2007 ACCESSORIES & EQUIPMENT

Wipers and Washers - Outlook

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Washer Solvent Container Nuts	9 N.m	80 lb in
Windshield Washer Solvent Heater Nuts	9 N.m	80 lb in
Wiper Arm Nut - Front	22 N.m	16 lb ft
Wiper Arm Nut - Rear	19 N.m	14 lb ft
Wiper Arm Pivot Shaft Nut - Rear	5.0 N.m	44 lb in
Wiper Module Bolts	22 N.m	22 lb in
Wiper Motor Bolts	4.5 N.m	40 lb in
Wiper Motor Support Bracket Screws	5.5 N.m	49 lb in

SCHEMATIC AND ROUTING DIAGRAMS

WIPER/WASHER SCHEMATICS

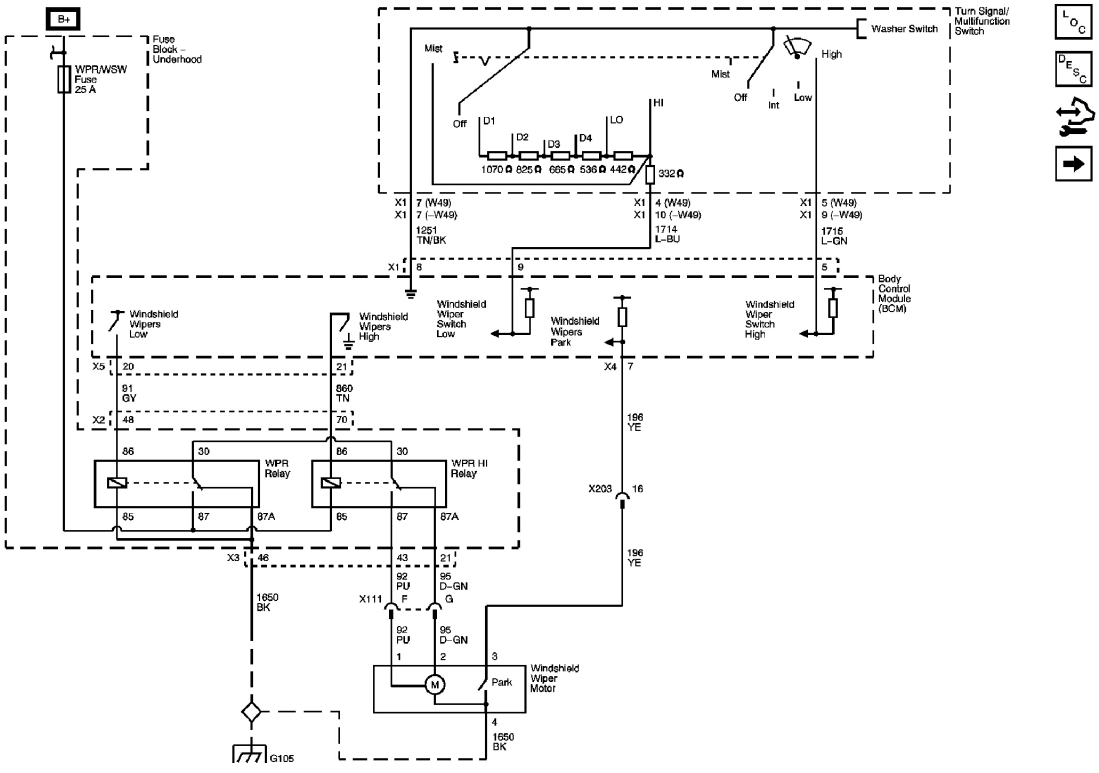

Fig. 1: Front Wipers Schematic
Courtesy of GENERAL MOTORS CORP.

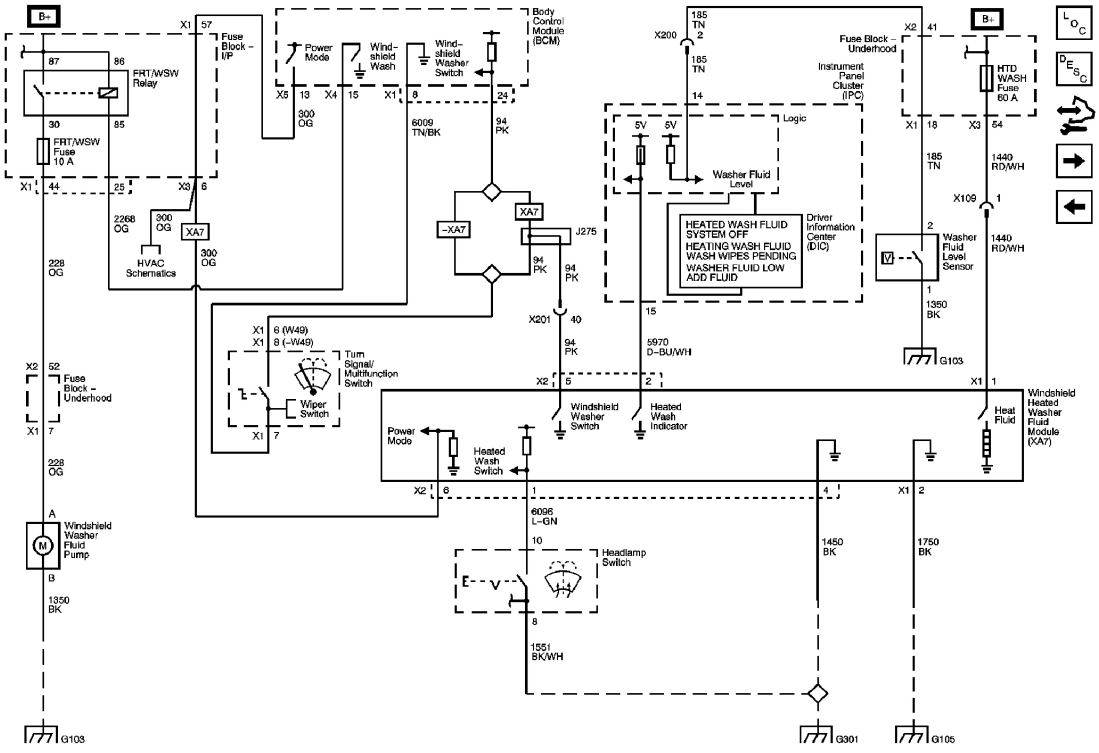

Fig. 2: Front Washers Schematic
Courtesy of GENERAL MOTORS CORP.

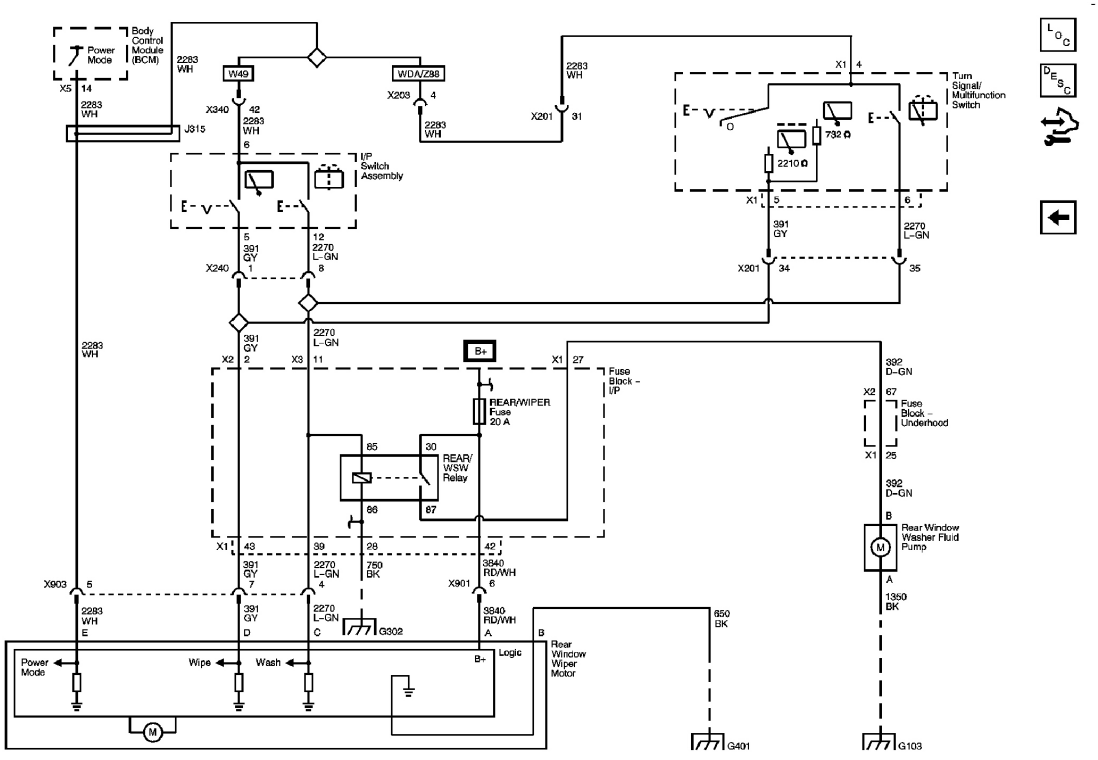

Fig. 3: Rear Wiper Schematic
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

WIPER/WASHER COMPONENT VIEWS

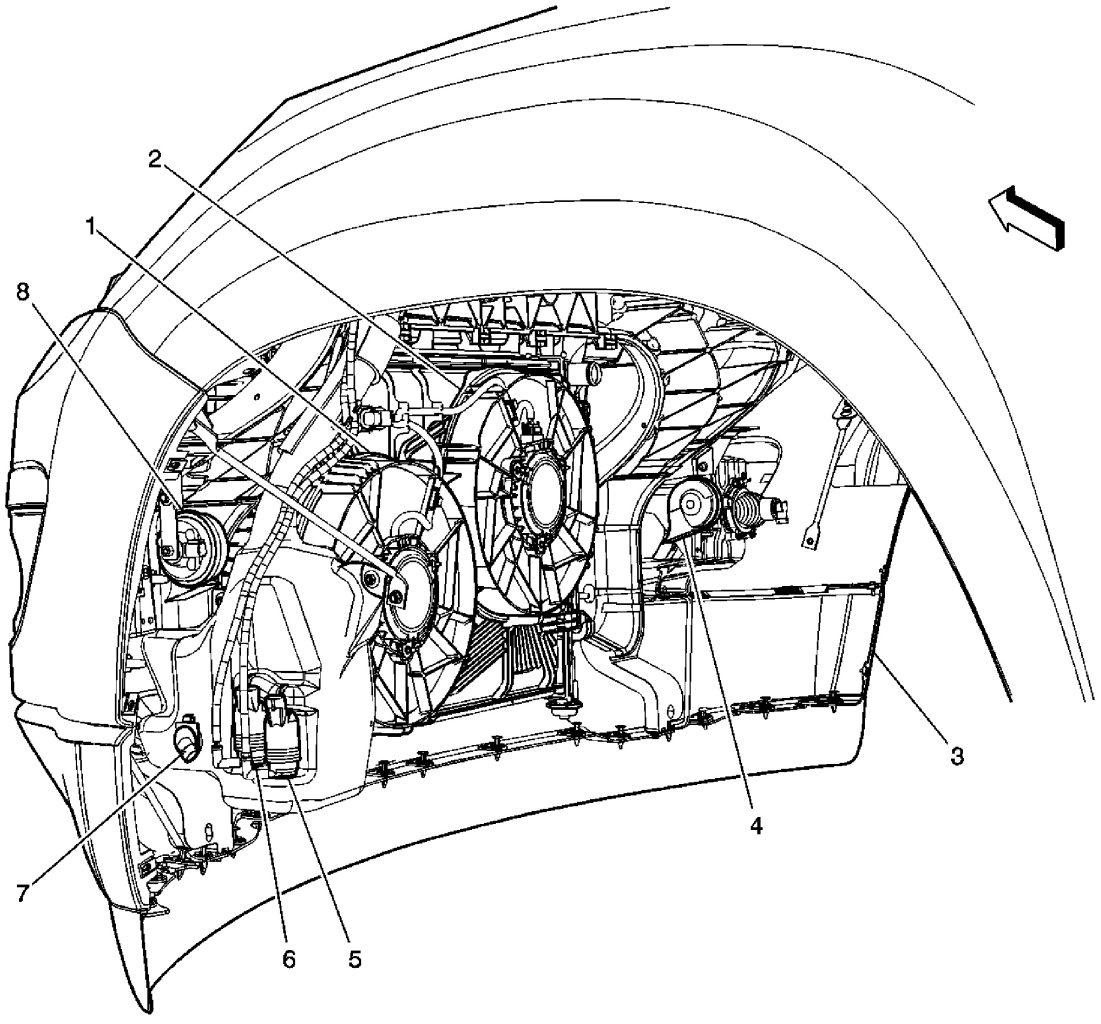

Fig. 4: Identifying Components Behind Front Fascia
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 4

Callout	Component Name
1	Cooling Fan - Left
2	Cooling Fan - Right
3	LF Fender
4	Horn - High Note
5	Windshield Washer Fluid Pump
6	Rear Window Washer Fluid Pump
7	Washer Fluid level Sensor
8	Horn - Low Note

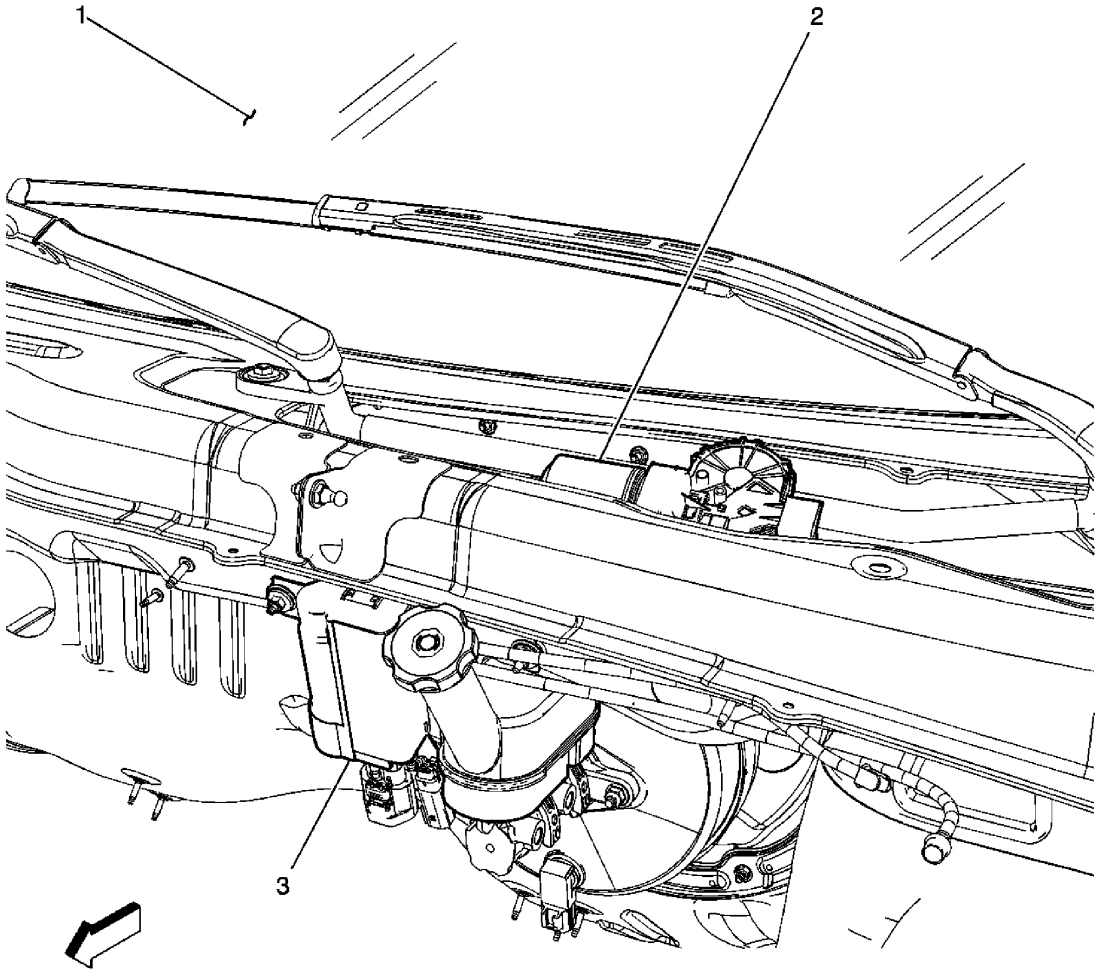

Fig. 5: Identifying Wiper/Washer Components At Bottom Of Windshield
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 5

Callout	Component Name
1	Windshield
2	Windshield Wiper Motor
3	Windshield Heated Washer Fluid Module

