WINDSHIELD WIPERS AND WASHERS

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GENERAL INFORMATION

INTRODUCTION

WARNING: ON VEHICLES EQUIPPED WITH AIRBAG, SEE GROUP 8M, RESTRAINT SYSTEMS FOR SAFETY PRECAUTIONS. DISCONNECT THE NEGATIVE CABLE FROM THE BATTERY BEFORE SERVICING COMPONENTS INVOLVING THE AIRBAG SYSTEM. ACCIDENTAL DEPLOYMENT OF AIRBAG AND PERSONAL INJURY CAN RESULT.

The windshield wipers can be operated with the windshield wiper switch when the ignition switch is in the RUN or ACCESSORY positions. The windshield wiper system is protected by a 40 amp fuse (9) located in the Power Distribution Center (PDC) in the engine compartment. The windshield washer circuit is protected by a 6 amp fuse (9) located in the Junction Block. The wiper motor has permanent magnetic fields. The speeds are determined by current flow to the appropriate set of brushes inside the motor. The current flow is controlled by the multi-function switch stalk mounted wiper switch, high speed/low speed relays located in the PDC. The speed sensitive intermittent wiper is controlled by the Body Control Module (BCM). The intermittent mode, with the vehicle traveling greater than 10.4 mph, has a range of 0.5 to 18 seconds. With the vehicle traveling less than 10.4 mph, and the time delay is not adjusted, time delay doubles to a range of 1 to 36 seconds. The wiper arms will park at the base of the windshield just above the cowl cover after the wiper switch is turned OFF.

The windshield wiper motor and linkage is located in an integral wiper unit at the rear of the engine compartment. The wiper unit must be removed to gain access to the wiper motor.

DIAGNOSIS AND TESTING

DIAGNOSTIC PROCEDURES

The windshield wiper system operates in several modes:

- Low and high speed normal wipe
- Speed sensitive intermittent wipe
- Wipe after wash
- Pulse wipe
- Park (switch OFF)

The windshield wiper circuits are continuously monitored and controlled by the Body Control Mod-

DIAGNOSIS AND TESTING (Continued)

ule (BCM). If a problem occurs in the electronic components, wiring, switch (except integral motor park switch) and wiper motor a Diagnostic Trouble Code (DTC) will be stored in the BCM memory. DTC's can be retrieved using a scan tool (DRB). Refer to proper Body Diagnostic Procedures manual for DTC descriptions and retrieval information.

The windshield wiper park switch and circuit is monitored by the BCM. The park switch and circuit can be tested using the Wiper System Diagnosis chart.

FAILED PARK SWITCH

If the wiper park switch has failed the windshield wipers will operate as follows:

SWITCH OFF—Wipers stop in current location regardless of the park signal.

INTERMITTENT MODE—Wipers operate at low speed for one or more extra wipes or continuously.

LOW SPEED—Wipers operate at low speed.

HIGH SPEED—Wipers operate at high speed.

PULSE WIPE—Wipers will not operate.

WIPE AFTER WASH—Wipers operate at low speed in any mode setting. Wipers operate only while wash button is depressed with switch in OFF mode, wipers stop in mid-cycle when button is released.

The windshield wiper park switch and circuit is monitored by the BCM. The park switch and circuit can be tested using the Wiper System Diagnosis table.

WIPER SYSTEM DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
WIPER BLADES DO NOT PARK PROPERLY	1. WIPER ARMS IMPROPERLY PARKED. 2. WIPER ARMS ARE LOOSE ON PIVOT SHAFT. 3. MOTOR CRANK LOOSE AT OUTPUT SHAFT.	1. REMOVE WIPER ARMS AND REPARK. REFER TO WIPER ARM REMOVAL AND INSTALLATION. 2. REMOVE WIPER ARM AND REPARK. REFER TO WIPER ARM REMOVAL AND INSTALLATION. 3. REMOVE WIPER ARM, RUN WIPER MOTOR TO PARK POSITION AND REMOVE THE MODULE. WITHOUT ROTATING THE MOTOR OUTPUT SHAFT, REMOVE THE CRANK AND CLEAN ANY FOREIGN MATTER FROM THE MOTOR SHAFT. INSTALL THE MOTOR CRANK IN ITS ORIGINAL POSITION.
MOTOR STOPS IN ANY POSITION WHEN THE SWITCH IS TURNED OFF	1. OPEN PARK CIRCUIT.	1. CHECK PARK SWITCH BY DISCONNECTING THE WIRE CONNECTOR AND APPLY BATTERY VOLTAGE TO PIN 4. PLACE A JUMPER WIRE FROM PIN 2 TO PIN 3 AND THEN TO AN EXTERNAL GROUND. REPLACE MOTOR IF IT DOES NOT PARK.
MOTOR WILL NOT STOP WHEN THE SWITCH IS TURNED OFF	1. FAULTY SWITCH. 2. LOCK OF DYNAMIC BRAKE ON WET GLASS.	1. CHECK SWITCH IN LOW, HIGH AND INTERMITTENT POSITION. 2. ENSURE PARK SWITCH HAS CLEAN GROUND.
WIPER BLADES SLAP AGAINST COWL SCREEN OR WINDOW MOLDINGS.	1. WIPER ARMS ARE PARKED INCORRECTLY.	1. PARK WIPER ARMS. REFER TO WIPER ARM ADJUSTMENT.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
BLADES CHATTER	1. FOREIGN SUBSTANCE SUCH AS POLISH ON GLASS OR BLADES. 2. ARMS TWISTED, BLADE AT WRONG ANGLE ON GLASS. 3. BLADE STRUCTURE BENT. 4. BLADE ELEMENT HAS PERMANENT SET.	1. CLEAN GLASS AND BLADE ELEMENT WITH NON-ABRASIVE CLEANER. 2. REPLACE ARM. 3. REPLACE BLADE. 4. REPLACE BLADE ELEMENT.
WIPER KNOCK AT REVERSAL	1. LINKAGE BUSHINGS WORN. 2. ARMATURE ENDPLAY IN MOTOR.	1. REPLACE WORN LINK. REFER TO WIPER LINKAGE REMOVAL AND INSTALLATION. 2. REPLACE WIPER MOTOR. REFER TO WIPER MOTOR REMOVAL AND INSTALLATION.
WIPER MOTOR WILL NOT RUN	1. BLOWN FUSE. 2. NEW FUSE BLOWS. 3. NEW FUSE BLOWS. 4. NO VOLTAGE AT MOTOR. 5. POOR GROUND.	1. REPLACE FUSE, AND RUN SYSTEM. 2. CHECK FOR SHORT IN WIRING OR SWITCH. 3. REPLACE FUSE, REMOVE MOTOR CONNECTOR, TURN SWITCH ON, FUSE DOES NOT BLOW, REPLACE MOTOR. 4. CHECK SWITCH AND WIRING HARNESS. REFER TO GROUP 8W, WIRING DIAGRAMS. 5. REPAIR GROUND WIRE CONNECTION AS NECESSARY.

