

2008 Ford Mustang
2008 ACCESSORIES & BODY, CAB Wipers & Washers - Mustang

2008 ACCESSORIES & BODY, CAB

Wipers & Washers - Mustang

SPECIFICATIONS

Material

Item	Specification	Fill Capacity
Premium Quality Windshield Washer Fluid (Canada) CXC-37-(A, B, C, D, E, F, G, H) (Canada)	-	-
Premium Windshield Washer Concentrate (US) ZC-32-A or B (US)	WSB-M8B16-A2	-

GENERAL SPECIFICATIONS

Item	Specification
LH wiper blade to top edge of cowl top vent panel	39-52 mm (1.53-2.05 in)
RH wiper blade to top edge of cowl top vent panel	33-45 mm (1.29-1.77 in)

TORQUE SPECIFICATIONS

Description	Nm	lb-ft	lb-in
Windshield washer fluid reservoir bolts	6	-	53
Windshield washer fluid reservoir nut	6	-	53
Windshield wiper motor bolts	15	11	-
Windshield wiper mounting arm and pivot shaft bolts	7	-	62
Windshield wiper pivot arm nuts	28	21	-

DESCRIPTION AND OPERATION

WIPERS AND WASHERS

The wiper and washer system consists of the following components:

- Wiper pivot arms
- Windshield washer nozzle and bracket
- Windshield washer pump
- Windshield washer fluid reservoir
- Windshield wiper blades
- Windshield wiper motor
- Windshield wiper mounting arm and pivot shaft
- Windshield wiper/washer switch

The wiper system is activated by the wiper/washer switch. The wiper/washer switch provides input to the wiper motor module to activate wash, low, high and intermittent modes.

The washer system consists of the washer reservoir and washer pump. When the wiper/washer switch is placed into the wash mode, the windshield wiper motor integral electronics activate the washer pump to direct washer fluid to the windshield.

DIAGNOSTIC TESTS

WIPERS AND WASHERS

Special Tools

Illustration	Tool Name	Tool Number
 ST1137-A	73III Automotive Meter	105-R0057 or equivalent
 ST2834-A	Flex Probe Kit	105-R025B or equivalent

Principles Of Operation

The windshield wiper motor is a smart wiper motor with an integrated electronics module. The internal components of the motor are the high/low relay, washer pump relay and the run/park relay and associated electronics.

The windshield wiper motor receives its inputs from the windshield wiper/washer switch. These signals are ground reference signals. When the switch is placed in different positions, various input signals are selected and sent through circuits to the motor. The windshield wiper motor module identifies these selected input signals and activates the motor to the selected function.

High Speed Windshield Wipers

When the wiper/wash switch is set to the HIGH-speed position, it supplies ground to the high/low-speed relay coil and the run/park relay coil, which causes the windshield wiper motor to operate at high speed. During HIGH-speed operation only, both the high/low-speed relay coil ground and the run/park relay coil ground are controlled directly by the windshield wiper/washer switch. This differs from LOW-speed or INTERMITTENT operation when the run/park relay coil is controlled by the microprocessor. When the switch is placed in the OFF position, the motor continues to operate until the motor returns to the PARK position and the internal Hall-effect sensor senses the motor magnet. The output to the run/park relay deactivates the relay and disconnects the voltage to the motor.

Since the high/low relay coil and the run/park relay coil are both controlled by a hard-wired circuit to the windshield wiper/washer switch, the windshield wipers will still operate in high-speed mode if the internal windshield wiper module fails, but will not automatically park when the windshield wiper/washer switch is turned to the OFF position.

Low Speed Windshield Wipers

When the wiper/wash switch is set to the LOW-speed position, it supplies ground to the internal windshield wiper motor module low-speed input and the windshield wiper motor operates at low speed. During LOW-speed operation, the internal run/park relay is activated by the microprocessor and supplies 12 volts to the low-speed brush of the windshield wiper motor. The run/park relay coil ground is controlled by the internal windshield wiper motor module based on inputs received from the windshield wiper/washer switch. When the switch is placed in the OFF position, the motor continues to operate until the motor returns to the PARK position and the internal Hall-effect sensor senses the motor magnet. The output to the run/park relay deactivates the relay and disconnects the voltage to the motor.

Since the run/park relay is controlled by the internal windshield wiper motor microprocessor, the wipers will only operate in high-speed mode if the internal windshield wiper motor module fails, and will not automatically park when the windshield wiper/washer switch is turned to the OFF position. This is due to the run/park and high/low relay coils being directly hard-wired to the switch in high speed. The diode prevents current flow through the high/low relay coil so the relay remains in the normally closed LOW-speed position.

Intermittent Wiper Speed Windshield Wipers

When the wiper/wash switch is set to the INTERMITTENT position(s), it supplies ground to the windshield wiper motor module inputs and the windshield wiper motor operates in intermittent mode. During INTERMITTENT operation, the windshield wiper motor activates the run/park relay coil which sends voltage through the high/low relay. The high/low relay remains deactivated, supplying the voltage to the low-speed brush of the windshield wiper motor. The windshield motor continues to operate until the internal Hall-effect sensor senses the magnet (PARK position) and deactivates the run/park relay, which disconnects voltage from the wiper motor. The windshield wipers remain parked until the windshield wiper motor module completes a time-out and then repeats the intermittent windshield wiper cycle.

Software Safe Mode

The windshield wiper motor defaults to software safe mode when the run/park sensor does not sense the Hall-effect magnet inside the wiper motor. This can be caused by an obstruction of the windshield wipers, a binding linkage or loss of the Hall sensor signal. The motor continues to operate in a high/low-speed condition, and when turned off, the wipers immediately park on the windshield. If necessary, the wipers can be turned on and off until they return to the PARK position.

Washer System

When windshield wash is selected on the wiper/wash switch, the windshield wiper motor module activates its integral washer relay which sends voltage to the washer pump to direct fluid to the windshield.

