Horn

Special Tool(s)

	Fluke 77-IV Digital Multimeter FLU77-4 or equivalent
	Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool
	Flex Probe Kit 105-R025D or equivalent

Principles of Operation

NOTE: *The Smart Junction Box (SJB) is also known as the Generic Electronic Module (GEM) .*

The SJB supplies the control and switched voltage to the horn relay (integrated into the SJB). When the driver air bag is pressed, ground is supplied through the clockspring to the horn relay. The horn relay is then energized, directing voltage to the horn and enabling the horn to sound.

The horn switch is comprised of 2 sets of contacts separated by springs. The lower set is connected to ground and the upper set is connected to the horn signal circuit. When the driver air bag module is pressed, it pushes down on the upper set of contacts, collapsing the springs and allowing the contacts to touch. When the contacts touch, it completes the circuit.

The SJB provides ground to the horn relay control side to sound the horn when the vehicle security system is armed, an intrusion is detected, or the panic alarm is activated.

Inspection and Verification

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

Visual Inspection Chart

Electrical
• Smart Junction Box (SJB) fuse 24 (20A) • Wiring, terminals or connectors • SJB

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. **NOTE:** *Make sure to use the latest scan tool software release.*

   If the cause is not visually evident, connect the scan tool to the Data Link Connector (DLC) .
5. **NOTE:** *The Vehicle Communication Module (VCM) LED prove-out confirms power and ground from the DLC are provided to the VCM .*

   If the scan tool does not communicate with the VCM :
   - Check the VCM connection to the vehicle.
   - Check the scan tool connection to the VCM .
   - Refer to Section 418-00, No Power To The Scan Tool, to diagnose no power to the scan tool.

6. If the scan tool does not communicate with the vehicle:
    - Verify the ignition key is in the ON position.
    - Verify the scan tool operation with a known good vehicle.
    - Refer to Section 418-00 to diagnose no response from the PCM.

7. Carry out the network test.
    - If the scan tool responds with no communication for one or more modules, refer to Section 418-00.
    - If the network test passes, verify the symptom. GO to Symptom Chart.

Symptom Chart

Symptom Chart

Condition	Possible Causes	Action
• The horn is inoperative	• Fuse • Wiring, terminals or connectors • Horn • Clockspring • Steering wheel harness • Horn switch (part of the steering wheel) • Smart Junction Box (SJB)	• GO to Pinpoint Test A.
• The horn is always on	• Wiring, terminals or connectors • Clockspring • Steering wheel harness • Horn switch (part of the steering wheel) • SJB	• GO to Pinpoint Test B.

Pinpoint Tests

Pinpoint Test A: The Horn Is Inoperative

Refer to Wiring Diagrams Cell 44 , Horn/Cigar Lighter for schematic and connector information.

Normal Operation

The Smart Junction Box (SJB) supplies the switched and control voltage to the horn relay (integrated into the SJB). When the horn switch (part of the steering wheel) is pressed, the switch is grounded to the steering wheel. Ground is then supplied to the horn relay, energizing the horn relay. The horn relay then sends voltage to the horn, enabling the horn to sound.

This pinpoint test is intended to diagnose the following:

- Fuse
- Wiring, terminals or connectors
- Horn
- Clockspring
- Steering wheel harness
- Horn switch (part of the steering wheel)
- SJB

PINPOINT TEST A : THE HORN IS INOPERATIVE

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

A1 CHECK THE SJB OUTPUT

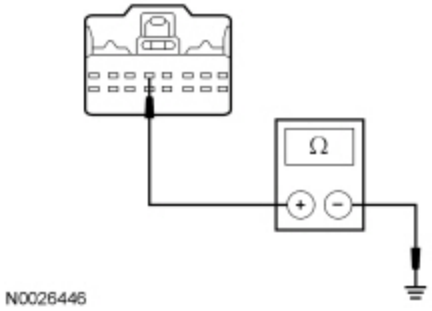
- Ignition ON.
- Enter the following diagnostic mode on the scan tool: SJB DataLogger.
- Select the SJB horn PID (HORN). Active command the horn on and then off.

Does the horn sound when commanded on?

Yes	GO to A2.
No	VERIFY the SJB fuse 24 (20A) is OK. If OK, GO to A7. If not OK, REFER to the Wiring Diagrams Manual to identify the possible causes of circuit short.

A2 CHECK THE CLOCKSPRING GROUND CIRCUIT FOR AN OPEN

- Ignition OFF.
- Depower the Supplemental Restraint System (SRS) . Refer to Section 501-20B.
- Disconnect: Clockspring C2274 .
- Measure the resistance between the clockspring C2274 Pin 5, circuit GD116 (BK/VT), harness side and ground.

