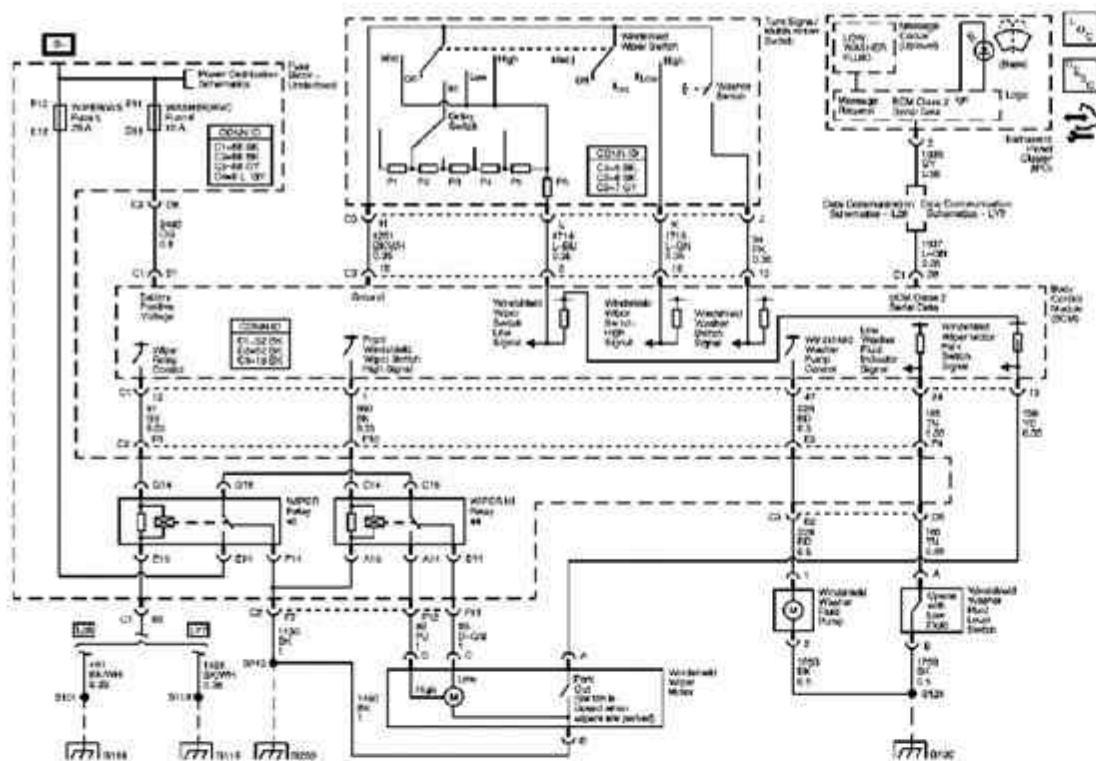


Wipers and Washers - LaCrosse

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Washer Solvent Container Bolts	10 N.m	89 lb in
Washer Solvent Container Screws	2.5 N.m	22 lb in
Windshield Washer Pulse Control Module	8 N.m	71 lb in
Wiper Arm Nut	24.5 N.m	18 lb ft
Wiper Drive System Module Screws	10 N.m	89 lb in
Wiper Motor Crank Arm nut	16 N.m	12 lb ft

WIPER/WASHER SCHEMATICS



DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B3873	B3873 00: Front Washer Relay Circuit
DTC B3874 (V6)	B3874 00: Wiper Low Speed Relay Circuit
DTC B3874 (V8)	B3874 00: Wiper Low Speed Relay Circuit

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DTC B3875 (V6)		Description
DTC B3875 (V8)		B3873 00: Front Washer Relay High Speed
DTC B3874 (V6)		B3874 00: Wiper Low Speed Relay Circuit

DIAGNOSTIC STARTING POINT - WIPER/WASHER SYSTEMS

Begin the system diagnosis with the **Diagnostic System Check - Vehicle**. The Diagnostic System Check - Vehicle 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 - Vehicle will identify the correct procedure for diagnosing the system and where the procedure is located.

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

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. 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**Schematic Reference****Wiper/Washer Schematics****Connector End View Reference****Component Connector End Views****Description and Operation****Wiper/Washer System Description and Operation****Electrical Information Reference**

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

Scan Tool Reference**Control Module References for Scan Tool Information****Circuit/System Testing**

1. Ignition OFF, disconnect the X2 harness connector at the underhood fuse block.
2. Connect a test lamp between the control circuit terminal 13 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, test or replace the BCM.
 - 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, test or replace the BCM.
4. If all circuits test normal, test or replace the underhood fuse block.

Repair Procedures

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

Control Module References for BCM replacement, setup, and programming**DTC B3874 (V6)****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 B3874 00**

Wiper Low Speed Relay Circuit

Diagnostic Fault Information

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	B3874 00	-
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				

Circuit/System Description

The body control module (BCM) controls and monitors the state of the wiper 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 wiper relay through the wiper relay control circuit. This energizes the wiper relay, allowing battery positive voltage from the wiper/ws fuse through the switched side of the wiper relay to the windshield wiper motor. Ground is applied at all times to the coil side of the wiper relay and the windshield wiper motor form G201.

Conditions for Running the DTC

- The ignition is in the ON position.

- The ignition voltage is between 9-16 volts.

Conditions for Setting the DTC

- The BCM detects an short to battery positive voltage in the wiper high speed relay control circuit for over 1 second.
- The BCM detects an open or a short to ground in the wiper high speed relay control circuit for over 1 second.

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.
- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.

Reference Information**Schematic Reference****Wiper/Washer Schematics****Connector End View Reference****Component Connector End Views****Description and Operation****Wiper/Washer System Description and Operation****Electrical Information Reference**

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

Scan Tool Reference**Control Module References for Scan Tool Information****Circuit/System Testing**

1. Ignition OFF, disconnect the Wiper Relay.
2. Connect a test lamp between the wiper Low speed relay control circuit terminal 85 and ground.
3. 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 ground. If the circuit tests normal, test or replace the BCM.
 - 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, test or replace the BCM.

4. If all circuits test normal, test or replace the WPR relay.

Component Testing

1. Ignition OFF, disconnect the WIPER Relay.
2. Test for 60-200 ohms between terminals G14 and E15.
 - If the resistance is not within the specified range, replace the relay.
3. Test for infinite resistance between the following terminals:
 - G15 and E15
 - G15 and E14
 - G14 and G14
 - G15 and E14
4. Test for less than 2 ohms between terminals G15 and F14.
 - If greater than the specified range, replace the relay.
5. Install a 10A fused jumper wire between relay terminal G14 and 12 volts. Install a jumper wire between relay terminal E15 and ground. Test for less than 2 ohms between terminals G15 and E14.
 - If greater than the specified range, replace the WIPER Relay.

Repair Procedures

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

Control Module References for BCM replacement, setup, and programming

DTC B3874 (V8)

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 B3874 00

Wiper Low Speed Relay Circuit

Diagnostic Fault Information

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	B3874 00	-

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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

Circuit/System Description

The body control module (BCM) monitors the wiper Low speed relay control circuit only when wiper Low speed mode is active. When the wiper Low speed mode is requested, the BCM responds by applying a ground through the wiper Low speed relay control circuit to the coil side of the relay, energizing the WPR 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 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****Component Connector End Views****Description and Operation****Wiper/Washer System Description and Operation****Electrical Information Reference**

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

• Wiring Repairs

Scan Tool Reference

Control Module References for Scan Tool Information

Circuit/System Testing

1. Ignition OFF, remove the WPR Relay from the underhood fuse block.
2. Connect a test lamp between the wiper Low speed relay control circuit terminal 86 and battery voltage.
3. 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.
 - o If the test lamp is always ON, test the control circuit for a short to ground. If the circuit tests normal, test or replace the BCM.
 - o 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, test or replace the BCM.
4. If all circuits test normal, test or replace the WPR relay.

Repair Procedures

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

Control Module References for BCM replacement, setup, and programming

DTC B3875 (V6)

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

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				

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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) controls and monitors the state of the wiper high speed relay control circuit. When the windshield wiper switch is placed in to a high speed setting, a signal is applied to the BCM through the windshield wiper switch high signal circuit. The BCM then applies battery positive voltage to the Wiper HI relay through the wiper High speed relay control circuit. This energizes the Wiper HI relay, allowing battery positive voltage to be applied from the wiper/ws fuse, through the switched contacts of the wiper relay and through the switched contacts of the Wiper HI relay to the windshield wiper motor. Ground is applied at all times to the coil side of the wiper HI relay and to the windshield wiper motor from G201.

Conditions for Running the DTC

- The ignition is in the ON position.
- The ignition voltage is between 9-16 volts.

Conditions for Setting the DTC

- The BCM detects an short to battery positive voltage in the wiper high speed relay control circuit for over 1 second.
- The BCM detects an open or a short to ground in the wiper high speed relay control circuit for over 1 second.

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****Component Connector End Views**

Description and Operation

Wiper/Washer System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for Scan Tool Information

Circuit/System Verification

Ignition ON, wiper switch in the HIGH position. Verify the windshield wipers are cycling at the high speed.

Circuit/System Testing

1. Ignition OFF, disconnect the Wiper HI Relay.
2. Connect a test lamp between the control circuit terminal C14 and ground.
3. Ignition ON, 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 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the BCM.
4. If all circuits test normal, test or replace the WIPER HI relay.

Component Testing

1. Ignition OFF, disconnect the WIPER Relay.
2. Test for 60-200 ohms between terminals GC14 and A15.
 - If the resistance is not within the specified range, replace the relay.
3. Test for infinite resistance between the following terminals:
 - C15 and E15
 - C15 and A14
 - C15 and C14
 - C14 and A14
4. Test for less than 2 ohms between terminals C15 and B14.
 - If greater than the specified range, replace the relay.
5. Install a 10A fused jumper wire between relay terminal C14 and 12 volts. Install a jumper wire between relay terminal A15 and ground. Test for less than 2 ohms between terminals C15 and A14.
 - If greater than the specified range, replace the Relay.

Repair Procedures

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

Control Module References for BCM replacement, setup, and programming**DTC B3875 (V8)****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

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 in 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.

Reference Information**Schematic Reference****Wiper/Washer Schematics****Connector End View Reference****Component Connector End Views****Description and Operation****Wiper/Washer System Description and Operation****Electrical Information Reference**

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

Scan Tool Reference**Control Module References for Scan Tool Information****Circuit/System Testing**

1. Ignition OFF, remove the WPR HI Relay from the underhood fuse block.
2. Connect a test lamp between the wiper high speed relay control circuit terminal 86 and battery voltage.
3. Ignition ON, 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, test or replace the BCM.
 - 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, test or replace the BCM.
4. If all circuits test normal, test or replace the WPR HI relay.

Repair Procedures

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

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

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 placed 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****Component Connector End Views****Description and Operation****Wiper/Washer System Description and Operation****Electrical Information Reference**

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

Scan Tool Reference**Control Module References for Scan Tool Information****Circuit/System Verification**

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 X1 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 L 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 X1 harness connector at the turn signal/multifunction switch.
2. Test the resistance between terminals H and L. 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 H 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 J 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 the **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. 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 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 System Malfunction
- Low Washer Fluid Indicator Malfunction
- Washer Malfunction

WINDSHIELD WIPER SYSTEM MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Windshield Wiper Motor Relay Coil Supply Voltage	B3874	2	6	-
Windshield Wiper Switch High Signal	6	4	1	-
Windshield Wiper Switch Low Signal	6	3	1	-
Windshield Wiper Motor Park Switch Signal	5	5	-	-
Windshield Wiper High Speed Relay Control	7	4	B3875 00	-
Windshield Wiper Motor High Speed Control	2	4	-	-
Windshield Wiper Motor Low Speed Control	2	3	B3874 00	-
Windshield Wiper Motor Ground	-	2	-	-
Windshield Wiper Switch Ground	-	1	-	-

1. Wipers and washers Inoperative in 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

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 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 relay and out to the switch input side of the WIPER HIGH 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 relay as stated above and the WIPER HIGH 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

- A short to ground in the following circuits will open the WPR fuse:
 - Windshield wiper motor relay coil supply voltage
 - Windshield wiper motor low speed control
 - Windshield wiper motor high speed control
- 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****Component Connector End Views****Description and Operation****Wiper/Washer System Description and Operation****Electrical Information Reference**

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

Scan Tool Reference

Control Module References for Scan Tool Information

Circuit/System Verification

BCM and Wiper Switch Verification

1. Ignition ON, observe the scan tool BCM Windshield Wiper Switch parameters. The reading should display Off, Intermittent, Low and High while rotating the wiper switch.
 - o If one or more of the wiper delay parameters are inoperative and the wiper low speed parameter functions, replace the turn signal/multifunction switch.
 - o If the low speed and/or high speed parameters are inoperative, perform the Multifunction Switch Circuit/System Testing.
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.
 - o 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.

BCM and Wiper Motor Verification

1. Ignition ON, 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.
 - o 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 X3 harness connector at the turn signal/multifunction switch.
2. Ignition OFF, test for less than 1 ohm of resistance between the ground circuit terminal H and ground.
 - o If greater than 1 ohm, test the ground circuit for an open/high resistance. If the circuit tests normal, replace the body control module.
3. Ignition ON, verify the scan tool Windshield Wiper Switch parameter is Off.
 - o If not Off, test the signal circuit terminal L 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.
 - o 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 L and ground. Verify the scan tool Windshield Wiper Switch parameter is Switch Fault.
 - o 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.
 - o 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, test or 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.
 - o If not Inactive, test the signal circuit terminal B for a short to ground. If the circuit tests normal, test or replace the body control module.
3. Install a 3-amp fused jumper wire between the wiper motor park switch signal circuit terminal B and ground. Verify the scan tool Wiper Park Switch parameter is Active.
 - o 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, test or replace the windshield wiper motor.

Wiper Motor Circuit/System Testing

1. Ignition OFF, disconnect the X2 harness connector at the underhood fuse block.
2. Test for less than 1 ohm of resistance between the wiper relay ground circuit terminal B1 and ground.
 - o If greater than 1 ohm, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal A1 and ground.
4. 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.
 - o 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.
 - o 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.
5. Connect a test lamp between the control circuit terminal C1 and battery voltage.
6. 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.
 - o 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.
 - o 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.
7. Ignition OFF, connect the X2 harness connector at the underhood fuse block.
8. Disconnect the harness connector at the wiper motor.
9. Test for less than 1 ohm of resistance between the wiper motor ground circuit terminal A and ground.
 - o If greater than 1 ohm, test the ground circuit for an open/high resistance.
10. Connect a test lamp between the control circuit terminal D and ground.
11. 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.
 - o 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.
 - o 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.
12. Connect a test lamp between the control circuit terminal C and ground.
13. Place the wiper switch in the LOW speed position.

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, test or replace the Windshield Wiper Motor.

Component Testing

Multifunction Switch

1. With the ignition OFF, disconnect the X3 harness connector at the turn signal/multifunction switch.
2. Test the resistance between terminals H and L. 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 with the wiper switch in the High speed position.
 - If less than infinite ohms, replace the turn signal/multifunction switch.
4. Test for infinite resistance between terminals H 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.
5. Test for less than 5 ohms of resistance with the wiper switch in the High speed position.
 - If greater than 5 ohms, replace the turn signal/multifunction switch.
6. Test for infinite resistance between terminals H and J while rotating the wiper switch to MIST, each DELAY and LOW speed positions.
 - If less than infinite, replace the turn signal/multifunction switch.
7. Test for less than 5 ohms of resistance while pressing the WASHER switch.
 - If greater than 5 ohms, 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 D and 12 volts. Install a jumper wire between the ground terminal A and ground.

3. The wiper motor should be in low speed mode.
 - o 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 C and 12 volts. Install a jumper wire between the ground terminal A and ground.
5. The wiper motor should be in the high speed mode.
 - o 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**
- **Windshield Wiper Motor Replacement**
- **Control Module References** for BCM replacement, setup, and programming

LOW WASHER FLUID INDICATOR MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Low Washer Fluid Indicator Signal	1	2	-	-
Windshield Washer Fluid Level Switch Ground	-	1	-	-
1. Low washer fluid indicator inoperative 2. Low washer fluid indicator always on				

Circuit/System Description

The low washer fluid indicator is located in the instrument panel cluster (IPC). Ground is applied at all times from G100 through the windshield washer fluid level switch and the low washer fluid indicator signal circuit to the IPC. When the washer fluid is low, the switch opens and ground is removed from the low washer fluid indicator signal circuit to the IPC. The IPC then displays the Low Washer Fluid Level message.

Reference Information

Schematic Reference

Wiper/Washer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Wiper/Washer System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for Scan Tool Information

Circuit/System Testing

Low Washer Fluid Indicator Inoperative

1. Ignition OFF, disconnect the harness connector at the windshield washer fluid level switch.
2. Ignition ON, verify that the DIC displays the Washer Fluid Level Low message.
 - o If the message is not displayed, test the signal circuit for a short to ground. If the circuit tests normal, replace the instrument panel cluster.
3. If all circuits test normal, replace the windshield washer fluid level switch.

Low Washer Fluid Indicator Always On

1. Ignition OFF, disconnect the harness connector at the windshield washer fluid level switch.
2. Ignition OFF, test for less than 1.0 ohm of resistance between the ground circuit terminal B and ground.
 - o If greater than 1.0 ohm, repair the ground circuit for an open/high resistance.
3. Install a 3-amp fused jumper wire between the signal circuit terminal A and ground.
4. Ignition ON, verify the Washer Fluid Level Low message is not displayed.
 - o If the Washer Fluid Level Low message is displayed, test the signal circuit for an open high/resistance. If the circuit test normal, replace the IPC.
5. If all circuits test normal, replace the windshield washer fluid level switch.

Repair Procedures

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Washer Solvent Container Level Sensor Replacement
- Control Module References for IPC replacement, setup, and programming

WASHER MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Windshield Washer Switch Signal	2	1	3	-

2008 Buick LaCrosse CXL

2008 ACCESSORIES & EQUIPMENT Wipers and Washers - LaCrosse

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 WS WASH relay energizing the relay. With the relay energized, battery voltage is applied through the switch contacts of the relay, the WSW fuse, and the control circuit to the windshield washer fluid pump.

Reference Information**Schematic Reference****Wiper/Washer Schematics****Connector End View Reference****Component Connector End Views****Description and Operation****Wiper/Washer System Description and Operation****Electrical Information Reference**

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

Scan Tool Reference**Control Module References for Scan Tool Information****Circuit/System Testing****Washers Inoperative Starting Point**

Ignition ON, with a test lamp connected to ground, probe each of the test points on the WSW fuse while activating the Windshield Washer Switch. The test lamp should illuminate at one or both of the fuse test points.

- If the test lamp does not illuminate at either test point, refer to **Washer Switch Test**.
- If the test lamp illuminates, refer to **Washer Fluid Pump Test**.

Washer Switch Test

1. Ignition ON, observe the scan tool Windshield Washer Switch parameter while pressing the Washer Switch. The reading should change between Inactive and Active.

- 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, test or replace the body control module.
- 2. Ignition OFF, disconnect the X2 harness connector at the underhood fuse block.
- 3. Connect a test lamp between the washer relay control circuit terminal H6 and battery voltage.
- 4. Ignition ON, 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 OFF, test the control circuit terminal H6 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, test or replace the underhood fuse block.

Washer Fluid Pump 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. Connect a test lamp between the washer pump control circuit terminal A and ground.
4. Ignition ON, 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 does not illuminate, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, test or replace the underhood fuse block.
5. If all the circuits test normal, test or replace the windshield washer fluid pump.

Washers Always On

1. Remove the WSW fuse from the underhood fuse block. The washer pump should turn OFF.
 - If the washer pump does not turn OFF, repair the short to voltage on the washer pump control circuit.
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.
3. Ignition OFF, disconnect the X2 harness connector at the underhood fuse block.
4. Ignition ON, verify that a test lamp does not illuminate between the windshield washer relay control circuit terminal H6 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, test or replace the underhood fuse block.

Component Testing

Multifunction Switch

1. With the ignition OFF, disconnect the X3 harness connector at the turn signal/multifunction switch.
2. Test the resistance between terminals H and L. 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 with the wiper switch in the High speed position.