WINDSHIELD WIPER CIRCUIT FUNCTION TABLE

Wiper/Wash	Circuit				
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Switch Position	680 (LB/OG)	Circuit 61 (YE/RD)	Circuit 56 (DB/OG)	Circuit 58 (WH)	Circuit 63 (RD)
OFF	OPEN	OPEN	OPEN	OPEN	OPEN
INT 1	OPEN	OPEN	OPEN	OPEN	GROUND
INT 2	OPEN	OPEN	OPEN	GROUND	GROUND
INT 3	OPEN	OPEN	OPEN	GROUND	OPEN
INT 4	OPEN	OPEN	GROUND	GROUND	OPEN
INT 5	OPEN	OPEN	GROUND	OPEN	OPEN
LOW	OPEN	OPEN	GROUND	OPEN	GROUND
HIGH	OPEN	GROUND	GROUND	OPEN	GROUND
WASH	GROUND	OPEN/GROUND	OPEN/GROUND	OPEN/GROUND	OPEN/GROUND

Inspection and Verification

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

VISUAL INSPECTION CHART

Mechanical	Electrical
• Windshield washer pump hoses • Windshield wiper mounting arm and pivot shaft	• Bussed electrical center (BEC) fuse 10 (30A) • Smart junction box (SJB) fuse 3 (10A) • Circuitry • Windshield wiper motor • Windshield washer pump • Windshield wiper/washer switch

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, verify the symptom and Go to **Symptom Chart**.

Symptom Chart

Symptom Chart

Condition	Possible Sources	Action
• The wipers are inoperative	• Fuse(s) • Circuitry • Windshield wiper motor	• Go to <u>Pinpoint Test A</u>.

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	• Windshield wiper/washer switch	
• The wipers stay on continuously	• Circuitry • Windshield wiper motor • Windshield wiper/washer switch	• Go to <u>Pinpoint Test B.</u>
• The high/low wiper speeds do not operate correctly	• Circuitry • Windshield wiper/washer switch • Windshield wiper motor	• Go to <u>Pinpoint Test C.</u>
• The intermittent wiper speed does not operate correctly	• Circuitry • Windshield wiper/washer switch • Windshield wiper motor	• Go to <u>Pinpoint Test D.</u>
• The wash and wipe function is inoperative	• Circuitry • Windshield wiper motor • Windshield wiper/washer switch	• If the washer pump is inoperative, go to <u>Pinpoint Test E.</u> • If the washer pump is operative, INSTALL a new wiper motor. TEST the system for normal operation.
• The washer pump is inoperative	• Circuitry • Windshield wiper motor • Windshield washer pump	• Go to <u>Pinpoint Test E.</u>
• The wipers will not park at correct position	• Linkage • Pivot arm adjustment • Windshield wiper motor	• If the wipers immediately stop on the windshield as soon as they are turned off, INSTALL a new windshield wiper motor. • ADJUST the pivot arms, REFER to <u>Wiper Blade and Pivot Arm Adjustment</u> in this article.

Pinpoint Tests

Pinpoint Test A: The Wipers are Inoperative

Refer to appropriate SYSTEM WIRING DIAGRAM ARTICLE, Wipers and Washers for schematic and connector information.

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Normal Operation

The windshield wiper motor receives open and ground inputs from the windshield wiper/washer switch through circuits 56 (DB/OG), 58 (WH), 61 (YE/RD) and 63 (RD) to activate the wipers to the appropriate modes. The internal wiper motor module controls the internal wiper run/park relay to control the windshield wiper motor in conjunction with the internal wiper high/low relay. The windshield wiper motor receives voltage from circuit 2026 (RD/OG) and is grounded through circuit 1205 (BK). The windshield wiper motor internal microprocessor and relays receive voltage from circuit 2025 (RD/YE) and are grounded through circuit 1205 (BK).

This pinpoint test is intended to diagnose the following:

- Fuse(s)
- Wiring, terminals or connectors
- Windshield wiper/washer switch
- Windshield wiper motor

PINPOINT TEST A: THE WIPERS ARE INOPERATIVE

CAUTION: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

A1 CHECK CIRCUITS 2025 (RD/YE) AND 2026 (RD/OG) FOR VOLTAGE

- Key in OFF position.
- Disconnect: Windshield Wiper Motor C125
- Key in ON position.

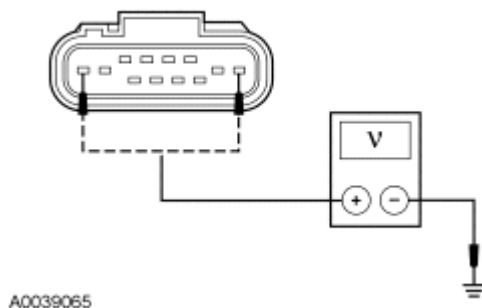


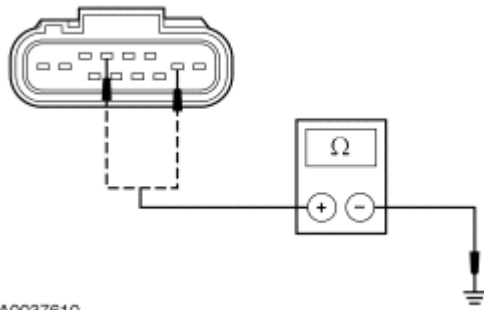
Fig. 1: Checking Circuits 2025 (RD/YE) & 2026 (RD/OG) For Voltage
Courtesy of FORD MOTOR CO.

- Measure the voltage between the windshield wiper motor C125-5, circuit 2026 (RD/OG), harness side and ground; and between windshield wiper motor C125-8, circuit 2025 (RD/YE), harness side and ground.
- **Are the voltages greater than 10 volts?**
YES : Go to A2.

NO : VERIFY the smart junction box (SJB) fuse 3 (10A) and bussed electrical center (BEC) fuse 10 (30A) are OK. If OK, REPAIR the circuit(s) in question. TEST the system for normal operation.

A2 CHECK CIRCUIT 1205 (BK) FOR AN OPEN

- Key in OFF position.



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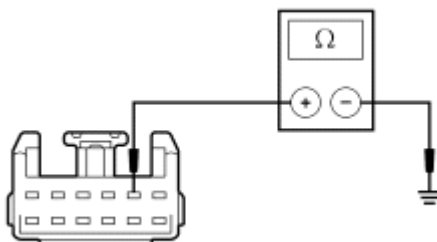
Fig. 2: Checking Circuit 1205 (BK) For An Open
Courtesy of FORD MOTOR CO.

- Measure the resistance between the windshield wiper motor C125-3, circuit 1205 (BK), harness side and ground; and between windshield wiper motor C125-6, circuit 1205 (BK), harness side and ground.
- **Is the resistance less than 5 ohms?**
YES : Go to A3.
NO : REPAIR the circuit. TEST the system for normal operation.

