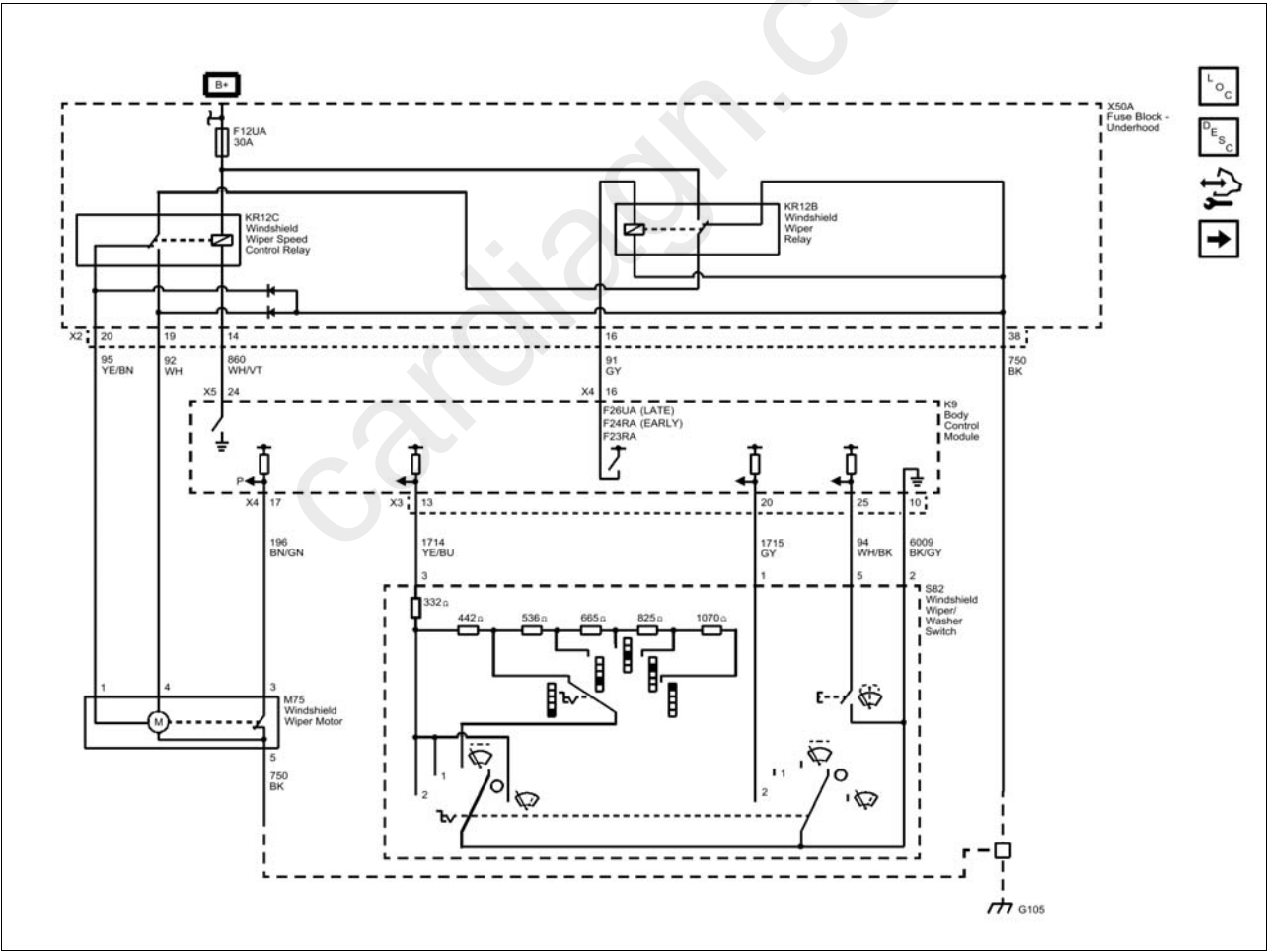


SPECIFICATIONS > FASTENER SPECIFICATIONS

Application	Specification	
	Metric	English
Windshield Washer Solvent Container Bolt	6 N.m	53 lb in
Windshield Washer Solvent Container Filler Tube Bolt	6 N.m	53 lb in
Windshield Wiper Arm Nut	36 N.m	27 lb ft
Windshield Wiper Motor Bolt	7.5 N.m	66 lb in
Windshield Wiper Motor Nut	7.5 N.m	66 lb in
Windshield Wiper Transmission Bolt	8 N.m	71 lb in

SCHEMATIC WIRING DIAGRAMS > WIPER/WASHER WIRING SCHEMATICS > WIPER

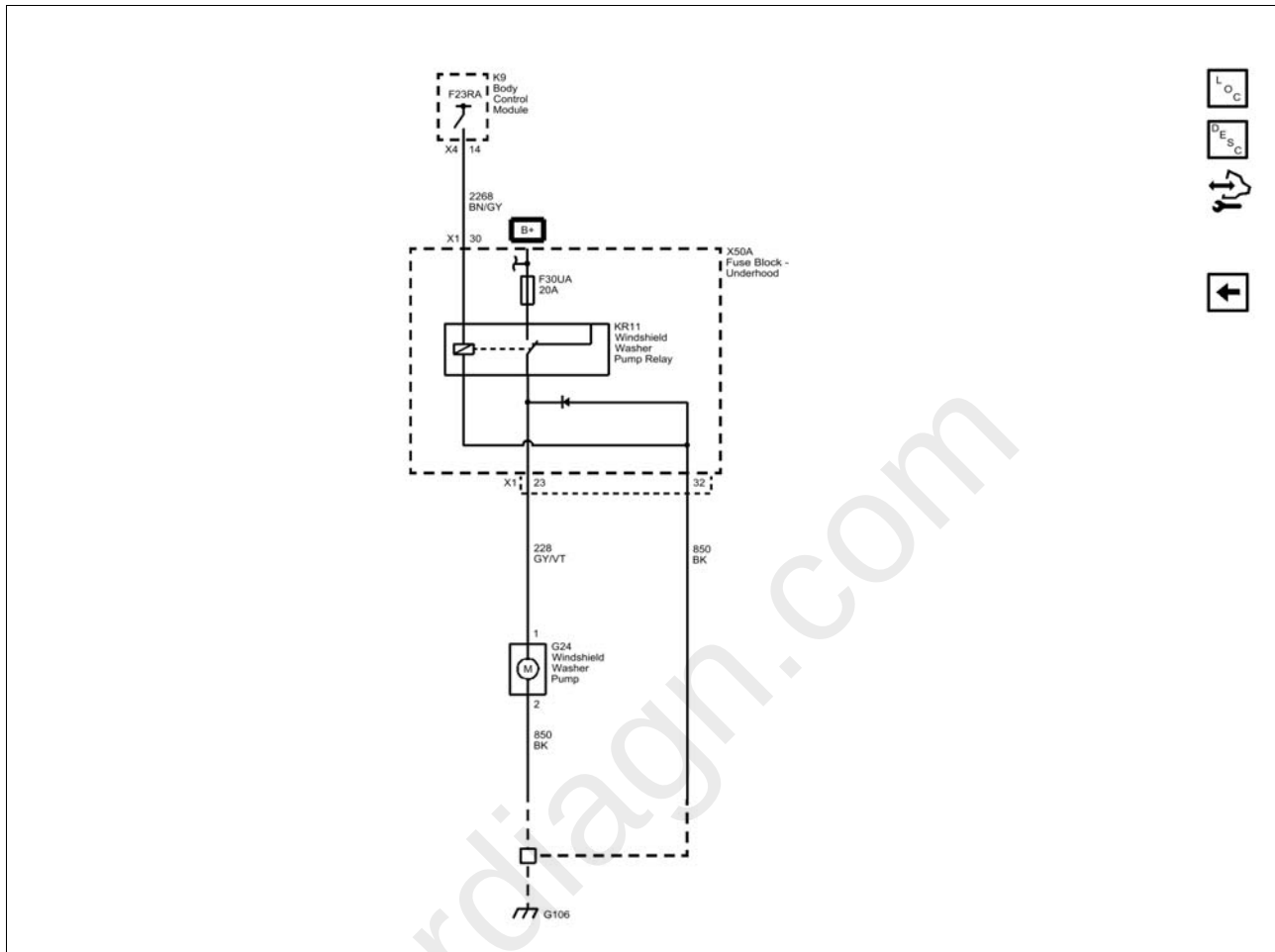
Fig 1: Wiper



Courtesy of GENERAL MOTORS COMPANY

SCHEMATIC WIRING DIAGRAMS > WIPER/WASHER WIRING SCHEMATICS > WASHER

Fig 1: Washer



Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3715 OR B3875: WINDSHIELD WIPER > 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 INFORMATION AND PROCEDURES > DTC B3715 OR B3875: WINDSHIELD WIPER > 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 INFORMATION AND PROCEDURES > DTC B3715 OR B3875: WINDSHIELD WIPER > DIAGNOSTIC FAULT INFORMATION

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

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3715 OR B3875: WINDSHIELD WIPER > 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 body control module 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. The windshield wiper motor will continue to operate using a discrete B+ circuit provided by the BCM until the wipers are in the park position.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3715 OR B3875: WINDSHIELD WIPER > CONDITIONS FOR RUNNING THE DTC

- A wiper output is actively being requested by the BCM.
- The system voltage is between 9-16 V.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3715 OR B3875:

WINDSHIELD WIPER > CONDITIONS FOR SETTING THE DTC

B3715 01

A short to battery 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 battery 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.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3715 OR B3875: WINDSHIELD WIPER > ACTION TAKEN WHEN THE DTC SETS

The BCM will not activate the wiper output.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3715 OR B3875: WINDSHIELD WIPER > 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.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3715 OR B3875: WINDSHIELD WIPER > REFERENCE INFORMATION

Schematic Reference

Wiper/Washer Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3715 OR B3875: WINDSHIELD WIPER > CIRCUIT/SYSTEM VERIFICATION

1. Ignition ON.
2. Verify the M75 Windshield Wiper Motor activates and functions in the Low wiping speed when cycling the S82 Windshield Wiper/Washer Switch between the Off and Low positions
 1. **If the M75 Windshield Wiper Motor does not activate or continuously functions in the Low wiping speed**

Refer to Circuit/System Testing - Windshield Wiper Motor Malfunction
 1. **If the M75 Windshield Wiper Motor does activate and functions in Low wiping speed**
3. Verify the M75 Windshield Wiper Motor changes between the Low and High wiping speeds when cycling the S82 Windshield Wiper/Washer Switch between the Low and High positions
 1. **If the M75 Windshield Wiper Motor does not change between Low and High wiping speed**

Refer to Circuit/System Testing - Windshield Wiper Speed Control Malfunction
 1. **If the M75 Windshield Wiper Motor does change between the Low and High wiping speed**
4. All OK.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3715 OR B3875: WINDSHIELD WIPER > CIRCUIT/SYSTEM TESTING

Windshield Wiper Motor Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the X2 harness connector at the X50A Fuse Block-Underhood. It may take up to 2 min for all vehicle systems to power down.

2. Test for less than 10 Ω between the ground circuit terminal 38 and ground.

1. If 10 Ω or greater

1. Ignition OFF.

2. Test for less than 2 Ω in the ground circuit end to end.

1. If 2 Ω or greater, repair the open/high resistance in the circuit.

2. If less than 2 Ω , repair the open/high resistance in the ground connection.

1. If less than 10 Ω

3. Connect the X2 harness connector at the X50A Fuse Block-Underhood and disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.

4. Verify the M75 Windshield Wiper Motor low wiping speed is not activated.

1. If the M75 Windshield Wiper Motor low wiping speed is activated

1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block-Underhood.

2. Test for less than 1 V between the K9 Body Control Module control circuit terminal 16 X4 and ground.

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

1. If less than 1 V, test or replace the X50A Fuse Block-Underhood.

1. If the M75 Windshield Wiper Motor low wiping speed is not activated

5. Connect a 3 A fused jumper wire between the control circuit terminal 16 and B+.

6. Verify the M75 Windshield Wiper Motor low wiping speed activates.

1. If the M75 Windshield Wiper Motor low wiping speed does not activate

1. Ignition OFF, remove the jumper wire, disconnect the X2 harness connector at the X50A Fuse Block-Underhood, ignition ON.

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

1. If less than Infinite resistance, repair the short to ground on the circuit.

1. If infinite resistance

3. Test for less than 2 Ω in the control circuit end to end.

1. If 2 Ω or greater, repair the open/high resistance in the circuit.

2. If less than 2 Ω , test or replace the X50A Fuse Block-Underhood.

1. If the M75 Windshield Wiper Motor low wiping speed activates

7. Replace the K9 Body Control Module.

1. Ignition OFF, disconnect the X4 and X5 harness connectors at the K9 Body Control Module, ignition ON.
2. Connect a 3 A fused jumper wire between the K9 Body Control Module control circuit terminal 16 X4 and B+.
3. Verify the M75 Windshield Wiper Motor high wiping speed is not activated.

1. If the M75 Windshield Wiper Motor high wiping speed is activated

1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block-Underhood.
2. Test for infinite resistance between the K9 Body Control Module control circuit terminal 24 X5 and ground.
 1. If less than Infinite resistance, repair the short to ground on the circuit.
 1. If infinite resistance, test or replace the X50A Fuse Block-Underhood.

1. If the M75 Windshield Wiper Motor high wiping speed is not activated

4. Connect a 3 A fused jumper wire between the K9 Body Control Module control circuit terminal 24 X5 and ground and a 3 A fused jumper wire between the control circuit terminal 16 X4 and B+.
5. Verify the M75 Windshield Wiper Motor high wiping speed activates.

1. If the M75 Windshield Wiper Motor high wiping speed does not activate

1. Ignition OFF, remove the jumper wires, disconnect the X2 harness connector at the X50A Fuse Block-Underhood, ignition ON.
2. Test for less than 1 V between the K9 Body Control Module control circuit terminal 24 X5 and ground.
 1. If 1 V or greater, repair the short to voltage on the circuit.
 1. If less than 1 V
3. Test for less than 2 Ω in the control circuit end to end.
 1. If 2 Ω or greater, repair the open/high resistance in the circuit.
 2. If less than 2 Ω , test or replace the X50A Fuse Block-Underhood.

