

2007 Hummer H3

2007 ACCESSORIES & EQUIPMENT Wipers and Washers - H3

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Wipers and Washers - H3

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

| Application | Specification | |
|--------------------------------|---------------|----------|
| | Metric | English |
| Front Wiper Arm Shaft Nut | 21 N.m | 15 lb ft |
| Front Wiper Motor Bolts | 12 N.m | 9 lb ft |
| Rear Wiper Arm Nut | 9 N.m | 80 lb in |
| Rear Wiper Motor Bolts | 10 N.m | 89 lb in |
| Washer Solvent Reservoir Nuts | 10 N.m | 89 lb in |
| Wiper Motor Transmission Bolts | 10 N.m | 89 lb in |

SCHEMATIC AND ROUTING DIAGRAMS

WIPER/WASHER SCHEMATICS

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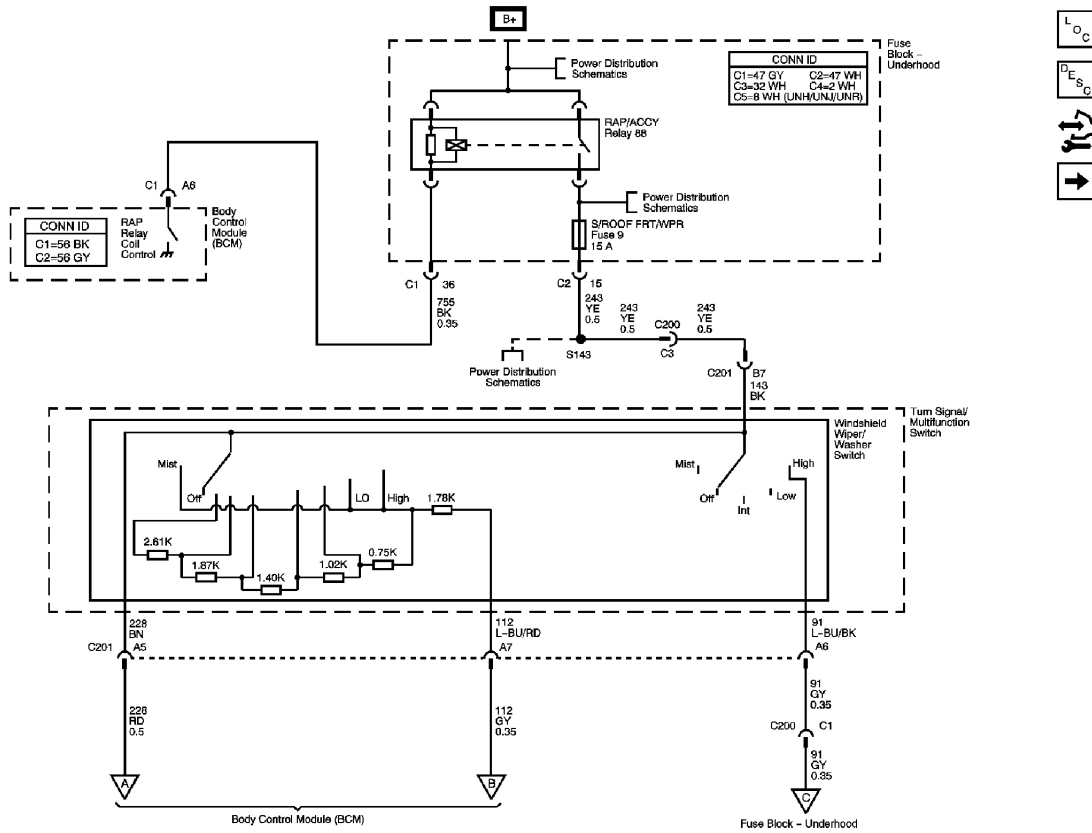


Fig. 1: Windshield Wiper/Washer Switch Schematic
 Courtesy of GENERAL MOTORS CORP.

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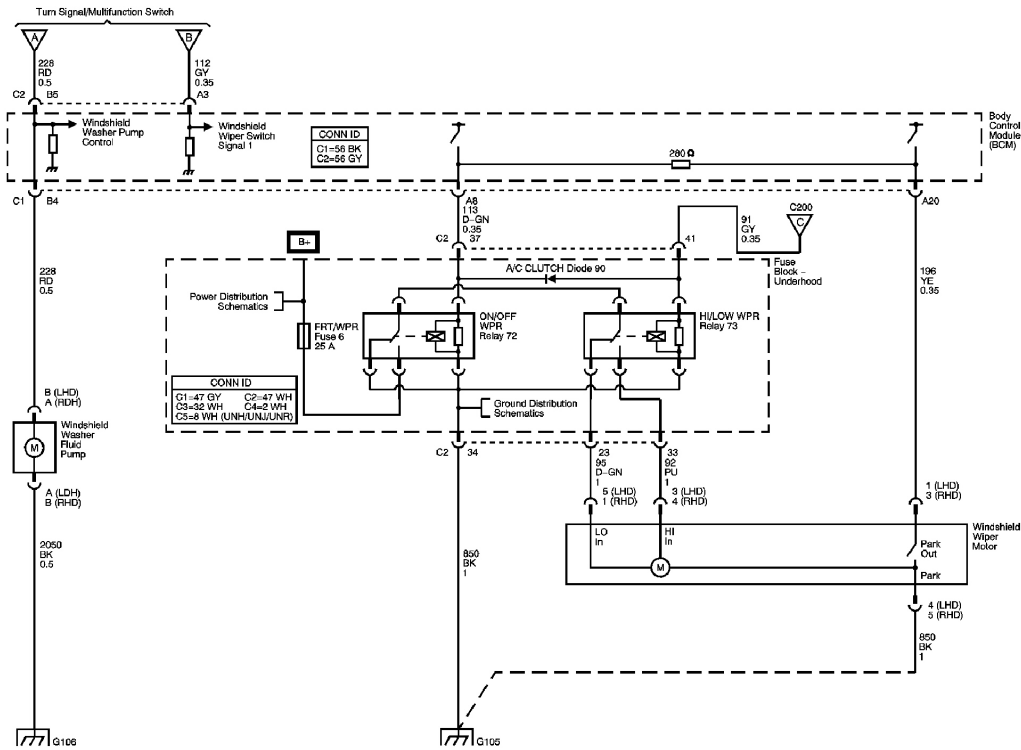


Fig. 2: Windshield Washer Fluid Pump and Windshield Wiper Motor Schematic
 Courtesy of GENERAL MOTORS CORP.

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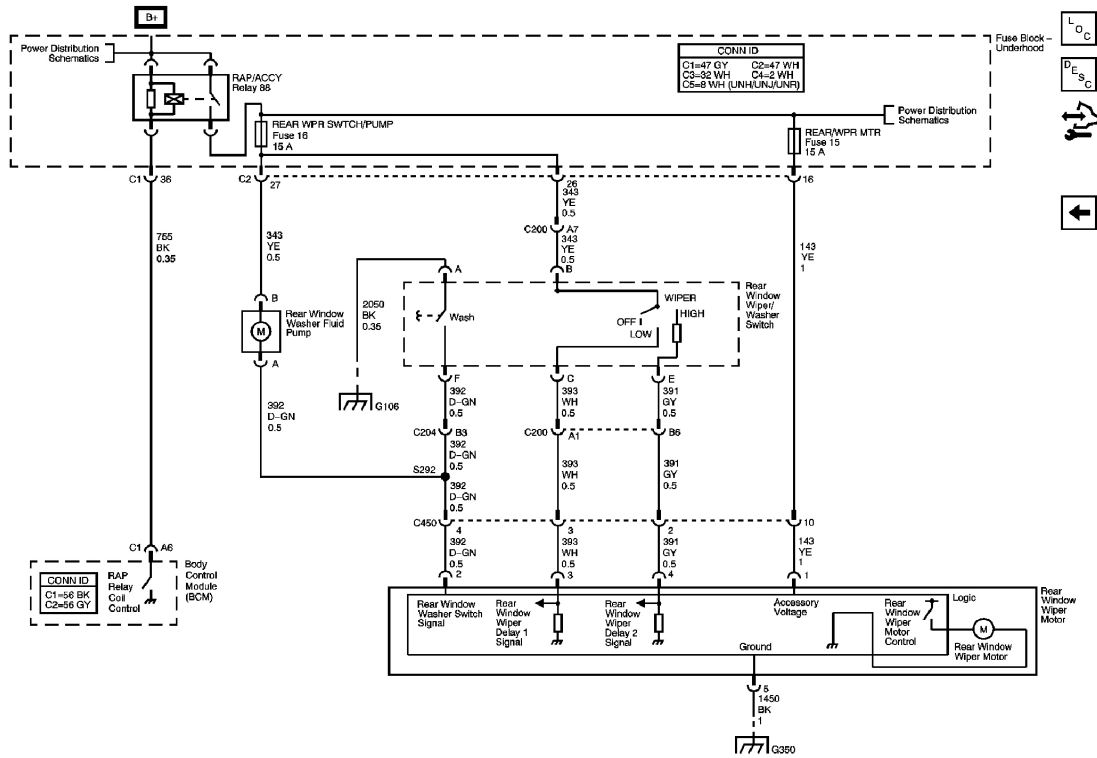


Fig. 3: Rear Wiper Schematic
 Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

WIPER/WASHER COMPONENT VIEWS

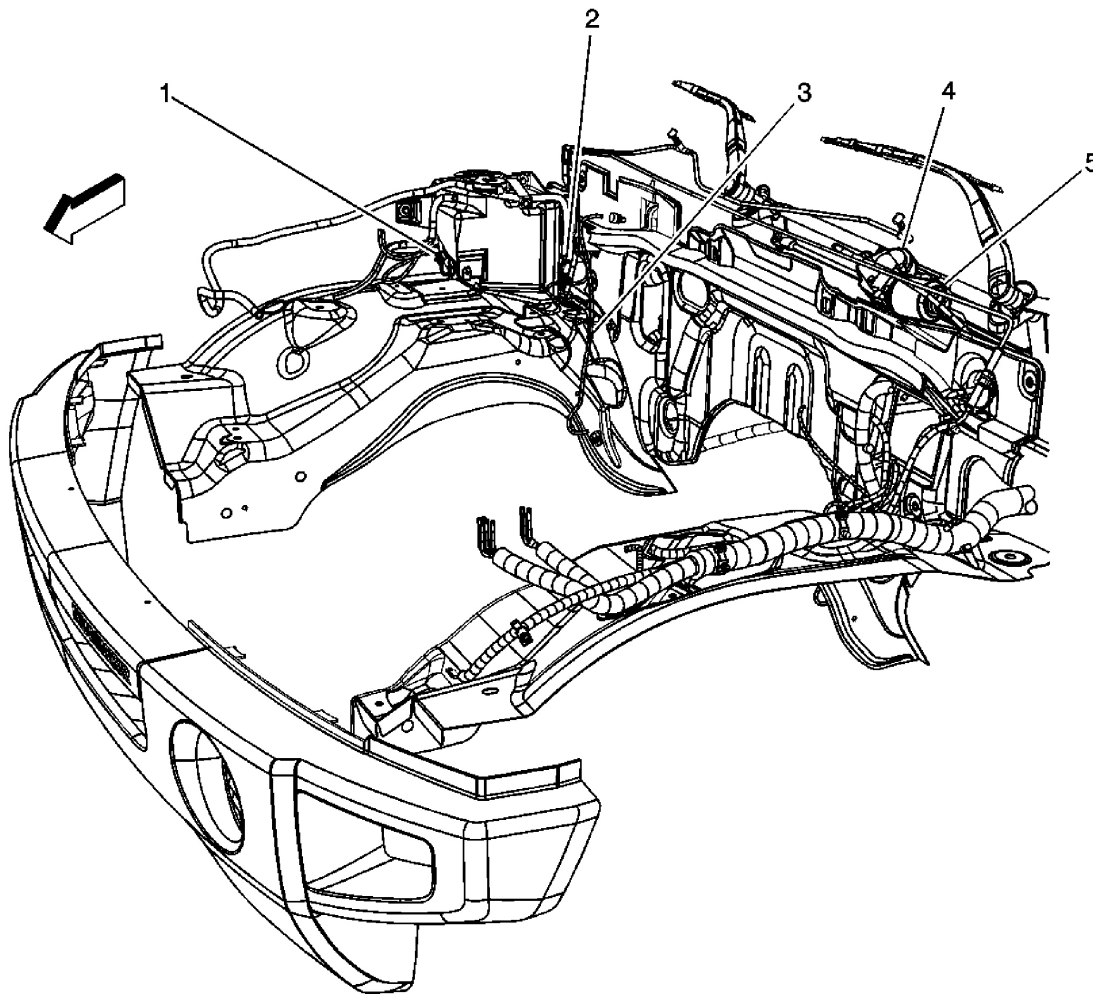


Fig. 4: View Of Engine Compartment
 Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 4

| Callout | Component Name |
|---------|--------------------------------|
| 1 | Rear Window Washer Fluid Pump |
| 2 | Windshield Washer Fluid Pump |
| 3 | Body Harness |
| 4 | Windshield Wiper/Washer Module |
| 5 | Windshield Wiper Motor |

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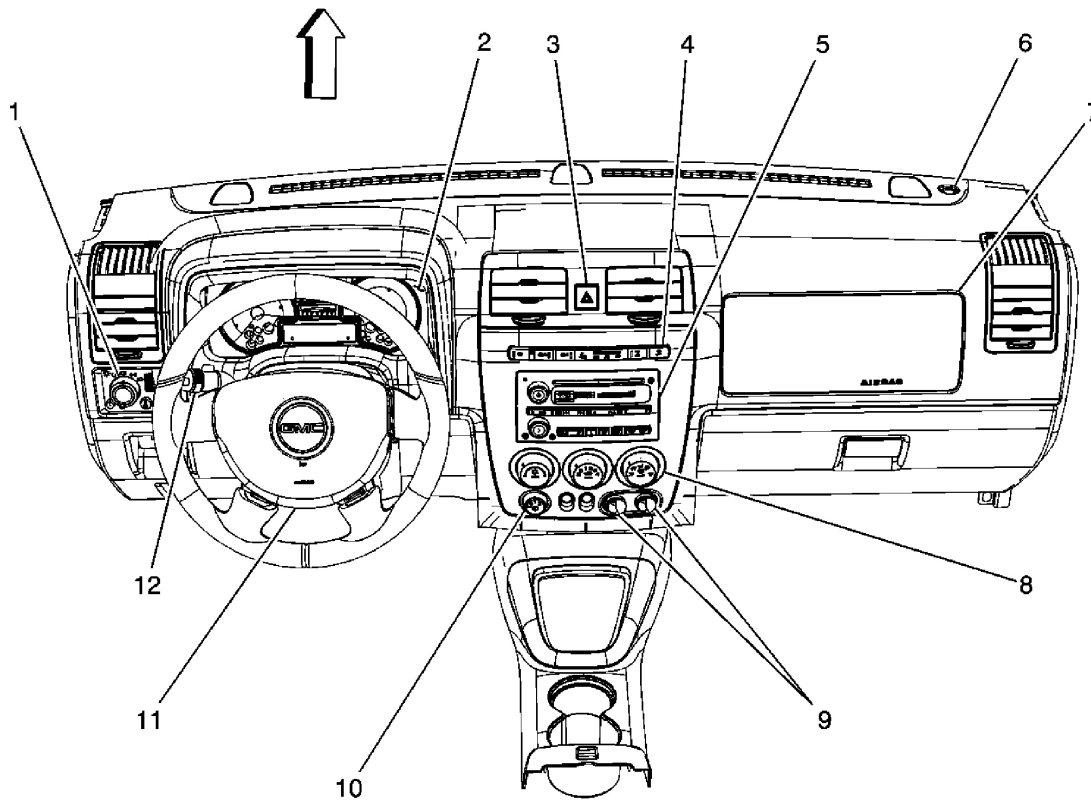


Fig. 5: Identifying I/P Harness Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 5

| Callout | Component Name |
|---------|--|
| 1 | Headlamp Switch |
| 2 | Instrument Panel Cluster (IPC) |
| 3 | Hazard Switch |
| 4 | Accessory Switch |
| 5 | Radio |
| 6 | Ambient Light Sensor |
| 7 | Inflatable Restraint I/P Module |
| 8 | HVAC Control Module |
| 9 | Auxiliary Power Outlets - Front |
| 10 | Rear Window Wiper/Washer Switch |
| 11 | Inflatable Restraint Steering Wheel Module |
| 12 | Turn Signal/Multifunction Switch |

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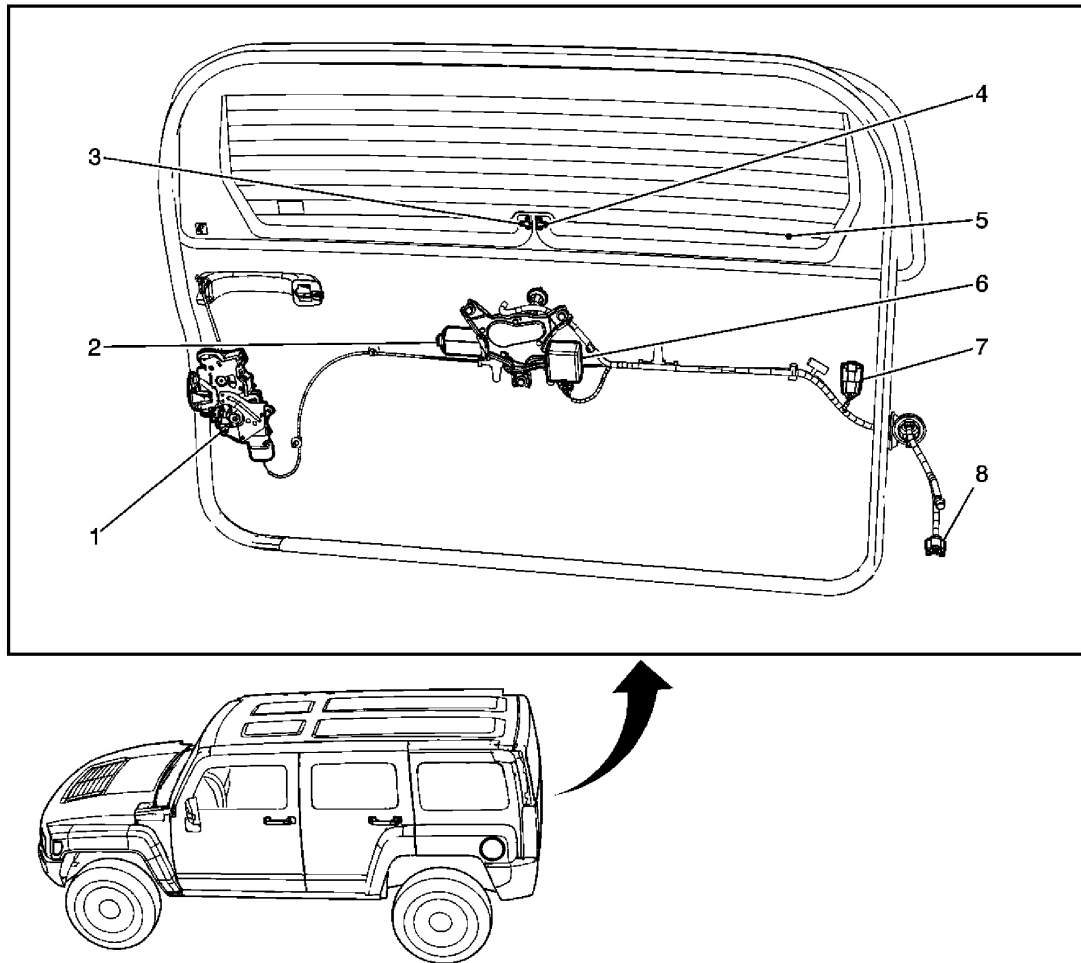


Fig. 6: Identifying Endgate Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 6

| Callout | Component Name |
|---------|--|
| 1 | Door Lock Actuator - Endgate |
| 2 | Rear Window Wiper Motor |
| 3 | Rear Window Defogger Connector |
| 4 | Rear Window Defogger Connector |
| 5 | Rear Window Defogger |
| 6 | Rear Window Wiper/Washer Module |
| 7 | C901 CHMSL Jumper Harness to Endgate Harness |
| 8 | C450 Body Harness to Endgate Harness |

WIPER/WASHER CONNECTOR END VIEWS

Rear Window Washer Fluid Pump (LHD)

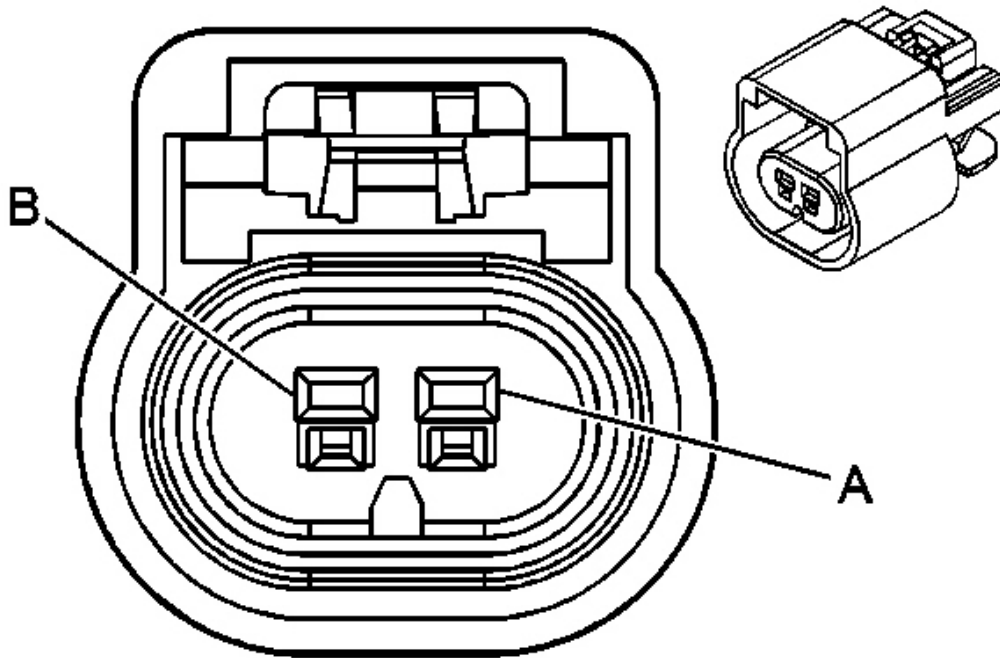


Fig. 7: Rear Window Washer Fluid Pump Connector End Views
Courtesy of GENERAL MOTORS CORP.

