

## Wiper/Washer System Description and Operation

### Wiper/Washer System Components

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

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

### Windshield Wiper System

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

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

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

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

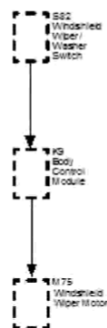
Parking the wiper motor, the BCM monitors the park circuit until the park switch pulls the park circuit to ground. At this time, the BCM will immediately deactivate the wiper motor on/off relay. The relay contacts will switch back to their normally closed position and will apply ground to the wiper motor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

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

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

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

#### Front Wiper Block Diagram

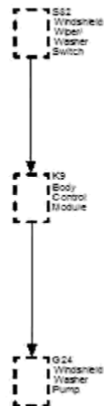


- (HW) Hard-Wired
- (HW) Hard-Wired
- (S82) S82 Windshield Wiper/Washer Switch
- (K9) K9 Body Control Module
- (M75) M75 Windshield Wiper Motor

### Windshield Washer System

The windshield washer system contains a windshield washer pump, a windshield washer pump relay, windshield wiper/washer switch. the windshield washer pump is controlled by the body control module (BCM) via a removable relay. When the washer switch is depressed, the BCM monitors the signal circuit by the washer request circuit. The BCM then applies voltage through a control circuit to the removable windshield washer pump relay. With the relay energized, fused battery voltage is applied through the switch contacts of the relay and the control circuit to activate the windshield washer pump.

### Washers System Block Diagram

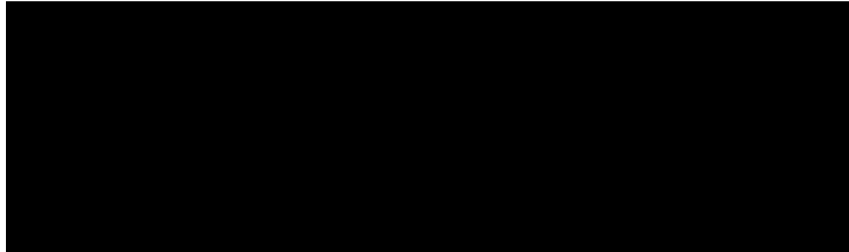
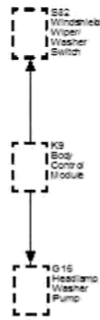


cardiagn.com

### Headlamp Washer System

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

### Headlamp Washer Pump Block Diagram



cardiagn.com

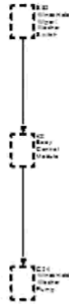
- (HW) Hard-Wired
- (HW) Hard-Wired
- (S82) S82 Windshield Wiper/Washer Switch
- (K9) K9 Body Control Module
- (G16) G16 Headlamp Washer Pump

#### Washer Fluid Level Indicator

The WASHER FLUID LOW ADD FLUID message is controlled by the instrument cluster using signal from the Windshield Washer Fluid level Sensor. The washer fluid level signal circuit is supplied voltage through a resistor then monitored within the instrument cluster. The Windshield Washer Fluid level Sensor is normally close so the instrument cluster detects voltage on the Windshield Washer Fluid level Sensor signal circuit whenever the washer fluid level sensor is not low. When the washer fluid reaches the point where the driver should be informed that the washer fluid is low, the washer fluid level sensor opens. When the washer fluid level sensor is closed the washer fluid level signal circuit voltage is pulled low, and the instrument cluster displays the WASHER FLUID LOW ADD FLUID message on the driver information center. In order to prevent the WASHER FLUID LOW ADD FLUID message from being displayed while sloshing is occurring in the washer fluid container, the instrument cluster is programmed with a 1 min delay before changing states of the check washer fluid message during an ignition cycle.

#### Front Washer-Washer Fluid Level Block Diagram

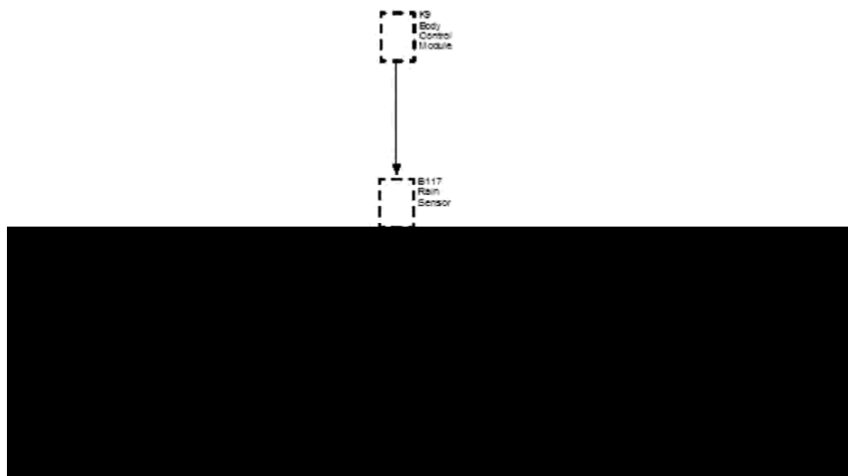




- (HW) Hard-Wired  
 (HW) Hard-Wired  
 (S82) S82 Windshield Wiper/Washer Switch  
 (K9) K9 Body Control Module  
 (G24) G24 Windshield Washer Pump

#### Rain Sensor Indicator

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

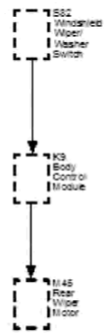


### Rear Wiper System

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

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

### Rear Wiper Block Diagram



(HW) Hard-Wired

(HW) Hard-Wired

(S82) S82 Windshield Wiper/Washer Switch

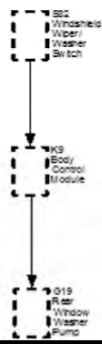
(K9) K9 Body Control Module

(M45) M45 Rear Wiper Motor

#### Rear Washer System

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

#### Rear Washer Block Diagram



- (HW) Hard-Wired  
(HW) Hard-Wired  
(S82) S82 Windshield Wiper/Washer Switch  
(K9) K9 Body Control Module  
(G19) G19 Rear Window Washer Pump

## DTC B370A

### 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 B370A

Rain Sensor

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

### Diagnostic Fault Information

| Circuit                 | Short to Ground | Open/High Resistance | Short to Voltage | Signal Performance |
|-------------------------|-----------------|----------------------|------------------|--------------------|
| B+                      | U151A           | U151A                | —                | —                  |
| Serial Data             | U151A           | U151A                | U151A            | —                  |
| Ground                  | —               | U151A                | —                | —                  |
| Rain Sensor Malfunction |                 |                      |                  |                    |

### Circuit/System Description

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

### Conditions for Running the DTC

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

### Conditions for Setting the DTC

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

### Action Taken When the DTC Sets

- If the BCM loses communication with the rain sensor while operating under manual 1X control, the windshield wiper operation will default to intermittent operation with a fixed dwell time of 4 s.
- If the BCM loses communication with the rain sensor while operating at low speed, the windshield wiper operation will default to low speed.

© 2014 General Motors. All rights reserved.

- If the BCM loses communication with the rain sensor while operating at high speed, the windshield wiper operation will default to high speed.

### **Conditions for Clearing the DTC**

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

### **Reference Information**

#### **Schematic Reference**

[Wiper/Washer Schematics](#)

#### **Connector End View Reference**

[Component Connector End Views](#)

#### **Description and Operation**

[Wiper/Washer System Description and Operation](#)

#### **Electrical Information Reference**

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

#### **Scan Tool Reference**

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

### **Circuit/System Verification**

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

### **Circuit/System Testing**

1. Ignition OFF, all vehicle systems OFF, disconnect the harness connector at the B117 Rain Sensor. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10  $\Omega$  between the ground circuit terminal 3 and ground.  
⇒ **If 10  $\Omega$  or greater**
  - 2.1. Ignition OFF.
  - 2.2. Test for less than 2  $\Omega$  in the ground circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.

↓ **If less than 10  $\Omega$**

3. Ignition ON.

4. Verify a test lamp illuminates between the B+ circuit terminal 1 and ground.

⇒ **If the test lamp does not illuminate and the circuit fuse is good**

4.1. Ignition OFF, remove the test lamp.

4.2. Test for less than 2  $\Omega$  in the B+ circuit end to end.

⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.

⇒ If less than 2  $\Omega$ , verify the fuse is not open and there is voltage at the fuse.

⇒ **If the test lamp does not illuminate and the circuit fuse is open**

4.1. Ignition OFF, remove the test lamp.

4.2. Test for infinite resistance between the B+ circuit and ground.

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

⇒ If infinite resistance, replace the B117 Rain Sensor.

↓ **If the test lamp illuminates**

5. Test for 5.0–10.0 V between the serial data circuit terminal 2 and ground.

⇒ **If less than 5.0 V**

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

5.2. Test for infinite resistance between the serial data circuit and ground.

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

↓ If infinite resistance

5.3. Test for less than 2  $\Omega$  in the serial data circuit end to end.

⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.

⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.

⇒ **If greater than 10.0 V**

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

5.2. Test for less than 1 V between the serial data circuit and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

⇒ If less than 1 V, replace the K9 Body Control Module.

↓ **If between 5.0–10.0 V**

6. Test or replace the B117 Rain Sensor.

### **Repair Instructions**

- Perform the [Diagnostic Repair Verification](#) after completing the repair.
- [Windshield Outside Moisture and Headlamp Automatic Control Ambient Light Sensor Replacement](#)
- [Control Module References](#) for body control module replacement, programming and setup.

## DTC B370B

### Diagnostic Instructions

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

### DTC Descriptor

#### DTC B370B

Rear Wiper Function Control Circuit

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

### Diagnostic Fault Information

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

### Circuit/System Description

The rear wiper motor is controlled by the body control module (BCM) via a removable relay. When low speed rear window wiper operation is requested, the BCM will apply voltage to the rear wiper motor relay control. This will cause the contacts in the rear window wiper relay to close and apply B+ to the rear wiper motor through the rear windshield wiper low speed control circuit, enabling low speed rear wiper operation. When high speed rear window wiper operation is requested, the BCM continues to apply voltage to the rear wiper motor relay control circuit and also applies ground to the rear wiper motor relay coil control circuit. This will cause the rear window wiper relay to close and apply B+ to the rear wiper motor.

### Conditions for Running the DTC

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

### Conditions for Setting the DTC

A short to ground or an open/high resistance is detected in the rear window wiper control circuit.

### Action Taken When the DTC Sets

Rear wiper operation is suspended.

### Conditions for Clearing the DTC

A current DTC clears when the diagnostic runs and passes.

### Reference Information

© 2014 General Motors. All rights reserved.



**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](#)****DTC B370B**

1. Ignition OFF and all vehicle systems OFF, disconnect the KR7 Rear Wiper Relay. It may take up to 2 min for all vehicle systems to power down.
  2. Test for less than 10  $\Omega$  between the ground circuit terminal listed below and ground.
    - Terminal 86
    - Terminal 87A
- ⇒ **If 10  $\Omega$  or greater**
- 2.1. Ignition OFF.
  - 2.2. Test for less than 2  $\Omega$  in the ground circuit end to end.
    - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
    - ⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.
- ⇓ **If less than 10  $\Omega$**
3. Ignition ON.
  4. Verify a test lamp illuminates between the B+ circuit terminal 87 and ground.
- ⇒ **If the test lamp does not illuminate and the circuit fuse is good**
- 4.1. Replace the X50A Fuse Block – Underhood.
- ⇒ **If the test lamp does not illuminate and the circuit fuse is open**
- 4.1. Ignition OFF, remove the test lamp. Disconnect the harness connector at the M45 Rear Wiper Motor.
  - 4.2. Test for infinite resistance between the terminal 30 control circuits and ground.
    - ⇒ If less than infinite resistance, repair the short to ground on the circuit.
    - ⇒ If infinite resistance, replace the KR7 Rear Wiper Relay
5. Ignition ON, connect a test lamp between the control circuit terminal 85 and the ground circuit terminal 86.
  6. Verify the test lamp turns ON and OFF when commanding the Rear Wiper Relay Active and Inactive with a scan tool.
- ⇒ **If the test lamp is always OFF**
- 6.1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
  - 6.2. Install a 3 A fused jumper wire between the control circuit terminal 10 X4 and B+.

6.3. Test for infinite resistance between the control circuit and ground.

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

⇓ If infinite resistance

6.4. Test for less than 2  $\Omega$  in the control circuit end to end.

⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.

⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.

⇒ **If the test lamp is always ON**

6.1. Ignition OFF, remove the test lamp, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.

6.2. Test for less than 1 V between the control circuit terminal 10 X4 and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

⇒ If less than 1 V, replace the K9 Body Control Module.

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

7. Test or replace the KR7 Rear Wiper Relay

### **Repair Instructions**

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

- [Accessory Wiring Junction Block Replacement](#)
- [Relay Replacement](#)
- [Control Module References](#) for BCM replacement, programming and setup

## DTC B3715 or B3875

### Diagnostic Instructions

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

### DTC Descriptors

#### DTC B3715

Windshield Wiper Relay Circuit

#### DTC B3875

Windshield Wiper High Speed Relay Circuit

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

### Diagnostic Fault Information

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

### Circuit/System Description

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

### Conditions for Setting the DTC

#### B3715 01

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

**B3715 02**

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

**B3715 04**

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

**B3875 01**

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

**B3875 02**

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

**B3875 04**

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

**Action Taken When the DTC Sets**

The BCM will not activate the wiper output.

**Conditions for Clearing the DTC**

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

**Reference Information****Schematic Reference**

[Wiper/Washer 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****DTC B3715**

1. Ignition OFF and all vehicle systems OFF, disconnect the KR12B Windshield Wiper Relay. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10  $\Omega$  between the ground circuit terminal listed below and ground.
  - Terminal 1
  - Terminal 4

⇒ **If 10  $\Omega$  or greater**

- 2.1. Ignition OFF.

- 2.2. Test for less than  $2\ \Omega$  in the ground circuit end to end.
  - ⇒ If  $2\ \Omega$  or greater, repair the open/high resistance in the circuit.
  - ⇒ If less than  $2\ \Omega$ , repair the open/high resistance in the ground connection.

↓ **If less than  $10\ \Omega$**

- 3. Ignition ON. Connect a test lamp between the control circuit terminal 2 and the ground circuit terminal 1.
- 4. Verify the test lamp turns ON and OFF when commanding the Windshield Wiper Motor Relay Low and Stop with a scan tool.
  - ⇒ **If the test lamp is always OFF**
    - 4.1. Ignition OFF, remove the test lamp, disconnect the X4 harness connector at the K9 Body Control Module.
    - 4.2. Test for infinite resistance between the control circuit and ground.
      - ⇒ If less than infinite resistance, repair the short to ground on the circuit.
    - ↓ If infinite resistance
    - 4.3. Test for less than  $2\ \Omega$  in the control circuit end to end.
      - ⇒ If  $2\ \Omega$  or greater, repair the open/high resistance in the circuit.
      - ⇒ If less than  $2\ \Omega$ , replace the K9 Body Control Module.
  - ⇒ **If the test lamp is always ON**
    - 4.1. Ignition OFF, remove the test lamp, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
    - 4.2. Test for less than 1 V between the control circuit 16 X4 and ground.
      - ⇒ If 1 V or greater, repair the short to voltage on the circuit.
      - ⇒ If less than 1 V, replace the K9 Body Control Module.

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

- 5. Test or replace the KR12B Windshield Wiper Relay.

### DTC B3875

- 1. Ignition OFF and all vehicle systems OFF, disconnect the KR12C Windshield Wiper Speed Control Relay.
- 2. Verify a test lamp illuminates between the B+ circuit terminal 2 and ground.
  - ⇒ **If the test lamp does not illuminate**  
Replace the X50A Fuse Block – Underhood.
  - ↓ **If the test lamp illuminates**
- 3. Ignition ON. Connect a test lamp between the control circuit terminal 1 and the B+ circuit terminal 2.
- 4. Verify the test lamp turns ON and OFF when commanding the Windshield Wiper Motor Relay High and Stop with a scan tool.
  - ⇒ **If the test lamp is always OFF**
    - 4.1. Ignition OFF, remove the test lamp, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
    - 4.2. Test for less than 1 V between the control circuit and ground.
      - ⇒ If 1 V or greater, repair the short to voltage on the circuit.
    - ↓ If less than 1 V
    - 4.3. Ignition OFF.
    - 4.4. Test for less than  $2\ \Omega$  in the control circuit end to end.
      - ⇒ If  $2\ \Omega$  or greater, repair the open/high resistance in the circuit.
      - ⇒ If less than  $2\ \Omega$ , replace the K9 Body Control Module.
  - ⇒ **If the test lamp is always ON**

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

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

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

#### **Repair Instructions**

- Perform the [Diagnostic Repair Verification](#) after completing the repair.
- [Relay Replacement](#)
- [Control Module References](#) for body control module replacement, programming and setup.

## DTC B371A

### 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 B371A 39

Windshield Wiper Motor Internal Malfunction

### Circuit/System Description

B+ voltage and ground are supplied to the windshield wiper motor. Whenever the ignition is ON or in accessory position, the body control module (BCM) sends the wiper/washer switch status through the LIN communication bus. If a fault occurs at any time in the windshield wiper motor, the BCM will set the DTC.

### Conditions for Running the DTC

The BCM runs the diagnostic to detect an internal fault when power up is commanded. The only requirements are voltage and ground. This diagnostic runs even if the voltage is out of the valid operating range.

### Conditions for Setting the DTC

The BCM receives an invalid signal from the windshield wiper motor.

### Action Taken When the DTC Sets

The BCM ignores all additional inputs.

### Conditions for Clearing the DTC

A current DTC clears when the diagnostic runs and passes.

### Reference Information

#### Schematic Reference

[Wiper/Washer Schematics](#)

#### Connector End View Reference

[Component Connector End Views](#)

#### Description and Operation

[Wiper/Washer System Description and Operation](#)

#### Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

#### Scan Tool Reference

© 2014 General Motors. All rights reserved.

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

#### **Circuit/System Verification**

1. Ignition ON.
2. Verify that there is no communications DTC set.  
⇒ **If there is a communications DTC set**  
Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#).  
↓ **If there is no communications DTC set**
3. Verify that DTC B371A is not set.  
⇒ **If DTC B371A is set**  
Replace the M75 Windshield Wiper Motor.  
↓ **If DTC B371A is not set**
4. All OK.

#### **Repair Instructions**

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

[Windshield Wiper Motor Replacement](#)



## DTC B3810

### 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 B3810 02

Headlamp Washer Relay Circuit Short to Ground

### Diagnostic Fault Information

| Circuit                                                         | Short to Ground | Open/High Resistance | Short to Voltage | Signal Performance |
|-----------------------------------------------------------------|-----------------|----------------------|------------------|--------------------|
| B+                                                              | —               | 1                    | —                | —                  |
| Headlamp Washer Pump Relay Control                              | B3810 02        | 1                    | 2                | —                  |
| Headlamp Washer Coil Relay Ground                               | —               | 1                    | —                | —                  |
| Headlamp Washer Pump Control                                    | 1               | 1                    | 2                | —                  |
| Headlamp Washer Pump Ground                                     | —               | 1                    | —                | —                  |
| 1. Headlamp Washer Inoperative<br>2. Headlamp Washers Always ON |                 |                      |                  |                    |

### Circuit/System Description

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

### Conditions for Running the DTC

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

### Conditions for Setting the DTC

A short to ground is detected in the headlamp washer pump relay control circuit.

### Action Taken When the DTC Sets

Washer operation is suspended.

### **Conditions for Clearing the DTC**

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

### **Diagnostic Aids**

The headlamp wash feature will only be activated if the low or high beam headlamps are active as well.

### **Reference Information**

#### **Schematic Reference**

[Wiper/Washer Schematics](#)

#### **Connector End View Reference**

[Component Connector End Views](#)

#### **Description and Operation**

[Wiper/Washer System Description and Operation](#)

#### **Electrical Information Reference**

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

#### **Scan Tool Reference**

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

### **Circuit/System Verification**

1. Ignition ON.
2. Verify the headlamps washers turn ON and OFF when commanding the Headlamp Washer Relay Command On and Off with a scan tool.  
⇒ **If the headlamp washers do not turn ON and OFF**  
Refer to Circuit/System Testing  
⇓ **If the headlamp washers turn ON and OFF**
3. All OK.

### **Circuit/System Testing**

1. Ignition OFF and all vehicle systems OFF, disconnect the KR2 Headlamp Washer Pump Relay. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10  $\Omega$  between the ground circuit terminal 85 and ground.  
⇒ **If 10  $\Omega$  or greater**
  - 2.1. Ignition OFF.
  - 2.2. Test for less than 2  $\Omega$  in the ground circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.
- ⇓ **If less than 10  $\Omega$**
3. Ignition ON.

4. Verify a test lamp illuminates between the B+ circuit terminal 30 and ground.  
⇒ **If the test lamp does not illuminate**
5. Replace the X50 Fuse Block-Underhood.  
↓ **If the test lamp illuminates**
6. Connect a test lamp between the control circuit terminal 86 and the ground circuit terminal 85.
7. Verify the test lamp turns ON and OFF when commanding the Headlamp Washer Relay Command On and Off with a scan tool.  
⇒ **If the test lamp is always OFF**
  - 7.1. Ignition OFF, remove the test lamp, disconnect the X5 harness connector at the K9 Body Control Module.
  - 7.2. Test for infinite resistance between the control circuit and ground.  
⇒ If less than infinite resistance, repair the short to ground on the circuit.  
↓ If infinite resistance
  - 7.3. Test for less than 2  $\Omega$  in the control circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.
- ⇒ **If the test lamp is always ON**
  - 7.1. Ignition OFF, remove the test lamp, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
  - 7.2. Test for less than 1 V between the control circuit and ground.  
⇒ If 1 V or greater, repair the short to voltage on the circuit.  
⇒ If less than 1 V, replace the K9 Body Control Module.
- ↓ **If the test lamp turns ON and OFF**
8. Verify that a test lamp does not illuminate between the control circuit terminal 87 and ground.  
⇒ **If the test lamp illuminates**  
Repair the short to voltage on the control circuit  
↓ **If the test lamp does not illuminate**
9. Ignition OFF and all vehicle systems OFF, remove the test lamp, disconnect the harness connector at the G16 Headlamp Washer Pump. It may take up to 2 min for all vehicle systems to power down.
10. Test for less than 10  $\Omega$  between the ground circuit terminal 2 and ground.  
⇒ **If 10  $\Omega$  or greater**
  - 10.1. Ignition OFF.
  - 10.2. Test for less than 2  $\Omega$  in the ground circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.
- ↓ **If less than 10  $\Omega$**
11. Connect the harness connector at the G16 Headlamp Washer Pump.
12. Ignition ON, connect a 3 A fused jumper wire between the B+ circuit terminal 30 and the control circuit terminal 87.
13. Verify the G16 Headlamp Washer Pump is activated.  
⇒ **If the G16 Headlamp Washer Pump does not activate**
  - 13.1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the G16 Headlamp Washer Pump.
  - 13.2. Test for infinite resistance between the control circuit terminal 1 and ground.

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

⇓ If infinite resistance

13.3. Test for less than  $2\ \Omega$  in the control circuit end to end.

⇒ If  $2\ \Omega$  or greater, repair the open/high resistance in the circuit.

⇒ If less than  $2\ \Omega$ , test or replace the G16 Headlamp Washer Pump.

⇓ **If the G16 Headlamp Washer Pump activates**

14. Test or replace the KR2 Headlamp Washer Pump Relay.

### **Component Testing**

#### **Relay Test**

1. Ignition OFF, disconnect the KR2 Headlamp Washer Pump Relay.

2. Test for  $60\text{--}200\ \Omega$  between terminals 85 and 86.

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

Replace the KR2 Headlamp Washer Pump Relay.

⇓ **If between  $60\text{--}200\ \Omega$**

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

◦ 30 and 86

◦ 30 and 87

◦ 30 and 85

◦ 85 and 87

⇒ **If less than infinite resistance**

Replace the KR2 Headlamp Washer Pump Relay.

⇓ **If infinite resistance**

4. Install a 10 A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground.

5. Test for less than  $10\ \Omega$  between terminals 30 and 87.

⇒ **If  $10\ \Omega$  or greater**

Replace the KR2 Headlamp Washer Pump Relay.

⇓ **If less than  $10\ \Omega$**

6. All OK.

### **Repair Instructions**

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

- [Relay Replacement](#)
- [Headlamp Washer Pump Replacement](#)
- [Body Wiring Harness Junction Block Replacement](#)
- [Control Module References](#) for BCM replacement, programming and setup

## DTC B3811

### Diagnostic Instructions

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

### DTC Descriptor

#### DTC B3811

Rear Washer Relay Circuit

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

### Diagnostic Fault Information

| Circuit | Short to Ground | Open/High Resistance | Short to Voltage | Signal Performance |
|---------|-----------------|----------------------|------------------|--------------------|
| Control | B3811 02        | 1                    | 2                | —                  |
| Ground  | —               | 1                    | 1, 2             | —                  |

1. Rear Washer Inoperative.  
2. Rear Washer Always ON.

### Circuit/System Description

The rear windshield washer pump is controlled by the body control module (BCM) via a removable relay. When the rear wiper/wash switch is depressed, the BCM monitors the signal circuit by the washer request circuit. The BCM then applies voltage through a control circuit to the removable rear windshield washer pump relay. With the relay energized, fused battery voltage is applied through the switch contacts of the relay and the control circuit to activate the rear windshield washer pump.

