

2005 Ford Focus ZX5 S

2005 ACCESSORIES & BODY, CAB Wipers And Washers - Focus

2005 ACCESSORIES & BODY, CAB**Wipers And Washers - Focus****SPECIFICATIONS****GENERAL SPECIFICATIONS****GENERAL SPECIFICATIONS**

Item	Specification
Premium Windshield Washer Concentrate ZC-32-A	WSB-M816-A2
P-80 (water-based rubber lubricant)	WSE-M99C45-A2

TORQUE SPECIFICATIONS**TORQUE SPECIFICATIONS**

Description	Nm	lb-ft	lb-in
Accessory drive splash shield	5	-	44
A/C accumulator bracket bolts	9	-	80
A/C accumulator bracket nut	9	-	80
Windshield washer reservoir bolts	5	-	44
Mounting plate bolts to rear wiper motor	8	-	71
Rear mounting plate bolts to liftgate	8	-	71
Rear wiper arm nut	20	15	-
Front wiper arm nut	25	18	-
Windshield wiper motor bolts	8	-	71
Wiper motor linkage to bulkhead bolts	8	-	71
Windshield wiper crank nut	20	15	-
Windshield washer reservoir filler neck	1.5	-	13.2

DESCRIPTION AND OPERATION

WIPERS AND WASHERS

All functions are initiated by means of a wiper/washer switch which is operated by the wiper lever on the right-hand side of the steering column.

Windshield Wiper

The windshield wiper system consists of the following parts:

- Windshield wiper arms (2)
- Windshield wiper motor on the air cowl trim panel
- Windshield wiper linkage
- Windshield wiper blades (2)
- Wiper relay, in the central junction box (CJB)
- Generic electronic module (GEM)
- Wiper/washer switch, consisting of:
 - Wiper switch
 - Washer switch (pressure switch) and
 - Delay control switch (rotary switch, depending on model)

Windshield Wiper Functions

The windshield wiper motor has 2 speeds and a limit switch for the parked position. It is controlled by the wiper/washer switch on the steering column through the wiper relay and the GEM.

After switching the ignition to the ON position, the following 5 wiper functions are available:

- Off
- Once
- Slow
- Fast
- Intermittent

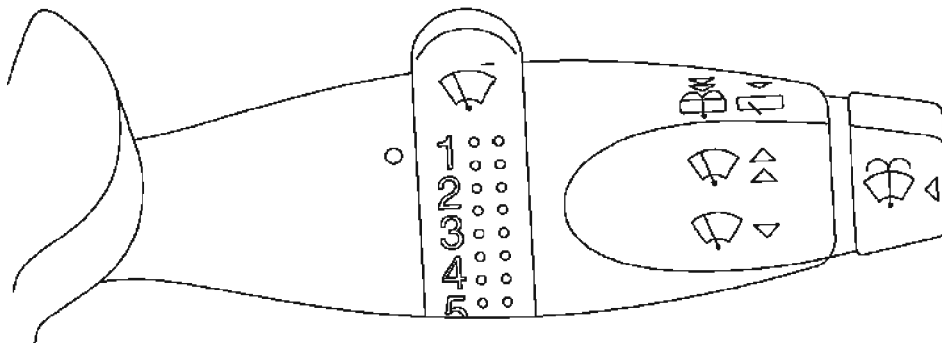
Wiper lever in the OFF position

If the wiper lever is switched from another position to OFF, the windshield wiper motor continues to operate at a slow speed until the parked position is reached and then stops. This is effected by a second circuit via the limit switch. Power is thereby supplied to the windshield wiper motor after it is switched off until the limit switch cuts off the flow of current through the wiper relay (normally closed contact) and the wiper/washer switch to the windshield wiper motor.

Push the wiper lever downwards and release. It returns automatically to the OFF position. The windshield wiper motor performs one wipe cycle at a slow speed. The current flows through the wiper/washer switch to the windshield wiper motor.

Push the wiper lever 2 steps upwards. The windshield wiper motor operates at a slow speed. The current flows through the wiper/washer switch to the windshield wiper motor.

Push the wiper lever 3 steps upwards. The windshield wiper motor operates at fast speed. The current flows through the wiper/washer switch to the windshield wiper motor.



E0002126

Fig. 1: Identifying Wiper Lever
Courtesy of FORD MOTOR CO.

Push the wiper lever 1 step upwards. The windshield wiper motor performs single wiping movements at a slow speed with pauses between them. Depending on the model, the wiping time interval is either set at the fixed setting of 9 seconds or 1 of 6 steps can be selected by turning the knob at the end of the wiper lever (position 1 = short interval, position 6 = long interval).

The wiper/washer switch sends a 12V signal to the GEM through the normally closed

contact for the washer system switch that activates the wiper relay periodically, at 9 second intervals or according to the intermittent wipe time selected (depending on the model variant). The current flow to the windshield wiper motor is established through the wiper relay (normally open contact) and the wiper/washer switch.

Windshield Washer

WARNING: Washer fluid contains the poisonous substance methanol. Observe the safety rules. Failure to follow this instruction may result in personal injury.

The windshield washer consists of the following parts:

- Windshield washer reservoir, below the front right-hand fender
- Washer pump, on the outside of the washer reservoir
- Washer nozzles on the hood.

There are 2 possible functions, and these depend on how the wipers are operating:

Wiper lever in the OFF or INTERMITTENT position

The wiper and the washer pump operate for as long as the wiper lever is pulled towards the steering wheel. Releasing the wiper lever causes the washer pump to be switched off immediately. The windshield wipers perform 2 to 3 more cycles before they adopt the intermittent operation again (INTERMITTENT position) or stop in the parked position (OFF position).

Wiper lever in the SLOW or FAST position

The washer operates together with the wipers for as long as the wiper lever is pulled towards the steering wheel. The current flows from the wiper/washer switch through the washer pump to the GEM and the washer switch. The washer switch in the active state makes the ground connection.

Rear Window Wiper

The rear window wiper system consists of the following parts:

- Rear window wiper motor
- Rear window wiper arm
- Rear window wiper blade
- Rear window wiper relay
- One nozzle

Wipers and Rear Window Washer

To operate the wiper and rear window washer, push the wiper lever towards the instrument panel. The washer operates for as long as the lever is pushed. When it is released, it returns automatically to the rest position. The washer fluid for the rear window washer is taken from the same reservoir (see **WINDSHIELD WASHER**) and also pumped by the washer pump.

The washer pump operates in the opposite direction of rotation for washing the windshield.

The current flows from the CJB through the washer switch to the washer pump. The washer switch in the active state makes the ground connection.

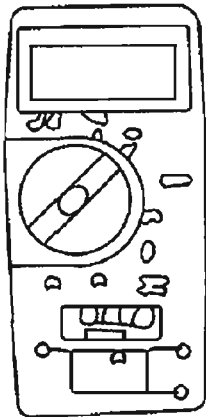
DIAGNOSIS AND TESTING

WIPERS AND WASHERS

Refer to **SYSTEM WIRING DIAGRAMS** for schematic and connector information.

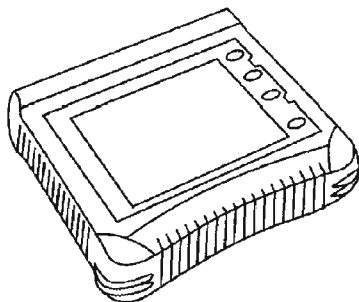
Special Tool(s)

SPECIAL TOOL SPECIFICATION



ST1137-A

73III Automotive Meter (105-R0057) or equivalent



ST2332-A

Worldwide Diagnostic System (WDS) 418-F224, New Generation STAR (NGS) Tester 418-F052, or equivalent diagnostic tool with appropriate adapter cable

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical and electrical damage:

VISUAL INSPECTION CHART

Mechanical	Electrical
<ul style="list-style-type: none"> • Wiper blades • Front wiper linkage • Fluid reservoir - windshield washing system (level) • Hoses • Nozzles 	<ul style="list-style-type: none"> • Central junction box (CJB) fuse(s): <ul style="list-style-type: none"> ○ 43 (15A) ○ 56 (20A) • Pump • Wiper/washer switch • Front wiper relay • Rear wiper relay • Generic electronic module (GEM) • Circuitry

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, connect the diagnostic tool to the data link connector and select the vehicle to be tested from the diagnostic tool menu. If the diagnostic tool does not communicate with the vehicle:
 - Check that the program card is correctly installed.
 - Check the connections to the vehicle.
 - Check the ignition switch position.
5. If the diagnostic tool still does not communicate with the vehicle, refer to the diagnostic tool operating manual.
6. Carry out the diagnostic tool data link test. If the diagnostic tool responds with:
 - ISO or SCP circuit fault; all electronic control units no response/not equipped, refer to **MODULE COMMUNICATIONS NETWORK**.
 - No response/not equipped for GEM, refer to **MULTIFUNCTION ELECTRONIC MODULES**.
 - System passed, retrieve and record the continuous diagnostic trouble codes (DTCs), erase the continuous DTCs, and carry out the self-test diagnostics for the GEM.
7. If the DTCs retrieved are related to the concern, Go to the Generic Electronic Module (GEM) Diagnostic Trouble Code (DTC) Index to continue diagnostics.

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8. If no DTCs related to the concern are retrieved, Go to **SYMPTOM CHART** to continue diagnostics.

Generic Electronic Module (GEM) Diagnostic Trouble Code (DTC) Index**GENERIC ELECTRONIC MODULE (GEM) DIAGNOSTIC TROUBLE CODE (DTC) INDEX**

DTC	Description	Source	Action
B1244	Rear Window Wiper Motor Run Relay Circuit Failure	GEM	Go to <u>PINPOINT TEST F</u> for inoperative. Go to <u>PINPOINT TEST E</u> for on continuously.
B1245	Rear Window Wiper Motor Run Relay Circuit Short To Battery	GEM	Go to <u>PINPOINT TEST F</u> .
B1342	GEM Is Defective	GEM	INSTALL a new GEM. Refer to <u>MULTIFUNCTION ELECTRONIC MODULES</u> . CLEAR the DTCs. REPEAT the self-test.
B1438	Wiper Mode Select Switch Circuit Failure	GEM	Go to <u>PINPOINT TEST H</u> .
B1446	Wiper Park Sense Circuit Failure	GEM	Go to <u>PINPOINT TEST G</u> .
B1451	Wiper Wash/Delay Switch Circuit Failure	GEM	Go to <u>PINPOINT TEST H</u> .
B1611	Wiper Rear Mode Select Switch Failure	GEM	Go to <u>PINPOINT TEST F</u> .
B2107	Front Wiper Motor Relay Circuit Short To Battery	GEM	Go to <u>PINPOINT TEST H</u> .
B2110	Front Wiper Motor Relay Circuit Open	GEM	Go to <u>PINPOINT TEST H</u> .
B2114	Front Washer Input Short To	GEM	Go to <u>PINPOINT TEST D</u> .

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	Ground		
B2115	Rear Washer Input Short To Ground	GEM	Go to <u>PINPOINT TEST I.</u>

Symptom Chart**SYMPTOM CHART**

Condition	Possible Sources	Action
<ul style="list-style-type: none">• No communication with the generic electronic module (GEM)	<ul style="list-style-type: none">• Circuitry.• GEM.• Wiring, data bus (ISO 9141).	<ul style="list-style-type: none">• refer to <u>MULTIFUNCTION ELECTRONIC MODULES .</u>
<ul style="list-style-type: none">• The wipers are inoperative	<ul style="list-style-type: none">• Wiper/washer switch.• Front wiper motor.• Circuitry.• Central junction box (CJB).	<ul style="list-style-type: none">• Go to <u>PINPOINT TEST A.</u>
<ul style="list-style-type: none">• The wipers stay on continuously	<ul style="list-style-type: none">• Wiper/washer switch.• Front wiper motor.• Front wiper relay.• Generic electronic module (GEM).• Central junction box (CJB).• Circuitry.	<ul style="list-style-type: none">• Go to <u>PINPOINT TEST B.</u>
<ul style="list-style-type: none">• The high/low wiper speeds do not operate correctly (intermittent wiper mode OK)	<ul style="list-style-type: none">• Wiper/washer switch.• Front wiper motor.• Circuitry.	<ul style="list-style-type: none">• Go to <u>PINPOINT TEST C.</u>
<ul style="list-style-type: none">• The wash and wipe function is inoperative	<ul style="list-style-type: none">• Generic electronic module (GEM).• Circuitry.	<ul style="list-style-type: none">• Go to <u>PINPOINT TEST D.</u>
<ul style="list-style-type: none">• The rear window wiper stays on continuously	<ul style="list-style-type: none">• Rear wiper motor (limit switch).• Rear wiper relay.	<ul style="list-style-type: none">• Go to <u>PINPOINT TEST E.</u>

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	<ul style="list-style-type: none">• Generic electronic module (GEM).• Central junction box (CJB).• Circuitry.	
<ul style="list-style-type: none">• The rear window wiper is inoperative	<ul style="list-style-type: none">• Wiper/washer switch.• Generic electronic module (GEM).• Rear wiper motor.• Central junction box (CJB).• Circuitry.	<ul style="list-style-type: none">• Go to <u>PINPOINT TEST F.</u>
<ul style="list-style-type: none">• The wipers will not park at the correct position	<ul style="list-style-type: none">• Rear wiper motor.• Front wiper motor.• Front wiper relay.• Central junction box (CJB).• Circuitry.	<ul style="list-style-type: none">• Go to <u>PINPOINT TEST G.</u>
<ul style="list-style-type: none">• The intermittent wiper speed does not operate correctly (high/low speeds OK)	<ul style="list-style-type: none">• Wiper/washer switch.• Front wiper relay.• Generic electronic module (GEM).• Circuitry.	<ul style="list-style-type: none">• Go to <u>PINPOINT TEST H.</u>
<ul style="list-style-type: none">• The washer pump is inoperative	<ul style="list-style-type: none">• Washer pump.• Windshield wiper motor relay.• Circuitry.	<ul style="list-style-type: none">• Go to <u>PINPOINT TEST I.</u>
<ul style="list-style-type: none">• The wipers will not park at the correct position - intermittent or one-swipe mode	<ul style="list-style-type: none">• Front wiper motor relay.	<ul style="list-style-type: none">• INSTALL a new front wiper motor relay. TEST the system for normal operation.

Pinpoint Tests**PINPOINT TEST A: THE WIPERS ARE INOPERATIVE**

A1 CHECK THE VOLTAGE SUPPLY AT CJB FUSE 56 (20A)

- Disconnect: CJB Fuse 56 (20A).
- Key in ON position.
- Measure the voltage between the CJB fuse 56 (20A), input cavity, circuit 15-DA3 (GN/RD) and ground.

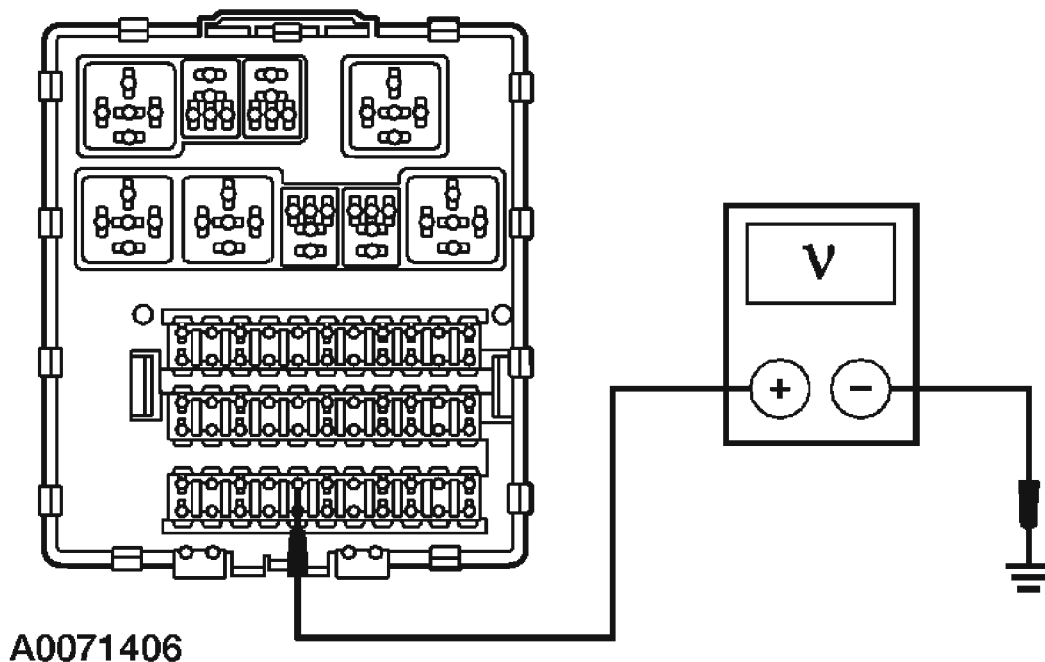


Fig. 2: Measuring Voltage Between CJB Fuse 56 (20A), Input Cavity, Circuit 15-DA3 (GN/RD) And Ground
 Courtesy of FORD MOTOR CO.

- Is the voltage greater than 10 volts?
 Yes : Go to A2.
 No : LOCATE and REPAIR the break in the power supply to fuse 56 (20A).
 TEST the system for normal operation.

A2 CHECK THE VOLTAGE SUPPLY

- Key in OFF position.
- Disconnect: CJB C270f.
- Connect: CJB Fuse 56 (20A).
- Key in ON position.
- Measure the voltage between the CJB C270f pin 5, component side and ground.

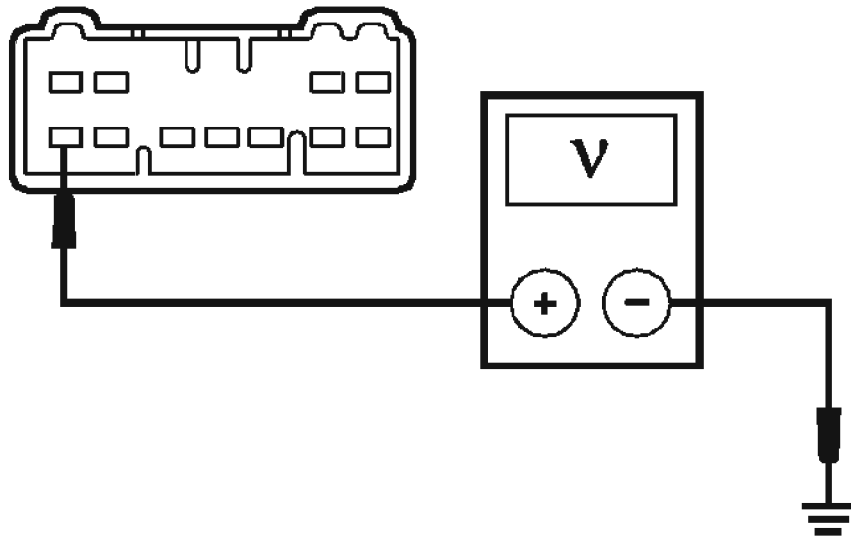
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Fig. 3: Measuring Voltage Between CJB C270f Pin 5, Component Side And Ground

Courtesy of FORD MOTOR CO.

- **Is the voltage greater than 10 volts?**

Yes : Go to A3.

No : INSTALL a new CJB. TEST the system for normal operation.

A3 CHECK THE VOLTAGE SUPPLY AT THE WIPER/WASHER SWITCH

- Key in OFF position.
- Disconnect: Wiper/Washer Switch C2081.
- Connect: CJB C270f.
- Key in ON position.
- Measure the voltage between the wiper/washer switch C2081 pin 6, circuit 15-KA19 (GN/OG), harness side and ground.

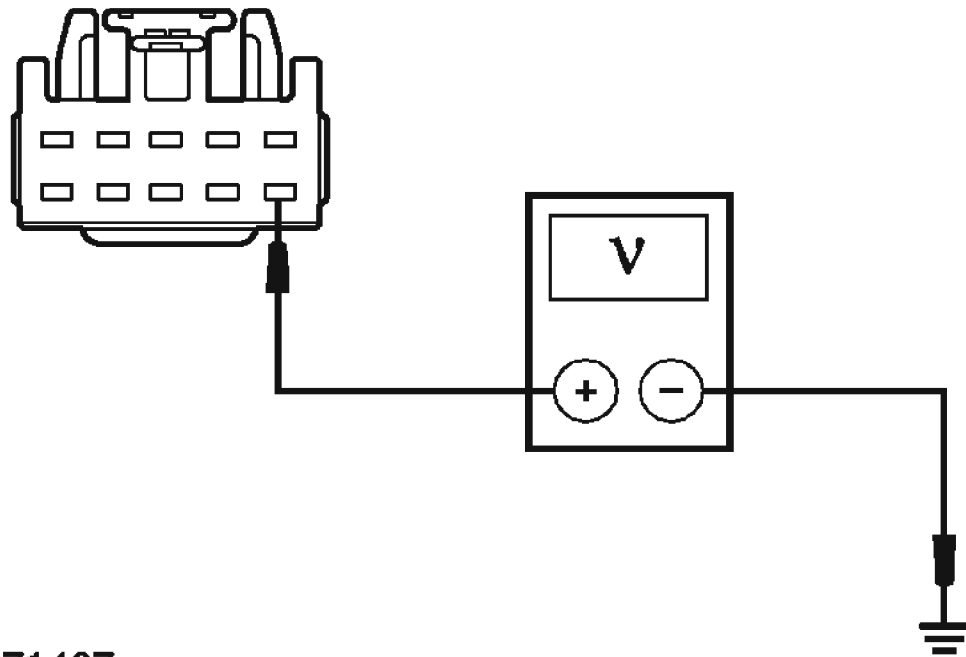
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Fig. 4: Measuring Voltage Between Wiper/Washer Switch C2081 Pin 6, Circuit 15-KA19 (GN/OG), Harness Side And Ground
Courtesy of FORD MOTOR CO.

- Is the voltage greater than 10 volts?

Yes : Go to A4.

No : REPAIR the circuit. TEST the system for normal operation.

A4 CHECK THE WINDSHIELD WIPER SWITCH

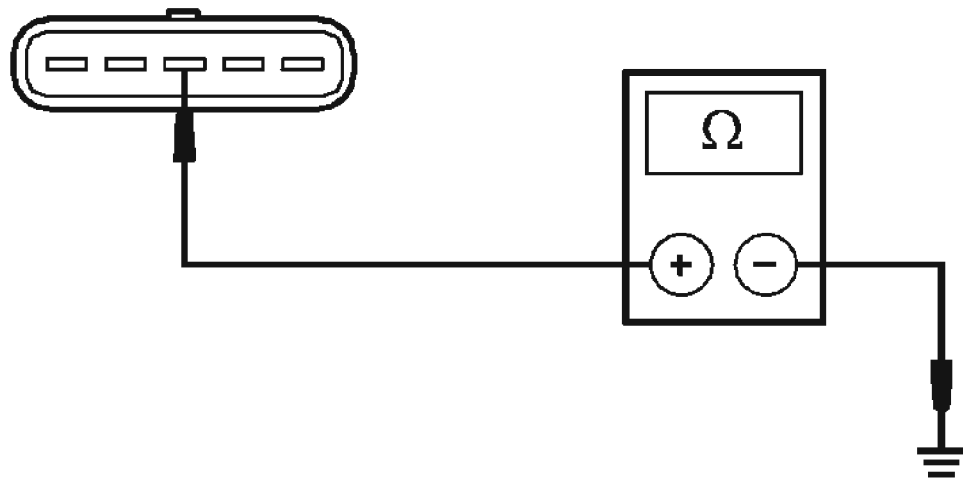
- Carry out the wiper/washer switch component test. Refer to **COMPONENT TESTS**.
- Did the switch pass the component test?

Yes : Go to A5.

No : INSTALL a new wiper/washer switch. TEST the system for normal operation.

