

2010 ACCESSORIES & EQUIPMENT

Wipers and Washers - Equinox & Terrain

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Rear Window Wiper Arm Nut	8 N.m	71 lb in
Rear Window Wiper Motor Bolt	9 N.m	80 lb in
Windshield Wiper Arm Nut	24 N.m	18 lb ft
Windshield Wiper Motor Bolt	6 N.m	53 lb in
Windshield Wiper Motor Transmission 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 Washer Solvent Container Filler Neck Bolt	9 N.m	80 lb in

SCHEMATIC AND ROUTING DIAGRAMS

WIPER/WASHER SCHEMATICS

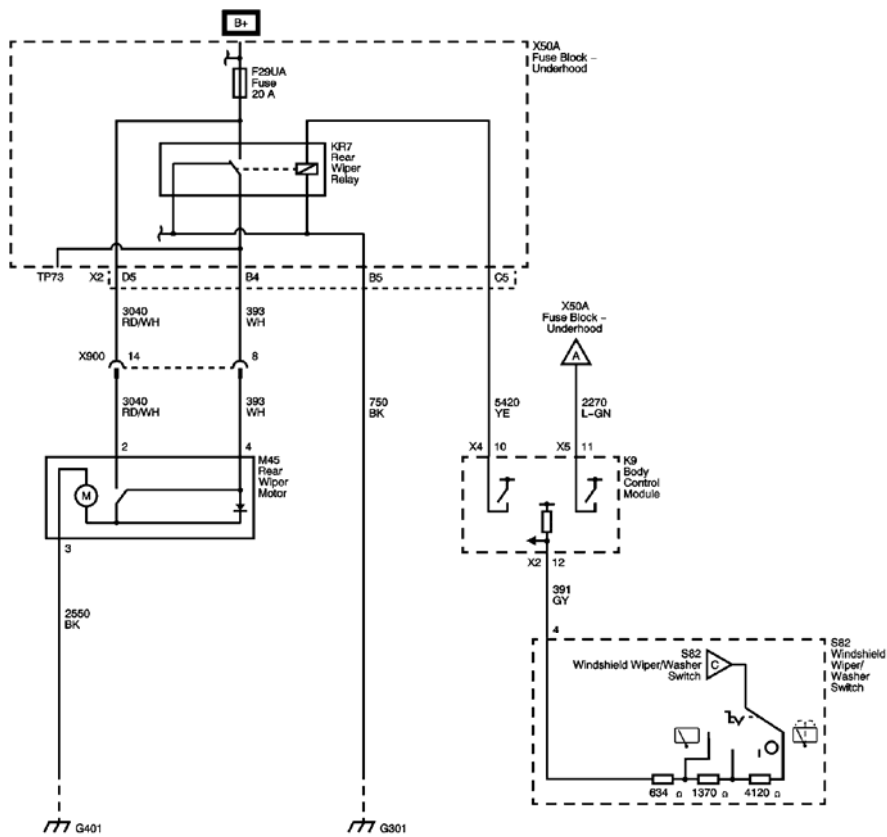


Fig. 2: Rear Window Wiper
 Courtesy of GENERAL MOTORS CORP.

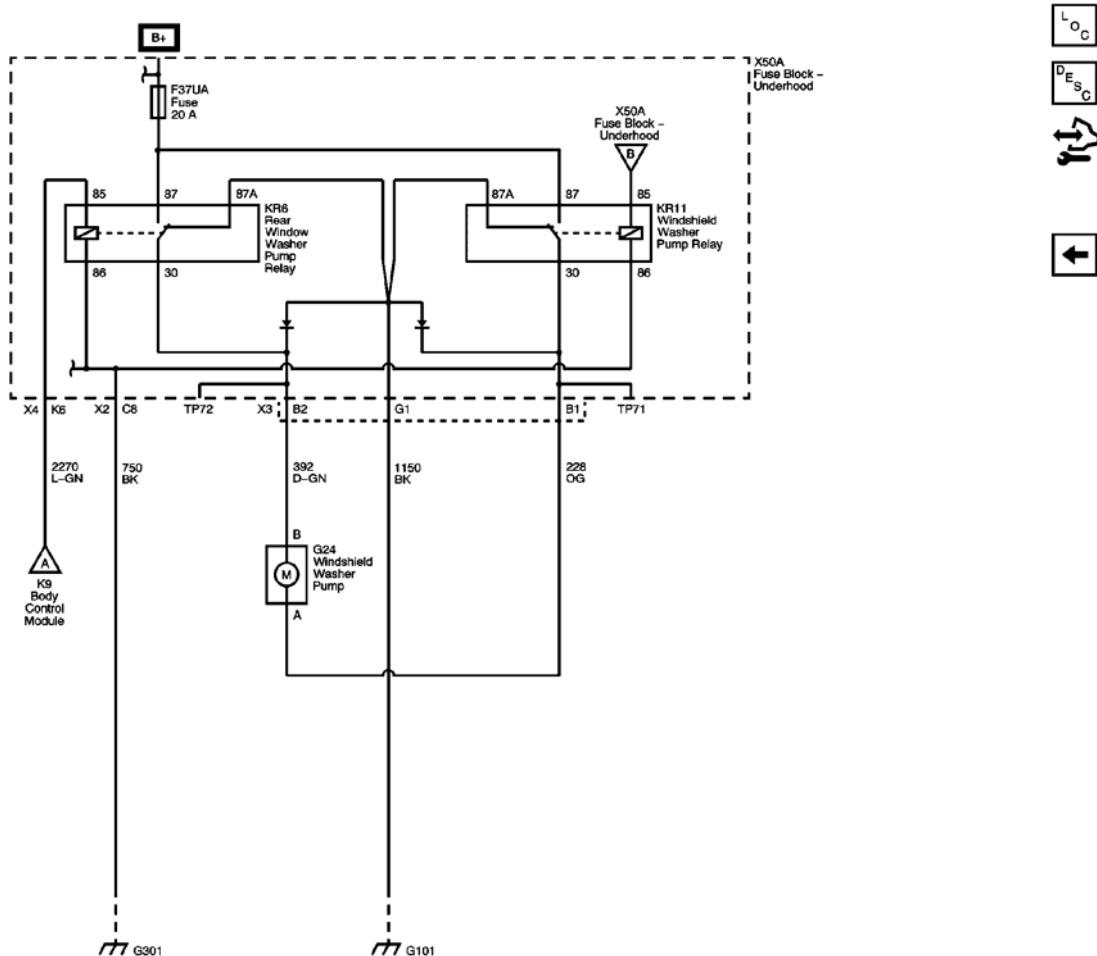


Fig. 3: Washer Pump
Courtesy of GENERAL MOTORS CORP.

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B370B	B370B 02: Rear Wiper Function Control Circuit Short to Ground
DTC B3715 or B3875	B3715 02: Windshield Wiper Relay Circuit Short to Ground B3875 02: Windshield Wiper High Speed Relay Circuit Short to Ground
DTC B3811	B3811 02: Rear Washer Relay Circuit Short to Ground
DTC B3873	B3873 02: Front Washer Relay Circuit Short to Ground

DTC B370B

Diagnostic Instructions

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

DTC Descriptor

DTC B370B 02

Rear Wiper Function Control Circuit Short to Ground

Diagnostic Fault Information

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

Circuit/System Description

The body control module (BCM) controls the single speed rear wiper motor by its active high output to the external rear wiper motor relay. When the BCM activates its 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 control input of the rear wiper motor. The motor then operates continuously at low speed.

Conditions for Running the DTC

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

Conditions for Setting the DTC

A short to ground is detected 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.

Reference Information

Schematic Reference

Wiper/Washer Schematics

Connector End View Reference

Component Connector End Views

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 diagnostic tester information.

Circuit/System Verification

Operate the rear wiper by using the S80 Window Wiper/Washer Switch in the continuous and the intermittent position. Verify the M45 Rear Wiper Motor activates.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector C at the X50A Fuse Block - Underhood.
2. Disconnect the harness connector X4 at the K9 Body Control Module.
3. Test for less than 5 ohms between the control circuit terminal 5 C at the X50A Fuse Block - Underhood and the control circuit terminal 10 X4 at the K9 Body Control Module.
 - If the value is not within the specified range, test the control circuit for a short to voltage or an open/high resistance.
 - If the circuit tests normal, test or replace the K9 Body Control Module.
4. Test for infinite resistance between the control circuit terminal 5 C at the X50A Fuse Block - Underhood and ground.
 - If the value is not within the specified range, test the control circuit for a short to ground.
5. If all circuits test normal, test or replace the X50A Fuse Block - Underhood.

Component Testing

Relay Test

1. Ignition OFF, disconnect the harness connector B at the X50A Fuse Block - Underhood.
2. Test for 60-200 ohms between control circuit terminal 5 C and ground circuit terminal 5 B.
 - If all circuits test normal, test or replace the X50A Fuse Block - Underhood.

Output Control Test

Connect all harness connectors, ignition ON, Command the Rear Wiper Relay Command On and OFF with a scan tool. Observe the KR7 Rear Window Wiper Relay clicks and the M45 Rear Wiper Motor runs.

- If the KR7 Rear Window Wiper Relay does not work, replace the X50A Fuse Block - Underhood.
- If the KR7 Rear Window Wiper Relay does work, but the M45 Rear Wiper Motor does not run, test the M45 Rear Wiper Motor ground and control circuit.
- If all circuits test normal, replace the M45 Rear Wiper Motor.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Control Module References** for BCM replacement, setup, and programming
- **Relay Replacement (Attached to Wire Harness)** or **Relay Replacement (Within an Electrical Center)**
- **Rear Window Wiper Motor Replacement (Equinox)** or **Rear Window Wiper Motor Replacement (Terrain)**

DTC B3715 OR B3875

Diagnostic Instructions

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

DTC Descriptors

DTC B3715 02

Windshield Wiper Relay Circuit Short to Ground

DTC B3875 02

Windshield Wiper High Speed Relay Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Windshield Wiper High Speed Relay B+	1, 2	1, 2	-	-
Windshield Wiper Switch Low Signal	1	1	1	-
Windshield Wiper Switch High Signal	4	2	2	-
Windshield Wiper Motor Park Switch Signal	3	3	-	-
Front Wiper Relay Control	B3715 02	1, 2	4	-
Windshield Wiper High Speed Relay Control	B3875 02	2	4	-
Windshield Wiper High Speed Relay Control	2	2	4	-
Front Wiper Motor Low Speed Control	1	1	4	-
Windshield Wiper Switch Low Reference	-	1, 2	1, 2	-
Windshield Wiper Motor Ground	-	1, 2, 3	-	-
Front Wiper Relay Ground	-	1	-	-
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 Body Control Module (BCM) controls the windshield wiper motor based on input from the windshield wiper/washer switch. The BCM monitors the wiper/washer switch through two separate signal circuits and a ground circuit. The windshield wiper switch high signal circuit is used to determine high speed wiper operation, the windshield wiper switch low signal is used to determine low speed, intermittent, and mist operation through the use of a resistor ladder, and windshield washer switch signal circuit is used to determine washer operation.

The BCM controls the windshield wiper motor through two output controls, controlling two relays which determine the desired wiper speed, high or low.

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

A short to ground is detected in the Front Wiper Relay control circuit or in the 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 Schematics

Connector End View Reference

Component Connector End Views

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 diagnostic tester information.

Circuit/System Verification

Ignition ON, S80 Window Wiper/Washer Switch in LOW position. Verify the front wipers are cycling at low speed.

Ignition ON, S80 Window Wiper/Washer Switch in the HIGH position. Verify the front wipers are cycling at high speed.

Circuit/System Testing

B3715

1. Ignition OFF, disconnect the KR12B Windshield Wiper Relay.

2. Test for less than 5 ohms between the ground circuit terminal 85 and ground
 - If greater than the specified range, test the ground circuit for an open/high resistance
3. Connect a test lamp between the control circuit terminal 86 and ground.
4. Ignition ON, command the low speed wipers ON and OFF using the wiper switch. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, test or replace the K9 Body Control Module.
 - If the test lamp is always OFF, test for a short to ground or an open/high resistance on the control circuit. If the circuit tests normal, test or replace the K9 Body Control Module.
5. Disconnect the harness connector X4 at the K9 Body Control Module. Test for infinite resistance between the control circuit terminal 16 X4 at the K9 Body Control Module and ground.
 - If the value is not within the specified range, test the control circuit for a short to ground.
6. If all circuits test normal, test or replace the KR12B Windshield Wiper Relay.

B3875

1. Ignition OFF, disconnect the KR12C Windshield Wiper Speed Control Relay.
2. Connect a test lamp between the control circuit terminal 86 and B+.
3. Ignition ON, command the high speed wipers ON and OFF using the S80 Window Wiper/Washer Switch. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to ground. If the circuit tests normal, test or replace the K9 Body Control Module.
 - If the test lamp is always OFF, test for a short to voltage or an open/high resistance on the control circuit. If the circuit tests normal, test or replace the K9 Body Control Module.
4. Disconnect the harness connector X5 at the K9 Body Control Module. Test for infinite resistance between the control circuit terminal 24 X5 at the K9 Body Control Module and ground.
 - If the value is not within the specified range, test the control circuit for a short to ground.
5. If all circuits test normal, test or replace the KR12C Windshield Wiper Speed Control Relay.

Component Testing

B3715 - Relay Test

1. Ignition OFF, disconnect the KR12B Windshield Wiper Relay.
2. Test for 60-200 ohms between terminals 85 and 86.
 - If the resistance is not within the specified range, replace the KR12B Windshield Wiper Relay.
3. Test for infinite resistance between the following terminals:
 - 30 and 86
 - 30 and 87
 - 30 and 85
 - 85 and 87

- If not the specified value, replace the KR12B Windshield Wiper Relay.
- 4. Test for less than 5 ohms between terminals 30 and 87A.
 - If greater than the specified value, replace the KR12B Windshield Wiper Relay.
- 5. Install a 10A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground. Test for less than 5 ohms between terminals 30 and 87.
 - If greater than the specified range, replace the KR12B Windshield Wiper Relay.

B3875 - Relay Test

1. Ignition OFF, disconnect the KR12C Windshield Wiper Speed Control Relay.
2. Test for 60-200 ohms between terminals 85 and 86.
 - If the resistance is not within the specified range, replace the KR12C Windshield Wiper Speed Control Relay.
3. Test for infinite resistance between the following terminals:
 - 30 and 86
 - 30 and 87
 - 30 and 85
 - 85 and 87
 - If not the specified value, replace the KR12C Windshield Wiper Speed Control Relay.
4. Test for less than 5 ohms between terminals 30 and 87A.
 - If greater than the specified value, replace the KR12C Windshield Wiper Speed Control Relay.
5. Install a 10A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground. Test for less than 5 ohms between terminals 30 and 87.
 - If greater than the specified value, replace the KR12C Windshield Wiper Speed Control Relay.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Control Module References** for BCM replacement, setup, and programming.
- **Relay Replacement (Attached to Wire Harness)** or **Relay Replacement (Within an Electrical Center)**

DTC B3811

Diagnostic Instructions

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

DTC Descriptor

DTC B3811 02

Rear Washer Relay Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Rear Washer Relay Switch Ignition	1	1	-	-
Rear Washer Switch Signal	2	1	1	-
Rear Washer Relay Control	B3811 02	1	2	-
Rear Washer Fluid Pump Control	1	1	2	-
Rear Washer Relay Coil Ground	1	1	1	-
Rear Washer Relay Switch Ground	-	1	1	-
Rear Washer Fluid Pump Ground	-	1	1, 2	-
1. Rear Washer Inoperative 2. Rear Washer Always ON				

Circuit/System Description

Rear Washer

When the body control module (BCM) detects that the rear wiper/wash switch has activated the momentary wash switch, it activates a high side drive output which supplies battery to the coil of the rear washer pump relay. This energizes the relay, which switches battery power to the washer pump motor. The BCM will also activate continuous low speed windshield wipers as described above. This washer and wiper operation shall be continued so long as the switch remains active. Upon termination the rear wash motor will be deactivated and the wiper shall move to its park position and deactivate.

Conditions for Running the DTC

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

Conditions for Setting the DTC

A short to ground is detected in the rear washer 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.
- A history DTC will clear after 50 consecutive ignition cycles without a fault present.

Reference Information

Schematic Reference

Wiper/Washer Schematics

Connector End View Reference

Component Connector End Views

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

Operate the washers using the S80 Window Wiper/Washer Switch. Verify the G24 Windshield Washer Pump activates.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the X50A Fuse Block - Underhood.
2. Disconnect the harness connector X5 at the K9 Body Control Module.
3. Test for less than 5 ohms between the control circuit terminal 6 K at the X50A Fuse Block - Underhood and the control circuit terminal 11 X5 at the K9 Body Control Module.
 - If the value is not within the specified range, test the control circuit for a short to voltage or an open/high resistance.
 - If the circuit tests normal, test or replace the K9 Body Control Module.
4. Test for infinite resistance between the control circuit terminal 6 K at the X50A Fuse Block - Underhood and ground.
 - If the value is not within the specified range, test the control circuit for a short to ground.
5. If all circuits test normal, test or replace the X50A Fuse Block - Underhood.

Component Testing

Relay Test

- 1. Ignition OFF, disconnect the harness connector B at the X50A Fuse Block - Underhood.
- 2. Test for 60-200 ohms between control circuit terminal K 6 and ground circuit terminal C 8.
 - o If all circuits test normal, test or replace the X50A Fuse Block - Underhood.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Control Module References** for BCM replacement, setup, and programming
- **Windshield Washer Pump Replacement (Equinox)** or **Windshield Washer Pump Replacement (Terrain)**

DTC B3873

Diagnostic Instructions

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

DTC Descriptor

DTC B3873 02

Front Washer Relay Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Windshield Washer Relay Switch Ignition	1	1	-	-
Windshield Washer Switch Signal	2	1	1	-
Windshield Washer Fluid Pump Control	1	1	2	-
Windshield Washer Relay Control	B3873 02	1	2	-
Windshield Washer Relay Coil Ground	-	1	1	-
Windshield Washer Relay Switch Ground	-	1	1	-
Windshield Washer Fluid Pump Ground	-	1	-	-
1. Front Washer Inoperative				

2. Front Washer Always ON

Circuit/System Description

The body control module (BCM) controls the windshield washer fluid pump based on an input from the window wiper/washer switch. The BCM monitors the washer switch through the windshield washer switch signal circuit. When the wash switch is closed, ground is supplied to the front washer switch signal circuit. When this is the case, the BCM will command the windshield washer fluid pump and the low speed wipers on.

Conditions for Running the DTC

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

Conditions for Setting the DTC

A short to ground is detected in the windshield washer 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 Schematics

Connector End View Reference

Component Connector End Views

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

Operate the front washers using the S80 Window Wiper/Washer Switch. Verify the G24 Windshield Washer Pump activates.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the X50A Fuse Block - Underhood.
2. Disconnect the harness connector X4 at the K9 Body Control Module.
3. Test for less than 5 ohms between the control circuit terminal 4 K at the X50A Fuse Block - Underhood and the control circuit terminal 14 X4 at the K9 Body Control Module.
 - If the value is not within the specified range, test the control circuit for a short to voltage or an open/high resistance.
 - If the circuit tests normal, test or replace the K9 Body Control Module.
4. Test for infinite resistance between the control circuit terminal 4 K at the X50A Fuse Block - Underhood and ground.
 - If the value is not within the specified range, test the control circuit for a short to ground.
5. If all circuits test normal, test or replace the X50A Fuse Block - Underhood.

Component Testing

Relay Test

1. Ignition OFF, disconnect the harness connector B at the X50A Fuse Block - Underhood.
2. Test for 60-200 ohms between control circuit terminal K 4 and ground circuit terminal C 8.
 - If all circuits test normal, test or replace the X50A Fuse Block - Underhood.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Control Module References** for BCM replacement, setup, and programming
- **Windshield Washer Pump Replacement (Equinox)** or **Windshield Washer Pump Replacement (Terrain)**

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**
- **Rear Wiper System Malfunction**
- **Rear Washer System 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.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Windshield Wiper High Speed Relay B+	1, 2	1, 2	-	-
Windshield Wiper Switch Low Signal	1	1	1	-
Windshield Wiper Switch High Signal	4	2	2	-
Windshield Wiper Motor Park Switch	3	3	-	-

Signal				
Front Wiper Relay Control	B3715 02	1, 2	4	-
Windshield Wiper High Speed Relay Control	B3875 02	2	4	-
Windshield Wiper High Speed Relay Control	2	2	4	-
Front Wiper Motor Low Speed Control	1	1	4	-
Windshield Wiper Switch Low Reference	-	1, 2	1, 2	-
Windshield Wiper Motor Ground	-	1, 2, 3	-	-
Front Wiper Relay Ground	-	1	-	-
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 body control module (BCM) controls the wiper motor based on input from the windshield wiper/washer switch. The BCM monitors the wiper/washer switch through 2 separate signal circuits and a ground circuit. The windshield wiper switch high signal circuit is used to determine high speed wiper operation, the windshield wiper switch low signal is used to determine low speed, intermittent, and mist operation through the use of a resistor ladder, and the windshield washer switch signal circuit is used to determine washer operation.

The BCM controls the windshield wiper motor through 2 output controls, controlling 2 relays which determine the desired wiper speed, high or low.