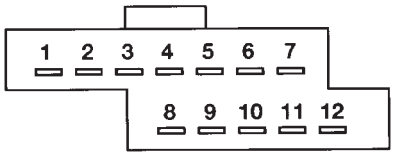
DIAGNOSIS AND TESTING (Continued)

MULTI-FUNCTION SWITCH

To test the windshield wiper and washer portion of the multi-function switch:

(1) Remove the multi-function switch, refer to removal procedures.

(2) Using an ohmmeter check continuity reading between switch pins, refer to (Fig. 1) for proper pin numbers.



SWITCH POSITION	RESISTANCE VALUE BETWEEN
OFF	6 AND 7 MAX. 1.0 Ω
DELAY POSITION	
1ST	6 AND 7 1.91 K Ω ± 5 Ω
2ND	6 AND 7 1.00 K Ω ± 5 Ω
3RD	6 AND 7 617 Ω ± 5 Ω
4TH	6 AND 7 389 Ω ± 2 Ω
5TH	6 AND 7 256 Ω ± 2 Ω
6TH	6 AND 7 156 Ω ± 1 Ω
LOW	6 AND 7 65.4 Ω ± 0.5 Ω
HIGH	5 AND 8 MAX. 1.0 Ω
WASH	8 AND 11 CONTINUITY

801cbd37

Fig. 1 Windshield Wiper and Washer–Multi-Function Switch Test

REMOVAL AND INSTALLATION

MULTI-FUNCTION SWITCH

WARNING: BEFORE SERVICING A STEERING COLUMN EQUIPPED WITH AN AIRBAG REFER TO GROUP 8M, RESTRAINT SYSTEMS FOR PROPER AND SAFE SERVICE PROCEDURES.

REMOVAL

(1) Release hood latch and open hood.

(2) Disconnect and isolate battery negative cable.

(3) Remove upper and lower steering column shrouds, refer to Group 19, Steering for proper procedures.

(4) Disconnect wire connector from back of turn signal multi-function switch (Fig. 2).

(5) Remove screws holding turn signal switch to steering column adapter collar.

(6) Remove turn signal switch.

INSTALLATION

For installation, reverse the above procedures. Verify switch operation by placing the control stalk in either the right or left position and turning the steering wheel to ensure the automatic cancellation of the switch.

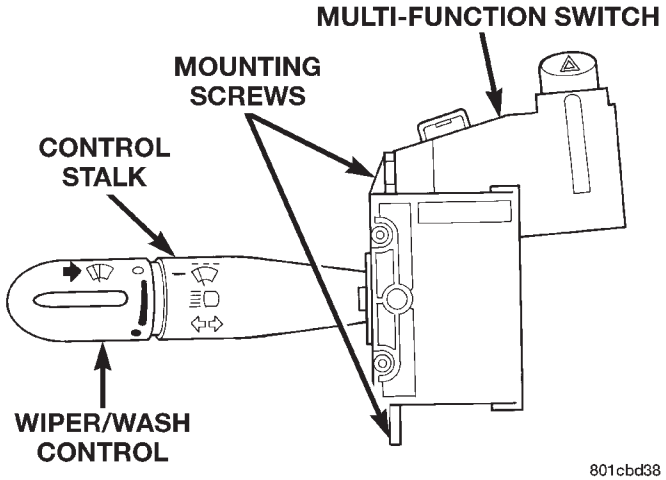


Fig. 2 Turn Signal Multi-Function Switch

WINDSHIELD WASHER BOTTLE

REMOVAL

(1) Hoist and support vehicle on safety stands.

(2) Remove right front wheel, refer to Group 22, Wheels and Tires for proper procedures and tightening sequences.

(3) Remove front wheelhouse splash shield.