### Conditions for Running the DTC

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

### Conditions for Setting the DTC

A short to ground is detected in the rear washer relay control circuit.

### Action Taken When the DTC Sets

Washer operation is suspended.

### Conditions for Clearing the DTC

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

### Reference Information

#### Schematic Reference

© 2014 General Motors. All rights reserved.

[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](#)****DTC B3811**

1. Ignition OFF and all vehicle systems OFF, disconnect the KR6 Rear Window Washer Pump Relay. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10  $\Omega$  between the ground circuit terminal 87A and ground.  
⇒ **If 10  $\Omega$  or greater**
  - 2.1. Ignition OFF.
  - 2.2. Test for less than 2  $\Omega$  in the ground circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.
- ⇓ **If less than 10  $\Omega$**
3. Ignition ON.
4. Verify a test lamp illuminates between the B+ circuit terminal 87 and ground.  
⇒ **If the test lamp does not illuminate**  
Replace the X50A Fuse Block – Underhood.
- ⇓ **If the test lamp illuminates**
5. Ignition ON, connect a test lamp between the control circuit terminal 86 and the ground circuit terminal 85.
6. Verify the test lamp turns ON and OFF when commanding the Rear Washer Relay Active and Inactive with a scan tool.  
⇒ **If the test lamp is always OFF**
  - 6.1. Ignition OFF, remove the test lamp, disconnect the X5 harness connector at the K9 Body Control Module.
  - 6.2. Test for infinite resistance between the control circuit terminal 11 X5 and ground.  
⇒ If less than infinite resistance, repair the short to ground on the circuit.  
⇓ If infinite resistance
  - 6.3. Test for less than 2  $\Omega$  in the control circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.
- ⇒ **If the test lamp is always ON**

6.1. Ignition OFF, remove the test lamp, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.

6.2. Test for less than 1 V between the control circuit terminal 11 X5 and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

⇒ If less than 1 V, replace the K9 Body Control Module.

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

7. Test or replace the KR6 Rear Window Washer Pump Relay.

### **Repair Instructions**

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

- [Accessory Wiring Junction Block Replacement](#)
- [Relay Replacement](#)
- [Control Module References](#) for BCM replacement, programming and setup

## 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 Descriptors

#### DTC B3873

Front Washer Relay Circuit

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

### Diagnostic Fault Information

| Circuit                                      | Short to Ground | Open/High Resistance | Short to Voltage | Signal Performance |
|----------------------------------------------|-----------------|----------------------|------------------|--------------------|
| B+                                           | B3873 02        | B3873 04             | —                | —                  |
| Windshield Washer Relay Control              | B3873 02        | B3873 04             | B3873 01         | —                  |
| Windshield Wiper Speed Control Relay Control | B3873 02        | B3873 04             | —                | —                  |
| Ground                                       | —               | B3873 04             | —                | —                  |

### Circuit/System Description

The windshield washer pump is controlled by the body control module (BCM) via a removable relay. When the washer switch is depressed, the BCM monitors the signal circuit by the washer request circuit. The BCM then applies voltage through a control circuit to the removable windshield washer pump relay. With the relay energized, fused battery voltage is applied through the switch contacts of the relay and the control circuit to activate the windshield washer pump.

### Conditions for Running the DTC

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

### Conditions for Setting the DTC

#### B3873 01

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

#### B3873 02

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

#### B3873 04



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

### **Action Taken When the DTC Sets**

Washer operation is suspended.

### **Conditions for Clearing the DTC**

A current DTC clears when the diagnostic runs and passes.

### **Reference Information**

#### **Schematic Reference**

[Wiper/Washer 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**

#### **DTC B3873**

1. Ignition OFF and all vehicle systems OFF, disconnect the KR11 Windshield Washer Pump Relay. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10  $\Omega$  between the ground circuit terminal 87A and ground.  
⇒ **If 10  $\Omega$  or greater**
  - 2.1. Ignition OFF.
  - 2.2. Test for less than 2  $\Omega$  in the ground circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.
- ↓ **If less than 10  $\Omega$**
3. Ignition ON.
4. Verify a test lamp illuminates between the B+ circuit terminal 87 and ground.  
⇒ **If the test lamp does not illuminate and the circuit fuse is OK**
  - 4.1. Ignition OFF, remove the test lamp.
  - 4.2. Test for less than 2  $\Omega$  in the ignition circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , verify the fuse is OK and there is voltage at the fuse.
- ↓ **If the test lamp illuminates**
5. Ignition ON, connect a test lamp between the control circuit terminal 86 and the ground circuit terminal 85.

6. Verify the test lamp turns ON and OFF when commanding the Windshield Washer Relay Active and Inactive with a scan tool.

⇒ **If the test lamp is always OFF**

6.1. Ignition OFF, remove the test lamp, disconnect the X4 harness connector at the K9 Body Control Module.

6.2. Test for infinite resistance between the control circuit terminal 14 X4 and ground.

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

⇓ If infinite resistance

7. Test for less than  $2\ \Omega$  in the control circuit end to end.

⇒ If  $2\ \Omega$  or greater, repair the open/high resistance in the circuit.

⇒ If less than  $2\ \Omega$ , replace the K9 Body Control Module.

⇒ **If the test lamp is always ON**

7.1. Ignition OFF, remove the test lamp, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.

7.2. Test for less than 1 V between the control circuit terminal 14 X4 and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

⇒ If less than 1 V, replace the K9 Body Control Module.

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

8. Test or replace the KR11 Windshield Washer Pump Relay.

### **Repair Instructions**

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

- [Accessory Wiring Junction Block Replacement](#)
- [Relay Replacement](#)
- [Control Module References](#) for body control module replacement, programming and setup.

## Symptoms - Wiper/Washer Systems

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

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

### Visual/Physical Inspection

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

### Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to [Testing for Intermittent Conditions and Poor Connections](#).

### Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

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

cardiagn.com

## 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 |
|------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------|------------------|--------------------|
| B+                                                                                                                           | 1               | 1                    | —                | —                  |
| Windshield Wiper Switch Signal Terminal 1                                                                                    | 4               | 2                    | —                | —                  |
| Windshield Wiper Switch Signal Terminal 3                                                                                    | 1               | 1                    | 1                | —                  |
| Underhood Fuse Block Control Terminal 28 X2                                                                                  | B3715 02        | B3715 04             | B3715 01         | —                  |
| Underhood Fuse Block Control Terminal 15 X3                                                                                  | B3875 02        | B3875 04             | B3875 01         | —                  |
| Windshield Wiper Motor Control Terminal 4 (RHD) or 1 (LHD)                                                                   | 1,2             | 1                    | 4                | —                  |
| Windshield Wiper Motor Signal Terminal 1 (RHD) or 4 (LHD)                                                                    | 4               | 3                    | —                | —                  |
| Windshield Wiper Motor Control Terminal 3 (RHD) or 4 (LHD)                                                                   | 1, 2            | 2                    | 4                | —                  |
| Windshield Wiper Switch Low Reference Terminal 2                                                                             | —               | 1,2                  | —                | —                  |
| Windshield Wiper Motor Ground Terminal 2 (RHD) or 3 (LHD)                                                                    | —               | 1, 2, 3              | —                | —                  |
| Underhood Fuse Block Ground Terminal 36 X2                                                                                   | —               | B3715 04             | —                | —                  |
| Underhood Fuse Block Ground Terminal 27 X1                                                                                   | —               | 1, 2, 3              | —                | —                  |
| 1. Delay or Low Speed Wipers Inoperative<br>2. High Speed Wipers Inoperative<br>3. Wipers Do Not Park<br>4. Wipers Always ON |                 |                      |                  |                    |

© 2014 General Motors. All rights reserved.

## **Circuit/System Description**

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

## **Reference Information**

### **Schematic Reference**

[Wiper/Washer Schematics](#)

### **Connector End View Reference**

[Component Connector End Views](#)

### **Description and Operation**

[Wiper/Washer System Description and Operation](#)

### **Electrical Information Reference**

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

### **Scan Tool Reference**

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

## **Circuit/System Verification**

1. Ignition ON.
2. Verify the scan tool Windshield Wiper High Speed Switch parameter changes between Active and Inactive when activating the high speed windshield wipers.
  - ⇒ **If the parameter does not change**  
Refer to Circuit/System Testing – Windshield Wiper/Washer Switch Malfunction.
  - ⇓ **If the parameter changes**
3. Verify the scan tool Windshield Wiper Switch parameter changes between Off and Low when activating the low speed windshield wipers.
  - ⇒ **If the parameter does not change**  
Refer to Circuit/System Testing – Windshield Wiper/Washer Switch Malfunction.
  - ⇓ **If the parameter changes**
4. Verify the scan tool Windshield Wiper Switch parameter changes between Delay 1 and Delay 5 when cycling the intermittent speed windshield wipers.
  - ⇒ **If the parameter does not change**  
Test or replace the S82 Windshield Wiper/Washer Switch.
  - ⇓ **If the parameter changes**

5. Verify the M75 Windshield Wiper Motor changes between Off, Low, and High when cycling the S82 Windshield Wiper/Washer Switch between Off, Low, and High.
  - ⇒ **If the Windshield Wiper Motor does not cycle between Off, Low, and High**  
Refer to Circuit/System Testing – Windshield Wiper Motor Malfunction
  - ↓ **If the Windshield Wiper Motor cycles between Off, Low, and High**
6. Ignition OFF.
7. Verify the scan tool Windshield Wiper Park Switch parameter is Active.
  - ⇒ **If the parameter does not change**  
Refer to Circuit/System Testing – Windshield Wiper Motor Malfunction.
  - ↓ **If the parameter changes**
8. All OK.

### Circuit/System Testing

#### **Windshield Wiper/Washer Switch Malfunction**

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S82 Windshield Wiper/Washer Switch. It may take up to 11 min for all vehicle systems to power down.
2. Test for less than 10  $\Omega$  between the low reference circuit terminal 2 and ground.
  - ⇒ **If 10  $\Omega$  or greater**
    - 2.1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module.
    - 2.2. Test for less than 2  $\Omega$  in the low reference circuit end to end.
      - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
      - ⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.
  - ↓ **If less than 10  $\Omega$**
3. Ignition ON.
4. Verify the scan tool Windshield Wiper High Speed Switch parameter is Inactive.
  - ⇒ **If not Inactive**
    - 4.1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module.
    - 4.2. Test for infinite resistance between the S82 Windshield Wiper/Washer Switch signal circuit terminal 1 and ground.
      - ⇒ If less than infinite resistance, repair the short to ground on the circuit.
      - ⇒ If infinite resistance, replace the K9 Body Control Module.
  - ↓ **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 1 and the low reference circuit terminal 2.
6. Verify the scan tool Windshield Wiper High Speed Switch parameter is Active.
  - ⇒ **If not Active**
    - 6.1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the K9 Body Control Module, ignition ON.
    - 6.2. Test for less than 1 V between the S82 Windshield Wiper/Washer Switch signal circuit terminal 1 and ground.
      - ⇒ If 1 V or greater, repair the short to voltage on the circuit.
      - ↓ If less than 1 V
    - 6.3. Test for less than 2  $\Omega$  in the signal circuit end to end.
      - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
      - ⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.
  - ↓ **If Active**

7. Test for greater than 8 V between the signal circuit terminal 3 and ground.  
⇒ **If less than 8 V**
  - 7.1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module.
  - 7.2. Test for infinite resistance between the signal circuit and ground  
⇒ If less than infinite resistance, repair the short to ground on the circuit.  
⇓ If infinite resistance
  - 7.3. Test for less than 2  $\Omega$  in the signal circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.
- ⇒ **If 8 V or greater**
8. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
9. Test for less than 1 V between the S82 Windshield Wiper/Washer Switch signal circuit terminal 3 and ground.  
⇒ **If 1 V or greater**  
Repair the short to voltage on the circuit.  
⇓ **If less than 1 V**
10. Test or replace the S82 Windshield Wiper/Washer Switch.
11. Verify the symptom does not occur while operating the wipers.  
⇒ **If the symptom is not corrected**  
replace the K9 Body Control Module.  
⇓ **If the symptom is corrected**
12. All OK.

#### Windshield Wiper Motor Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the M75 Windshield Wiper Motor. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10  $\Omega$  between the ground circuit terminal below and ground.
  - Control circuit terminal 3 (LHD)
  - Control circuit terminal 2 (RHD)
- ⇒ **If 10  $\Omega$  or greater**
  - 2.1. Ignition OFF.
  - 2.2. Test for less than 2  $\Omega$  in the ground circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.
- ⇓ **If less than 10  $\Omega$**
3. Ignition ON.
4. Verify the scan tool Windshield Wiper Park Switch parameter is Inactive.  
⇒ **If not Inactive**
  - 4.1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
  - 4.2. Test for infinite resistance between the signal circuit terminal 17 X4 and ground.  
⇒ If less than infinite resistance, repair the short to ground on the circuit.  
⇒ If infinite resistance, replace the K9 Body Control Module.
- ⇓ **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal listed below and ground.
  - Signal circuit terminal 4 (LHD)

- Signal circuit terminal 1 (RHD)

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

⇒ **If not Active**

- 6.1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the K9 Body Control Module, ignition ON.
- 6.2. Test for less than 1 V between the signal circuit and ground.
  - ⇒ If 1 V or greater, repair the short to voltage on the circuit.
  - ↓ If less than 1 V
- 6.3. Test for less than 2  $\Omega$  in the signal circuit end to end.
  - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
  - ⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.

↓ **If Active**

7. Ignition OFF and all vehicle systems OFF, disconnect the KR12B Windshield Wiper Relay. It may take up to 2 min for all vehicle systems to power down.
8. Test for less than 10  $\Omega$  between the ground circuit terminals listed below and ground.
  - terminal 1
  - terminal 4

⇒ **If 10  $\Omega$  or greater**

- 8.1. Ignition OFF.
- 8.2. Test for less than 2  $\Omega$  in the ground circuit end to end.
  - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
  - ⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.

↓ **If less than 10  $\Omega$**

9. Ignition ON.

10. Verify a test lamp illuminates between the B+ circuit terminal 5 and the ground circuit terminal 4.

⇒ **If the test lamp does not illuminate and the circuit fuse is good**

Replace the X50A Fuse Block – Underhood.

⇒ **If the test lamp does not illuminate and the circuit fuse is open**

- 10.1. Ignition OFF, remove the test lamp. Disconnect the KR12C Windshield Wiper Speed Control Relay.
- 10.2. Test for infinite resistance between the control circuit terminal 5 and ground.
  - ⇒ If less than infinite resistance, repair the short to ground on the circuit.
  - ⇒ If infinite resistance, replace the M75 Windshield Wiper Motor

↓ **If the test lamp illuminates**

11. Connect a test lamp between the control circuit terminal 1 and the ground circuit terminal 2.

12. Verify the test lamp turns ON and OFF when commanding the Windshield Wiper Motor Relay Low and Off with a scan tool.

⇒ **If the test lamp is always OFF**

- 12.1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K9 Body Control Module.
- 12.2. Test for infinite resistance between the control circuit and ground.
  - ⇒ If less than infinite resistance, repair the short to ground on the circuit.
  - ↓ If infinite resistance
- 12.3. Test for less than 2  $\Omega$  in the control circuit end to end.
  - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.



⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.

⇒ **If the test lamp is always ON**

12.1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K9 Body Control Module, ignition ON.

12.2. Test for less than 1 V between the control circuit and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

⇒ If less than 1 V, replace the K9 Body Control Module.

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

13. Ignition OFF, connect the KR12B Windshield Wiper Relay and disconnect the KR12C Windshield Wiper Speed Control Relay, ignition ON.

14. Test for less than 10  $\Omega$  between the control circuit terminal 3 and ground.

⇒ **If 10  $\Omega$  or greater**

Test or replace the KR12B Windshield Wiper Relay.

↓ **If less than 10  $\Omega$**

15. Connect a test lamp between the control circuit terminal 3 and ground.

16. Verify the test lamp turns ON and OFF when commanding the Windshield Wiper Motor Relay Low and Off with a scan tool.

⇒ **If the test lamp does not turn ON and OFF**

Test or replace the KR12B Windshield Wiper Relay.

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

17. Verify a test lamp illuminates between the B+ circuit terminal 2 and ground.

⇒ **If the test lamp does not illuminate**

Replace the X50A Fuse Block – Underhood.

↓ **If the test lamp illuminates**

18. Connect a test lamp between the B+ circuit terminal 2 and the control circuit terminal 1.

19. Verify the test lamp turns ON and OFF when commanding the Windshield Wiper High Speed Relay Active and Inactive with a scan tool.

⇒ **If the test lamp is always OFF**

19.1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K9 Body Control Module, ignition ON.

19.2. Test for less than 1 V between the control circuit and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

↓ If less than 1 V

19.3. Ignition OFF.

19.4. Test for less than 2  $\Omega$  in the control circuit end to end.

⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.

⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.

⇒ **If the test lamp is always ON**

19.1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K9 Body Control Module.

19.2. Test for infinite resistance between the control circuit and ground.

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

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

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

20. Ignition OFF, connect the KR12C Windshield Wiper Speed Control Relay.

21. Connect a test lamp between the M75 Windshield Wiper Motor control circuit terminal listed below and ground, ignition ON.

- Control circuit terminal 4 (LHD)
  - Control circuit terminal 3 (RHD)
22. Verify the test lamp turns ON and OFF when commanding the Windshield Wiper High Speed Relay Active and Inactive with a scan tool.
- ⇒ **If the test lamp is always OFF**
- 22.1. Ignition OFF, remove the test lamp, disconnect the KR12C Windshield Wiper Speed Control Relay.
  - 22.2. Test for infinite resistance between the control circuit and ground.
    - ⇒ If less than infinite resistance, repair the short to ground on the circuit.
    - ⇓ If infinite resistance
  - 22.3. Test for less than 2  $\Omega$  in the control circuit end to end.
    - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
    - ⇒ If less than 2  $\Omega$ , test or replace the KR12C Windshield Wiper Speed Control Relay.
- ⇒ **If the test lamp is always ON**
- 22.1. Ignition OFF, remove the test lamp, disconnect the KR12C Windshield Wiper Speed Control Relay, ignition ON.
  - 22.2. Test for less than 1 V between the control circuit and ground.
    - ⇒ If 1 V or greater, repair the short to voltage on the circuit.
    - ⇒ If less than 1 V, test or replace the KR12C Windshield Wiper Speed Control Relay.
- ⇓ **If the test lamp turns ON and OFF**
23. Connect a test lamp between the M75 Windshield Wiper Motor control circuit terminal listed below and ground, ignition ON.
- Control circuit terminal 1 (LHD)
  - Control circuit terminal 4 (RHD)
24. Verify the test lamp turns ON and OFF when commanding the Windshield Wiper Low Speed Relay Active and Inactive with a scan tool.
- ⇒ **If the test lamp is always OFF**
- 24.1. Ignition OFF, remove the test lamp, disconnect the KR12C Windshield Wiper Speed Control Relay.
  - 24.2. Test for infinite resistance between the control circuit and ground.
    - ⇒ If less than infinite resistance, repair the short to ground on the circuit.
    - ⇓ If infinite resistance
  - 24.3. Test for less than 2  $\Omega$  in the control circuit end to end.
    - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
    - ⇒ If less than 2  $\Omega$ , test or replace the KR12C Windshield Wiper Speed Control Relay.
- ⇒ **If the test lamp is always ON**
- 24.1. Ignition OFF, remove the test lamp, disconnect the KR12C Windshield Wiper Speed Control Relay, ignition ON.
  - 24.2. Test for less than 1 V between the control circuit and ground.
    - ⇒ If 1 V or greater, repair the short to voltage on the circuit.
    - ⇒ If less than 1 V, test or replace the KR12C Windshield Wiper Speed Control Relay.
- ⇓ **If the test lamp turns ON and OFF**
25. Test or replace the M75 Windshield Wiper Motor.

## Component Testing

### **Windshield Wiper/Washer Switch**

1. Ignition OFF, disconnect the harness connector at the S82 Windshield Wiper/Washer Switch.
2. Test for infinite resistance between the signal terminal 1 and the low reference terminal 2 with the high speed switch in the open position.  
⇒ **If less than infinite resistance**  
Replace the S82 Windshield Wiper/Washer Switch.  
⇓ **If infinite resistance**
3. Test for less than  $2\ \Omega$  between the signal circuit terminal 1 and the low reference circuit terminal 2 with the high speed switch in the closed position.  
⇒ **If  $2\ \Omega$  or greater**  
Replace the S82 Windshield Wiper/Washer Switch.  
⇓ **If less than  $2\ \Omega$**
4. Test for infinite resistance between the signal terminal 3 and the low reference terminal 2 with the low speed switch in the open position.  
⇒ **If less than infinite resistance**  
Replace the S82 Windshield Wiper/Washer Switch.  
⇓ **If infinite resistance**
5. Test for the resistance values listed below between the signal circuit terminal 3 and the low reference circuit terminal 2 by cycling the switch between Delay 1 and Delay 5.
  - Delay 1 :  $3.4\text{k}\Omega$ - $4.2\text{k}\Omega$
  - Delay 2 :  $2.5\text{k}\Omega$ - $3.1\text{k}\Omega$
  - Delay 3 :  $1.7\text{k}\Omega$ - $2.1\text{k}\Omega$
  - Delay 4 :  $2.5\text{k}\Omega$ - $3.1\text{k}\Omega$
  - Delay 5 :  $693\Omega$ - $847\Omega$⇒ **If not within the resistance values listed**  
Replace the S82 Windshield Wiper/Washer Switch.  
⇓ **If within the resistance values listed**
6. All OK

#### Relay Test

1. Ignition OFF, disconnect the appropriate relay.
2. Test for  $60$ – $200\ \Omega$  between terminals 1 and 2.  
⇒ **If less than 60 or greater than 200**  
Replace the relay.  
⇓ **If between  $60$ – $200\ \Omega$**
3. Test for infinite resistance between the terminals listed below:
  - 3 and 2
  - 3 and 5
  - 3 and 1
  - 1 and 5⇒ **If less than infinite resistance**  
Replace the relay.  
⇓ **If infinite resistance**
4. Test for less than  $5\ \Omega$  between terminals 3 and 4.  
⇒ **If  $5\ \Omega$  or greater**  
Replace the relay.  
⇓ **If less than  $5\ \Omega$**

5. Install a 10 A fused jumper wire between relay terminal 1 and 12 V. Install a jumper wire between relay terminal 2 and ground.
6. Test for less than 5  $\Omega$  between terminals 3 and 5.
  - ⇒ **If 5  $\Omega$  or greater**  
Replace the relay.
  - ⇓ **If less than 5  $\Omega$**
7. All OK

### **Repair Instructions**

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

- [Windshield Wiper Motor Replacement](#)
- [Relay Replacement](#)
- [Windshield Wiper and Washer Switch 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 |
|---------------------------------------------------------------------------------------------|-----------------|----------------------|------------------|--------------------|
| Signal                                                                                      | 2               | 1                    | —                | —                  |
| Ground                                                                                      | —               | 1                    | —                | —                  |
| 1. Low washer fluid message always displayed<br>2. Low washer fluid message never displayed |                 |                      |                  |                    |

### Circuit/System Description

The WASHER FLUID LOW ADD FLUID message is controlled by the instrument cluster using signal from the Windshield Washer Fluid level Sensor. The washer fluid level signal circuit is supplied voltage through a resistor then monitored within the instrument cluster. The Windshield Washer Fluid level Sensor is normally close so the instrument cluster detects voltage on the Windshield Washer Fluid level Sensor signal circuit whenever the washer fluid level sensor is not low. When the washer fluid reaches the point where the driver should be informed that the washer fluid is low, the washer fluid level sensor opens. When the washer fluid level sensor is closed the washer fluid level signal circuit voltage is pulled low, and the instrument cluster displays the WASHER FLUID LOW ADD FLUID message on the driver information center. In order to prevent the WASHER FLUID LOW ADD FLUID message from being displayed while sloshing is occurring in the washer fluid container, the instrument cluster is programmed with a 1 min delay before changing states of the check washer fluid message during an ignition cycle.

### Reference Information

#### Schematic Reference

[Wiper/Washer Schematics](#)

#### Connector End View Reference

[Component Connector End Views](#)

#### Description and Operation

[Wiper/Washer System Description and Operation](#)

#### Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

## Scan Tool Reference

[Control Module References](#) for Scan Tool Information

### Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool Washer Fluid Level Switch parameter changes between On and Off when filling or depleting the windshield washer reservoir.
  - ⇒ **If the parameter does not change**  
Refer to Circuit/System Testing
  - ↓ **If the parameter changes**
3. All OK.

### Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the B118B Windshield Washer Fluid Level Switch. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10  $\Omega$  between the ground circuit terminal A and ground.
  - ⇒ **If 10  $\Omega$  or greater**
    - 2.1. Ignition OFF.
    - 2.2. Test for less than 2  $\Omega$  in the ground circuit end to end.
      - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
      - ⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.
  - ↓ **If less than 10  $\Omega$**
3. Ignition ON.
4. Verify the scan tool Washer Fluid Level Switch parameter is On.
  - ⇒ **If not On**
    - 4.1. Ignition OFF, disconnect the harness connector at the P16 Instrument Cluster.
    - 4.2. Test for infinite resistance between the signal circuit terminal B and ground.
      - ⇒ If less than infinite resistance, repair the short to ground on the circuit.
      - ⇒ If infinite resistance, replace the P16 Instrument Cluster.
  - ↓ **If On**
5. Install a 3 A fused jumper wire between the signal circuit terminal B and the ground circuit terminal A.
6. Verify the scan tool Washer Fluid Level Switch parameter is Off.
  - ⇒ **If not Off**
    - 6.1. Ignition OFF, disconnect the harness connector at the P16 Instrument Cluster, ignition ON.
    - 6.2. Test for less than 1 V between the signal circuit and ground.
      - ⇒ If 1 V or greater, repair the short to voltage on the circuit.
      - ↓ If less than 1 V
    - 6.3. Test for less than 2  $\Omega$  in the signal circuit end to end.
      - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
      - ⇒ If less than 2  $\Omega$ , replace the P16 Instrument Cluster.
  - ↓ **If Off**
7. Test or replace the B118B Windshield Washer Fluid Level Switch.

### Repair Instructions

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

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

## Washer Malfunction (without C25)

### 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 |
|------------------------------------------------------------------------------|-----------------|----------------------|------------------|--------------------|
| B+                                                                           | 2               | 2                    | —                | —                  |
| Windshield Washer Switch Signal                                              | 1               | 1                    | 1                | —                  |
| Underhood Fuse Block Ground                                                  | —               | B3873 04             | —                | —                  |
| Windshield Washer Pump Relay Control                                         | B3873 02        | B3873 04             | B3873 01         | —                  |
| Windshield Washer Pump Control                                               | 2               | 2                    | 2                | —                  |
| Windshield Washer Pump Ground                                                | —               | 2                    | —                | —                  |
| Windshield Wiper Switch Low Reference                                        | —               | 2                    | —                | —                  |
| 1. Windshield Washer Pump Always ON<br>2. Windshield Washer Pump Inoperative |                 |                      |                  |                    |

### Circuit/System Description

The windshield washer pump is controlled by the body control module (BCM) via a removable relay. When the washer switch is depressed, the BCM monitors the signal circuit by the washer request circuit. The BCM then applies voltage through a control circuit to the removable windshield washer pump relay. With the relay energized, fused battery voltage is applied through the switch contacts of the relay and the control circuit to activate the windshield washer pump.

### 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

© 2014 General Motors. All rights reserved.



- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

## Scan Tool Reference

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

### [Circuit/System Verification](#)

1. Ignition ON.
2. Verify the scan tool Windshield Washer Switch parameter changes between Active and Inactive when pressing the windshield washer switch.  
⇒ **If the parameter does not change**  
Refer to Circuit/System Testing – Windshield Wiper/Washer Switch Malfunction.  
⇓ **If the parameter changes**
3. Verify the Windshield Washers turn On when commanding the Windshield Washer Relay Active and Inactive with a scan tool.  
⇒ **If the Windshield Washers do not turn ON**  
Refer to Circuit/System Testing – Windshield Washer Pump Malfunction  
⇓ **If the Windshield Washers turn ON**
4. All OK.

### [Circuit/System Testing](#)

#### Windshield Wiper/Washer Switch Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S82 Windshield Wiper/Washer Switch. It may take up to 11 min for all vehicle systems to power down.
2. Test for less than 5  $\Omega$  between the low reference circuit terminal 2 and ground.  
⇒ **If 5  $\Omega$  or greater**
  - 2.1. Ignition OFF.
  - 2.2. Test for less than 2  $\Omega$  in the low reference circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.  
⇓ **If less than 5  $\Omega$**
3. Ignition ON.
4. Verify the scan tool Windshield Washer Switch parameter is Inactive.  
⇒ **If not Inactive**
  - 4.1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module.
  - 4.2. Test for infinite resistance between the S82 Windshield Wiper/Washer Switch signal circuit terminal 5 and ground.  
⇒ If less than infinite resistance, repair the short to ground on the circuit.  
⇒ If infinite resistance, replace the K9 Body Control Module.  
⇓ **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 5 and the low reference circuit terminal 2.
6. Verify the scan tool Windshield Washer Switch parameter is Active.  
⇒ **If not Active**

- 6.1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the K9 Body Control Module, ignition ON.
- 6.2. Test for less than 1 V between the signal circuit and ground.
  - ⇒ If 1 V or greater, repair the short to voltage on the circuit.
  - ⇓ If less than 1 V
- 6.3. Test for less than 2  $\Omega$  in the signal circuit end to end.
  - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
  - ⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.

⇓ **If Active**

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

### Windshield Washer Pump Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the KR11 Windshield Washer Pump Relay. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10  $\Omega$  between the ground circuit terminal 87A and ground.

⇒ **If 10  $\Omega$  or greater**

- 2.1. Ignition OFF.
- 2.2. Test for less than 2  $\Omega$  in the ground circuit end to end.
  - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
  - ⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.

⇓ **If less than 10  $\Omega$**

3. Ignition ON.
4. Verify a test lamp illuminates between the B+ circuit terminal 87 and ground.

⇒ **If the test lamp does not illuminate and the circuit fuse is OK**

- 4.1. Ignition OFF, remove the test lamp.
- 4.2. Test for less than 2  $\Omega$  in the ignition circuit end to end.
  - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
  - ⇒ If less than 2  $\Omega$ , verify the fuse is OK and there is voltage at the fuse.

⇓ **If the test lamp illuminates**

5. Connect a test lamp between the control circuit terminal 86 and the ground circuit terminal 87A.
6. Verify the test lamp turns ON and OFF when commanding the Windshield Washer Relay Active and Inactive with a scan tool.

⇒ **If the test lamp is always OFF**

- 6.1. Ignition OFF, remove the test lamp, disconnect the X4 harness connector at the K9 Body Control Module.
- 6.2. Test for infinite resistance between the control circuit terminal 14 X4 and ground.
  - ⇒ If less than infinite resistance, repair the short to ground on the circuit.
  - ⇓ If infinite resistance
- 6.3. Test for less than 2  $\Omega$  in the control circuit end to end.
  - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
  - ⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.

⇒ **If the test lamp is always ON**

- 6.1. Ignition OFF, remove the test lamp, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
- 6.2. Test for less than 1 V between the control circuit terminal 14 X4 and ground.
  - ⇒ If 1 V or greater, repair the short to voltage on the circuit.

⇒ If less than 1 V, replace the K9 Body Control Module.

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

7. Verify that a test lamp does not illuminate between the control circuit terminal 30 and ground.

⇒ **If the test lamp illuminates**

Repair the short to voltage on the control circuit

↓ **If the test lamp does not illuminate**

8. Ignition OFF and all vehicle systems OFF, disconnect the X3 harness connector at the G24 Windshield Washer Pump. It may take up to 2 min for all vehicle systems to power down.
9. Test for less than 10  $\Omega$  between the ground circuit terminal 2 and ground.

⇒ **If 10  $\Omega$  or greater**

9.1. Ignition OFF.

9.2. Test for less than 2  $\Omega$  in the ground circuit end to end.

⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.

⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.

↓ **If less than 10  $\Omega$**

10. Connect the harness connector at the G24 Windshield Washer Pump.
11. Ignition ON, connect a 20 A fused jumper wire between the B+ circuit terminal 87 and the control circuit terminal 30.
12. Verify the G24 Windshield Washer Pump is activated.

⇒ **If the G24 Windshield Washer Pump does not activate**

12.1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the G24 Windshield Washer Pump.

12.2. Test for infinite resistance between the control circuit and ground.

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

↓ If infinite resistance

12.3. Test for less than 2  $\Omega$  in the control circuit end to end.

⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.

⇒ If less than 2  $\Omega$ , replace the G24 Windshield Washer Pump.

↓ **If the G24 Windshield Washer Pump activates**

13. Test or replace the KR11 Windshield Washer Pump Relay.

## **Component Testing**

### **Washer Switch**

1. Ignition OFF, disconnect the harness connector at the S82 Windshield Wiper/Washer Switch.
  2. Test for infinite resistance between the signal terminal 5 and the low reference terminal 2 with the switch in the open position.
- ⇒ **If less than infinite resistance**  
Replace the S82 Windshield Wiper/Washer Switch.
- ↓ **If infinite resistance**
3. Test for less than 2  $\Omega$  between the signal circuit terminal 5 and the low reference circuit terminal 2 with the switch in the closed position.
- ⇒ **If 2  $\Omega$  or greater**  
Replace the S82 Windshield Wiper/Washer Switch.
- ↓ **If less than 2  $\Omega$**
4. Test for infinite resistance between the signal terminal 5 and the Windshield Wiper Switch High Signal terminal 1 with the switch in the open position.

⇒ **If less than infinite resistance**

Replace the S82 Windshield Wiper/Washer Switch.

⇓ **If infinite resistance**

5. Test for less than 2  $\Omega$  between the signal circuit terminal 5 and the Windshield Wiper Switch High Signal terminal 1 with the switch in the closed position.

⇒ **If 2  $\Omega$  or greater**

Replace the S82 Windshield Wiper/Washer Switch.

⇓ **If less than 2  $\Omega$**

6. Test for infinite resistance between the signal terminal 5 and the Windshield Wiper Switch Low Signal terminal 3 with the switch in the open position.

⇒ **If less than infinite resistance**

Replace the S82 Windshield Wiper/Washer Switch.

⇓ **If infinite resistance**

7. Test for less than 2  $\Omega$  between the signal circuit terminal 5 and the Windshield Wiper Switch Low Signal terminal 3 with the switch in the closed position.

⇒ **If 2  $\Omega$  or greater**

Replace the S82 Windshield Wiper/Washer Switch.

⇓ **If less than 2  $\Omega$**

8. All OK.

### **Repair Instructions**

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

- [Accessory Wiring Junction Block Replacement](#)
- [Windshield Washer Pump Replacement](#)
- [Windshield Wiper and Washer Switch Replacement](#)
- [Control Module References](#) for BCM replacement, programming and setup

## Washer Malfunction (with C25)

### 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](#) provide an overview of each diagnostic category.

### Diagnostic Fault Information

| Circuit                                                                      | Short to Ground | Open/High Resistance | Short to Voltage | Signal Performance |
|------------------------------------------------------------------------------|-----------------|----------------------|------------------|--------------------|
| B+                                                                           | 2               | 2                    | —                | —                  |
| Windshield Washer Switch Signal                                              | 1               | 1                    | 1                | —                  |
| Underhood Fuse Block Ground                                                  | —               | B3873 04             | —                | —                  |
| Windshield Washer Pump Relay Control                                         | B3873 02        | B3873 04             | B3873 01         | —                  |
| Windshield Washer Pump Control                                               | 2               | 2                    | 2                | —                  |
| Windshield Washer Pump Ground                                                | —               | 2                    | —                | —                  |
| Windshield Wiper Switch Low Reference                                        | —               | 2                    | —                | —                  |
| 1. Windshield Washer Pump Always ON<br>2. Windshield Washer Pump Inoperative |                 |                      |                  |                    |

### Circuit/System Description

The windshield washer pump is controlled by the body control module (BCM) via a removable relay. When the washer switch is depressed, the BCM monitors the signal circuit by the washer request circuit. The BCM then applies voltage through a control circuit to the removable windshield washer pump relay. With the relay energized, fused battery voltage is applied through the switch contacts of the relay and the control circuit to activate the windshield washer pump.

### 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

© 2014 General Motors. All rights reserved.

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

### Scan Tool Reference

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

### [Circuit/System Verification](#)

1. Ignition ON.
2. Verify the scan tool Windshield Washer Switch parameter changes between Active and Inactive when pressing the windshield washer switch.  
⇒ **If the parameter does not change**  
Refer to Circuit/System Testing – Windshield Wiper/Washer Switch Malfunction.  
⇓ **If the parameter changes**
3. Verify the Windshield Washers turn On when commanding the Windshield Washer Relay Active and Inactive with a scan tool.  
⇒ **If the Windshield Washers do not turn ON**  
Refer to Circuit/System Testing – Windshield Washer Pump Malfunction  
⇓ **If the Windshield Washers turn ON**
4. All OK.

### [Circuit/System Testing](#)

#### Windshield Wiper/Washer Switch Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S82 Windshield Wiper/Washer Switch. It may take up to 11 min for all vehicle systems to power down.
2. Test for less than 5  $\Omega$  between the low reference circuit terminal 2 and ground.  
⇒ **If 5  $\Omega$  or greater**
  - 2.1. Ignition OFF.
  - 2.2. Test for less than 2  $\Omega$  in the low reference circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.  
⇓ **If less than 5  $\Omega$**
3. Ignition ON.
4. Verify the scan tool Windshield Washer Switch parameter is Inactive.  
⇒ **If not Inactive**
  - 4.1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module.
  - 4.2. Test for infinite resistance between the S82 Windshield Wiper/Washer Switch signal circuit terminal 5 and ground.  
⇒ If less than infinite resistance, repair the short to ground on the circuit.  
⇒ If infinite resistance, replace the K9 Body Control Module.  
⇓ **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 5 and the low reference circuit terminal 2.
6. Verify the scan tool Windshield Washer Switch parameter is Active.  
⇒ **If not Active**

- 6.1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the K9 Body Control Module, ignition ON.
- 6.2. Test for less than 1 V between the signal circuit and ground.
  - ⇒ If 1 V or greater, repair the short to voltage on the circuit.
  - ↓ If less than 1 V
- 6.3. Test for less than 2  $\Omega$  in the signal circuit end to end.
  - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
  - ⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.

↓ **If Active**

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

### Windshield Washer Pump Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the KR11 Windshield Washer Pump Relay. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10  $\Omega$  between the ground circuit terminal 87A and ground.

⇒ **If 10  $\Omega$  or greater**

- 2.1. Ignition OFF.
- 2.2. Test for less than 2  $\Omega$  in the ground circuit end to end.
  - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
  - ⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.

↓ **If less than 10  $\Omega$**

3. Ignition ON.
4. Verify a test lamp illuminates between the B+ circuit terminal 87 and ground.

⇒ **If the test lamp does not illuminate and the circuit fuse is OK**

- 4.1. Ignition OFF, remove the test lamp.
- 4.2. Test for less than 2  $\Omega$  in the ignition circuit end to end.
  - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
  - ⇒ If less than 2  $\Omega$ , verify the fuse is OK and there is voltage at the fuse.

↓ **If the test lamp illuminates**

5. Connect a test lamp between the control circuit terminal 86 and the ground circuit terminal 87A.
6. Verify the test lamp turns ON and OFF when commanding the Windshield Washer Relay Active and Inactive with a scan tool.

⇒ **If the test lamp is always OFF**

- 6.1. Ignition OFF, remove the test lamp, disconnect the X4 harness connector at the K9 Body Control Module.
- 6.2. Test for infinite resistance between the control circuit terminal 14 X4 and ground.
  - ⇒ If less than infinite resistance, repair the short to ground on the circuit.
  - ↓ If infinite resistance
- 6.3. Test for less than 2  $\Omega$  in the control circuit end to end.
  - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
  - ⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.

⇒ **If the test lamp is always ON**

- 6.1. Ignition OFF, remove the test lamp, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
- 6.2. Test for less than 1 V between the control circuit terminal 14 X4 and ground.
  - ⇒ If 1 V or greater, repair the short to voltage on the circuit.

⇒ If less than 1 V, replace the K9 Body Control Module.

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

7. Verify that a test lamp does not illuminate between the control circuit terminal 30 and ground.

⇒ **If the test lamp illuminates**

Repair the short to voltage on the control circuit

↓ **If the test lamp does not illuminate**

8. Ignition OFF and all vehicle systems OFF, disconnect the X3 harness connector at the G24 Windshield Washer Pump. It may take up to 2 min for all vehicle systems to power down.
9. Test for less than 10  $\Omega$  between the ground circuit terminal 2 and ground.

⇒ **If 10  $\Omega$  or greater**

9.1. Ignition OFF.

9.2. Test for less than 2  $\Omega$  in the ground circuit end to end.

⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.

⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.

↓ **If less than 10  $\Omega$**

10. Connect the harness connector at the G24 Windshield Washer Pump.
11. Ignition ON, connect a 20 A fused jumper wire between the B+ circuit terminal 87 and the control circuit terminal 30.
12. Verify the G24 Windshield Washer Pump is activated.

⇒ **If the G24 Windshield Washer Pump does not activate**

12.1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the G24 Windshield Washer Pump.

12.2. Test for infinite resistance between the control circuit and ground.

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

↓ If infinite resistance

12.3. Test for less than 2  $\Omega$  in the control circuit end to end.

⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.

⇒ If less than 2  $\Omega$ , replace the G24 Windshield Washer Pump.

↓ **If the G24 Windshield Washer Pump activates**

13. Test or replace the KR11 Windshield Washer Pump Relay.

## **Component Testing**

### **Washer Switch**

1. Ignition OFF, disconnect the harness connector at the S82 Windshield Wiper/Washer Switch.
  2. Test for infinite resistance between the signal terminal 5 and the low reference terminal 2 with the switch in the open position.
- ⇒ **If less than infinite resistance**  
Replace the S82 Windshield Wiper/Washer Switch.
- ↓ **If infinite resistance**
3. Test for less than 2  $\Omega$  between the signal circuit terminal 5 and the low reference circuit terminal 2 with the switch in the closed position.
- ⇒ **If 2  $\Omega$  or greater**  
Replace the S82 Windshield Wiper/Washer Switch.
- ↓ **If less than 2  $\Omega$**
4. Test for infinite resistance between the signal terminal 5 and the Windshield Wiper Switch High Signal terminal 1 with the switch in the open position.



⇒ **If less than infinite resistance**

Replace the S82 Windshield Wiper/Washer Switch.

⇓ **If infinite resistance**

5. Test for less than 2  $\Omega$  between the signal circuit terminal 5 and the Windshield Wiper Switch High Signal terminal 1 with the switch in the closed position.

⇒ **If 2  $\Omega$  or greater**

Replace the S82 Windshield Wiper/Washer Switch.

⇓ **If less than 2  $\Omega$**

6. Test for infinite resistance between the signal terminal 5 and the Windshield Wiper Switch Low Signal terminal 3 with the switch in the open position.

⇒ **If less than infinite resistance**

Replace the S82 Windshield Wiper/Washer Switch.

⇓ **If infinite resistance**

7. Test for less than 2  $\Omega$  between the signal circuit terminal 5 and the Windshield Wiper Switch Low Signal terminal 3 with the switch in the closed position.

⇒ **If 2  $\Omega$  or greater**

Replace the S82 Windshield Wiper/Washer Switch.

⇓ **If less than 2  $\Omega$**

8. All OK.

### **Repair Instructions**

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

- [Windshield Washer Pump Replacement](#)
- [Body Front Wiring Harness Fuse Block Replacement](#)
- [Relay Replacement](#)
- [Windshield Wiper and Washer Switch Replacement](#)
- [Control Module References](#) for BCM replacement, programming and setup

## Rain Sensor Malfunction

### Diagnostic Instructions

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

### DTC Descriptor

#### DTC B370A

Rain Sensor

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

### Diagnostic Fault Information

| Circuit                 | Short to Ground | Open/High Resistance | Short to Voltage | Signal Performance |
|-------------------------|-----------------|----------------------|------------------|--------------------|
| B+                      | U151A           | U151A                | —                | —                  |
| Serial Data             | U151A           | U151A                | U151A            | —                  |
| Ground                  | —               | U151A                | —                | —                  |
| Rain Sensor Malfunction |                 |                      |                  |                    |

### Circuit/System Description

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

### Conditions for Running the DTC

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

### Conditions for Setting the DTC

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

### Action Taken When the DTC Sets

- If the BCM loses communication with the rain sensor while operating under manual 1X control, the windshield wiper operation will default to intermittent operation with a fixed dwell time of 4 s.
- If the BCM loses communication with the rain sensor while operating at low speed, the windshield wiper operation will default to low speed.

© 2014 General Motors. All rights reserved.

- If the BCM loses communication with the rain sensor while operating at high speed, the windshield wiper operation will default to high speed.

### **Conditions for Clearing the DTC**

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

### **Reference Information**

#### **Schematic Reference**

[Wiper/Washer Schematics](#)

#### **Connector End View Reference**

[Component Connector End Views](#)

#### **Description and Operation**

[Wiper/Washer System Description and Operation](#)

#### **Electrical Information Reference**

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

#### **Scan Tool Reference**

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

### **Circuit/System Verification**

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

### **Circuit/System Testing**

1. Ignition OFF, all vehicle systems OFF, disconnect the harness connector at the B117 Rain Sensor. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10  $\Omega$  between the ground circuit terminal 3 and ground.  
⇒ **If 10  $\Omega$  or greater**
  - 2.1. Ignition OFF.
  - 2.2. Test for less than 2  $\Omega$  in the ground circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.

↓ **If less than 10  $\Omega$**

3. Ignition ON.

4. Verify a test lamp illuminates between the B+ circuit terminal 1 and ground.

⇒ **If the test lamp does not illuminate and the circuit fuse is good**

4.1. Ignition OFF, remove the test lamp.

4.2. Test for less than 2  $\Omega$  in the B+ circuit end to end.

⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.

⇒ If less than 2  $\Omega$ , verify the fuse is not open and there is voltage at the fuse.

⇒ **If the test lamp does not illuminate and the circuit fuse is open**

4.1. Ignition OFF, remove the test lamp.

4.2. Test for infinite resistance between the B+ circuit and ground.

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

⇒ If infinite resistance, replace the B117 Rain Sensor.

↓ **If the test lamp illuminates**

5. Test for 5.0–10.0 V between the serial data circuit terminal 2 and ground.

⇒ **If less than 5.0 V**

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

5.2. Test for infinite resistance between the serial data circuit and ground.

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

↓ If infinite resistance

5.3. Test for less than 2  $\Omega$  in the serial data circuit end to end.

⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.

⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.

⇒ **If greater than 10.0 V**

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

5.2. Test for less than 1 V between the serial data circuit and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

⇒ If less than 1 V, replace the K9 Body Control Module.

↓ **If between 5.0–10.0 V**

6. Test or replace the B117 Rain Sensor.

### Repair Instructions

- Perform the [Diagnostic Repair Verification](#) after completing the repair.
- [Windshield Outside Moisture and Headlamp Automatic Control Ambient Light Sensor Replacement](#)
- [Control Module References](#) for body control module replacement, programming and setup.

## Rear Wiper System Malfunction

### Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [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 |
|--------------------------------------------------------|-----------------|----------------------|------------------|--------------------|
| B+                                                     | 1               | 1                    | —                | —                  |
| Rear Wiper Switch Signal                               | 2               | 1                    | 1                | —                  |
| Rear Window Wiper Motor Control                        | 1               | 1                    | 2                | —                  |
| Rear Window Wiper Relay Control                        | B370B 02        | B370B 04             | B370B 01         | —                  |
| Windshield Wiper/Washer Switch Low Reference           | —               | 1                    | 1                | —                  |
| Rear Window Wiper Motor Ground                         | —               | 1                    | —                | —                  |
| Fuse Block Rear Body Ground                            | —               | 1                    | —                | —                  |
| Rear Wiper Relay Ground                                | —               | 1                    | —                | —                  |
| 1. Rear Wiper Inoperative.<br>2. Rear Wiper Always ON. |                 |                      |                  |                    |

### Circuit/System Description

The rear wiper motor is controlled by the body control module (BCM) via a removable relay. When low speed rear window wiper operation is requested, the BCM will apply voltage to the rear wiper motor relay control. This will cause the contacts in the rear window wiper relay to close and apply B+ to the rear wiper motor through the rear windshield wiper low speed control circuit, enabling low speed rear wiper operation. When high speed rear window wiper operation is requested, the BCM continues to apply voltage to the rear wiper motor relay control circuit. This will cause the rear window wiper relay to close and apply B+ to the rear wiper motor.