Reference Information

Schematic Reference

Wiper/Washer Schematics

Connector End View Reference

Component Connector End Views

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, wiper switch in the OFF position, verify the scan tool Windshield Washer Switch parameter is Inactive.
 - If not the specified value, refer to **Washer Malfunction**.
2. Wiper switch in the OFF position, verify the scan tool Windshield Wiper Switch parameter is Off.
 - If not the specified value, refer to Multifunction Switch Malfunction.
3. Wiper switch in the OFF position, verify the scan tool Wiper High Speed Switch parameter is Inactive.
 - If not the specified value, refer to Multifunction Switch Malfunction.
4. Wiper switch in the LOW position, verify the scan tool Windshield Wiper Switch parameter is Low.
 - If not the specified value, refer to Multifunction Switch Malfunction.
5. Wiper switch in the HIGH position, verify the scan tool Wiper High Speed Switch parameter is Active.
 - If not the specified value, refer to Multifunction Switch Malfunction.
6. Wiper switch in the INT position, verify the scan tool Windshield Wiper Switch parameter is Intermittent.
 - If not the specified value, test or replace the multifunction switch.
7. Wiper switch in the INT position, observe the scan tool Wiper Delay Setting parameter while cycling the delay adjustment switch from long delay to short delay. The parameter should cycle between D1 and D5 as each delay position is selected.
 - If not the specified value, test or replace the multifunction switch.
8. Wiper switch in the LOW position, verify the windshield wipers are cycling at the low speed.
 - If the wipers are not operating at the low speed, refer to Windshield Wiper Motor Malfunction.
9. Wiper switch in the HIGH position, verify the windshield wipers are cycling at the high speed.
 - If the wipers are not operating at the high speed, refer to Windshield Wiper Motor Malfunction.
10. Wiper switch in the INT position, cycling the delay adjustment switch from long delay to short delay. Verify the wiper delay time decreases from long delay to short delay as each delay position is selected.
 - If the delay does not change as specified, refer to Windshield Wiper Motor Malfunction.

Circuit/System Testing

Wiper/Washer Switch Malfunction

1. Ignition OFF, disconnect the X1 harness connector at the S80 Window Wiper/Washer Switch.
2. Retained Accessory Power off, remove Scan Tool, wait 1 minute.
3. Test for less than 5 ohms between the ground circuit terminal 2 and ground.

- If greater than the specified value, test the ground circuit for an open/high resistance. If the circuit tests normal, replace the K9 Body Control Module.
- 4. Disconnect the harness connector X3 at the K9 Body Control Module.
- 5. Install a test lamp between ground and the terminals listed below:
 - Low reference circuit terminal 10 X3 and ground
 - Signal circuit terminal 13 X3 and ground
 - Signal circuit terminal 20 X3 and ground
- 6. Verify, the test lamp does not illuminate.
 - If the test lamp illuminates, test the circuits for a short to voltage.
- 7. Test for infinite resistance between the low reference circuit terminal 10 X3 and signal circuit terminals and ground listed below:
 - Low reference circuit terminal 10 X3 and ground
 - Signal circuit terminal 13 X3 and ground
 - Signal circuit terminal 20 X3 and ground
 - If less than the specified value, test the circuits for a short to ground or a short to voltage.
- 8. Test for less than 5 ohms between the terminals listed below:
 - Low reference circuit terminal 10 X3 at the K9 Body Control Module and 2 X1 at the S80 Window Wiper/Washer Switch
 - Signal circuit terminal 13 X3 at the K9 Body Control Module and 3 X1 at the S80 Window Wiper/Washer Switch
 - Signal circuit terminal 20 X3 at the K9 Body Control Module and 1 X1 at the S80 Window Wiper/Washer Switch
 - If greater than the specified value, test the circuit for an open/high resistance.
- 9. If all circuits test normal, test or replace the S80 Window Wiper/Washer Switch.

Windshield Wiper Motor Malfunction

1. Ignition OFF, disconnect KR12B Windshield Wiper Relay.
2. Test for less than 5 ohms between the ground circuit terminal 85 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Test for less than 5 ohms between the ground circuit terminal 87A and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
4. Ignition ON, verify a test lamp illuminates between the B+ circuit terminal 87A and ground.
 - If the test lamp does not illuminate, test or replace the underhood fuse block.
5. Install a test lamp between the control circuit terminal 86 and the ground circuit terminal 85.
6. Using the S80 Window Wiper/Washer Switch, command the low speed wipers ON and OFF. The test lamp should turn ON and OFF as commanded.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, test or replace the K9 Body Control Module.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high

resistance. If the circuit tests normal, test or replace the K9 Body Control Module.

7. Ignition OFF, disconnect the KR12C Windshield Wiper Speed Control Relay.
8. Test for less than 5 ohms between the control circuit terminal 30 at the KR12B Windshield Wiper Relay socket and the control circuit terminal 30 at the KR12C Windshield Wiper Speed Control Relay socket.
 - If greater than the specified range, replace the underhood fuse block.
9. Connect the KR12B Windshield Wiper Relay.
10. Test for less than 5 ohms between the control circuit terminal 30 from the KR12C Windshield Wiper Speed Control Relay socket and ground.
 - If greater than the specified range, test or replace the KR12B Windshield Wiper Relay.
11. Ignition ON, verify a test lamp illuminates between the B+ circuit terminal 85 from the KR12C Windshield Wiper Speed Control Relay socket and ground.
 - If the test lamp does not illuminate, test or replace the underhood fuse block.
12. Install a test lamp between the control circuit terminal 30 from the KR12C Windshield Wiper Speed Control Relay socket and ground.
13. Using the S80 Window Wiper/Washer Switch, command the low speed wipers ON. The test lamp should illuminate.
 - If the test lamp does not illuminate, replace the KR12B Windshield Wiper Relay.
14. Install a test lamp between the B+ circuit terminal 85 from the KR12C Windshield Wiper Speed Control Relay socket and the control circuit terminal 86 from the KR12C Windshield Wiper Speed Control Relay socket.
15. Using the S80 Window Wiper/Washer Switch, command the high speed wipers ON and OFF. The test lamp should turn ON and OFF as commanded.
 - If the test lamp is always ON, test the control circuit for a short to ground. If the circuit tests normal, replace the K9 Body Control Module.
 - If the test lamp is always OFF, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 Body Control Module.
16. Ignition OFF, connect the KR12C Windshield Wiper Speed Control Relay. Disconnect the harness connector X1 at the M75 Windshield Wiper Motor.
17. Test for less than 5 ohms between the ground circuit terminal C and ground.
 - If greater than the specified value, test the ground circuit for an open/high resistance.
18. Connect a test lamp between the control circuit terminal E and ground.
19. Using the S80 Window Wiper/Washer Switch, command the low speed wipers ON and OFF. The test lamp should turn ON and OFF as commanded.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, test or replace the KR12C Windshield Wiper Speed Control Relay.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, test or replace the KR12C Windshield Wiper Speed Control Relay.
20. Connect a test lamp between the control circuit terminal D and ground.
21. Using the S80 Window Wiper/Washer Switch, command the high speed wipers ON and OFF. The test lamp should turn ON and OFF as commanded.

- If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, test or replace the KR12C Windshield Wiper Speed Control Relay.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, test or replace the KR12C Windshield Wiper Speed Control Relay.
22. Ignition ON, wipers OFF, test for greater than 11 V between the signal circuit terminal B and ground.
- If less than 11 V, test the signal circuit for a short to ground or an open high resistance. If the circuit tests normal, replace the K9 Body Control Module.
23. If all circuits test normal, test or replace the M75 Windshield Wiper Motor.

Component Testing

Multifunction Switch - Static Test

1. Disconnect the harness connector at the S80 Window Wiper/Washer Switch.
2. With the S80 Window Wiper/Washer Switch in the HIGH position, test for less than 5 ohms between the terminal 2 and the signal terminal 1.
 - If greater than the specified value, replace the S80 Window Wiper/Washer Switch.
3. While cycling the S80 Window Wiper/Washer Switch through each delay and speed position, test for the specified resistance between the low reference terminal 2 and the signal terminal 3.

NOTE: If the switch tests open in any switch position other than OFF, test the signal circuits for a short to voltage before replacing the switch.

Wiper Switch Values

Switch Position	Resistance
Off	Infinite
Mist	300-364 ohms
Delay 1	3.70-4.10 kohms
Delay 2	2.60-3.20 kohms
Delay 3	1.80-2.20 kohms
Delay 4	1.10-1.50 kohms
Delay 5	650-1 000 ohms
Low	300-364 ohms
High	300-364 ohms

- If any switch position is not within the specified range, replace the S80 Window Wiper/Washer Switch.

Dynamic Test

1. Ignition OFF, disconnect the harness connector at the M75 Windshield Wiper Motor.
2. Install a 25 A fused jumper wire between the control terminal E and 12 V. Install a jumper wire between the ground terminal C and ground.

3. Verify the M75 Windshield Wiper Motor is operating in the low speed mode.
 - If the M75 Windshield Wiper Motor is not in the low speed mode, replace the M75 Windshield Wiper Motor.
4. Install a 25 A fused jumper wire between the control terminal D and 12 V. Install a jumper wire between the ground terminal C and ground.
5. Verify the M75 Windshield Wiper Motor is operating in the high speed mode.
 - If the M75 Windshield Wiper Motor is not in the high speed mode, replace the M75 Windshield Wiper Motor.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Windshield Wiper Motor Replacement (Equinox Terrain)**
- **Relay Replacement (Attached to Wire Harness)** or **Relay Replacement (Within an Electrical Center)**
- **Windshield Wiper and Washer Switch Replacement**
- **Control Module References** for BCM replacement, setup, and programming

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.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Windshield Washer Relay Switch Ignition	1	1	-	-
Windshield Washer Switch Signal	2	1	1	-
Windshield Washer Fluid Pump Control	1	1	2	-
Windshield Washer Relay Control	B3873 02	1	2	-
Windshield Washer Relay Coil Ground	-	1	1	-
Windshield Washer Relay Switch Ground	-	1	1	-
Windshield Washer Fluid Pump Ground	-	1	-	-
1. Front Washer Inoperative				

2. Front Washer Always ON

Circuit/System Description

The body control module (BCM) controls the windshield washer fluid pump based on an input from the wiper/washer switch. The BCM monitors the washer switch through the windshield washer switch signal circuit. When the wash switch is closed, ground is supplied to the windshield washer switch signal circuit. When this is the case, the BCM will command the windshield washer fluid pump and the low speed wipers on.

Reference Information

Schematic Reference

Wiper/Washer Schematics

Connector End View Reference

Component Connector End Views

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

Operate the front washers by using the S80 Window Wiper/Washer Switch. Verify the G24 Windshield Washer Pump activates.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the X50A Fuse Block - Underhood.
2. Disconnect the harness connector X4 at the K9 Body Control Module.
3. Test for less than 5 ohms between the control circuit terminal 4 K at the X50A Fuse Block - Underhood and the control circuit terminal 14 X4 at the K9 Body Control Module.
 - If the value is not within the specified range, test the control circuit for a short to voltage or an

open/high resistance.

- If the circuit tests normal, test or replace the K9 Body Control Module.
4. Test for infinite resistance between the control circuit terminal 4 K at the X50A Fuse Block - Underhood and ground.
 - If the value is not within the specified range, test the control circuit for a short to ground.
 5. Test for less than 5 ohms between the ground circuit terminal G 1 at the X50A Fuse Block - Underhood and ground.
 - If the value is not within the specified range, test the ground circuit for a short to voltage or an open/high resistance.
 6. If all circuits test normal, test or replace the X50A Fuse Block - Underhood.
 7. Disconnect the harness connector X3 at the K9 Body Control Module and the harness connector X1 at the S80 Window Wiper/Washer Switch.
 8. Test for less than 5 ohms between the signal circuit terminal 25 X3 at the K9 Body Control Module and the signal circuit terminal 5 X1 at the S80 Window Wiper/Washer Switch.
 - If the value is not within the specified range, test the signal circuit for a short to voltage or an open/high resistance.
 9. Test for infinite resistance between the signal circuit terminal 25 X3 at the K9 Body Control Module and ground.
 - If the value is not within the specified range, test the control circuit for a short to ground.
 - If the circuit tests normal, test or replace the S80 Window Wiper/Washer Switch.
 10. Connect all connectors.
 11. Disconnect the harness connector X1 at the G24 Windshield Washer Pump.
 12. Test for less than 5 ohms between the ground circuit terminal B X1 at the G24 Windshield Washer Pump and ground.
 - If the value is not within the specified range, test the ground circuit for a short to voltage or an open/high resistance.
 - If the circuit tests normal, test or replace the K9 Body Control Module.
 13. Install a test lamp between the control circuit terminal A X1 at the G24 Windshield Washer Pump and the ground circuit terminal B X1 at the G24 Windshield Washer Pump.
 14. Ignition ON, activate the front washer by using the S80 Window Wiper/Washer Switch. The test lamp should turn ON.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open.
 - If the test lamp is always ON, test the control circuit for a short to voltage.
 15. If all circuits test normal, test or replace the G24 Windshield Washer Pump.

Component Testing

Multifunction Switch - Static Test

1. Ignition OFF, remove the S80 Window Wiper/Washer Switch.
2. Test for less than 5 ohms between ground terminal 2 and 5 at the S80 Window Wiper/Washer Switch while activating the front wash switch.

- If the resistance is not within the specified range, replace the S80 Window Wiper/Washer Switch.

Washer Pump - Dynamic Test

1. Ignition OFF, disconnect the harness connector at the G24 Windshield Washer Pump.
2. Install a 10 A fused jumper wire between the control terminal A and 12 V. Install a jumper wire between the ground terminal B and ground.
3. Verify the G24 Windshield Washer Pump is activated.
 - If the G24 Windshield Washer Pump does not activate, replace the G24 Windshield Washer Pump.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Control Module References** for BCM replacement, setup, and programming
- **Windshield Wiper and Washer Switch Replacement**
- **Windshield Washer Pump Replacement (Equinox)** or **Windshield Washer Pump Replacement (Terrain)**

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.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

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

Circuit/System Description

The body control module (BCM) controls the single speed rear wiper motor by its active high output to the external rear wiper motor relay. When the BCM activates its 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 control input of the rear wiper motor. The motor then operates continuously at low speed.

Diagnostic Aids

Verify the Trunk/Liftgate is closed during Circuit/System Verification.

Reference Information

Schematic Reference

Wiper/Washer Schematics

Connector End View Reference

Component Connector End Views

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, observe the scan tool Internal Trunk/Liftgate Switch parameter while pressing the open switch on the mode/release switch. The reading should change between Active and Inactive.
 - If not the specified value, refer to Liftgate Release Malfunction (Power) or Liftgate Release Malfunction (Manual) .
2. Verify the front wipers operate in all modes.
 - If the front wipers do not operate in all modes, refer to Windshield Wiper System Malfunction.
3. Press and release the rear window washer switch. The rear window wiper motor and pump should operate continuously for as long as the wash switch is pressed and several wipe cycles will occur after the switch is released.
 - If the rear wiper motor and the rear washer pump are inoperative, refer to Multifunction Switch Circuit Test.
 - If the rear washer pump operates normal and the rear wiper motor is inoperative, refer to the Rear Wiper Motor Circuit Malfunction.
 - If the rear wiper motor operates and the rear washer pump is inoperative, refer to Rear Washer

System Malfunction.

Circuit/System Testing

Multifunction Switch Circuit Malfunction

1. Ignition OFF, disconnect the harness connector X1 at the S80 Window Wiper/Washer Switch.
2. Test for less than 5 ohms between the ground circuit terminal 2 and ground.
 - If greater than the specified value, test the ground circuit for an open/high resistance and a short to voltage. If the circuit tests normal, replace the K9 BCM.
3. Disconnect the harness connector X2 at the K9 BCM.
4. Test for less than 5 ohms between the signal circuit terminal 4 X1 at the S80 Window Wiper/Washer Switch harness connector and the X2 harness connector terminal 12 at the K9 BCM.
 - If greater than the specified value, test the signal circuit for an open/high resistance and a short to voltage.
5. Test for infinite resistance between the control circuit terminal 4 X1 at the S80 Window Wiper/Washer Switch harness connector and ground.
 - If the value is not within the specified range, test the control circuit for a short to ground.
6. If all circuits test normal, replace the S80 Window Wiper/Washer Switch.

Rear Wiper Motor Circuit Malfunction

1. Ignition OFF, disconnect the harness connector at the M45 Rear Wiper Motor.
2. Test for less than 5 ohms between the ground circuit terminal 3 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Test for less than 5 ohms between the control circuit terminal 4 and ground.
 - If greater than the specified range, test the control circuit for an open/high resistance.
4. Verify a test lamp illuminates between the B+ circuit terminal 2 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for an open/high resistance and a short to ground.
 - If all circuits test normal, replace the X50A Fuse Block - Underhood.
5. Install a test lamp between the control circuit terminal 4 and the ground circuit terminal 3.
6. Using the S80 Window Wiper/Washer Switch, command the rear wiper ON and OFF. The test lamp should turn ON and OFF as commanded. Observe this in the switch position continuous and intermittent.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, test or replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, test or replace the K9 BCM.
7. If all circuits test normal, test or replace the X50A Fuse Block - Underhood.

Component Testing

Relay Test

1. Ignition OFF, disconnect the harness connector B at the X50A Fuse Block - Underhood.
2. Test for 60-200 ohms between control circuit terminal 5 C and ground circuit terminal 5 B.
 - If all circuits test normal, test or replace the X50A Fuse Block - Underhood.

Dynamic Test

1. Ignition OFF, disconnect the harness connector at the M45 Rear Wiper Motor.
2. Install a 25 A fused jumper wire between the control terminal 4 and 12 V. Install a jumper wire between the ground terminal 3 and ground.
3. Verify the M45 Rear Wiper Motor is operating.
 - If the M45 Rear Wiper Motor is not operating, replace the M45 Rear Wiper Motor.

Static Test

1. Ignition OFF, remove the S80 Window Wiper/Washer Switch.
2. Test for 580-730 ohms between the signal terminals 2 and 4 at the S80 Window Wiper/Washer Switch in the Low position.
 - If the resistance is not within the specified range, replace the S80 Window Wiper/Washer Switch.
3. Test for 1.80-2.20 kohms between the signal terminals 2 and 4 at the S80 Window Wiper/Washer Switch in the intermittent position.
 - If the resistance is not within the specified range, replace the S80 Window Wiper/Washer Switch.

NOTE: If the switch tests open in any switch position other than OFF, test the signal circuits for a short to voltage before replacing the switch.

Rear Wiper Switch Values

Switch Position	Resistance
Off	Infinite
Wash	5.90-6.30 kohms
Int	1.80-2.20 kohms
Low	580-730 ohms

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Relay Replacement (Attached to Wire Harness)** or **Relay Replacement (Within an Electrical Center)**
- **Rear Window Wiper Motor Replacement (Equinox)** or **Rear Window Wiper Motor Replacement (Terrain)**
- **Windshield Wiper and Washer Switch Replacement**

- **Control Module References** for BCM replacement, setup, and programming

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.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Rear Washer Relay Switch Ignition	1	1	-	-
Rear Washer Switch Signal	2	1	1	-
Rear Washer Relay Control	B3811 02	1	2	-
Rear Washer Fluid Pump Control	1	1	2	-
Rear Washer Relay Coil Ground	1	1	1	-
Rear Washer Relay Switch Ground	-	1	1	-
Rear Washer Fluid Pump Ground	-	1	1, 2	-
1. Rear Washer Inoperative 2. Rear Washer Always ON				

Circuit/System Description

When the body control module (BCM) detects that the rear wiper/wash switch has activated the momentary wash switch, it activates a high side drive output which supplies battery to the coil of the rear washer pump relay. This energizes the relay, which switches battery power to the washer pump motor. The BCM will also activate continuous low speed windshield wipers as described above. This washer and wiper operation shall be continued so long as the switch remains active. Upon termination the rear wash motor will be deactivated and the wiper shall move to its park position and deactivate.

Reference Information

Schematic Reference

Wiper/Washer Schematics

Connector End View Reference

Component Connector End Views

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

Operate the rear washers by using the S80 Window Wiper/Washer Switch. Verify the G24 Windshield Washer Pump activates.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the X50A Fuse Block - Underhood.
2. Disconnect the harness connector X5 at the K9 Body Control Module.
3. Test for less than 5 ohms between the control circuit terminal 6 K at the X50A Fuse Block - Underhood and the control circuit terminal 11 X5 at the K9 Body Control Module.
 - If the value is not within the specified range, test the control circuit for a short to voltage or an open/high resistance.
 - If the circuit tests normal, test or replace the K9 Body Control Module.
4. Test for infinite resistance between the control circuit terminal 6 K at the X50A Fuse Block - Underhood and ground.
 - If the value is not within the specified range, test the control circuit for a short to ground.
5. Test for less than 5 ohms between the ground circuit terminal G 1 at the X50A Fuse Block - Underhood and ground.
 - If the value is not within the specified range, test the ground circuit for a short to voltage or an open/high resistance.
6. If all circuits test normal, test or replace the X50A Fuse Block - Underhood.
7. Disconnect the harness connector X2 at the K9 Body Control Module and the harness connector X1 at the S80 Window Wiper/Washer Switch.
8. Test for less than 5 ohms between the signal circuit terminal 12 X2 at the K9 Body Control Module and the signal circuit terminal 4 X1 at the S80 Window Wiper/Washer Switch.
 - If the value is not within the specified range, test the signal circuit for a short to voltage or an open/high resistance.
9. Test for infinite resistance between the signal circuit terminal 12 X2 at the K9 Body Control Module and ground.

- If the value is not within the specified range, test the control circuit for a short to ground.
 - If the circuit tests normal, test or replace the S80 Window Wiper/Washer Switch.
10. Connect all connectors.
 11. Disconnect the harness connector X1 at the G24 Windshield Washer Pump.
 12. Test for less than 5 ohms between the ground circuit terminal A X1 at the G24 Windshield Washer Pump and ground.
 - If the value is not within the specified range, test the ground circuit for a short to voltage or an open/high resistance.
 - If the circuit tests normal, test or replace the K9 Body Control Module.
 13. Install a test lamp between the control circuit terminal B X1 at the G24 Windshield Washer Pump and the ground circuit terminal A X1 at the G24 Windshield Washer Pump.
 14. Ignition ON, activate the rear washer by using the S80 Window Wiper/Washer Switch. The test lamp should turn ON.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open.
 - If the test lamp is always ON, test the control circuit for a short to voltage.
 15. If all circuits test normal, test or replace the G24 Windshield Washer Pump.

Component Testing

Multifunction Switch - Static Test

1. Ignition OFF, remove the S80 Window Wiper/Washer Switch.
2. Test for 5.90-6.30 kohms between signal terminal 2 and 4 at the S80 Window Wiper/Washer Switch while activating the rear wash switch.
 - If the resistance is not within the specified range, replace the S80 Window Wiper/Washer Switch.