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

- **Windshield Wiper Motor Replacement**
- **Washer Pump Replacement**
- **Control Module References** for BCM replacement, setup, and programming

REPAIR INSTRUCTIONS

WINDSHIELD WIPER AND WASHER SWITCH REPLACEMENT

Removal Procedure

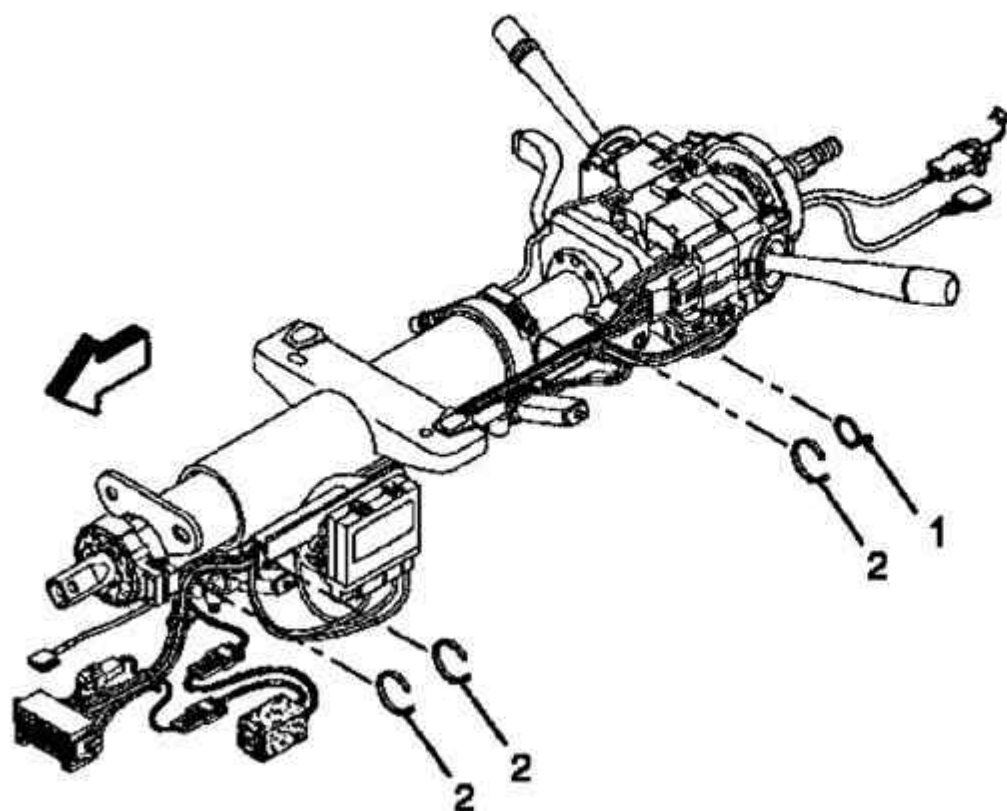


Fig. 2: Identifying Steering Column Wiring Harness Tie Straps
 Courtesy of GENERAL MOTORS CORP.

CAUTION: Refer to SIR Caution .

1. Disable the SIR system. Refer to SIR Disabling and Enabling .
2. Remove the steering column trim covers. Refer to Steering Column Trim Covers Replacement .
3. Remove the steering column wiring harness tie straps (1,2).

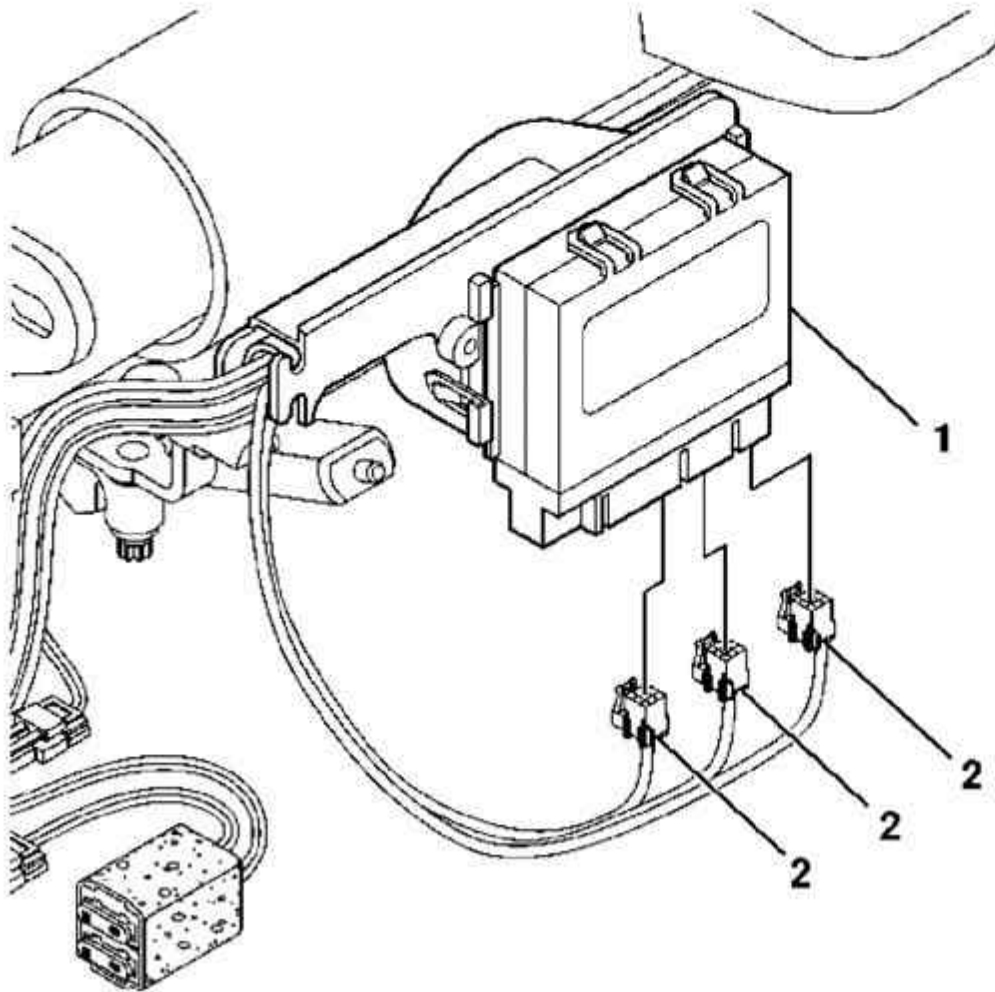


Fig. 3: View of Module Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

4. Disconnect the module electrical connectors (2).

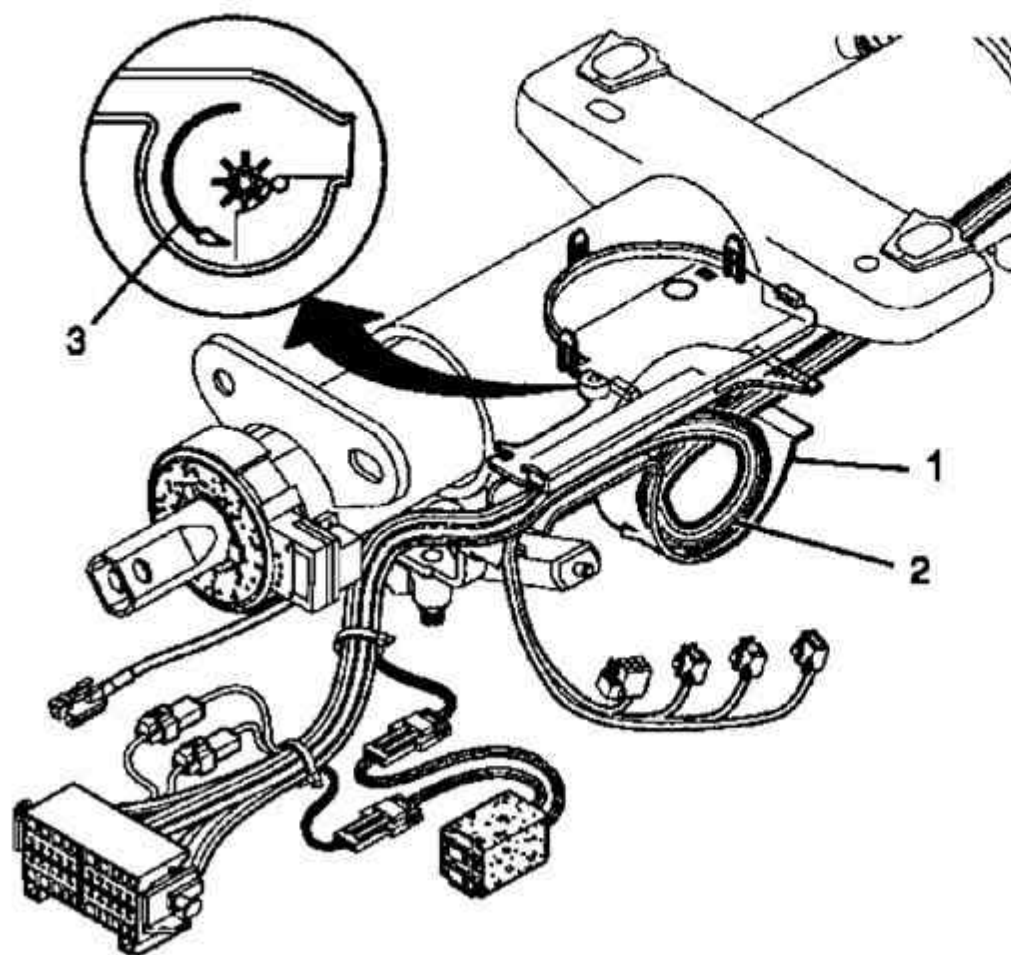


Fig. 4: View of Wire Harness & Shield
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Note the direction that the steering column wiring harness is routed for re-installation.

5. Open the wire harness shield (1) at the lower steering column and remove the wire harness (2).

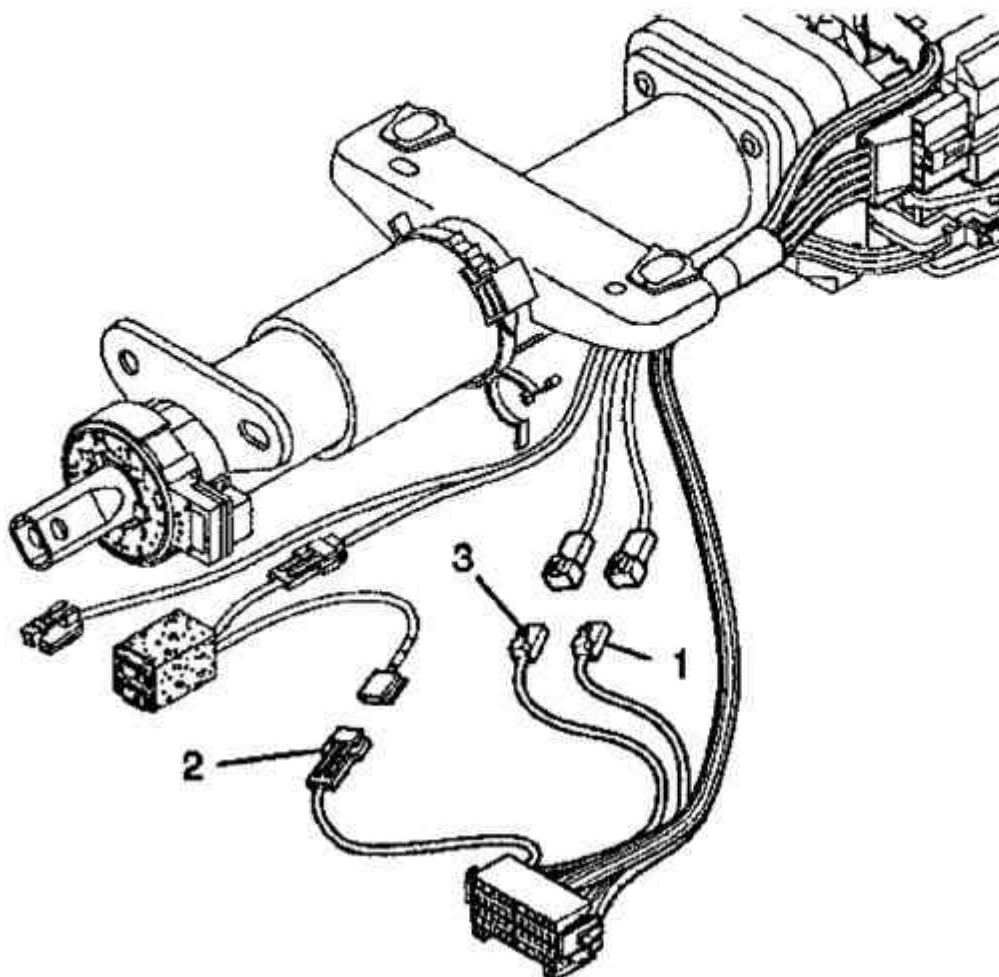


Fig. 5: View Of Windshield & Washer Switch Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

6. Disconnect the electrical connectors (1,3) from the windshield wiper and washer switch.

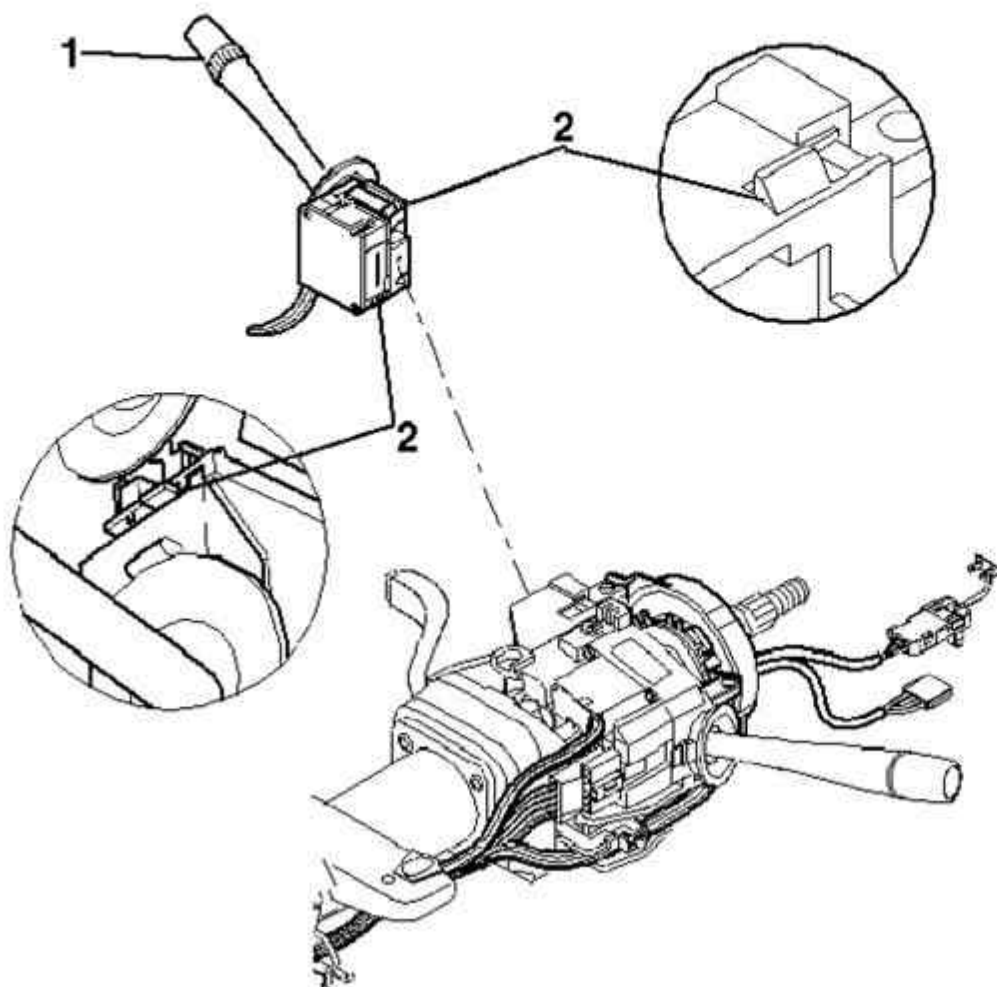


Fig. 6: View Of Windshield Wiper & Washer Switch
Courtesy of GENERAL MOTORS CORP.

7. Depress the locking tab (2) on the windshield wiper and washer switch (1) and remove the switch from the steering column.

Installation Procedure

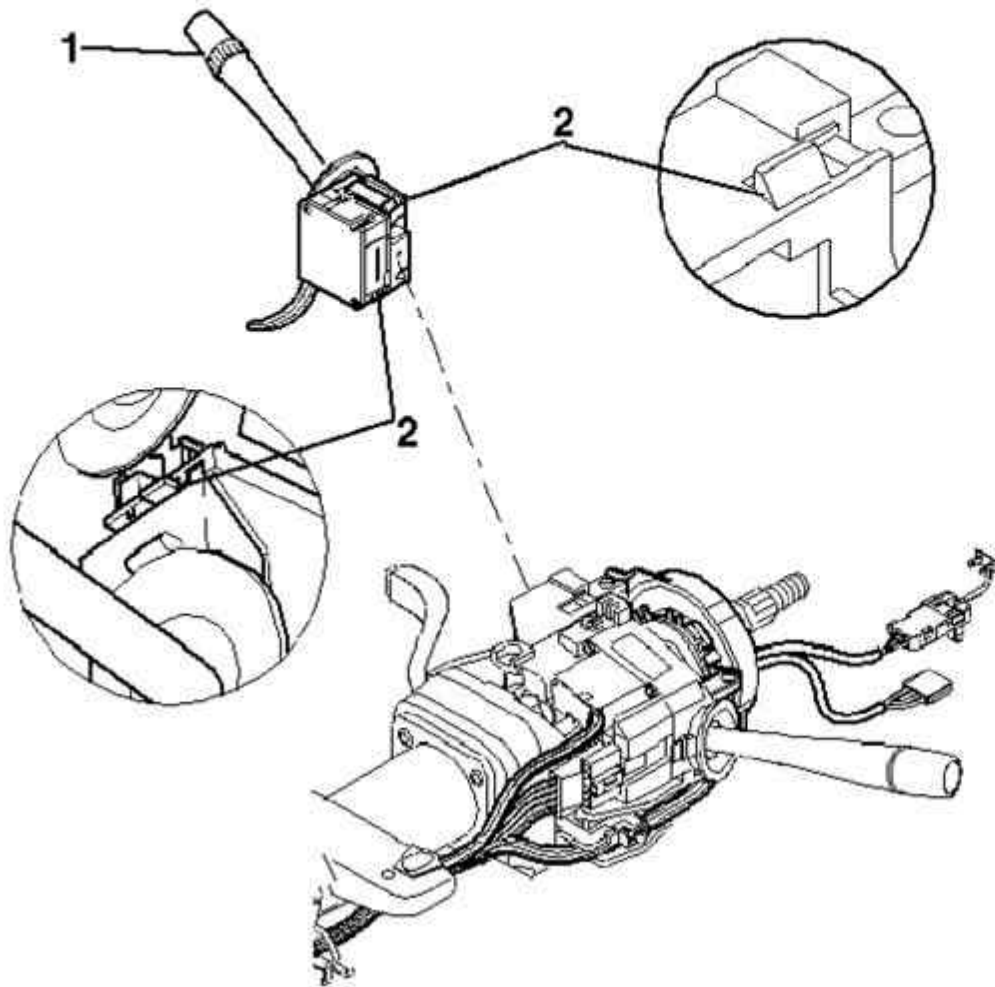


Fig. 7: View Of Windshield Wiper & Washer Switch
Courtesy of GENERAL MOTORS CORP.