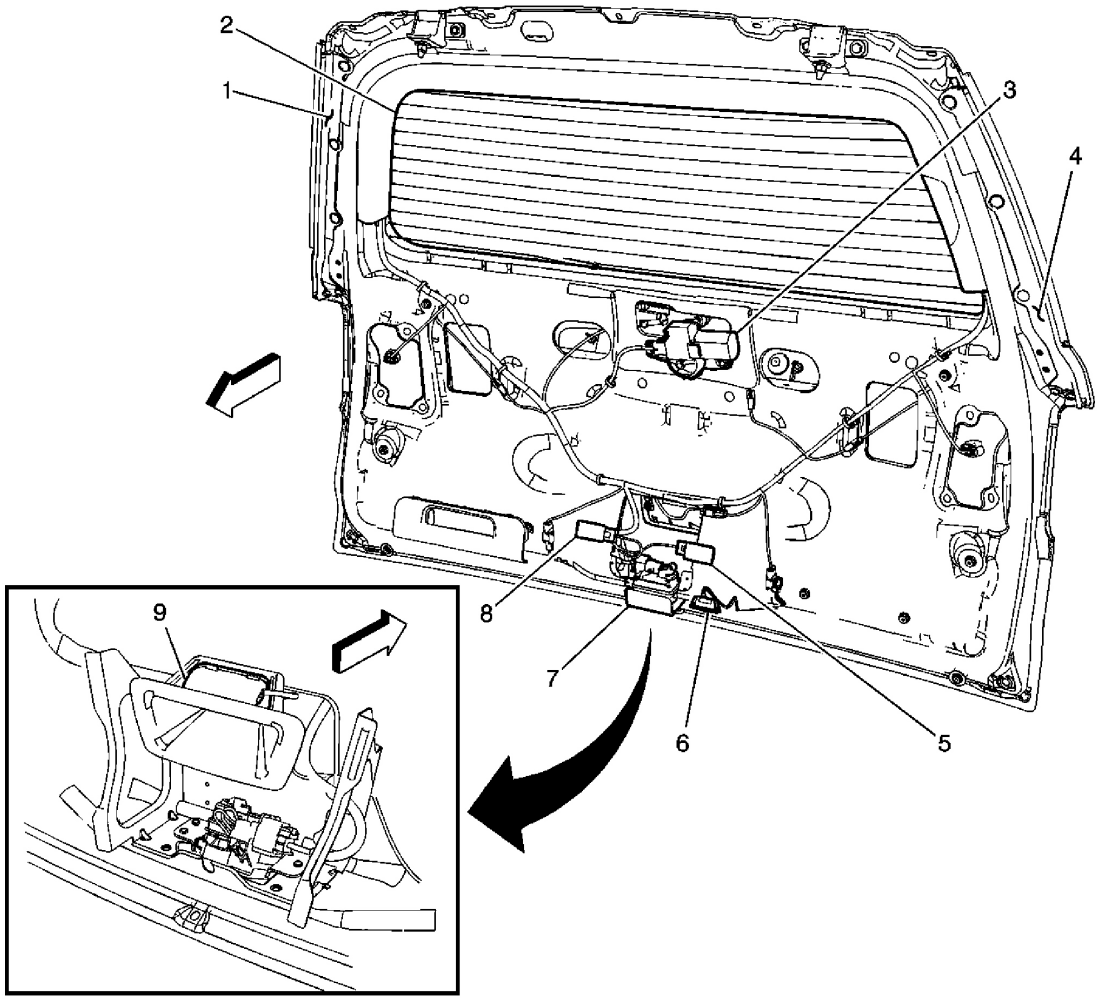

Fig. 6: Identifying Liftgate Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 6

Callout	Component Name
1	Liftgate Object Sensor - Right (E61)
2	Rear Window Defogger Grid
3	Rear Window Wiper Motor
4	Liftgate Object Sensor - Left (E61)
5	Courtesy Lamp - Liftgate - Left
6	Liftgate Switch - Interior (E61)
7	Liftgate Latch Assembly
8	Courtesy Lamp - Liftgate - Right

9	Liftgate Switch - Exterior (E61)

WIPER/WASHER CONNECTOR END VIEWS

Rear Window Washer Fluid Pump

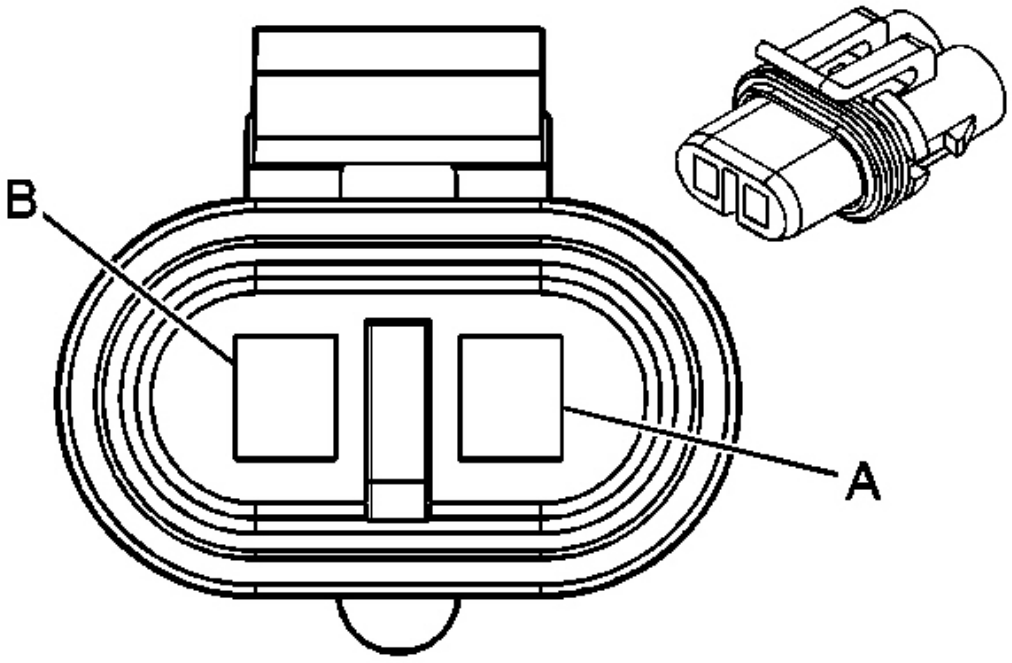

Fig. 7: Rear Window Washer Fluid Pump Connector End View
Courtesy of GENERAL MOTORS CORP.

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

- Terminal/Tray: 12077411/2

- Core/Insulation Crimp: 2/5
- Release Tool/Test Probe: 12094430/J-35616-4A (PU)

Rear Window Washer Fluid Pump Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.5 BK	1350	Ground
B	0.8 D-GN	392	Rear Window Washer Pump Control

Rear Window Wiper Motor

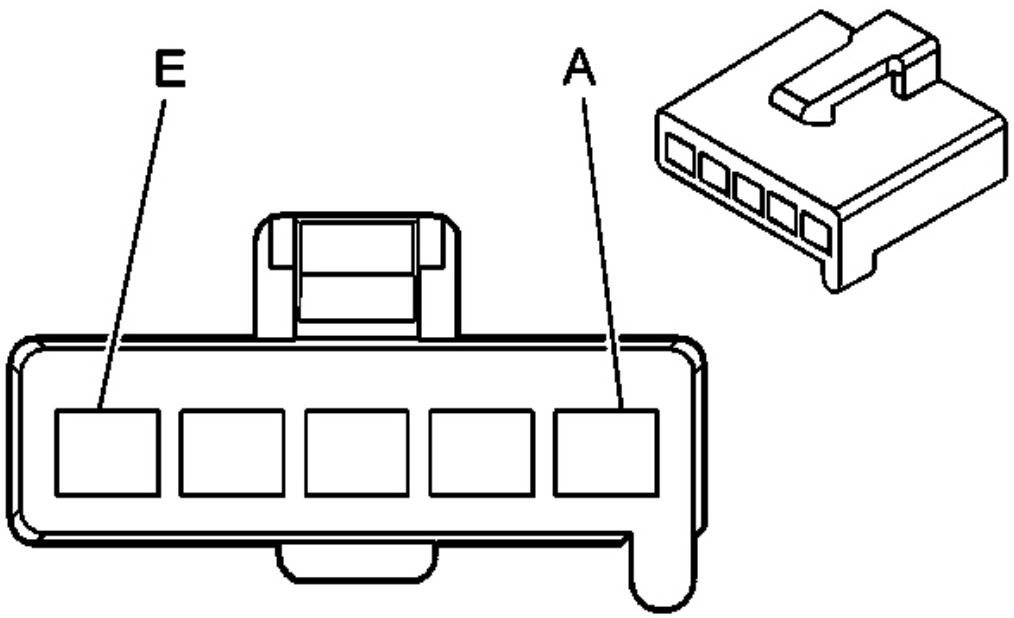

Fig. 8: Rear Window Wiper Motor Connector End View
Courtesy of GENERAL MOTORS CORP.

Rear Window Wiper Motor Connector Parts Information

Connector Part Information

- OEM: 12041429
- Service: 12167129

- Description: 5-Way F Metri-Pack 280 Series (BK)

Terminal Part Information

- Pins: A, B
- Terminal/Tray: 12066214/2
- Core/Insulation Crimp: F/D
- Release Tool/Test Probe: 12094430/J-35616-4A (PU)

- Pins: C-E
- Terminal/Tray: 12034046/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094430/J-35616-4A (PU)

Rear Window Wiper Motor Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	1 RD/WH	3840	Front Sunshade Switch Open Signal
B	1 BK	650	Ground
C	0.5 L-GN	2270	Rear Window Washer Relay Control
D	0.5 GY	391	Rear Window Wiper Switch Signal
E	0.35 WH	2283	Rear Wiper/Washer Switch Supply Voltage

Washer Fluid Level Sensor

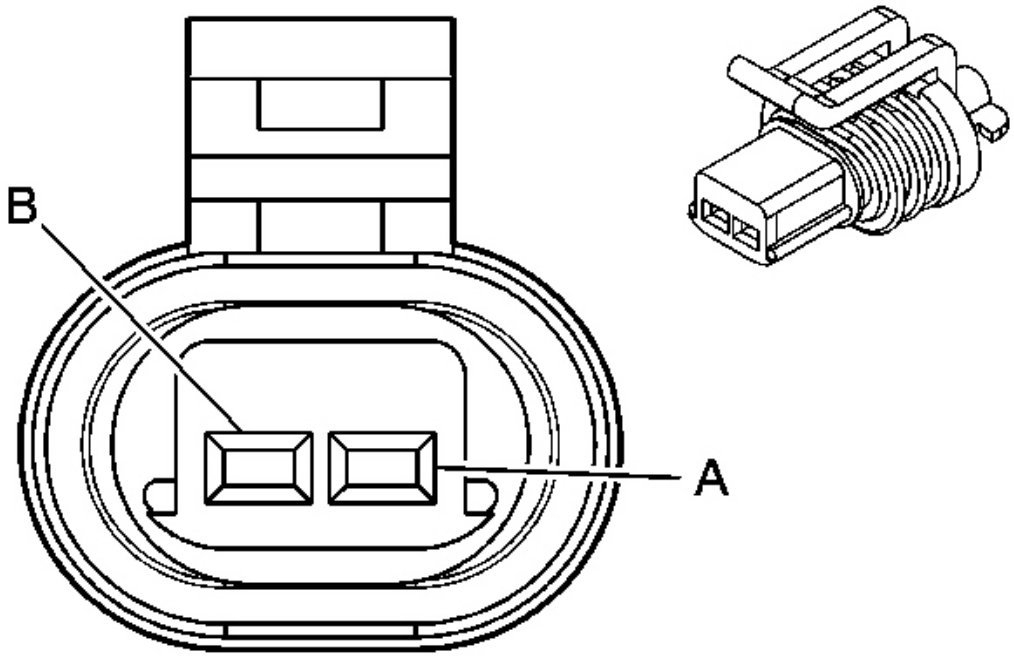

Fig. 9: Washer Fluid Level Sensor Connector End View
Courtesy of GENERAL MOTORS CORP.

Washer Fluid Level Sensor Connector Parts Information

Connector Part Information

- OEM: 15336024
- Service: 88987993
- Description: 2-Way F GT 150 Sealed (BK)

Terminal Part Information

- Terminal/Tray: 15326267/19
- Core/Insulation Crimp: E/4
- Release Tool/Test Probe: 15315247/J-35616-2A (GY)

Washer Fluid Level Sensor Connector Terminal Identification

Pin	Wire	Circuit No.	Function

1	0.5 BK	1350	Ground
2	0.35 TN	185	Low Washer Fluid Indicator Control

Windshield Heated Washer Fluid Module X1 (XA7)

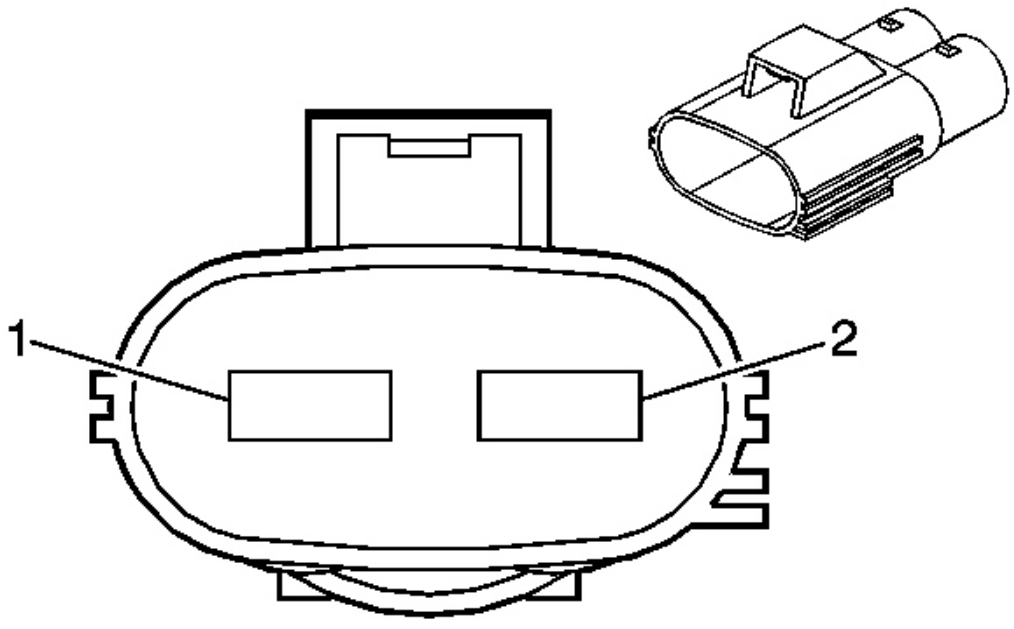

Fig. 10: Windshield Heated Washer Fluid Module X1 (XA7) Connector End View
Courtesy of GENERAL MOTORS CORP.

Windshield Heated Washer Fluid Module X1 (XA7) Connector Parts Information

Connector Part Information

- OEM: 7282-3214-30
- Service: 19115654
- Description: 2-Way M Y-Type 9.5 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 7114-3250/14
- Core/Insulation Crimp: G/3

- Release Tool/Test Probe: 12094430/J-35616-21 (RD)

Windshield Heated Washer Fluid Module X1 (XA7) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	5 RD/WH	1440	Battery Positive Voltage
2	5 BK	1750	Ground

Windshield Heated Washer Fluid Module X2 (XA7)

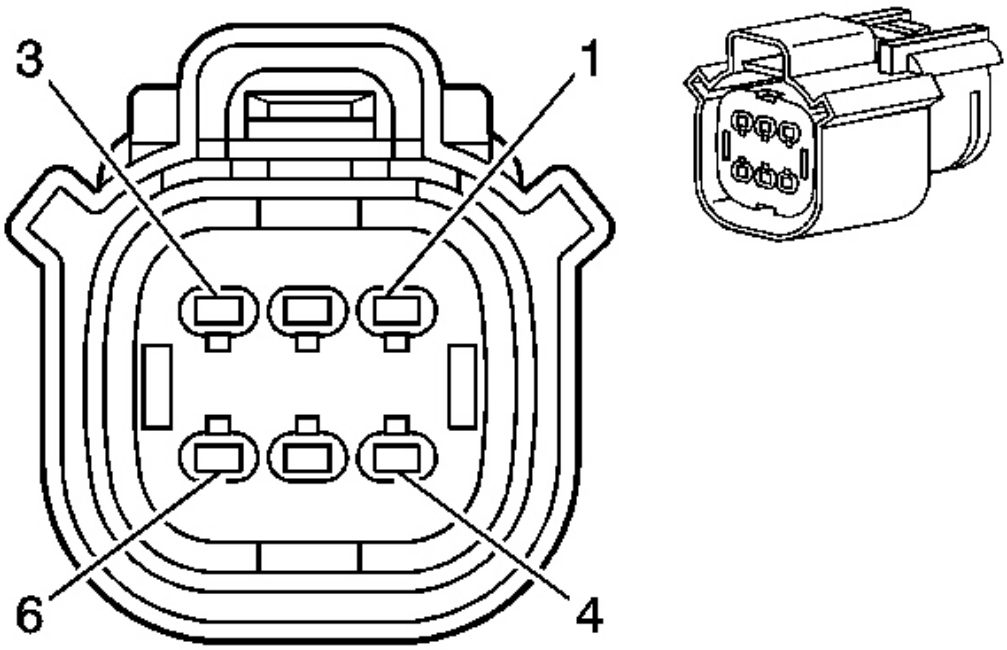

Fig. 11: Windshield Heated Washer Fluid Module X2 (XA7) Connector End View
Courtesy of GENERAL MOTORS CORP.

Windshield Heated Washer Fluid Module X2 (XA7) Connector Parts Information

Connector Part Information

- OEM: 33472-0611
- Service: 19115669

- Description: 6-Way F Sealed (BK)

Terminal Part Information

- Terminal/Tray: 33012-1003/23
- Core/Insulation Crimp: 2/E/2
- Release Tool/Test Probe: J-38125-217/J-35616-14 (GN)

Windshield Heated Washer Fluid Module X2 (XA7) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	0.35 L-GN	6096	Washer Fluid Heated Control Switch Signal
2	0.35 D-BU/WH	5970	Washer Fluid Heated Control Switch LED Supply Voltage
3	-	-	Not Used
4	0.35 BK	1450	Ground
5	0.35 PK	94	Windshield Washer Switch Signal
6	0.35 OG	300	Power Mode

Windshield Washer Fluid Pump

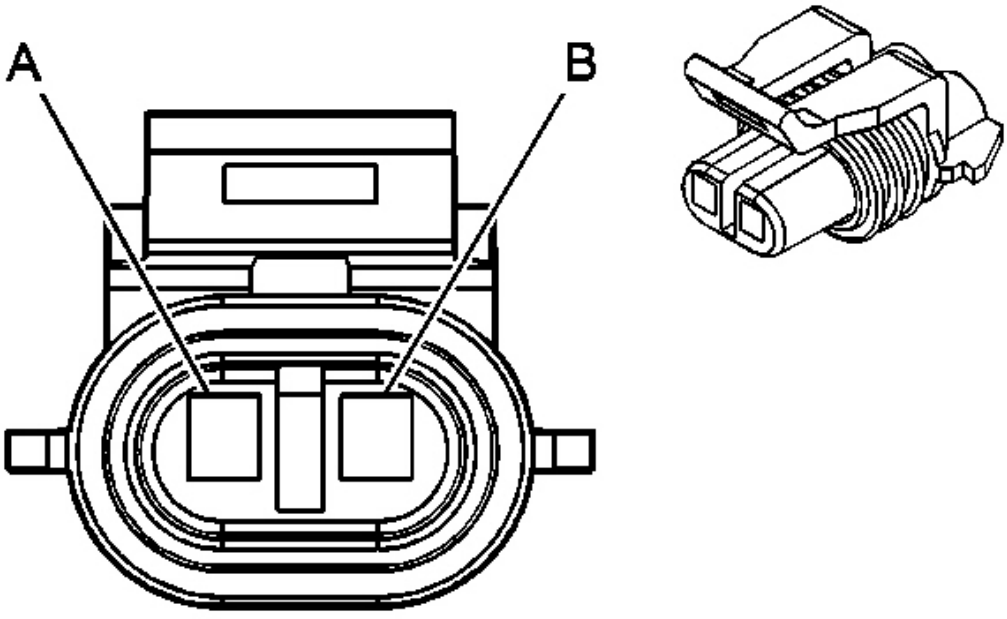

Fig. 12: Windshield Washer Fluid Pump Connector End View
Courtesy of GENERAL MOTORS CORP.