Washer Pump - Dynamic Test

1. Ignition OFF, disconnect the harness connector at the G24 Windshield Washer Pump.
2. Install a 10 A fused jumper wire between the control terminal B and 12 V. Install a jumper wire between the ground terminal A and ground.
3. Verify the G24 Windshield Washer Pump is activated.
 - If the G24 Windshield Washer Pump does not activate, replace the G24 Windshield Washer Pump.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Control Module References** for BCM replacement, setup, and programming
- **Windshield Washer Pump Replacement (Equinox)** or **Windshield Washer Pump Replacement (Terrain)**
- **Windshield Wiper and Washer Switch Replacement**

REPAIR INSTRUCTIONS

WINDSHIELD WIPER AND WASHER SWITCH REPLACEMENT

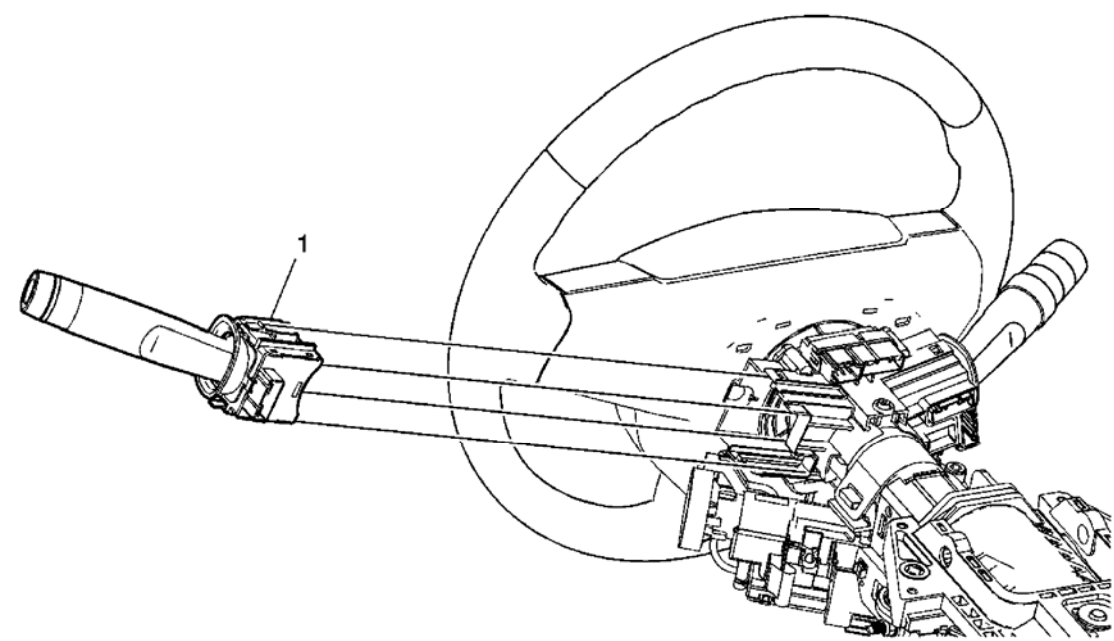


Fig. 4: Windshield Wiper and Washer Switch
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the steering column shroud. Refer to Steering Column Shroud Replacement .	
1	Windshield Wiper and Washer Switch Procedure 1. Disconnect any electrical connectors as needed. 2. Release the plastic retaining tabs and remove the windshield wiper and washer switch from the turn signal switch bracket.

WINDSHIELD WASHER NOZZLE HOSE REPLACEMENT (EQUINOX)

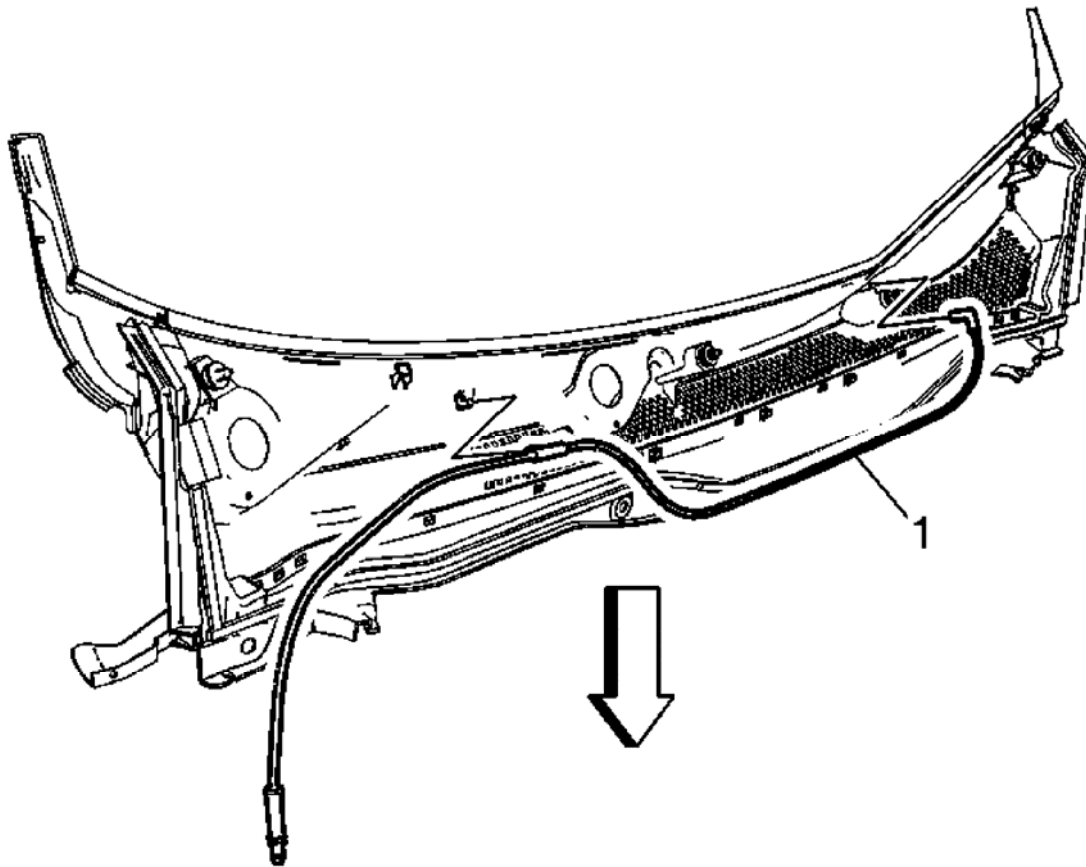


Fig. 5: Windshield Washer Nozzle Hose (Equinox)
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the air inlet screen. Refer to <u>Air Inlet Screen Replacement (Equinox)</u> or <u>Air Inlet Screen Replacement (Terrain)</u> .	
1	Windshield Washer Nozzle Hose Assembly Procedure 1. Detach both hose connections from the windshield washer nozzles. 2. Detach the washer nozzle hose from the integral clips on the bottom side of the air inlet screen. 3. Remove the windshield washer nozzle hose.

WINDSHIELD WASHER NOZZLE HOSE REPLACEMENT (TERRAIN)

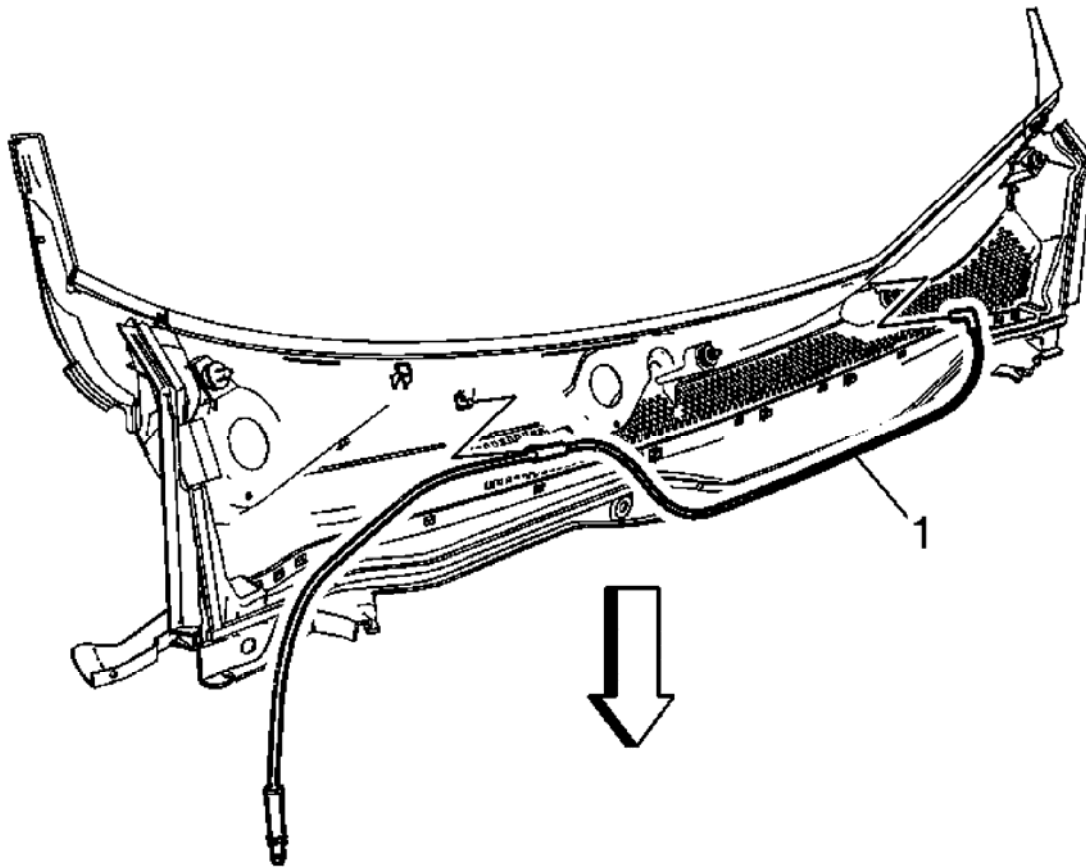


Fig. 6: Windshield Washer Nozzle Hose (Terrain)
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the air inlet screen. Refer to <u>Air Inlet Screen Replacement (Equinox)</u> or <u>Air Inlet Screen Replacement (Terrain)</u> .	
1	Windshield Washer Nozzle Hose Assembly Procedure 1. Detach both hose connections from the windshield washer nozzles. 2. Detach the washer nozzle hose from the integral clips on the bottom side of the air inlet screen. 3. Remove the windshield washer nozzle hose.

WINDSHIELD WASHER NOZZLE REPLACEMENT (EQUINOX)

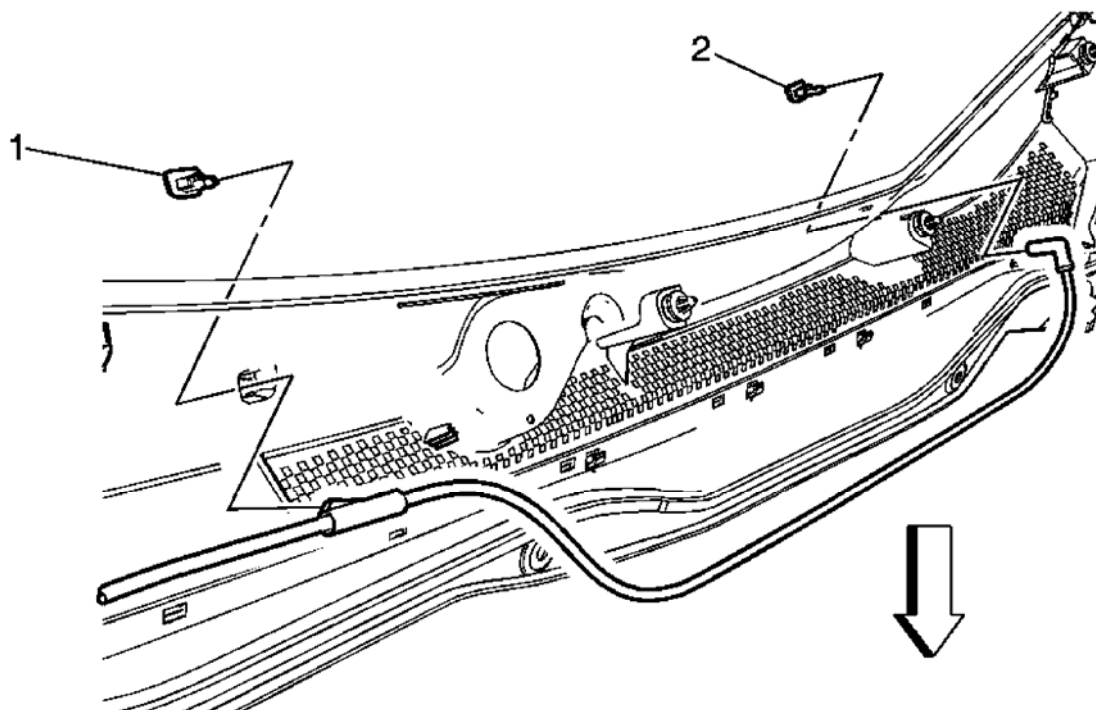


Fig. 7: Windshield Washer Nozzle (Equinox)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the air inlet screen. Refer to <u>Air Inlet Screen Replacement (Equinox)</u> or <u>Air Inlet Screen Replacement (Terrain)</u> .	
1	Windshield Washer Nozzle Driver Side Procedure 1. Disengage the windshield washer nozzle hose connection at the driver side washer nozzle. 2. Pinch the tabs on the underside of the washer nozzle and push the nozzle outward, from the air inlet screen.
2	Windshield Washer Nozzle Passenger Side Procedure 1. Disengage the windshield washer nozzle hose connection at the passenger washer nozzle. 2. Pinch the tabs on the underside of the washer nozzle and push the nozzle outward, from the air inlet screen.

WINDSHIELD WASHER NOZZLE REPLACEMENT (TERRAIN)

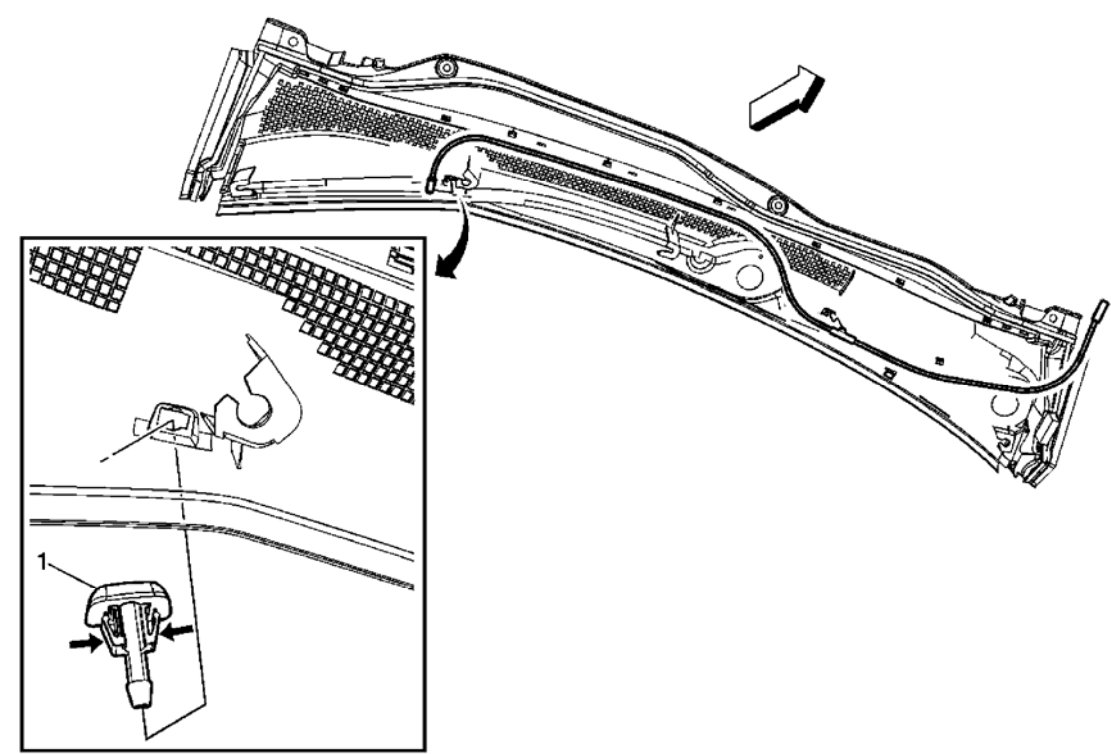


Fig. 8: Windshield Washer Nozzle (Terrain)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the air inlet screen. Refer to <u>Air Inlet Screen Replacement (Equinox)</u> or <u>Air Inlet Screen Replacement (Terrain)</u> .	
1	Windshield Washer Nozzle Passenger Side Procedure 1. Disengage the windshield washer nozzle hose connection at the passenger or driver side windshield washer nozzle. 2. Pinch the tabs on the underside of the washer nozzle and push the nozzle outward, away from the air inlet screen.

REAR WINDOW WASHER NOZZLE REPLACEMENT (EQUINOX)

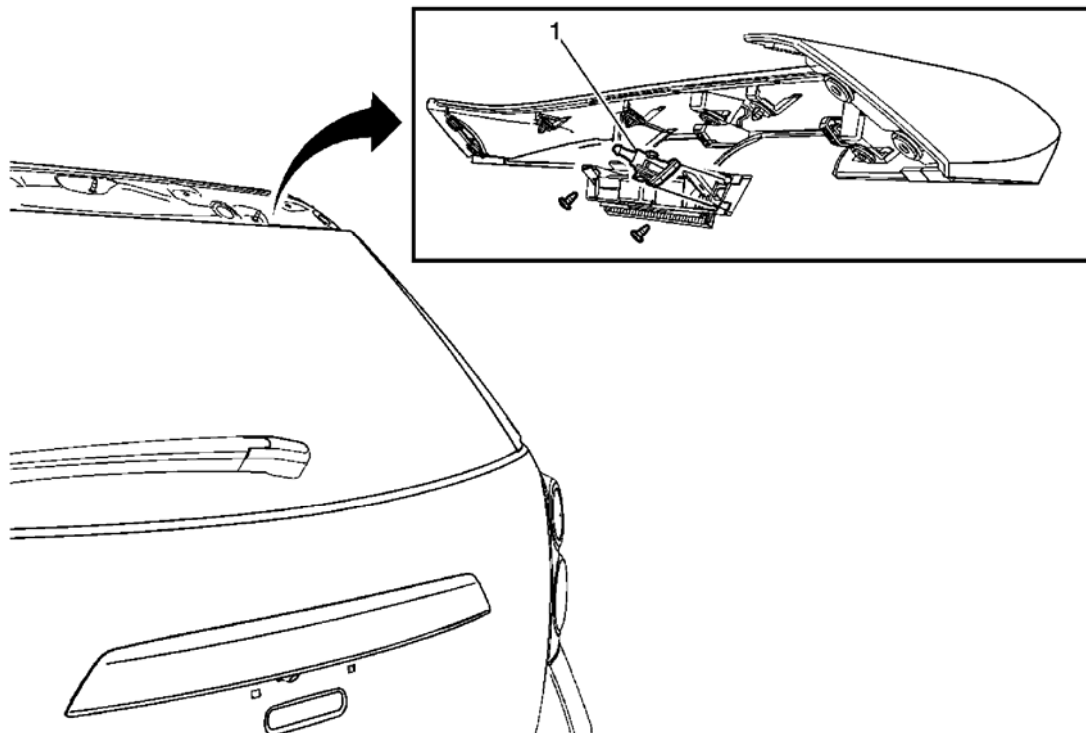


Fig. 9: Rear Window Washer Nozzle (Equinox)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the high mount stop lamp. Refer to <u>High Mount Stop Lamp Replacement (Equinox)</u> or <u>High Mount Stop Lamp Replacement (Terrain)</u> .	
1	Rear Window Washer Nozzle Procedure: Remove the washer nozzle from the high mount stop lamp assembly.

REAR WINDOW WASHER NOZZLE REPLACEMENT (TERRAIN)

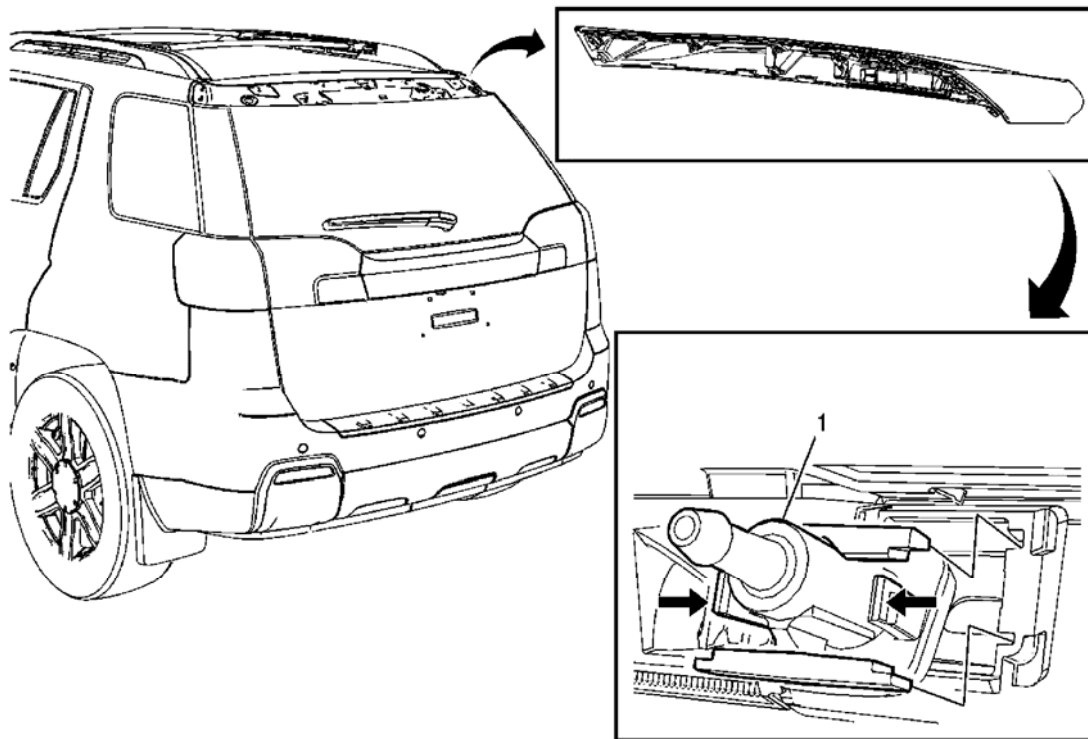


Fig. 10: Rear Window Washer Nozzle (Terrain)
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the rear end spoiler. Refer to <u>Rear End Spoiler Replacement (Equinox)</u> or <u>Rear End Spoiler Replacement (Terrain)</u> .	
1	Rear Window Washer Nozzle Procedure 1. Disconnect the rear window washer nozzle hose from the rear window washer nozzle spout. 2. Depress the two tabs and remove the rear washer nozzle from the high mount stop lamp assembly.