(4) Disconnect wire connectors from the windshield and rear window washer pumps (Fig. 3).

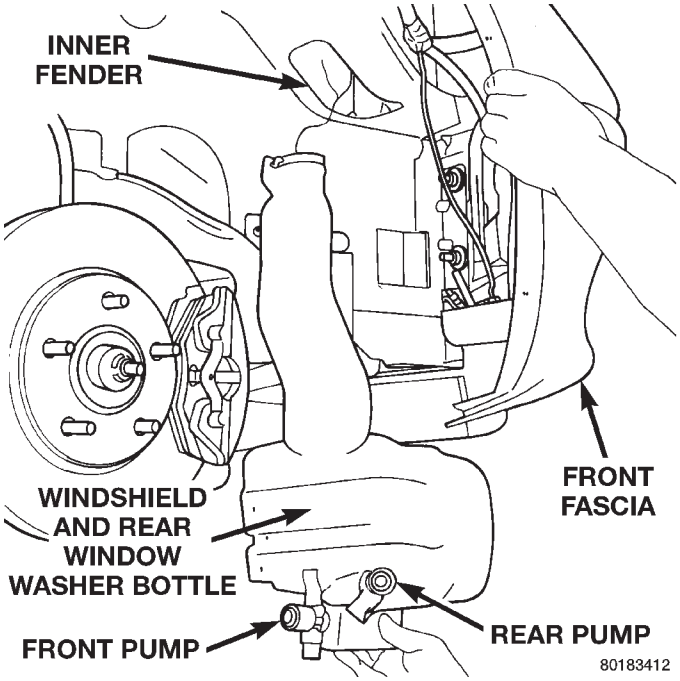


Fig. 3 Windshield Washer Bottle

(5) If washer bottle has fluid in it place a suitable drain pan under the hose connections.

REMOVAL AND INSTALLATION (Continued)

(6) Disconnect front washer hose at front wiper unit in the engine compartment (Fig. 4). The front hose will be removed with the bottle.

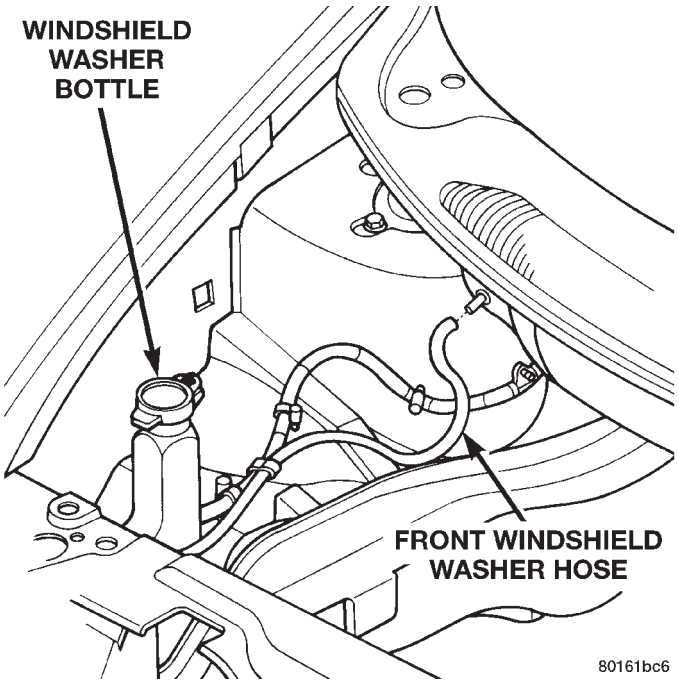


Fig. 4 Front Washer Hose

(7) Disconnect hose from rear washer pump nipple (Fig. 5).

(8) Allow washer bottle to drain.

(9) Remove screws holding washer bottle to front fender support and remove bottle.

INSTALLATION

For installation, reverse the above procedure.

WINDSHIELD WIPER BLADE

REMOVAL

(1) Lift the wiper arm away from windshield.

(2) Disengage the release tab holding the wiper blade to the wiper arm and remove the wiper blade from the wiper arm (Fig. 6).

(3) Remove the wiper blade from the wiper arm.

INSTALLATION

For installation, reverse the above procedure.