Windshield Washer Fluid Pump Connector Parts Information

Connector Part Information

- OEM: 12052641
- Service: 12102747
- Description: 2-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12048074/2
- Core/Insulation Crimp: E/1
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Windshield Washer Fluid Pump Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.5 OG	228	Windshield Washer Pump Control

B	0.5 BK	1350	Ground

Windshield Wiper Motor

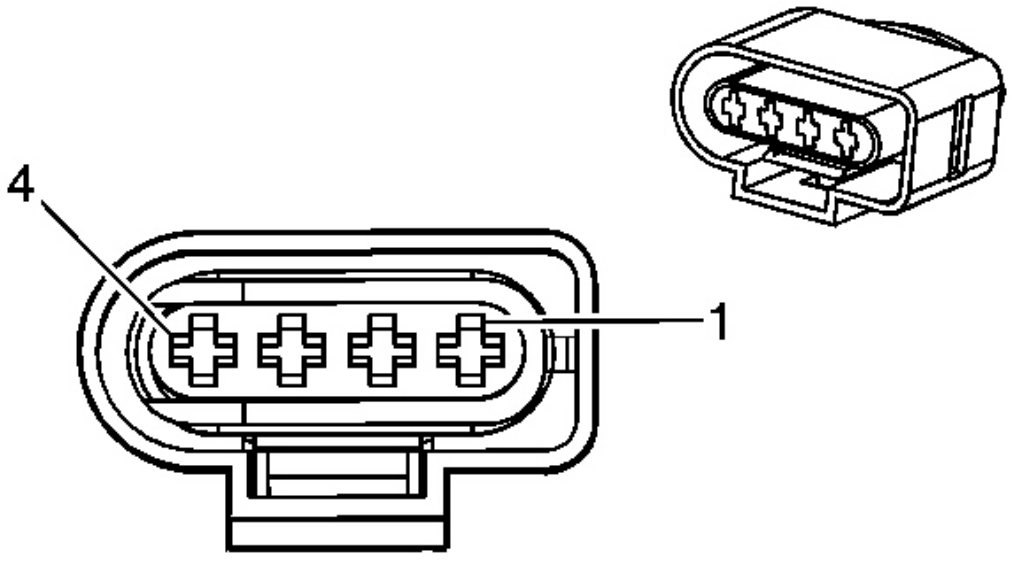

Fig. 13: Windshield Wiper Motor Connector End View
Courtesy of GENERAL MOTORS CORP.

Windshield Wiper Motor Connector Parts Information

Connector Part Information

- OEM: 10811710
- Service: 88987987
- Description: 4-Way F Timer Jr-Power Sealed (BK)

Terminal Part Information

- Terminal/Tray: 4-964273-1/15
- Core/Insulation Crimp: E/1
- Release Tool/Test Probe: 12093647/J-35616-4A (PU)

Windshield Wiper Motor Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	1 PU	92	Windshield Wiper Motor High Speed
2	1 D-GN	95	Windshield Washer Switch Signal
3	0.35 YE	196	Windshield Wiper Motor Park Switch Signal
4	1 BK	1650	Ground

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B3715	Front Wiper Relay Drive Circuit Short to Ground
DTC B3873	Front Washer Relay Circuit
DTC B3875	Wiper High Speed Relay Circuit
DTC B3922	Front Wiper Function Select Circuit

DIAGNOSTIC STARTING POINT - WIPER/WASHER SYSTEMS

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

- The identification of the control modules which command the system
- 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 system and where the procedure is located.

SCAN TOOL OUTPUT CONTROLS

Scan Tool Output Controls

Scan Tool Output Control	Additional Menu Selection	Description
Wiper Motor Relay	Miscellaneous Test	This output control commands the wiper 1 relay On and Off. The wiper motor will operate at Low speed when the wiper 1 relay is On.
Wiper Motor Low/Hi Speed	Miscellaneous Test	This output control commands the wiper Hi relay

Relay		On or Off.

SCAN TOOL DATA LIST

Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF			
Low Washer Fluid	Inputs	Low/OK	OK
Wiper High Speed Switch	Inputs	On/Off	Off
Wiper Motor Low/Hi Speed Relay	Outputs	On/Off	Off
Wiper Motor Park Switch	Inputs	Active/Inactive	Active
Wiper Motor Relay	Outputs	On/Off	Off
Wiper Washer Motor	Outputs	On/Off	Off
Wiper Washer Switch	Inputs	Active/Inactive	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.

Low Washer Fluid

This input displays the washer fluid level. Low is displayed when the level is Low and OK is displayed if it is above the switch threshold.

Wiper High Speed Switch

This input displays On if the wiper washer switch is in the Hi position.

Wiper Motor Low/Hi Speed Relay

This output displays the state of the wiper Hi relay. On is wipers Hi speed and Off is wipers Low speed.

Wiper Motor Park Switch

The body control module (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 Motor Relay

This output displays whether or not the BCM is providing voltage for the wiper relay. ON is displayed when the BCM detects the correct signal from the windshield wiper switch.

Wiper Washer Motor

This output displays the operation mode of the washer pump.

Wiper Washer Switch

The BCM uses this input to determine if the wash switch is depressed. If it is depressed, the BCM commands the wiper 1 relay ON and keeps it ON until 2 wipe cycles have completed after the switch has been released.

DTC B3715

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 B3715 02

Front Wiper Relay Drive Circuit Short to Ground

Diagnostic Fault Information

DTC B3715

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Windshield Washer Switch Signal	6 8	8	1	-
Windshield Wiper Motor Relay Coil Supply Voltage	B3715 00	2	6	-
Windshield Wiper Switch High Signal	6	4	1	-
Windshield Wiper Switch Low Signal	B3922 00	3	1	-
Windshield Wiper Motor Park Switch Signal	5	5	-	-
Windshield Wiper Motor High Speed Control	2	4	-	-
Windshield Wiper Motor Low Speed Control	2	3	-	-
Windshield Wiper Motor Ground	-	2	-	-
Windshield Wiper Switch Ground	-	1	-	-
Wiper High Speed Relay Control	7	4	B3875 00	-
Wiper Relay Ground	-	2	-	-

1. Wipers and Washers Inoperative All Modes
2. Wipers Inoperative All Modes and Washers Work
3. Delay or Low Speed Wipers Inoperative
4. High Speed Wipers Inoperative
5. Wipers Do Not Park
6. Wipers Always ON
7. Wipers Operate at High Speed in the Low Speed Mode
8. Washer Malfunction

Circuit/System Description

The body control module (BCM) monitors the control circuit of the wiper relay. The voltage level should be low while the wiper relay is de-energized and near system voltage when the relay is energized. After the BCM receives a low, intermittent or mist signal from the wiper/washer

switch, it responds by applying battery voltage through the wiper relay control circuit to the coil side of the relay, energizing the WIPER Relay. Ground is supplied at all times to the coil side of the WIPER relay from G104.

Conditions for Running the DTC

This DTC can set only when the output is actively being requested by the BCM.

Conditions for Setting the DTC

If the BCM detects a short to ground in the wiper relay control circuit.

Action Taken When the DTC Sets

The BCM will not activate the output.

Conditions for Clearing the DTC

- The current DTC will become history when the request for the output is removed or when the condition for setting the fault is corrected.
- The history DTC will clear after 50 consecutive ignition cycles without a fault present.

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

1. Ignition OFF, disconnect the C5 harness connector at the underhood fuse block.
2. Connect a test lamp between the control circuit terminal K3 and ground.
3. Command the Wiper Relay ON and OFF with a scan tool. 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, replace the 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, replace the body control module.
4. If all circuits test normal, replace the underhood fuse block.

Repair Procedures

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

- **Underhood Electrical Center or Junction Block Replacement**
- **Control Module References** for BCM replacement, setup and programming

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 00

Front Washer Relay Circuit

Diagnostic Fault Information

DTC B3873

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance

Windshield Washer Switch Signal	2	1	3	-
Windshield Washer Pump Control	1	1	2	-
Windshield Washer Relay Control	2	1	B3873	-
Windshield Washer Pump Ground	-	1	-	-
Windshield Wiper Switch Ground	-	3	-	-

1. Washer Inoperative
2. Washers Always ON
3. Windshield Wiper System Malfunction

Circuit/System Description

The windshield washer function is controlled by the body control module (BCM). When the washer switch is pressed, ground is applied through the switch contacts and the signal circuit to the BCM indicating the wash request. The BCM then applies ground through the control circuit to the coil side of the WSH Relay energizing the relay. With the relay energized, battery voltage from the WPR fuse is applied through the switch contacts of the relay, the WSW/PUMP Fuse and the control circuit to the windshield washer fluid pump.

Conditions for Running the DTC

This DTC can set only when the output is actively being requested by the BCM.

Conditions for Setting the DTC

This DTC sets if the BCM detects a short to battery voltage in the windshield washer pump relay control circuit.

Action Taken When the DTC Sets

The BCM will not activate the output.

Conditions for Clearing the DTC

- The current DTC will become history when the request for the output is removed or when the condition for setting the fault is corrected.

- The history DTC will clear after 50 consecutive ignition cycles without a fault present.

Reference Information

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Wiper/Washer Connector End Views

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- **Wiring Repairs**

Scan Tool Reference

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

Circuit/System Testing

1. Ignition OFF, disconnect the C4 harness connector at the underhood fuse block.
2. Connect a test lamp between the control circuit terminal A3 and battery voltage.
3. Command the Wiper Washer Motor ON and OFF with a scan tool. 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, replace the 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 body control module.
4. If all circuits test normal, replace the underhood fuse block.

Repair Procedures

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

- **Underhood Electrical Center or Junction Block Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC 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 Descriptor

DTC B3875 00

Wiper High Speed Relay Circuit

Diagnostic Fault Information

DTC B3875

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Windshield Washer Switch Signal	6 8	8	1	-
Windshield Wiper Motor Relay Coil Supply Voltage	B3715 00	2	6	-
Windshield Wiper Switch High Signal	6	4	1	-
Windshield Wiper Switch Low Signal	B3922 00	3	1	-
Windshield Wiper Motor Park Switch Signal	5	5	-	-
Windshield Wiper Motor High Speed Control	2	4	-	-
Windshield Wiper Motor Low Speed Control	2	3	-	-
Windshield Wiper Motor Ground	-	2	-	-

Windshield Wiper Switch Ground	-	1	-	-
Wiper High Speed Relay Control	7	4	B3875 00	-
Wiper Relay Ground	-	2	-	-

1. Wipers and Washers Inoperative All Modes
2. Wipers Inoperative All Modes and Washers Work
3. Delay or Low Speed Wipers Inoperative
4. High Speed Wipers Inoperative
5. Wipers Do Not Park
6. Wipers Always ON
7. Wipers Operate at High Speed in the Low Speed Mode
8. Washer Malfunction

Circuit/System Description

The body control module (BCM) monitors the wiper high speed relay control circuit only when wiper high speed mode is active. When the wiper high speed mode is requested, the BCM responds by applying a ground through the wiper high speed relay control circuit to the coil side of the relay, energizing the WPR HI Relay.

Conditions for Running the DTC

This DTC can set only when the output is actively being requested by the BCM.

Conditions for Setting the DTC

This DTC sets if the BCM detects a short to battery voltage on the wiper high speed relay control circuit.

Action Taken When the DTC Sets

The BCM will not activate the output.

Conditions for Clearing the DTC

- The current DTC will become history when the request for the output is removed or when the condition for setting the fault is corrected.
- The history DTC will clear after 50 consecutive ignition cycles without a fault present.

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- **Wiring Repairs**

Scan Tool Reference

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

Circuit/System Testing

1. Ignition OFF, disconnect the C4 harness connector at the underhood fuse block.
2. Connect a test lamp between the control circuit terminal A3 and battery voltage.
3. Command the Wiper High Speed Relay ON and OFF with a scan tool. 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, replace the 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 body control module.
4. If all circuits test normal, replace the underhood fuse block.

Repair Procedures

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

- **Underhood Electrical Center or Junction Block Replacement**
- **Control Module References** for BCM replacement, setup and programming

DTC B3922

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 B3922 00

Front Wiper Function Select Circuit

Diagnostic Fault Information

DTC B3922

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Windshield Washer Switch Signal	6 8	8	1	-
Windshield Wiper Switch High Signal	6	4	1	-
Windshield Wiper Switch Low Signal	B3922 00	3	1	-
Windshield Wiper Motor Park Switch Signal	5	5	-	-
Windshield Wiper Motor High Speed Control	2	4	-	-
Windshield Wiper Motor Low Speed Control	2	3	-	-
Wiper Relay Control	B3715 00	2	6	-
Windshield Wiper Motor Ground	-	2	-	-
Windshield Wiper Switch Ground	-	1	-	-
Wiper High Speed Relay Control	7	4	B3875 00	-
Wiper Relay Ground	-	2	-	-

1. Wipers and Washers Inoperative All Modes
2. Wipers Inoperative All Modes and Washers Work
3. Delay or Low Speed Wipers Inoperative
4. High Speed Wipers Inoperative
5. Wipers Do Not Park
6. Wipers Always ON
7. Wipers Operate at High Speed in the Low Speed Mode
8. Washer Malfunction

Circuit/System Description

The body control module (BCM) monitors the windshield wiper switch low signal circuit. When the wiper switch is place in the low position, battery voltage is applied through the switch contacts, a series of resistors and the wiper switch low signal circuit to the BCM. The BCM then applies battery voltage through the wiper relay control circuit to energize the WPR Relay. When energized, battery voltage from the WPR Fuse is applied through the switch side of the WPR relay then through the switch side of the WPR HI relay to the windshield wiper motor.

Conditions for Running the DTC

The ignition switch is in the ON position.

Conditions for Setting the DTC

The BCM detects a short to ground on the windshield wiper switch low signal circuit.

Action Taken When the DTC Sets

- The BCM will not activate the low speed output.
- The windshield wipers will only operate in the high speed mode.

Conditions for Clearing the DTC

- The DTC will clear the current status when the condition for setting the fault is corrected.
- 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

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 Verification

Ignition ON, observe the scan tool Windshield Wiper Switch parameter while rotating the wiper switch. The reading should change between Off, Intermittent and Low.

Circuit/System Testing

1. Ignition OFF, disconnect the C3 harness connector at the turn signal/multifunction switch.
2. Ignition ON, verify the scan tool Windshield Wiper Switch parameter is not Switch Fault.
    - If Switch Fault, test the windshield wiper switch low signal circuit terminal N for a short to ground. If the circuit tests normal, replace the BCM.
3. If all circuits test normal, test or replace the turn signal/multifunction switch.

Component Testing

Multifunction Switch

1. With the ignition OFF, disconnect the C3 harness connector at the turn signal/multifunction switch.
2. Test the resistance between terminals M and N. Rotate the wiper switch and compare the resistance readings to the values in the Windshield Wiper Switch Values table below for MIST, each DELAY and LOW speed.
    - If the resistance is not within the specified range, replace the turn signal/multifunction switch.
3. Test for infinite resistance between terminals M and K while rotating the wiper switch to

MIST, each DELAY and LOW speed positions.
- If the less than infinite, replace the turn signal/multifunction switch.

4. Test for less than 5 ohms of resistance with the wiper switch in the High speed position.
   - If greater than 5 ohm, replace the turn signal/multifunction switch.
5. Test for infinite resistance between terminals H and L while rotating the wiper switch to MIST, each DELAY and LOW speed positions.
   - If less than infinite, replace the turn signal/multifunction switch.
6. Test for less than 5 ohm of resistance while pressing the WASHER switch.
   - If greater than 5 ohm, replace the turn signal/multifunction switch.

IMPORTANT: If the switch tests open in any switch position other than Off, test the wiper/washer switch 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	3.48K-4.25K ohms
Delay 2	2.52K-3.08K ohms
Delay 3	1.78K-2.18K ohms
Delay 4	1.17K-1.44K ohms
Delay 5	697-851 ohms
Low	300-364 ohms

Repair Procedures

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

- **Turn Signal Multifunction Switch Replacement**
- **Control Module References** for BCM replacement, setup and programming

SYMPTOMS - WIPER/WASHER SYSTEMS

IMPORTANT: 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 the system description and operation in order to familiarize yourself with the system functions:
   - **Wiper/Washer System Description and Operation**
   - **Rear Wiper/Washer System Description and Operation**

Visual/Physical Inspection

- Inspect for aftermarket devices which could 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 could 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 Washer System Malfunction**
- **Washer Malfunction**
- **Windshield Washer Solvent Heater Malfunction**
- **Rear Washer Inoperative**
- **Rear Wiper Always On**
- **Rear Wiper Inoperative**

WINDSHIELD WIPER 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

Windshield Wiper Washer System Malfunction

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Windshield Washer Switch Signal	6 8	8	1	-
Windshield Wiper Motor Relay Coil Supply Voltage	B3715 00	2	6	-
Windshield Wiper Switch High Signal	6	4	1	-
Windshield Wiper Switch Low Signal	B3922 00	3	1	-
Windshield Wiper Motor Park Switch Signal	5	5	-	-
Windshield Wiper Motor High Speed Control	2	4	-	-
Windshield Wiper Motor Low Speed Control	2	3	-	-
Windshield Wiper Motor Ground	-	2	-	-
Windshield Wiper Switch Ground	-	1	-	-
Wiper High Speed Relay Control	7	4	B3875 00	-
Wiper Relay Ground	-	2	-	-

1. Wipers and Washers Inoperative All Modes
2. Wipers Inoperative All Modes and Washers Work
3. Delay or Low Speed Wipers Inoperative
4. High Speed Wipers Inoperative
5. Wipers Do Not Park
6. Wipers Always ON
7. Wipers Operate at High Speed in the Low Speed Mode
8. Washer Malfunction

Circuit/System Description

Wiper Mist, Delay 1-5 and Low are all low speed wiper motor functions that are controlled by the body control module (BCM). When the wiper switch is placed in one of the LOW speed wiper modes, ground is applied through the switch contacts a series of internal resistors and the wiper switch low signal circuit to the BCM. In response to this signal, the BCM energizes the WIPER 1 relay by applying battery voltage through the wiper relay control circuit to the coil side of the relay. This allows battery positive voltage from the WPR fuse to flow through the switch input side of the WIPER 1 relay and out to the switch input side of the WIPER 2 relay. Since the wiper high relay is de-energized and its switch contacts are normally closed to the low speed control circuit of the windshield wiper motor, the motor will operate at low speed.