### Reference Information

#### Schematic Reference

[Wiper/Washer Schematics](#)

#### Connector End View Reference

[Component Connector End Views](#)**Description and Operation**[Wiper/Washer System Description and Operation](#)**Electrical Information Reference**

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

**Scan Tool Reference**

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

**[Circuit/System Verification](#)**

1. Ignition ON.
2. Verify the scan tool Rear Wiper Switch parameter changes between Off and On when turning the rear wipers ON and OFF.  
⇒ **If the parameter does not change**  
Refer to Circuit/System Testing – Rear Wiper/Washer Switch Malfunction.  
⇓ **If the parameter changes**
3. Verify the M45 Rear Wiper Motor turns On when commanding the Rear Wiper Active and Inactive with a scan tool.  
⇒ **If the Rear Wiper Motor does not turn ON**  
Refer to Circuit/System Testing – Rear Wiper Motor Malfunction  
⇓ **If the Rear Wiper Motor turns ON**
4. Verify the Rear Wiper finishes the wiping cycle and will park at the button of the rear window when cycling the S82 Rear Wiper/Washer Switch Malfunction from Rear Wiper to Off.  
⇒ **If the Rear Wiper does not park at the button of the rear window**  
Refer to Circuit/System Testing – Wiper Park Feature Malfunction  
⇓ **If the Rear Wiper park at the button of the rear window**
5. All OK.

**[Circuit/System Testing](#)****Rear Wiper/Washer Switch Malfunction**

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S82 Windshield Wiper/Washer Switch. It may take up to 11 min for all vehicle systems to power down.
2. Test for less than 10  $\Omega$  between the low reference circuit terminal 2 and ground.  
⇒ **If 10  $\Omega$  or greater**
  - 2.1. Ignition OFF.
  - 2.2. Test for less than 2  $\Omega$  in the low reference circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.
- ⇓ **If less than 10  $\Omega$**
3. Ignition ON.
4. Test for greater than 8 V between the signal circuit terminal 4 and ground.

**⇒ If less than 8 V**

- 4.1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
- 4.2. Test for infinite resistance between the signal circuit and ground
  - ⇒ If less than infinite resistance, repair the short to ground on the circuit.
  - ⇓ If infinite resistance
- 4.3. Test for less than 2  $\Omega$  in the signal circuit end to end.
  - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
  - ⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.

**⇒ If 8 V or greater**

5. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
6. Test for less than 1 V between the S82 Windshield Wiper/Washer Switch signal circuit terminal 4 and ground.

**⇒ If 1 V or greater**

Repair the short to voltage on the circuit.

**⇓ If less than 1 V**

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

**Rear Wiper Motor Malfunction**

1. Ignition OFF and all vehicle systems OFF, disconnect the KR7 Rear Wiper Relay. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10  $\Omega$  between the ground circuit terminal listed below and ground.
  - Terminal 86
  - Terminal 87A

**⇒ If 10  $\Omega$  or greater**

- 2.1. Ignition OFF.
- 2.2. Test for less than 2  $\Omega$  in the ground circuit end to end.
  - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
  - ⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.

**⇓ If less than 10  $\Omega$** 

3. Ignition ON.
4. Verify a test lamp illuminates between the B+ circuit terminal 87 and ground.

**⇒ If the test lamp does not illuminate and the circuit fuse is good**

- 4.1. Replace the X50A Fuse Block – Underhood.

**⇒ If the test lamp does not illuminate and the circuit fuse is open**

- 4.1. Ignition OFF, remove the test lamp. Disconnect the harness connector at the M45 Rear Wiper Motor.
- 4.2. Test for infinite resistance between the control circuit terminal 30 and ground.
  - ⇒ If less than infinite resistance, repair the short to ground on the circuit.
  - ⇒ If infinite resistance, replace the KR7 Rear Wiper Relay

**⇓ If the test lamp illuminates**

- 4.3. Connect a test lamp between the control circuit terminal 85 and the ground circuit terminal 86.
- 4.4. Verify the test lamp turns ON and OFF when commanding the Rear Wiper Active and Inactive with a scan tool.
  - ⇒ **If the test lamp is always OFF**

- 4.5. Ignition OFF, remove the test lamp, disconnect the X4 harness connector at the K9 Body Control Module.
- 4.6. Test for infinite resistance between the control circuit terminal 10 X4 and ground.  
⇒ If less than infinite resistance, repair the short to ground on the circuit.  
↓ If infinite resistance
- 4.7. Test for less than 2  $\Omega$  in the control circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.  
⇒ **If the test lamp is always ON**
- 4.8. Ignition OFF, remove the test lamp, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
- 4.9. Test for less than 1 V between the control circuit and ground.  
⇒ If 1 V or greater, repair the short to voltage on the circuit.  
⇒ If less than 1 V, replace the K9 Body Control Module.  
↓ **If the test lamp turns ON and OFF**
- 4.10. Verify that a test lamp does not illuminate between the control circuit terminal 30 and ground.  
⇒ **If the test lamp illuminates**  
Repair the short to voltage on the control circuit  
↓ **If the test lamp does not illuminate**
- 4.11. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the M45 Rear Wiper Motor. It may take up to 2 min for all vehicle systems to power down.
- 4.12. Test for less than 10  $\Omega$  between the ground circuit terminal 3 and ground.  
⇒ **If 10  $\Omega$  or greater**
- 4.13. Ignition OFF.
- 4.14. Test for less than 2  $\Omega$  in the ground circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.  
↓ **If less than 10  $\Omega$**
- 4.15. Connect the harness connector at the M45 Rear Wiper Motor.
- 4.16. Ignition ON, connect a 20 A fused jumper wire between the B+ circuit terminal 87 and the control circuit terminal 30.
- 4.17. Verify the M45 Rear Wiper Motor is activated.  
⇒ **If the M45 Rear Wiper Motor does not activate**
- 4.18. Ignition OFF, remove the jumper wire, disconnect the harness connector at the M45 Rear Wiper Motor.
- 4.19. Test for infinite resistance between the control circuit and ground.  
⇒ If less than infinite resistance, repair the short to ground on the circuit.  
↓ If infinite resistance
- 4.20. Test for less than 2  $\Omega$  in the control circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , replace the M45 Rear Wiper Motor.  
↓ **If the M45 Rear Wiper Motor activates**
5. Test or replace the KR7 Rear Wiper Relay

### Wiper Park Feature Malfunction



1. Ignition OFF, disconnect the harness connector at the M45 Rear Wiper Motor. Ignition ON
2. Verify a test lamp illuminates between the B+ circuit terminal 2 and ground.  
⇒ **If the test lamp does not illuminate**
  - 2.1. Ignition OFF, remove the test lamp.
  - 2.2. Test for less than  $2\ \Omega$  in the B+ circuit end to end.  
⇒ If  $2\ \Omega$  or greater, repair the open/high resistance in the circuit.
- ↓ **If the test lamp illuminates**
3. Test or replace the M45 Rear Wiper Motor.

### Component Testing

#### **Windshield Wiper/Washer Switch**

1. Ignition OFF, disconnect the harness connector at the S82 Windshield Wiper/Washer Switch.
2. Test for infinite resistance between the signal terminal 4 and the low reference terminal 2 with the rear window washer switch in the open position.  
⇒ **If less than infinite resistance**  
Replace the S82 Windshield Wiper/Washer Switch.
- ↓ **If infinite resistance**
3. Verify the resistance reading is within the range specified below between the signal circuit terminal 4 and the low reference circuit terminal 2 by cycling the switch between Rear Wiper position and Rear Washers position.
  - Rear Wiper :  $624\text{--}644\ \Omega$
  - Rear Wiper Sweep :  $1.99\text{--}2.01\text{k}\Omega$
  - Rear Washer :  $6.11\text{--}6.13\text{k}\Omega$
- ⇒ **If not within range specified**  
Replace the S82 Windshield Wiper/Washer Switch.
- ↓ **If within range specified**
4. All OK

#### **Relay Test**

1. Ignition OFF, disconnect the KR7 Rear Wiper Relay.
2. Test for  $60\text{--}200\ \Omega$  between terminals 85 and 86.  
⇒ **If less than 60 or greater than 200**  
Replace the KR7 Rear Wiper Relay.
- ↓ **If between  $60\text{--}200\ \Omega$**
3. Test for infinite resistance between the terminals listed below:
  - 30 and 86
  - 30 and 87
  - 30 and 85
  - 85 and 87
- ⇒ **If less than infinite resistance**  
Replace the KR7 Rear Wiper Relay.
- ↓ **If infinite resistance**
4. Install a 10 A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground.
5. Test for less than  $10\ \Omega$  between terminals 30 and 87.  
⇒ **If  $10\ \Omega$  or greater**  
Replace the KR7 Rear Wiper Relay.

↓ **If less than 10  $\Omega$**

6. All OK.

### **Repair Instructions**

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

- [Relay Replacement](#)
- [Rear Window Wiper Motor Replacement](#)
- [Windshield Wiper and Washer Switch Replacement](#)
- [Control Module References](#) or BCM replacement, programming and setup

## Rear Washer System Malfunction

### Diagnostic Instructions

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

### Diagnostic Fault Information

| Circuit                                                  | Short to Ground | Open/High Resistance | Short to Voltage | Signal Performance |
|----------------------------------------------------------|-----------------|----------------------|------------------|--------------------|
| Rear Washer Switch Control                               | 2               | 1                    | 1                | —                  |
| Rear Washer Relay Control                                | B3811 02        | 1                    | 2                | —                  |
| Rear Washer Pump Control                                 | 1               | 1                    | 2                | —                  |
| Rear Washer Pump Ground                                  | —               | 1                    | —                | —                  |
| Underhood Fuse Block Ground                              | —               | 1                    | —                | —                  |
| 1. Rear Washer Inoperative.<br>2. Rear Washer Always ON. |                 |                      |                  |                    |

### Circuit/System Description

The rear window washer pump is controlled by the body control module (BCM) via a removable relay. When the rear wiper/wash switch is depressed, the BCM monitors the signal circuit by the washer request circuit. The BCM then applies voltage through a control circuit to the removable rear windshield washer pump relay. With the relay energized, fused battery voltage is applied through the switch contacts of the relay and the control circuit to activate the rear windshield washer 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 Verification

1. Ignition ON.
2. Verify the scan tool Rear Closure Ajar switch Parameter changes between Inactive and Active when opening and closing the liftgate.
  - ⇒ **If the parameter does not change**  
Refer to [Door Ajar Indicator Malfunction](#)
  - ⇓ **If the parameter changes**
3. Verify the scan tool Rear Washer Relay Command parameter changes between Active and Inactive when cycling the rear wiper switch ON and OFF.
  - ⇒ **If the parameter does not change**  
Refer to Rear Wiper/Washer Switch Malfunction
  - ⇓ **If the parameter changes**
4. Verify the G19 Rear Window Washer Pump turns on and off when commanding the rear washers Inactive and Active with the rear washer switch
  - ⇒ **If the G19 Rear Window Washer Pump do not turn ON**  
Refer to Rear Washer Pump Malfunction
  - ⇓ **If the G19 Rear Window Washer Pump turn ON**
5. All OK.

### Circuit/System Testing

#### Rear Wiper/Washer Switch Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the X3 harness connector at the S82 Windshield Wiper/Washer Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10  $\Omega$  between the low reference circuit terminal 2 and ground.
  - ⇒ **If 10  $\Omega$  or greater**
    - 2.1. Ignition OFF.
    - 2.2. Test for less than 2  $\Omega$  in the low reference circuit end to end.
      - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
      - ⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.
  - ⇓ **If less than 10  $\Omega$**
3. Ignition ON.
4. Test for greater than 8 V between the signal circuit terminal 4 and ground.
  - ⇒ **If less than 8 V**
    - 4.1. Ignition OFF, disconnect the 12 X2 harness connector at the K9 Body Control Module.
    - 4.2. Test for infinite resistance between the signal circuit and ground
      - ⇒ If less than infinite resistance, repair the short to ground on the circuit.
      - ⇓ If infinite resistance
    - 4.3. Test for less than 2  $\Omega$  in the signal circuit end to end.
      - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
      - ⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.
  - ⇒ **If 8 V or greater**
5. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.

6. Test for less than 1 V between the S82 Windshield Wiper/Washer Switch signal circuit terminal 4 and ground.

⇒ **If 1 V or greater**

Repair the short to voltage on the circuit.

⇓ **If less than 1 V**

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

### Rear Washer Pump Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the KR6 Rear Window Washer Pump Relay. It may take up to 2 min for all vehicle systems to power down.

2. Test for less than 10  $\Omega$  between the ground circuit terminal 87A and ground.

⇒ **If 10  $\Omega$  or greater**

2.1. Ignition OFF.

2.2. Test for less than 2  $\Omega$  in the ground circuit end to end.

⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.

⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.

⇓ **If less than 10  $\Omega$**

3. Ignition ON.

4. Verify a test lamp illuminates between the B+ circuit terminal 87 and ground.

⇒ **If the test lamp does not illuminate**

Replace the X50A Fuse Block – Underhood.

⇓ **If the test lamp illuminates**

5. Connect a test lamp between the control circuit terminal 86 and the ground circuit terminal 85.

6. Verify the test lamp turns ON and OFF when commanding the Rear Washer Relay Active and Inactive with a scan tool.

⇒ **If the test lamp is always OFF**

6.1. Ignition OFF, remove the test lamp, disconnect the X5 harness connector at the K9 Body Control Module.

6.2. Test for infinite resistance between the control circuit terminal 11 X5 and ground.

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

⇓ If infinite resistance

6.3. Test for less than 2  $\Omega$  in the control circuit end to end.

⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.

⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.

⇒ **If the test lamp is always ON**

6.1. Ignition OFF, remove the test lamp, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.

6.2. Test for less than 1 V between the control circuit and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

⇒ If less than 1 V, replace the K9 Body Control Module.

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

7. Verify that a test lamp does not illuminate between the control circuit terminal 30 and ground.

⇒ **If the test lamp illuminates**

Repair the short to voltage on the control circuit

⇓ **If the test lamp does not illuminate**

8. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the G19 Rear Window Washer Pump. It may take up to 2 min for all vehicle systems to power down.
9. Test for less than 10  $\Omega$  between the G19 Rear Window Washer Pump ground circuit terminal A and ground.
  - ⇒ **If 10  $\Omega$  or greater**
    - 9.1. Ignition OFF.
    - 9.2. Test for less than 2  $\Omega$  in the ground circuit end to end.
      - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
      - ⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.
  - ↓ **If less than 10  $\Omega$**
10. Connect the harness connector at the G19 Rear Window Washer Pump.
11. Ignition ON, connect a 20 A fused jumper wire between the B+ circuit terminal 87 and the control circuit terminal 30.
12. Verify the G19 Rear Window Washer Pump is activated.
  - ⇒ **If the G19 Rear Window Washer Pump does not activate**
    - 12.1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the G19 Rear Window Washer Pump.
    - 12.2. Test for infinite resistance between the control circuit and ground.
      - ⇒ If less than infinite resistance, repair the short to ground on the circuit.
      - ↓ If infinite resistance
    - 12.3. Test for less than 2  $\Omega$  in the control circuit end to end.
      - ⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
      - ⇒ If less than 2  $\Omega$ , replace the G19 Rear Window Washer Pump.
  - ↓ **If the G19 Rear Window Washer Pump activates**
13. Test or replace the KR6 Rear Window Washer Pump Relay.

## Component Testing

### Relay Test

1. Ignition OFF, disconnect the KR6 Rear Window Washer Pump Relay.
2. Test for 60 — 180  $\Omega$  between terminals 85 and 86.
  - ⇒ **If less than 60  $\Omega$  or greater than 180  $\Omega$**   
Replace the KR6 Rear Window Washer Pump Relay.
  - ↓ **If between 60  $\Omega$  or greater than 180  $\Omega$**
3. Test for infinite resistance between the terminals listed below:
  - 30 and 86
  - 30 and 87
  - 30 and 85
  - 85 and 87
  - ⇒ **If less than infinite resistance**  
Replace the KR6 Rear Window Washer Pump Relay.
  - ↓ **If infinite resistance**
4. Test for less than 2  $\Omega$  between terminals 30 and 87A.
  - ⇒ **If 2  $\Omega$  or greater**  
Replace the KR6 Rear Window Washer Pump Relay.
  - ↓ **If less than 2  $\Omega$**

5. Install a 3 A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground.
6. Test for less than 2  $\Omega$  between terminals 30 and 87.  
⇒ **If 2  $\Omega$  or greater**  
Replace the KR6 Rear Window Washer Pump Relay.  
⇓ **If less than 2  $\Omega$**
7. All OK

### **Repair Instructions**

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

- [Windshield Wiper and Washer Switch Replacement](#)
- [Relay Replacement](#)
- [Windshield Washer Pump Replacement](#)
- [Accessory Wiring Junction Block Replacement](#)
- [Control Module References](#) for BCM replacement, programming and setup

## Headlamp 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.

### DTC Descriptor

#### DTC B3810 02

Headlamp Washer Relay Circuit Short to Ground

### Diagnostic Fault Information

| Circuit                                                         | Short to Ground | Open/High Resistance | Short to Voltage | Signal Performance |
|-----------------------------------------------------------------|-----------------|----------------------|------------------|--------------------|
| B+                                                              | —               | 1                    | —                | —                  |
| Headlamp Washer Pump Relay Control                              | B3810 02        | 1                    | 2                | —                  |
| Headlamp Washer Coil Relay Ground                               | —               | 1                    | —                | —                  |
| Headlamp Washer Pump Control                                    | 1               | 1                    | 2                | —                  |
| Headlamp Washer Pump Ground                                     | —               | 1                    | —                | —                  |
| 1. Headlamp Washer Inoperative<br>2. Headlamp Washers Always ON |                 |                      |                  |                    |

### Circuit/System Description

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

### Conditions for Running the DTC

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

### Conditions for Setting the DTC

A short to ground is detected in the headlamp washer pump relay control circuit.

### Action Taken When the DTC Sets



Washer operation is suspended.

### **Conditions for Clearing the DTC**

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

### **Diagnostic Aids**

The headlamp wash feature will only be activated if the low or high beam headlamps are active as well.

### **Reference Information**

#### **Schematic Reference**

[Wiper/Washer Schematics](#)

#### **Connector End View Reference**

[Component Connector End Views](#)

#### **Description and Operation**

[Wiper/Washer System Description and Operation](#)

#### **Electrical Information Reference**

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

#### **Scan Tool Reference**

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

### **Circuit/System Verification**

1. Ignition ON.
2. Verify the headlamps washers turn ON and OFF when commanding the Headlamp Washer Relay Command On and Off with a scan tool.  
⇒ **If the headlamp washers do not turn ON and OFF**  
Refer to Circuit/System Testing  
⇓ **If the headlamp washers turn ON and OFF**
3. All OK.

### **Circuit/System Testing**

1. Ignition OFF and all vehicle systems OFF, disconnect the KR2 Headlamp Washer Pump Relay. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10  $\Omega$  between the ground circuit terminal 85 and ground.  
⇒ **If 10  $\Omega$  or greater**
  - 2.1. Ignition OFF.
  - 2.2. Test for less than 2  $\Omega$  in the ground circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.
- ⇓ **If less than 10  $\Omega$**
3. Ignition ON.

4. Verify a test lamp illuminates between the B+ circuit terminal 30 and ground.  
⇒ **If the test lamp does not illuminate**
5. Replace the X50 Fuse Block-Underhood.  
↓ **If the test lamp illuminates**
6. Connect a test lamp between the control circuit terminal 86 and the ground circuit terminal 85.
7. Verify the test lamp turns ON and OFF when commanding the Headlamp Washer Relay Command On and Off with a scan tool.  
⇒ **If the test lamp is always OFF**
  - 7.1. Ignition OFF, remove the test lamp, disconnect the X5 harness connector at the K9 Body Control Module.
  - 7.2. Test for infinite resistance between the control circuit and ground.  
⇒ If less than infinite resistance, repair the short to ground on the circuit.  
↓ If infinite resistance
  - 7.3. Test for less than 2  $\Omega$  in the control circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , replace the K9 Body Control Module.
- ⇒ **If the test lamp is always ON**
  - 7.1. Ignition OFF, remove the test lamp, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
  - 7.2. Test for less than 1 V between the control circuit and ground.  
⇒ If 1 V or greater, repair the short to voltage on the circuit.  
⇒ If less than 1 V, replace the K9 Body Control Module.
- ↓ **If the test lamp turns ON and OFF**
8. Verify that a test lamp does not illuminate between the control circuit terminal 87 and ground.  
⇒ **If the test lamp illuminates**  
Repair the short to voltage on the control circuit  
↓ **If the test lamp does not illuminate**
9. Ignition OFF and all vehicle systems OFF, remove the test lamp, disconnect the harness connector at the G16 Headlamp Washer Pump. It may take up to 2 min for all vehicle systems to power down.
10. Test for less than 10  $\Omega$  between the ground circuit terminal 2 and ground.  
⇒ **If 10  $\Omega$  or greater**
  - 10.1. Ignition OFF.
  - 10.2. Test for less than 2  $\Omega$  in the ground circuit end to end.  
⇒ If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.
- ↓ **If less than 10  $\Omega$**
11. Connect the harness connector at the G16 Headlamp Washer Pump.
12. Ignition ON, connect a 3 A fused jumper wire between the B+ circuit terminal 30 and the control circuit terminal 87.
13. Verify the G16 Headlamp Washer Pump is activated.  
⇒ **If the G16 Headlamp Washer Pump does not activate**
  - 13.1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the G16 Headlamp Washer Pump.
  - 13.2. Test for infinite resistance between the control circuit terminal 1 and ground.

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

⇓ If infinite resistance

13.3. Test for less than  $2\ \Omega$  in the control circuit end to end.

⇒ If  $2\ \Omega$  or greater, repair the open/high resistance in the circuit.

⇒ If less than  $2\ \Omega$ , test or replace the G16 Headlamp Washer Pump.

⇓ **If the G16 Headlamp Washer Pump activates**

14. Test or replace the KR2 Headlamp Washer Pump Relay.

### **Component Testing**

#### **Relay Test**

1. Ignition OFF, disconnect the KR2 Headlamp Washer Pump Relay.

2. Test for  $60\text{--}200\ \Omega$  between terminals 85 and 86.

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

Replace the KR2 Headlamp Washer Pump Relay.

⇓ **If between  $60\text{--}200\ \Omega$**

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

◦ 30 and 86

◦ 30 and 87

◦ 30 and 85

◦ 85 and 87

⇒ **If less than infinite resistance**

Replace the KR2 Headlamp Washer Pump Relay.

⇓ **If infinite resistance**

4. Install a 10 A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground.

5. Test for less than  $10\ \Omega$  between terminals 30 and 87.

⇒ **If  $10\ \Omega$  or greater**

Replace the KR2 Headlamp Washer Pump Relay.

⇓ **If less than  $10\ \Omega$**

6. All OK.

### **Repair Instructions**

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

- [Relay Replacement](#)
- [Headlamp Washer Pump Replacement](#)
- [Body Wiring Harness Junction Block Replacement](#)
- [Control Module References](#) for BCM replacement, programming and setup

## Wiper Blade Element Check

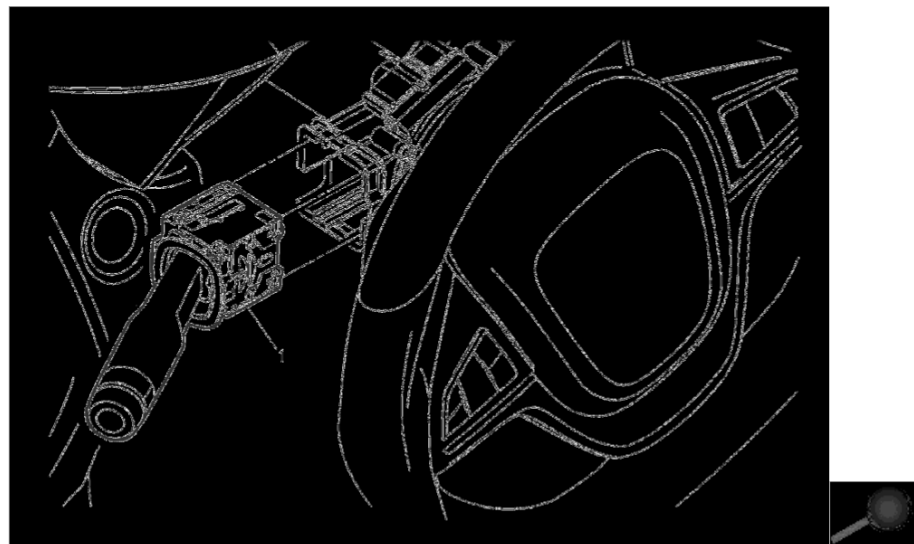


1. Remove the wiper blades from the wiper arms. Refer to [Windshield Wiper Blade Replacement](#).

**Note:** Replace the wiper blade element if the element is deflected more than 15 degrees from the centre line of the blade.

2. Inspect the wiper blade element.
3. Install the wipers blades on the wiper arms. Refer to [Windshield Wiper Blade Replacement](#).
4. Operate the wipers to inspect for correct operation.

