

2005 Ford Focus ZX5 S

2005 BRAKES Anti-Lock Control - Focus

2005 BRAKES

Anti-Lock Control - Focus

SPECIFICATIONS

GENERAL SPECIFICATIONS

GENERAL SPECIFICATIONS

Item	Specification
Lubricants	
High Performance DOT 3 Motor Vehicle Brake Fluid PM-1 (Canada CPM-1)	ESA-M6C25-A
High Temperature Nickel Anti-Seize Lubricant XL-2	ESE-M12A4-A

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Description	Nm	lb-ft	lb-in
Anti-lock brake system (ABS) module to hydraulic control unit (HCU) bolts	2	-	18
Brake tube-to-HCU	18	13	-
HCU bracket-to-body bolts	9	-	80
HCU-to-bracket bolts	9	-	80
Wheel speed sensor bolts	9	-	80

DESCRIPTION AND OPERATION

ANTI-LOCK CONTROL

The anti-lock brake system (ABS) consists of the following components:

- Anti-lock brake system (ABS) module
- Hydraulic control unit (HCU)
- Front wheel speed sensor
- Front wheel speed sensor ring

- Rear wheel speed sensor
- Rear wheel speed sensor ring
- Red brake warning indicator
- Traction control switch
- Yellow ABS warning indicator

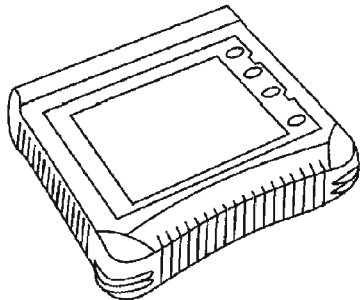
DIAGNOSIS AND TESTING

ANTI-LOCK CONTROL

Refer to **ANTI-LOCK BRAKES** in SYSTEM WIRING DIAGRAMS article for schematic and connector information.

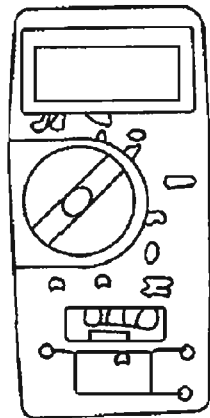
Special Tool(s)

SPECIAL TOOLS DESCRIPTION



ST2332-A

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



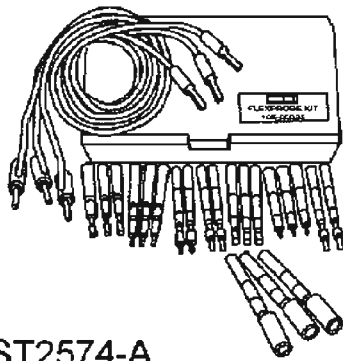
ST1137-A

73III Automotive Meter 105-R0057 or
equivalent

Flex Probe Kit 105-R025B

2005 Ford Focus ZX5 S

2005 BRAKES Anti-Lock Control - Focus



ST2574-A

Principles of Operation

Anti-lock Brake System (ABS)

The ABS module executes control of the anti-lock brakes and full speed traction control functions to enhance driver control of the vehicle. The ABS module manages the interactions between the anti-lock, traction control, and engine control systems to optimize the vehicle traction during deceleration and acceleration.

The ABS module continuously monitors and compares the rotational speed of each wheel. The rotational wheel speed is measured by the wheel speed sensor which electrically senses the pole pairs of the magnetic encoder ring passing the sensor head.

The ABS module is self-monitoring. When the ignition switch is turned to the RUN position, the ABS module carries out a preliminary electrical check. At approximately 20 km/h (12 mph) the pump motor is turned on for approximately 0.5 second. Any concern with the ABS causes the ABS module to shut off, the ABS warning indicator to illuminate, and the power assist braking system to function normally.

Traction Control

The traction control system helps maintain vehicle traction at the limits of tire adhesion. System effectiveness varies with vehicle speed, road conditions, and steering inputs.

The ABS module defaults to ON when the engine is started.

The traction control switch (TCS) allows the driver to control the ON/OFF operation of the traction control system by pressing the switch for a minimum of 1 second, independent of the ABS function. The ABS control system cannot be switched off by the driver. The traction control system status is indicated by a traction control system warning light. An illuminated traction control warning light in the instrument cluster indicates that the system has been switched off by the traction control switch, or a system error has been detected and the system function is disabled. A flashing warning light indicates that wheel slip has occurred. The warning light remains flashing until traction control intervention is no longer

required.

The ABS module communicates with the powertrain control module (PCM) requesting assistance with traction control. At speeds under 40 km/h (25 mph) the ABS module requests the PCM to reduce engine torque, while simultaneously applying and releasing the appropriate brake to restore traction when one or both drive wheels lose traction and begin to spin. The PCM accomplishes this by minor incremental ignition timing changes and fewer fuel injector pulses until the driven wheel speed returns to normal and the traction control module ends the request. After the vehicle speed exceeds 40 km/h (25 mph), the traction control is accomplished only by the PCM controlling the torque.

During a traction control event you may experience any of the following normal behaviors:

- A rumble or grinding sound much like ABS
- A small deceleration of the vehicle
- The traction control indicator will flash

The ABS module continually monitors all sensors and actuators used to improve the traction control of the vehicle. Some drivers may notice a slight movement of the brake pedal when the system checks itself. If the brake system has not been bled correctly, the brake pedal movement may become more significant. The ABS function continues to work as designed unless the yellow ABS warning indicator is also illuminated. The normal brake function should always occur, unless the red brake warning indicator is illuminated.

Electronic Brake Distribution (EBD)

The EBD controls rear brake pressure and acts as an electronic proportioning valve. It is controlled by the ABS module. When EBD is disabled, the amber ABS warning indicator and the red brake warning indicator will illuminate.

Inspection and Verification

NOTE: If a new ABS module is installed, it must be configured. REFER to MODULE CONFIGURATION .

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

VISUAL INSPECTION CHART

Mechanical	Electrical
<ul style="list-style-type: none"> • Wheel speed sensor • HCU • Incorrectly inflated 	<ul style="list-style-type: none"> • Battery junction box <ul style="list-style-type: none"> ○ (30A) ○ (20 A)

2005 Ford Focus ZX5 S

2005 BRAKES Anti-Lock Control - Focus

tires	o (10A) (vehicles built after 11/2004)
• Ford specified steering components, suspension components and tire size	• Central junction box (CJB) fuse 46 (7.5A) (vehicles built before 11/2004)
• Wheel speed sensor ring	• Circuitry
	• ABS module
	• Traction control switch
	• Wheel speed sensor

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:
 - o CAN circuit fault; all electronic control units no response/not equipped, refer to **MODULE COMMUNICATIONS NETWORK** .
 - o No response/not equipped for ABS module, GO to **PINPOINT TEST A**.
 - o System passed, retrieve and record the continuous diagnostic trouble codes (DTCs), erase the continuous DTCs and carry out self-test diagnostics for the ABS module.
7. If the DTCs retrieved are related to the concern, go to the Anti-lock Brake System (ABS) Module Diagnostic Trouble Code (DTC) Index.
8. If no DTCs related to the concern are retrieved, GO to **SYMPTOM CHART**.

Anti-Lock Brake System (ABS) Module Diagnostic Trouble Code (DTC) Index

ANTI-LOCK BRAKE SYSTEM (ABS) MODULE DIAGNOSTIC TROUBLE CODE (DTC) INDEX

DTC	Description	Source	Action
B1342	ECU Is Defective	ABS Module	NOTE:

2005 Ford Focus ZX5 S

2005 BRAKES Anti-Lock Control - Focus

			<p>If other DTCs are present, REPAIR them before installing a new component.</p> <p>CLEAR the DTCs. RETRIEVE the DTCs. If DTC B1342 is retrieved, INSTALL a new module. REFER to ANTI-LOCK BRAKE SYSTEM (ABS) MODULE. REPEAT the self-test.</p>
B1317	Battery Voltage High	ABS Module	GO to <u>PINPOINT TEST C</u> .
B1318	Battery Voltage Low	ABS Module	GO to <u>PINPOINT TEST C</u> .
B2141	NVM Configuration Failure	ABS Module	REFER to <u>MODULE CONFIGURATION</u> .
C1095	ABS Hydraulic Pump Motor Circuit Failure	ABS Module	GO to <u>PINPOINT TEST D</u> .
C1141	Wheel Speed Sensor LF Tone Ring Tooth Missing Fault	ABS Module	<p>INSPECT the LF tone ring for missing/damaged teeth or debris. INSTALL a new wheel speed sensor ring as necessary. REFER to <u>FRONT SUSPENSION</u>. CLEAR the DTCs. REPEAT the self-test.</p>
C1142	Wheel Speed Sensor RF Tone Ring Tooth Missing Fault	ABS Module	<p>INSPECT the RF tone ring for missing/damaged teeth or debris. INSTALL a new wheel speed sensor ring as necessary. REFER to <u>FRONT SUSPENSION</u>. CLEAR the DTCs. REPEAT the self-test.</p>
C1143	Wheel Speed Sensor LR Tone Ring Tooth Missing Fault	ABS Module	<p>INSPECT the LR tone ring for missing/damaged teeth or debris. INSTALL a new wheel speed sensor ring as necessary. REFER to <u>REAR SUSPENSION</u>. CLEAR the DTCs. REPEAT the self-test.</p>
C1144	Wheel Speed Sensor RR Tone Ring Tooth Missing Fault	ABS Module	<p>INSPECT the RR tone ring for missing/damaged teeth or debris. INSTALL a new wheel speed sensor ring as necessary. REFER to <u>REAR SUSPENSION</u>. CLEAR the</p>

2005 Ford Focus ZX5 S

2005 BRAKES Anti-Lock Control - Focus

			DTCs. REPEAT the self-test.
C1145	Speed Wheel Sensor RF Input Circuit Failure	ABS Module	GO to <u>PINPOINT TEST E.</u>
C1155	Speed Wheel Sensor LF Input Circuit Failure	ABS Module	GO to <u>PINPOINT TEST E.</u>
C1165	Speed Wheel Sensor RR Input Circuit Failure	ABS Module	GO to <u>PINPOINT TEST E.</u>
C1175	Speed Wheel Sensor LR Input Circuit Failure	ABS Module	GO to <u>PINPOINT TEST E.</u>
C1233	Speed Wheel LF Input Signal Missing	ABS Module	GO to <u>PINPOINT TEST F.</u>
C1234	Speed Wheel RF Input Signal Missing	ABS Module	GO to <u>PINPOINT TEST F.</u>
C1235	Speed Wheel RR Input Signal Missing	ABS Module	GO to <u>PINPOINT TEST F.</u>
C1236	Speed Wheel LR Input Signal Missing	ABS Module	GO to <u>PINPOINT TEST F.</u>
C1267	ABS Functions Temporarily Disabled	ABS Module	GO to <u>PINPOINT TEST G.</u>
C1446	Brake Switch Circuit Failure	ABS Module	GO to <u>PINPOINT TEST B.</u>
C1470	TCS Functions Temporarily Disabled (Thermal Brake Protection)	ABS Module	Allow brakes to cool. CLEAR the DTCs. REPEAT the self-test.
U1900	CAN Communication Bus Fault Receive Error	Network Fault	REFER to <u>MODULE COMMUNICATIONS NETWORK .</u>
U2012	Communication Bus Error (Non-SCP)	Network Fault	REFER to <u>MODULE COMMUNICATIONS NETWORK .</u>
U2023	Invalid	PCM	REFER to <u>MODULE</u>

2005 Ford Focus ZX5 S

2005 BRAKES Anti-Lock Control - Focus

	Configuration Data Received		<u>COMMUNICATIONS NETWORK</u> .
U2202	Invalid Configuration Data Received	PCM	REFER to the <u>MODULE CONFIGURATION</u> .

Symptom Chart

SYMPTOM CHART

Condition	Possible Sources	Action
<ul style="list-style-type: none"> No communication with the anti-lock brake system (ABS) module 	<ul style="list-style-type: none"> Battery junction box (BJB) fuse(s): <ul style="list-style-type: none"> (20 A). (10A) (vehicles built after 11/2004). Central junction box (CJB) fuse 46 (20A) (vehicles built before 11/2004). Circuitry. CJB. ABS module. 	<ul style="list-style-type: none"> GO to <u>PINPOINT TEST A</u>.
<ul style="list-style-type: none"> The yellow anti-lock brake system (ABS) warning indicator is never/always on 	<ul style="list-style-type: none"> Circuitry. Instrument cluster. ABS module. 	<ul style="list-style-type: none"> REFER to <u>INSTRUMENT CLUSTER</u> .
<ul style="list-style-type: none"> The red brake warning indicator does not self-check 	<ul style="list-style-type: none"> Circuitry. Instrument cluster. Brake fluid level sensor. 	<ul style="list-style-type: none"> REFER to <u>INSTRUMENT CLUSTER</u> .
<ul style="list-style-type: none"> The red brake warning indicator stays on when the ignition switch is in RUN 	<ul style="list-style-type: none"> Circuitry. Brake fluid level sensor. Instrument cluster. Anti-lock brake system (ABS) module. 	<ul style="list-style-type: none"> REFER to <u>INSTRUMENT CLUSTER</u> .

2005 Ford Focus ZX5 S

2005 BRAKES Anti-Lock Control - Focus

	<ul style="list-style-type: none"> • Base brakes. • Parking brake. 	<ul style="list-style-type: none"> • REFER to <u>BRAKE SYSTEM-GENERAL INFORMATION</u> .
<ul style="list-style-type: none"> • The yellow anti-lock brake system (ABS) warning indicator does not self-check 	<ul style="list-style-type: none"> • Circuitry. • Instrument cluster. • ABS module. 	<ul style="list-style-type: none"> • REFER to <u>INSTRUMENT CLUSTER</u> .
<ul style="list-style-type: none"> • Spongy brake pedal with no warning indicator 	<ul style="list-style-type: none"> • Air in brake hydraulic system. 	<ul style="list-style-type: none"> • REFER to <u>BRAKE SYSTEM-GENERAL INFORMATION</u> .
<ul style="list-style-type: none"> • The traction control is inoperative 	<ul style="list-style-type: none"> • Circuitry. • Traction control switch (TCS). • Anti-lock brake system (ABS) module. 	<ul style="list-style-type: none"> • GO to <u>PINPOINT TEST H</u>. • REFER to <u>BRAKE SYSTEM-GENERAL INFORMATION</u> .
	<ul style="list-style-type: none"> • Base brake system. 	
<ul style="list-style-type: none"> • The traction control indicator is never/always on 	<ul style="list-style-type: none"> • Circuitry. • Traction control switch (TCS). • Anti-lock brake system (ABS) module. 	<ul style="list-style-type: none"> • REFER to <u>INSTRUMENT CLUSTER</u> .
<ul style="list-style-type: none"> • The traction control system cannot be disabled 	<ul style="list-style-type: none"> • Circuitry. • Traction control switch (TCS). • Anti-lock brake system (ABS) module. 	<ul style="list-style-type: none"> • GO to <u>PINPOINT TEST I</u>.