Rear Window Washer Pump Connector Parts Information

Connector Part Information

- OEM: 15326801
- Service: 15306156
- Description: 2-Way F GT 150 Series Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191818/8
- Core/Insulation Crimp: See Terminal Kit
- Release Tool/Test Probe: See Terminal Kit

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Rear Window Washer Fluid Pump (LHD) Connector Terminal Identification

| Pin | Wire Color | Circuit No. | Function |
|-----|------------|-------------|----------------------------------|
| A | D-GN | 392 | Rear Window Washer Switch Signal |
| B | YE | 343 | Accessory Voltage |

Rear Window Washer Fluid Pump (RHD)

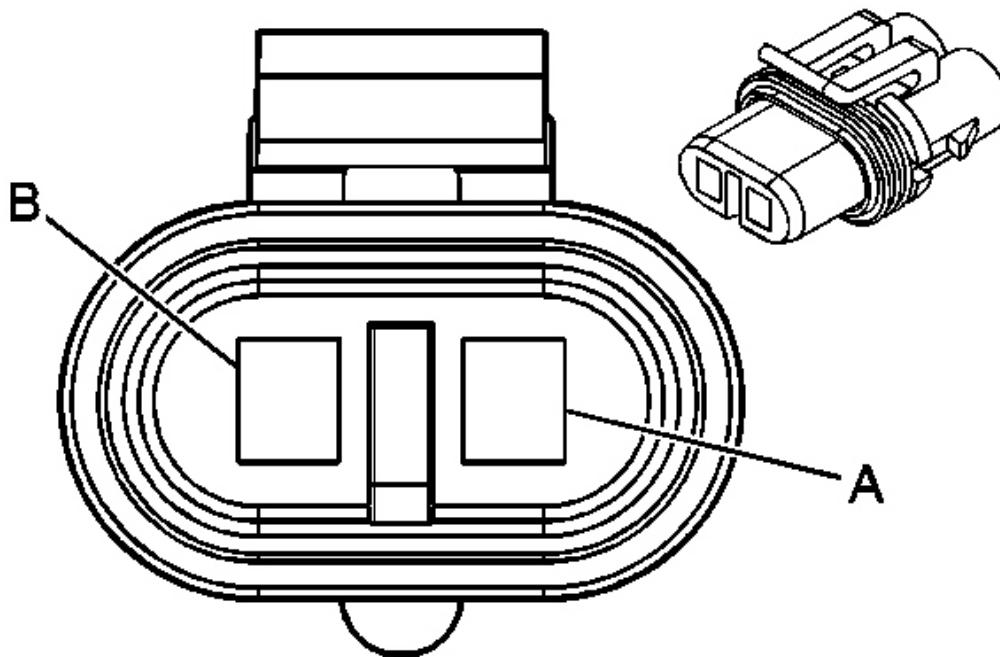


Fig. 8: Rear Window Washer Fluid Pump Connector End View
Courtesy of GENERAL MOTORS CORP.

Rear Window Washer Fluid Pump Connector Parts Information

Connector Part Information

- OEM: 12020599
- Service: 12102664
- Description: 2-Way F Metri-Pack 280 Series (BK)

Terminal Part Information

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- Terminal/Tray: 12191818/8
- Core/Insulation Crimp: See Terminal Kit
- Release Tool/Test Probe: See Terminal Kit

Rear Window Washer Fluid Pump (RHD) Connector Terminal Identification

| Pin | Wire Color | Circuit No. | Function |
|-----|------------|-------------|----------------------------------|
| A | D-GN | 392 | Rear Window Washer Switch Signal |
| B | YE | 343 | Accessory Voltage |

Rear Window Wiper Motor

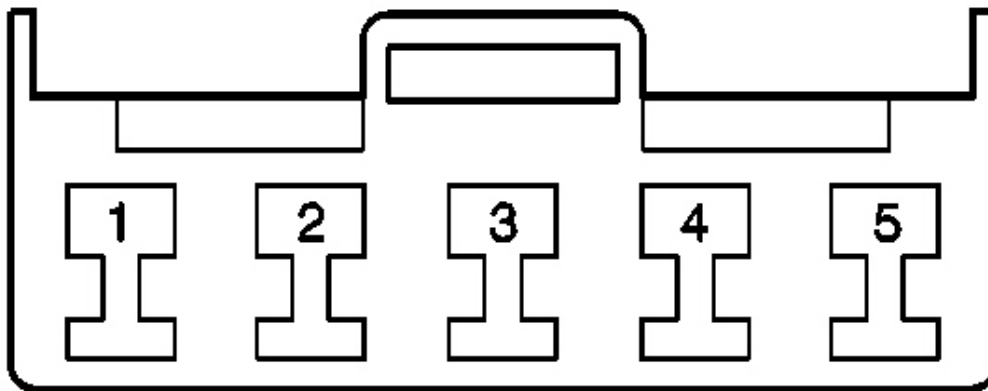


Fig. 9: Rear Window Wiper Motor Connector End View
Courtesy of GENERAL MOTORS CORP.

Rear Window Wiper Motor Connector Parts Information

Connector Part Information

- OEM: 1300-3111
- Service: 88988645
- Description: 5-Way F 090 Series (WH)

Terminal Part Information

- Pins: 1, 5

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- Terminal/Tray: 8240-4892/22
- Core/Insulation Crimp: 2/4
- Release Tool/Test Probe: 15315247/J-35616-18 (BK)

- Pins: 3-4
- Terminal/Tray: 8240-4882/22
- Core/Insulation Crimp: E/C
- Release Tool/Test Probe: 15315247/J-35616-18 (BK)

Rear Window Wiper Motor) Connector Terminal Identification

| Pin | Wire Color | Circuit No. | Function |
|-----|------------|-------------|----------------------------------|
| 1 | YE | 143 | Accessory Voltage |
| 2 | D-GN | 392 | Rear Window Washer Switch Signal |
| 3 | WH | 393 | Rear Window Wiper Delay 1 Signal |
| 4 | GY | 391 | Rear Window Wiper Delay 2 Signal |
| 5 | BK | 1450 | Ground |

Rear Window Wiper/Washer Switch

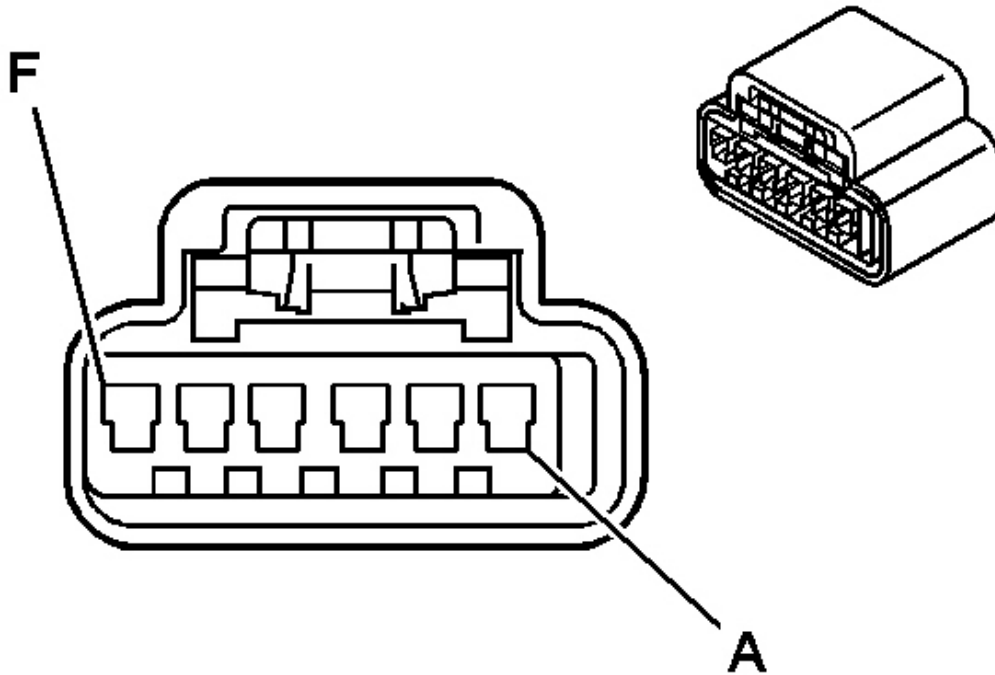


Fig. 10: Rear Window Wiper/Washer Switch Connector End View
 Courtesy of GENERAL MOTORS CORP.

Rear Window Wiper/Washer Switch Connector Parts Information

Connector Part Information

- OEM: 15332141
- Service: 88986249
- Description: 6-Way F GT 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12191811/3
- Core/Insulation Crimp: See Terminal Kit
- Release Tool/Test Probe: See Terminal Kit

Rear Window Wiper/Washer Switch) Connector Terminal Identification

| | | | |
|--|--|--|--|
| | | | |
|--|--|--|--|

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| Pin | Wire Color | Circuit No. | Function |
|-----|------------|-------------|---|
| A | BK | 2050 | Ground |
| B | YE | 343 | Accessory Voltage |
| C | WH | 393 | Rear Window Wiper Delay 1 Signal |
| D | GY | 8 | Instrument Panel Lamps Dimmer Switch Signal |
| E | GY | 391 | Rear Window Wiper Delay 2 Signal |
| F | D-GN | 392 | Rear Window Washer Switch Signal |

Windshield Washer Fluid Pump

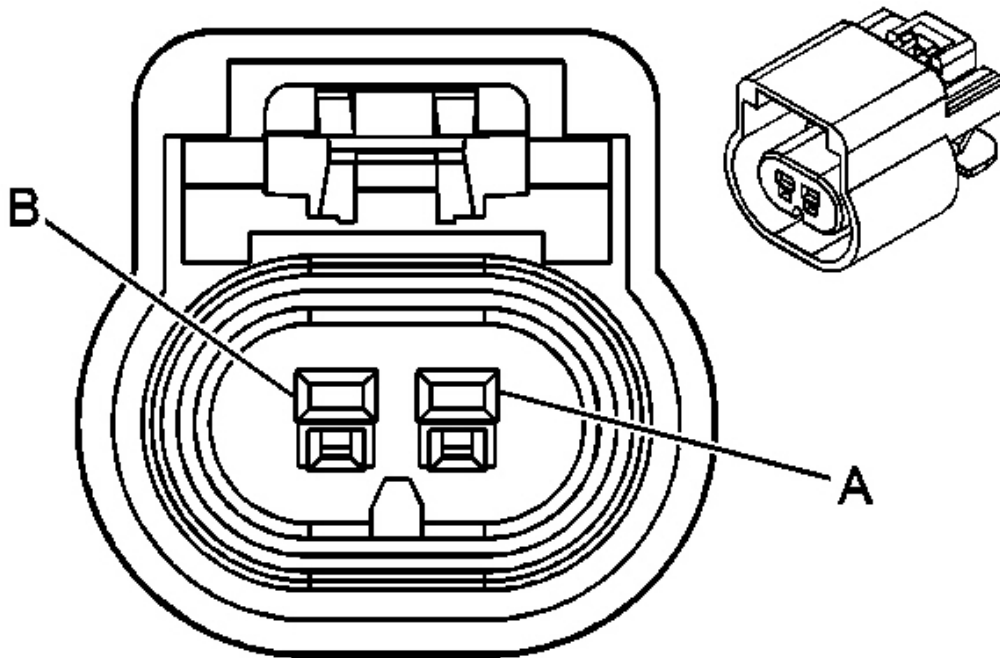


Fig. 11: Windshield Washer Fluid Pump Connector End View
 Courtesy of GENERAL MOTORS CORP.

Windshield Washer Pump Connector Parts Information

Connector Part Information

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- OEM: 15326801
- Service: 15306156
- Description: 2-Way F GT 150 Series Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191818/8
- Core/Insulation Crimp: See Terminal Kit
- Release Tool/Test Probe: See Terminal Kit

Windshield Washer Fluid Pump) Connector Terminal Identification

| Pin | Wire Color | Circuit No. | Function |
|-----|------------|-------------|--------------------------------------|
| A | BK | 2050 | Ground (LHD) |
| | RD | 228 | Windshield Washer Pump Control (RHD) |
| B | RD | 228 | Windshield Washer Pump Control (LHD) |
| | BK | 2050 | Ground (RHD) |

Windshield Wiper Motor

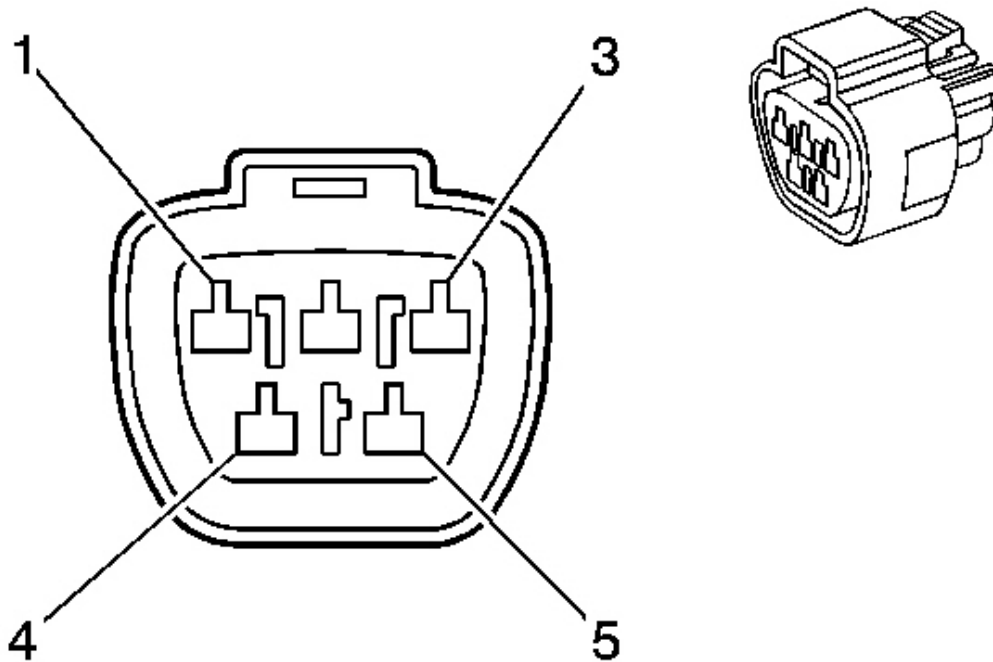


Fig. 12: Windshield Wiper Motor Connector End Views
Courtesy of GENERAL MOTORS CORP.

Windshield Wiper Motor Connector Parts Information

Connector Part Information

- OEM: 6189-0504
- Service: 88988646
- Description: 5-Way F 090 TS Series Sealed (GY)

Terminal Part Information

- Pins: 1
- Terminal/Tray: 8100-0460/6
- Core/Insulation Crimp: E/1
- Release Tool/Test Probe: 15315247/J-35616-2A (GY)

- Pins: 3-5

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- Terminal/Tray: 8100-0461/6
- Core/Insulation Crimp: 2/1
- Release Tool/Test Probe: 15315247/J-35616-2A (GY)

Windshield Wiper Motor) Connector Terminal Identification

| Pin | Wire Color | Circuit No. | Function |
|-----|------------|-------------|---|
| 1 | YE | 196 | Windshield Wiper Motor Park Switch Signal (LHD) |
| | D-GN | 95 | Windshield Wiper Motor Low Speed Control (RHD) |
| 2 | - | - | Not Used |
| 3 | PU | 92 | Windshield Wiper Motor High Speed Control (LHD) |
| | YE | 196 | Windshield Wiper Motor Park Switch Signal (RHD) |
| 4 | BK | 850 | Ground (LHD) |
| | PU | 92 | Windshield Wiper Motor High Speed Control (RHD) |
| 5 | D-GN | 95 | Windshield Wiper Motor Low Speed Control (LHD) |
| | BK | 850 | Ground (RHD) |

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - WIPER/WASHER SYSTEMS

Review the **Wiper/Washer System Description and Operation** before you begin the system diagnosis. Reviewing the Description and Operation will help you determine if the condition described by the customer is normal operation.

Begin the system diagnosis with the **Diagnostic System Check - Vehicle**. The Diagnostic System Check will provide the following information:

- The identification of the control modules which command the system
- The ability of the control modules to communicate through the serial data circuit
- The identification of any stored diagnostic trouble codes (DTCs) and their status

The use of the Diagnostic System Check will identify the correct procedure for diagnosing the

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system and where the procedure is located.

SCAN TOOL OUTPUT CONTROLS

Scan Tool Output Controls

| Scan Tool Output Control | Additional Menu Selection | Description |
|--------------------------|---------------------------|--|
| Wiper Relay | Miscellaneous Test | This output control commands the wiper micro relay ON and OFF. The wiper motor will operate at low speed when the wiper micro relay is ON. |

SCAN TOOL DATA LIST

Scan Tool Data List

| Scan Tool Parameter | Data List | Units Displayed | Typical Data Value |
|-------------------------------|-----------|-----------------|--------------------|
| Ignition On/Engine Off | | | |
| Washer Switch | Inputs | On/Off | Off |
| Wiper Delay Input | Data | volts | 0 |
| Wiper Park Switch | Inputs | Active/Inactive | Active |
| Wiper Relay Cmd. | Outputs | On/Off | Off |

SCAN TOOL DATA DEFINITIONS

Use the scan tool data display values and definitions information in order to assist in diagnosing vehicle malfunctions. Compare the vehicles actual scan tool data display with the typical data value in the table. Use the data in order to aid in understanding the nature of the concern when the vehicle data display does not match the typical data values. Refer to **Scan Tool Data List**.

The typical scan tool data values were taken from a known good vehicle under the following conditions:

- The ignition switch is in the ON position.
- The windshield wiper/washer switch is OFF.

Washer Switch

The body control module (BCM) uses this input to determine if the wash switch is pressed. If it is pressed, the BCM commands the wiper micro relay ON and keeps it ON until 2 wipe cycles have completed after the switch has been released.

Wiper Delay Input

The BCM uses this input to determine if it should command the wiper micro relay ON and the length of the delay between wiper strokes. The scan tool displays 0 volts when the windshield wiper switch is OFF.

Wiper Park Switch

The BCM uses this input to determine if the wipers are approaching the park position. The scan tool displays Active when the BCM detects ground on the windshield wiper motor park switch signal circuit.

Wiper Relay Cmd.

This output displays whether or not the BCM or any other voltage source, is providing voltage for the wiper micro relay. ON is displayed when the BCM detects voltage on the windshield wiper switch signal 2 circuit.

DTC B3715, B3716, B3717, B3718 OR B3719

Circuit Description

The body control module (BCM) controls and monitors the state of the ON/OFF wiper relay control circuit. When the windshield wiper switch is placed in to a low speed setting, a signal is applied to the BCM. The BCM then applies battery positive voltage to the coil side of the ON/OFF WPR relay through the relay control circuit. This energizes the relay, allowing battery positive voltage from the FRT/WPR fuse through the switched side of the ON/OFF WPR relay through the HI/LOW WPR relay and to the windshield wiper motor. Ground is applied at all times to the coil sides of the wiper relays and the windshield wiper motor from G105.

DTC Descriptors

This diagnostic procedure supports the following DTCs:

- DTC B3717 Front Wiper Relay Drive Circuit Low
- DTC B3718 Front Wiper Relay Drive Circuit High

Conditions for Running the DTCs

- The ignition is ON.
- The ignition voltage is between 9-18.5 volts.

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Conditions for Setting the DTCs

The following conditions will cause these DTCs to set:

- DTC B3717, the BCM detects a low voltage level on the supply circuit of the wiper micro relay for 1 second when the relay is energized.
- DTC B3718, the BCM detects a high voltage level on the supply circuit of the wiper micro relay for 1 second when the relay is de-energized.

Action Taken When the DTC Sets

The BCM de-energizes the wiper micro relay, until the wiper switch is turned OFF and ON.