A3 CHECK THE WINDSHIELD WIPER/WASHER SWITCH

- Disconnect: Windshield Wiper/Washer Switch C2137
- Carry out the windshield wiper/washer switch component test. Refer to COMPONENT TESTING.
- **Does the windshield wiper/washer switch pass the component test?**
YES : Go to A4.
NO : INSTALL a new windshield wiper/washer switch. REFER to **Wiper/Washer Switch** in this article.

A4 CHECK CIRCUIT 1205 (BK) FOR AN OPEN



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Fig. 3: Measuring Resistance Between Windshield Wiper/Washer Switch C2137-2, Circuit

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1205 (BK), Harness Side & Ground **Courtesy of FORD MOTOR CO.**

- Measure the resistance between the windshield wiper/washer switch C2137-2, circuit 1205 (BK), harness side and ground.
- **Is the resistance less than 5 ohms?**
YES : Go to A5.
NO : REPAIR the circuit. TEST the system for normal operation.

A5 CHECK FOR SHORTS IN THE WINDSHIELD WIPER MOTOR HARNESS

- Measure the resistance at the windshield wiper motor electrical connector between the circuits shown in the table.

Windshield Wiper Motor C125	Windshield Wiper Motor C125
Pin 10, circuit 56 (DB/OG)	Pin 11, circuit 58 (WH)
	Pin 1, circuit 63 (RD)
	Pin 9, circuit 61 (YE/RD)
Pin 11, circuit 58 (WH)	Pin 1, circuit 63 (RD)
	Pin 9, circuit 61 (YE/RD)
Pin 1, circuit 63 (RD)	Pin 9, circuit 61 (YE/RD)

- **Is the resistance greater than 10,000 ohms for all measurements?**
YES : Go to A6.
NO : REPAIR the circuit. TEST the system for normal operation.

A6 CHECK FOR CORRECT WINDSHIELD WIPER MOTOR OPERATION

- Disconnect all the windshield wiper motor connectors.
- Check for:
 - corrosion.
 - pushed-out pins.

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- Connect all the windshield wiper motor 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 windshield wiper motor. REFER to **Wiper Motor** in this article. 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.

Pinpoint Test B: The Wipers Stay On Continuously

Refer to appropriate SYSTEM WIRING DIAGRAM ARTICLE, Wipers and Washers for schematic and connector information.

Normal Operation

The windshield wiper motor receives open and ground inputs from the windshield wiper/washer switch through circuits 56 (DB/OG), 58 (WH), 61 (YE/RD) and 63 (RD) to activate the wipers to the appropriate modes. The module (internal) controls the run/park relay (internal) using internal circuitry to control the windshield wiper motor in conjunction with the high/low relay (internal).

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Windshield wiper motor
- Windshield wiper/washer switch

PINPOINT TEST B: THE WIPERS STAY ON CONTINUOUSLY

CAUTION: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

B1 CHECK THE WINDSHIELD WIPER/WASHER SWITCH

- Key in OFF position.
- Disconnect: Windshield Wiper/Washer Switch C2137
- Carry out the windshield wiper/washer switch component test. Refer to COMPONENT TESTING.
- **Does the windshield wiper/washer switch pass the component test?**

YES : Go to B2.

NO : INSTALL a new windshield wiper/washer switch. REFER to **Wiper/Washer Switch** in this article.

B2 CHECK CIRCUITS 56 (DB/OG), 58 (WH), 61 (YE/RD) AND 63 (RD) FOR A SHORT TO GROUND

- Disconnect: Windshield Wiper Motor C125

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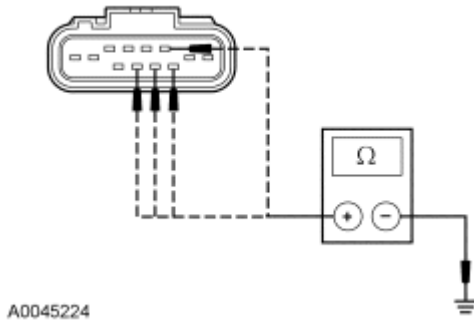


Fig. 4: Checking Circuits 56 (DB/OG), 58 (WH), 61 (YE/RD) & 63 (RD) For A Short To Ground
Courtesy of FORD MOTOR CO.

- Using the following table, measure the resistance between windshield wiper motor C125 harness side and ground:

Windshield Wiper Motor C125 Pin	Circuit
C125-10	56 (DB/OG)
C125-11	58 (WH)
C125-1	63 (RD)
C125-9	61 (YE/RD)

- **Are the resistances greater than 10,000 ohms?**

YES : Go to B3.

NO : REPAIR the circuit(s) in question. TEST the system for normal operation.

B3 CHECK FOR CORRECT WINDSHIELD WIPER MOTOR OPERATION

- Disconnect all the windshield wiper motor connectors.
- Check for:
 - corrosion.
 - pushed-out pins.
- Connect all the windshield wiper motor 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 windshield wiper motor. REFER to **Wiper Motor** in this article. 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.

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Pinpoint Test C: The High/Low Wiper Speeds Do Not Operate Correctly

Refer to appropriate SYSTEM WIRING DIAGRAM ARTICLE, Wipers and Washers for schematic and connector information.

Normal Operation

The windshield wiper motor receives open and ground inputs from the windshield wiper/washer switch through circuits 56 (DB/OG), 58 (WH), 61 (YE/RD) and 63 (RD) to activate the wipers to the appropriate modes. The module (internal) controls the wiper run/park relay (internal) using internal circuitry to control the motor in conjunction with the high/low relay (internal).

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Windshield wiper/washer switch
- Windshield wiper motor

PINPOINT TEST C: THE HIGH/LOW WIPER SPEEDS DO NOT OPERATE CORRECTLY

CAUTION: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

C1 CHECK THE WINDSHIELD WIPER/WASHER SWITCH

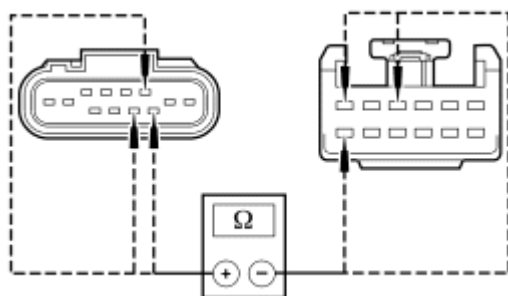
- Key in OFF position.
- Disconnect: Windshield Wiper/Washer Switch C2137
- Carry out the windshield wiper/washer switch component test. Refer to COMPONENT TESTING.
- **Does the windshield wiper/washer switch pass the component test?**

YES : Go to C2.