1. If the M75 Windshield Wiper Motor high wiping speed activates

6. Replace the K9 Body Control Module.

**DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3715 OR B3875:
WINDSHIELD WIPER > REPAIR INSTRUCTIONS**

Perform the Diagnostic Repair Verification after completing the repair.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3873: FRONT WASHER RELAY CIRCUIT > 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 INFORMATION AND PROCEDURES > DTC B3873: FRONT WASHER RELAY CIRCUIT > DTC DESCRIPTORS

DTC B3873

Front Washer Relay Circuit

For symptom byte information refer to: Symptom Byte List

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3873: FRONT WASHER RELAY CIRCUIT > DIAGNOSTIC FAULT INFORMATION

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Control	B3873 02	B3873 04	B3873 01	-

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3873: FRONT WASHER RELAY CIRCUIT > CIRCUIT/SYSTEM DESCRIPTION

The windshield washer pump is controlled by the body control module (BCM) via a printed circuit board (PCB) relay. When the washer switch is depressed, the BCM's internally pulled high resistor is pulled low by the washer request circuit. The BCM then applies voltage through a control circuit to the PCB 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 fluid pump.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3873: FRONT WASHER RELAY CIRCUIT > CONDITIONS FOR RUNNING THE DTC

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

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3873: FRONT WASHER RELAY CIRCUIT > 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

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3873: FRONT WASHER RELAY CIRCUIT > ACTION TAKEN WHEN THE DTC SETS

Washer operation is suspended.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3873: FRONT WASHER RELAY CIRCUIT > CONDITIONS FOR CLEARING THE DTC

A current DTC clears when the diagnostic runs and passes.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3873: FRONT WASHER RELAY CIRCUIT > REFERENCE INFORMATION

Schematic Reference

Wiper/Washer Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3873: FRONT WASHER RELAY CIRCUIT > CIRCUIT/SYSTEM VERIFICATION

1. Ignition ON.
2. Verify the G24 Windshield Washer Pump activates when commanding the Windshield Washer Relay On and Off with a scan tool.
 1. **If the G24 Windshield Washer Pump does not activate**
Refer to Circuit/System Testing
 1. **If the G24 Windshield Washer Pump activates**
3. All OK.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3873: FRONT WASHER RELAY CIRCUIT > CIRCUIT/SYSTEM TESTING

1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
2. Verify the G24 Windshield Washer Pump is not activated.
 1. **If the G24 Windshield Washer Pump is activated**
 1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block-Underhood.
 2. Test for less than 1 V between the K9 Body Control Module control circuit terminal 14 X4 and ground.
 1. If 1 V or greater, repair the short to voltage on the circuit.
 1. If less than 1 V, test or replace the X50A Fuse Block-Underhood.
 1. **If the G24 Windshield Washer Pump is not activated**
3. Connect a 3 A fused jumper wire between the control circuit terminal 14 and B+.
4. Verify the G24 Windshield Washer Pump activates.
 1. **If the G24 Windshield Washer Pump does not activate**
 1. Ignition OFF, remove the jumper wire, disconnect the X1 harness connector at the

X50A Fuse Block-Underhood, ignition ON.

2. Test for infinite resistance between the control circuit and ground.
 1. If less than Infinite resistance, repair the short to ground on the circuit.
 1. If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
 1. If 2 Ω or greater, repair the open/high resistance in the circuit.
 2. If less than 2 Ω , test or replace the X50A Fuse Block-Underhood.

1. If the G24 Windshield Washer Pump activates

5. Replace the K9 Body Control Module.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3873: FRONT WASHER RELAY CIRCUIT > REPAIR INSTRUCTIONS

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for body control module replacement, programming and setup.

DIAGNOSTIC INFORMATION AND PROCEDURES > 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:
 1. No DTCs are set.
 2. 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.

DIAGNOSTIC INFORMATION AND PROCEDURES > SYMPTOMS - WIPER/WASHER SYSTEMS > 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.

DIAGNOSTIC INFORMATION AND PROCEDURES > SYMPTOMS - WIPER/WASHER SYSTEMS > INTERMITTENT

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

DIAGNOSTIC INFORMATION AND PROCEDURES > SYMPTOMS - WIPER/WASHER SYSTEMS > SYMPTOM LIST

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

- Windshield Wiper System Malfunction
- Washer Malfunction

DIAGNOSTIC INFORMATION AND PROCEDURES > 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 INFORMATION AND PROCEDURES > WINDSHIELD WIPER SYSTEM MALFUNCTION > DIAGNOSTIC FAULT INFORMATION

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Windshield Wiper Switch Signal terminal 3	1	1	1	-
Windshield Wiper Switch Signal terminal 4	4	2	-	-
Windshield Wiper Motor Park Signal	3	3	-	-
Windshield Wiper Relay Control	B3715 02	B3715 04	B3715 01	-

Windshield Wiper Speed Control Relay Control	B3875 02	B3875 04	B3875 01	-
Windshield Wiper High Speed Motor Control	2	2	4	-
Front Wiper Low Speed Motor Control	1	1	4	-
Windshield Wiper/Washer Switch Low Reference	-	1, 2	-	-
Windshield Wiper Motor Ground	-	1, 2, 3	-	-
Underhood Fuse Block Ground	-	1	-	-
1. Delay or Low Speed Wipers Inoperative 2. High Speed Wipers Inoperative 3. Wipers Do Not Park 4. Wipers Always On				

DIAGNOSTIC INFORMATION AND PROCEDURES > WINDSHIELD WIPER SYSTEM MALFUNCTION > CIRCUIT/SYSTEM DESCRIPTION

The body control module (BCM) controls the windshield wiper motor based on inputs from the windshield wiper/washer switch. The BCM monitors the windshield wiper/washer switch through two separate signal circuits and a low reference circuit. The windshield wiper/washer switch uses a resistor ladder to determine low speed and intermittent operation. The BCM applies and monitors voltage on the windshield wiper switch signal circuit. When the wiper switch is placed in the low speed or intermittent position, the voltage is pulled down through a different resistor in the resistor ladder, reducing the voltage seen at the BCM. The BCM will respond by commanding on the low speed or intermittent wipers. The high speed wipers are controls through a discrete signal circuit. With the windshield wiper/washer switch is in the high speed position, the windshield wiper high speed switch signal circuit is pulled directly to ground. The BCM will respond by commanding on the high speed wipers.

The windshield wiper motor is controlled by the BCM through the windshield wiper relay and the windshield wiper speed control relay. A constant ground is supplied to the rear wiper motor. 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. The windshield wiper motor will continue to operate using a discrete B+ circuit provided by the BCM until the wipers are in the park position.

DIAGNOSTIC INFORMATION AND PROCEDURES > WINDSHIELD WIPER SYSTEM

MALFUNCTION > REFERENCE INFORMATION

Schematic Reference

Wiper/Washer Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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

DIAGNOSTIC INFORMATION AND PROCEDURES > WINDSHIELD WIPER SYSTEM MALFUNCTION > CIRCUIT/SYSTEM VERIFICATION

1. Ignition ON.
2. Verify the scan tool Windshield Wiper Switch parameter changes between Off and Low cycling the S82 Windshield Wiper/Washer Switch between the Off and Low positions.
 1. **If the parameter does not change**

Refer to Circuit/System Testing - Windshield Wiper/Washer Switch Malfunction.
 1. **If the parameter changes**
3. Verify the scan tool Windshield Wiper Switch parameter changes between Delay 1 and Delay 5 cycling the S82 Windshield Wiper/Washer Switch intermittent wipe speed positions.
 1. **If the parameter does not change**

Test or replace the S82 Windshield Wiper/Washer Switch.
 1. **If the parameter changes**
4. Verify the scan tool Windshield Wiper High Speed Switch parameter changes between Active and Inactive cycling the S82 Windshield Wiper/Washer Switch between the Low and High positions.

1. If the parameter does not change

Refer to Circuit/System Testing - Windshield Wiper/Washer Switch Malfunction.

1. If the parameter changes

5. Verify the M75 Windshield Wiper Motor activates and functions in the Low wiping speed when cycling the S82 Windshield Wiper/Washer Switch between the Off and Low positions

1. If the M75 Windshield Wiper Motor does not activate or continuously functions in the Low wiping speed

Refer to Circuit/System Testing - Windshield Wiper Motor Malfunction

1. If the M75 Windshield Wiper Motor does activate and functions in Low wiping speed

6. Verify the M75 Windshield Wiper Motor changes between the Low and High wiping speeds when cycling the S82 Windshield Wiper/Washer Switch between the Low and High positions

1. If the M75 Windshield Wiper Motor does not change between Low and High wiping speed

Refer to Circuit/System Testing - Windshield Wiper Speed Control Malfunction

1. If the M75 Windshield Wiper Motor does change between the Low and High wiping speed

7. Verify the windshield wipers finish the wiping cycle and park at the bottom of the windshield when cycling the S82 Windshield Wiper/Washer Switch from Low to Off.

1. If the windshield wipers immediately stop do not park at the bottom of the windshield

Refer to Circuit/System Testing - Windshield Wiper Park Feature Malfunction.

1. If the windshield wipers park at the bottom of the windshield

8. All OK.

DIAGNOSTIC INFORMATION AND PROCEDURES > WINDSHIELD WIPER SYSTEM MALFUNCTION > 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 5 min for all vehicle systems to power down.

2. Test for less than 10 Ω between the low reference circuit terminal 2 and ground.

1. If 10 Ω or greater

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

2. Test for less than 2 Ω in the low reference circuit end to end.

1. If 2 Ω or greater, repair the open/high resistance in the circuit.

2. If less than 2 Ω , replace the K9 Body Control Module.

1. If less than 10 Ω

3. Ignition ON.

4. Verify the scan tool Windshield Wiper High Speed Switch parameter is Inactive.

1. If not Inactive

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

2. Test for infinite resistance between the signal circuit terminal 1 and ground.

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

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

1. 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.

1. If not Active

1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the K9 Body Control Module, ignition ON.

2. Test for less than 1 V between the signal circuit and ground.

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

1. If less than 1 V

3. Test for less than 2 Ω in the signal circuit end to end.

1. If 2 Ω or greater, repair the open/high resistance in the circuit.

2. If less than 2 Ω , replace the K9 Body Control Module.

1. If Active

7. Test for 8 V or greater between the signal circuit terminal 3 and ground.

1. If less than 8 V

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

2. Test for infinite resistance between the signal circuit and ground

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

1. If infinite resistance

3. Test for less than 2 Ω in the signal circuit end to end.

1. If 2 Ω or greater, repair the open/high resistance in the circuit.

2. If less than 2 Ω , replace the K9 Body Control Module.

1. 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.

1. If 1 V or greater

Repair the short to voltage on the circuit.

1. If less than 1 V

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

Windshield Wiper Motor Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the X2 harness connector at the X50A Fuse Block-Underhood. It may take up to 2 min for all vehicle systems to power down.

2. Test for less than 10 Ω between the ground circuit terminal 38 and ground.

1. If 10 Ω or greater

1. Ignition OFF.

2. Test for less than 2 Ω in the ground circuit end to end.

1. If 2 Ω or greater, repair the open/high resistance in the circuit.

2. If less than 2 Ω , repair the open/high resistance in the ground connection.

1. If less than 10 Ω

3. Connect the X2 harness connector at the X50A Fuse Block-Underhood and disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.

4. Verify the M75 Windshield Wiper Motor low wiping speed is not activated.

1. If the M75 Windshield Wiper Motor low wiping speed is activated

1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block-Underhood.

2. Test for less than 1 V between the K9 Body Control Module control circuit terminal 16 X4 and ground.

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

1. If less than 1 V, test or replace the X50A Fuse Block-Underhood.

1. If the M75 Windshield Wiper Motor low wiping speed is not activated

5. Connect a 3 A fused jumper wire between the control circuit terminal 16 and B+.

6. Verify the M75 Windshield Wiper Motor low wiping speed activates.

1. If the M75 Windshield Wiper Motor low wiping speed does not activate

1. Ignition OFF, remove the jumper wire, disconnect the X2 harness connector at the X50A Fuse Block-Underhood.

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

1. If less than Infinite resistance, repair the short to ground on the circuit.

1. If infinite resistance

3. Test for less than 2 Ω in the control circuit end to end.

1. If 2 Ω or greater, repair the open/high resistance in the circuit.

2. If less than 2 Ω , test or replace the X50A Fuse Block-Underhood.

1. If the M75 Windshield Wiper Motor low wiping speed activates

7. Replace the K9 Body Control Module.

Windshield Wiper Speed Control Malfunction

1. Ignition OFF, disconnect the X4 and X5 harness connectors at the K9 Body Control Module, ignition ON.

2. Connect a 3 A fused jumper wire between the K9 Body Control Module control circuit terminal 16 X4 and B+.

3. Verify the M75 Windshield Wiper Motor high wiping speed is not activated.

1. If the M75 Windshield Wiper Motor high wiping speed is activated

1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block-Underhood.

2. Test for infinite resistance between the K9 Body Control Module control circuit terminal 24 X5 and ground.

1. If less than Infinite resistance, repair the short to ground on the circuit.

1. If infinite resistance, test or replace the X50A Fuse Block-Underhood.

1. If the M75 Windshield Wiper Motor high wiping speed is not activated

4. Connect a 3 A fused jumper wire between the K9 Body Control Module control circuit terminal 24 X5 and ground and a 3 A fused jumper wire between the control circuit terminal 16 X4 and B+.

5. Verify the M75 Windshield Wiper Motor high wiping speed activates.

1. If the M75 Windshield Wiper Motor high wiping speed does not activate

1. Ignition OFF, remove the jumper wires, disconnect the X2 harness connector at the

X50A Fuse Block-Underhood, ignition ON.

2. Test for less than 1 V between the K9 Body Control Module control circuit terminal 24 X5 and ground.

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

1. If less than 1 V

3. Test for less than 2 Ω in the control circuit end to end.

1. If 2 Ω or greater, repair the open/high resistance in the circuit.

2. If less than 2 Ω , test or replace the X50A Fuse Block-Underhood.

1. If the M75 Windshield Wiper Motor high wiping speed activates

6. Replace the K9 Body Control Module.

Windshield Wiper Park Feature Malfunction

1. Ignition OFF, disconnect the harness connector at the M75 Windshield Wiper Motor.
2. Connect a test lamp between the control circuit terminal 3 and the ground circuit terminal 5
3. Ignition ON, verify that a test lamp turns ON and OFF when cycling the S82 Windshield Wiper/Washer Switch between the Off and Low positions

1. If test lamp does not turn ON

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

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

1. If less than Infinite resistance, repair the short to ground on the circuit.

1. Infinite resistance

3. Test for less than 2 Ω in the control circuit end to end.

1. If 2 Ω or greater, repair the open/high resistance in the circuit.

2. If less than 2 Ω , test or replace the K9 Body Control Module.

1. If test lamp does not turn OFF

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

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

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

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

1. If the test lamp turns ON and OFF

4. Replace the M75 Windshield Wiper Motor.

DIAGNOSTIC INFORMATION AND PROCEDURES > WINDSHIELD WIPER SYSTEM MALFUNCTION > 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 terminals listed below and the low reference terminal 2 with the switch in the OFF position.

1. Signal terminal 1 and low reference terminal 2

2. Signal terminal 3 and low reference terminal 2

- 1. If less than infinite resistance**

Replace the S82 Windshield Wiper/Washer Switch.

- 1. If infinite resistance**

3. Test for less than 2 Ω between the signal terminal 1 and the low reference terminal 2 with the switch in the HIGH position.

- 1. If 2 Ω or greater**

Replace the S82 Windshield Wiper/Washer Switch.

- 1. If less than 2 Ω**

4. Verify the resistance readings are within the specified range listed below between the signal terminal 3 and the low reference terminal 2 by cycling the switch in the listed positions below.

1. Delay 1 : 3.75-3.85k Ω

2. Delay 2 : 2.75-2.85k Ω

3. Delay 3 : 1.95-2.05k Ω

4. Delay 4 : 1.25-1.35k Ω

5. Delay 5 : 765-775 Ω

6. Low : 315-335 Ω

- 1. If not within the specified range**

Replace the S82 Windshield Wiper/Washer Switch.

- 1. If within the specified range**

5. All OK

MALFUNCTION > REPAIR INSTRUCTIONS

Perform the Diagnostic Repair Verification after completing the repair.

- Windshield Wiper Motor Replacement
- Turn Signal Switch Replacement
- Control Module References for body control module replacement, programming and setup.