Conditions for Clearing the DTCs

- DTC B3717 will change from current to history when the windshield wiper switch is turned OFF and ON and the condition is no longer present.
- DTC B3718 will change from current to history when the condition is no longer present.
- A history DTC will clear after 100 ignition cycles, without a repeat of the malfunction.

DTC B3715, B3716, B3717, B3718 or B3719

| Step | Action | Yes | No |
|--|--|--|---|
| Schematic Reference: <u>Wiper/Washer Schematics</u> Connector End View Reference: <u>Wiper/Washer Connector End Views</u> | | | |
| 1 | Did you perform the Diagnostic System Check - Vehicle? | Go to Step 2 | Go to <u>Diagnostic System Check - Vehicle</u> |
| 2 | 1. Turn the ignition to the ON position. 2. Turn the wiper switch to the low position. Do the windshield wipers operate? | Go to <u>Testing for Intermittent Conditions and Poor Connections</u> | Go to Step 3 |
| 3 | 1. Turn the ignition to the OFF position. 2. Turn the wiper switch OFF. 3. Remove the ON/OFF WPR relay from the underhood fuse block. 4. Using a test lamp connected to | | |

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| | | | |
|---|---|----------------------|----------------------|
| | ground, probe the relay control circuit at the underhood fuse block. | | |
| | Does the test lamp illuminate? | Go to Step 8 | Go to Step 4 |
| 4 | <ol style="list-style-type: none"> 1. Leave the test lamp connected. 2. Turn the ignition to the ON position. 3. Turn the wiper switch to the low position. | | |
| | Does the test lamp illuminate? | Go to Step 5 | Go to Step 6 |
| 5 | <ol style="list-style-type: none"> 1. Turn the wiper switch to the OFF position. 2. Turn the ignition to the OFF position. 3. Using a test lamp, probe the relay control circuit and the ground circuit of the relay at the underhood fuse block. 4. Turn the ignition to the ON position. 5. Turn the wiper switch to the low position. | | |
| | Does the test lamp illuminate? | Go to Step 9 | Go to Step 7 |
| 6 | <p>Test for a poor connection, an open or short to ground in the ON/OFF wiper relay control circuit. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> .</p> <p>Did you find and correct the condition?</p> | Go to Step 12 | Go to Step 10 |
| 7 | <p>Test for a poor connection or an open in the ground circuit of the ON/OFF WPR relay. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> .</p> <p>Did you find and correct the condition?</p> | Go to Step 12 | Go to Step 11 |
| 8 | <p>Repair a short to battery positive voltage in the ON/OFF wiper relay control circuit. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> .</p> | | |

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| | | | |
|----|---|----------------------|----------------------|
| | Did you complete the repair? | Go to Step 12 | - |
| 9 | <p>1. Replace the ON/OFF WPR relay. Refer to <u>Relay Replacement (Attached to Wire Harness)</u> or <u>Relay Replacement (Within an Electrical Center)</u> .</p> <p>2. Operate the vehicle within the Conditions for Running the DTC.</p> | | |
| | Does the DTC reset? | Go to Step 11 | Go to Step 12 |
| 10 | <p>Replace the body control module (BCM). Refer to <u>Control Module References</u> for replacement, setup and programming. Did you complete the replacement?</p> | Go to Step 12 | - |
| 11 | <p>Replace the underhood electrical center. Refer to <u>Underhood Electrical Center or Junction Block Replacement</u> . Did you complete the replacement?</p> | Go to Step 12 | - |
| 12 | <p>1. Use the scan tool in order to clear the DTCs.</p> <p>2. Operate the vehicle within the Conditions For Running the DTC as specified in the supporting text.</p> | | |
| | Does the DTC reset? | Go to Step 2 | System OK |

SYMPTOMS - WIPER/WASHER SYSTEMS

IMPORTANT: Review the system operation in order to familiarize yourself with the system functions. Refer to Wiper/Washer System Description and Operation.

Visual/Physical Inspection

- Inspect the washer fluid reservoir for the proper fluid level and condition.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Inspect for aftermarket devices which could affect the operation of the Windshield

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Wiper/Washer System.

Intermittent

- If the wipers operate at low speed for approximately 3 seconds and then stop, the wiper motor park switch or its signal circuit, may be malfunctioning.
- 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 Washer System Malfunction**
- **Rear Wiper Washer System Malfunction**

WINDSHIELD WIPER WASHER SYSTEM MALFUNCTION

Diagnostic Fault Information

IMPORTANT: Always perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.

Windshield Wiper Washer System Malfunction

| Circuit | Short to Ground | Open/High Resistance | Short to Voltage | Signal Performance |
|--------------------------------|-----------------|----------------------|------------------|--------------------|
| Switch Supply Voltage | 1 | 1 | - | - |
| Wiper Switch Signal 1 | 2 | 2 | 2 | - |
| Wiper Switch Signal 2 | 1 | 3 | 4 | - |
| Washer Pump Control | 1 | 5 | 6 | - |
| Wiper Relay Control | B3717 | 2 | B3718 | - |
| Wiper Motor Low Speed | 1 | 2 | - | - |
| Wiper Motor High Speed | 1 | 3 | 4 | - |
| Wiper Motor Park Switch Signal | 2 | 2 | 2 | - |
| Wash Pump Ground | - | 6 | - | - |
| Wiper Relay Ground | - | 1 | - | - |
| Wiper Motor Ground | - | 1 | - | - |

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1. Wipers Inoperative All Modes
2. Delay or Low Speed Wipers Inoperative
3. High Speed Wipers Inoperative
4. Wipers Always On
5. Washers Inoperative
6. Washers Always On

Circuit/System Description

Wash, Mist, Delay 1-5, Low and Park are all low speed wiper motor functions controlled by the body control module (BCM). The BCM energizes the ON/OFF WPR relay in order to operate the wiper motor at low speed. The high speed wiper function operates independent of the wiper switch signal 1 circuit and any BCM output. During high speed wiper operation the wiper switch signal 2 circuit directly energizes the HI/LOW WPR relay and energizes the ON/OFF WPR relay through the wiper diode #90.

Diagnostic Aids

If the wiper motor runs at high speed during the low speed modes replace the wiper diode #90.

Reference Information

Schematic Reference

Wiper/Washer Schematics

Connector End View Reference

Wiper/Washer Connector End Views

Electrical Information Reference

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

Scan Tool Reference

- Scan Tool Output Controls
- Scan Tool Data List

• **Scan Tool Data Definitions**

Circuit Testing

Wipers Inoperative All Modes

1. Install a scan tool and display the Wiper Delay Input parameter in the BCM data list.
2. Ignition ON, the scan tool should display 0.5 to 3.0 volts in switch positions Mist, Delay 1-5, Low and High.
 - If the scan tool displays 0.0 volts in the listed switch positions test the voltage supply circuit to the windshield wiper washer switch for an open or short to ground or the windshield wiper switch signal 2 and the washer pump control circuits for a short to ground.
3. With the windshield wiper switch to the Low speed position the Front Wipers Active parameter in the BCM inputs data list should display On for several seconds.
 - If the scan tool does not display On test the windshield wiper motor high and low speed circuits for a short to ground. If the circuits test normal replace the ON/OFF WPR relay.
4. Disconnect the windshield wiper motor connector.
5. Verify that a test lamp will illuminate when connected from battery voltage to the ground circuit.
 - If the test lamp does not illuminate repair the windshield wiper motor ground circuit for an open/high resistance.
6. If all the circuits test normal replace the windshield wiper motor.

Delay or Low Speed Wipers Inoperative

1. Install a scan tool and display the Wiper Delay Input parameter in the BCM data list.
2. Ignition ON, the scan tool should display 0.5 to 3.0 volts in switch positions Mist, Delay 1-5, Low and High.
 - If the scan tool displays 0.0 volts in any of the listed switch positions test the windshield wiper switch signal 1 circuit for an open or short to ground and perform the windshield wiper washer switch low speed component test. If the circuit and switch test normal replace the body control module.
3. With the wiper switch in the High speed position verify that the Front Wipers Active parameter in the BCM Inputs data list is On.
 - If the scan tool does not display On test the wiper relay control circuit for an open/high resistance. If the circuit tests normal replace the body control module.

4. Disconnect the windshield wiper motor connector.
5. Connect a test lamp between the low speed control circuit and the ground circuit.
6. The test lamp should illuminate with the windshield wiper switch in the Low speed position.
 - If the test lamp does not illuminate test the wiper motor low speed circuit and underhood fuse block for an open/high resistance.
7. If all the circuits test normal replace the windshield wiper motor.

High Speed Wipers Inoperative

1. Operate the wiper switch to the High speed position.
2. With the ignition on verify that the Front Wipers Active parameter in the BCM inputs data list is On.
 - If the Front Wipers Active parameter is not On perform the windshield wiper washer switch high speed component test, test the windshield wiper switch signal 2 circuit and underhood fuse block for an open/high resistance. If the circuit and switch test normal replace the wiper diode #90.
3. Disconnect the windshield wiper motor connector.
4. Verify that a test lamp will illuminate when connected between the high speed control circuit and the ground circuit.
 - If the test lamp does not illuminate test the wiper motor high speed circuit for an open/high resistance. If the circuit tests normal replace the HI/LOW WPR relay.
5. If all the circuits test normal replace the windshield wiper motor.

Low Speed Wipers Always On

1. Ignition ON, verify that the Wiper Relay Command parameter on the BCM outputs data list is Off.
 - If the scan tool displays On test the windshield wiper switch signal 1 circuit for a short to voltage and perform the windshield wiper washer switch low speed component test. If the circuit and switch test normal replace the body control module.
2. Verify that the Front Wipers Active parameter on the BCM inputs data list is Off.
 - If the scan tool displays On test the wiper relay control circuit for a short to voltage. If the circuit tests normal replace the BCM.
3. Verify that the wipers stop when the ON/OFF WPR relay is removed.
 - If the wipers remain on test the windshield wiper motor low speed control circuit for a short to voltage.

4. If all the circuits test normal replace the ON/OFF WPR relay.

High Speed Wipers Always On

1. Verify that the Front Wipers Active parameter on the BCM inputs data list is Off.
 - If the scan tool displays On test the windshield wiper washer switch signal 2 circuit for a short to voltage and perform the windshield wiper washer switch high speed component test.
2. Disconnect the windshield wiper motor connector.
3. Wiper switch OFF, verify that a test lamp will not illuminate when connected between the wiper motor high speed control circuit and ground.
 - If the test lamp illuminates repair the wiper motor high speed control circuit for a short to voltage. If the circuit tests normal replace the underhood fuse block.

Washers Inoperative

1. Display the Washer Switch parameter on the BCM Inputs data list.
2. Ignition ON, verify that the Washer Switch parameter is On while the washer switch is pressed.
 - If the scan tool displays Off perform the windshield washer switch component test. If the switch tests normal repair the windshield washer pump control circuit from the switch to the BCM for an open/high resistance.
3. Disconnect the windshield washer pump connector.
4. A test lamp connected between the washer pump control circuits should illuminate while the washer switch is pressed.
 - If the test lamp does not illuminate repair the windshield washer pump control circuit from the BCM to the pump or the ground circuit for an open/high resistance.
5. If all the circuits test normal replace the windshield washer pump.

Washers Always On

1. Disconnect the steering column harness to instrument panel (I/P) harness inline connector C201.
2. Ignition ON, the windshield washers should not be ON.
 - If the windshield washers remain on repair the windshield washer pump control circuit for a short to voltage.
3. If the windshield washers turn off replace the windshield wiper washer switch.

Component Testing

Windshield Wiper Washer Switch High and Wash circuits.

1. Disconnect the steering column harness to I/P harness inline connector C201.
2. Connect a DMM from the accessory voltage supply circuit terminal to the windshield wiper switch signal 2 circuit terminal in the steering column connector half.
3. The DMM should indicate continuity while the wiper switch is in the High speed position.
 - o If the DMM does not display 0-2 ohms replace the windshield wiper washer switch.
4. The DMM should indicate no continuity while the wiper switch is in any position other than High.
 - o If the DMM does not display infinite resistance replace the windshield wiper washer switch.
5. Connect a DMM from the accessory voltage supply circuit terminal to the windshield washer pump control circuit terminal.
6. The DMM should indicate continuity while the windshield washer switch is pressed.
 - o If the DMM does not display 0-2 ohms replace the windshield wiper washer switch.
7. The DMM should indicate no continuity when the windshield washer switch is released.
 - o If the DMM does not display infinite resistance replace the windshield wiper washer switch.

Windshield Wiper Washer Switch Low Speed Circuit

IMPORTANT: If the switch tests open in any switch position other than Off test wiper switch signal 1 circuit for a short to ground before replacing the switch.

1. Disconnect the Steering Column harness to I/P harness inline connector C201.
2. Connect a DMM from the accessory voltage supply circuit terminal to the windshield wiper switch signal 2 circuit terminal in the steering column connector half.
3. Operate the windshield wiper switch from Off to Mist, Delay 1 through 5, Low and High.
 - o If the DMM does not display at or near the resistance values provided replace the windshield wiper washer switch.

Windshield Wiper Washer System Malfunction

| Switch Position | Resistance |
|-----------------|------------|
| Off | Infinite |
| | |

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| | |
|---------|------------|
| Mist | 1.78K ohms |
| Delay 1 | 9.43K ohms |
| Delay 2 | 6.82K ohms |
| Delay 3 | 4.95K ohms |
| Delay 4 | 3.55K ohms |
| Delay 5 | 2.53K ohms |
| Low | 1.78K ohms |
| High | 1.78K ohms |

Repair Procedures

IMPORTANT: Always perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Windshield Washer Pump Replacement
- Windshield Wiper Motor Replacement
- Turn Signal Multifunction Switch Replacement

REAR WIPER WASHER SYSTEM MALFUNCTION

Diagnostic Fault Information

IMPORTANT: Always perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.

Rear Wiper Washer System Malfunction

| Circuit | Short to Ground | Open/High Resistance | Short to Voltage | Signal Performance |
|---------------------|-----------------|----------------------|------------------|--------------------|
| Wiper Motor Supply | 1 | 1 | - | - |
| Switch Supply | 2 | 2 | - | - |
| Delay 1 Signal | 2 | 3 | 4 | - |
| Delay 2 Signal | 2 | 3 | 4 | - |
| Washer Pump Control | 8 | 5, 6, 7 | - | - |
| Switch Ground | - | 7 | - | - |
| Motor Ground | - | 1 | - | - |

1. Wiper Motor Inoperative in All Modes
2. Wiper Motor Inoperative in Both Delay Modes

3. Wiper Motor Inoperative in One Delay Mode
4. Wiper Motor Always On
5. Washer Pump Inoperative
6. Washer Wipers Inoperative
7. Washer Wipers and Pump Inoperative
8. Washers Always On

Circuit/System Description

The rear wiper motor module is part of the rear wiper motor assembly and controls wiper motor operation. System voltage is supplied to the switch, washer pump and wiper motor by two retained accessory power circuits. The washer switch controls the washer pump by providing a path to ground when pressed. The rear washer control circuit is also used as a wash signal to the rear wiper motor module. The WASH command on the washer control circuit will cause the wiper motor to operate at low speed for as long as the switch is held in the closed position and 2 cycles after being released.

Reference Information**Schematic Reference****Wiper/Washer Schematics****Connector End View Reference****Wiper/Washer Connector End Views****Electrical Information Reference**

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

Scan Tool Reference

- **Scan Tool Output Controls**
- **Scan Tool Data List**
- **Scan Tool Data Definitions**

Circuit/System Testing

Wiper Motor Inoperative in All Modes

1. Disconnect the rear wiper motor connector.
2. Ignition ON, verify that a test lamp will illuminate when connected from the wiper motor supply circuit to ground.
 - If the test lamp does not illuminate repair the wiper motor supply circuit for an open/high resistance or short to ground.
3. Verify that a test lamp will illuminate when connected from the wiper motor ground circuit to battery voltage.
 - If the test lamp does not illuminate repair the wiper motor ground circuit for an open/high resistance.
4. If all the circuits test normal replace the rear wiper motor.

Wiper Motor Inoperative in Both Delay Modes

1. Verify that the wiper fuse is not open.
 - If the wiper fuse is open repair the short to ground in the switch supply, delay 1 signal, delay 2 signal or washer pump control circuit.
2. Disconnect the wiper switch connector.
3. Ignition ON, verify that a test lamp will illuminate when connected between the wiper switch supply circuit and ground.
 - If the test lamp does not illuminate repair the wiper switch supply circuit for an open/high resistance.
4. Connect the wiper switch connector.
5. Disconnect the wiper motor connector.
6. Connect a test lamp between the delay 1 signal circuit and ground.
7. Turn the rear wiper switch to the delay 1 position, the test lamp should illuminate.
 - If the test lamp does not illuminate replace the rear wiper/washer switch.
8. If all the circuits test normal replace the rear wiper motor.

Wiper Motor Inoperative in One Delay Mode

1. Disconnect the rear wiper motor connector.
2. Connect a test lamp between the inoperative delay signal circuit and ground.
3. Ignition ON, turn the rear wiper switch to the inoperative delay position, the test lamp should illuminate.

- If the test lamp does not illuminate test the inoperative delay signal circuit for an open/high resistance. If the circuit tests normal replace the rear wiper switch.
4. If all the circuits test normal replace the rear wiper motor.

Wiper Motor Always On

1. Disconnect the rear wiper motor connector.
2. Connect a test lamp between the delay 1 signal circuit and ground.
3. Ignition ON, wiper switch OFF, the test lamp should not illuminate.
 - If the test lamp illuminates test the delay 1 signal circuit for a short to voltage. If the circuit tests normal replace the rear wiper switch.
4. Connect a test lamp between the delay 2 signal circuit and ground.
5. Ignition ON, wiper switch OFF, the test lamp should not illuminate.
 - If the test lamp illuminates test the delay 2 signal circuit for a short to voltage. If the circuit tests normal replace the rear wiper switch.
6. If all the circuits test normal replace the rear wiper motor.

Washer Pump Inoperative

1. Disconnect the rear washer pump connector.
2. Connect a test lamp between the washer pump supply circuit and ground.
3. Ignition ON, the test lamp should illuminate.
 - If the test lamp does not illuminate repair the rear washer pump supply circuit for an open/high resistance.
4. Connect a test lamp between the washer pump supply circuit and control circuit.
5. Ignition ON, washer switch pressed, the test lamp should illuminate.
 - If the test lamp does not illuminate test the washer pump control and switch ground circuits for an open/high resistance. If the circuits test normal replace the rear wiper washer switch.
6. If all the circuits test normal replace the rear washer pump.

Washer Wiper Inoperative

1. Disconnect the rear wiper motor connector.
2. Connect a test lamp between battery voltage and the washer pump control circuit.
3. The test lamp should illuminate while the washer switch is pressed.

- If the test lamp does not illuminate repair the washer pump control circuit for an open/high resistance.
4. If all the circuits test normal replace the rear wiper motor.

Washer Wipers and Pump Inoperative

1. Disconnect the rear washer pump connector.
2. Connect a test lamp between battery voltage and the washer pump control circuit.
3. The test lamp should illuminate while the washer switch is pressed.
 - If the test lamp does not illuminate test the washer pump control and switch ground circuits for an open/high resistance. If the circuits test normal replace the rear wiper washer switch.

Washers Always On

1. Disconnect the rear wiper motor connector.
2. Connect a test lamp between battery voltage and the washer pump control circuit.
3. The test lamp should not illuminate while the washer switch is OFF.
 - If the test lamp illuminates repair the washer pump control circuit for a short to ground. If the circuit tests normal replace the rear wiper washer switch.
4. If all the circuits test normal replace the rear wiper motor.

Repair Procedures

IMPORTANT: Always perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- **Rear Window Washer Pump Replacement**
- **Rear Window Wiper Motor Replacement**
- **Rear Window Wiper and Washer Switch Replacement**

WIPER ARM TIP PRESSURE CHECK

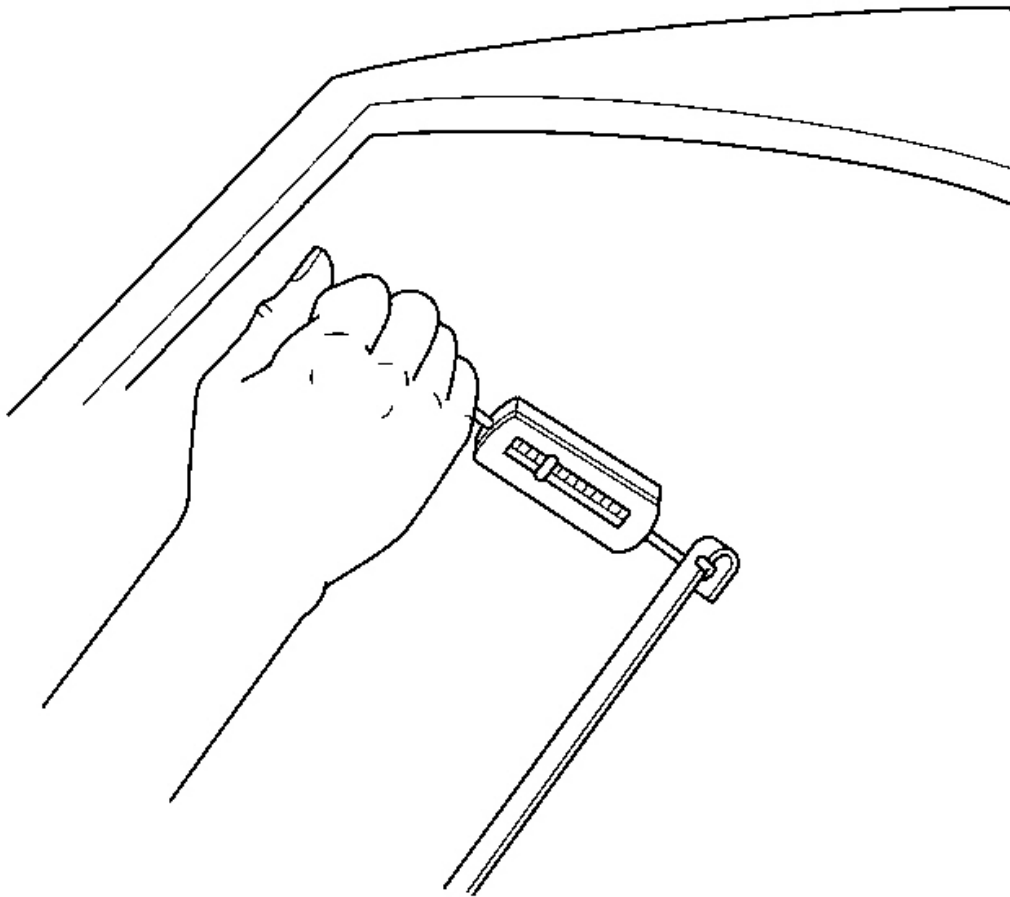


Fig. 13: Measuring Required Wiper Arm Force
Courtesy of GENERAL MOTORS CORP.