NO : INSTALL a new windshield wiper/washer switch. REFER to **Wiper/Washer Switch** in this article.

C2 CHECK CIRCUITS 56 (DB/OG), 61 (YE/RD) AND 63 (RD) FOR AN OPEN

- Disconnect: Windshield Wiper Motor C125



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Fig. 5: Checking Circuits 56 (DB/OG), 61 (YE/RD) & 63 (RD) For An Open
Courtesy of FORD MOTOR CO.

- Using the following table, measure the resistance between windshield wiper/washer switch C2137 harness side and windshield wiper motor C125 harness side:

Windshield Wiper/Washer Switch C2137	Windshield Wiper Motor C125
Pin 12, circuit 56 (DB/OG)	Pin 10, circuit 56 (DB/OG)
Pin 4, circuit 63 (RD)	Pin 1, circuit 63 (RD)
Pin 6, circuit 61 (YE/RD)	Pin 9, circuit 61 (YE/RD)

- Is the resistance less than 5 ohms?

YES : Go to C3.

NO : REPAIR the circuit(s) in question. TEST the system for normal operation.

C3 CHECK CIRCUITS 56 (DB/OG), 61 (YE/RD) AND 63 (RD) FOR A SHORT TO GROUND

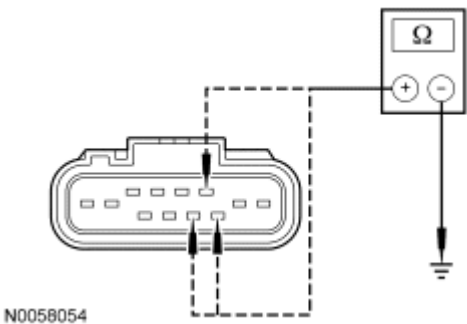


Fig. 6: Checking Circuits 56 (DB/OG), 61 (YE/RD) & 63 (RD) For A Short To Ground
Courtesy of FORD MOTOR CO.

- Using the following table, measure the resistance between windshield wiper motor C125 harness side and ground:

Windshield Wiper Motor C125	Ground

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Pin 10, circuit 56 (DB/OG)	Ground
Pin 1, circuit 63 (RD)	Ground
Pin 9, circuit 61 (YE/RD)	Ground

- **Is the resistance greater than 10,000 ohms?**

YES : Go to C4.

NO : REPAIR the circuit(s) in question. TEST the system for normal operation.

C4 CHECK FOR SHORTS IN THE WINDSHIELD WIPER MOTOR HARNESS

- Measure the resistance at the windshield wiper motor electrical connector between the circuits shown in the table.

Windshield Wiper Motor C125	Windshield Wiper Motor C125
Pin 10, circuit 56 (DB/OG)	Pin 11, circuit 58 (WH)
	Pin 1, circuit 63 (RD)
	Pin 9, circuit 61 (YE/RD)
Pin 11, circuit 58 (WH)	Pin 1, circuit 63 (RD)
	Pin 9, circuit 61 (YE/RD)
Pin 1, circuit 63 (RD)	Pin 9, circuit 61 (YE/RD)

- **Is the resistance greater than 10,000 ohms for all measurements?**

YES : Go to C5.

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

C5 CHECK FOR CORRECT WINDSHIELD WIPER MOTOR OPERATION

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- Disconnect all the windshield wiper motor connectors.
- Check for:
 - corrosion.
 - pushed-out pins.
- Connect all the windshield wiper motor 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 windshield wiper motor. REFER to **Wiper Motor** in this article. 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.

Pinpoint Test D: The Intermittent Wiper Speed Does Not Operate Correctly

Refer to appropriate SYSTEM WIRING DIAGRAM ARTICLE, Wipers and Washers for schematic and connector information.

Normal Operation

The windshield wiper motor receives open and ground inputs from the windshield wiper/washer switch through circuits 56 (DB/OG), 58 (WH), 61 (YE/RD) and 63 (RD) to activate the wipers to the appropriate modes. The module (internal) controls the wiper run/park relay (internal) using internal circuitry to control the motor in conjunction with the high/low relay (internal).

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Windshield wiper motor
- Windshield wiper/washer switch

PINPOINT TEST D: THE INTERMITTENT WIPER SPEED DOES NOT OPERATE CORRECTLY

CAUTION: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

D1 CHECK THE WINDSHIELD WIPER/WASHER SWITCH

- Key in OFF position.
- Disconnect: Windshield Wiper/Washer Switch C2137
- Carry out the windshield wiper/washer switch component test. Refer to COMPONENT TESTING.
- **Does the windshield wiper/washer switch pass the component test?**

YES : Go to D2.

NO : INSTALL a new windshield wiper/washer switch. REFER to **Wiper/Washer Switch** in this

article.

D2 CHECK CIRCUITS 56 (DB/OG), 58 (WH) AND 61 (YE/RD) FOR AN OPEN

- Disconnect: Windshield Wiper Motor C125

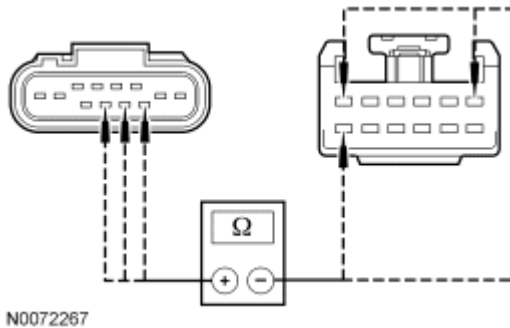


Fig. 7: Checking Circuits 56 (DB/OG), 58 (WH) & 61 (YE/RD) For An Open
Courtesy of FORD MOTOR CO.