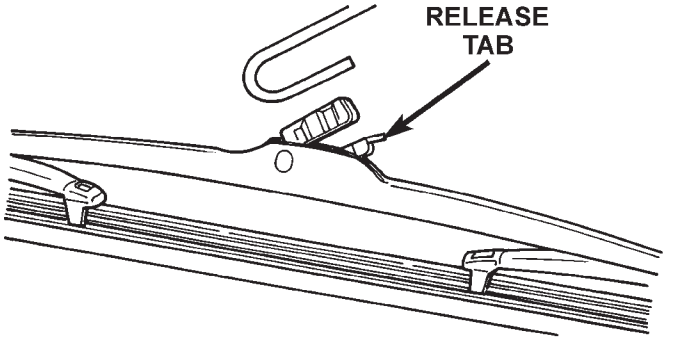


Fig. 6 Windshield Wiper Blade

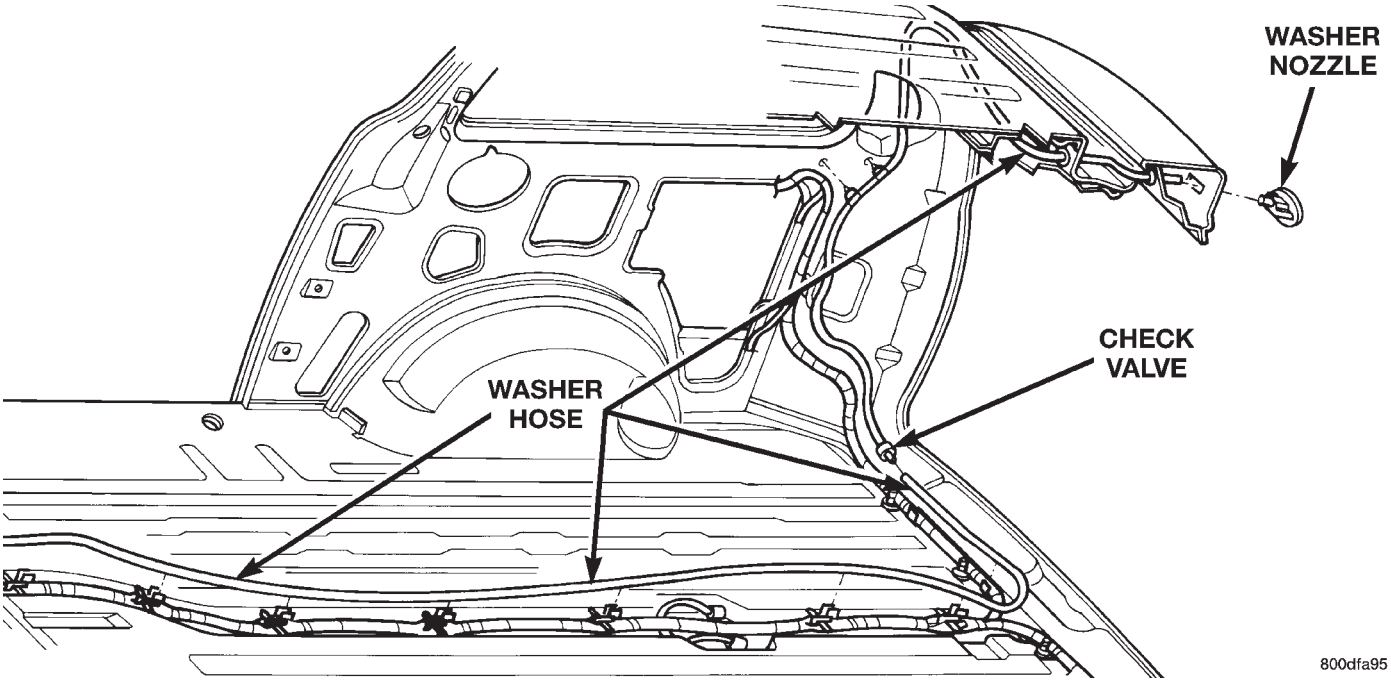


Fig. 5 Rear Washer Hose Routing

REMOVAL AND INSTALLATION (Continued)

WINDSHIELD WIPER BLADE ELEMENT

REMOVAL

(1) Disengage the release tab holding the wiper blade to the wiper arm and remove the wiper blade from the wiper arm (Fig. 6).

(2) Disengage clip holding the wiper element to wiper blade (Fig. 7).

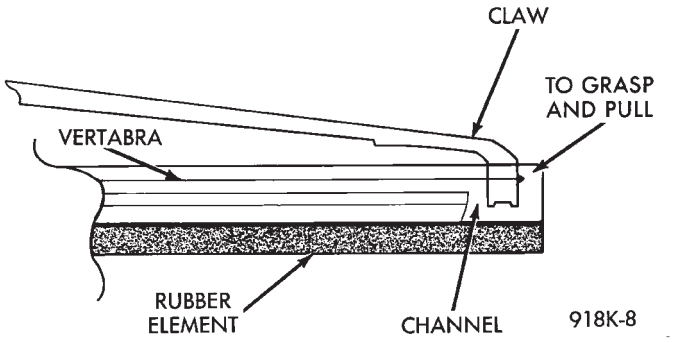


Fig. 7 Windshield Wiper Blade Element

(3) Pull the element from the claws on the wiper blade.

INSTALLATION

(1) Insert the element vertebra (Fig. 8) into claw at the open end of the wiper blade and through each claw location along the blade.

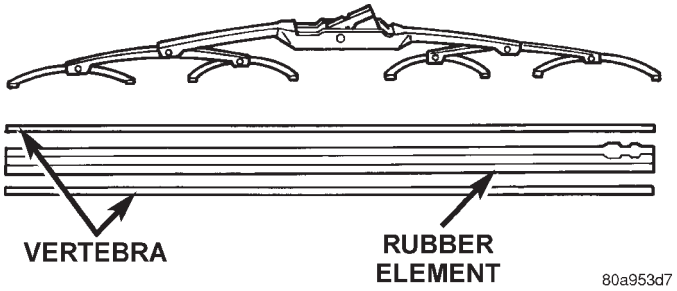


Fig. 8 Wiper Blade and Element

(2) Engage clip to hold wiper element to wiper blade.

(3) Test wiper effectiveness using washer mode and align if necessary.

WINDSHIELD WIPER MOTOR

REMOVAL

(1) Remove wiper unit from vehicle.

(2) Remove wiper linkage and motor mount plate from wiper unit.

(3) Disconnect wire connectors from back of wiper motor (Fig. 16).