1. Run the wiper arms to the mid-wipe position.
2. Remove the wiper blades from the wiper arms. Refer to **Windshield Wiper Blade Replacement**.
3. Attach a scale to the end of the wiper arm and measure the force required to lift the wiper arm perpendicular to the windshield to normal working height with the blade attached.
4. Replace the wiper arm if the measurement is not within the specification. Refer to **Windshield Wiper Arm Replacement**.

Tip Pressure:

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- Driver Side-8.1-9.5 Newtons (29-34 Ounces)
- Passenger Side-5.8-7.0 Newtons (21-25 Ounces)

WIPER BLADE ELEMENT CHECK

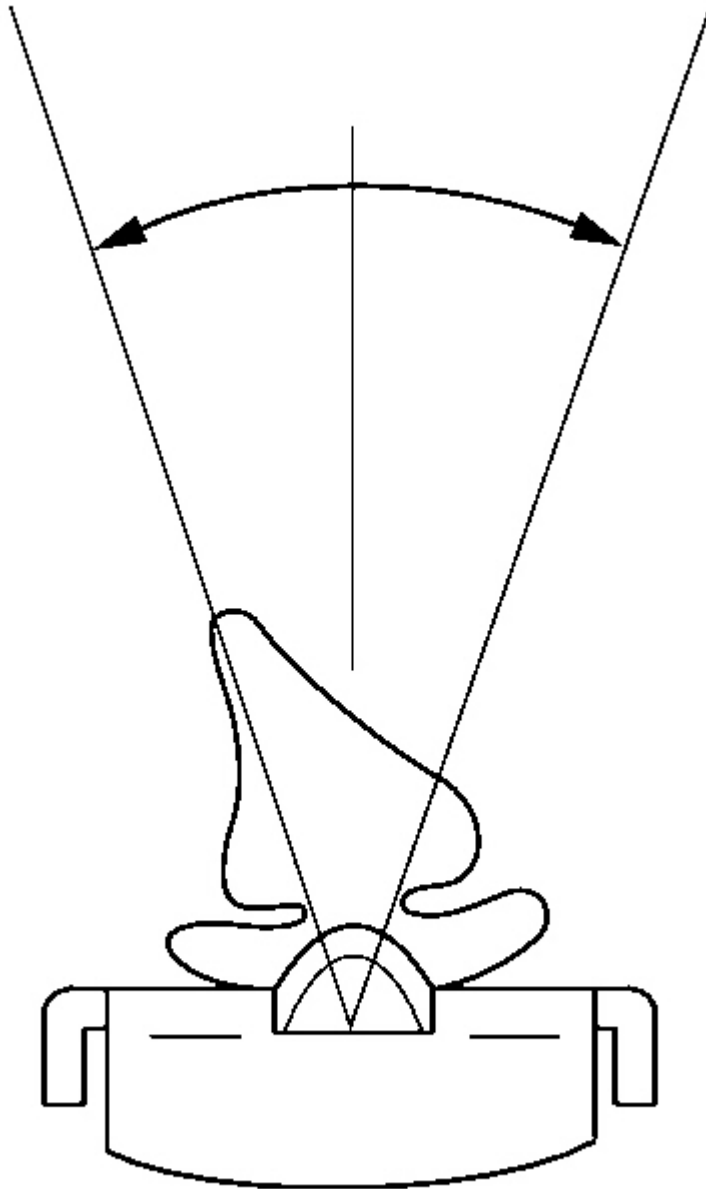
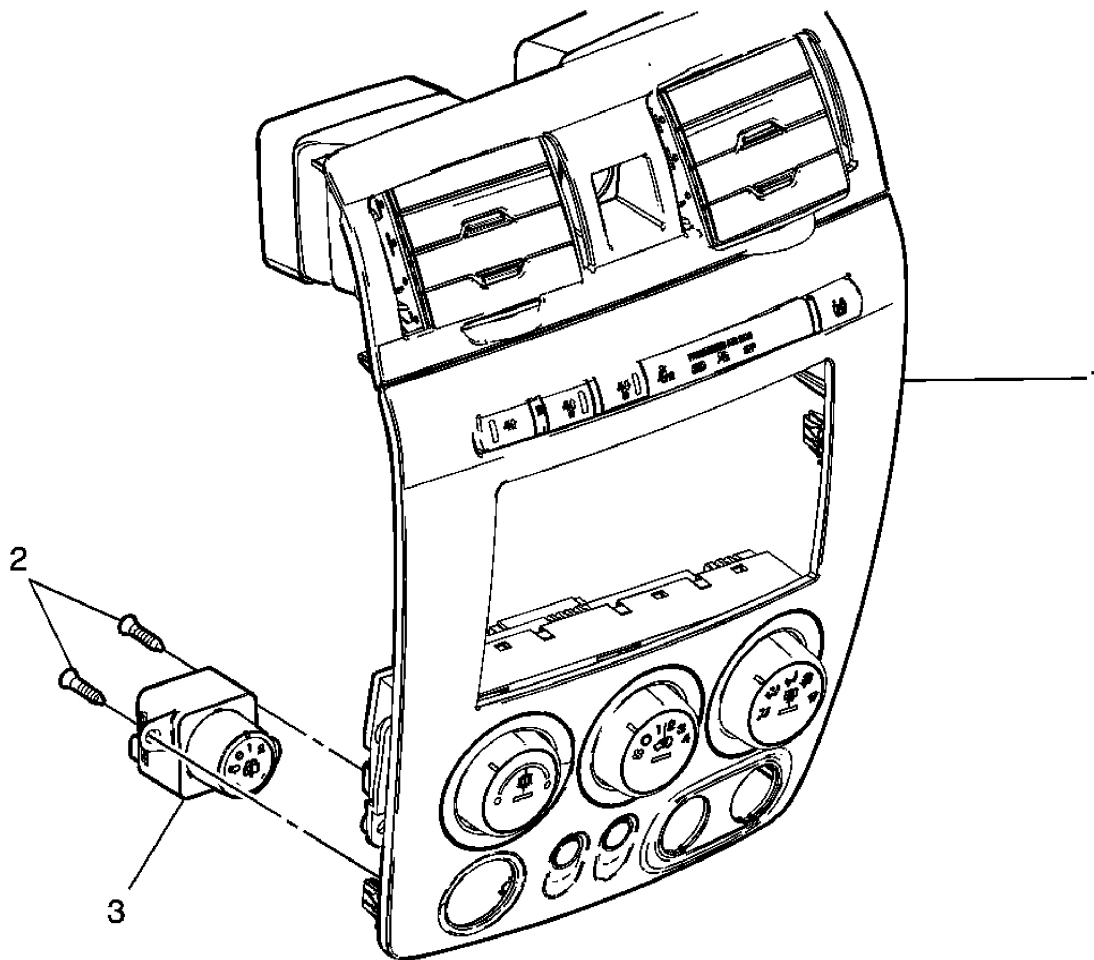


Fig. 14: Measuring Wiper Blade Element Centerline Contact
Courtesy of GENERAL MOTORS CORP.

1. Remove the wiper blades from the wiper arms. Refer to Windshield Wiper Blade Replacement.
2. Look down the length of the blade element.
3. Replace the wiper blade element if the rubber element which contacts the glass is not on the centerline of the blade ± 15 degrees. Refer to Wiper Blade Element Replacement.
4. Install the wiper blades on the wiper arms. Refer to Windshield Wiper Blade Replacement.

REPAIR INSTRUCTIONS

REAR WINDOW WIPER AND WASHER SWITCH REPLACEMENT



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Fig. 15: Wiper/Washer Switch Replacement - Rear
Courtesy of GENERAL MOTORS CORP.

Rear Window Wiper and Washer Switch Replacement

| Callout | Component Name |
|---|---|
| NOTE: | |
| Refer to <u>Fastener Notice</u> . | |
| Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> . | |
| 1 | Instrument Panel Center Trim Panel Assembly Refer to <u>Instrument Panel Center Trim Panel Replacement (Left Hand Drive)</u> or <u>Instrument Panel Center Trim Panel Replacement (Right Hand Drive)</u> . |
| 2 | Rear Wiper Washer Switch Screw (Qty: 2) Tighten: 2 N.m (18 lb in) |
| 3 | Rear Wiper Washer Switch Assembly |

WINDSHIELD WASHER NOZZLE REPLACEMENT

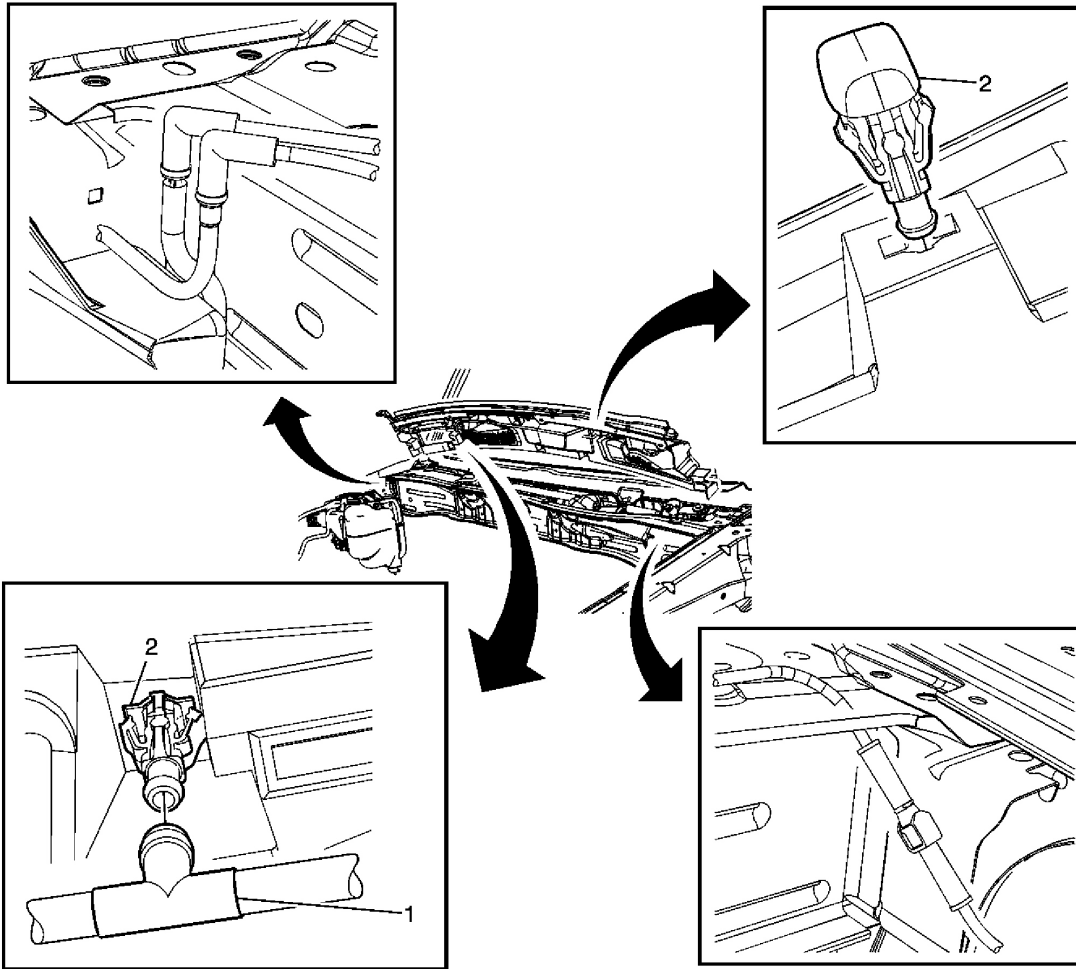


Fig. 16: Hose Replacement - Windshield Washer
 Courtesy of GENERAL MOTORS CORP.

Windshield Washer Nozzle Replacement

| Callout | Component Name |
|--|--------------------------------|
| <p>Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>.</p> | |
| <p>Preliminary Procedures</p> | |
| <p>1. Remove the front wiper arms. Refer to <u>Windshield Wiper Arm Replacement</u>.</p> <p>2. Remove the lower air inlet grille panel. Refer to <u>Air Inlet Grille Panel Replacement (Upper)</u> or <u>Air Inlet Grille Panel Replacement (Lower)</u>.</p> | |
| | <p>Hose, Windshield Washer</p> |

| | |
|---|--|
| 1 | <p>IMPORTANT: The windshield washer nozzles are serviced with the front windshield washer hose.</p> <p>Tip:</p> <ol style="list-style-type: none"> 1. Remove the hose T-connection and elbow from both washer nozzles. 2. Remove the hose from the lower air inlet grille panel retainers. |
| 2 | <p>Nozzle, Windshield Washer (Qty: 2)</p> <p>Tip: Squeeze the washer nozzle tabs and push the nozzle outward from the lower air inlet grille panel.</p> |

WASHER SOLVENT CONTAINER HOSE REPLACEMENT (FRONT HOSE)

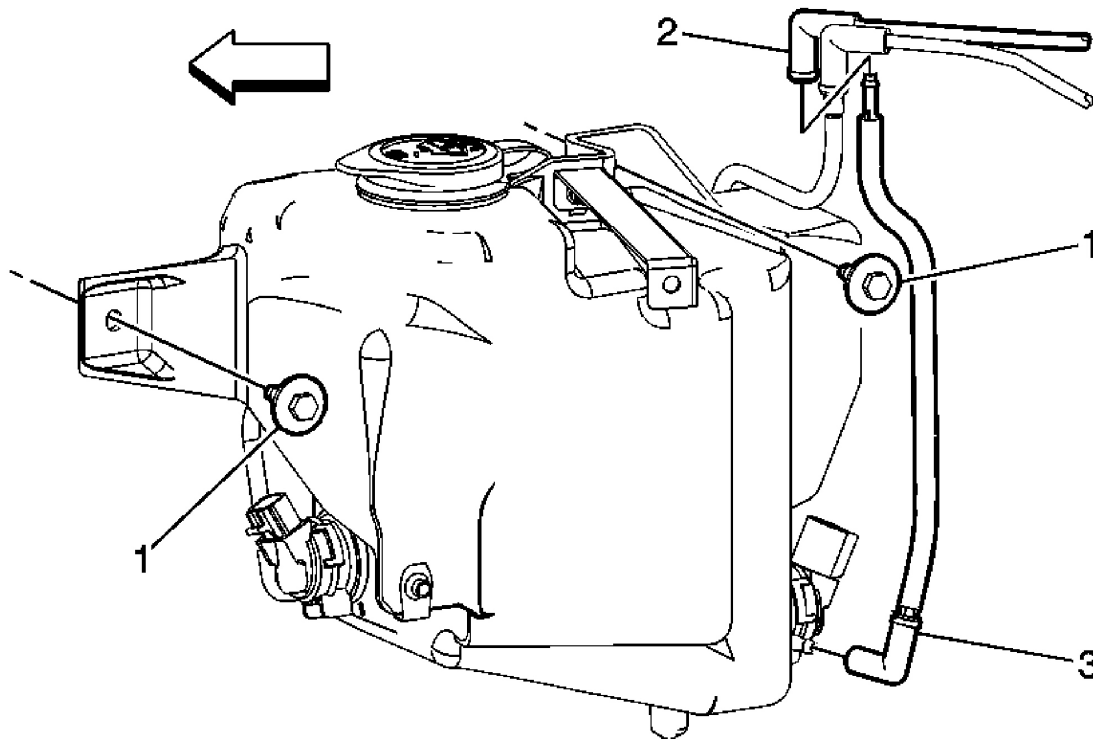


Fig. 17: Washer Solvent Container Hose Replacement (Front Hose)
Courtesy of GENERAL MOTORS CORP.

Washer Solvent Container Hose Replacement (Front Hose)

| Callout | Component Name |
|--------------|----------------|
| NOTE: | |

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Refer to Fastener Notice .

Fastener Tightening Specifications: Refer to Fastener Tightening Specifications.

Preliminary Procedure

1. Remove the air cleaner assembly. Refer to Air Cleaner Assembly Replacement .
2. Remove the coolant recovery reservoir. Refer to Coolant Recovery Reservoir Replacement (Left Hand Drive) or Coolant Recovery Reservoir Replacement (Right Hand Drive) .

| | |
|---|---|
| 1 | Windshield Washer Solvent Container Bolts Tighten: 9 N.m (80 lb in) |
| 2 | Air Inlet Panel Front Washer Hose Tip: Disconnect the hose at the plenum. |
| 3 | Front Window Washer Solvent Container Hose Assembly Tip: Disconnect the hose elbow from the rear washer pump spout. |

WASHER SOLVENT CONTAINER HOSE REPLACEMENT (REAR HOSE)

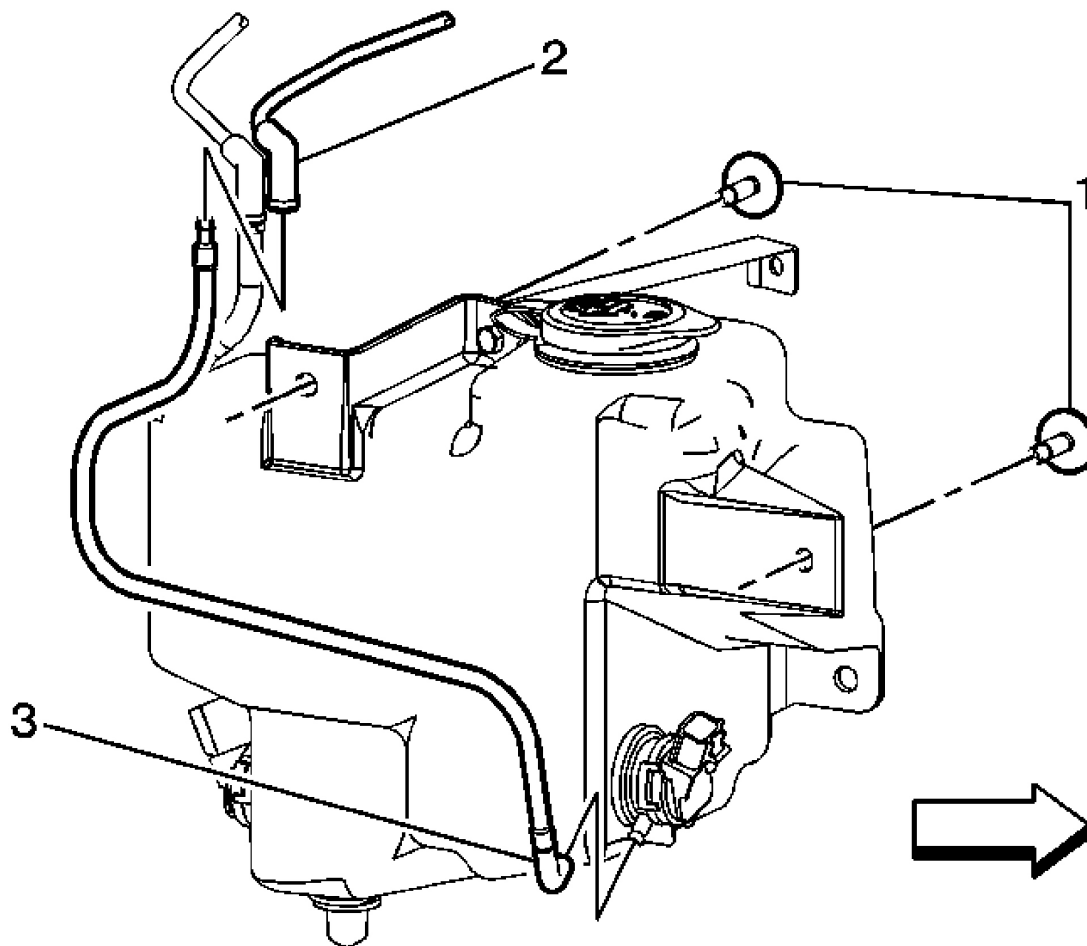


Fig. 18: Washer Solvent Container Hose Replacement (Rear Hose)
 Courtesy of GENERAL MOTORS CORP.