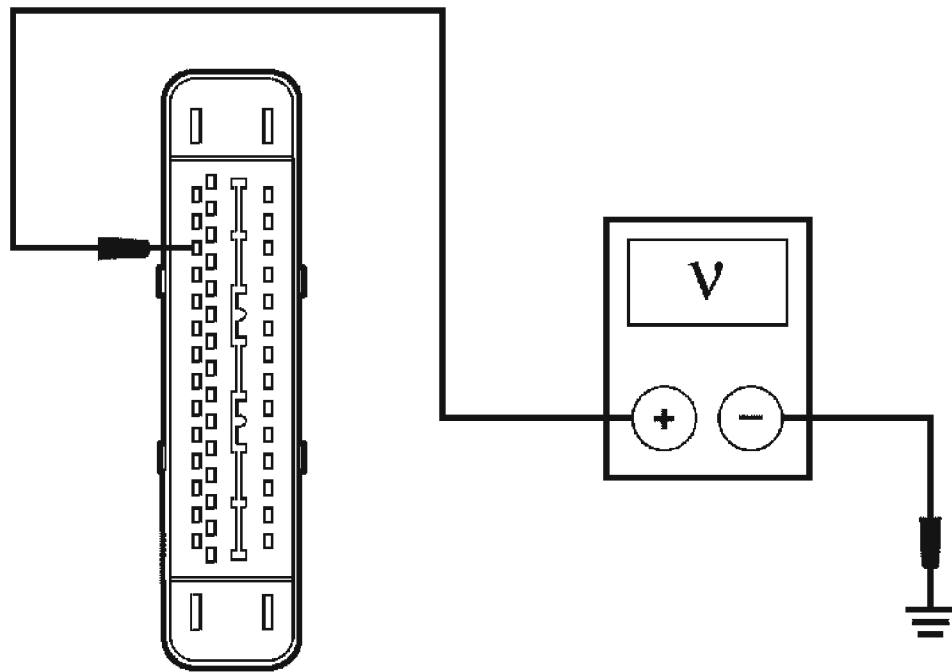
Pinpoint Tests

PINPOINT TEST A: NO COMMUNICATION WITH THE ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

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

A1 CHECK THE VOLTAGE TO THE ABS MODULE

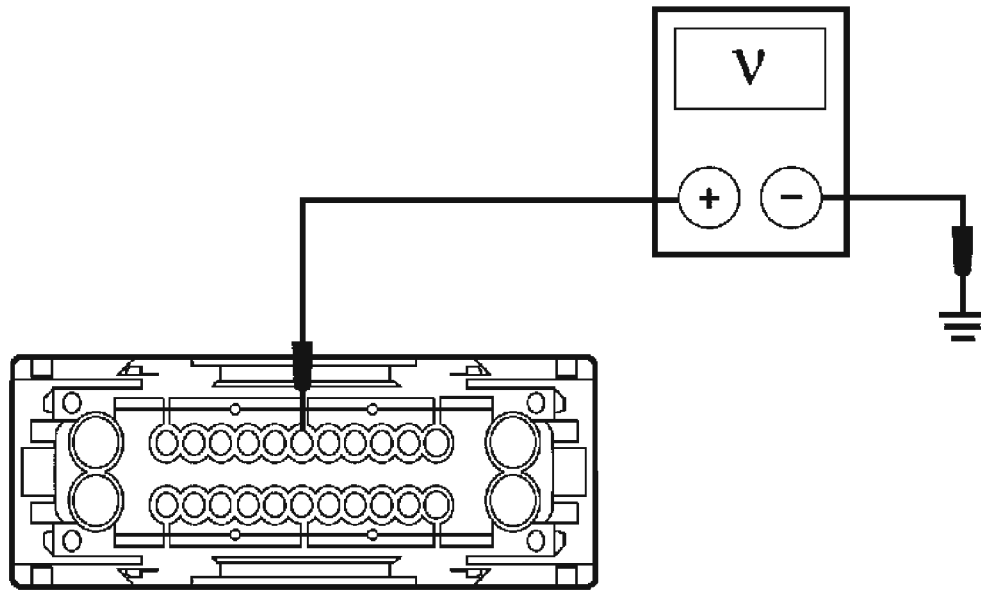
- Key in OFF position.
- Disconnect: ABS Module C135 (with traction control).
- Disconnect: ABS Module C155 (without traction control).
- Key in ON position.
- If equipped with traction control, measure the voltage between the ABS module C135 pin 4, circuit 15-CF6A (GN/YE), harness side and ground.



A0084764

Fig. 1: Measuring Voltage Between ABS Module C135 Pin 4, Circuit 15-CF6A (GN/YE), Harness Side And Ground
Courtesy of FORD MOTOR CO.

- If not equipped with traction control, measure the voltage between the ABS module C155 pin 20, circuit 15-CF6A (GN/YE), harness side and ground.



A0093556

Fig. 2: Measuring Voltage Between ABS Module C155 Pin 20, Circuit 15-CF6A (GN/YE), Harness Side And Ground
Courtesy of FORD MOTOR CO.

- Is the voltage greater than 10 volts?

Yes : GO to A2.

No : REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.

A2 CHECK THE ABS MODULE GROUND(S)

- Key in OFF position.
- If equipped with traction control, measure the resistance between the ABS module C135 pin 16, circuit 31-CF6 (BK), harness side and ground; and between the ABS module C135 pin 47, circuit 31-CF13 (BK), harness side and ground.

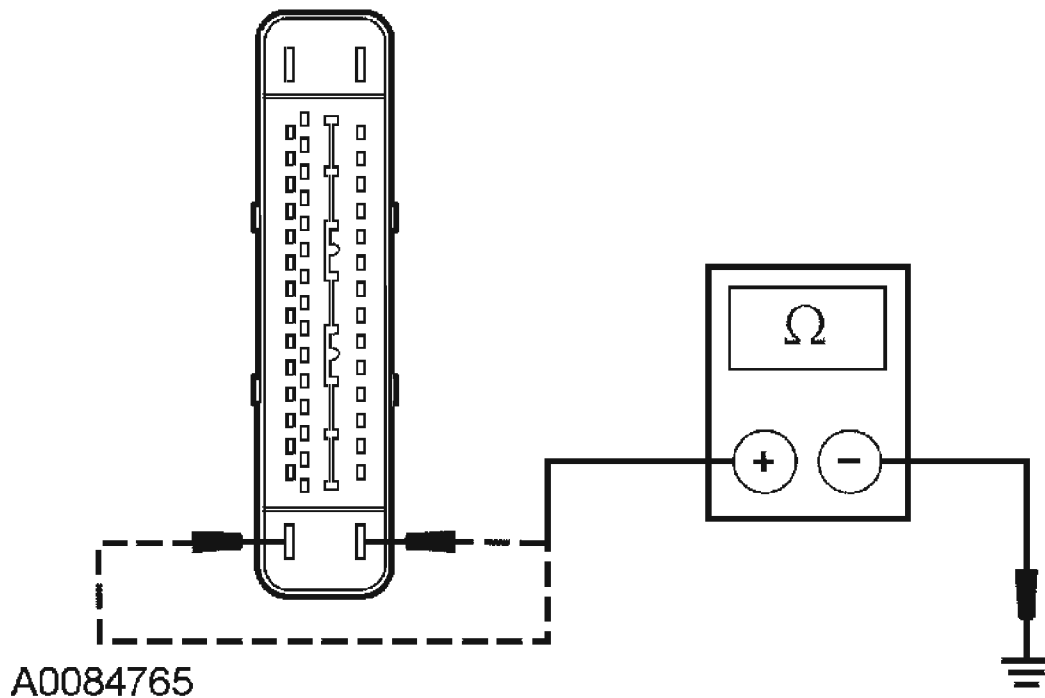
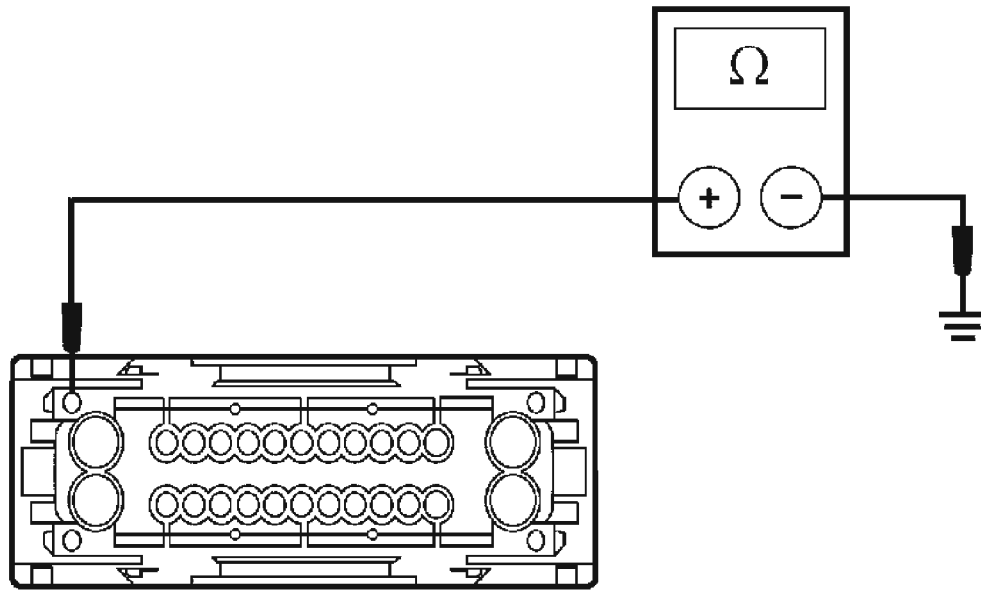


Fig. 3: Measuring Resistance Between ABS Module C135 Pin 16, Circuit 31-CF6 (BK), Harness Side And Ground And Between ABS Module C135 Pin 47, Circuit 31-CF13 (BK), Harness Side And Ground
Courtesy of FORD MOTOR CO.

- If not equipped with traction control measure the resistance between the ABS module C155 pin 26, circuit 31-CF6 (BK), harness side and ground.



A0093557

Fig. 4: Measuring Resistance Between ABS Module C155 Pin 26, Circuit 31-CF6 (BK), Harness Side And Ground
 Courtesy of FORD MOTOR CO.

- Are the resistances less than 5 ohms?

Yes : REFER to **MODULE COMMUNICATIONS NETWORK** .

No : REPAIR the circuit(s) in question. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.

PINPOINT TEST B: DTC C1446 - BRAKE SWITCH CIRCUIT FAILURE

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

B1 CHECK THE STOPLAMP OPERATION

- Check the stoplamps for correct operation by pressing and releasing the brake pedal and observing the stoplamps.
- **Do the stoplamps operate correctly?**

Yes : GO to B2.

No : REFER to **EXTERIOR LIGHTING** . For further diagnosis of the stoplamps.

B2 MONITOR THE BRAKE SWITCH PID

- Key in OFF position.
- Connect the diagnostic tool.
- Key in ON position.
- Enter the following diagnostic mode on the diagnostic tool: Generic Electronic Module (GEM) PID.
- Monitor the GEM brake switch PID status while pressing and releasing the brake pedal.
- **Does the PID value agree with the positions of the brake switch?**

Yes : GO to B3.

No : GO to B4.

B3 CHECK FOR CORRECT ABS MODULE OPERATION

- Disconnect the ABS connector.
- Check for:
 - Corrosion
 - Pushed-out pins
- Connect the ABS connector and make sure it is seated correctly.
- Operate the system and verify the concern is still present.
- **Is the concern still present?**

Yes : INSTALL a new ABS module. REFER to **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**. TEST the system for normal operation.

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

B4 CHECK FOR CORRECT GEM OPERATION

- Disconnect all GEM connectors.
- Check for:
 - Corrosion
 - Pushed-out pins
- Connect all 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 C: DTC B1317, B1318 - BATTERY VOLTAGE HIGH/LOW

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

C1 CHECK THE BATTERY VOLTAGE

- Measure the battery voltage between the positive and negative battery posts with the key ON engine OFF (KOEO), and with the engine running.
- **Is the battery voltage between 10 and 13 volts with KOEO, and between 11 and 17 volts with the engine running?**

Yes : GO to C2.

No : CHECK the charging system. REFER to CHARGING SYSTEM - GENERAL INFORMATION .

C2 CHECK THE ABS POWER SUPPLY

- Key in OFF position.
- Disconnect: ABS Module C135 (with traction control).
- Disconnect: ABS Module C155 (without traction control).
- Key in ON position.
- Measure the voltage between the ABS module connector, harness side and ground as follows:

ABS MODULE C135 (W/AND W/O TRACTION CONTROL) PIN REFERENCE

ABS Module C135 (with traction control) Pin	ABS Module C155 (without traction control) Pin	Circuit
1	14	30-CF13A (RD)
4	20	15-CF6A (GN/YE)
32	1	30-CF6A (RD)

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

Yes : GO to C3.

No : REPAIR the circuit(s) in question. CLEAR the DTCs. REPEAT the self-test.

C3 CHECK THE ABS GROUND CIRCUITS FOR AN OPEN

- Key in OFF position.
- If equipped with traction control, measure the resistance between the ABS module

C135 pin 16, circuit 31-CF6 (BK), harness side and ground; and between the ABS module C135 pin 47, circuit 31-CF13 (BK), harness side and ground.

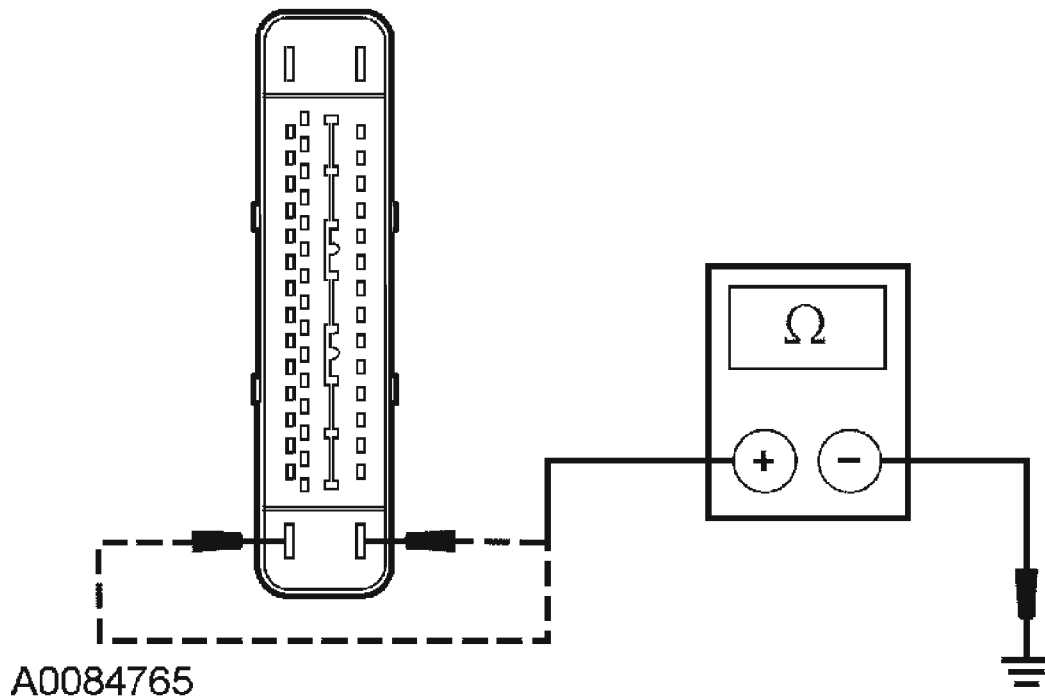
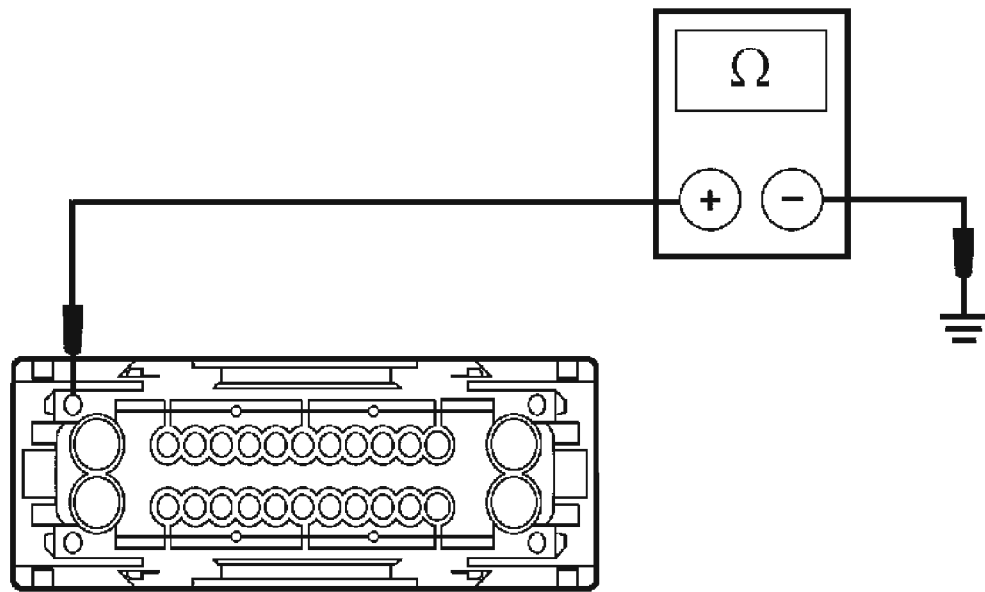


Fig. 5: Measuring Resistance Between ABS Module C135 Pin 16, Circuit 31-CF6 (BK), Harness Side And Ground; And Between ABS Module C135 Pin 47, Circuit 31-CF13 (BK), Harness Side And Ground
Courtesy of FORD MOTOR CO.