(4) Remove wiper linkage from motor crank. Do NOT remove crank from motor.

(5) Remove bolts holding wiper motor to mount plate and remove motor (Fig. 9) and (Fig. 10).

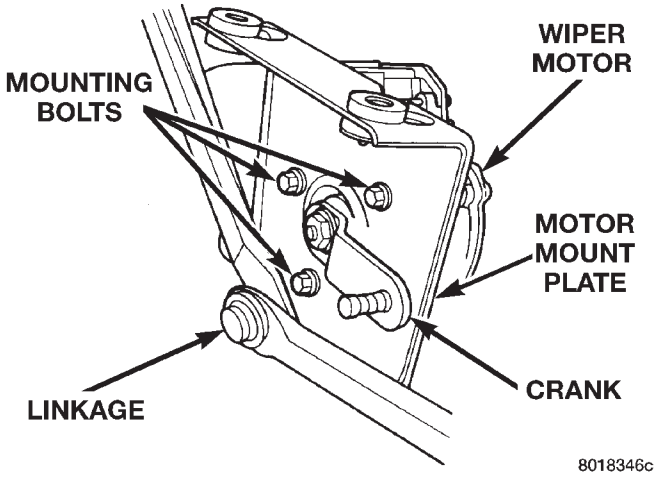


Fig. 9 Wiper Motor Crank

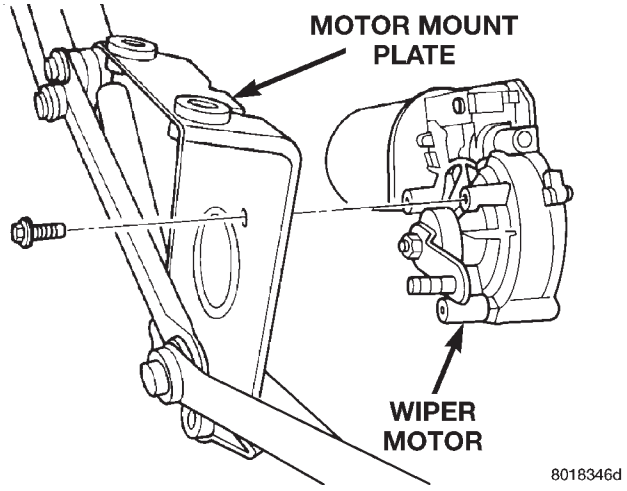


Fig. 10 Wiper Motor

INSTALLATION

(1) Place wiper unit on a suitable work surface.

(2) Place wiper motor in position on mount plate.

(3) Install bolts to hold wiper motor to mount plate.

(4) Install wiper linkage and motor mount plate into wiper unit.

(5) Connect wire connectors to wiper motor (Fig. 16).

(6) Place the wiper unit into engine compartment and connect wiper unit wire connector to engine wire harness (Fig. 13).

(7) Operate wiper motor and verify that the wiper motor parks when wiper switch is turned OFF.

REMOVAL AND INSTALLATION (Continued)

WIPER ARM

CAUTION: The Driver side wiper arm must be parked above the passenger side. Failure to do so will result in damage to the arms, blades, or system.

REMOVAL

(1) Disengage the clip holding outside end of the wiper arm pivot cover to the wiper arm.

(2) Lift the arm cap upward.

(3) Remove the nut holding wiper arm to the wiper pivot.

(4) Using a suitable two jaw puller, separate the wiper arm from the wiper pivot (Fig. 11).

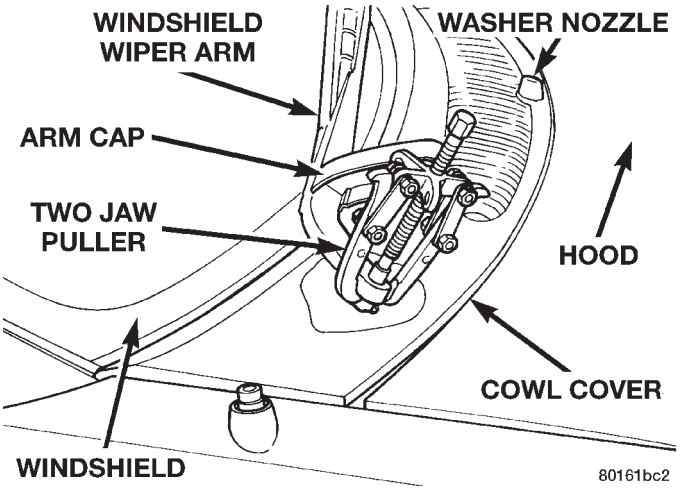


Fig. 11 Wiper Arm Removal

INSTALLATION

(1) Verify that the wiper motor and linkage are in the park position.

(2) Place the wiper arm in position over the wiper pivot (Fig. 12). Refer to Alignment.

(3) Install the nut to hold the wiper arm to the wiper pivot. Tighten nut to 35 N·m (26 ft. lbs.).

(4) Push the arm cap cover down.

(5) Engage clip to the hold outside end of wiper arm pivot cover to the wiper arm.

WIPER UNIT

REMOVAL

(1) Remove the wiper arms.

(2) Remove the cowl cover. Refer to Group 23 Body for proper procedure.

(3) Release the hood latch and open hood.

(4) Disconnect the positive lock on the wiper unit wire connector (Fig. 13).

(5) Disconnect the wiper unit wire connector from the engine compartment wire harness.