- Using the following table, measure the resistance between windshield wiper/washer switch C2137 harness side and windshield wiper motor C125 harness side:

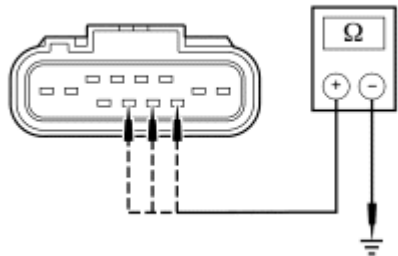
Windshield Wiper/Washer Switch C2137	Windshield Wiper Motor C125
Pin 12, circuit 56 (DB/OG)	Pin 10, circuit 56 (DB/OG)
Pin 6, circuit 61 (YE/RD)	Pin 9, circuit 61 (YE/RD)
Pin 1, circuit 58 (WH)	Pin 11, circuit 58 (WH)

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

YES : Go to D3.

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

D3 CHECK CIRCUITS 56 (DB/OG), 58 (WH) AND 61 (YE/RD) FOR A SHORT TO GROUND



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Fig. 8: Checking Circuits 56 (DB/OG), 58 (WH) & 61 (YE/RD) For A Short To Ground
Courtesy of FORD MOTOR CO.

- Using the following table, measure the resistance between windshield wiper motor C125 harness side and ground:

Windshield Wiper Motor C125	Ground
Pin 10, circuit 56 (DB/OG)	Ground
Pin 11, circuit 58 (WH)	Ground
Pin 9, circuit 61 (YE/RD)	Ground

- **Is the resistance greater than 10,000 ohms?**

YES : Go to D4.

NO : REPAIR the circuit(s) in question. TEST the system for normal operation.

D4 CHECK FOR SHORTS IN THE WINDSHIELD WIPER MOTOR HARNESS

- Measure the resistance at the windshield wiper motor electrical connector between the circuits shown in the table.

Windshield Wiper Motor C125	Windshield Wiper Motor C125
Pin 10, circuit 56 (DB/OG)	Pin 11, circuit 58 (WH)
	Pin 1,

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	circuit 63 (RD)
	Pin 9, circuit 61 (YE/RD)
Pin 11, circuit 58 (WH)	Pin 1, circuit 63 (RD)
	Pin 9, circuit 61 (YE/RD)
Pin 1, circuit 63 (RD)	Pin 9, circuit 61 (YE/RD)

- **Is the resistance greater than 10,000 ohms for all measurements?**

YES : Go to D5.

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

D5 CHECK FOR CORRECT WINDSHIELD WIPER MOTOR OPERATION

- Disconnect all the windshield wiper motor connectors.
- Check for:
 - corrosion.
 - pushed-out pins.
- Connect all the windshield wiper motor 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 windshield wiper motor. REFER to **Wiper Motor** in this article. 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.

Pinpoint Test E: The Washer Pump is Inoperative

Refer to appropriate SYSTEM WIRING DIAGRAM ARTICLE, Wipers and Washers for schematic and connector information.

Normal Operation

When activated, the windshield wiper/washer switch sends a ground signal through circuit 680 (LB/OG) to the windshield wiper motor. The windshield wiper motor then supplies voltage through circuit 941 (BK/WH) to activate the windshield washer pump motor. Ground is provided to the windshield washer pump through circuit 1205 (BK).

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This pinpoint test is intended to diagnose the following:

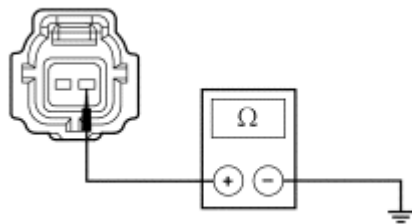
- Wiring, terminals or connectors
- Windshield wiper motor
- Windshield washer pump

PINPOINT TEST E: THE WASHER PUMP IS INOPERATIVE

CAUTION: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

E1 CHECK CIRCUIT 1205 (BK) FOR AN OPEN

- Key in OFF position.
- Disconnect: Washer Pump Motor C137



GK9963-A

Fig. 9: Measuring Resistance Between Windshield Washer Pump C137-2, Circuit 1205 (BK), Harness Side & Ground
Courtesy of FORD MOTOR CO.

- Measure the resistance between the windshield washer pump C137-2, circuit 1205 (BK), harness side and ground.
- **Is the resistance less than 5 ohms?**
YES : Go to E2.
NO : REPAIR the circuit. TEST the system for normal operation.

E2 CHECK THE WINDSHIELD WASHER PUMP FOR VOLTAGE

- Key in ON position.

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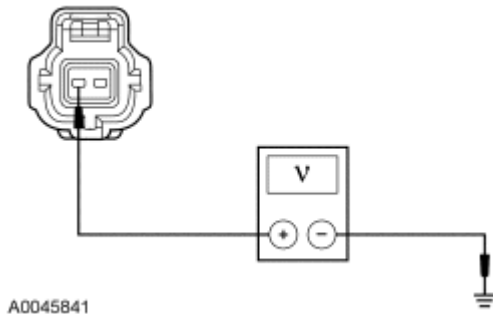


Fig. 10: Checking Windshield Washer Pump For Voltage
Courtesy of FORD MOTOR CO.

- Measure the voltage between the windshield washer pump C137-1, circuit 941 (BK/WH) harness side and ground while pressing the windshield wiper/washer switch to the WASH position.
- **Is the voltage greater than 10 volts?**
YES : INSTALL a new washer pump. REFER to **Washer Pump and Reservoir** in this article.
NO : Go to E3.

E3 CHECK THE WINDSHIELD WIPER/WASHER SWITCH

- Key in OFF position.
- Disconnect: Windshield Wiper/Washer Switch C2137
- Carry out the windshield wiper/washer switch component test. Refer to COMPONENT TESTING.
- **Does the windshield wiper/washer switch pass the component test?**
YES : Go to E4.
NO : INSTALL a new windshield wiper/washer switch. REFER to **Wiper/Washer Switch** in this article.

E4 CHECK CIRCUIT 680 (LB/OG) FOR AN OPEN CIRCUIT

- Disconnect: Windshield Wiper Motor C125

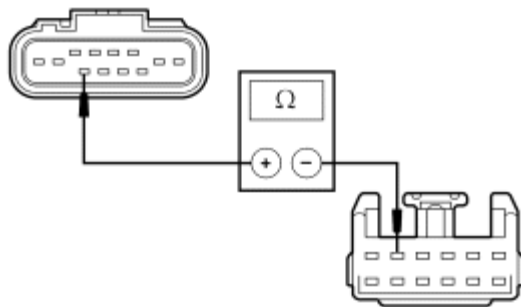


Fig. 11: Measuring Resistance Between Windshield Wiper/Washer Switch C2137-5, Circuit 680 (LB/OG)
Courtesy of FORD MOTOR CO.