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

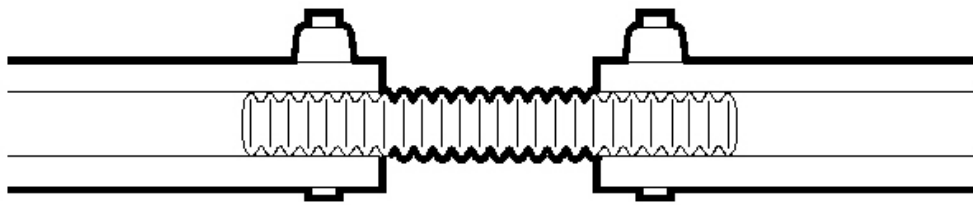


Fig. 11: View Of Rear Washer Hose
Courtesy of GENERAL MOTORS CORP.

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.

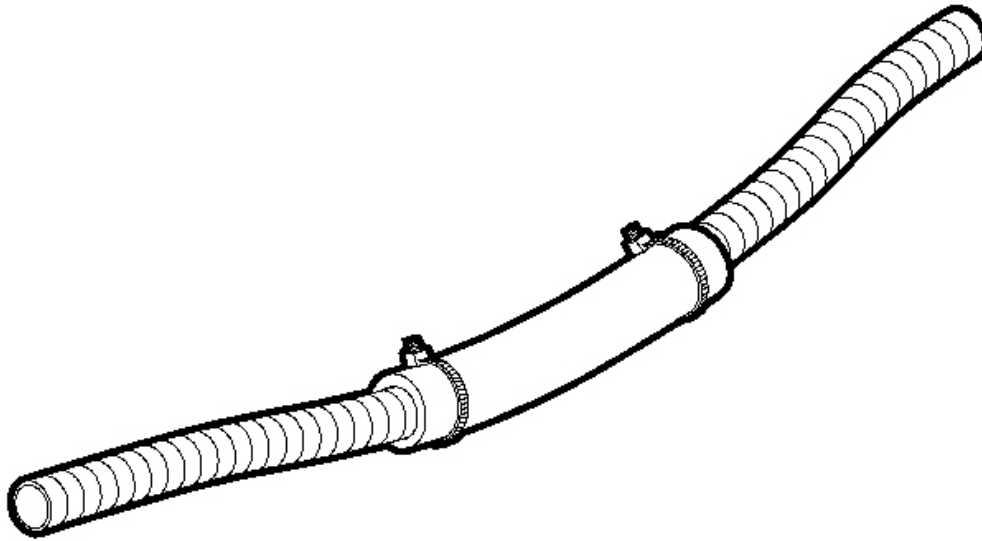


Fig. 12: Repairing Rear Washer Hose
Courtesy of GENERAL MOTORS CORP.

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 (EQUINOX)

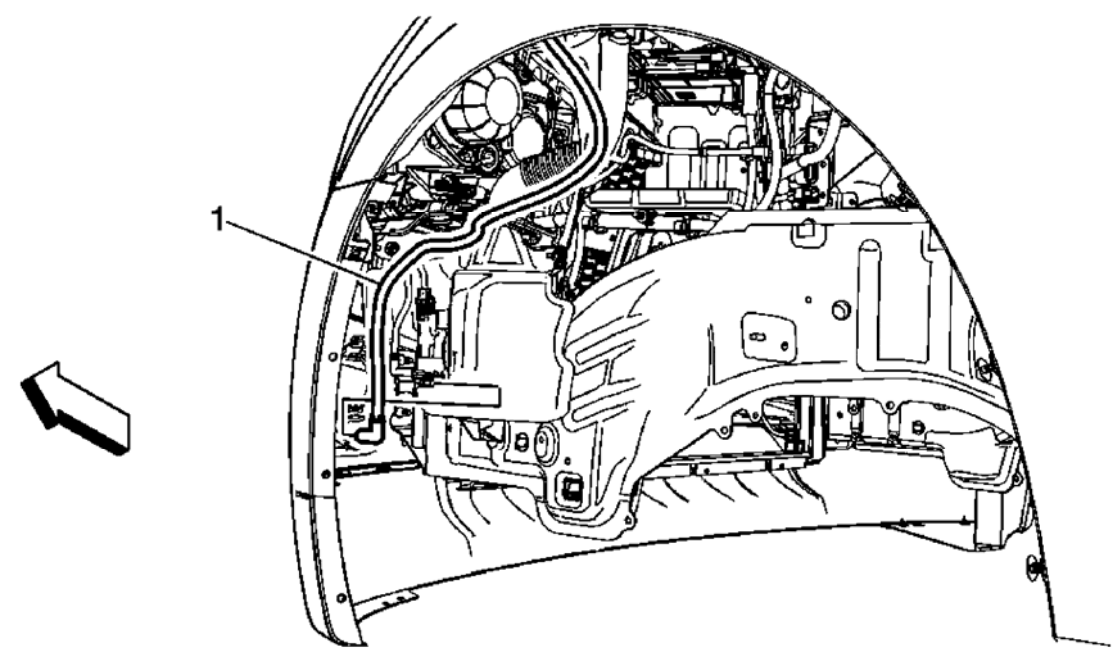


Fig. 13: Windshield Washer Pump Hose (Equinox)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	
1. Open and support the hood. 2. Remove the left side front bumper fascia opening cover. Refer to <u>Front Bumper Fascia Opening Cover Replacement (Equinox)</u> or <u>Front Bumper Fascia Opening Cover Replacement (Terrain)</u> . 3. Disconnect the windshield washer pump hose from the windshield washer nozzle hose at the left side fender flange. 4. Remove the driver side wheelhouse liner. Refer to <u>Front Wheelhouse Liner Replacement (Equinox)</u> or <u>Front Wheelhouse Liner Replacement (Terrain)</u> . 5. Place a clean suitable container under the windshield washer container. 6. Disconnect the windshield washer pump hose from the windshield washer pump spout.	
1	Windshield Washer Pump Hose Procedure: Route the new hose through the windshield washer solvent container tabs as removed and re-connect the hose ends.

REAR WINDOW WASHER PUMP HOSE REPLACEMENT - WASHER PUMP TO HEADLINER HOSE (EQUINOX)

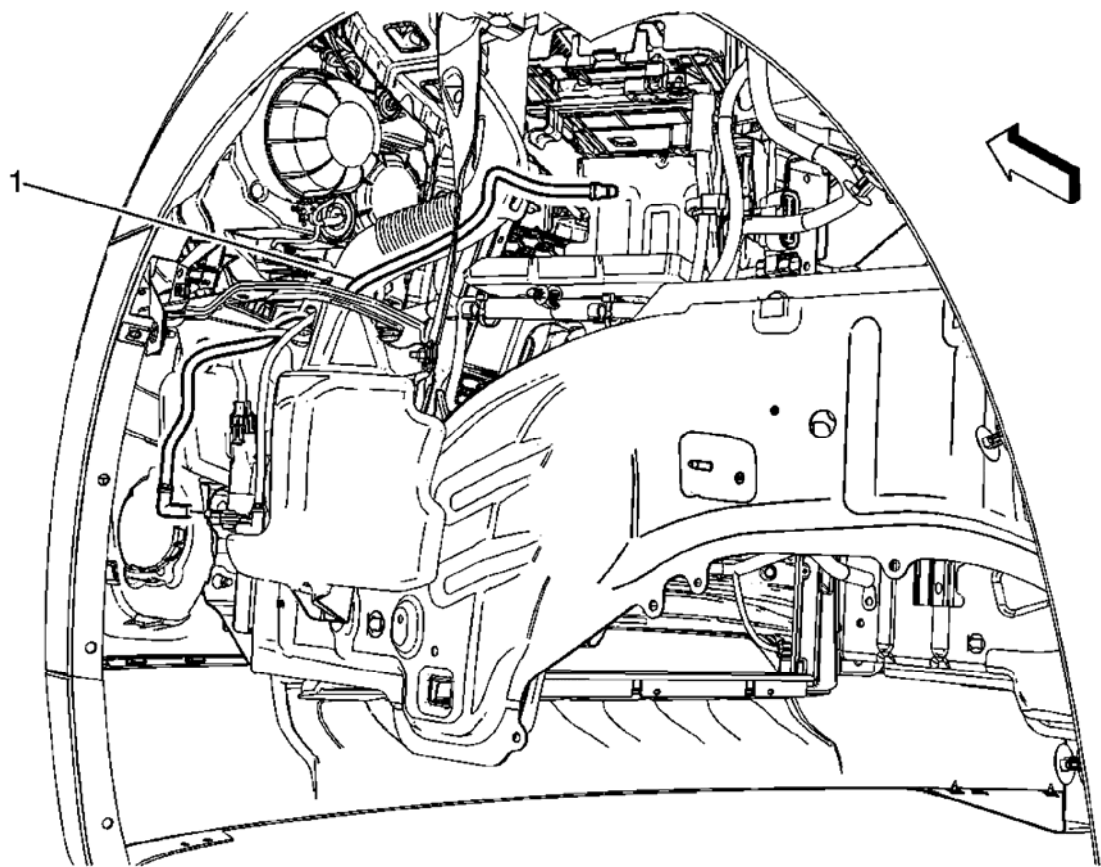


Fig. 14: Rear Window Washer Pump Hose - Washer Pump to Headliner Hose (Equinox)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	
1. Remove the driver side wheelhouse liner. Refer to <u>Front Wheelhouse Liner Replacement (Equinox)</u> or <u>Front Wheelhouse Liner Replacement (Terrain)</u> . 2. Place a clean suitable container under the windshield washer container. 3. Disconnect the rear window washer pump hose from the rear window washer nozzle extension hose. 4. Disconnect the rear window washer pump hose from the windshield washer pump spout. 5. Remove the rear window washer pump hose from the windshield washer container.	
1	Rear Window Washer Pump Hose Procedure: Route the new hose through the windshield washer solvent container tabs as removed and re-connect the hose ends.

WINDSHIELD WASHER SOLVENT CONTAINER REPLACEMENT (EQUINOX)

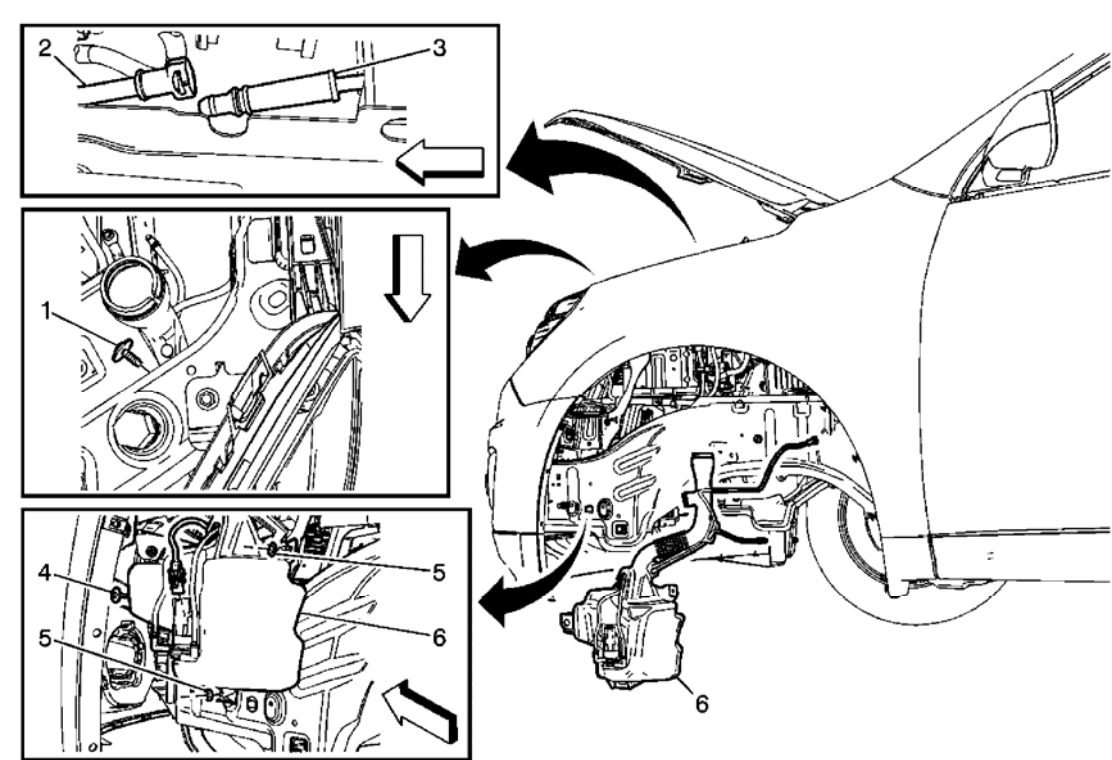


Fig. 15: Windshield Washer Solvent Container (Equinox)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	
1. Open and support the hood.	
2. Remove the front bumper fascia opening cover. Refer to Front Bumper Fascia Opening Cover Replacement (Equinox) or Front Bumper Fascia Opening Cover Replacement (Terrain) .	
3. Disconnect the windshield washer nozzle hose from the windshield washer pump hose.	
4. Remove the windshield washer container filler neck bolt from the front compartment front panel.	
5. Remove the left front wheelhouse liner. Refer to Front Wheelhouse Liner Replacement (Equinox) or Front Wheelhouse Liner Replacement (Terrain) .	
1	Windshield Washer Solvent Container Filler Neck Bolt CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 9 N.m (80 lb in)
2	Windshield Washer Pump Hose

3	Windshield Washer Nozzle Hose
4	Windshield Washer Solvent Container Bolt Tighten: 9 N.m (80 lb in)
5	Windshield Washer Solvent Container Nut (Qty: 2) Tighten: 9 N.m (80 lb in)
6	Windshield Washer Solvent Container Assembly Procedure 1. Disconnect the rear window washer pump hose. 2. Disconnect the windshield washer pump electrical connector. 3. Transfer the washer hoses to the new container. 4. Remove and transfer the washer container cap. 5. Empty the windshield washer solvent container contents into an approved container. 6. Install a new washer pump grommet to the washer container. 7. Remove and transfer the windshield washer container pump. 8. After installation, fill the windshield washer container with new washer solvent. 9. Inspect the system for leaks.

WINDSHIELD WASHER SOLVENT CONTAINER REPLACEMENT (TERRAIN)

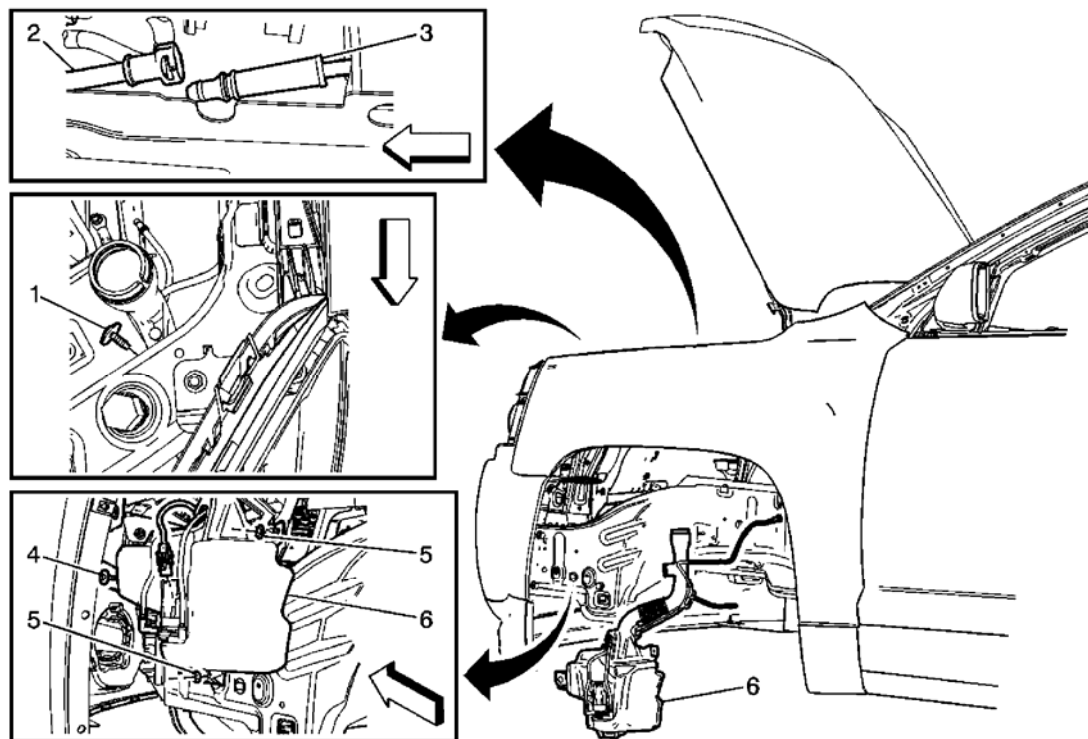


Fig. 16: Windshield Washer Solvent Container (Terrain)
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Open and support the hood. 2. Remove the left front bumper fascia opening cover. Refer to <u>Front Bumper Fascia Opening Cover Replacement (Equinox)</u> or <u>Front Bumper Fascia Opening Cover Replacement (Terrain)</u>. 3. Disconnect the windshield washer nozzle hose from the windshield washer pump hose. 4. Remove the windshield washer container filler neck bolt from the front compartment front panel. 5. Remove the left front fender liner. Refer to <u>Front Wheelhouse Liner Replacement (Equinox)</u> or <u>Front Wheelhouse Liner Replacement (Terrain)</u>.	
1	Windshield Washer Solvent Container Filler Neck Bolt CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 9 N.m (80 lb in)
2	Windshield Washer Pump Hose
3	Windshield Washer Nozzle Hose

4	Windshield Washer Solvent Container Bolt Tighten: 9 N.m (80 lb in)
5	Windshield Washer Solvent Container Nut (Qty: 2) Tighten: 9 N.m (80 lb in)
6	Windshield Washer Solvent Container Assembly Procedure 1. Disconnect the rear window washer pump hose. 2. Disconnect the windshield washer pump electrical connector. 3. Transfer the washer hoses to the new container. 4. Remove and transfer the washer container cap. 5. Empty the windshield washer solvent container contents into an approved container. 6. Install a new washer pump grommet to the washer container. 7. Remove and transfer the windshield washer container pump. 8. Install the left front fender liner. Refer to <u>Front Wheelhouse Liner Replacement (Equinox)</u> or <u>Front Wheelhouse Liner Replacement (Terrain)</u> . 9. After installation, fill the windshield washer container with new washer solvent. 10. Inspect the system for leaks.

WINDSHIELD WASHER PUMP REPLACEMENT (EQUINOX)

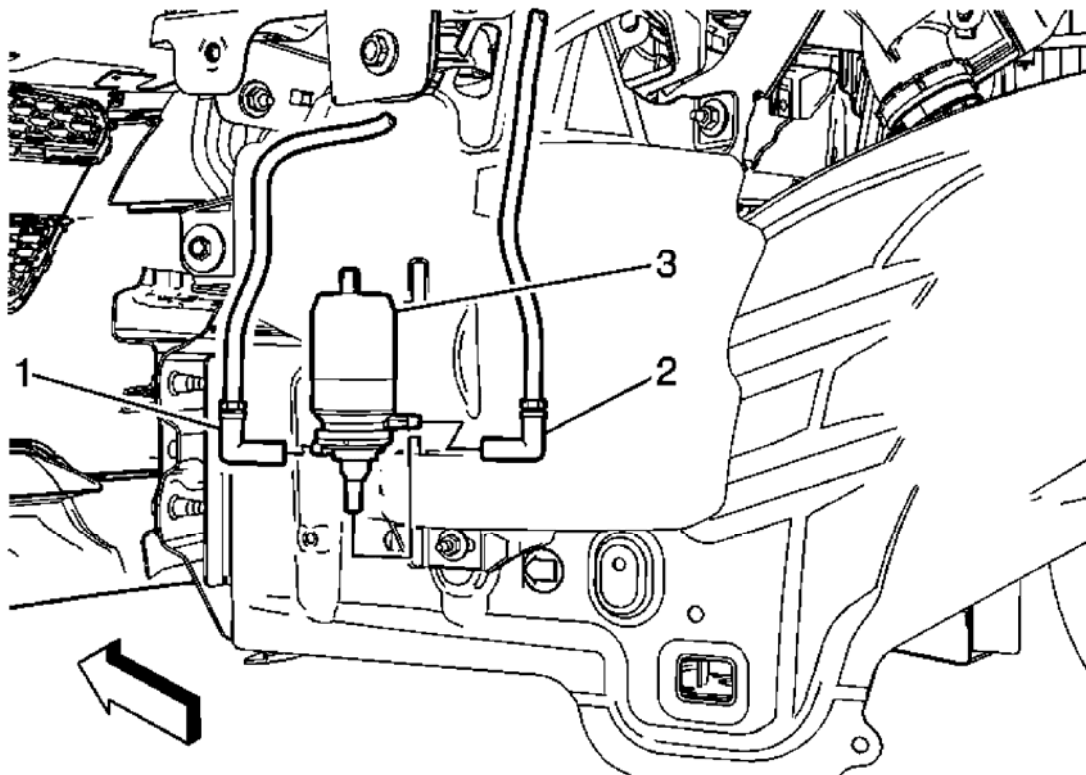


Fig. 17: Windshield Washer Pump (Equinox)
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	
1. Remove the driver side wheelhouse liner. Refer to <u>Front Wheelhouse Liner Replacement (Equinox)</u> or <u>Front Wheelhouse Liner Replacement (Terrain)</u> . 2. Place a clean suitable drain pan under the windshield washer solvent container. 3. Disconnect the windshield washer pump electrical connector. 4. Disconnect the windshield washer pump front hose. 5. Disconnect the rear washer system pump hose. 6. Disengage the washer pump from the washer container. 7. Using two flat-bladed tools under the washer pump, pry upward in order to remove the pump from the washer container grommet.	
1	Rear Window Washer Pump Hose
2	Windshield Washer Pump Hose
3	Windshield Washer Pump Assembly Tip: Install a new grommet prior to installing a new windshield washer pump.