DIAGNOSTIC INFORMATION AND PROCEDURES > WASHER MALFUNCTION > DIAGNOSTIC INSTRUCTIONS

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

DIAGNOSTIC INFORMATION AND PROCEDURES > WASHER MALFUNCTION > DIAGNOSTIC FAULT INFORMATION

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Underhood Fuse Block B+	-	3	-	-
Windshield Washer Switch Signal	1, 2	1	1	-
Windshield Washer Pump Control	3	3	2	-
Windshield Washer Pump Relay Control	B3873 02	B3873 04	B3873 01	-
Underhood Fuse Block Ground	-	3	-	-
Windshield Washer Pump Ground	-	3	-	-
1. Windshield Washer Switch Malfunction 2. Windshield Washer Pump Always ON 3. Windshield Washer Pump Inoperative				

DIAGNOSTIC INFORMATION AND PROCEDURES > WASHER MALFUNCTION > CIRCUIT/SYSTEM DESCRIPTION

The windshield washer pump is controlled by the body control module (BCM) via a printed circuit board

(PCB) relay. When the washer switch is depressed, the BCM's internally pulled high resistor is pulled low by the washer request circuit. The BCM then applies voltage through a control circuit to the PCB 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 fluid pump.

DIAGNOSTIC INFORMATION AND PROCEDURES > WASHER MALFUNCTION > DIAGNOSTIC AIDS



NOTE:

The windshield washer pump uses washer fluid as a coolant and lubricant, do not activate washer pump for long periods without washer fluid in the windshield washer bottle as the washer pump will overheat and become damaged.

If the windshield washer pump activates but does not spray fluid, inspect for the following:

- Disconnected washer hose
- Cut or perforated washer hose
- Obstructed washer hose
- Dirt or debris in washer bottle obstructing washer pump inlet
- Obstructed washer nozzles

DIAGNOSTIC INFORMATION AND PROCEDURES > WASHER MALFUNCTION > REFERENCE INFORMATION

Schematic Reference

Wiper/Washer Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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

DIAGNOSTIC INFORMATION AND PROCEDURES > WASHER MALFUNCTION > CIRCUIT/SYSTEM VERIFICATION

1. Ignition ON.
2. Verify the scan tool Windshield Washer Switch parameter changes between Active and Inactive when pulling and releasing the S82 Windshield Wiper/Washer Switch.
 1. **If the parameter does not change**

Refer to Circuit/System Testing - Windshield Wiper/Washer Switch Malfunction.
 1. **If the parameter changes**
3. Verify the G24 Windshield Washer Pump turns ON and OFF when commanding the Windshield Washer Relay Active and Inactive with a scan tool.
 1. **If the G24 Windshield Washer Pump does not turn ON or OFF**

Refer to Circuit/System Testing - Windshield Washer Pump Malfunction
 1. **If the G24 Windshield Washer Pump does turn ON and OFF**
4. All OK.

DIAGNOSTIC INFORMATION AND PROCEDURES > WASHER MALFUNCTION > 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 Ω between the low reference circuit terminal 2 and ground.
 1. **If 10 Ω or greater**
 1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module.
 2. Test for less than 2 Ω in the low reference circuit end to end.
 1. If 2 Ω or greater, repair the open/high resistance in the circuit.
 2. If less than 2 Ω , replace the K9 Body Control Module.
 1. **If less than 10 Ω**

3. Ignition ON.
4. Verify the scan tool Windshield Washer Switch parameter is Inactive.

1. If not Inactive

1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module.
2. Test for infinite resistance between the signal circuit terminal 5 and ground.
 1. If less than infinite resistance, repair the short to ground on the circuit.
 2. If infinite resistance, replace the K9 Body Control Module.

1. 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.

1. If not Active

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

1. 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 harness connector at the G24 Windshield Washer Pump. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 2 and ground.

1. If 10 Ω or greater

1. Ignition OFF.
2. Test for less than 2 Ω in the ground circuit end to end.
 1. If 2 Ω or greater, repair the open/high resistance in the circuit.
 2. If less than 2 Ω , repair the open/high resistance in the ground connection.

1. If less than 10 Ω

3. Connect a test lamp between the control circuit terminal 1 and ground, ignition ON.
4. Verify the test lamp does not turn ON and OFF when commanding the Windshield Washer Relay Active and Inactive with a scan tool.

1. If the test lamp turns ON and OFF

Test or replace the G24 Windshield Washer Pump.

1. If the test lamp does not turn ON and OFF

5. Ignition OFF, connect the harness connector at the G24 Windshield Washer Pump. Disconnect the X1 harness connector at the X50A Fuse Block-Underhood, ignition ON.
6. Verify the G24 Windshield Washer Pump is not activated.

1. If the G24 Windshield Washer Pump is activated

1. Ignition OFF, disconnect the harness connector at the G24 Windshield Washer Pump, ignition ON.
2. Test for less than 1 V between the control circuit terminal 23 X1 and ground.
 1. If 1 V or greater, repair the short to voltage on the circuit.
 2. If less than 1 V, test or replace the G24 Windshield Washer Pump.

1. If the G24 Windshield Washer Pump is not activated

7. Connect a 20 A fused jumper wire between the control circuit terminal 23 and B+.
8. Verify the G24 Windshield Washer Pump activates.

1. If the G24 Windshield Washer Pump does not activate

1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the G24 Windshield Washer Pump, ignition ON.
2. Test for infinite resistance between the control circuit and ground.
 1. If less than Infinite resistance, repair the short to ground on the circuit.
 1. If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
 1. If 2 Ω or greater, repair the open/high resistance in the circuit.
 2. If less than 2 Ω , test or replace the G24 Windshield Washer Pump.

1. If the G24 Windshield Washer Pump activates

9. Ignition OFF and all vehicle systems OFF, disconnect the X2 harness connector at the X50A Fuse Block-Underhood. It may take up to 2 min for all vehicle systems to power down.
10. Test for less than 10 Ω between the ground circuit terminal 32 and ground.

1. If 10 Ω or greater

1. Ignition OFF.
2. Test for less than 2 Ω in the ground circuit end to end.
 1. If 2 Ω or greater, repair the open/high resistance in the circuit.
 2. If less than 2 Ω , repair the open/high resistance in the ground connection.

1. If less than 10 Ω

11. Connect the X1 and X2 harness connectors at the X50A Fuse Block-Underhood. Disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
12. Verify the G24 Windshield Washer Pump is not activated.

1. If the G24 Windshield Washer Pump is activated

1. Ignition OFF, disconnect the harness connector at the X50A Fuse Block-Underhood, ignition ON.
2. Test for less than 1 V between the K9 Body Control Module control circuit terminal 14 and ground.
 1. If 1 V or greater, repair the short to voltage on the circuit.
 2. If less than 1 V, test or replace the X50A Fuse Block-Underhood.

1. If the G24 Windshield Washer Pump is not activated

13. Connect a 3 A fused jumper wire between the control circuit terminal 14 X4 and B+.
14. Verify the G24 Windshield Washer Pump activates.

1. If the G24 Windshield Washer Pump does not activate

1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the X50A Fuse Block-Underhood.
2. Test for infinite resistance between the K9 Body Control Module control circuit terminal 14 and ground.
 1. If less than Infinite resistance, repair the short to ground on the circuit.
 1. If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
 1. If 2 Ω or greater, repair the open/high resistance in the circuit.
 2. If less than 2 Ω , test or replace the X50A Fuse Block-Underhood.

1. If the G24 Windshield Washer Pump activates

15. Replace the K9 Body Control Module.

DIAGNOSTIC INFORMATION AND PROCEDURES > WASHER MALFUNCTION > 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 5 and the low reference terminal 2 with the switch in the open position.

1. **If less than infinite resistance**

- Replace the S82 Windshield Wiper/Washer Switch.

1. **If infinite resistance**

3. Test for less than 2 Ω between the signal terminal 5 and the low reference terminal 2 with the switch in the closed position.

1. **If 2 Ω or greater**

- Replace the S82 Windshield Wiper/Washer Switch.

1. **If less than 2 Ω**

4. All OK.

Windshield Washer Pump

1. Ignition OFF, disconnect the harness connector at the G24 Windshield Washer Pump.
2. Install a 20A fused jumper wire between the control terminal 1 and 12 V. Install a jumper wire between the ground terminal 2 and ground.
3. Verify the G24 Windshield Washer Pump activates

1. **If the G24 Windshield Washer Pump does not activate.**

- Replace the G24 Windshield Washer Pump.

1. **If the G24 Windshield Washer Pump does activate.**

4. All OK

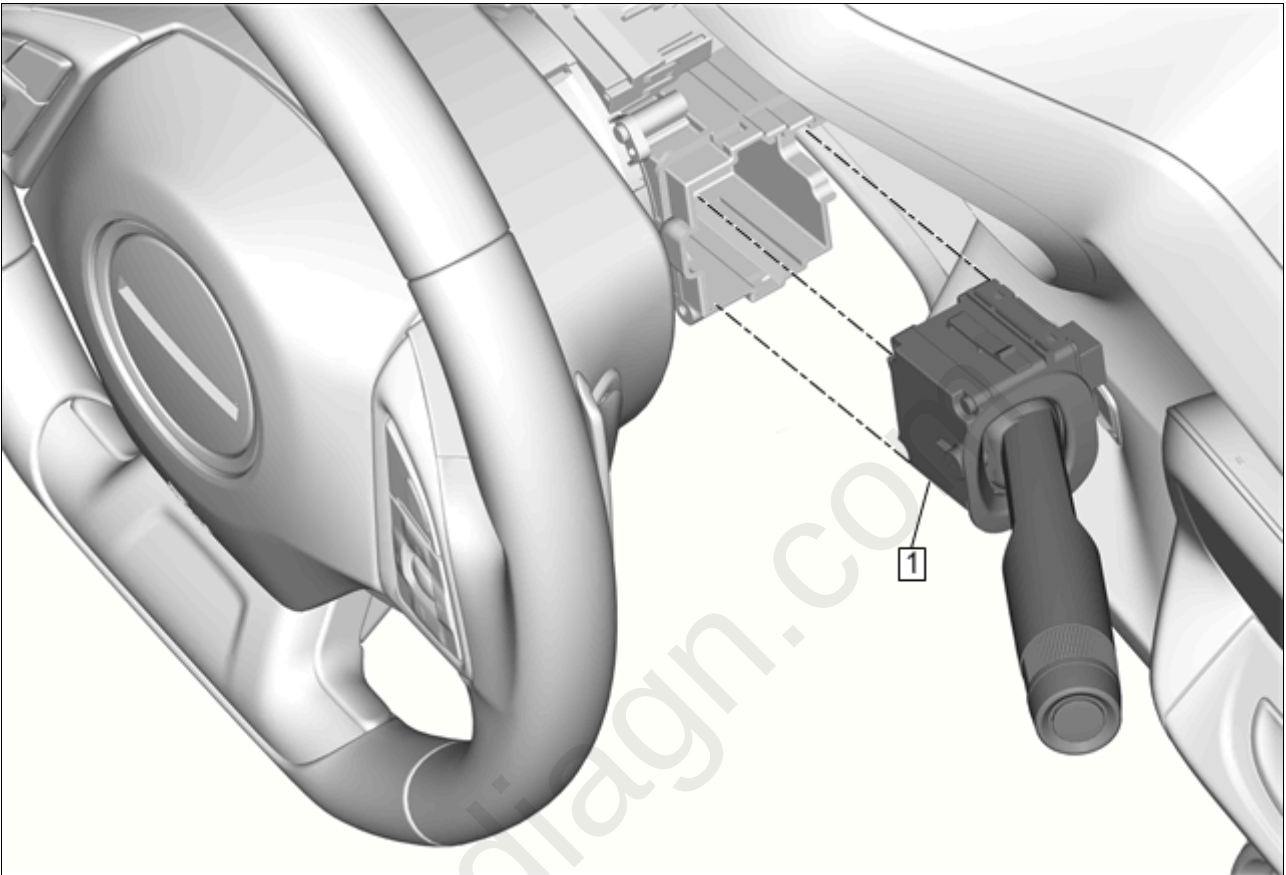
DIAGNOSTIC INFORMATION AND PROCEDURES > WASHER MALFUNCTION > REPAIR INSTRUCTIONS

Perform the Diagnostic Repair Verification after completing the repair.

- Windshield Washer Pump Replacement
- Windshield Wiper and Washer Switch Replacement
- Control Module References for body control module replacement, programming and setup.

REPAIR INSTRUCTIONS > WINDSHIELD WIPER AND WASHER SWITCH
REPLACEMENT

Fig 1: Windshield Wiper and Washer Switch

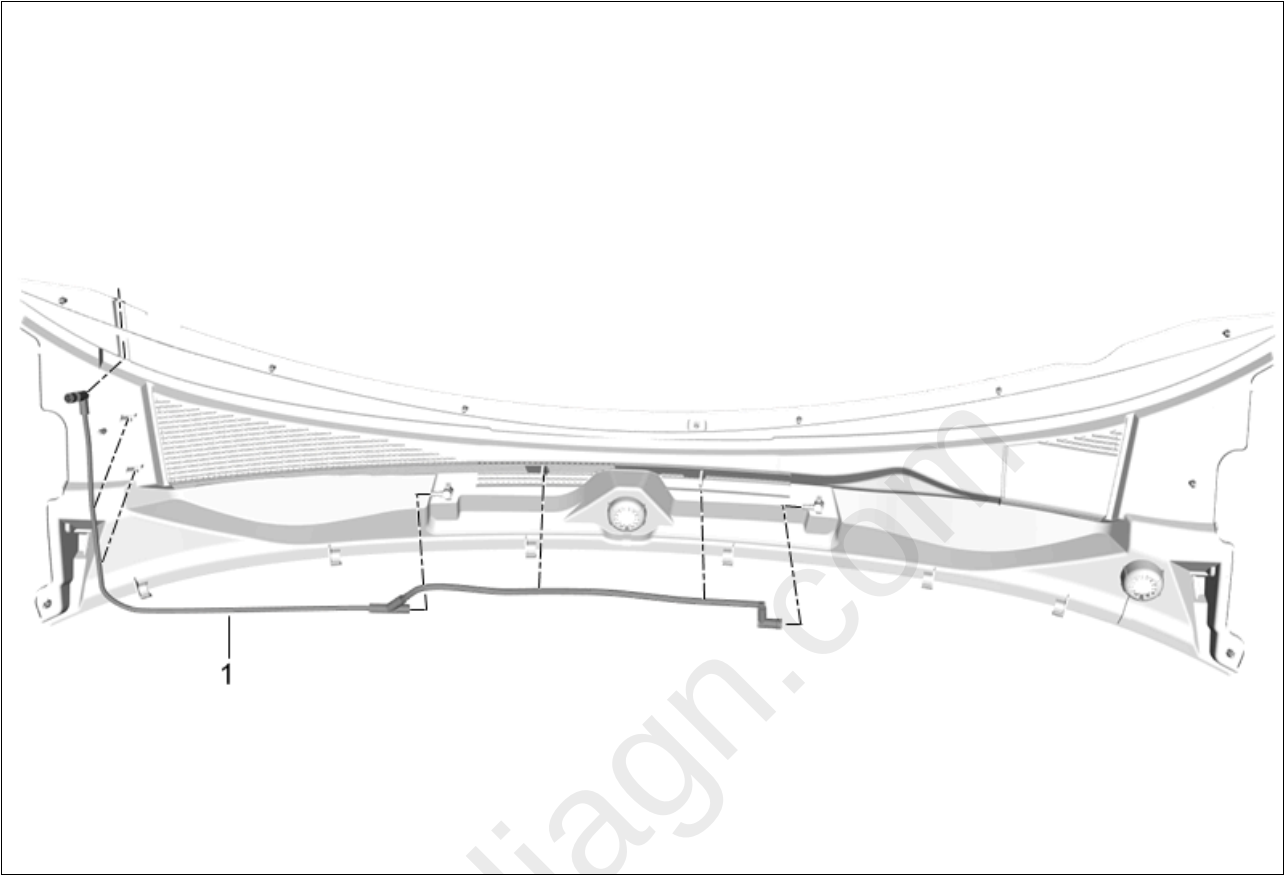


Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Remove the steering column lower trim cover. Steering Column Trim Cover Replacement 2. Reposition the steering column upper trim cover as necessary.	
1	Windshield Wiper and Washer Switch Procedure 1. Disconnect the electrical connector. 2. Release the retaining tabs and remove the windshield wiper and washer switch from the turn signal switch bracket.