- Measure the resistance between the windshield wiper/washer switch C2137-5, circuit 680

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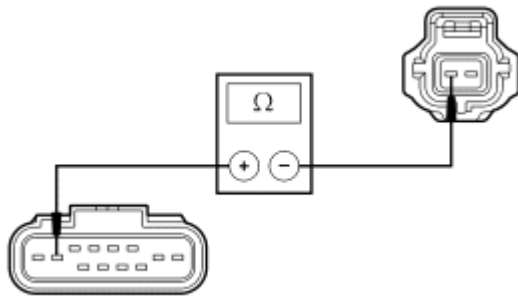
(LB/OG), harness side and windshield wiper motor connector C125-12, circuit 680 (LB/OG), harness side.

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

YES : Go to E5.

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

E5 CHECK CIRCUIT 941 (BK/WH) FOR AN OPEN CIRCUIT



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Fig. 12: Measuring Resistance Between Windshield Wiper Motor Connector C125-7, Circuit 941 (BK/WH)

Courtesy of FORD MOTOR CO.

- Measure the resistance between the windshield wiper motor connector C125-7, circuit 941 (BK/WH), harness side and the windshield washer pump connector C137-1, circuit 941 (BK/WH), harness side.

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

YES : Go to E6.

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

E6 CHECK FOR CORRECT WINDSHIELD WIPER MOTOR OPERATION

- Disconnect the windshield wiper motor connectors.
- Check for:
 - corrosion.
 - pushed-out pins.
- Connect all the windshield wiper motor 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 windshield wiper motor. REFER to **Wiper Motor** in this article. 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.

GENERAL PROCEDURES

WIPER BLADE AND PIVOT ARM ADJUSTMENT

NOTE: When adjusting the wiper pivot arms, the wiper blades must not be less than the specified distance from the cowl weatherstrip.

1. Cycle and park the windshield wipers.

NOTE: Make sure there is no mechanical binding in the linkage preventing the wiper arms from returning to the fully PARKED position.

2. Verify that the RH windshield wiper blade is 33-45 mm (1.29-1.77 in) above the cowl weatherstrip.

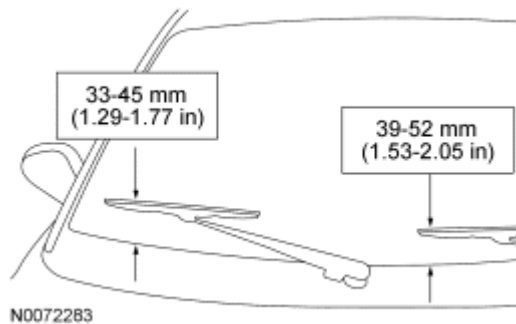


Fig. 13: Verifying That RH Windshield Wiper Blade Is 33-45 mm (1.29-1.77 in) Above Cowl Weatherstrip
Courtesy of FORD MOTOR CO.

3. Verify that the LH wiper blade is 39-52 mm (1.53-2.05 in) above the cowl weatherstrip.
4. If the distance is not within specification, remove the windshield wiper pivot arms and reposition to specification. For additional information, refer to **Wiper Pivot Arm** in this article.

REMOVAL AND INSTALLATION

WIPER AND WASHER SYSTEM - EXPLODED VIEW

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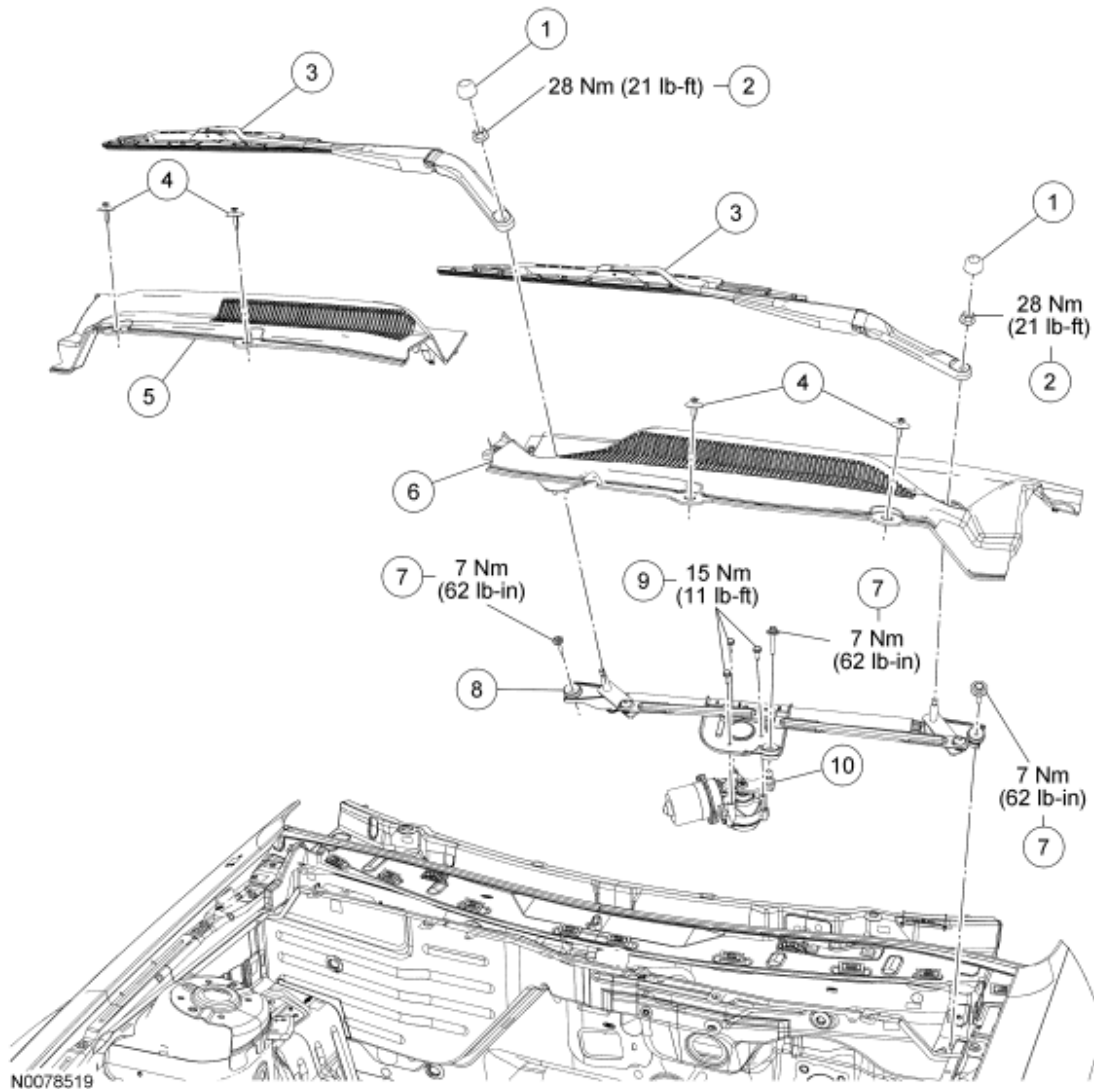
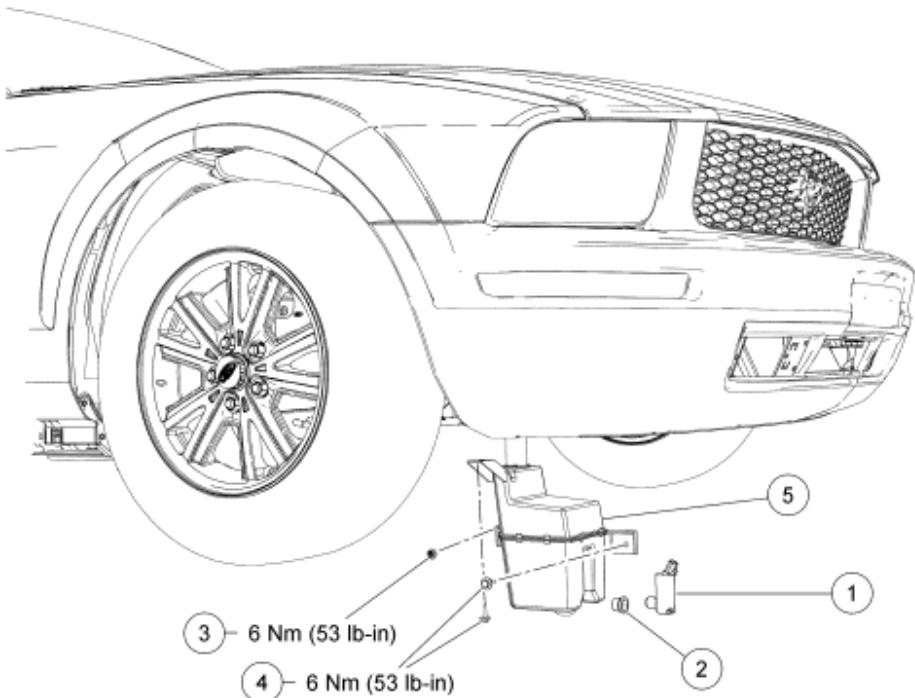