WINDSHIELD WASHER PUMP REPLACEMENT (TERRAIN)

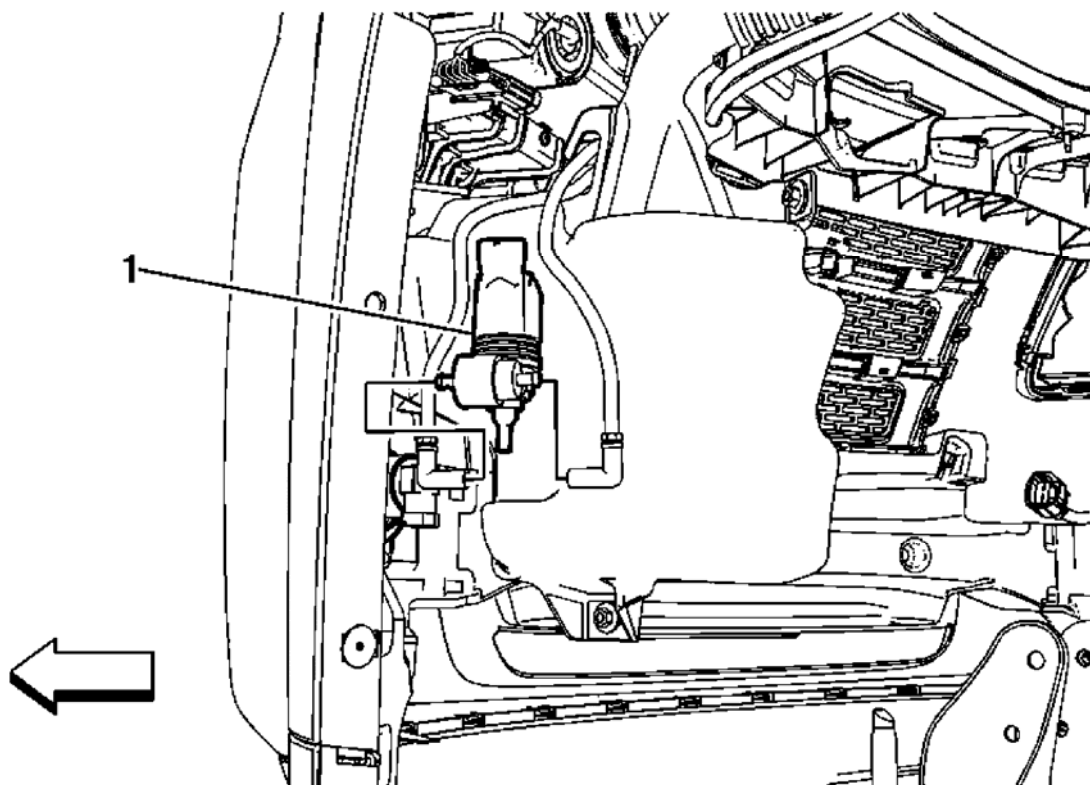


Fig. 18: Windshield Washer Pump (Terrain)
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	
1. Remove the driver side wheelhouse liner. Refer to <u>Front Wheelhouse Liner Replacement (Equinox)</u> or <u>Front Wheelhouse Liner Replacement (Terrain)</u>. 2. Place a clean suitable drain pan under the windshield washer solvent container.	
1	Windshield Washer Pump Assembly Procedure 1. Disconnect the windshield washer pump electrical connector. 2. Disconnect the windshield washer pump front hose. 3. Disconnect the rear washer system pump hose. 4. Using two flat-bladed tools under the washer pump, pry upward in order to release the pump from the washer container grommet. Tip: Install a new grommet prior to installing a new windshield washer pump.

AIR INLET SCREEN REPLACEMENT (EQUINOX)

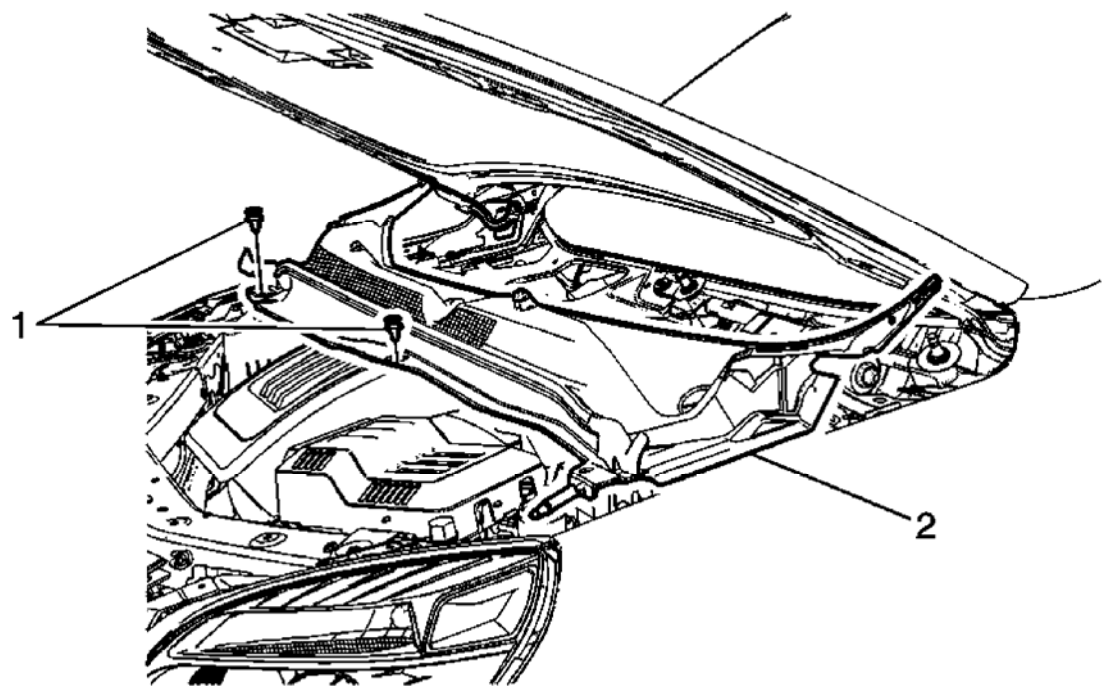


Fig. 19: Air Inlet Screen (Equinox)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	
1. Remove both windshield wiper arms. Refer to <u>Windshield Wiper Arm Replacement (Equinox Driver Side)</u> or <u>Windshield Wiper Arm Replacement (Equinox Passenger Side)</u> or <u>Windshield Wiper Arm Replacement (Terrain Driver Side)</u> or <u>Windshield Wiper Arm Replacement (Terrain Passenger Side)</u> .	
2. Remove both air inlet grille panel extensions. Refer to <u>Air Inlet Grille Panel Extension Replacement (Equinox)</u> or <u>Air Inlet Grille Panel Extension Replacement (Terrain)</u> .	
3. Remove the hood rear weatherstrip. Refer to <u>Hood Rear Weatherstrip Replacement</u> .	
4. Remove both front bumper fascia opening covers. Refer to <u>Front Bumper Fascia Opening Cover Replacement (Equinox)</u> or <u>Front Bumper Fascia Opening Cover Replacement (Terrain)</u> .	
5. Disconnect the windshield washer pump hose from the windshield washer nozzle hose at the driver side rear fender flange.	
1	Air Inlet Screen Push Pin Retainer (Qty: 2)
	Air Inlet Screen
	Procedure

2

1. Lift the front edge of the air inlet screen and lift in order to clear both windshield wiper transmission pivot shafts.
2. Remove the air inlet screen.
3. Transfer the windshield washer nozzles. Refer to **Windshield Washer Nozzle Replacement (Equinox)** or **Windshield Washer Nozzle Replacement (Terrain)**.
4. Transfer the windshield washer nozzle hose. Refer to **Windshield Washer Nozzle Hose Replacement (Equinox)** or **Windshield Washer Nozzle Hose Replacement (Terrain)**.

AIR INLET SCREEN REPLACEMENT (TERRAIN)

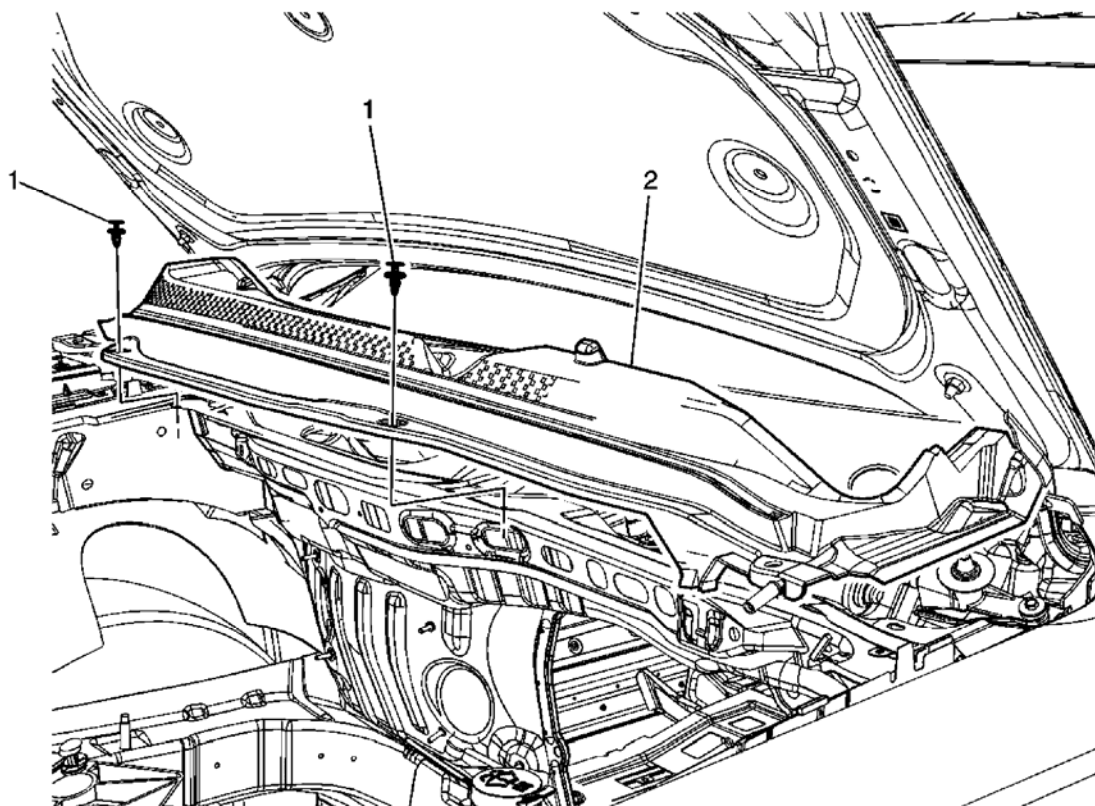


Fig. 20: Air Inlet Screen (Terrain)

Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	
1.	Remove both windshield wiper arms. Refer to <u>Windshield Wiper Arm Replacement (Equinox Driver Side)</u> or <u>Windshield Wiper Arm Replacement (Equinox Passenger Side)</u> or <u>Windshield Wiper Arm Replacement (Terrain Driver Side)</u> or <u>Windshield Wiper Arm Replacement (Terrain Passenger Side)</u> .

2. Remove both air inlet grille panel extensions. Refer to <u>Air Inlet Grille Panel Extension Replacement (Equinox)</u> or <u>Air Inlet Grille Panel Extension Replacement (Terrain)</u> . 3. Remove the hood rear weatherstrip. Refer to <u>Hood Rear Weatherstrip Replacement</u> . 4. Remove both front bumper fascia opening covers. Refer to <u>Front Bumper Fascia Opening Cover Replacement (Equinox)</u> or <u>Front Bumper Fascia Opening Cover Replacement (Terrain)</u> . 5. Disconnect the windshield washer pump hose from the windshield washer nozzle hose at the left side rear fender flange.	
1	Air Inlet Screen Push Pin Retainer (Qty: 2)
2	Air Inlet Screen Procedure 1. Lift the front edge of the air inlet screen in order to clear both windshield wiper transmission pivot shafts. 2. Remove the air inlet screen. 3. Transfer the windshield washer nozzles. Refer to <u>Windshield Washer Nozzle Replacement (Equinox)</u> or <u>Windshield Washer Nozzle Replacement (Terrain)</u> . 4. Transfer the windshield washer nozzle hose. Refer to <u>Windshield Washer Nozzle Hose Replacement (Equinox)</u> or <u>Windshield Washer Nozzle Hose Replacement (Terrain)</u> .

AIR INLET GRILLE PANEL EXTENSION REPLACEMENT (EQUINOX)

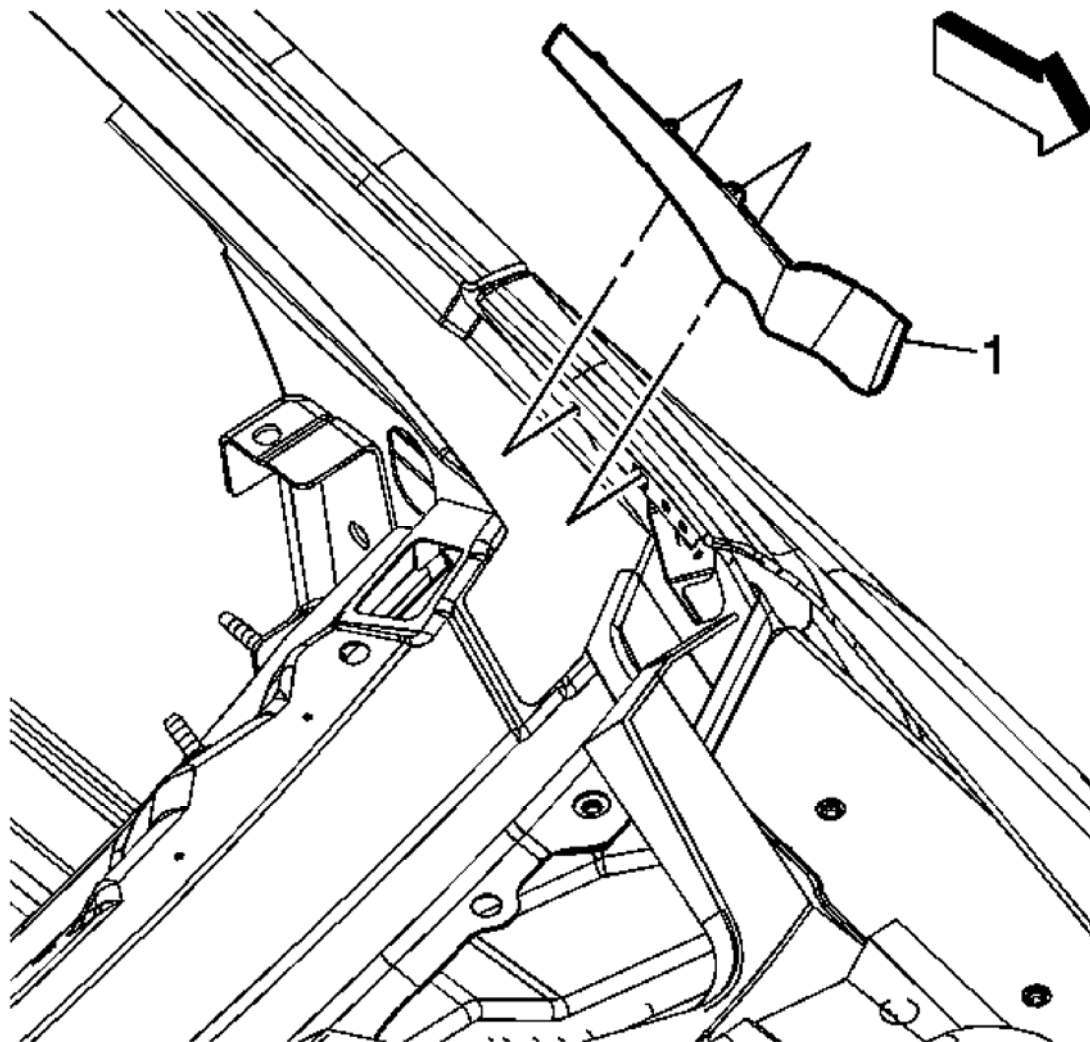


Fig. 21: Air Inlet Grille Panel Extension (Equinox)

Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Open and support hood in order to access the air inlet grille panel extension.	
Air Inlet Grille Panel Extension	
Procedure	
1	1. Release the tabs securing the air inlet grille panel extension to the rear upper fender flange and air inlet grille. 2. Disengage the rearward edge of the extension from under the top edge of the fender flange. 3. Remove the extension from the vehicle.

AIR INLET GRILLE PANEL EXTENSION REPLACEMENT (TERRAIN)

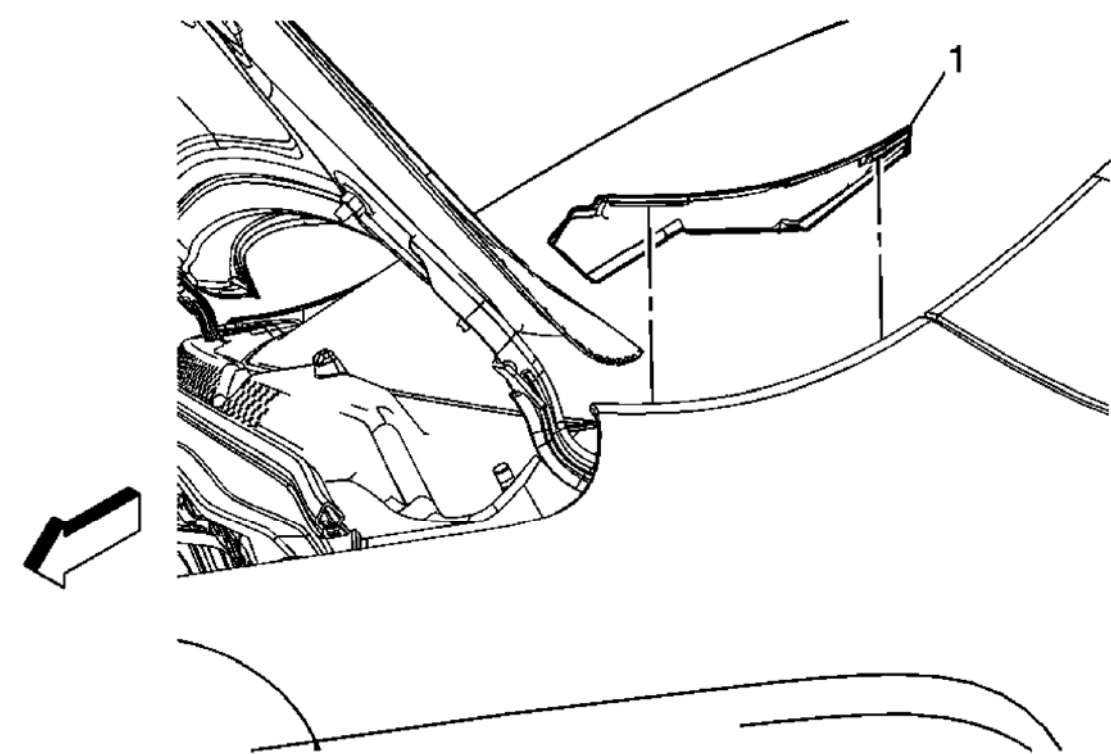


Fig. 22: Air Inlet Grille Panel Extension (Terrain)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Open and support hood in order to access the air inlet grille panel extension.	
1	Air Inlet Grille Panel Extension Procedure - Release the tabs securing the air inlet grille panel extension to the rear upper fender flange and air inlet grille. - Disengage the rearward edge of the extension from under the top edge of the fender flange. - Remove the air inlet grille panel extension from the vehicle.

WINDSHIELD WIPER ARM REPLACEMENT (EQUINOX DRIVER SIDE)

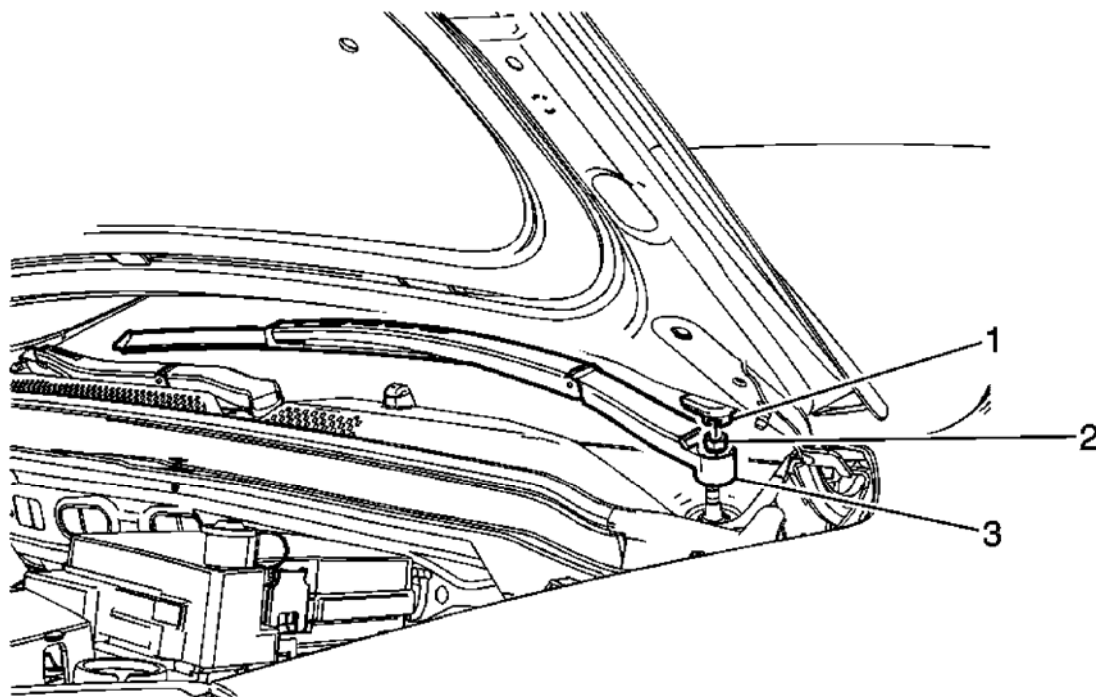


Fig. 23: Windshield Wiper Arm (Equinox Driver Side)
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Open and suitably support the hood assembly.	
1	Windshield Wiper Arm Nut Cap Procedure: Use a small flat-bladed tool to disengage the nut cap from the windshield wiper arm.
2	Windshield Wiper Arm Nut CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 24 N.m (18 lb ft) Procedure 1. Carefully rock the windshield wiper arm from the windshield wiper transmission pivot shaft. 2. Clean the knurls on the pivot shaft with a soft wire brush. 3. When installing the new wiper arm onto the pivot shaft, align the wiper blade with the small line in the windshield lower blackout area. 4. Hold the wiper arm in position while securing the wiper arm nut.