REPAIR INSTRUCTIONS > WINDSHIELD WASHER NOZZLE HOSE REPLACEMENT

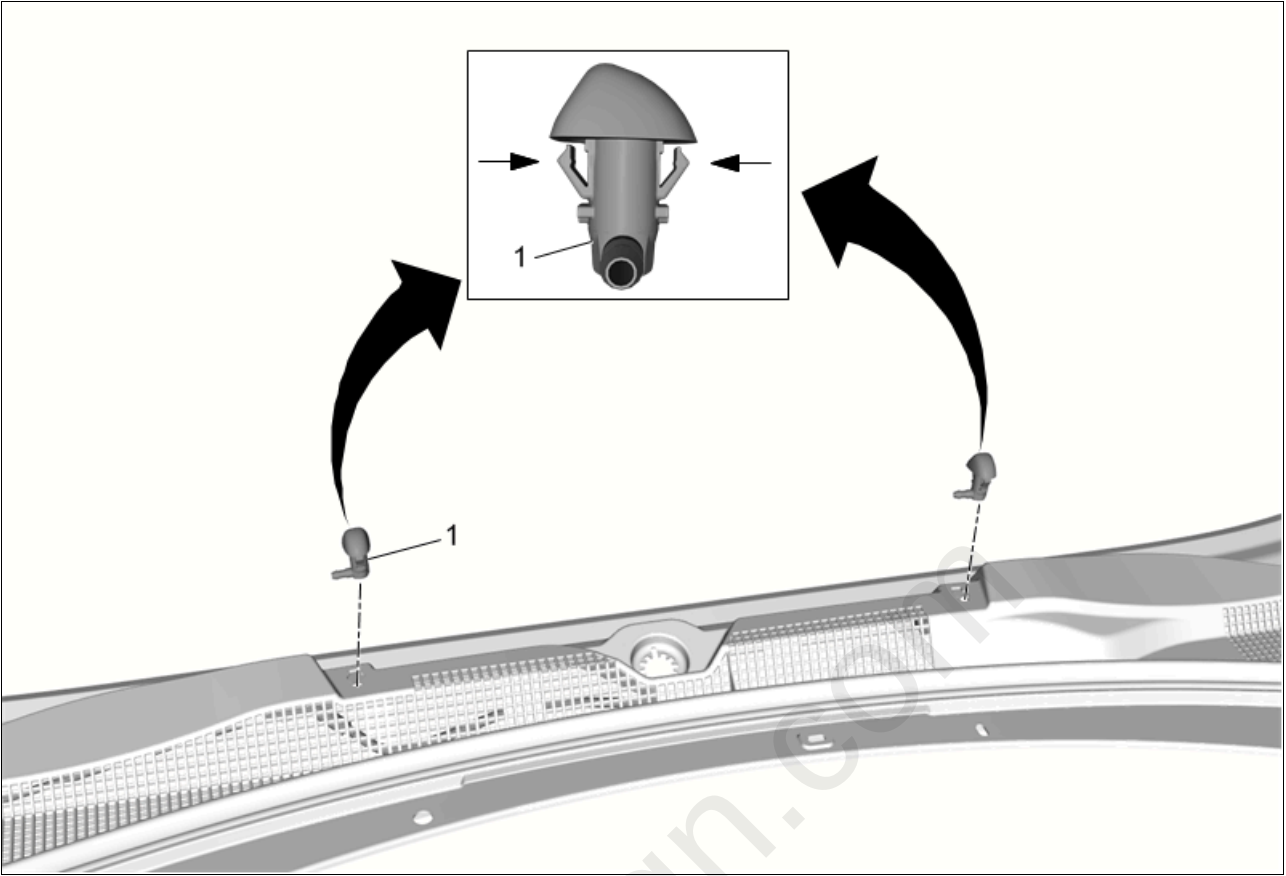
Fig 1: Windshield Washer Nozzle Hose



Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Air Inlet Grille Panel Replacement	
1	Windshield Washer Nozzle Hose Procedure 1. Disconnect the windshield washer nozzle hose at both windshield washer nozzles. 2. Remove the windshield washer hose from the air inlet grille panel retainers. 3. Slide the windshield washer nozzle hose between the air inlet grille panel and the foam seal.

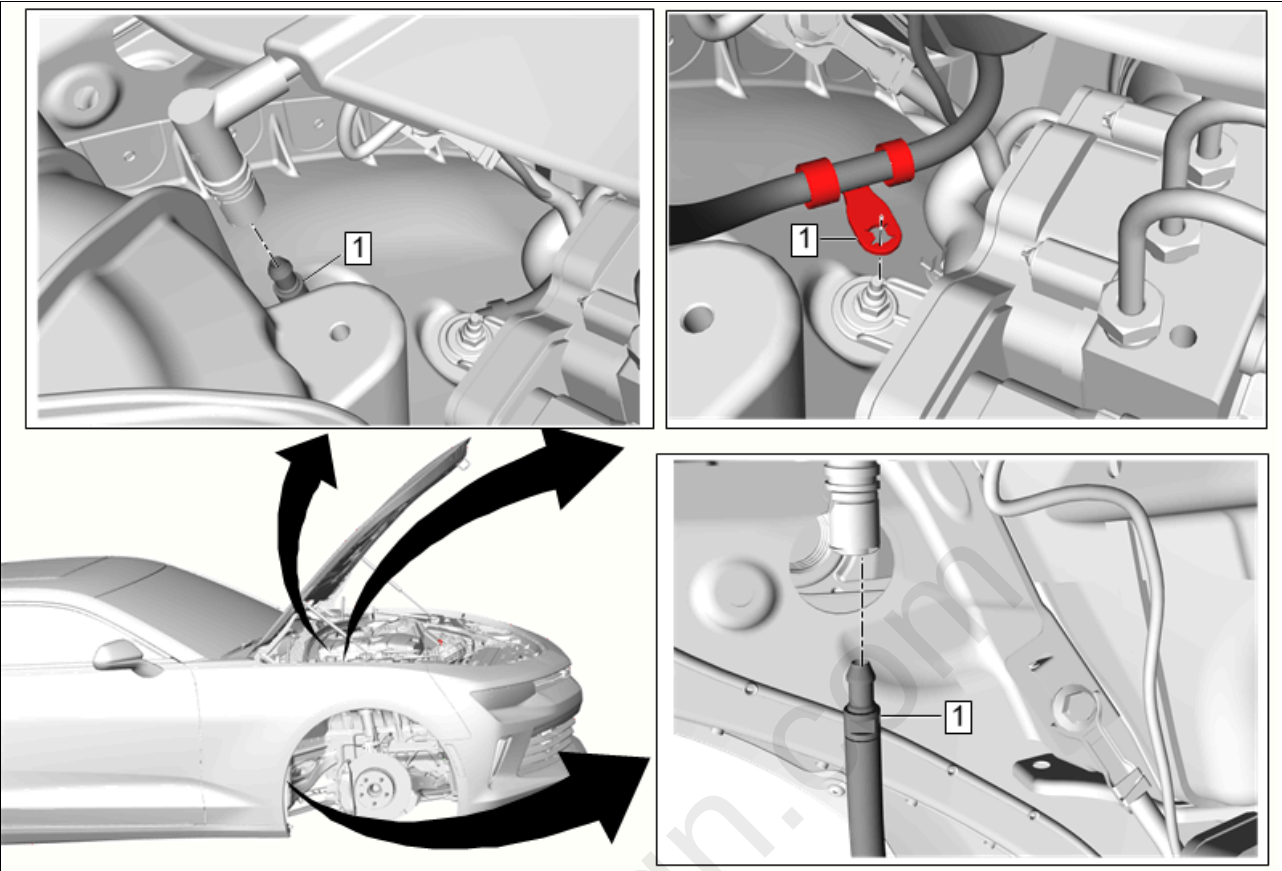
Fig 1: Windshield Washer Nozzle



Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Air Inlet Grille Panel Replacement	
1	Windshield Washer Nozzle
	Procedure
	1. Disconnect the windshield washer nozzle hose at the windshield washer nozzle being serviced.
	2. Compress the locking tabs on the windshield washer nozzle.
	3. Push the windshield washer nozzle outward from the air inlet grille panel.
	4. Remove the windshield washer nozzle from the air inlet grille panel.

Fig 1: Windshield Washer Pump Hose

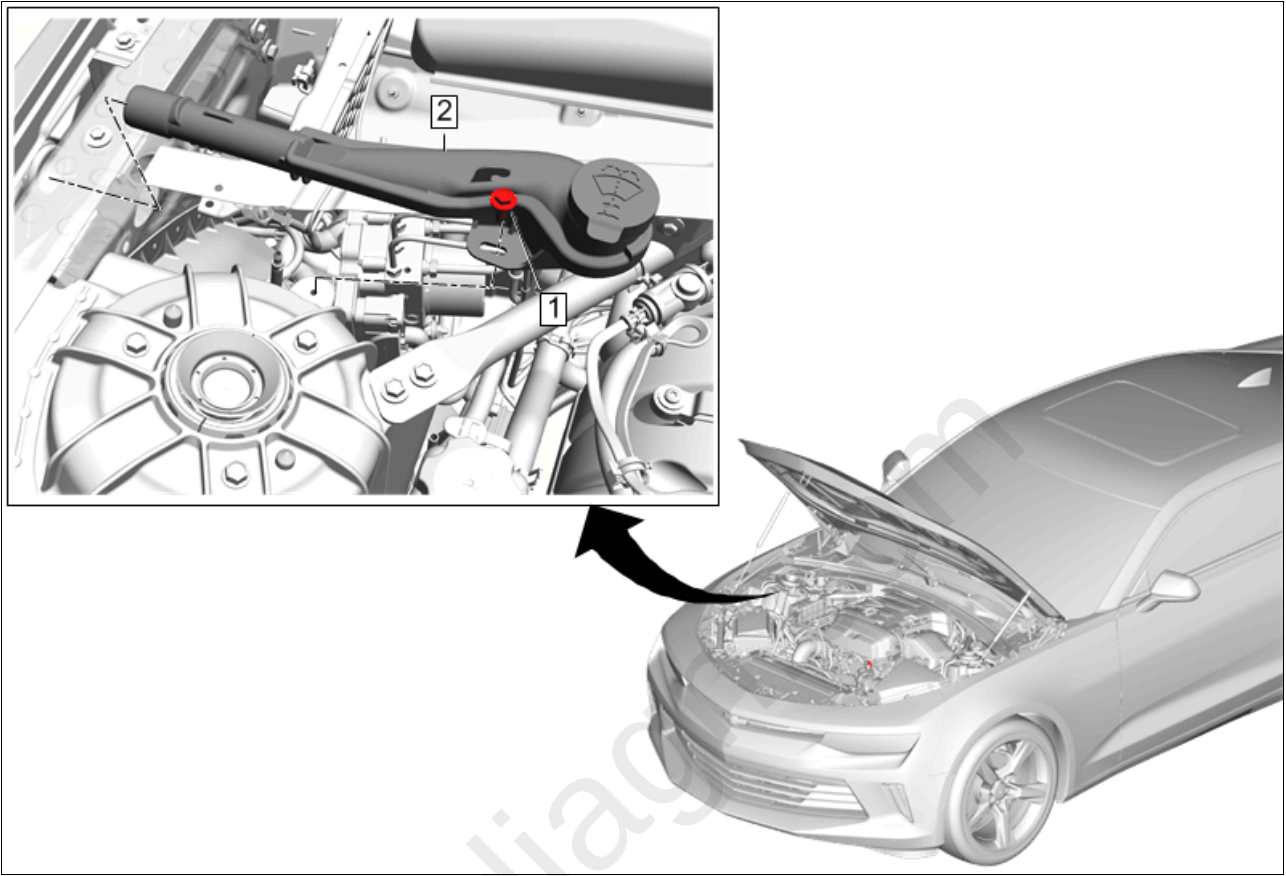


Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures	
1. Windshield Washer Solvent Container Filler Tube Replacement	
2. Front Wheelhouse Liner Replacement	
1	Windshield Washer Pump Hose Procedure 1. Disconnect the windshield washer pump hose from the windshield washer pump. 2. Release the windshield washer pump hose from the front wheelhouse panel stud. 3. Disconnect the windshield washer pump hose from the windshield washer nozzle hose. 4. Pull the windshield washer pump hose up through the front wheelhouse panel and remove from the vehicle.

REPAIR INSTRUCTIONS > WINDSHIELD WASHER SOLVENT CONTAINER FILLER
TUBE REPLACEMENT

Fig 1: Windshield Washer Solvent Container Filler Tube



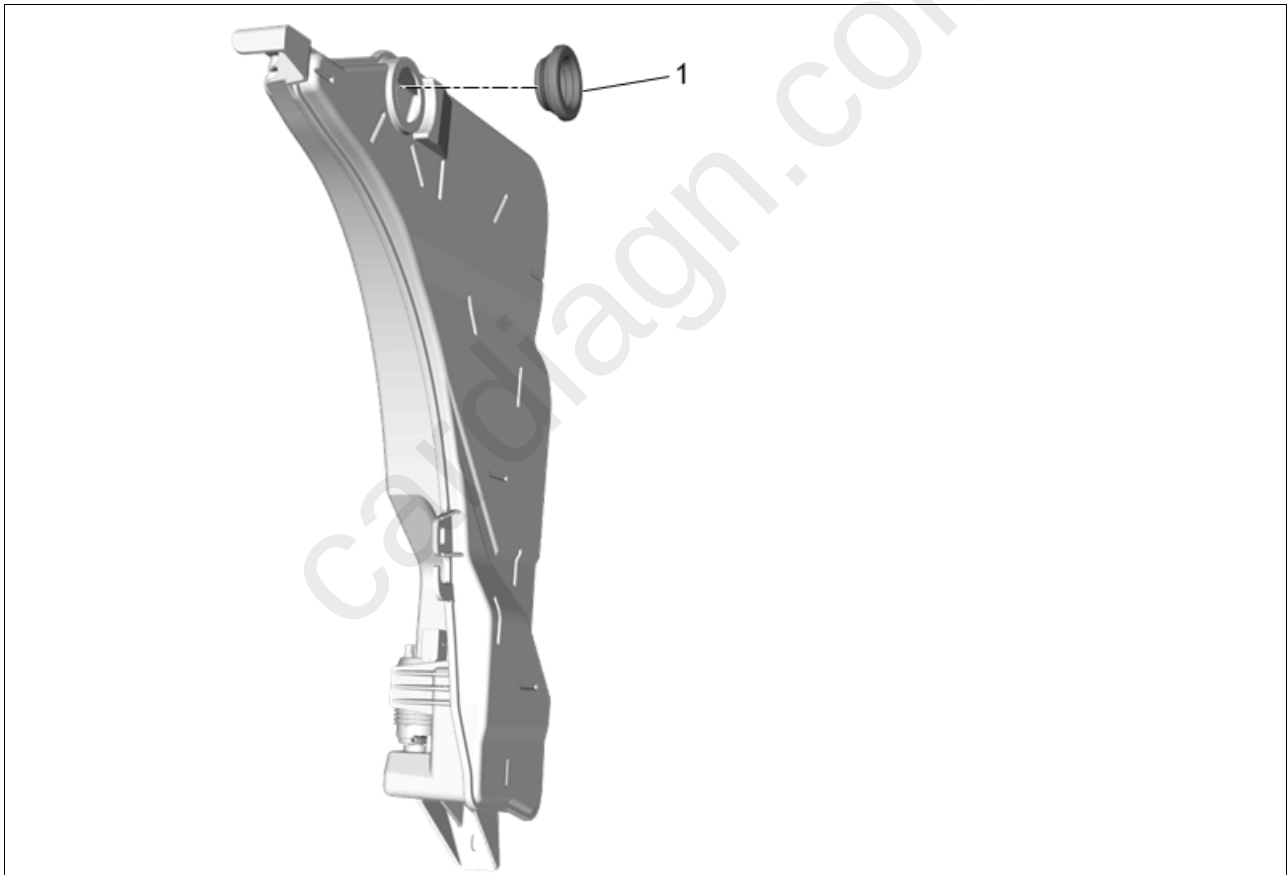
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Open the hood. 2. Remove the five passenger side push in retainers for the air inlet grille panel then gently reposition the panel upward to access the tube retainer. Air Inlet Grille Panel Replacement	
1	Windshield Washer Solvent Container Filler Tube Bolt <i>CAUTION:</i> <i>Refer to Fastener Caution .</i>

	Tighten 6 N.m (53 lb in)
2	Windshield Washer Solvent Container Filler Tube Procedure 1. Pull inboard on the solvent container filler tube in order to disconnect the filler tube from the windshield washer solvent container grommet. 2. Make sure the windshield washer solvent container filler tube is fully inserted before tightening the fastener.

