

2006 Chevrolet Equinox LS

2006 ACCESSORIES & EQUIPMENT Wipers/Washer Systems - Equinox & Torrent

2006 ACCESSORIES & EQUIPMENT

Wipers/Washer Systems - Equinox & Torrent

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Coolant Surge Tank Bolts	6 N.m	53 lb in
Washer Solvent Container Screws	2.5 N.m	22 lb in
Wiper Arm Retaining Nut - Front	28 N.m	21 lb in
Wiper Arm Retaining Nut - Rear	21 N.m	16 lb ft
Wiper Module Bolts - Front	12 N.m	9 lb ft
Wiper Module Bolts - Rear	7 N.m	62 lb in
Wiper Motor to Crank Nut	14 N.m	10 lb ft
Wiper Motor to Module Bolts	8 N.m	71 lb in

SCHEMATIC AND ROUTING DIAGRAMS

WIPER/WASHER SYSTEM SCHEMATICS

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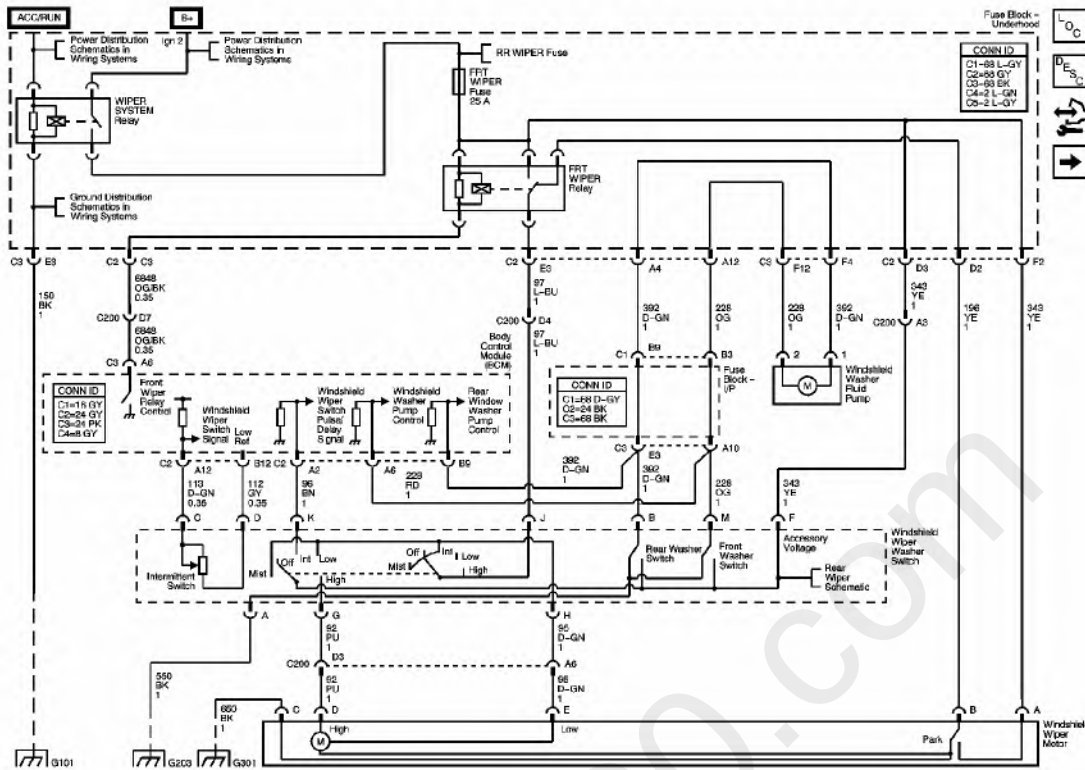


Fig. 1: Front Wiper/Washer
Courtesy of GENERAL MOTORS CORP.

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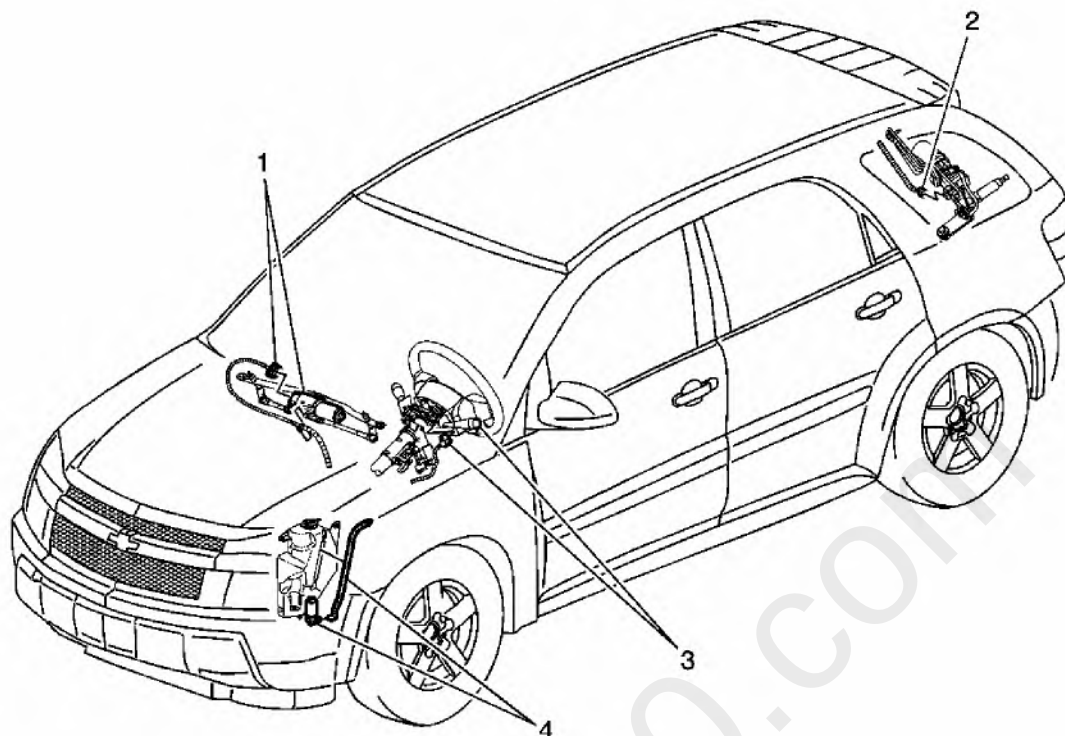


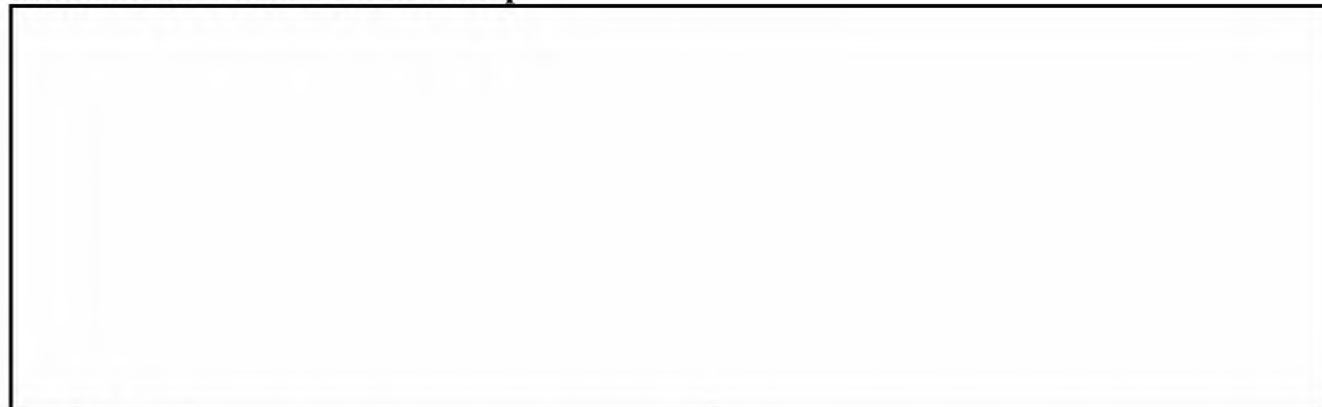
Fig. 3: Wiper/Washer System Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 3

Callout	Component Name
1	Windshield Wiper/Washer Motor
2	Wiper Motor - Rear
3	Windshield Wiper/Washer Switch
4	Windshield Washer Fluid Pump

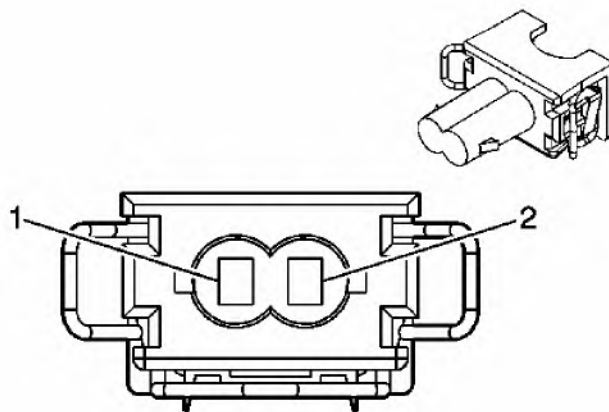
WIPER/WASHER SYSTEM CONNECTOR END VIEWS

Windshield Washer Fluid Pump



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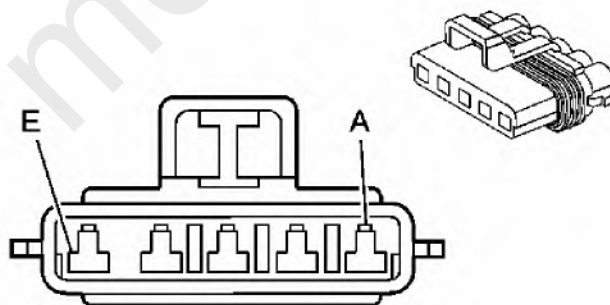


Connector Part Information

- OEM: 15305325
- Service: 89046634
- 2-Way F Mini-Timer (BK)

Pin	Wire Color	Circuit No.	Function
1	D-GN	392	Rear Window Washer Pump Control
2	OG	228	Windshield Washer Pump Control

Windshield Wiper Motor



Connector Part Information

- OEM: 12084891
- Service: 15305874
- 5-Way F Metri-Pack 280 Series, Sealed (GY)

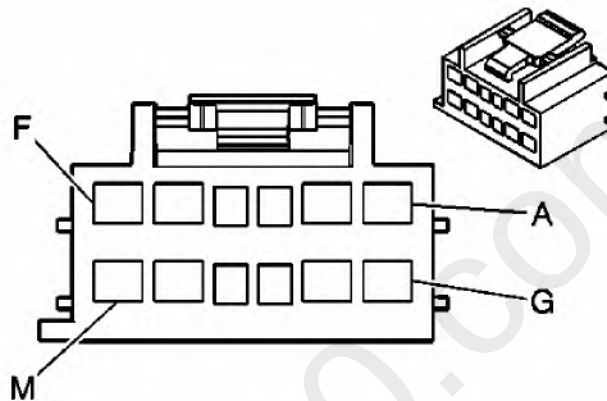
Pin	Wire Color	Circuit No.	Function
A	YE	343	Accessory Voltage
B	YE	196	Windshield Wiper Motor Park Switch Signal

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C	BK	650	Ground
D	PU	92	Windshield Wiper Motor High Speed Control
E	D-GN	95	Windshield Wiper Motor Low Speed Control

Windshield Wiper/Washer Switch



Connector Part Information

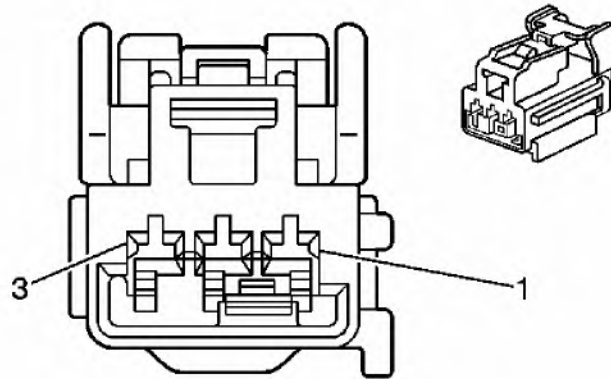
- **OEM: 15336888**
- **Service: 15306116**
- **12-Way F GT 150, 280 (BK)**

Pin	Wire Color	Circuit No.	Function
A	BK	550	Ground
B	D-GN	392	Rear Window Washer Pump Control
C	D-GN	113	Windshield Wiper Switch On Signal
D	GY	112	Low Reference
E	PK	94	Rear Wiper Switch Signal
F	YE	343	Accessory Voltage
G	PU	92	Windshield Wiper Motor High Speed Control
H	D-GN	95	Windshield Wiper Motor Low Speed Control
J	L-BU	97	Windshield Wiper Switch Mist/Off/Low Signal
K	BN	96	Windshield Wiper Switch Pulse Delay Signal
L	-	-	Not Used
M	OG	228	Windshield Washer Pump Control

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Wiper Motor - Rear



Connector Part Information

- **OEM: 7283-5539-40**
- **Service: 15383359**
- **3-Way F YESC/USCAR Class III Series (L-GY)**

Pin	Wire Color	Circuit No.	Function
1	WH	393	Rear Window Wiper Relay Control
2	BK	750	Ground
3	YE	143	Accessory Voltage

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B3702	Intermittent Wiper Delay Input Circuit Low
DTC B3703	Intermittent Wiper Delay Input Circuit High
DTC B3708	Front Washer Motor Input High
DTC B3713	Rear Washer Motor Input Circuit High
DTC B3715, B3716, B3717, B3718, or B3719	** MULTIPLE VALUES **
DTC B3722	Rear Wiper Relay Drive Circuit Low
DTC B3723	Rear Wiper Relay Drive Circuit High

DIAGNOSTIC STARTING POINT - WIPER/WASHER SYSTEMS

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Begin wiper/washer system diagnosis with the **Diagnostic System Check - Vehicle** in Vehicle DTC Information. The Diagnostic System Check will provide the following information:

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

The use of the Diagnostic System Check will identify the correct procedure for diagnosing the system and where the procedure is located.

SCAN TOOL OUTPUT CONTROLS

Body Control Module (BCM)

Scan Tool Output Control	Additional Menu Selection(s)	Description
Wiper Test	Front Wiper Relay	The wiper switch has to be in the Low position for this output control to function. The BCM actuates the Wiper relay when ON is selected. The front wiper should operate at low speed.
Wiper Test	Rear Wiper Relay	The wiper switch has to be in the Low position for this output control to function. The BCM actuates the Wiper relay when ON is selected. The rear wiper should operate at low speed.

SCAN TOOL DATA LIST

Wiper/Washer

Scan Tool Parameter	Units Displayed	Typical Data Value
Operating Conditions: Ignition in Run, Engine OFF, All Doors Closed, Park Brake Applied (DRLs OFF)		
Battery 1	Volts	Varies
Front Washer Motor Input	On/Off	Off
Front Wiper Delay Switch	On/Off	Off
Front Wiper Delay Relay Cmd.	On/Off	Off
Front Wiper Delay Relay Fdbk.	High/Low	High
Rear Washer Motor Input	On/Off	Off
Rear Wiper Switch	On/Off	Off
Rear Wiper Relay Cmd.	On/Off	Off
Rear Wiper Relay Fdbk.	High/Low	High
Wiper Delay 1	Yes/No	Varies
Wiper Delay 2	Yes/No	Varies

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Wiper Delay 3	Yes/No	Varies
Wiper Delay Input	Volts	Varies

SCAN TOOL DATA DEFINITIONS

Front Washer Motor Input

The scan tool displays On/Off. This input displays On when the front washer spray is on.

Front Wiper Relay Cmd.

The scan tool displays On/Off. The body control module will indicate if it is commanding the front wiper relay On or Off.

Front Wiper Relay Fdbk.

The scan tool displays High/Low. This input to the BCM displays the state of the front wiper relay feedback circuit. Low is displayed when the BCM is providing a ground to the front wiper relay control circuit.

Front Wiper Switch

The scan tool displays On/Off. This input displays On when the front wipers are on.

Rear Washer Motor Input

The scan tool displays On/Off. This input displays On when the rear washer spray is on.

Rear Wiper Relay Cmd.

The scan tool displays On/Off. The body control module will indicate if it is commanding the rear wiper relay On or Off.

Rear Wiper Relay Fdbk.

The scan tool displays High/Low. This input to the BCM displays the state of the rear wiper relay feedback circuit. Low is displayed when the BCM is providing a ground to the rear wiper relay control circuit.

Rear Wiper Switch

The scan tool displays On/Off. This input displays On when the rear wipers are on.

Wiper Delay 1

The scan tool displays Yes/No. This input to the body control module displays the state of the wiper delay switch.

Wiper Delay 2

The scan tool displays Yes/No. This input to the body control module displays the state of the wiper delay switch.

Wiper Delay 3

The scan tool displays Yes/No. This input to the body control module displays the state of the wiper delay switch.

Wiper Delay Input

The scan tool displays volts. This input displays the voltage supplied to the body control module.

DTC B3702**Circuit Description**

The intermittent switch in the windshield wiper washer switch is a voltage divider connected across the body control module (BCM) inputs circuits windshield wiper switch signal circuit and windshield wiper switch low reference circuit. The front wiper relay is energized by the BCM switching the front wiper relay control circuit to ground.

The intermittent wiper delay switch has 3 switch positions.

- Delay 1 (500 ohms resistance)
- Delay 2 (1000 ohms resistance)
- Delay 3 (2000 ohms resistance)

Refer to **Wiper/Washer System Description and Operation** for the timing of each delay position.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B3702 Intermittent Wiper Delay Input Circuit Low

Conditions for Running the DTC

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The ignition is in RUN or ACC position.

Conditions for Setting the DTC

The windshield wiper switch signal circuit is shorted to ground or less than 0.20 volts.

Actions Taken When the DTC Sets

- No light will illuminate in the instrument panel (I/P).
- Cannot vary wiper speed
- B3702 is set in the BCM.

Conditions for Clearing the DTC

- A current DTC clears when the fault is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the fault.

Diagnostic Aids

- Inspect wiring harness for damage. Inspect for broken or chaffed insulation.
- If fault is suspected to be intermittent, wiggling harness wiring may help in locating fault.
- Inspect for poor connection at the BCM. Inspect harness connectors for backed out terminals, improper terminal mating, broken connector locks, improperly formed or damaged terminals and poor terminal-to-wire connection, terminal is crimped over wire insulation and not conductors.

DTC B3702

Step	Action	Values	Yes	No
Schematic Reference: Wiper/Washer System Schematics Connector End View Reference: <u>Master Electrical Component List</u> in Wiring Systems				
1	Did you perform the Diagnostic System Check - Vehicle?	-	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u> in Vehicle DTC Information
	1. Turn ON the ignition, with the engine OFF. 2. With a scan tool, observe the			

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2	wiper delay input in the body control module (BCM) wiper/washer data list. Is the voltage less than the specified value?	0.4 V	Go to Step 3	Go to Diagnostic Aids
3	1. Turn OFF the ignition. 2. Disconnect the windshield wiper washer switch. 3. Turn ON the ignition, with the engine OFF. 4. With a scan tool, observe the wiper delay input in the BCM wiper/washer data list. Is the voltage greater than the specified value?	4.5 V	Go to Step 6	Go to Step 4
4	1. Turn OFF the ignition. 2. Disconnect the BCM connector C2. 3. Check continuity between the windshield wiper switch signal circuit and ground, then between the windshield wiper switch signal circuit and the windshield wiper low reference circuit. Is there continuity?	-	Go to Step 5	Go to Step 7
5	Repair a short to ground in the windshield wiper switch signal circuit. Refer to Wiring Repairs or Connector Repairs in Wiring Systems. Did you complete the repair?	-	Go to Step 8	-
6	Replace the windshield wiper washer switch. Refer to Multifunction, Turn Signal Switch Replacement in Steering Wheel and Column. Did you complete the replacement?	-	Go to Step 8	-
7	Replace the BCM. Refer to Control Module References in Computer/Integrating Systems for replacement, setup, and programming.	-	Go to Step	

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	Did you complete the replacement?		8	-
8	1. Use the scan tool to clear the DTCs. 2. Operate the vehicle within the conditions for running the DTC, as specified in the supporting text.	-		
	Does the DTC reset?		Go to Step 2	System OK

DTC B3703**Circuit Description**

The intermittent switch in the windshield wiper washer switch is a voltage divider connected across the body control module (BCM) inputs circuits, windshield wiper switch signal circuit, and windshield wiper switch low reference circuit. The front wiper relay is energized by the BCM switching the front wiper relay control circuit to ground.

The intermittent wiper delay switch has 3 switch positions.

- Delay 1 (500 ohms resistance)
- Delay 2 (1000 ohms resistance)
- Delay 3 (2000 ohms resistance)

Refer to **Wiper/Washer System Description and Operation** for the timing of each delay position.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B3703 Intermittent Wiper Delay Input Circuit High

Conditions for Running the DTC

The ignition is in RUN or ACC position.

Conditions for Setting the DTC

- The windshield wiper switch signal circuit is greater than 4.71 volts, open or shorted to voltage.
- The windshield wiper switch low reference circuit is open.

Actions Taken When the DTC Sets

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- No light will illuminate in the instrument panel (I/P).
- Cannot vary wiper speed

Conditions for Clearing the DTC

- A current DTC clears when the fault is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the fault.

Diagnostic Aids

- Inspect wiring harness for damage. Inspect for broken or chaffed insulation.
- If fault is suspected to be intermittent, wiggling harness wiring may help in locating fault.
- Inspect for poor connection at the BCM. Inspect harness connectors for backed out terminals, improper terminal mating, broken connector locks, improperly formed or damaged terminals and poor terminal-to-wire connection, terminal is crimped over wire insulation and not conductors.