3	Windshield Wiper Arm Assembly Driver Side Procedure: Remove the windshield wiper blade. Refer to <u>Windshield Wiper Blade Replacement (Equinox Driver Side)</u> or <u>Windshield Wiper Blade Replacement (Equinox Passenger Side)</u> or <u>Windshield Wiper Blade Replacement (Terrain Driver Side)</u> or <u>Windshield Wiper Blade Replacement (Terrain Passenger Side)</u> .
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WINDSHIELD WIPER ARM REPLACEMENT (EQUINOX PASSENGER SIDE)

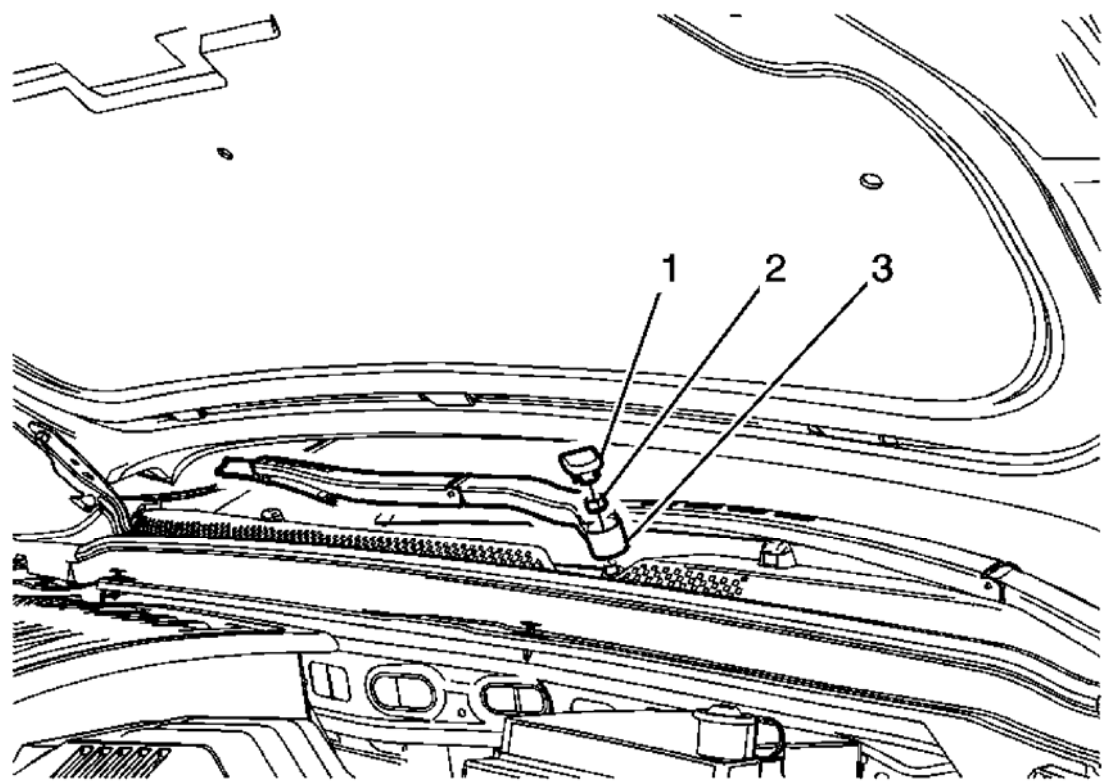


Fig. 24: Windshield Wiper Arm (Equinox Passenger Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Open and suitably support the hood assembly.	
1	Windshield Wiper Arm Nut Cap Procedure: Use a small flat-bladed tool to disengage the nut cap from the windshield wiper arm.
	Windshield Wiper Arm Nut CAUTION: Refer to <u>Fastener Caution</u> .

2	Procedure 1. Carefully rock the windshield wiper arm from the windshield wiper transmission pivot shaft. 2. Clean the knurls on the pivot shaft with a soft wire brush. 3. When installing the new wiper arm onto the pivot shaft, align the wiper blade with the small line in the windshield lower blackout area. 4. Hold the wiper arm in position while securing the wiper arm nut. Tighten: 24 N.m (18 lb ft)
3	Windshield Wiper Arm Assembly Passenger Side Procedure: Remove the windshield wiper blade. Refer to <u>Windshield Wiper Blade Replacement (Equinox Driver Side)</u> or <u>Windshield Wiper Blade Replacement (Equinox Passenger Side)</u> or <u>Windshield Wiper Blade Replacement (Terrain Driver Side)</u> or <u>Windshield Wiper Blade Replacement (Terrain Passenger Side)</u>.

WINDSHIELD WIPER ARM REPLACEMENT (TERRAIN DRIVER SIDE)

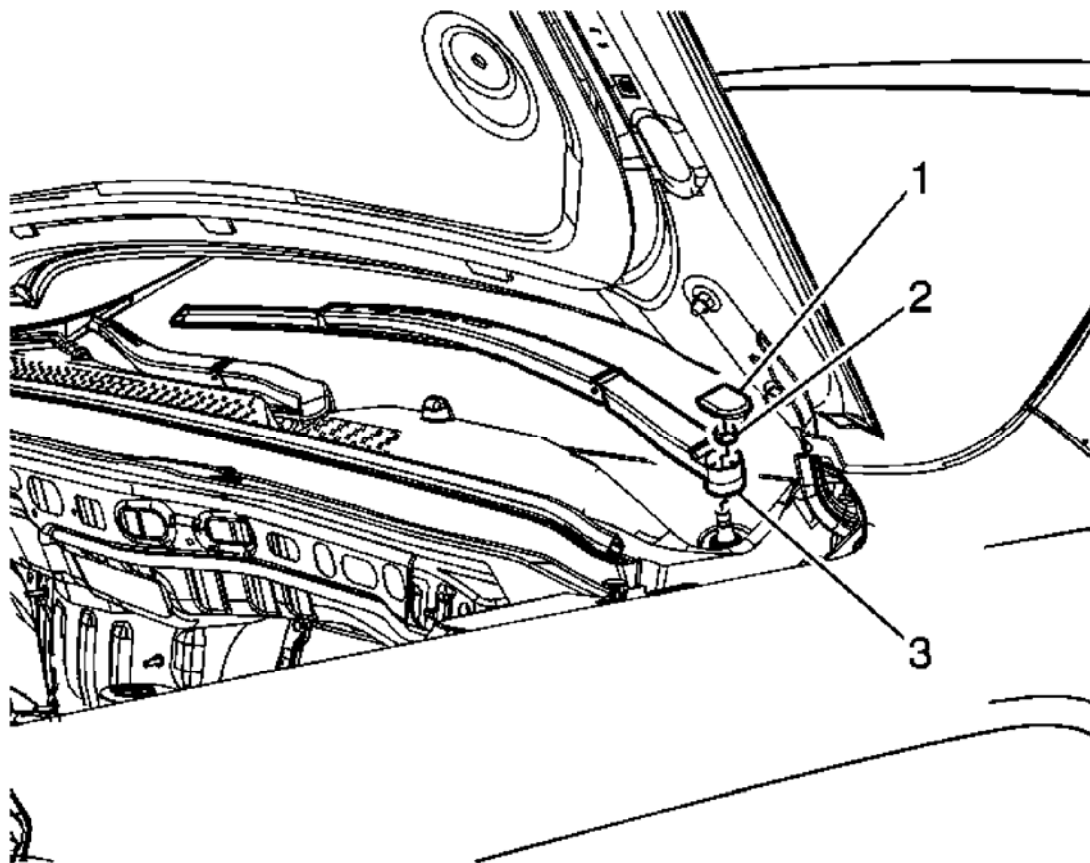


Fig. 25: Windshield Wiper Arm (Terrain Driver Side)

Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Open and suitably support the hood assembly.	
1	Windshield Wiper Arm Nut Cap Procedure: Use a small flat-bladed tool to disengage the nut cap from the windshield wiper arm.
2	Windshield Wiper Arm Nut CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 24 N.m (18 lb ft) Procedure 1. Carefully rock the windshield wiper arm from the windshield wiper transmission pivot shaft. 2. Clean the knurls on the pivot shaft with a soft wire brush. 3. When installing the new wiper arm onto the pivot shaft, align the wiper blade with the small line in the windshield lower blackout area. 4. Hold the wiper arm in position while securing the wiper arm nut.
3	Windshield Wiper Arm Assembly Driver Side Procedure: Remove the windshield wiper blade. Refer to <u>Windshield Wiper Blade Replacement (Equinox Driver Side)</u> or <u>Windshield Wiper Blade Replacement (Equinox Passenger Side)</u> or <u>Windshield Wiper Blade Replacement (Terrain Driver Side)</u> or <u>Windshield Wiper Blade Replacement (Terrain Passenger Side)</u> .

WINDSHIELD WIPER ARM REPLACEMENT (TERRAIN PASSENGER SIDE)

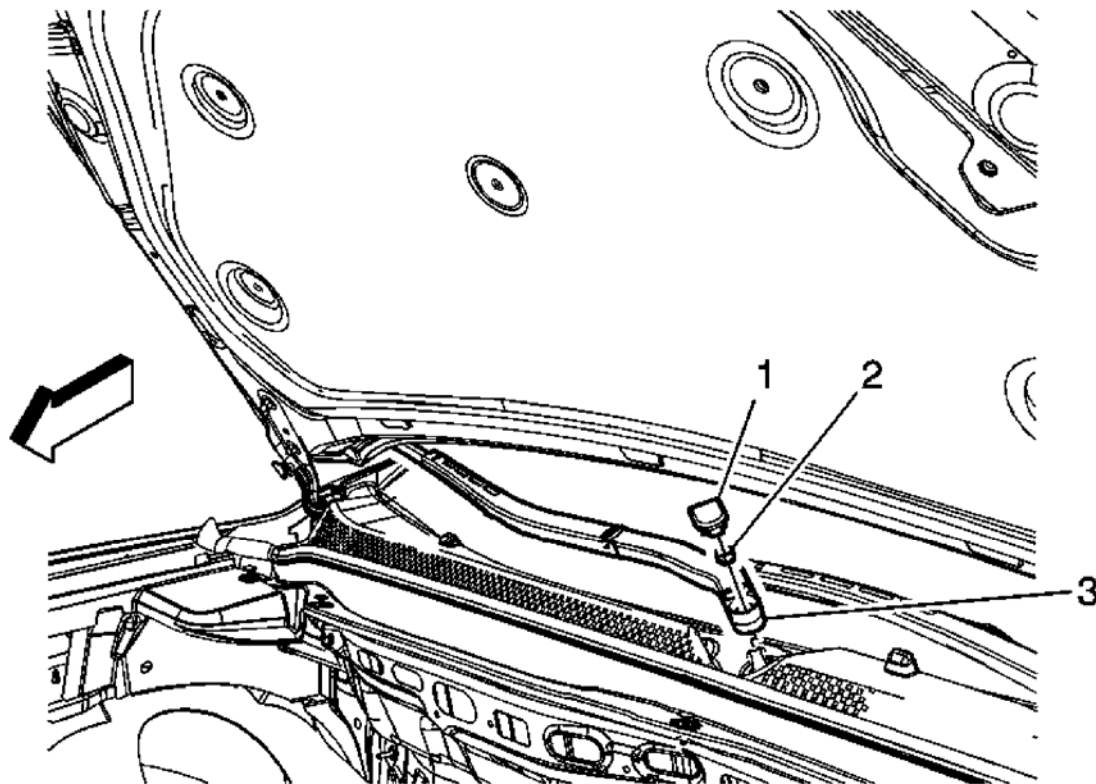


Fig. 26: Windshield Wiper Arm (Terrain Passenger Side)
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Open and suitably support the hood assembly.	
1	Windshield Wiper Arm Nut Cap Procedure: Use a small flat-bladed tool to disengage the nut cap from the windshield wiper arm.
2	Windshield Wiper Arm Nut CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 24 N.m (18 lb ft) Procedure - Carefully rock the windshield wiper arm from the windshield wiper transmission pivot shaft. - Clean the knurls on the pivot shaft with a soft wire brush. - When installing the new wiper arm onto the pivot shaft, align the wiper blade with

	the small line in the windshield lower blackout area. 4. Hold the wiper arm in position while securing the wiper arm nut.
3	Windshield Wiper Arm Assembly Passenger Side Procedure: Remove the windshield wiper blade. Refer to <u>Windshield Wiper Blade Replacement (Equinox Driver Side)</u> or <u>Windshield Wiper Blade Replacement (Equinox Passenger Side)</u> or <u>Windshield Wiper Blade Replacement (Terrain Driver Side)</u> or <u>Windshield Wiper Blade Replacement (Terrain Passenger Side)</u> .

REAR WINDOW WIPER ARM REPLACEMENT (EQUINOX)

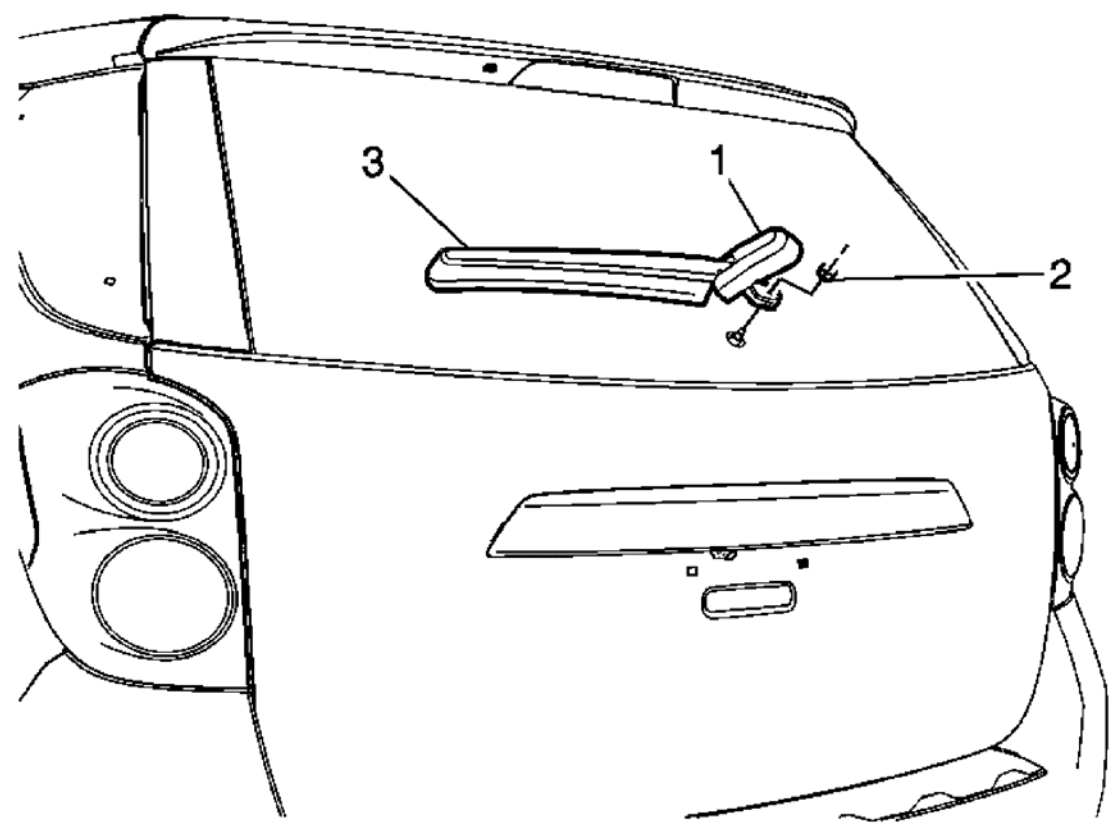


Fig. 27: Rear Window Wiper Arm (Equinox)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Rear Wiper Arm Nut Cover Tip: Lift the wiper arm nut cover in order to access the wiper arm nut.
2	Rear Wiper Arm Nut CAUTION: Refer to <u>Fastener Caution</u> .

	Tighten: 8 N.m (71 lb in)
3	Rear Wiper Arm Assembly Procedure 1. Remove the old wiper arm. 2. Clean the knurls on the wiper motor pivot shaft with a soft wire brush. 3. Electrically park the rear wiper arm motor. 4. Position the arm to the pivot shaft and rear window. 5. Align the rear wiper blade to the lower blackout edge. 6. Hold the wiper blade in position while securing the wiper arm nut.

REAR WINDOW WIPER ARM REPLACEMENT (TERRAIN)

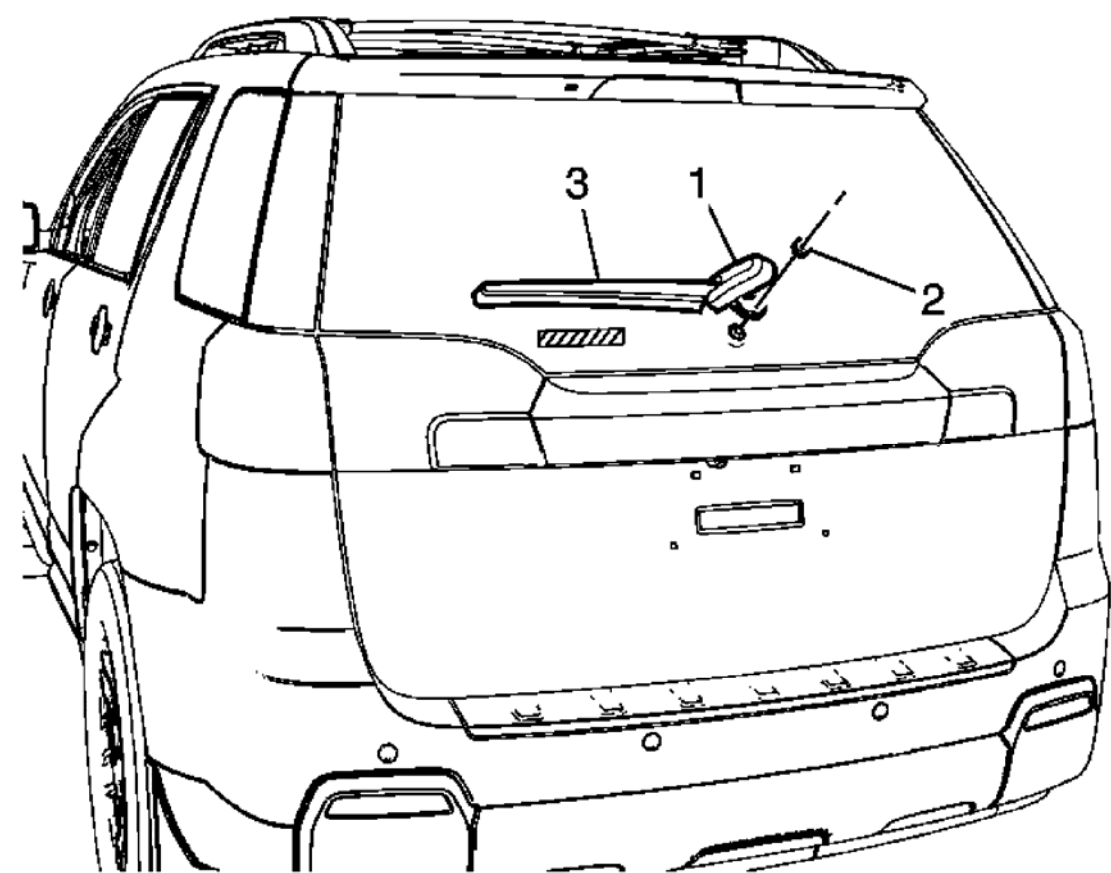


Fig. 28: Rear Window Wiper Arm (Terrain)
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

1	Rear Wiper Arm Nut Cover Tip: Lift the wiper arm nut cover in order to access the wiper arm nut.
2	Rear Wiper Arm Nut CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 8 N.m (71 lb in)
3	Rear Wiper Arm Assembly Procedure 1. Remove the old wiper arm from the rear wiper motor pivot shaft. 2. Clean the knurls on the wiper motor pivot shaft with a soft wire brush. 3. Electrically park the rear wiper arm motor. 4. Position the arm to the pivot shaft and rear window. 5. Align the rear wiper blade to above the lower blackout edge mark, as shown. 6. Hold the wiper blade in position while securing the wiper arm nut.