REPAIR INSTRUCTIONS > WINDSHIELD WASHER SOLVENT CONTAINER GROMMET REPLACEMENT

Fig 1: Windshield Washer Solvent Container Grommet

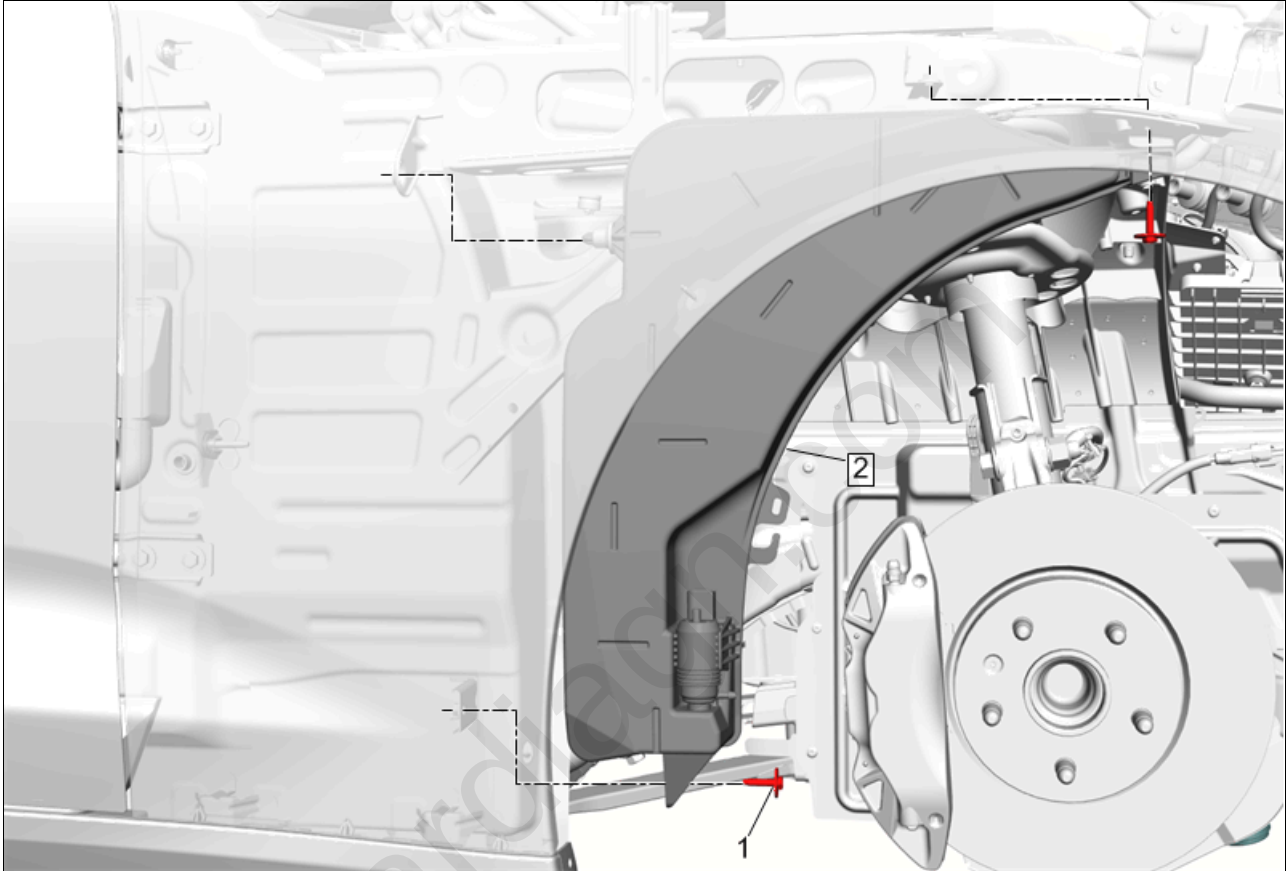


Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Windshield Washer Solvent Container Replacement	

REPAIR INSTRUCTIONS > WINDSHIELD WASHER SOLVENT CONTAINER REPLACEMENT

Fig 1: Windshield Washer Solvent Container



Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Front Wheelhouse Liner Replacement 2. Windshield Washer Solvent Container Filler Tube Replacement 3. Place a suitable drain pan under the windshield washer pump area to recover the windshield washer solvent when the windshield washer pump hose is disconnected.	
1	Windshield Washer Solvent Container Bolt (Qty: 2) CAUTION:

Refer to Fastener Caution .

Tighten

6 N.m (53 lb in)

Windshield Washer Solvent Container

Procedure

2

1. Disconnect windshield washer nozzle hose from the windshield washer pump hose.
2. Disconnect the electrical connector.
3. Remove the windshield washer solvent container from the vehicle.
4. Drain the windshield washer solvent into a suitable clean container.
5. Transfer components as necessary.

REPAIR INSTRUCTIONS > WINDSHIELD WASHER PUMP REPLACEMENT

Fig 1: Windshield Washer Pump



Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Windshield Washer Solvent Container Replacement	
1	Windshield Washer Pump Procedure 1. Disconnect the electrical connector. 2. Using appropriate tools, place under each side of the washer pump, twist and lift in opposite directions to disengage the windshield washer pump from the windshield washer solvent container and grommet. 3. Install a NEW windshield washer pump grommet upon replacement of the windshield washer pump.  NOTE: <i>DISCARD the grommet and replace with NEW grommet.</i>

REPAIR INSTRUCTIONS > WINDSHIELD WASHER PUMP GROMMET REPLACEMENT

Fig 1: Windshield Washer Pump Grommet

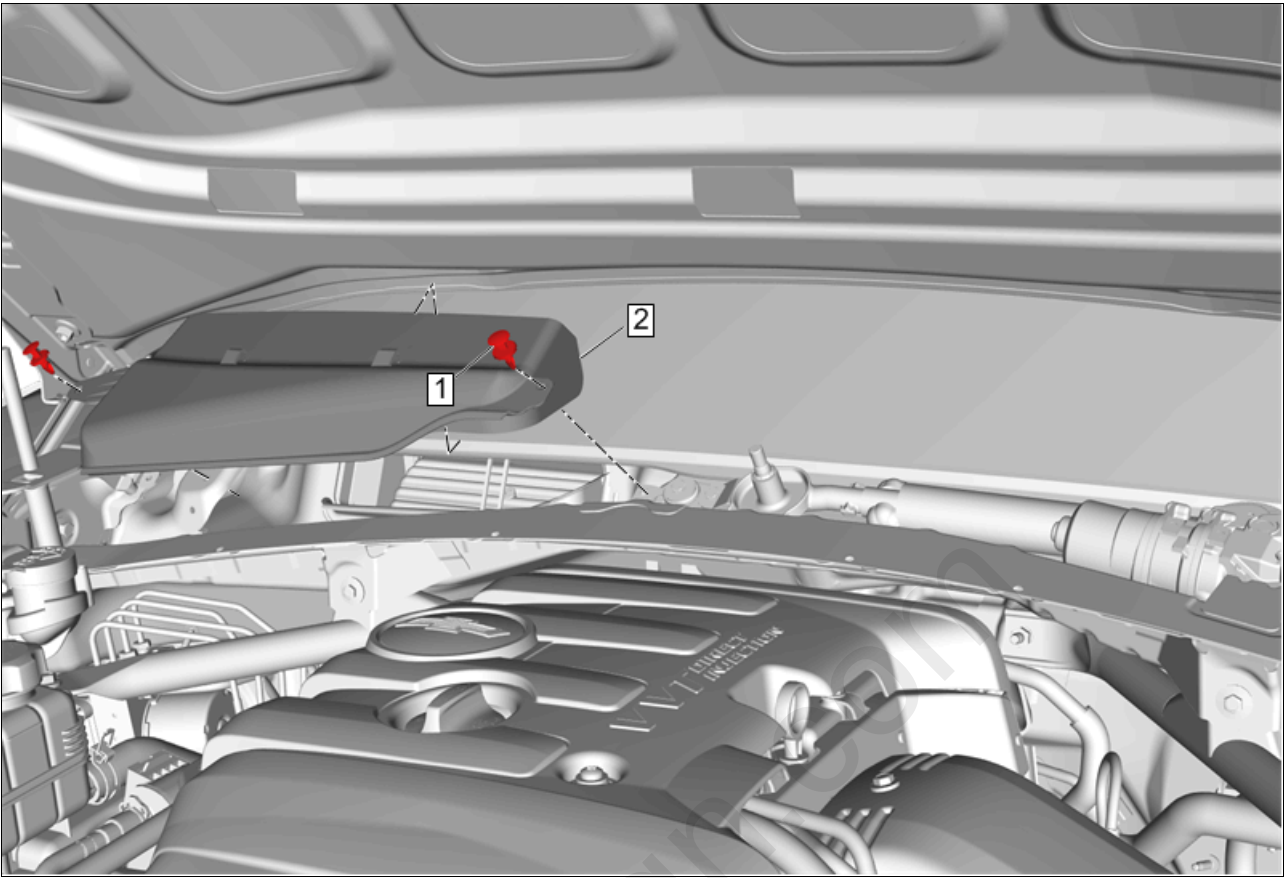


Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Windshield Washer Solvent Container Replacement	
1	Windshield Washer Solvent Container Grommet

REPAIR INSTRUCTIONS > PLENUM WATER DEFLECTOR REPLACEMENT

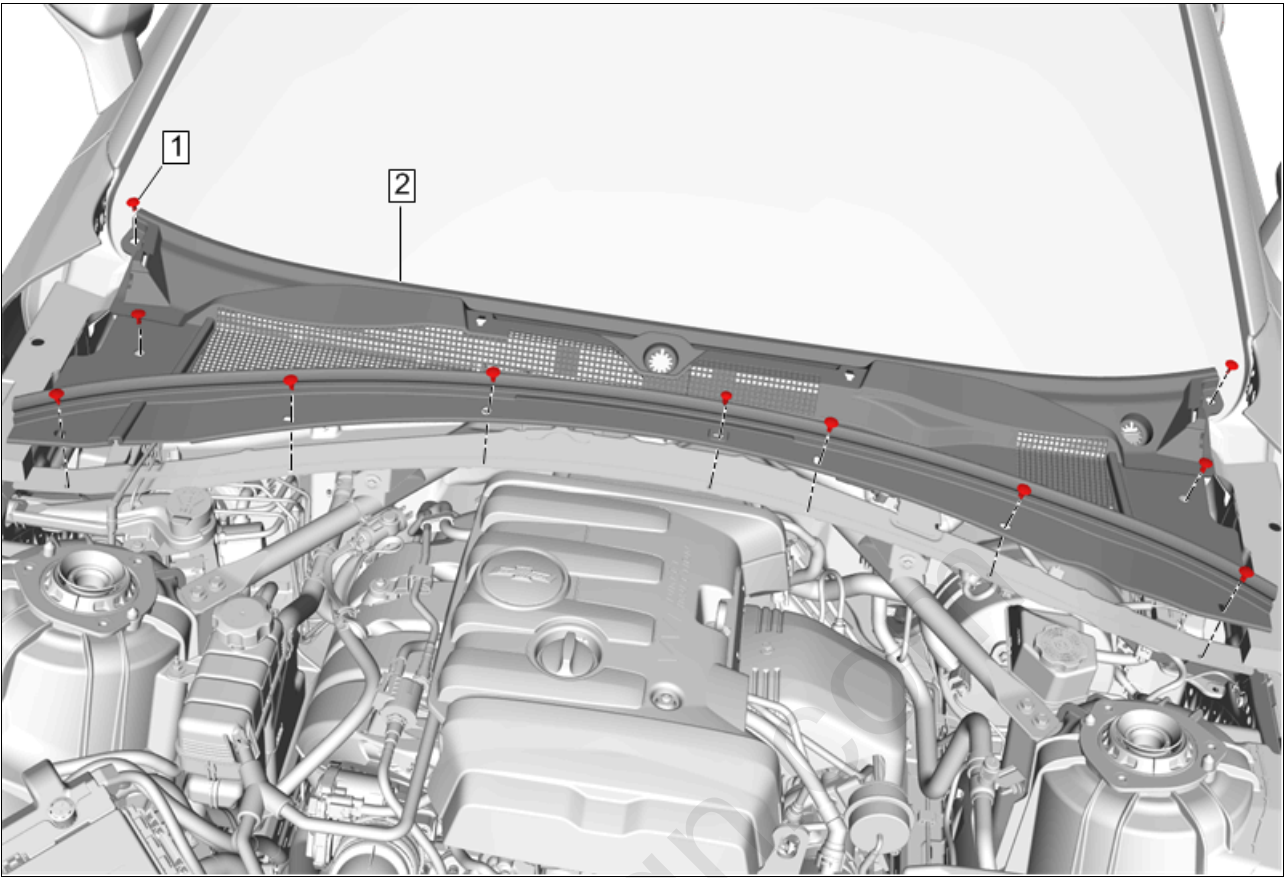
Fig 1: Plenum Water Deflector



Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Air Inlet Grille Panel Replacement	
1	Plenum Water Deflector Retainer (Qty: 2)
2	Plenum Water Deflector Procedure 1. Using an appropriate tool, release the retainers from the plenum. 2. Lift up the front edge of the water deflector, slide the water deflector forward from the plenum.