When the wiper switch is placed in the HIGH speed position, ground is applied through the switch contacts and the wiper switch high signal circuit to the BCM indicating the wiper high speed request. The BCM then energizes WIPER 1 relay as stated above and the WIPER 2 relay by applying ground through the control circuit to the coil side of the relay. With the wiper high relay energized and its switch contacts closed to the high speed control circuit of the wiper motor, the motor will operate at high speed.

Diagnostic Aids

1. A short to ground in the following circuits will open the WPR fuse:
    - Ignition 1 voltage
    - Windshield wiper motor relay coil supply voltage
    - Windshield wiper switch high signal
    - Windshield wiper motor low speed control
    - Windshield wiper motor high speed control
2. A short to B+ on any of the wiper/washer switch signal circuits will open the ground trace in the wiper switch.

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 Verification

BCM and Wiper Switch Verification

1. Ignition ON, observe the scan tool BCM Windshield Wiper Switch parameter. The reading should display Off, Intermittent, Low and High while rotating the wiper switch.
    - If one or more of the wiper delay parameters are inoperative and the wiper low speed parameter functions, replace the turn signal/multifunction switch.
    - If the low speed and/or high speed parameters are inoperative, perform the Multifunction Switch Circuit/System Testing and/or the Multifunction Switch Component Test.
2. Observe the scan tool BCM Wiper Park Switch parameter. The reading should display Active when the wipers are parked and Inactive with the wipers ON or out of the park position.
    - If the Wiper Park Switch parameter is always Active or Inactive, perform the Wipers do not Park Circuit/System Testing.
3. If all wiper position parameters displayed correctly on the scan tool, perform the Wiper Motor Circuit/System Testing and/or the Wiper Motor Component Test.

BCM and Wiper Motor Verification

1. Command the windshield wiper motor to the off, low speed and high speed modes with a scan tool. The wipers should perform the commanded state.
    - If one or more of the commanded states do not work, perform the Wiper Motor tests in Circuit/System Testing and/or Component test.
2. If all the wiper motor speeds function, perform the Multifunction Switch Circuit/System Testing and/or the Multifunction Switch Component Test.

Circuit/System Testing

Multifunction Switch Circuit/System Testing

1. Ignition OFF, disconnect the C3 harness connector at the turn signal/multifunction switch.
2. Ignition OFF, test for less than 15 ohms of resistance between the ground circuit terminal M and ground.
    - If greater than 15 ohms, test the ground circuit for an open/high resistance. If the circuit tests normal, replace the body control module.
3. Verify the scan tool Windshield Wiper Switch parameter is Off.
    - If not Off, test the signal circuit terminal N for a short to ground. If the circuit tests normal, replace the body control module.
4. Verify the scan tool Wiper High Speed Switch parameter is Inactive.
    - If not Inactive, test the signal circuit terminal K for a short to ground. If the circuit tests normal, replace the body control module.
5. Install a 3-amp fused jumper wire between the signal circuit terminal N and ground. Verify the scan tool Windshield Wiper Switch parameter is Switch Fault.
    - If not Switch Fault, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the body control module.
6. Install a 3-amp fused jumper wire between the signal circuit terminal K and ground. Verify the scan tool Wiper High Speed Switch parameter is Active.
    - If not Active, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the body control module.
7. If all circuits test normal, replace the turn signal/multifunction switch.

Wipers Do Not Park Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the windshield wiper motor.
2. Ignition ON, verify the scan tool BCM Wiper Park Switch parameter is Inactive.
    - If not Inactive, test the signal circuit terminal 3 for a short to ground. If the circuit tests normal, replace the body control module.
3. Install a 3-amp fused jumper wire between the wiper motor park switch signal circuit terminal 3 and ground. Verify the scan tool Wiper Park Switch parameter is Active.
    - If not Active, test the signal circuit for an open/high resistance. If the circuit tests normal, replace the body control module.
4. If all circuits test normal, replace the windshield wiper motor.

Wiper Motor Circuit/System Testing

1. Ignition OFF, disconnect the underhood fuse block.

IMPORTANT: The underhood fuse block bottom view illustration is an inverted view of the connectors in the bracket assembly.

2. Test for less that 5 ohms of resistance between the wiper relay ground circuit in connector C2 terminal N5 and ground.
    - If greater than 5 ohms, test the ground circuit for an open/high resistance.
3. Connect a 60A fused jumper from the battery supply terminal in connector C6 to the LBEC 2 fuse output circuit 42 in connector C5 terminal F2.
4. Connect a test lamp from the WIPER 1 relay control circuit in connector C5 terminal K3 to ground.
5. Ignition on, command the Wiper Relay ON and OFF with a scan tool. 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, replace the 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, replace the body control module.
6. Connect a test lamp from battery voltage to the WIPER 2 relay control circuit in connector C5 terminal K1.
7. Command the Wiper High Speed Relay ON and OFF with a scan tool. 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, replace the 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 body control module.
8. Ignition OFF, connect the underhood fuse block.
9. Disconnect the harness connector at the wiper motor.
10. Test for less that 1 ohm of resistance between the wiper motor ground circuit terminal 2 and ground.
    - If greater than 1 ohm, test the ground circuit for an open/high resistance.
11. Connect a test lamp between the low speed motor control circuit terminal 1 and ground.
12. Ignition on, command the Wiper Relay ON and OFF with a scan tool. 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, replace the underhood fuse block.

- 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, replace the underhood fuse block.

13. Connect a test lamp between the high speed motor control circuit terminal A and ground.
14. Command the Wiper High Speed Relay ON and OFF with a scan tool. 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, replace the underhood fuse block.
    - 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, replace the underhood fuse block.
15. If all circuits test normal, replace the windshield wiper motor.

Component Testing

Multifunction Switch

1. Ignition OFF, disconnect the C3 harness connector at the turn signal/multifunction switch.
2. Test the resistance between terminals M and N. Rotate the wiper switch and compare the resistance readings to the values in the Windshield Wiper Switch Values table below for MIST, each DELAY and LOW speed.
    - If the resistance is not within the specified range, replace the turn signal/multifunction switch.
3. Test for infinite resistance between terminals M and K while rotating the wiper switch to MIST, each DELAY and LOW speed positions.
    - If the less than infinite, replace the turn signal/multifunction switch.
4. Test for less than 5 ohms of resistance with the wiper switch in the High speed position.
    - If greater than 5 ohm, replace the turn signal/multifunction switch.
5. Test for infinite resistance between terminals M and L while rotating the wiper switch to MIST, each DELAY and LOW speed positions.
    - If less than infinite, replace the turn signal/multifunction switch.
6. Test for less than 5 ohm of resistance while pressing the WASHER switch.
    - If greater than 5 ohm, replace the turn signal/multifunction switch.

IMPORTANT: If the switch tests open in any switch position other than Off, test the wiper/washer switch 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	3.48K-4.25K ohms
Delay 2	2.52K-3.08K ohms
Delay 3	1.78K-2.18K ohms
Delay 4	1.17K-1.44K ohms
Delay 5	697-851 ohms
Low	300-364 ohms

Windshield Wiper Motor Dynamic Test

1. Ignition OFF, disconnect the harness connector at the windshield wiper motor.
2. Install a 25-amp fused jumper wire between the control terminal 1 and 12 volts. Install a jumper wire between the ground terminal 5 and ground.
3. The wiper motor should be in low speed mode.
    - If the wiper motor is not in the low speed mode replace the motor.
4. Install a 25-amp fused jumper wire between the control terminal 4 and 12 volts. Install a jumper wire between the ground terminal 5 and ground.
5. The wiper motor should be in the high speed mode.
    - If the wiper motor is not in the high speed mode replace the motor.

Repair Procedures

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

- **Turn Signal Multifunction Switch Replacement**
- **Wiper Motor Module Replacement**
- **Underhood Electrical Center or Junction Block Replacement**
- **Control Module References** for BCM replacement, programming and setup

WASHER MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Washer Malfunction

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Windshield Washer Switch Signal	2	1	3	-
Windshield Washer Pump Control	1	1	2	-
Windshield Washer Relay Control	2	1	B3873 00	-
Windshield Washer Pump Ground	-	1	-	-
Windshield Wiper Switch Ground	-	3	-	-
1. Washers Inoperative 2. Washers Always On 3. Windshield Wiper System Malfunction				

Circuit/System Description

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

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 Verification

1. Ignition on, verify that a test lamp connected to ground does not illuminate on either side of the FRT WASH fuse while the windshield washer switch is inactive.
    - If the test lamp illuminates on one or both sides of the fuse perform the Windshield Washer Pump Always On Circuit Test.
2. Ignition on, verify that a test lamp connected to ground illuminates on at least one side of the FRT WASH fuse while pressing the windshield washer switch.
    - If the test lamp does not illuminate on either side of the fuse, perform the Windshield Washer Switch Circuit Test.
3. If the test lamp illuminates on one or both sides of the fuse perform the Windshield Washer Pump Circuit Test.

Circuit/System Testing

Windshield Washer Switch Circuit Test

1. Ignition ON, verify that the scan tool Windshield Washer Switch parameter is Active while pressing the washer switch.
    - If not Active, test the following:
        - Perform the multifunction switch component test.
        - Test the windshield washer switch signal circuit for an open/high resistance. If the washer switch and circuit test normal, replace the body control module.

IMPORTANT: The underhood fuse block bottom view illustration is an inverted view of the connectors in the bracket assembly.

2. Ignition OFF, disconnect the underhood fuse block and connect a 60A fused jumper wire from the battery supply terminal in connector C6 to the LBEC 2 fuse output circuit 42 in

connector C5 terminal F2.

3. Connect a test lamp from battery voltage to the windshield washer pump relay control circuit in connector C4 terminal A3.
4. Ignition ON, verify that the test lamp illuminates while pressing the washer switch.
    - If the test lamp does not illuminate, test the washer relay control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the body control module.
5. If all circuits test normal, replace the underhood fuse block.

Windshield Washer Pump Circuit Test

1. Ignition OFF, disconnect the harness connector at the windshield washer fluid pump.
2. Test for less than 1 ohm of resistance between the ground circuit terminal B and ground.
    - If greater than 1 ohm, repair the ground circuit for an open/high resistance.
3. Ignition ON, verify that a test lamp illuminates between the washer pump control circuit terminal A and ground while pressing the washer switch.
    - If the test lamp does not illuminate, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the underhood fuse block.
4. If all the circuits test normal, replace the windshield washer fluid pump.

Windshield Washer Pump Always On Circuit Test

1. Remove the FRT WASH fuse from the underhood fuse block. The washer pump should turn OFF.
    - If the washer pump does not turn OFF, test the washer pump control circuit for a short to voltage.
2. Ignition ON, verify the scan tool Windshield Washer Switch parameter is Inactive.
    - If not Inactive, test the following:
        - Perform the multifunction switch component test.
        - Test the windshield washer switch signal circuit for a short to ground. If the washer switch and circuit test normal, replace the body control module.

IMPORTANT: The underhood fuse block bottom view illustration is an inverted view of the connectors in the bracket assembly.

3. Ignition OFF, disconnect the underhood fuse block and connect a 60A fused jumper wire from the battery supply terminal in connector C6 to the LBEC 2 fuse output circuit 42 in connector C5 terminal F2.

4. Ignition ON, verify that a test lamp does not illuminate between the windshield washer relay control circuit in connector C4 terminal A3 and battery voltage.
    - If the test lamp illuminates, test the control circuit for a short to ground. If the circuit tests normal, replace the body control module.
5. If all circuits test normal, replace the underhood fuse block.

Component Testing

Multifunction Switch

1. Ignition OFF, disconnect the C3 harness connector at the turn signal/multifunction switch.
2. Test the resistance between terminals M and N. Rotate the wiper switch and compare the resistance readings to the values in the Windshield Wiper Switch Values table below for MIST, each DELAY and LOW speed.
    - If the resistance is not within the specified range, replace the turn signal/multifunction switch.
3. Test for infinite resistance between terminals M and K while rotating the wiper switch to MIST, each DELAY and LOW speed positions.
    - If the less than infinite, replace the turn signal/multifunction switch.
4. Test for less than 5 ohms of resistance with the wiper switch in the High speed position.
    - If greater than 5 ohm, replace the turn signal/multifunction switch.
5. Test for infinite resistance between terminals M and L while rotating the wiper switch to MIST, each DELAY and LOW speed positions.
    - If less than infinite, replace the turn signal/multifunction switch.
6. Test for less than 5 ohm of resistance while pressing the WASHER switch.
    - If greater than 5 ohm, replace the turn signal/multifunction switch.

IMPORTANT: If the switch tests open in any switch position other than Off, test the wiper/washer switch 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	3.48K-4.25K ohms
Delay 2	2.52K-3.08K ohms

Delay 3	1.78K-2.18K ohms
Delay 4	1.17K-1.44K ohms
Delay 5	697-851 ohms
Low	2.52K-3.08K ohms

Repair Procedures

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

- **Turn Signal Multifunction Switch Replacement**
- **Washer Pump Replacement**
- **Underhood Electrical Center or Junction Block Replacement**
- **Control Module References** for BCM replacement, programming and setup

WINDSHIELD WASHER SOLVENT HEATER 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

Windshield Washer Solvent Heater Malfunction

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Battery Positive Voltage	1	1	-	-
Ignition 3 Voltage	1	1	-	-
Washer Fluid Heated Control Switch Signal	3	1	1	-
Windshield Washer Switch Signal	4	1	4	-
Washer Fluid Heated Control Switch LED Supply Voltage	2	2	1	-
Washer Solvent Heater Assembly Ground	-	1	-	-

Washer Solvent Heater Assembly Logic Ground	-	1	-	-
1. Windshield Washer Solvent Heater Malfunction 2. Windshield Washer Solvent Heater Indicator Inoperative 3. Windshield Washer Solvent Heater Indicator Always ON 4. Windshield Wiper System Malfunction				

Circuit/System Description

The windshield washer solvent heater operates with the standard windshield wiper washer system and when a heated washer cycle is activated the solvent heater controls the windshield washers through the washer switch signal circuit to the body control module (BCM). The heater is supplied with high current power and ground circuits that are used to energize the heater coils. The low current logic voltage is supplied to the heater through the RUN relay in the underhood fuse block. The RUN relay is a PCB relay energized by the BCM only while the engine is running. The heated washer cycle operation is activated by a separate switch located on the instrument panel accessory switch assembly. When the heated washer fluid switch is pressed the heated washer switch signal circuit is momentarily grounded and the heated washer cycle is activated. During the heated wash cycle the 3 heater elements in the solvent heater are energized and when the solvent temperature reaches approximately 70° C (160° F) the heater grounds the washer switch signal circuit until the heated solvent is dispensed. The heated washer cycle will run 4 heat and wash actions unless deactivated by the heated washer switch signal.

Diagnostic Aids

Verify that the standard windshield wiper washer system operates normally before attempting to diagnose a heated washer system concern.

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

Windshield Washer Solvent Heater Malfunction

1. Ignition OFF, disconnect the C1 harness connector at the windshield washer solvent heater assembly.
2. Ignition ON, verify that a test lamp illuminates between the battery positive voltage circuit terminal 1 and ground.
    - If the test lamp does not illuminate, test the battery positive voltage circuit for a short to ground or an open/high resistance.
3. Verify that a test illuminates between the washer solvent heater assembly ground circuit terminal 2 and battery voltage.
    - If the test lamp does not illuminate, test the ground circuit for an open/high resistance.
4. Ignition OFF, disconnect the C2 harness connector at the windshield washer solvent heater assembly.
5. Engine running, verify that a test lamp illuminates between the ignition 3 voltage circuit terminal 6 and ground.
    - If the test lamp does not illuminate, test the ignition 3 voltage circuit for a short to ground or an open/high resistance.
6. Verify that a test illuminates between the washer solvent heater assembly ground circuit terminal 4 and battery voltage.
    - If the test lamp does not illuminate, test the ground circuit for an open/high resistance.
7. Verify that a test lamp does not illuminate between the washer fluid heated control switch signal circuit terminal 1 and battery voltage.
    - If the test lamp is illuminated, test the signal circuit for a short to ground. If the circuit tests normal, test or replace the heated washer fluid switch.
8. With a test lamp connected between the washer fluid heated control switch signal circuit terminal 1 and battery voltage, press the heated washer fluid switch and verify that the test

lamp illuminates.
- If the test lamp does not illuminate, test the switch signal and ground circuits for a short to voltage or an open/high resistance. If the circuit test normal, test or replace the heated washer fluid switch.

9. If all circuits test normal, test or replace the windshield washer solvent heater assembly.

Windshield Heated Washer Fluid Indicator Inoperative

1. Ignition OFF, disconnect the C2 harness connector at the windshield washer solvent heater assembly.
2. Ignition ON, install a 3-amp fused jumper wire between the washer fluid heated control switch LED control circuit terminal 2 and ground. Verify the heated washer switch indicator is illuminated.
   - If the indicator is not illuminated, test the control circuit for an open/high resistance. If the circuit tests normal, replace the accessory switch assembly.
3. If all circuits test normal, replace the windshield washer solvent heater assembly.