WINDSHIELD WIPER BLADE REPLACEMENT (EQUINOX DRIVER SIDE)

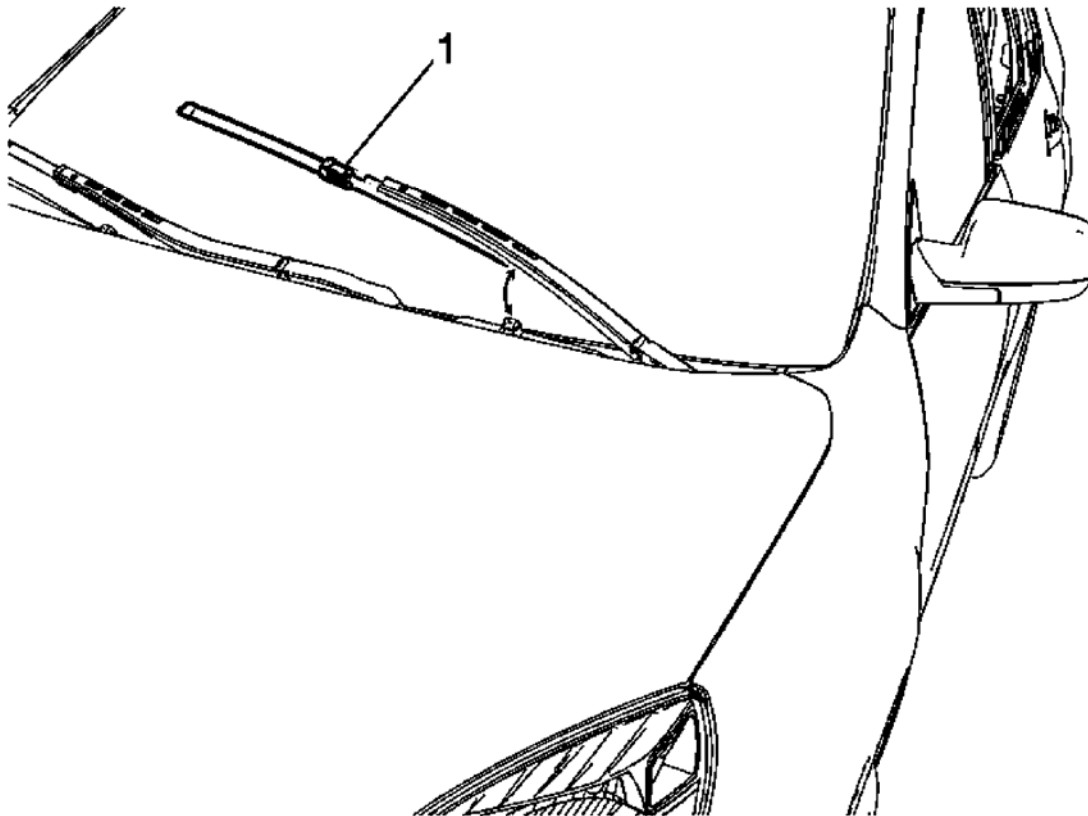


Fig. 29: Windshield Wiper Blade (Equinox Driver Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	
1. Lift the wiper arm off the windshield to the service up position.	
2. Depress the wiper arm tab at the small square hole in the wiper arm.	
3. Rotate the wiper blade slightly downward and slide the wiper blade assembly from the windshield wiper arm.	
4. Gently return the wiper arm to the windshield.	
5. Install a new windshield wiper blade.	
1	Windshield Wiper Blade Assembly Driver Side

WINDSHIELD WIPER BLADE REPLACEMENT (EQUINOX PASSENGER SIDE)

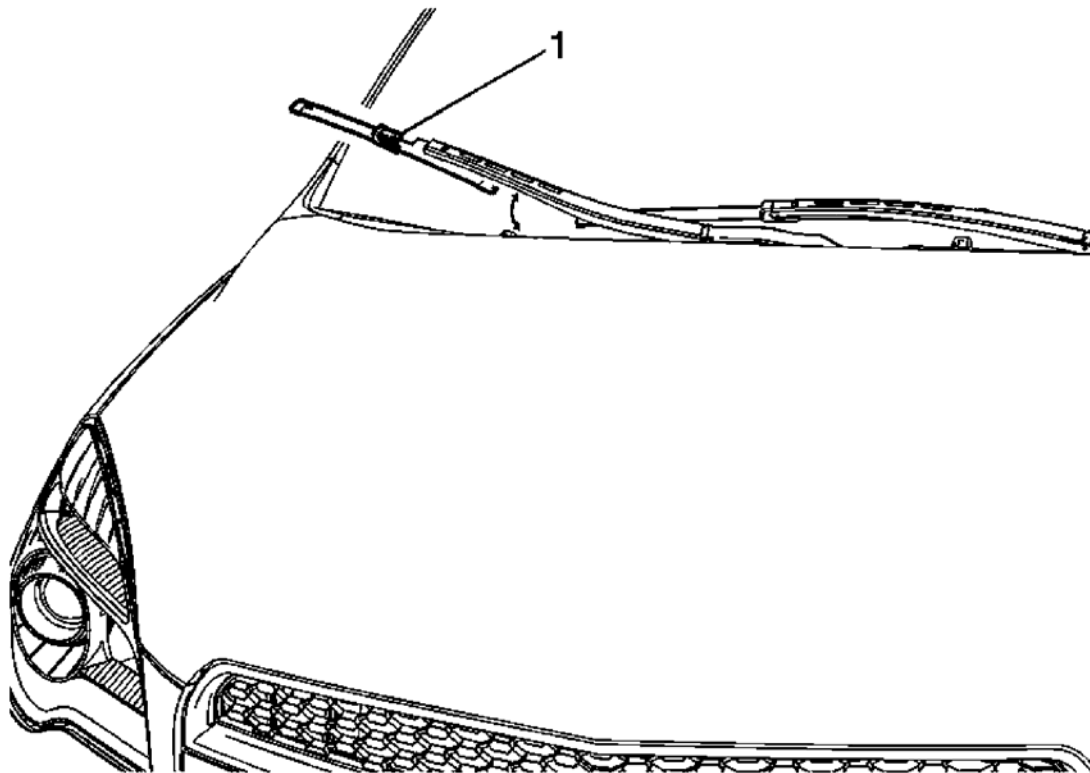


Fig. 30: Windshield Wiper Blade (Equinox Passenger Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	
1. Lift the wiper arm off the windshield to the service up position.	
2. Depress the wiper arm tab at the small square hole in the wiper arm.	
3. Rotate the wiper blade slightly downward and slide the wiper blade assembly from the windshield wiper arm.	
4. Gently return the wiper arm to the windshield.	
5. Install a new windshield wiper blade.	
1	Windshield Wiper Blade Assembly Passenger Side

WINDSHIELD WIPER BLADE REPLACEMENT (TERRAIN DRIVER SIDE)

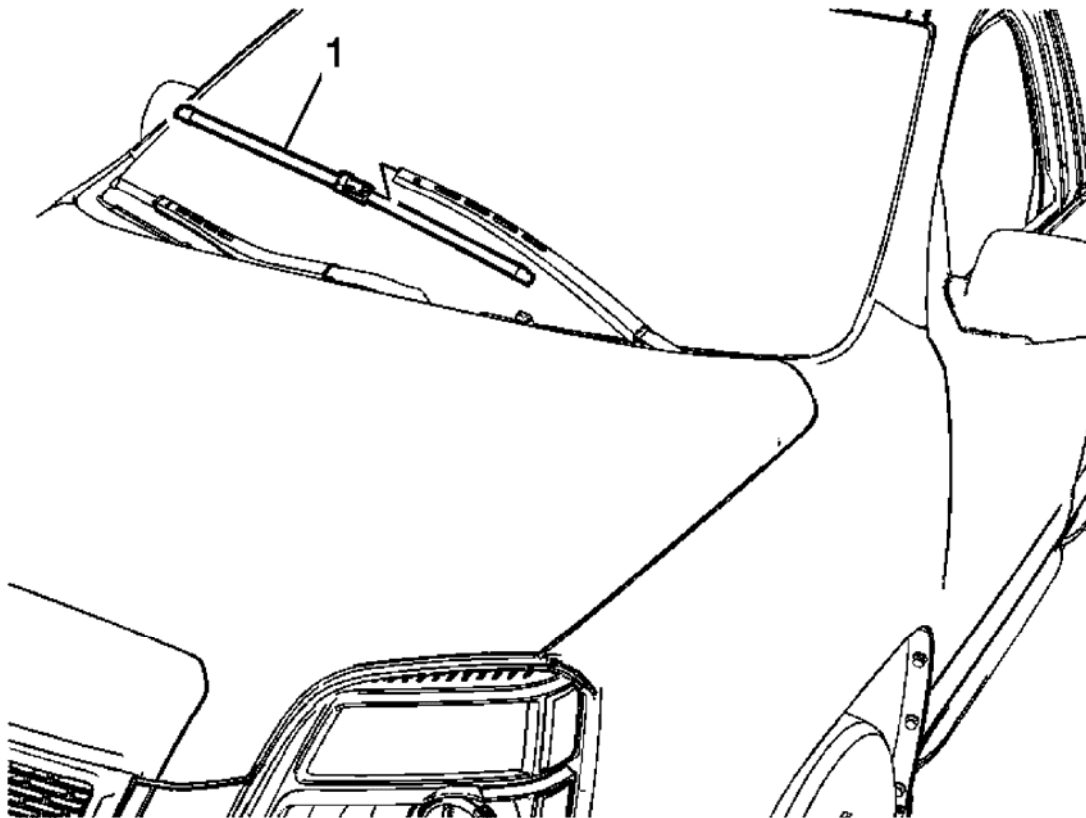


Fig. 31: Windshield Wiper Blade (Terrain Driver Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Windshield Wiper Blade Assembly Driver Side Procedure 1. Lift the wiper arm off the windshield to the service up position. 2. Depress the wiper arm tab at the small square hole in the wiper arm. 3. Rotate the wiper blade slightly downward and slide the wiper blade assembly from the windshield wiper arm. 4. Gently return the wiper arm to the windshield. 5. Install a new windshield wiper blade.

WINDSHIELD WIPER BLADE REPLACEMENT (TERRAIN PASSENGER SIDE)

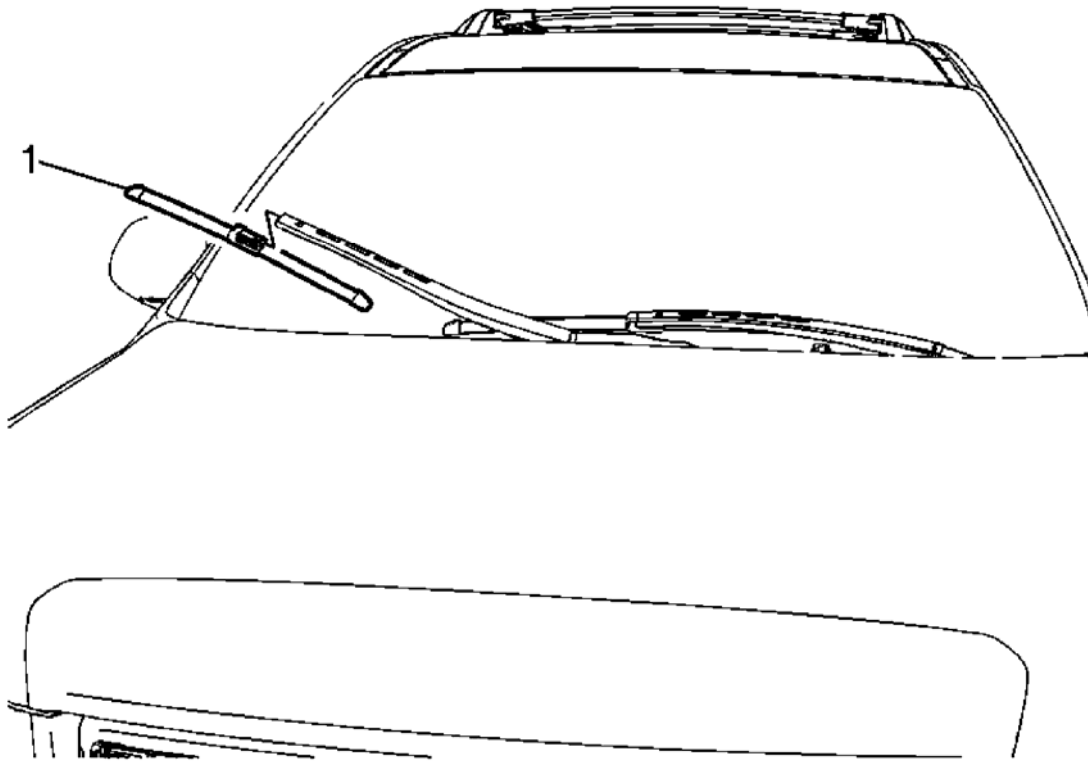


Fig. 32: Windshield Wiper Blade (Terrain Passenger Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Windshield Wiper Blade Assembly Passenger Side Preliminary Procedures 1. Lift the wiper arm off the windshield to the service up position. 2. Depress the wiper arm tab at the small square hole in the wiper arm. 3. Rotate the wiper blade slightly downward and slide the wiper blade assembly from the windshield wiper arm. 4. Gently return the wiper arm to the windshield. 5. Install a new windshield wiper blade.

REAR WINDOW WIPER BLADE REPLACEMENT (EQUINOX)

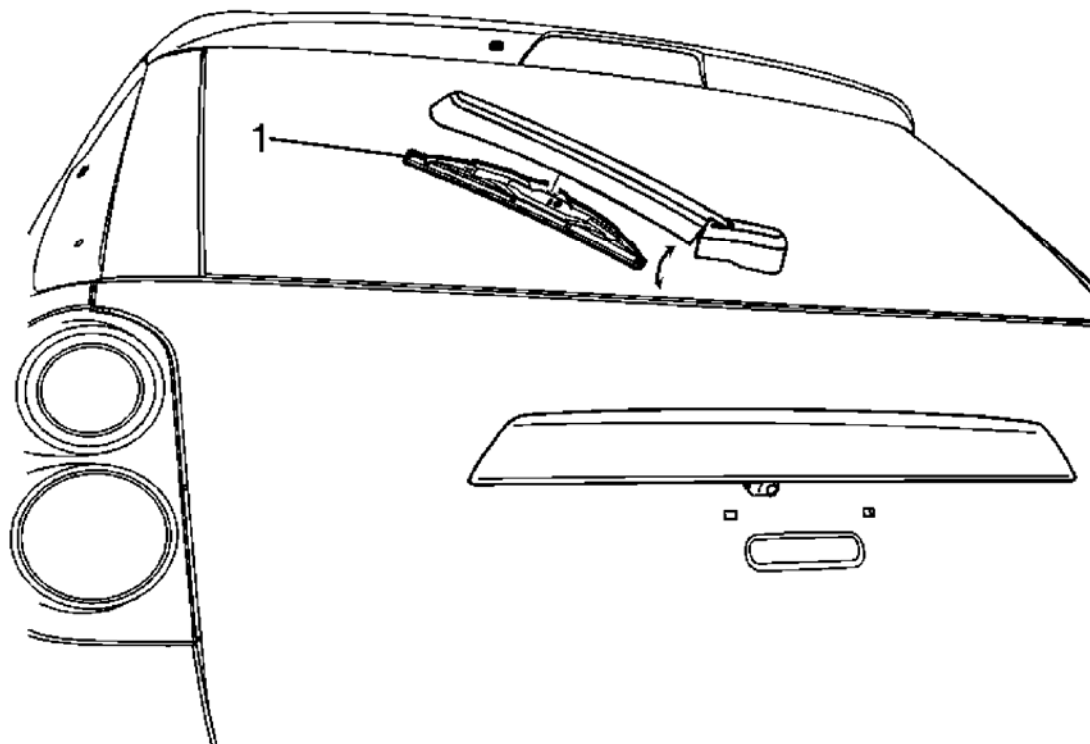


Fig. 33: Rear Window Wiper Blade (Equinox)
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Rear Window Wiper Blade Procedure 1. Lift the rear wiper arm off the rear window. 2. Disengage the inner wiper blade from the wiper arm cover retention clips. 3. Remove the rear window wiper blade.

REAR WINDOW WIPER BLADE REPLACEMENT (TERRAIN)

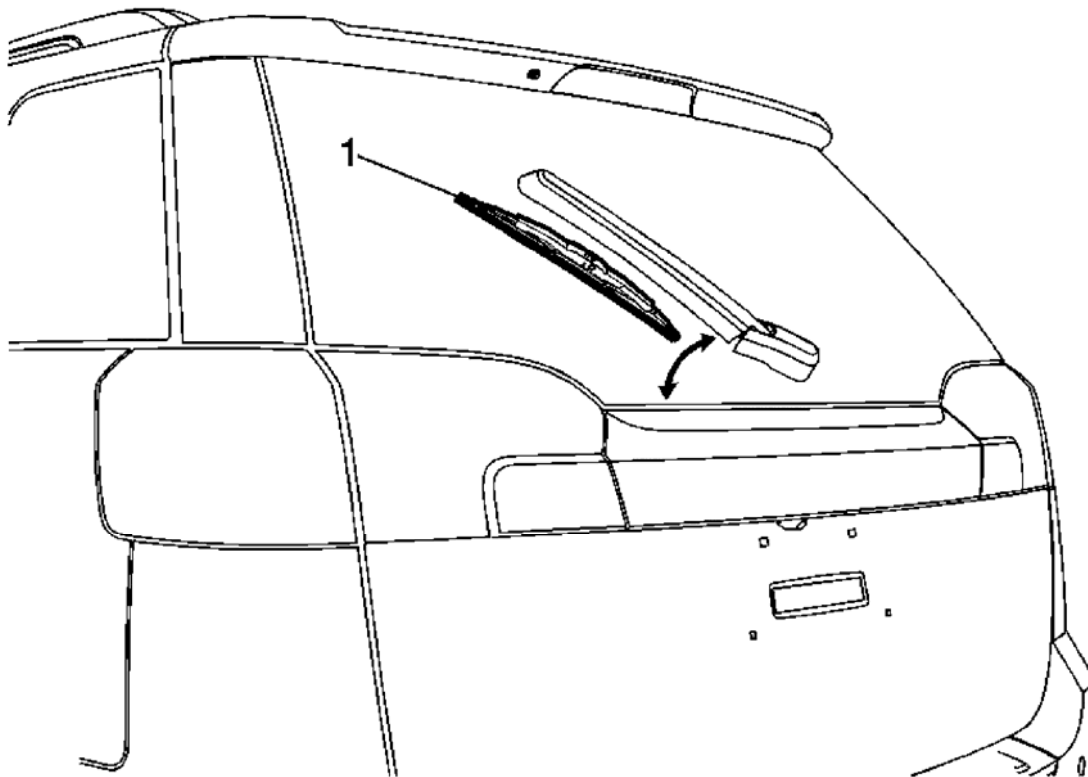


Fig. 34: Rear Window Wiper Blade (Terrain)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Rear Window Wiper Blade Procedure 1. Lift the rear wiper arm off the rear window. 2. Disengage the inner wiper blade from the wiper arm cover retention clips. 3. Remove the rear window wiper blade.

WINDSHIELD WIPER MOTOR REPLACEMENT (EQUINOX TERRAIN)

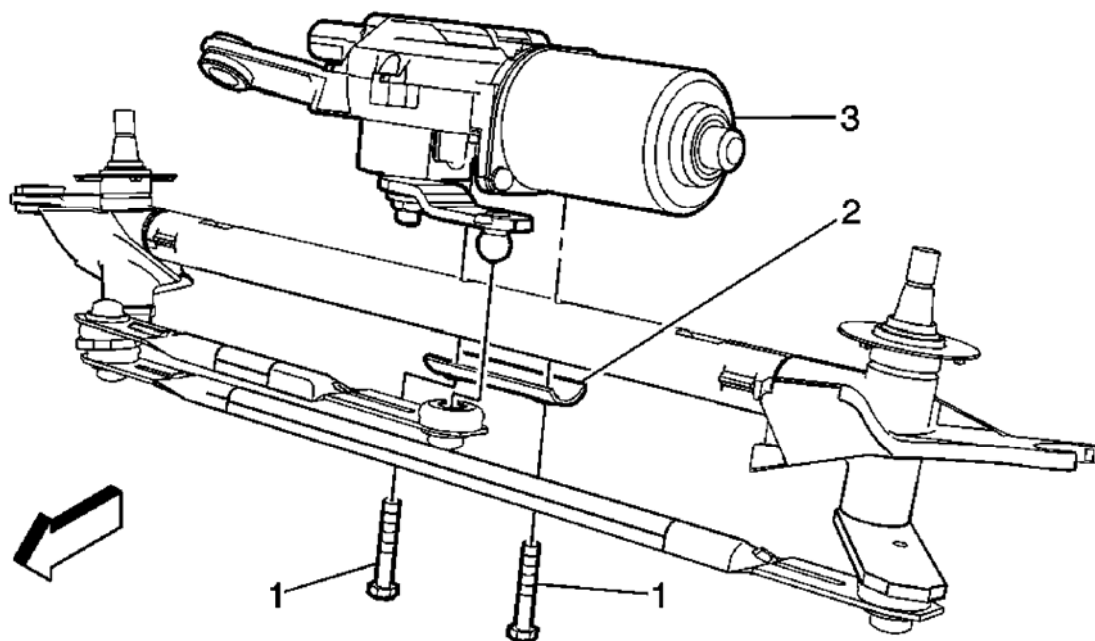


Fig. 35: Windshield Wiper Motor (Equinox Terrain)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the windshield wiper transmission. Refer to Windshield Wiper Transmission Replacement (Equinox) or Windshield Wiper Transmission Replacement (Terrain) .	
1	Windshield Wiper Motor Bolt (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 6 N.m (53 lb in)
2	Windshield Wiper Motor Plate
3	Windshield Wiper Motor Procedure - Using the J 39232: separator remove the wiper motor crank arm from the transmission link. - Remove the windshield wiper motor from the wiper transmission. - Position the new windshield wiper motor to the transmission. - Align the transmission links to the wiper motor crank arm. - Using the J 39529: installer secure the wiper motor crank arm ball to the transmission link ball socket.

6. Install the windshield wiper transmission. Refer to **Windshield Wiper Transmission Replacement (Equinox)** or **Windshield Wiper Transmission Replacement (Terrain)**.

Tools Required

- J 39232: Wiper Linkage Separator
- J 39529: Wiper Linkage Installer

For equivalent regional tools, refer to **Fastener Tightening Specifications**.