1. Install the windshield wiper and washer switch (1) to the steering column.

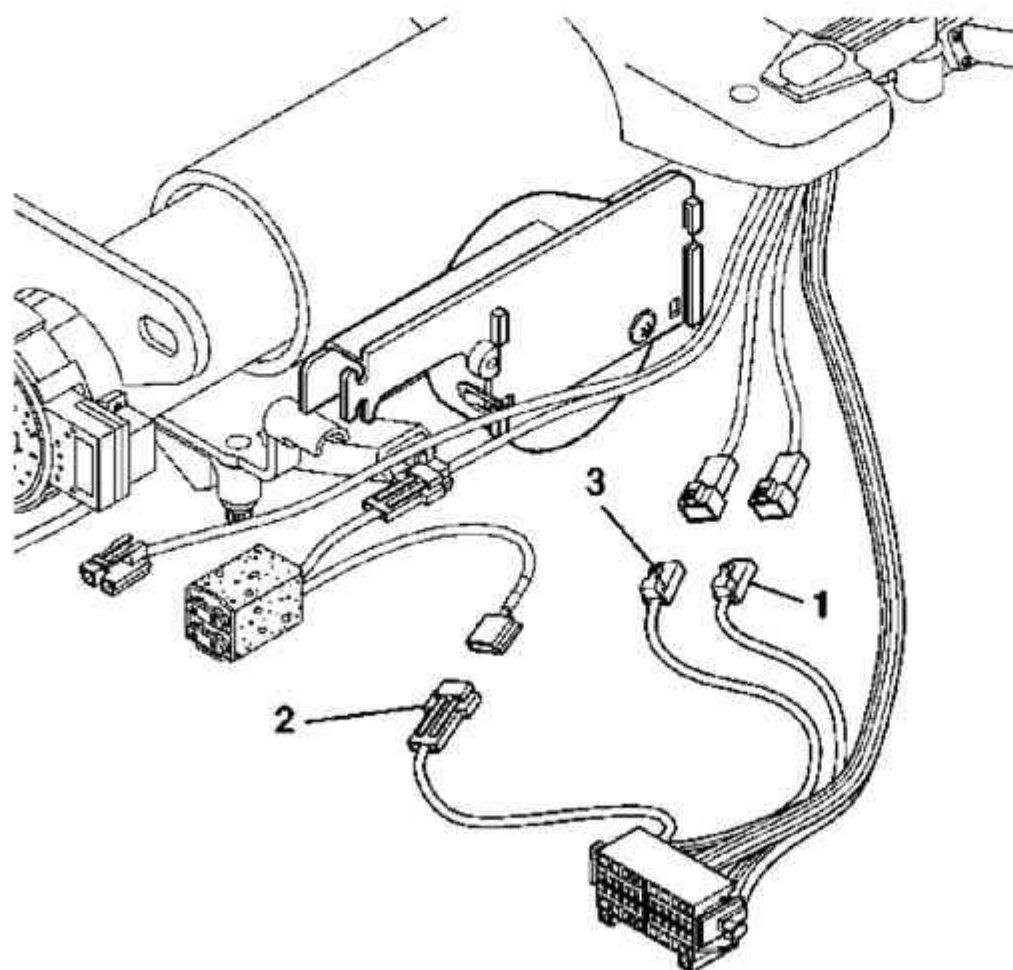


Fig. 8: View of Windshield Wiper & Washer Switch Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

2. Connect the electrical connectors (1,3) on the windshield wiper and washer switch.

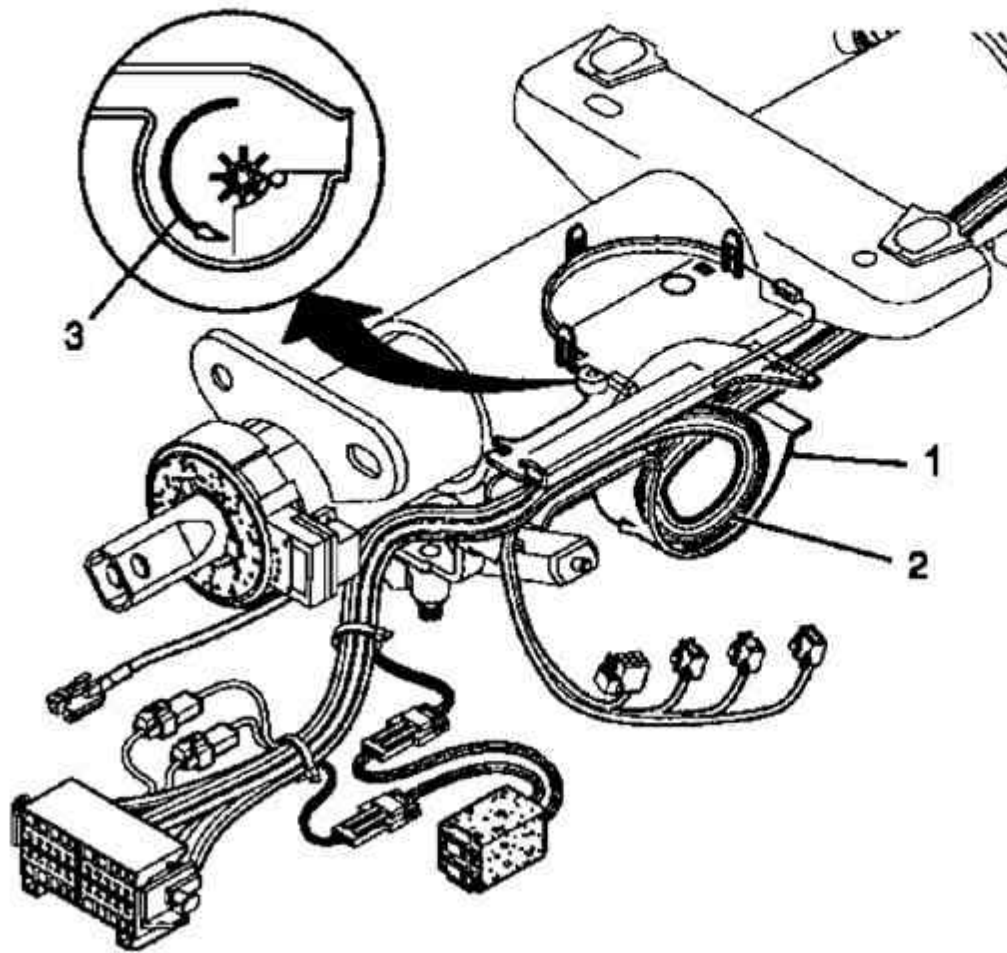


Fig. 9: View of Wire Harness & Shield
Courtesy of GENERAL MOTORS CORP.

3. Install the wire harness (2) to the wire harness shield (1) on the lower steering column.

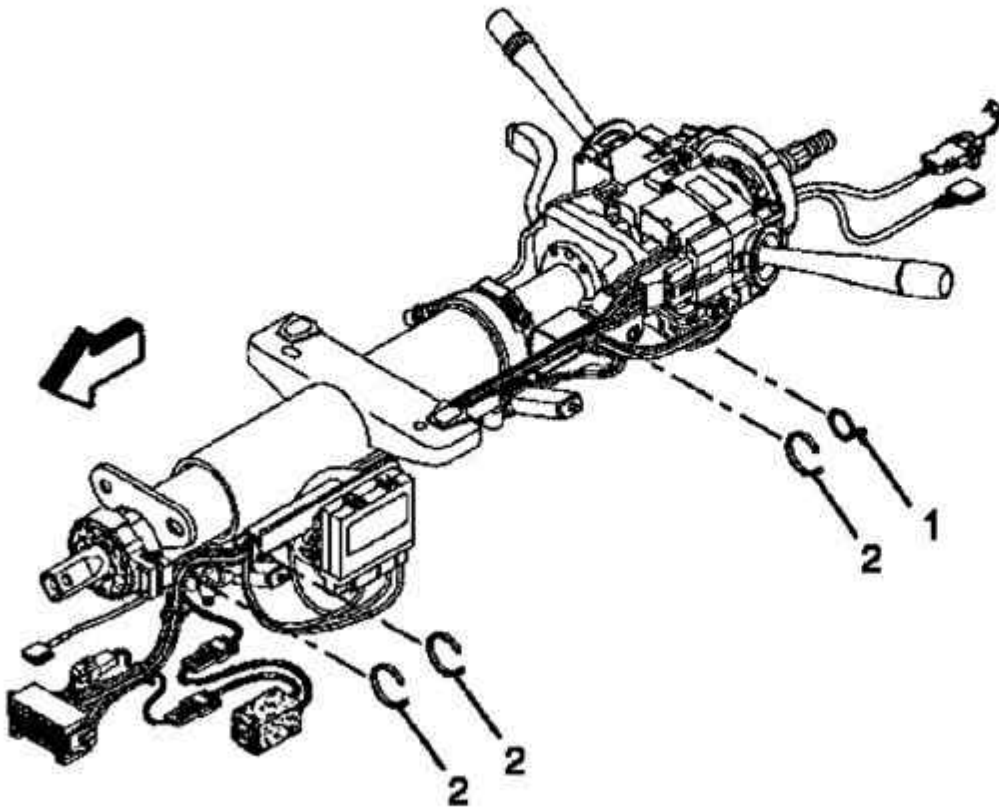


Fig. 10: Identifying Steering Column Wiring Harness Tie Straps
Courtesy of GENERAL MOTORS CORP.

4. Route and connect the electrical connector from the windshield wiper and washer switch.
5. Install the wiring harness tie straps (1,2).
6. Install the steering column trim covers. Refer to **Steering Column Trim Covers Replacement**.
7. Enable the SIR system. Refer to **SIR Disabling and Enabling**.

WINDSHIELD WASHER HOSE REPLACEMENT

Removal Procedure

1. Open the hood.
2. Remove the right front fender liner. Refer to **Front Fender Liner Replacement**.

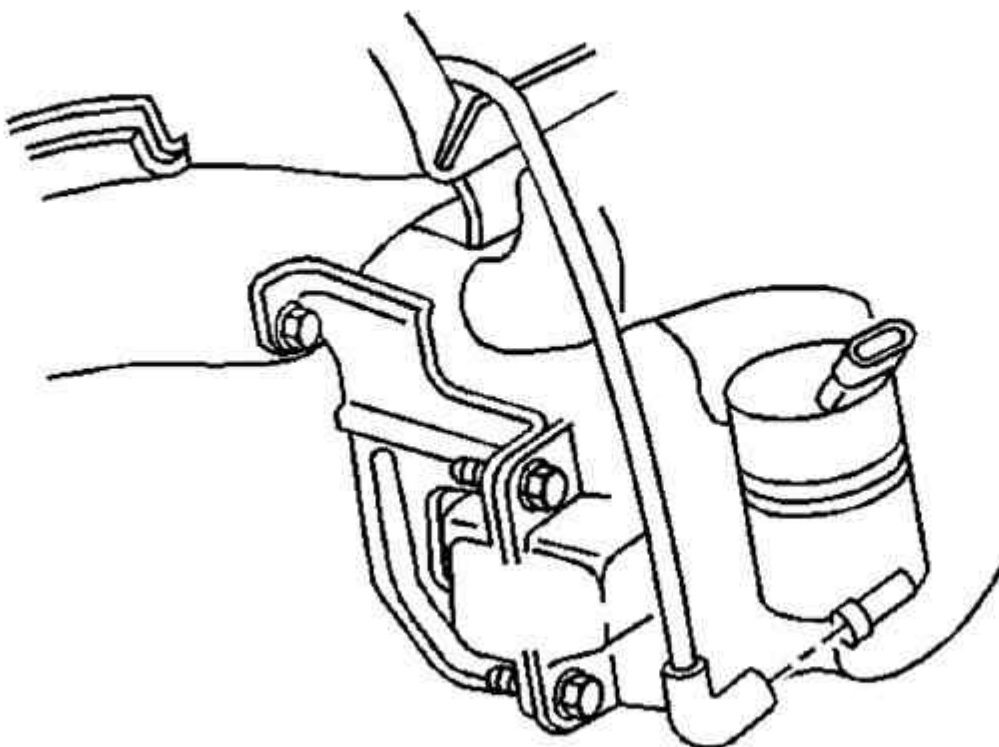


Fig. 11: View Of Washer Hose & Washer Pump
Courtesy of GENERAL MOTORS CORP.

3. Disconnect the washer hose from the washer pump.
4. Lower the Vehicle.

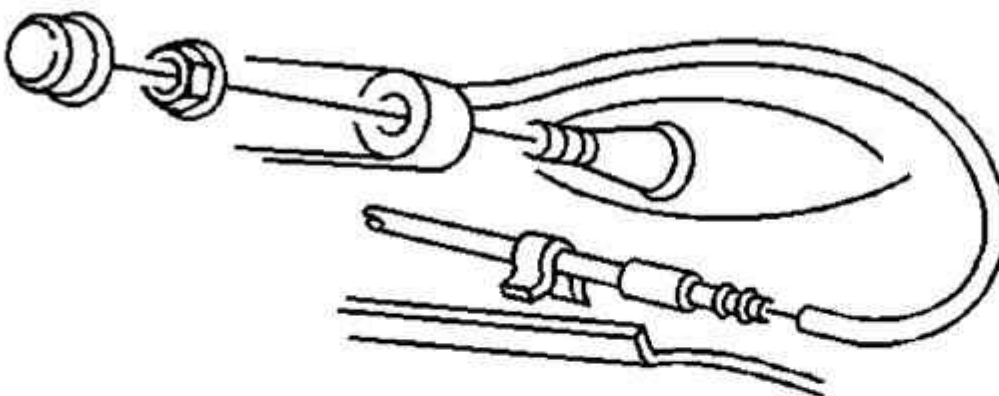


Fig. 12: View Of Washer Hose At Wiper Arms
Courtesy of GENERAL MOTORS CORP.

5. Disconnect the washer hose from the wiper arms.

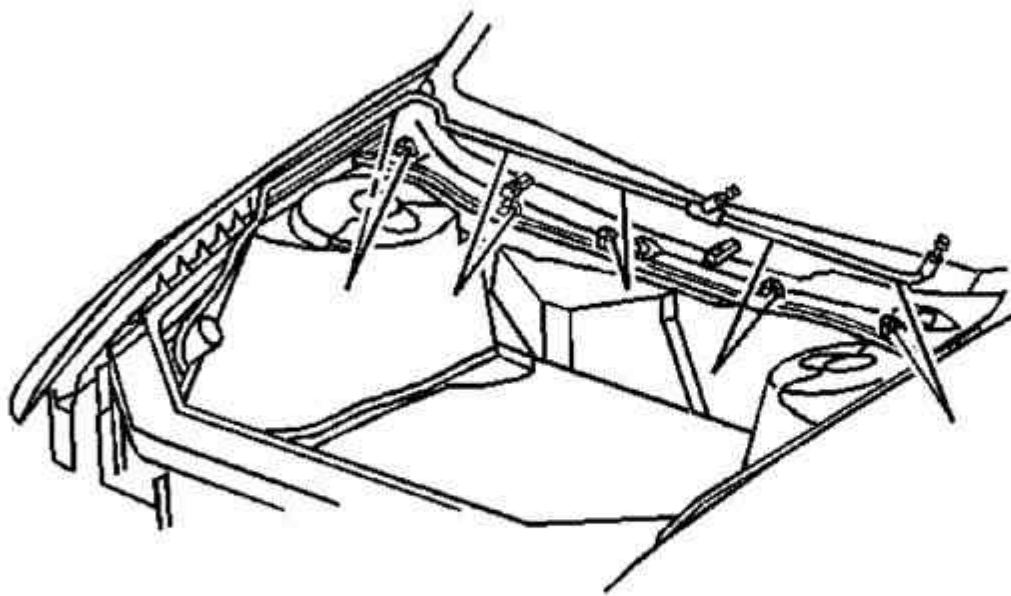


Fig. 13: View Of Washer Hose
Courtesy of GENERAL MOTORS CORP.

6. Disconnect the washer hose from the air inlet grille panel.
7. Pull the washer pump hose out from along side the right front inner fender and into the engine compartment.
8. Remove the washer hose from the vehicle.

Installation Procedure

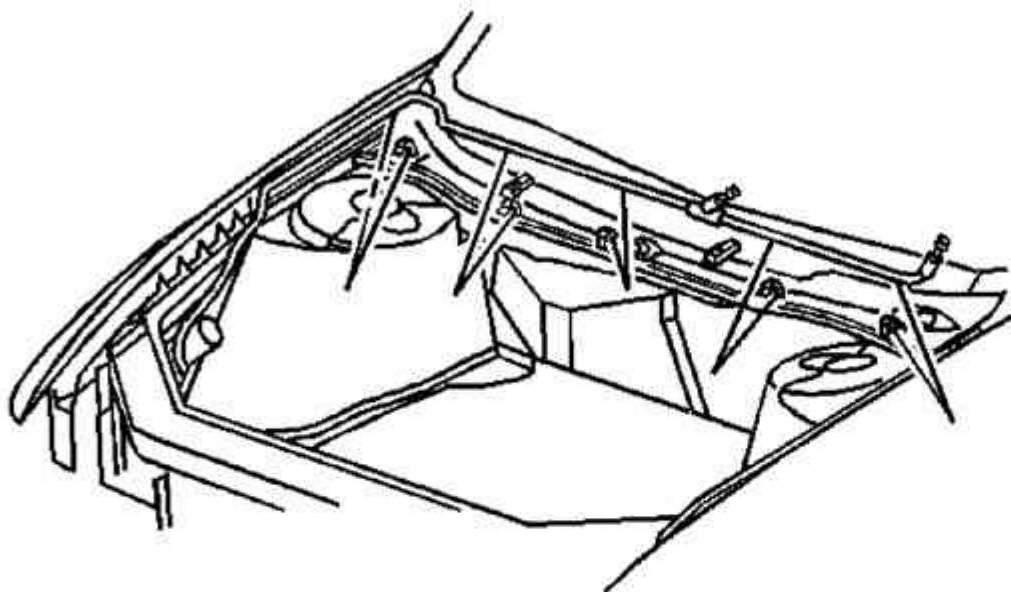


Fig. 14: View Of Washer Hose
Courtesy of GENERAL MOTORS CORP.

1. Position the washer hose to the vehicle.

2. Route the washer pump hose down along side the right front inner fender and into the front inner fender area.
3. Connect the washer hose to the air inlet grille panel.

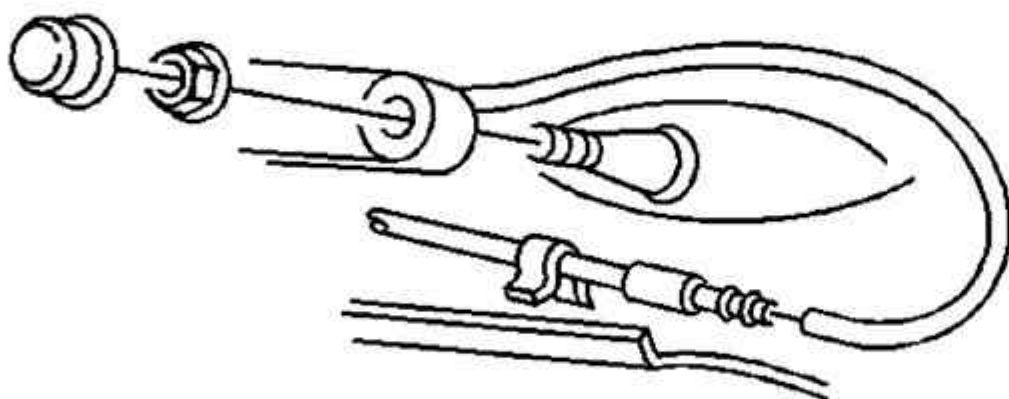


Fig. 15: View Of Washer Hose At Wiper Arms
Courtesy of GENERAL MOTORS CORP.

4. Connect the washer hose to the wiper arms.

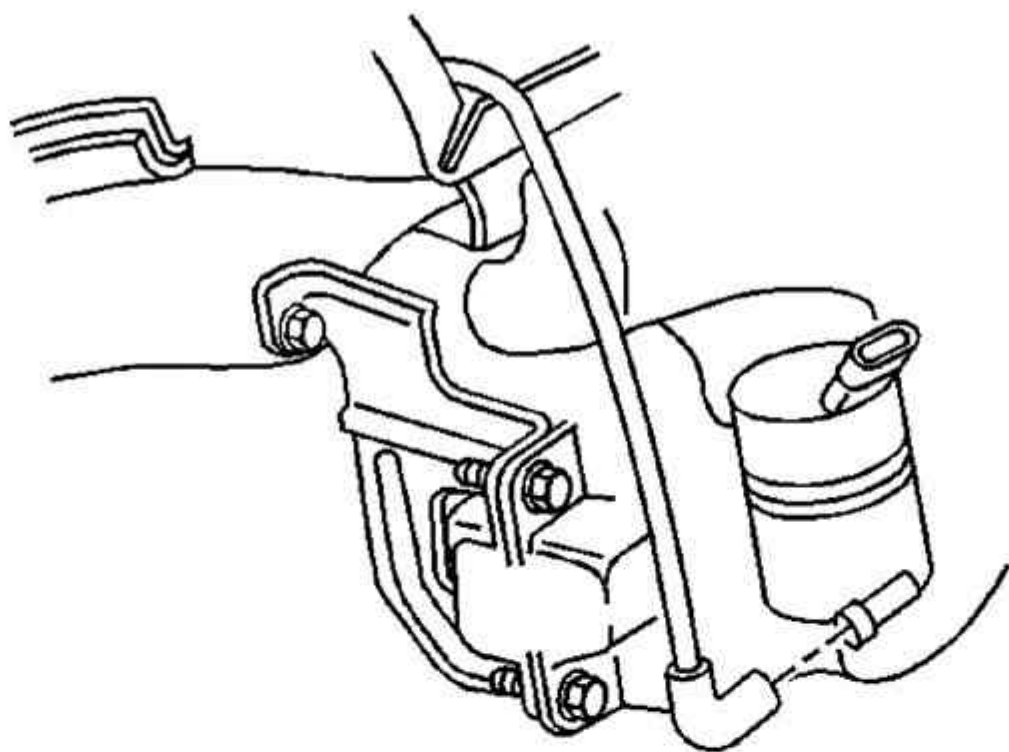


Fig. 16: View Of Washer Hose & Washer Pump
Courtesy of GENERAL MOTORS CORP.

