

Service Manual: HORN SYSTEM - SERVICE INFORMATION

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An electrically-operated dual-note horn system is standard factory-installed equipment in this vehicle. The horn system features one low-note horn unit and one high-note horn unit. The Power Distribution Center (PDC) contains the horn fuse and the horn relay. Depressing either side of the upper surface of the Driver AirBag (DAB) trim cover in the center of the steering wheel actuates the horn switch contacts, which provides the vehicle operator with a convenient, audible signaling device that can be used to alert pedestrians or the operators of other vehicles in near proximity.

The horn system includes the following major components, which are described in further detail elsewhere in this service information:

- **Horn Relay** - The horn relay is an International Standards Organization (ISO) micro relay located within the Power Distribution Center (PDC). The PDC is located on the left side of the engine compartment outboard of the battery.
- **Horns** - The low note and high note electromagnetic diaphragm-type trumpet horns are each secured by a mounting bracket to the right and left fender front lower brackets ahead of each front wheel house splash shield, below each front combination lamp and behind each outboard end of the front bumper fascia.
- **Horn Switch Plate** - The floating horn switch plate is secured to the back of the DAB housing within the steering wheel hub cavity and also serves as the mounting bracket between the DAB and the steering wheel. The horn switch rotates with the steering wheel and is connected to the vehicle electrical system through the steering wheel wire harness and a pass-through circuit of the clockspring at the top of the steering column.
- **Power Distribution Center** - The Power Distribution Center (PDC) is located on the left side of the engine compartment outboard of the battery. Refer to DESCRIPTION AND OPERATION .

Hard wired circuitry connects the various horn system components to each other through the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other and to the vehicle electrical system through the use of a combination of soldered splices, splice block connectors and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention as well as pin out and location views for the various wire harness connectors, splices and grounds.

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The horn operates on battery current received from a horn relay located in the Power Distribution Center (PDC) through a fuse also located in the PDC. The vehicle operator can control typical horn system signaling through the horn switch within the hub of the steering wheel. When the upper surface of the Driver AirBag (DAB) trim cover is depressed, it provides a hard wired ground path to the Body Control Module (BCM). In response to that input the BCM uses a Low Side Driver (LSD) to provide a ground path to the control coil of the horn relay. The horn system circuit is designed so that the system will remain operational, regardless of the status of the ignition switch.

The horns can also be activated by the BCM to support each of the following features:

- **Remote Keyless Entry System** - Remote Keyless Entry (RKE) system **Lock** request audible verification.
- **Remote Keyless Entry System** - Remote Keyless Entry (RKE) system **Panic** mode audible alert for North America Free Trade Agreement (NAFTA) markets only.
- **Remote Start System** - Remote Start System **Start** request audible verification for North America Free Trade Agreement (NAFTA) markets only.
- **Vehicle Theft Alarm** - Vehicle Theft Alarm (VTA) audible alarm except in vehicles manufactured for markets where an alarm siren is required.

The hard wired circuits between components related to the horn system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the horn system or the electronic controls and communication between modules and other devices that provide some features of the horn system. The most reliable, efficient and accurate means to diagnose the horn system or the electronic controls and communication related to horn system operation requires the use of a diagnostic scan tool.

DIAGNOSIS AND TESTING > DIAGNOSIS AND TESTING - HORN SYSTEM

 **WARNING:**

To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbags, airbag curtains, knee blocker, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Refer to WARNING . Disconnect the IBS/negative battery cable assembly from the negative battery post, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