A5 CHECK GROUND CIRCUIT 31-KA9 (BK) FOR AN OPEN

- Key in OFF position.
- Disconnect: Windshield Wiper Motor C125.
- Measure the resistance between the windshield wiper motor C125 pin 3, circuit 31-KA9 (BK), harness side and ground.



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Fig. 5: Measuring Resistance Between Windshield Wiper Motor C125 Pin 3, Circuit 31-KA9 (BK), Harness Side And Ground
Courtesy of FORD MOTOR CO.

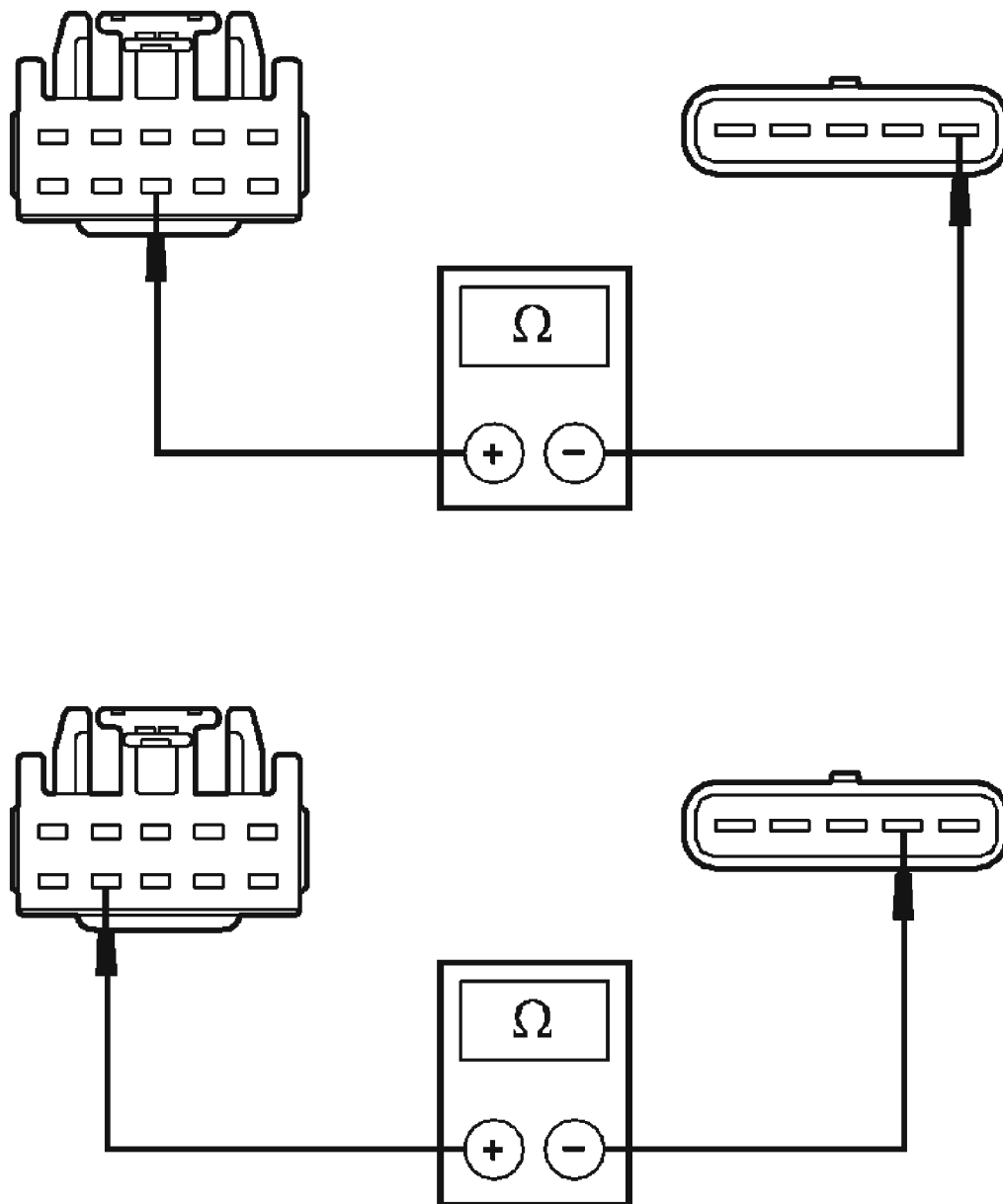
- **Is the resistance less than 5 ohms?**

Yes : Go to A6.

No : REPAIR the circuit. TEST the system for normal operation.

A6 CHECK CIRCUITS 32-KA10 (WH/GN) AND 32-KA11 (WH/BK) FOR AN OPEN

- Measure the resistance between the windshield wiper motor C125 pin 1, circuit 32-KA11 (WH/BK), harness side and the wiper/washer switch C2081 pin 8, circuit 32-KA11 (WH/BK), harness side and between C125 pin 2, circuit 32-KA10 (WH/GN), harness side and C2081 pin 9, circuit 32-KA10 (WH/GN), harness side.



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Fig. 6: Checking Circuits 32-KA10 (WH/GN) And 32-KA11 (WH/BK) For An Open
 Courtesy of FORD MOTOR CO.

- Are both resistance(s) less than 5 ohms?

Yes : INSTALL a new windshield wiper motor. Refer to **WINDSHIELD WIPER MOTOR**. TEST the system for normal operation.

No : REPAIR the circuit in question. TEST the system for normal operation.

PINPOINT TEST B: THE WIPERS STAY ON CONTINUOUSLY

B1 DETERMINE THE WIPE SPEED

- Move the wiper lever to the OFF position.
- Key in ON position.
- **Do the windshield wipers move at a fast rate?**

Yes : Go to B2.

No : Go to B4.

B2 CHECK THE WINDSHIELD WIPER SWITCH

- Key in OFF position.
- Disconnect: Wiper/Washer Switch C2081.
- Key in ON position.
- **Do the windshield wipers move at a fast rate?**

Yes : Go to B3.

No : CHECK the wiper/washer switch for correct operation. Refer to the **COMPONENT TESTS**. If necessary, INSTALL a new wiper/washer switch. TEST the system for normal operation.

B3 CHECK CIRCUIT 32-KA11 (WH/BK) FOR A SHORT TO POWER

- Key in OFF position.
- Disconnect: Windshield Wiper Motor C125.
- Key in ON position.
- Measure the voltage between the wiper/washer switch C2081 pin 8, circuit 32-KA11 (WH/BK), harness side and ground.

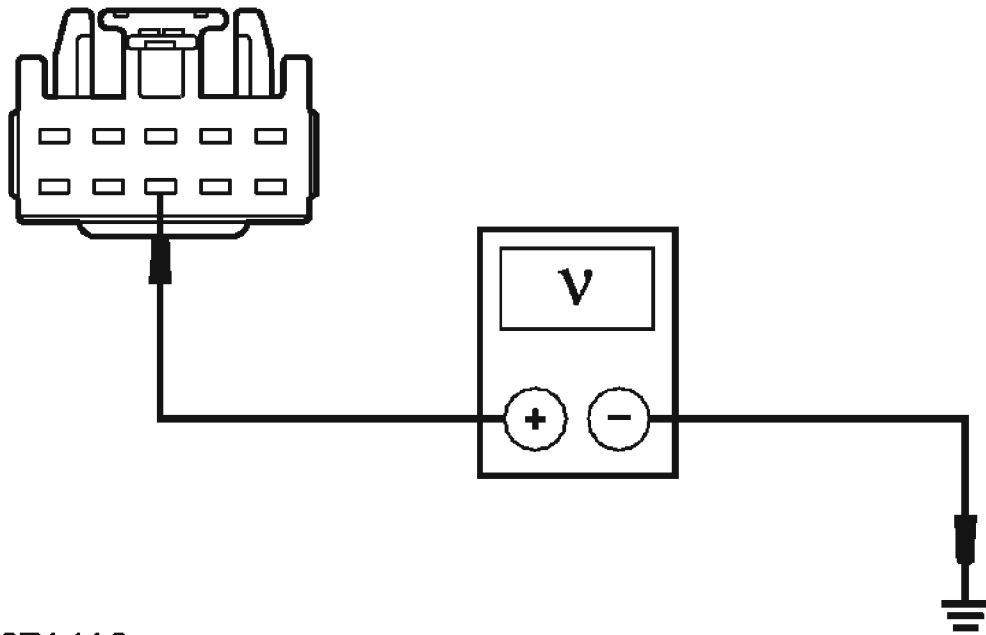
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Fig. 7: Measuring Voltage Between Wiper/Washer Switch C2081 Pin 8, Circuit 32-KA11 (WH/BK), Harness Side And Ground
Courtesy of FORD MOTOR CO.

- **Is the voltage greater than 10 volts?**

Yes : REPAIR the circuit. TEST the system for normal operation.

No : INSTALL a new windshield wiper motor. Refer to **WINDSHIELD WIPER MOTOR**. TEST the system for normal operation.

B4 CHECK THE WIPER/WASHER SWITCH

- Key in OFF position.
- Disconnect: Wiper/Washer Switch C2081.
- Key in ON position.
- **Do the front wipers move at a slow rate?**

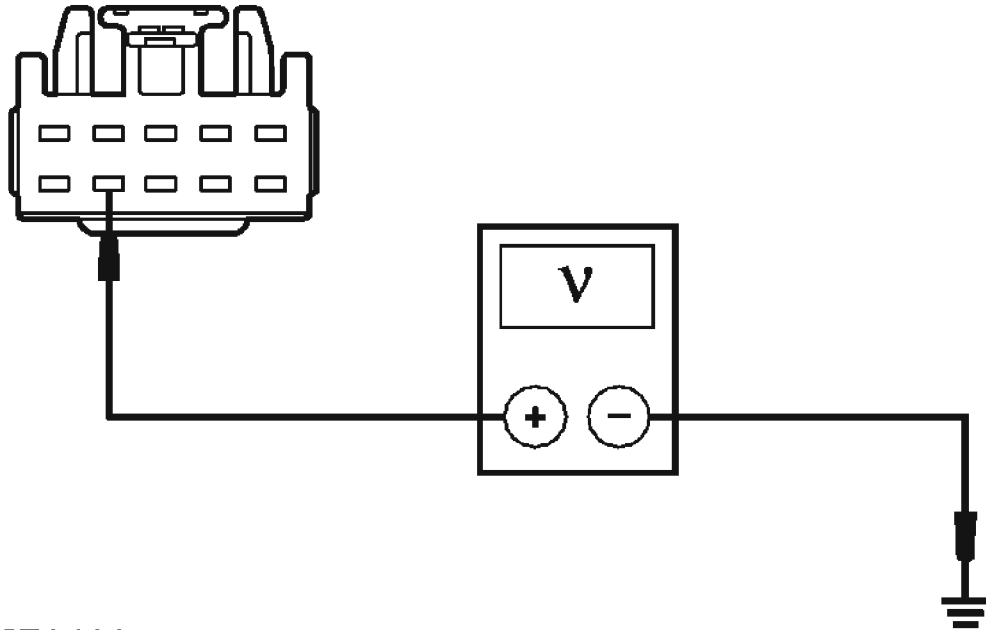
Yes : Go to B5.

No : Go to B6.

B5 CHECK CIRCUIT 32-KA10 (WH/GN) FOR A SHORT TO POWER

- Key in OFF position.
- Disconnect: Windshield Wiper Motor C125.
- Key in ON position.
- Measure the voltage between the wiper/washer switch C2081 pin 9, circuit 32-

KA10 (WH/GN), harness side and ground.



A0071411

Fig. 8: Measuring Voltage Between Wiper/Washer Switch C2081 Pin 9, Circuit 32-KA10 (WH/GN), Harness Side And Ground
Courtesy of FORD MOTOR CO.

- **Is the voltage greater than 10 volts?**

Yes : REPAIR the circuit. TEST the system for normal operation.

No : INSTALL a new windshield wiper motor. Refer to **WINDSHIELD WIPER MOTOR**. TEST the system for normal operation.

B6 CHECK THE WINDSHIELD WIPER SWITCH

- Carry out the windshield wiper switch component test. Refer to **COMPONENT TESTS**.
- **Did the wiper/washer switch pass the component test?**

Yes : Go to B7.

No : INSTALL a new wiper/washer switch. TEST the system for normal operation.

B7 CHECK CIRCUIT 32-KA19 (WH/BK)

- Key in OFF position.
- Connect: Wiper/Washer Switch C2081.
- Disconnect: CJB C270c.

- Key in ON position.
- **Do the windshield wipers move at a slow rate?**
Yes : REPAIR the circuit. TEST the system for normal operation.
No : Go to B8.

B8 CHECK THE WINDSHIELD WIPER RELAY

- Key in OFF position.
- Disconnect: Windshield Wiper Relay C2042.
- Connect: CJB C270c.
- Key in ON position.
- **Do the windshield wipers move at a slow rate?**
Yes : INSTALL a new CJB. TEST the system for normal operation.
No : CARRY OUT the **WIPER/WASHER SWITCH (17A553)** component test.
If necessary, INSTALL a new windshield wiper relay. TEST the system for normal operation. If the windshield wiper relay is OK, Go to B9.

B9 CHECK CIRCUIT 91S-KA12 (BK/WH) FOR A SHORT TO GROUND

- Key in OFF position.
- Connect: Windshield Wiper Relay C2042.
- Disconnect: GEM C201e.
- Key in ON position.
- **Do the windshield wipers move at a slow rate?**
Yes : REPAIR the circuit. TEST the system for normal operation.
No : Go to B10.

B10 CHECK FOR CORRECT GEM OPERATION

- Disconnect all the GEM connectors.
- Check for:
 - Corrosion
 - Pushed-out pins
- Connect all the GEM connectors and make sure they seat correctly.
- Operate the system and verify the concern is still present.
- **Is the concern still present?**
Yes : INSTALL a new GEM. Refer to **MULTIFUNCTION ELECTRONIC MODULES** . TEST the system for normal operation.
No : The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.

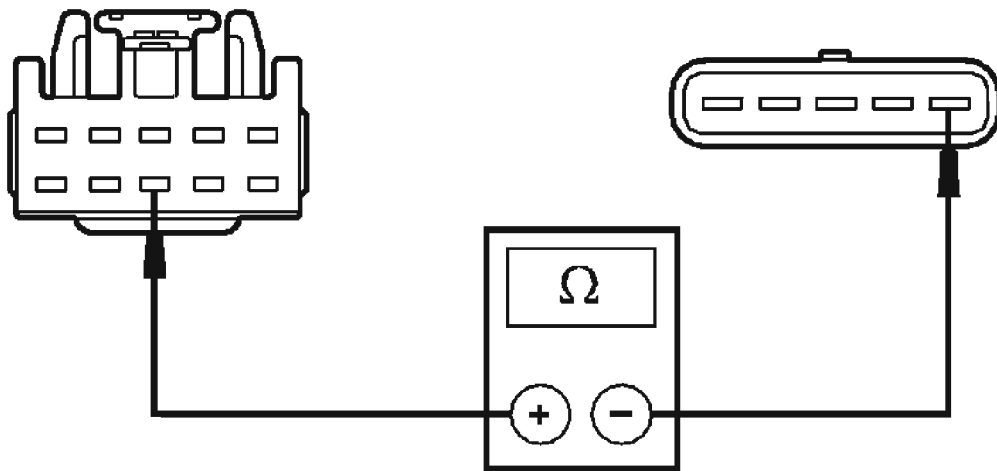
MODE OK)

C1 CHECK THE FRONT WIPER SWITCH

- Key in OFF position.
- Disconnect: Wiper/Washer Switch C2081.
- Check the windshield wiper switch for correct operation. Refer to **COMPONENT TESTS**.
- **Did the switch pass the component test?**
Yes : Go to C2.
No : INSTALL a new wiper/washer switch. TEST the system for normal operation.

C2 CHECK CIRCUIT 32-KA11 (WH/BK) FOR AN OPEN

- Disconnect: Windshield Wiper Motor C125.
- Measure the resistance between the wiper/washer switch C2081 pin 8, circuit 32-KA11 (WH/BK), harness side and windshield wiper motor C125 pin 1, circuit 32-KA11 (WH/BK), wiring harness side.



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Fig. 9: Checking Circuit 32-KA11 (WH/BK) For An Open
Courtesy of FORD MOTOR CO.

- **Is the resistance less than 5 ohms?**
Yes : INSTALL a new windshield wiper motor. Refer to **WINDSHIELD WIPER MOTOR**. TEST the system for normal operation.
No : REPAIR the circuit. TEST the system for normal operation.

PINPOINT TEST D: THE WASH AND WIPE FUNCTION IS INOPERATIVE

D1 CHECK FOR CORRECT WIPER OPERATION

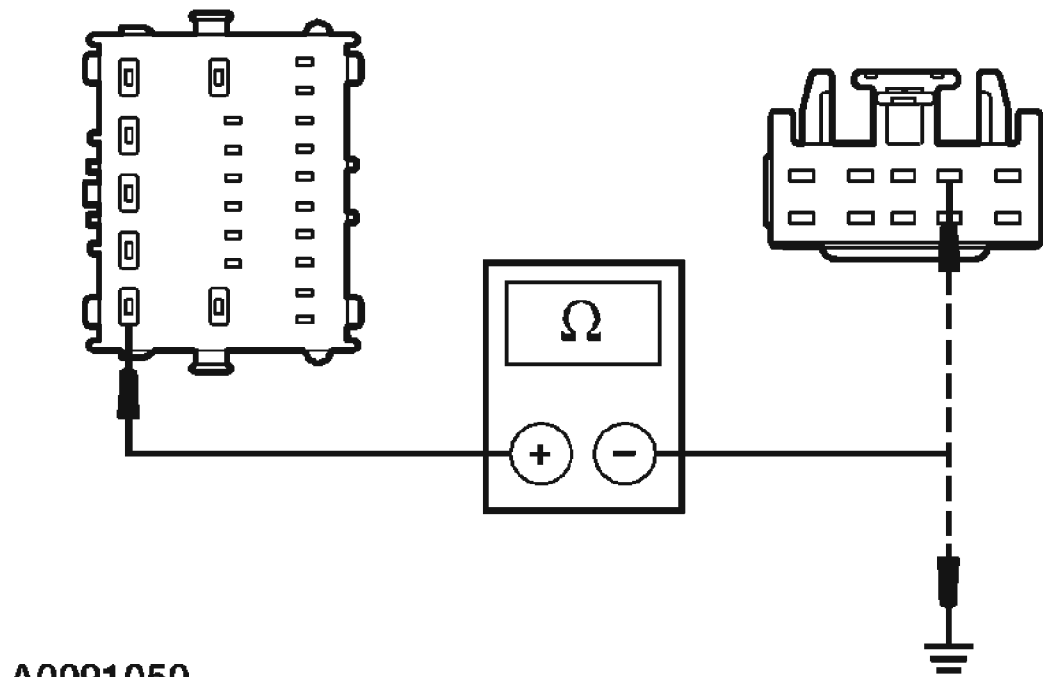
- Key in ON position.
- Turn the wiper/washer switch to the wash and wipe function.
- **Do the wipers operate correctly?**
Yes : Go to **PINPOINT TEST I** to diagnose the washer pump.
No : Go to D2.

D2 CHECK THE INTERMITTENT WIPER MODE

- Turn the wiper/washer switch to the intermittent wiper function.
- **Do the wiper operate correctly in the intermittent mode?**
Yes : Go to D3.
No : Go to **PINPOINT TEST H** to diagnose the intermittent wiper mode.

D3 CHECK CIRCUIT 32-KA6 (WH/VT) FOR AN OPEN OR SHORT TO GROUND

- Key in OFF position.
- Disconnect: Wiper/Washer Switch C2081.
- Disconnect: GEM C201d.
- Measure the resistance between the GEM C201d pin 5, 32-KA6 (WH/VT), harness side and the wiper/washer switch C2081 pin 2, circuit 32-KA6 (WH/VT), harness side; and between the GEM C201d pin 5, 32-KA6 (WH/VT), harness side and ground.



A0091050

Fig. 10: Checking Circuit 32-KA6 (WH/VT) For An Open Or Short To Ground

Courtesy of FORD MOTOR CO.

- Is the resistance less than 5 ohms between the GEM and wiper/washer switch; and greater than 10,000 ohms between the GEM and ground?

Yes : Go to D4.

No : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

D4 CHECK FOR CORRECT GEM OPERATION

- Disconnect all the GEM connectors.
- Check for:
 - Corrosion
 - Pushed-out pins
- Connect all the GEM connectors and make sure they seat correctly.
- Operate the system and verify the concern is still present.
- **Is the concern still present?**

Yes : INSTALL a new GEM. Refer to **MULTIFUNCTION ELECTRONIC MODULES** . TEST the system for normal operation.

No : The system is operating correctly at this time. The concern may have been

caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.

PINPOINT TEST E: THE REAR WINDOW WIPER STAYS ON CONTINUOUSLY**E1 CHECK THE REAR WIPER MOTOR**

- Key in OFF position.
- Disconnect: Rear Wiper Relay C2020.
- Key in ON position.
- **Does the rear wiper operate?**

Yes : CARRY OUT the rear wiper motor component test. Refer to the **COMPONENT TESTS**. If necessary, INSTALL a new rear wiper motor. Refer to **REAR WINDOW WIPER MOTOR**. TEST the system for normal operation.

No : Go to E2.

E2 CHECK THE REAR WIPER RELAY

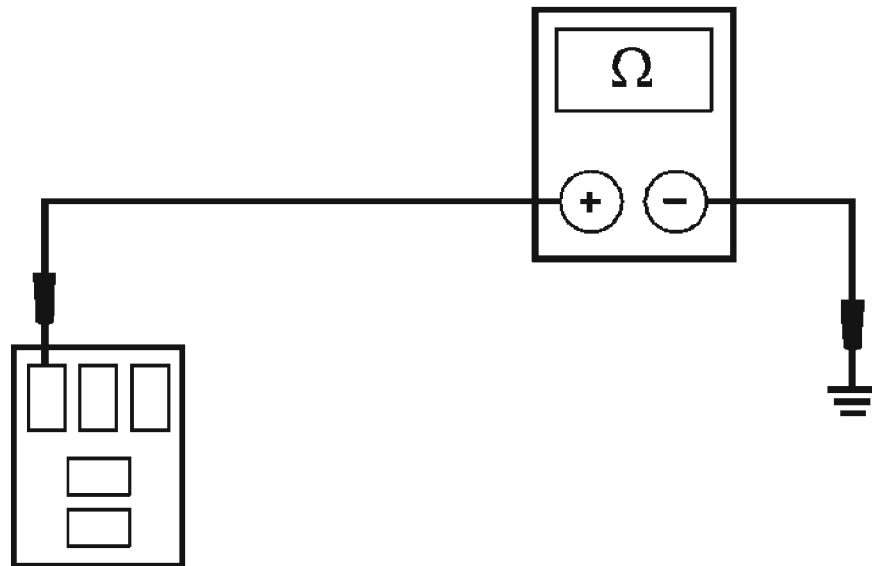
- Carry out the rear wiper relay component test. Refer to **COMPONENT TESTS**.
- **Did the relay pass the component test?**

Yes : Go to E3.

No : INSTALL a new rear wiper relay. TEST the system for normal operation.

E3 CHECK CIRCUIT 91S-KA29 (BK/YE) FOR A SHORT TO GROUND

- Key in OFF position.
- Disconnect: GEM C201e.
- Measure the resistance between the CJB rear wiper relay C2020 pin 2, component side and ground.



A0071417

Fig. 11: Measuring Resistance Between CJB Rear Wiper Relay C2020 Pin 2, Component Side And Ground
Courtesy of FORD MOTOR CO.

- **Is the resistance greater than 10,000 ohms?**
Yes : Go to E5.
No : Go to E4.

E4 CHECK THE CJB FOR A SHORT TO GROUND

- Disconnect: CJB C270b.
- Measure the resistance between the CJB rear wiper relay C2020 pin 2, component side and ground.