5. Raise the vehicle.
6. Connect the washer hose to the washer pump.

7. Install the right front fender liner. Refer to **Front Fender Liner Replacement**.
8. Close the hood.

WINDSHIELD WASHER SOLVENT CONTAINER REPLACEMENT

Removal Procedure

1. Raise the hood.
2. Drain the washer solvent from the washer solvent container.

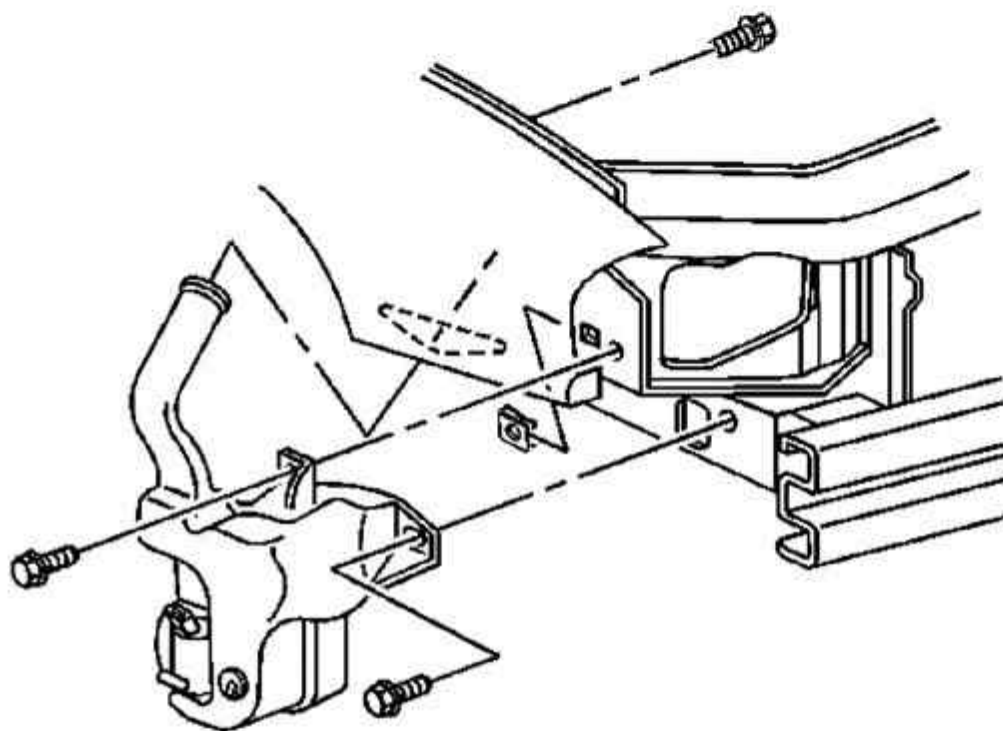


Fig. 17: Identifying Upper Washer Solvent Container Screw
Courtesy of GENERAL MOTORS CORP.

3. Remove the upper washer solvent container screw.
4. Remove the right front fender liner. Refer to **Front Fender Liner Replacement**.

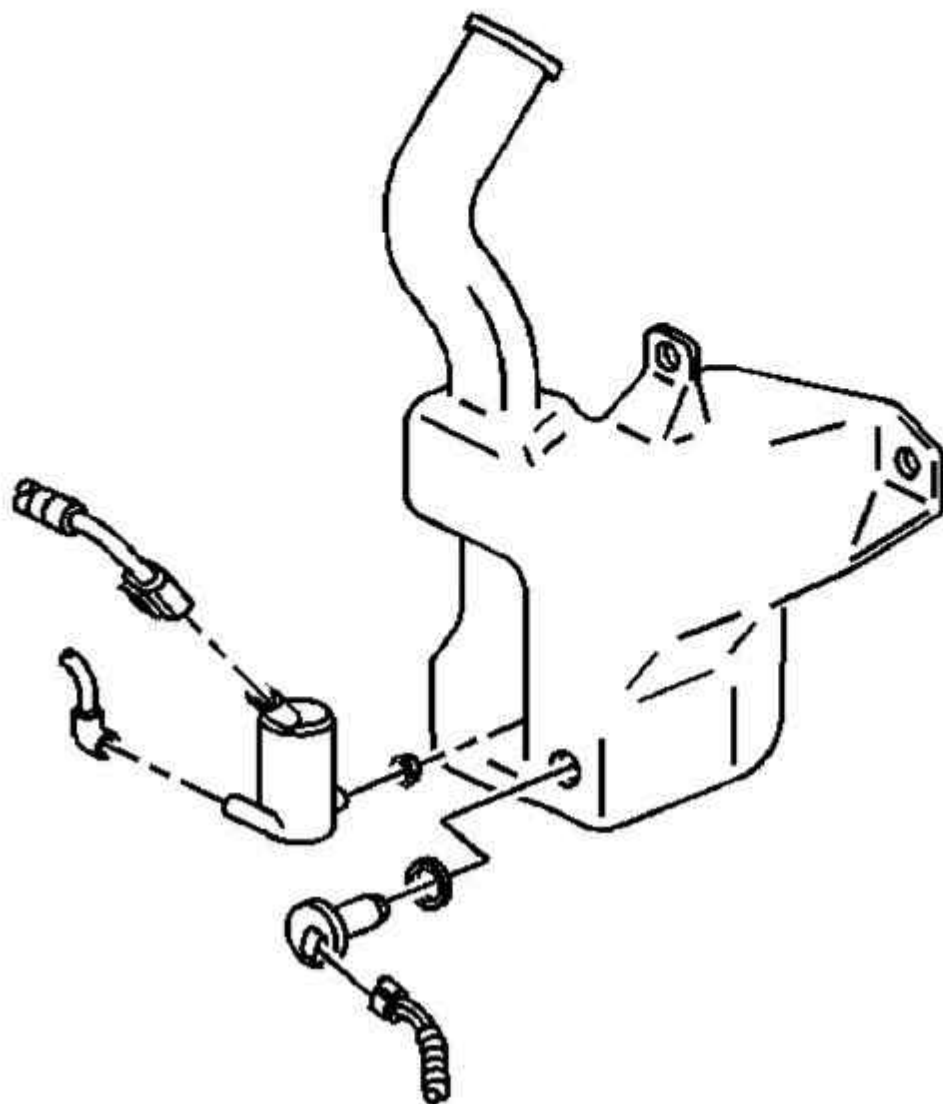


Fig. 18: Identifying Washer Pump Hose, Washer Pump Electrical Connector, & Washer Solvent Level Sensor

Courtesy of GENERAL MOTORS CORP.

5. Disconnect the washer pump hose.
6. Disconnect the washer pump electrical connector.
7. Disconnect the washer solvent level sensor electrical connector.
8. Remove the washer pump from the container.
9. Remove the level sensor from the container.

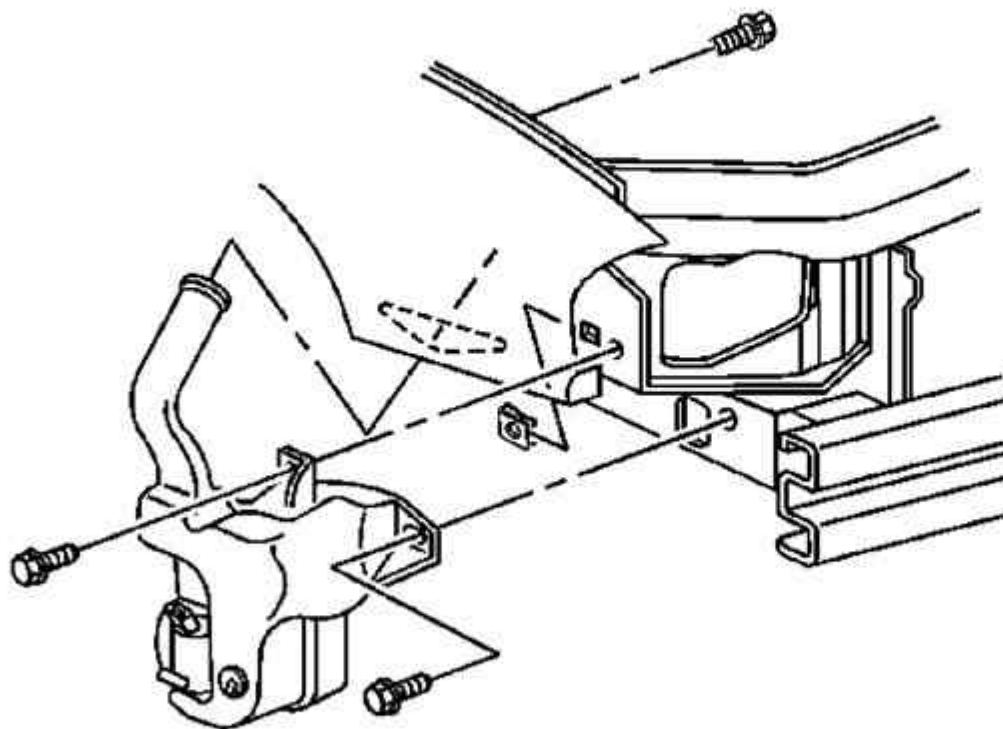


Fig. 19: Identifying Upper Washer Solvent Container Screw
Courtesy of GENERAL MOTORS CORP.

10. Remove the lower washer solvent container screws.
11. Remove the washer solvent container from the right frame rail.

Installation Procedure

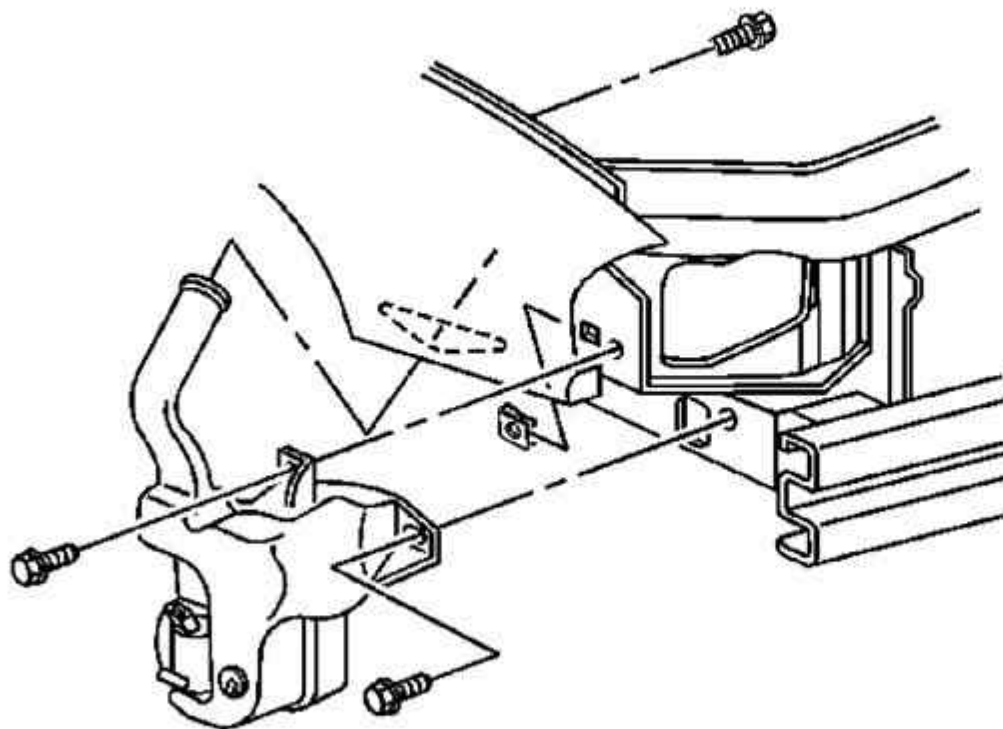


Fig. 20: Identifying Upper Washer Solvent Container Screw
Courtesy of GENERAL MOTORS CORP.

1. Position the washer solvent container to the right frame rail.

NOTE: Refer to Fastener Notice .

2. Install the lower washer solvent container screws.

Tighten: Tighten the screws to 10 N.m (89 lb in).

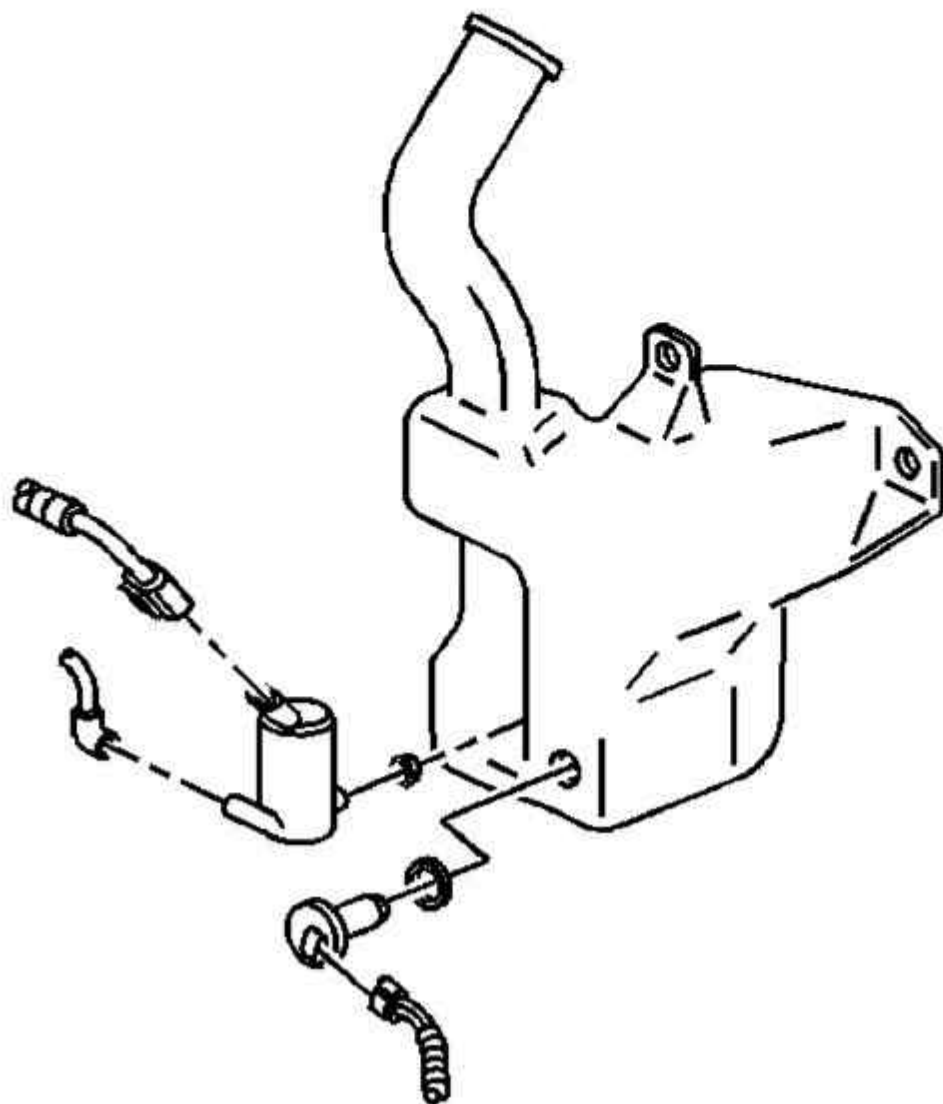


Fig. 21: Identifying Washer Pump Hose, Washer Pump Electrical Connector, & Washer Solvent Level Sensor

Courtesy of GENERAL MOTORS CORP.

3. Install the washer pump to the container.
4. Install the level sensor to the container.
5. Connect the washer solvent level sensor electrical connector.
6. Connect the washer pump electrical connector.
7. Connect the washer pump hose.
8. Install the right front fender liner. Refer to **Front Fender Liner Replacement**.

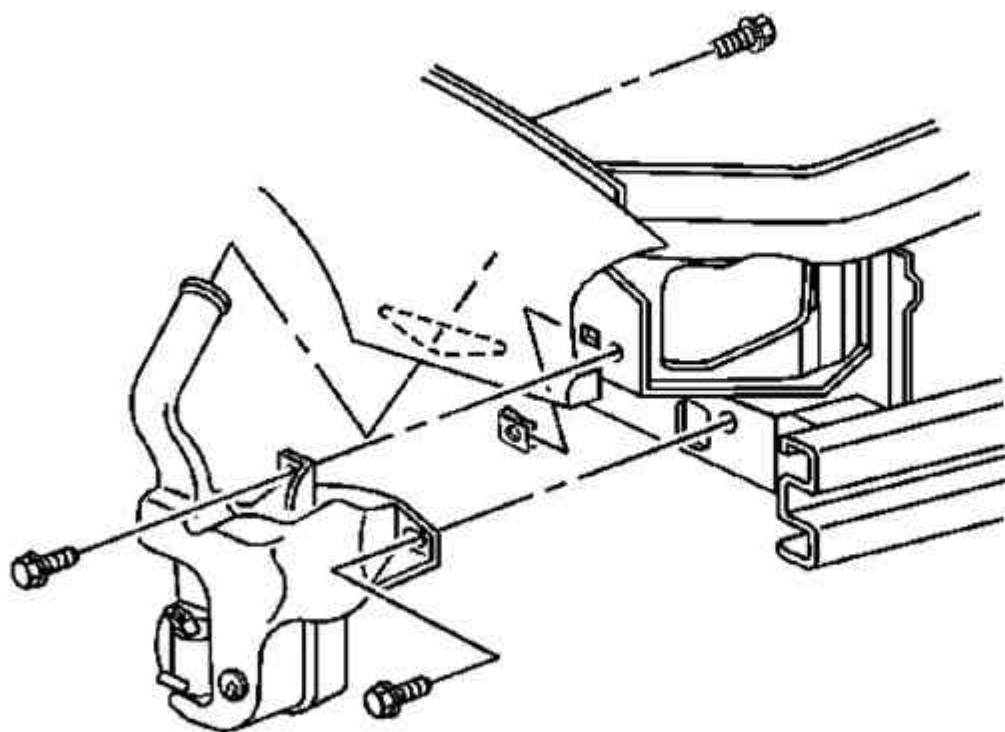


Fig. 22: Identifying Upper Washer Solvent Container Screw
Courtesy of GENERAL MOTORS CORP.

9. Install the upper washer solvent container screw.

Tighten: Tighten the screw to 10 N.m (89 lb in).

10. Fill the washer solvent container with washer solvent.
11. Close the hood.

WASHER PUMP REPLACEMENT

Removal Procedure

1. Open the hood.
2. Drain the washer solvent from the washer solvent container.
3. Remove the right front fender liner. Refer to **Front Fender Liner Replacement**.

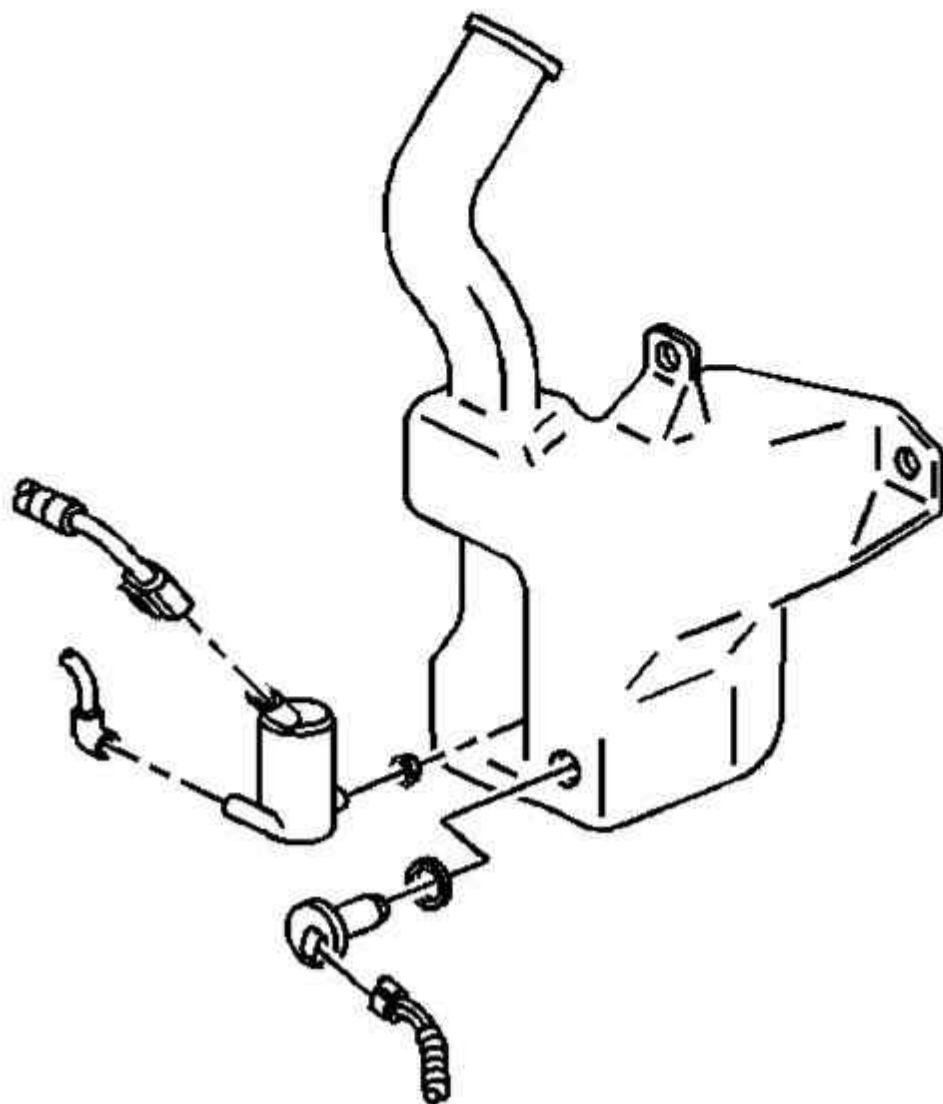


Fig. 23: Identifying Washer Pump Hose, Washer Pump Electrical Connector, & Washer Solvent Level Sensor

Courtesy of GENERAL MOTORS CORP.

4. Disconnect the washer pump electrical connector.
5. Disconnect the washer pump hose.
6. Use a small flat-bladed tool to remove the washer pump from the washer solvent container.
7. Use a small flat-bladed tool to remove the seal from the washer solvent container.