 **NOTE:**

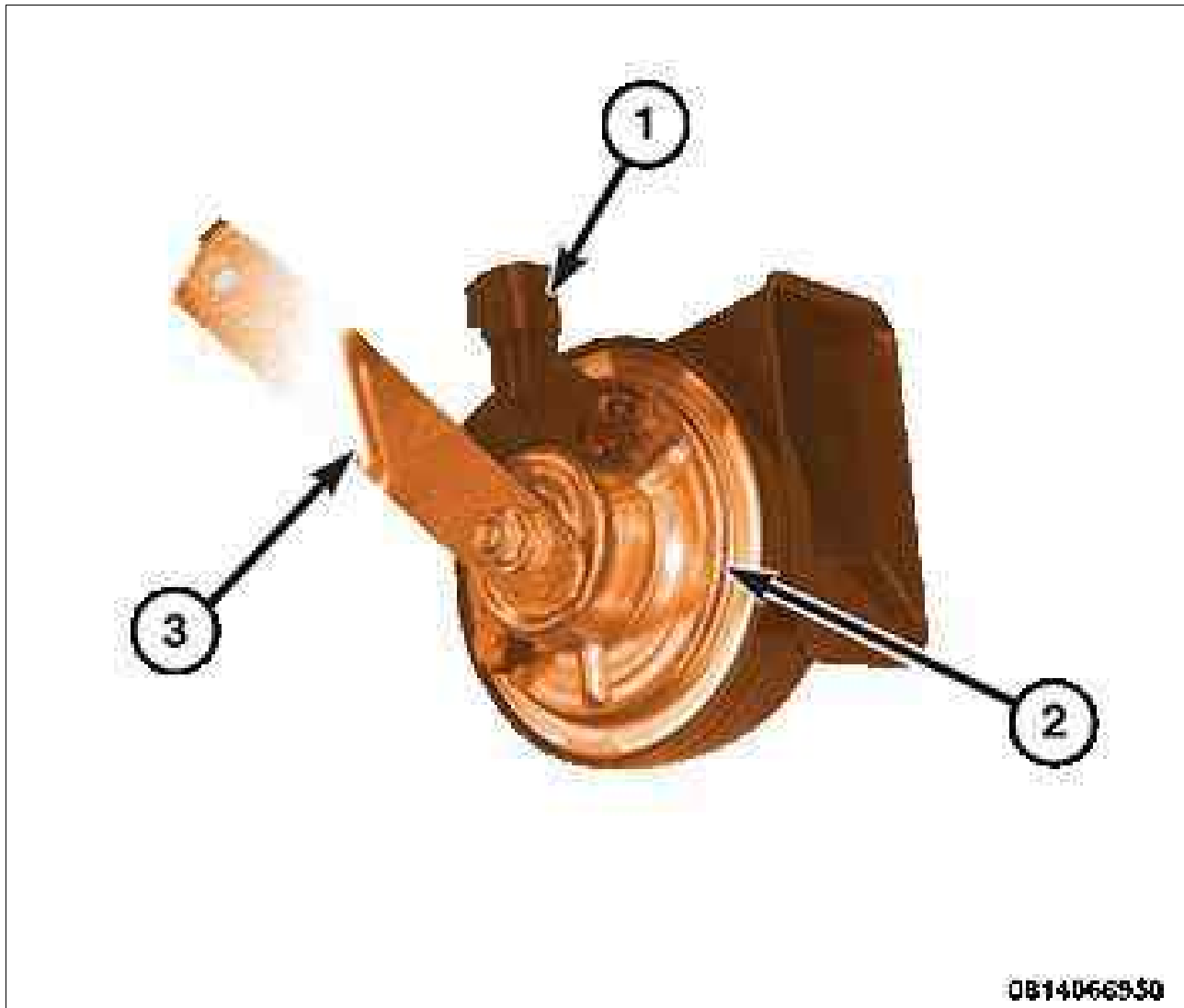
A continuously sounding horn is immediately resolved by removing the horn relay from the Power Distribution Center (PDC).

HORN SYSTEM DIAGNOSIS		
CONDITION	POSSIBLE CAUSES	CORRECTION

HORN SOUNDS CONTINUOUSLY	1. Damaged or ineffective horn feed circuit.	1. Test and repair shorted horn feed circuit if required.
	2. Damaged or ineffective horn switch return circuit.	2. Test and repair shorted horn switch return circuit if required.
	3. Damaged or ineffective clockspring.	3. Test and replace the shorted clockspring and stalk unit if required.
	4. Damaged or ineffective horn switch.	4. Test and replace the shorted horn switch, mounting plate and DAB unit if required.
	5. Damaged or ineffective horn relay.	5. Test the horn relay inputs and outputs of the Power Distribution Center (PDC). Replace the horn relay if required.
	6. Ineffective Body Control Module (BCM) inputs or outputs.	6. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
HORN SOUNDS INTERMITTENTLY AS THE STEERING WHEEL IS ROTATED	1. Damaged or ineffective horn switch return circuit.	1. Test and repair intermittent shorted horn switch return circuit if required.
	2. Damaged or ineffective horn switch.	2. Test and replace the intermittent open or shorted horn switch, mounting plate and DAB unit if required.
HORN DOES NOT SOUND	1. Damaged or ineffective horn ground circuit.	1. Test and repair open horn ground circuit if required.
	2. Damaged or ineffective horn feed circuit.	2. Test and repair open horn feed circuit if required.
	3. Damaged or ineffective horn.	3. Test and replace open horn if required.
	4. Damaged or ineffective horn switch feed circuit.	4. Test and repair open horn switch feed circuit if required.
	5. Damaged or ineffective horn switch return circuit.	5. Test and repair open horn switch return circuit if required.
	6. Damaged or ineffective clockspring.	6. Test and replace the open clockspring and stalk unit if required.
	7. Damaged or ineffective horn switch.	7. Test and replace the open horn switch, mounting plate and DAB unit if required.
	8. Damaged or ineffective horn relay.	8. Test the horn relay inputs and outputs of the PDC. Replace the horn relay if required.
	9. Ineffective Body Control Module (BCM) inputs or outputs.	9. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.