- If not equipped with traction control, measure the resistance between the ABS module C155 pin 26, circuit 31-CF6 (BK), harness side and ground.



A0093557

Fig. 6: Measuring Resistance Between ABS Module C155 Pin 26, Circuit 31-CF6 (BK), Harness Side And Ground
Courtesy of FORD MOTOR CO.

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

Yes : GO to C4.

No : REPAIR the circuit(s) in question. CLEAR the DTCs. REPEAT the self-test.

C4 CHECK FOR CORRECT ABS MODULE OPERATION

- Disconnect the ABS connector.
- Check for:
 - Corrosion
 - Pushed-out pins
- Connect the ABS connector and make sure it is seated correctly.
- Operate the system and verify the concern is still present.
- **Is the concern still present?**

Yes : INSTALL a new ABS module. REFER to **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**. 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 D: DTC C1095 - ABS HYDRAULIC PUMP MOTOR CIRCUIT FAILURE**D1 CHECK THE ABS PUMP MOTOR**

- Key in ON position.
- Check the ABS pump for continuous operation.
- **Is the ABS pump motor running continuously?**

Yes : INSTALL a new HCU. REFER to **HYDRAULIC CONTROL UNIT (HCU)**. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.

No : GO to D2.

D2 CHECK PUMP MOTOR OPERATION

- Key in OFF position.
- Connect the diagnostic tool.
- Key in ON position.
- Enter the following diagnostic mode on the diagnostic tool: ABS Module Active Commands.
- Trigger the ABS module active command pump motor on.
- **Does the ABS pump motor run for approximately three seconds?**

Yes : CLEAR the DTCs. CHECK the yellow ABS warning indicator while driving the vehicle (brakes must not be applied) above 32 km/h (20 mph). If the yellow ABS warning indicator illuminates, RETRIEVE the DTCs. If DTC C1095 is retrieved, INSTALL a new HCU. REFER to **HYDRAULIC CONTROL UNIT (HCU)**. REPEAT the self-test. If the yellow ABS warning indicator does not illuminate, the system is OK.

No : TRIGGER the ABS module active command pump motor off. GO to D3.

D3 CHECK CIRCUIT 30-CF13A (RD) FOR AN OPEN

- Key in OFF position.
- Disconnect: ABS Module C135 (with traction control).
- Disconnect: ABS Module C155 (without traction control).
- If equipped with traction control, measure the voltage between the ABS module C135 pin 1, circuit 30-CF13A (RD), harness side and ground.

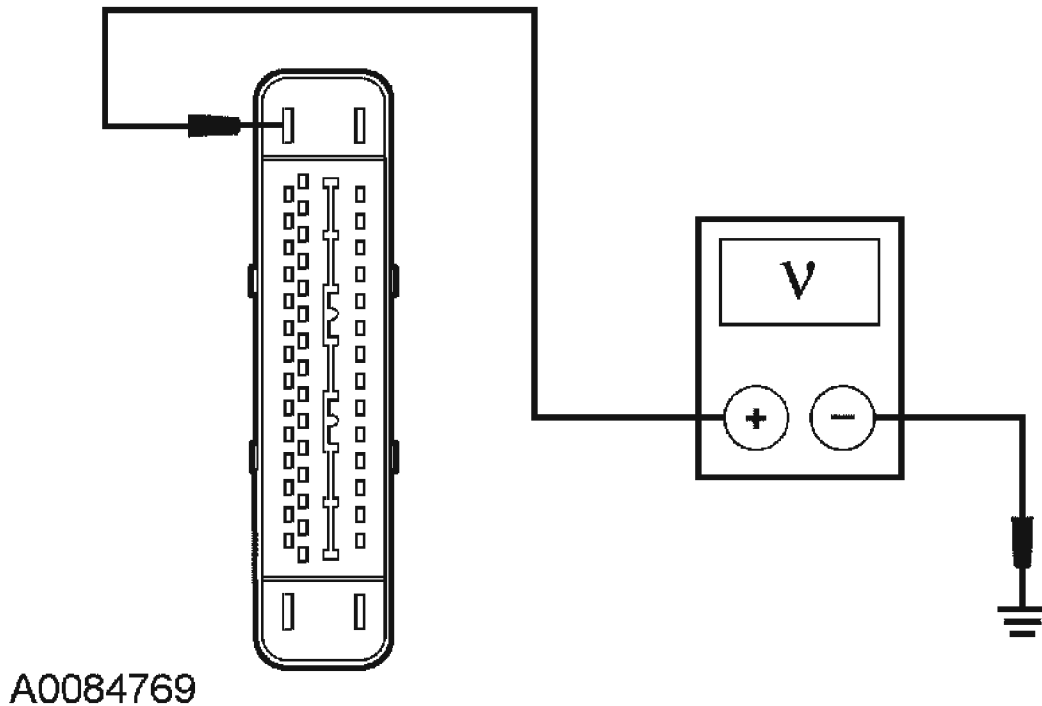
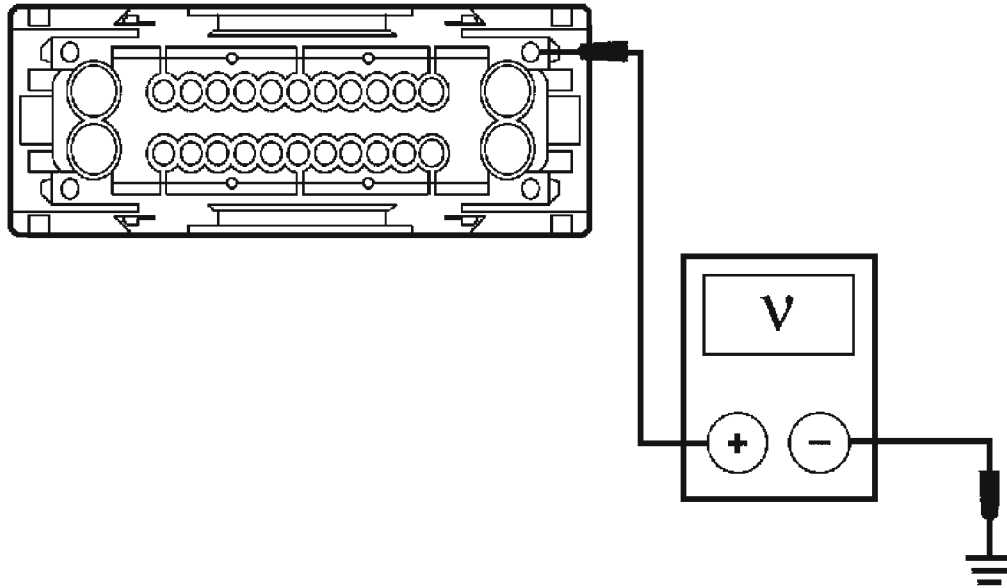


Fig. 7: Measuring Voltage Between ABS Module C135 Pin 1, Circuit 30-CF13A (RD), Harness Side And Ground
Courtesy of FORD MOTOR CO.

- If not equipped with traction control, measure the voltage between the ABS module C155 pin 14, circuit 30-CF13A (RD), harness side and ground.



A0093448

Fig. 8: Measuring Voltage Between ABS Module C155 Pin 14, Circuit 30-CF13A (RD), Harness Side And Ground
Courtesy of FORD MOTOR CO.

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

Yes : GO to D4.

No : REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.

D4 CHECK THE ABS MODULE GROUNDS

- Key in OFF position.
- If equipped with traction control, measure the resistance between the ABS module C135 pin 16, circuit 31-CF6 (BK), harness side and ground; and between the ABS module C135 pin 47, circuit 31-CF13 (BK), harness side and ground.

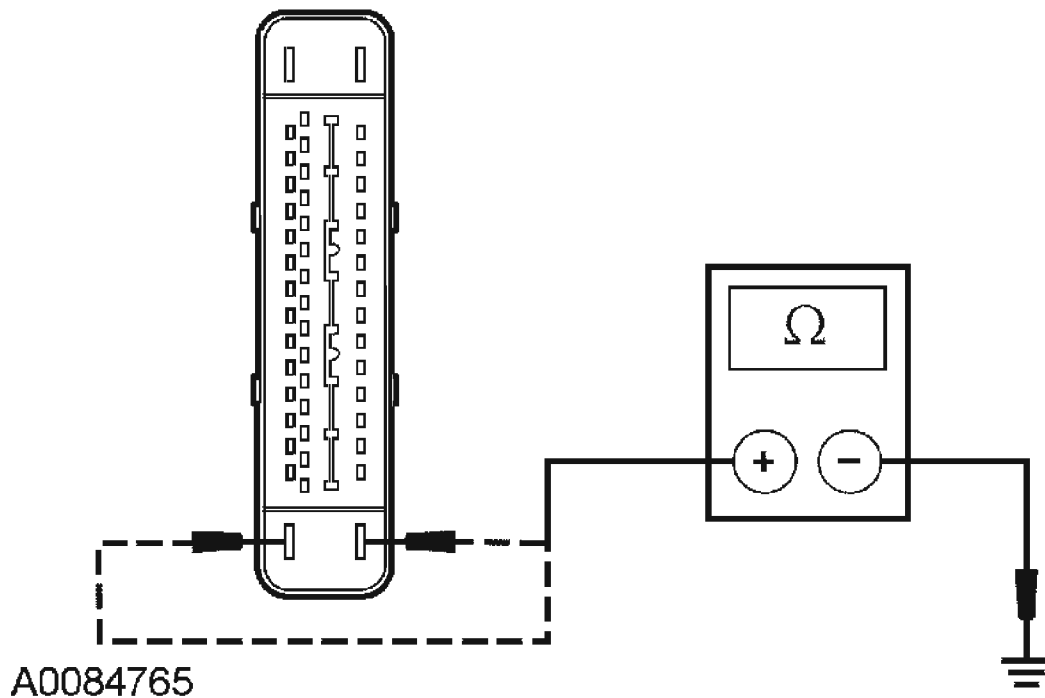
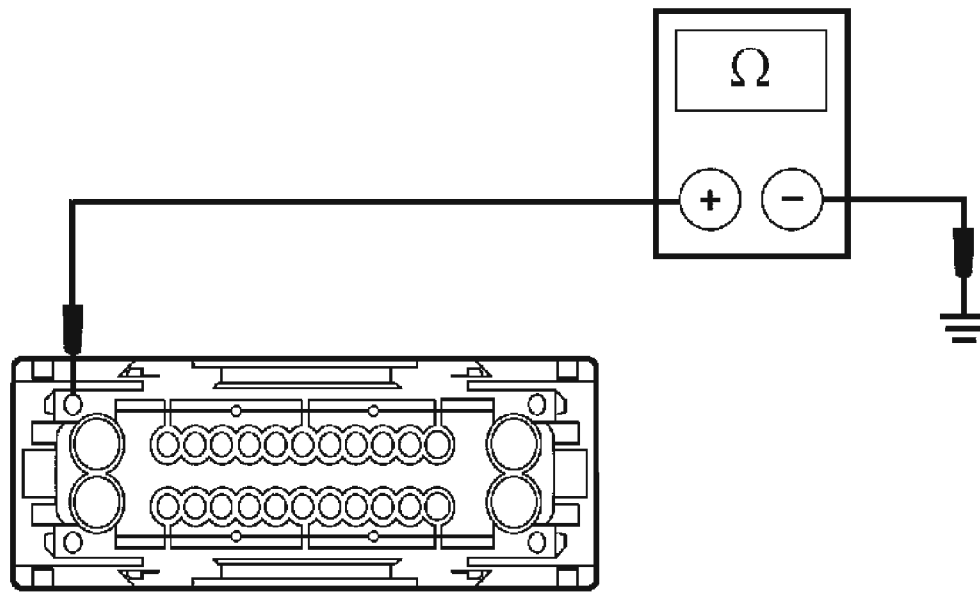


Fig. 9: Measuring Resistance Between ABS Module C135 Pin 16, Circuit 31-CF6 (BK), Harness Side And Ground; And Between ABS Module C135 Pin 47, Circuit 31-CF13 (BK), Harness Side And Ground
Courtesy of FORD MOTOR CO.

- If not equipped with traction control, measure the resistance between the ABS module C155 pin 26, circuit 31-CF6 (BK), harness side and ground.



A0093557

Fig. 10: Measuring Resistance Between ABS Module C155 Pin 26, Circuit 31-CF6 (BK), Harness Side And Ground
Courtesy of FORD MOTOR CO.

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

Yes : INSTALL a new HCU. REFER to **HYDRAULIC CONTROL UNIT (HCU)** . CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.

No : REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.

PINPOINT TEST E: DTC C1145 (RF), DTC C1155 (LF), DTC C1165 (RR), DTC C1175 (LR) - WHEEL SPEED SENSOR INPUT CIRCUIT FAILURE

E1 CHECK THE WHEEL SPEED CIRCUITS FOR A SHORT TO POWER

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

NOTE: Both circuits must be checked for each DTC.

- Key in OFF position.
- Disconnect: ABS Module C135 (with traction control).

2005 Ford Focus ZX5 S

2005 BRAKES Anti-Lock Control - Focus

- Disconnect: ABS Module C155 (without traction control).
- Disconnect: Suspect Wheel Speed Sensor.
- Key in ON position.
- Measure the voltage between the ABS module connector, harness side and ground as follows:

ABS MODULE C135 (W/AND W/O TRACTION CONTROL) PIN REFERENCE

DTC	ABS Module C135 (with traction control) Pin	ABS Module C155 (without traction control) Pin	Circuit
C1145	33	6	9-CF38 (BN/RD)
C1145	34	5	8-CF38 (WH/RD)
C1155	45	9	8-CF32 (WH)
C1155	46	8	9-CF32 (BN)
C1165	42	12	9-CF40 (BN/GN)
C1165	43	11	8-CF40 (WH/GN)
C1175	36	3	8-CF34 (WH/BU)
C1175	37	2	9-CF34 (BN/BU)

- **Is any voltage present?**

Yes : REPAIR the circuit(s) in question. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.