DTC B3703

Step	Action	Values	Yes	No
Schematic Reference: Wiper/Washer System Schematics Connector End View Reference: Master Electrical Component List in Wiring Systems				
1	Did you perform the Diagnostic System Check - Vehicle?	-	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	1. Turn ON the ignition, with the engine OFF. 2. With a scan tool, observe the wiper delay input in the body control module (BCM) wiper/washer data list. Is the voltage greater than the specified value?	4.71 V	Go to Step 3	Go to Diagnostic Aids
	1. Turn OFF the ignition. 2. Disconnect the windshield wiper			

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3	washer switch. 3. Turn ON the ignition, with the engine OFF. 4. Measure the voltage between the windshield wiper switch signal circuit and the windshield wiper switch low reference circuit at the harness connector. Is the voltage less than the specified value?	4 V	Go to Step 4	Go to Step 5
4	Measure the voltage between the windshield wiper switch signal circuit and a good ground. Is the voltage between the specified values?	4-6 V	Go to Step 7	Go to Step 8
5	Is the voltage between the specified values?	4-6 V	Go to Step 6	Go to Step 9
6	Using a fused jumper, jumper the windshield wiper switch signal circuit to the windshield wiper switch low reference circuit at the harness connector. Is the voltage less than the specified value?	0.4 V	Go to Step 11	Go to Step 10
7	Test the windshield wiper switch low reference circuit for an open. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	-	Go to Step 12	Go to Step 10
8	Test the windshield wiper switch signal circuit for an open. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	-	Go to Step 12	Go to Step 10
9	Test the windshield wiper switch signal circuit for a short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	-	Go to Step 12	Go to Step 10
	Replace the BCM. Refer to Control Module References in			

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10	Computer/Integrating Systems for replacement, setup, and programming. Did you complete the replacement?	-	Go to Step 12	-
11	Replace the windshield wiper washer switch. Refer to Multifunction, Turn Signal Switch Replacement in Steering Wheel and Column. Did you complete the replacement?	-	Go to Step 12	-
12	1. Use the scan tool to clear the DTCs. 2. Operate the vehicle within the conditions for running the DTC, as specified in the supporting text. Does the DTC reset?	-	Go to Step 2	System OK

DTC B3708**Circuit Description**

The body control module (BCM) monitors the windshield washer pump control circuit. When a front windshield wash is requested for more than 2 minutes, the BCM will turn OFF the windshield washer pump if the front wiper is NOT requested by the wiper switch.

Battery voltage for the windshield washer pump is supplied through the FRT WIPER 25 A fuse and windshield wiper washer switch. Grounding for the windshield washer pump is through the OFF position of the rear washer switch, when equipped.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B3708 Front Washer Motor Input High

Conditions for Running the DTC

Ignition is in RUN or ACC position.

Conditions for Setting the DTC

Front windshield washer pump control circuit is shorted to battery voltage for 2 minutes.

Actions Taken When the DTC Sets

- No light will illuminate in the instrument panel (I/P).

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- Default turns OFF washer motor after failing DTC if wiper input is not active.

Conditions for Clearing the DTC

- A current DTC clears when the fault is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the fault.

Diagnostic Aids

- Inspect for poor connection at the BCM. Inspect harness connectors for backed out terminals, improper terminal mating, broken connector locks, improperly formed or damaged terminals and poor terminal-to-wire connection, terminal crimped over wire insulation and not conductors.
- Inspect wiring harness for damage. Inspect for broken or chaffed insulation.
- If fault is suspected to be intermittent, wiggling harness wiring may help in locating fault.

DTC B3708

Step	Action	Yes	No
Schematic Reference: <u>Wiper/Washer System Schematics</u> Connector End View Reference: <u>Master Electrical Component List</u> in Wiring Systems			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	1. Turn ON the ignition, with the engine OFF. 2. With a scan tool, observe the front washer motor input in the body control module (BCM) wiper/washer data list, while cycling the front washer switch. Does the scan tool indicate the correct washer pump status, ON/OFF?	Go to Diagnostic Aids	Go to Step 3
	1. Turn OFF the ignition. 2. Disconnect the windshield wiper washer switch. 3. Turn ON the ignition, with the engine		

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3	OFF. 4. With a scan tool, observe the front washer motor input. Does the scan tool indicate the switch is OFF?	Go to Step 5	Go to Step 4
4	1. Turn OFF the ignition. 2. Disconnect the BCM connector C2. 3. Test the windshield washer pump control circuit for a short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 7	Go to Step 6
5	Replace the windshield wiper washer switch. Refer to Multifunction, Turn Signal Switch Replacement in Steering Wheel and Column. Did you complete the replacement?	Go to Step 7	-
6	Replace the BCM. Refer to Control Module References in Computer/Integrating Systems for replacement, setup, and programming. Did you complete the replacement?	Go to Step 7	-
7	1. Use the scan tool to clear the DTCs. 2. Operate the vehicle within the conditions for running the DTC, as specified in the supporting text. Does the DTC reset?	Go to Step 2	System OK

DTC B3713

Circuit Description

The body control module (BCM) monitors the rear window washer switch signal circuit. When a rear windshield wash is requested for more than 2 minutes, the BCM will turn OFF the windshield washer fluid pump motor if the rear wiper is NOT requested by the windshield wiper washer switch.

Power for the windshield washer fluid pump is supplied through the FRT WIPER 25 A fuse and windshield wiper washer switch. Grounding for the windshield washer fluid pump is through the OFF position of the windshield washer fluid pump.

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DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B3713 Rear Washer Motor Input Circuit High

Conditions for Running the DTC

Ignition is in RUN or ACC position.

Conditions for Setting the DTC

Rear window washer switch signal circuit at battery voltage for 2 minutes.

Actions Taken When the DTC Sets

No light will illuminate in the instrument panel (I/P).

Conditions for Clearing the DTC

- A current DTC clears when the fault is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the fault.

Diagnostic Aids

- Inspect wiring harness for damage.
- Inspect for broken or chaffed insulation.
- If fault is suspected to be intermittent, wiggling harness wiring may help in locating fault.

DTC B3713

Step	Action	Yes	No
Schematic Reference: <u>Wiper/Washer System Schematics</u> Connector End View Reference: <u>Master Electrical Component List</u> in Wiring Systems			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
	1. Turn ON the ignition, with the engine OFF. 2. With a scan tool, observe the rear		

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2	washer motor input in the body control module (BCM) wiper/washer data list, while cycling the rear washer switch. Does the scan tool indicate the correct washer pump status, ON/OFF?	Go to Diagnostic Aids	Go to Step 3
3	1. Turn OFF the ignition. 2. Disconnect the windshield wiper washer switch. 3. Turn ON the ignition, with the engine OFF. 4. With a scan tool, observe the rear washer motor input. Does the scan tool indicate the switch is OFF?	Go to Step 4	Go to Step 5
4	Using a fused jumper, jumper the windshield wiper washer switch power circuit to the front washer switch circuit and jumper the rear window washer switch circuit to the windshield wiper washer switch ground circuit at the wiper switch harness connector. Does the washer pump motor run?	Go to Step 7	Go to Step 6
5	1. Turn OFF the ignition. 2. Disconnect the BCM connector C2. 3. Turn ON the ignition, with the engine OFF. 4. Test the front washer switch circuit and the rear washer switch circuit for a short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 9	Go to Step 8
6	Repair an open in the rear window washer switch circuit or the windshield wiper washer switch ground circuit. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 9	-

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7	Replace the windshield wiper washer switch. Refer to Multifunction, Turn Signal Switch Replacement in Steering Wheel and Column. Did you complete the replacement?	Go to Step 9	-
8	Replace the BCM. Refer to Control Module References in Computer/Integrating Systems for replacement, setup, and programming. Did you complete the replacement?	Go to Step 9	-
9	1. Use the scan tool to clear the DTCs. 2. Operate the vehicle within the conditions for running the DTC, as specified in the supporting text. Does the DTC reset?	Go to Step 2	System OK

DTC B3715, B3716, B3717, B3718, OR B3719**Circuit Description**

The body control module (BCM) commands the Intermittent mode of the wipers by switching the front wiper relay control circuit to ground at regular timed intervals. This provides low speed operation of the wiper motor during single swipes of the wipers. Each time the BCM grounds the circuit, the FRT WIPER relay energizes, which closes the switch side contacts of the relay in order to apply battery positive voltage to the windshield wiper motor via the windshield wiper switch MIST/OFF/LOW signal circuit and windshield wiper motor low speed circuit. The BCM monitors the voltage on the front wiper relay control circuit in order to determine when a failure has occurred. When the FRT WIPER relay is energized, the voltage level on the front wiper relay control circuit should be near 0 volts. When the FRT WIPER relay is de-energized, the voltage level should be high, near system voltage.

Control of the wipers during LO or HIGH speed switch settings is direct wired from the windshield wiper washer switch to the wiper motor and is not under the control of the BCM.

DTC Descriptors

This diagnostic procedure supports the following DTCs:

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

Conditions for Running the DTC

The ignition is in the RUN or ACC position.

Conditions for Setting the DTCs

The following conditions will cause these DTCs to set:

- B3717-the BCM detects short to ground or open.
- B3718- the BCM detects a short to battery voltage.
- For B3718 to set the wiper switch must be in Mist or Intermittent.
- An open FRT WIPER 25 amp fuse
- An open or short to ground in one of the WIPER SYSTEM relay circuits

Action Taken When the DTC Sets

- If the front wiper relay control circuit is open or shorted to battery, the Intermittent wiper mode will not operate.
- If the front wiper relay control circuit is shorted to ground, the wipers will always be on
- If the FRT WIPER relay does not receive battery positive voltage from the WIPER SYSTEM relay, all wiper washer functions will be inoperative.
- If any of the circuits that receive battery positive voltage from the FRT WIPER fuse are shorted to ground, the fuse will be open and all wiper washer functions will be inoperative.

Conditions for Clearing the DTC

- This DTC will change from current to history when the fault is no longer present.
- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.

Diagnostic Aids

DTC B3717 indicates a probable failure of the front wiper relay control circuit. However, the DTC will also set if the WIPER SYSTEM relay fails to supply battery positive voltage to the FRT WIPER relay. This failure may be due to an open FRT WIPER 25 amp fuse, or a malfunction of the WIPER SYSTEM relay or associated circuits. All wiper washer functions will be inoperative for both the front windshield and the rear window. If the fuse is open, a short to ground in any one of the following circuits may be the cause:

- Accessory voltage circuit
- Windshield washer pump control circuit
- Windshield wiper motor high speed circuit
- Windshield wiper motor low speed circuit
- Windshield wiper switch Mist/Off/Low signal circuit

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- Windshield wiper switch pulse delay signal circuit
- Windshield wiper motor park switch signal circuit
- Rear wiper switch signal circuit
- Rear window washer pump control circuit

If there is no battery positive voltage supply to the FRT WIPER relay and an open FRT WIPER 25 amp fuse is not the cause, test the WIPER SYSTEM relay and associated circuits.

Test Description

The number below refers to the step number on the diagnostic table.

7: Listen for an audible click when the front wiper relay operates. Command both the ON and OFF states. Repeat the commands, as necessary.

DTC B3715, B3716, B3717, B3718, or B3719

Step	Action	Yes	No
Schematic Reference: <u>Wiper/Washer System Schematics</u> Connector End View Reference: <u>Master Electrical Component List</u> in Wiring Systems			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	1. Turn ON the ignition, with the engine OFF. 2. Operate the windshield wiper washer switch through all the switch positions. Refer to Wiper/Washer System Description and Operation . Does the windshield wiper/washer system operate normally?	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems	Go to Step 3
3	Are the wipers always ON?	Go to Step 12	Go to Step 4
4	Inspect the FRT WIPER 25 amp fuse for an open. Is the fuse open?	Go to Step 5	Go to Step 6
	1. Replace the FRT WIPER 25 amp fuse with a new one. 2. Attempt to operate all functions of the		

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5	front and rear wipers and washers. Did the new fuse open?	Go to Step 10	Go to Step 15
6	1. Turn OFF the ignition. 2. Disconnect the FRT WIPER relay in the underhood fuse block (UHFB). 3. Turn ON the ignition, with the engine OFF. 4. With a test lamp connected to a good ground, probe the battery positive voltage supply circuit of the relay at the relay socket terminal. Does the test lamp illuminate?	Go to Step 7	Go to Step 11
7	1. Connect the test lamp between the battery positive voltage circuit and the front wiper relay control circuit at the relay socket terminals. 2. With a scan tool command the front wiper relay ON and OFF under body control module (BCM) special functions. Does the test lamp illuminate when you command the relay ON and go out when you command the relay OFF?	Go to Step 13	Go to Step 8
8	Test the front wiper relay control circuit for an open or a short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 15	Go to Step 9
9	Inspect for poor connections at the harness connector of the BCM. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 15	Go to Step 14
	Repair one of the following circuits for a short to ground: • Accessory voltage circuit • Windshield washer pump control		

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10	circuit • Windshield wiper motor high speed circuit • Windshield wiper motor low speed circuit • Windshield wiper switch Mist/Off/Low signal circuit • Windshield wiper switch pulse delay signal circuit • Windshield wiper motor park switch signal circuit • Rear wiper switch signal circuit • Rear window washer pump control circuit Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 15	-
11	Repair an open or a high resistance in the battery positive voltage supply circuit of the FRT WIPER relay. Refer to Wiring Repairs or Connector Repairs in Wiring Systems. Did you complete the repair?	Go to Step 15	-
12	Repair a short to ground on the front wiper relay control circuit. Refer to Wiring Repairs or Connector Repairs in Wiring Systems. Did you complete the repair?	Go to Step 15	-
13	Replace the front wiper relay. Refer to Relay Replacement (Within an Electrical Center) or Relay Replacement (Attached to Wire Harness) in Wiring Systems. Did you complete the replacement?	Go to Step 15	-
14	Replace the BCM. Refer to Control Module References in Computer/Integrating Systems for replacement, setup, and programming. Did you complete the replacement?	Go to Step 15	-
	1. Use the scan tool to clear the DTCs.		

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15	2. Operate the vehicle within the Conditions for Running the DTC, as specified in the supporting text.		
	Does the DTC reset?	Go to Step 2	System OK

DTC B3722

Circuit Description

When operation of the rear wiper is selected, battery voltage from the rear wiper switch is applied to the rear wiper switch signal input of the body control module (BCM) circuit. The BCM responds by switching the rear wiper relay control circuit to ground. This action energizes the rear wiper relay, providing power to the rear wiper motor.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B3722 Rear Wiper Relay Drive Circuit Low

Conditions for Running the DTC

The ignition is in RUN or ACC position.

Conditions for Setting the DTC

- The rear wiper relay control circuit is shorted to ground or open.
- The accessory voltage circuit to the coil side of the relay is open.
- The accessory voltage circuit is shorted to ground between the fuse and the rear wiper motor.
- The rear window wiper motor control circuit is shorted to ground.
- The RR WIPER 15-amp fuse is open.

Actions Taken When the DTC Sets

Service (wrench) light will illuminate.

Conditions for Clearing the DTC

- A current DTC clears when the fault is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the fault.

Diagnostic Aids

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- Inspect for poor connection at the BCM. Inspect harness connectors for backed out terminals, improper terminal mating, broken connector locks, improperly formed or damaged terminals and poor terminal-to-wire connection, terminal crimped over wire insulation and not conductors.
- If the rear wiper relay control circuit is open, the rear wipers will be inoperative.
- If the rear wiper relay control circuit is shorted to ground, the rear wipers will always be ON.
- If, either the accessory voltage circuit, or the rear window wiper motor control circuit is shorted to ground, the RR WIPER fuse will open and the rear wipers will be inoperative.
- Inspect the wiring harness for damage. Inspect for broken or chaffed insulation.
- If the fault is suspected to be intermittent, wiggling the harness wiring may help in locating fault.

DTC B3722

Step	Action	Yes	No
Schematic Reference: Wiper/Washer System Schematics Connector End View Reference: Master Electrical Component List in Wiring Systems			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	1. Turn OFF the ignition. 2. Remove the rear wiper relay from the underhood fuse block (UHFB). 3. Turn ON the ignition, with the engine OFF. 4. Turn the rear wipers ON. 5. With a test lamp connected to a good ground, probe the coil side accessory voltage supply circuit of the relay. 6. With the test lamp still connected to a good ground, probe the switch side accessory voltage supply circuit of the relay. Does the test lamp illuminate for both accessory voltage circuits?	Go to Step 3	Go to Step 4

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3	1. Connect the test lamp between the accessory voltage supply circuit and the rear wiper relay control circuit of the relay. 2. Using a scan tool, command the rear wipers ON and OFF. Does the test lamp illuminate when you command ON and go out when you command OFF?	Go to Step 8	Go to Step 7
4	Inspect for an open RR WIPER 15-amp fuse. Is the fuse open?	Go to Step 5	Go to Step 11
5	1. Turn OFF the ignition. 2. Install the rear wiper relay. 3. Replace the RR WIPER fuse with a new one. 4. Turn ON the ignition with the engine OFF. 5. Attempt to operate the rear wipers. Does the RR WIPER fuse open again?	Go to Step 6	Go to Step 15
6	Test the following circuits of the rear wiper motor for a short to ground: • Accessory voltage circuit. • Rear window wiper motor control circuit. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 15	Go to Step 10
7	Test the rear wiper relay control circuit for an open or a short to ground. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 15	Go to Step 9
8	Inspect for poor connections and terminal damage at the UHFB. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in		

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	Wiring Systems. Did you find and correct the condition?	Go to Step 15	Go to Step 14
9	Inspect for poor connections at the harness connector of the body control module (BCM). Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 15	Go to Step 13
10	Inspect for poor connections at the harness connector of the rear wiper motor. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 15	Go to Step 12
11	Repair the open in the accessory voltage supply circuit of the rear wiper relay. Refer to Connector Repairs and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 15	-
12	Replace the rear wiper motor. Refer to Wiper Motor Replacement - Liftgate . Did you complete the replacement?	Go to Step 15	-
13	Replace the BCM. Refer to Control Module References in Computer/Integrating Systems for replacement, setup, and programming. Did you complete the replacement?	Go to Step 15	-
14	Replace the rear wiper relay. Refer to Relay Replacement (Within an Electrical Center) or Relay Replacement (Attached to Wire Harness) in Wiring Systems. Did you complete the replacement?	Go to Step 15	-
15	1. Use the scan tool to clear the DTCs. 2. Operate the vehicle within the conditions for running the DTC, as specified in the supporting text. Does the DTC reset?	Go to Step 2	System OK

DTC B3723

Circuit Description

When operation of the rear wiper is selected, battery voltage from the rear wiper switch is

applied to the rear wiper switch signal input circuit of the body control module (BCM). The BCM responds by switching the rear wiper relay control circuit to ground. This action energizes the rear wiper relay, providing power to the rear wiper motor.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B3723 Rear Wiper Relay Drive Circuit High

Conditions for Running the DTC

Ignition is in RUN or ACC position.

Conditions for Setting the DTC

- The rear wiper relay control circuit is shorted to battery.
- The rear wiper relay output is ON.

Actions Taken When the DTC Sets

- The service (wrench) light will illuminate.
- The rear wipers are inoperative.

Conditions for Clearing the DTC

- A current DTC clears when the fault is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the fault.

Diagnostic Aids

- When the BCM has been requested to activate the rear wiper relay, the BCM switches the rear wiper relay control circuit to ground. However, if the circuit is shorted to battery voltage, high current flow will result and the BCM output will go into a protective state. The BCM output will not allow itself to be activated for as much as 3 minutes.
- Inspect the harness connectors at the BCM for improper terminal mating, broken connector locks, and improperly formed or damaged terminals.
- Inspect wiring harness for damage. Inspect for broken or chaffed insulation.
- Review all fail information as this may assist in determining the conditions when the fault occurs.
- If the fault is suspected to be intermittent, wiggling the harness wiring may help in locating the fault.

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Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: This step will determine if the rear wiper relay is internally shorted to battery voltage. Once you have disconnected the relay, you should be able to clear DTC B3723 with no recurrence. It is, however, normal for DTC B3722 to set while the relay is disconnected.

3: This step will determine if the rear wiper relay control circuit is shorted to battery voltage, or if the BCM is at fault.

DTC B3723

Step	Action	Yes	No
Schematic Reference: <u>Wiper/Washer System Schematics</u> Connector End View Reference: <u>Master Electrical Component List</u> in Wiring Systems			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	IMPORTANT: DTC B3722 may set as a result of disconnecting the REAR WIPER Relay. 1. Turn the front and rear wiper and washer switches OFF. 2. Turn OFF the ignition. 3. Disconnect the REAR WIPER Relay from the underhood fuse block. 4. Turn ON the ignition, with the engine OFF. 5. Use a scan tool to clear DTC B3723. Does DTC B3723 clear?	Go to Step 5	Go to Step 3
3	Test the rear wiper relay control circuit for a short to battery. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 6	Go to Step 4
4	Replace the body control module (BCM). Refer to Control Module References in Computer/Integrating Systems for		

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	replacement, setup, and programming. Did you complete the replacement?	Go to Step 6	-
5	Replace the rear wiper relay. Refer to <u>Relay Replacement (Within an Electrical Center)</u> or <u>Relay Replacement (Attached to Wire Harness)</u> in Wiring Systems. Did you complete the replacement?	Go to Step 6	-
6	1. Use the scan tool to clear the DTCs. 2. Operate the vehicle within the conditions for running the DTC, as specified in the supporting text. Does the DTC reset?	Go to Step 2	System OK

SYMPTOMS - WIPER/WASHER SYSTEMS

IMPORTANT: The following steps must be completed before using the symptom tables.

1. Perform the **Diagnostic System Check - Vehicle** in Vehicle DTC Information before using the Symptom Tables in order to verify that all of the following are true:
 - There are no DTCs set.
 - The control modules can communicate via the serial data link.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to **Wiper/Washer System Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the wiper/washer system. Refer to **Checking Aftermarket Accessories** in Wiring Systems.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Ensure that all mechanical components are operative before diagnosing the electrical portion of the system.