# Windshield Wiper and Washer Switch Replacement



Windshield Wiper and Washer Switch Replacement

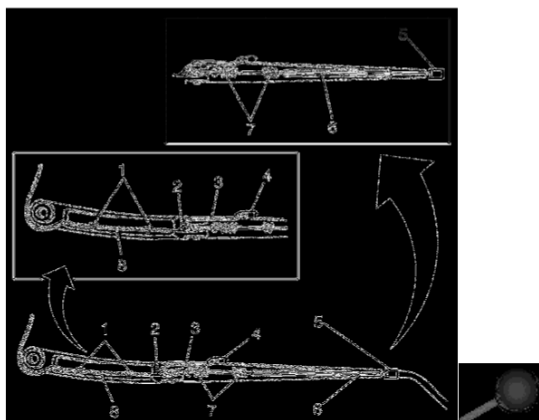
| Callout                                                                                                                                                         | Component Name                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br>Remove the steering column upper and lower trim covers. Refer to <a href="#">Steering Column Lower Trim Cover Replacement</a> . |                                                                                                                                                                                                                           |
| 1                                                                                                                                                               | Windshield Wiper and Washer Switch<br><b>Procedure</b><br>1. Disconnect the electrical connector.<br>2. Release the retaining tabs and remove the windshield wiper and washer switch from the turn signal switch bracket. |

cardiagn.com

## Windshield Washer Nozzle Hose Replacement (Long Wheelbase Sedan)

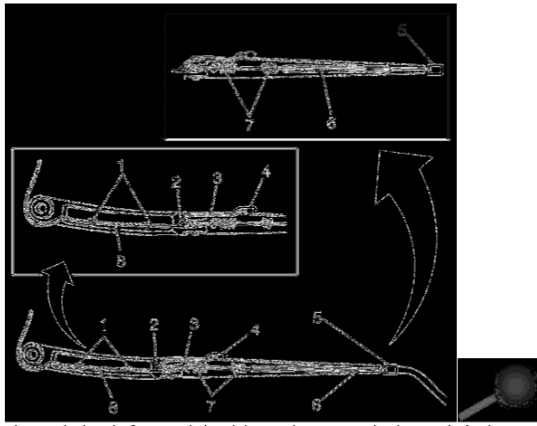
### Removal Procedure

1. Remove the windshield wiper arm. Refer to [Windshield Wiper Arm Replacement](#).



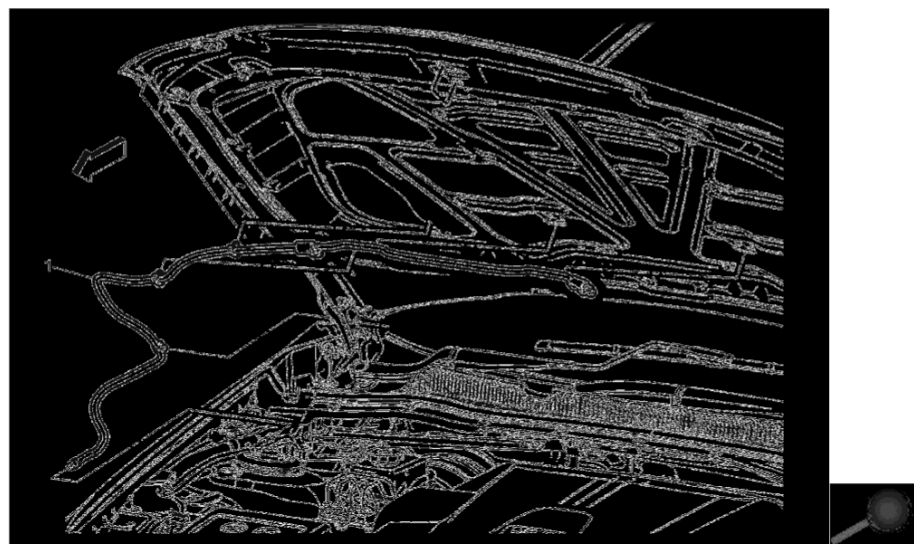
2. Detach the primary windshield washer hose (8) from the primary windshield washer hoses retaining clips (1).
3. Disconnect and remove the primary windshield washer hose (8) from the primary windshield washer hoses to right and left washer nozzle hose connector (2).
4. Disconnect the right windshield washer nozzle hose (3) from the primary windshield washer hoses to right and left washer nozzle hose connector (2).
5. Disconnect and remove the right windshield washer nozzle hose (3) from the right windshield washer nozzle (4).
6. Disconnect and remove the primary windshield washer hoses to right and left washer nozzle hose connector (2) from the left windshield washer nozzle hose (6).
7. Disconnect the left windshield washer nozzle hose (6) from the left windshield washer nozzle (5).
8. Thread and remove the left windshield washer nozzle hose (6) out of the windshield wiper arm tension spring (7).

### Installation Procedure



1. Thread the left windshield washer nozzle hose (6) through the windshield wiper arm tension spring (7) to the left windshield washer nozzle (5).
2. Connect the left windshield washer nozzle hose (6) to the left windshield washer nozzle (5).
3. Connect the primary windshield washer hoses to right and left washer nozzle hose connector (2) to the left windshield washer nozzle hose (6).
4. Connect the right windshield washer nozzle hose (3) to the right windshield washer nozzle (4).
5. Connect the right windshield washer nozzle hose (3) to the primary windshield washer hoses to right and left washer nozzle hose connector (2).
6. Connect the primary windshield washer hose (8) to the primary windshield washer hoses to right and left washer nozzle hose connector (2).
7. Attach the primary windshield washer hose (8) to the primary windshield washer hoses retaining clips (1).
8. Install the wiper arm. Refer to [Windshield Wiper Arm Replacement](#).
9. Check the operation of the windshield washers and make sure there are no solvent leaks.

# Windshield Washer Nozzle Hose Connector Hose Replacement (Short Wheelbase)



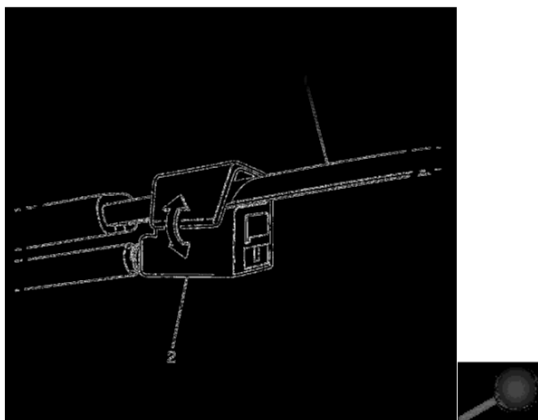
Windshield Washer Nozzle Hose Connector Hose Replacement

| Callout                                                                                                                                                                                                                                                                      | Component Name                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br><br>1. Open and support the hood assembly.<br>2. Remove the hood insulator. Refer to <a href="#">Hood Insulator Replacement</a> .<br>3. Remove the windshield washer nozzle. Refer to <a href="#">Windshield Washer Nozzle Replacement</a> . |                                                                                                                                                                                                                                                                                     |
| 1                                                                                                                                                                                                                                                                            | Windshield Washer Nozzle Hose Connector Hose<br><b>Procedure</b><br><br>1. Disconnect the windshield washer nozzle hose connector hose, at the windshield washer nozzle hose.<br>2. Detach the windshield washer nozzle hose connector hose, from the hood hinge and hood assembly. |



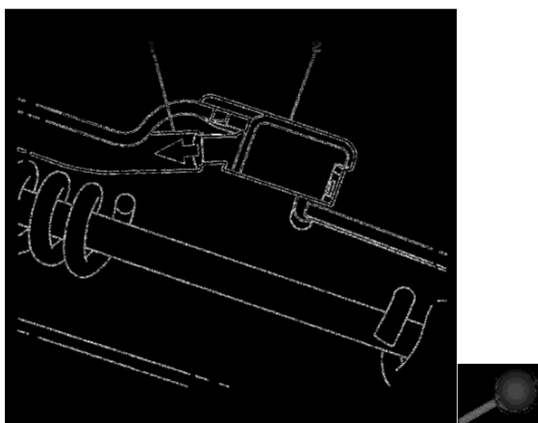
## Windshield Washer Nozzle Replacement (Long Wheelbase)

### [Removal Procedure](#)



**Note:** Exercise gentle force with fragile washer nozzle clips.

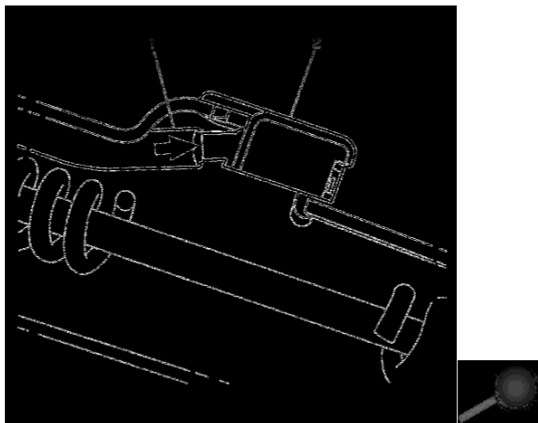
1. Unclip the washer nozzle (2) from the wiper arm (1).



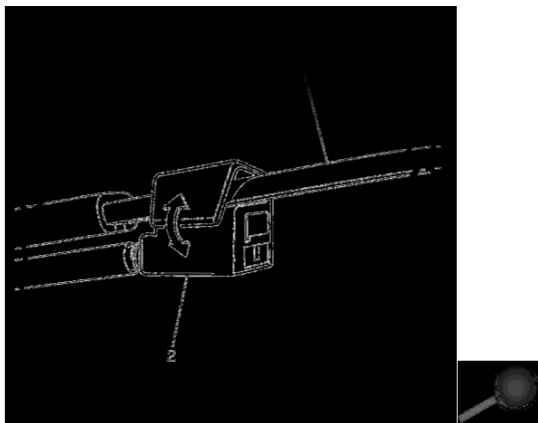
**Note:** Take care not to pierce the washer hose.

2. Using a suitable tool disconnect the washer hose (1) from the washer nozzle (2).

### [Installation Procedure](#)

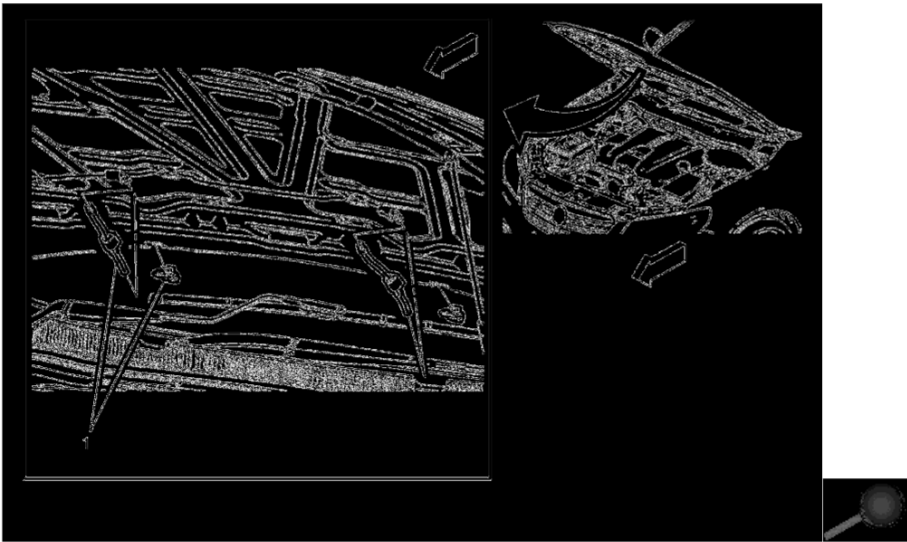


1. Connect the washer hose (1) onto the washer nozzle (2).



2. Press the washer nozzle (2) onto the wiper arm (1) clipping it firmly into place. Listen for an audible click to confirm fitting.
3. Test washer nozzle for correct operation.

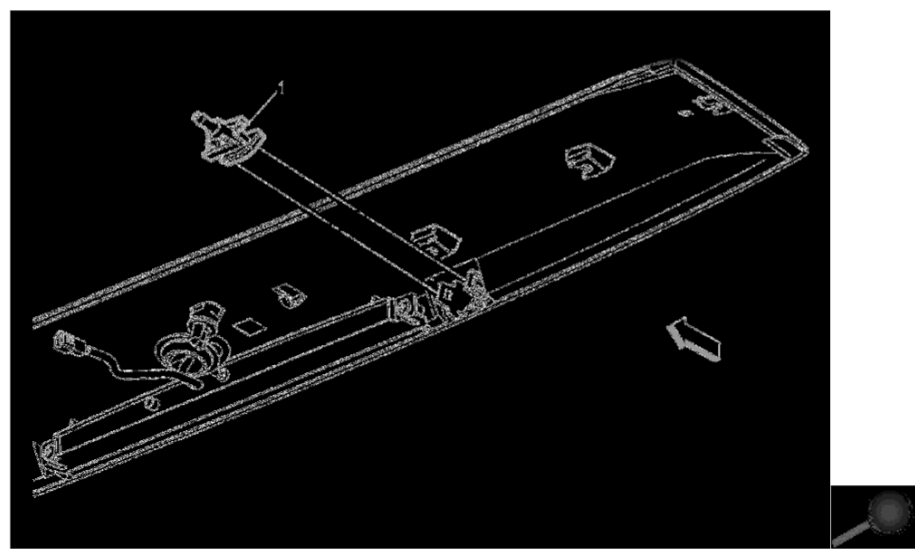
# Windshield Washer Nozzle Replacement (Short Wheelbase)



Windshield Washer Nozzle Replacement

| Callout                                                                                                                                                      | Component Name                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br>1. Open and support the hood assembly.<br>2. Remove the hood insulator. Refer to. <a href="#">Hood Insulator Replacement</a> |                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1                                                                                                                                                            | Windshield Washer Nozzle<br><b>Procedure</b><br>1. Release the locking tab to disconnect the windshield washer nozzle at the windshield washer nozzle connector hose.<br>2. Compress the locking tabs on the windshield washer nozzle by simultaneously pulling forward and then downward to remove the nozzle from the hood assembly.<br>3. Disconnect the windshield washer hose at the windshield washer nozzle being serviced. |

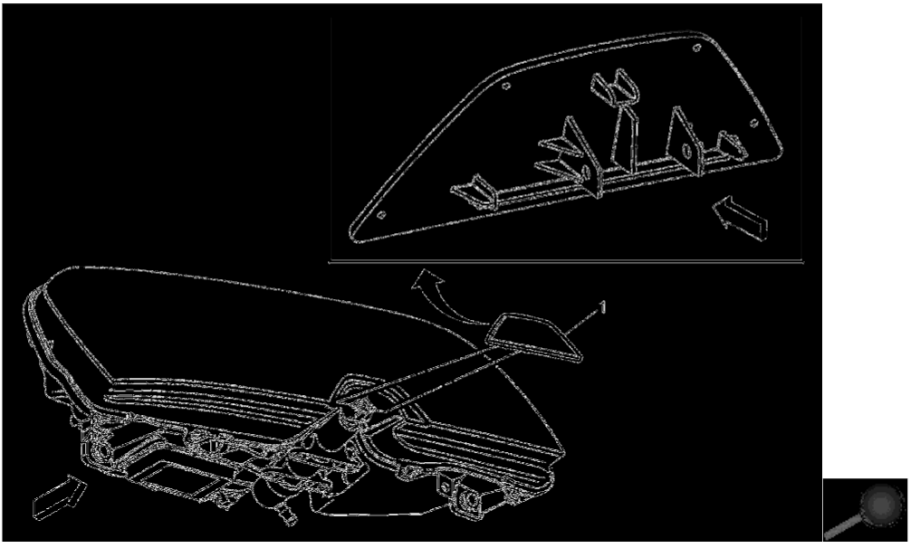
# Rear Window Washer Nozzle Replacement (Sportwagon)



Rear Window Washer Nozzle Replacement

| Callout                                                                                                                                                              | Component Name                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br>1. Open and support the liftgate assembly.<br>2. Remove the rear end spoiler. Refer to. <a href="#">Rear End Spoiler Replacement</a> |                                                                                                                                                                                                                                                                                                                                                                  |
| 1                                                                                                                                                                    | <b>Rear Window Washer Nozzle</b><br><b>Procedure</b><br>1. Disconnect the rear window washer nozzle hose at the rear window washer nozzle being serviced.<br>2. Slide the rear window washer nozzle hose through the grommet.<br>3. Compress the locking tabs on the windshield washer nozzle and slide rearward to remove the nozzle from the spoiler assembly. |

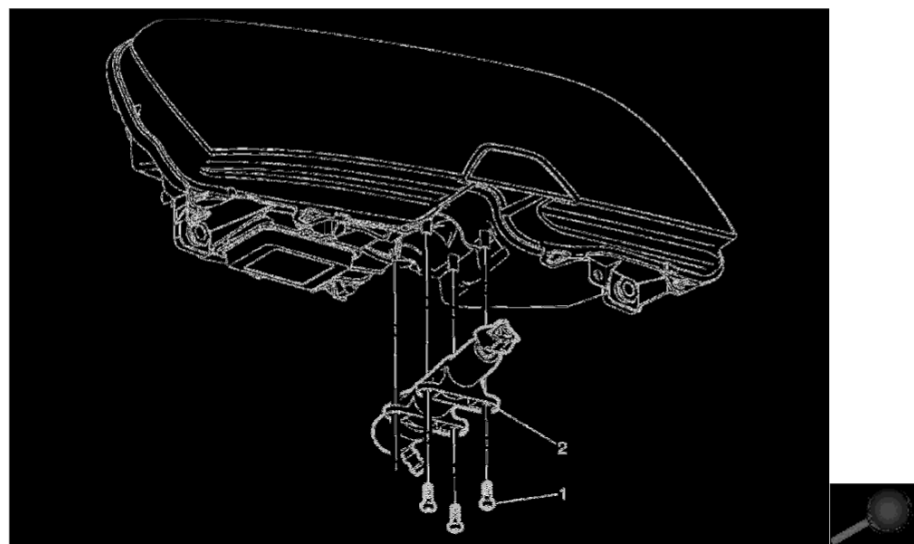
# Headlamp Washer Nozzle Cover Replacement (Long Wheelbase Sedan with CE4)



Headlamp Washer Nozzle Cover Replacement

| Callout | Component Name                                                                                                                      |
|---------|-------------------------------------------------------------------------------------------------------------------------------------|
| 1       | Headlamp Washer Nozzle Cover<br><b>Preliminary Procedure</b><br>Remove the headlamp washer nozzle cover from the headlamp assembly. |

# Headlamp Washer Nozzle Replacement (Long Wheelbase Sedan with CE4)



Headlamp Washer Nozzle Replacement

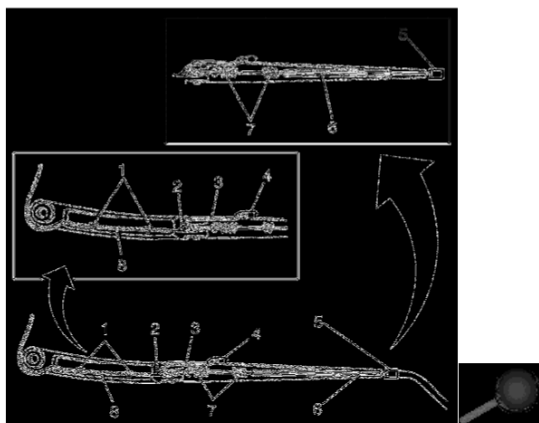
| Callout                                                                                                       | Component Name                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br>Remove the headlamp assembly. Refer to <a href="#">Headlamp Replacement</a> . |                                                                                                                                  |
| 1                                                                                                             | Headlamp Washer Nozzle Screw (Qty: 3)<br><b>Caution:</b> Refer to <a href="#">Fastener Caution</a> .                             |
| 2                                                                                                             | Headlamp Washer Nozzle<br><b>Preliminary Procedure</b><br>Remove the headlamp washer nozzle assembly from the headlamp assembly. |

cardiagn.com

## Windshield Washer Pump Hose Replacement (Long Wheelbase Sedan)

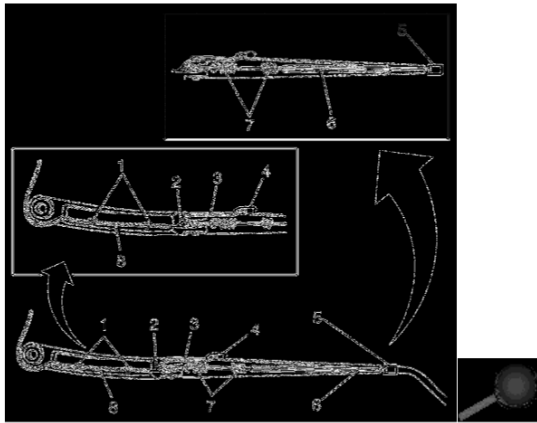
### Removal Procedure

1. Remove the windshield wiper arm. Refer to [Windshield Wiper Arm Replacement](#).



2. Detach the primary windshield washer hose (8) from the primary windshield washer hoses retaining clips (1).
3. Disconnect and remove the primary windshield washer hose (8) from the primary windshield washer hoses to right and left washer nozzle hose connector (2).
4. Disconnect the right windshield washer nozzle hose (3) from the primary windshield washer hoses to right and left washer nozzle hose connector (2).
5. Disconnect and remove the right windshield washer nozzle hose (3) from the right windshield washer nozzle (4).
6. Disconnect and remove the primary windshield washer hoses to right and left washer nozzle hose connector (2) from the left windshield washer nozzle hose (6).
7. Disconnect the left windshield washer nozzle hose (6) from the left windshield washer nozzle (5).
8. Thread and remove the left windshield washer nozzle hose (6) out of the windshield wiper arm tension spring (7).

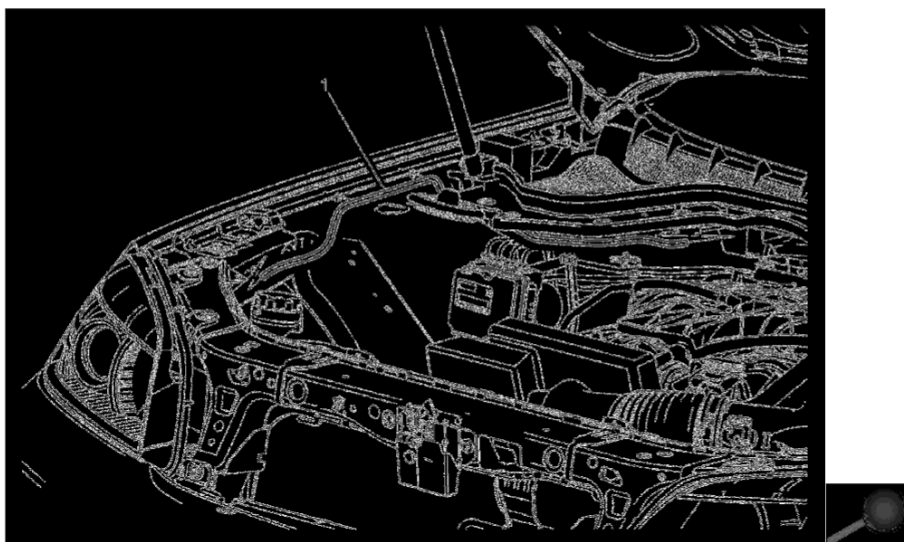
### Installation Procedure



1. Thread the left windshield washer nozzle hose (6) through the windshield wiper arm tension spring (7) to the left windshield washer nozzle (5).
2. Connect the left windshield washer nozzle hose (6) to the left windshield washer nozzle (5).
3. Connect the primary windshield washer hoses to right and left washer nozzle hose connector (2) to the left windshield washer nozzle hose (6).
4. Connect the right windshield washer nozzle hose (3) to the right windshield washer nozzle (4).
5. Connect the right windshield washer nozzle hose (3) to the primary windshield washer hoses to right and left washer nozzle hose connector (2).
6. Connect the primary windshield washer hose (8) to the primary windshield washer hoses to right and left washer nozzle hose connector (2).
7. Attach the primary windshield washer hose (8) to the primary windshield washer hoses retaining clips (1).
8. Install the wiper arm. Refer to [Windshield Wiper Arm Replacement](#).
9. Check the operation of the windshield washers and make sure there are no solvent leaks.