Washer Solvent Container Hose Replacement (Rear Hose)

| Callout | Component Name |
|--|----------------|
| <p>NOTE: Refer to <u>Fastener Notice</u> .</p> | |
| <p>Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>.</p> | |
| <p>Preliminary Procedure</p> | |
| <p>1. Remove the air cleaner assembly. Refer to <u>Air Cleaner Assembly Replacement</u> .</p> | |
| <p>2. Remove the coolant recovery reservoir. Refer to <u>Coolant Recovery Reservoir Replacement (Left Hand Drive)</u> or <u>Coolant Recovery Reservoir Replacement</u></p> | |

(Right Hand Drive) .

| | |
|---|--|
| 1 | Windshield Washer Solvent Container Bolts Tighten: 9 N.m (80 lb in) |
| 2 | Air Inlet Panel Rear Washer Hose Tip: Disconnect the hose at the plenum. |
| 3 | Rear Window Washer Solvent Container Hose Assembly Tip: Disconnect the hose elbow from the rear washer pump spout. |

WINDSHIELD WASHER HOSE REPLACEMENT

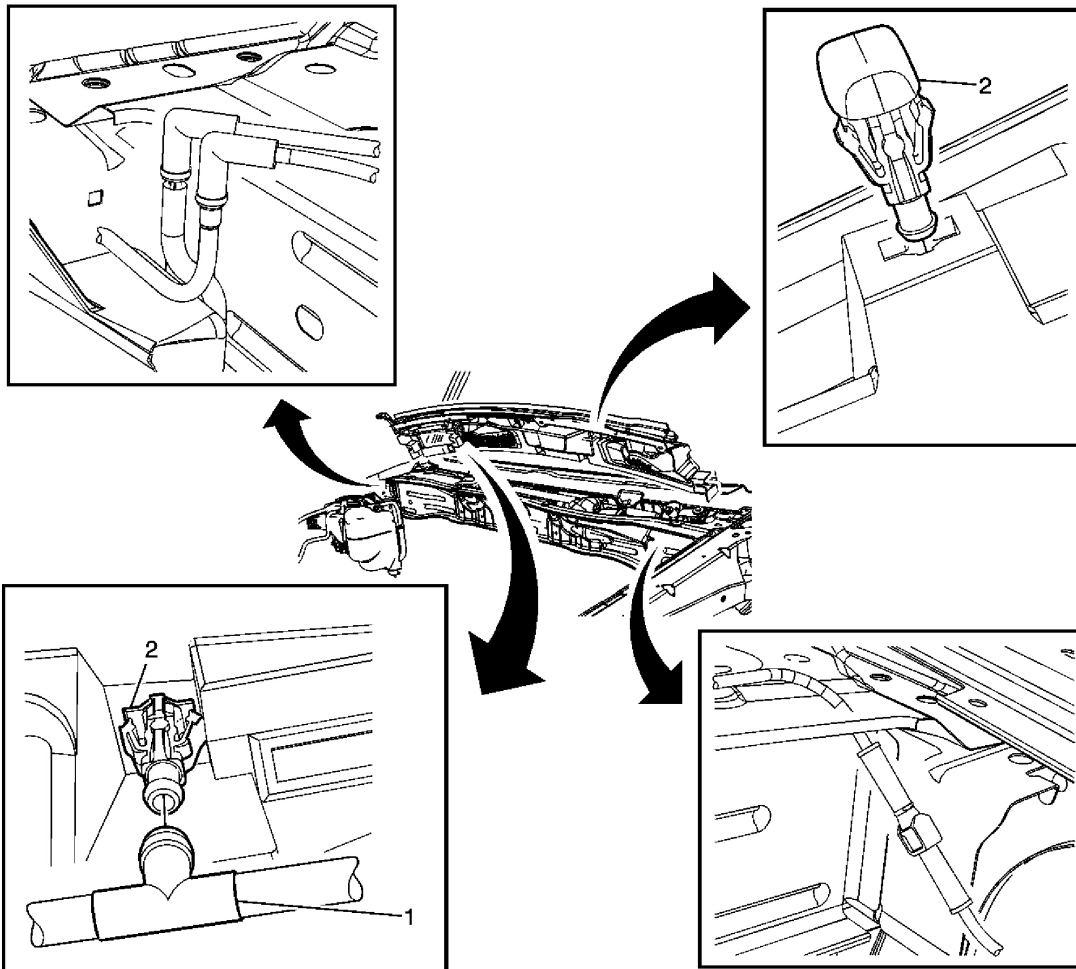


Fig. 19: Hose Replacement - Windshield Washer
 Courtesy of GENERAL MOTORS CORP.

Windshield Washer Hose Replacement

| Callout | Component Name |
|---|---|
| Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> . | |
| Preliminary Procedures | |
| <ol style="list-style-type: none"> 1. Remove the front wiper arms. Refer to <u>Windshield Wiper Arm Replacement</u>. 2. Remove the lower air inlet grille panel. Refer to <u>Air Inlet Grille Panel Replacement (Upper)</u> or <u>Air Inlet Grille Panel Replacement (Lower)</u>. | |
| 1 | Hose, Windshield Washer (Qty: 1) Tip: <ul style="list-style-type: none"> • Remove the hose T-connection and elbow from the washer nozzles. • Remove the hose from the lower air inlet grille panel retainers. |
| 2 | Nozzle, Windshield Washer (Qty: 2) Tip: Squeeze the washer nozzle tabs and push the nozzle outward from the lower air inlet grille panel. |

REAR WINDOW WASHER NOZZLE HOSE REPLACEMENT

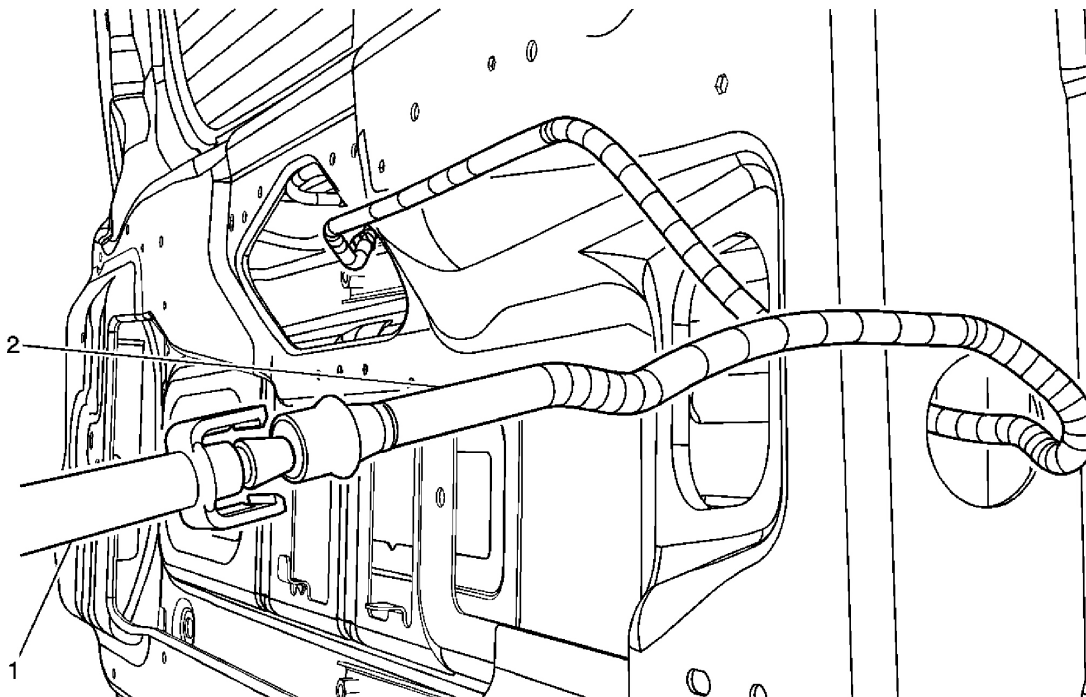


Fig. 20: Washer Hose Replacement - Rear
 Courtesy of GENERAL MOTORS CORP.

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Rear Window Washer Nozzle Hose Replacement

| Callout | Component Name |
|---|---|
| Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> . | |
| Preliminary Procedure | |
| <ol style="list-style-type: none">1. Remove the rear wiper motor. Refer to <u>Rear Window Wiper Motor Replacement</u>.2. Remove the left body side trim. Refer to <u>Body Side Trim Panel Replacement - Left Side</u>. | |
| 1 | Hose, Bodyside Electrical Harness Washer (Qty: 1) Tip: Release connector claws from rear washer hose connection. |
| 2 | Hose, Rear Windshield Washer (Qty: 1) Tip: Pull the washer hose rearward from the end gate and out from the washer elbow opening. |

WASHER SOLVENT CONTAINER REPLACEMENT (PRIOR TO VIN 78135604)

Removal Procedure

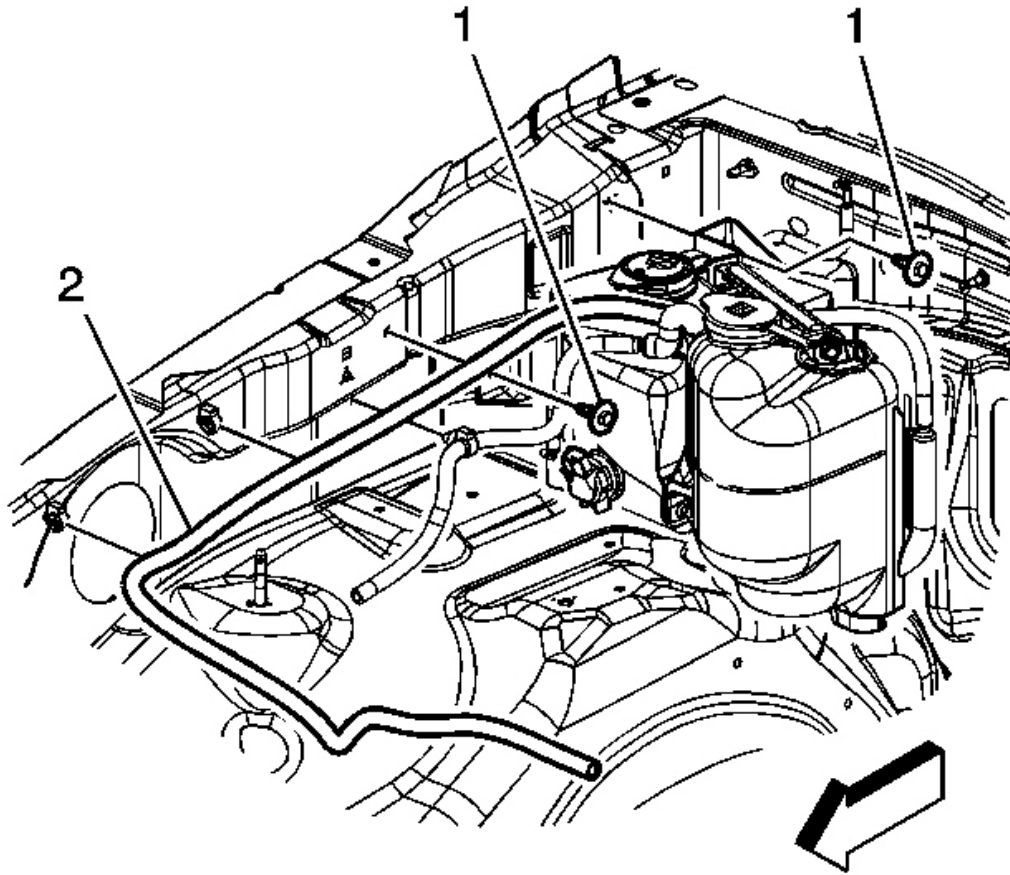


Fig. 21: Identifying Washer Solvent Container
Courtesy of GENERAL MOTORS CORP.

1. Remove the air cleaner assembly. Refer to **Air Cleaner Assembly Replacement**
2. Remove the washer container to front wheelhouse upper extension bolts (1).
3. Disconnect the coolant overflow hose (2) from the wheelhouse upper extension retainer clips.
4. Pinch the coolant hose to prevent coolant loss and remove the hose.

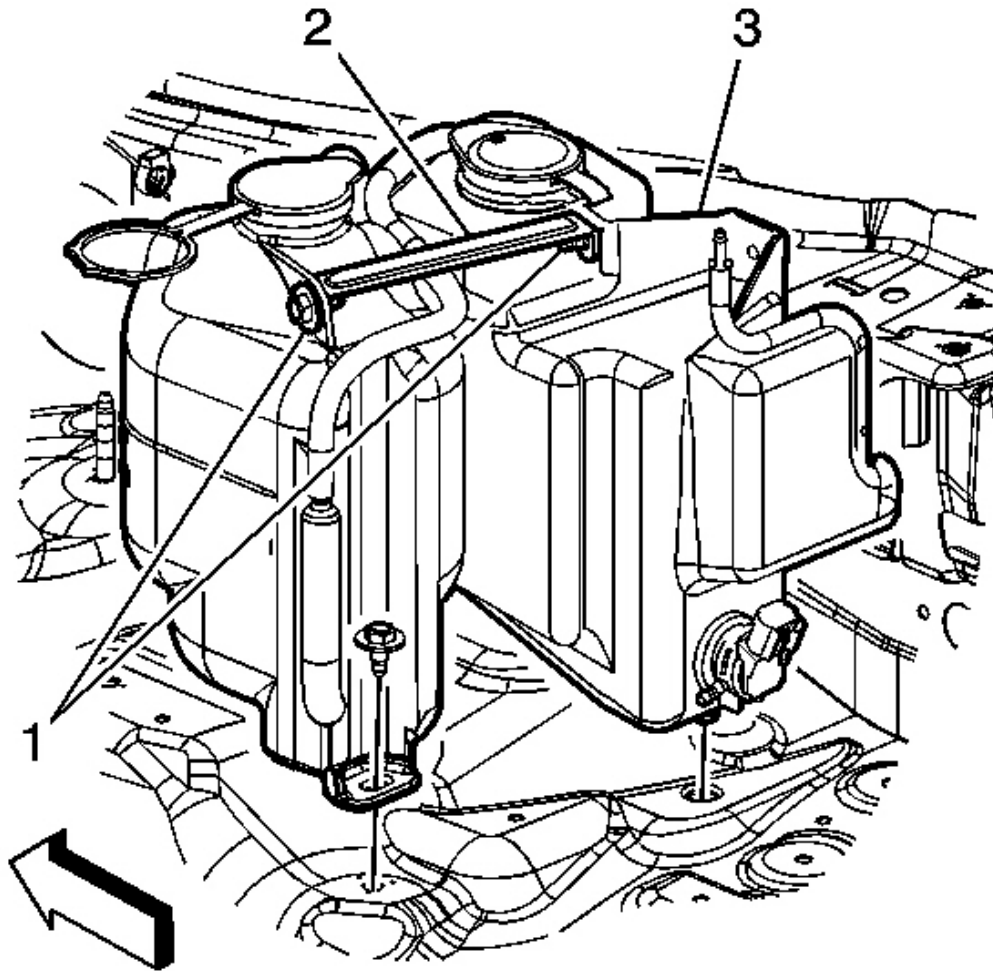


Fig. 22: Identifying Washer Solvent Container Bolts
Courtesy of GENERAL MOTORS CORP.

5. Remove the lower coolant reservoir bolt.
6. Disconnect both washer pump electrical connectors.
7. Disconnect both washer pump jumper hoses from the air inlet grille panel connections.
8. Lift the washer/coolant reservoir assembly from the lower inner fender assembly.
9. Remove the bracket bolts (1) and the bracket (2) from the two containers and discard.

1. Open the black conduit and cut off the front washer pump electrical harness connector.
2. Splice in the new front washer pump electrical connector harness. Refer to **Wiring Repairs** .
3. Open the black conduit and cut off the rear washer pump electrical harness connector.
4. Splice in the new rear washer pump electrical connector harness.
5. Install the new front and rear washer pumps to the washer container.
6. Position the new windshield washer/coolant recovery reservoir assembly to the lower inner fender assembly.
7. Connect both new washer pump electrical connectors to the front and rear washer pumps.
8. Secure the jumper hoses to the washer pumps.
9. Connect both washer pump jumper hoses to the air inlet grille panel hose connections.

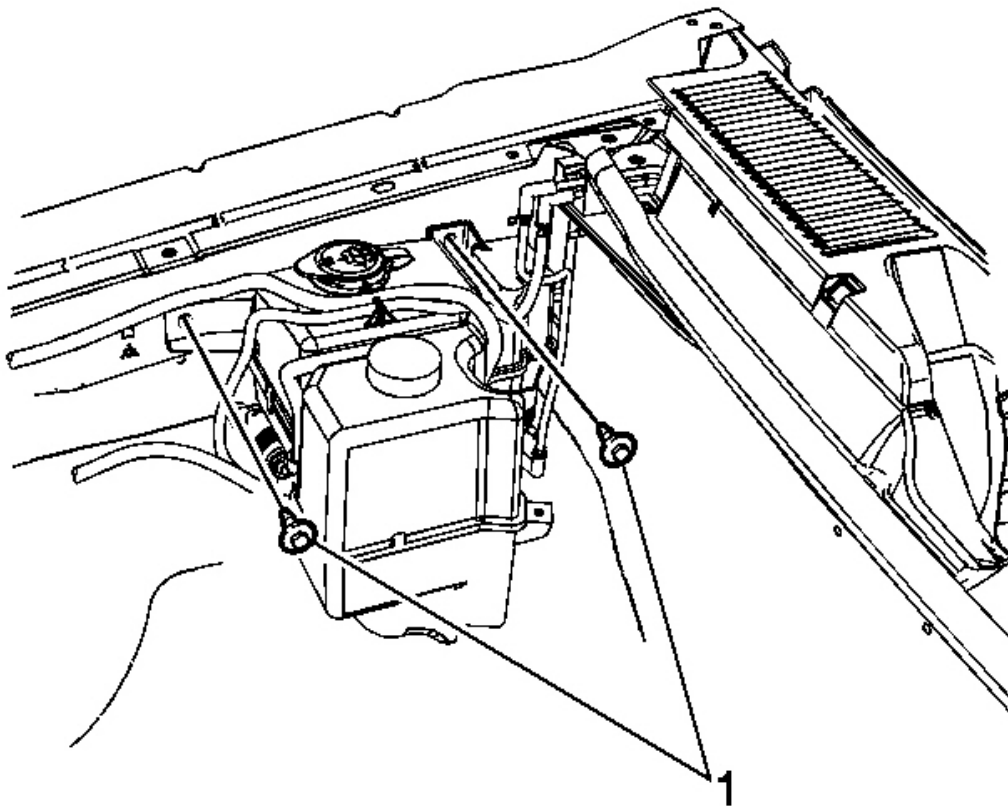


Fig. 23: View Of Washer Solvent Container Bolts

Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

10. Install the 2 washer container to front wheelhouse upper extension bolts (1).

Tighten: 9 N.m (80 lb in)

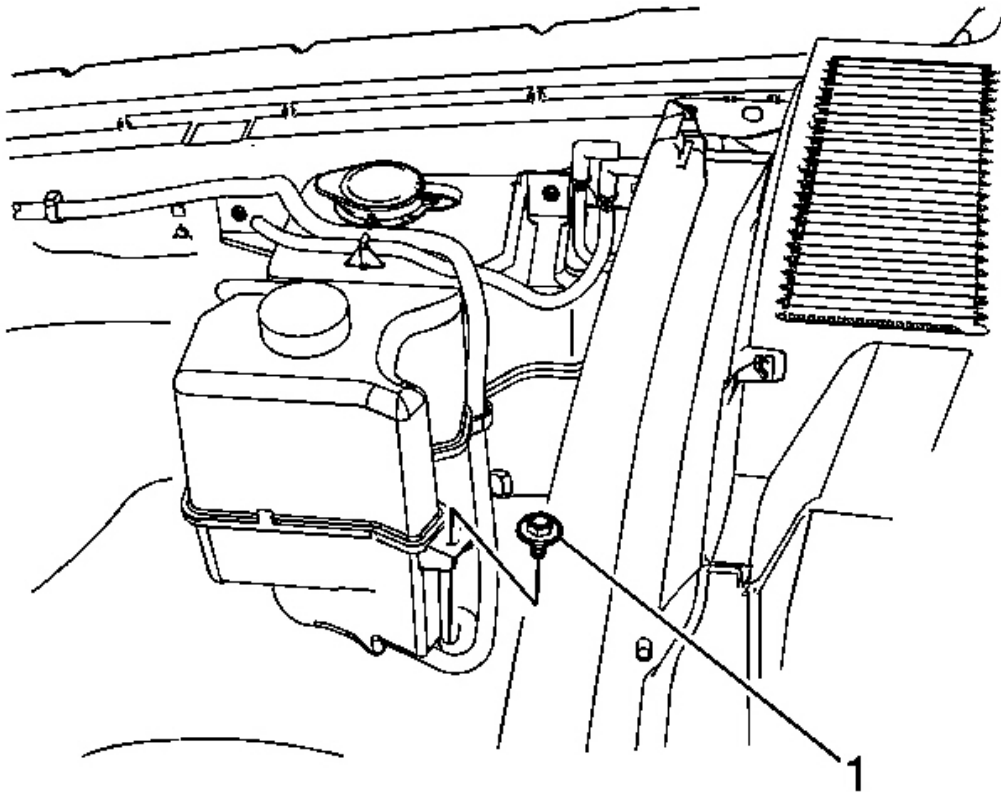


Fig. 24: Locating Coolant Recovery Reservoir Bolt
Courtesy of GENERAL MOTORS CORP.