Intermittent

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

Symptom List

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

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symptom:

- **Washers Inoperative**
- **Wipers Always On**
- **Wipers Inoperative - One or More Modes (Front Wipers) or Wipers Inoperative - One or More Modes (Rear Wipers)**

WASHERS INOPERATIVE

Washers Inoperative

Step	Action	Yes	No
Schematic Reference: <u>Wiper/Washer System Schematics</u> Connector End View Reference: <u>Master Electrical Component List</u> in Wiring Systems			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u> in Vehicle DTC Information
2	Verify that the Washers Inoperative complaint is present. Do the washers operate as described in the Description and Operation?	Go to <u>Testing for Intermittent Conditions and Poor Connections</u> in Wiring Systems	Go to Step 3
3	1. Turn OFF the ignition. 2. Disconnect the harness connector of the windshield washer fluid pump. 3. Connect a test lamp from the windshield washer pump control circuit to a good ground. 4. Turn ON the ignition, with the engine OFF. 5. Press the front washer switch. Does the test lamp illuminate?	Go to Step 4	Go to Step 8
4	1. Connect the test lamp from the rear window washer pump control circuit to a good ground. 2. Turn ON the ignition, with the engine		

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	OFF. 3. Press the rear washer switch.		
	Does the test lamp illuminate?	Go to Step 5	Go to Step 7
5	1. Connect the test lamp between the windshield washer pump control circuit and the rear window washer pump control circuit at the windshield washer fluid pump. 2. Turn ON the ignition, with the engine OFF. 3. Press the front washer switch.		
	Does the test lamp illuminate?	Go to Step 9	Go to Step 6
6	1. Turn OFF the ignition. 2. Disconnect the harness connector of the windshield wiper washer switch. 3. With a test lamp connected to battery positive voltage, probe the ground circuit of the harness connector.		
	Does the test lamp illuminate?	Go to Step 10	Go to Step 11
7	1. Turn OFF the ignition. 2. Disconnect the harness connector of the windshield wiper washer switch. 3. Test the rear window washer pump control circuit for an open or a short to ground. Refer to Circuit Testing and Wiring Repairs in Wiring Systems.		
	Did you find and correct the condition?	Go to Step 14	Go to Step 10
8	1. Turn OFF the ignition. 2. Disconnect the harness connector of the windshield wiper washer switch. 3. Test the windshield washer pump control circuit for an open or a short to ground. Refer to Circuit Testing and Wiring Repairs in Wiring Systems.		

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	Did you find and correct the condition?	Go to Step 14	Go to Step 10
9	Inspect for poor connections at the windshield washer fluid pump. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 14	Go to Step 12
10	Inspect for poor connections at the windshield wiper washer switch. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 14	Go to Step 13
11	Repair the ground circuit for an open or a high resistance. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 14	-
12	Replace the windshield washer fluid pump. Refer to Washer Pump/Reservoir Replacement . Did you complete the replacement?	Go to Step 14	-
13	Replace the windshield wiper washer switch. Refer to Multifunction, Turn Signal Switch Replacement in Steering Wheel and Column. Did you complete the replacement?	Go to Step 14	-
14	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 2

WIPERS ALWAYS ON

Wipers Always On

Step	Action	Yes	No
Schematic Reference: <u>Wiper/Washer System Schematics</u> Connector End View Reference: <u>Master Electrical Component List</u> in Wiring Systems			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information

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2	1. Turn ON the ignition, with the engine OFF. 2. Turn both the front windshield and rear window wiper washer switches OFF. Are the wipers OFF?	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems	Go to Step 3
3	Are the rear wipers always ON?	Go to Step 4	Go to Step 7
4	1. The rear wipers are always ON. 2. Turn OFF the ignition. 3. Disconnect the rear wiper relay. 4. Turn ON the ignition, with the engine OFF. Are the rear wipers OFF?	Go to Step 5	Go to Step 6
5	1. Turn OFF the ignition. 2. Connect a test lamp between the rear wiper relay control circuit and the accessory voltage side of the rear wiper relay at the rear wiper relay socket terminals. 3. Turn ON the ignition, with the engine OFF. Does the test lamp illuminate?	Go to Step 8	Go to Step 16
6	Test the rear window wiper motor control circuit for a short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 20	Go to Step 14
7	1. The front wipers are always ON. 2. Turn OFF the ignition. 3. Disconnect the harness connector of the windshield wiper washer switch. 4. Turn ON the ignition, with the engine OFF. Are the front wipers OFF?	Go to Step 9	Go to Step 15
	1. Turn OFF the ignition. 2. Disconnect the harness connector C2		

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8	of the body control module (BCM). 3. Connect a test lamp between the rear wiper switch signal circuit of the harness connector and a good ground. 4. Turn ON the ignition, with the engine OFF. Does the test lamp illuminate?	Go to Step 10	Go to Step 12
9	Connect a test lamp between the windshield wiper switch pulse delay signal circuit of the harness connector and a good ground. Does the test lamp illuminate?	Go to Step 11	Go to Step 13
10	Test the rear wiper switch signal circuit for a short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 20	Go to Step 13
11	Test the windshield wiper switch pulse delay signal circuit for a short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 20	Go to Step 12
12	Inspect for poor connections at the BCM. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 20	Go to Step 19
13	Inspect for poor connections at the windshield wiper washer switch. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 20	Go to Step 18
14	Inspect for poor connections at the rear wiper motor. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 20	Go to Step 17
15	Repair the windshield wiper motor high speed circuit or the windshield wiper motor low speed circuit for a short to voltage. Refer to Wiring Repairs and Connector		

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	Repairs in Wiring Systems. Did you complete the repair?	Go to Step 20	-
16	Replace the rear wiper relay. Refer to Relay Replacement (Within an Electrical Center) or Relay Replacement (Attached to Wire Harness) in Wiring Systems. Did you complete the replacement?	Go to Step 20	-
17	Replace the rear wiper motor. Refer to Wiper Motor Replacement . Did you complete the replacement?	Go to Step 20	-
18	Replace the windshield wiper washer switch. Refer to Multifunction, Turn Signal Switch Replacement in Steering Wheel and Column. Did you complete the replacement?	Go to Step 20	-
19	Replace the BCM. Refer to Control Module References in Computer/Integrating Systems for replacement, setup, and programming. Did you complete the replacement?	Go to Step 20	-
20	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 2

WIPERS INOPERATIVE - ALL MODES

Wipers Inoperative - All Modes

Step	Action	Yes	No
Schematic Reference: Wiper/Washer System Schematics Connector End View Reference: Master Electrical Component List in Wiring Systems DEFINITION: Both the front and rear wipers are inoperative, however the front and rear washers still operate.			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	1. Turn ON the ignition, with the engine OFF. 2. Operate the front and rear wiper	Go to Testing for Intermittent Conditions and	

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	switches through all switch positions. Does the wiper system operate normally?	Poor Connections in Wiring Systems	Go to Step 3
3	1. Turn OFF the ignition. 2. Disconnect the windshield wiper washer switch connector. 3. Turn ON the ignition, with the engine OFF. 4. With a test lamp connected to a good ground, probe the accessory voltage feed circuit of the harness connector. Does the test lamp illuminate?	Go to Step 4	Go to Step 5
4	Inspect for poor connections at the harness connector of the windshield wiper washer switch. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 7	Go to Step 6
5	Repair the open or short to ground in the accessory voltage feed circuit. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 7	-
6	Replace the windshield wiper washer switch. Refer to Multifunction, Turn Signal Switch Replacement in Steering Wheel and Column. Did you complete the replacement?	Go to Step 7	-
7	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 2

WIPERS INOPERATIVE - ONE OR MORE MODES (FRONT WIPERS)

Diagnostic Aids

The Wash mode for this diagnostic procedure is defined as the mode when the wiper switch is OFF and only the windshield washer switch has been activated. When the washer switch is activated with the wiper switch OFF, the wipers should wipe the windshield 3-5 times and then park.

Test Description

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The numbers below refer to the step numbers on the diagnostic table.

2: This step will pinpoint which specific wiper functions are inoperative. The wipers should operate for all active windshield wiper switch positions. When the wiper switch is OFF and only the windshield washer switch is activated, the wipers should wipe the windshield 3-5 times and then park.

6: This step will help to pinpoint which specific circuit or component may be involved in the malfunction. When the Wash, and Park modes are inoperative as well as the Intermittent mode, the windshield wiper switch mist/off/low signal circuit and associated components are suspect. When the wipers operate for the Park mode but the Intermittent and Wash modes are both inoperative, suspect the accessory voltage feed circuit of the FRT WIPER Relay or an associated component.

12: This step is used when the wipers fail to wipe the windshield while only the washer switch is activated.

13: This step is used when the wipers still operate in all wiping modes, but fail to Park at the full down position. If this condition is present while the wipers are being operated in the Intermittent mode, the wipers typically will not return to the full down position. Instead, they will stop at random positions on the windshield and in between the timed wiper strokes. Or, if the wipers are being operated in either the High or Low mode, the wipers will stop in mid-stroke when the wiper switch is turned OFF.

Wipers Inoperative - One or More Modes (Front Wipers)

Step	Action	Yes	No
Schematic Reference: <u>Wiper/Washer System Schematics</u> Connector End View Reference: <u>Master Electrical Component List</u> in Wiring Systems DEFINITION: The front windshield wipers are inoperative in one or more modes. The windshield washer still operates.			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u> in Vehicle DTC Information
2	1. Turn ON the ignition, with the engine OFF. 2. Operate the windshield wiper switch through all switch positions. 3. Turn the windshield wiper switch OFF. 4. With the windshield wiper switch OFF, operate the front windshield	Go to <u>Testing for Intermittent</u>	

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	washer switch to ON.	Conditions and Poor Connections in Wiring Systems	
	Do the windshield wipers operate as described in the Description and Operation?		Go to Step 3
3	Are the windshield wipers completely inoperative?	Go to Step 10	Go to Step 4
4	Are the windshield wipers inoperative for every mode except High speed?	Go to Step 11	Go to Step 5
5	Are the wipers inoperative in the Intermittent mode?	Go to Step 6	Go to Step 7
6	In addition to the Intermittent mode, are the windshield wipers inoperative for one or both of the following two modes: • Wash • Park	Go to Step 17	Go to Step 14
7	IMPORTANT: When the windshield washer mode is activated with the windshield wiper switch OFF, the windshield wipers should wipe the windshield 3-5 times and then park. Are the wipers inoperative for only the Wash mode.	Go to Step 12	Go to Step 8
8	Are the wipers inoperative for only the Park mode?	Go to Step 13	Go to Step 9
9	The wipers are inoperative for only the High speed mode. 1. Disconnect the windshield wiper motor harness connector. 2. With a test lamp connected to ground, probe the windshield wiper motor high speed circuit of the harness connector. 3. Operate the windshield wiper switch to the high speed position.		
	Does the test lamp illuminate?	Go to Step 24	Go to Step 22
	The windshield wipers are totally inoperative. 1. Disconnect the windshield wiper		

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10	motor harness connector. 2. With a test lamp connected to battery positive voltage, probe the windshield wiper motor ground circuit.		
	Does the test lamp illuminate?	Go to Step 16	Go to Step 29
11	The windshield wipers operate only in High speed. 1. Disconnect the windshield wiper motor harness connector. 2. With a test lamp connected to ground, probe the windshield wiper motor low speed circuit of the harness connector. 3. Operate the windshield wiper switch to the low speed position.		
	Does the test lamp illuminate?	Go to Step 24	Go to Step 20
12	The windshield wipers are inoperative for only the Wash mode. 1. Disconnect the body control module (BCM) C2 harness connector. 2. With a test lamp connected to ground, probe the windshield washer pump control circuit of the harness connector. 3. Operate the windshield washer switch to ON.		
	Does the test lamp illuminate?	Go to Step 25	Go to Step 21
13	The wipers are inoperative for only the Park mode. 1. Disconnect the windshield wiper motor harness connector. 2. Test for continuity between the windshield wiper motor park switch signal circuit and ground circuit of the		

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	wiper motor, at the wiper motor pins.		
	Is there continuity?	Go to Step 15	Go to Step 24
14	The wipers are inoperative for only the Intermittent mode. 1. Disconnect the body control module (BCM) C2 harness connector. 2. With a test lamp connected to ground, probe the windshield wiper switch pulse delay signal circuit of the harness connector. 3. Operate the windshield washer switch through all of the Intermittent positions. Is the test lamp illuminated for all of the Intermittent positions?		
		Go to Step 25	Go to Step 23
15	1. Connect the windshield wiper motor harness connector. 2. Disconnect the FRT WIPER Relay. 3. With a test lamp connected to battery positive voltage, probe the windshield wiper motor park switch signal circuit of the underhood fuse block. Does the test lamp illuminate?		
		Go to Step 33	Go to Step 30
16	1. Connect the test lamp between ground and the windshield wiper motor high speed circuit of the harness connector. 2. Operate the windshield wiper switch to the high speed position. 3. Connect the test lamp between ground and the windshield wiper motor low speed circuit of the harness connector. 4. Operate the windshield wiper switch to the low speed position. Does the test lamp illuminate for both the high and the low positions?		
		Go to Step 24	Go to Step 26

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17	1. Turn OFF the ignition. 2. Disconnect the FRT WIPER Relay. 3. Turn ON the ignition, with the engine OFF. 4. With a test lamp connected to ground, probe the accessory voltage feed circuits of the FRT WIPER Relay, at the underhood fuse block.		
	Does the test lamp illuminate?	Go to Step 18	Go to Step 28
18	1. Turn OFF the ignition. 2. Connect a 3 amp fused jumper between the accessory voltage feed circuit and the windshield wiper switch mist/off/low signal circuit, at the underhood fuse block. 3. Turn ON the ignition, with the engine OFF. 4. Turn the windshield wiper switch to the Intermittent position. 5. With a test lamp connected to ground, probe the windshield wiper switch mist/off/low signal circuit, at the windshield wiper switch terminal.		
	Does the test lamp illuminate?	Go to Step 19	Go to Step 27
19	With the test lamp connected to ground, probe the windshield wiper switch low speed circuit, at the windshield wiper switch terminal. Does the test lamp illuminate?		
		Go to Step 33	Go to Step 26
20	Test the windshield wiper motor low speed circuit for an open. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?		
		Go to Step 35	Go to Step 26
21	Test the windshield washer pump control circuit for an open. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?		
		Go to Step 35	Go to Step 26

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22	Test the windshield wiper motor high speed circuit for an open. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 35	Go to Step 26
23	Test the windshield wiper switch pulse delay signal circuit for an open. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 35	Go to Step 26
24	Inspect for poor connections at the harness connector of the windshield wiper motor. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 35	Go to Step 32
25	Inspect for poor connections at the harness connector of the body control module (BCM). Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 35	Go to Step 34
26	Inspect for poor connections at the harness connector of the windshield wiper washer switch. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 35	Go to Step 31
27	Repair the windshield wiper switch mist/off/low signal circuit for an open or a high resistance. Refer to Connector Repairs and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 35	-
28	Repair the accessory voltage feed circuit for an open or a high resistance. Refer to Connector Repairs and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 35	-
29	Repair the open ground circuit. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 35	-

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30	Repair the windshield wiper motor park switch signal circuit for an open or a high resistance. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 35	-
31	Replace the windshield wiper washer switch. Refer to Multifunction, Turn Signal Switch Replacement in Steering Wheel and Column. Did you complete the replacement?	Go to Step 35	-
32	Replace the windshield wiper motor. Refer to Wiper Motor Replacement . Did you complete the replacement?	Go to Step 35	-
33	Replace the FRT WIPER relay. Refer to Relay Replacement (Within an Electrical Center) or Relay Replacement (Attached to Wire Harness) in Wiring Systems. Did you complete the replacement?	Go to Step 35	-
34	Replace the BCM. Refer to Control Module References in Computer/Integrating Systems for replacement, setup, and programming. Did you complete the replacement?	Go to Step 35	-
35	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 2

WIPERS INOPERATIVE - ONE OR MORE MODES (REAR WIPERS)**Diagnostic Aids**

Except for when it is in the Wash mode, the rear window wiper wipes the rear window at delay time intervals. With the rear wiper system activated, the length of time between wipes can be adjusted by selecting any one of the three delay speed settings of the windshield wiper switch.

During the Wash mode, if the rear washer switch is momentarily turned to ON, the rear wiper will wipe the rear window 3-5 times and then park. However, if the rear washer switch is held to ON, the rear window wipers will continue to operate until the switch is released.

While the delay speed of both the front and rear wipers is adjusted by the windshield wiper switch selections, the delay time intervals of the rear wiper are not synchronized with the delay time intervals of the front wipers.

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The rear wiper should stop at the Park position anytime the rear wiper is not wiping. However, if the ignition switch is turned OFF while the rear wiper is wiping, the wiper will stop at its current location on the glass.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: This step will determine if the rear wiper operates properly when only the rear window washer switch is activated. When the rear window washer switch is operated with the rear wiper switch OFF, the rear wiper should wipe the window 3-5 times and then park.

4: This step helps to pinpoint the specific malfunction. The Park mode of the rear window wiper may be the only feature malfunctioning. When the rear wiper switch is ON, the rear wiper should stop at the parked position in between the timed strokes of the wiper. When the rear wiper switch is turned OFF, the rear wiper should park and remain in the parked position until either the wipe or wash mode is operated again.

Wipers Inoperative - One or More Modes (Rear Wipers)

Step	Action	Yes	No
Schematic Reference: <u>Wiper/Washer System Schematics</u> Connector End View Reference: <u>Master Electrical Component List</u> in Wiring Systems DEFINITION: The rear wiper is inoperative in one or more modes, however the rear washer still operates.			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	1. Turn ON the ignition, with the engine OFF. 2. Turn the rear window wiper switch ON. Does the rear window wiper operate?	Go to Step 3	Go to Step 5
3	1. Turn the rear window wiper switch OFF. 2. With the rear window wiper switch OFF, turn the rear window washer switch ON.		

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	Does the rear window wiper operate?	Go to Step 4	Go to Step 7
4	IMPORTANT: Unless the rear window wiper is being operated for the Wash mode, it operates only in the delay modes. When the rear wiper is ON, it should stop at the parked position in between timed strokes of the wiper. When the rear wiper is turned OFF, it should park and remain in the parked position until either the wiper or wash mode is operated again. Does the rear window wiper Park in the full down position as it should?	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems	Go to Step 9
5	Turn the rear window washer switch ON. Does the rear window wiper operate?	Go to Step 8	Go to Step 6
6	1. Turn OFF the ignition. 2. Remove the REAR WIPER Relay from the underhood fuse block. 3. Turn ON the ignition, with the engine OFF. 4. With a test lamp connected to a good ground, probe the accessory voltage feed circuit to the switch side of the relay at the underhood fuse block. Does the test lamp illuminate?	Go to Step 10	Go to Step 20
7	1. Disconnect the body control module (BCM) C2 harness connector. 2. With a test lamp connected to ground, probe the rear window washer pump control circuit. 3. Operate the rear window washer switch to ON while the rear window wiper switch is OFF. Does the test lamp illuminate?	Go to Step 17	Go to Step 13
8	1. Disconnect the body control module (BCM) C2 harness connector. 2. With a test lamp connected to ground, probe the rear wiper switch signal circuit. 3. Operate the rear window wiper switch to ON.		

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	Does the test lamp illuminate?	Go to Step 17	Go to Step 14
9	1. Turn OFF the ignition. 2. Disconnect the harness connector of the rear window wiper motor. 3. Turn ON the ignition, with the engine OFF. 4. With a test lamp connected to a good ground, probe the accessory voltage circuit of the rear window wiper motor.		
	Does the test lamp illuminate?	Go to Step 16	Go to Step 19
10	1. Turn OFF the ignition 2. Connect a 3 amp fused jumper wire between the accessory voltage feed circuit terminal and the rear window wiper motor control circuit terminal at the underhood fuse block. 3. Turn the ignition ON, with the engine OFF.		
	Does the rear wiper operate?	Go to Step 24	Go to Step 11
11	1. Ensure that the fused jumper wire between the accessory voltage feed circuit terminal and the rear window wiper motor control circuit terminal is still connected. 2. With a test lamp connected to a good ground, probe the rear window wiper motor control circuit at the rear wiper motor.		
	Does the test lamp illuminate?	Go to Step 12	Go to Step 21
12	Connect the test lamp between the rear window wiper motor control circuit and the rear window wiper motor ground circuit. Does the test lamp illuminate?	Go to Step 16	Go to Step 18
13	Test the rear window washer pump control circuit for an open or a high resistance. Refer to Circuit Testing and Wiring		

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	Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 26	Go to Step 15
14	Test the rear wiper switch signal circuit for an open or a high resistance. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 26	Go to Step 15
15	Inspect for poor connections at the harness connector of the windshield wiper washer switch. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 26	Go to Step 22
16	Inspect for poor connections at the harness connector of the rear window wiper motor. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 26	Go to Step 23
17	Inspect for poor connections at the harness connector of the BCM. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 26	Go to Step 25
18	Repair the rear window wiper motor ground circuit for an open or a high resistance. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 26	-
19	Repair the accessory voltage circuit, between the REAR WIPER Relay splice and the wiper motor, for an open or a high resistance. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 26	-
20	Repair the open or high resistance in the accessory voltage feed circuit. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 26	-
	Repair the open or high resistance in the rear window wiper motor control circuit.		