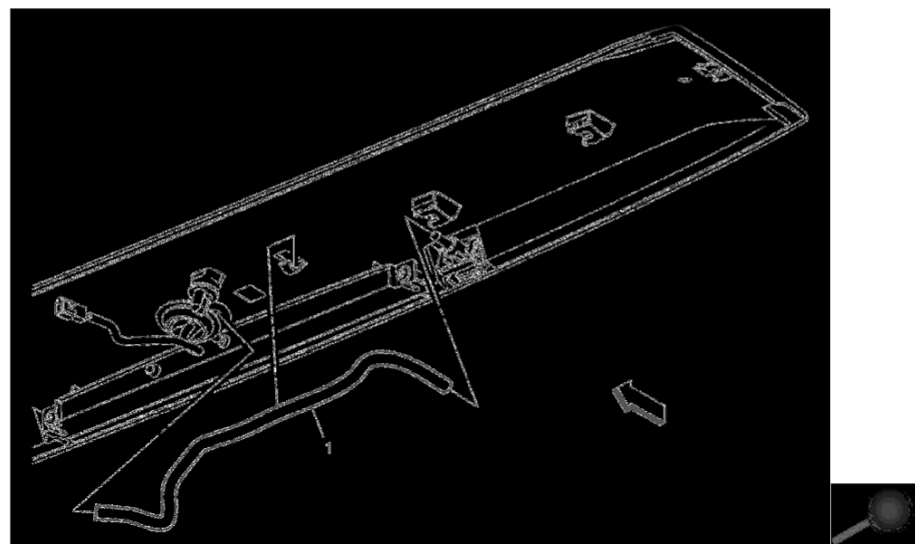
## Windshield Washer Pump Hose Replacement (Short Wheelbase)



Windshield Washer Pump Hose Replacement

| Callout                                                                                                                                                                                                                                                         | Component Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b> <ol style="list-style-type: none"><li>1. Open and support the hood assembly.</li><li>2. Place a clean suitable container under the front edge of the front wheel in order to contain any lost windshield washer solvent.</li></ol> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1                                                                                                                                                                                                                                                               | <p>Windshield Washer Hose</p> <p><b>Procedure</b></p> <ol style="list-style-type: none"><li>1. Disconnect the washer hose from the windshield washer pump hose at the passenger side fender flange.</li><li>2. Disconnect the windshield washer hose from the air inlet panel washer hose connector.</li><li>3. Disconnect the washer hose from the retainer clips at the right side upper fender flange.</li><li>4. Disconnect the hose from two retainer clips located under the front edge of the air inlet housing upper outer panel.</li><li>5. Pull the washer hose from the front underside of the air inlet housing upper outer panel.</li><li>6. Remove the windshield washer hose from the engine compartment.</li></ol> |

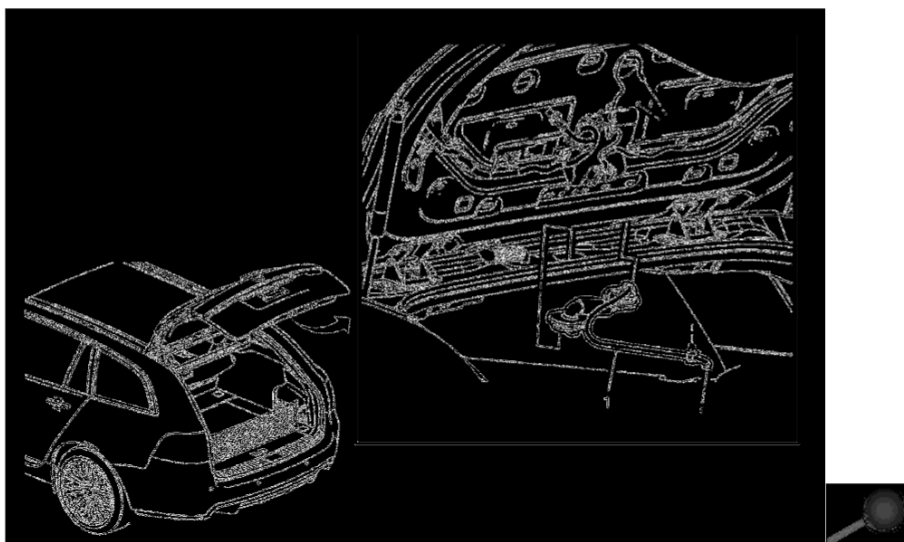
# Rear Window Washer Nozzle Hose Replacement (Sportwagon)



Rear Window Washer Nozzle Hose Replacement

| Callout                                                                                                                                                                                                                                                                                            | Component Name                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br><br>1. Open and support the liftgate assembly.<br>2. Remove the rear end spoiler. Refer to. <a href="#">Rear End Spoiler Replacement</a><br>3. Remove the liftgate upper trim finish panel. Refer to. <a href="#">Liftgate Upper Trim Finish Panel Replacement</a> |                                                                                                                                                                                                                                                                                                                                                                                       |
| 1                                                                                                                                                                                                                                                                                                  | Rear Window Washer Nozzle Hose<br><b>Procedure</b><br><br>1. Disconnect the rear window washer nozzle hose from the nozzle.<br>2. Disconnect the rear window washer nozzle hose from the windshield washer liftgate extension rear hose.<br>3. Slide the rear window washer nozzle hose through the grommet.<br>4. Detach the hose from the spoiler clip and remove from the vehicle. |

## Windshield Washer Liftgate Extension Rear Hose Replacement (Sportwagon)



Windshield Washer Liftgate Extension Rear Hose Replacement

| Callout                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Component Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedures</b> <ol style="list-style-type: none"><li>1. Open and support the liftgate assembly.</li><li>2. Remove the liftgate upper side trim finish panel. Refer to. <a href="#">Liftgate Upper Side Trim Finish Panel Replacement</a></li><li>3. Remove the liftgate upper trim finish panel. Refer to. <a href="#">Liftgate Upper Trim Finish Panel Replacement</a></li><li>4. Remove the liftgate lower trim finish panel. Refer to. <a href="#">Liftgate Lower Trim Finish Panel Replacement</a></li></ol> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p>Windshield Washer Liftgate Extension Rear Hose</p> <p><b>Procedure</b></p> <ol style="list-style-type: none"><li>1. Disconnect the liftgate extension rear hose from the rear window washer nozzle hose.</li><li>2. Detach the liftgate extension rear hose retainer from the liftgate assembly.</li><li>3. Detach the liftgate extension rear hose grommet from both the roof rear header and the liftgate assembly.</li><li>4. Remove the liftgate extension rear hose from the vehicle.</li></ol> <p><b>Note:</b> To avoid damage to the headlining carefully pull down on the headlining rear clip assembly to detach from the roof panel</p> |

# Windshield Washer Solvent Container Filler Tube Replacement



Windshield Washer Solvent Container Filler Tube Replacement

| Callout                                                                                                                                                                                                                                                                                                                                                                         | Component Name                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br><br>1. Open and support the hood assembly.<br>2. Remove the air cleaner assembly to gain needed access. Refer to <a href="#">Air Cleaner Assembly Replacement</a> .<br>3. Place a clean suitable container under the front of the vehicle to contain lost windshield washer solvent when servicing the windshield washer container filler tube. |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1                                                                                                                                                                                                                                                                                                                                                                               | Windshield Washer Solvent Container Filler Tube Bolt<br><b>Caution:</b> Refer to <a href="#">Fastener Caution</a> .<br><b>Tighten</b><br>4.5 N•m (40 lb in)                                                                                                                                                                                                                                                                                        |
| 2                                                                                                                                                                                                                                                                                                                                                                               | Windshield Washer Solvent Container Filler Tube<br><b>Procedure</b><br><br>1. Hold the windshield washer solvent container bracket stationary with one hand.<br>2. Pull rearward, the windshield washer solvent container filler tube to disengage from the washer container filler tube bracket.<br>3. Transfer the windshield washer container filler tube cap.<br>4. Inspect and replace damaged O-rings on the filler tube bracket, if needed. |

| Callout | Component Name                                                                                                                                                                                                  |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | 5. Upon assembly, use full strength windshield washer solvent fluid on the O-rings when pushing the filler tube onto the washer container filler tube bracket.                                                  |
| 3       | Windshield Washer Solvent Container Filler Tube Bracket (with O-rings)<br><b>Procedure</b><br>Fill the windshield washer solvent container and inspect for any leakage at the filler tube bracket connections . |

# Windshield Washer Solvent Container Filler Tube Replacement (HSV)

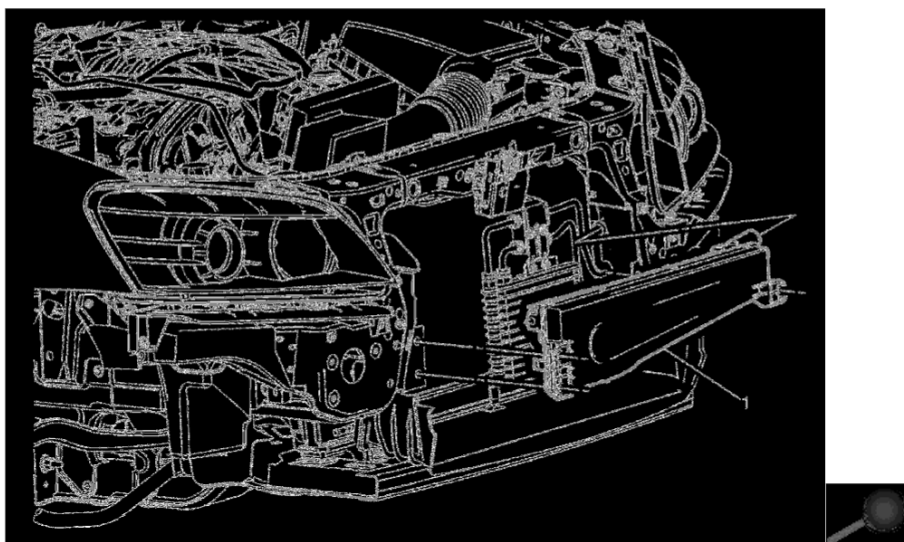


Windshield Washer Solvent Container Filler Tube Replacement

| Callout                                                                                                                                                                                                                                                                                                                                                                         | Component Name                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br><br>1. Open and support the hood assembly.<br>2. Remove the air cleaner assembly to gain needed access. Refer to <a href="#">Air Cleaner Assembly Replacement</a> .<br>3. Place a clean suitable container under the front of the vehicle to contain lost windshield washer solvent when servicing the windshield washer container filler tube. |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1                                                                                                                                                                                                                                                                                                                                                                               | Windshield Washer Solvent Container Filler Tube Bolt<br><b>Caution:</b> Refer to <a href="#">Fastener Caution</a> .<br><b>Tighten</b><br>4.5 N•m (40 lb in)                                                                                                                                                                                                                                                                                        |
| 2                                                                                                                                                                                                                                                                                                                                                                               | Windshield Washer Solvent Container Filler Tube<br><b>Procedure</b><br><br>1. Hold the windshield washer solvent container bracket stationary with one hand.<br>2. Pull rearward, the windshield washer solvent container filler tube to disengage from the washer container filler tube bracket.<br>3. Transfer the windshield washer container filler tube cap.<br>4. Inspect and replace damaged O-rings on the filler tube bracket, if needed. |

| Callout | Component Name                                                                                                                                                 |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | 5. Upon assembly, use full strength windshield washer solvent fluid on the O-rings when pushing the filler tube onto the washer container filler tube bracket. |

## Windshield Washer Solvent Container Replacement (without CE4)

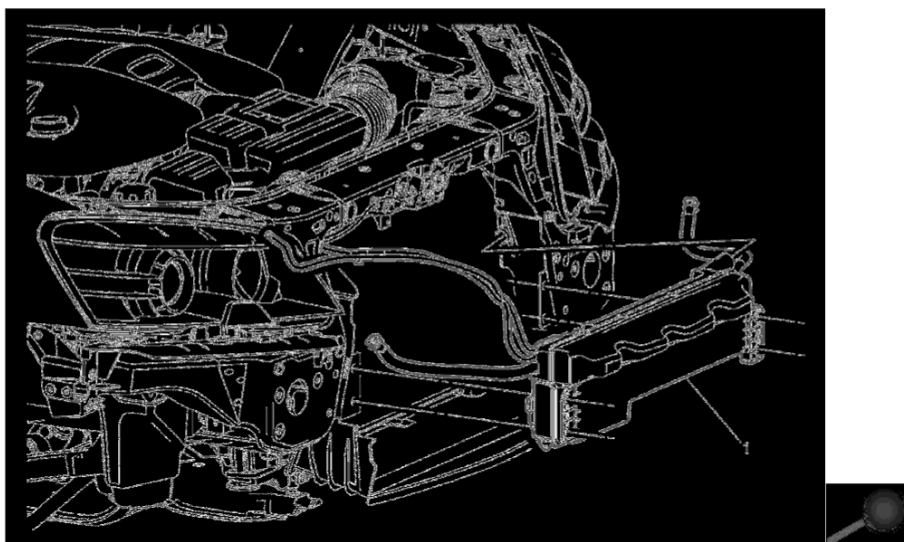


Windshield Washer Solvent Container Replacement

| Callout                                                                                                                            | Component Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br>Remove the front bumper impact bar. Refer to <a href="#">Front Bumper Impact Bar Replacement</a> . |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1                                                                                                                                  | <p>Windshield Washer Solvent Container</p> <p><b>Procedure</b></p> <ol style="list-style-type: none"><li>1. Place a clean suitable container on the floor under the windshield washer solvent container to contain any loss washer solvent.</li><li>2. Disconnect the windshield washer hose and the vent hose from the washer solvent container.</li><li>3. Disconnect the electrical connector to the windshield washer pump.</li><li>4. Carefully pull inward and rotate the windshield washer solvent container from the windshield washer solvent container bracket at the same time, disengaging the filler tube from the container.</li><li>5. Lower the washer container and remove the container from the vehicle.</li><li>6. Empty the washer solvent from the container into a clean suitable container.</li><li>7. Transfer parts as needed.</li></ol> |



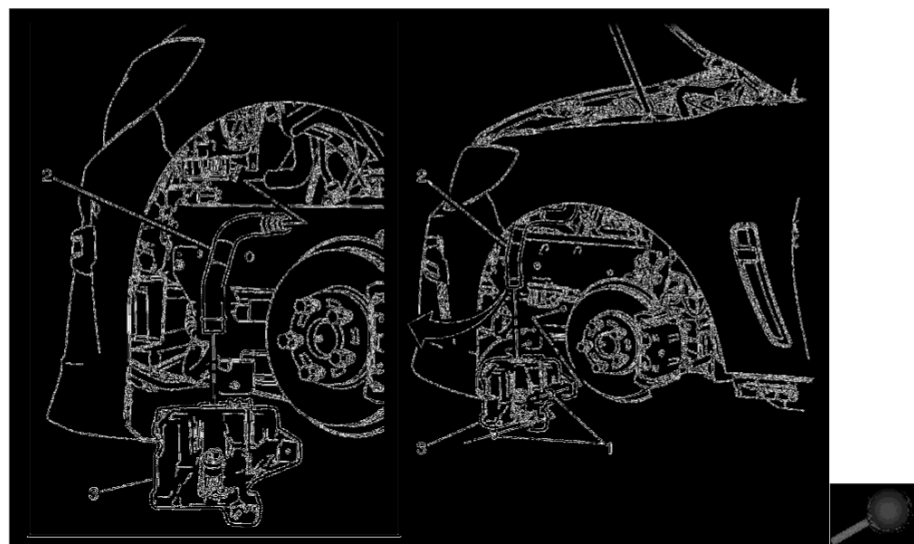
## Windshield Washer Solvent Container Replacement (Long Wheelbase Sedan with CE4)



Windshield Washer Solvent Container Replacement

| Callout                                                                                                                                                                                                                                                                                                                                      | Component Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b> <ol style="list-style-type: none"> <li>1. Remove the front bumper impact bar. Refer to <a href="#">Front Bumper Impact Bar Replacement</a>.</li> <li>2. Remove the air cleaner assembly to gain needed access to the headlamp connection. Refer to <a href="#">Air Cleaner Assembly Replacement</a>.</li> </ol> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1                                                                                                                                                                                                                                                                                                                                            | <p>Windshield Washer Solvent Container</p> <p><b>Procedure</b></p> <ol style="list-style-type: none"> <li>1. Place a clean suitable container on the floor under the windshield washer solvent container to contain any loss washer solvent.</li> <li>2. Disconnect the windshield washer hose and the vent hose from the washer solvent container.</li> <li>3. Disconnect the headlamp wash hose from the headlamp assembly.</li> <li>4. Disconnect the electrical connector to the windshield washer pump.</li> <li>5. Carefully pull inward and rotate the windshield washer solvent container from the windshield washer solvent container bracket at the same time, disengaging the filler tube from the container.</li> <li>6. Lower the washer container and remove the container from the vehicle.</li> <li>7. Empty the washer solvent from the container into a clean suitable container.</li> <li>8. Transfer parts as needed.</li> </ol> |

# Windshield Washer Solvent Container Replacement (HSV)

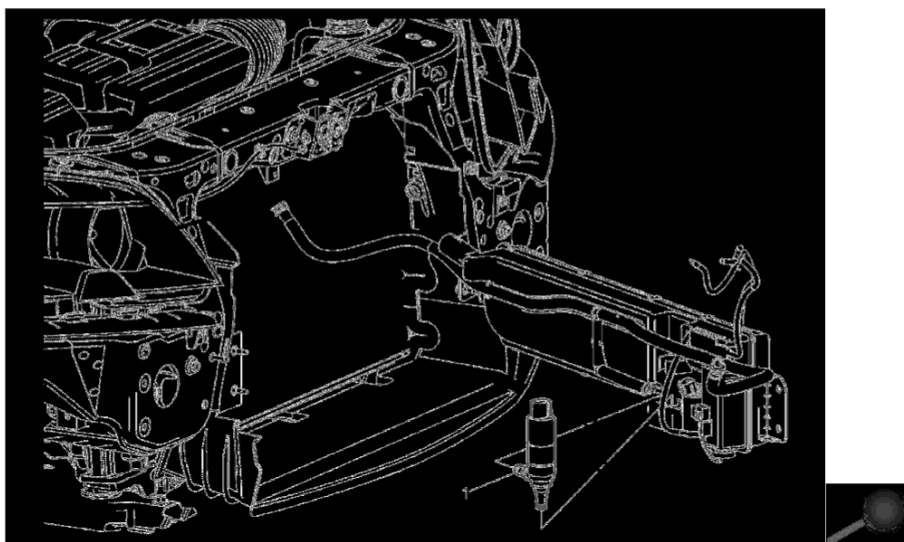


Windshield Washer Solvent Container Replacement

| Callout                                                                                                                          | Component Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br>Remove the front wheelhouse liner. Refer to <a href="#">Front Wheelhouse Liner Replacement</a> . |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 1                                                                                                                                | Windshield Washer Solvent Container Nut (Qty: 2)<br><b>Caution:</b> Refer to <a href="#">Fastener Caution</a> .<br><b>Tighten</b><br>4.5 N•m (40 lb in)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 2                                                                                                                                | Windshield Washer Solvent Container filler tube bracket (with O-rings)<br><b>Procedure</b><br><ol style="list-style-type: none"><li>1. Place a clean suitable container on the floor under the windshield washer solvent container to contain any loss washer solvent.</li><li>2. Hold the windshield washer solvent container bracket stationary with one hand.</li><li>3. Pull rearward, the windshield washer solvent container filler tube to disengage from the washer container filler tube bracket.</li><li>4. Pull downward, the windshield washer solvent container filler tube to disengage from the washer container filler tube bracket.</li><li>5. Transfer the windshield washer container filler tube cap.</li><li>6. Inspect and replace damaged O-rings on the filler tube bracket, if needed.</li></ol> |

| Callout | Component Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | <p>7. Upon assembly, use full strength windshield washer solvent fluid on the O-rings when pushing the filler tube onto the washer container filler tube bracket.</p> <p>8. Upon assembly, use full strength windshield washer solvent fluid on the O-rings when pushing the washer container filler tube bracket onto the solvent container.</p>                                                                                                                                                            |
| 3       | <p>Windshield Washer Solvent Container</p> <p><b>Procedure</b></p> <ol style="list-style-type: none"><li>1. Disconnect the windshield washer hose and the vent hose from the washer solvent container.</li><li>2. Disconnect the electrical connector to the windshield washer pump.</li><li>3. Lower the washer container and remove the container from the vehicle.</li><li>4. Empty the washer solvent from the container into a clean suitable container.</li><li>5. Transfer parts as needed.</li></ol> |

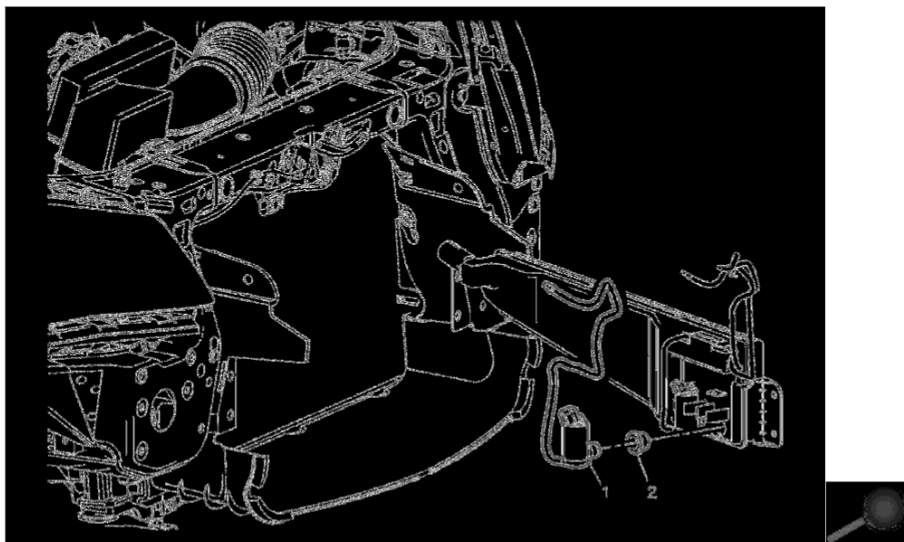
## Headlamp Washer Pump Replacement (Long Wheelbase Sedan with CE4)



Headlamp Washer Pump Replacement

| Callout                                                                                                                                                    | Component Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br>Remove the windshield washer solvent container. Refer to <a href="#">Windshield Washer Solvent Container Replacement</a> . |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 1                                                                                                                                                          | <p>Rear Windshield Washer Pump</p> <p><b>Procedure</b></p> <ol style="list-style-type: none"><li>1. Disconnect the headlamp washer pump electrical connector.</li><li>2. Disconnect the headlamp washer pump hose, by applying pressure to each side of the connection and pulling it away from the washer pump.</li><li>3. Use two medium sized flat-bladed tools, insert the blades under the lip edge of the washer pump.</li><li>4. Use a twisting motion in opposite directions, gently pry the washer pump from the washer solvent container grommet and windshield washer solvent container.</li><li>5. Remove and discard the windshield washer pump grommet.</li><li>6. Use full strength windshield washer solvent when installing a new washer pump grommet into the windshield washer solvent container.</li><li>7. Use full strength washer solvent when installing the washer pump into the previously installed washer pump grommet.</li></ol> <p><b>Note:</b> Inspect the headlamp washer pump seal for damage due to perishing, replace as necessary.</p> |

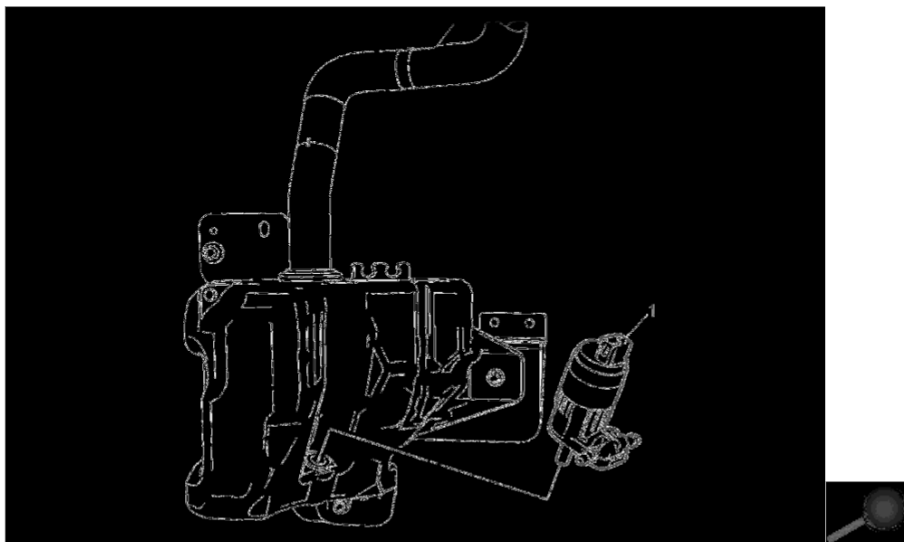
## Windshield Washer Pump Replacement



Windshield Washer Pump Replacement

| Callout                                                                                                                                                    | Component Name                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br>Remove the windshield washer solvent container. Refer to <a href="#">Windshield Washer Solvent Container Replacement</a> . |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1                                                                                                                                                          | Windshield Washer Pump<br><b>Procedure</b> <ol style="list-style-type: none"><li>1. Disconnect the washer solvent jumper hose from the washer pump to the container.</li><li>2. Use two medium sized flat-bladed tools, insert the blades under the lip edge of the washer pump.</li><li>3. Use a twisting motion in opposite directions, gently pry the washer pump from the washer solvent container grommet and windshield washer solvent container.</li></ol> |
| 2                                                                                                                                                          | Windshield Washer Pump Grommet<br><b>Procedure</b> <ol style="list-style-type: none"><li>1. Remove and discard the windshield washer pump grommet.</li><li>2. Use full strength windshield washer solvent when installing a new washer pump grommet into the windshield washer solvent container.</li><li>3. Use full strength washer solvent when installing the washer pump into the previously installed washer pump grommet.</li></ol>                        |