Windshield Heated Washer Fluid Indicator Always On

1. Ignition OFF, disconnect the C2 harness connector at the windshield washer solvent heater assembly.
2. Ignition ON, the heated washer switch indicator should not be illuminated.
   - If illuminated, test the washer fluid heated control switch LED control circuit for a short to voltage. If the circuit tests normal, replace the accessory switch assembly.
3. If all circuits test normal, replace the windshield washer solvent heater assembly.

Component Testing

Heated Washer Fluid Switch

1. Ignition OFF, disconnect the harness connector at the instrument panel accessory switch assembly.
2. Test for infinite resistance between the switch signal circuit terminal and the ground circuit terminal with the switch in the open position.
   - If less than infinite, replace the accessory switch assembly.
3. Test for less than 3 ohms between the switch signal circuit terminal and the ground circuit terminal with the switch in the closed position.
   - If greater than 3 ohms, replace the accessory switch assembly.

Repair Procedures

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

- **Front Floor Console Accessory Switch Mount Plate Replacement**
- **Windshield Washer Solvent Heater Replacement**

REAR WASHER INOPERATIVE

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

Rear Washer Inoperative

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Switch Supply Voltage	1	1	-	-
Switch Signal	1	2	4	-
Washer Pump Relay Control	1	3	5	-
Washer Pump Control	3	3	5	-
Washer Pump Ground	-	3	-	-
1. All Rear Wiper Washer System Functions Inoperative 2. Rear Wiper Motor Inoperative 3. Rear Washer Pump Inoperative 4. Rear Wiper Motor Always ON 5. Rear Washer Pump Always ON				

Circuit/System Description

The rear window washer pump is controlled by the rear window wiper washer switch through the rear washer pump relay. The switch supply voltage is from the body control module (BCM) and when the WASH switch is pressed battery voltage is applied to the rear washer relay control circuit and to the rear wiper switch signal circuit. When the rear wiper motor module receives battery voltage on the rear wiper switch signal circuit, the wiper motor will operate continuously for as long as the voltage is present and several cycles after the switch is released. The rear

washer relay control circuit is used to energize the relay coil and close the rear washer pump control circuit to battery voltage.

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**

Circuit/System Verification

1. Ignition ON, Press the rear window washer switch.
    - If the rear wiper motor and the rear washer pump are inoperative perform the Rear Wiper Washer Switch Circuit Test.
    - If the rear wiper motor operates and the rear washer pump is inoperative perform the Rear Washer Pump Circuit Test.
    - If the rear wiper motor is inoperative and the rear washer pump operates perform the Rear Wiper Motor Circuit Test.

Circuit/System Testing

Rear Wiper Washer Switch Circuit Test

1. Disconnect the rear wiper washer switch pigtail connector.
2. Ignition ON, verify that a test lamp illuminates when connected from the switch supply circuit terminal in the harness connector to ground.
    - If the test lamp does not illuminate test the switch supply circuit for an open or short to ground. If the circuit tests normal replace the BCM.
3. If the circuits test normal replace the rear wiper washer switch.

Rear Washer Pump Circuit Test

1. Remove the REAR WASH 15A fuse in the underhood fuse block and connect a fused jumper wire to the washer pump output fuse terminal in the fuse block.
2. Verify that the rear washer pump operates when the other end of the fused jumper wire is connected to battery voltage.
    - If the washer pump does not operate, test the washer pump control and ground circuits for an open or short to ground. If the circuits test normal replace the rear washer pump.
3. Disconnect the underhood fuse block connector C4 and connect a test lamp from the rear washer pump relay control circuit terminal in the harness connector to ground.
4. Ignition on, verify that a test lamp illuminates when the rear washer switch is pressed.
    - If the test lamp does not illuminate test the relay control circuit for an open or short to ground. If the circuit tests normal replace the rear wiper washer switch.
5. If the circuits test normal replace the underhood fuse block.

Rear Wiper Motor Circuit Test

1. Disconnect the rear wiper motor connector and connect a test lamp from the rear wiper switch signal circuit terminal in the harness connector to ground.
2. Ignition on, verify that the test lamp will illuminate when the WASH switch is pressed.
    - If the test lamp does not illuminate test the rear wiper switch signal circuit for an open or short to ground. If the circuit tests normal replace the rear wiper washer switch.
3. If the circuits test normal replace the rear wiper motor.

Repair Procedures

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

- **Turn Signal Multifunction Switch Replacement**
- **Rear Window Washer Pump Replacement**
- **Rear Window Wiper Motor Replacement**
- **Underhood Electrical Center or Junction Block Replacement**

REAR WIPER ALWAYS ON

Rear Wiper Always On

Step	Action	Yes	No

Schematic Reference: Wiper/Washer Schematics
Connector End View Reference: Wiper/Washer Connector End Views
DEFINITION: Rear wiper is always ON.

1	Did you review the Rear Wiper/Washer System Description and Operation and perform the necessary inspections?	Go to **Step 2**	Go to **Rear Wiper/Washer System Description and Operation**
2	1. Turn the ignition ON. 2. Turn the rear wiper/washer switch to the OFF position. Is the rear wiper always on?	Go to **Step 3**	Go to **Testing for Intermittent Conditions and Poor Connections**
3	1. Turn the ignition OFF. 2. Disconnect the rear wiper/washer switch. 3. Turn the ignition ON. Is the rear wiper always on?	Go to **Step 4**	Go to **Step 6**
4	1. Turn the ignition OFF. 2. Disconnect the window wiper module-rear. 3. Turn the ignition ON. 4. Test the rear wiper switch signal circuit for a short to voltage. Refer to **Circuit Testing** and to **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 10**	Go to **Step 5**
5	Test the rear window washer switch signal circuit for a short to voltage. Refer to **Circuit Testing** and to **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 10**	Go to **Step 8**
	Inspect for poor connections at the rear wiper/washer switch. Refer to **Testing for Intermittent Conditions and Poor**		

6	**Connections** and to **Connector Repairs** . Did you find and correct the condition?	Go to **Step 10**	Go to **Step 7**
7	Replace the rear wiper/washer switch. Refer to **Turn Signal Multifunction Switch Replacement** . Is the repair complete?	Go to **Step 10**	-
8	Inspect for poor connections at the window wiper module-rear. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** . Did you find and correct the condition?	Go to **Step 10**	Go to **Step 9**
9	Replace the window wiper module - rear. Refer to **Rear Window Wiper Motor Replacement**. Is the repair complete?	Go to **Step 10**	-
10	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 3**

REAR WIPER INOPERATIVE

Rear Wiper Inoperative

Step	Action	Yes	No
Schematic Reference: Wiper/Washer Schematics **Connector End View Reference: Wiper/Washer Connector End Views** DEFINITION: The rear wiper motor is inoperative in one or more modes, the rear washer pump may or may not operate.			
1	Did you review the Rear Wiper/Washer System Description and Operation and perform the necessary inspections?	Go to **Step 2**	Go to **Rear Wiper/Washer System Description and Operation**
2	1. Turn the ignition ON. 2. Operate the rear wiper/washer system in all the switch positions, including the washer position.	Go to **Testing for Intermittent**	

	Does the rear wiper/washer system operate normally?	**Conditions and Poor Connections**	Go to **Step 3**
3	Does the rear washer pump operate when the rear washer switch is pressed?	Go to **Step 4**	Go to **Step 8**
4	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. Observe the Cargo Door Ajar Switch parameter in body control module (BCM) inputs display screen, with the liftgate closed and opened. Did the parameter displayed Open and the Closed accordingly?	Go to **Step 5**	Go to **Courtesy Lamps Always On**
5	1. Disconnect the rear wiper motor/module connector. 2. Connect a test lamp from the rear wiper switch signal circuit terminal in the harness connector to a good ground. 3. Operate the rear window wiper switch to the WASH position. Does the test lamp illuminate?	Go to **Step 6**	Go to **Step 9**
6	Connect a test lamp from the battery supply circuit terminal in the wiper motor harness connector to a good ground. Does the test lamp illuminate?	Go to **Step 7**	Go to **Step 10**
7	Connect a test lamp from the battery supply circuit terminal to the ground circuit terminal in the wiper motor harness connector. Does the test lamp illuminate?	Go to **Step 13**	Go to **Step 11**
8	Test the rear wiper/washer switch accessory voltage supply circuit for an open or short to ground. Refer to **Circuit**		

	Testing and to **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 16**	Go to **Step 12**
9	Test the rear wiper/washer switch signal circuit for an open or high resistance. Refer to **Circuit Testing** and to **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 16**	Go to **Step 12**
10	Repair the rear wiper motor battery supply circuit for an open or short to ground. Refer to **Circuit Testing** and to **Wiring Repairs** . Is the repair complete?	Go to **Step 16**	-
11	Repair the rear wiper motor ground circuit for an open or high resistance. Refer to **Circuit Testing** and to **Wiring Repairs** . Is the repair complete?	Go to **Step 16**	-
12	Inspect for poor connections at the rear wiper/washer switch. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** . Did you find and correct the condition?	Go to **Step 16**	Go to **Step 14**
13	Inspect for poor connections at the rear wiper motor/module. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** . Did you find and correct the condition?	Go to **Step 16**	Go to **Step 15**
14	Replace the rear wiper/washer switch. Refer to **Turn Signal Multifunction Switch Replacement** . Is the repair complete?	Go to **Step 16**	-
15	Replace the rear wiper motor/module. Refer to **Rear Window Wiper Motor Replacement**. Is the repair complete?	Go to **Step 16**	-
	Operate the system in order to verify the		

16	repair. Did you correct the condition?	System OK	Go to **Step 2**

WIPER ARM TIP PRESSURE CHECK

Wiper Arm Pressure Check

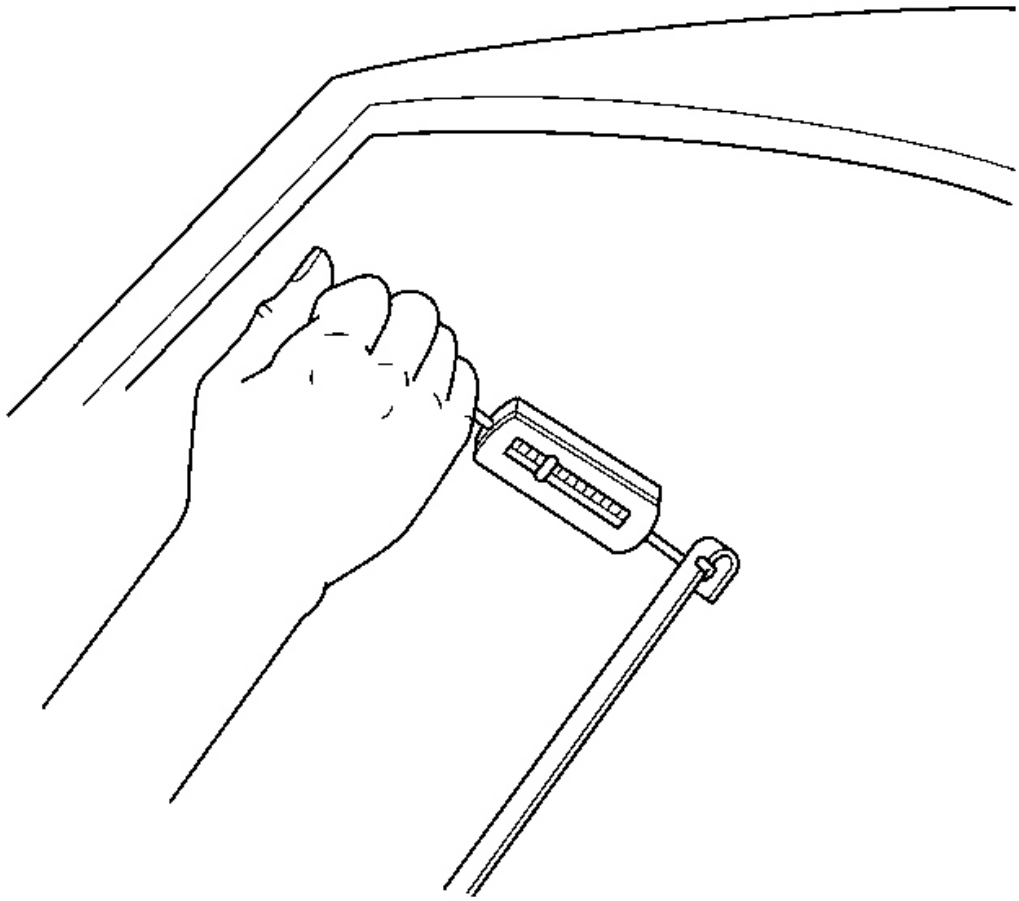


Fig. 14: Measuring Required Wiper Arm Force
Courtesy of GENERAL MOTORS CORP.

1. Run the wiper arms to the mid-wipe position.
2. Remove the wiper blades from the wiper arms. Refer to **Wiper Arm 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 (height with the blade attached).

4. Replace the wiper arm if the measurement is not within the specification. Refer to **Wiper Arm Replacement**.

   Tip Pressure: 8.3-10.1 Newtons (30-36 oz).

5. Install the wiper blades on the wiper arms. Refer to **Wiper Arm Blade Replacement**.

WIPER BLADE ELEMENT CHECK

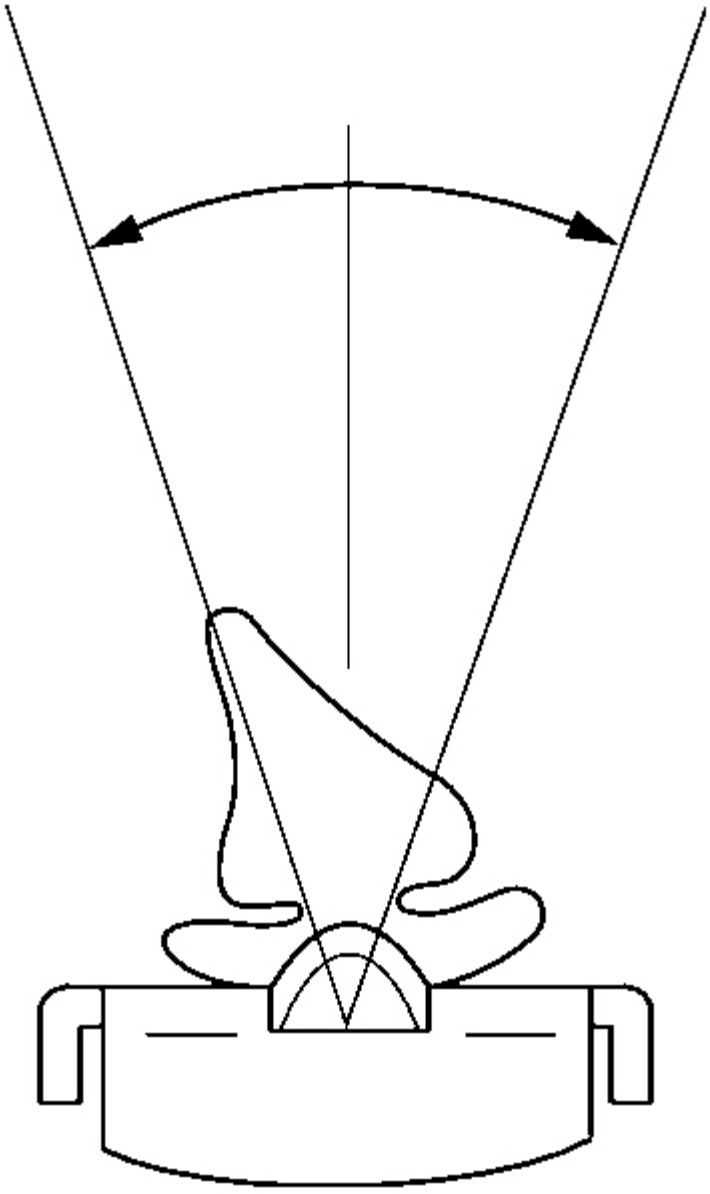


Fig. 15: Measuring Wiper Blade Element Centerline Contact
Courtesy of GENERAL MOTORS CORP.

1. Remove the wiper blades from the wiper arms. Refer to **Wiper Arm 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.
4. Install the wiper blades on the wiper arms. Refer to **Wiper Arm Blade Replacement**.

REPAIR INSTRUCTIONS

REAR WINDOW WASHER NOZZLE REPLACEMENT

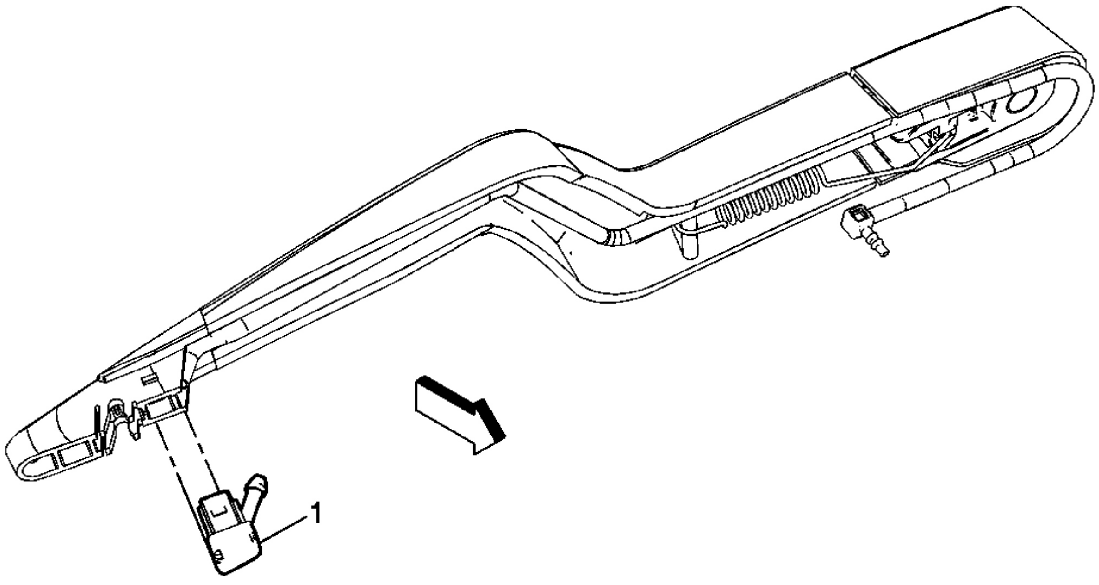


Fig. 16: Identifying Rear Window Washer Nozzle
Courtesy of GENERAL MOTORS CORP.