11. Install the coolant recovery reservoir bolt (1).

Tighten: 9 N.m (80 lb in)

12. Install the new coolant reservoir overflow hose and secure the plastic retaining clips on the

front upper wheelhouse extension.

13. Refill the windshield washer solvent container.
14. Fill and top off the engine coolant reservoir.
15. Install the air cleaner assembly. Refer to **Air Cleaner Assembly Replacement** .
16. Verify the operation of the windshield wiper washer system.
17. Inspect for any fluid leakage.

WASHER SOLVENT CONTAINER REPLACEMENT (BASE)

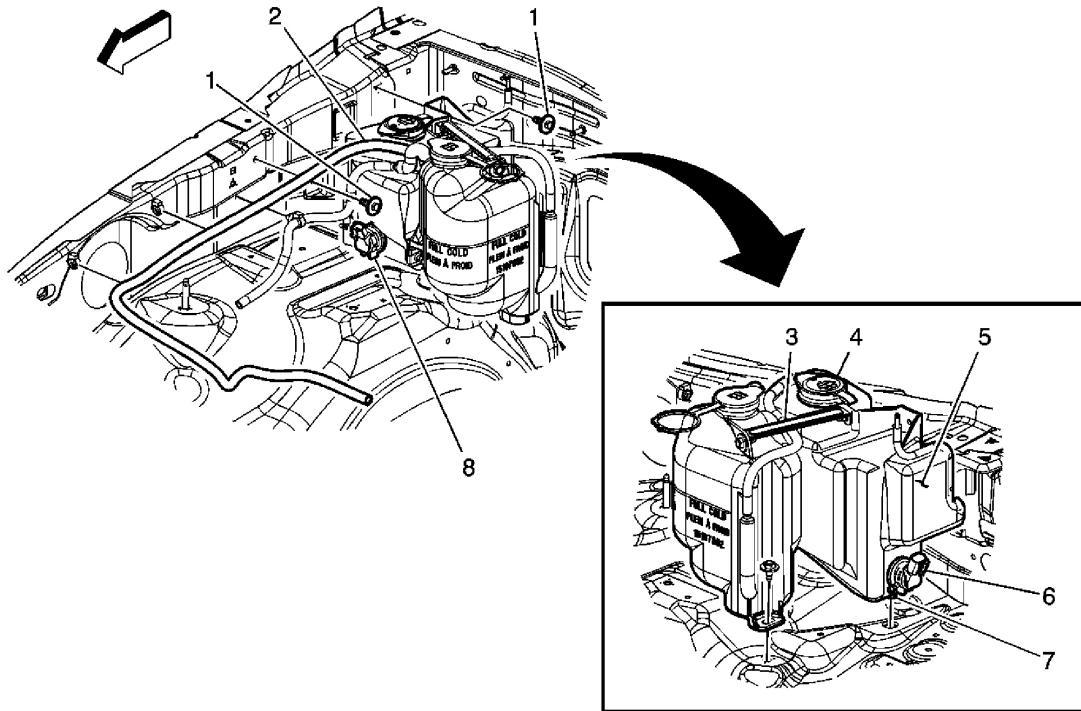


Fig. 25: Identifying Washer Solvent Container Bolts
 Courtesy of GENERAL MOTORS CORP.

Washer Solvent Container Replacement (Base)

| Callout | Component Name |
|------------------------------|---|
| Preliminary Procedure | |
| 1. | Remove the air cleaner assembly. Refer to <u>Air Cleaner Assembly Replacement</u> . |
| 2. | Remove the coolant recovery reservoir. Refer to <u>Coolant Recovery Reservoir Replacement (Left Hand Drive)</u> or <u>Coolant Recovery Reservoir Replacement (Right Hand Drive)</u> . |

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| | |
|---|---|
| 1 | Washer Solvent Container Bolt (Qty: 2) NOTE: Refer to <u>Fastener Notice</u> . Tighten: 9 N.m (80 lb in) |
| 2 | Washer Solvent Container Cap |
| 3 | Washer Solvent/Coolant Recovery Tank Bracket Bolt Tighten: 9 N.m (80 lb in) |
| 4 | Washer Solvent/Coolant Recovery Tank Bracket |
| 5 | Washer Container Rear Washer Pump Hose |
| 6 | Front Washer Pump with Grommet |
| 7 | Washer Container Front Washer Pump Hose |
| 8 | Rear Washer Pump with Grommet |

WASHER SOLVENT CONTAINER REPLACEMENT (POST VIN 78135604)

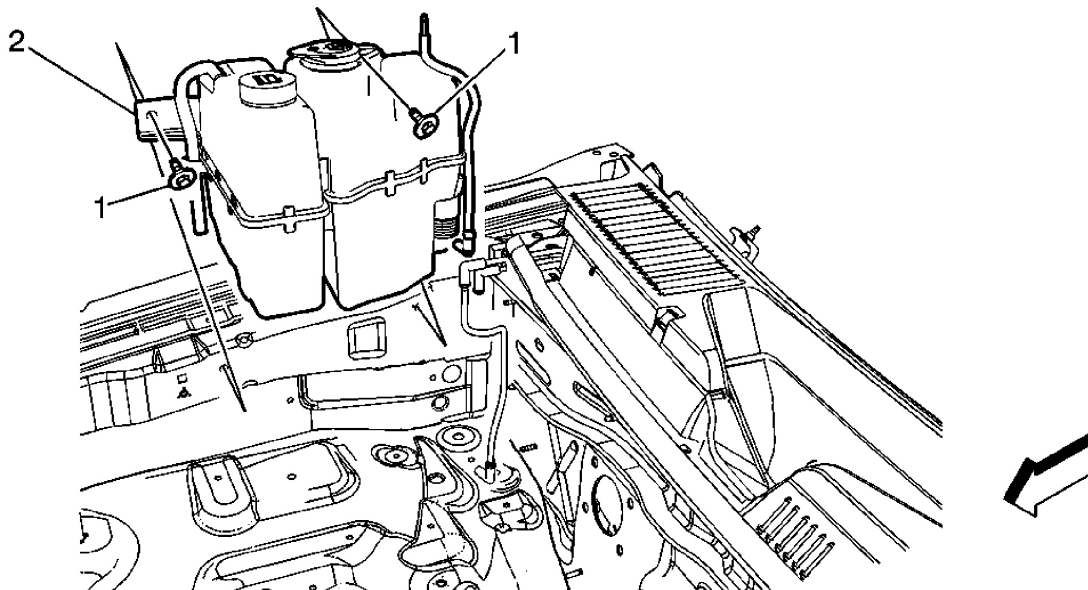


Fig. 26: Identifying Washer Solvent Container & Fasteners
Courtesy of GENERAL MOTORS CORP.

Washer Solvent Container Replacement (Post VIN 78135604)

| Callout | Component Name |
|---------|----------------|
|---------|----------------|

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Preliminary Procedure:

Remove the air cleaner assembly. Refer to [Air Cleaner Assembly Replacement](#) .

| | |
|---|---|
| 1 | <p>Windshield Washer Solvent Container Assembly Bolt (Qty: 2)</p> <p>NOTE: Refer to <u>Fastener Notice</u> .</p> <p>Tighten: 9 N.m (80 lb in)</p> <p>Procedure</p> <ol style="list-style-type: none">1. Roll the container assembly forward.2. Disconnect both washer pump electrical connectors.3. Disconnect both washer pump jumper hoses at the air inlet grille panel connections. (if equipped)4. Contain any lost washer solvent fluid in a clean suitable container.5. Disconnect and secure the coolant container overflow hose.6. Transfer all parts as needed. |
| 2 | Windshield Washer Solvent Container Assembly |

WINDSHIELD WASHER PUMP REPLACEMENT

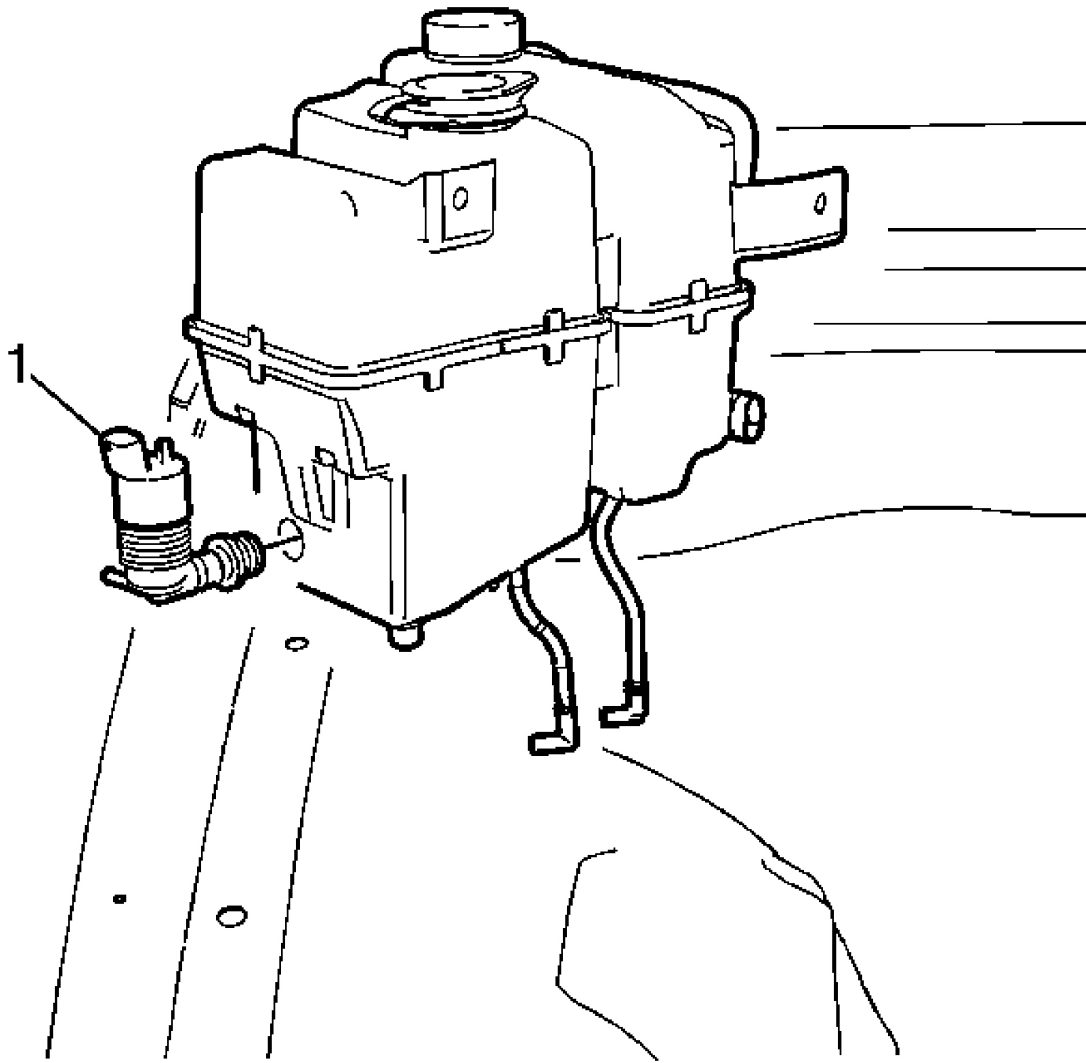


Fig. 27: Identifying Windshield Washer Pump
 Courtesy of GENERAL MOTORS CORP.

Windshield Washer Pump Replacement

| Callout | Component Name |
|--|----------------|
| <p>Preliminary Procedure: Remove the windshield washer solvent container. Refer to <u>Washer Solvent Container Replacement (Prior to VIN 78135604)</u>, <u>Washer Solvent Container Replacement (Base)</u> or <u>Washer Solvent Container Replacement (Post VIN 78135604)</u>.</p> | |

Windshield Washer Pump

Procedure

1

1. Support the container while using two flat-bladed tools under the edges of the washer pump and pry outward.
2. Discard the washer pump grommet after the pump has been removed.

REAR WINDOW WASHER PUMP REPLACEMENT

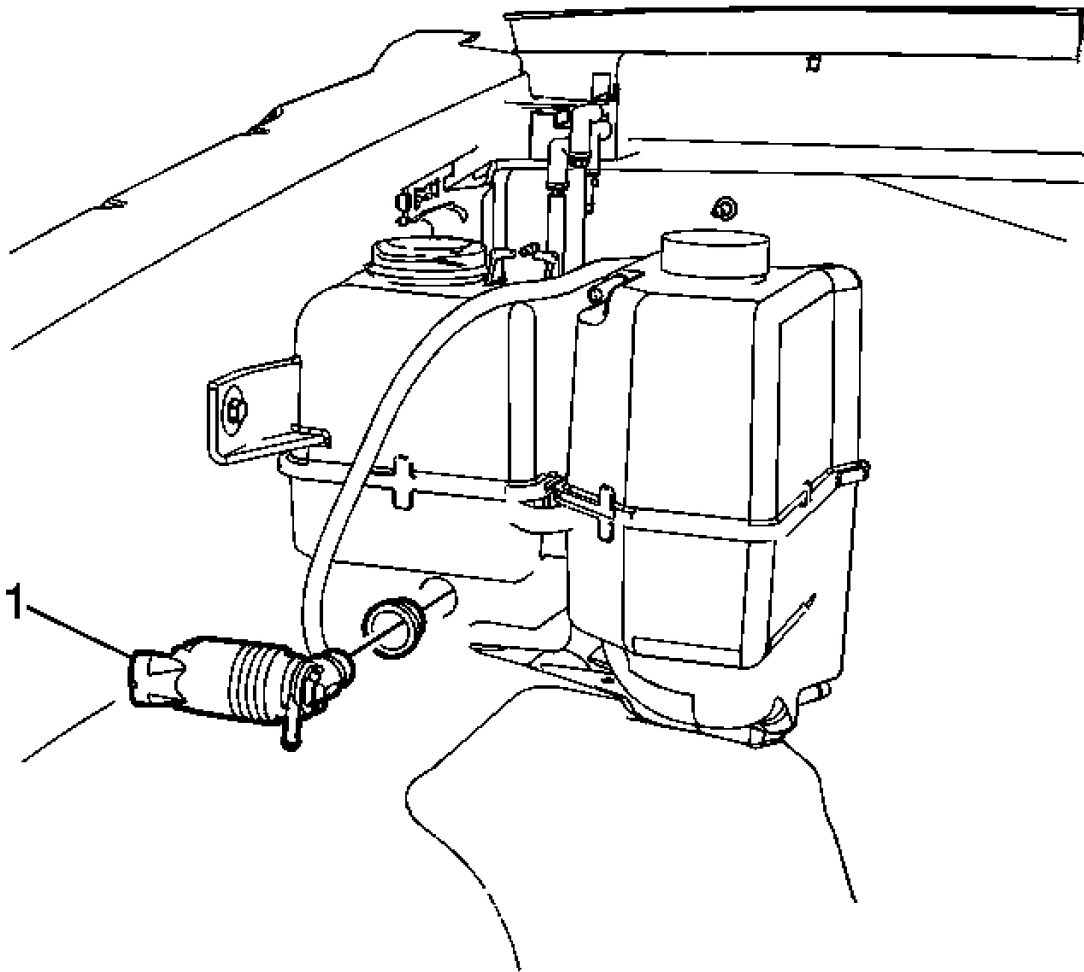


Fig. 28: Identifying Rear Window Washer Pump
 Courtesy of GENERAL MOTORS CORP.

Rear Window Washer Pump Replacement

| Callout | Component Name |
|--|-------------------------|
| Preliminary Procedure: | |
| Remove the air cleaner assembly. Refer to <u>Air Cleaner Assembly Replacement</u> . | |
| | Rear Window Washer Pump |

Procedure

1

1. Disconnect the washer pump electrical connector.
2. Disconnect the washer pump jumper hose.
3. Place a clean suitable container under the vehicle to contain the washer solvent loss when removing the washer pump.
4. Using two flat-bladed tools under the edge of the washer pump, gently pry outward.
5. Remove the washer pump and discard the washer pump container grommet.

AIR INLET GRILLE PANEL REPLACEMENT (UPPER)

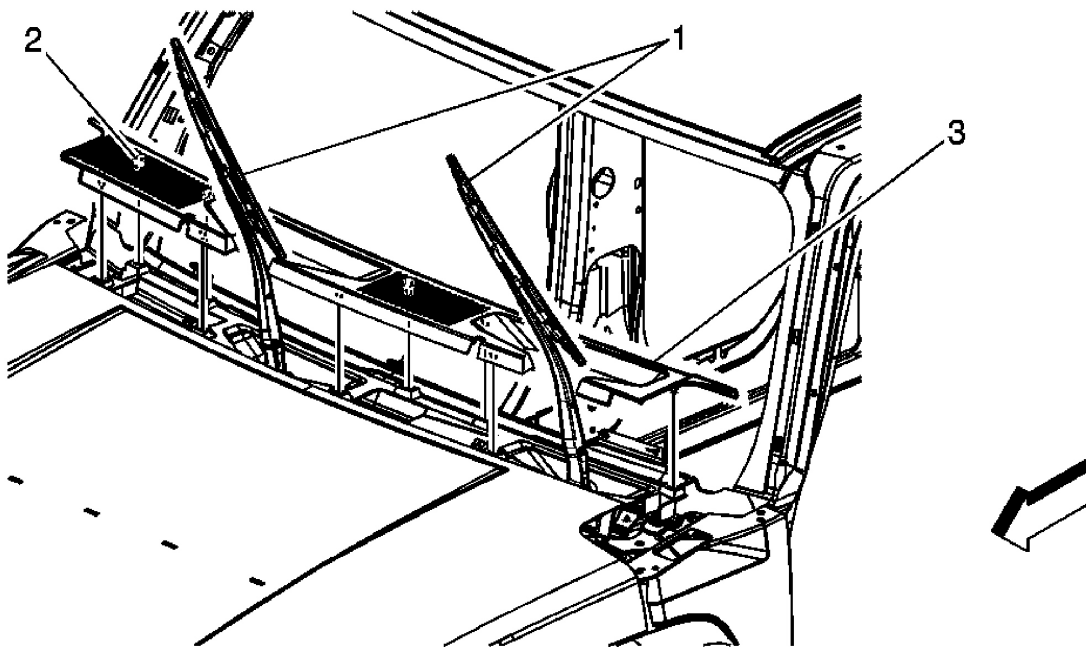


Fig. 29: View Of Upper Air Inlet Grille Panel
 Courtesy of GENERAL MOTORS CORP.

Air Inlet Grille Panel Replacement (Upper)

| Callout | Component Name |
|---------|----------------|
|---------|----------------|

Fastener Tightening Specifications: Refer to Fastener Tightening Specifications.

Preliminary Procedures

1. Remove both non-functional air inlet grille panels. Refer to **Non-Functional Air Inlet Grille Panel Replacement**.
2. Service up both front wiper arms.

| | |
|---|--|
| 1 | Front Windshield Wiper Arms Tip: Move the front wiper arms to the service up position prior to releasing the integral retainers on the air inlet grille panel. |
| 2 | Integral Retainers (Qty: 9) Tip: Gently pry upwards on the upper panel in order to release the nine integral retaining clips. |
| 3 | Upper Air Inlet Grille Panel |

AIR INLET GRILLE PANEL REPLACEMENT (LOWER)

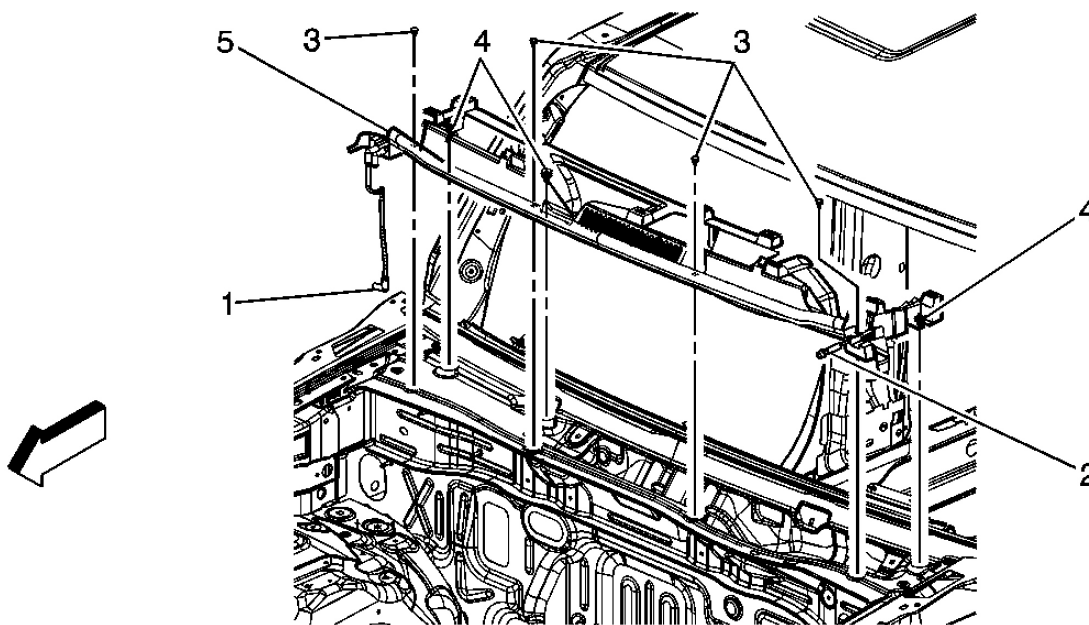


Fig. 30: View Of Lower Air Inlet Grille Panel
 Courtesy of GENERAL MOTORS CORP.