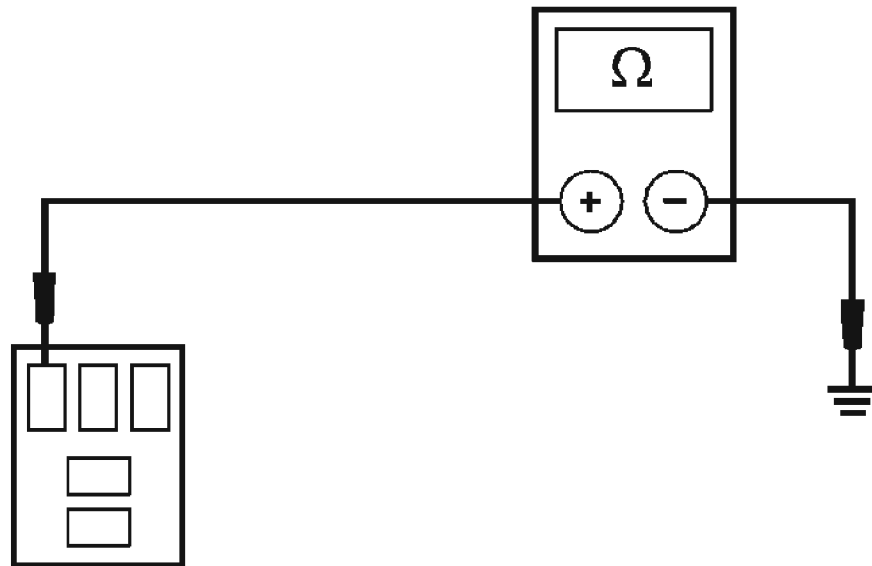
**A0071417**

Fig. 12: Measuring Resistance Between CJB Rear Wiper Relay C2020 Pin 2, Component Side And Ground
Courtesy of FORD MOTOR CO.

- **Is the resistance greater than 10,000 ohms?**
Yes : REPAIR the circuit. TEST the system for normal operation.
No : INSTALL a new CJB. TEST the system for normal operation.

E5 CHECK THE WIPER/WASHER SWITCH

- Disconnect: Wiper/Washer Switch C2081.
- Carry out the wiper/washer switch component test. Refer to **COMPONENT TESTS**.
- **Did the wiper/washer switch pass the component test?**
Yes : Go to E6.
No : INSTALL a new wiper/washer switch. TEST the system for normal operation.

E6 CHECK FOR CORRECT GEM OPERATION

- Disconnect all the GEM connectors.
- Check for:
 - Corrosion
 - Pushed-out pins

- Connect all the GEM connectors and make sure they seat correctly.
- Operate the system and verify the concern is still present.
- **Is the concern still present?**

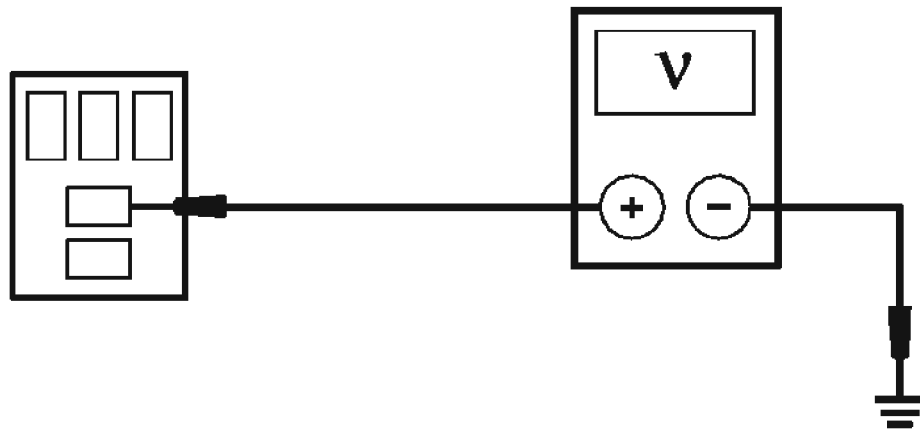
Yes : INSTALL a new GEM. Refer to **MULTIFUNCTION ELECTRONIC MODULES** . TEST the system for normal operation.

No : The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.

PINPOINT TEST F: THE REAR WINDOW WIPER IS INOPERATIVE

F1 CHECK THE VOLTAGE TO THE REAR WINDOW WIPER MOTOR RELAY

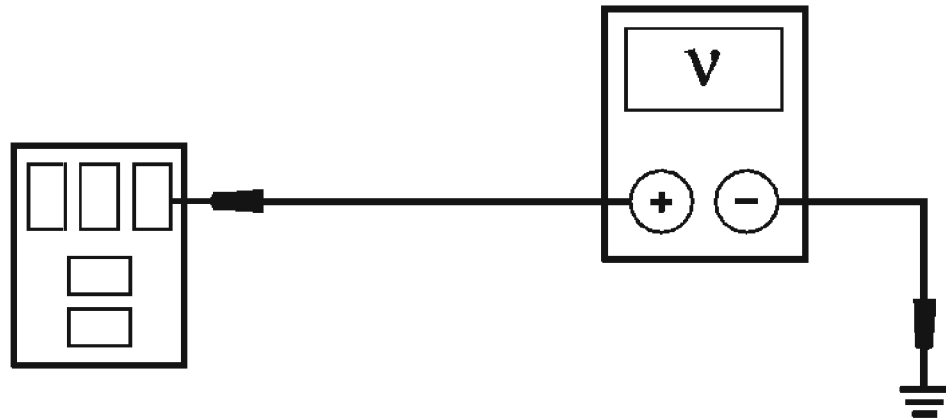
- Key in OFF position.
- Disconnect: Rear Wiper Relay.
- Key in ON position.
- Measure the voltage between the rear wiper relay pin 5 and ground.



A0071418

Fig. 13: Measuring Voltage Between Rear Wiper Relay Pin 5 And Ground
Courtesy of FORD MOTOR CO.

- Measure the voltage between the rear window wiper motor relay pin 1, and ground.



A0071419

Fig. 14: Measuring Voltage Between Rear Window Wiper Motor Relay Pin 1, And Ground

Courtesy of FORD MOTOR CO.

- **Are the voltages greater than 10 volts?**

Yes : Go to F2.

No : INSTALL a new CJB. TEST the system for normal operation.

F2 CHECK CIRCUIT 31-DA1 (BK) FOR AN OPEN

- Key in OFF position.
- Measure the resistance between the rear wiper relay C2020 pin 4, circuit 31-DA1 (BK), and ground.

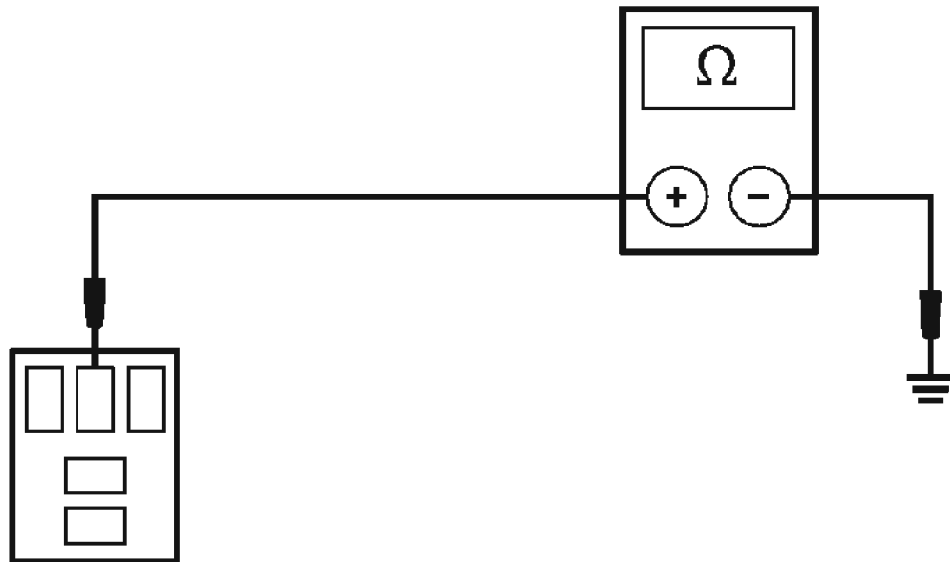
**A0071420**

Fig. 15: Measuring Resistance Between Rear Wiper Relay C2020 Pin 4, Circuit 31-DA1 (BK), And Ground
Courtesy of FORD MOTOR CO.

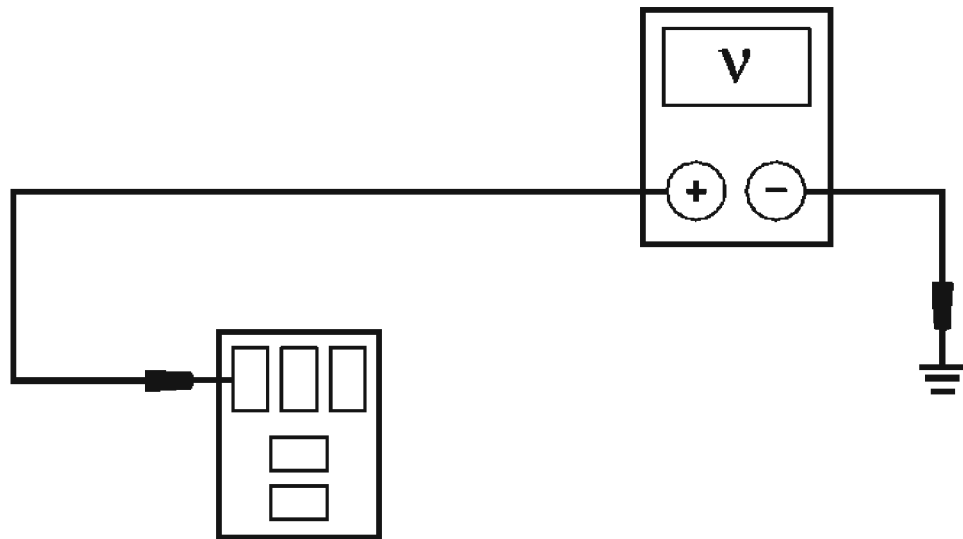
- Is the resistance less than 5 ohms?

Yes : Go to F3.

No : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

F3 CHECK CIRCUIT 91S-KA29 (BK/YE) FOR A SHORT TO VOLTAGE

- Key in ON position.
- Measure the voltage between the rear wiper relay C2020 pin 2, circuit 91S-KA29 (BK/YE), harness side and ground.



A0091053

Fig. 16: Measuring Voltage Between Rear Wiper Relay C2020 Pin 2, Circuit 91S-KA29 (BK/YE), Harness Side And Ground
Courtesy of FORD MOTOR CO.

- **Is the voltage greater than 10 volts?**

Yes : Go to F4.

No : Go to F6.

F4 ISOLATE THE GEM FROM CIRCUIT 91S-KA29 (BK/YE) AND CHECK FOR A SHORT TO VOLTAGE

- Key in OFF position.
- Disconnect: GEM C201e.
- Key in ON position.
- Measure the voltage between the rear wiper relay C2020 pin 2, circuit 91S-KA29 (BK/YE), harness side and ground.

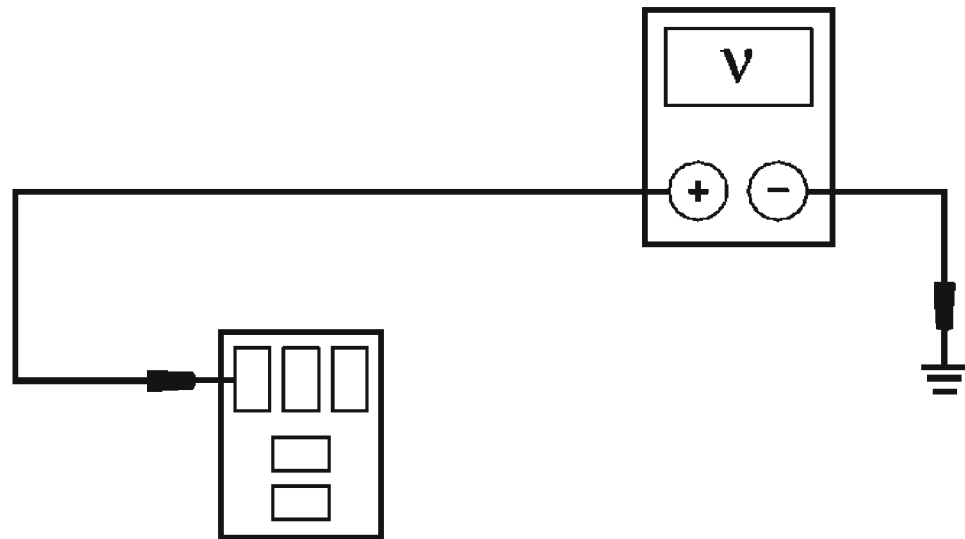
**A0091053**

Fig. 17: Measuring Voltage Between Rear Wiper Relay C2020 Pin 2, Circuit 91S-KA29 (BK/YE), Harness Side And Ground
Courtesy of FORD MOTOR CO.

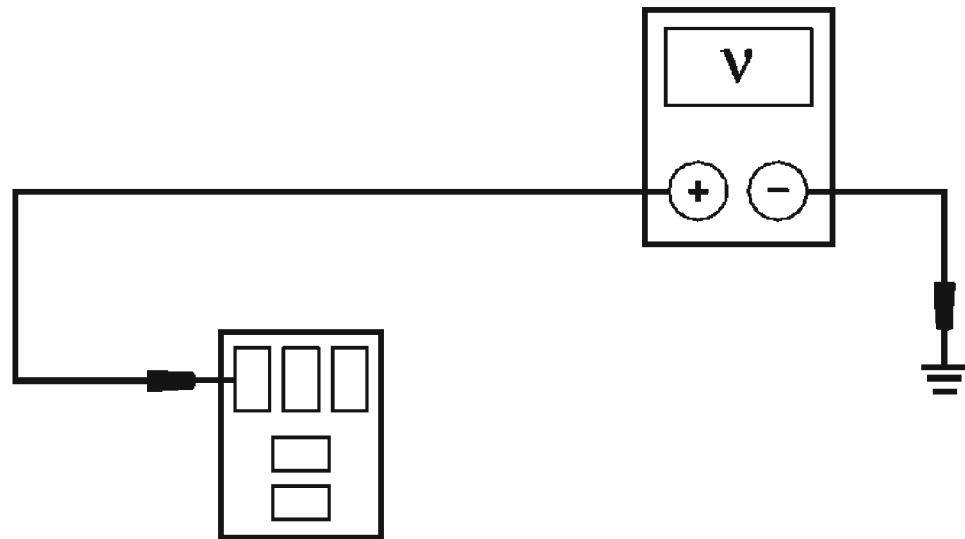
- **Is the voltage greater than 10 volts?**

Yes : Go to F5.

No : Go to F17.

F5 ISOLATE THE CJB FROM CIRCUIT 91S-KA29 (BK/YE) AND CHECK FOR A SHORT TO VOLTAGE

- Disconnect: CJB C270b.
- Key in ON position.
- Measure the voltage between the rear wiper relay C2020 pin 2, circuit 91S-KA29 (BK/YE), harness side and ground.



A0091053

Fig. 18: Measuring Voltage Between Rear Wiper Relay C2020 Pin 2, Circuit 91S-KA29 (BK/YE), Harness Side And Ground
Courtesy of FORD MOTOR CO.

- **Is the voltage greater than 10 volts?**

Yes : INSTALL a new CJB. CLEAR the DTCs. TEST the system for normal operation.

No : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

F6 CHECK CIRCUIT 91S-KA29 (BK/YE) FOR GROUND

- Turn the wiper/washer switch to the ON position for the rear wiper and measure the resistance between the rear wiper relay C2020 pin 2, circuit 91S-KA29 (BK/YE), and ground.

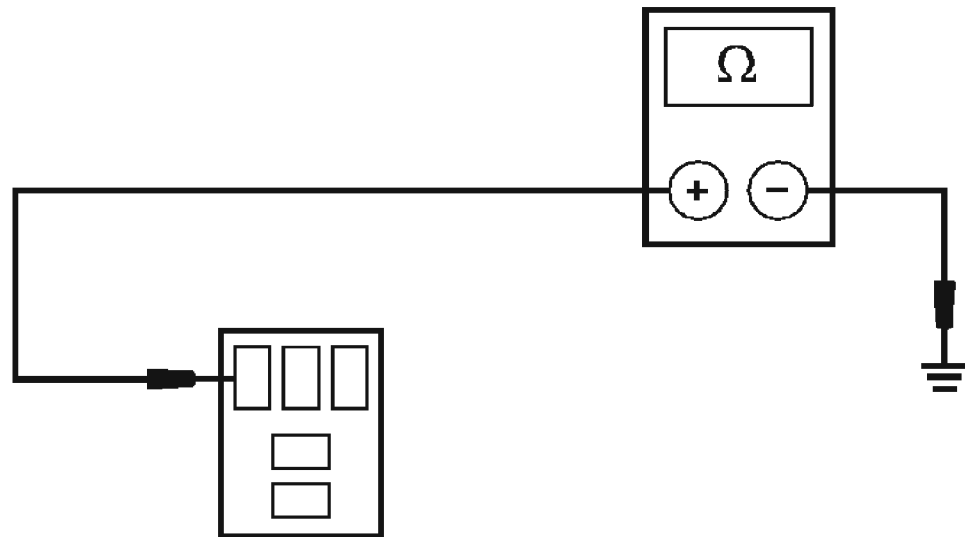
**A0071421**

Fig. 19: Measuring Resistance Between Rear Wiper Relay C2020 Pin 2, Circuit 91S-KA29 (BK/YE), And Ground
Courtesy of FORD MOTOR CO.

- Is the resistance less than 5 ohms?

Yes : Go to F7.

No : Go to F10.

F7 CHECK THE REAR WINDOW WIPER MOTOR RELAY

- Key in OFF position.
- Carry out the rear wiper relay component test. Refer to **COMPONENT TESTS**.
- **Did the rear wiper relay pass the component test?**

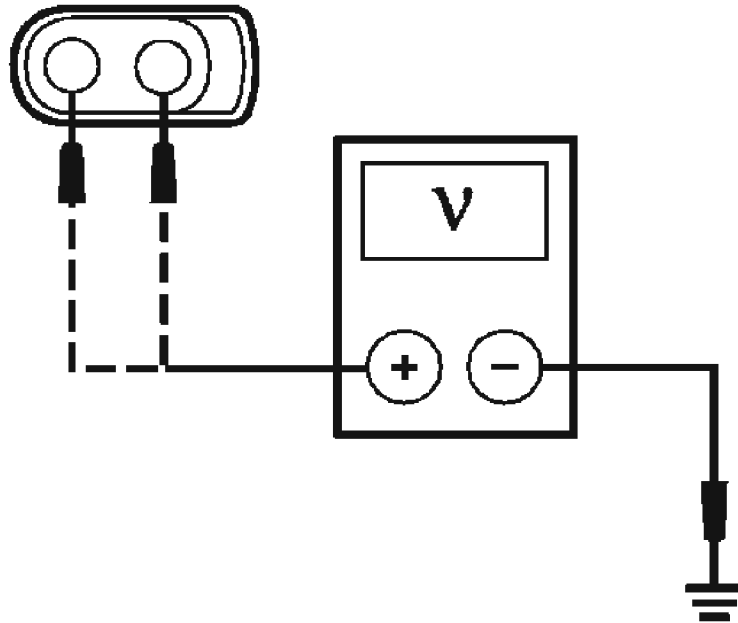
Yes : Go to F8.

No : INSTALL a new rear wiper relay. CLEAR the DTCs. TEST the system for normal operation.

F8 CHECK CIRCUIT 32-KA28 (WH/RD) AND 15-KA28 (GN/BU) FOR VOLTAGE

- Disconnect: Rear Window Wiper Motor C4218.
- Connect: Rear Wiper Relay C2020.
- Key in ON position.
- Turn the wiper/washer switch to the ON position for the rear wiper and measure the voltage between the rear wiper motor C4218 pin 2, circuit 32-KA28 (WH/RD), harness side and ground, and between the rear wiper motor C4218 pin

1, circuit 15-KA28 (GN/BU), harness side and ground.



A0091051

Fig. 20: Measuring Voltage Between Rear Wiper Motor C4218 Pin 2, Circuit 32-KA28 (WH/RD), Harness Side And Ground
Courtesy of FORD MOTOR CO.

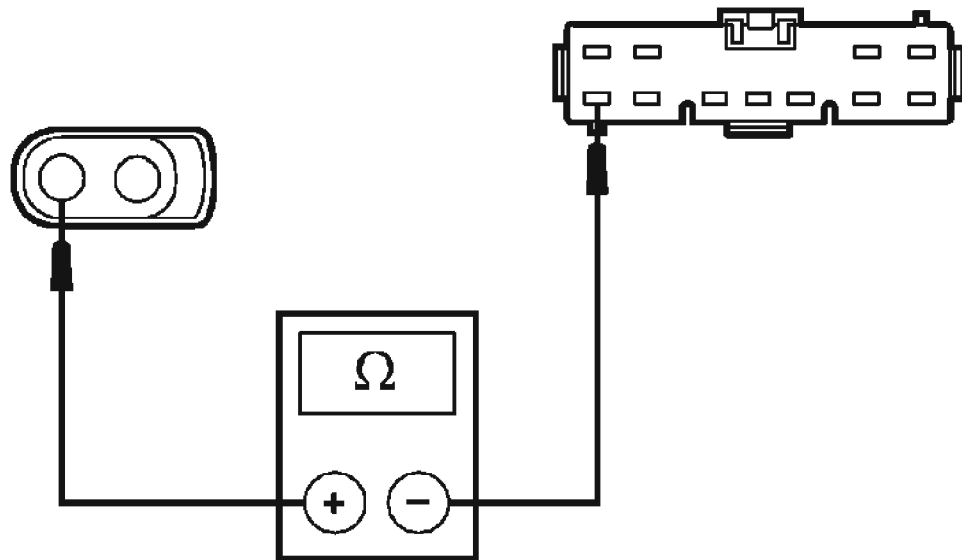
- **Are the voltages greater than 10 volts?**

Yes : INSTALL a new rear wiper motor. Refer to **REAR WINDOW WIPER MOTOR**. CLEAR the DTCs. TEST the system for normal operation.

No : Go to F9.

F9 CHECK CIRCUIT 32-KA28 (WH/RD) AND 15-KA28 (GN/BU) FOR AN OPEN

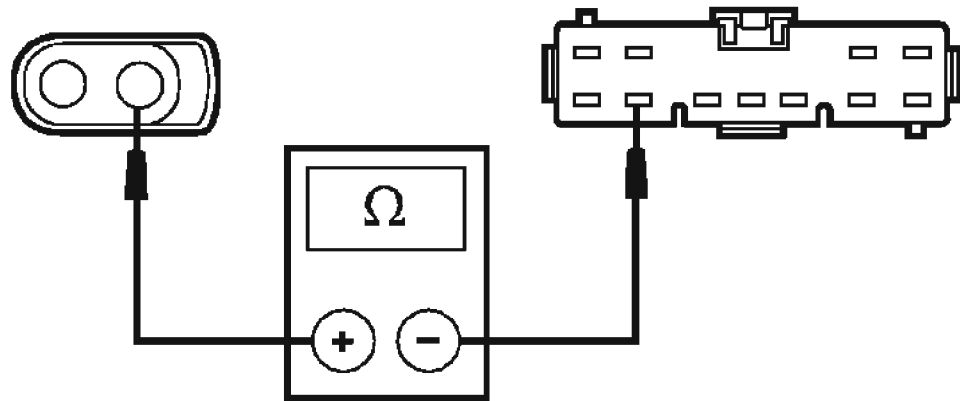
- Key in OFF position.
- Disconnect: CJB C270c.
- Disconnect: CJB C270f.
- Measure the resistance between the rear wiper motor C4218 pin 2, circuit 32-KA28 (WH/RD), harness side and the CJB C270c pin 11, circuit 32-KA28 (WH/RD) harness side.