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Fig 1: Horn, Bracket & Connector Insulator



Courtesy of CHRYSLER GROUP, LLC

Electromagnetic diaphragm-type horns are standard equipment on this vehicle. Each trumpet-style horn (2) is secured to a stamped metal mounting bracket (3). The horn and mounting bracket unit is then secured by a single screw to the underside of the left (high note) or right (low note) fender front lower bracket ahead of each front wheel house splash shield, below each front combination lamp and behind each outboard end of the front bumper fascia.

The horn includes a single connector insulator (1) with two terminal pins integral to the horn. A dedicated take out and connector of the headlamp and dash wire harness connects the horn to the vehicle electrical system.

The horn and the mounting bracket are factory-tuned as a unit and; therefore, are serviced only as a unit. The horn cannot be adjusted or repaired. If the horn or the mounting bracket is ineffective or damaged, the entire unit must be replaced.

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The horn has a path to ground at all times through its wire harness connection to an eyelet terminal secured to the body sheet metal. The horn is completely controlled by a fused B(+) output received through a fuse and the closed contacts of the horn relay located within the Power Distribution Center (PDC).

Within the two halves of the horn housing are a flexible diaphragm, a plunger, an electromagnetic coil and a set of contact points. The diaphragm is secured in suspension around its perimeter by the mating surfaces of the horn housing. The plunger is secured to the center of the diaphragm and extends into the center of the electromagnetic coil. The contact points control the current flow through the windings of the electromagnetic coil.

When the horn is energized, electrical current flows through the closed contact points to the electromagnetic coil. The resulting electromagnetic field draws the plunger and diaphragm toward it until that movement mechanically opens the contact points. When the contact points open, the electromagnetic field collapses allowing the plunger and diaphragm to return to their relaxed positions and closing the contact points again. This cycle continues repeating at a very rapid rate producing the vibration and movement of air that creates the sound that is directed through the horn trumpet outlet.

The horn as well as the hard wired input circuit for the horn may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information.