Fig 1: Air Inlet Grille Panel



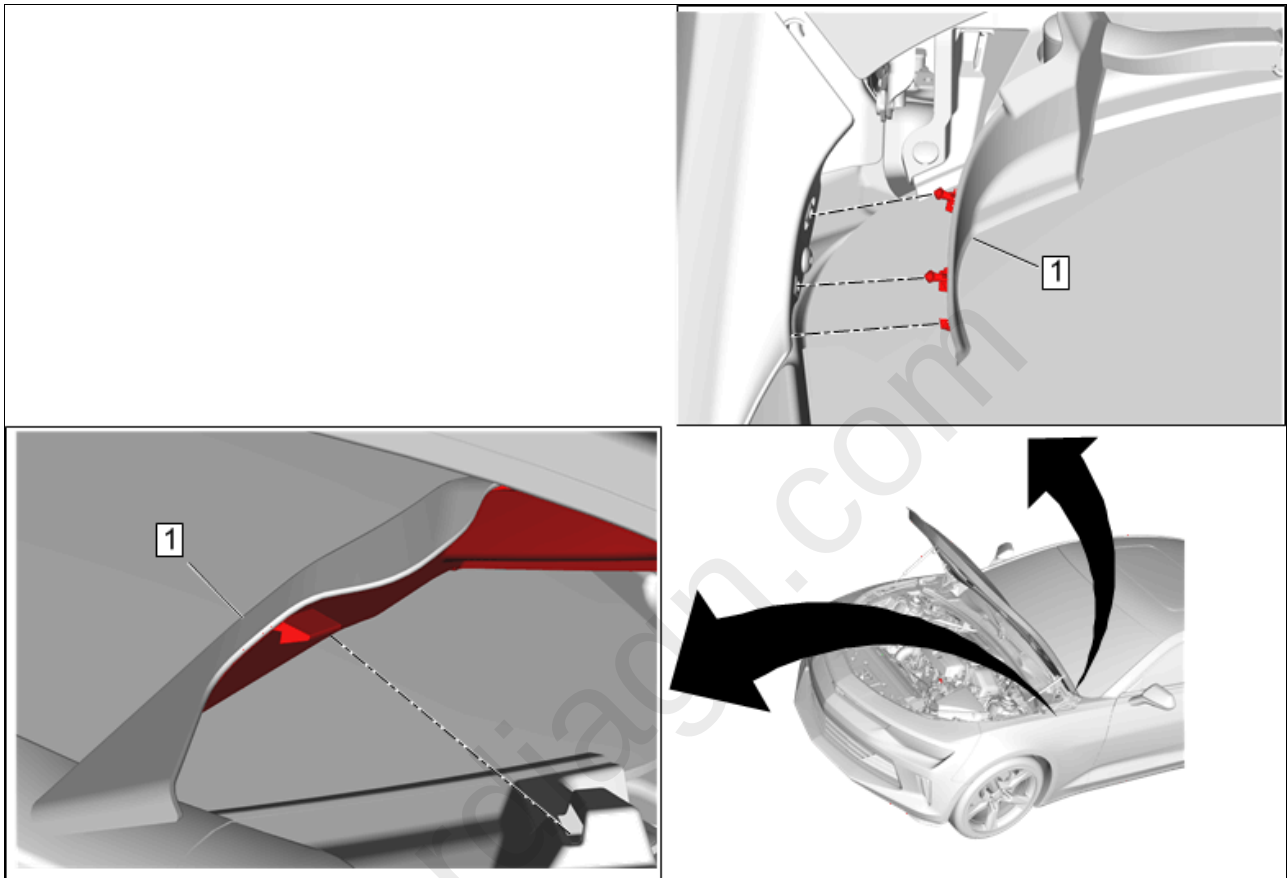
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Windshield Wiper Arm Replacement 2. Air Inlet Grille Panel Extension Replacement 3. Hood Rear Outer Air Inlet Seal Replacement	
1	Air Inlet Grille Panel Retainer (Qty: 11)
2	Air Inlet Grille Panel Procedure 1. Using an appropriate tool, release the air inlet grille panel from the windshield lower molding. 2. Lift up the front edge of the air inlet grille panel, slide the grille panel forward from both hood hinges. 3. Disconnect the windshield washer nozzle hose from the windshield washer nozzle hose connector hose.

4. Transfer components as necessary.

REPAIR INSTRUCTIONS > AIR INLET GRILLE PANEL EXTENSION REPLACEMENT

Fig 1: Air Inlet Grille Panel Extension

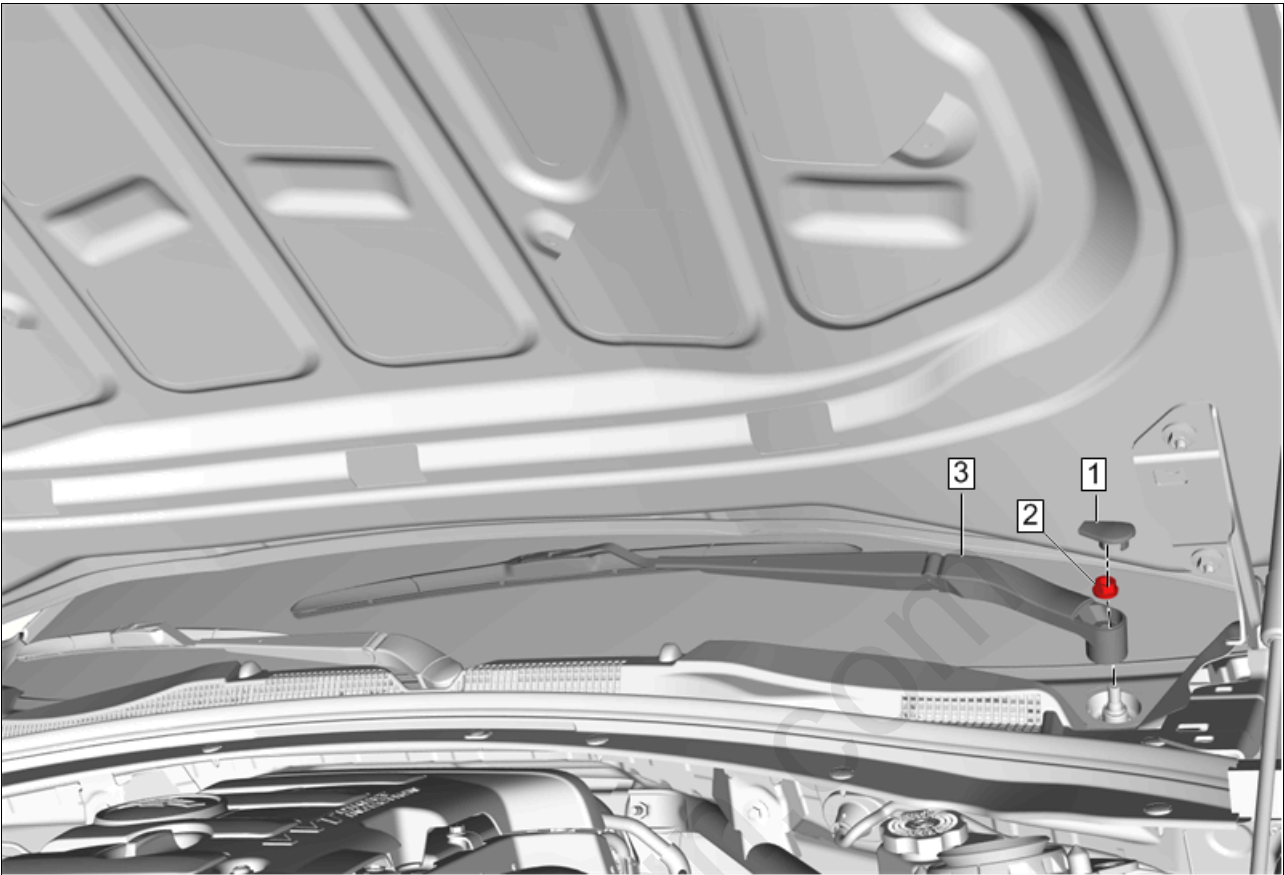


Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Open the hood.	
1	Air Inlet Grille Panel Extension Procedure Grasp the air inlet grille panel extension and disengage the retainers from the top edge of the fender and the end of the air inlet grille panel.

REPAIR INSTRUCTIONS > WINDSHIELD WIPER ARM REPLACEMENT

Fig 1: Windshield Wiper Arm



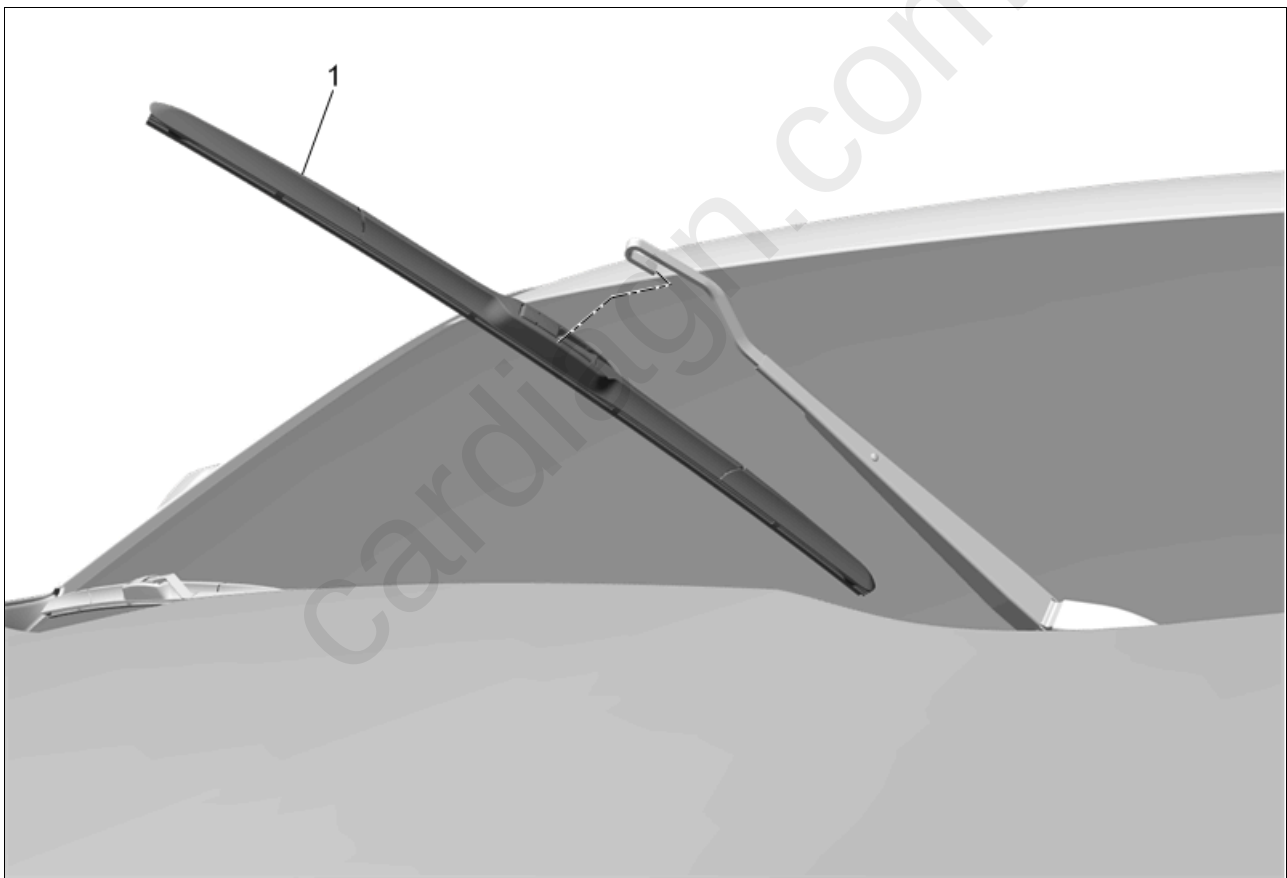
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Open the hood.	
1	Windshield Wiper Arm Nut Cap Procedure Use a small flat-bladed tool in order to release the cap from the wiper arm.
2	Windshield Wiper Arm Nut <i>CAUTION:</i> <i>Refer to Fastener Caution .</i> Tighten 36 N.m (27 lb ft)
3	Windshield Wiper Arm Procedure

1. Grasp the outer end of the wiper arm and rock the arm back and forth while holding the wiper blade off the windshield.
2. Lift the arm assembly from the wiper motor pivot shaft.
3. Clean the knurls on the wiper motor pivot shaft with a soft wire brush.
4. Align the wiper blade just below the small clear triangles in the lower windshield blackout and hold into position while torquing the nut.
5. Cycle the wiper arms and re-check the blade alignment to the lower windshield alignment triangles.

REPAIR INSTRUCTIONS > WINDSHIELD WIPER BLADE REPLACEMENT

Fig 1: Windshield Wiper Blade



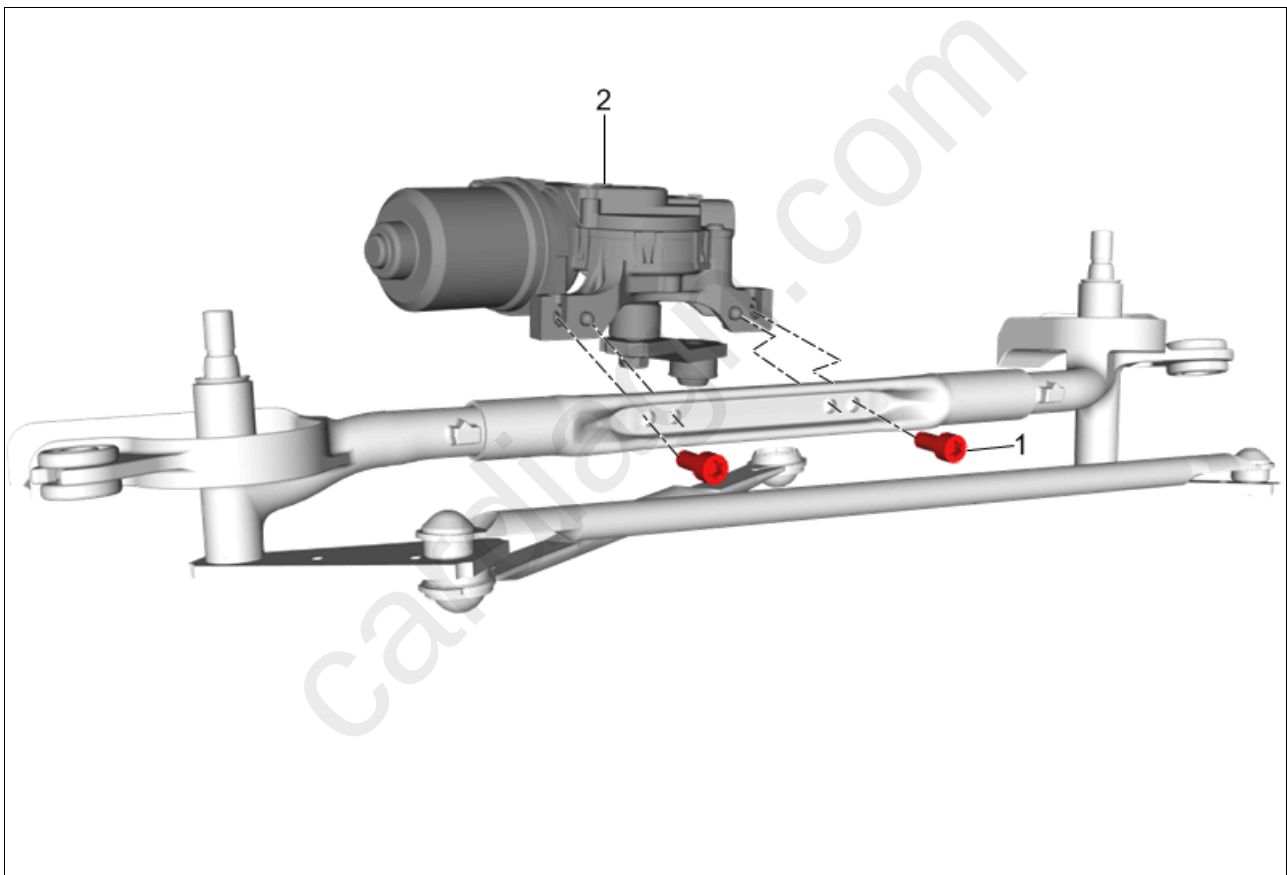
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Windshield Wiper Blade Procedure

1. Lift the windshield wiper arm from the windshield.
2. Disengage the windshield wiper blade lock from the windshield wiper arm.
3. Release the retention tab securing the windshield wiper blade to the windshield wiper arm.
4. Pull the windshield wiper blade from the windshield wiper arm.
5. Remove the windshield wiper blade.