Air Inlet Grille Panel Replacement (Lower)

| Callout | Component Name |
|---------|----------------|
|---------|----------------|

Fastener Tightening Specifications: Refer to **Fastener Tightening Specifications**.

Preliminary Procedures

1. Remove the upper air inlet grille panel. Refer to **Air Inlet Grille Panel Replacement (Upper)** or **Air Inlet Grille Panel Replacement (Lower)**.
2. Open and support the hood.

| | |
|---|--|
| 1 | Front Windshield Washer Hose Connection Tip: Disconnect the front washer hose from the front windshield washer pump. |
| 2 | Rear Windshield Washer Hose Connection Tip: Disconnect the rear washer hose from the rear windshield washer pump jumper hose. |
| 3 | Push Pin Retainers (Qty: 4) |
| 4 | Integral Lower Air Inlet Panel Retainers Tip: Disengage the three retainers from the plenum in order to remove the lower air inlet grille panel. |
| 5 | Lower Air Inlet Grille Panel |

NON-FUNCTIONAL AIR INLET GRILLE PANEL REPLACEMENT

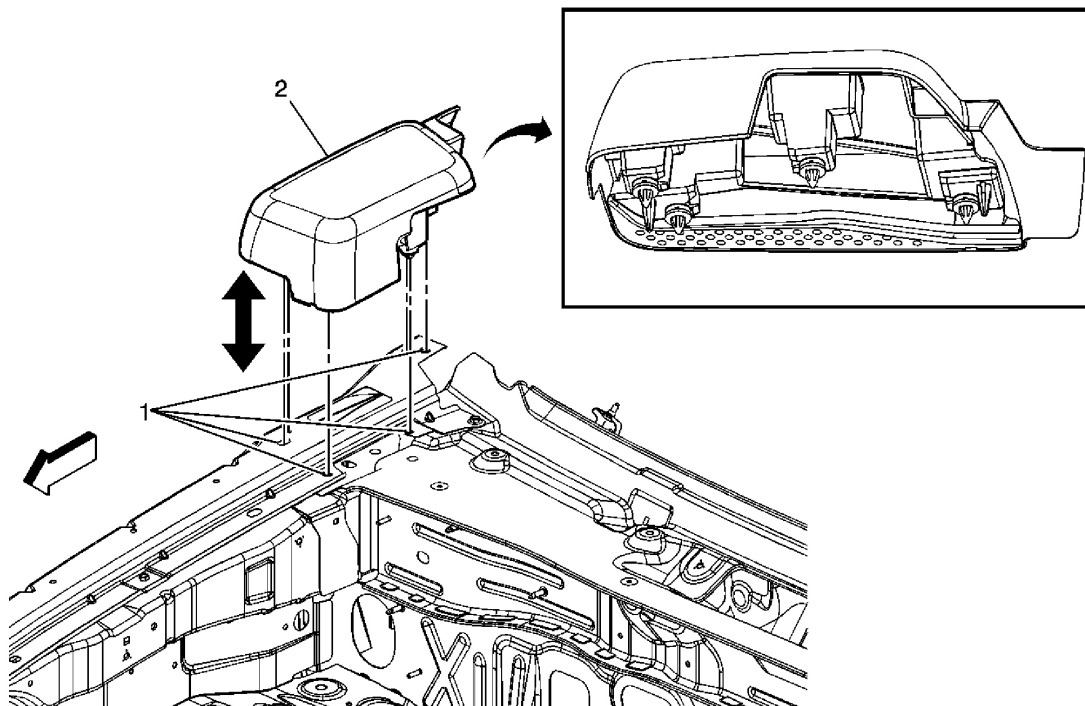


Fig. 31: Air Inlet Grille Panel Replacement - Non Functional
 Courtesy of GENERAL MOTORS CORP.

Non-Functional Air Inlet Grille Panel Replacement

| Callout | Component Name |
|---|---|
| Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> . | |
| 1 | Retainers, Integral (Qty: 4) Tip: Pull the non functional air inlet grille panel upward to release the 4 retainers from the fender. |
| 2 | Grille, Non Functional Air Inlet |

WINDSHIELD WIPER ARM REPLACEMENT

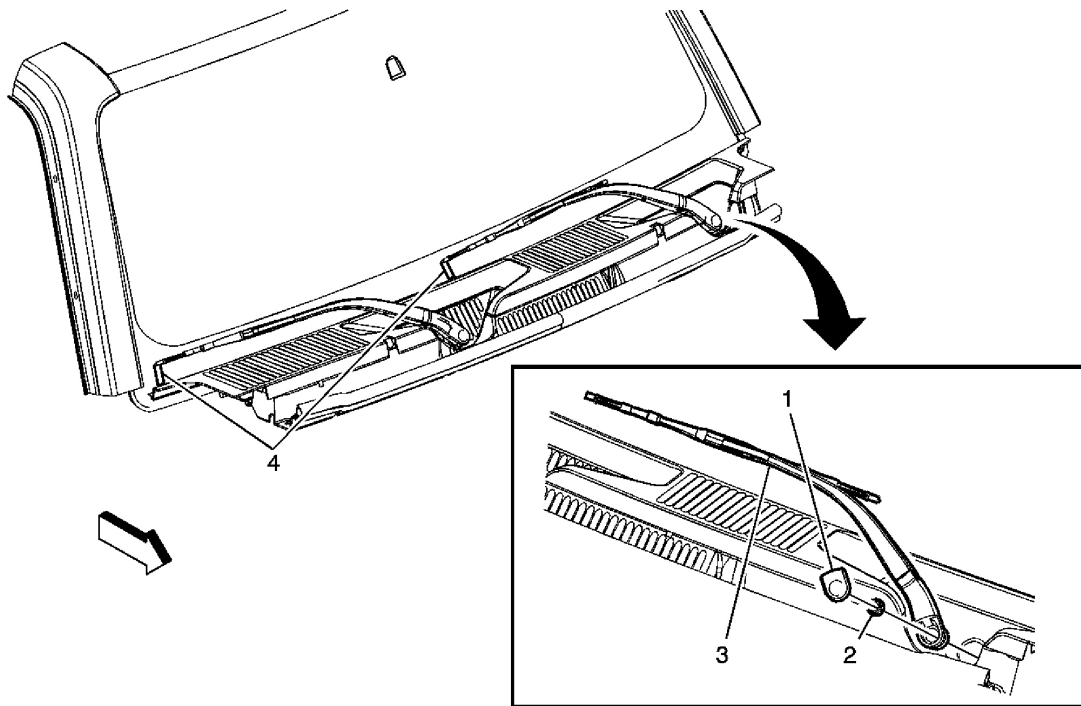


Fig. 32: Wiper Arm Replacement
 Courtesy of GENERAL MOTORS CORP.

Windshield Wiper Arm Replacement

| Callout | Component Name |
|---------|---|
| 1 | Windshield Wiper Arm Cap |
| 2 | Windshield Wiper Arm Shaft Nut NOTE: Refer to <u>Fastener Notice</u> . |

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| | |
|---|--|
| | Tighten: 21 N.m (15 lb ft) |
| 3 | Driver Side Windshield Washer Arm Tip: Passenger side wiper arm similar. |
| 4 | Windshield Target Mark Procedure: Hold wiper arm blade tip in position to rectangular target boxes in windshield blackout area while tightening windshield wiper arm nut. |

REAR WINDOW WIPER ARM REPLACEMENT

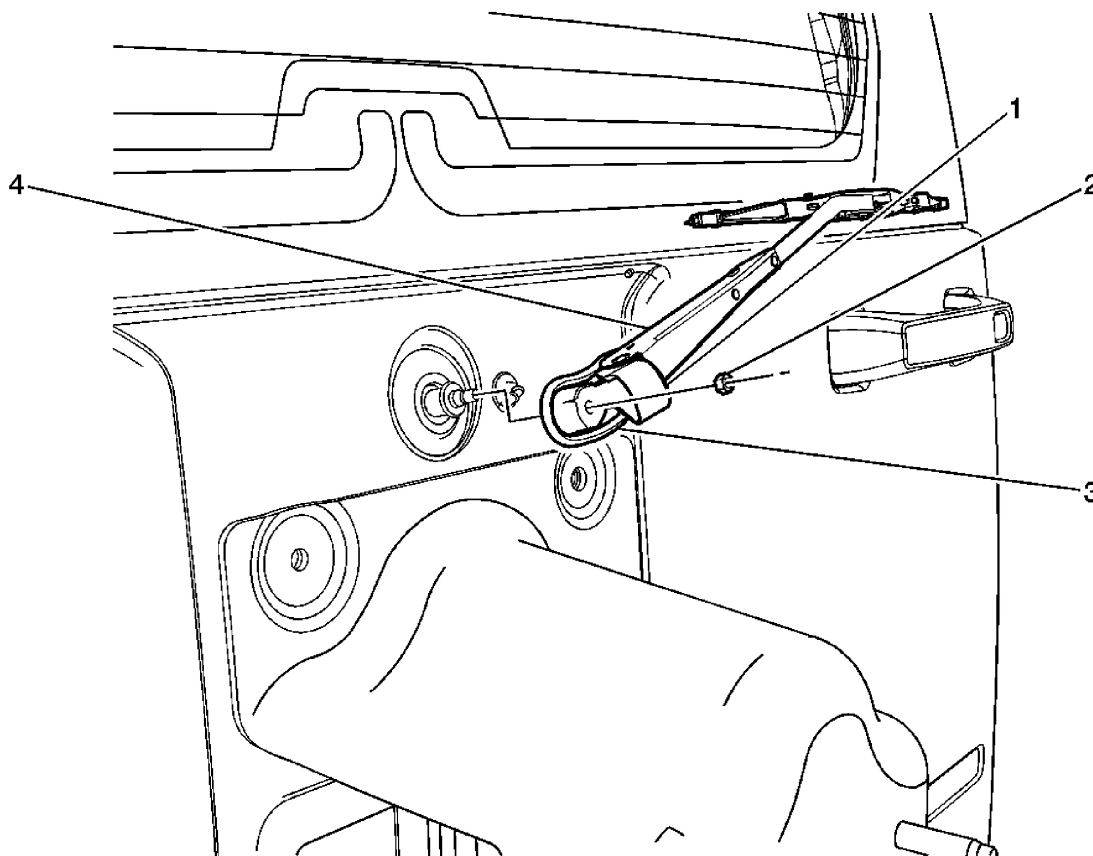


Fig. 33: Wiper Arm Replacement - Rear
Courtesy of GENERAL MOTORS CORP.

Rear Window Wiper Arm Replacement

| Callout | Component Name |
|------------------------------|----------------|
| Preliminary Procedure | |

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1. Remove the spare wheel from the spare tire carrier.
2. Remove the wiper arm blade. Refer to **Rear Window Wiper Blade Replacement**.

| | |
|---|--|
| 1 | Rear Wiper Arm Finish Cover Tip: Release locking tab from under end of cover and lift to access nut. |
| 2 | Rear Window Wiper Motor Nut (Qty: 2) NOTE: Refer to Fastener Notice . Tip: Hold the rear wiper blade to the locating dot in the blackout area of the rear window while securing the nut. Tighten: 9 N.m (80 lb in) |
| 3 | Rear Wiper Washer Hose Tip: Disconnect at the endgate elbow and re-route clockwise around motor pivot shaft. |
| 4 | Rear Window Wiper Assembly Arm |

WINDSHIELD WIPER BLADE REPLACEMENT

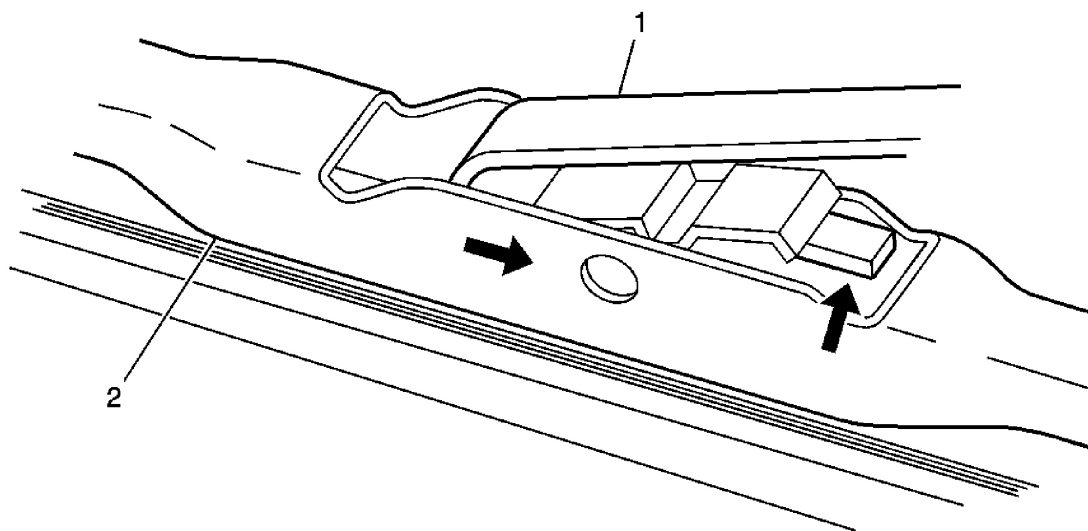


Fig. 34: Wiper Arm Blade Replacement
Courtesy of GENERAL MOTORS CORP.

Windshield Wiper Blade Replacement

| Callout | Component Name |
|---|---|
| Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> . | |
| Preliminary Procedure: Lift the wiper arm blade off the windshield. | |
| 1 | Arm, Windshield Wiper (Qty: 1) Tip: Hold the arm and release the locking tab before sliding the blade from the wiper arm. |
| 2 | Blade, Windshield Wiper (Qty: 1) Tip: Slide the blade rearward out of the wiper arm sheep hook. |

REAR WINDOW WIPER BLADE REPLACEMENT

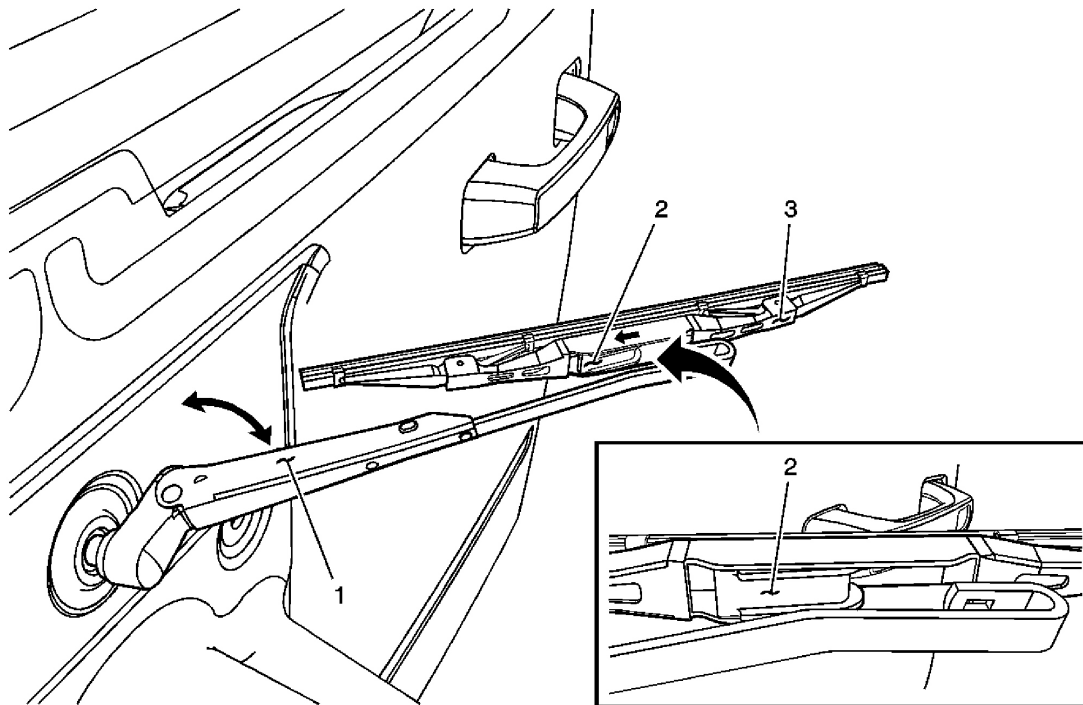


Fig. 35: Wiper Arm Blade Replacement - Rear
Courtesy of GENERAL MOTORS CORP.

Rear Window Wiper Blade Replacement

| Callout | Component Name |
|---|---|
| Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> . | |
| 1 | Arm, Rear Window Wiper (Qty: 1) Tip: Lift wiper arm slightly off rear window. |

| | |
|---|---|
| 2 | Tab, Sheep Hook Tip: Lift tab to release blade from arm. |
| 3 | Blade, Rear Window Wiper (Qty: 1) Tip: Push blade inward to release from arm. |

WIPER BLADE ELEMENT REPLACEMENT

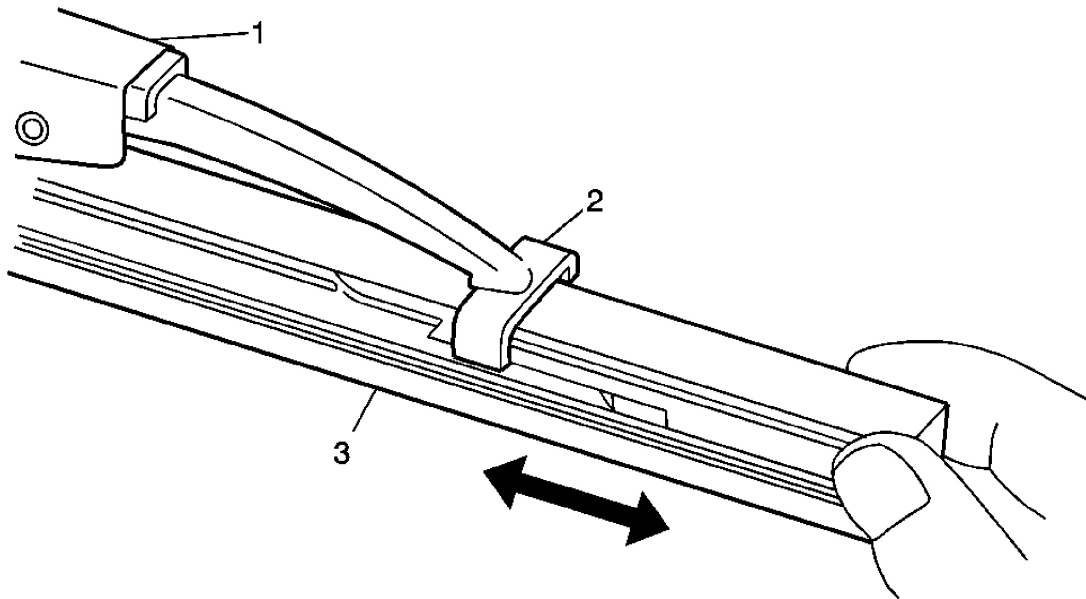


Fig. 36: Wiper Blade Element Replacement
Courtesy of GENERAL MOTORS CORP.

Wiper Blade Element Replacement

| Callout | Component Name |
|---|---|
| Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> . | |
| Preliminary Procedure: Remove the wiper arm blade. Refer to <u>Windshield Wiper Blade Replacement</u> . | |
| 1 | Blade, Windshield Wiper Arm |
| 2 | Bear Claws, Wiper Arm Blade |
| 3 | Insert, Wiper Arm Blade Tip: <ol style="list-style-type: none"> 1. Hold the wiper arm blade firmly and pull blade element from blade bear claws. 2. Passenger and driver side inserts are not interchangeable. |

REAR WINDOW WIPER BLADE ELEMENT REPLACEMENT

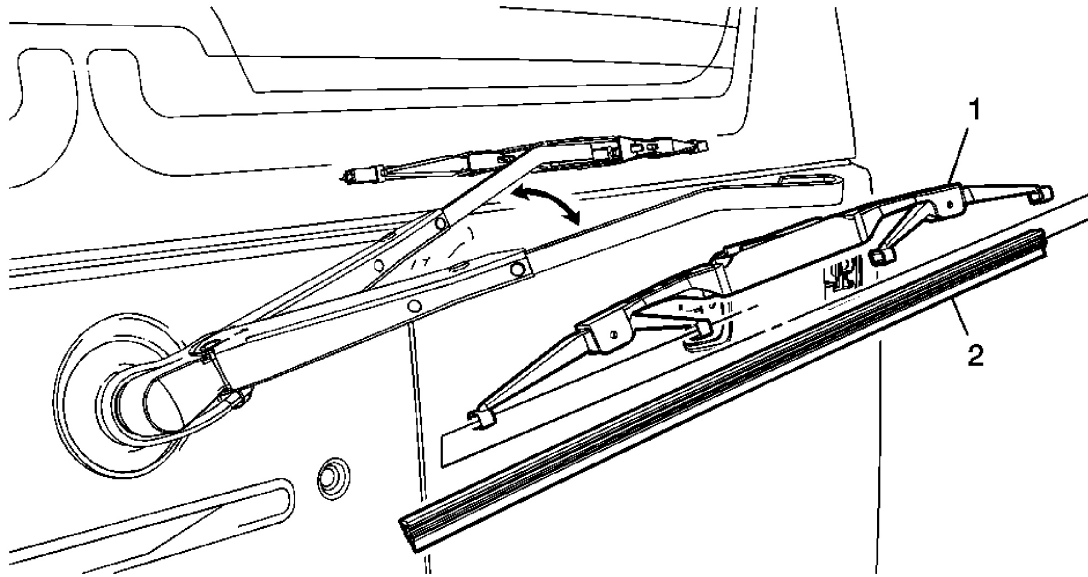


Fig. 37: Blade Element Replacement - Rear
 Courtesy of GENERAL MOTORS CORP.