Fig. 14: Exploded View Of Windshield Wiper System With Torque Specifications
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	17C526	Wiper pivot arm nut covers (2 required)
2	W706109	Wiper pivot arm nuts (2 required)
3	17526 RH/ 17527 LH	Wiper pivot arms
4	N804837	Cowl top vent screen pin-type retainers (4 required)
5	63018A16	RH cowl top vent screen
6	63018A17	LH cowl top vent screen
7	W707532	Windshield wiper mounting arm and pivot shaft bolts (3 required)
8	17508	Windshield wiper mounting arm and pivot shaft
9	-	Windshield wiper motor bolts (3 required)



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Fig. 15: Exploded View Of Windshield Washer Pump & Fluid Reservoir With Torque Specifications
 Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	17664	Windshield washer pump (or part of 17618)
2	17B610	Windshield washer pump seal (or part of 17664)
3	W623332	Windshield washer fluid reservoir nut
4	W710381	Windshield washer fluid reservoir bolts (2 required)
5	17618	Windshield washer fluid reservoir (includes 17664 and 17B618)

- For additional information, refer to the procedures in this article.

WIPER PIVOT ARM

REMOVAL AND INSTALLATION

NOTE: **New wiper pivot arms need to be installed as an assembly.**

- Remove the 2 wiper pivot arm nut covers.
- Remove the 2 wiper pivot arm nuts and the 2 wiper pivot arms.

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- Tighten to 28 N.m (21 lb-ft).
- 3. To install, reverse the removal procedure.
 - Adjust the wiper pivot arms. For additional information, refer to **Wiper Blade and Pivot Arm Adjustment** in this article.

WIPER MOUNTING ARM AND PIVOT SHAFT

REMOVAL AND INSTALLATION

1. Remove the RH and LH cowl vent screens. For additional information, refer to **FRONT END BODY PANELS** article.
2. Remove the 3 bolts and the windshield wiper mounting arm and pivot shaft.
 - To install, tighten to 7 Nm (62 lb-in).
3. Disconnect the windshield wiper motor electrical connector.
4. To install, reverse the removal procedure.

WIPER MOTOR

REMOVAL AND INSTALLATION

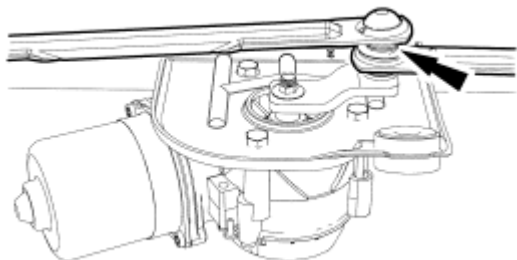
CAUTION: The internal permanent magnets used in the windshield wiper motor are made of a glass-like material. To avoid damaging the magnets, do not handle the windshield wiper motor roughly or strike the motor with a hammer or any other object.

NOTE: A new wiper motor assembly comes with the linkage arm installed.

1. Remove the wiper mounting arm and pivot shaft. For additional information, refer to **Wiper Mounting Arm and Pivot Shaft** in this article.

NOTE: Do not remove the wiper motor linkage arm from the wiper motor assembly. If the arm is removed, the wiper arms may not park in the correct location.