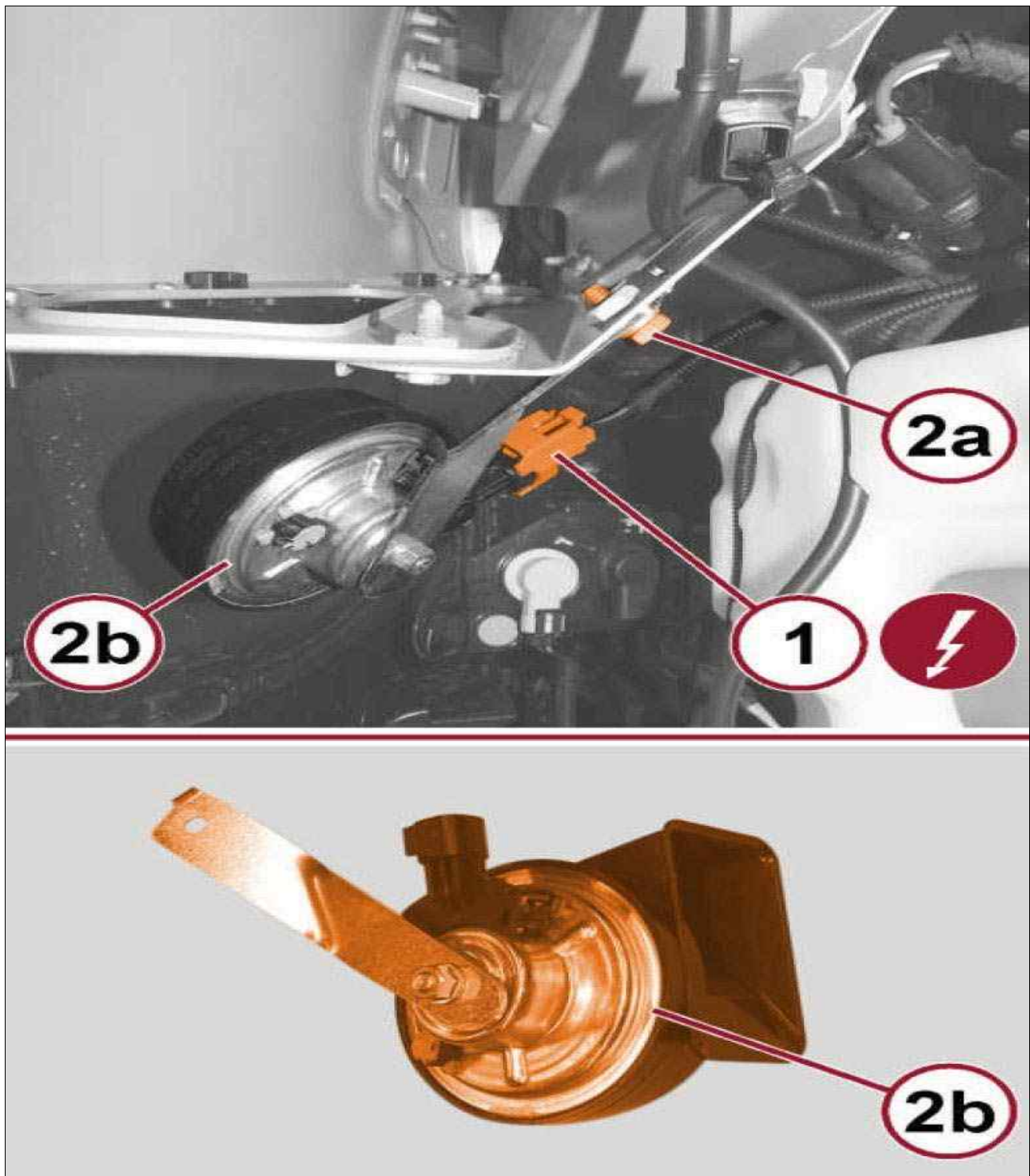
HORN > DIAGNOSIS AND TESTING > DIAGNOSIS AND TESTING - HORN

Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

1. Disconnect the wire harness connector from the horn. Check for continuity between the horn ground circuit cavity of the harness connector and a good ground. There should be continuity. If OK, go to Step 2. If not OK, repair the open ground circuit to ground as required.
2. Check for battery voltage at the horn input circuit cavity of the harness connector. There should be zero volts. If OK, go to Step 3. If not OK, repair the shorted horn output circuit between the horn and the horn relay in the Power Distribution Center (PDC) as required.