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21	Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 26	-
22	Replace the windshield wiper washer switch. Refer to Multifunction, Turn Signal Switch Replacement in Steering Wheel and Column. Did you complete the replacement?	Go to Step 26	-
23	Replace the rear window wiper motor. Refer to Wiper Motor Replacement . Did you complete the replacement?	Go to Step 26	-
24	Replace the rear wiper relay. Refer to Relay Replacement (Within an Electrical Center) or Relay Replacement (Attached to Wire Harness) in Wiring Systems. Did you complete the replacement?	Go to Step 26	-
25	Replace the BCM. Refer to Control Module References in Computer/Integrating Systems for replacement, setup, and programming. Did you complete the replacement?	Go to Step 26	-
26	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 2

REPAIR INSTRUCTIONS**WASHER PUMP/RESERVOIR REPLACEMENT****Removal Procedure**

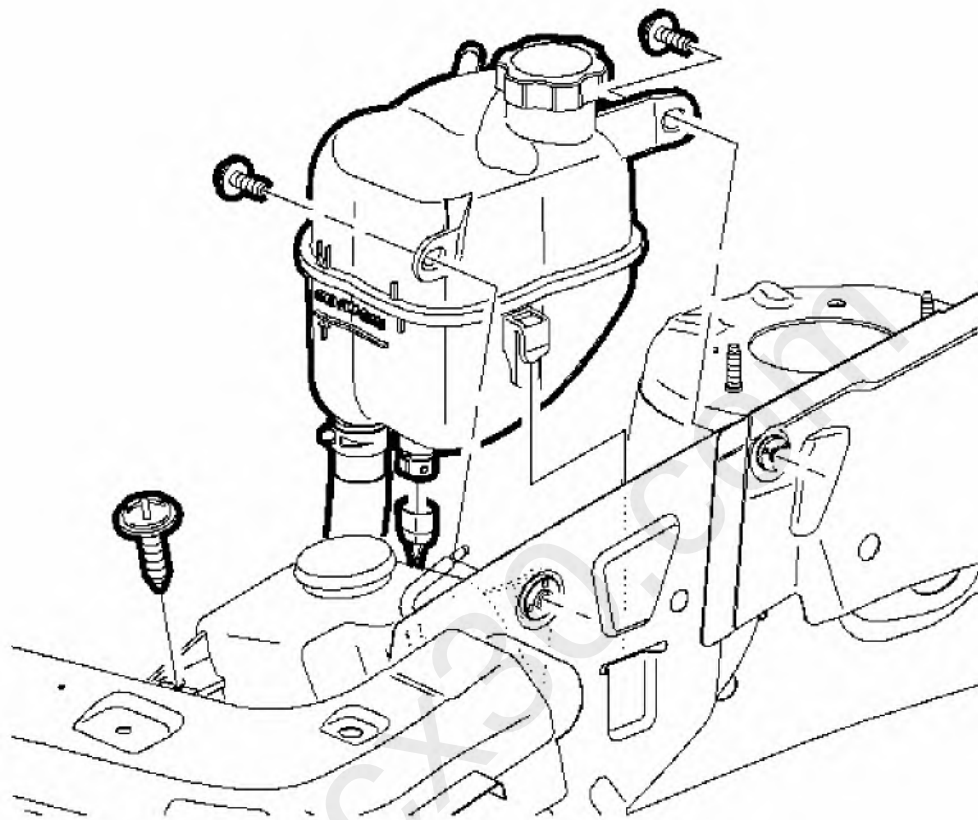


Fig. 4: View Of Washer Pump/Reservoir
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Allow the coolant surge tank sufficient cooling time before handling.

1. Remove the coolant surge tank bolts.

IMPORTANT: Do not disconnect the coolant hoses from the coolant surge tank.

2. Disconnect the surge tank level sensor and set surge tank aside in engine compartment.
3. Remove the front washer solvent container bolts.

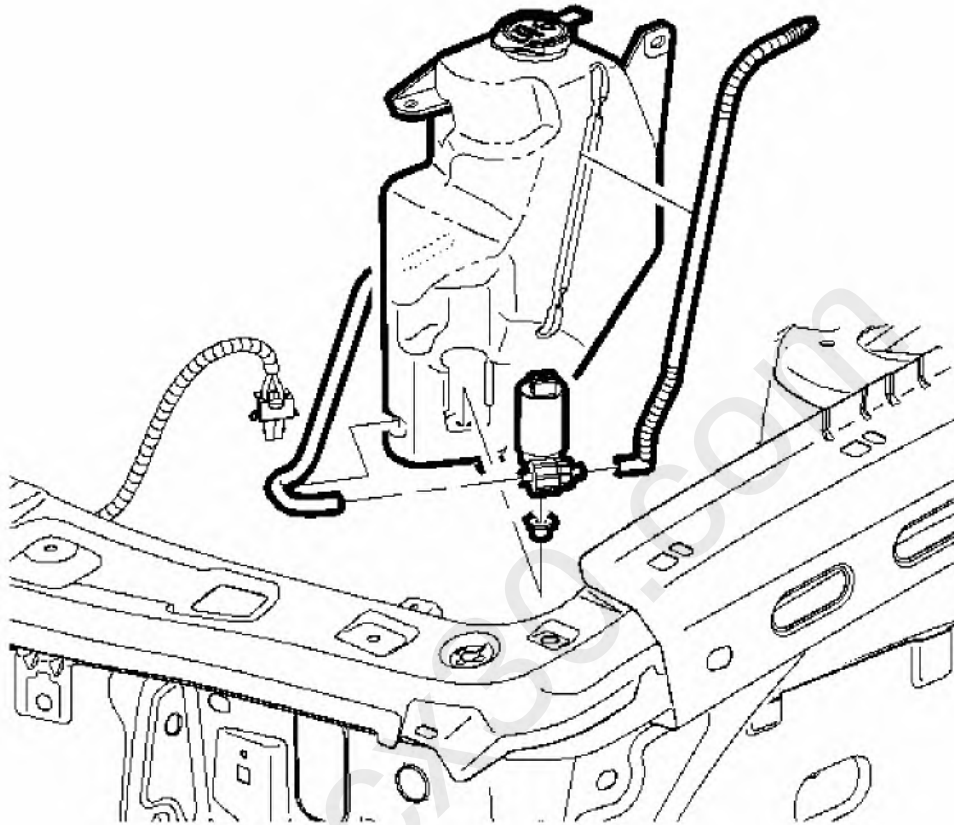


Fig. 5: Removing/Installing Washer Solvent Filter Grommet
Courtesy of GENERAL MOTORS CORP.

4. Disconnect the front washer solvent container hose from the front washer nozzle hose that runs along the upper motor compartment rail.
5. Angle the washer solvent container to the rear of the vehicle and pull out of the mounting hole.
6. Disconnect the washer pump electrical connector.

IMPORTANT: Contain any solvent the may spill while removing pump and hoses.

7. Pull the washer solvent pump from the solvent container.
8. Disconnect the front and rear washer solvent hoses from the washer pump.

Installation Procedure

IMPORTANT: Do not reuse washer solvent as debris may clog the system.

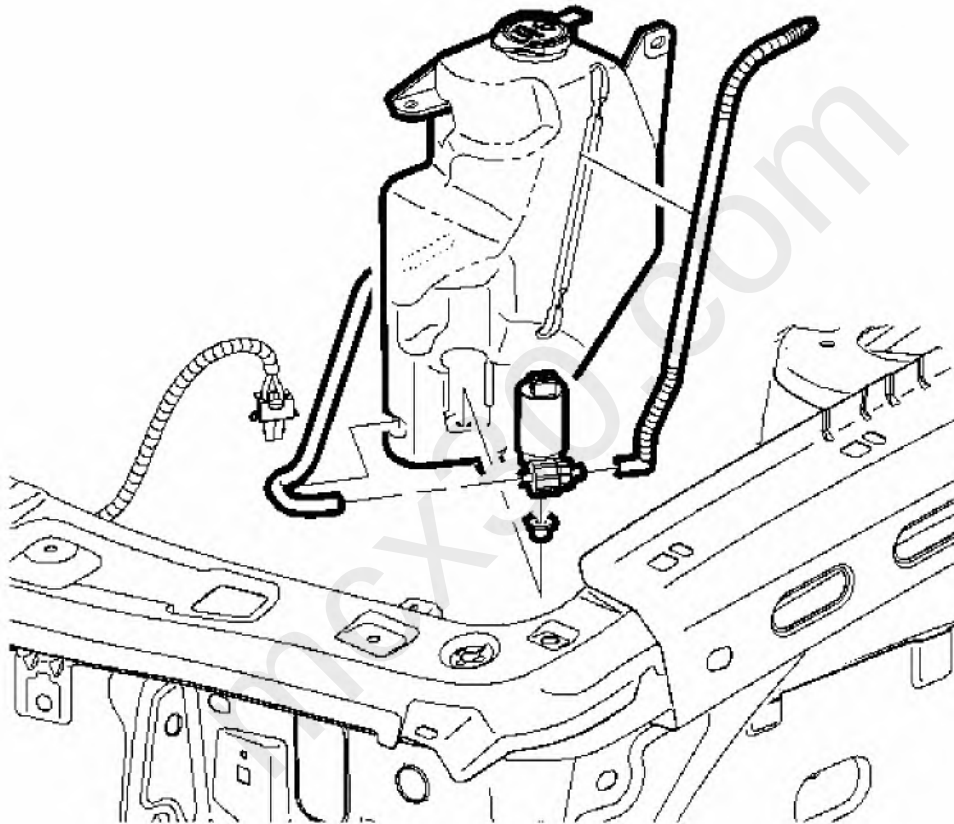


Fig. 6: Removing/Installing Washer Solvent Filter Grommet
Courtesy of GENERAL MOTORS CORP.

1. Connect the front and rear washer solvent hoses to the washer pump.
2. Install the washer pump into the washer solvent container. Ensure the washer pump filter is installed, if removed.
3. Connect the washer pump electrical connector.
4. Insert the front and rear washer solvent container hoses into the grooves in the solvent container.

IMPORTANT: Washer solvent container grommet must be installed between container and body structure to prevent squeaks and rattles.

5. Install the washer solvent container into the motor compartment. Ensure that the washer solvent container's mounting peg, with grommet installed, is seated into the mounting hole in the body structure. A lubricant may be used to ease installation.
6. Connect the front washer solvent container hose to front nozzle hose that runs along the upper motor compartment rail.

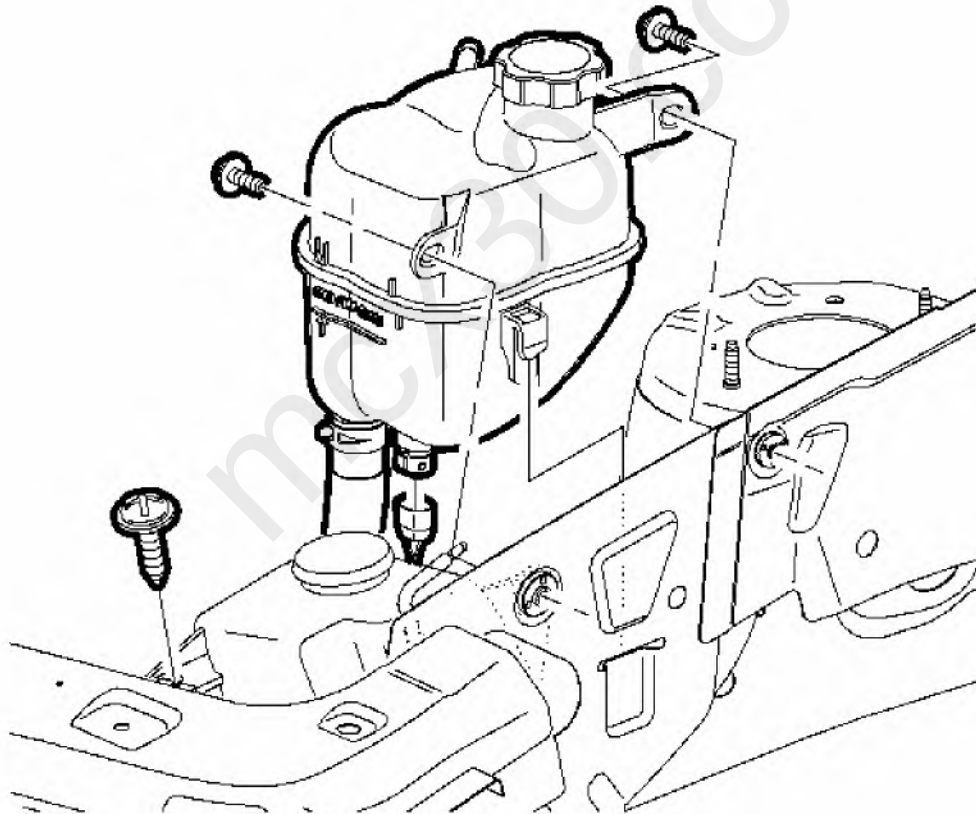


Fig. 7: View Of Washer Pump/Reservoir
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

7. Install the washer solvent container screws.

Tighten: Tighten the screws to 2.5 N.m (22 lb in).

8. Position coolant surge tank back into correct location.
9. Install the coolant surge tank bolts.

Tighten: Tighten the bolts to 6 N.m (53 lb in).

10. Fill the washer solvent container with washer solvent.

WASHER PUMP FILTER GROMMET REPLACEMENT

Removal Procedure

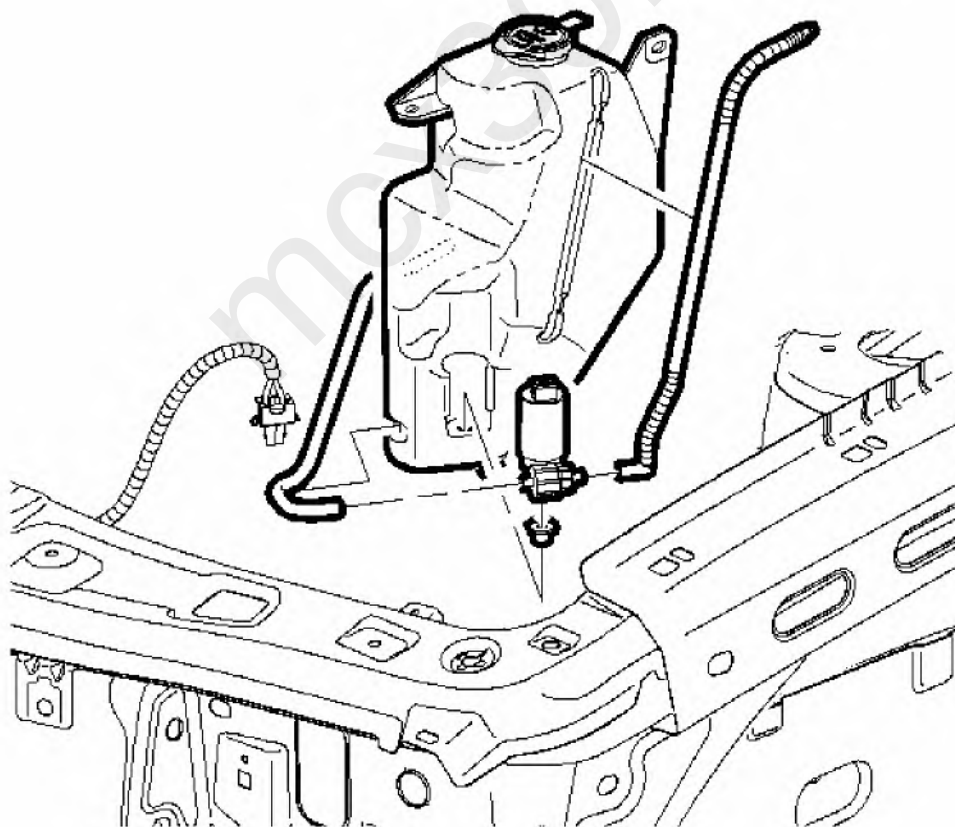


Fig. 8: Removing/Installing Washer Solvent Filter Grommet
Courtesy of GENERAL MOTORS CORP.

1. Remove the washer solvent pump. Refer to **Washer Pump/Reservoir Replacement**.
2. Remove the washer solvent filter grommet from the pump.

Installation Procedure

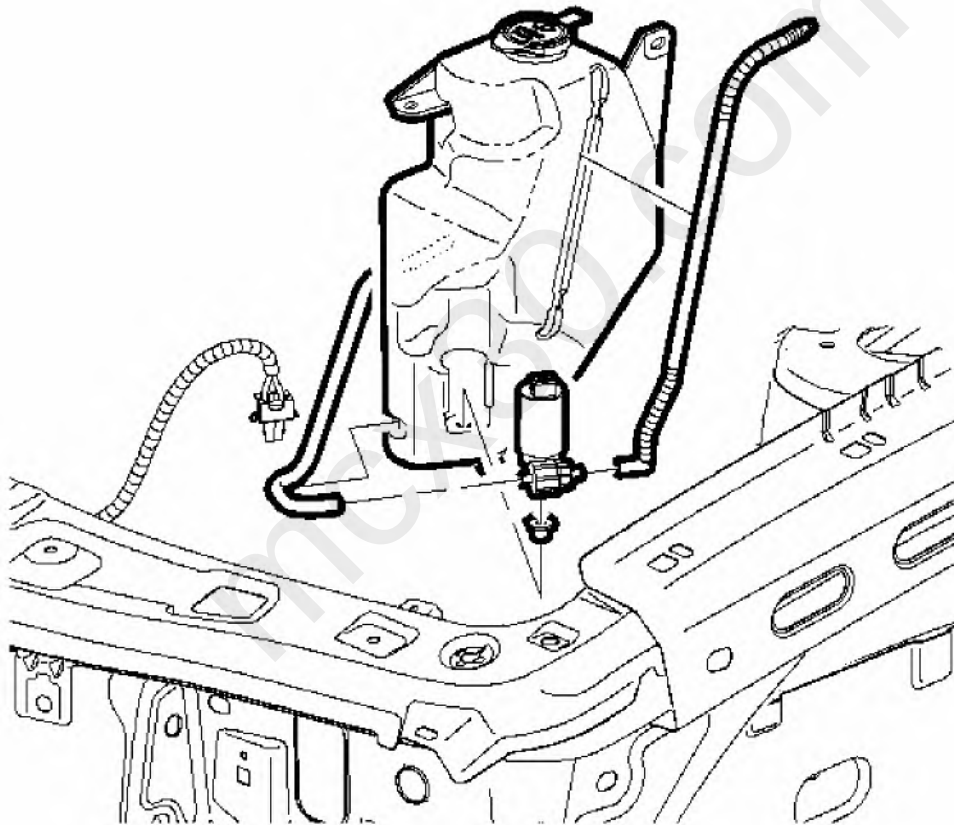


Fig. 9: Removing/Installing Washer Solvent Filter Grommet
Courtesy of GENERAL MOTORS CORP.

1. Install the washer solvent filter grommet to the pump.
2. Install the washer solvent pump. Refer to **Washer Pump/Reservoir Replacement**.

Removal Procedure

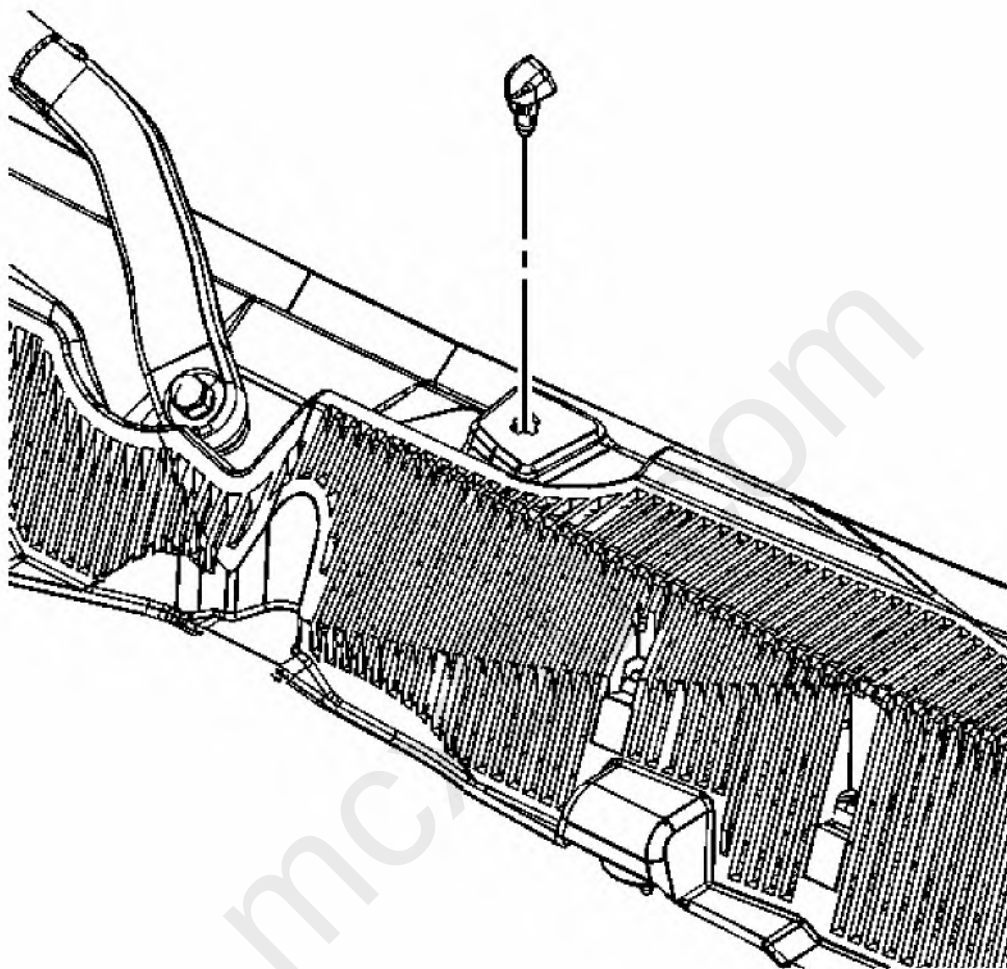


Fig. 10: View Of Front Washer Nozzle
Courtesy of GENERAL MOTORS CORP.

1. Remove the air inlet grille panel. Refer to **Air Inlet Grille Panel Replacement** in Body Front End.
2. Depress the washer nozzle tabs to disengage the nozzle from the air inlet grille.
3. Remove the nozzle.