Installation Procedure

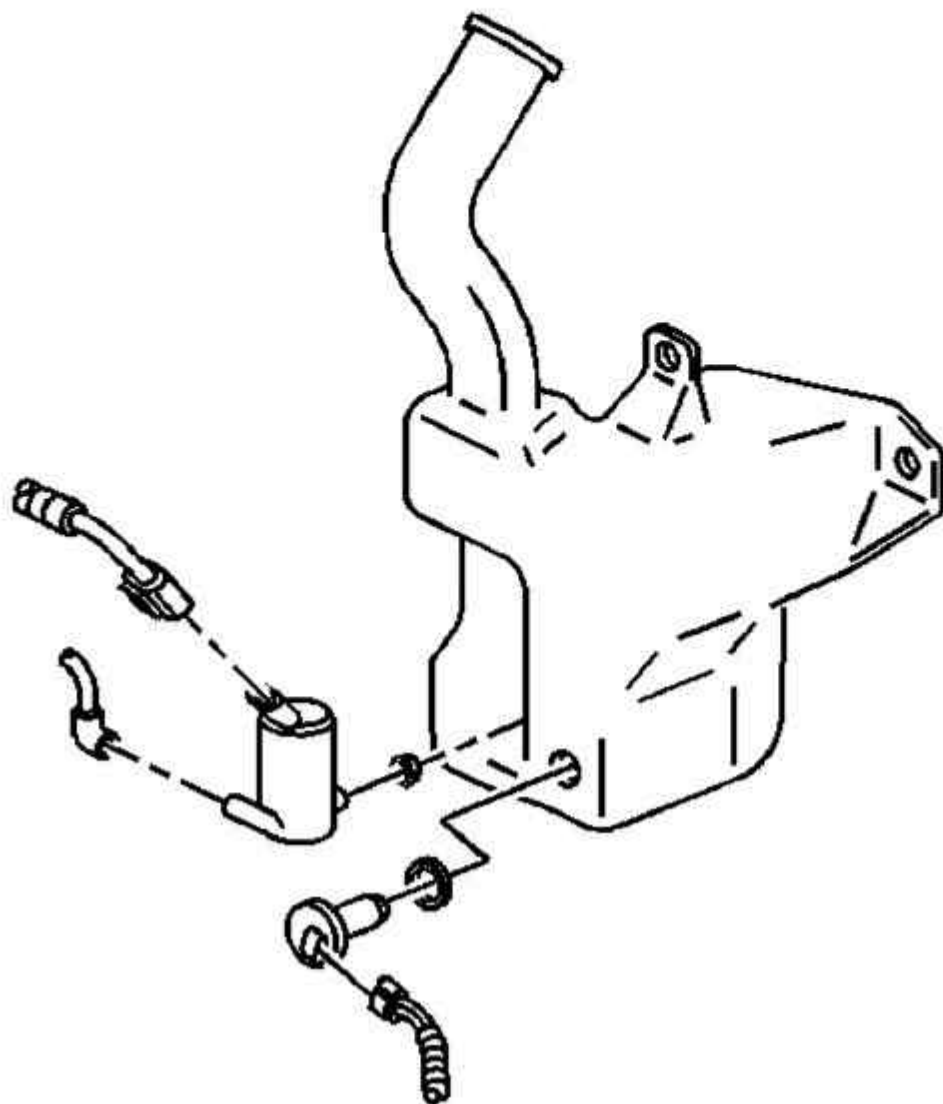


Fig. 24: Identifying Washer Pump Hose, Washer Pump Electrical Connector, & Washer Solvent Level Sensor

Courtesy of GENERAL MOTORS CORP.

1. Install the seal to the washer solvent container.
2. Install the washer pump to the washer solvent container.
3. Connect the washer pump electrical connector.
4. Connect the washer pump hose.
5. Install the right front fender liner. Refer to **Front Fender Liner Replacement**.
6. Fill the washer solvent container with washer solvent.
7. Close the hood.

WASHER SOLVENT CONTAINER LEVEL SENSOR REPLACEMENT

Removal Procedure

1. Drain the washer solvent from the washer solvent container.
2. Remove the right front fender liner. Refer to **Front Fender Liner Replacement**.

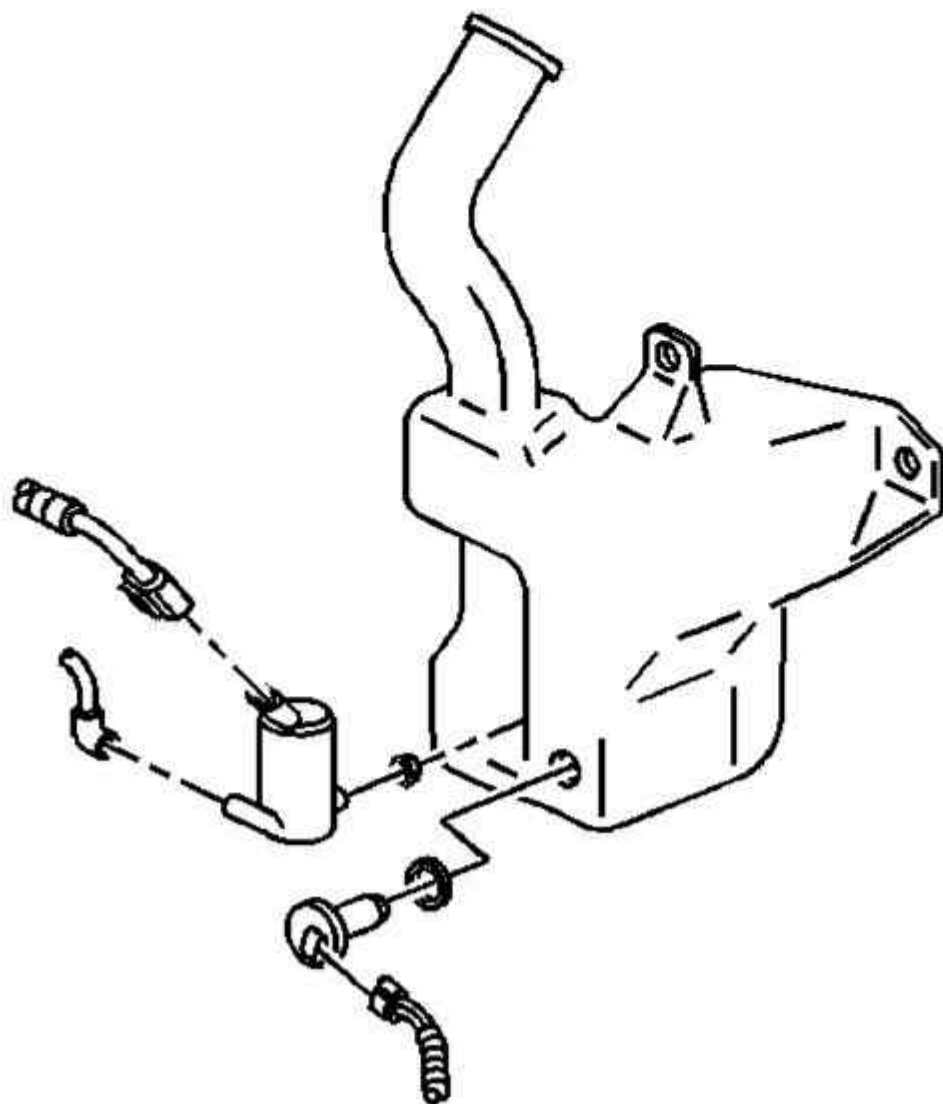


Fig. 25: Identifying Washer Pump Hose, Washer Pump Electrical Connector, & Washer Solvent Level Sensor

Courtesy of GENERAL MOTORS CORP.

3. Disconnect the washer solvent container level sensor electrical connector.
4. Using a small flat-bladed tool, remove the washer solvent level sensor from the washer solvent container.
5. Using a small flat-bladed tool, remove the seal from the washer solvent container.

Installation Procedure

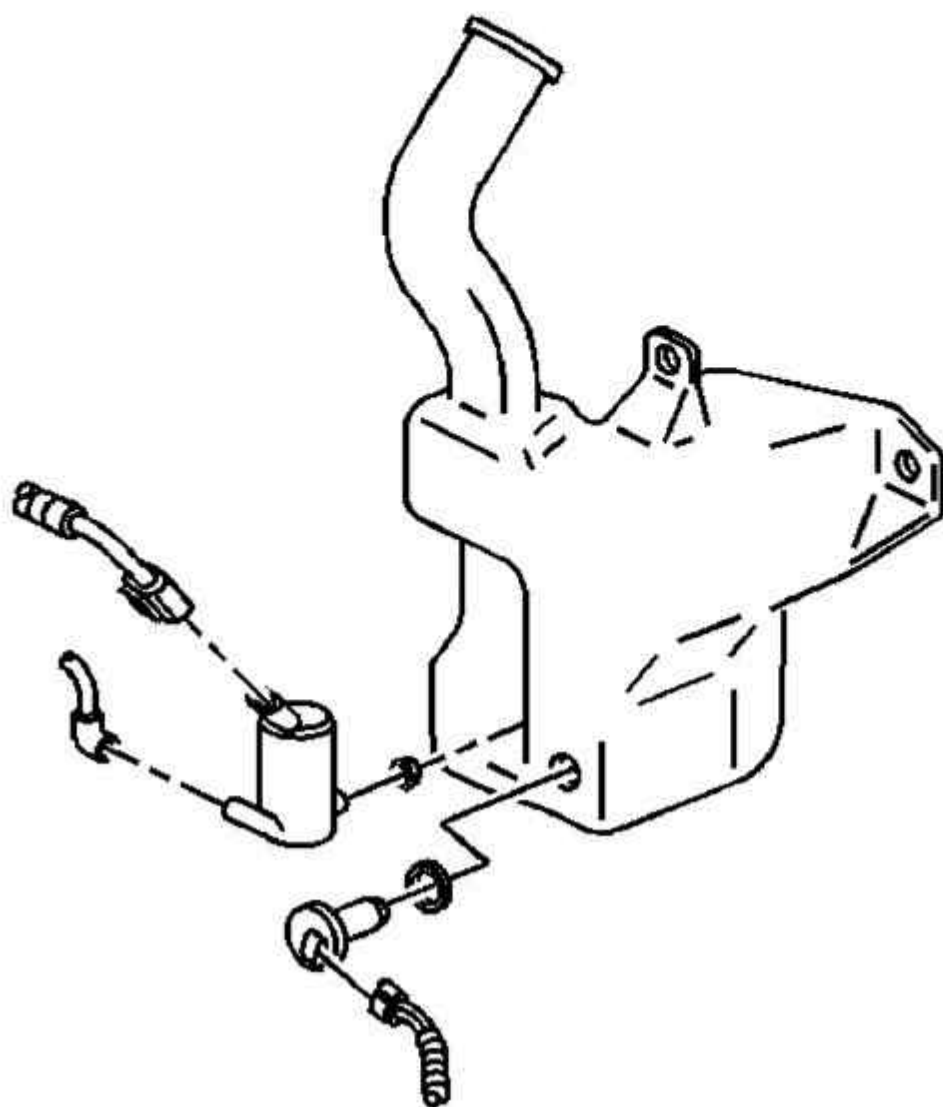


Fig. 26: Identifying Washer Pump Hose, Washer Pump Electrical Connector, & Washer Solvent Level Sensor

Courtesy of GENERAL MOTORS CORP.

1. Position the seal to the washer solvent container, pressing in until fully seated.
2. Position the washer solvent level sensor to the washer solvent container, pressing in until fully seated.
3. Connect the washer solvent level sensor electrical connector.
4. Install the right front fender liner. Refer to **Front Fender Liner Replacement**.
5. Fill the washer solvent container with washer solvent.

AIR INLET GRILLE PANEL REPLACEMENT

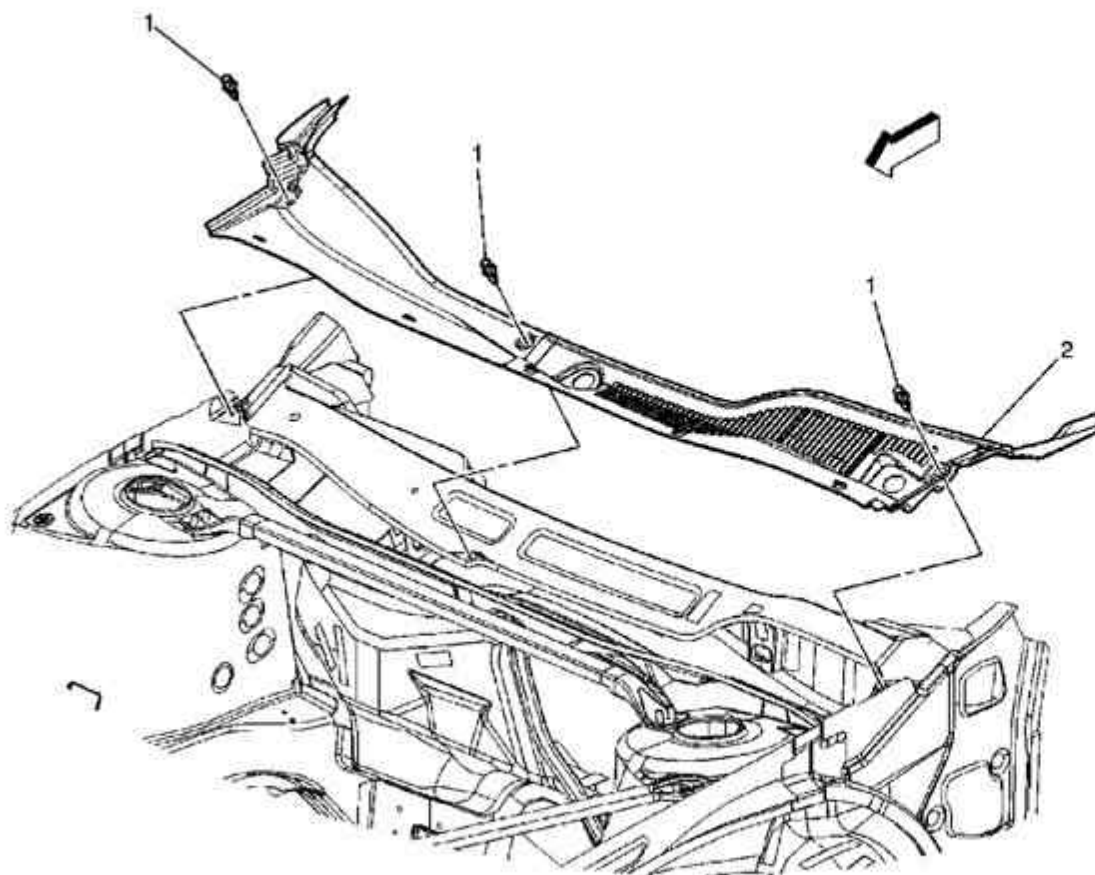


Fig. 27: Replacing Air Inlet Grille Panel
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
Preliminary Procedure:	
Remove wiper arms. Refer to <u>Windshield Wiper Arm Replacement</u> .	
1	Retainer, Air Inlet Grille Panel (Qty: 3)
2	Panel, Air Inlet Grille

WINDSHIELD WIPER ARM REPLACEMENT

Tools Required

J 39822 Wiper Arm Puller. See Special Tools.

Removal Procedure

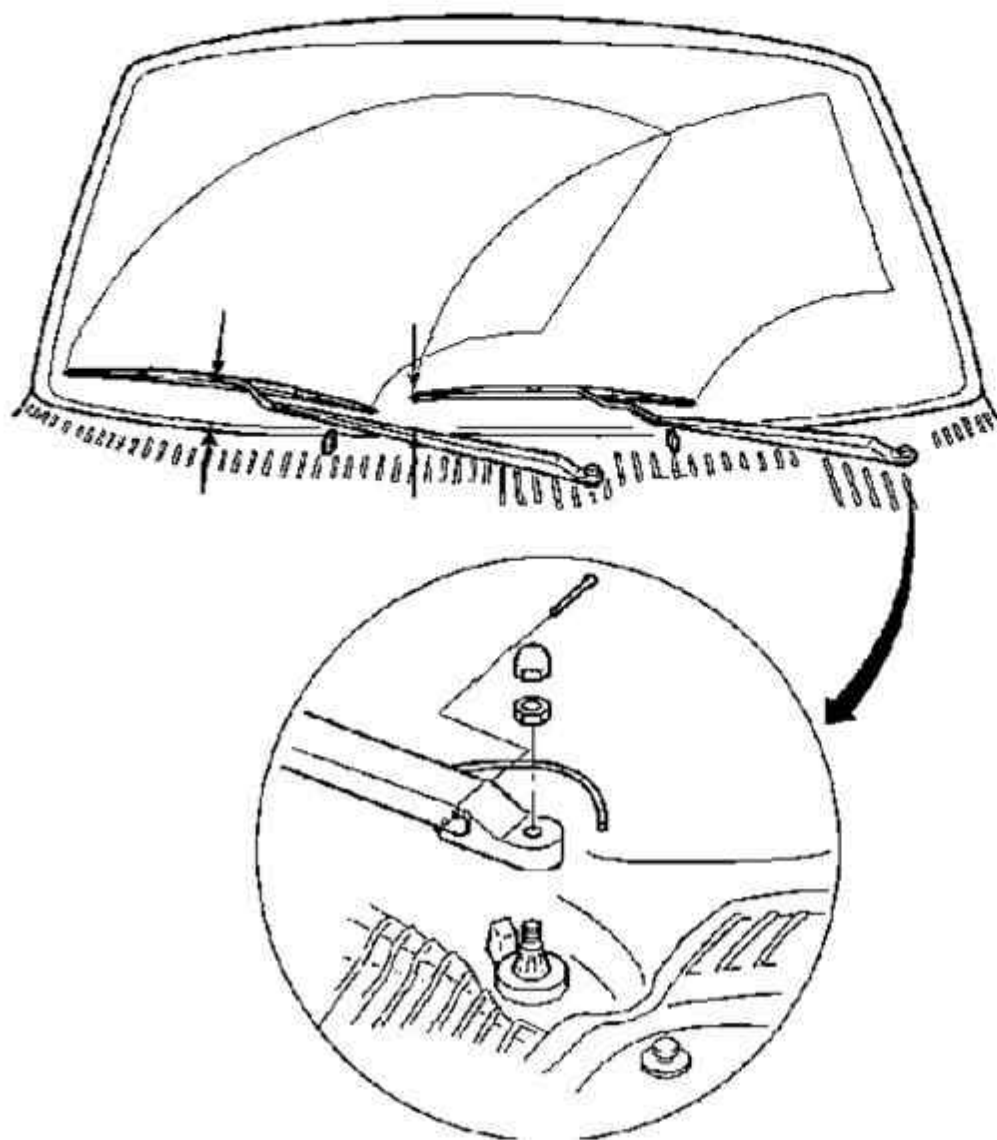


Fig. 28: View Of Wiper Arm Nut & Cover
Courtesy of GENERAL MOTORS CORP.

1. Ensure that the wipers are in the park position and the ignition key is OFF.
2. Open the hood.
3. Disconnect the washer hose from the wiper arm.
4. Remove the wiper arm nut cover.
5. Remove the wiper arm nut.
6. Use the **J 39822** to remove the wiper arm from the wiper transmission. See **Special Tools**.

Installation Procedure

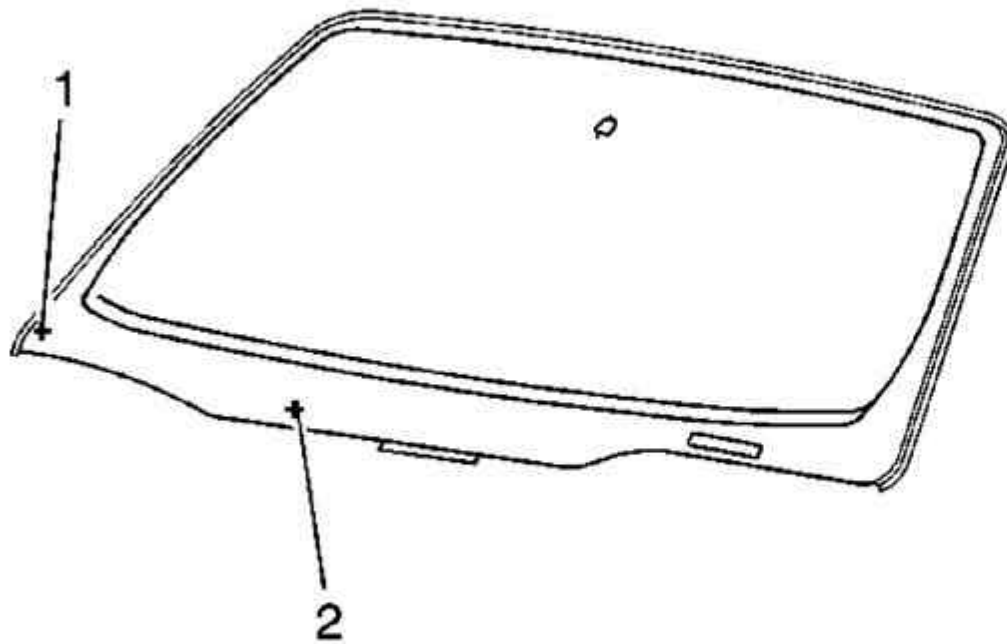


Fig. 29: Identifying Wiper Blades & Windshield Blackout
Courtesy of GENERAL MOTORS CORP.