3. Depress the horn switch. There should now be battery voltage at the horn input circuit cavity of the harness connector for the horn. If OK, replace the ineffective horn. If not OK, perform further diagnosis of the horn switch, the clockspring, the horn switch input to the Body Control Module (BCM) and the BCM output to the horn relay in the PDC as required.

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Fig 1: Horn, Connector & Screw



Courtesy of CHRYSLER GROUP, LLC

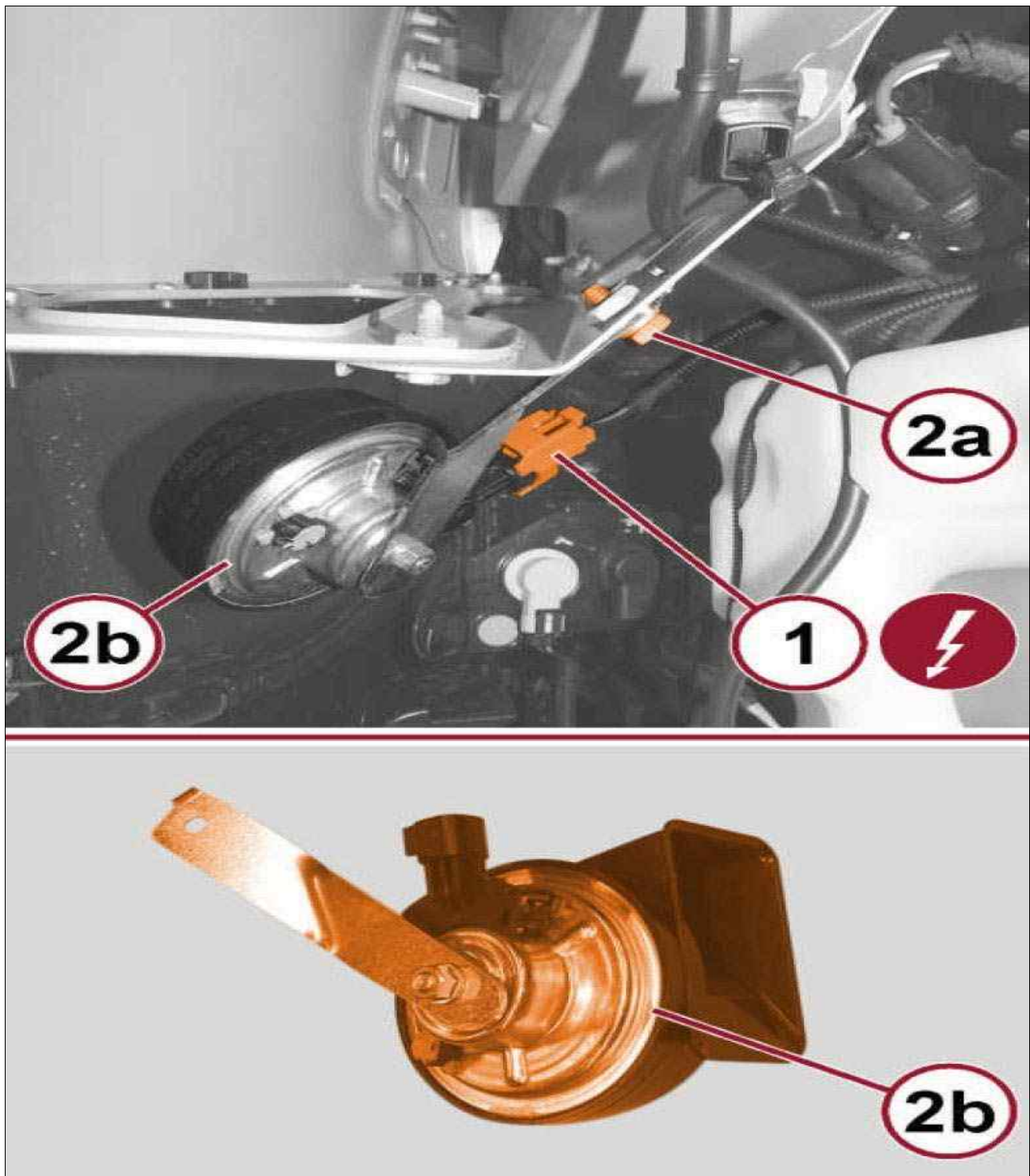
1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Raise and support the vehicle.
3. Disengage the front of the appropriate right or left front wheel house splash shield from the