Installation Procedure

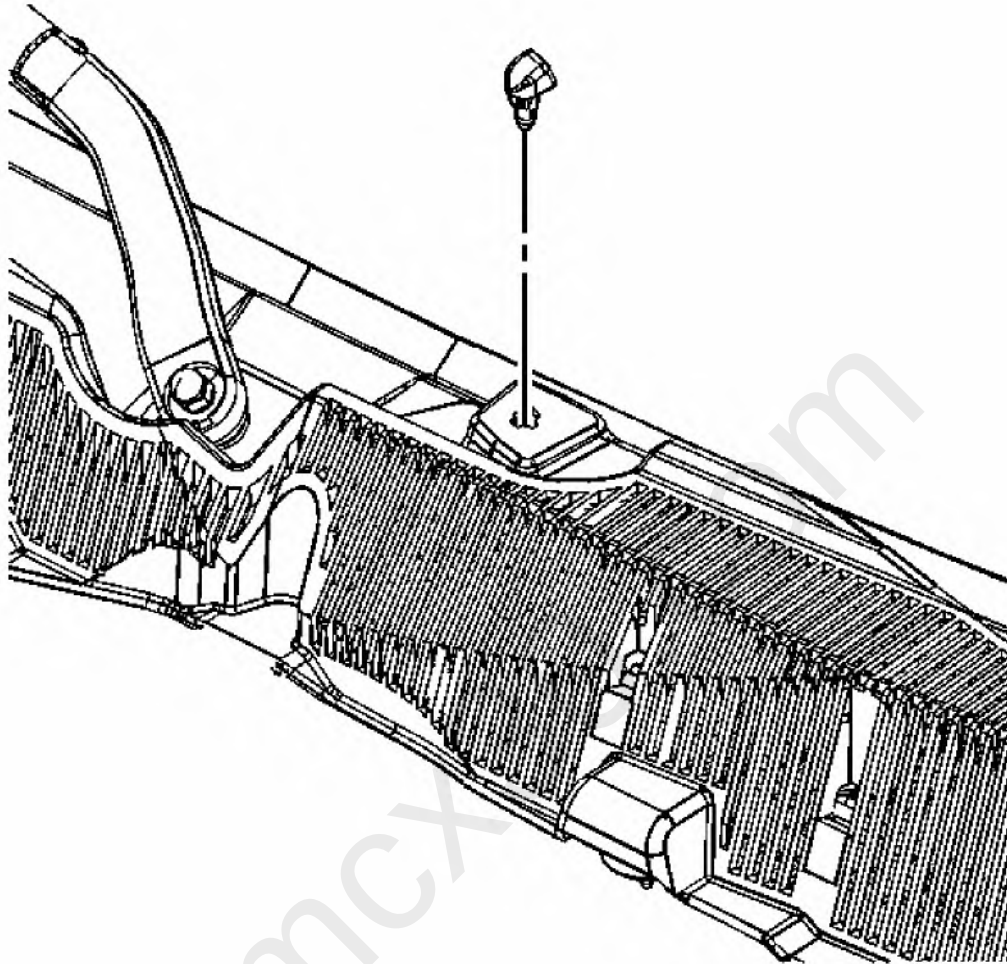


Fig. 11: View Of Front Washer Nozzle
Courtesy of GENERAL MOTORS CORP.

1. Push the washer nozzles into the air inlet grille panel until the tabs engage with the panel.
2. Install the air inlet grille panel. Refer to **Air Inlet Grille Panel Replacement** in Body Front End.

HOSE REPLACEMENT - WINDSHIELD WASHER

Removal Procedure

1. Remove the air inlet grille. Refer to **Air Inlet Grille Panel Replacement** in Body Front End.

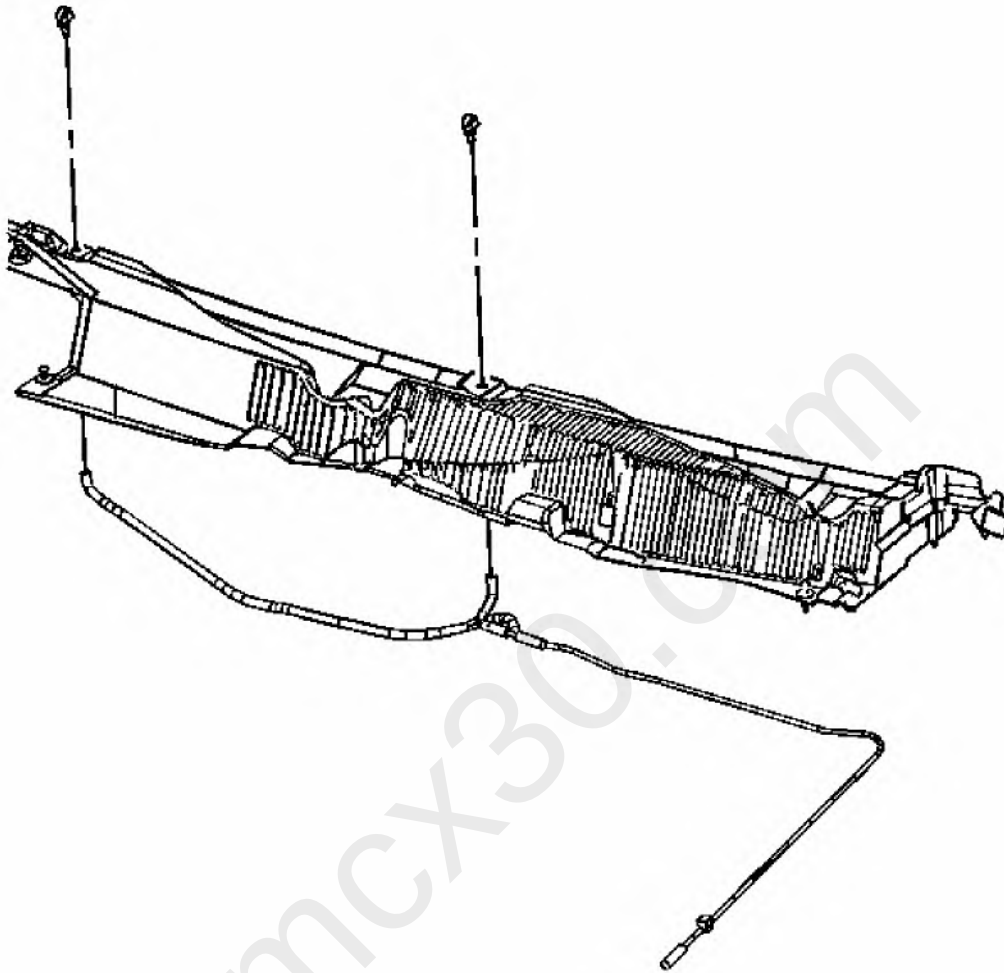


Fig. 12: View Of Windshield Washer Hose
Courtesy of GENERAL MOTORS CORP.

2. Separate the front washer nozzle hose from the front washer solvent container hose that runs along the upper motor compartment rail.
3. Remove the front washer nozzle hose.

Installation Procedure

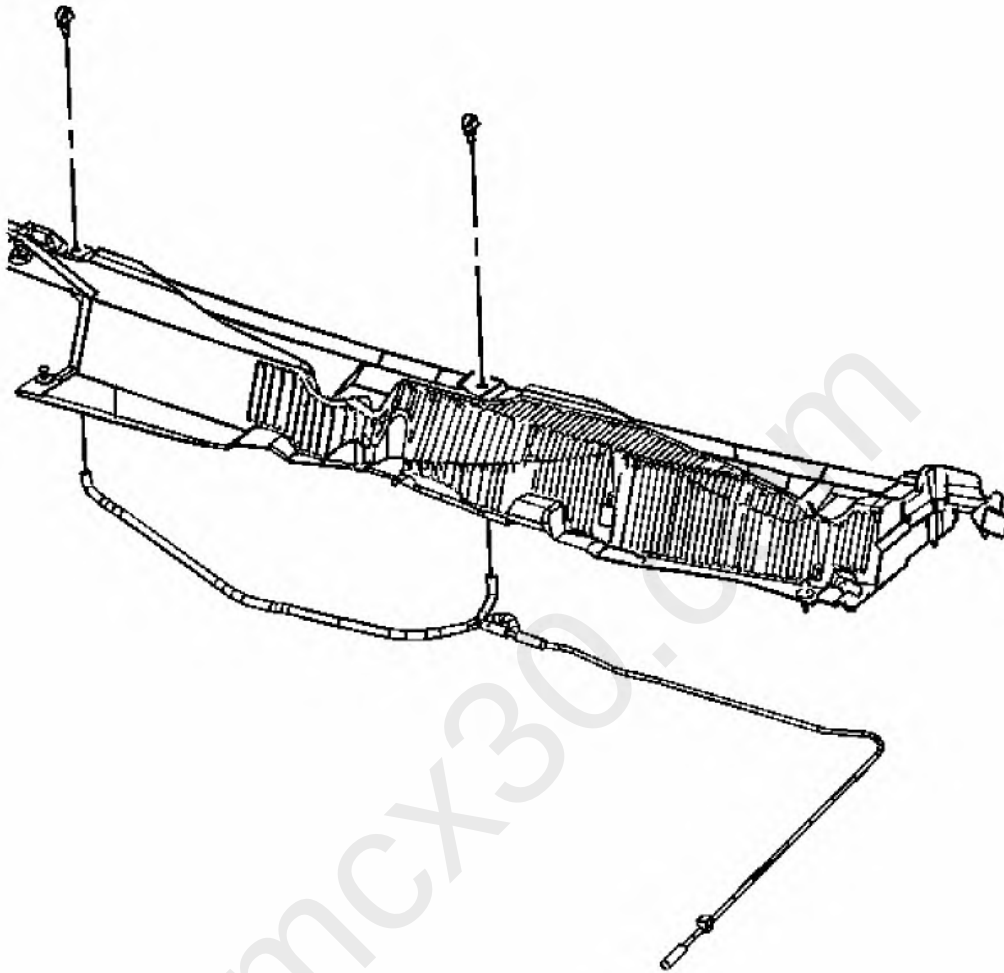


Fig. 13: View Of Windshield Washer Hose
Courtesy of GENERAL MOTORS CORP.

1. Connect the front nozzle hose to the front washer solvent container hose that runs along the upper motor compartment rail.
2. Position the washer hoses into the vehicle.
3. Install the air inlet grille. Refer to **Air Inlet Grille Panel Replacement** in Body Front End.

WIPER ARM REPLACEMENT

Removal Procedure

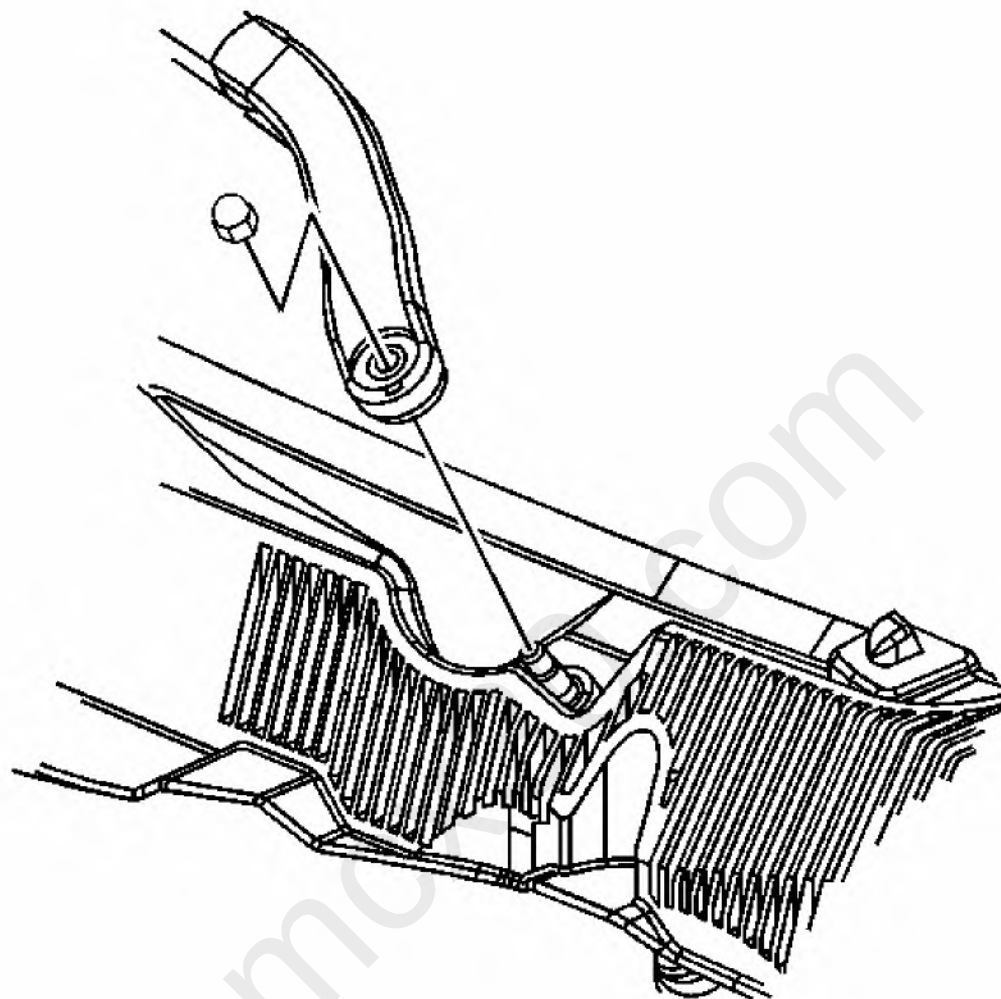


Fig. 14: View Of Wiper Arm & Nut
Courtesy of GENERAL MOTORS CORP.

1. Open hood to access wiper arm nut.
2. Remove wiper arm nut.
3. Lift wiper arm assembly away from windshield and remove wiper arm from pivot shaft.

Installation Procedure

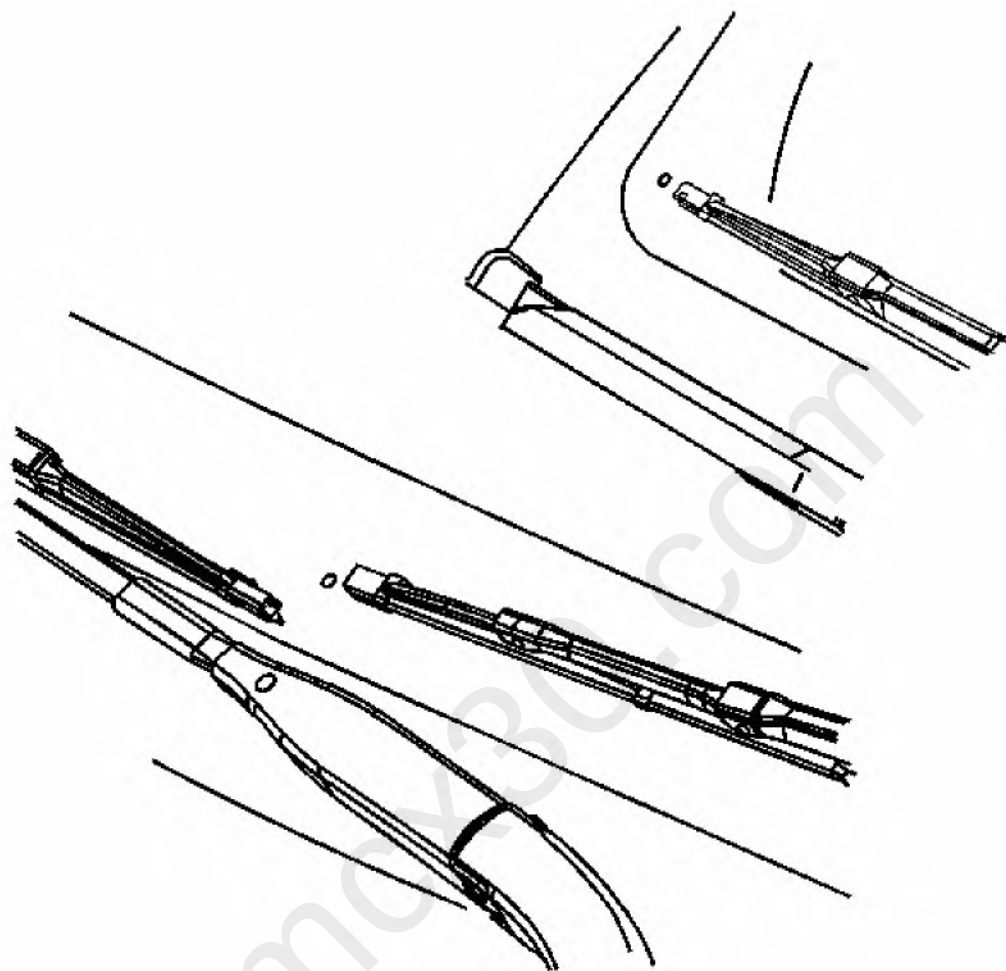


Fig. 15: Positioning Wiper Blade Assembly
Courtesy of GENERAL MOTORS CORP.

1. Position wiper blade assembly at the dot in lower portion of windshield blackout strip on driver side of vehicle.
2. Position wiper blade assembly at the dot in windshield pillar portion of windshield blackout strip on passenger side of vehicle.

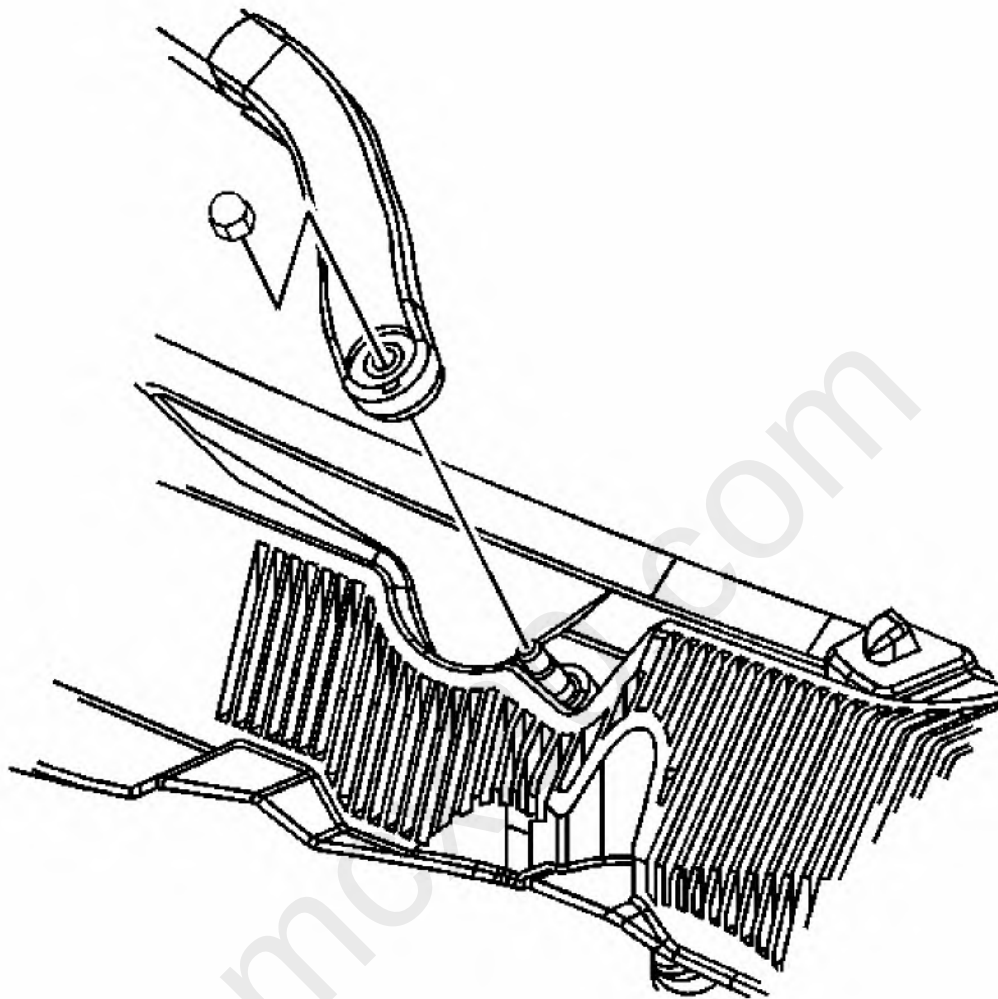


Fig. 16: View Of Wiper Arm & Nut
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the wiper arm nut.

Tighten: Tighten the nut to 28 N.m (21 lb ft).

4. Operate the windshield wipers and inspect for proper operation.

WIPER ARM BLADE REPLACEMENT

Removal Procedure

1. Move the wiper arm to the service up position

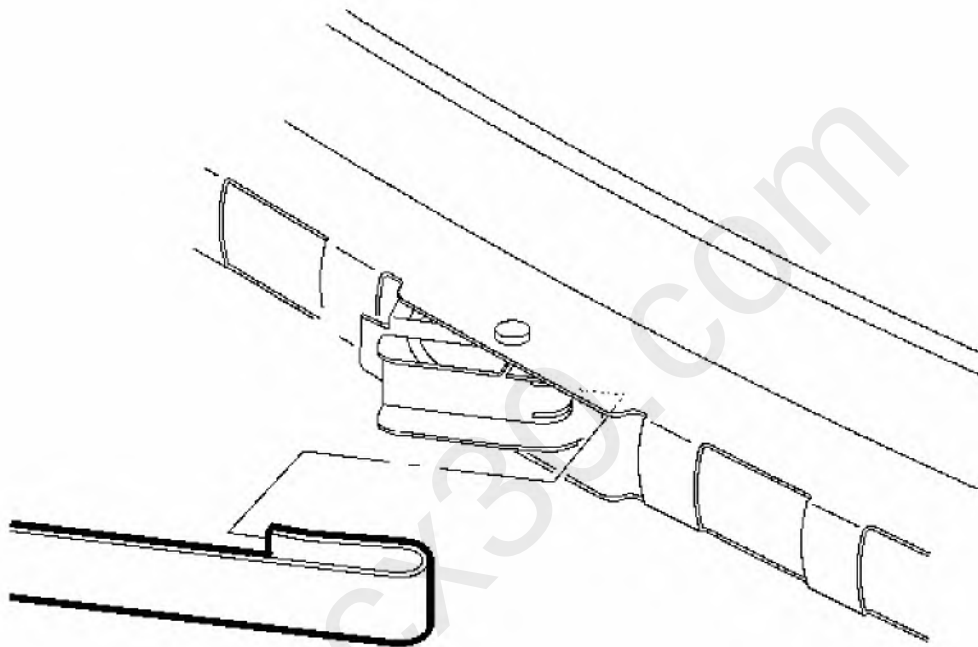


Fig. 17: View Of Wiper Arm Blade
Courtesy of GENERAL MOTORS CORP.

2. Depress the wiper blade attachment clip and slide blade out of wiper arm hook.

Installation Procedure

IMPORTANT: Passenger and driver side wiper blades are different lengths. Ensure that the longer blade is installed on the driver side.