1. Position the wiper arm onto the wiper transmission.
2. Align the wiper blades to the small voids in the windshield blackout (1 and 2).
3. Apply Threadlocking compound, GM P/N 89021297 (Canadian P/N 10953488) or equivalent, to the wiper arm nut.

NOTE: Refer to Fastener Notice .

4. Install the wiper arm nut.

Tighten: Tighten the nut to 30 N.m (22 lb ft).

5. Install the wiper arm nut cover.
6. Connect the washer hose to the wiper arm.
7. Operate the windshield wipers and inspect for proper operation.
8. Close the hood.

WINDSHIELD WIPER BLADE REPLACEMENT

Removal Procedure

1. Turn the ignition ON.
2. Turn the wiper switch to the DELAY position.
3. Turn the ignition OFF when the windshield wipers are in the midwipe position.

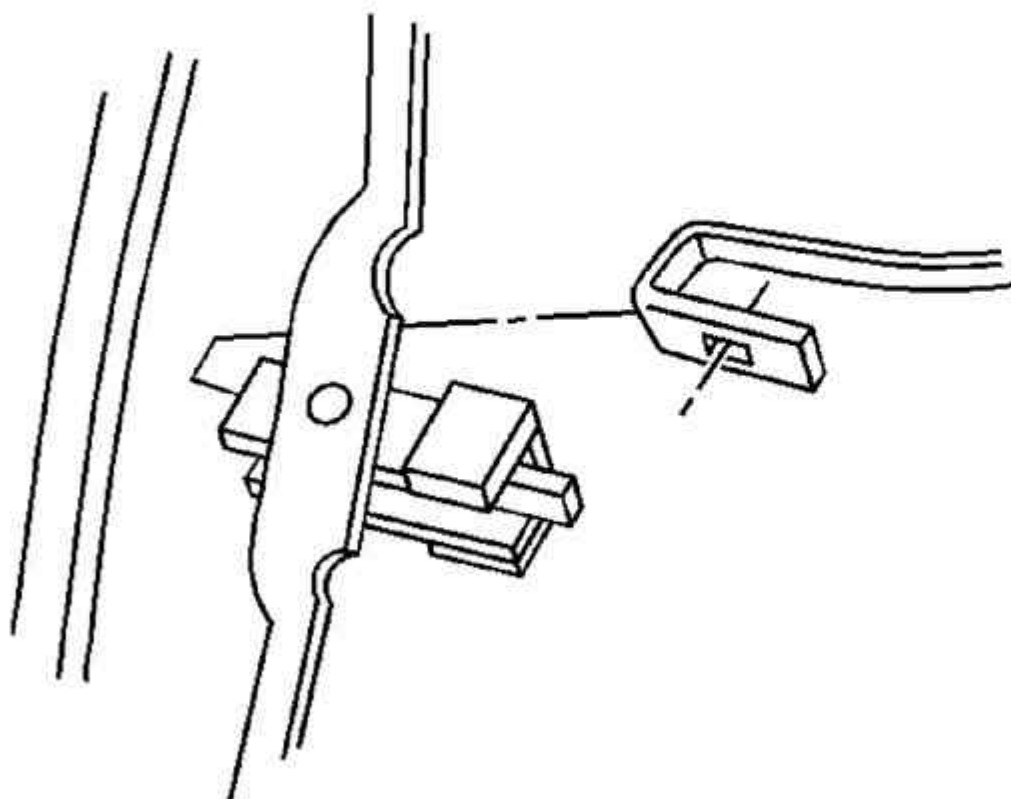


Fig. 30: Identifying Wiper Arm To Wiper Blade
Courtesy of GENERAL MOTORS CORP.

4. Press the wiper blade clip button in to release the wiper blade from the inside radius of the wiper arm.

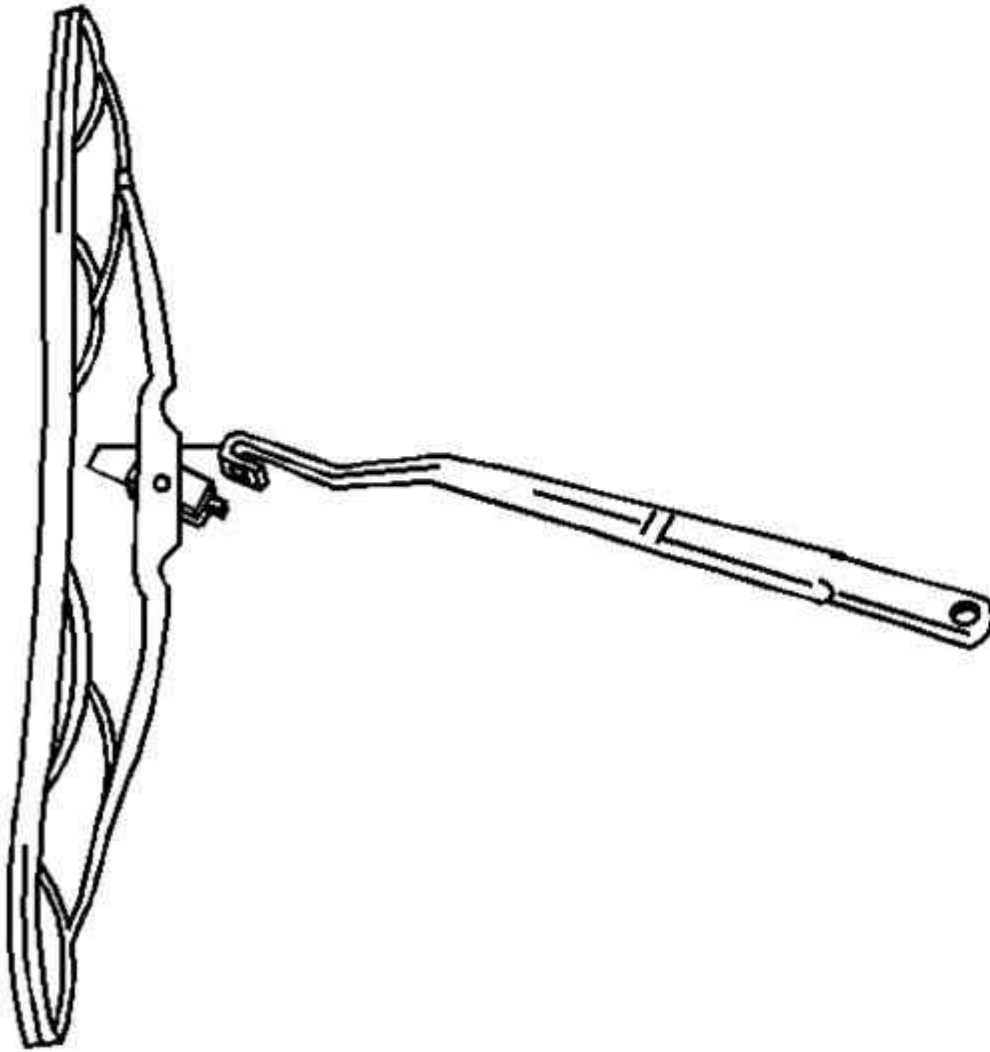


Fig. 31: View Of Wiper Arm Blade
Courtesy of GENERAL MOTORS CORP.

5. Remove the wiper arm out through the opening in the wiper blade.

Installation Procedure

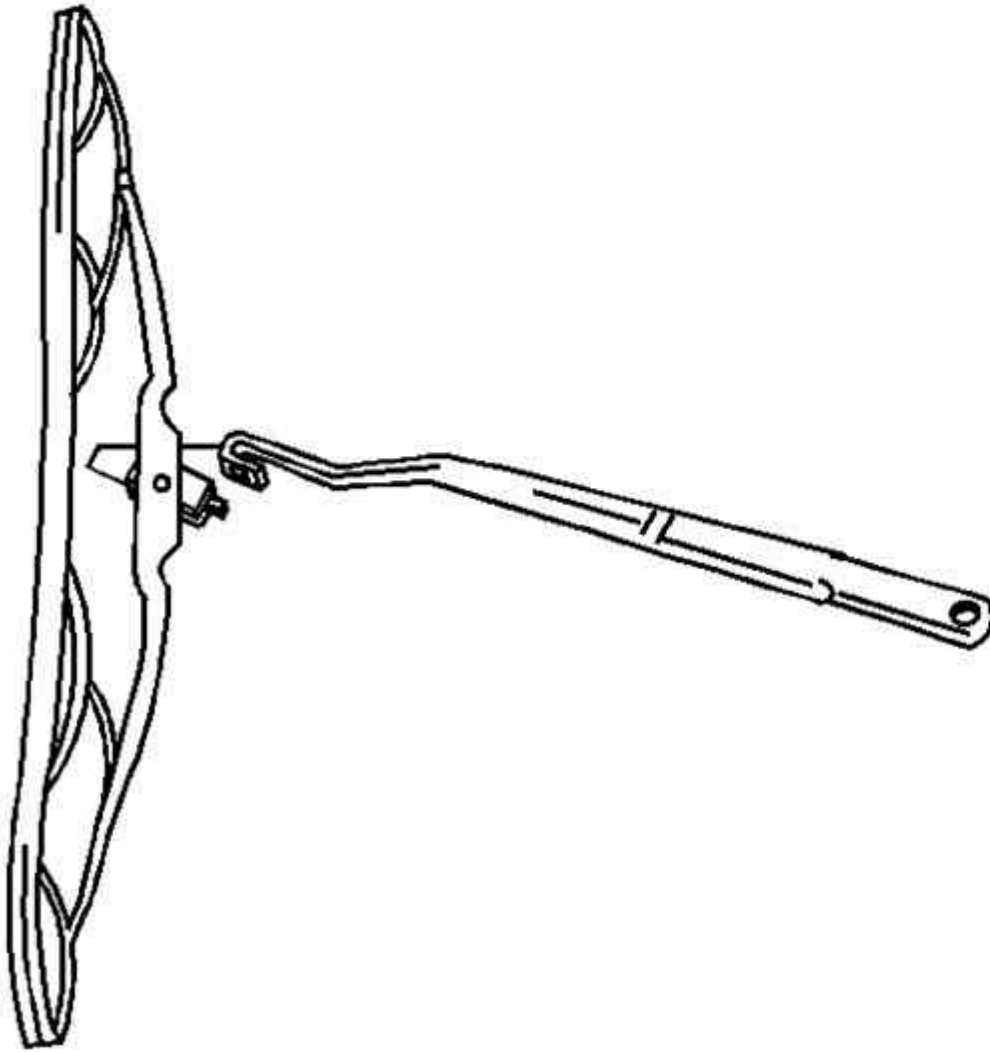


Fig. 32: View Of Wiper Arm Blade
Courtesy of GENERAL MOTORS CORP.

1. Install the hook of the wiper arm through the opening in the wiper blade.

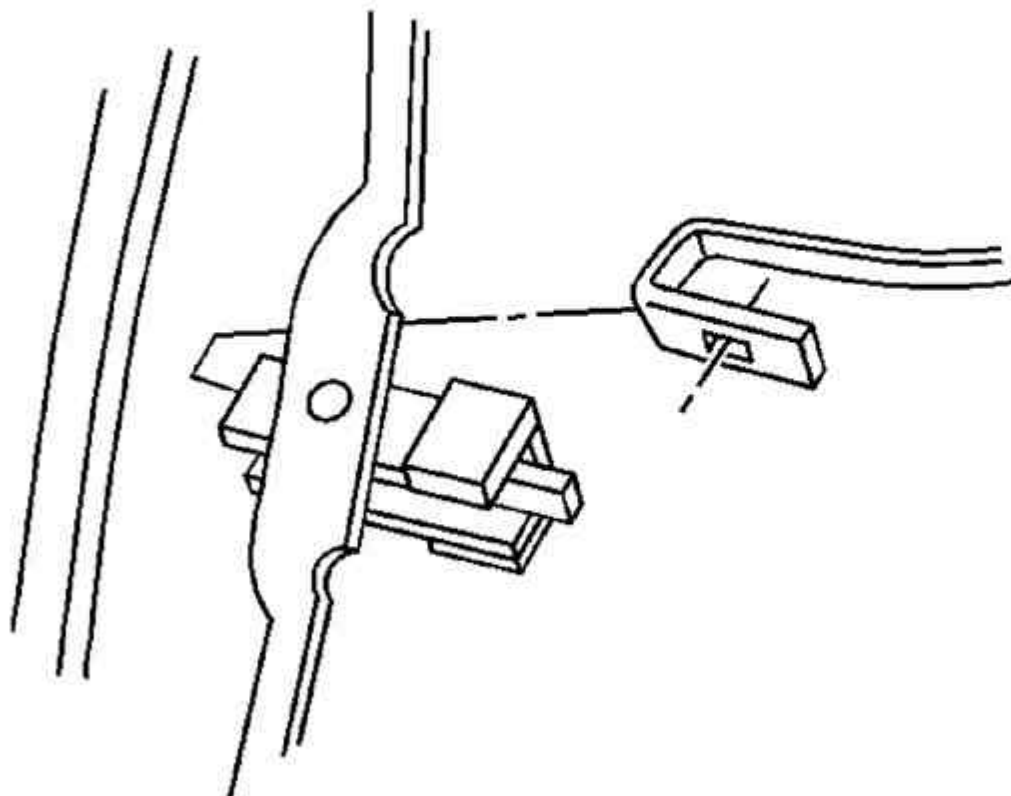


Fig. 33: Identifying Wiper Arm To Wiper Blade
Courtesy of GENERAL MOTORS CORP.

2. Position the wiper blade pivot in the inside radius of the wiper arm hook.
3. Press the wiper blade pivot into the wiper arm hook until the pivot locks into the hook.
4. Operate the windshield wipers and inspect for proper operation.

WIPER BLADE ELEMENT REPLACEMENT

Removal Procedure

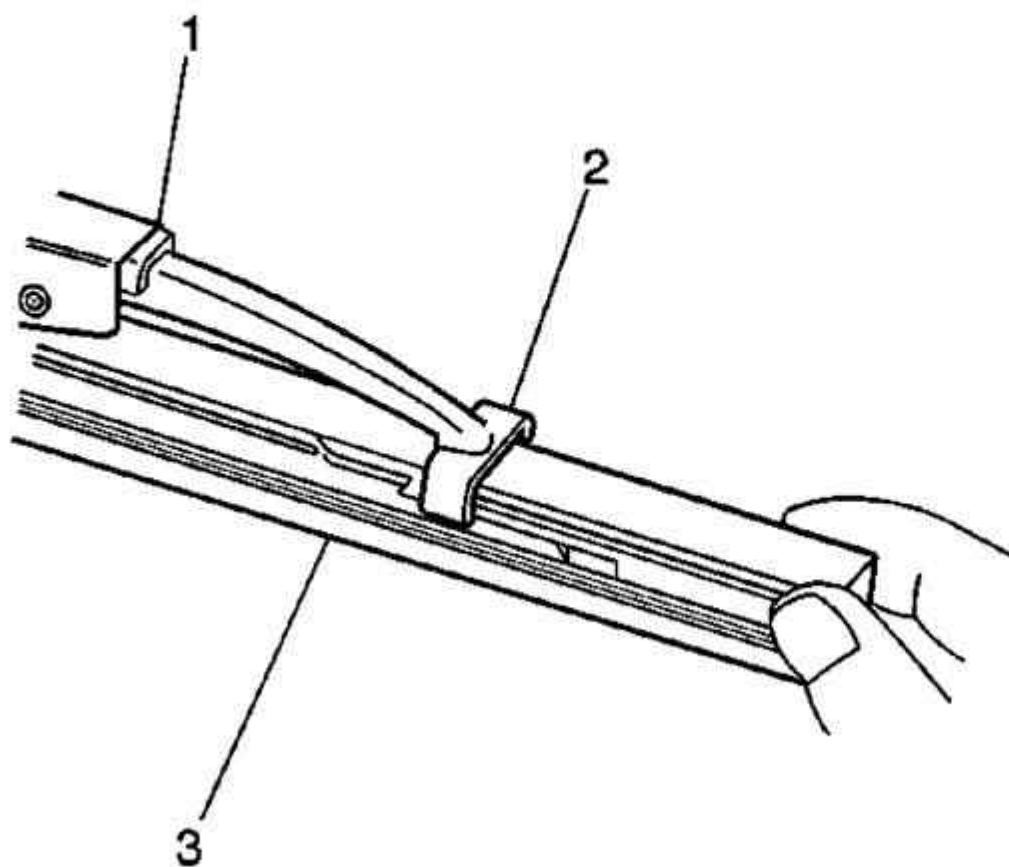


Fig. 34: Identifying Wiper Blade & Components
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Replace the wiper blade element if it is removed from the wiper blade.

1. Remove the wiper blade from the wiper arm. Refer to Windshield Wiper Blade Replacement.
2. Remove the bottom claws (2) of the wiper blade (1) from the notches in the wiper blade element (3).
3. Pull the wiper blade element (3) out through the wiper blade claws (2).

Installation Procedure

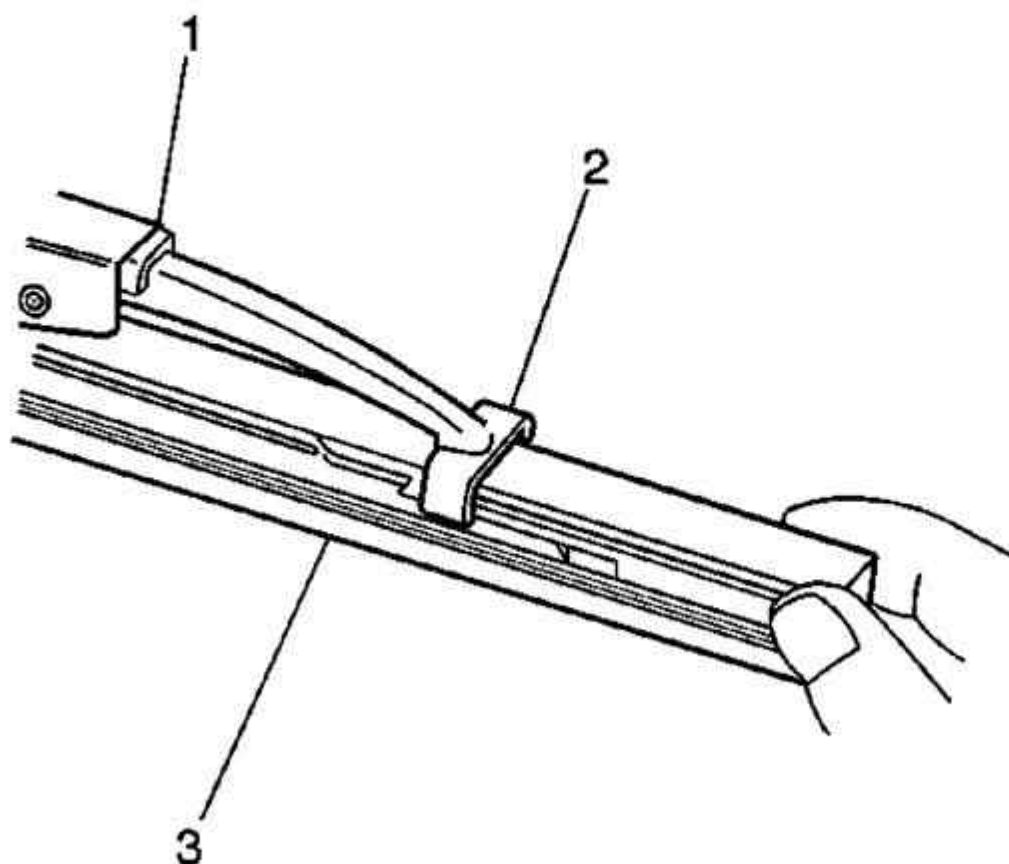


Fig. 35: Identifying Wiper Blade & Components
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Keep the wiper blade claws in the rubber claw channel of the wiper blade element. Do not allow the claws of the wiper blade to contact the metal spline of the wiper blade element.

1. Insert the open end of the wiper blade element (3) into the bottom claws of the wiper blade (2).
2. Guide the wiper blade element (3) through the wiper blade (1) claw sets.
3. Engage the bottom claw (2) of the wiper blade (1) into the notches in wiper blade element (3).
4. Install the wiper blade onto the wiper arm. Refer to Windshield Wiper Blade Replacement.

WIPER MOTOR CRANK ARM REPLACEMENT

Tools Required

- J 39232 Wiper Transmission Separator. See Special Tools.
- J 39529 Wiper Transmission Installer. See Special Tools.