No : GO to E2.

E2 CHECK THE WHEEL SPEED CIRCUITS FOR A SHORT TO GROUND

NOTE: Both circuits must be checked for each DTC.

- Key in OFF position.
- Measure the resistance between the ABS module connector, harness side and

ground as follows:

ABS MODULE C135 (W/AND W/O TRACTION CONTROL) PIN REFERENCE

DTC	ABS Module C135 (with traction control) Pin	ABS Module C155 (without traction control) Pin	Circuit
C1145	33	6	9-CF38 (BN/RD)
C1145	34	5	8-CF38 (WH/RD)
C1155	45	9	8-CF32 (WH)
C1155	46	8	9-CF32 (BN)
C1165	42	12	9-CF40 (BN/GN)
C1165	43	11	8-CF40 (WH/GN)
C1175	36	3	8-CF34 (WH/BU)
C1175	37	2	9-CF34 (BN/BU)

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

Yes : For vehicles with traction control, GO to E3. For vehicles without traction control, GO to E4.

No : REPAIR the circuit(s) in question. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.

E3 CHECK THE WHEEL SPEED CIRCUITS FOR AN OPEN

NOTE: Both circuits must be checked for each DTC.

- Measure the resistance of the suspect wheel speed sensor circuit between:

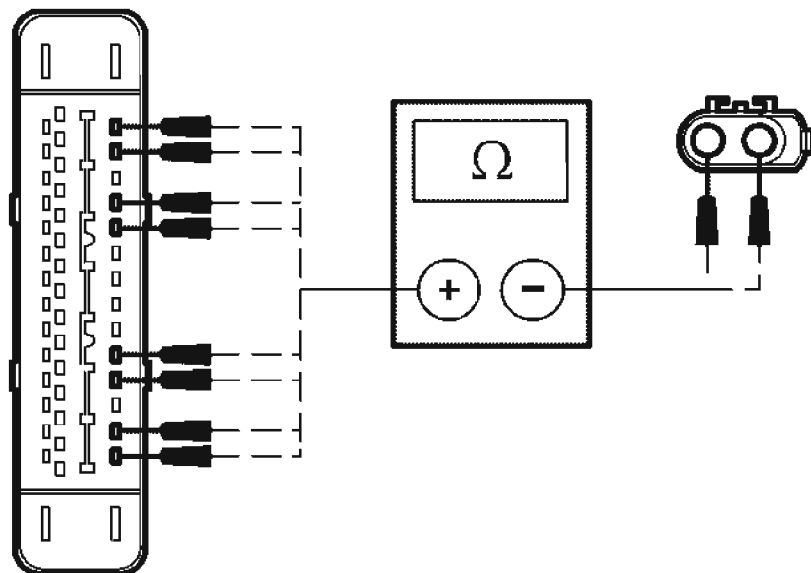
ABS MODULE C135 PIN REFERENCE

	ABS	Wheel Speed Sensor	
--	-----	--------------------------	--

2005 Ford Focus ZX5 S

2005 BRAKES Anti-Lock Control - Focus

DTC	Module C135 Pin	Connector Pin	Circuit
C1145	33	C160 pin 1	9-CF38 (BN/RD)
C1145	34	C160 pin 2	8-CF38 (WH/RD)
C1155	45	C150 pin 2	8-CF32 (WH)
C1155	46	C150 pin 1	9-CF32 (BN)
C1165	42	C426 pin 1	9-CF40 (BN/GN)
C1165	43	C426 pin 2	8-CF40 (WH/GN)
C1175	36	C440 pin 2	8-CF34 (WH/BU)
C1175	37	C440 pin 1	9-CF34 (BN/BU)



VUE0028349

Fig. 11: E3 Checking Wheel Speed Circuits For An Open
Courtesy of FORD MOTOR CO.

2005 Ford Focus ZX5 S

2005 BRAKES Anti-Lock Control - Focus

- Are the resistances less than 5 ohms?

Yes : GO to E5.

No : REPAIR the circuit(s) in question. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.

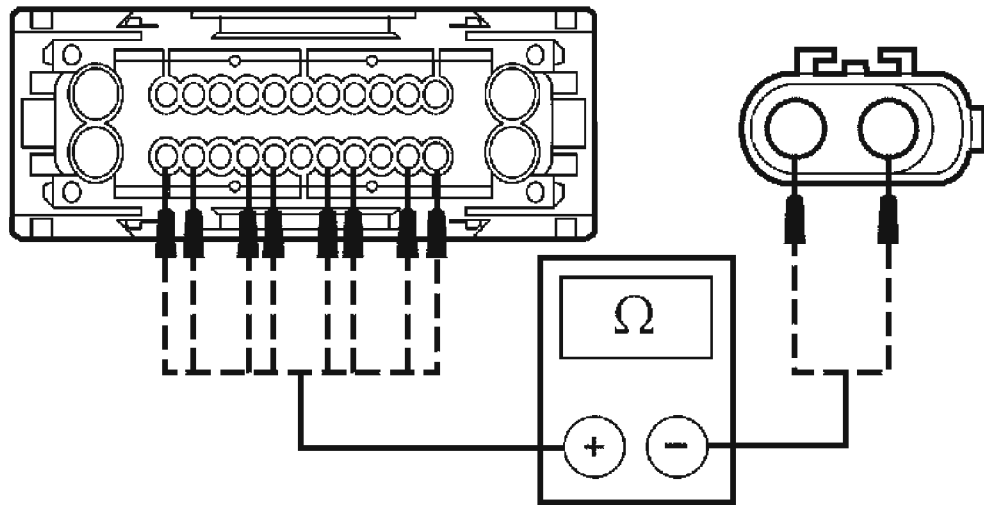
E4 CHECK THE WHEEL SPEED CIRCUITS FOR AN OPEN

NOTE: Both circuits must be checked for each DTC.

- Measure the resistance of the suspect wheel speed sensor circuit between:

ABS MODULE C135 PIN REFERENCE

DTC	ABS Module C155 Pin	Wheel Speed Sensor Connector Pin	Circuit
C1145	6	C160 pin 1	9-CF38 (BN/RD)
C1145	5	C160 pin 2	8-CF38 (WH/RD)
C1155	9	C150 pin 2	8-CF32 (WH)
C1155	8	C150 pin 1	9-CF32 (BN)
C1165	12	C426 pin 1	9-CF40 (BN/GN)
C1165	11	C426 pin 2	8-CF40 (WH/GN)
C1175	3	C440 pin 2	8-CF34 (WH/BU)
C1175	2	C440 pin 1	9-CF34 (BN/BU)



A0093449

Fig. 12: E4 Checking Wheel Speed Circuits For An Open
 Courtesy of FORD MOTOR CO.

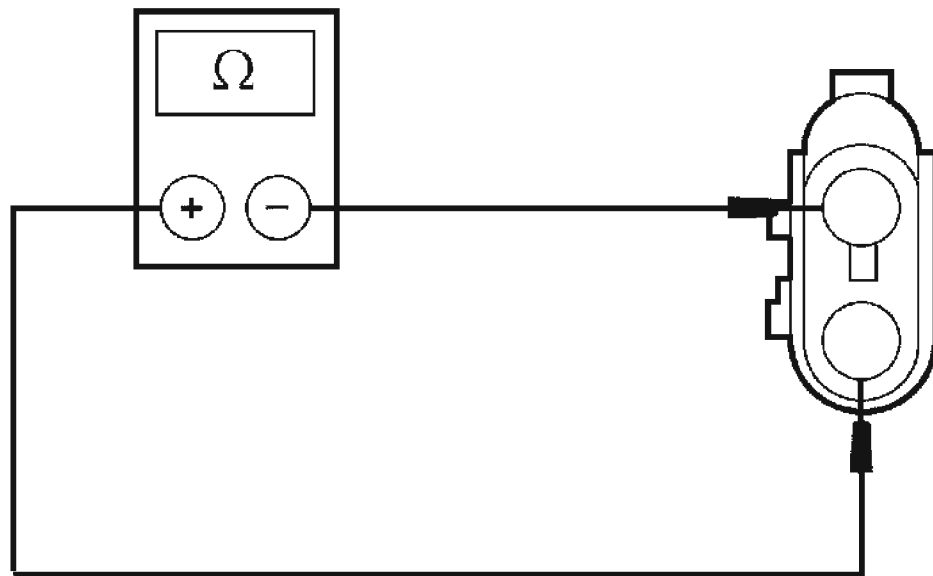
- Are the resistances less than 5 ohms?

Yes : GO to E5.

No : REPAIR the circuit(s) in question. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.

E5 CHECK FOR SHORTED WHEEL SPEED SENSOR CIRCUITS

- Measure the resistance between the suspect wheel speed sensor pins, harness side.



A0093558

Fig. 13: E5 Checking For Shorted Wheel Speed Sensor Circuits
Courtesy of FORD MOTOR CO.

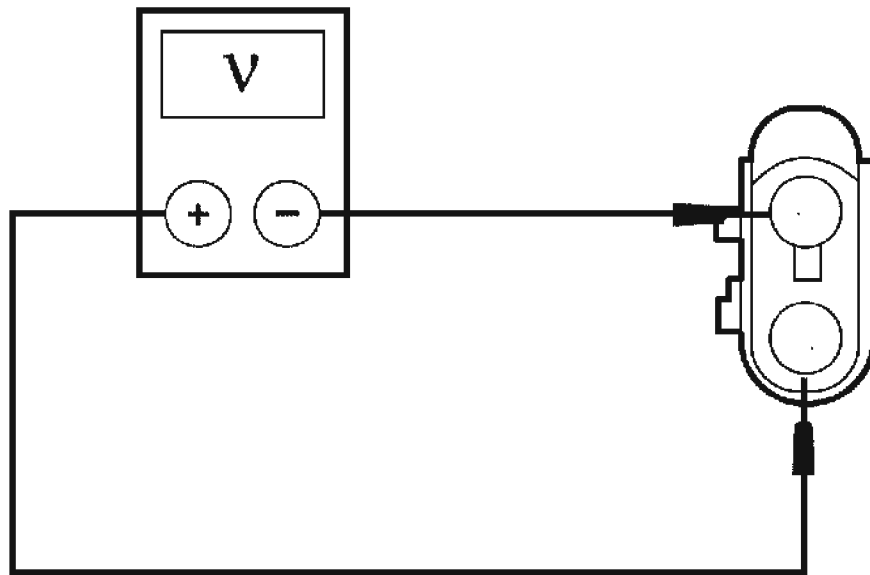
- **Is the resistance greater 10,000 ohms?**

Yes : GO to E6.

No : REPAIR the circuit(s) in question. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.

E6 CHECK THE ABS MODULE OUTPUT

- Connect: ABS Module C135 (with traction control).
- Connect: ABS Module C155 (without traction control).
- Key in ON position.
- Measure the voltage between the suspect wheel speed sensor pins, harness side.



A0065327

Fig. 14: E6 Checking ABS Module Output
Courtesy of FORD MOTOR CO.

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

Yes : INSTALL a new wheel speed sensor. REFER to **WHEEL SPEED SENSOR - FRONT** or **WHEEL SPEED SENSOR - REAR**. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.

No : GO to E7.

E7 CHECK FOR CORRECT ABS MODULE OPERATION

- Disconnect all ABS connectors.
- Check for:
 - Corrosion
 - Pushed-out pins
- Connect all ABS 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 ABS module. REFER to **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**. 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: DTC C1233 (LF), C1234 (RF), C1235 (RR), C1236 (LR), SPEED WHEEL INPUT SIGNAL MISSING

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

F1 CHECK THE DTCs FROM THE SELF-TEST

- Use the recorded results from the ABS self-test.
- **Are DTCs C1145, C1155, C1165, or C1175 present?**

Yes : GO to PINPOINT TEST E.

No : GO to F2.

F2 MONITOR THE WHEEL SPEED PID

- Connect the diagnostic tool.
- Key in ON position.
- Enter the following diagnostic mode on the diagnostic tool: ABS Module PIDs.
- Use the diagnostic tool to monitor the ABS module wheel speed sensor PIDs while driving the vehicle at a constant speed.
- **Are all the wheel speed sensor PID values similar?**

Yes : CLEAR the DTCs. DRIVE the vehicle. RETRIEVE the DTCs. If DTC C1233, C1234, C1235 or C1236 is present, GO to F9.

No : GO to F3.

F3 INSPECT THE WHEEL SPEED SENSOR MOUNTING

- Key in OFF position.
- Raise and support the vehicle. Refer to JACKING AND LIFTING .
- Inspect the wheel speed sensor for looseness.
- **Is the wheel speed sensor loose?**

Yes : TIGHTEN the wheel speed sensor to specification. CLEAR the DTCs. GO to F4.

No : GO to F5.

F4 RECHECK THE WHEEL SPEED PID

- Connect the diagnostic tool.
- Key in ON position.
- Enter the following diagnostic mode on the diagnostic tool: ABS Module PIDs.
- Use the diagnostic tool to monitor the ABS module wheel speed sensor PIDs while driving the vehicle at a constant speed.
- **Are all the wheel speed sensor PID values similar?**

Yes : The vehicle is OK. The concern may have been caused by a loose wheel speed sensor.

No : GO to F5.

F5 CHECK THE WHEEL SPEED SENSOR FOR DAMAGE

- Key in OFF position.
- Raise and support the vehicle. Refer to **JACKING AND LIFTING** .

CAUTION: Examine the wheel speed sensor wire carefully with a good light source. Failure to verify damage in the wheel speed sensor wire can lead to unnecessary installation of a new component.

- Inspect the wheel speed sensor for general damage.
- **Is the wheel speed sensor OK?**

Yes : GO to F6.

No : INSTALL a new wheel speed sensor. REFER to **WHEEL SPEED SENSOR - FRONT** or **WHEEL SPEED SENSOR - REAR**. CLEAR the DTCs. TEST the system for normal operation.

F6 CHECK FOR WHEEL SPEED SENSOR RING DAMAGE

- Remove the wheel speed sensor. Refer to **WHEEL SPEED SENSOR - FRONT** or **WHEEL SPEED SENSOR - REAR**.
- Inspect the wheel speed sensor ring for damaged or missing teeth. Rotate the wheel to verify that no teeth are missing.
- **Is the wheel speed sensor ring OK?**

Yes : GO to F7.

No : INSTALL a new wheel speed sensor ring. REFER to **FRONT SUSPENSION** or **REAR SUSPENSION** . CLEAR the DTCs. REPEAT the self-test.