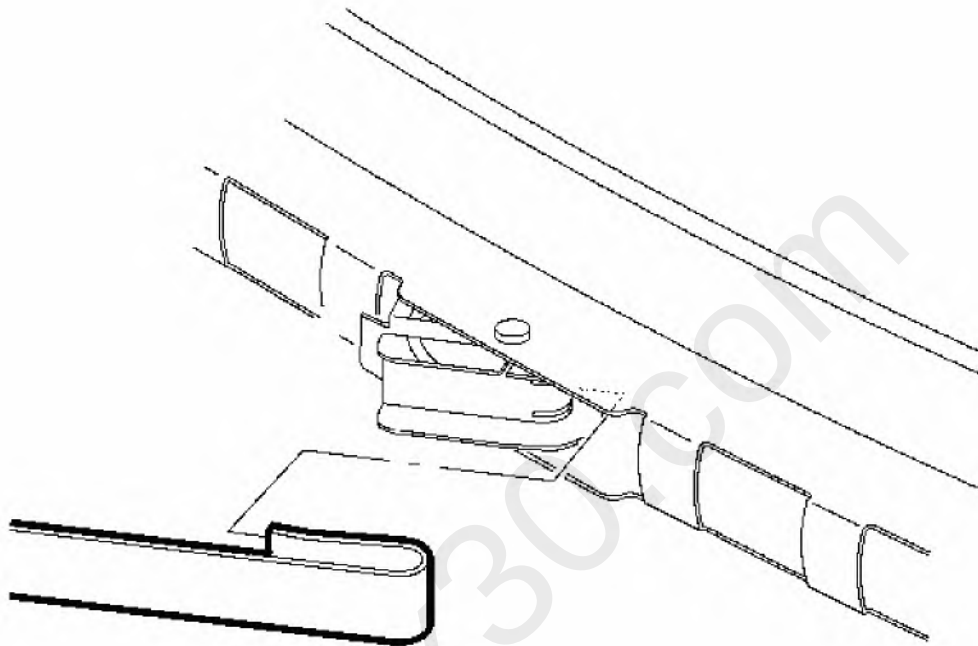


Fig. 18: View Of Wiper Arm Blade
Courtesy of GENERAL MOTORS CORP.

1. Install the hook of the wiper arm through the opening in the wiper blade.
2. Press the wiper blade pivot into the wiper arm hook until the pivot locks into the hook.
3. Operate the windshield wipers and inspect for proper operation.

WIPER BLADE ELEMENT REPLACEMENT

Removal Procedure

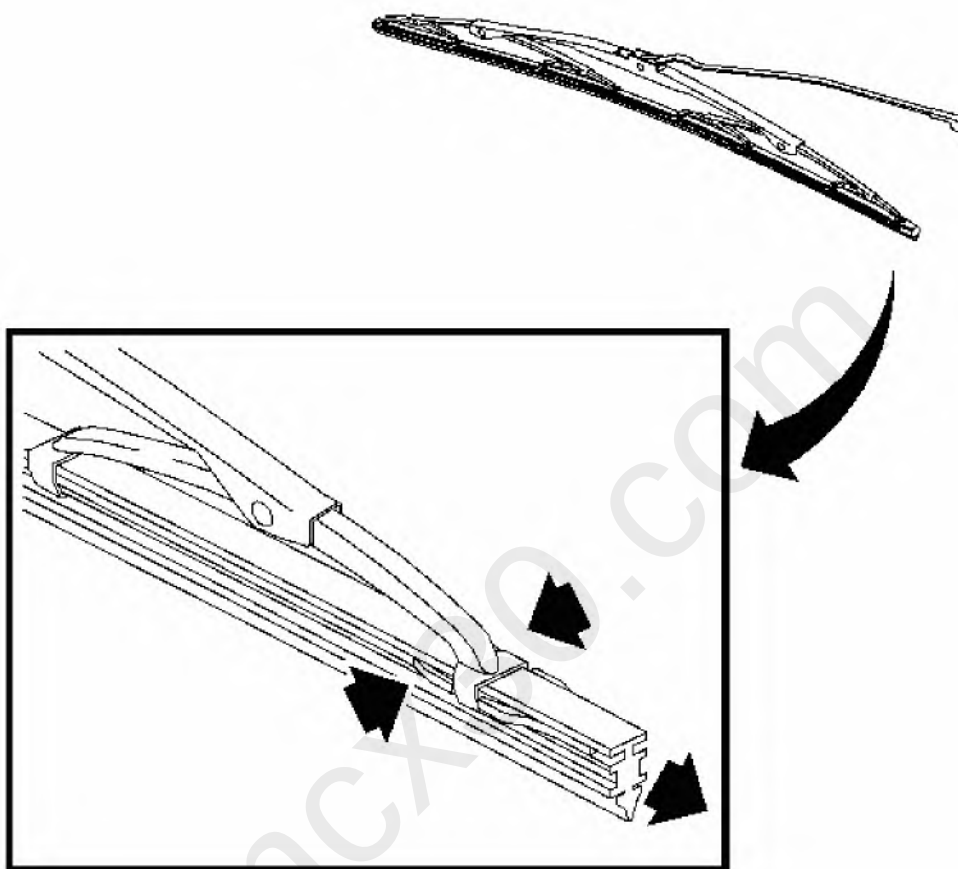


Fig. 19: View Of Wiper Blade Element
Courtesy of GENERAL MOTORS CORP.

1. Lift the wiper arm up to the service position.
2. Remove the wiper blade element by squeezing the metal tabs and pulling on the end of the insert at the heel claw.

Installation Procedure

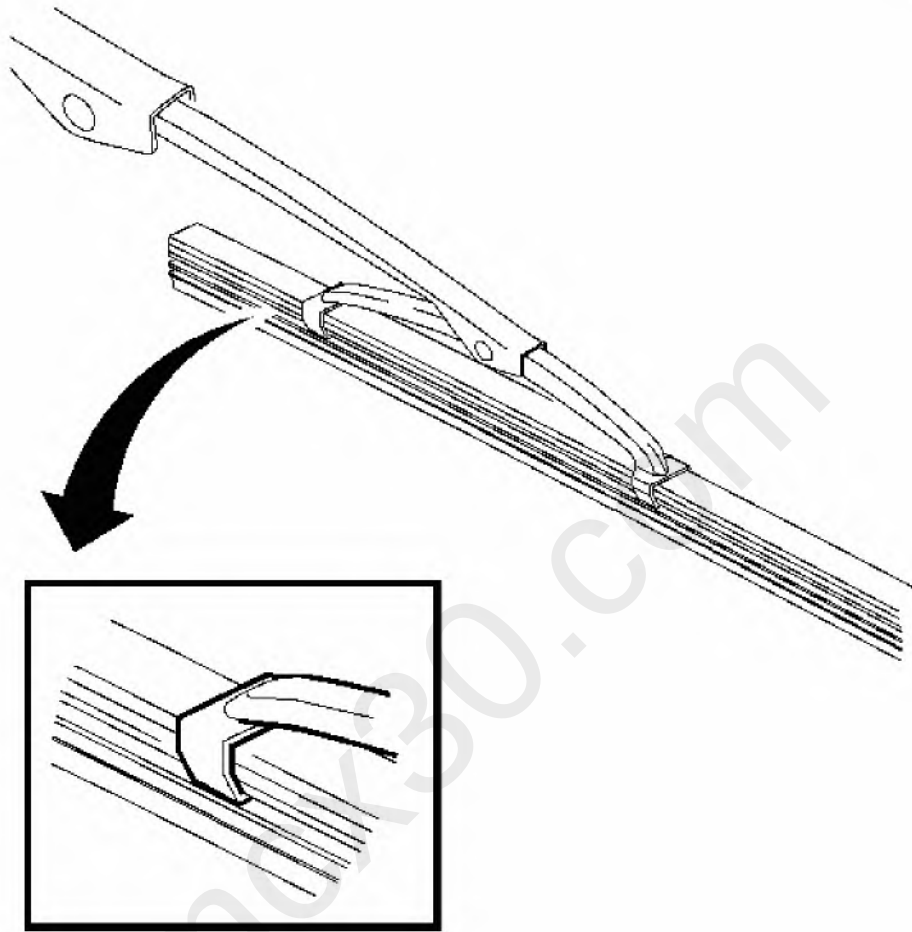


Fig. 20: Removing/Installing Wiper Blade Element
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Passenger and driver side wiper blades are different lengths. Ensure that the longer blade is installed on the driver side.

IMPORTANT: Do not remove the retainer clips from the new wiper blade element until installed.

1. Slide the wiper blade element into the wiper blade, starting with the heel claw, so that the claw engages in the groove of the wiper blade element.
2. Guide the wiper blade element through the wiper blade claw sets.

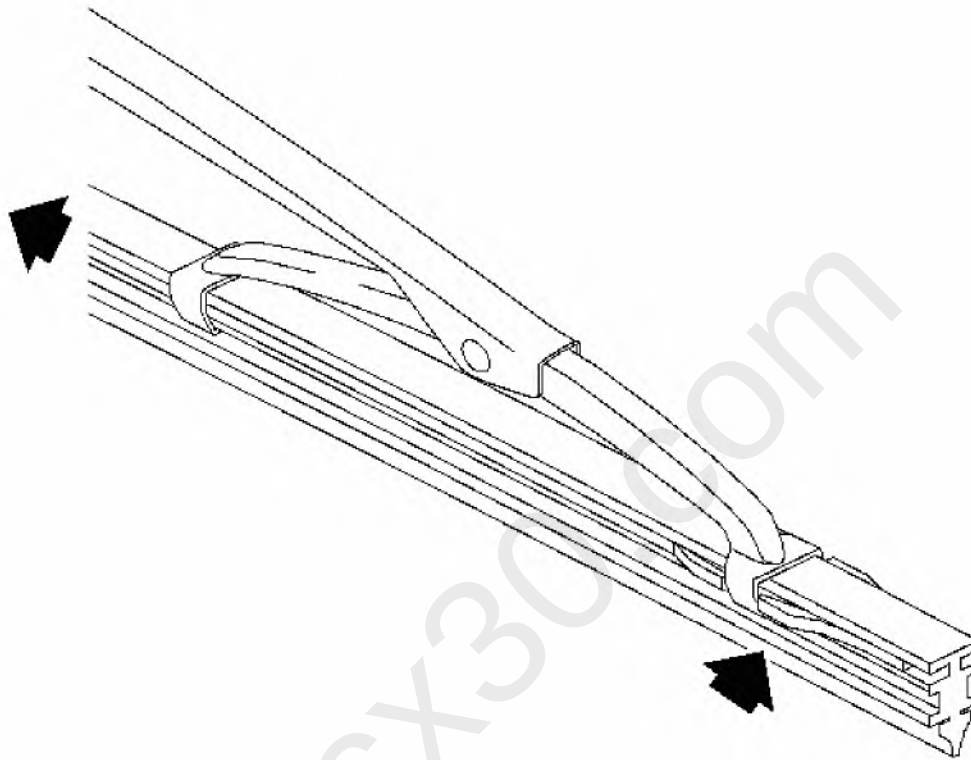


Fig. 21: View Of Wiper Blade Insert
Courtesy of GENERAL MOTORS CORP.

NOTE: If the metal clip on the wiper blade insert is not completely engaged to the heel claw, the wiper blade insert will not be sufficiently retained and may result in windshield damage.

3. Push the wiper blade insert so that the metal tabs fully engage into the heel claw.

WIPER MOTOR REPLACEMENT

Removal Procedure

1. Remove the wiper motor module. Refer to Wiper Motor Module Replacement (Old).

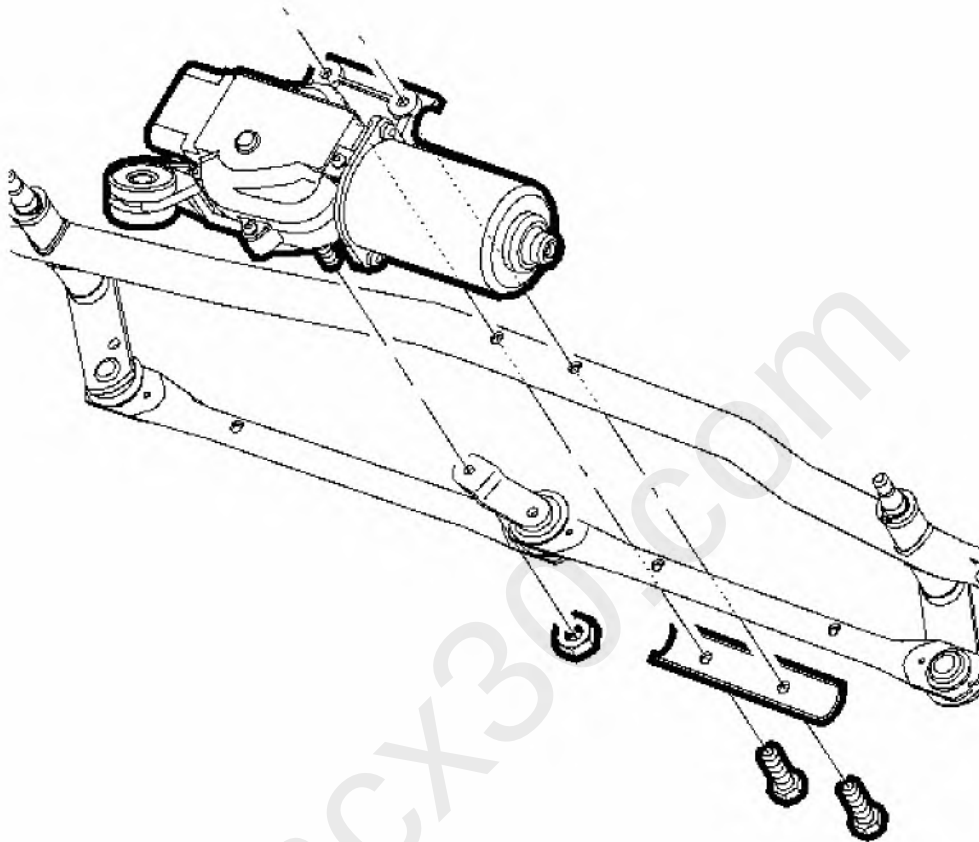


Fig. 22: Removing/Installing Wiper Motor
Courtesy of GENERAL MOTORS CORP.

2. Remove the wiper motor to crank nut.
3. Remove the two wiper motor to wiper module frame bolts.
4. Remove the wiper motor from the wiper module.

Installation Procedure

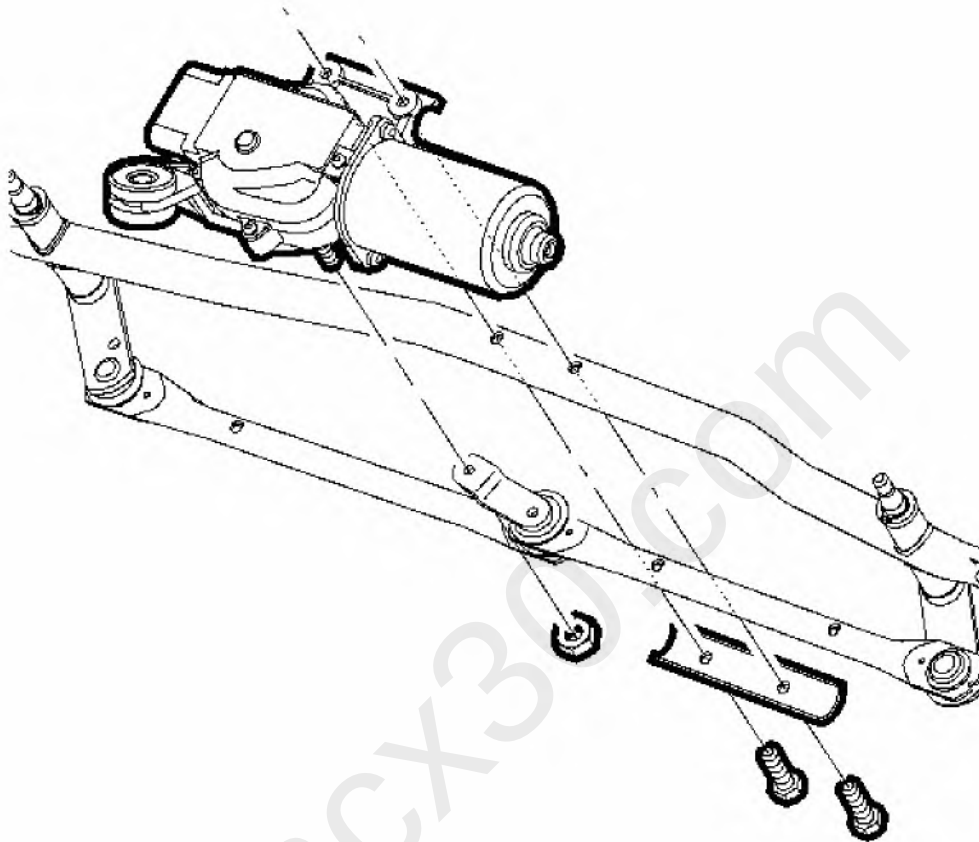


Fig. 23: Removing/Installing Wiper Motor
Courtesy of GENERAL MOTORS CORP.

1. Position the wiper motor to the wiper module.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the two wiper motor to wiper module frame bolts.

Tighten: Tighten the bolts to 8 N.m (71 lb in).

3. Install the wiper motor crank arm and crank arm nut.

Tighten: Tighten the screws to 14 N.m (10 lb ft).

4. Install the wiper motor module. Refer to **Wiper Motor Module Replacement (Old)**.

WIPER MOTOR MODULE REPLACEMENT (OLD)

Removal Procedure

1. Remove the wiper arms. Refer to **Wiper Arm Replacement**.
2. Remove the air inlet grille. Refer to **Air Inlet Grille Panel Replacement** in Body Front End.

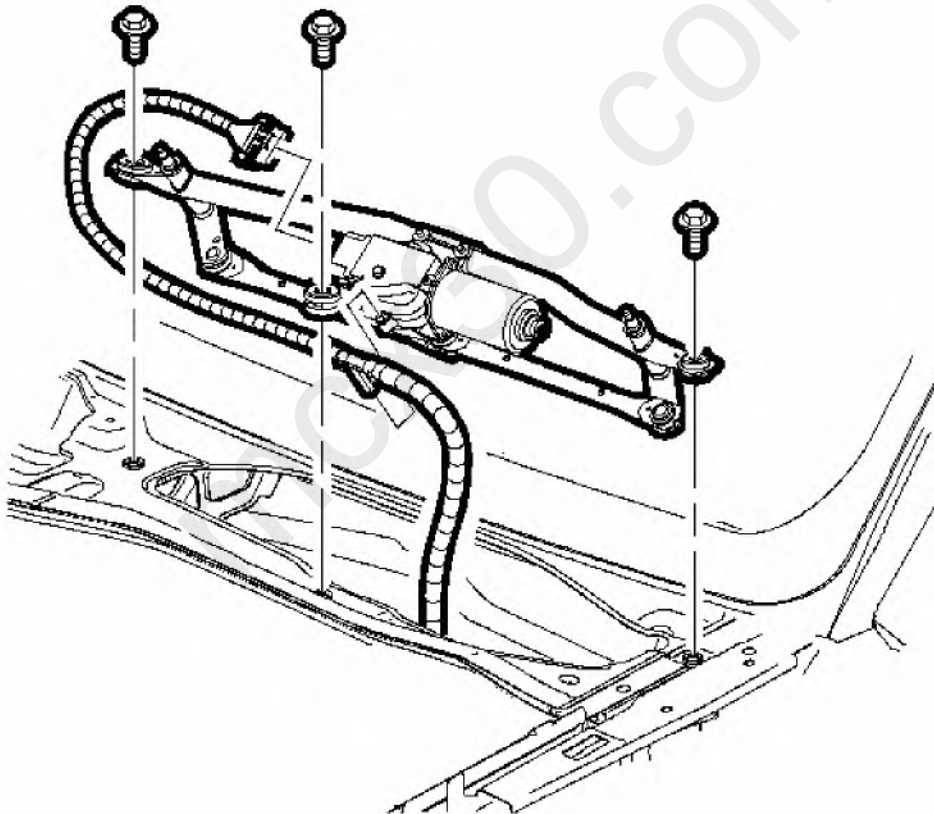


Fig. 24: Removing/Installing Wiper Motor Module Assembly
Courtesy of GENERAL MOTORS CORP.

3. Remove the wiper module bolts.
4. Lift the wiper motor module away from the cowl.

5. Disconnect the wire harness rosebud clip from the wiper module frame.
6. Disconnect the wiper module electrical connector at the motor.

Installation Procedure

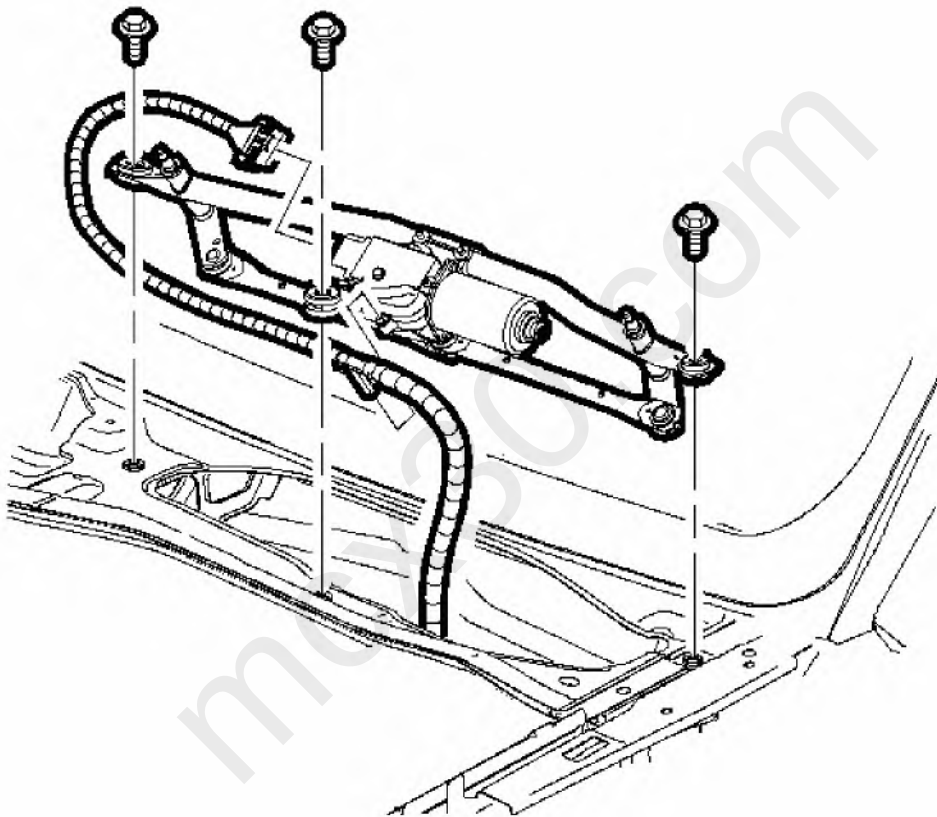


Fig. 25: Removing/Installing Wiper Motor Module Assembly
Courtesy of GENERAL MOTORS CORP.