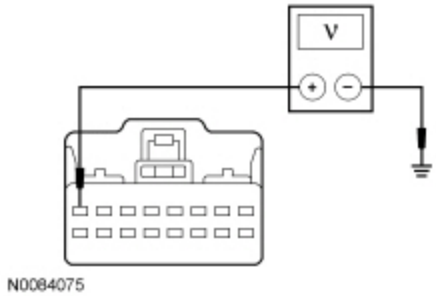


Is the resistance less than 5 ohms?

Yes	GO to A3.
No	REPAIR circuit GD116 (BK/VT) for an open. REPOWER the SRS . REFER to Section 501-20B. TEST the system for normal operation.

A3 CHECK FOR VOLTAGE TO THE CLOCKSPRING

- Connect: Negative Battery Cable.
- Measure the voltage between the clockspring C2274 Pin 8, circuit CRH02 (BU/WH), harness side and ground.

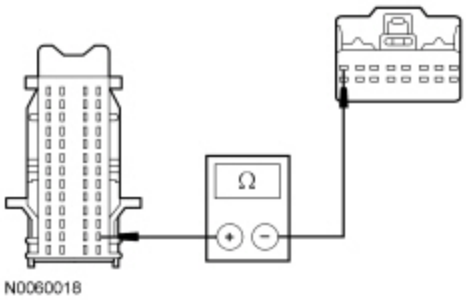


Is the voltage greater than 10 volts?

Yes	GO to A5.
No	GO to A4.

A4 CHECK THE HORN RELAY COIL GROUND CONTROL CIRCUIT FOR AN OPEN

- Disconnect: SJB C2280B .
- Measure the resistance between the SJB C2280B Pin 41, circuit CRH02 (BU/WH), harness side and the clockspring C2274 Pin 8, circuit CRH02 (BU/WH), harness side.



Is the resistance less than 5 ohms?

Yes	GO to A10.
No	REPAIR circuit CRH02 (BU/WH) for an open. REPOWER the SRS . REFER to Section 501-20B. TEST the system for normal operation.

A5 CHECK THE STEERING WHEEL HARNESS FOR OPENS

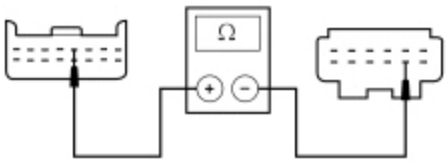
- Remove the driver air bag module. Refer to Section 501-20B.
- Disconnect: Upper Clockspring .
- Inspect the steering wheel harness for opens.

Is the steering wheel harness OK?

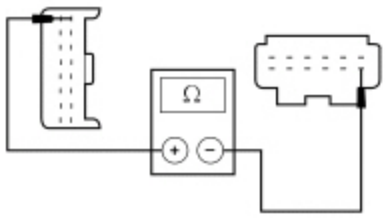
Yes	GO to A6.
No	REPAIR or INSTALL a new steering wheel harness. INSTALL the driver air bag module. REFER to Section 501-20B. TEST the system for normal operation.

A6 CHECK THE CLOCKSPRING FOR AN OPEN

- Measure the resistance between the clockspring C2274 pin 5, component side and the upper clockspring pin 2, component side.



- Measure the resistance between the clockspring C2274 pin 8, component side and the upper clockspring pin 1, component side.

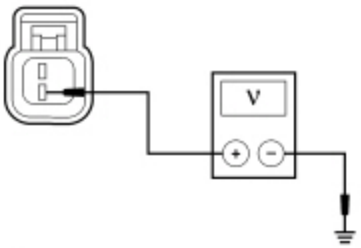


Are the resistances less than 5 ohms?

Yes	INSTALL a new steering wheel. REFER to Section 211-04. TEST the system for normal operation.
No	INSTALL a new clockspring. REFER to Section 501-20B. TEST the system for normal operation.

A7 CHECK FOR VOLTAGE TO THE HORN

- Disconnect: Horn C131 .
- While pressing the horn switch, measure the voltage between the horn C131 Pin 2, circuit SRH01 (YE/RD), harness side and ground.



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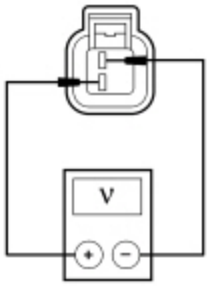
Is the voltage greater than 10 volts?

Yes	GO to A8.
No	GO to A9.

A8 CHECK FOR VOLTAGE TO THE HORN USING THE CONNECTOR GROUND

- While pressing the horn switch, measure the voltage between the horn C131 Pin 2, circuit SRH01 (YE/RD), harness side and the horn C131 Pin 1, circuit GD129 (BK/YE), harness side.



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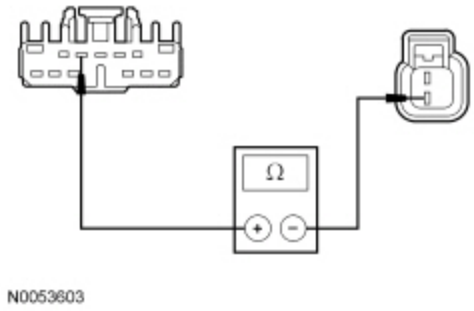
Is the voltage greater than 10 volts?