F7 CHECK FOR BEARING DAMAGE

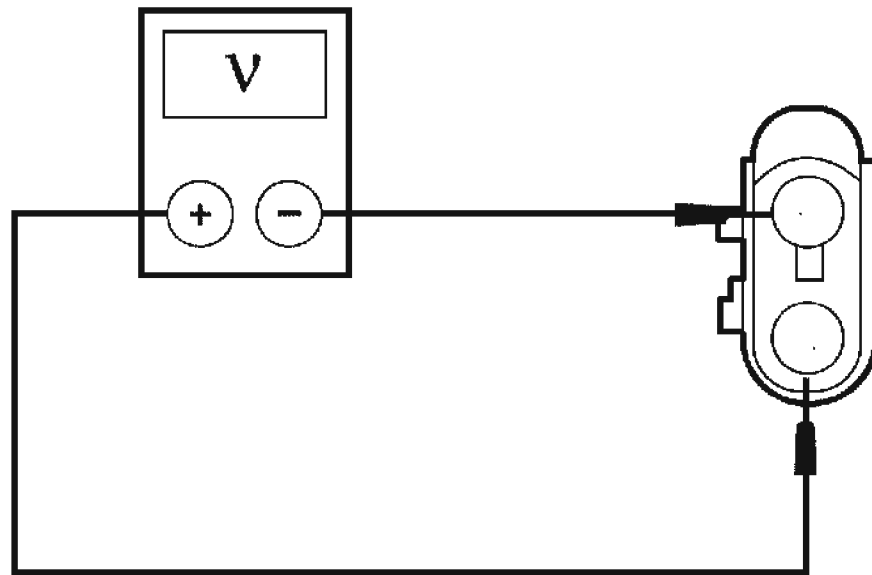
- Inspect the wheel bearings for damage.
- **Are the wheel bearings OK?**

Yes : GO to F8.

No : INSTALL new wheel bearings as necessary. REFER to **FRONT SUSPENSION** or **REAR SUSPENSION** . CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.

F8 CHECK THE ABS MODULE OUTPUT

- Key in OFF position.
- Disconnect: Suspect Wheel Speed Sensor.
- Key in ON position.
- Measure the voltage between the suspect wheel speed sensor pins, harness side.



A0065327

Fig. 15: Measuring Voltage Between Suspect Wheel Speed Sensor Pins, Harness Side

Courtesy of FORD MOTOR CO.

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

Yes : INSTALL a new wheel speed sensor. REFER to **WHEEL SPEED SENSOR - FRONT** or **WHEEL SPEED SENSOR - REAR**. CLEAR the DTCs. REPEAT the self-test.

No : GO to F9.

F9 CHECK FOR CORRECT ABS MODULE OPERATION

- Disconnect all ABS connectors.
- Check for:
 - Corrosion
 - Pushed-out pins
- Connect all ABS 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 ABS module. REFER to **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**. 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: DTC C1267 - ABS FUNCTIONS TEMPORARILY DISABLED**G1 CARRY OUT THE RECALIBRATION PROCEDURE**

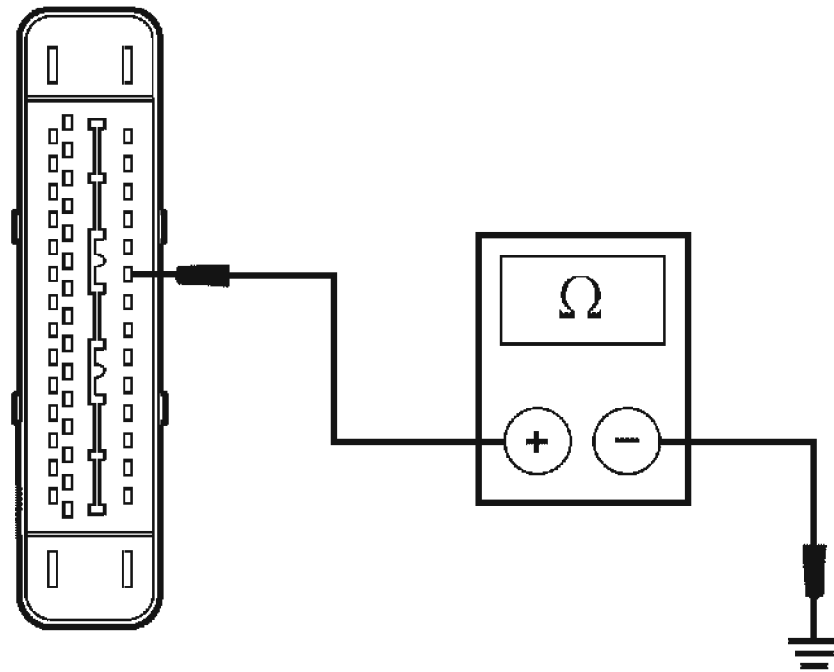
- Key in ON position.
- Enter the following diagnostic mode on the diagnostic tool: Clear DTCs.
- Carry out the ABS module recalibration procedure using the diagnostic tool.
- Enter the following diagnostic mode on the diagnostic tool: Retrieve DTCs.
- **Are any DTCs retrieved?**

Yes : GO to the Anti-Lock Brake System (ABS) Module Diagnostic Trouble Code (DTC) Index. If DTC C1267 is retrieved again, **INSTALL** a new ABS module. REFER to **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**. REPEAT the self-test. CLEAR the DTCs. TEST the system for normal operation.

No : TEST the system for normal operation.

PINPOINT TEST H: THE TRACTION CONTROL IS INOPERATIVE**H1 CHECK THE TRACTION CONTROL OFF INPUT TO THE TRACTION CONTROL MODULE FOR A SHORT TO GROUND**

- Key in OFF position.
- Disconnect: ABS Module C135 (with traction control).
- Place the traction control switch in the OFF position.
- Measure the resistance between the ABS module C135 pin 38, circuit 91S-CF54 (BK/WH), harness side and ground while switching between the OFF and ON position of the traction control switch.



A0084774

Fig. 16: Measuring Resistance Between ABS Module C135 Pin 38, Circuit 91S-CF54 (BK/WH), Harness Side And Ground
Courtesy of FORD MOTOR CO.

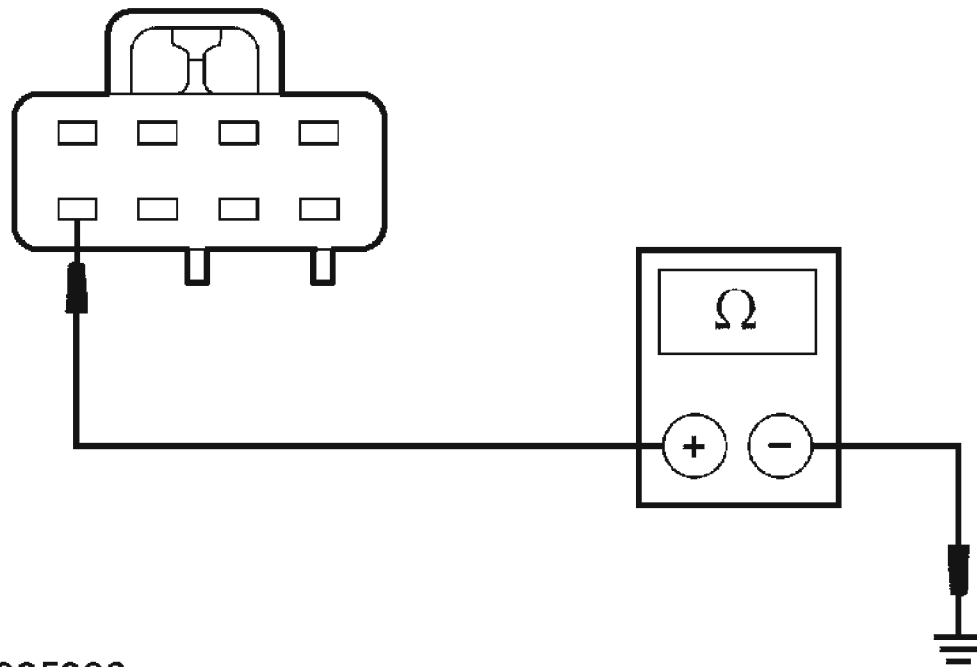
- Is the resistance less than 5 ohms with the traction control switch pressed and greater than 10,000 ohms with the traction control switch released?

Yes : INSTALL a new ABS module. REFER to **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**. REPEAT the self-test. TEST the system for normal operation.

No : GO to H2.

H2 CHECK THE TRACTION CONTROL SWITCH GROUND

- Disconnect: Traction Control Switch C2267.
- Measure the resistance between the traction control switch C2267 pin 1, circuit 91-CF54 (BK/WH), harness side and ground.



A0065328

Fig. 17: Measuring Resistance Between Traction Control Switch C2267 Pin 1, Circuit 91-CF54 (BK/WH), Harness Side And Ground
Courtesy of FORD MOTOR CO.

- Is the resistance less than 5 ohms?

Yes : GO to H3.

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

H3 CHECK CIRCUIT 91S-CF54 (BK/WH) FOR OPEN AND SHORT TO GROUND

- Measure the resistance between the traction control switch C2267 pin 2, circuit 91S-CF54 (BK/WH), harness side and the traction control module C135 pin 38, circuit 91S-CF54 (BK/WH), harness side; and between the traction control switch C2267 pin 2, circuit 91S-CF54 (BK/WH), harness side and ground.

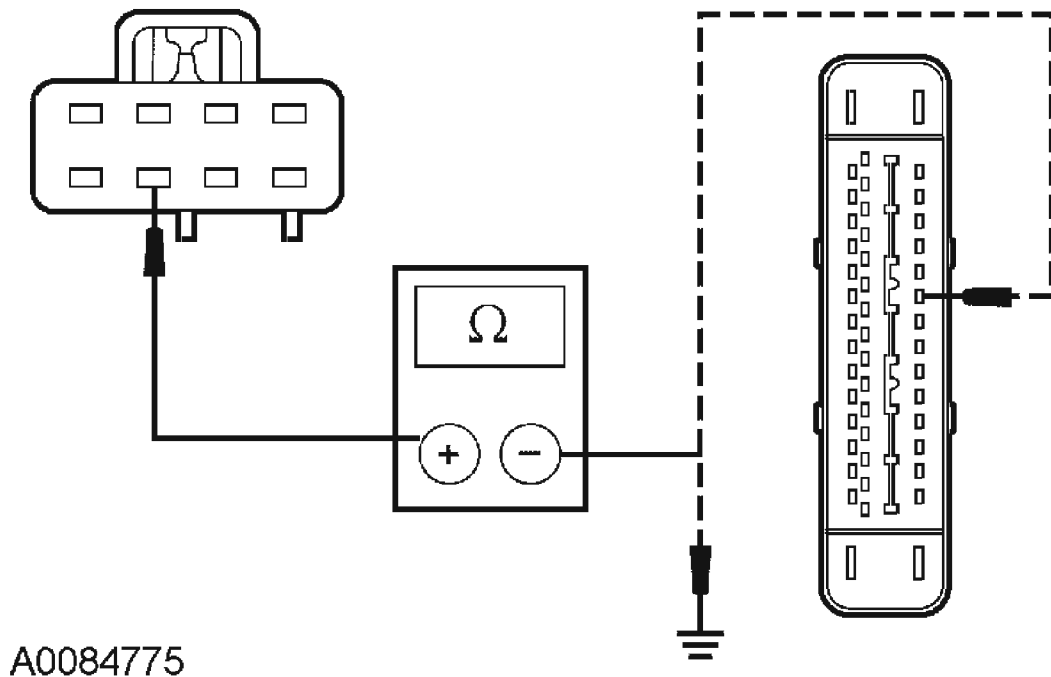


Fig. 18: Checking Circuit 91S-CF54 (BK/WH) For Open And Short
 Courtesy of FORD MOTOR CO.

- Is the resistance less than 5 ohms between the traction control switch and the traction control module and greater than 10,000 ohms between the traction control switch and ground?

Yes : INSTALL a new traction control switch. TEST the system for normal operation.

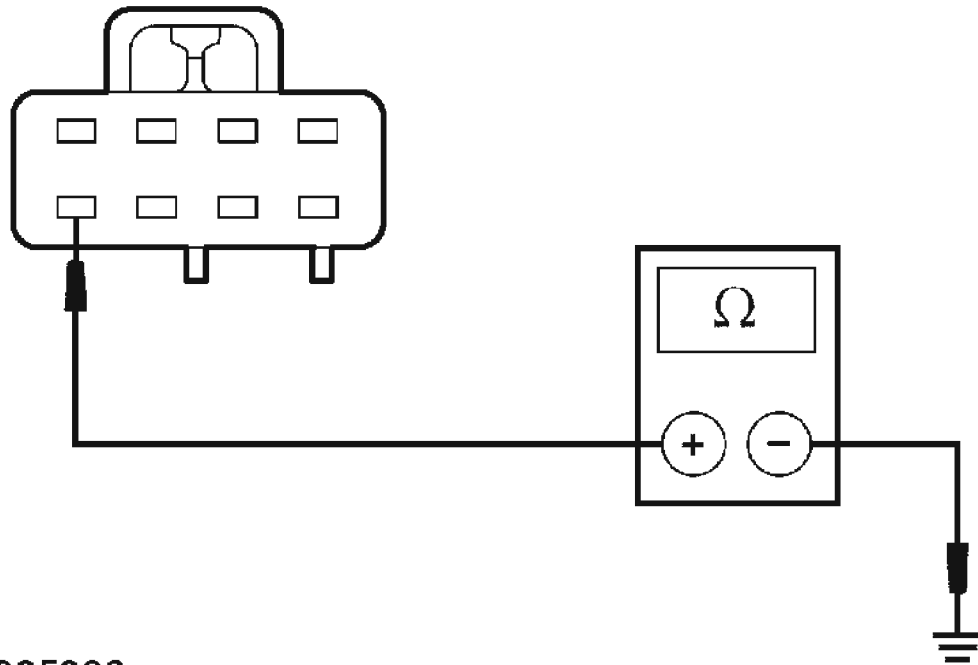
No : REPAIR the circuit. TEST the system for normal operation.

PINPOINT TEST I: THE TRACTION CONTROL SYSTEM CANNOT BE DISABLED

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

11 CHECK CIRCUIT 91-CF54 (BK/WH) FOR AN OPEN

- Key in OFF position.
- Disconnect: Traction Control Switch C2267.
- Measure the resistance between the traction control switch C2267 pin 1, circuit 91-CF54 (BK/WH), harness side and ground.



A0065328

Fig. 19: Measuring Resistance Between Traction Control Switch C2267 Pin 1, Circuit 91-CF54 (BK/WH), Harness Side And Ground
 Courtesy of FORD MOTOR CO.

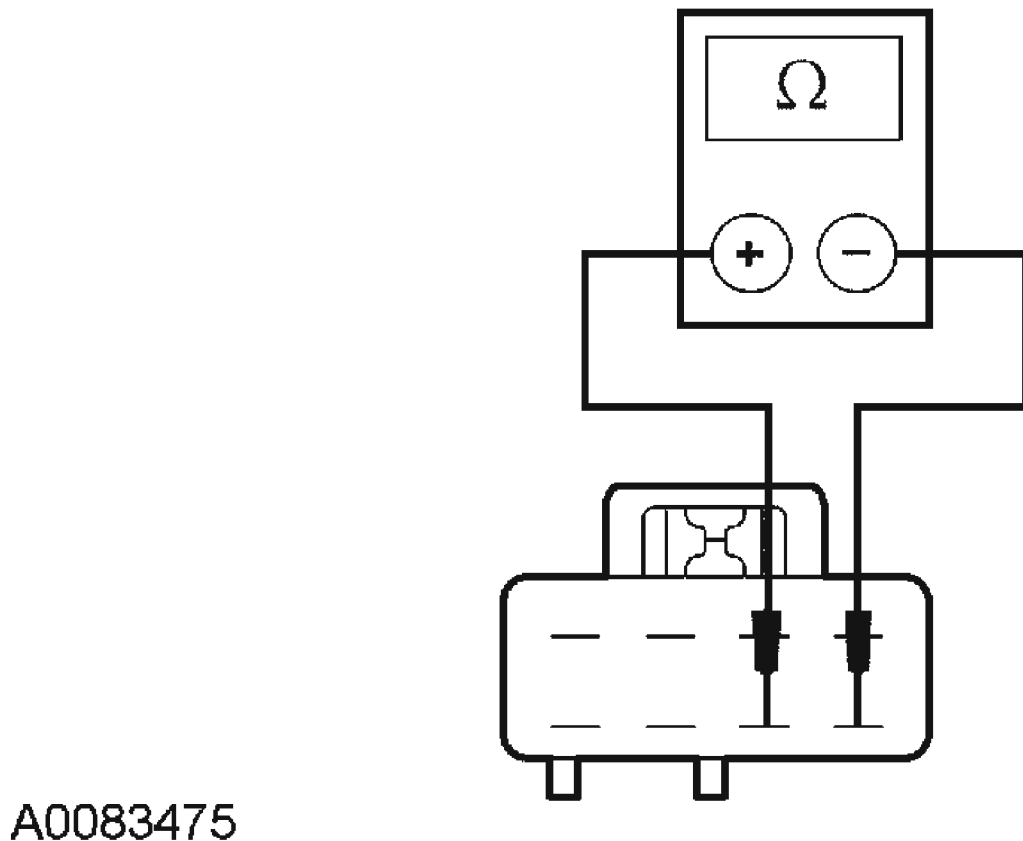
- Is the resistance less than 5 ohms?