1. Connect the wiper module electrical connector to the motor.
2. Connect the wire harness rosebud clip to the wiper module frame.
3. Install the wiper module assembly into the plenum.

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the fasteners attaching the wiper module assembly to the plenum.

Tighten: Tighten the fasteners to 12 N.m (9 lb ft)

5. Turn the key to RUN position and cycle wiper system to ensure motor is in the park position.
6. Install the air inlet screens. Refer to **Air Inlet Grille Panel Replacement** in Body Front End.
7. Install the wiper arms. Refer to **Wiper Arm Replacement**.

WIPER MOTOR MODULE GROMMET REPLACEMENT

Removal Procedure

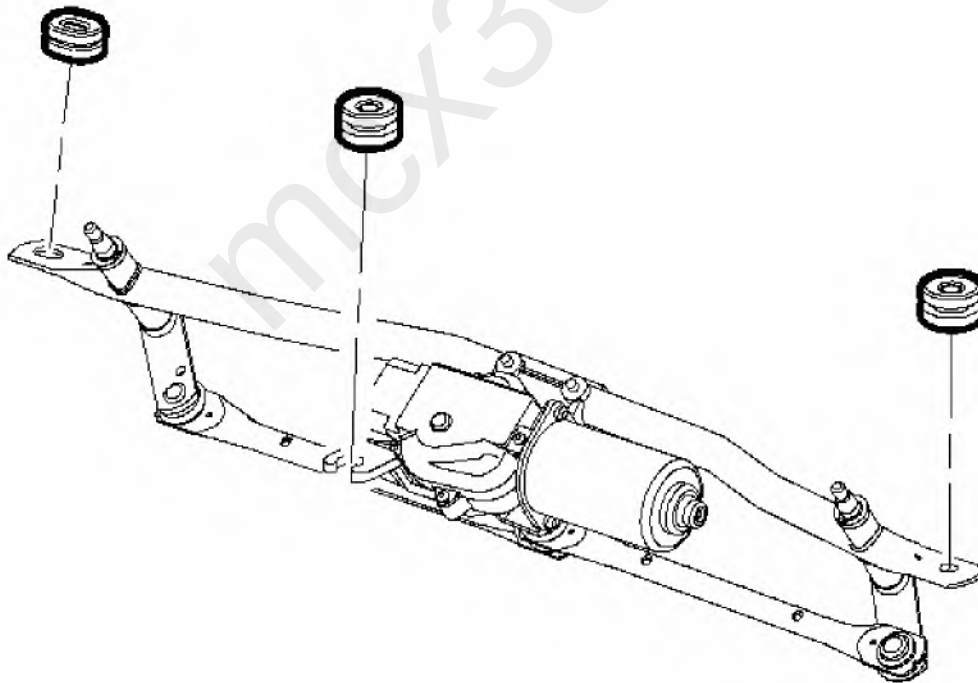


Fig. 26: Removing/Installing Front Wiper Motor

Courtesy of GENERAL MOTORS CORP.

1. Remove the front wiper motor. Refer to **Wiper Motor Module Replacement (Old)**.
2. Remove the grommets and the bushings from the module.

Installation Procedure

IMPORTANT: The metal bushing inserts need to be installed with the flat side underneath the module bolts.

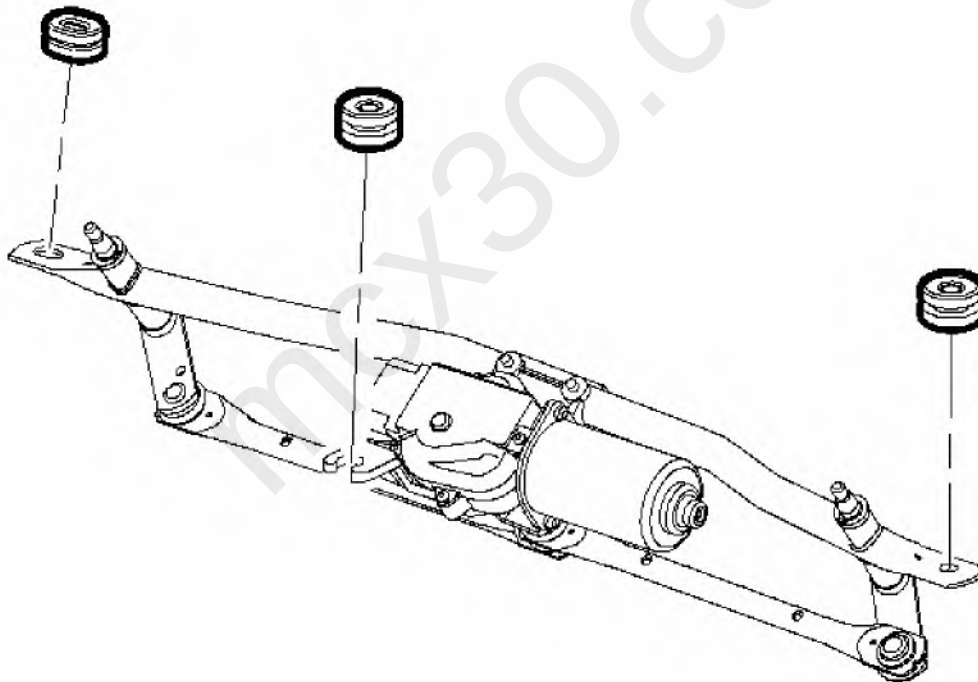


Fig. 27: Removing/Installing Front Wiper Motor
Courtesy of GENERAL MOTORS CORP.

1. Install the grommets and the bushings to the module.
2. Install the front wiper motor. Refer to **Wiper Motor Module Replacement (Old)**.

WINDSHIELD GLASS CLEANING

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

BLADE ELEMENT CLEANING

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

WASHER NOZZLE REPLACEMENT - REAR**Removal Procedure**

1. Remove the center high mounted stop lamp (CHMSL). Refer to **High Mounted Stop Lamp Replacement** in Lighting Systems.

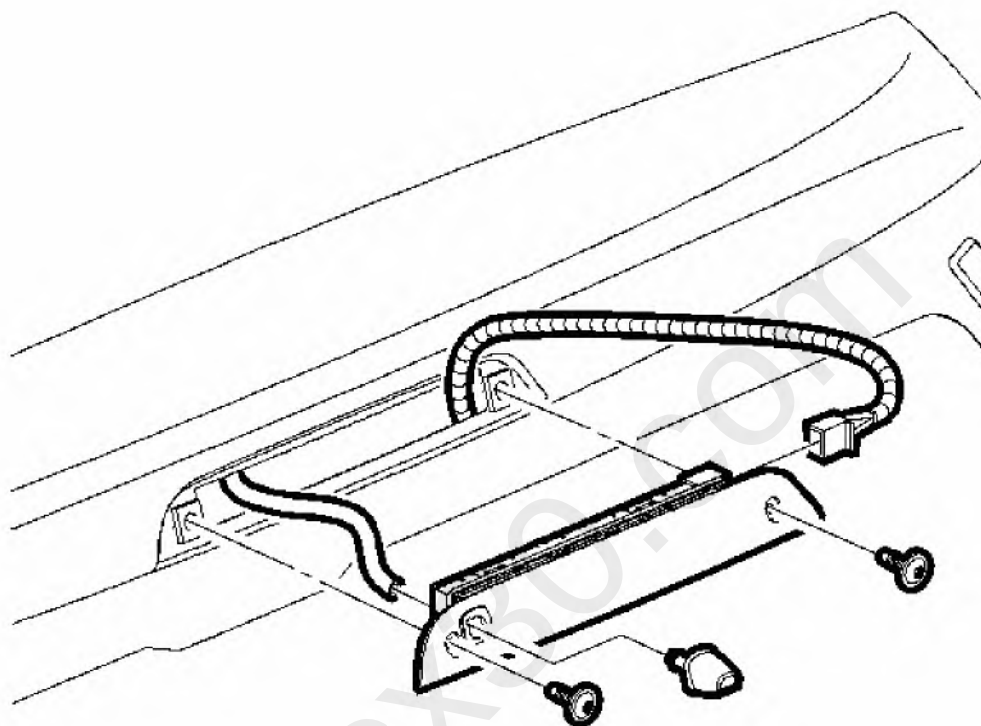


Fig. 28: Disconnecting/Connecting Rear Washer Nozzle Hose
Courtesy of GENERAL MOTORS CORP.

2. Disconnect the rear washer nozzle hose from the rear washer nozzle.
3. Rotate the rear washer nozzle 45 degrees counterclockwise and remove the nozzle.

Installation Procedure

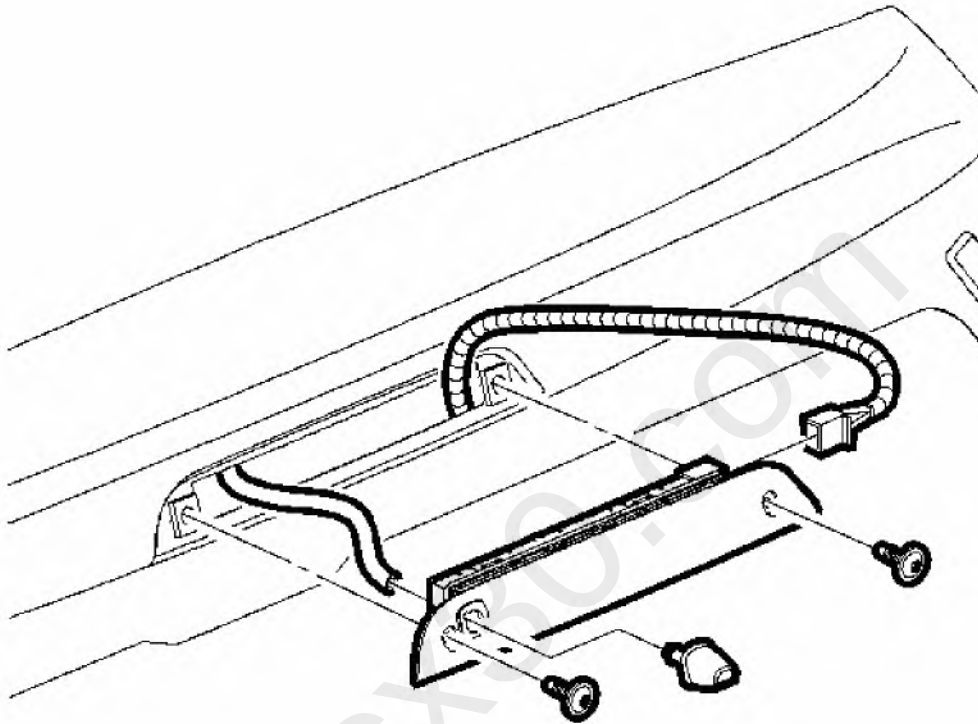


Fig. 29: Disconnecting/Connecting Rear Washer Nozzle Hose
Courtesy of GENERAL MOTORS CORP.

1. Insert the rear washer nozzle into the CHMSL and rotate 45 degrees clockwise to lock the nozzle into position.
2. Connect the rear washer nozzle hose to the rear nozzle. Soapy water may be used as a lubricant to aid in assembly.
3. Install the CHMSL. Refer to **High Mounted Stop Lamp Replacement** in Lighting Systems.

WASHER HOSE REPLACEMENT - REAR

Rear Washer Hose Routing

The rear washer hose is a component of the main body wire harness assembly. The rear

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washer hose is a hard plastic convoluted tube that is wrapped in the electrical tape along with the main body wiring harness. It starts underhood where it connects to the rear washer solvent container hose, this is rubber tubing. The rear washer hose routes into the main body wire harness underhood and passes through the front of the dash. The rear washer hose runs inside the vehicle interior along the left side rocker and over the right side at the 2nd bar beneath the front seats. It proceeds over the right side wheel housing and up the right side pillar where it connects to the washer nozzle hose, at the top of the lift gate opening.

Removal Procedure

1. Locate the damaged section of the rear washer hose, this will be hard plastic convoluted tubing.
2. If the leak is located inside the main body wire harness, cut back the wire harness electrical tape to expose the damaged section.
3. Cut out the damaged section of the rear washer hose.

Installation Procedure

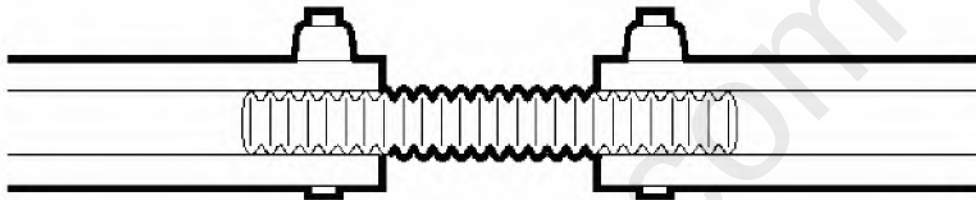


Fig. 30: View Of Rear Washer Hose
Courtesy of GENERAL MOTORS CORP.

1. Replace the damaged section of the rear washer hose.
 - Use a 9.5 mm (3/8 in) vacuum hose to replace damaged section.
 - Overlap the rear washer hose, the plastic tubing, by 10 mm (0.39 in) on each end.
 - Retain each end of the vacuum hose with a 100 mm (4 in) cable tie.
2. Verify the repair by activating the washer system and checking for leaks.
3. If the leak was located inside the main body wire harness, use electrical tape to retain the repaired section to the wire harness.

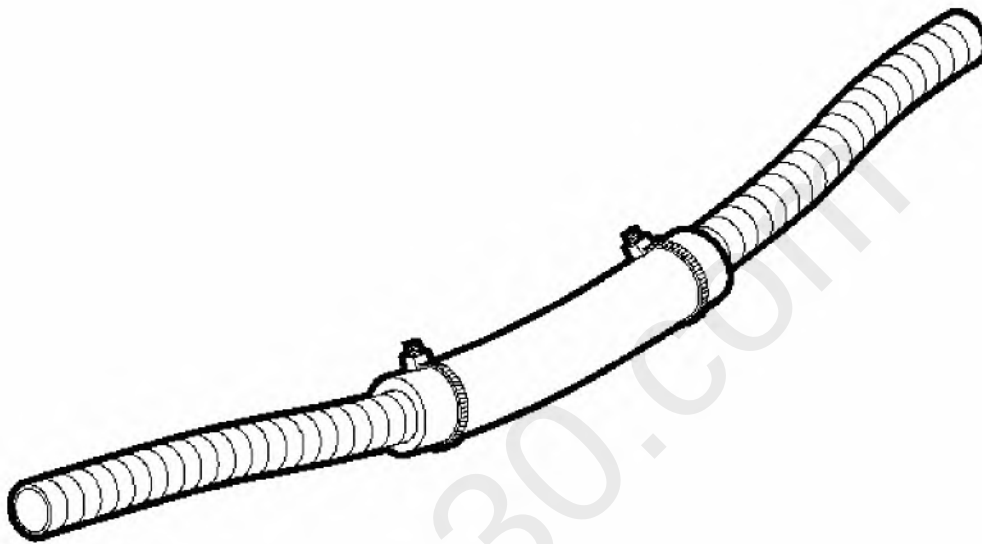


Fig. 31: Repairing Rear Washer Hose
Courtesy of GENERAL MOTORS CORP.

4. If the leak requires the rear washer hose to be removed in the front of dash grommet do the following:
 - Cut out the auxiliary washer hose hole from the grommet.
 - Pass new section of the rear washer hose through the new grommet hose.
 - Repair the hose on either side of the grommet.

WIPER ARM REPLACEMENT - REAR

Removal Procedure

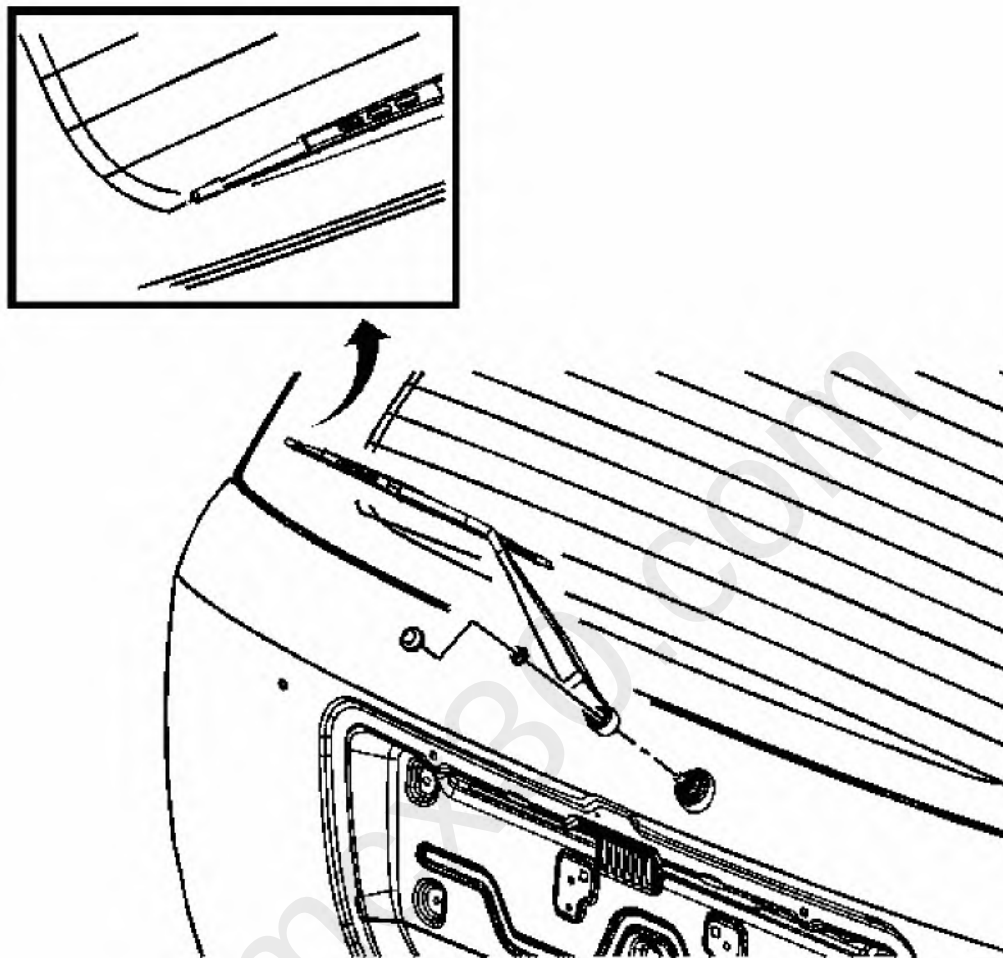


Fig. 32: View Of Rear Wiper Arm
Courtesy of GENERAL MOTORS CORP.

1. Remove the rear wiper arm finish cap to expose the wiper arm nut.
2. Remove the rear wiper arm nut.
3. Lift the rear wiper arm assembly away from the rear window and remove the wiper arm from the pivot shaft.

Installation Procedure

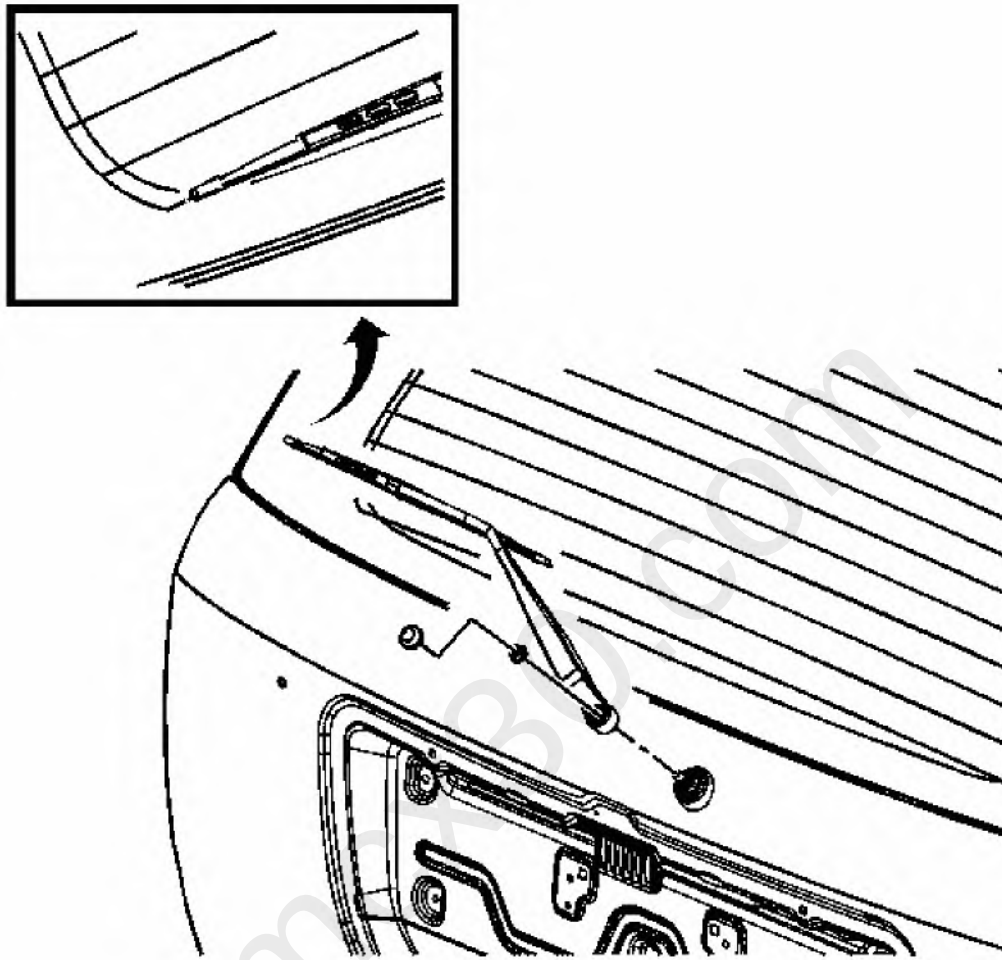


Fig. 33: View Of Rear Wiper Arm
Courtesy of GENERAL MOTORS CORP.

1. Position wiper blade assembly on the blackout strip as shown in the illustration.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the rear wiper arm nut.