A0070998

Fig. 21: Measuring Resistance Between Rear Wiper Motor C4218 Pin 2, Circuit 32-KA28 (WH/RD), Harness Side And CJB C270c Pin 11, Circuit 32-KA28 (WH/RD) Harness Side
Courtesy of FORD MOTOR CO.

- Measure the resistance between the rear wiper motor C4218 pin 1, circuit 15-KA28 (GN/BU), harness side and the CJB C270f pin 10, circuit 15-KA28 (GN/BU), harness side.



A0091052

Fig. 22: Checking Circuit 32-KA28 (WH/RD) And 15-KA28 (GN/BU) For An Open

Courtesy of FORD MOTOR CO.

- **Are the resistances less than 5 ohms?**

Yes : INSTALL a new CJB. CLEAR the DTCs. TEST the system for normal operation.

No : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

F10 CHECK CIRCUIT 91S-KA29 (BK/YE) FOR AN OPEN

- Disconnect: GEM C201e.
- Measure the resistance between the rear wiper relay pin 2, harness side and the GEM C201e pin 17, circuit 91S-KA29 (BK/YE), harness side.

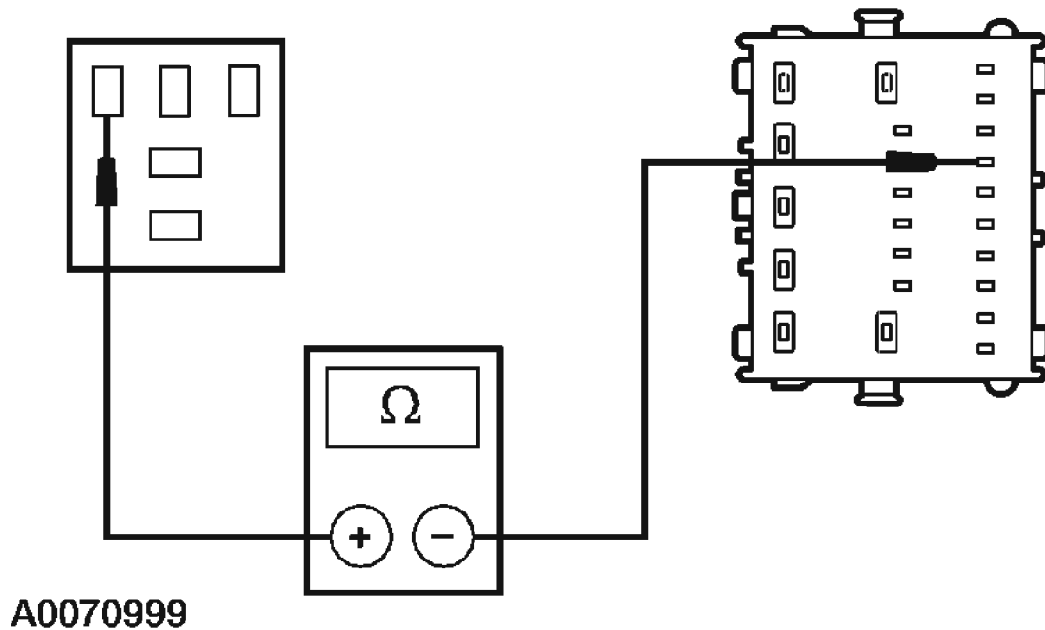


Fig. 23: Measuring Resistance Between Rear Wiper Relay Pin 2, Harness Side And GEM C201e Pin 17, Circuit 91S-KA29 (BK/YE), Harness Side
 Courtesy of FORD MOTOR CO.

- Is the resistance less than 5 ohms?

Yes : Go to F12.

No : Go to F11.

F11 CHECK THE CJB

- Disconnect: CJB C270b.
- Measure the resistance between the CJB C270b pin 2, circuit 91S-KA29 (BK/YE), harness side and the GEM C201e pin 17, circuit 91S-KA29 (BK/YE), harness side.

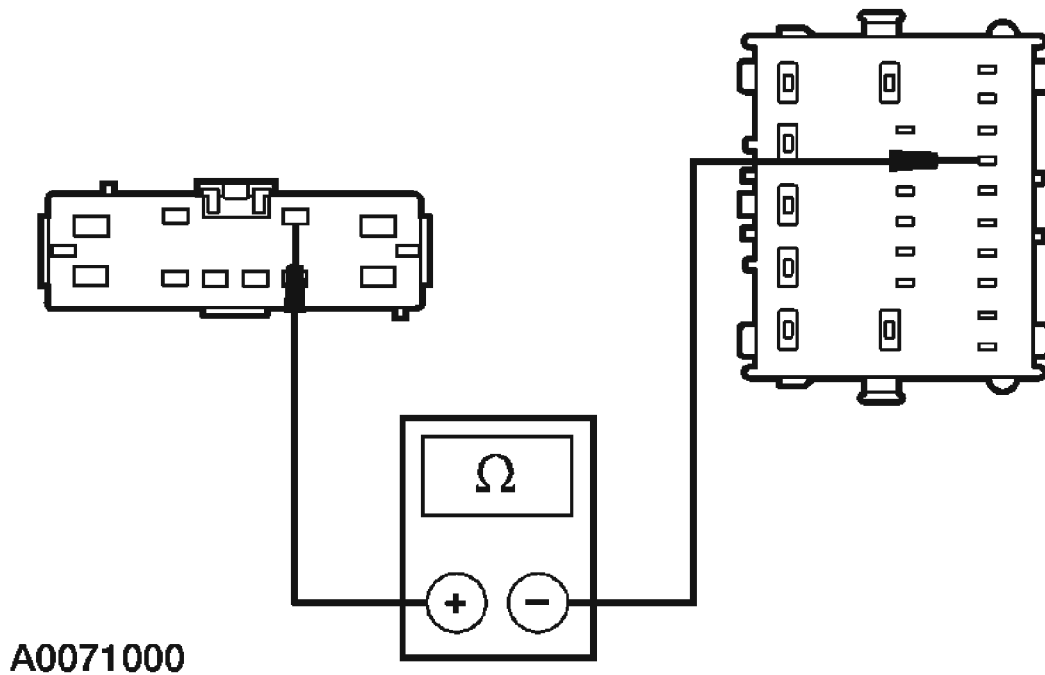


Fig. 24: Measuring Resistance Between CJB C270b Pin 2, Circuit 91S-KA29 (BK/YE), Harness Side And GEM C201e Pin 17, Circuit 91S-KA29 (BK/YE), Harness Side

Courtesy of FORD MOTOR CO.

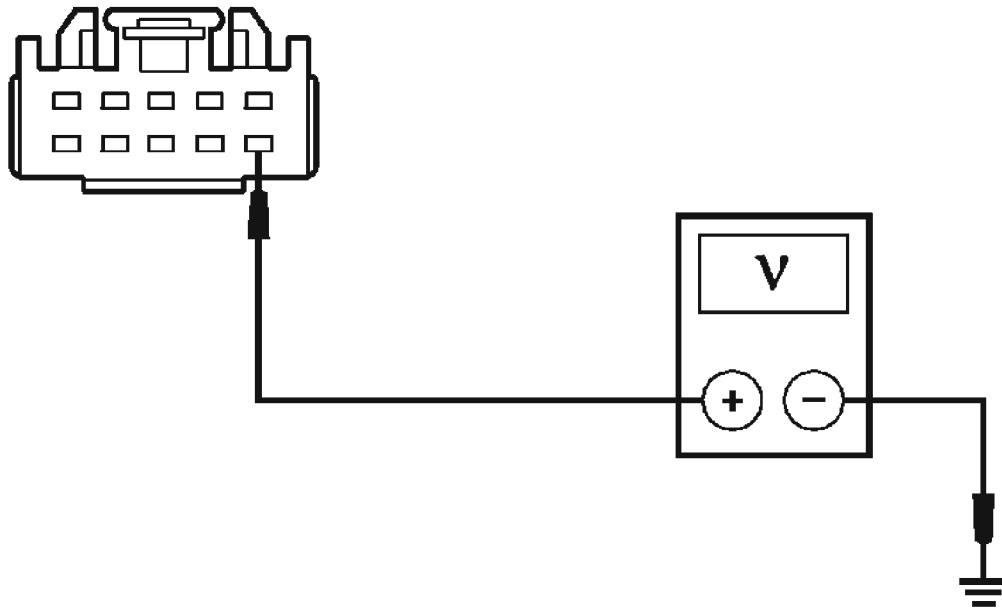
- **Is the resistance less than 5 ohms?**

Yes : INSTALL a new CJB. CLEAR the DTCs. TEST the system for normal operation.

No : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

F12 CHECK CIRCUIT 15-KA19 (GN/OG) FOR VOLTAGE

- Key in OFF position.
- Disconnect: Wiper/Washer Switch C2081.
- Key in ON position.
- Measure the voltage between the wiper/washer switch C2081 pin 6, circuit 15-KA19 (GN/OG), harness side and ground.



A0071425

Fig. 25: Measuring Voltage Between Wiper/Washer Switch C2081 Pin 6, Circuit 15-KA19 (GN/OG), Harness Side And Ground
 Courtesy of FORD MOTOR CO.

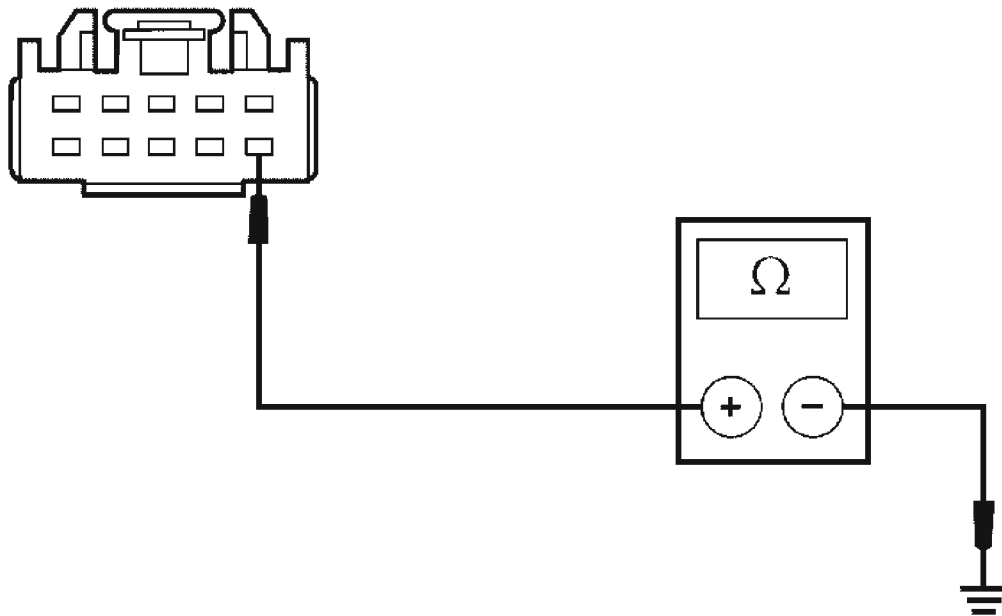
- Is the voltage greater than 10 volts?

Yes : Go to F14.

No : Go to F13.

F13 CHECK CIRCUIT 15-KA19 (GN/OG) FOR AN OPEN

- Key in OFF position.
- Disconnect: CJB C270f.
- Measure the resistance between the wiper/washer switch C2081 pin 6, circuit 15-KA19 (GN/OG), harness side and the CJB C270f pin 5, circuit 15-KA19 (GN/OG).



A0093370

Fig. 26: Checking Circuit 15-KA19 (GN/OG) For An Open
Courtesy of FORD MOTOR CO.

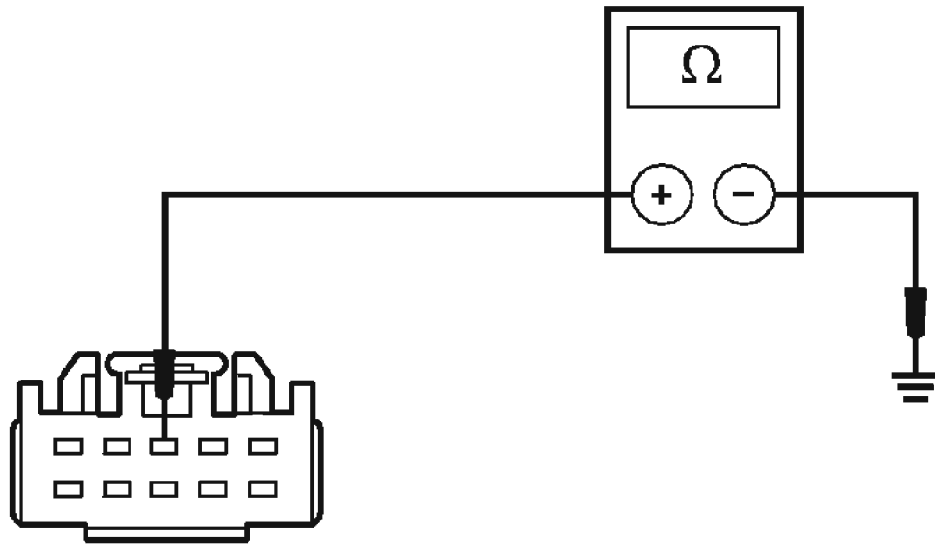
- **Is the resistance less than 5 ohms?**

Yes : INSTALL a new CJB. CLEAR the DTCs. TEST the system for normal operation.

No : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

F14 CHECK CIRCUIT 31-KA19 (BK) FOR GROUND

- Key in OFF position.
- Measure the resistance between the wiper/washer switch C2081 pin 3, circuit 31-KA19 (BK), harness side and ground.



A0071422

Fig. 27: Measuring Resistance Between Wiper/Washer Switch C2081 Pin 3, Circuit 31-KA19 (BK), Harness Side And Ground
Courtesy of FORD MOTOR CO.

- Is the resistance less than 5 ohms?

Yes : Go to F15.

No : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

F15 CHECK CIRCUIT 32-KA35 (WH/RD) FOR AN OPEN

- Measure the resistance between the wiper/washer switch C2081 pin 5, circuit 32-KA35 (WH/RD), harness side and the GEM C201e pin 3, circuit 32-KA35 (WH/RD), harness side.

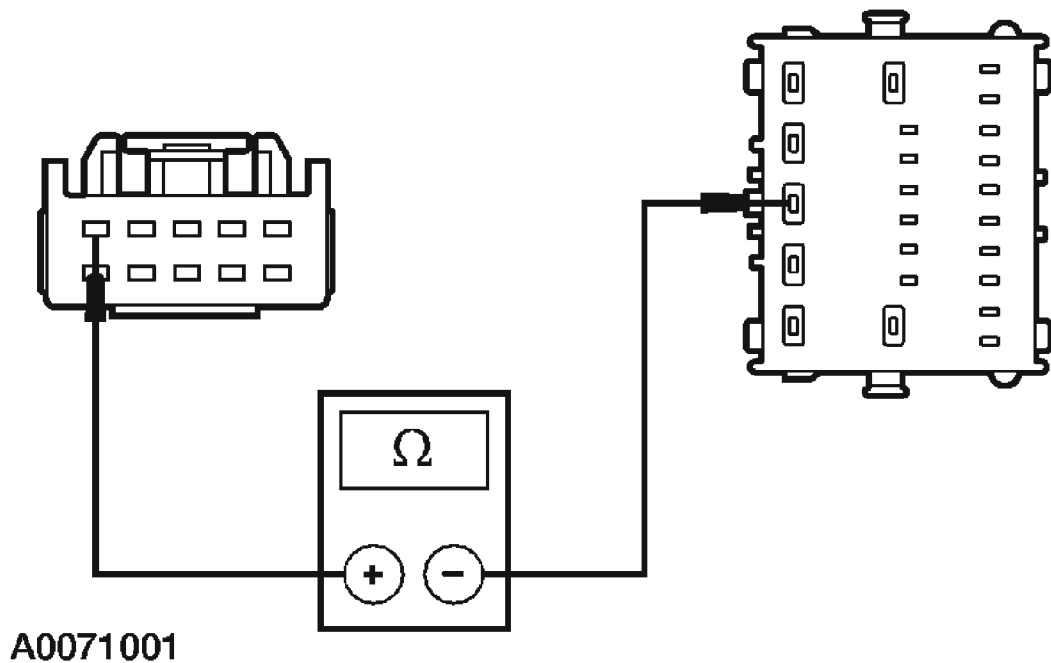


Fig. 28: Checking Circuit 32-KA35 (WH/RD) For An Open
Courtesy of FORD MOTOR CO.

- **Is the resistance less than 5 ohms?**

Yes : Go to F16.

No : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

F16 CHECK THE MULTIFUNCTION SWITCH

- Carry out the wiper/washer switch component test. Refer to **COMPONENT TESTS**.
- **Did the wiper/washer switch pass the component test?**

Yes : Go to F17.

No : INSTALL a new wiper/washer switch. CLEAR the DTCs. TEST the system for normal operation.

F17 CHECK FOR CORRECT GEM OPERATION

- Disconnect all the GEM connectors.
- Check for:
 - Corrosion
 - Pushed-out pins
- Connect all the GEM connectors and make sure they seat correctly.
- Operate the system and verify the concern is still present.

- **Is the concern still present?**

Yes : INSTALL a new GEM. Refer to **MULTIFUNCTION ELECTRONIC MODULES** . TEST the system for normal operation.

No : The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.

PINPOINT TEST G: THE WIPERS WILL NOT PARK AT THE CORRECT POSITION

G1 CHECK THE WIPERS FOR CORRECT OPERATION

- Key in ON position.
- **Do the front wipers park in the correct position?**

Yes : Go to G9 to diagnose the rear wipers.

No : Go to G2.

G2 CHECK CIRCUIT 32-KA9A (WH/BU) FOR AN OPEN

- Key in OFF position.
- Disconnect: CJB C270c.
- Disconnect: GEM C201c.
- Measure the resistance between the CJB C270c pin 10, circuit 32-KA9A (WH/BU), harness side and the GEM C201c pin 2, circuit 32-KA9A (WH/BU), harness side.

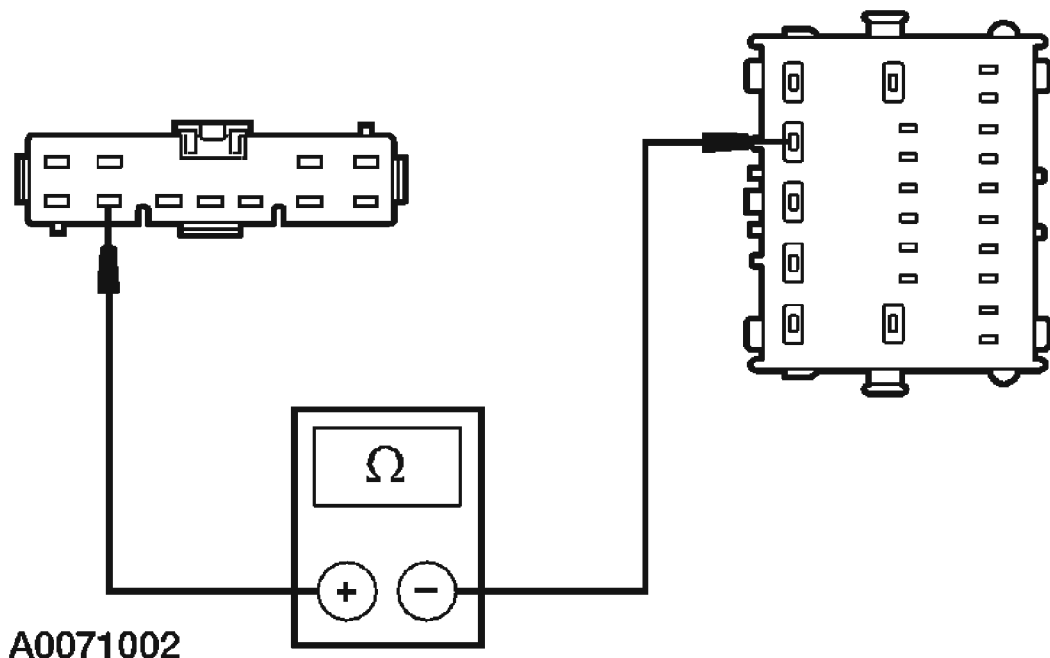


Fig. 29: Checking Circuit 32-KA9A (WH/BU) For An Open
Courtesy of FORD MOTOR CO.

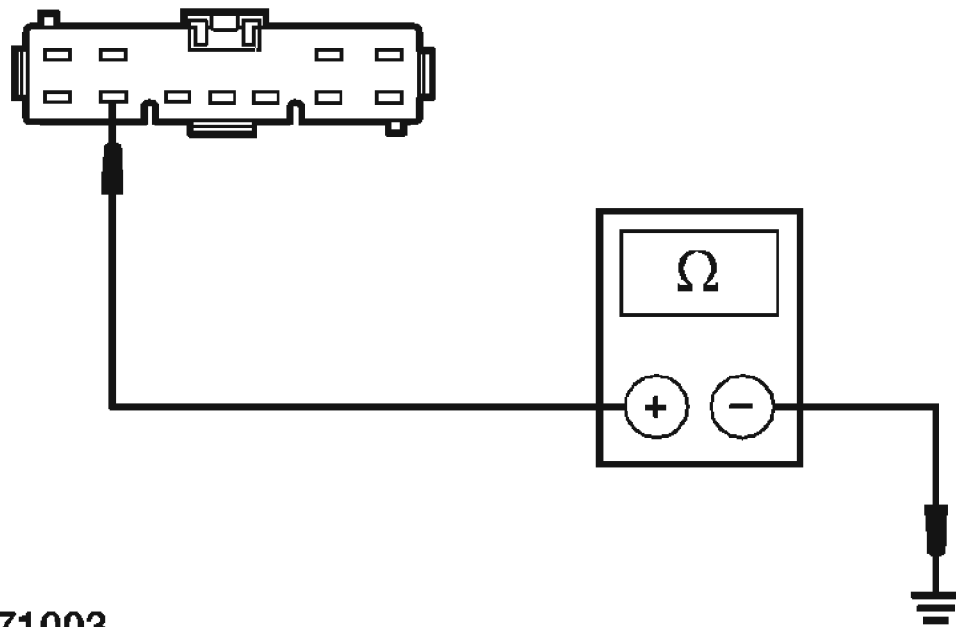
- Is the resistance less than 5 ohms?

Yes : Go to G3.

No : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

G3 CHECK CIRCUIT 32-KA9A (WH/BU) FOR A SHORT TO GROUND

- Disconnect: Windshield Wiper Motor C125.
- Measure the resistance between the CJB C270c pin 10, circuit 32-KA9A (WH/BU), harness side and ground.



A0071003

Fig. 30: Measuring Resistance Between CJB C270c Pin 10, Circuit 32-KA9A (WH/BU), Harness Side And Ground
Courtesy of FORD MOTOR CO.

- Is the resistance greater than 10,000 ohms?

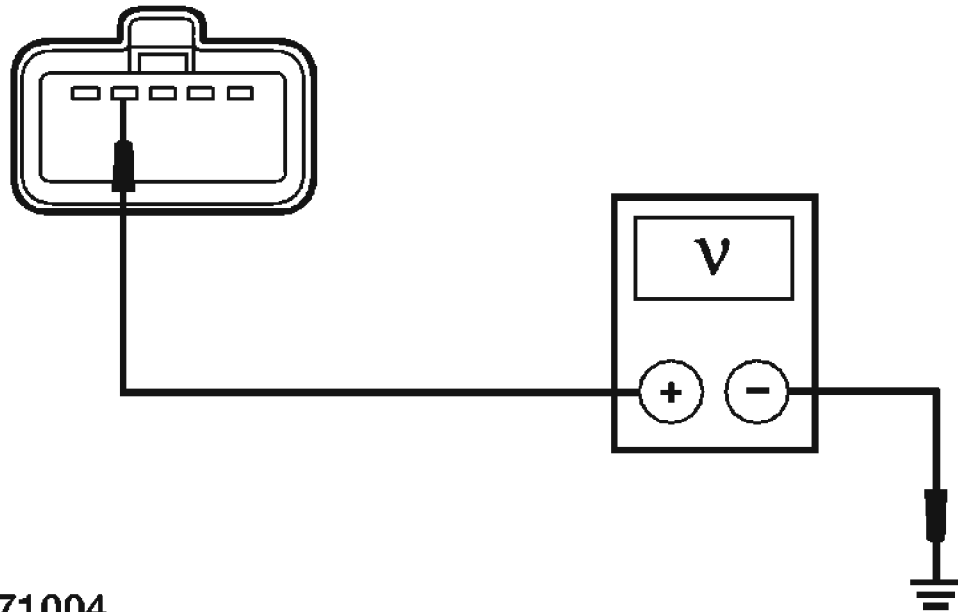
Yes : Go to G4.

No : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

G4 CHECK CIRCUIT 15-KA9 (GN/RD) FOR VOLTAGE

- Key in ON position.

- Measure the voltage between the windshield wiper motor C125 pin 4, circuit 15-KA9 (GN/RD), harness side and ground.



A0071004

Fig. 31: Measuring Voltage Between Windshield Wiper Motor C125 Pin 4, Circuit 15-KA9 (GN/RD), Harness Side And Ground
Courtesy of FORD MOTOR CO.

- Is the voltage greater than 10 volts?

Yes : Go to G5.

No : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

G5 CHECK CIRCUIT 32-KA9 (WH/BU) FOR AN OPEN

- Key in OFF position.
- Measure the resistance between the windshield wiper motor C125 pin 5, circuit 32-KA9 (WH/BU), harness side and the CJB C270c pin 10, circuit 32-KA9 (WH/BU), harness side.

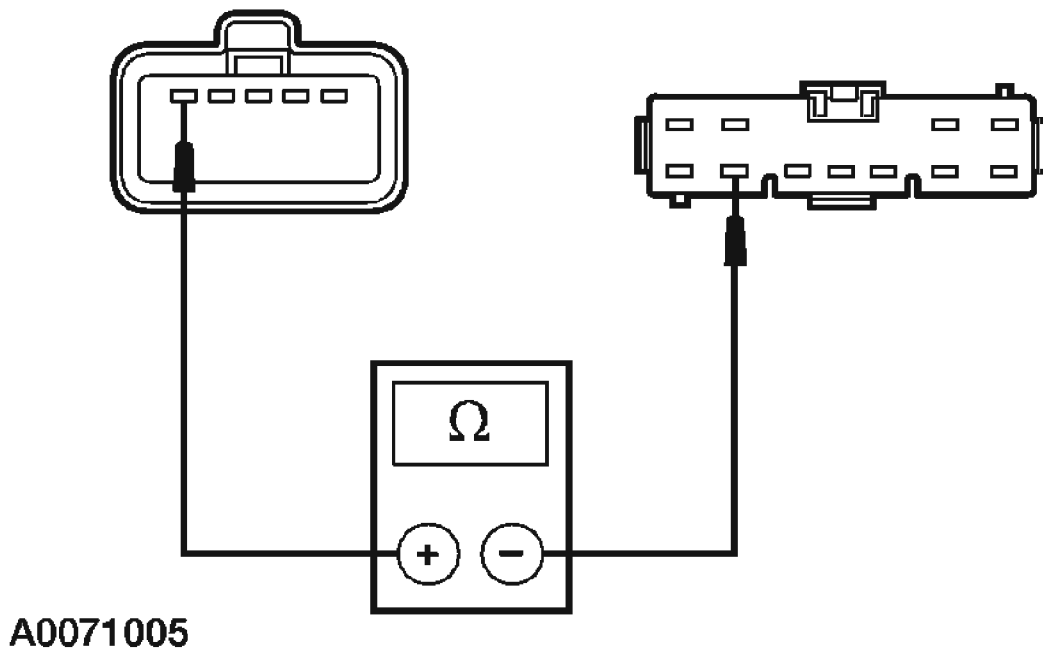


Fig. 32: Checking Circuit 32-KA9 (WH/BU) For An Open
Courtesy of FORD MOTOR CO.

- **Is the resistance less than 5 ohms?**

Yes : Go to G6.

No : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

G6 CHECK THE WINDSHIELD WIPER RELAY

- Disconnect: Windshield Wiper Relay.
- Carry out the windshield wiper relay component test. Refer to **COMPONENT TESTS**.

- **Did the windshield wiper relay pass the component test?**

Yes : Go to G7.

No : INSTALL a new windshield wiper relay. CLEAR the DTCs. TEST the system for normal operation.

G7 CHECK THE CJB

- Measure the resistance between the windshield wiper relay C2042 pin 4, harness side and the CJB C270c pin 10, component side.

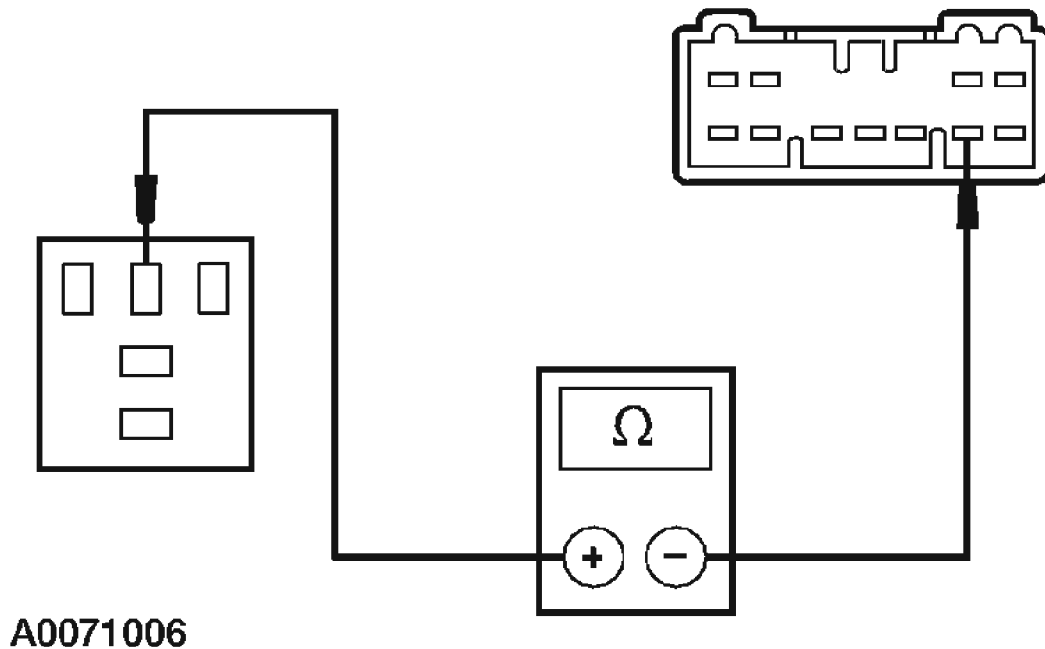


Fig. 33: Measuring Resistance Between Windshield Wiper Relay C2042 Pin 4, Harness Side And CJB C270c Pin 10, Component Side
 Courtesy of FORD MOTOR CO.

- Is the resistance less than 5 ohms?

Yes : Go to G8.

No : INSTALL a new CJB. CLEAR the DTCs. TEST the system for normal operation.

G8 CHECK THE WINDSHIELD WIPER LINKAGE

- Check the windshield wiper linkage for binding or improper adjustment.
- Is the windshield wiper linkage OK?

Yes : INSTALL a new windshield wiper motor. Refer to **WINDSHIELD WIPER MOTOR**. CLEAR the DTCs. TEST the system for normal operation.

No : REPAIR or ADJUST the linkage. CLEAR the DTCs. TEST the system for normal operation.

G9 CHECK THE REAR WIPER ADJUSTMENT

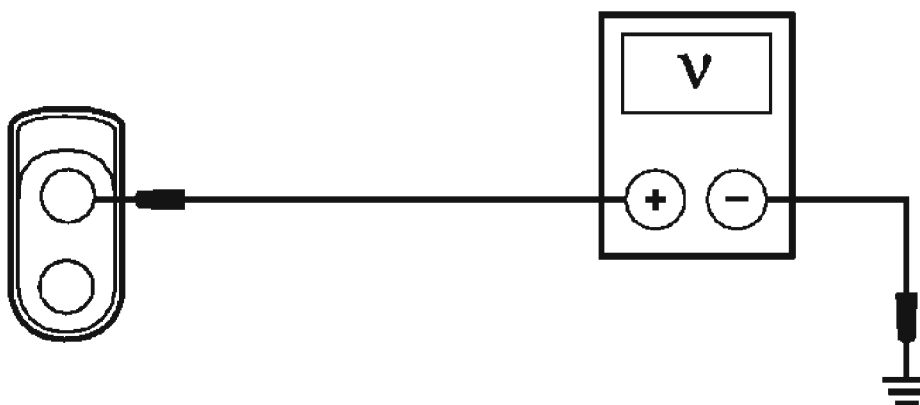
- Check the rear wiper adjustment.
- Does the rear wiper arm always stop at the same place after the rear wiper is turned off?

Yes : ALIGN the wiper arms. CLEAR the DTCs. TEST the system for normal operation.

No : Go to G10.

G10 CHECK THE VOLTAGE SUPPLY AT THE REAR WIPER MOTOR

- Key in OFF position.
- Disconnect: Rear Window Wiper Motor C4218.
- Key in ON position.
- Measure the voltage between the rear window wiper motor C4218 pin 1, circuit 15-KA28 (GN/BU), harness side and ground.



A0071423

Fig. 34: Measuring Voltage Between Rear Window Wiper Motor C4218 Pin 1, Circuit 15-KA28 (GN/BU), Harness Side And Ground
Courtesy of FORD MOTOR CO.

- Is the voltage greater than 10 volts?

Yes : INSTALL a new rear wiper motor. Refer to **REAR WINDOW WIPER MOTOR**. CLEAR the DTCs. TEST the system for normal operation.

No : Go to G11.

G11 CHECK CIRCUIT 15-KA28 (GN/BU) FOR AN OPEN

- Key in OFF position.
- Disconnect: CJB C270f.
- Key in ON position.
- Measure the voltage between the CJB C270f pin 10, circuit 15-KA28 (GN/BU), component side and ground.

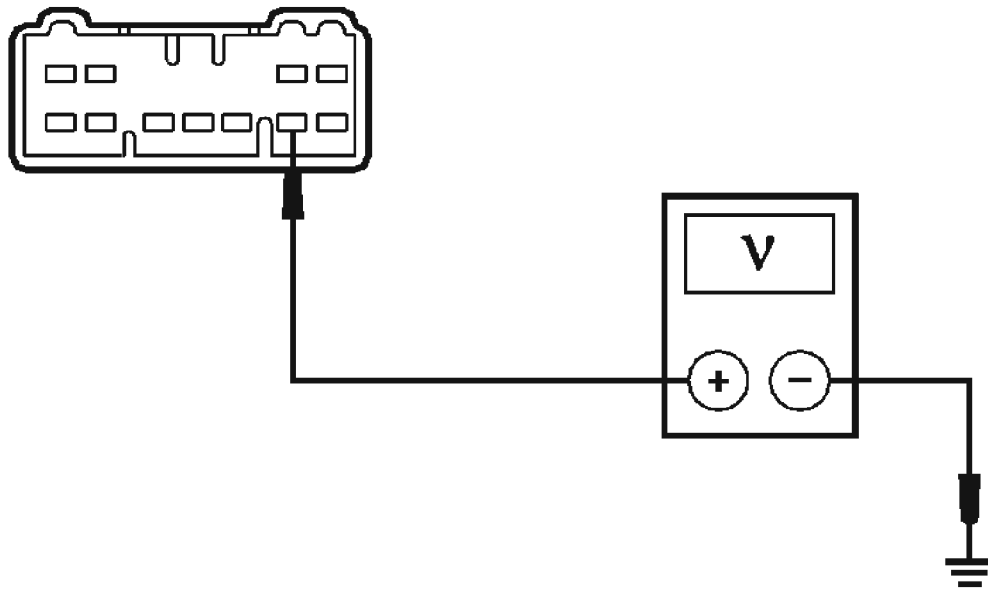
**A0071424**

Fig. 35: Measuring Voltage Between CJB C270f Pin 10, Circuit 15-KA28 (GN/BU), Component Side And Ground
Courtesy of FORD MOTOR CO.

- **Is the voltage greater than 10 volts?**

Yes : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

No : INSTALL a new CJB. CLEAR the DTCs. TEST the system for normal operation.

PINPOINT TEST H: THE INTERMITTENT WIPER SPEED DOES NOT OPERATE CORRECTLY (HIGH/LOW SPEEDS OK)

H1 CHECK THE VOLTAGE TO THE WIPER/WASHER SWITCH

- Key in OFF position.
- Disconnect: Wiper/Washer Switch C2081.
- Key in ON position.
- Measure the voltage between the wiper/washer switch C2081 pin 6, circuit 15-KA19 (GN/OG), harness side and ground.

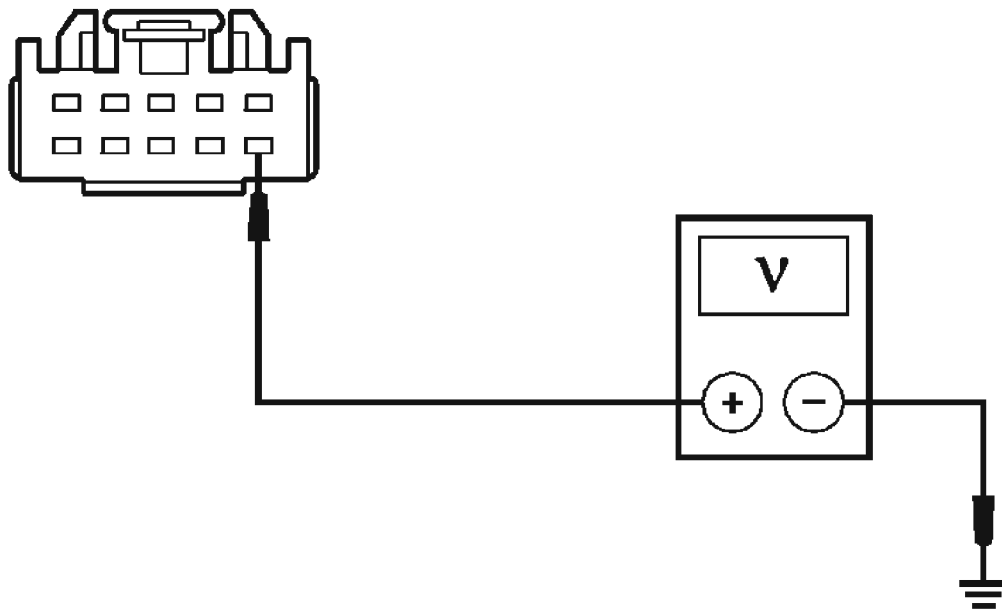
**A0071425**

Fig. 36: Measuring Voltage Between Wiper/Washer Switch C2081 Pin 6, Circuit 15-KA19 (GN/OG), Harness Side And Ground
Courtesy of FORD MOTOR CO.

- Is the voltage greater than 10 volts?

Yes : Go to H2.

No : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

H2 CHECK CIRCUIT 8-KA19 (WH/BK) FOR AN OPEN

- Key in OFF position.
- Disconnect: GEM C201d.
- Measure the resistance between the wiper/washer switch C2081 pin 10, circuit 8-KA19 (WH/BK), harness side and the GEM C201d pin 4, circuit 8-KA19 (WH/BK) harness side.

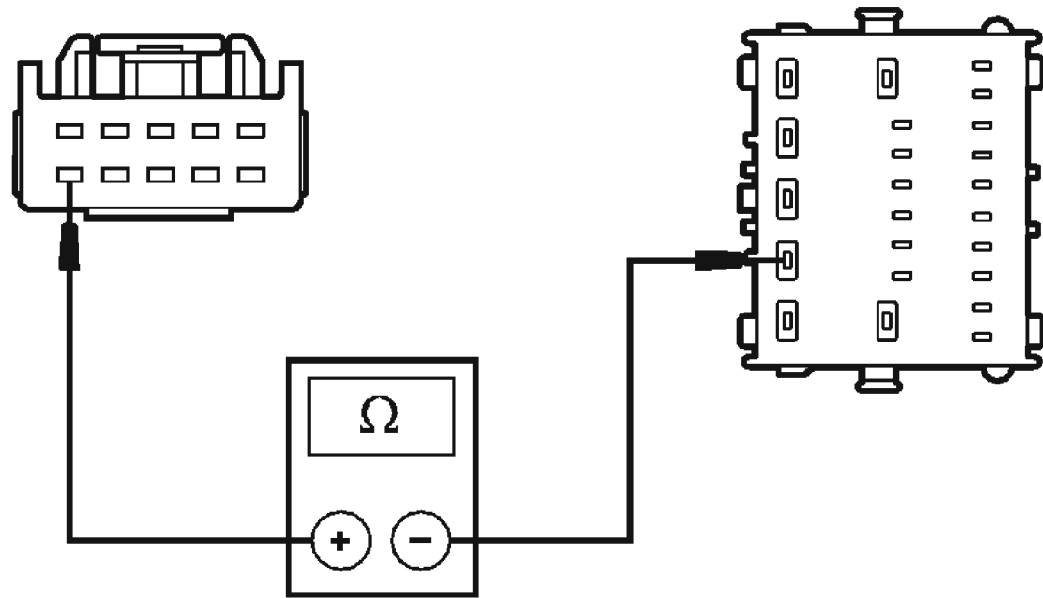
**A0071007**

Fig. 37: Checking Circuit 8-KA19 (WH/BK) For An Open
Courtesy of FORD MOTOR CO.

- **Is the resistance less than 5 ohms?**

Yes : Go to H3.

No : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

H3 CHECK CIRCUITS 8-KA18 (WH) FOR AN OPEN

- Disconnect: GEM C201e.
- Measure the resistance between the wiper/washer switch C2081 pin 1, circuit 8-KA18 (WH), harness side and the GEM C201e pin 4, circuit 8-KA18 (WH), harness side.

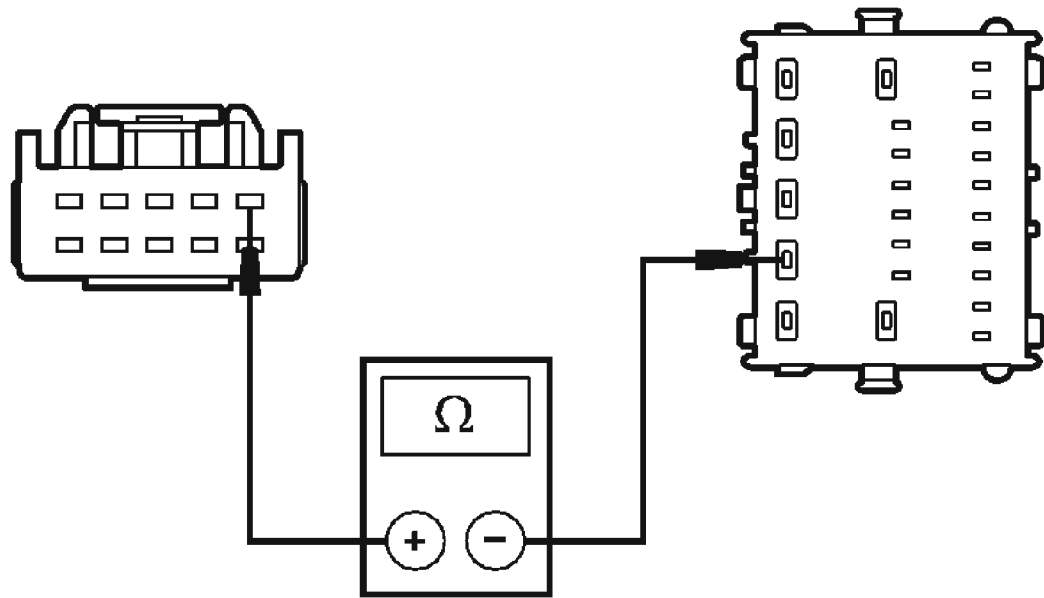
**A0071008**

Fig. 38: Checking Circuits 8-KA18 (WH) For An Open
Courtesy of FORD MOTOR CO.

- **Is the resistance less than 5 ohms?**

Yes : Go to H4.

No : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

H4 CHECK CIRCUIT 32-KA19 (WH/BK) FOR AN OPEN

- Disconnect: CJB C270c.
- Measure the resistance between the wiper/washer switch C2081 pin 7, circuit 32-KA19 (WH/BK), harness side and the CJB C270c pin 3, circuit 32-KA19 (WH/BK) harness side.

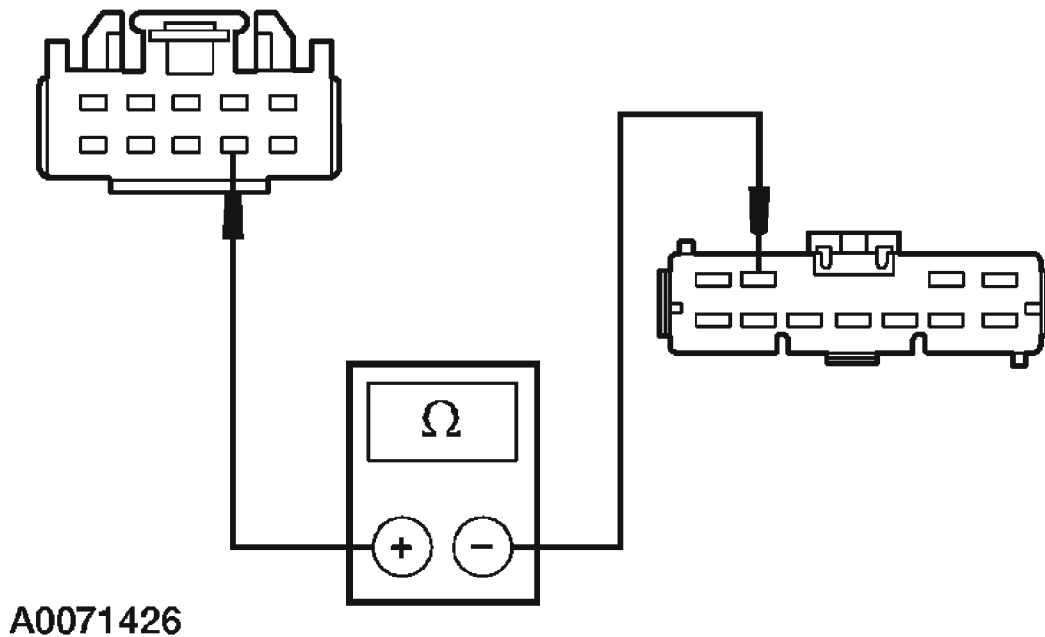


Fig. 39: Checking Circuit 32-KA19 (WH/BK) For An Open
Courtesy of FORD MOTOR CO.

- Is the resistance less than 5 ohms?

Yes : Go to H5.

No : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

H5 CHECK CIRCUIT 91S-KA12 (BK/WH) FOR A SHORT TO VOLTAGE

- Disconnect: CJB C270a.
- Key in ON position.
- Measure the voltage between the CJB C270a pin 7, circuit 91S-KA12 (BK/WH), harness side and ground.