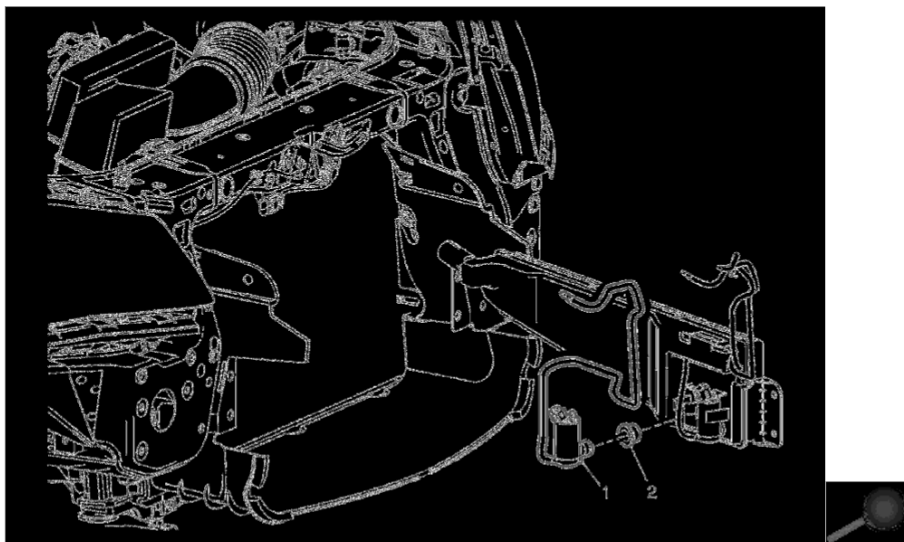
## Windshield Washer Pump Replacement (HSV)



Windshield Washer Pump Replacement

| Callout                                                                                                                                                    | Component Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br>Remove the windshield washer solvent container. Refer to <a href="#">Windshield Washer Solvent Container Replacement</a> . |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1                                                                                                                                                          | <p>Windshield Washer Pump</p> <p><b>Procedure</b></p> <ol style="list-style-type: none"><li>1. Disconnect the washer pump electrical connector.</li><li>2. Disconnect the windshield washer hose and the vent hose from the washer solvent container.</li><li>3. Use two medium sized flat-bladed tools, insert the blades under the lip edge of the washer pump.</li><li>4. Use a twisting motion in opposite directions, gently pry the washer pump from the washer solvent container grommet and windshield washer solvent container.</li><li>5. Remove and discard the windshield washer pump grommet.</li><li>6. Use full strength windshield washer solvent when installing a new washer pump grommet into the windshield washer solvent container.</li><li>7. Use full strength washer solvent when installing the washer pump into the previously installed washer pump grommet.</li></ol> |

## Rear Window Washer Pump Replacement (Sportwagon)



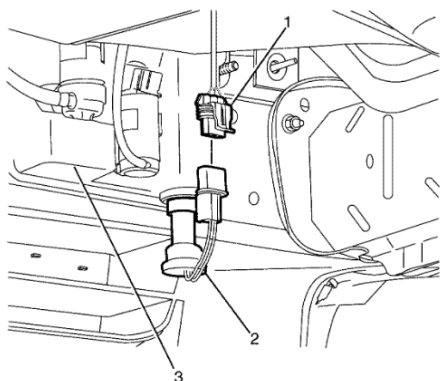
Rear Window Washer Pump Replacement

| Callout                                                                                                                                                    | Component Name                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br>Remove the windshield washer solvent container. Refer to <a href="#">Windshield Washer Solvent Container Replacement</a> . |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 1                                                                                                                                                          | Rear Windshield Washer Pump<br><b>Procedure</b> <ol style="list-style-type: none"><li>1. Disconnect the washer solvent jumper hose from the washer pump to the container.</li><li>2. Use two medium sized flat-bladed tools, insert the blades under the lip edge of the washer pump.</li><li>3. Use a twisting motion in opposite directions, gently pry the washer pump from the washer solvent container grommet and windshield washer solvent container.</li></ol> |
| 2                                                                                                                                                          | Rear Windshield Washer Pump Grommet<br><b>Procedure</b> <ol style="list-style-type: none"><li>1. Remove and discard the windshield washer pump grommet.</li><li>2. Use full strength windshield washer solvent when installing a new washer pump grommet into the windshield washer solvent container.</li><li>3. Use full strength washer solvent when installing the washer pump into the previously installed washer pump grommet.</li></ol>                        |

## Windshield Washer Solvent Level Switch Replacement

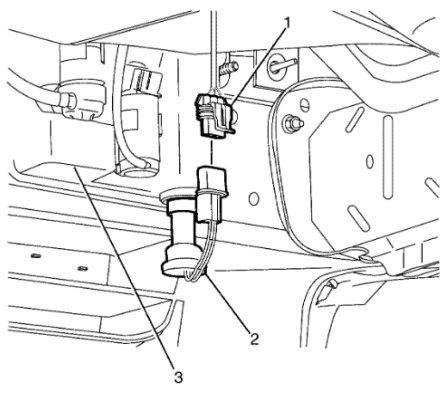
### Removal Procedure

1. Remove the radiator assembly. Refer to [Radiator Replacement](#).



2. Disconnect the washer fluid level switch electrical connector (1).
3. Place a suitable container under the washer fluid level switch (2).
4. Remove the washer fluid level switch (2) from the washer fluid container and discard the rubber seal.

### Installation Procedure



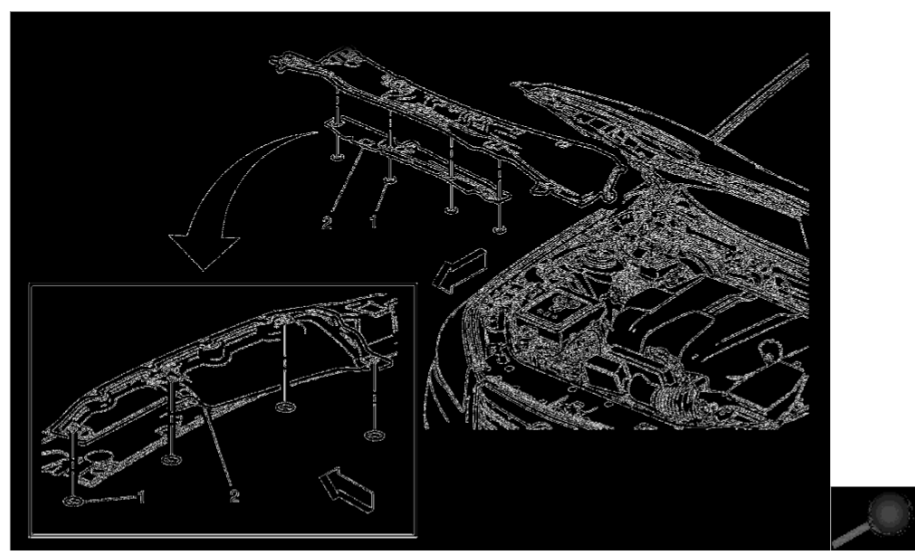
**Note:** Insert the washer fluid level switch into the washer fluid container until fully seated.

1. Install the washer fluid level switch (2) into the washer fluid container.
2. Connect the washer fluid level switch electrical connector (1).
3. Fill the washer solvent container with washer solvent.
4. Install the radiator assembly. Refer to [Radiator Replacement](#).

© 2014 General Motors. All rights reserved.



# Plenum Upper Panel Insulator Replacement

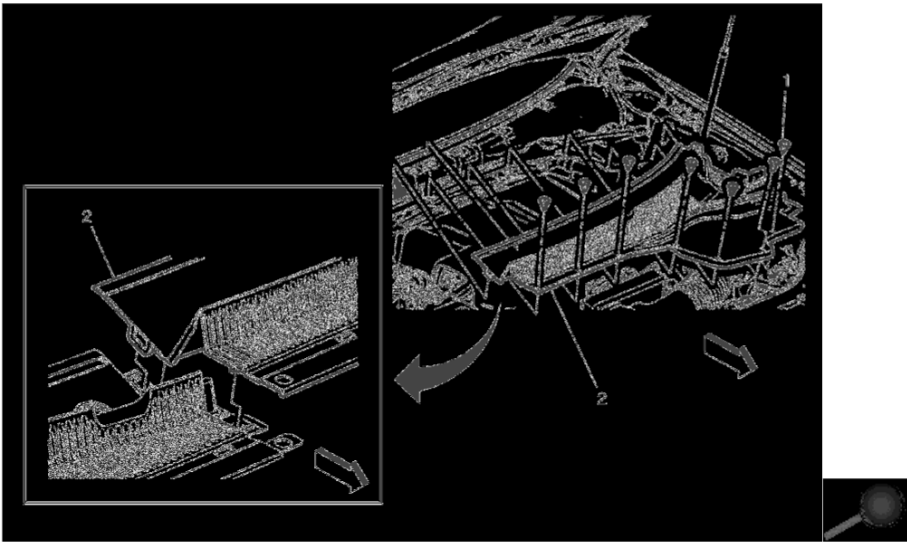


Plenum Upper Panel Insulator Replacement

| Callout                                                                                                                                                                              | Component Name                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br>1. Open and support the hood assembly.<br>2. Remove the air inlet grille panel support. Refer to. <a href="#">Air Inlet Grille Panel Replacement</a> |                                                                                                                                        |
| 1                                                                                                                                                                                    | Plenum Upper Panel Insulator Retainer (Qty: 4)                                                                                         |
| 2                                                                                                                                                                                    | Plenum Upper Panel Insulator<br><b>Procedure</b><br>Separate the plenum upper panel insulator from the air inlet grille panel support. |

cardiagn.com

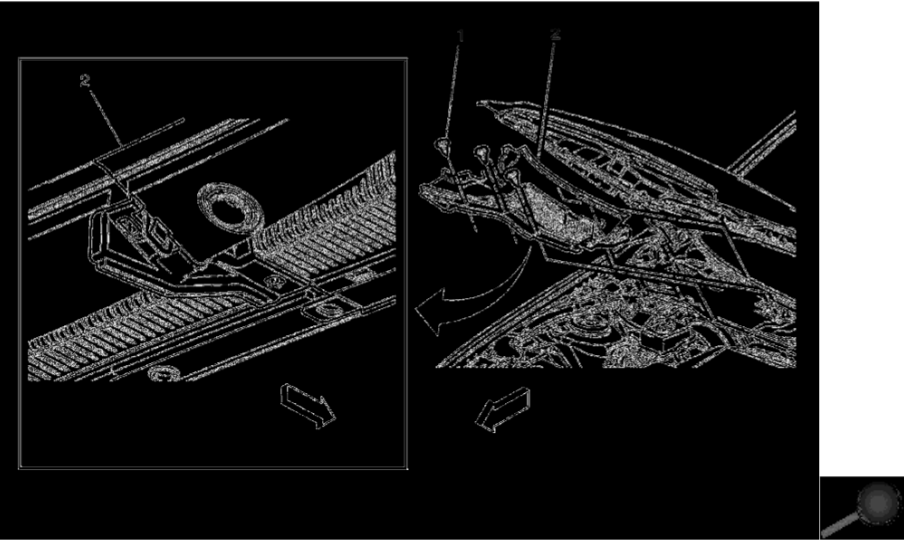
Air Inlet Grille Panel Replacement (Passenger Side, Except Long Wheelbase Sedan)



Air Inlet Grille Panel Replacement

| Callout                                                                                                                                                                                                                                                                                                 | Component Name                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br>1. Open and support the hood assembly.<br>2. Remove the hood rear weather strip. Refer to. <a href="#">Hood Rear Weatherstrip Replacement</a><br>3. Remove the air inlet grille panel extension. Refer to. <a href="#">Air Inlet Grille Panel Extension Replacement</a> |                                                                                                                                                                                |
| 1                                                                                                                                                                                                                                                                                                       | Air Inlet Grille Panel Retainer (Qty: 7)                                                                                                                                       |
| 2                                                                                                                                                                                                                                                                                                       | Air Inlet Grille Panel<br><b>Procedure</b><br>Gently grasp the inner top corner at the windscreen seal area and gradually pull the locking strip from the windscreen surround. |

Air Inlet Grille Panel Replacement (Driver Side, Except Long Wheelbase Sedan)



Air Inlet Grille Panel Replacement

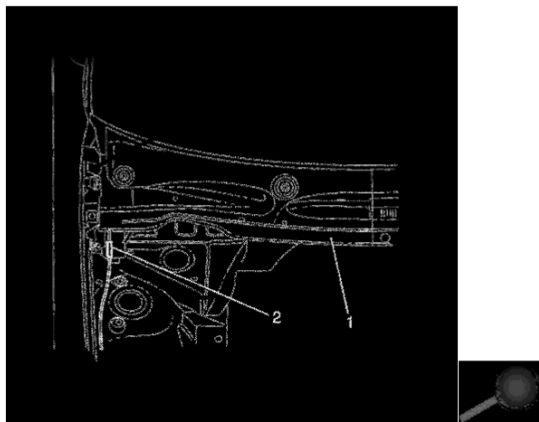
| Callout                                                                                                                                                                                                                                                                                                                                           | Component Name                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br>1. Open and support the hood assembly.<br>2. Remove the air inlet grille panel upper.<br>3. Remove the air inlet grille panel extension. Refer to. <a href="#">Air Inlet Grille Panel Extension Replacement</a><br>4. Remove the windshield wiper arm. Refer to. <a href="#">Windshield Wiper Arm Replacement</a> |                                                                                                                                                                                                                                      |
| 1                                                                                                                                                                                                                                                                                                                                                 | Air Inlet Grille Panel Retainer (Qty: 3)                                                                                                                                                                                             |
| 2                                                                                                                                                                                                                                                                                                                                                 | Air Inlet Grille Panel<br><b>Procedure</b><br>Gently grasp the inner top corner at the windscreen seal area and gradually pull the locking strip from the windscreen surround. Use caution when lifting over the wiper arm spindles. |

## Air Inlet Grille Panel Replacement (Long Wheelbase Sedan)

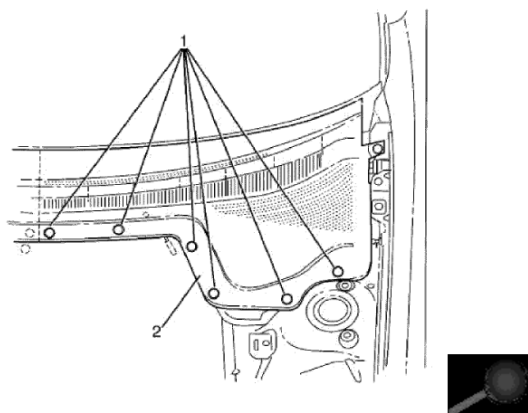
### Removal Procedure

**Note:** When a suitable hold open device is being removed or installed, provide alternate support.

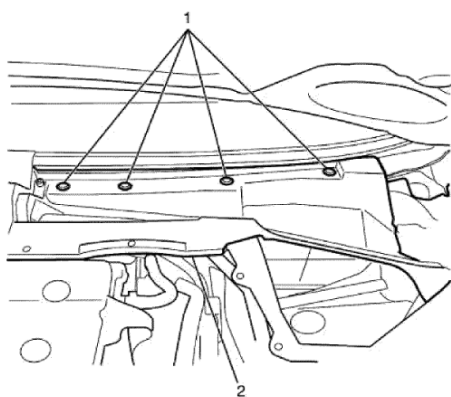
1. Install a suitable hood brace to the vehicle.
2. Remove the windshield wiper arms. Refer to [Windshield Wiper Arm Replacement](#).
3. Remove the hood rear seal. Refer to [Hood Rear Weatherstrip Replacement](#).



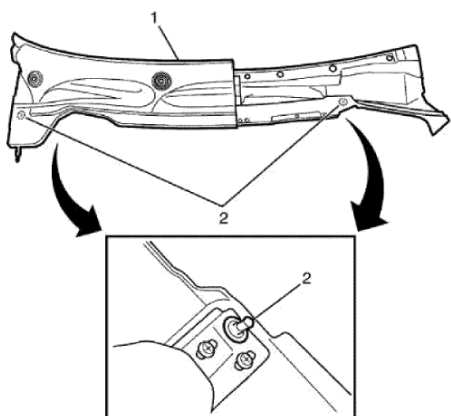
4. Disconnect the washer jet feed line (2) from the air inlet grille panel lower (1).



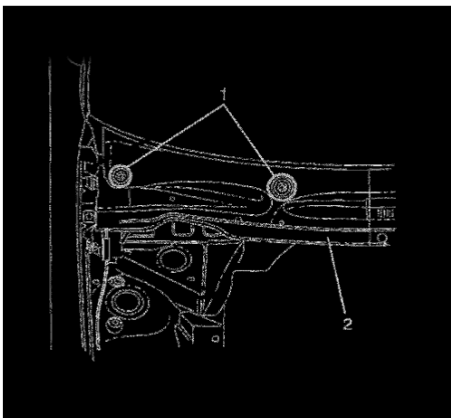
5. Remove the air inlet grille panel upper retaining scrivenets (1).
6. Remove the air inlet grille panel upper (2) from the vehicle.



7. Remove the air inlet grille panel lower retaining screws (1).



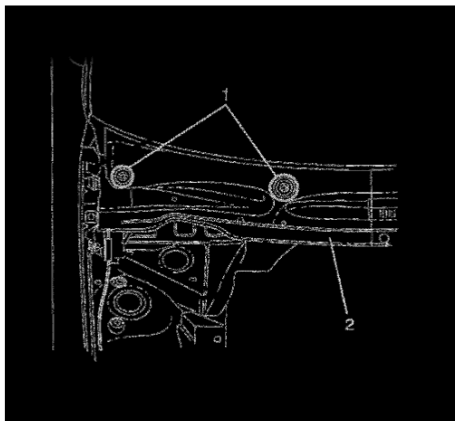
8. Lift the air inlet grille panel lower (1) and pull upwards to disengage the retaining clips (2).



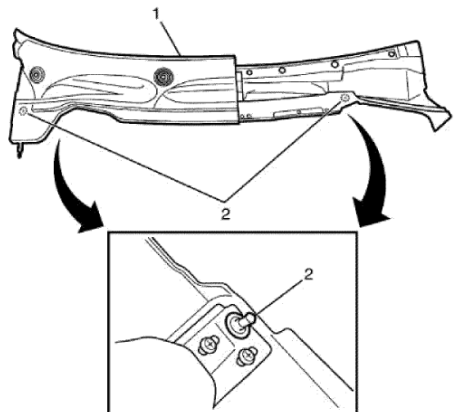
9. Lift the air inlet grille panel lower (2) over the wiper arm drive spindles (1).

10. Remove the air inlet grille panel lower (2) from the vehicle.

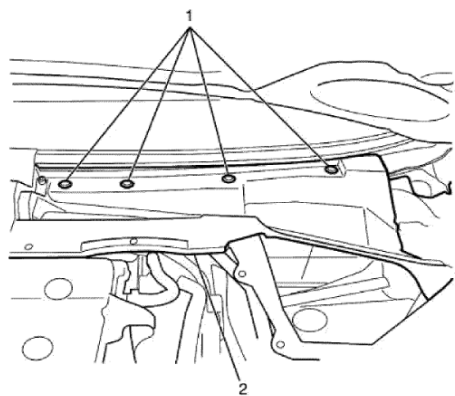
#### [Installation Procedure](#)



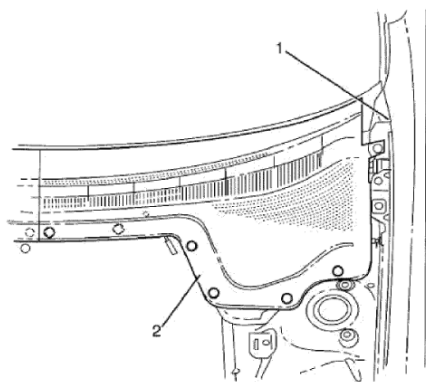
1. Position the air inlet grille panel lower (2) to the vehicle, over the wiper arm drive spindles (1) and in behind the hood hinge.



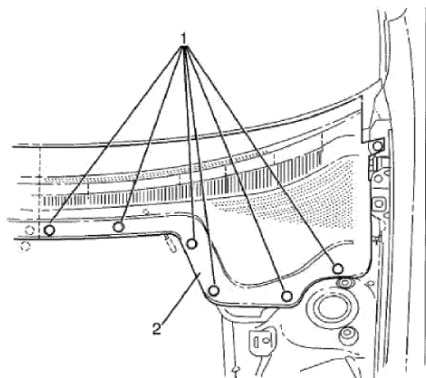
2. Locate the air inlet grille panel lower (1) retaining clips (2).
3. Firmly press the retaining clips (2) to secure the air inlet grille panel lower to the vehicle.



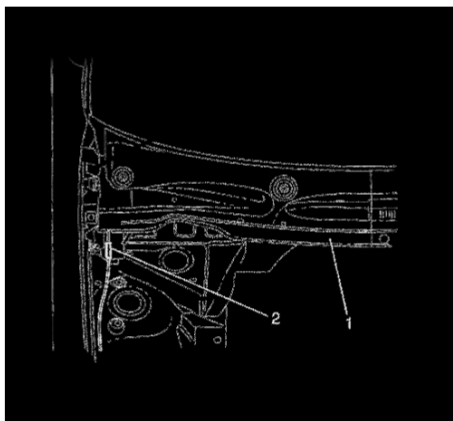
4. Install the air inlet grille panel lower retaining scrivenets (1).



5. Position the air inlet grille panel lower (2) around the hood hinge (1) and under the front hood assist rod.



6. Install the air inlet grille panel lower (2) retaining scrivenets (1).

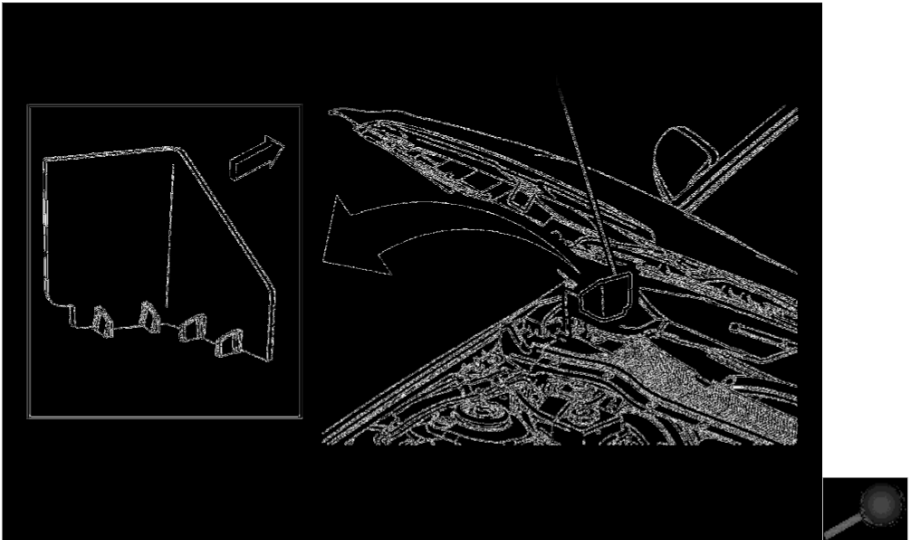


7. Connect the washer jet feed line (2) to the air inlet grille panel lower (1).
8. Install the hood rear seal to the flange on the air inlet grille panel. Refer to [Hood Rear Weatherstrip Replacement](#).

9. Apply pressure to the seal to secure.
10. Install the windshield wiper arms. Refer to [Windshield Wiper Arm Replacement](#).
11. Remove the suitable hood brace from the vehicle.



# Air Inlet Grille Panel Extension Replacement

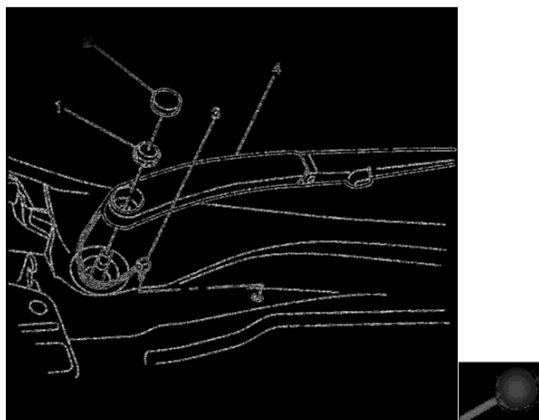


Air Inlet Grille Panel Extension Replacement

| Callout | Component Name                                                                                                                                                                                                              |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | <p>Air Inlet Grille Panel Extension</p> <p><b>Procedure</b></p> <p>Carefully grasp the air inlet grille panel extension and gently disengage the retainers from the front and side edges of the air inlet grille panel.</p> |

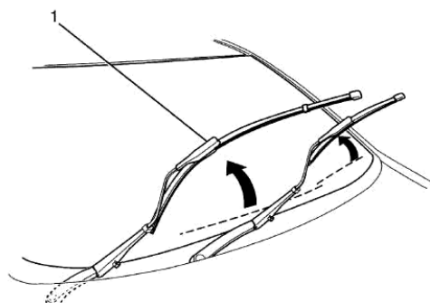
## Windshield Wiper Arm Replacement (Long Wheelbase Sedan)

### Removal Procedure



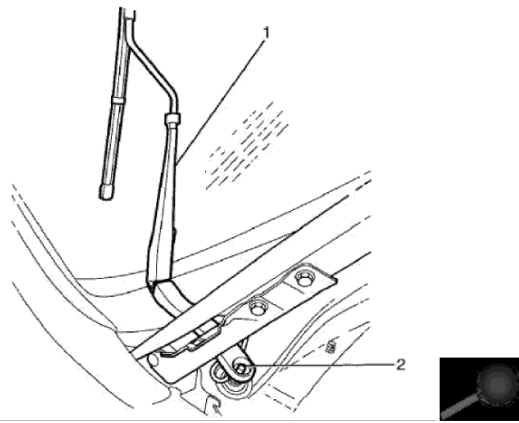
**Note:** Make sure that the wiper arms do not interfere with the bonnet while being moved away from the windshield otherwise damage to the bonnet may occur.