Yes	INSTALL a new horn. REFER to Horn in this section. TEST the system for normal operation.
No	REPAIR circuit GD129 (BK/YE) for an open. TEST the system for normal operation.

A9 CHECK THE HORN VOLTAGE SUPPLY CIRCUIT FOR AN OPEN

- Disconnect: SJB C2280E .
- Measure the resistance between the SJB C2280E Pin 5, circuit SRH01 (YE/RD), harness side and the horn C131 Pin 2, circuit SRH01 (YE/RD), harness side.



Is the resistance less than 5 ohms?

Yes	GO to A10.
No	REPAIR circuit SRH01 (YE/RD) for an open. TEST the system for normal operation.

A10 CHECK FOR CORRECT SJB OPERATION

- Disconnect all the SJB connectors.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect all the SJB 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 SJB . REFER to Section 419-10. REPOWER the SRS . REFER to Section 501-20B. 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. REPOWER the SRS . REFER to Section 501-20B.

Pinpoint Test B: The Horn Is Always On

Refer to Wiring Diagrams Cell 44 , Horn/Cigar Lighter for schematic and connector information.

Normal Operation

The Smart Junction Box (SJB) supplies the switched and control voltage to the horn relay (integrated into the SJB). When the horn switch (part of the steering wheel) is pressed, the switch is grounded to the steering wheel. Ground is then supplied to the horn relay, energizing the horn relay. The horn relay then sends voltage to the horn, enabling the horn to sound.

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Clockspring
- Steering wheel harness
- Horn switch (part of the steering wheel)
- SJB

PINPOINT TEST B : THE HORN IS ALWAYS ON

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

B1 CHECK THE HORN POWER SUPPLY CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect: SJB C2280E .

Does the horn continue to sound?

Yes	REPAIR circuit SRH01 (YE/RD) for a short to voltage. TEST the system for normal operation.
No	GO to B2.

B2 CHECK THE HORN SWITCH INPUT

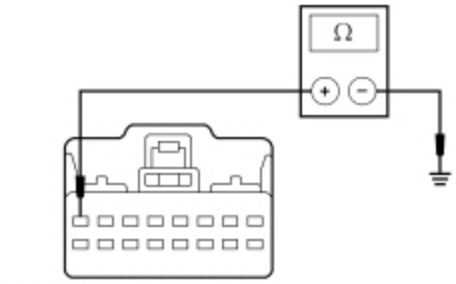
- Disconnect: SJB C2280B .
- Connect: SJB C2280E .

Does the horn continue to sound?

Yes	GO to B6.
No	GO to B3.

B3 CHECK THE HORN RELAY COIL GROUND CONTROLLED CIRCUIT FOR A SHORT TO GROUND

- Depower the Supplemental Restraint System (SRS) . Refer to Section 501-20B.
- Disconnect: Clockspring C2274 .
- Measure the resistance between the clockspring C2274 Pin 8, circuit CRH02 (BU/WH), harness side and ground.

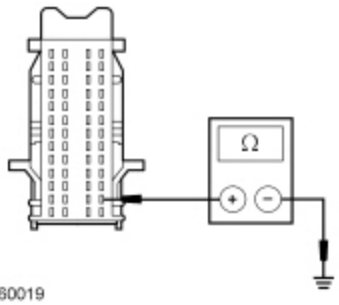


Is the resistance greater than 10,000 ohms?

Yes	GO to B4.
No	REPAIR circuit CRH02 (BU/WH) for a short to ground. REPOWER the SRS . REFER to Section 501-20B. TEST the system for normal operation.

B4 CHECK THE CLOCKSPRING FOR A SHORT TO GROUND

- Remove the driver air bag module. Refer to Section 501-20B.
- Connect: Clockspring C2274 .
- Disconnect: Upper Clockspring .
- Measure the resistance between the SJB C2280B Pin 41, circuit CRH02 (BU/WH), harness side and ground.



Is the resistance greater than 10,000 ohms?

Yes	GO to B5.
No	INSTALL a new clockspring. REFER to Section 501-20B. TEST the system for normal operation.

B5 CHECK THE STEERING WHEEL HARNESS FOR A SHORT

- Remove the driver air bag module. Refer to Section 501-20B.
- Disconnect: Upper Clockspring .
- Disconnect: Horn Switch .
- Inspect the steering wheel harness for shorts.

Is the steering wheel harness OK?

Yes	INSTALL a new steering wheel. REFER to Section 211-04. TEST the system for normal operation.
No	REPAIR or INSTALL a new steering wheel harness. INSTALL the driver air bag module. REFER to Section 501-20B. TEST the system for normal operation.

B6 CHECK FOR CORRECT SJB OPERATION

- Disconnect all the SJB connectors.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect all the SJB 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 SJB . REFER to Section 419-10. 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.