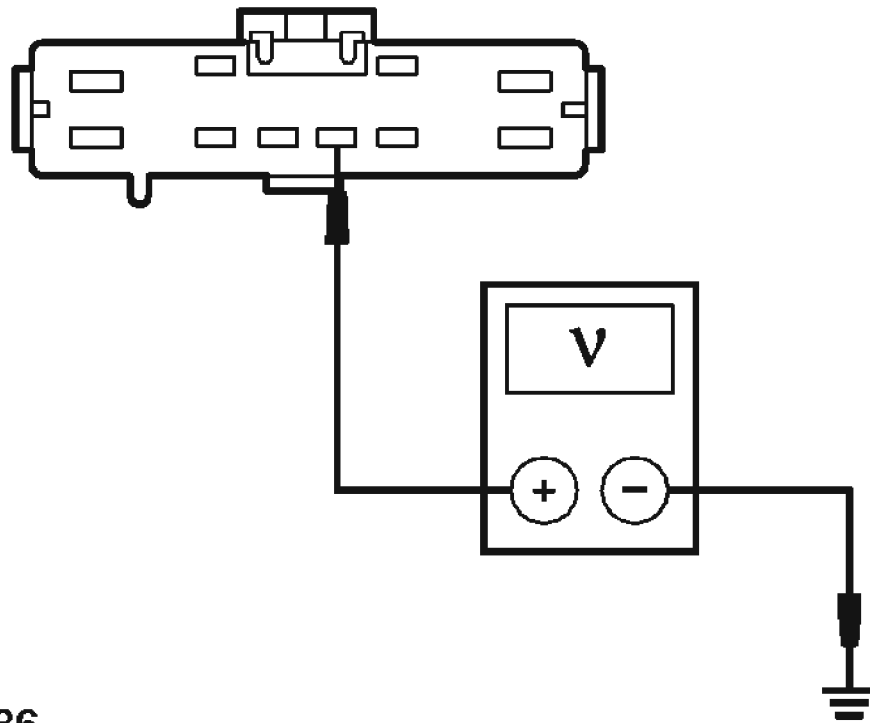
**A0091086**

Fig. 40: Measuring Voltage Between CJB C270a Pin 7, Circuit 91S-KA12 (BK/WH), Harness Side And Ground
Courtesy of FORD MOTOR CO.

- **Is any voltage present?**

Yes : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

No : Go to H6.

H6 CHECK CIRCUIT 91S-KA12 (BK/WH) FOR AN OPEN

- Key in OFF position.
- Measure the resistance between the CJB C270a pin 7, circuit 91S-KA12 (BK/WH), harness side and the GEM C201e pin 21, circuit 91S-KA12 (BK/WH), harness side.

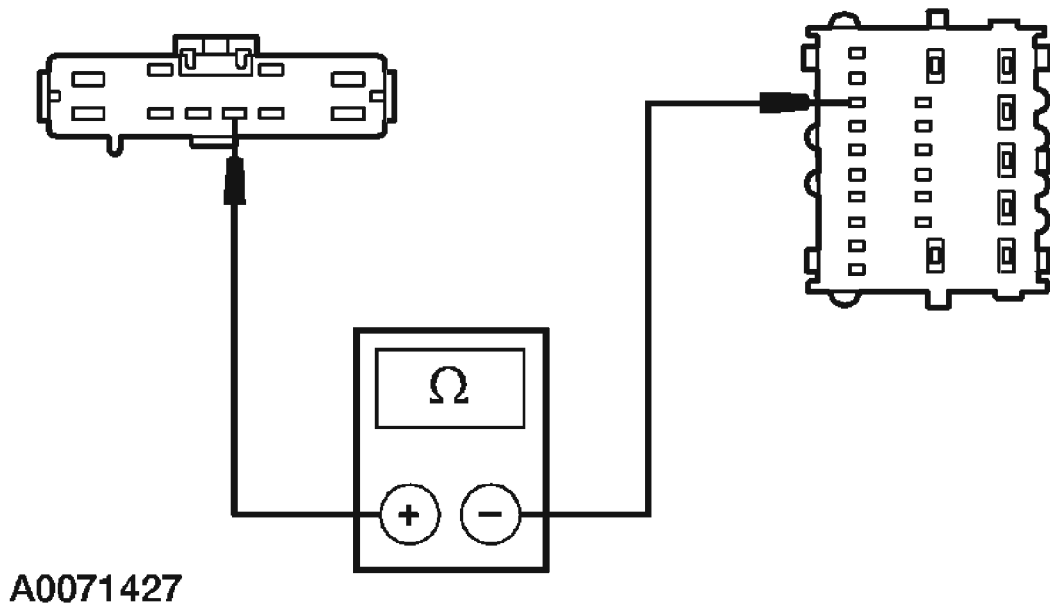


Fig. 41: Checking Circuit 91S-KA12 (BK/WH) For An Open
Courtesy of FORD MOTOR CO.

- **Is the resistance less than 5 ohms?**

Yes : Go to H7.

No : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

H7 CHECK THE WINDSHIELD WIPER MOTOR RELAY

- Disconnect: Windshield Wiper Relay.
- Carry out the windshield wiper relay component test. Refer to **COMPONENT TESTS**.
- **Did the windshield wiper relay pass the component test?**

Yes : Go to H8.

No : INSTALL a new windshield wiper relay. CLEAR the DTCs. TEST the system for normal operation.

H8 CHECK THE WIPER/WASHER SWITCH

- Carry out the wiper/washer switch component test. Refer to the **COMPONENT TESTS**.
- **Did the wiper/washer switch pass the component test?**

Yes : Go to H9.

No : INSTALL a new wiper/washer switch. CLEAR the DTCs. TEST the system for normal operation.

H9 CHECK FOR CORRECT GEM OPERATION

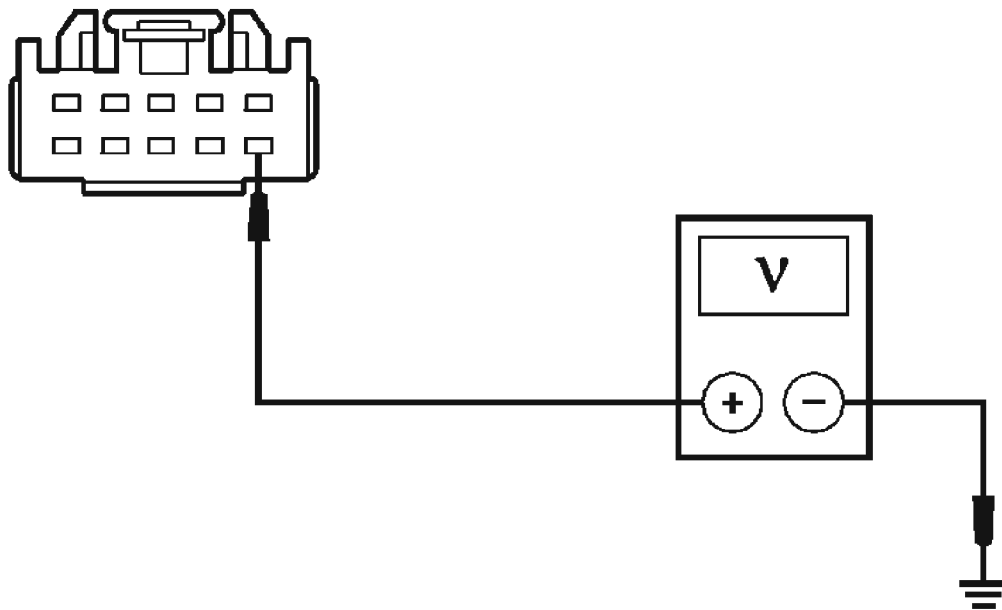
- Disconnect all the GEM connectors.
- Check for:
 - Corrosion
 - Pushed-out pins
- Connect all the GEM connectors and make sure they seat correctly.
- Operate the system and verify the concern is still present.
- **Is the concern still present?**

Yes : INSTALL a new GEM. Refer to **MULTIFUNCTION ELECTRONIC/MODULES** . TEST the system for normal operation.

No : The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.

PINPOINT TEST I: THE WASHER PUMP IS INOPERATIVE**I1 CHECK THE VOLTAGE TO THE WIPER/WASHER SWITCH**

- Key in OFF position.
- Disconnect: Wiper/Washer Switch C2081.
- Key in ON position.
- Measure the voltage between the wiper/washer switch C2081 pin 6, circuit 15-KA19 (GN/OG), harness side and ground.



A0071425

Fig. 42: Measuring Voltage Between Wiper/Washer Switch C2081 Pin 6, Circuit 15-KA19 (GN/OG), Harness Side And Ground
Courtesy of FORD MOTOR CO.

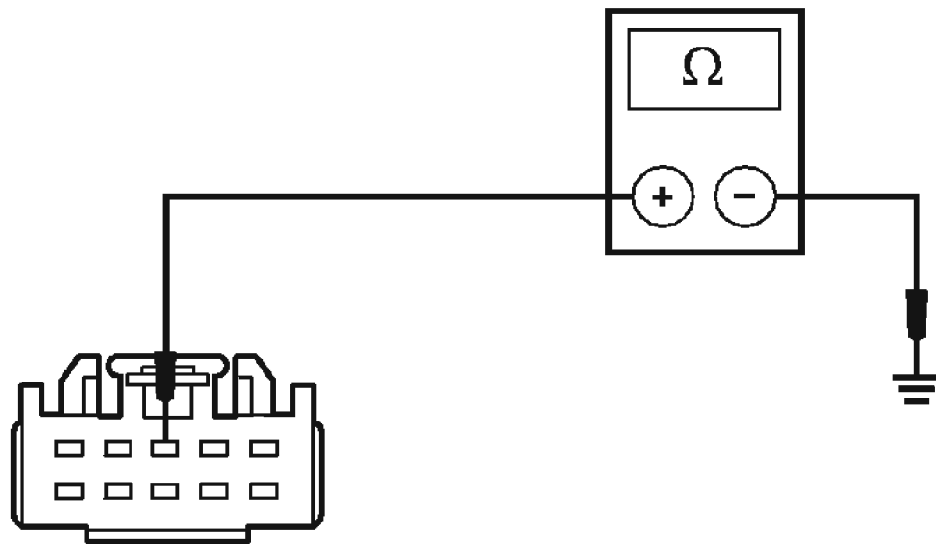
- Is the voltage greater than 10 volts?

Yes : Go to I2.

No : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

I2 CHECK CIRCUIT 31-KA19 (BK) FOR GROUND

- Key in OFF position.
- Measure the resistance between the wiper/washer switch C2081 pin 3, circuit 31-KA19 (BK), harness side and ground.



A0071422

Fig. 43: Measuring Resistance Between Wiper/Washer Switch C2081 Pin 3, Circuit 31-KA19 (BK), Harness Side And Ground
 Courtesy of FORD MOTOR CO.

- Is the resistance less than 5 ohms?

Yes : Go to I3.

No : REPAIR the circuit. CLEAR the DTCs. TEST the system for normal operation.

I3 CHECK THE WIPER/WASHER SWITCH

- Carry out the wiper/washer switch component test. Refer to the **COMPONENT TESTS**.
- Did the wiper/washer switch pass the component test?

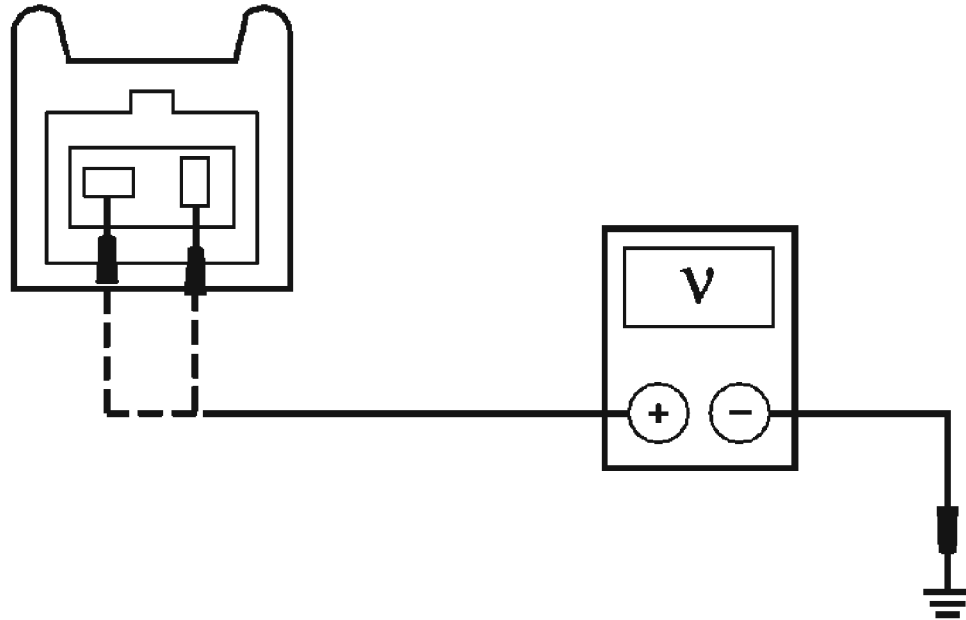
Yes : Go to I4.

No : INSTALL a new wiper/washer switch. CLEAR the DTCs. TEST the system for normal operation.

I4 CHECK CIRCUIT 32-KA34 (WH/BK) AND CIRCUIT 33-KA34 (YE/BK) FOR VOLTAGE

- Connect: Wiper/Washer Switch C2081.
- Key in ON position.
- Disconnect: Washer Pump Motor C1397.
- Measure the voltage between the washer pump motor C1397 pin 1, circuit 32-KA34 (WH/BK), harness side and ground; and between the washer pump motor

C1397 pin 2, circuit 33-KA34 (YE/BK), harness side and ground.



A0071428

Fig. 44: Checking Circuit 32-KA34 (WH/BK) And Circuit 33-KA34 (YE/BK) For Voltage
Courtesy of FORD MOTOR CO.

- **Are the voltages greater than 10 volts?**

Yes : INSTALL a new washer pump motor. Refer to **WINDSHIELD WASHER PUMP AND RESERVOIR**. CLEAR the DTCs. TEST the system for normal operation.

No : REPAIR the circuit in question. CLEAR the DTCs. TEST the system for normal operation.

Component Tests

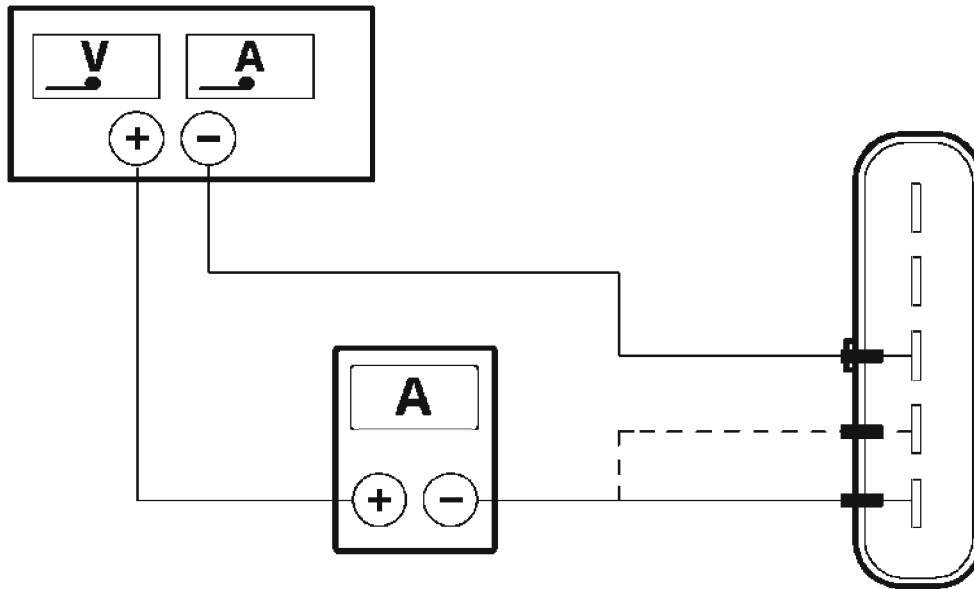
Windshield Wiper Motor

CAUTION: The magnets in the windshield wiper washer motor can become damaged if the motor is jarred.

CAUTION: The ammeter must have a range of at least 10 amps DC in order to not be damaged.

NOTE: Use an external 12V DC supply which can be loaded to at least 10 amps, or use fused battery voltage.

Measure the power drained by the front wiper motor.



E0010054

Fig. 45: Measuring Power Drained By Front Wiper Motor
Courtesy of FORD MOTOR CO.

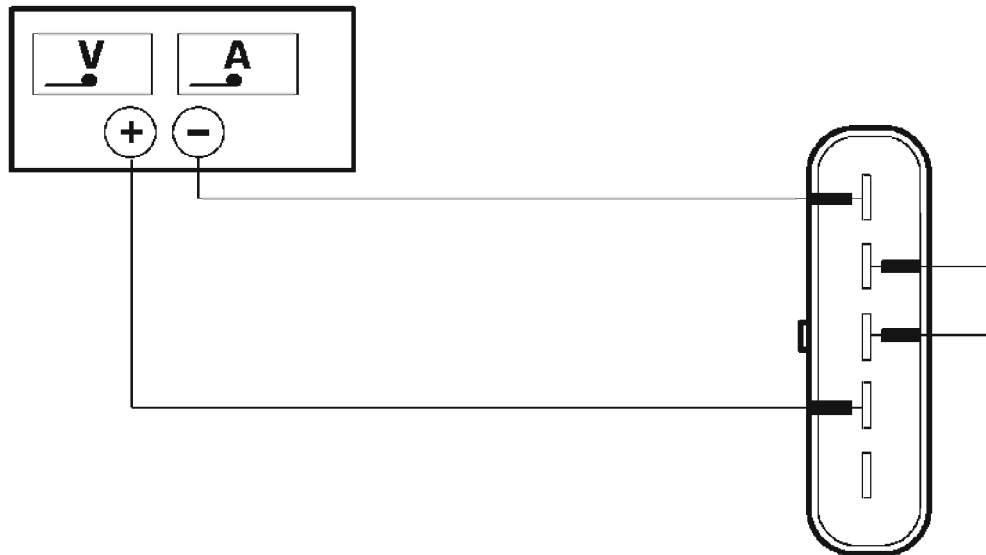
1. Switch off the ignition.
2. Remove the windshield wiper motor.
3. Remove the component multiplug.

CAUTION: Mount the windshield wiper motor firmly, so that the wiper linkage can move freely.

4. Connect the negative terminal of the ammeter to pin 1 of the windshield wiper motor.
5. Connect the voltage supply negative to pin 3 of the windshield wiper motor.
6. Connect the voltage supply positive to the positive terminal of the ammeter and switch on the voltage supply. Read the current on the meter as the windshield wiper motor runs at high speed. The reading should be about 3 amps.
7. Switch off the voltage supply and disconnect the negative terminal of the ammeter from the windshield wiper washer motor.

8. Connect the negative terminal of the ammeter to pin 2 of the windshield wiper motor and switch on the voltage supply. Read the current on the meter as the windshield wiper motor runs slowly. The reading should be about 2 amps.
9. Switch off the voltage supply.

Check the limit switch.



E0010101

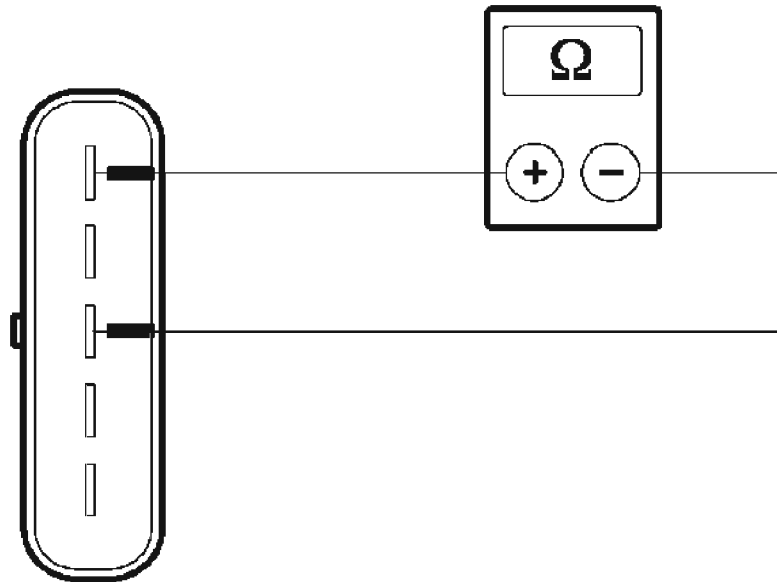
Fig. 46: Checking Limit Switch
Courtesy of FORD MOTOR CO.

NOTE: The windscreen wiper motor must not be at the rest position.

Connect the voltage supply positive to pin 2, the voltage supply negative to pin 5 of the front windshield wiper motor. Using test cables, connect pin 3 with pin 4 on the windshield wiper motor. Switch on the voltage supply. The windshield wiper motor must run at slow speed and stop in the rest position.

If it does, continue with the next test step; if not, install a new windshield wiper motor. Refer to **WINDSHIELD WIPER MOTOR**.

Measure the resistance between pin 5 and 3 of the windshield wiper motor.



E0010102

Fig. 47: Measuring Resistance Between Pin 5 And 3 Of Windshield Wiper Motor
Courtesy of FORD MOTOR CO.

If the resistance is less than 1 ohm the motor is OK. If not, install a new windshield wiper motor. Refer to **WINDSHIELD WIPER MOTOR**.

Rear Wiper Motor

CAUTION: The magnets in the windscreen washer motor can become damaged if the motor is jarred.

CAUTION: The ammeter must have a range of at least 10 amps DC in order to not damage the meter.

NOTE: Use an external 12V DC supply which can be loaded to at least 10 amps, or use fused battery voltage.

Measure the power drained by the rear wiper motor.

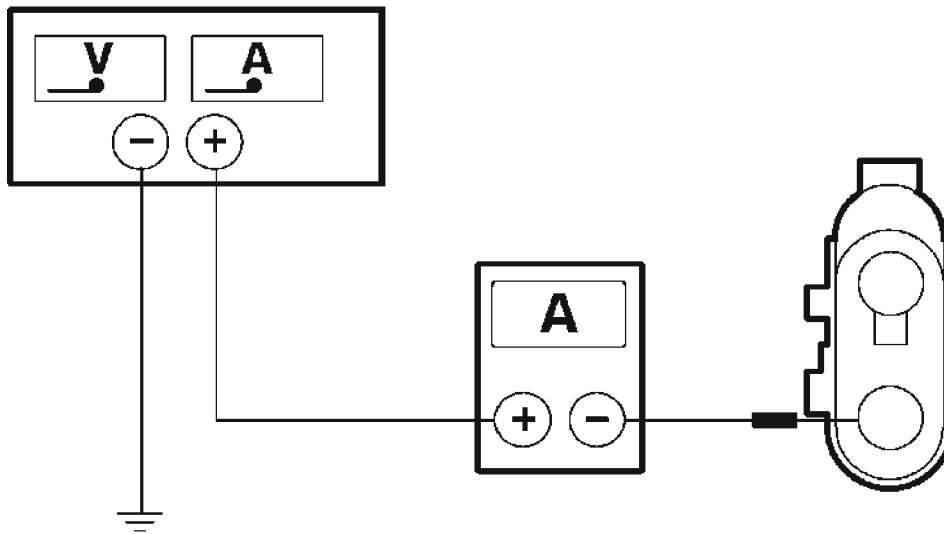
**E0002219**

Fig. 48: Measuring Power Drained By Rear Wiper Motor
Courtesy of FORD MOTOR CO.

1. Turn off the ignition.
2. Remove the component multiplug.
3. Connect the negative terminal of the ammeter to pin 2 of the rear wiper motor. Connect the voltage supply negative to the rear wiper motor housing.
4. Connect the voltage supply positive to the positive terminal of the ammeter and switch on the voltage supply. Read the current on the meter as the rear wiper motor runs. The reading should be about 2 amps.
5. Turn off the voltage supply and remove all test connections.

Check limit switch.