(6) Disconnect the windshield washer hose from coupling inside unit.

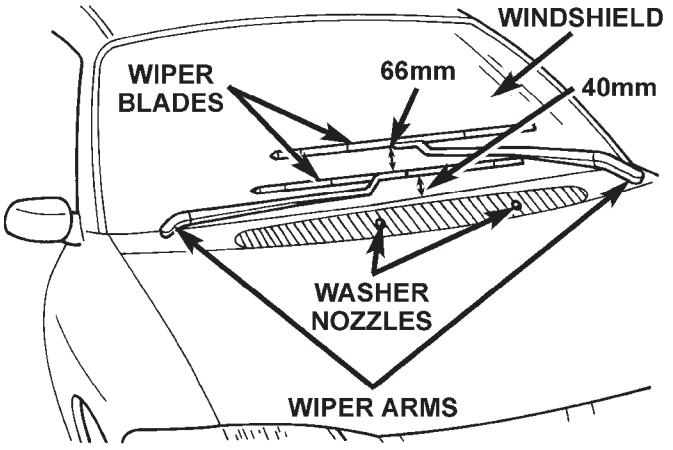


Fig. 12 Wiper Arm Adjustment

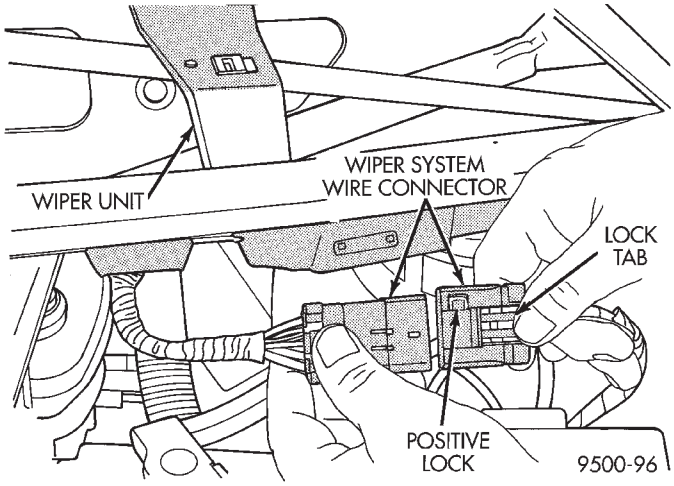


Fig. 13 Wiper Unit Wire Connector

(7) Disconnect the drain tubes from nipples on bottom of the wiper unit.

(8) Remove nuts holding wiper unit to lower windshield fence.

(9) Remove bolts holding the wiper unit to the dash panel (Fig. 14).

(10) Lift wiper unit from weld-studs on lower windshield fence.

CAUTION: Do not allow wiper unit to rest on brake master cylinder reservoir, damage to brake system can result.

(11) Remove wiper unit.

INSTALLATION

For installation, reverse the above procedure.

WIPER LINKAGE

REMOVAL

(1) Remove the windshield wiper unit from vehicle.

REMOVAL AND INSTALLATION (Continued)

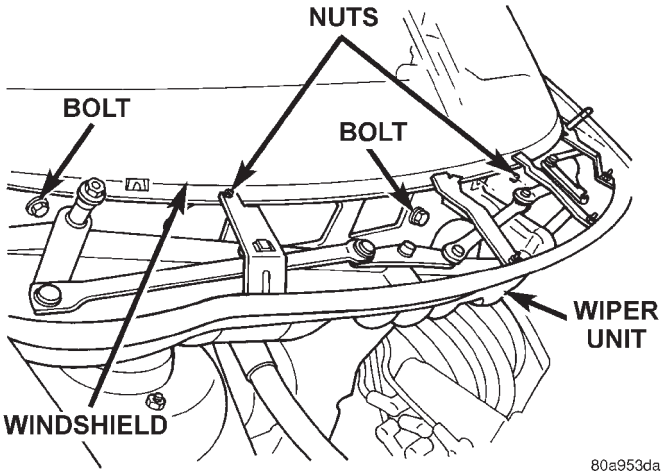


Fig. 14 Wiper Unit

(2) Place the wiper unit on a suitable work surface.

(3) Remove nuts holding the cowl cover brackets to the wiper unit.

(4) Remove cowl cover brackets from the wiper unit.

(5) Remove nuts holding linkage and motor mount plate to the wiper unit (Fig. 15).

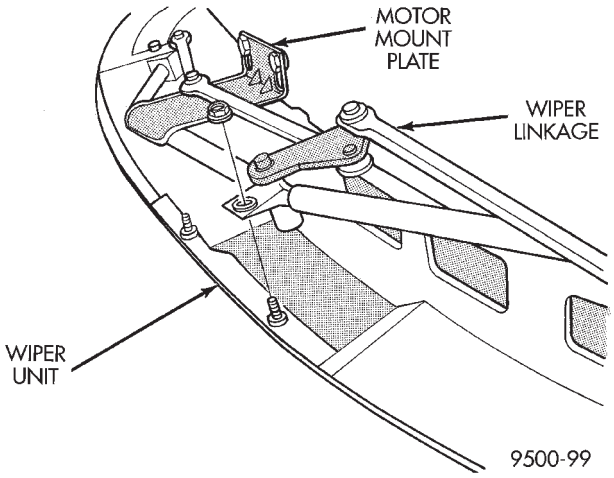


Fig. 15 Wiper Linkage

(6) Remove the wiper linkage from the wiper unit.