REPAIR INSTRUCTIONS > WINDSHIELD WIPER MOTOR REPLACEMENT

Fig 1: Windshield Wiper Motor



Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Windshield Wiper Transmission Replacement	
1	Windshield Wiper Motor Bolt (Qty: 2) Tighten 7.5 N.m (66 lb in)

Windshield Wiper Motor

Procedure

2

1. Using the **J 39232** separator remove the windshield wiper motor crank arm from the transmission link.
2. Remove the windshield wiper motor from the windshield wiper transmission.
3. Position the new windshield wiper motor to the windshield wiper transmission.
4. Align the transmission links to the windshield wiper motor crank arm.
5. Using the **J 39529** installer secure the windshield wiper motor crank arm ball to the transmission link ball socket.

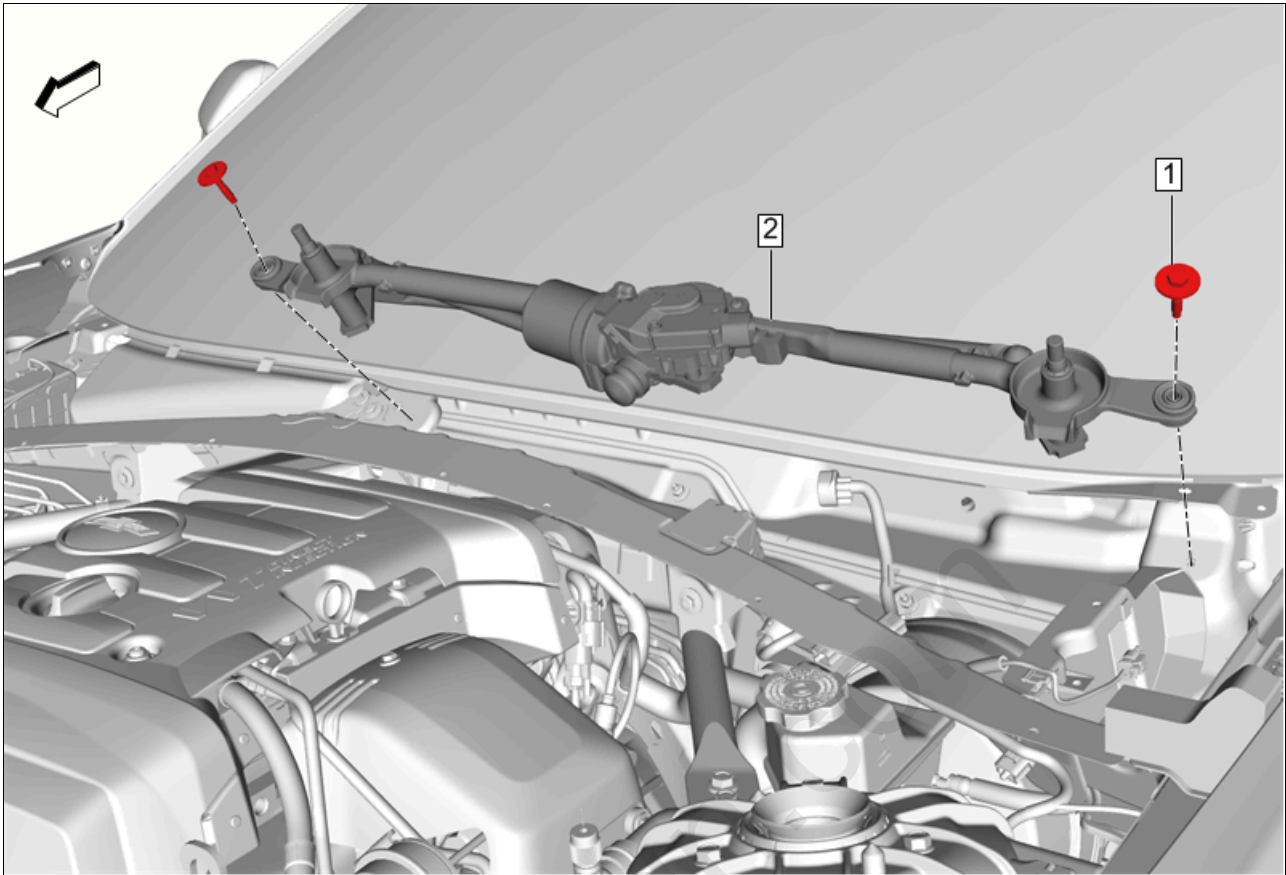
Special Tools

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

Equivalent regional tools:Special Tools

REPAIR INSTRUCTIONS > WINDSHIELD WIPER TRANSMISSION REPLACEMENT

Fig 1: Windshield Wiper Transmission



Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Air Inlet Grille Panel Replacement	
1	Windshield Wiper Transmission Bolt (Qty: 2)
	CAUTION: Refer to Fastener Caution .
	Tighten 8 N.m (71 lb in)
2	Windshield Wiper Transmission
	Procedure 1. Slide the windshield wiper transmission inboard to release the grommet from the plenum. 2. Disconnect the electrical connector.

- | | |
|--|--|
| | <ol style="list-style-type: none">3. Remove the windshield wiper transmission from the vehicle.4. Transfer components as necessary. |
|--|--|

REPAIR INSTRUCTIONS > WINDSHIELD GLASS CLEANING > EXTERIOR:

Clean the windshield with windshield cleaner, GM P/N 19287404 (18 oz.) or 19259280 (6 oz.) (Canadian P/N 88865156) or equivalent. The cleaner should not harm the paint finish or scratch the glass. The glass is clean when the water no longer beads, but sheets across the entire glass surface.

REPAIR INSTRUCTIONS > WINDSHIELD GLASS CLEANING > INTERIOR:

The interior glass should be cleaned with plain water only applied with a clean terry cloth towel. Water only eliminates any film or haze on the window and helps prevent fogging.

REPAIR INSTRUCTIONS > 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. Hold the blade in one hand and wipe the element with the saturated cloth until the black residue disappears. Then rinse the blade assembly elements with clean drinkable water.

REPAIR INSTRUCTIONS > 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 inspected and corrected as necessary.

1. Inspect the wiper blade elements and replace as needed. Refer to Windshield Wiper Blade Replacement .
2. Clean the wiper blade elements. Refer to Wiper Blade Element Cleaning .
3. Clean the windshield. Refer to Windshield Glass Cleaning .

DESCRIPTION AND OPERATION > WIPER/WASHER SYSTEM DESCRIPTION AND OPERATION > WIPER/WASHER SYSTEM COMPONENTS

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

- Windshield Wiper Relay
- Windshield Wiper Speed Control Relay
- Windshield Washer Pump Relay

- Windshield Washer Pump
- Windshield Wiper Motor
- Window Wiper/Washer Switch
- Body Control Module (BCM)
- Headlamp Washer Pump Relay (CE4)
- Headlamp Washer Pump (CE4)
- Windshield Washer Fluid Level Switch
- Rain Sensor
- Instrument Cluster

DESCRIPTION AND OPERATION > WIPER/WASHER SYSTEM DESCRIPTION AND OPERATION > 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.

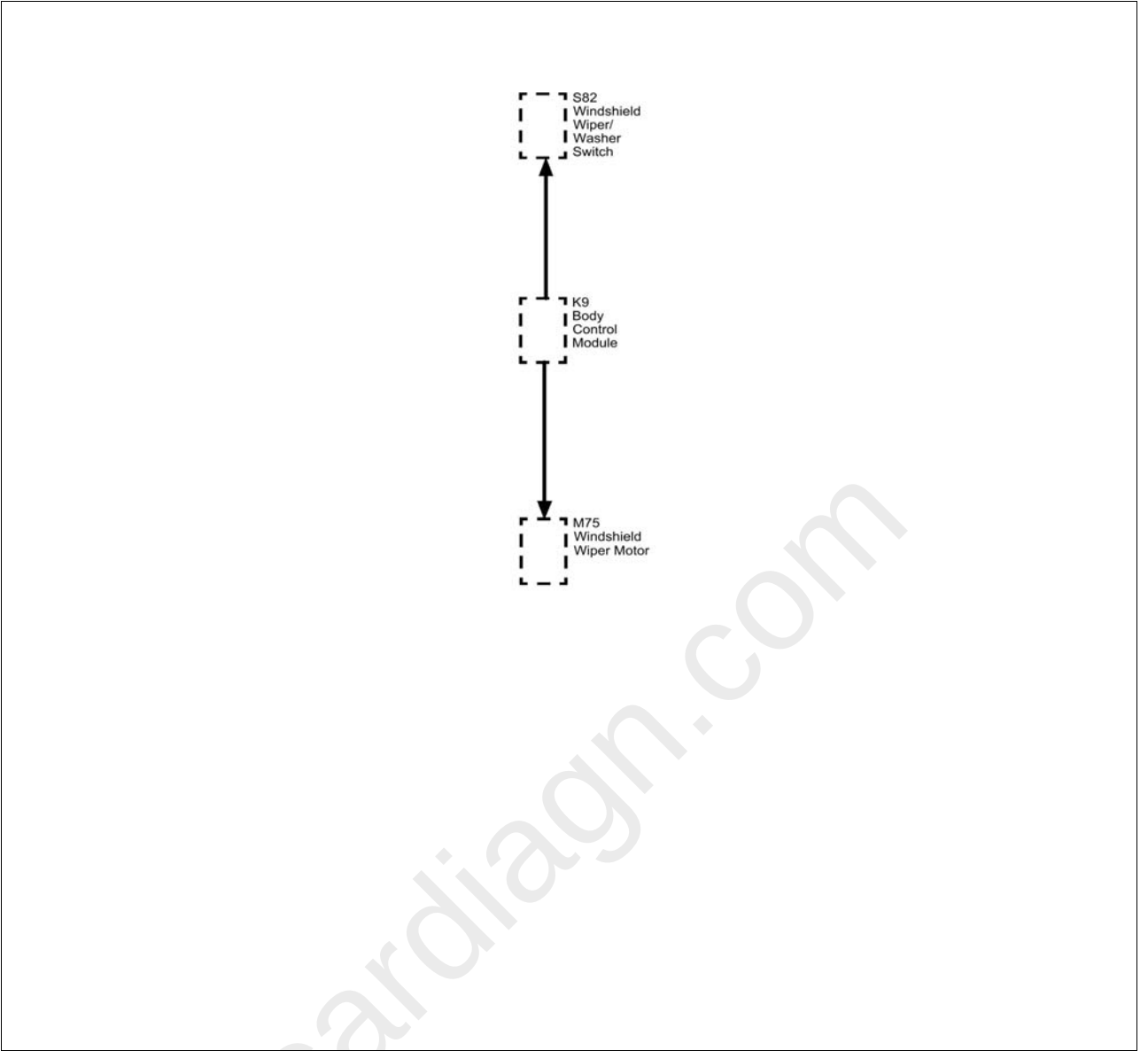
The windshield wiper system MIST operation is identical to LOW speed operation, except that the MIST switch is a press and release type switch. When the wiper switch is moved to the MIST position and released, low speed wiper motor operation is started and will continue until 1 cycle is complete. If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

Intermittent wiper operation may be vehicle speed sensitive. When enabled, the speed compensated intermittent feature causes the intermittent wiper delay intervals to become shorter as a function of increased speed. As vehicle speed is reduced the intervals will become closer to the predetermined

Fig 1: Intermittent Wiper Operation Diagram



Courtesy of GENERAL MOTORS COMPANY

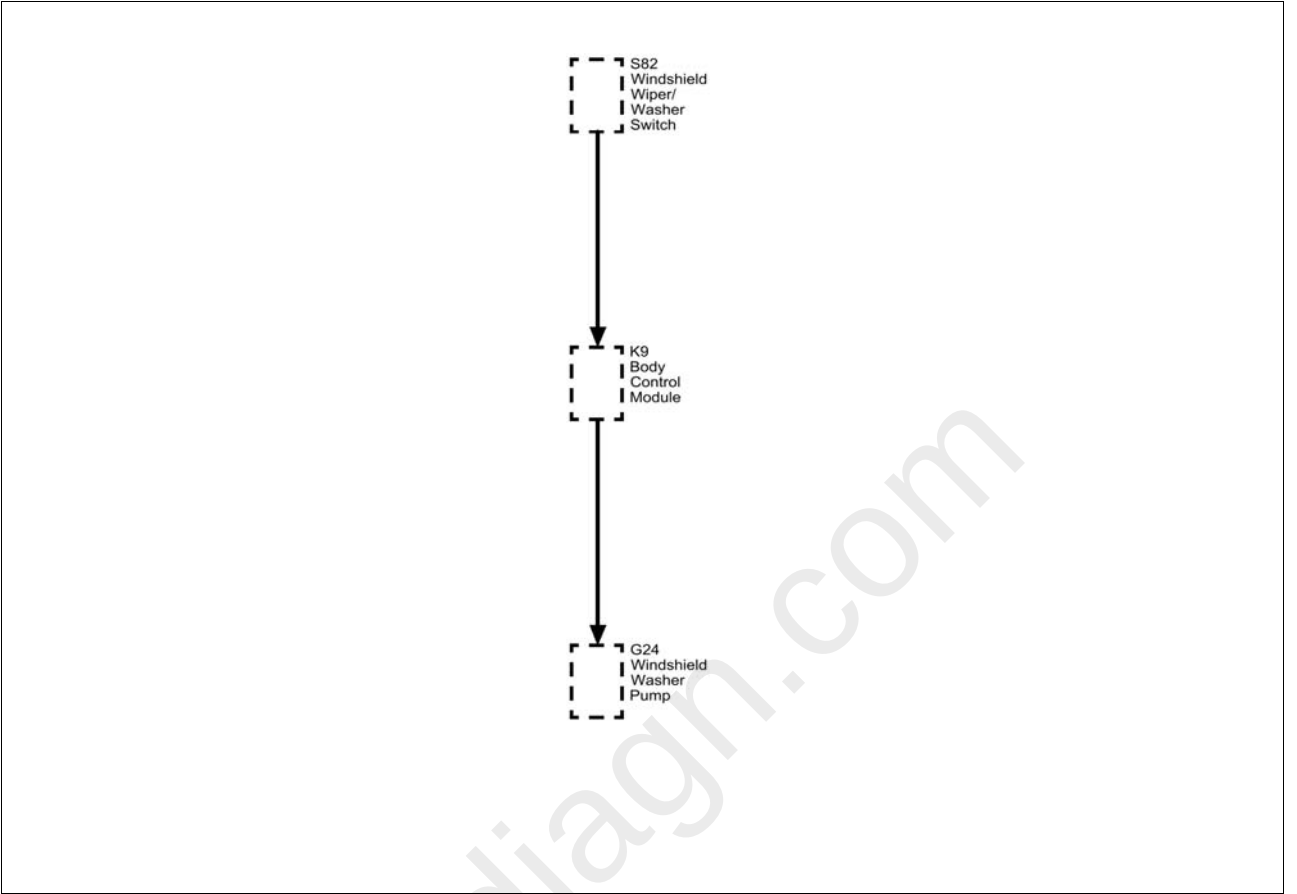
Callout	Component Name
S82	S82 Windshield Wiper/Washer Switch
K9	K9 Body Control Module
M75	M75 Windshield Wiper Motor

DESCRIPTION AND OPERATION > WIPER/WASHER SYSTEM DESCRIPTION AND OPERATION > WINDSHIELD WASHER SYSTEM

The windshield washer pump is controlled by the body control module (BCM) via a printed circuit board (PCB) relay. When the washer switch is depressed, the BCM's internally pulled high resistor is pulled low

by the washer request circuit. The BCM then applies voltage through a control circuit to the PCB 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 fluid pump.