Rear Window Wiper Blade Element Replacement

| Callout | Component Name |
|---|--|
| Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> . | |
| Preliminary Procedure: | |
| Remove the rear wiper arm blade. Refer to <u>Rear Window Wiper Blade Replacement</u> . | |
| 1 | Blade, Rear Wiper Arm (Qty: 1) |
| 2 | Insert, Rear Wiper Blade (Qty: 1) Tip: Pull insert through the wiper blade bear claws from the end closest to center of glass. |

WINDSHIELD WIPER MOTOR REPLACEMENT

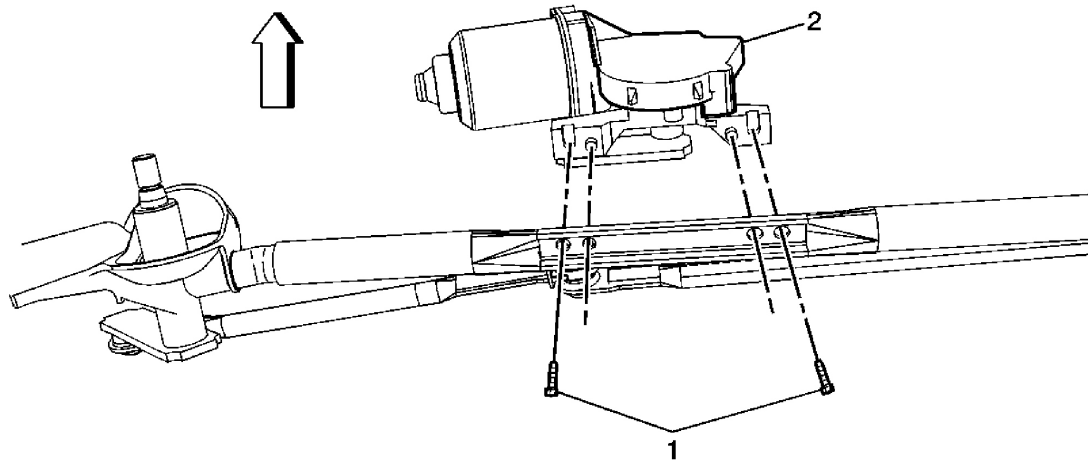


Fig. 38: Wiper Motor Replacement
 Courtesy of GENERAL MOTORS CORP.

Windshield Wiper Motor Replacement

| Callout | Component Name |
|---|---|
| <p>NOTE: Refer to <u>Fastener Notice</u> .</p> | |
| <p>Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>. Preliminary Procedure: Remove the front wiper module. Refer to <u>Windshield Wiper System Module Replacement</u>.</p> | |
| <p>1</p> | <p>Bolts, Transmission to Wiper Motor (Qty: 2) Tighten: 10 N.m (89 lb in)</p> |
| <p>2</p> | <p>Motor, Windshield Wiper Tip:</p> <ol style="list-style-type: none"> 1. The new wiper motor and crank arm position is pre-set, no crank arm to transmission arm alignment is needed. 2. Use a J 39232 Wiper Transmission Separator or equivalent to remove the transmission linkage from the crank arm. 3. Use a J 39529 Transmission Installer or equivalent to secure the transmission linkage to the wiper motor crank arm. |

REAR WINDOW WIPER MOTOR REPLACEMENT

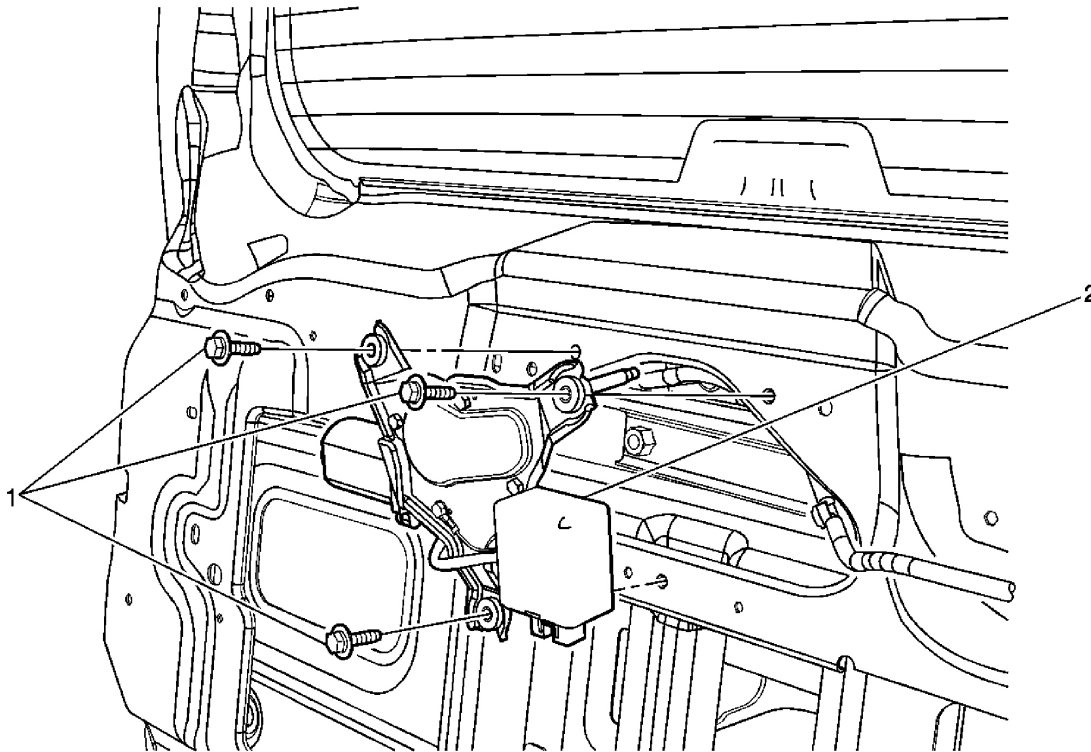


Fig. 39: Wiper Motor Replacement - Rear
 Courtesy of GENERAL MOTORS CORP.

Rear Window Wiper Motor Replacement

| Callout | Component Name |
|--|--|
| <p>NOTE: Refer to <u>Fastener Notice</u> .</p> | |
| <p>Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>.</p> | |
| <p>Preliminary Procedures</p> | |
| <p>1. Remove the rear wiper arm. Refer to <u>Rear Window Wiper Arm Replacement</u>. 2. Remove the jack stowage cover. 3. Remove the jack stowage tool kit.</p> | |
| <p>1</p> | <p>Bolts, Rear Wiper Motor (Qty: 3) Tighten: 10 N.m (89 lb in)</p> |
| | <p>Motor, Rear Window Wiper (Qty: 1)</p> |

2

Tip: Pull motor rearward to access washer hose and electrical connections, lower motor into endgate and remove from exterior pivot shaft grommet.

WINDSHIELD WIPER SYSTEM MODULE REPLACEMENT

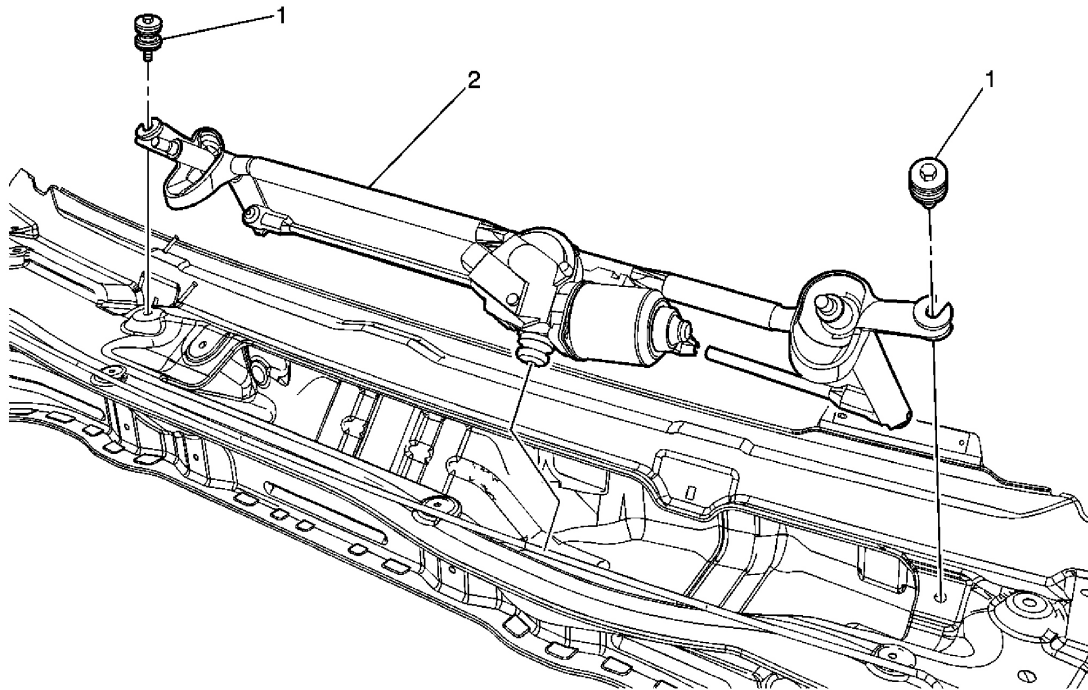


Fig. 40: Wiper Motor Module Replacement
 Courtesy of GENERAL MOTORS CORP.

Windshield Wiper System Module Replacement

| Callout | Component Name |
|--|----------------|
| <p>NOTE: Refer to <u>Fastener Notice</u> .</p> | |
| <p>Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>.</p> | |
| <p>Preliminary Procedures</p> | |
| <ol style="list-style-type: none"> 1. Remove the air inlet panel. Refer to <u>Air Inlet Grille Panel Replacement (Upper)</u> or <u>Air Inlet Grille Panel Replacement (Lower)</u>. 2. Disconnect the wiper motor electrical connector. | |

Bolts, Windshield Wiper Transmission Grommet (Qty: 2)

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| | |
|---|---|
| 1 | Tighten: 10 N.m (89 lb in) |
| 2 | Module, Windshield Washer (Qty: 1) Tip: Rotate module assembly forward to remove from cowl panel. |

WINDSHIELD GLASS CLEANING

Clean the windshield glass with windshield cleaner. The cleaner used should be one that will not harm the paint finish or scratch the glass. The windshield glass is clean when water no longer beads, but sheets across the entire glass surface.

BLADE ELEMENT CLEANING

1. Lift the wiper blade assemblies off of the windshield glass.
2. Clean the wiper blade element with a clean cloth saturated with full strength washer solution.
3. Rinse the wiper blade assemblies with water.
4. Place the wiper blade assemblies back onto the windshield glass.

WIPER CHATTER REPAIR

Some vehicles may exhibit a condition where the windshield wiper blades chatter or wipe unevenly. Several different conditions can cause the wiper blade chatter. To completely repair wiper blade chatter, all of the following should be checked and repaired as necessary:

- The windshield glass must be clean.
- The wiper blade element must be clean.
- The wiper arm tip pressure must be within specifications.
- The wiper blade element set must be within specifications.

REAR WASHER HOSE REPLACEMENT

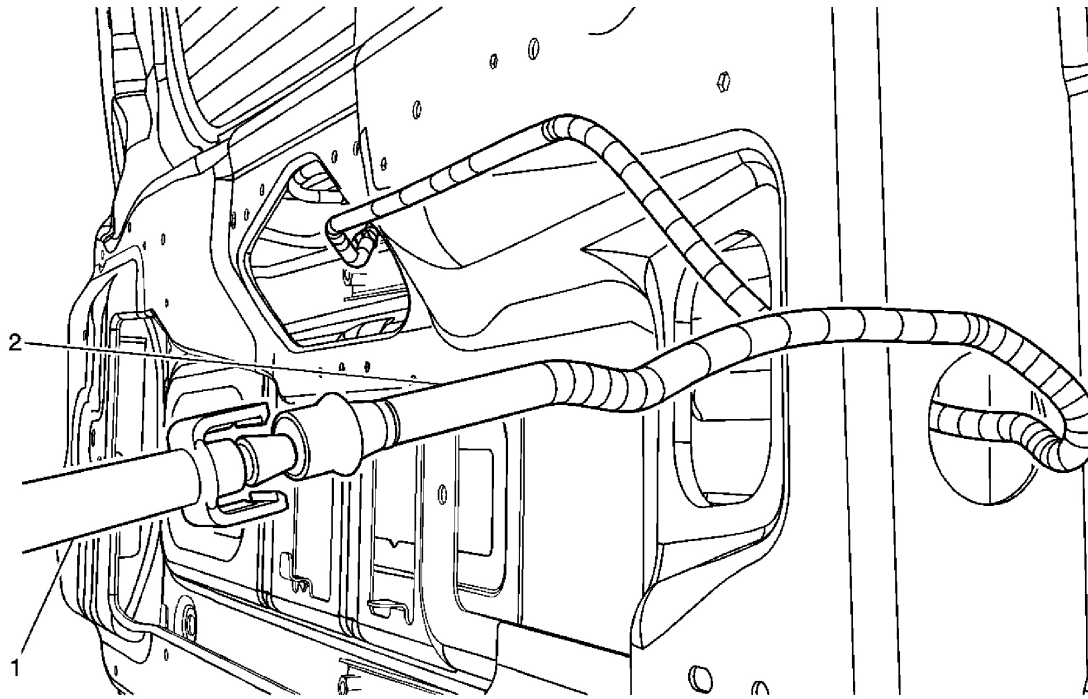


Fig. 41: Washer Hose Replacement - Rear
 Courtesy of GENERAL MOTORS CORP.

Rear Washer Hose Replacement

| Callout | Component Name |
|--|--|
| Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> . | |
| Preliminary Procedure | |
| <ol style="list-style-type: none"> 1. Remove the rear wiper motor. Refer to <u>Rear Window Wiper Motor Replacement</u>. 2. Remove the left body side trim. Refer to <u>Body Side Trim Panel Replacement - Left Side</u>. | |
| 1 | Hose, Bodyside Electrical Harness Washer (Qty: 1) Tip: Release connector claws from rear washer hose connection. |
| 2 | Hose, Rear Windshield Washer (Qty: 1) Tip: Pull the washer hose rearward from the endgate and out from the washer elbow opening. |

DESCRIPTION AND OPERATION

WIPER/WASHER SYSTEM DESCRIPTION AND OPERATION

Wiper/Washer System Components

The Wiper/Washer System consists of the following components:

- Windshield wiper/washer switch
- Body control module (BCM)
- Wiper micro relay
- Wiper 2 relay
- Wiper diode
- Windshield wiper motor
- Windshield washer pump
- Windshield washer nozzles
- Windshield washer solvent container
- Windshield wiper arm and blade assemblies
- Windshield wiper transmission
- WIP/WASH 10A fuse
- WIPER 25A fuse

Refer to **Wiper/Washer Component Views**.

Wiper/Washer System Description

The body control module (BCM) controls wiper motor low speed operation. The washer pump and high speed operation are controlled directly by the wiper/washer switch. The windshield wiper/washer switch supplies voltage on the signal circuits to the BCM for windshield wiper/washer operation. When WASH, MIST, DELAY, LOW or HIGH is detected, the BCM energizes the wiper micro relay by supplying voltage to the relay coil. This allows battery voltage from the WIPER fuse to flow through the relay switched input then through the contacts and out the relay switched output to the wiper 2 relay switch contacts. Since the wiper 2 relay switch contacts are normally closed to the low speed circuit of the windshield wiper motor, the motor will operate at low speed.

Wash Operation

In the WASH position windshield wiper/washer switch supplies voltage to the windshield washer pump. The body control module (BCM) monitors voltage on this circuit to detect when a wash cycle is requested so it can enable the wipers. After a short delay, the BCM energizes the wiper relay which will operate the windshield wiper motor at low speed. The wiper motor will continue to operate for 2 wipe cycles after the wash switch is released.

Mist Operation

Windshield Wiper/Washer System mist operation is identical to low 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 mode until the switch is released.

In the MIST position, voltage is supplied through an internal resistor to the signal circuit of the windshield wiper/washer switch for the body control module (BCM). The BCM will energize the wiper micro relay which will operate the windshield wiper motor at low speed.

Intermittent Operation

Windshield wiper delay operation is a low speed wiper motor function with a variable delay interval between the wiper motor cycles. The delay interval is determined by a series of 5 resistors within the wiper/washer switch. During delay wiper operation the signal circuit voltage is further reduced through the delay resistors. The body control module (BCM) monitors the voltage on the signal circuit to determine the delay interval between the low speed wiper motor cycles.

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.

Low Speed Operation

When the wiper switch is in the Low position, voltage is supplied through an internal resistor to the signal circuit. The body control module (BCM) monitors the windshield wiper switch signal 1 circuit and energizes the wiper micro relay which will operate the windshield wiper motor. The wiper motor will operate at low speed, since the wiper 2 relay is de-energized. Low speed can also be commanded with a scan tool, by commanding Wiper Relay Cmd. ON and OFF. Refer to **Scan Tool Output Controls**.

High Speed Operation

In the High position, the windshield wiper/washer switch supplies voltage to both the wiper micro relay and wiper 2 relay coils. This energizes both relays and allows battery voltage from the wiper micro relay switched output to the switched input of the wiper 2 relay through its contacts and out the switched output of the wiper 2 relay to the high speed circuit of the windshield wiper motor. The windshield wiper motor will operate at high speed. During high speed wiper motor operation the wiper switch signal circuit is at the low speed signal voltage and the body control module (BCM) supplies redundant voltage to the wiper relay via the wiper

diode.

Park Position Operation

Windshield wiper motor park operation is controlled by the body control module (BCM) using an input from the park switch within the wiper motor assembly. The BCM monitors the windshield wiper motor park switch circuit to determine if the windshield wiper blades are at the bottom of the glass. The circuit will be pulled to ground by the wiper motor park switch while the windshield wiper motor is operating. 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 ignition is turned OFF while the wipers are in mid-cycle, the wipers will stop immediately where they are. The BCM will park the wipers the next time the ignition is turned ON.

The wipers will not park when they are commanded ON and OFF with a scan tool. The BCM will park the wipers the next time the wiper switch is turned ON and OFF.

The BCM provides stall protection for the wiper motor by monitoring the park switch. If the park switch does not transition for 3 seconds while the wipers are operating, the BCM will assume that the wiper motor is stalled and will de-energize the wiper relay until the wiper switch is cycled OFF and ON again.

Windshield Wiper/Washer System Power and Ground

With the ignition in the ON position, accessory voltage is supplied through the WIP/WASH 10A fuse in the underhood fuse block to the wiper/washer switch. Refer to **Wiper/Washer Schematics**.

G101 provides ground for the following:

- Windshield washer pump
- Windshield wiper motor
- Wiper micro relay
- Wiper 2 relay

Diagnostic Trouble Codes (DTCs)

The body control module (BCM) monitors the voltage on the windshield wiper switch signal 2 circuit for diagnostic purposes. If the circuit is shorted to voltage while the driver is commanded OFF, the BCM will store DTC B3717. If the circuit is shorted to ground while the driver is commanded ON, the BCM will store DTC B3718.

REAR WIPER/WASHER SYSTEM DESCRIPTION AND OPERATION

Rear Wiper/Washer System Components

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

- Rear wiper/washer switch
- Rear wiper motor
- Rear washer pump
- RR Wiper 15A fuse
- RR Washer Pump 15A fuse

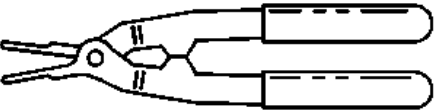
Rear Wiper/Washer System Description

The rear wiper motor module is part of the rear wiper motor assembly and controls wiper motor operation. System voltage is supplied to the switch, washer pump and wiper motor by two retained accessory power circuits. The washer switch controls the washer pump by providing a path to ground when pressed. The rear washer control circuit is also used as a wash signal to the rear wiper motor module. The WASH command on the washer control circuit will cause the wiper motor to operate at low speed for as long as the switch is held in the closed position and 2 cycles after being released.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Special Tools

| Illustration | Tool Number/Description |
|---|--|
|  | <p>J 39232 Wiper Linkage Separator</p> |
| | <p>J 39529</p> |

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Wiper Linkage Installer