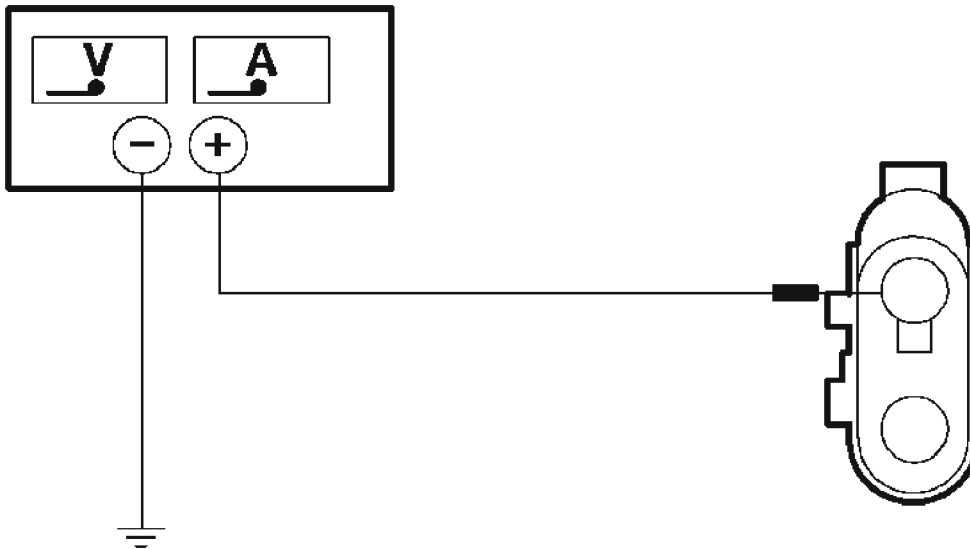
**E0002220**

Fig. 49: Checking Limit Switch
Courtesy of FORD MOTOR CO.

NOTE: The rear wiper motor must not be at the rest position.

Connect the voltage supply negative to the rear wiper motor housing. Connect the voltage supply positive to pin 1 of the rear wiper motor and switch on the voltage supply. The motor must run and stop in the rest position. If it does, the motor is OK. If not, install a new rear wiper motor. Refer to **REAR WINDOW WIPER MOTOR**.

Front/rear wiper relay

1. Check break contact.

Measure the resistance between pin 3 and 4.

Is the resistance less than 1 ohm?

If yes, Go to Step 2.

If no, install a new relay.



E0002222

Fig. 50: Measuring Resistance Between Pin 3 And 4
Courtesy of FORD MOTOR CO.

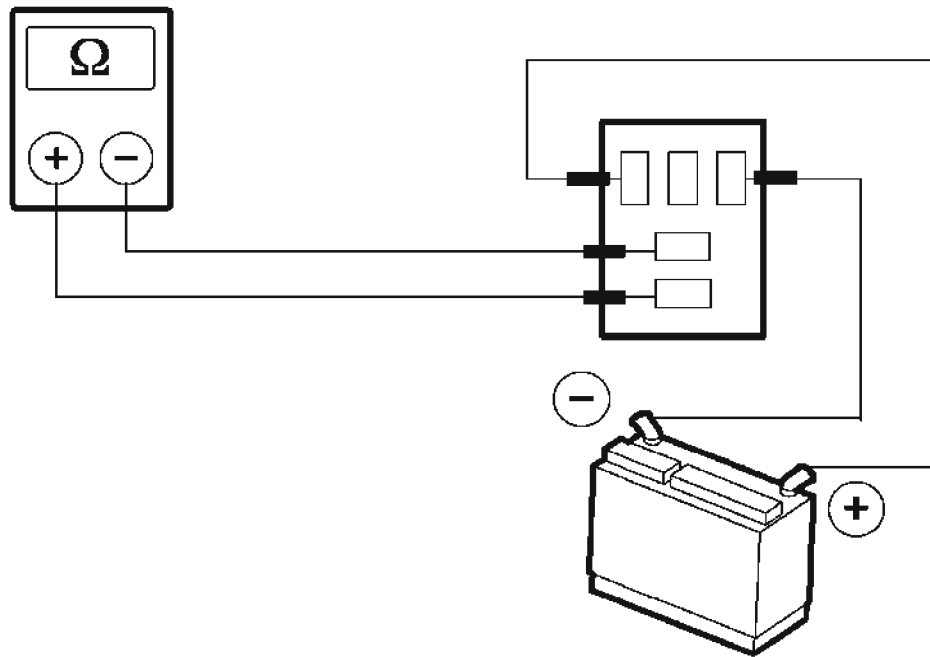
2. Check make contact.

Measure the resistance between pin 3 and pin 5.

Is the resistance greater than 10 kohm?

If yes, Go to Step 3.

If no, install a new relay.



E0002223

Fig. 51: Measuring Resistance Between Pin 3 And Pin 5
 Courtesy of FORD MOTOR CO.

3. Check relay contact in activated condition.

Connect the positive terminal of the power supply with pin 1.

Connect the negative terminal of the power supply with pin 2.

Measure the resistance between pin 3 and pin 5.

Does the relay switch click and is the resistance less than 1 ohm?

If yes, the relay is OK.

If no, install a new relay.

Wiper/Washer Switch

Use the following table to test the wiper/washer switch for continuity between the pins. Disconnect the wiper/washer switch. Set the wiper/washer switch to the indicated position and measure the resistance between the indicated pins. If any of the ohm values do not match the target values, install a new wiper/washer switch.

2005 Ford Focus ZX5 S

2005 ACCESSORIES & BODY, CAB Wipers And Washers - Focus

WINDSHIELD INTERMITTENT WIPE CONTROL SWITCH REFERENCE

Function to Check	Pins to Connect with Ohmmeter	Switch Setting	Target Values
Windshield intermittent wipe control switch	1 and 10	1	1 kohm
		2	10 kohms
		3	20 kohms
		4	30 kohms
		5	40 kohms
		6	47 kohms
Windshield wiper switch (one-touch operation)	6 and 9	One-touch	Less than 1 ohm
		Off	Greater than 10 kohms
		Intermittent	Greater than 10 kohms
		Low speed	Greater than 10 kohms
		High speed	Greater than 10 kohms
Windshield wiper (intermittent)	6 and 10	One-touch	Greater than 10 kohms
		Off	Greater than 10 kohms
		Intermittent	Less than 1 ohm
		Low speed	Greater than 10 kohms
		High speed	Greater than 10 kohms
	7 and 9	One-touch	Greater than 10 kohms
		Off	Less than 1 ohm
		Intermittent	Less than 1 ohm
		Low speed	Greater than 10 kohms
		High speed	Greater than 10 kohms
	1 and 6	One-touch	Greater than 10 kohms

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2005 ACCESSORIES & BODY, CAB Wipers And Washers - Focus

		Off	Greater than 10 kohms
		Intermittent	Refer to Windshield Intermittent Wiper Control Switch in this table.
		Low speed	Greater than 10 kohms
		High speed	Greater than 10 kohms
Windshield wiper low speed	6 and 9	One-touch	Greater than 10 kohms
		Off	Greater than 10 kohms
		Intermittent	Greater than 10 kohms
		Low speed	Less than 1 ohm
		High speed	Greater than 10 kohms
Windshield wiper high speed	6 and 8	One-touch	Greater than 10 kohms
		Off	Greater than 10 kohms
		Intermittent	Greater than 10 kohms
		Low speed	Greater than 10 kohms
		High speed	Less than 1 ohm
		High speed	Greater than 10 kohms
Windshield washer	2 and 6	Off	Less than 1 ohm
		On	Greater than 10 kohms
	2 and 3	Off	Greater than 10 kohms
		On	Less than 1 ohm
Rear wiper/washer switch	3 and 5	Off	Less than 1 ohm
		Rear washer	Greater than 10 kohms
		Rear washer	Greater than 10

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			kohms
	4 and 6	Off	Less than 1 ohm
		Rear wiper	Less than 1 ohm
		Rear washer	Greater than 10 kohms
	3 and 4	Off	Greater than 10 kohms
		Rear wiper	Greater than 10 kohms
		Rear washer	Less than 1 ohm
	5 and 6	Off	Greater than 10 kohms
		Rear wiper	Less than 1 ohm
		Rear washer	Less than 1 ohm

REMOVAL AND INSTALLATION

WINDSHIELD WIPER MOTOR

Removal

NOTE: Make sure the windshield wiper motor is in the park position.

1. Remove the cowl panel. For additional information, refer to **FRONT END BODY PANELS**.
2. Remove the cowl panel support brace.

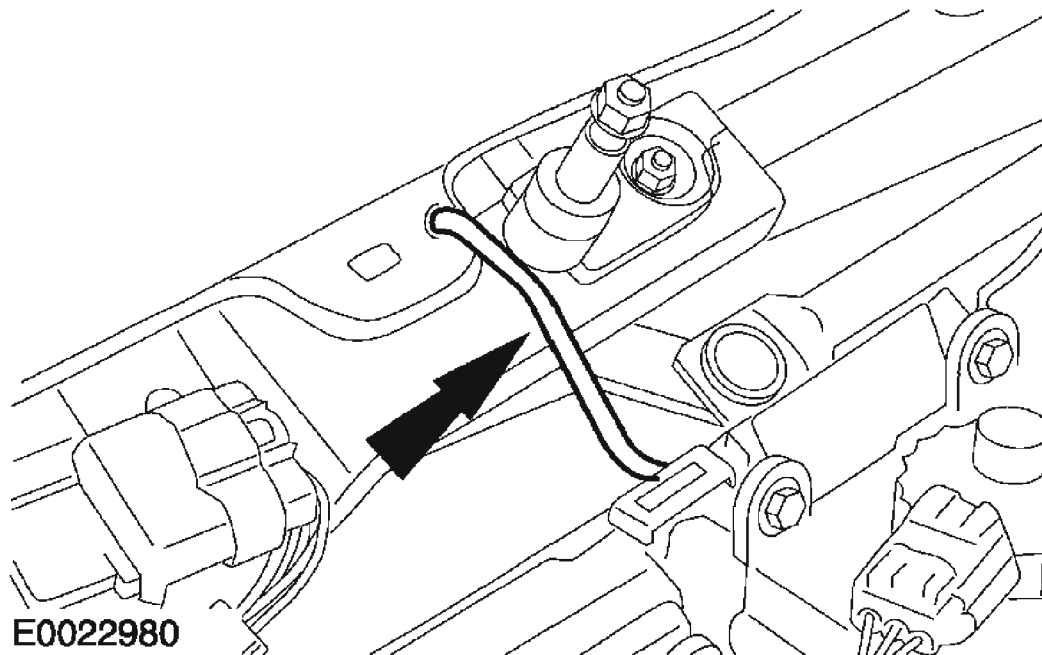


Fig. 52: Removing Cowl Panel Support Brace
Courtesy of FORD MOTOR CO.

3. Disconnect the windshield wiper motor electrical connector.

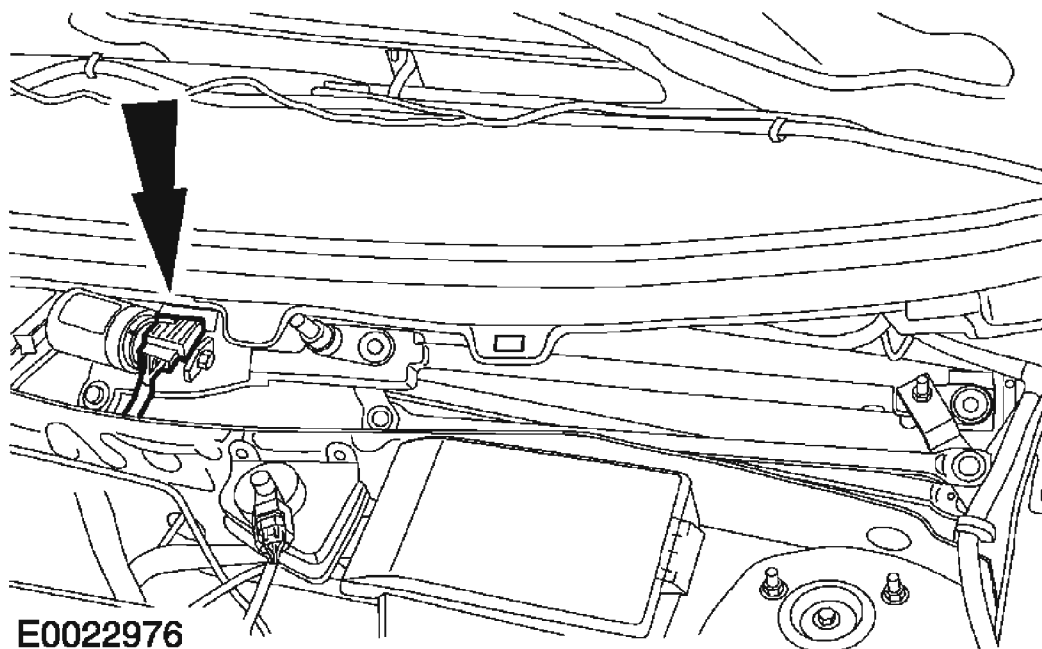


Fig. 53: Disconnecting Windshield Wiper Motor Electrical Connector
Courtesy of FORD MOTOR CO.

4. Remove the bolts and the windshield wiper motor and linkage.
 - Remove the wiper motor protective cap.

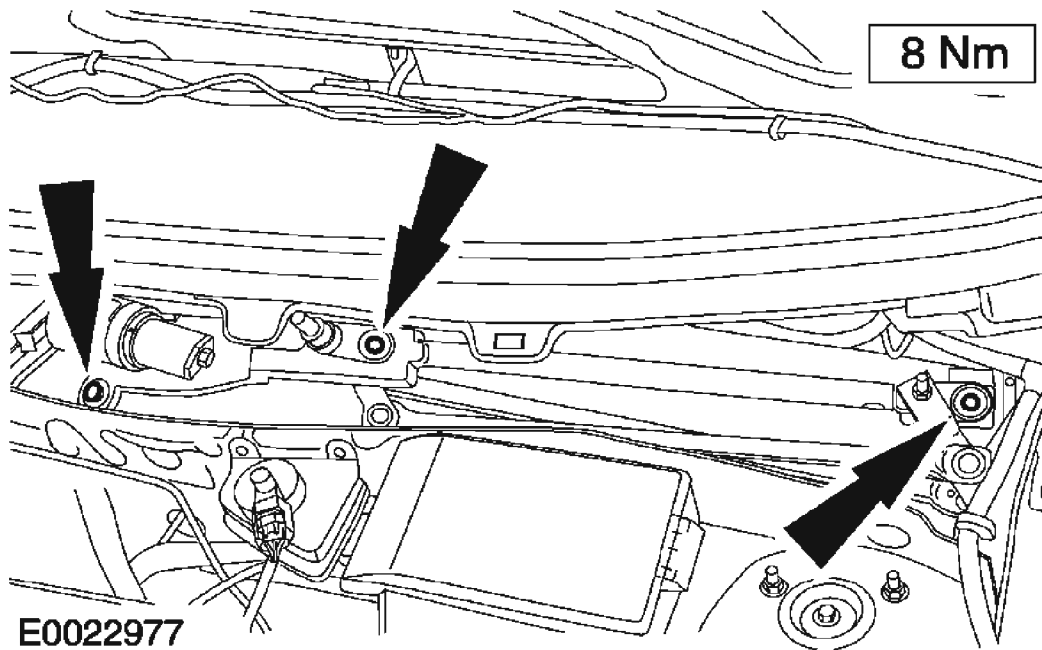
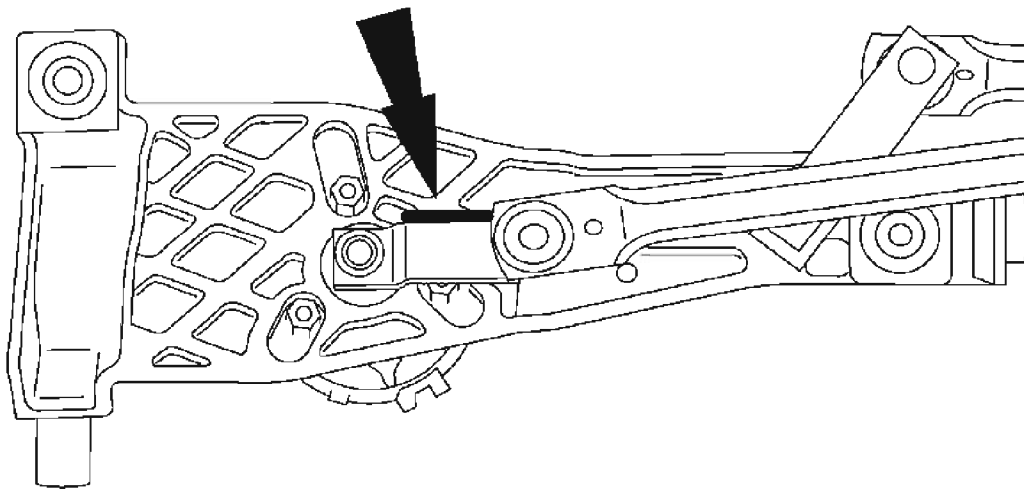


Fig. 54: Removing Bolts And Windshield Wiper Motor And Linkage
Courtesy of FORD MOTOR CO.

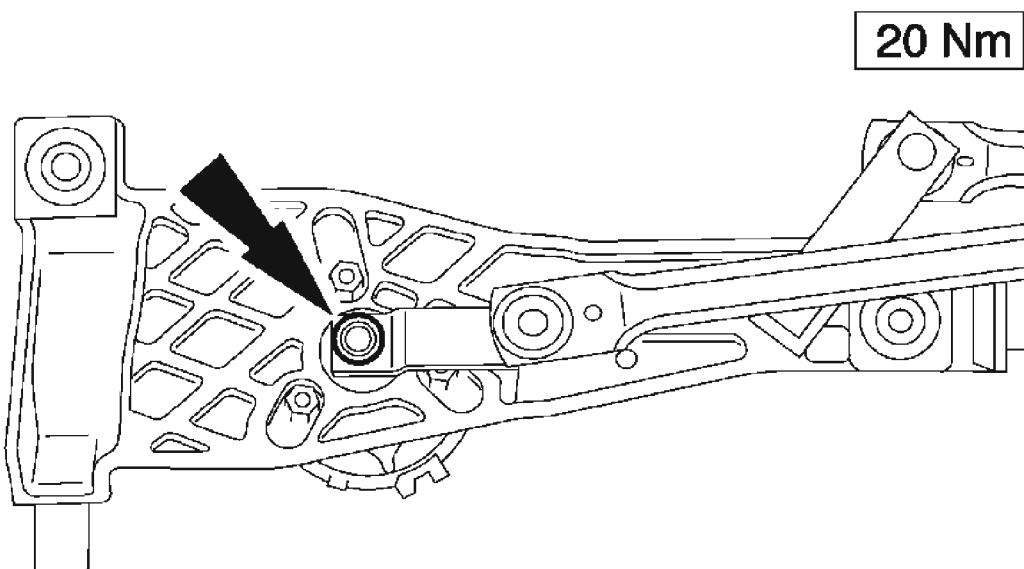
5. Mark the position of the windshield wiper crank in relation to the wiper motor bracket to aid installation.



V9310258

Fig. 55: Marking Position Of Windshield Wiper Crank In Relation To Wiper Motor Bracket To Aid Installation
Courtesy of FORD MOTOR CO.

6. Remove the windshield wiper crank nut.



E0022978

Fig. 56: Removing Windshield Wiper Crank Nut

Courtesy of FORD MOTOR CO.

7. Remove the bolts and the windshield wiper motor.

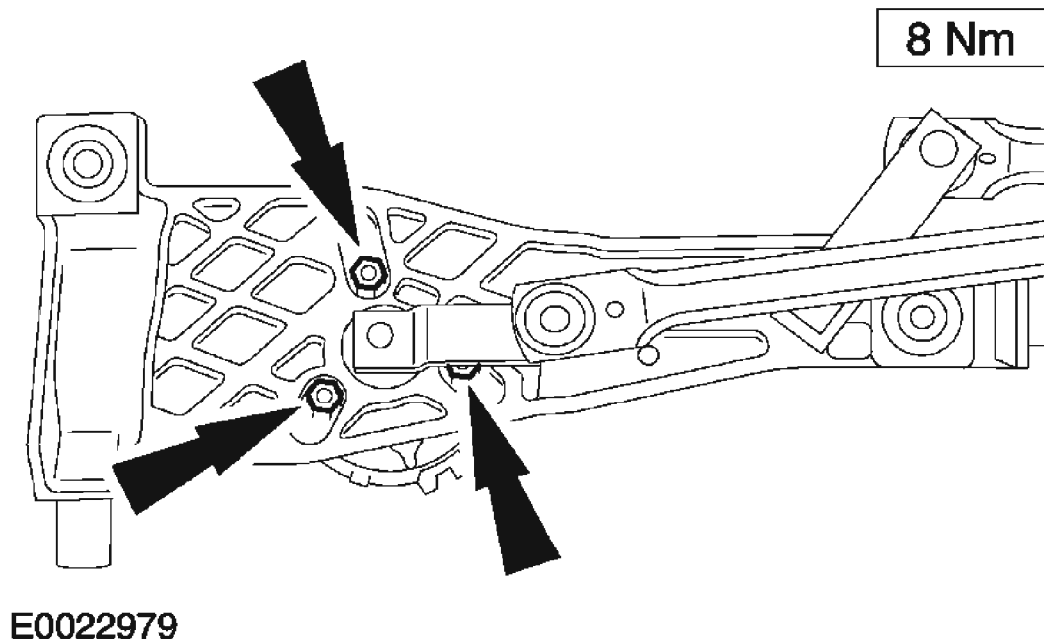


Fig. 57: Removing Bolts And Windshield Wiper Motor
Courtesy of FORD MOTOR CO.

Installation

1. To install, reverse the removal procedure.

REAR WINDOW WIPER MOTOR

Removal

NOTE: Make sure the wiper motor is in the park position.

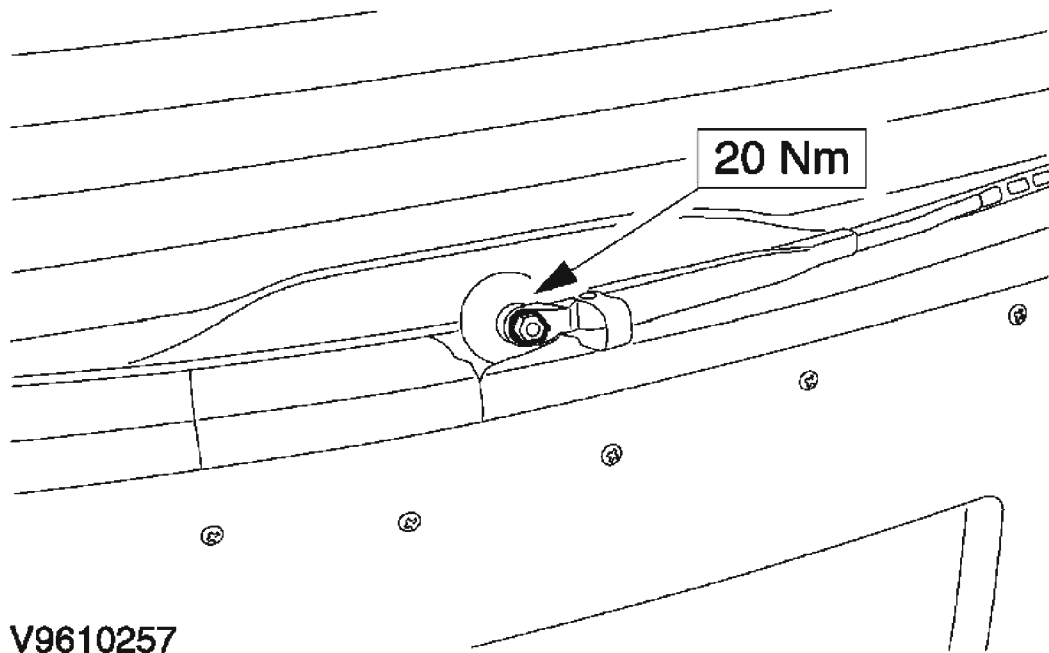


Fig. 58: Removing Wiper Arm
Courtesy of FORD MOTOR CO.