Fig 1: Front Washer-Washer Fluid Level Block Diagram



Courtesy of GENERAL MOTORS COMPANY

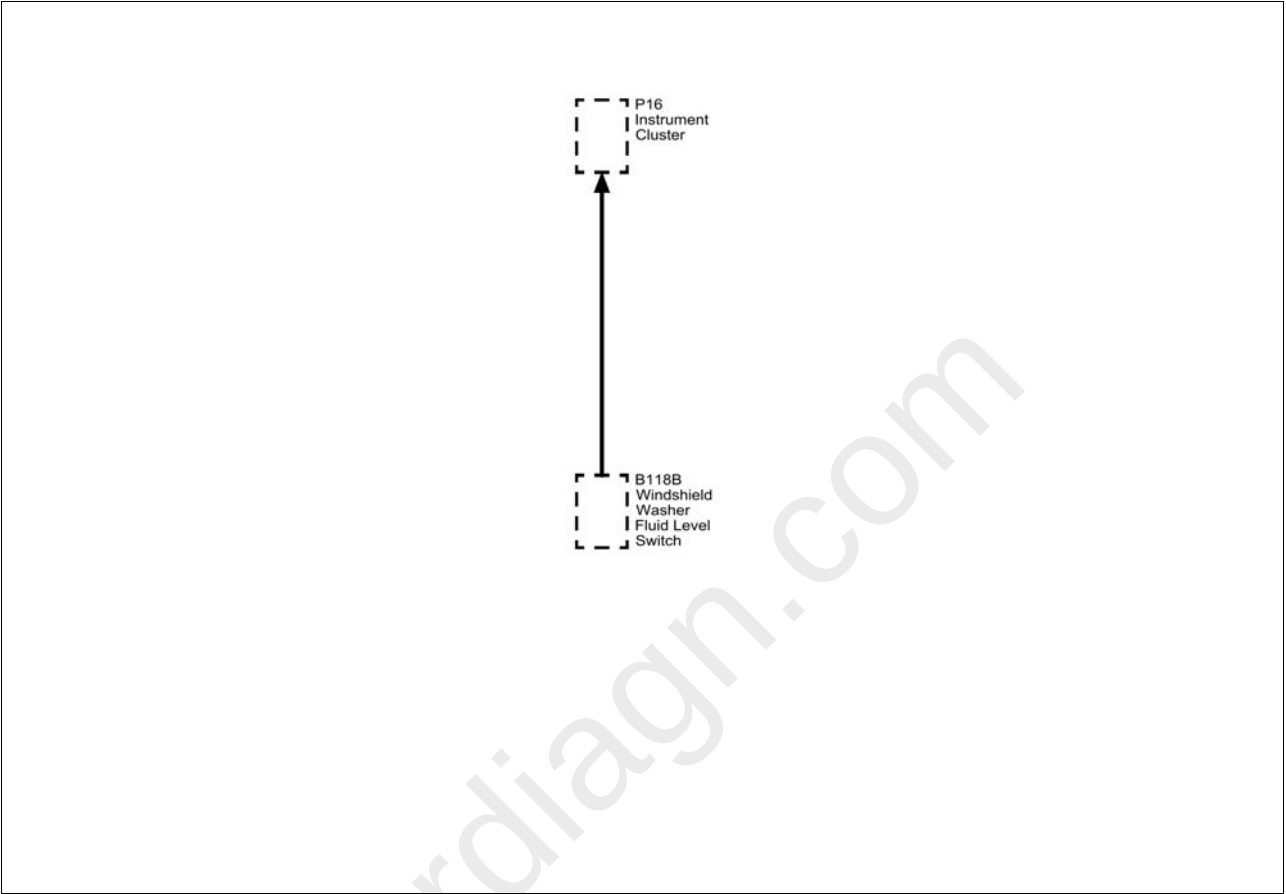
Callout	Component Name
S82	S82 Windshield Wiper/Washer Switch
K9	K9 Body Control Module
G24	G24 Windshield Washer Pump

DESCRIPTION AND OPERATION > WIPER/WASHER SYSTEM DESCRIPTION AND OPERATION > WASHER FLUID LEVEL INDICATOR

The check washer 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 LOW WASHER FLUID INDICATOR message on the driver information center. In order to prevent the LOW WASHER FLUID INDICATOR message from being displayed while sloshing is occurring in the washer fluid container, the instrument cluster is programed with a 1 min delay before changing states of the check washer fluid message during an ignition cycle.

Fig 1: Washer Fluid Level Block Diagram



Courtesy of GENERAL MOTORS COMPANY

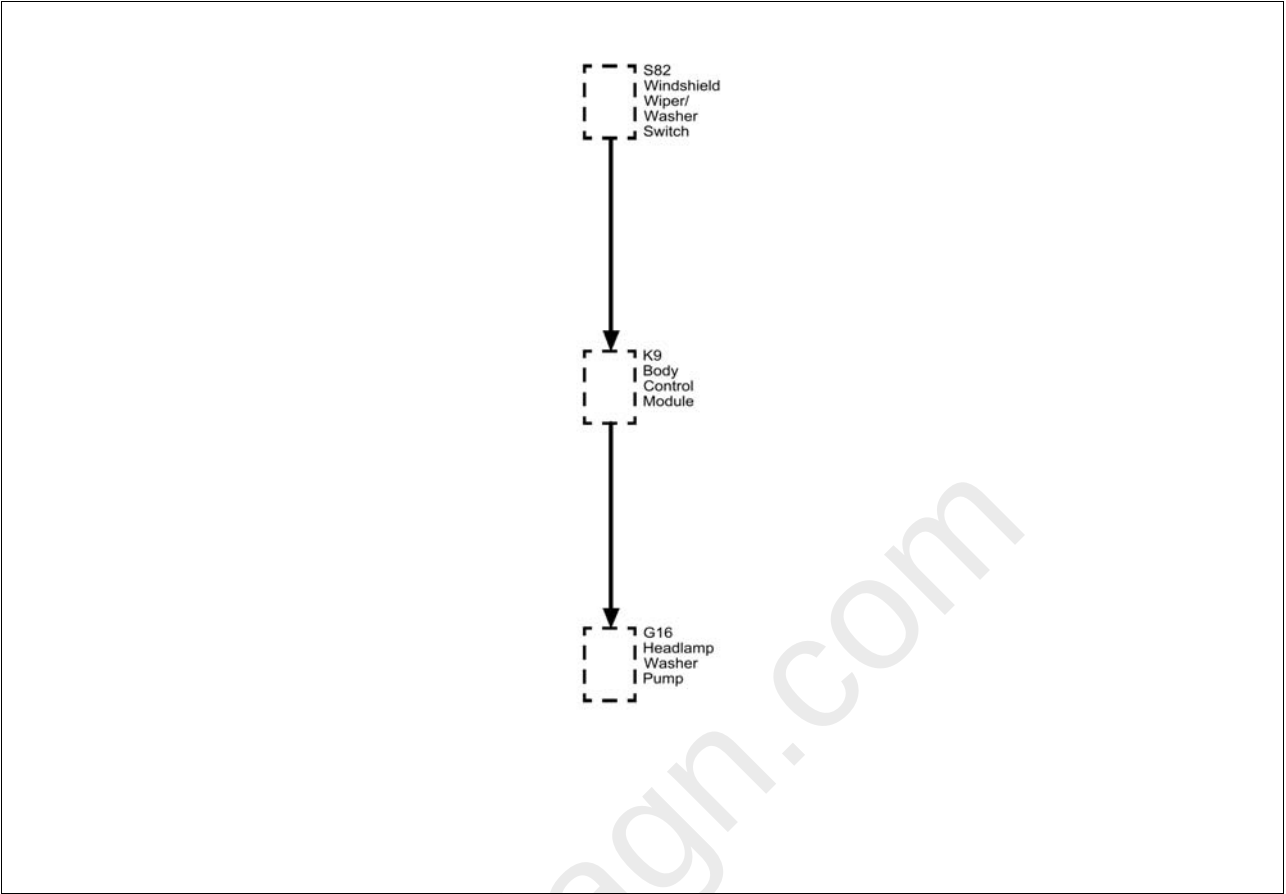
Callout	Component Name
P16	P16 Instrument Cluster
B118B	B118B Windshield Washer Fluid Level Switch

DESCRIPTION AND OPERATION > WIPER/WASHER SYSTEM DESCRIPTION AND OPERATION > 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 fluid pump.

Fig 1: Headlamp Washer Pump Block Diagram



Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
S82	S82 Windshield Wiper/Washer Switch
K9	K9 Body Control Module
G16	G16 Headlamp Washer Pump

DESCRIPTION AND OPERATION > WIPER/WASHER SYSTEM DESCRIPTION AND OPERATION > RAIN SENSE MODE AND RAIN SENSE INDICATOR

When this feature is activated on rain sense equipped vehicles, the wiper subsystem performs front windshield wipes according to the amount of moisture detected on the windshield. The BCM will control the wiper motor speed, as indicated above, based on wipe requests that it receives from a moisture sensor (rain sense module) which is mechanically attached to the windshield through a windshield mounted optic coupler. The BCM uses the serial data communication bus to enable or disable rain sense module operation, communicate wiper control switch settings, and wiper motor position information to the rain sense module. The rain sense module requests wiper motor function, and provides the BCM with system status and diagnostic information for diagnostic reporting. When this feature is present, the BCM

uses the front wiper control switch's intermittent 1 thru intermittent 5 settings to activate the system and to act as the automatic wiper sensitivity control. This allows the driver to adjust the moisture level at which the rain Sensor requests the BCM to automatically wipe the windshield. The intermittent 1 setting corresponds to the lowest sensitivity and intermittent 5 the highest sensitivity.

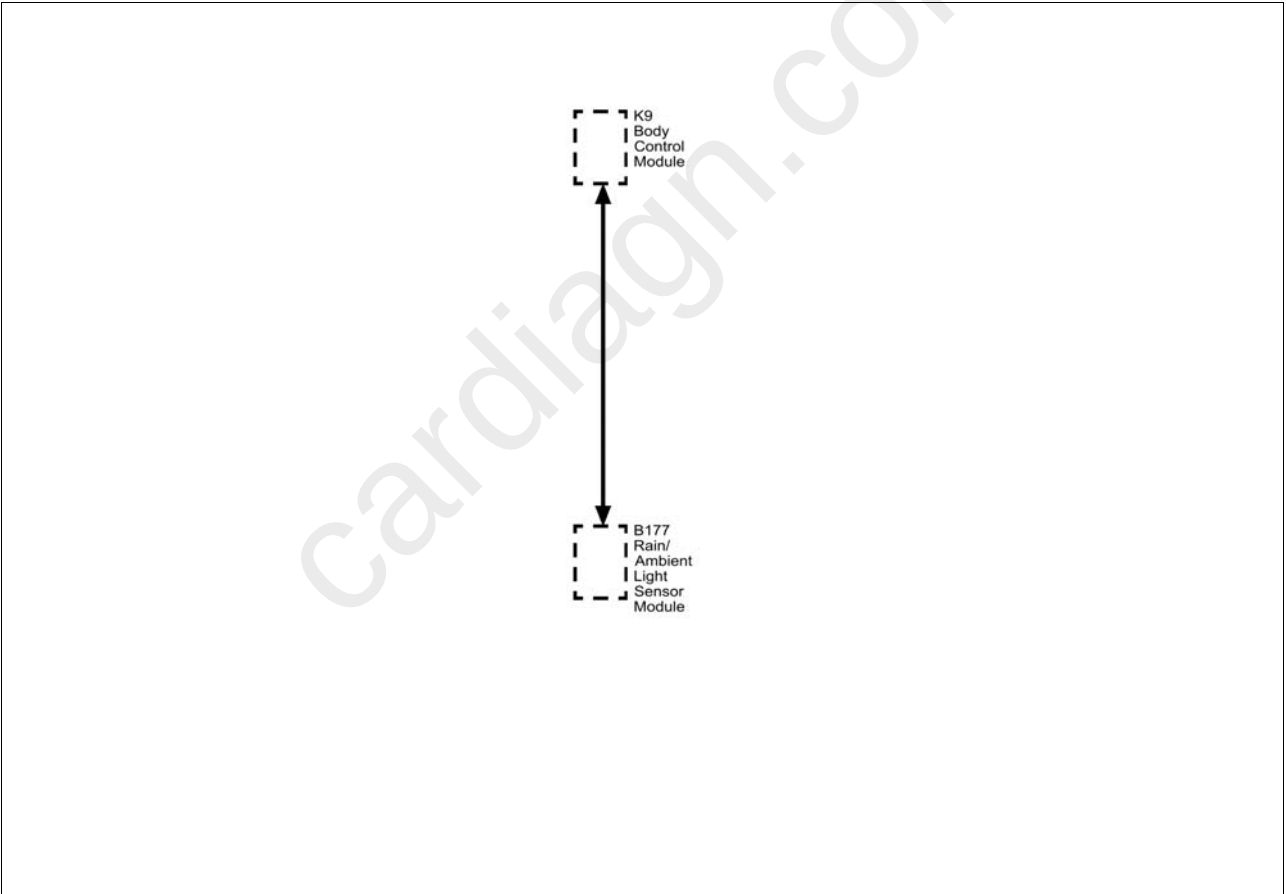
This indicator shall be requested when all of the following are true:

- 1. Power mode is RUN.
- 2. If single steering column switch equipped: The front wiper switch is SENSITIVITY 1 through SENSITIVITY 5.
- 3. If dual steering column stalk equipped: The front wiper switch stalk angle is SENSITIVITY.

The above indicator shall be turned OFF when any of the following become true:

- 1. Power mode becomes OFF, CRANK or ACCESSORY.
- 2. Front wiper switch is changed to OFF, MIST, LOW or HIGH.

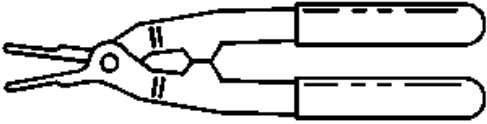
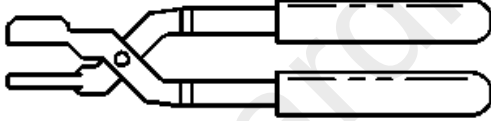
Fig 1: Rain Sensor Block Diagram



Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
K9	K9 Body Control Module

SPECIAL TOOLS AND EQUIPMENT > SPECIAL TOOLS

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