Removal Procedure

1. Remove the air inlet grille panel. Refer to Air Inlet Grille Panel Replacement.

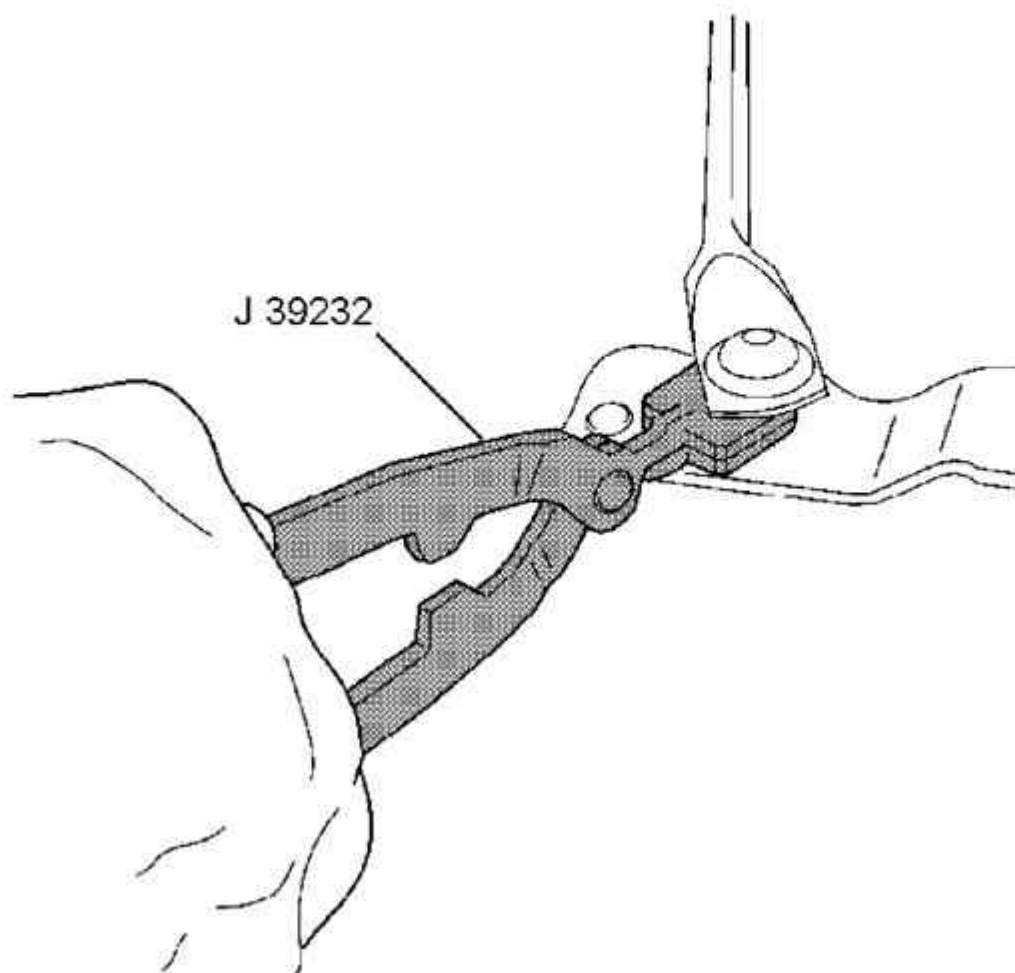


Fig. 36: Identifying Wiper Transmission & Wiper Motor Crank Arm
Courtesy of GENERAL MOTORS CORP.

2. Using the **J 39232** , disconnect the wiper transmission from the wiper motor crank arm.

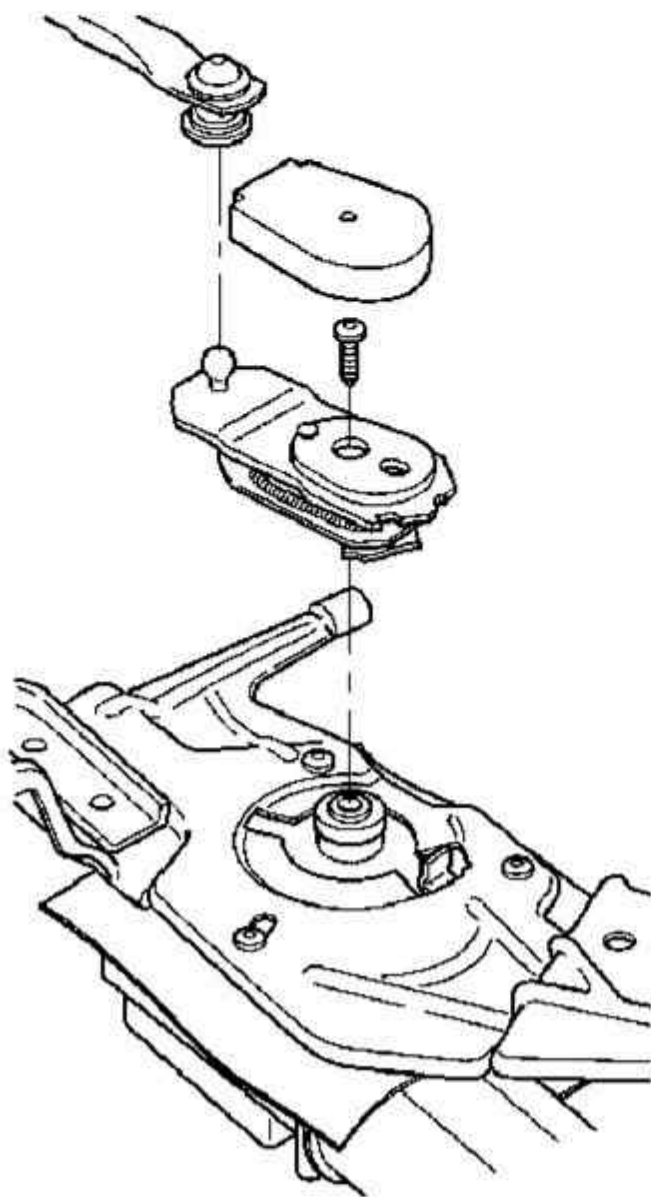


Fig. 37: View Of Wiper Motor Crank Arm Cover & Screw
Courtesy of GENERAL MOTORS CORP.

3. Remove the wiper motor crank arm cover.
4. Remove the wiper motor crank arm screw.
5. Remove the wiper motor crank arm from the wiper motor.

Installation Procedure

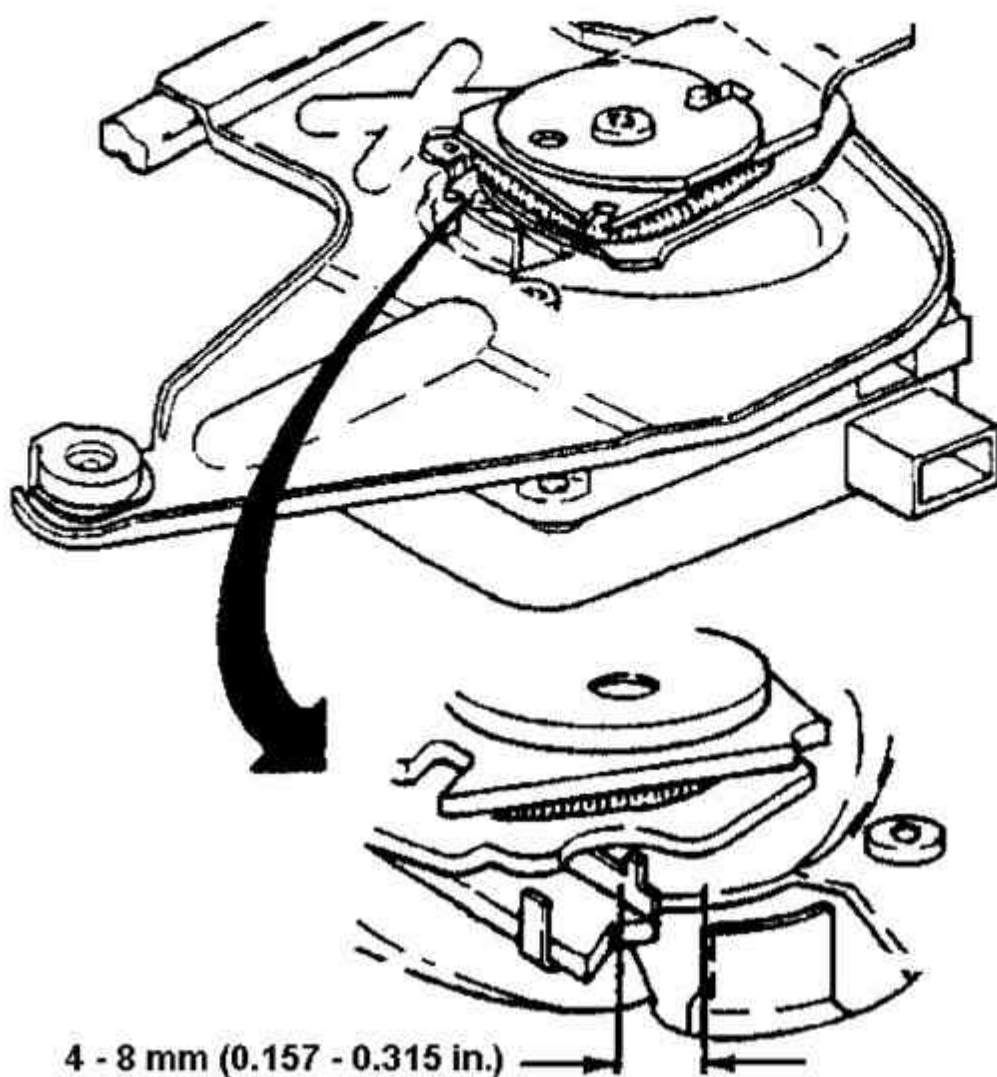


Fig. 38: Identifying Gap Between Wiper Motor Crank Arm & Tab
Courtesy of GENERAL MOTORS CORP.

1. Position the wiper motor crank arm onto the wiper motor.
2. Measure the gap between wiper motor crank arm and the bracket tab. If the gap is not 4-8 mm (0.157-0.314 in), remove the wiper motor crank arm and repeat installation.

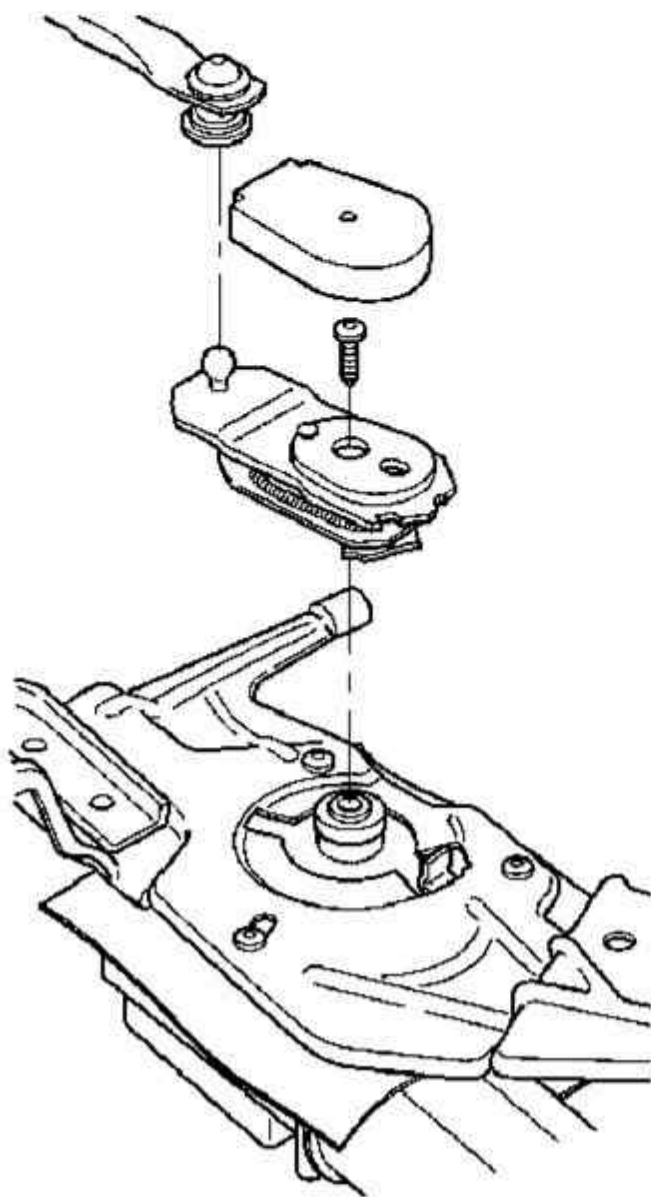


Fig. 39: View Of Wiper Motor Crank Arm Cover & Screw
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

3. Install the wiper motor crank arm screw.

Tighten: Tighten the screw to 16 N.m (12 lb ft).

4. Install the wiper motor crank arm cover.

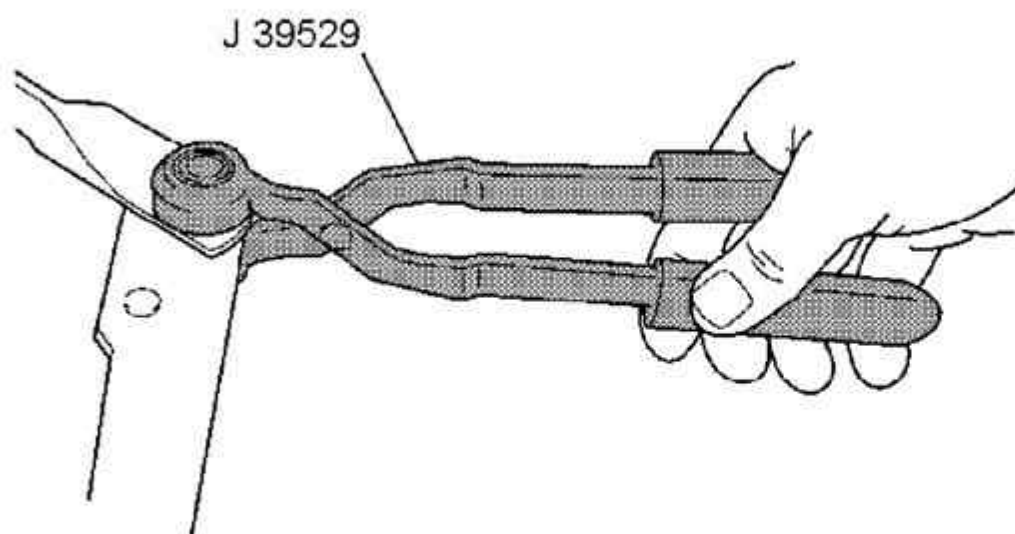


Fig. 40: Installing Wiper Transmission To Wiper Motor Crank Arm
Courtesy of GENERAL MOTORS CORP.

5. Using the **J 39529** , install the wiper transmission to the wiper motor crank arm.
6. Install the air inlet grille panel. Refer to **Air Inlet Grille Panel Replacement**.
7. Operate the windshield wipers and inspect for proper operation.

WINDSHIELD WIPER MOTOR REPLACEMENT

Removal Procedure

1. Remove the wiper drive system module. Refer to **Windshield Wiper System Module Replacement**.

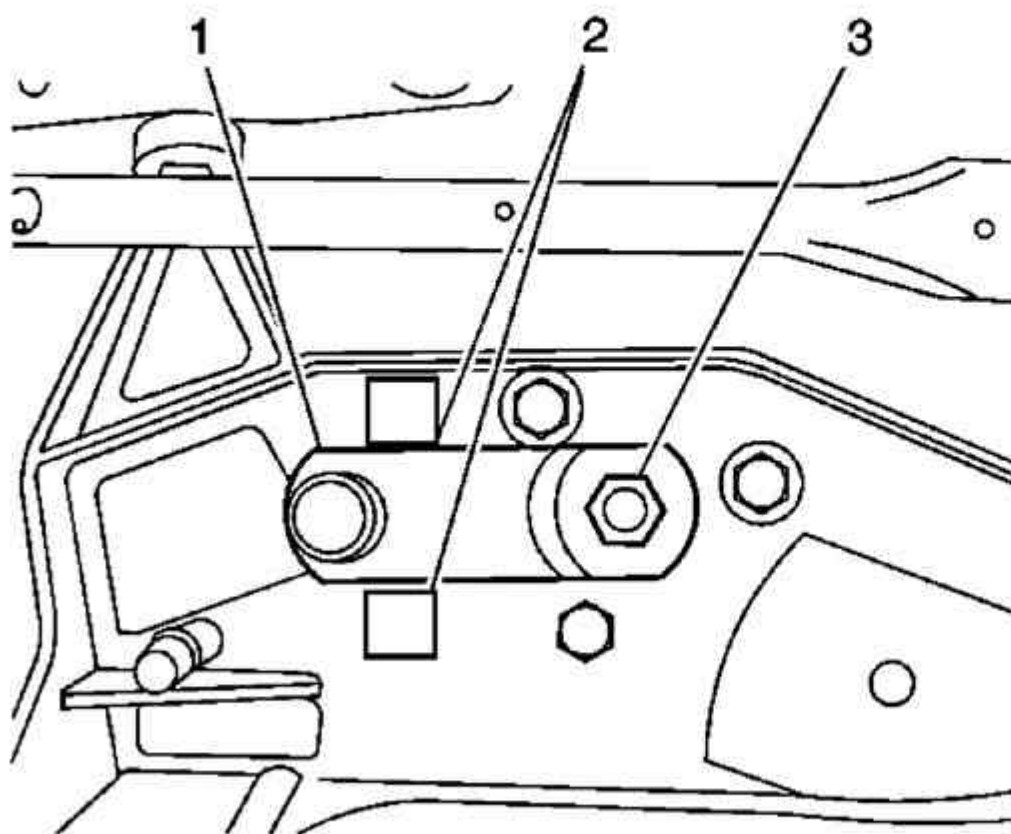


Fig. 41: Locating Wiper Crank Arm & Nut
Courtesy of GENERAL MOTORS CORP.

2. Remove the wiper crank arm nut (2) from the wiper motor shaft.
3. Remove the wiper crank arm (1) from the wiper motor shaft.

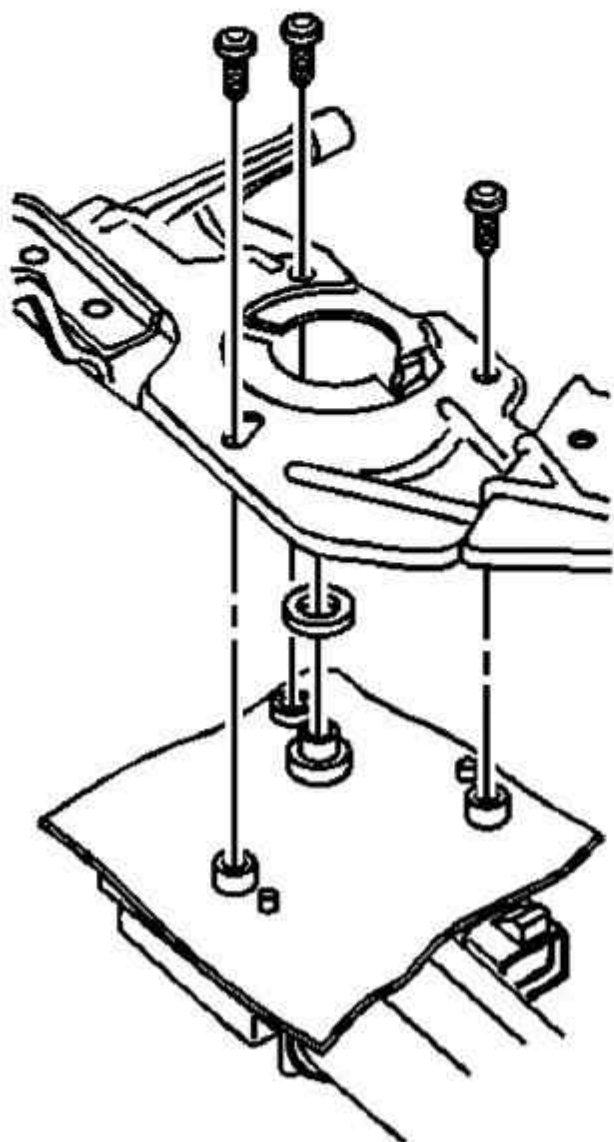


Fig. 42: View Of Wiper Motor Screws
Courtesy of GENERAL MOTORS CORP.