Yes : GO to I2.

No : REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.

I2 CHECK THE TRACTION CONTROL SWITCH

- Measure the resistance between the traction control switch C2267, pin 1 and pin 2 (component side) while pressing the traction control switch.



A0083475

Fig. 20: Measuring Resistance Between Traction Control Switch C2267, Pin 1 And Pin 2 (Component Side)

Courtesy of FORD MOTOR CO.

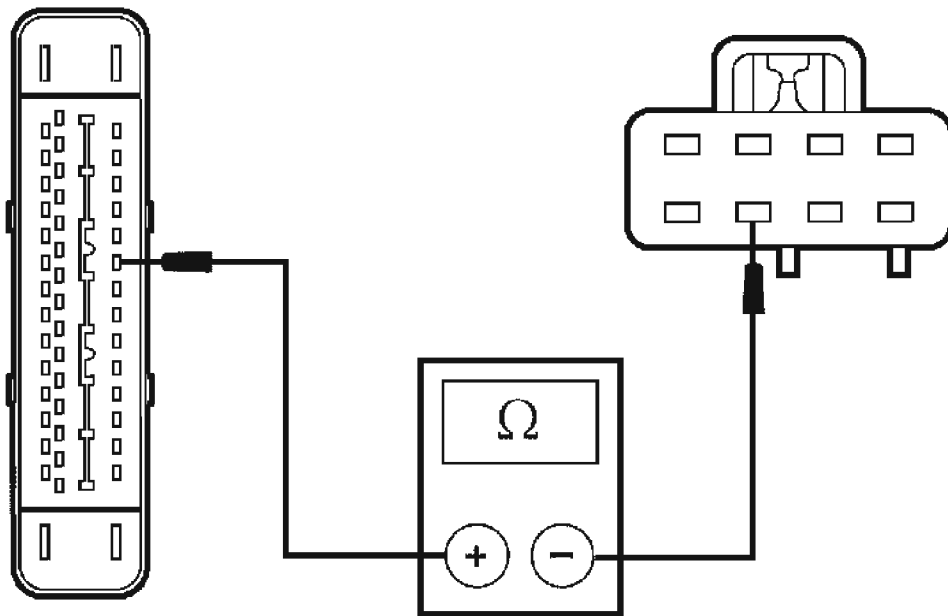
- Is the resistance less than 5 ohms with the traction control switch pressed and greater than 10,000 ohms with the traction control switch released?

Yes : GO to I3.

No : INSTALL a new traction control switch. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.

I3 CHECK CIRCUIT 91S-CF54 (BK/WH) FOR AN OPEN

- Disconnect: ABS Module C135 (with traction control).
- Measure the resistance between the ABS module C135 (with traction control) pin 38, circuit 91S-CF54 (BK/WH), harness side and traction control switch C2267 pin 2, circuit 91S-CF54 (BK/WH), harness side.



A0084778

Fig. 21: Measuring Resistance Between ABS Module C135 (With Traction Control) Pin 38 And Traction Control Switch C2267 Pin 2, Circuit 91S-CF54 (BK/WH), Harness Side
Courtesy of FORD MOTOR CO.

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

Yes : GO to I4.

No : REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.

I4 CHECK FOR CORRECT ABS MODULE OPERATION

- Disconnect all ABS connectors.
- Check for:
 - Corrosion
 - Pushed-out pins
- Connect all ABS 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 ABS module. REFER to **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**. 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.

REMOVAL AND INSTALLATION

HYDRAULIC CONTROL UNIT (HCU)

Material

MATERIAL SPECIFICATIONS

Item	Specification
High Performance DOT 3 Motor Vehicle Brake Fluid PM-1 (Canada CPM-1)	ESA-M6C25-A
High Temperature Nickel Anti-Seize Lubricant XL-2	ESE-M12A4-A

Removal and Installation

WARNING: Brake fluid contains polyglycol ethers and polyglycols. Avoid contact with eyes. Wash hands thoroughly after handling. If brake fluid contacts the eyes, flush the eyes with running water for 15 minutes. Get medical attention if irritation persists. If taken internally, drink water and induce vomiting. Get medical attention immediately. Failure to follow these instructions may result in personal injury.

CAUTION: Use of any other than approved DOT brake fluid will cause permanent damage to brake components and will render the brakes inoperative.

CAUTION: Brake fluid is harmful to painted or plastic surfaces. If brake fluid is spilled onto a painted or plastic surface, immediately rinse it off with water.

1. Remove the battery tray. For additional information, refer to **BATTERY, MOUNTING AND CABLES**.
2. Disconnect the low brake fluid warning indicator switch electrical connector.
 1. Pull back the tab.
 2. Press the clips.
 3. Disconnect the electrical connector.

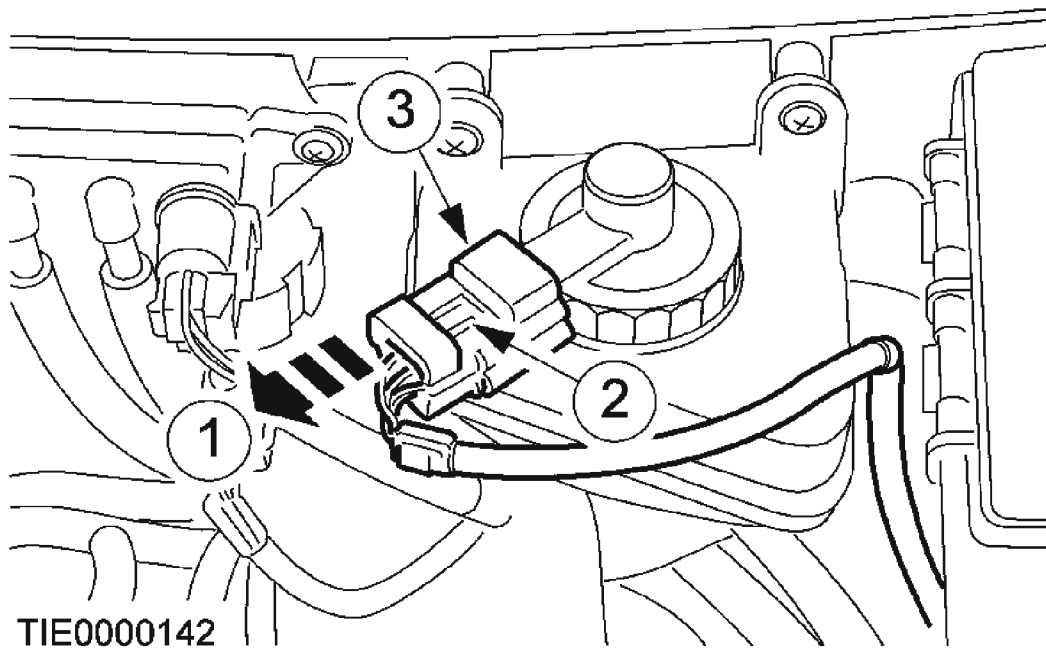


Fig. 22: Disconnecting Low Brake Fluid Warning Indicator Switch Electrical Connector

Courtesy of FORD MOTOR CO.

CAUTION: Make sure the filler cap does not become contaminated.

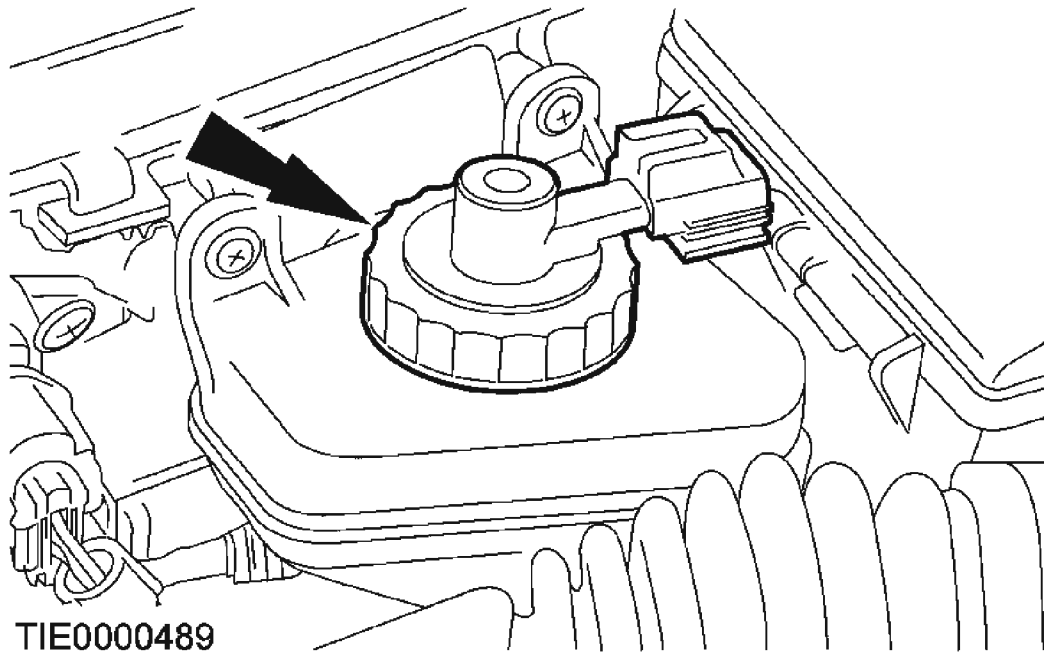


Fig. 23: Removing Reservoir Filler Cap
Courtesy of FORD MOTOR CO.

3. Remove the reservoir filler cap.
4. Using a suitable clean suction device drain the reservoir.
5. Install the brake fluid reservoir cap.
6. Disconnect the electrical connector.

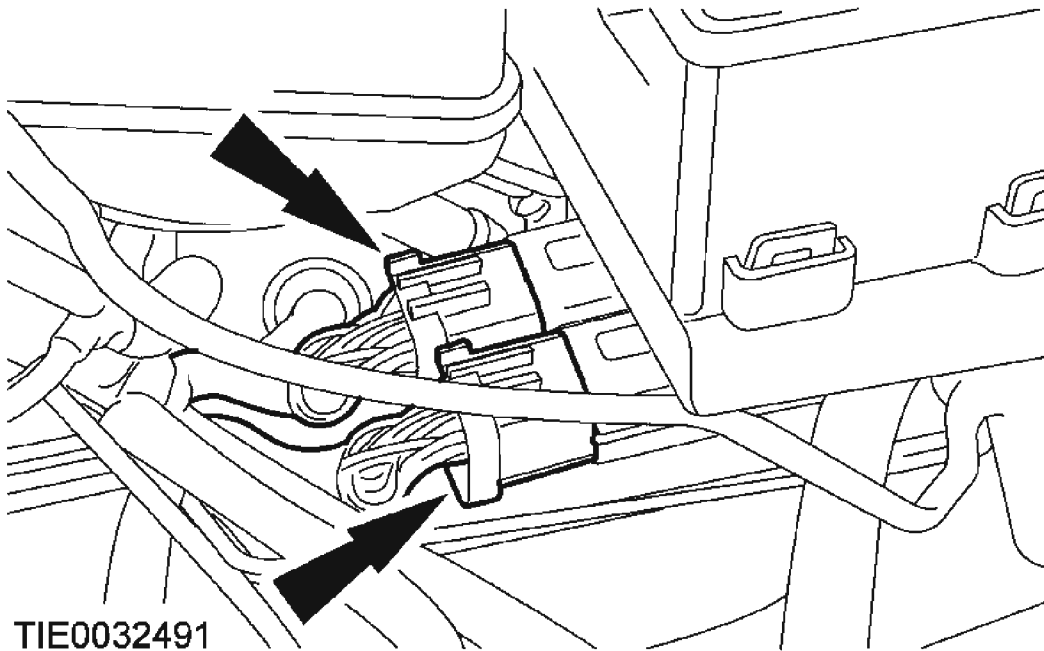


Fig. 24: Disconnecting Electrical Connector
Courtesy of FORD MOTOR CO.

7. Remove the battery junction box (BJB).

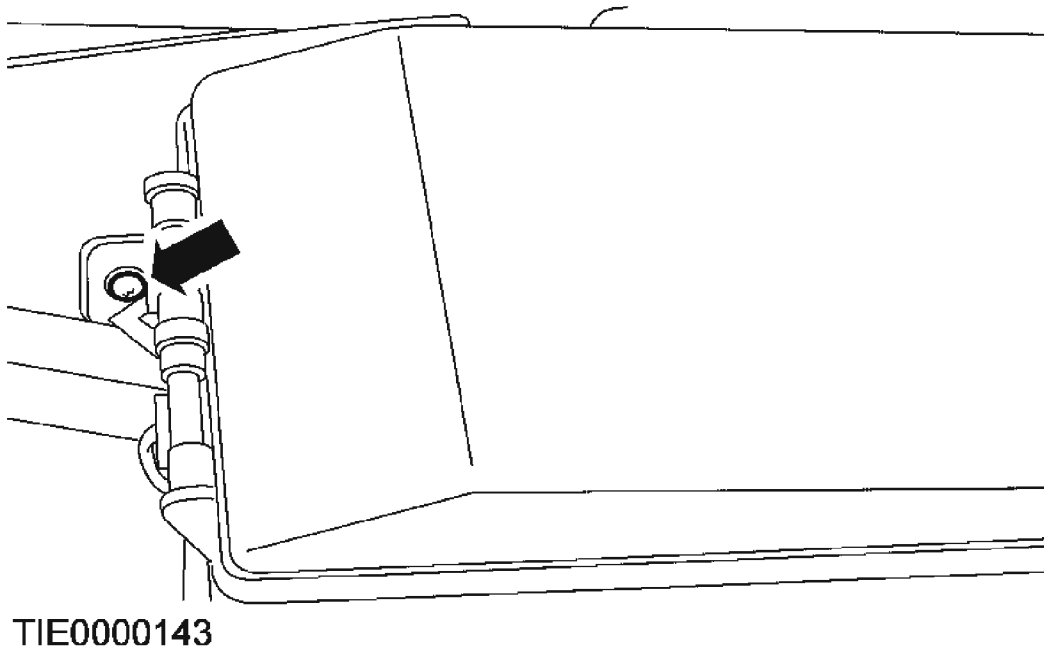


Fig. 25: Removing Battery Junction Box (BJB)
Courtesy of FORD MOTOR CO.