fender and the front bumper fascia and move it far enough to access the horn and mounting bracket. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION

4. Reach behind the appropriate right or left outboard end of the front bumper fascia to access and disconnect the headlamp and dash wire harness connector (1) for the horn from the horn connector.
5. Remove the screw (2a) that secures the horn (2b) mounting bracket to the underside of the left (high note) or right (low note) fender front lower bracket.
6. Remove the horn and mounting bracket from the vehicle as a unit.

HORN > REMOVAL AND INSTALLATION > REMOVAL AND INSTALLATION > INSTALLATION

Fig 1: Horn, Connector & Screw



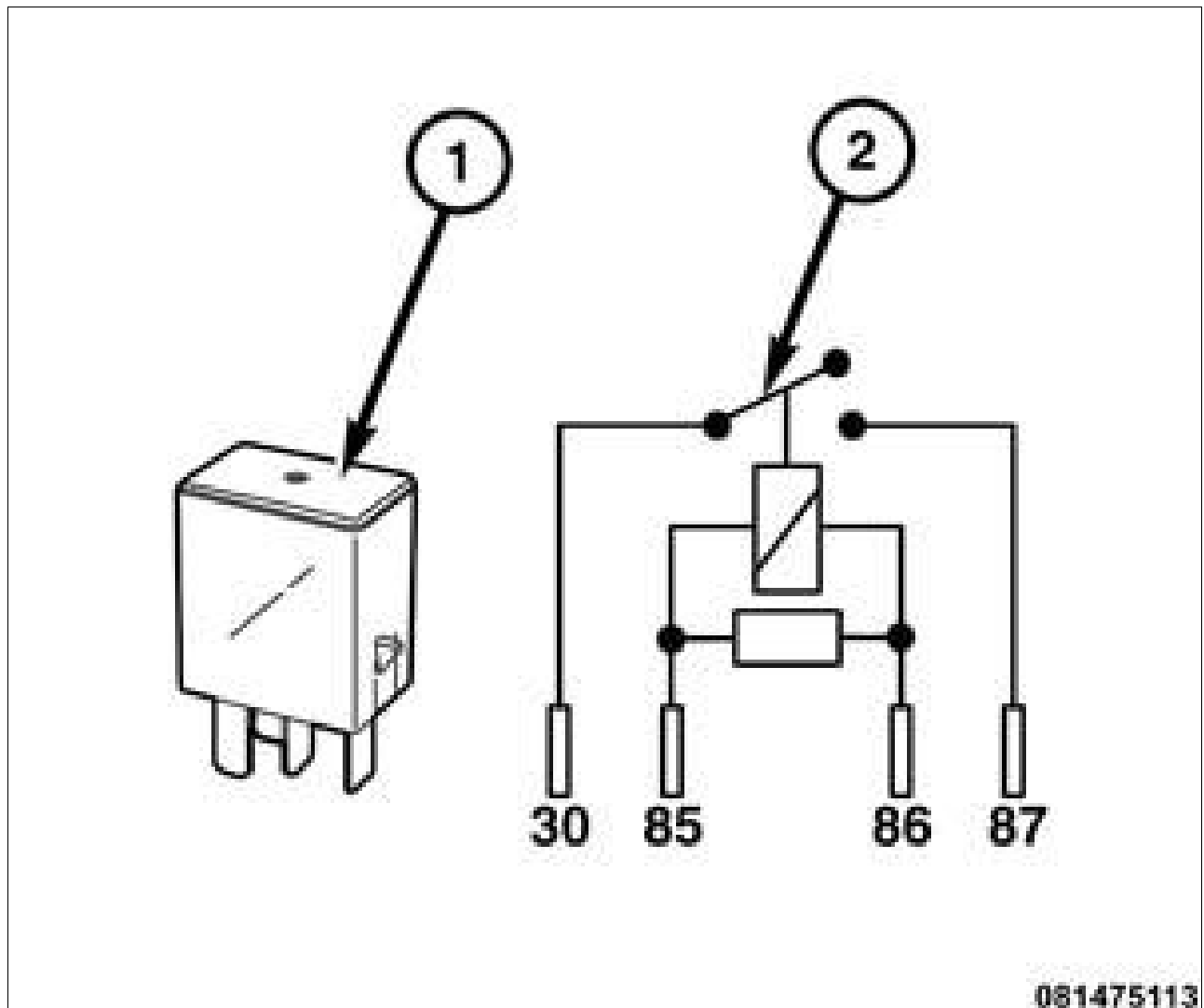
Courtesy of CHRYSLER GROUP, LLC

1. Reach behind the appropriate right or left outboard end of the front bumper fascia to position the horn and mounting bracket unit (2b) to the underside of the left (high note) or right (low note) fender front lower bracket. Be certain to engage the anti-rotation tab of the horn mounting bracket with the anti-rotation clearance hole in the fender front lower bracket.
2. Install and tighten the screw (2a) that secures the horn mounting bracket to the fender front lower bracket. Tighten the screw securely.

3. Connect the headlamp and dash wire harness connector (1) to the horn connector.
4. Install the front of the appropriate right or left front wheel house splash shield to the fender and the front bumper fascia. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
5. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

RELAY, HORN > DESCRIPTION AND OPERATION > DESCRIPTION AND OPERATION > DESCRIPTION

Fig 1: Horn Relay Circuit Diagram



Courtesy of CHRYSLER GROUP, LLC

The horn relay (1) is a conventional International Standards Organization (ISO) micro relay. Relays conforming to the ISO specifications have common physical dimensions, current capacities, terminal patterns, and terminal functions. This relay is contained within a small, rectangular, molded plastic housing and is connected to all of the required inputs and outputs through four integral male spade-type

terminals that extend from the relay base plate.

Internally (2), the horn relay is a electromechanical device that consists of an electromagnetic coil, a resistor and a pair of normally open electrical contacts. One of the two electrical contacts is fixed, while the other contact is movable. The movable relay contact is held away from the fixed contact by spring pressure. The horn relay for this vehicle is installed in a cavity within the Power Distribution Center (PDC), which is located on the left side of the engine compartment and outboard of the battery. Refer to the layout label on the underside of the PDC cover for specific relay cavity assignment information.

The horn relay cannot be repaired or adjusted and, if ineffective or damaged, the relay unit must be replaced.

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The horn relay within the PDC switches battery current to the horn when the Body Control Module (BCM) provides a path to ground for the electromagnetic coil of the relay. When the electromagnetic relay coil is energized, it draws and holds the normally open movable contact of the relay against the fixed relay contact. The closed relay contacts supply fused battery current from a fuse in the PDC to energize the horns.

When the BCM de-energizes the electromagnetic relay coil, spring pressure returns the movable contact to the normally open position, which de-energizes the horns. The resistor within the relay is connected in parallel with the electromagnetic coil, which helps to dissipate voltage spikes that are produced when the coil is de-energized.

The hard wired inputs and outputs of the horn relay in the PDC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information.

RELAY, HORN > DIAGNOSIS AND TESTING > DIAGNOSIS AND TESTING - HORN RELAY

The hard wired inputs and outputs of the horn relay in the Power Distribution Center (PDC) may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information.

RELAY, HORN > REMOVAL AND INSTALLATION > REMOVAL AND INSTALLATION > REMOVAL

Fig 1: Battery & Power Distribution Center



Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the cover from the Power Distribution Center (PDC) (2) located on the left side of the engine compartment near the battery (1) and the washer reservoir filler neck.