REAR WINDOW WIPER MOTOR REPLACEMENT (EQUINOX)

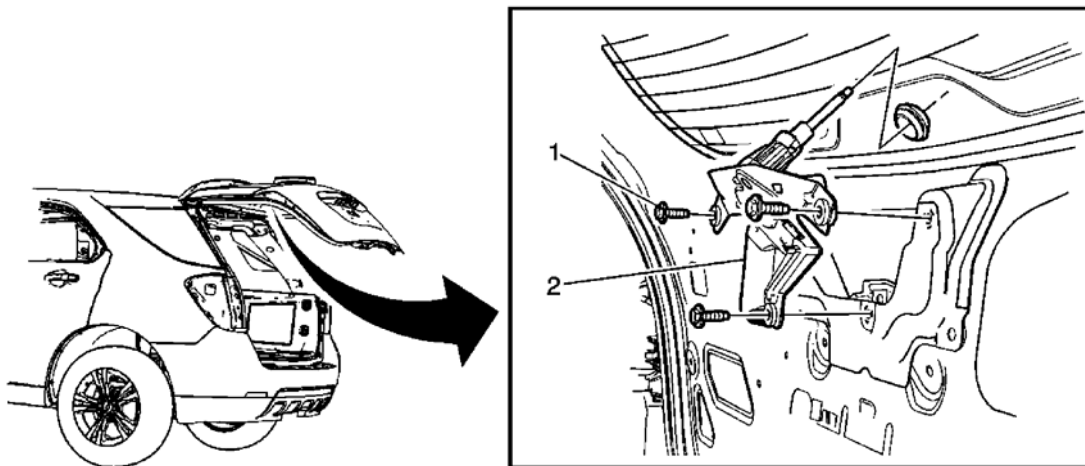


Fig. 36: Rear Window Wiper Motor (Equinox)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	
1. Remove the rear window wiper arm. Refer to <u>Rear Window Wiper Arm Replacement (Equinox)</u> or <u>Rear Window Wiper Arm Replacement (Terrain)</u>. 2. Open and support the rear liftgate. 3. Remove the liftgate lower trim finish panel. Refer to <u>Liftgate Lower Trim Finish Panel Replacement</u>.	
1	Rear Wiper Motor Bolt (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> .

	Tighten: 9 N.m (80 lb in)
	Rear Window Wiper Motor
2	Procedure 1. Disconnect the rear wiper motor electrical connector. 2. Pull the wiper motor assembly and bracket from the liftgate window grommet. 3. Remove the rear wiper motor from the vehicle.

REAR WINDOW WIPER MOTOR REPLACEMENT (TERRAIN)

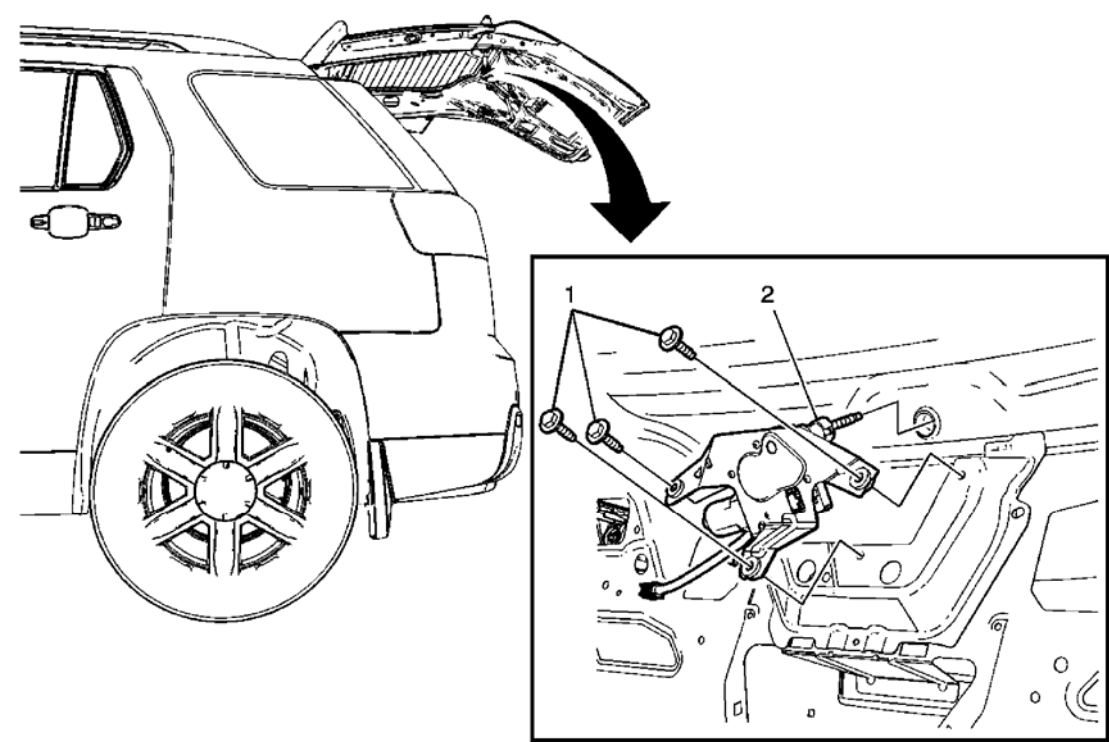


Fig. 37: Rear Window Wiper Motor (Terrain)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	
	1. Remove the rear window wiper arm. Refer to <u>Rear Window Wiper Arm Replacement (Equinox)</u> or <u>Rear Window Wiper Arm Replacement (Terrain)</u>. 2. Open and support the rear liftgate. 3. Remove the liftgate lower trim finish panel. Refer to <u>Liftgate Lower Trim Finish Panel Replacement</u>.
	Rear Window Wiper Motor Bolt (Qty: 3)

1	CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 9 N.m (80 lb in)
2	Rear Window Wiper Motor Procedure 1. Pull the wiper motor assembly from the liftgate window grommet. 2. Disconnect the rear wiper motor electrical connector. 3. Remove the rear wiper motor from the vehicle.

WINDSHIELD WIPER TRANSMISSION REPLACEMENT (EQUINOX)

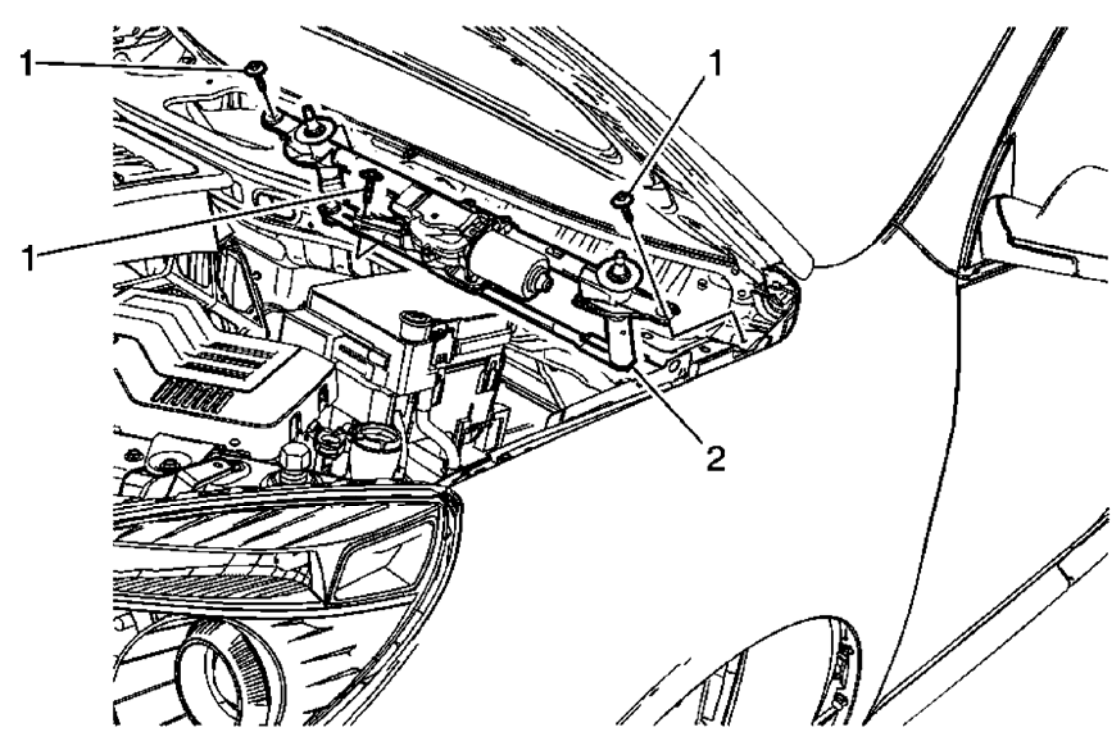


Fig. 38: Windshield Wiper Transmission (Equinox)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	
1. Remove the air inlet screen. Refer to <u>Air Inlet Screen Replacement (Equinox)</u> or <u>Air Inlet Screen Replacement (Terrain)</u>. 2. Disconnect the electrical connector to the windshield wiper motor.	

1	Windshield Wiper Motor Transmission Bolt (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 9 N.m (80 lb in)
2	Windshield Wiper Motor Transmission Procedure 1. Transfer the windshield wiper motor to the transmission assembly. Refer to <u>Windshield Wiper Motor Replacement (Equinox Terrain)</u>. 2. Position the transmission assembly into the plenum upper panel. 3. Secure the transmission to outer fender flange bolt first, followed with the other two transmission bolts.

WINDSHIELD WIPER TRANSMISSION REPLACEMENT (TERRAIN)

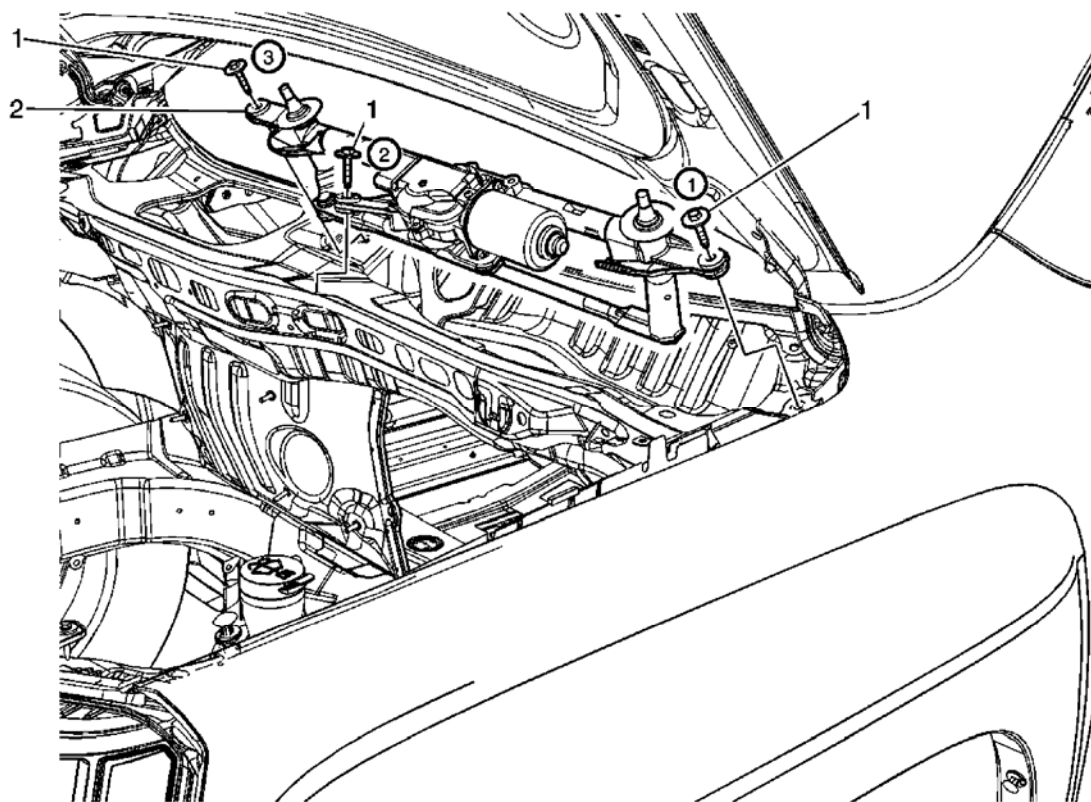


Fig. 39: Windshield Wiper Transmission (Terrain)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the air inlet screen. Refer to <u>Air Inlet Screen Replacement (Equinox)</u> or <u>Air Inlet Screen Replacement (Terrain)</u> . 2. Disconnect the electrical connector to the windshield wiper motor.	
1	Windshield Wiper Motor Transmission Bolt (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 9 N.m (80 lb in)
2	Windshield Wiper Motor Transmission Procedure 1. Remove and install the windshield wiper motor. Refer to <u>Windshield Wiper Motor Replacement (Equinox Terrain)</u> . 2. Position the transmission assembly into the plenum upper panel. 3. Secure the electrical connector to the windshield wiper motor. 4. Secure the transmission to outer fender flange bolt first, followed with the other two transmission bolts, (as shown).

REAR WINDOW WIPER MOTOR GROMMET REPLACEMENT (TERRAIN)

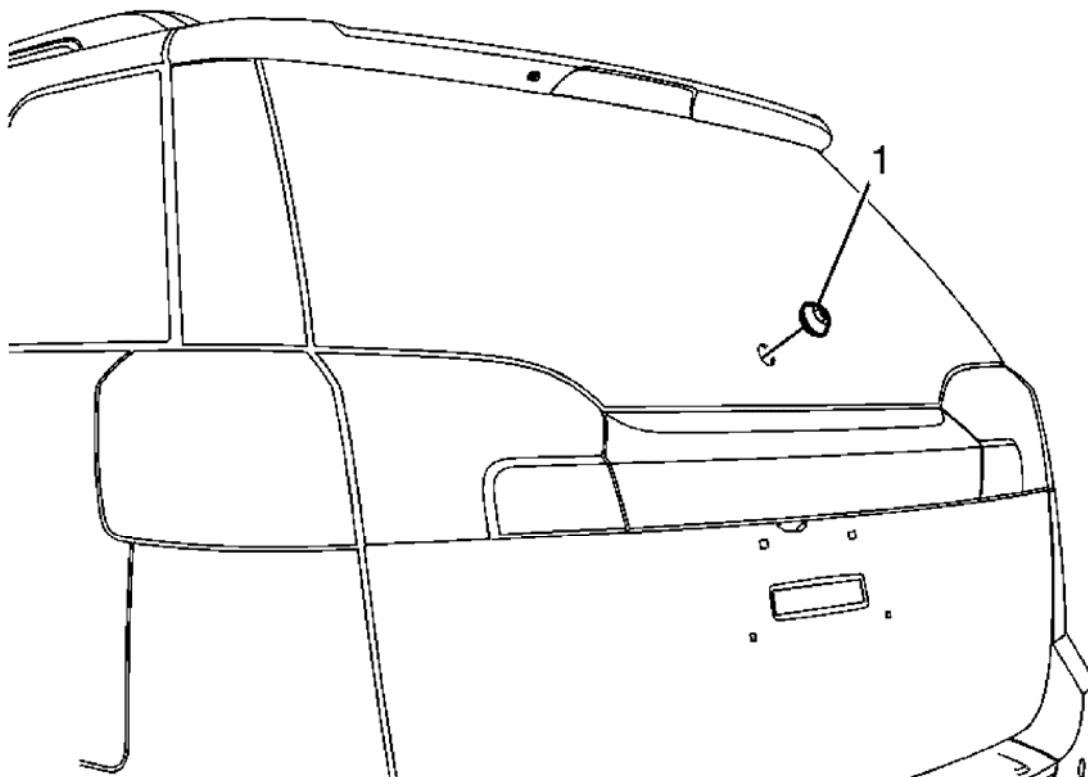


Fig. 40: Rear Window Wiper Motor Grommet (Terrain)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	
1. Remove the rear window wiper arm. Refer to <u>Rear Window Wiper Arm Replacement (Equinox)</u> or <u>Rear Window Wiper Arm Replacement (Terrain)</u> .	
2. Remove the rear window wiper motor. Refer to <u>Rear Window Wiper Motor Replacement (Equinox)</u> or <u>Rear Window Wiper Motor Replacement (Terrain)</u> .	
1	Rear Window Wiper Motor Grommet Tip: Apply a very small amount of lithium grease to the inner grommet where the grommet seals to the glass, to a aid in the installation of the grommet.

DESCRIPTION AND OPERATION

WIPER/WASHER SYSTEM DESCRIPTION AND OPERATION

Wiper/Washer System Components

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

- Windshield Wiper Relay

- Windshield Wiper Speed Control Relay
- 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

Windshield Wiper System

The body control module (BCM) determines the front wipe/wash system mode of operation by monitoring several signals from the front wipe/wash switch as indicated in the wiper switch

The front wipe/wash switch receives a reference ground signal from the BCM. Each input of the BCM provides a switched battery pull-up for each front wiper/washer switch output signal it receives. All the BCM inputs are recognized as active when the wiper switch provides a path to the referenced ground signal. The first signal received by the BCM is the result of 6 resistors in the front wiper switch configured as a resistor ladder network. This signal is connected to a BCM analog to digital input. Depending on the function selected (High, Low, Intermittent 1 thru 5, Mist, Off), the front 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 wiper motor On/Off Relay. It should be noted that High, Low, and Mist all have the same value on this signal circuit. The second signal received from the front wiper switch is active only when the front wiper switch is in the high speed wiper position. When the wiper switch is not in the high speed position, the switch is open and the signal circuit is pulled to battery by the BCM. When the wiper switch is in the high speed position, the switch pulls the circuit low. The BCM determines how to control the Wiper high/low speed relay from this input. The third signal received from the front wiper switch is from the momentary windshield wash control switch. When the washer switch is not active the switch is open and the signal circuit is pulled to battery by the BCM. When the washer switch is active, the switch pulls the circuit low. The BCM controls the windshield wash and windshield wash activated wiper operation based on this input.

The BCM controls front wiper motor operation through two output signals and the monitoring of one input signal. The two outputs (one high side drive, one low side drive) are used to control two external wiper motor relays: front wiper motor on/off relay: which provides the wiper motor with battery power when it is activated by the high side drive signal (switched battery) from the BCM. When left deactivated, the normally closed contacts provide a ground to the wiper motor. Wiper high/low speed relay: when activated by a low side drive signal (ground) from the BCM, it switches the power supplied by the wiper motor on/off relay to the motor high speed input. When left deactivated, the normally closed contacts connect the power supplied by the wiper motor on/off relay to the motor low speed input. The input used by the BCM is from the park switch located in the wiper motor assembly. When the wiper blades are not in the park position, the wiper park switch is open and the

circuit is pulled up to battery by the BCM. When the wiper blades are in the park position at the bottom of the glass, the wiper park switch closes to ground pulling the park signal circuit low.

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.

Redundant high speed switch pass through. The BCM provides redundant circuitry which places battery power on its wiper motor on/off relay output with activation of its low assertion high speed wiper switch input. The BCM shall be capable of doing this, even if the module has lost all microprocessor control. This redundant circuit shall supply power while in the RUN and CRANK power modes. however; while in the CRANK power mode, the pass through shall only be active if the BCM is NOT in a computer operating properly state.

To initiate high speed operation, the BCM energizes both the front wiper motor on/off relay and the wiper high/low speed 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 switched contacts of the wiper high/low speed relay, to the high speed control circuit of the windshield wiper motor.

Parking the wiper motor. In order to perform an accurate read of the park switch and to ensure the wipers will come to rest while still in the park position, parking of the wipers only occurs while in a low speed wiper mode. This requires that if the wipers are performing a high speed wiper operation at the time they are required to park, the BCM shall transition the Wipers to low speed by deactivating the wiper high/low relay before attempting to park. In order to park the wipers, 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 seconds, 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 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

Windshield Washer System

The BCM controls the windshield wash operation and windshield wash activated wiper operation. When the BCM detects the activation of the momentary windshield wash control switch, it activates its washer pump relay drive output which supplies battery power to the coil of the washer pump relay. This energizes the relay, which switches battery power to the pump motor. The BCM will also activate continuous low speed windshield wipes as described above. Upon deactivation of the windshield wash control switch, the wiper control module (BCM) shall deactivate the wash motor and will also park the wiper motor as described above unless the drip wipe feature is enabled. On some vehicles the drip wipe feature will be enabled and cause the system to provide additional wiping of the windshield after the switch has been released and fluid is no longer being applied. The front wash feature may attempt to detect a stuck switch. When enabled, activation of the wash feature shall be limited to 10 seconds.

On vehicles with the Rear Wash feature a single reversing wash motor may be utilized for both the front and rear wash operation. In this system the wash motor is operated in one direction to spray fluid on the front windshield and then operated in the reverse direction to spray fluid on the rear window. The BCM Controls the reversing wash motor through two High Side Drive outputs. One controls the Front Wiper Motor Relay and one controls the Rear Wiper Relay.

Rear Wiper System

On vehicles equipped with a Rear Wiper, the BCM determines of the Rear Wipe/Wash System Mode of Operation by monitoring the multiplexed output of the Rear Wipe/Wash Switch. The Rear Wipe Wash Switch uses a reference ground signal from the BCM. The BCM provides a switched Battery pull-up for the Rear Wiper/Washer Switch output signal it receives. All the BCM inputs are recognized as active when the Rear Wiper Switch provides a path to the referenced ground signal. 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 (Low, Intermittent, 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 Controls the single speed Rear Wiper Motor by its Active High output to the external Rear Wiper Motor Relay. When the BCM activates its 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 control input. The motor then operates continuously at low speed. 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 which will be used by the wiper for Dynamic

Braking. The Rear Wiper internal park switch and circuitry will sustain motor operation until the wiper arm has returned to its Park position.

Rear Wash

When the Body Control Module detects that the Rear wiper/wash switch has activated the momentary Wash switch, it activates a High Side Drive output which supplies Battery to the coil of the Rear Washer Pump Relay. This energizes the Relay, which switches Battery Power to the Washer Pump Motor. The BCM will also activate continuous Low Speed Windshield Wipers as described above. The BCM software will attempt to detect a stuck Rear Wash Switch. A stuck Rear Wash Switch condition is detected if the Rear Wash Motor Relay Output has been continuously active for 10 seconds or more. Upon detecting this the BCM will fail soft the state of the Rear Wash Control to Inactive. This shall cause the System to perform as if the momentary Wash control had been released.