Tighten: Tighten the nut to 21 N.m (16 lb ft).

3. Install the rear wiper arm finish cap.
4. Operate the windshield wipers and inspect for proper operation.

Removal Procedure

1. Move the wiper arm to the service up position

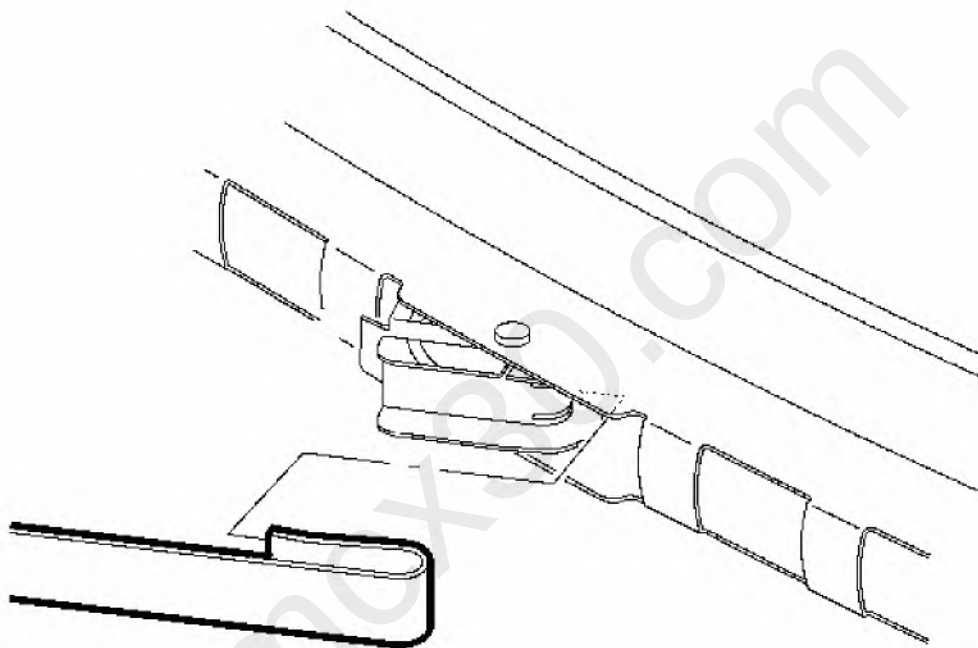


Fig. 34: View Of Wiper Arm Blade
Courtesy of GENERAL MOTORS CORP.

2. Depress the wiper blade attachment clip and slide blade out of wiper arm hook.

Installation Procedure

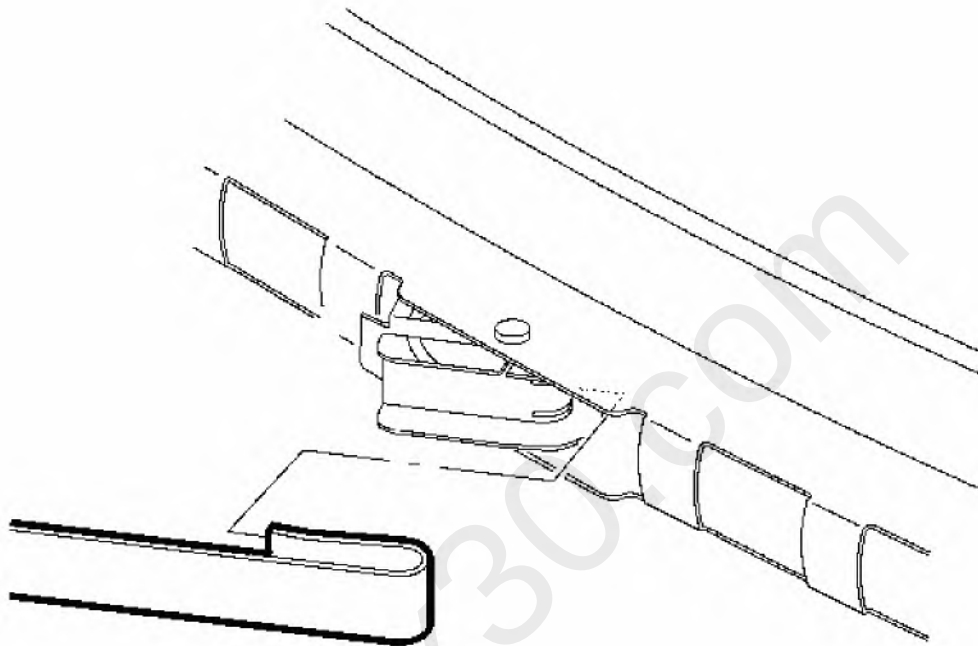


Fig. 35: View Of Wiper Arm Blade
Courtesy of GENERAL MOTORS CORP.

1. Install the hook of the wiper arm through the opening in the wiper blade.
2. Press the wiper blade pivot into the wiper arm hook until the pivot locks into the hook.
3. Operate the windshield wipers and inspect for proper operation.

BLADE ELEMENT REPLACEMENT - REAR

Removal Procedure

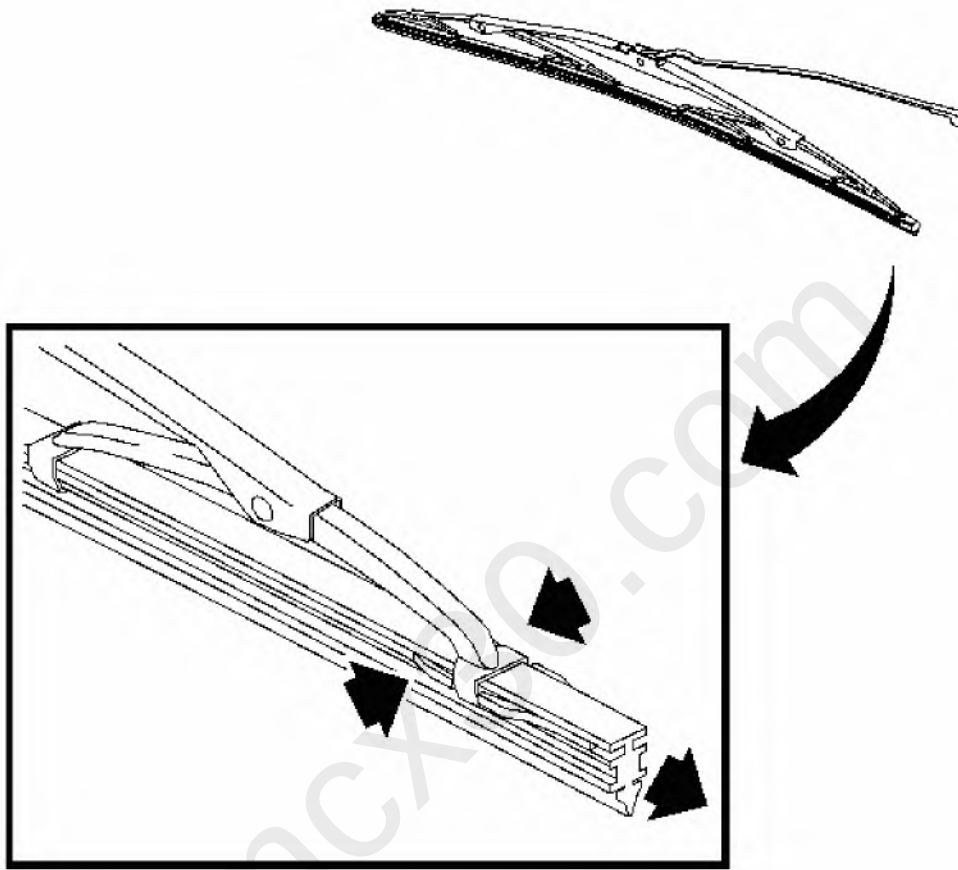


Fig. 36: View Of Wiper Blade Element
Courtesy of GENERAL MOTORS CORP.

1. Lift the wiper arm up to the service position.
2. Remove the wiper blade element by squeezing the metal tabs and pulling on the end of the insert at the heel claw.

Installation Procedure

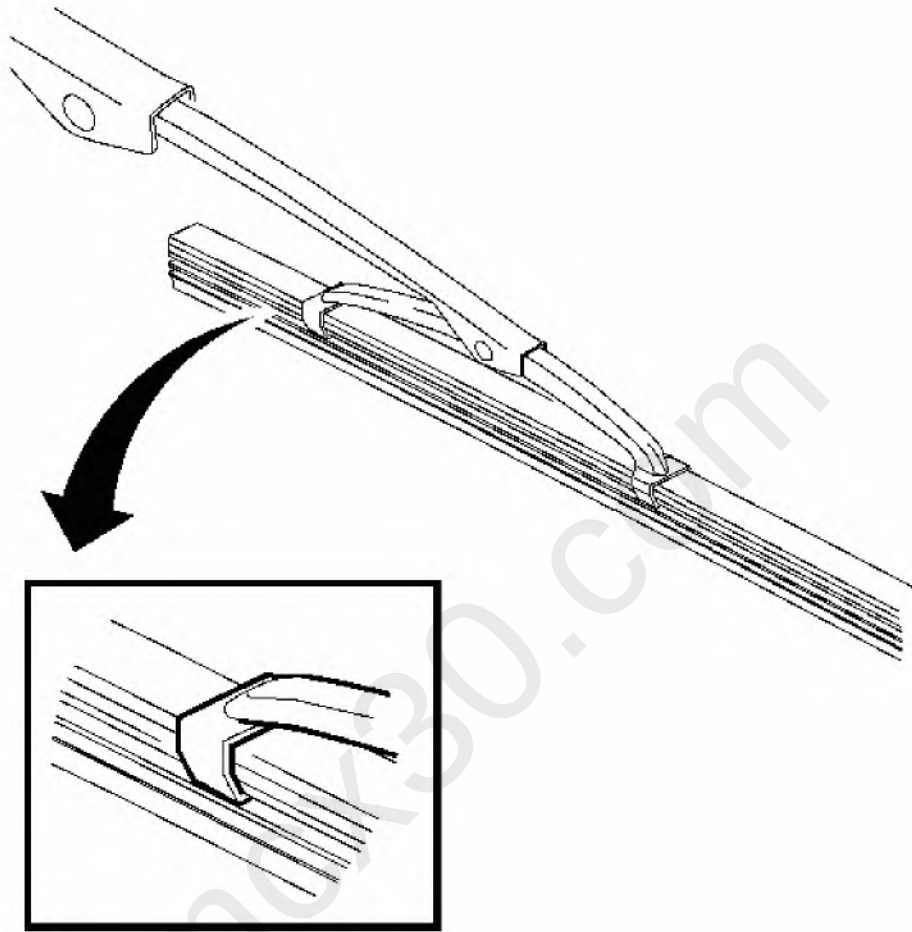


Fig. 37: Removing/Installing Wiper Blade Element
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not remove the retainer clips from the new wiper blade element until installed.

1. Slide the wiper blade element into the wiper blade, starting with the heel claw, so that the claw engages in the groove of the wiper blade element.
2. Guide the wiper blade element through the wiper blade claw sets.

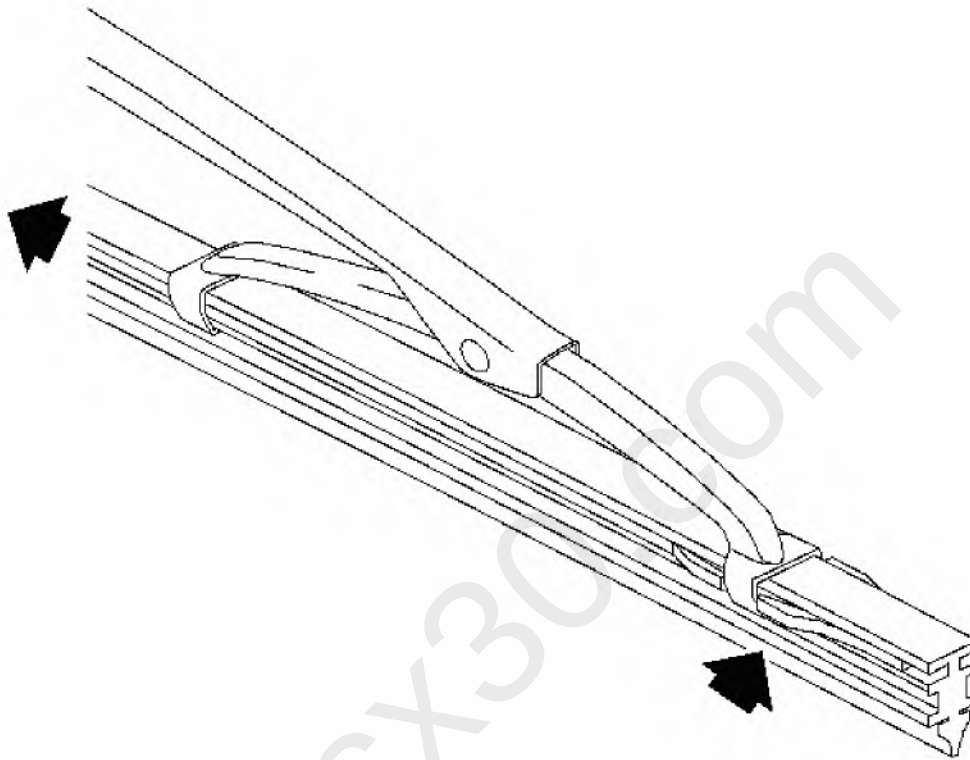


Fig. 38: View Of Wiper Blade Insert
Courtesy of GENERAL MOTORS CORP.

NOTE: If the metal clip on the wiper blade insert is not completely engaged to the heel claw, the wiper blade insert will not be sufficiently retained and may result in windshield damage.

3. Push the wiper blade insert so that the metal tabs fully engage into the heel claw.

WIPER MOTOR REPLACEMENT - LIFTGATE

Removal Procedure

1. Remove the rear wiper arm. Refer to **Wiper Arm Replacement - Rear**.
2. Remove the liftgate trim panel. Refer to **Trim Panel Replacement - Liftgate** in Body

Rear End.

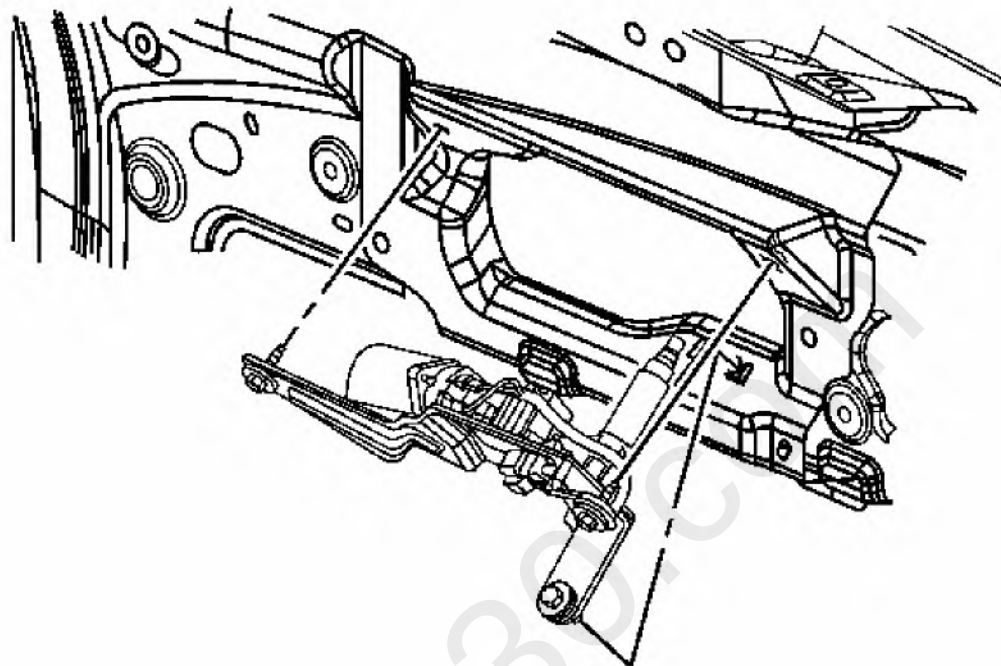


Fig. 39: View Of Rear Wiper Motor
Courtesy of GENERAL MOTORS CORP.

3. Remove the rear wiper motor bolts.
4. Remove the motor by sliding the pivot shaft out of the rear window grommet.
5. Disconnect the electrical connector.

Installation Procedure

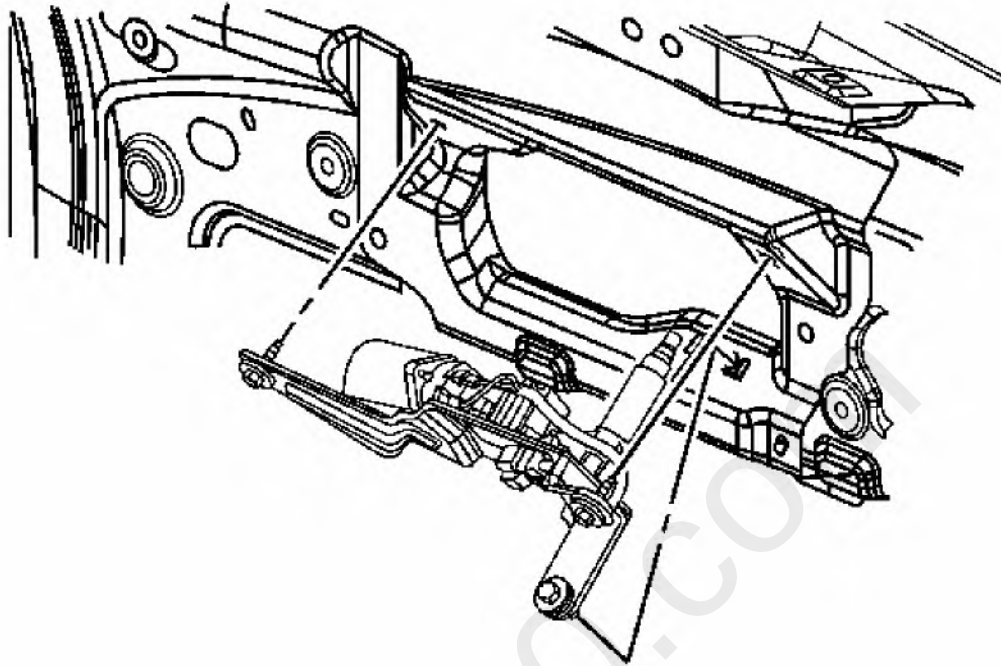


Fig. 40: View Of Rear Wiper Motor
Courtesy of GENERAL MOTORS CORP.

1. Connect the electrical connector.
2. Install the rear wiper motor through the rear window grommet.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the wiper motor bolts.

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

4. Install the liftgate trim panel. Refer to Trim Panel Replacement - Liftgate in Body Rear End.
5. Install the wiper motor module. Refer to Wiper Arm Replacement - Rear.

DESCRIPTION AND OPERATION

WIPER/WASHER SYSTEM DESCRIPTION AND OPERATION

The windshield wiper/washer system consists of front and rear wipers. The front and rear

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wipers are operative when the vehicle is in accessory or run. The front wipers have 4 different modes. The 4 modes are MIST, Intermittent, Low, and High. When the front wipers are in the intermittent mode, there are 3 delay modes to chose from, commanded by the windshield wiper washer switch through the body control module (BCM). There is one mode for the rear wipers. The rear wipers has an intermittent mode only, and the intermittent mode has 3 delay modes to chose from. The wipers are powered through the windshield wiper washer switch except for the intermittent mode. The intermittent mode is controlled by the BCM. The front and rear wipers also have a washer function. By putting the wiper switch in the wash mode the front or rear wipers will spray washer fluid on the windshield and the wipers will then clean the windshield, wipers will be controlled by the BCM.

High Operation (Front Wipers Only)

In the High position, the windshield wiper washer switch supplies voltage to the high speed circuit of the windshield wiper motor. The windshield wiper motor will operate at high speed.

Intermittent Operation (Front and Rear Wipers)

The BCM controls the front and rear wipers, when the wipers are in the intermittent mode. When the BCM receives an input from the front or rear wipers switch, the BCM controls the input into the front or rear wiper relay. The BCM will energize the front or rear relay commanding the wipers On. There are 3 intermittent positions for the front or rear wipers. The intermittent switch (located in the wiper switch) sends inputs to the BCM indicating the speed the wipers should be in. Below is a table for the front and rear wipers indicating the time delay for each intermittent mode:

Wiper/Washer System Description and Operation

Front	Rear (with front wipers off)	Rear (with front wipers on)		
		Front (INT)	Front (LOW)	Front (HIGH)
12 seconds	17 seconds	22 seconds	17 seconds	17 seconds
7 seconds	9 seconds	13 seconds	9 seconds	9 seconds
1 second	2 seconds	4 seconds	2 seconds	2 seconds

Low Operation (Front Wipers Only)

In the Low position, the windshield wiper washer switch supplies voltage to the low/mist circuit of the windshield wiper motor. The windshield wiper motor will operate at low speed.

Mist Operation (Front Wipers Only)

In the MIST position, the windshield wiper washer switch supplies voltage to the low/mist circuit of the windshield wiper motor. The windshield wiper motor will operate at low speed.

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The windshield wipers make one sweep at low speed and returns to the park position. If the windshield wiper washer switch is held in MIST mode, the windshield wipers will continue to operate until the switch is released.

Park Position Operation

The wiper and rear wiper fuses, supply voltage to signal circuit of the front and rear wiper motor, respectively. The signal will be pulled to voltage by the wiper motor while the windshield wiper motor is operating. When the windshield wiper motor has parked, the signal is at ground, (front wiper motor), or open, (rear wiper motor).

Wash Operation (Front and Rear Wipers)

The front and rear washer systems use the same windshield washer fluid pump. When either the front or rear wiper is in the washer position voltage will be supplied to one side of the windshield washer fluid pump (depending on whether it is front or rear), while the other side of the pump is grounded.

At this point, the windshield washer fluid pump sprays solvent onto the windshield. When the front or rear washer is activated, the BCM receives an input from the switch that is activated. The BCM will control the wipers while in the WASH mode. The BCM will control either the front wiper relay or the rear wiper relay to turn on the wipers. The windshield wipers operate at low speed for 3 swipes and returns to the park position.