 NOTE:

Refer to the appropriate wiring information and the fuse and relay layout map on the underside of the PDC cover for relay identification and cavity location.

3. Remove the horn relay by grasping it firmly and pulling it straight out from the cavity within the PDC.

RELAY, HORN > REMOVAL AND INSTALLATION > REMOVAL AND INSTALLATION > INSTALLATION

Fig 1: Battery & Power Distribution Center



Courtesy of CHRYSLER GROUP, LLC



NOTE:

Refer to the appropriate wiring information and the fuse and relay layout map on the underside of the Power Distribution Center (PDC) cover for relay identification and cavity location.

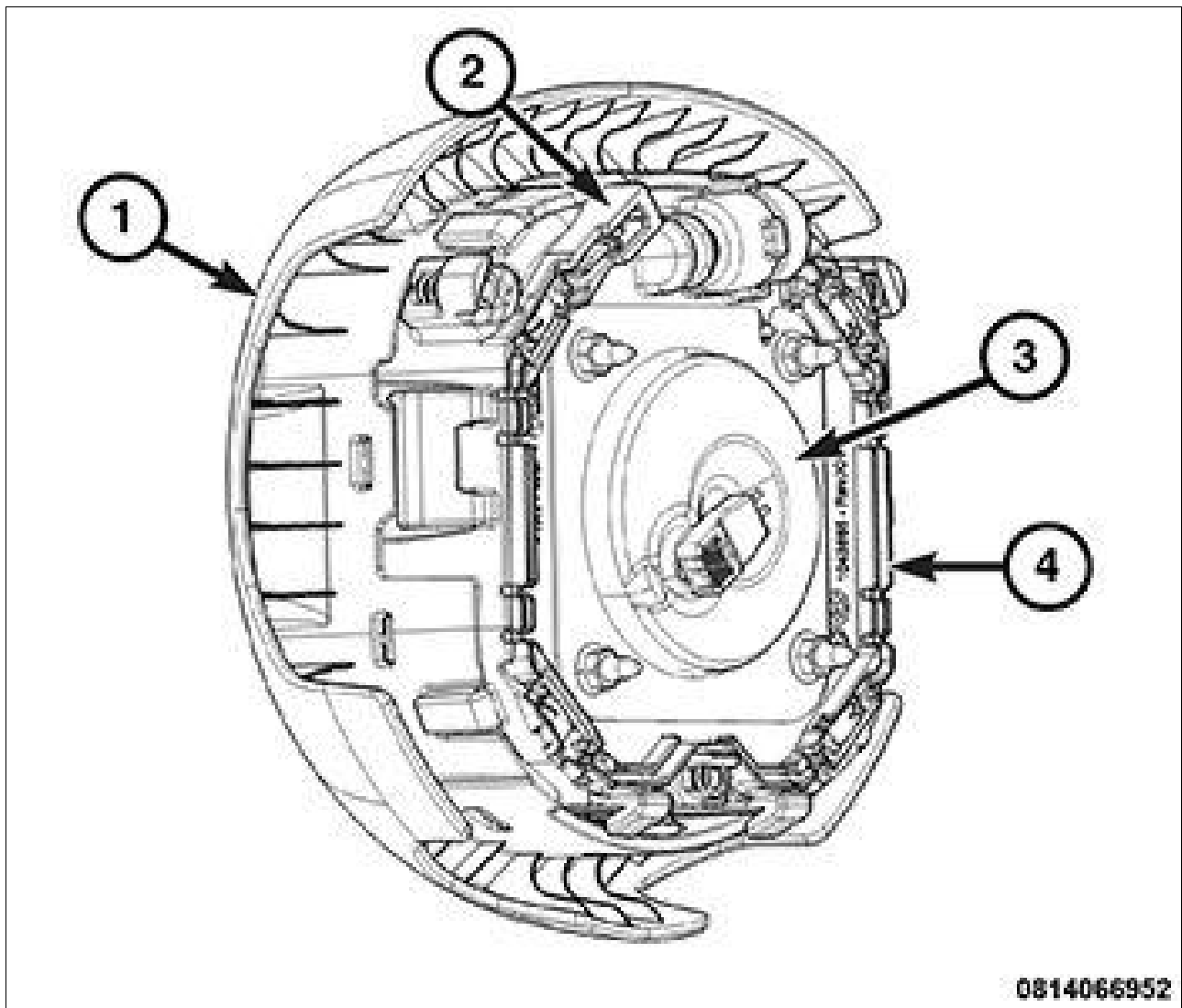
1. Position the horn relay in the proper cavity within the PDC (2).
2. Align the relay terminals with the terminal cavities in the PDC.
3. Push firmly and evenly on the top of the relay until the terminals are fully seated in the terminal

cavities in the PDC.