Rear Window Washer Nozzle Replacement

Callout	Component Name
Preliminary Procedure 1. Remove the rear wiper arm blade. Refer to **Rear Window Wiper Blade Replacement**. 2. Lift the arm from the liftgate window and using a small flat-bladed tool, gently pry the rear wiper arm nozzle from the wiper arm. 3. Disconnect the rear wiper arm washer hose from the nozzle.	
1	Rear Wiper Arm Nozzle

WINDSHIELD WASHER HOSE REPLACEMENT

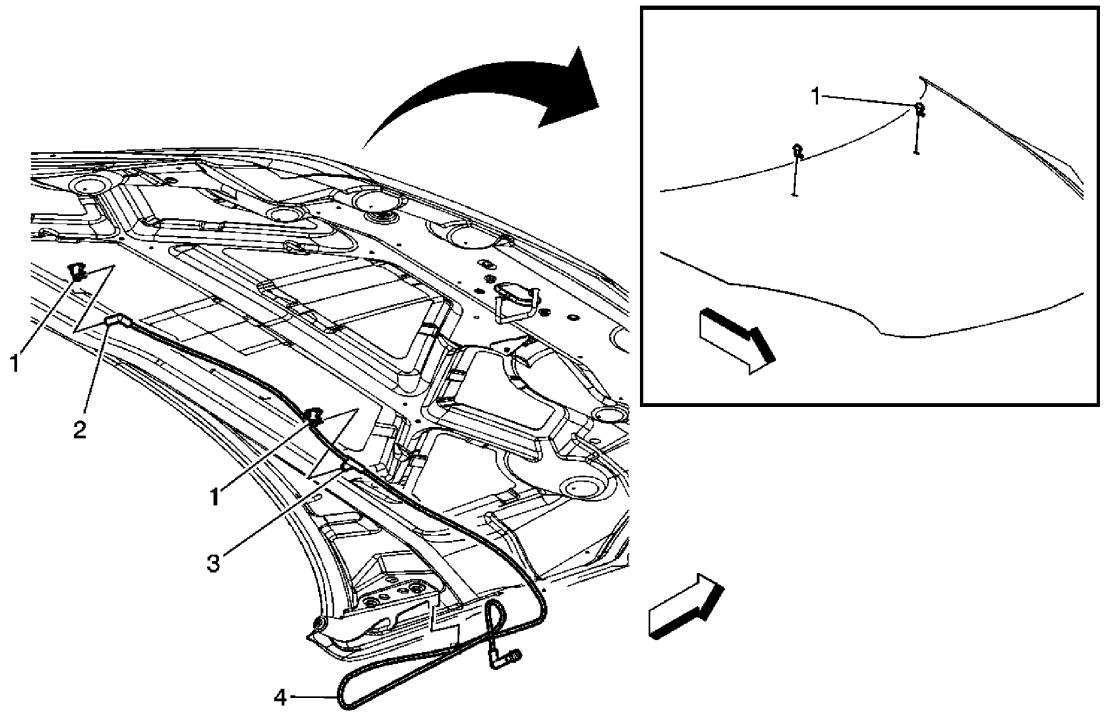


Fig. 17: View Of Windshield Washer Hose & Nozzle
Courtesy of GENERAL MOTORS CORP.

Windshield Washer Hose Replacement

Callout	Component Name
Preliminary Procedure: Remove the hood insulator. Refer to **Hood Insulator Replacement** .	
1	Windshield Washer Nozzle **Procedure** 1. Disconnect the washer hose. 2. Pinch the washer nozzle tabs and push outward from the hood to remove.
2	Windshield Washer Nozzle Hose Assembly Elbow
3	Windshield Washer Nozzle Hose Assembly Tee
4	Windshield Washer Nozzle Hose Assembly **Procedure**

	1. Disconnect the integral clip from the driver side hood hinge in order to release the hose from the hinge. 2. Disconnect the washer hose from the washer pump hose connection.

WASHER SOLVENT CONTAINER REPLACEMENT

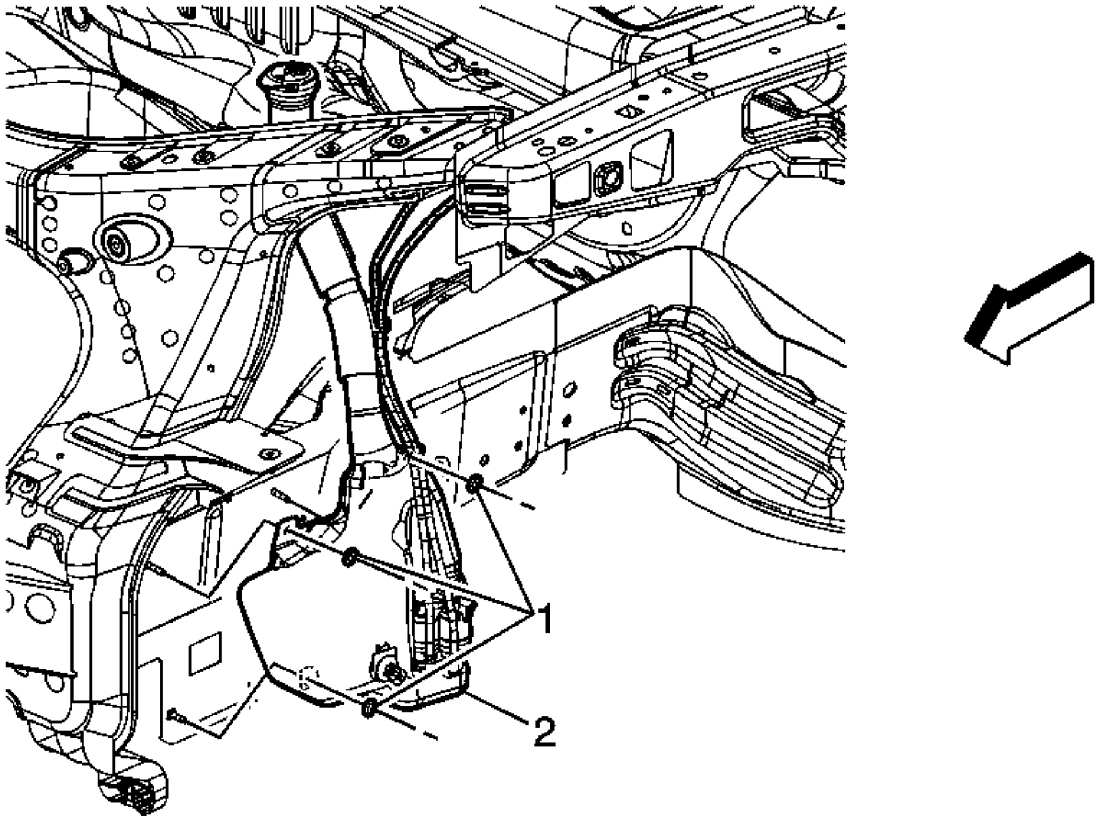


Fig. 18: Identifying Windshield Washer Solvent Container
Courtesy of GENERAL MOTORS CORP.

Washer Solvent Container Replacement

Callout	Component Name

Procedures

1. Remove the left front wheelhouse liner. Refer to **Front Wheelhouse Liner Replacement (Front)** or **Front Wheelhouse Liner Replacement (Rear)** .
2. Disconnect the washer pump hoses.
3. Drain the washer solvent into a suitable clean container.

4. Disconnect the washer pump electrical connectors. 5. Disconnect the windshield washer level indicator electrical connector. 6. Disconnect the upper neck from the lower portion of the washer solvent container.	
1	Windshield Washer Solvent Container Nut (Qty: 3) **NOTE:** **Refer to Fastener Notice .** **Tighten:** 10 N.m (89 lb in)
2	Windshield Washer Solvent Container **Tip:** • Remove the container from the front side rail studs. • Transfer the washer pumps as needed. • Transfer the level indicator as needed.

WASHER PUMP REPLACEMENT

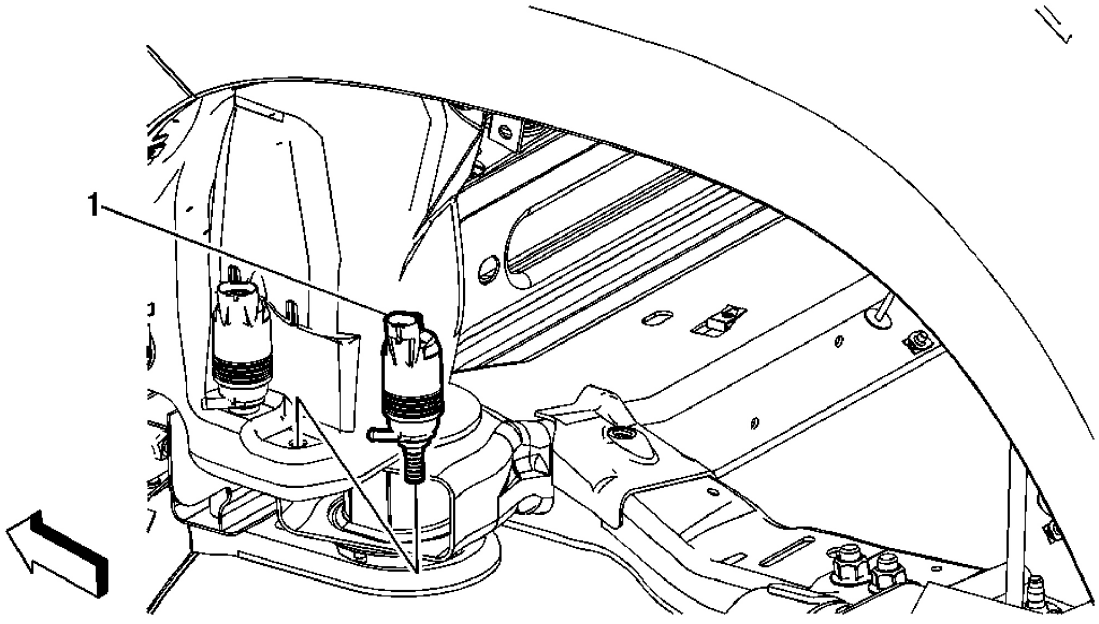


Fig. 19: Identifying Washer Pump
Courtesy of GENERAL MOTORS CORP.

Washer Pump Replacement

Callout	Component Name
Preliminary Procedures 1. Remove the LF wheelhouse liner in order to access the washer pumps. Refer to **Front Wheelhouse Liner Replacement (Front)** or **Front Wheelhouse Liner Replacement (Rear)** . 2. Drain the washer solvent into a clean suitable container. 3. Disconnect the electrical connector.	
1	Windshield Washer Pump Assembly **Procedure** 1. Using two flat-bladed tools, at the pump gasket, pry upwards until the washer pump is dislodged from the washer container. 2. Discard the windshield washer pump grommet.

REAR WINDOW WASHER PUMP REPLACEMENT

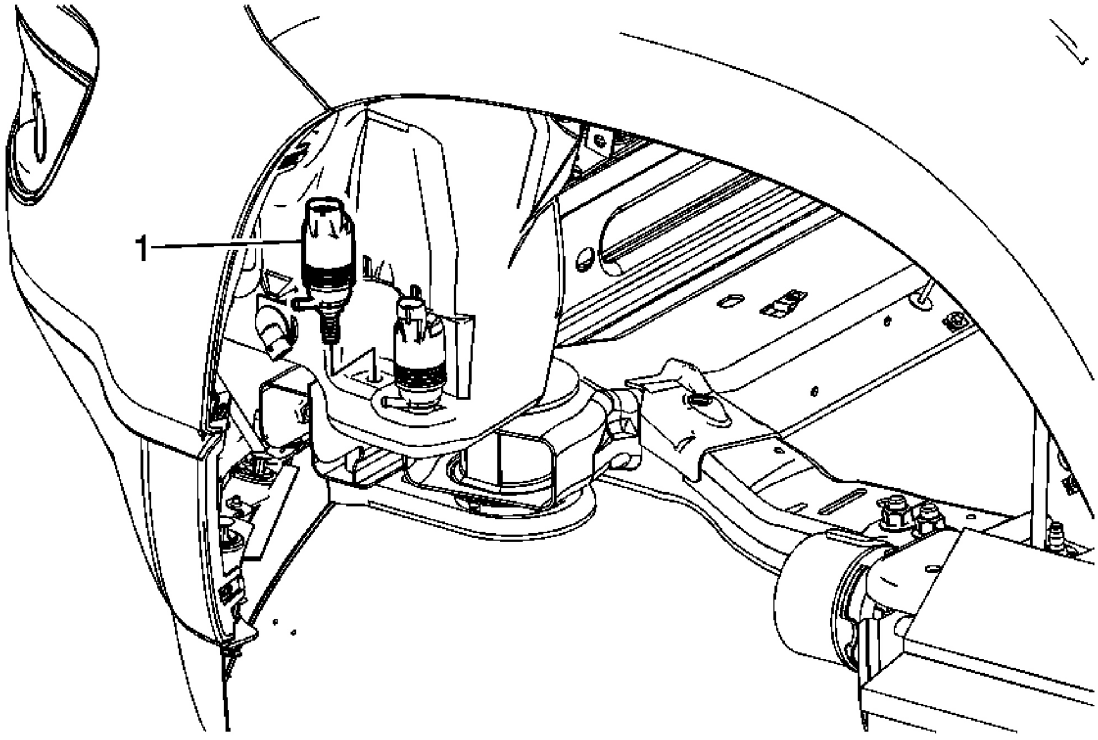


Fig. 20: Identifying Rear Window Washer Pump
Courtesy of GENERAL MOTORS CORP.

Rear Window Washer Pump Replacement

Callout	Component Name
Preliminary Procedures 1. Remove the LF wheelhouse liner in order to access the washer pumps. Refer to **Front Wheelhouse Liner Replacement (Front)** or **Front Wheelhouse Liner Replacement (Rear)** . 2. Drain the washer solvent into a clean suitable container. 3. Disconnect the electrical connector.	
1	Rear Window Washer Pump Assembly **Procedure** 1. Using two flat-bladed tools, at the pump gasket, pry upwards until the washer pump is disengaged from the windshield washer container. 2. Discard the washer pump grommet.

WASHER SOLVENT CONTAINER LEVEL SENSOR REPLACEMENT

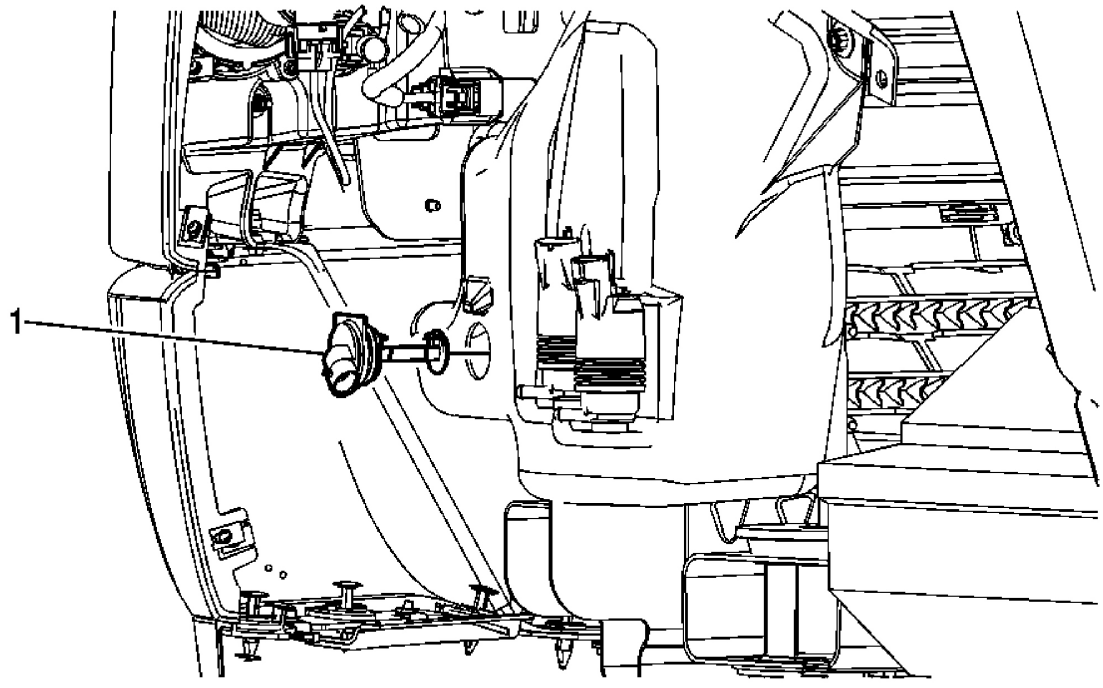


Fig. 21: View Of Windshield Washer Solvent Level Switch
Courtesy of GENERAL MOTORS CORP.

Washer Solvent Container Level Sensor Replacement

Callout	Component Name
Preliminary Procedure: Remove the wheelhouse liner in order to access the level indicator. Refer to **Front Wheelhouse Liner Replacement (Front)** or **Front Wheelhouse Liner Replacement (Rear)** .	
1	Windshield Washer Solvent Level Indicator **Procedure** 1. Disconnect the electrical connector. 2. Using two flat-bladed tools under the lip of the level indicator, pry outward using a suitable clean container in order to recover the windshield washer solvent. 3. Discard the level indicator and grommet.