4. Remove the wiper motor screws from the wiper motor.
5. Remove the wiper motor from the wiper module.

Installation Procedure

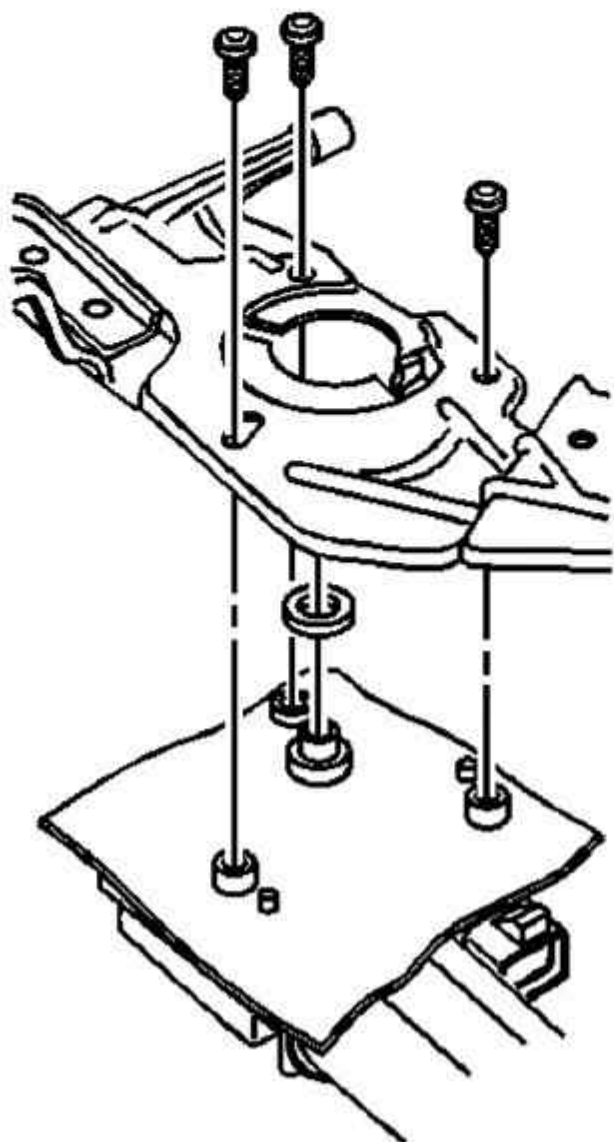


Fig. 43: View Of Wiper Motor Screws
Courtesy of GENERAL MOTORS CORP.

1. Position the wiper motor to the wiper drive system module.

NOTE: Refer to Fastener Notice .

2. Install the wiper motor screws.

Tighten: Tighten the screws to 7 N.m (62 lb in).

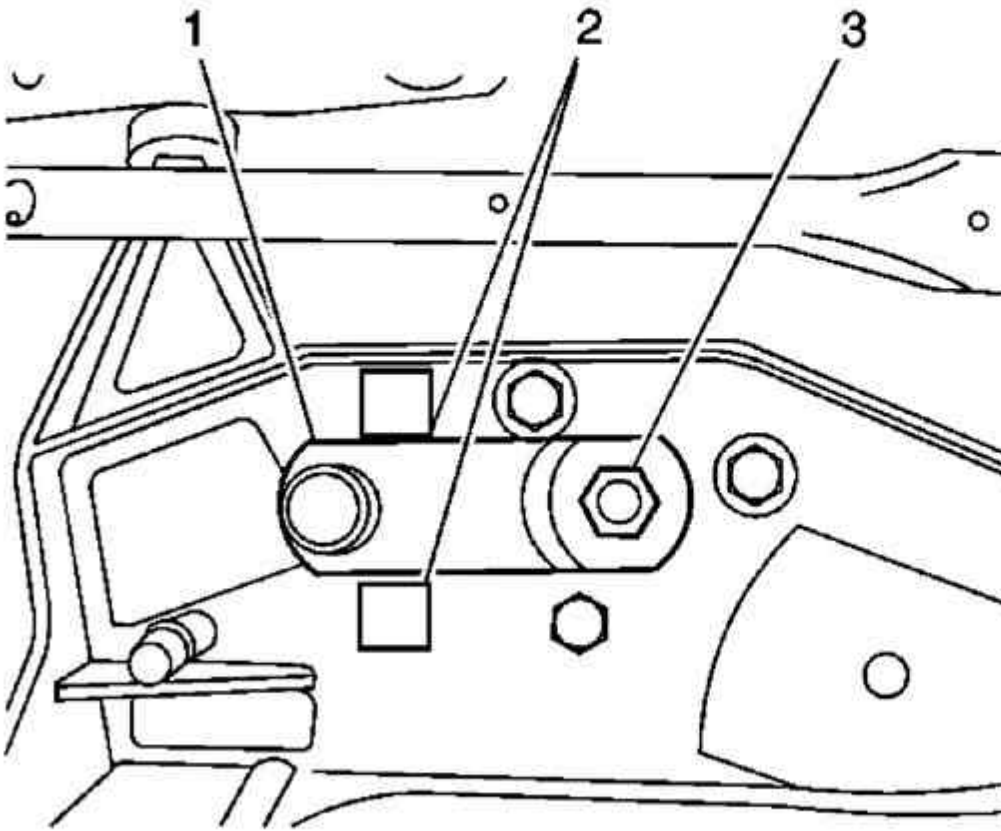


Fig. 44: Locating Wiper Crank Arm & Nut
Courtesy of GENERAL MOTORS CORP.

3. Install the wiper crank arm (1) to the wiper motor shaft.
4. Install the wiper crank arm nut (2) to the wiper motor shaft.

Tighten: Tighten the nut to 30 N.m (22 lb ft).

5. Install the wiper drive system module. Refer to Windshield Wiper System Module Replacement.

WINDSHIELD WIPER SYSTEM MODULE REPLACEMENT

Tools Required

- J 39232 Wiper Transmission Separator
- J 39529 Wiper Transmission Installer

Removal Procedure

1. Remove the air inlet grille panel. Refer to Air Inlet Grille Panel Replacement.

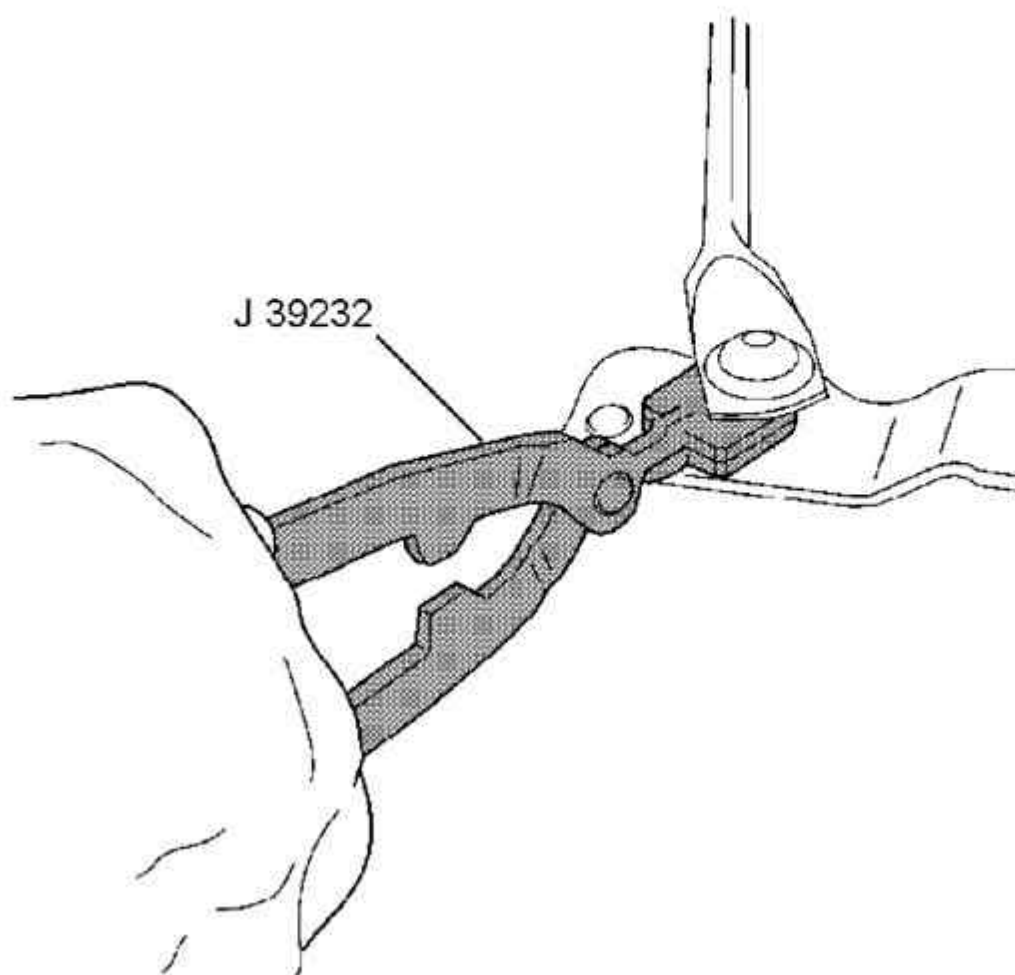


Fig. 45: Identifying Wiper Transmission & Wiper Motor Crank Arm
Courtesy of GENERAL MOTORS CORP.

2. Disconnect the wiper transmission link from the wiper motor crank arm using the **J 39232** .

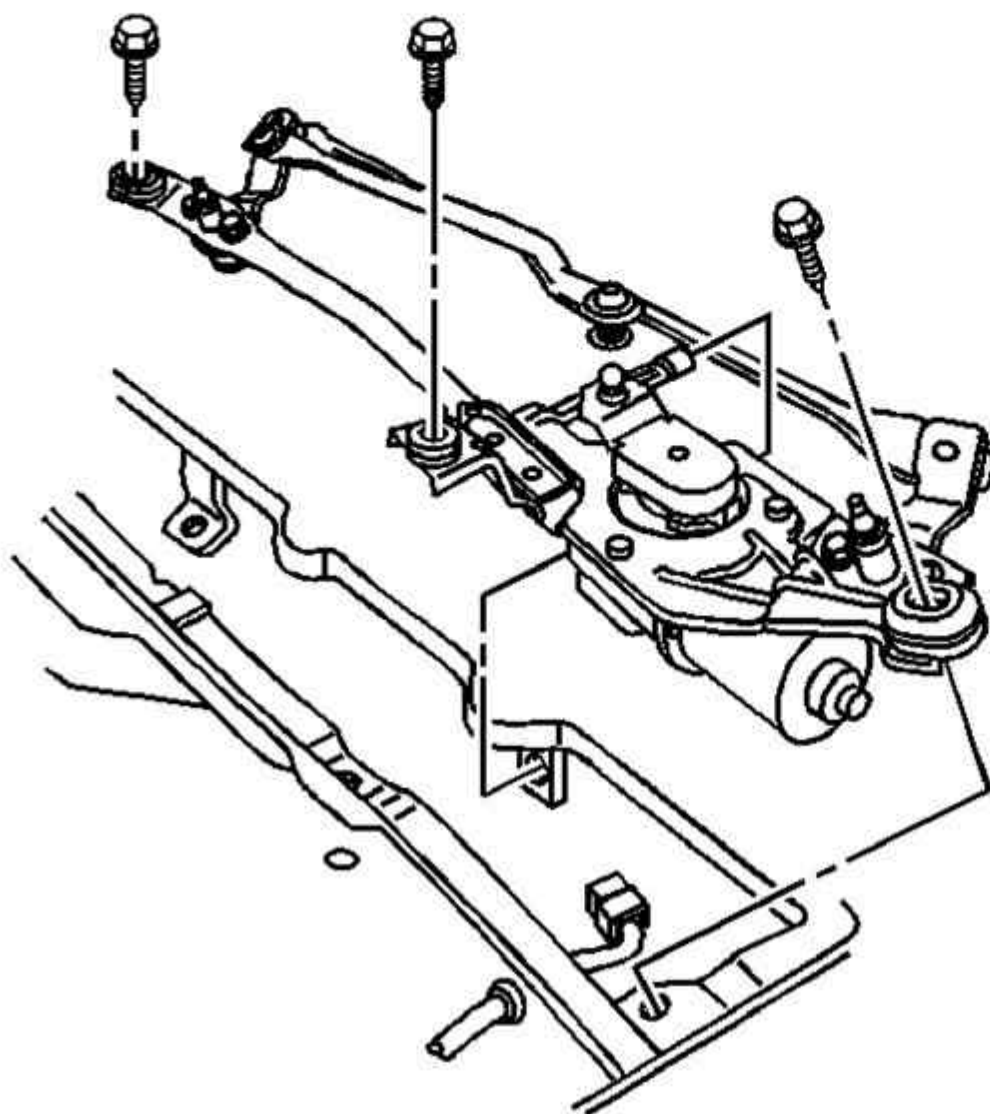


Fig. 46: View Of Wiper Drive System Module & Screws
Courtesy of GENERAL MOTORS CORP.

3. Remove the wiper drive system module screws.
4. Rotate the wiper drive system module to access the wiper motor electrical connector.
5. Disconnect the wiper motor electrical connector.
6. Remove the wiper drive system module from the vehicle.

Installation Procedure

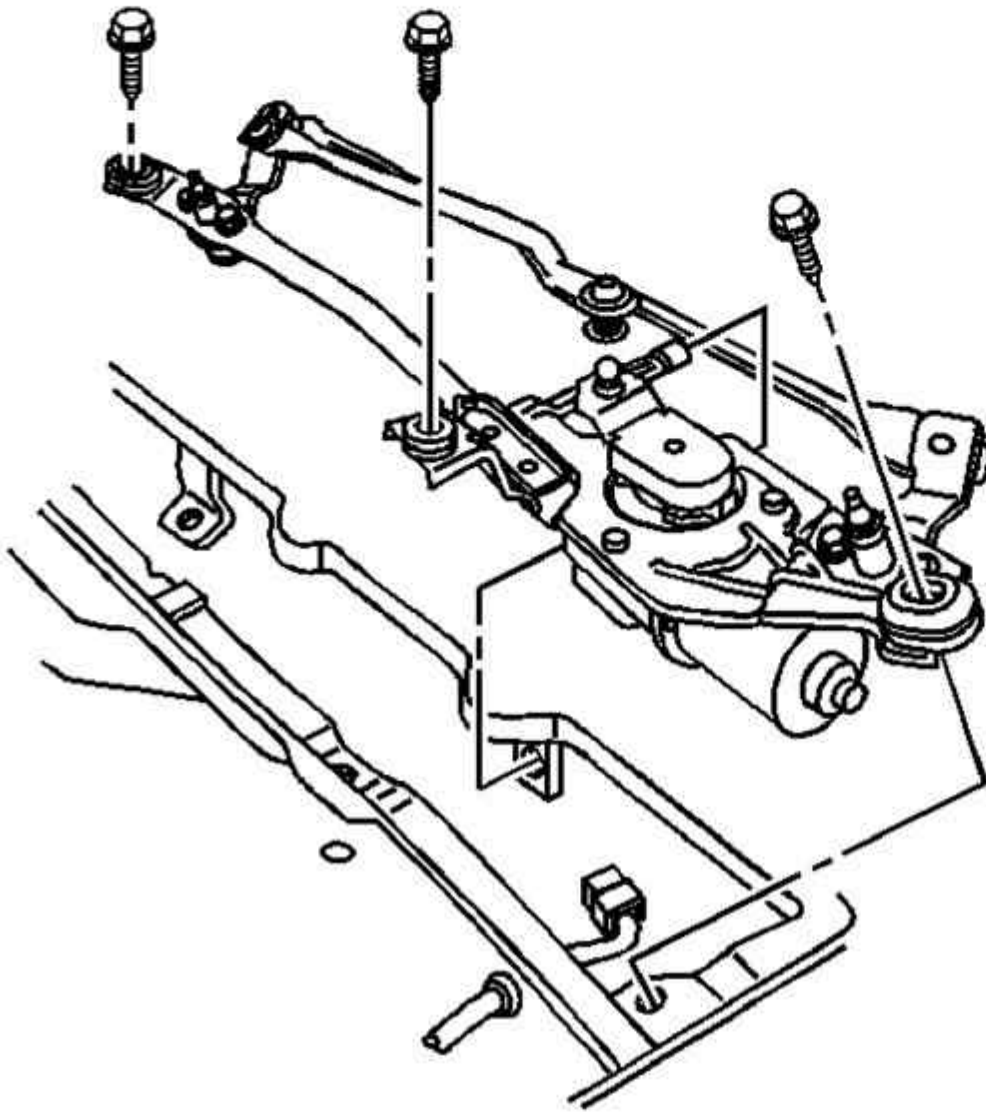


Fig. 47: View Of Wiper Drive System Module & Screws
Courtesy of GENERAL MOTORS CORP.

1. Position the wiper drive system module to the vehicle.
2. Connect the wiper motor electrical connector.
3. Rotate the wiper drive system module to the mounting position.

NOTE: Refer to Fastener Notice .

4. Install the wiper drive system module screws.

Tighten: Tighten the screws to 10 N.m (89 lb in).

5. Install the wiper transmission link to the wiper motor crank arm using the **J 39529** .
6. Install the air inlet grille panel. Refer to Air Inlet Grille Panel Replacement.
7. Inspect the wipers for proper operation.

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. Refer to **Windshield Glass Cleaning**.
- Clean the wiper blade elements. Refer to **Blade Element Cleaning**.
- Inspect the wiper blade element set.

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 relay
- WIPER HI relay
- Windshield wiper motor
- Windshield washer fluid level switch
- Windshield washer pump
- WIPER/WS 25A fuse
- WASHER/RVC 15A fuse

Wiper/Washer System Operation

The body control module (BCM) is part of the windshield wiper motor system and controls the wiper motor operation. The windshield wiper motor is a 2 speed motor. Windshield wiper intermittent operation is a low speed wiper motor function with a variable delay interval between the wipe cycles. The intermittent interval is controlled through a series of resistors within the wiper/washer switch. During intermittent wiper operation the windshield wiper switch low signal circuit is at the same circuit used for LOW operation.

Wiper/Washer System Description

Battery positive voltage is applied from the WIPER/WS fuse to the switch side of the WIPER relay. Battery positive voltage is also applied from the body control module (BCM) to the WIPER and WIPER HIGH relay coil circuits when commanded by the wiper switch.

Ground is applied continuously from G200 to windshield wiper motor and to the coil sides of the WIPER and WIPER HI relays. The BCM also provides a ground to the windshield wiper/washer switch.

Low Speed Operation

With the wiper switch in the low position, the body control module (BCM) detects a signal in the windshield wiper switch low signal circuit. The BCM then applies voltage to the WIPER relay control circuit. This energizes the WIPER relay and allows voltage to be applied through the switched contacts of the WIPER relay to the normally open switched contacts of the WIPER HI relay. Voltage is then applied from the WIPER HI relay normally open contacts to the low control circuit of the windshield wiper motor.

High Speed Operation

With the wiper switch in the high position, the body control module (BCM) receives two signals, one from the windshield wiper switch low signal circuit and one from the windshield wiper switch high signal circuit. When the BCM detects these two signals, the BCM then applies voltage to the wiper high speed relay control circuit. This energizes the WIPER relay and allows voltage to be applied from the switched contacts of the WIPER relay to the high control circuit of the wiper motor.

Intermittent Operation

Windshield wiper delay operation is a low speed wiper motor function which a variable delay interval between the wiper motor cycles. The delay interval is determined by a series of resistors within the wiper/washer switch. During delay wiper operation, the windshield wiper switch low signal is reduced through the delay resistors. The body control module (BCM) monitors 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.

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 windshield. The circuit will be pulled to ground by the wiper motor park switch while the windshield wiper motor is in operation. 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 cycled to the ON position. 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 in operation, the BCM will assume the wiper motor is stalled, and will de-energize the WIPER relay until the wiper switch is cycled off and on again.

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, ground is supplied through an internal resistor to the windshield wiper switch low signal circuit to the body control module (BCM). The BCM will energize the WIPER relay that operates the windshield wiper motor at low speed.

Washer Operation

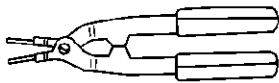
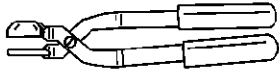
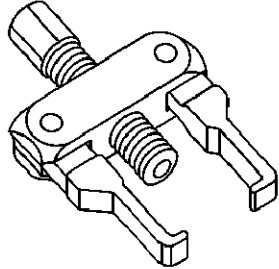
In the WASH position the windshield wiper/washer switch supplies a ground signal to the body control module (BCM) through the windshield washer switch signal circuit. The BCM will energize the WIPER relay that operates the windshield wiper motor at low speed and the BCM then applies voltage to the windshield washer fluid pump. The washer pump will function for as long as the washer switch is applied. The wiper motor will continue to operate for approximately 2 wipe cycles after the wash switch is released.

Low Washer Fluid Indicator

The low washer fluid indicator is located in the instrument panel cluster (IPC). Ground is applied at all times from G100 through the windshield washer fluid level switch, to the low washer fluid indicator signal circuit to the body control module (BCM). When the washer fluid is low, ground is removed from the low washer fluid indicator signal circuit to the BCM. The BCM then applies a message along the class 2 serial data circuit to the IPC. The IPC then illuminates the low washer fluid indicator.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/Description
	J 39232 Wiper Linkage Separator
	J 39529 Wiper Linkage Installer
	J 39822 Wiper Arm Puller

2008 Buick LaCrosse CXL
2008 ACCESSORIES & EQUIPMENT Wipers and Washers - LaCrosse

2008 Buick LaCrosse CXL
2008 ACCESSORIES & EQUIPMENT Wipers and Washers - LaCrosse

2008 Buick LaCrosse CXL
2008 ACCESSORIES & EQUIPMENT Wipers and Washers - LaCrosse

2008 Buick LaCrosse CXL
2008 ACCESSORIES & EQUIPMENT Wipers and Washers - LaCrosse

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2008 ACCESSORIES & EQUIPMENT Wipers and Washers - LaCrosse

2008 Buick LaCrosse CXL
2008 ACCESSORIES & EQUIPMENT Wipers and Washers - LaCrosse

2008 Buick LaCrosse CXL
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