(7) Disconnect the wire connectors from back of the wiper motor (Fig. 16).

INSTALLATION

For installation, reverse the above procedure.

CLEANING AND INSPECTION

WIPER BLADES

Wiper blades exposed to the weather for a long period of time tend to lose their wiping effectiveness.

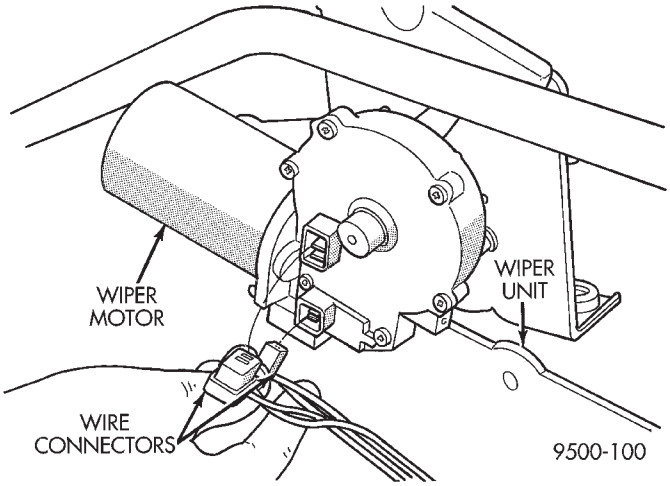


Fig. 16 Wiper Motor Connector

Periodic cleaning of the wiper blade is recommended to remove the accumulation of salt and road grime. The wiper blades, arms and windshield should be cleaned with a sponge or cloth and a mild detergent or nonabrasive cleaner. If the wiper blades continue to streak or smear, they should be replaced. The wiper blade should run smoothly across the windshield in both directions. The wiper blade should slightly roll over center when the blade reverses direction. A wiper blade insert that has lost flexibility or a wiper arm that has lost spring tension, will cause the blade to skip or chatter across the windshield. If the wiper blades are new and the wiper arm spring tension is OK and a chattering sound is emitted from the wiper(s), the wiper blade is not rolling over center. If this condition exists, refer to the Wiper Arm Alignment paragraph of this group.

ADJUSTMENTS

WIPER ARM ALIGNMENT

(1) Verify wiper blade element condition and wiper arm spring tension. Run wipers in low speed mode while applying water to the windshield. Observe the wiper blade that is chattering or skipping across the windshield. If the wiper element is not rolling over when the wiper direction reverses, align the wiper arm. The extension bar portion of the wiper arm must be twisted in the proper direction to allow the wiper element to roll over when the direction reverses.

(2) Place two small adjustable wrenches placed 50 mm (2 in.) apart on the wiper arm extension rod.

(3) Twist the extension rod slightly in the opposite direction that the element is laying on the windshield while holding the wrench closest to the pivot stationary.

(4) Repeat step Step 1, and align as necessary until wiper stops chattering and wipes the windshield clear.

REAR WIPER AND WASHER

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DESCRIPTION AND OPERATION

INTRODUCTION

When continuous rear wiper operation is required, the Body Control Module (BCM) will provide ignition ON voltage to the rear wiper motor. When the wiper switch is turned OFF, the BCM provides circuit ground to operate the motor until the wipe cycle is complete and the wiper arm returns to the base of the rear window.

When intermittent rear wiper mode is selected, the wiper motor will cycle every 7 seconds. The intermittent delay time is also adjusted based upon vehicle speed. With the vehicle traveling greater at 50 mph, the cycle changes to every 5 seconds.

REAR WINDOW WIPER/WASHER SWITCHES

The rear window wiper/washer switches are incorporated into the HVAC switch panel. Refer to Group 8E, Instrument Panel for proper service procedures.

DIAGNOSIS AND TESTING

DIAGNOSTIC PROCEDURES

The rear window wiper system operates in several modes:

- Continuous wipe
- Intermittent wipe
- Wash
- Wipe after wash

The windshield wiper circuits are continuously monitored and controlled by the Body Control Module (BCM). If a problem occurs in the electronic components, wiring, switch (except integral motor park switch) and wiper motor a Diagnostic Trouble Code (DTC) will be stored in the BCM memory. The DTC(s) can be retrieved using a scan tool (DRB). Refer to proper Body Diagnostic Procedures manual for DTC descriptions and retrieval information.

REMOVAL AND INSTALLATION

REAR GLASS RUBBER GROMMET

REMOVAL

(1) Remove rear window wiper motor.
(2) Peel wiper pivot seal grommet from rear glass.
(3) Remove grommets from vehicle (Fig. 1).

INSTALLATION

For installation, reverse the above procedure.