8. Disconnect the BJB from the bracket and position aside.
 - Press the locking tabs.

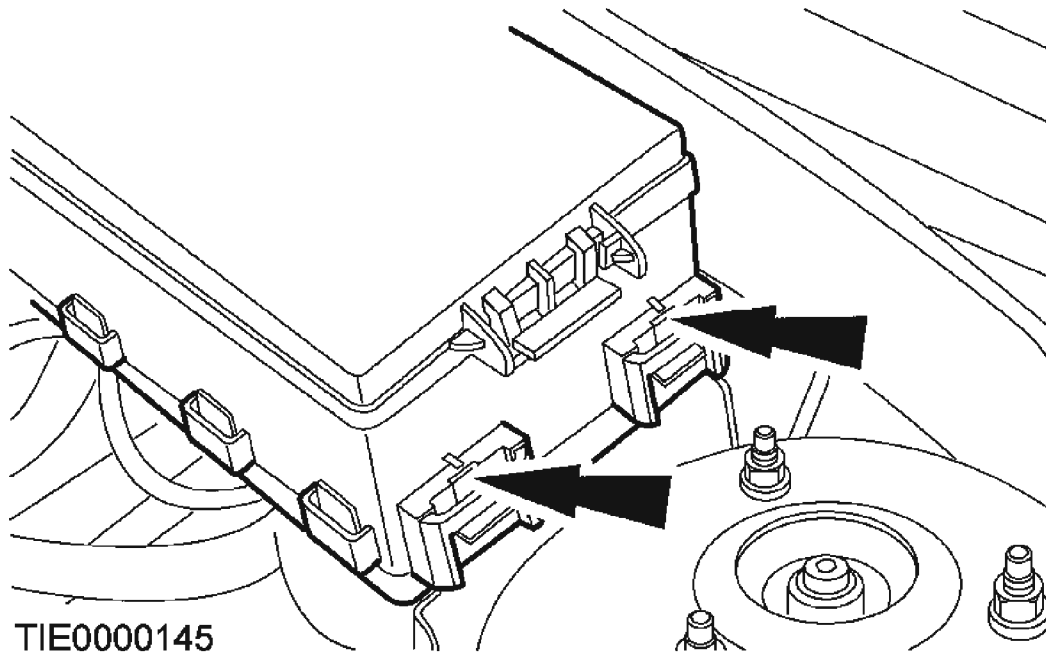


Fig. 26: Disconnecting BJB From Bracket And Position Aside
Courtesy of FORD MOTOR CO.

9. Disconnect the ABS module electrical connector by rotating the connector.

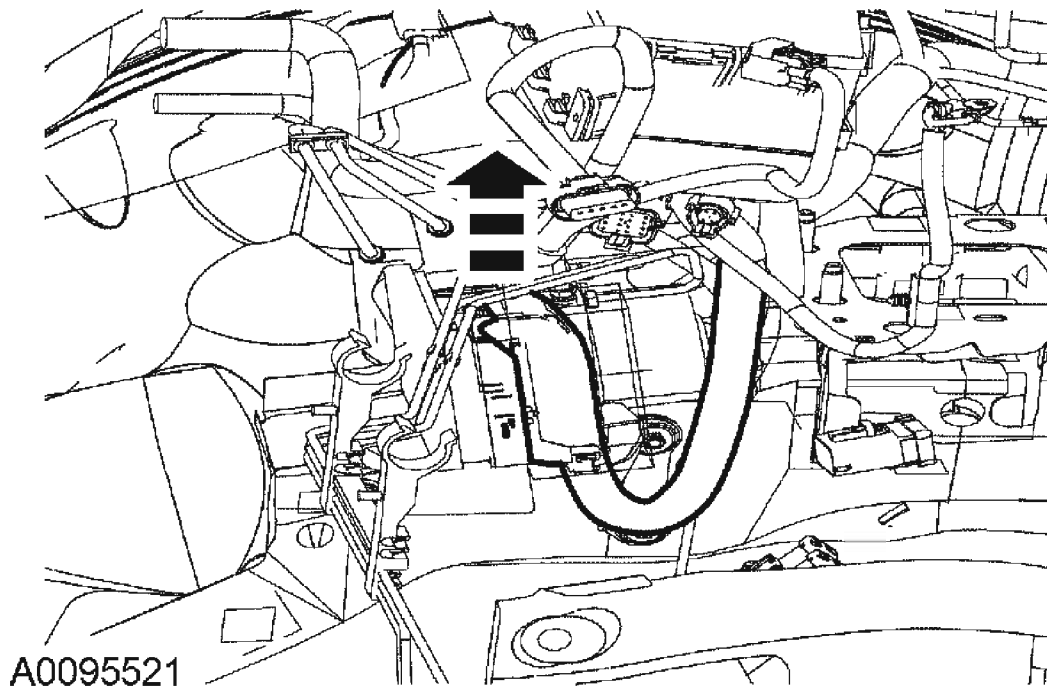


Fig. 27: Disconnecting ABS Module Electrical Connector
Courtesy of FORD MOTOR CO.

CAUTION: Cap the brake lines connections to prevent fluid loss or dirt contamination.

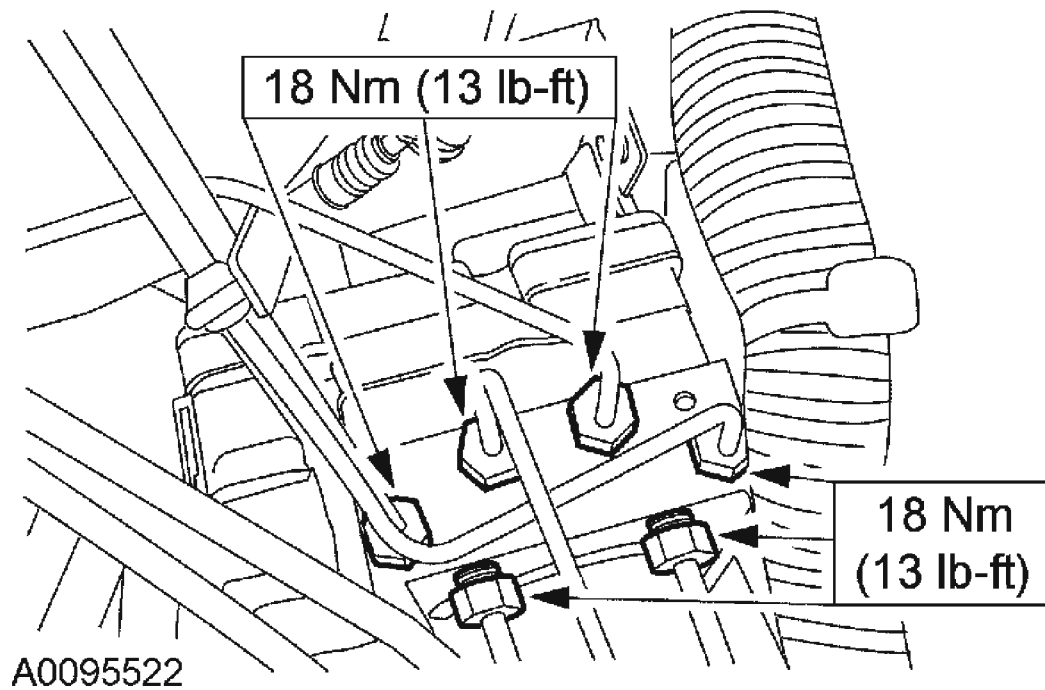


Fig. 28: Disconnecting HCU Brake Lines
Courtesy of FORD MOTOR CO.

10. Disconnect the HCU brake lines.
11. Remove the brake lines from the clips.

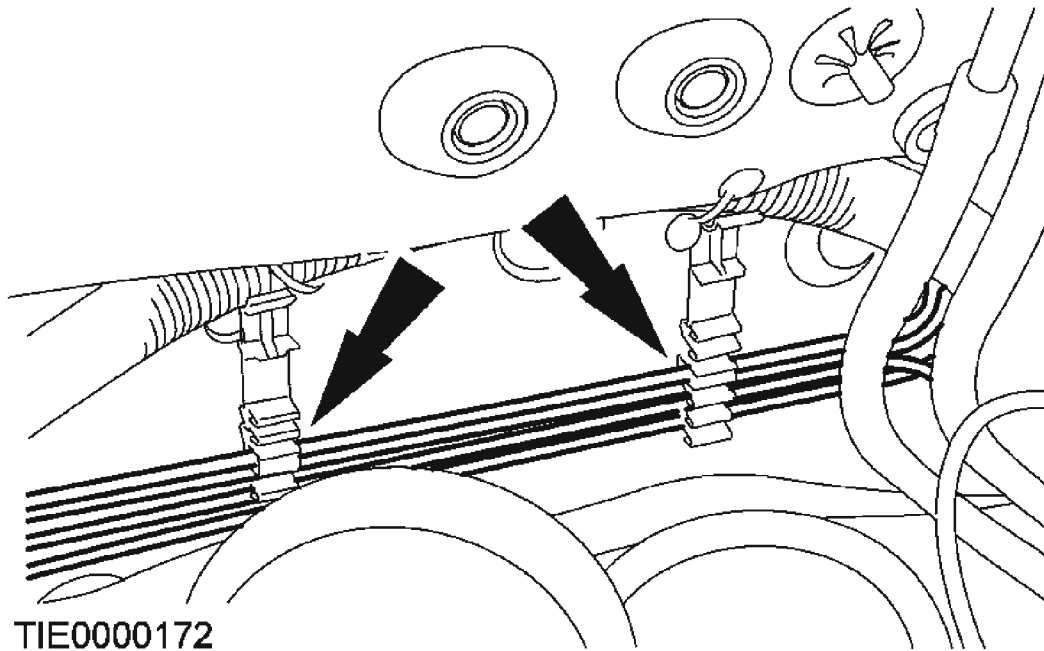


Fig. 29: Removing Brake Lines From Clips
Courtesy of FORD MOTOR CO.

12. Disconnect the wiring harness from the wheelhouse assembly.

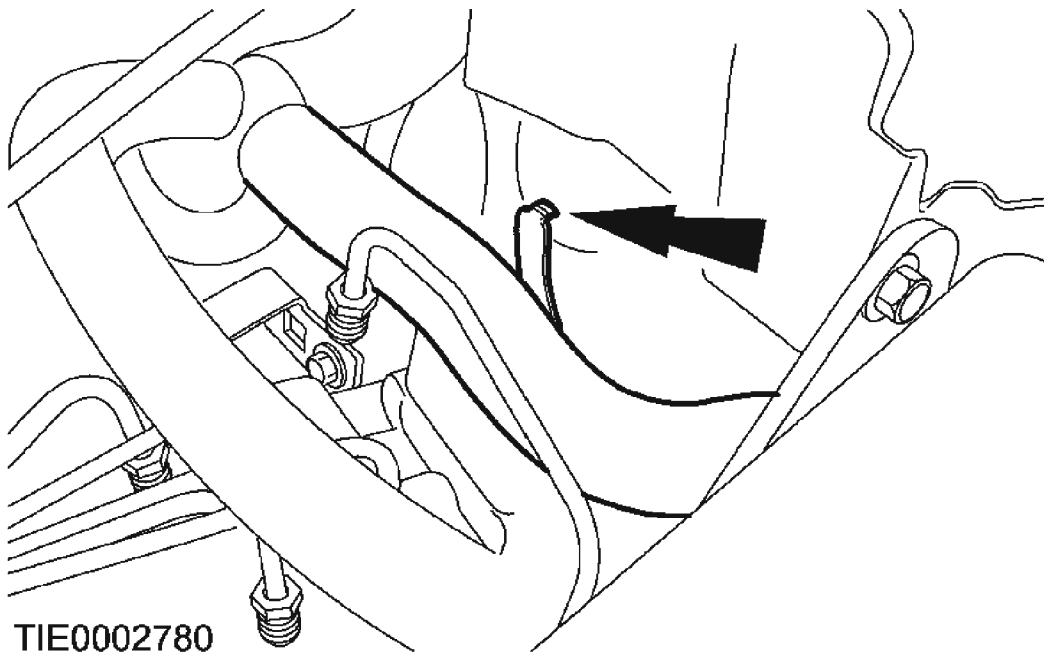


Fig. 30: Disconnecting Wiring Harness From Wheelhouse Assembly
Courtesy of FORD MOTOR CO.

13. Remove the HCU support bracket-to-frame bolts.

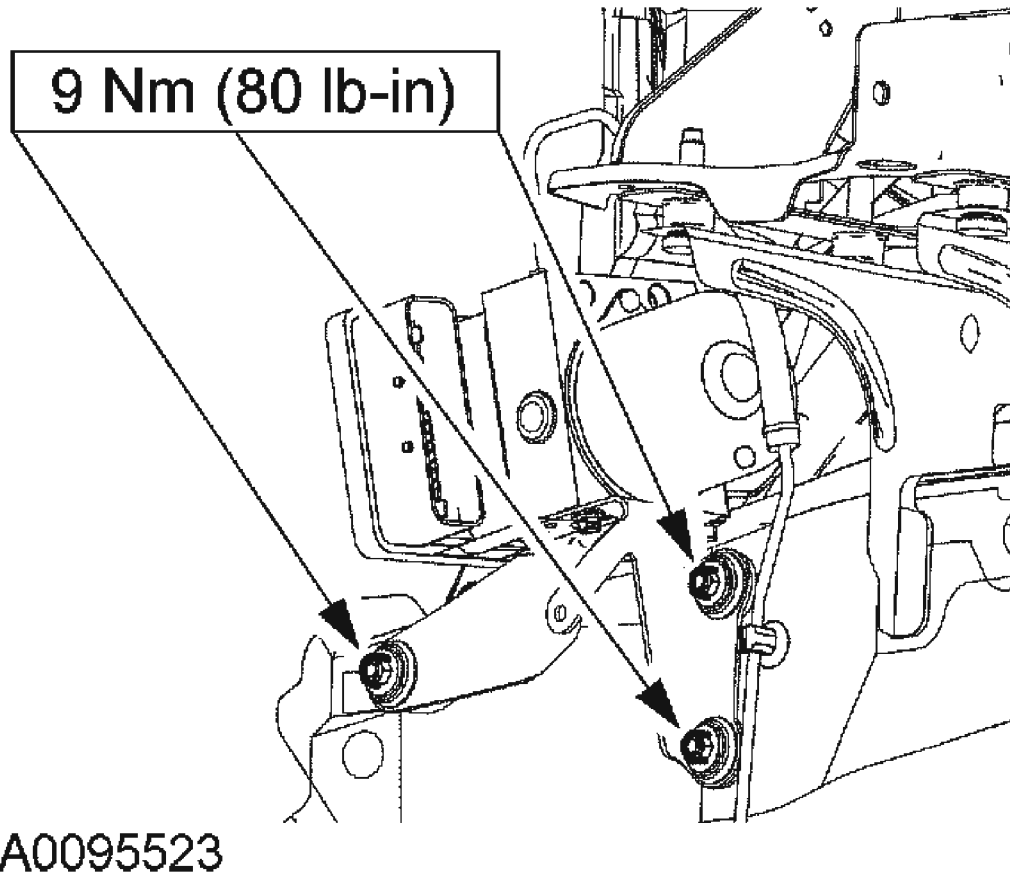


Fig. 31: Removing HCU Support Bracket-To-Frame Bolts
Courtesy of FORD MOTOR CO.