WINDSHIELD WASHER SOLVENT HEATER REPLACEMENT

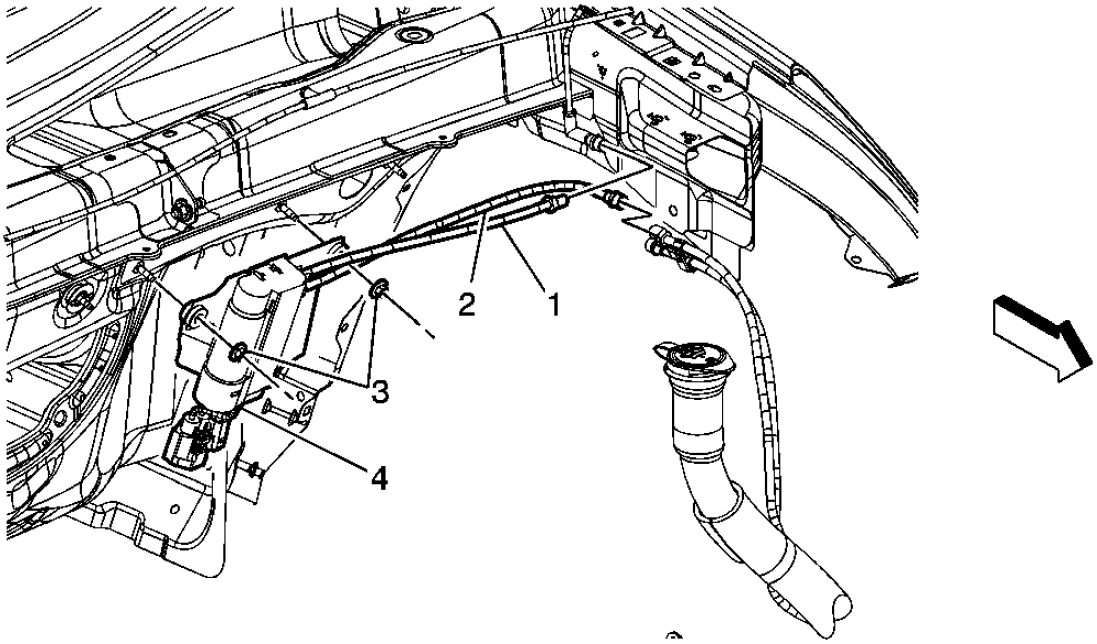


Fig. 22: View Of Windshield Washer Solvent Heater
Courtesy of GENERAL MOTORS CORP.

Windshield Washer Solvent Heater Replacement

Callout	Component Name
1	Windshield Washer Hose - Outlet **Tip:** Disconnect the air inlet panel jumper hose from the outlet side of the heater assembly.
2	Windshield Washer Pump Hose - Inlet
3	Windshield Washer Solvent Heater Nut (Qty: 2) **NOTE:** **Refer to Fastener Notice .** **Tighten:** 10 N.m (89 lb in)
4	Windshield Washer Solvent Heater Assembly **Tip:** Disconnect the electrical connectors before removing the heater from the lower plenum panel studs.

AIR INLET GRILLE PANEL REPLACEMENT

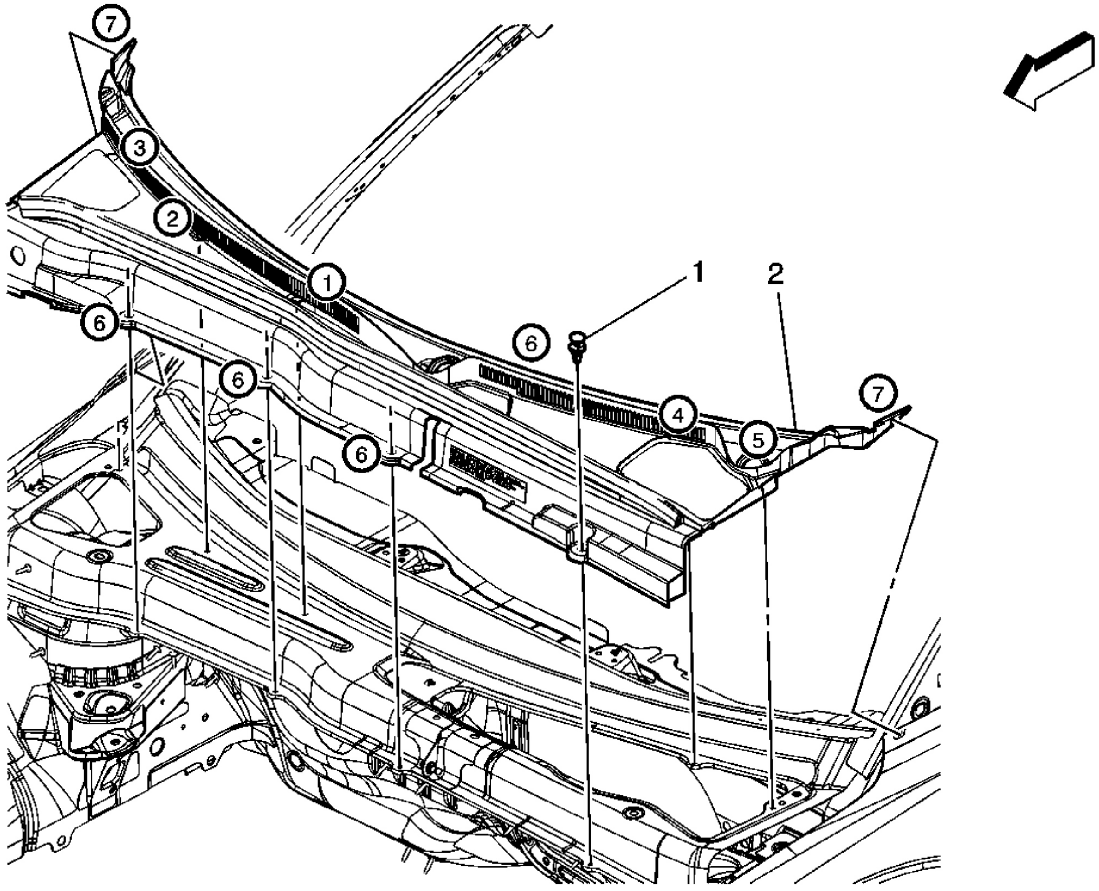


Fig. 23: Identifying Air Inlet Grille Panel
Courtesy of GENERAL MOTORS CORP.

Air Inlet Grille Panel Replacement

Callout	Component Name

Procedure

1. Remove both front wiper arm assemblies. Refer to **Wiper Arm Replacement**.
2. Begin the air inlet panel installation with sequence number 1 to install the air inlet panel tab to the upper plenum first.
3. Sequence numbers 2 and 3 are the rear tabs positioned to the bottom edge of the windshield.
4. Sequence numbers 4 and 5 are used for positioning the outer grille panel edge to the upper outer plenum.
5. Sequence 6, are the retainers that secure the front of the air inlet panel to the plenum.
6. Sequence 7, are the attachments to both the right and left side fenders and need to be

	secured last to the vehicle.
1	Air Inlet Grille Panel
2	Air Inlet Grille Panel Retainers (Qty: 4)

WIPER ARM REPLACEMENT

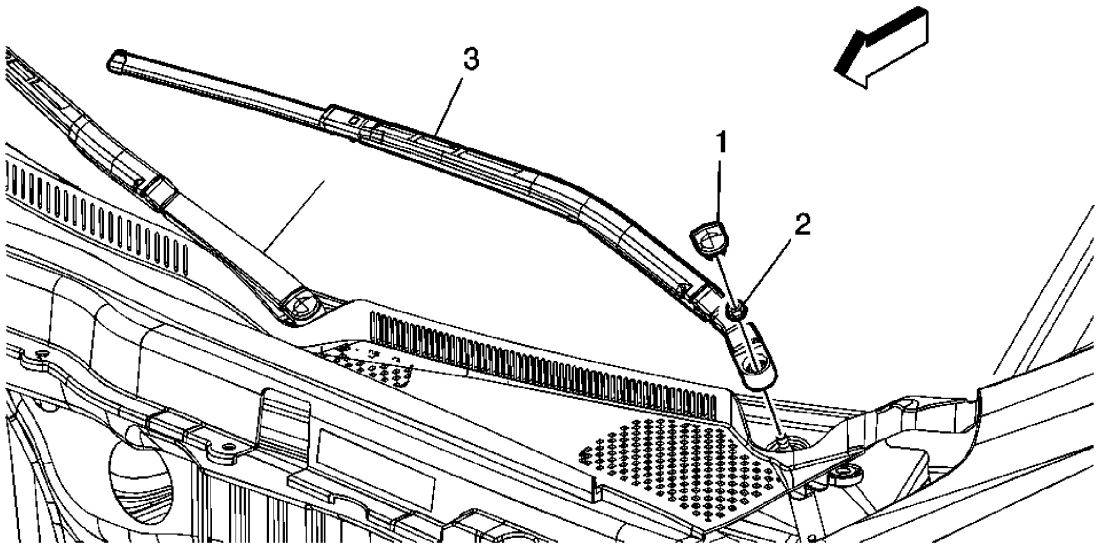


Fig. 24: View Of Wiper Arm
Courtesy of GENERAL MOTORS CORP.

Wiper Arm Replacement

Callout	Component Name
1	Wiper Arm Nut Cap (Qty: 2)
2	Windshield Wiper Arm Nut (Qty: 2) **NOTE:** **Refer to Fastener Notice .** **Tighten:** 22 N.m (16 lb ft)
3	Windshield Wiper Arm Assembly **Tip:** Hold and align the front wiper blades to the paint dots on the windshield while securing the nut.

REAR WINDOW WIPER ARM REPLACEMENT

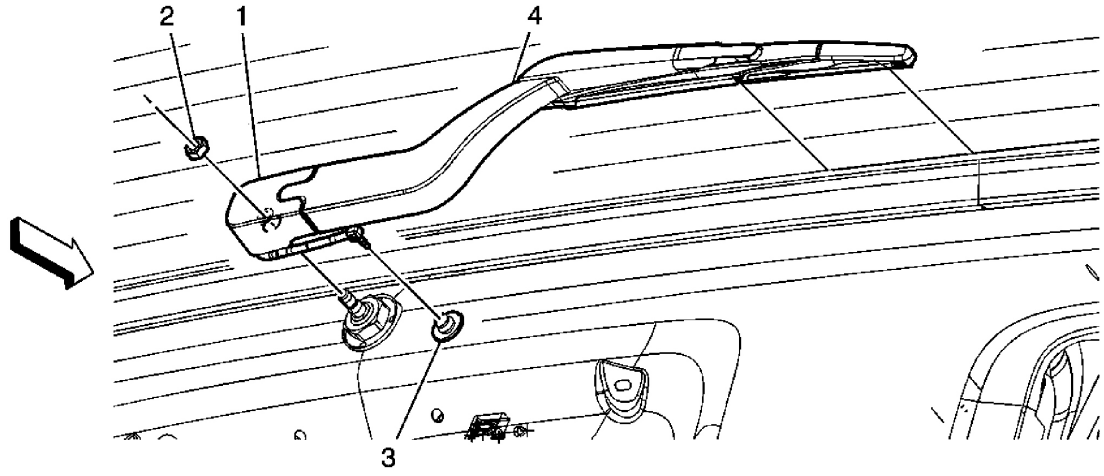


Fig. 25: View Of Rear Window Wiper Arm Components
Courtesy of GENERAL MOTORS CORP.

Rear Window Wiper Arm Replacement

Callout	Component Name
1	Rear Wiper Arm Finish Cap **Tip:** Use a small flat-bladed tool to disengage the cap from the rear wiper arm.
2	Rear Window Wiper Arm Nut **NOTE:** **Refer to Fastener Notice .** **Tip:** Hold the wiper arm blade to the first line of the rear defroster grid line before securing. **Tighten:** 5 N.m (44 lb in)
3	Rear Window Washer Nozzle Hose Assembly **Procedure:** Rotate the hose counter-clockwise around the end of the rear wiper washer arm upon installation.
4	Rear Window Wiper Arm (w/blade) Assembly **Procedure:** Clean the knurls on the rear wiper motor pivot shaft after the rear wiper arm has been removed.

WIPER ARM BLADE REPLACEMENT

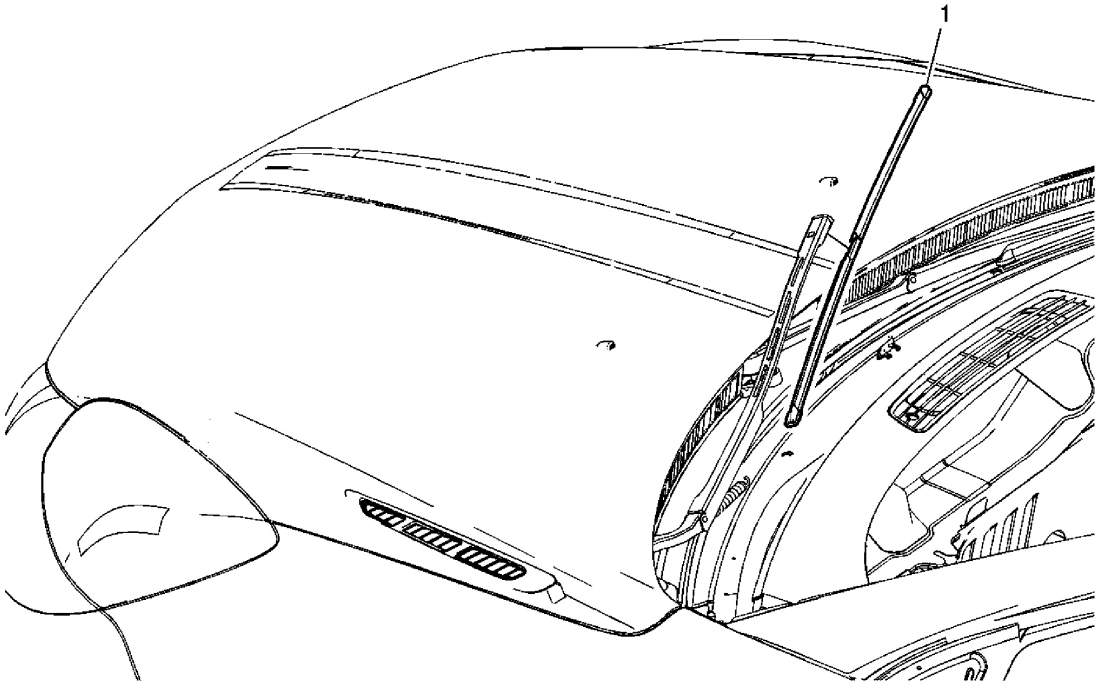


Fig. 26: Identifying Windshield Wiper Blade
Courtesy of GENERAL MOTORS CORP.

Wiper Arm Blade Replacement

Callout	Component Name
Preliminary Procedure: Raise the wiper arm to the full up position, (service up).	
3	Windshield Washer Blade Assembly **Procedure** 1. Squeeze the tabs at the tip of the wiper arm to release the blade. 2. Rotate the blade upward and slide the blade assembly from the wiper arm. 3. Discard the blade if the rubber element appears worn or does not wipe the windshield clean.

REAR WINDOW WIPER BLADE REPLACEMENT

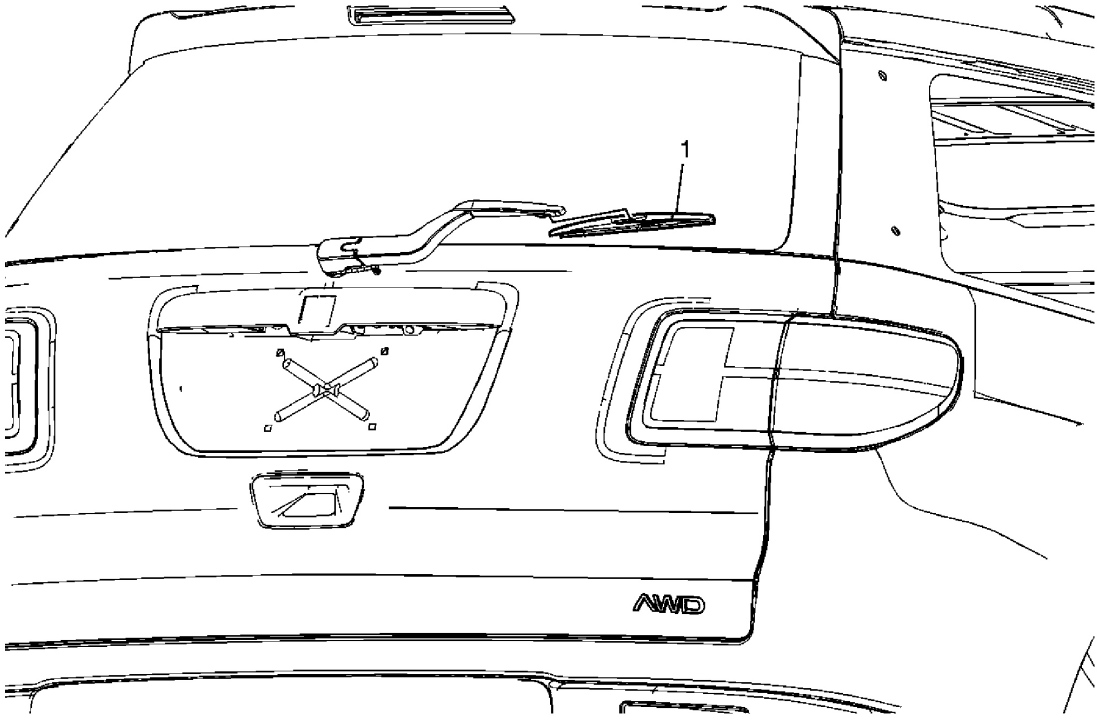


Fig. 27: View Of Rear Window Wiper Blade
Courtesy of GENERAL MOTORS CORP.