1. Open the Bonnet
2. Remove the wiper arm to pivot stud retaining nut covers (2).
3. Remove the wiper arm to air inlet grille washer hose connectors (3).
4. Remove the wiper arm to pivot stud retaining nuts (1).



**Note:** Make sure that the wiper arms do not interfere with the bonnet while being moved away from the windshield otherwise damage to the bonnet may occur.

5. Close the Bonnet
6. Lift the wiper arms (1) away from the windshield to the upright position.
7. Remove the LHS wiper arm from the wiper pivot stud.

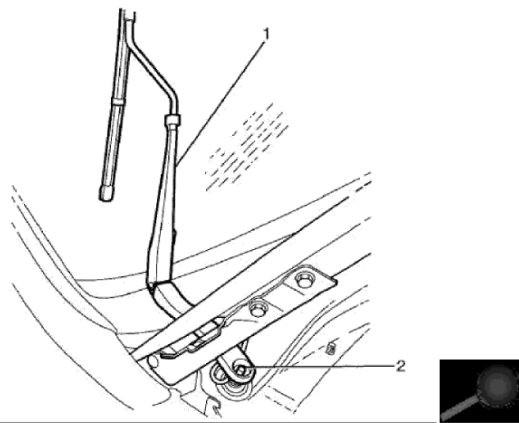


**Note:** Make sure that the RHS wiper arm does not interfere with the bonnet otherwise damage to the bonnet may occur.

**Note:** The RHS wiper should be in the vertical position and away from the windshield as shown.

8. Pull the right hand side wiper arm (1) away from the spline
9. Rotate the RHS wiper arm (1) so the bonnet can be opened without hitting the wiper.
10. Open the bonnet.
11. Manoeuvre the RHS wiper arm (1) off the wiper pivot stud and off the vehicle.

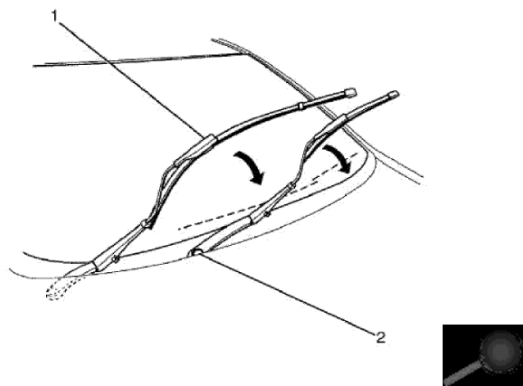
#### Installation Procedure



**Note:** Make sure that the RHS wiper arm does not interfere with the bonnet otherwise damage to the bonnet may occur.

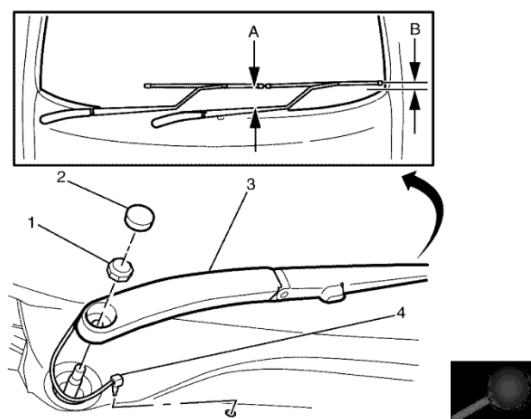
**Note:** The RHS wiper should be in the vertical position and away from the windshield as shown.

1. Install the RHS wiper arm (1) onto the wiper pivot stud.
2. Install the wiper arm to pivot stud retaining nut (2).  
Do not fully tighten at this stage.
3. Close the bonnet



**Note:** Make sure that the wiper arms do not interfere with the bonnet while being moved away from the windshield otherwise damage to the bonnet may occur.

4. Install the LHS wiper arm (1) to the wiper pivot stud.
5. Install the LHS wiper arm to pivot stud retaining nut (2).  
Do not fully tighten at this stage.
6. Lower the wiper arms (1) toward the windshield to the lowered position.



**Note:** When installing the wiper arm, ensure the installation measurements are adhered to otherwise fouling of the inlet panel may occur.

7. Align the wiper arm blades to the inlet panel using the following measurements :
  - Point ' A ' 59 mm
  - Point ' B ' 29 mm

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

8. Install the LHS wiper arm to pivot stud retaining nut (1).

**Tighten**

Tighten the nut to 35N•m (26 lb ft).

9. Open the bonnet.

10. Install the RHS wiper arm to pivot stud retaining nut (1).

**Tighten**

Tighten the nut to 35N•m (26 lb ft).

11. Install the wiper arm to pivot stud retaining nut covers.
12. Connect the wiper arm (3) to the air inlet grille washer hose connectors (4).

13. Close the bonnet.
14. Check the windshield wipers for correct operation.

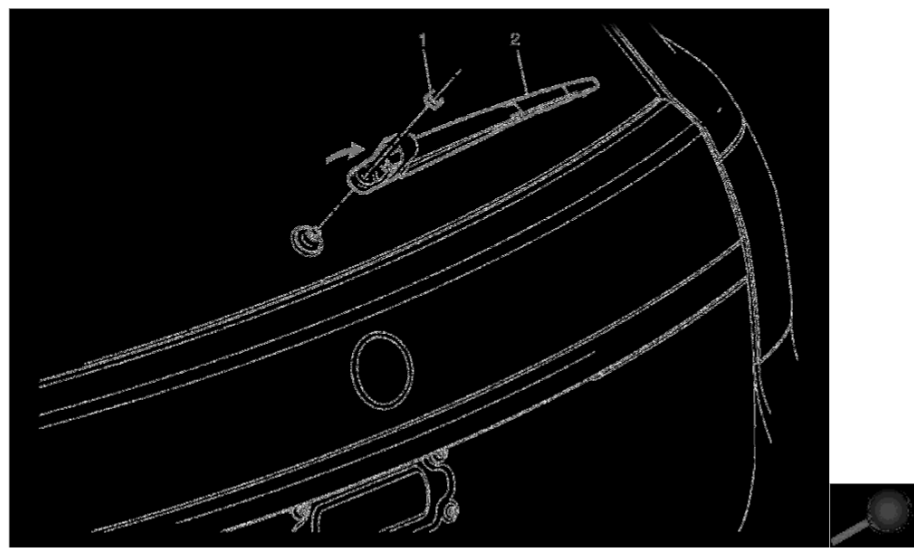
# Windshield Wiper Arm Replacement (Short Wheelbase)



Windshield Wiper Arm Replacement

| Callout                                                             | Component Name                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br>Open and support the hood assembly. |                                                                                                                                                                                                                                                                                                                                                                                       |
| 1                                                                   | Windshield Wiper Arm Nut Cap<br><b>Note:</b> Use a small flat-bladed tool in order to release the finish cap from the wiper arm assembly.                                                                                                                                                                                                                                             |
| 2                                                                   | Windshield Wiper Arm Nut<br><b>Caution:</b> Refer to <a href="#">Fastener Caution</a> .<br><b>Tighten</b><br>33 N·m(24 lb ft)                                                                                                                                                                                                                                                         |
| 3                                                                   | Windshield Wiper Arm<br><b>Procedure</b><br><ol style="list-style-type: none"><li>1. Use a suitable tool to pull the windshield wiper arm from the windshield wiper transmission pivot shaft.</li><li>2. Remove the windshield wiper arm from the pivot shaft.</li><li>3. Clean the pivot shaft knurls with a soft wire brush before installing a new windshield wiper arm.</li></ol> |

# Rear Window Wiper Arm Replacement (Sportwagon)

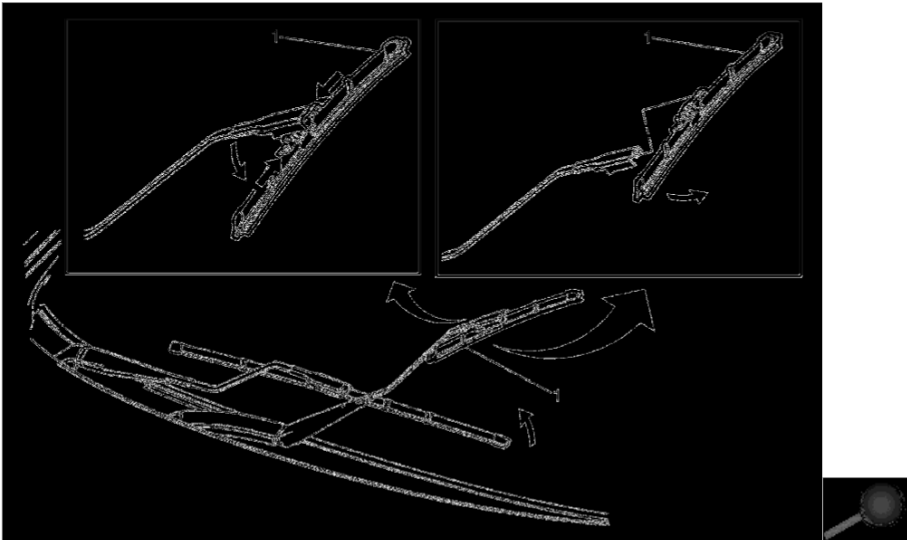


Rear Window Wiper Arm Replacement

| Callout | Component Name                                                                                                                                                                                                                                                                                                     |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | <p>Rear Window Wiper Arm Nut</p> <p><b>Caution:</b> Refer to <a href="#">Fastener Caution</a>.</p> <p><b>Procedure</b></p> <p>Lift the rear wiper arm cover away from the rear window to gain access to the rear wiper arm retaining nut.</p> <p><b>Tighten</b></p> <p>14 N•m (10 lb in)</p>                       |
| 2       | <p>Rear Window Wiper Arm</p> <p><b>Procedure</b></p> <p>1. Mark the position of the rear wiper arm to the rear wiper pivot stud.</p> <p>2. Remove the rear wiper arm from the rear wiper pivot stud.</p> <p><b>Note:</b> Ensure that the wiper arms remain at rest and Do Not spring back onto the windshield.</p> |

cardiagn.com

Windshield Wiper Blade Replacement

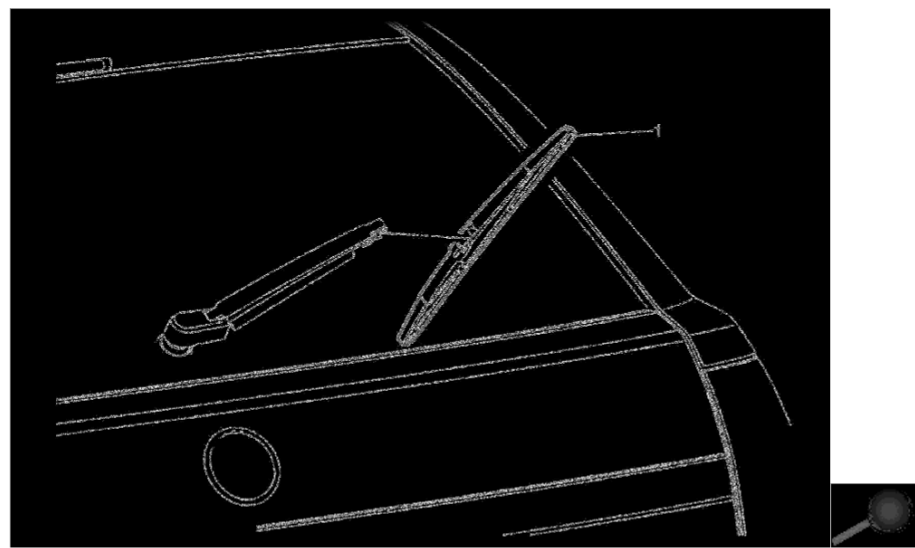


Windshield Wiper Blade Replacement

| Callout | Component Name                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | <p>Windshield Wiper Blade (Qty: 2)</p> <p><b>Procedure</b></p> <ol style="list-style-type: none"><li>1. Lift the wiper arms away from the windshield to the upright position.</li><li>2. Press inward on the wiper arm blade side clips to release the wiper blade from the arm.</li><li>3. Slide the blade upward to remove.</li></ol> <p><b>Note:</b> Ensure that the wiper arms remain at rest and Do Not spring back onto the windshield.</p> |



# Rear Window Wiper Blade Replacement (Sportwagon)

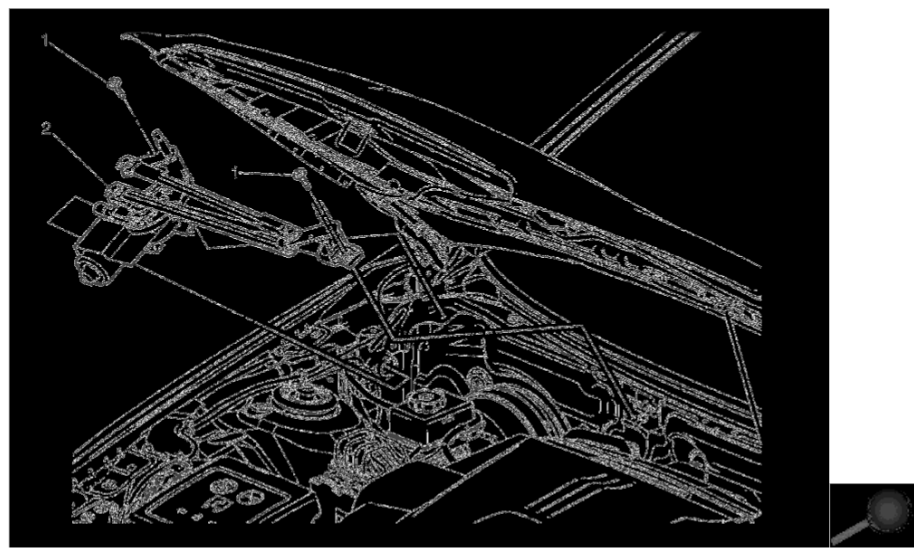


Rear Window Wiper Blade Replacement

| Callout | Component Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | <p>Rear Window Wiper Blade</p> <p><b>Procedure</b></p> <ol style="list-style-type: none"><li>1. Lift the rear wiper arm away from the rear window to the upright position.</li><li>2. Disengage the rear wiper blade lock by rotating the lower end of the rear wiper blade away from the wiper arm.</li><li>3. Remove the rear wiper blade out of the opening in the rear wiper arm.</li></ol> <p><b>Note:</b> Ensure that the wiper arms remain at rest and Do Not spring back onto the windshield.</p> |

cardiagn.com

# Windshield Wiper Motor Replacement

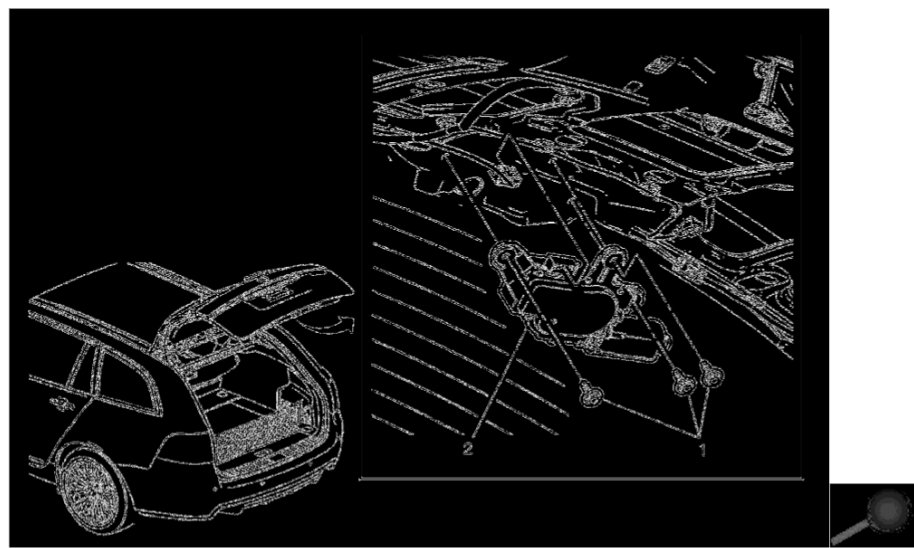


Windshield Wiper Motor Replacement

| Callout                                                                                                                                                                                                                                                                                                                                                                                                 | Component Name                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br><br>1. Open and support the hood assembly.<br>2. Remove the windshield wiper arm. Refer to <a href="#">Windshield Wiper Arm Replacement</a> .<br>3. Remove the air inlet grille panel. Refer to <a href="#">Air Inlet Grille Panel Replacement</a> .<br>4. Remove the plenum upper panel insulator. Refer to <a href="#">Plenum Upper Panel Insulator Replacement</a> . |                                                                                                                                                                                                                                                                                 |
| 1                                                                                                                                                                                                                                                                                                                                                                                                       | Windshield Wiper Motor Bolt (Qty: 2)<br><b>Caution:</b> Refer to <a href="#">Fastener Caution</a> .<br><b>Tighten</b><br>9 N•m (33 lb ft)                                                                                                                                       |
| 2                                                                                                                                                                                                                                                                                                                                                                                                       | Windshield Wiper Motor<br><b>Procedure</b><br><br>1. Slide the windshield wiper transmission inboard to release the grommet from the plenum.<br>2. Disconnect the windshield wiper motor electrical connector.<br>3. Remove the windshield wiper transmission from the vehicle. |

cardiagn.com

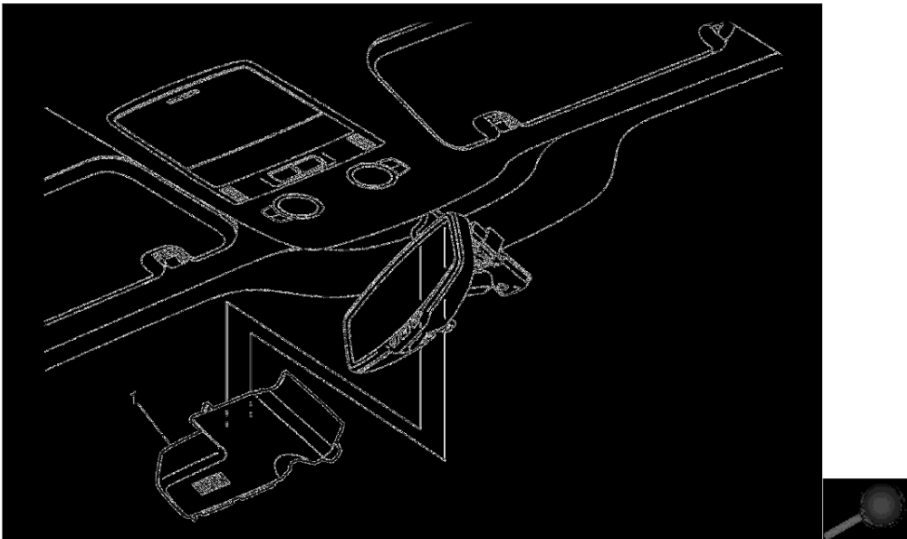
# Rear Window Wiper Motor Replacement (Sportwagon)



Rear Window Wiper Motor Replacement

| Callout                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Component Name                                                                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br><br>1. Open and support the liftgate assembly.<br>2. Remove the liftgate upper side trim finish panel. Refer to. <a href="#">Liftgate Upper Side Trim Finish Panel Replacement</a><br>3. Remove the liftgate upper trim finish panel. Refer to. <a href="#">Liftgate Upper Trim Finish Panel Replacement</a><br>4. Remove the liftgate lower trim finish panel. Refer to. <a href="#">Liftgate Lower Trim Finish Panel Replacement</a> |                                                                                                                                                                                                          |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Rear Window Wiper Motor (Qty: 3)<br><b>Caution:</b> Refer to <a href="#">Fastener Caution</a> .<br><b>Tighten</b><br>30 N•m (22 lb ft)                                                                   |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Rear Window Wiper Motor<br><b>Procedure</b><br><br>1. Disconnect the rear window wiper motor electrical connector from the rear window wiper motor.<br>2. Remove the rear window wiper from the vehicle. |

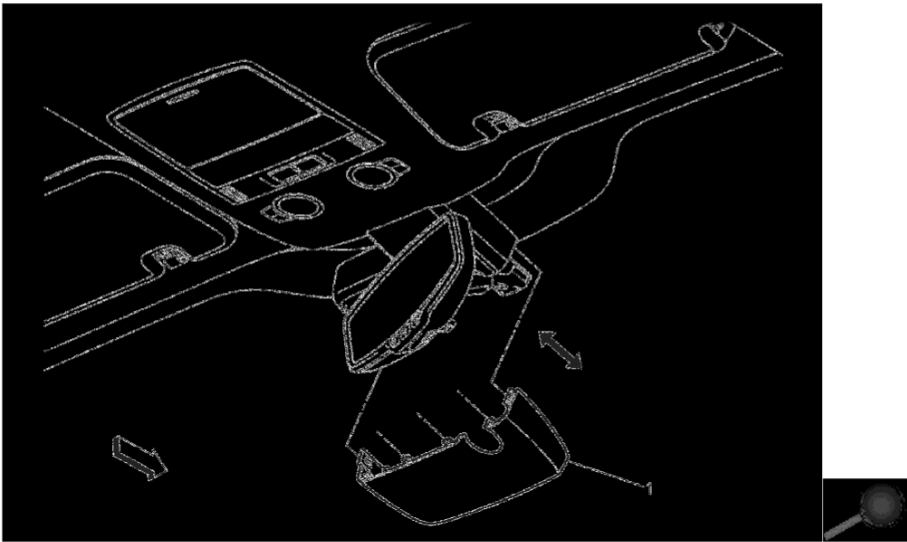
# Windshield Multifunction Sensor Mount Bracket Cover Replacement



Windshield Multifunction Sensor Mount Bracket Cover Replacement

| Callout                                                                                                                                                                                                | Component Name                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br>Remove the windshield multifunction sensor mount bracket lower cover. Refer to <a href="#">Windshield Multifunction Sensor Mount Bracket Lower Cover Replacement</a> . |                                                                                                                                                          |
| 1                                                                                                                                                                                                      | Windshield Multifunction Sensor Mount Bracket Cover<br><b>Preliminary Procedure</b><br>Grasp the cover on both sides and gently pull downward to remove. |

# Windshield Multifunction Sensor Mount Bracket Lower Cover Replacement



Windshield Multifunction Sensor Mount Bracket Lower Cover Replacement

| Callout | Component Name                                                                                                                                                 |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | Windshield Multifunction Sensor Mount Bracket Lower Cover<br><b>Preliminary Procedure</b><br>Grasp the cover on both sides and gently pull rearward to remove. |

## Windshield Glass Cleaning

**Important:** 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.

Clean the windshield with windshield cleaner, Optikleen P/N 92140004 or equivalent.

cardiagn.com

## Wiper Blade Element Cleaning

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

cardiagn.com

## 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 [Wiper Blade Element Cleaning](#).
- Replace the wiper blades, if necessary. Refer to [Windshield Wiper Blade Replacement](#).

cardiagn.com



## Fastener Tightening Specifications

Fastener Tightening Specifications

| Application                                               | Specification |          |
|-----------------------------------------------------------|---------------|----------|
|                                                           | Metric        | English  |
| Rear Window Wiper Arm Nut (Sportwagon)                    | 14 N•m        | 10 lb in |
| Rear Window Wiper Motor Bolt (Sportwagon)                 | 30 N•m        | 22 lb ft |
| Windshield Wiper Arm Retaining Nut (Short Wheelbase)      | 33 N•m        | 24 lb ft |
| Windshield Wiper Arm Retaining Nut (Long Wheelbase Sedan) | 35 N•m        | 26 lb ft |
| Windshield Wiper Solvent Container Filler Tube Bolt       | 4.5 N•m       | 40 lb in |
| Windshield Washer Solvent Container Bolt (HSV)            | 4.5 N•m       | 40 lb in |
| Windshield Wiper Motor Bolt                               | 9 N•m         | 33 lb ft |

cardiagn.com

## Wiper/Washer Schematics

**Figure 1:** [Front Wipers](#)

**Figure 2:** [Headlamp Washer, Windshield Washer and Rain Sensor](#)

**Figure 3:** [Rear Wiper/Washer](#)

cardiagn.com