14. Remove the HCU bolts and separate the HCU from the support bracket.

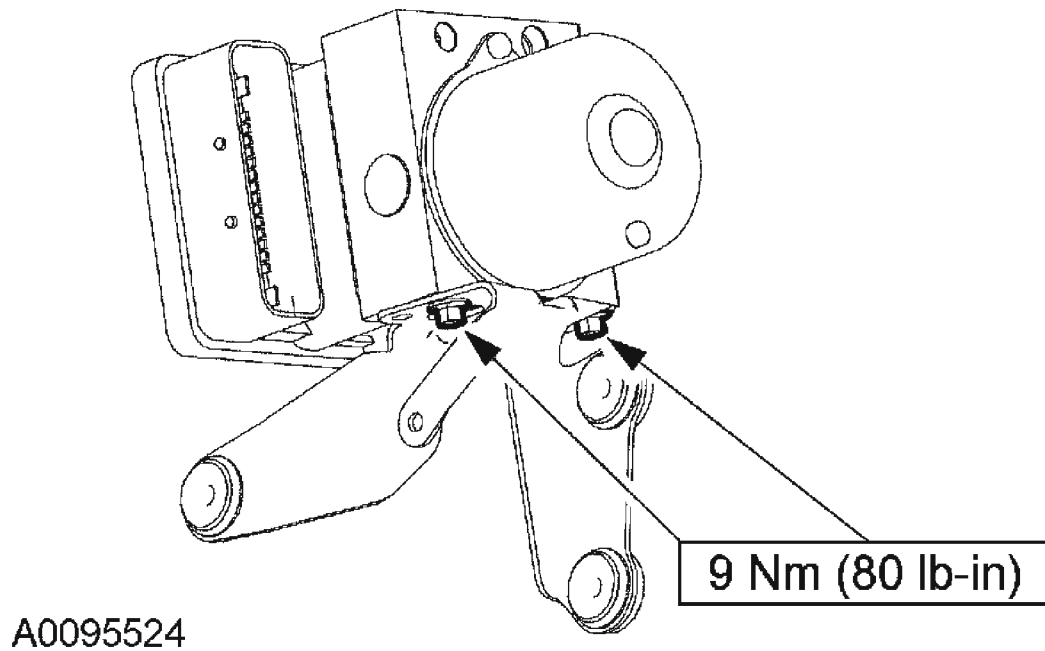


Fig. 32: Removing HCU Bolts
Courtesy of FORD MOTOR CO.

NOTE: After installation, bleed the brake system. For additional information, refer to **BRAKE SYSTEM-GENERAL INFORMATION** .

15. To install, reverse the removal procedure.

ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

Removal and Installation

1. Remove the hydraulic control unit (HCU). For additional information, refer to **HYDRAULIC CONTROL UNIT (HCU)**.
2. Remove the ABS module to HCU retaining bolts.

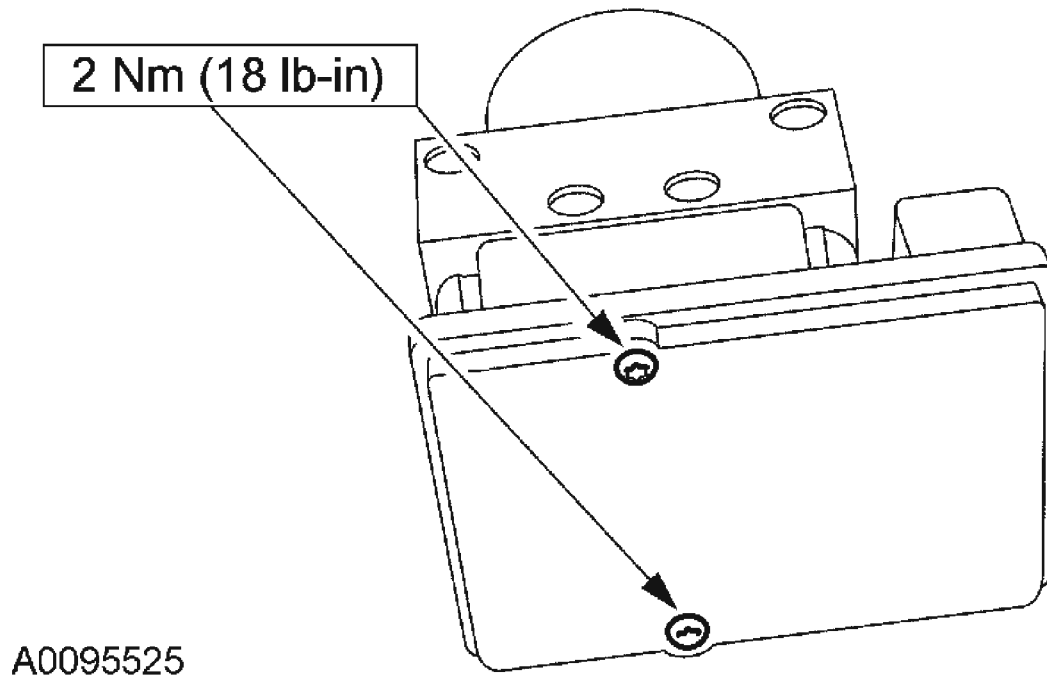


Fig. 33: Removing ABS Module To HCU Retaining Bolts
Courtesy of FORD MOTOR CO.

3. Remove the ABS module from the HCU.
4. To install, reverse the removal procedure.

WHEEL SPEED SENSOR - FRONT

Removal and Installation

1. Raise and support the vehicle. For additional information, refer to **JACKING AND LIFTING** .
2. Remove the wheel speed sensor (wheel removed for clarity).
 - Remove the wheel speed sensor bolt.

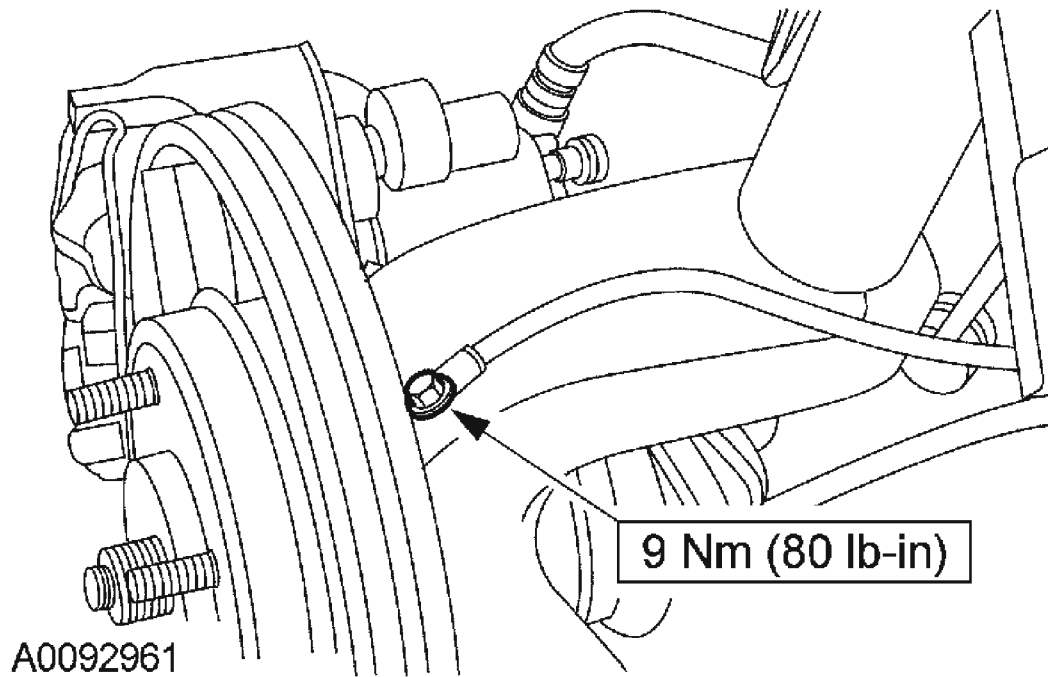


Fig. 34: Removing Wheel Speed Sensor Bolt
Courtesy of FORD MOTOR CO.

3. Disconnect the wheel speed sensor wiring harness.
 1. Disconnect the electrical connector.
 2. Remove the clips.

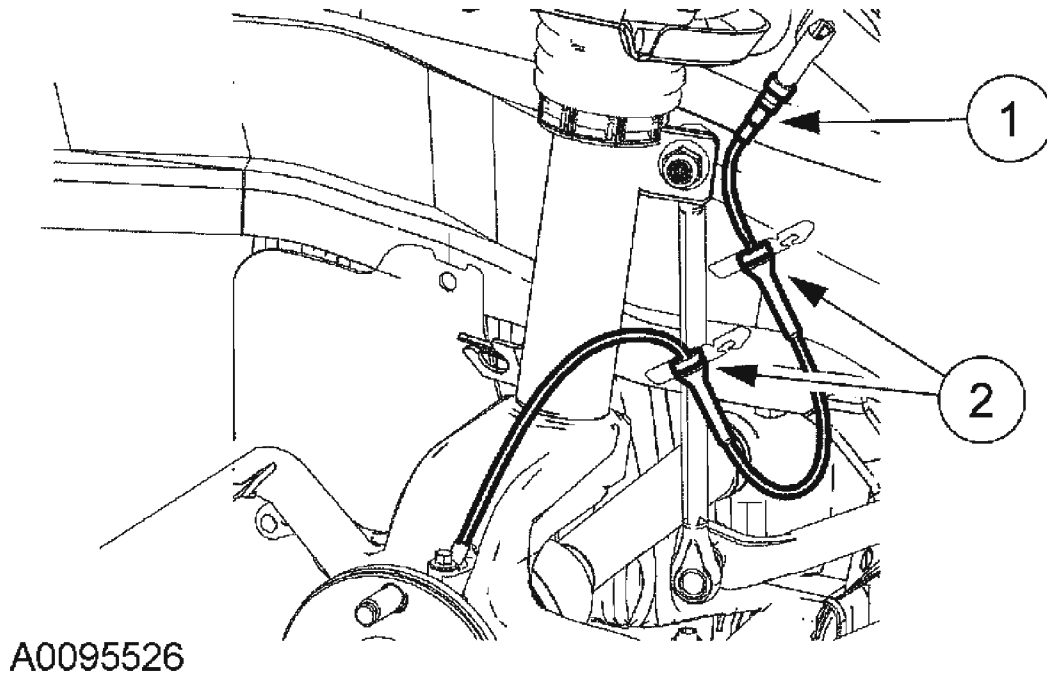


Fig. 35: Disconnecting Wheel Speed Sensor Wiring Harness
Courtesy of FORD MOTOR CO.

4. To install, reverse the removal procedure.

WHEEL SPEED SENSOR - REAR

Removal and Installation

1. Remove the wheel. For additional information, refer to **WHEELS AND TIRES** .
2. Remove the wheel speed sensor.
 - Remove the wheel speed sensor bolt.

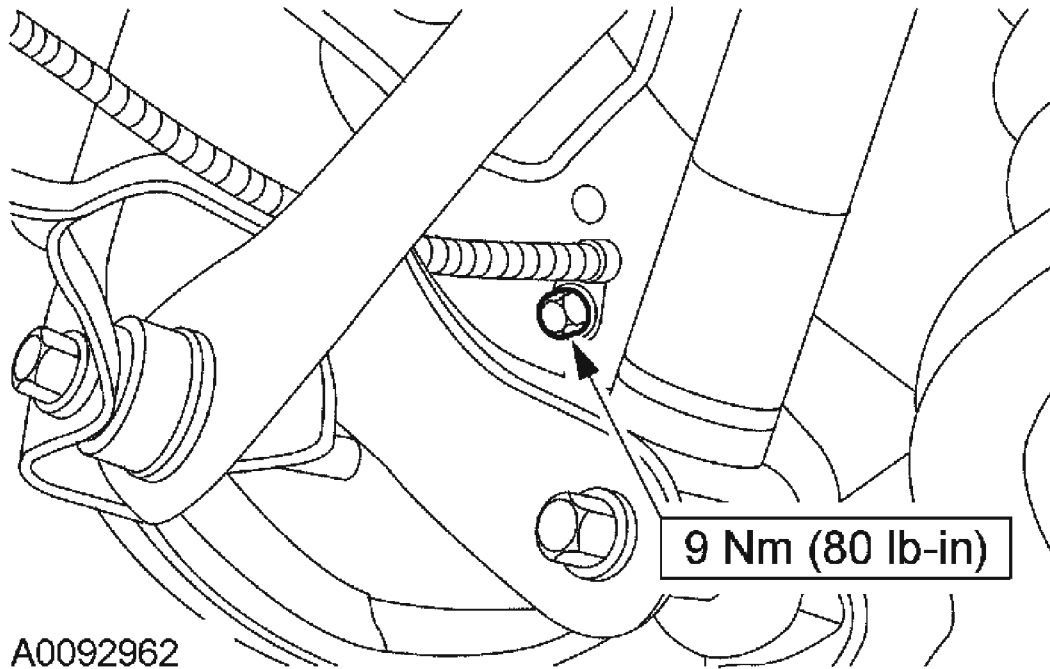


Fig. 36: Removing Wheel Speed Sensor Bolt
Courtesy of FORD MOTOR CO.

NOTE: Not all the clips are part of the sensor assembly and may not be reusable.

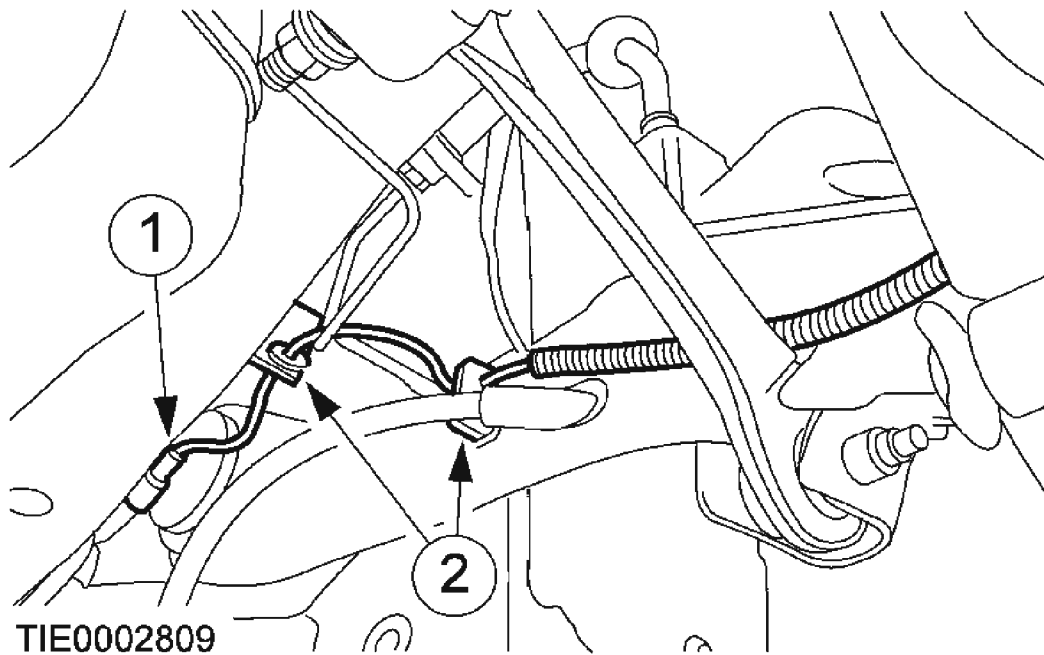


Fig. 37: Disconnecting Wheel Speed Sensor Wiring Harness
Courtesy of FORD MOTOR CO.

3. Disconnect the wheel speed sensor wiring harness.
 1. Disconnect the electrical connector.
 2. Remove sensor by detaching small clip and pulling sensor grommets out of clips.
4. To install, reverse the removal procedure.