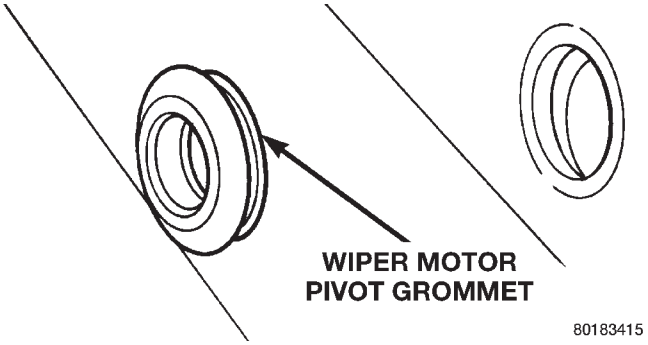

Fig. 1 Rear Glass Rubber Grommet

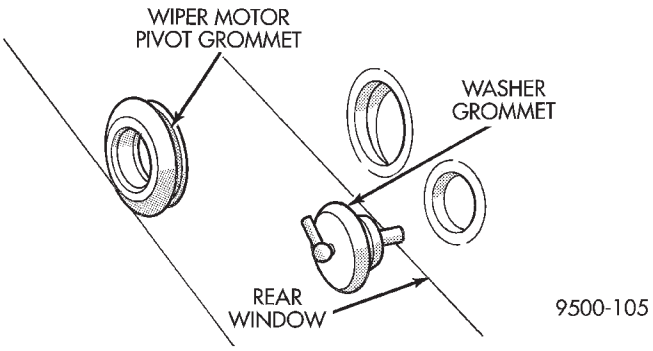

Fig. 2 Rear Glass Rubber Grommets

REMOVAL AND INSTALLATION (Continued)

REAR WINDOW WIPER MOTOR

REMOVAL

(1) Remove rear wiper arm.
(2) Open liftgate.
(3) Remove liftgate trim panel.
(4) Disconnect wire connector from rear wiper motor.
(5) Remove screws holding rear wiper motor to liftgate (Fig. 3).
(6) Remove wiper motor from liftgate.

INSTALLATION

For installation, reverse the above procedure.

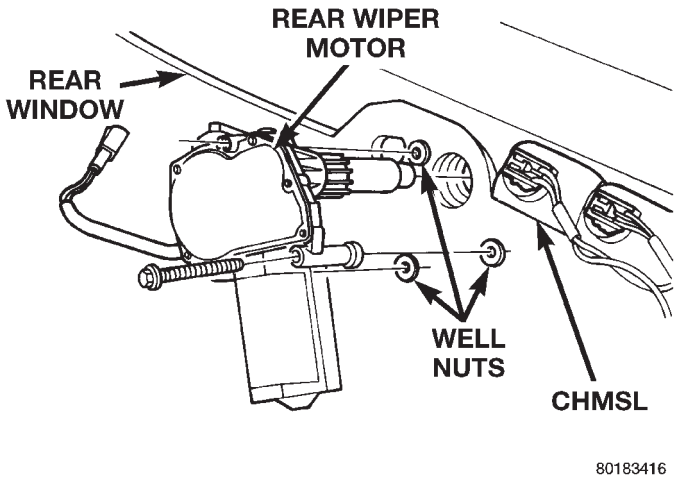

Fig. 3 Rear Window Wiper Motor

REAR WIPER ARM

REMOVAL

(1) Lift and hold wiper blade away from rear window.
(2) Lift lock holding wiper arm to wiper pivot upward.
(3) Allow wiper arm to rest against lock.
(4) Pull wiper from pivot (Fig. 4).

INSTALLATION

For installation, reverse the above procedure.

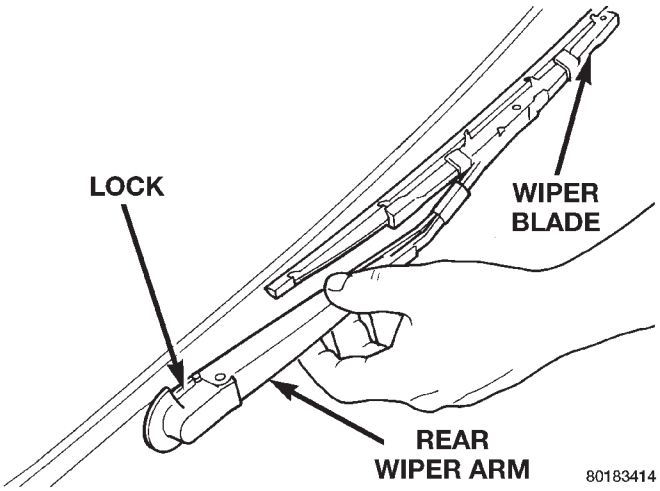

Fig. 4 Rear Wiper Arm

REAR WIPER BLADE

REMOVAL

(1) Lift wiper blade away from rear window.
(2) Release latch holding blade to wiper arm (Fig. 5).
(3) Remove blade from wiper arm.

INSTALLATION

For installation, reverse the above procedure.

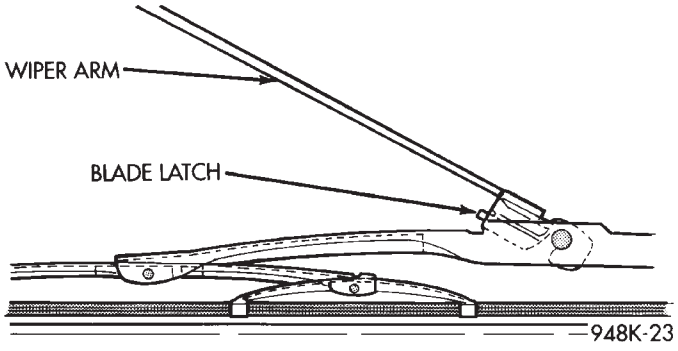

Fig. 5 Rear Wiper Arm

REAR WIPER BLADE ELEMENT

Refer to Windshield Wiper Blade Element in this section.