1. Remove the wiper arm.
 - Lift up the plastic cap and loosen the nut approximately 2 turns.
 - Lift the wiper arm and release it from the taper by moving it to one side.
 - Remove the nut and the wiper arm.
2. Remove the liftgate trim panel.
 1. Remove the pull handle covers, screws and handle.
 2. Remove the liftgate trim panel bolt covers and screws.

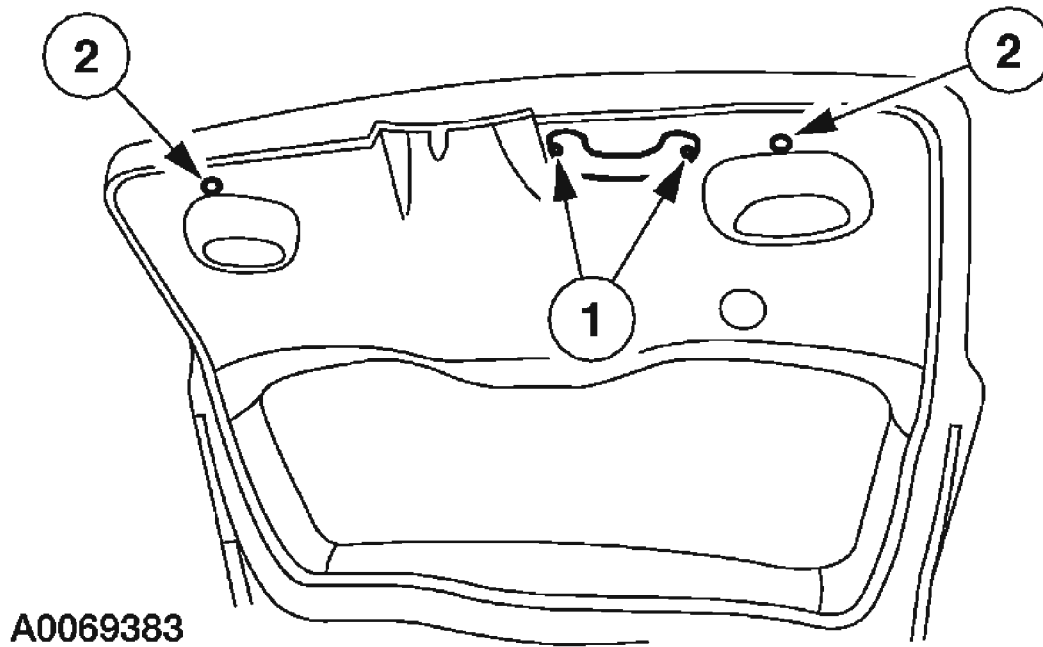


Fig. 59: Removing Liftgate Trim Panel
Courtesy of FORD MOTOR CO.

3. Remove the rear wiper motor and mounting plate.
 1. Disconnect the wiper motor electrical connector.
 2. Remove the ground lead.
 - Remove the 3 bolts.

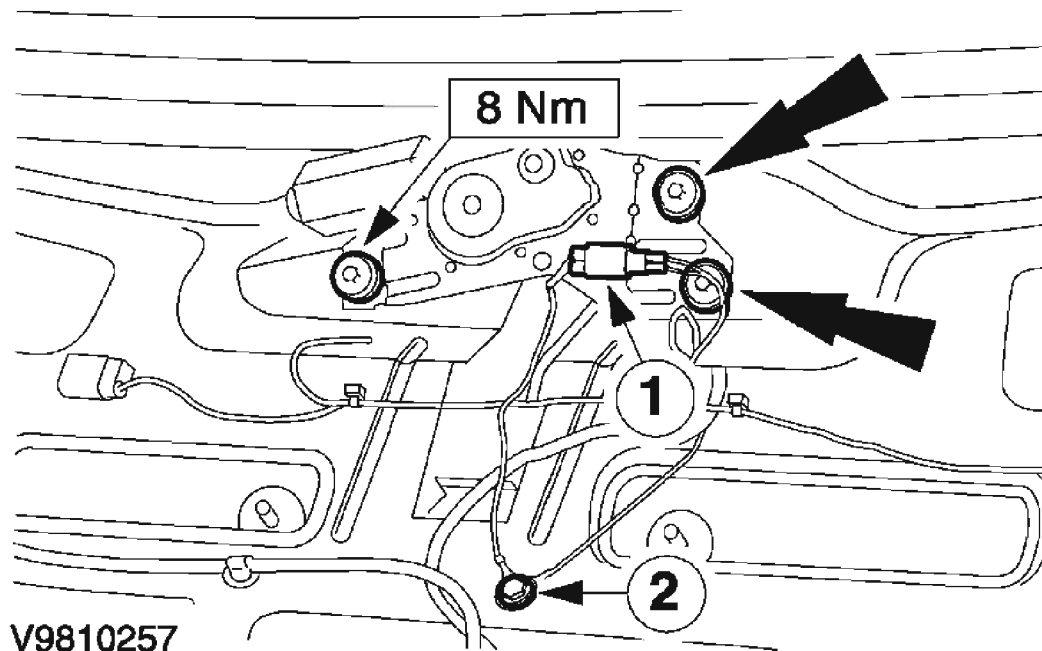


Fig. 60: Disconnecting Wiper Motor Electrical Connector And Bolts
 Courtesy of FORD MOTOR CO.

4. Remove the wiper motor from the mounting plate.

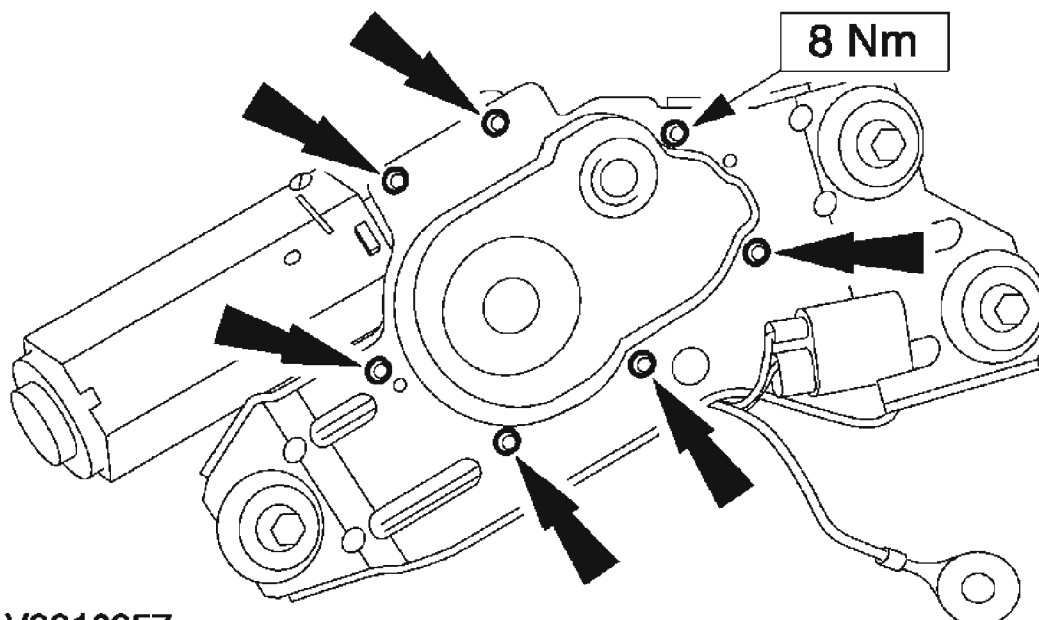
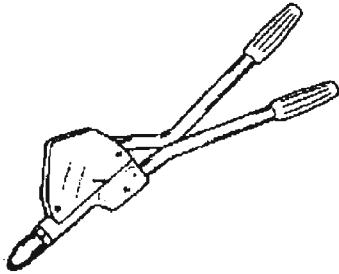


Fig. 61: Removing Bolts And Wiper Motor From Mounting Plate
Courtesy of FORD MOTOR CO.**Installation**

NOTE: Make sure the wiper motor is in the park position.

1. To install, reverse the removal procedure.
2. Check the operation of the wiper.

WINDSHIELD WASHER PUMP AND RESERVOIR**Special Tool(s)****SPECIAL TOOL SPECIFICATION**

 ST1132-A	Heavy Duty Riveter 501-D011 (D80L-23200-A) or equivalent
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Material**MATERIAL SPECIFICATION**

Item	Specification
Premium Windshield Washer Concentrate ZC-32-A	WSB-M816-A2
P-80 (water-based rubber lubricant)	WSE-M99C45-A2

Removal and Installation

WARNING: Windshield washer solution contains methanol, which is poisonous. Observe all cautions and warnings indicated on label of washer solution container. Failure to follow these instructions may result in personal injury.

CAUTION: When replacing the windshield washer pump be careful not to damage the rubber grommet.

CAUTION: Do not operate the windshield washer pump before filling the reservoir. Failure to do so could result in premature pump failure.

NOTE: When installing the reservoir, the filler neck must be lubricated using a water-based lubricant.

1. Remove the bolt and the windshield washer filler neck.

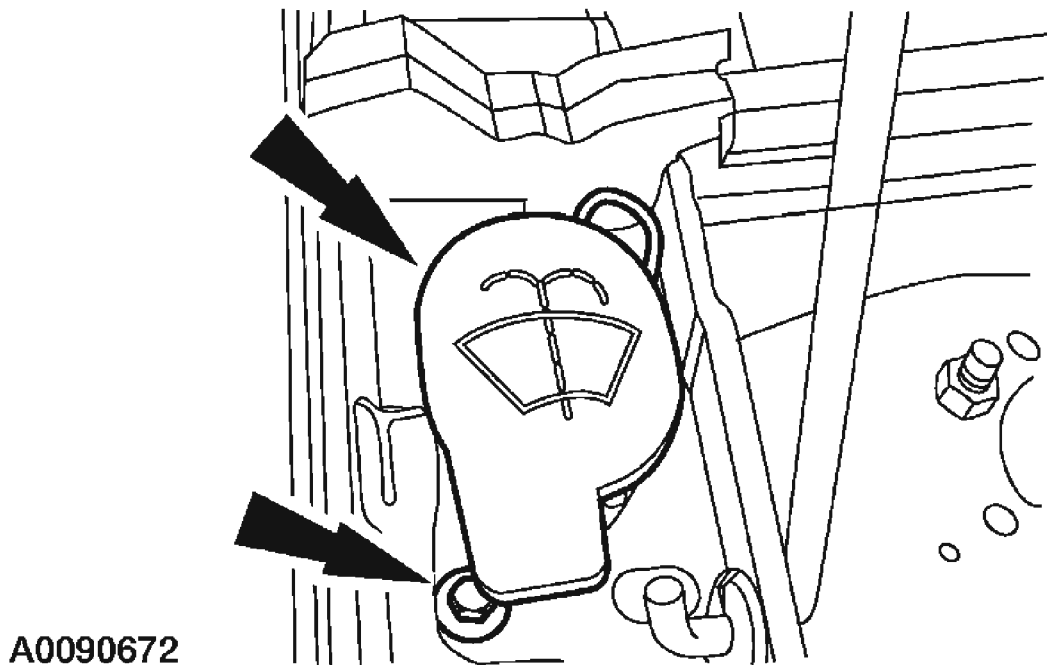


Fig. 62: Removing Bolt And Windshield Washer
Courtesy of FORD MOTOR CO.

2. Remove the RH fender splash shield. For additional information, refer to **FRONT END BODY PANELS**.
3. Remove the foam filler and remove the retainer.
4. Remove the screws and the accessory drive splash shield.

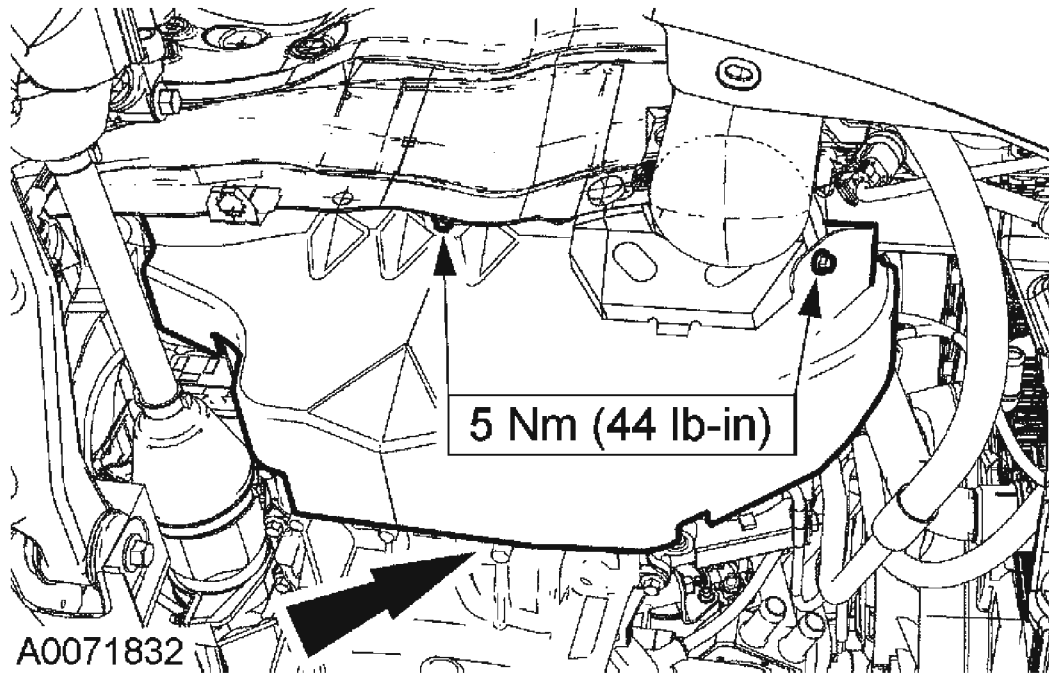


Fig. 63: Removing Screws And Accessory Drive Splash Shield
Courtesy of FORD MOTOR CO.

5. Remove the 2 bolts and 1 nut.
 - Position aside the A/C accumulator.

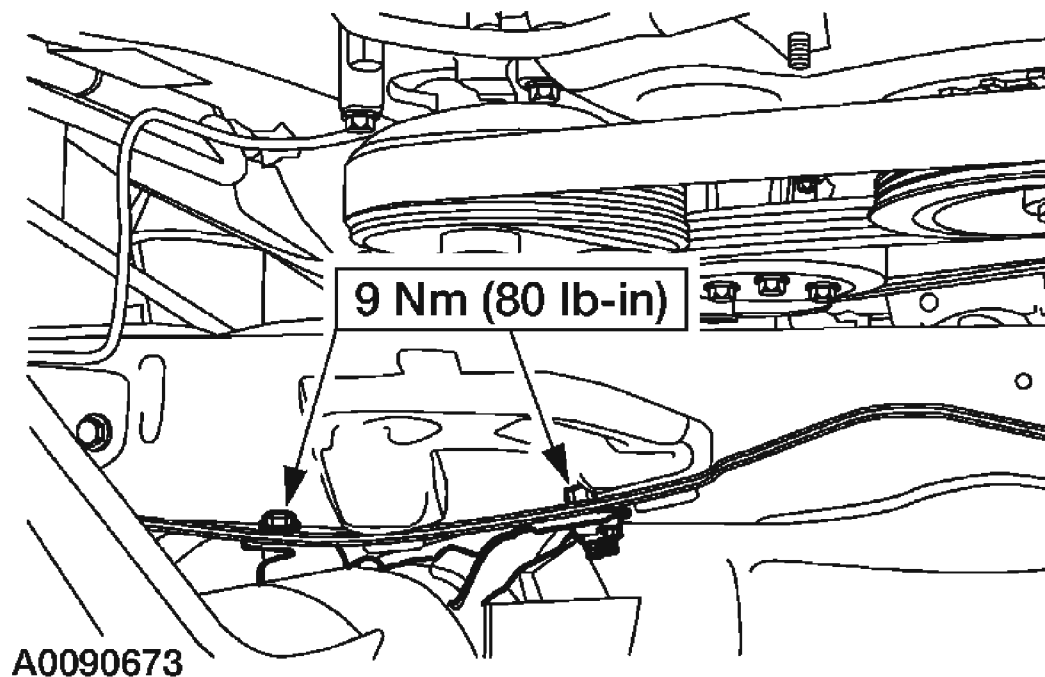


Fig. 64: Removing Bolts And Nut
Courtesy of FORD MOTOR CO.

NOTE: When reinstalling the rivet use the special tool.

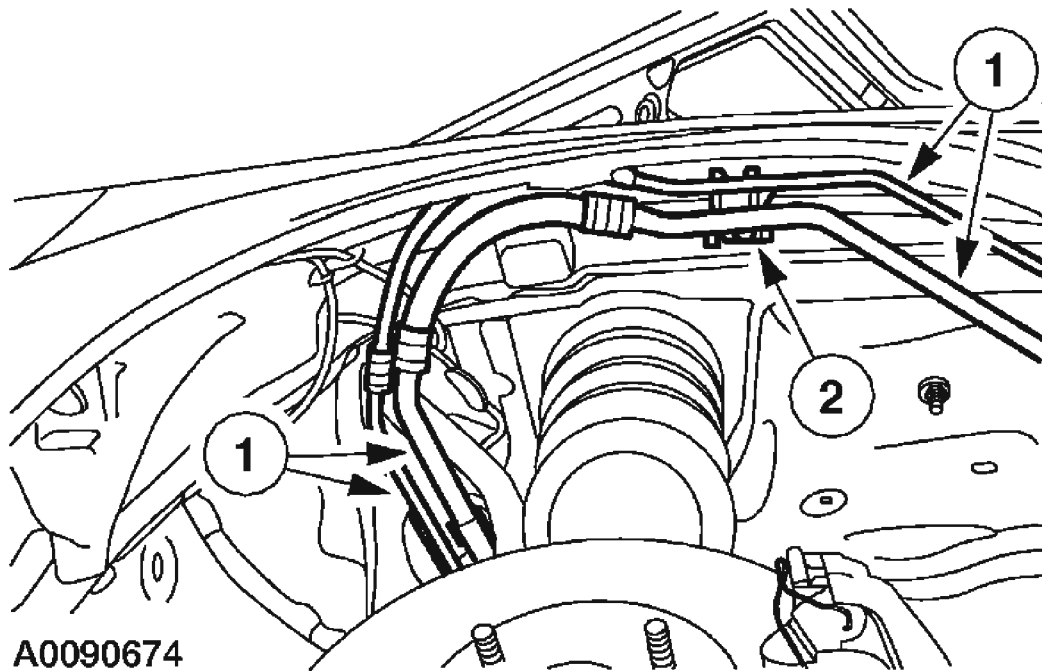


Fig. 65: Disconnecting A/C Lines From Inner Fender Well
Courtesy of FORD MOTOR CO.

6. Disconnect the A/C lines from the inner fender well.
 1. Unclip the A/C lines and position aside.
 2. Drill out the rivet and remove the bracket.

NOTE: The fender is removed for clarity.

NOTE: When reinstalling the washer reservoir secure it by sliding it rearward into position and then installing the upper bolt followed by the lower bolt.

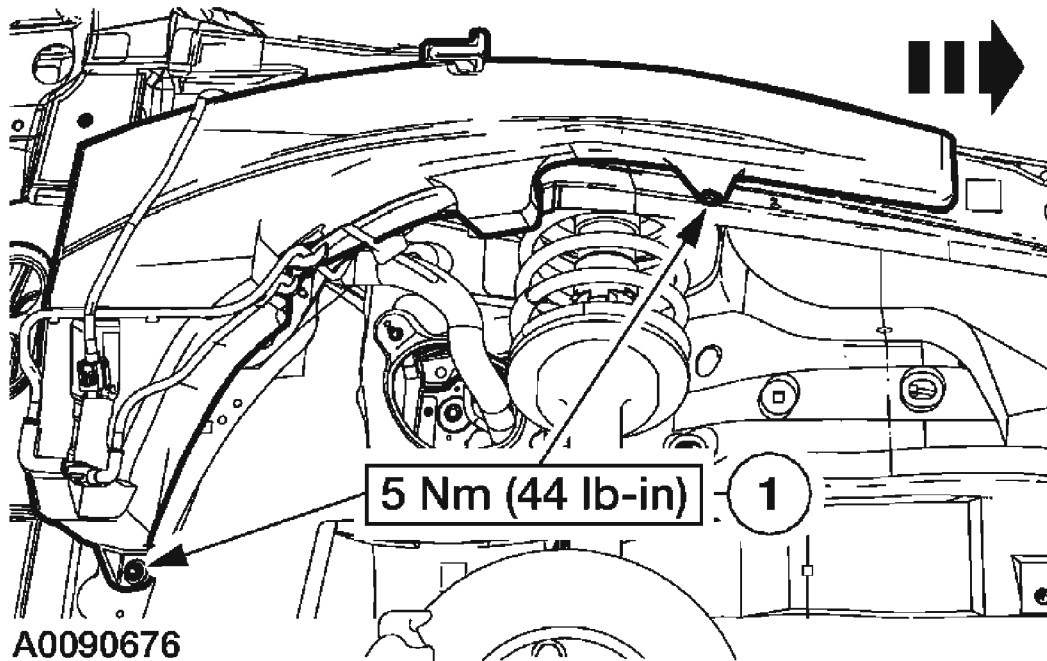
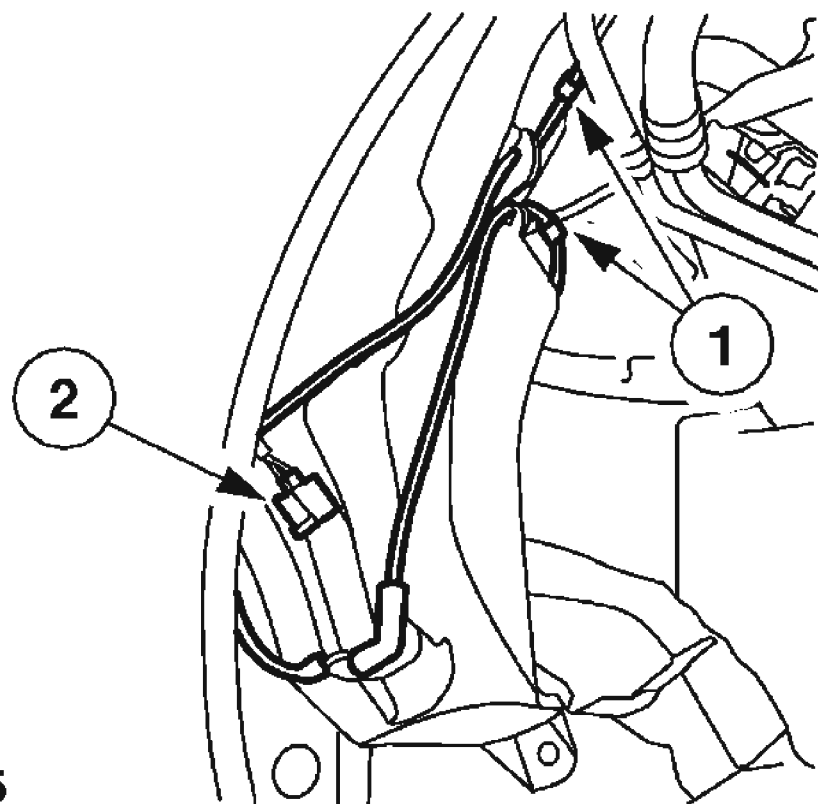


Fig. 66: Removing Bolts

Courtesy of FORD MOTOR CO.

7. Remove the bolts.
 - Slide the windshield washer reservoir assembly forward to release it from the fender reinforcement.
8. Disconnect the windshield washer reservoir.
 1. Disconnect the hoses and release the hoses from the washer reservoir.
 2. Disconnect the electrical connector and release the wiring harness from the washer reservoir.



A0090675

Fig. 67: Disconnecting Electrical Connector
Courtesy of FORD MOTOR CO.

9. To install, reverse the removal procedure.