Rear Window Wiper Blade Replacement

Callout	Component Name
Preliminary Procedures 1. Lift the wiper arm from the rear window in order to access the blade assembly. 2. Hold the arm stationary and rotate the blade in a vertical position. 3. Push the blade off from the wiper arm.	
1	Rear Window Wiper Blade Assembly

REAR WINDOW WIPER BLADE ELEMENT REPLACEMENT

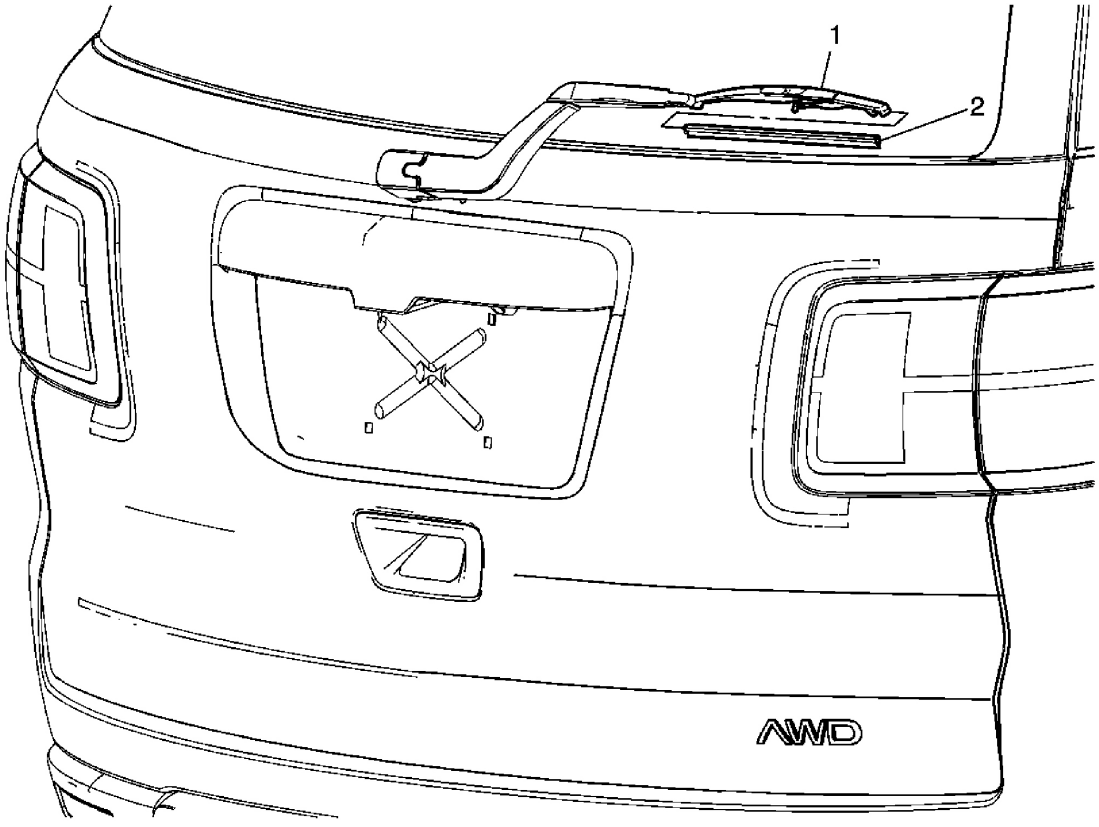


Fig. 28: Identifying Rear Window Wiper Blade Element
Courtesy of GENERAL MOTORS CORP.

Rear Window Wiper Blade Element Replacement

Callout	Component Name
Preliminary Procedure: Lift the rear window wiper arm off the rear window.	
1	Rear Window Wiper Blade Assembly
2	Rear Window Wiper Blade Refill **Procedure:** Pull the wiper blade element from the claws on the wiper blade.

WIPER MOTOR REPLACEMENT

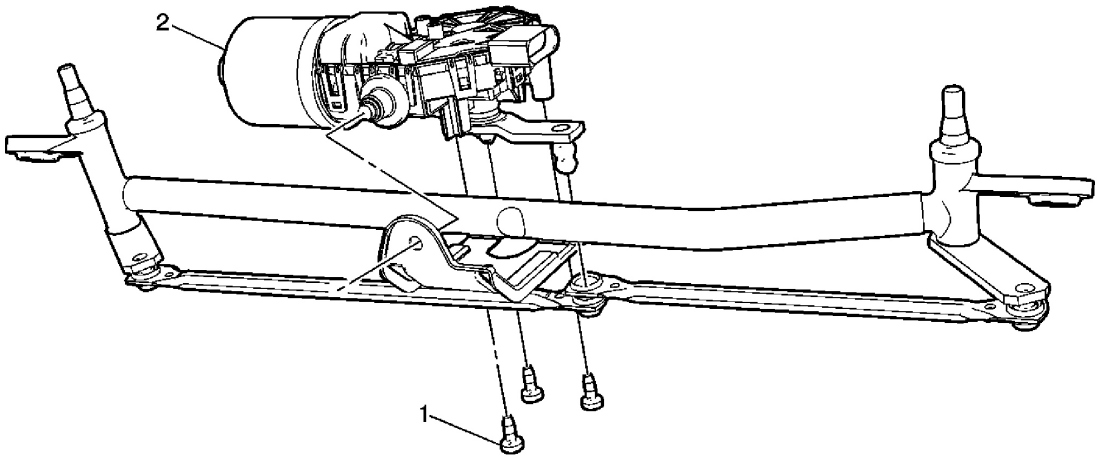


Fig. 29: Identifying Windshield Wiper Motor
Courtesy of GENERAL MOTORS CORP.

Wiper Motor Replacement

Callout	Component Name
Preliminary Procedure: Remove the windshield wiper motor module. Refer to **Wiper Motor Module Replacement**.	
1	Wiper Motor Bolt (Qty: 3) **NOTE:** **Refer to Fastener Notice .** **Tighten:** 10 N.m (89 lb in)
2	Wiper Motor Kit **Procedure** 1. Using the **J 39232** Wiper Linkage Separator or equivalent, separate the transmission arm socket from the ball stud on the crank arm. See **Special Tools**. 2. Using the **J 39529** Wiper Linkage Installer or equivalent, secure the ball stud on the crank arm to the transmission arm socket. See **Special Tools**.

REAR WINDOW WIPER MOTOR REPLACEMENT

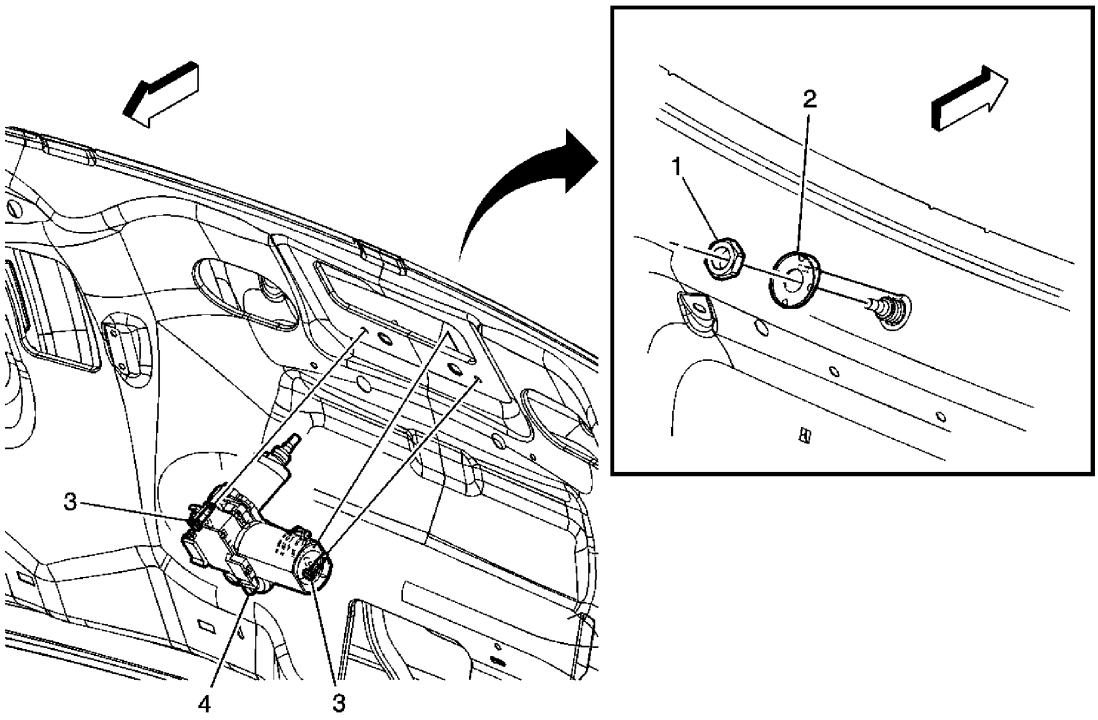


Fig. 30: View Of Rear Window Wiper Motor
Courtesy of GENERAL MOTORS CORP.

Rear Window Wiper Motor Replacement

Callout	Component Name
Preliminary Procedures 1. Remove the rear liftgate interior trim panel. Refer to **Liftgate Trim Panel Replacement** . 2. Remove the rear wiper arm assembly. Refer to **Rear Window Wiper Arm Replacement**. 3. Disconnect the electrical connector.	
1	Rear Window Wiper Arm Nut **NOTE:** **Refer to Fastener Notice .** **Tighten:** 19 N.m (14 lb ft)
2	Rear Window Wiper Pivot Shaft Gasket **Procedure:**

	Align the tab on the gasket to the slot on the rear wiper motor upon assembly.
3	Rear Window Wiper Motor Bolt (Qty: 2) **Tighten:** 10 N.m (89 lb in)
4	Rear Window Wiper Motor Assembly

WIPER TRANSMISSION REPLACEMENT

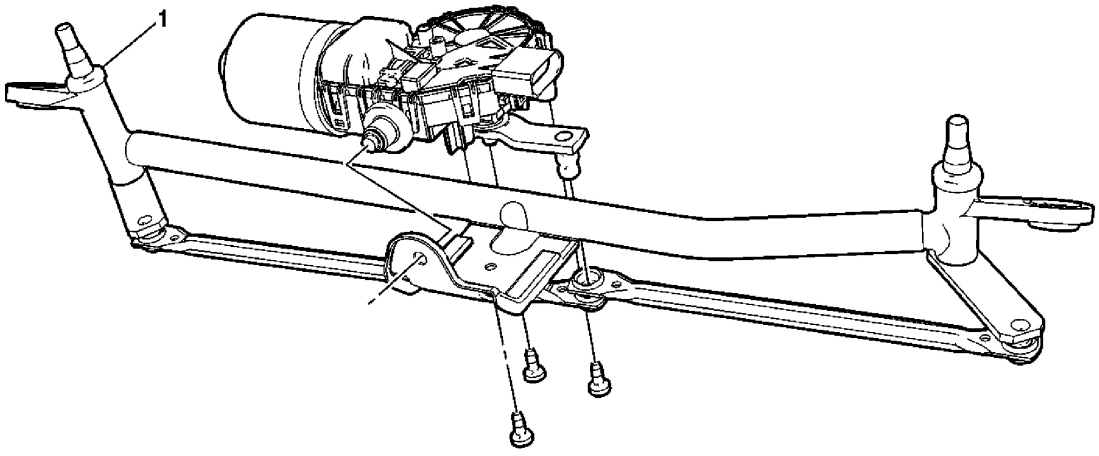


Fig. 31: Identifying Wiper Transmission
Courtesy of GENERAL MOTORS CORP.

Wiper Transmission Replacement

Callout	Component Name
Preliminary Procedure: Remove the windshield wiper motor. Refer to **Wiper Motor Replacement**.	
1	Windshield Washer Transmission Assembly

WIPER MOTOR MODULE REPLACEMENT

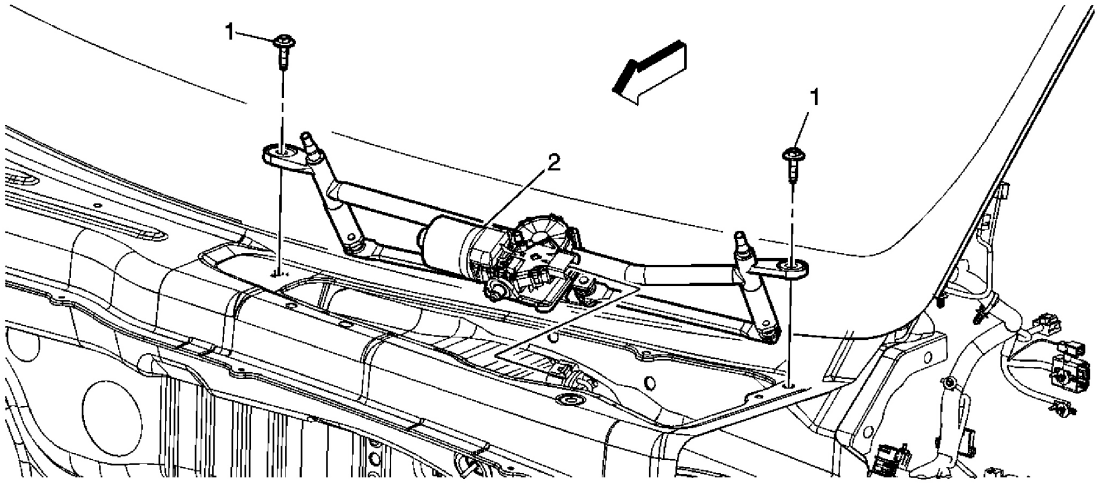


Fig. 32: Identifying Windshield Wiper Module
Courtesy of GENERAL MOTORS CORP.

Wiper Motor Module Replacement

Callout	Component Name
Preliminary Procedures 1. Remove the wiper arms. Refer to **Wiper Arm Replacement**. 2. Remove the air inlet grille panel. Refer to **Air Inlet Grille Panel Replacement**.	
1	Windshield Wiper Module Bolts (Qty: 2) **NOTE:** **Refer to Fastener Notice .** **Tighten:** 22 N.m (16 lb ft)
2	Windshield Washer System Module Assembly **Tip:** 1. Raise the rearward edge of the windshield washer module assembly out of the plenum panel. 2. Upon installation of the windshield washer module, connect the I/P harness to the wiper module. 3. Turn the module 180°, insert the transmission into the plenum then align the grommets on the module to the bolt holes in the upper plenum.

WINDSHIELD GLASS CLEANING

Clean the windshield with windshield cleaner, GM P/N 1050011 (Canadian P/N 992727) or equivalent. The cleaner should not harm the paint finish or scratch the glass. The glass is clean when the water no longer beads, but sheets across the entire glass surface.

BLADE ELEMENT CLEANING

Lift each blade assembly off of the windshield and clean the element with a cloth saturated with full strength washer solvent. Then rinse the blade assemblies with clear water.

WIPER CHATTER REPAIR

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

- Clean the windshield glass.
- Clean the wiper blade elements.
- Perform the wiper arm pressure test.
- Inspect the wiper blade element set.

DESCRIPTION AND OPERATION

WIPER/WASHER SYSTEM DESCRIPTION AND OPERATION

Windshield Wipers

The windshield wiper/washer switch signal circuits are inputs to the body control module (BCM) and the BCM controls wiper motor low speed operation, washer pump and high speed operation. The windshield wiper/washer switch is provided a low reference from the BCM and each of the switch signal circuits is supplied 12 volts through a resistor and monitored within the BCM. During LOW or INTERMITTENT operation the wiper switch low signal circuit is closed to the low reference circuit through a series of resistors within the switch assembly and the signal circuit voltage monitored by the BCM will depend on the switch contact location to the resistor assembly. During HIGH or WASH operation the high and wash switch signal circuits are closed directly to the low reference circuit within the switch assembly and nearly all the signal circuit voltage will be dropped across the BCM resistors. The BCM controls the wiper motor through the Wiper Relay and the Wiper High Relay. During any wiper motor function that uses low speed the BCM supplies the voltage to energize the Wiper Relay and battery voltage will be supplied from the Wiper Relay through the de-energized Wiper High Relay to the wiper motor low speed control circuit. During high speed wiper motor operation the Wiper Relay is energized as in low speed and the BCM provides a ground to energize the Wiper High Relay and the battery voltage

is supplied to the wiper motor high speed control circuit. Wiper motor park operation is controlled by the BCM using an input from the park switch within the wiper motor assembly. The BCM supplies the park switch signal circuit 12 volts through a resistor then monitors the circuit. Whenever the wiper motor is out of the park position the park switch signal circuit is closed to ground and nearly all the signal circuit voltage will be dropped across the BCM resistor. 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 and the BCM will park the wipers the next time the ignition is cycled ON.

Windshield Washers

When the windshield Wash switch is pressed, ground is applied through the switch contacts and the windshield washer switch signal circuit to the body control module (BCM) indicating the windshield wash request. The BCM then energizes the WPR relay, as stated above and the FRT/WSW relay by applying ground through the control circuit to the coil side of the relay. With the FRT/WSW relay energized, battery voltage from the BATT 3 fuse is applied through the switch side of the relay and out to the control circuit of the windshield washer fluid pump. The wiper motor will operate for 2 wipe cycles after the wash switch is released.

Heated Windshield Washers

The windshield washer solvent heater operates with the standard windshield wiper washer system and when a heated washer cycle is activated the solvent heater controls the windshield washers through the washer switch signal circuit to the body control module (BCM). The heater is supplied with high current power and ground circuits that are used to energize the heater coils. The low current logic voltage is supplied to the heater through the RUN relay in the underhood fuse block. The RUN relay is a PCB relay energized by the BCM only while the engine is running. The heated washer cycle operation is activated by a separate switch located on the instrument panel accessory switch assembly. When the heated washer fluid switch is pressed the heated washer switch signal circuit is momentarily grounded and the heated washer cycle is activated. During the heated wash cycle the 3 heater elements in the solvent heater are energized and when the solvent temperature reaches approximately 70° C (160° F) the heater grounds the washer switch signal circuit until the heated solvent is dispensed. The heated washer cycle will run 4 heat and wash actions unless deacitvated by the heated washer switch signal.

REAR WIPER/WASHER SYSTEM DESCRIPTION AND OPERATION

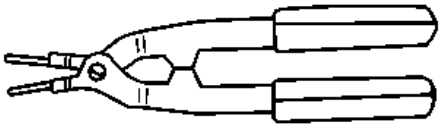
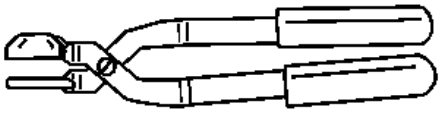
The rear wiper module controls rear wiper motor operation. Battery voltage supplied to the module is used to operate the wiper motor in all modes and to return the rear wiper arm to the park position after the ignition is turned off. Accessory voltage supplied to the rear wiper/washer

switch is used to supply the rear window wiper and washer switch signal circuits. In wiper switch positions 1, 2 and WASH the wiper switch signal circuit voltage level to the wiper motor module determines the wiper motor operating mode. A second wash switch contact is used as the washer pump relay control circuit and the washer pump relay will remain energized for as long as the rear washer switch is pressed. The liftgate ajar switch signal circuit provides information to the rear window wiper module about the status of the liftgate. If the liftgate or liftglass is open the rear wiper operation is not performed.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Special Tools

Illustration	Tool Number/Description
	J 39232 Wiper Linkage Separator
	J 39529 Wiper Linkage Installer