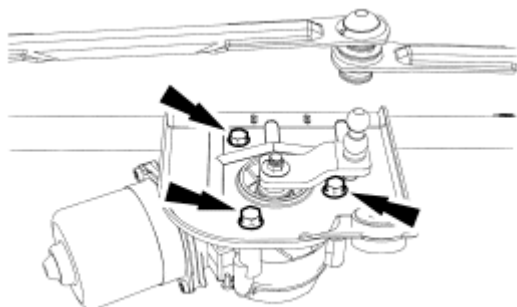
2. Separate the wiper motor linkage arm from the wiper mounting arm and pivot shaft assembly.
 - Use a suitable tool at the location shown to separate the wiper linkage arm from the wiper mounting arm and pivot shaft assembly.



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Fig. 16: Separating Wiper Linkage Arm From Wiper Mounting Arm & Pivot Shaft Assembly
Courtesy of FORD MOTOR CO.

3. Remove the 3 bolts and the windshield wiper motor.
 - To install, tighten to 15 N.m (11 lb-ft).



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Fig. 17: Locating Windshield Wiper Motor Bolts
Courtesy of FORD MOTOR CO.

4. To install, reverse the removal procedure.

WASHER PUMP AND RESERVOIR

Material

Item	Specification
Premium Windshield Washer Concentrate (US) ZC-32-A or B (US)	WSB-M8B16-A2
Premium Quality Windshield Washer Fluid (Canada) CXC-37-(A, B, C, D, E, F, G, H) (Canada)	-

REMOVAL AND INSTALLATION

Windshield washer pump or fluid reservoir

WARNING: Carefully read cautionary information on product label. For EMERGENCY

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MEDICAL INFORMATION seek medical advice. In the USA or Canada on Ford/Motorcraft products call: 1-800-959-3673. For additional information, consult the product Material Safety Data Sheet (MSDS) if available. Failure to follow these instructions may result in serious personal injury.

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING AND LIFTING** article.
2. Disconnect windshield washer pump hose and drain the windshield washer solvent.
3. Disconnect the windshield washer pump electrical connector.

Windshield washer pump only

4. Remove the windshield washer pump.

Windshield washer fluid reservoir

5. Remove the 2 windshield washer fluid reservoir bolts.
 - To install, tighten to 6 N.m (53 lb-in).
6. Remove the nut and the windshield washer fluid reservoir.
 - To install, tighten to 6 N.m (53 lb-in).

Windshield washer pump or fluid reservoir

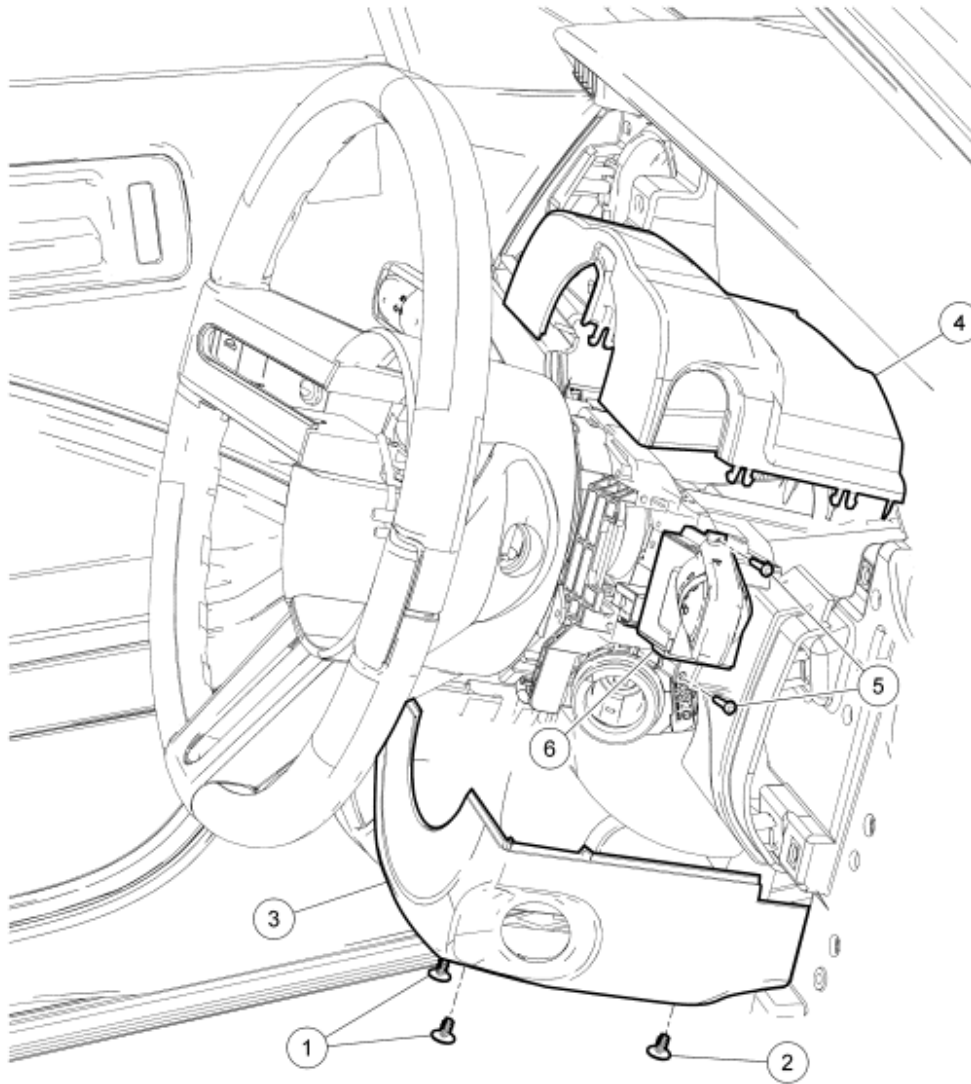
CAUTION: Do not operate the windshield pump before filling the windshield washer reservoir. Failure to do so could result in premature pump failure.

7. To install, reverse the removal procedure.

WIPER/WASHER SWITCH

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N0051525

Fig. 18: Exploded View Of Windshield Wiper/Washer Switch
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	W710937	Steering column lower shroud screws (2 required)
2	W706805	Steering column lower shroud screw
3	3530	Steering column lower shroud
4	3530	Steering column upper shroud
5	-	Windshield wiper/washer switch screws (2 required)
6	17A553	Windshield wiper/washer switch

REMOVAL AND INSTALLATION

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1. Remove the 3 screws and the steering column upper and lower shrouds.
2. Remove the 2 windshield wiper/washer switch screws.
3. Disconnect the electrical connector and remove the windshield wiper/washer switch.
4. To install, reverse the removal procedure.