4. Install the cover onto the PDC on the left side of the engine compartment near the battery (1) and the washer reservoir filler neck.
5. Connect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

SWITCH, HORN > DESCRIPTION AND OPERATION > DESCRIPTION AND OPERATION > DESCRIPTION

Fig 1: Driver AirBag, Connector Receptacle, Inflator & Horn Switch



Courtesy of CHRYSLER GROUP, LLC

The horn switch (4) for this vehicle consists of four individual sets of normally open contacts wired in parallel so that all four sets of contacts operate as one switch. The horn switch contacts are secured to, but insulated from the four coiled springs secured to the molded plastic fixing plate for the Driver AirBag (DAB) (1). The fixing plate includes an integral connector receptacle (2) on the upper center and integral routing clips for the contact wiring routed around both sides and the bottom of the plate.

The horn switch and fixing plate unit is secured to the DAB housing by four nuts with washers. Each nut is secured to a stud that also secures the DAB inflator (3) to the DAB housing. The DAB inflator protrudes through a clearance hole in the center of the fixing plate. A dedicated take out and connector of the steering wheel wire harness connects the horn switch to the vehicle electrical system through the clockspring. A retainer that extends to each outboard side of the fixing plate is secured within the hub of the steering wheel under a latch formation in the steering wheel hub armature adjacent to each side of the steering wheel hub cavity.

The components that make up the horn switch cannot be adjusted or repaired. If damaged or ineffective, the entire DAB, horn switch and fixing plate unit must be replaced.

SWITCH, HORN > DESCRIPTION AND OPERATION > DESCRIPTION AND OPERATION > OPERATION

The horn switch allows the vehicle operator to actuate the horns by depressing anywhere on the upper surface of the DAB trim cover in the center of the steering wheel. The four sets of horn switch contacts are wired in parallel so they perform as a single switch. One wire for each pair of contacts is connected to a path to ground at all times through the steering wheel wire harness and the clockspring.

When the DAB trim cover is depressed, the DAB trim cover compresses the coil springs isolating the floating horn switch contacts causing at least one of the four sets of electrically conductive horn switch contacts to close the horn switch circuits. When the DAB trim cover is released, the coil springs between the DAB trim cover and the fixing plate return the DAB to its at rest position and open the horn switch circuit. The closed horn switch circuit provides a ground signal to the Body Control Module (BCM), which then pulls the control coil of the horn relay located within the Power Distribution Center (PDC) to ground. The horn relay in the PDC then controls the output to the horns accordingly.

The hard wired circuits between components related to the horn switch may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

SWITCH, HORN > DIAGNOSIS AND TESTING > DIAGNOSIS AND TESTING - HORN SWITCH

WARNING:

To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbags, airbag curtains, knee blocker, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Refer to WARNING . Disconnect the IBS/negative battery cable assembly from the negative battery post, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

1. Remove the Driver AirBag (DAB) from the steering wheel. Refer to AIR BAG, DRIVER, REMOVAL AND INSTALLATION .
2. Disconnect the steering wheel wire harness connector from the horn switch connector.
3. With the horn switch contacts released, check for continuity between the two terminals in the horn switch connector. There should be no continuity. If OK, go to Step 4. If not OK, replace the ineffective horn switch, mounting plate and DAB unit.
4. With each of the horn switch contacts compressed one at a time, check for continuity between the two terminals in the horn switch connector. There should now be continuity. If OK, go to Step 5. If not OK, replace the ineffective horn switch, fixing plate and DAB unit.
5. Check the horn switch ground circuit between the steering wheel wire harness and the ground source for continuity. If OK, go to Step 6. If not OK, repair the open ground circuit or replace the clockspring and stalk unit as required.
6. Check the horn switch output circuit between the steering wheel wire harness and the horn relay coil ground (85) terminal of the Power Distribution Center (PDC) for shorts or opens. Repair the shorted or open circuit or replace the clockspring and stalk unit as required.

SWITCH, HORN > REMOVAL AND INSTALLATION > REMOVAL AND INSTALLATION > REMOVAL

The horn switch is serviced only as a unit with the Driver AirBag (DAB). Refer to AIR BAG, DRIVER, REMOVAL AND INSTALLATION .

SWITCH, HORN > REMOVAL AND INSTALLATION > REMOVAL AND INSTALLATION > INSTALLATION

The horn switch is serviced only as a unit with the Driver AirBag (DAB). Refer to AIR BAG, DRIVER, REMOVAL AND INSTALLATION .