HORN SYSTEMS

TABLE OF CONTENTS

page

DESCRIPTION AND OPERATION
HORN SYSTEM 1
HORN RELAY 2
HORN SWITCH 2
HORN 3
DIAGNOSIS AND TESTING
HORN RELAY 3
HORN SWITCH 3
HORN 4
REMOVAL AND INSTALLATION
HORN RELAY 5
HORN SWITCH 5
HORN 6

DESCRIPTION AND OPERATION

HORN SYSTEM

DESCRIPTION

A dual-note electric horn system is standard factory-installed equipment on this model. The standard equipment horn system features one low-note horn unit and one high-note horn unit. The horn system allows the vehicle operator to provide an audible warning of the presence or approach of the vehicle to pedestrians and the drivers of other vehicles in near proximity. The horn system uses a non-switched source of battery current so that the system will remain functional, regardless of the ignition switch position.

The horn system can also be activated by the Body Control Module (BCM). The BCM is programmed to activate the horns in order to provide the following features:

- Remote Keyless Entry (RKE) system lock request audible verification (customer programmable)
- RKE system panic mode audible alert
- Vehicle Theft Security System (VTSS) audible alarm.

This vehicle also offers several customer programmable features, which allows the selection of several optional electronic features to suit individual preferences. Refer to **ELECTRONIC VEHICLE INFORMATION CENTER PROGRAMMING** in the Service Procedures section of Group 8V - Overhead Console Systems for more information on the customer programmable feature options. Customer programmable feature options affecting the horn system include:

- **Sound Horn on Lock** - Allows the option of having the horn sound a short chirp as an audible verification that the RKE system received a valid Lock request from the RKE transmitter, or having no audible verification.

The horn system includes the following components:

- Clockspring
- Horns
- Horn relay
- Horn switch

Certain functions and features of the horn system rely upon resources shared with other electronic modules in the vehicle over the Programmable Communications Interface (PCI) data bus network. The PCI data bus network allows the sharing of sensor information. This helps to reduce wire harness complexity, internal controller hardware, and component sensor current loads. At the same time, this system provides increased reliability, enhanced diagnostics, and allows the addition of many new feature capabilities. For diagnosis of these electronic modules or of the PCI data bus network, the use of a DRB scan tool and the proper Diagnostic Procedures manual are recommended.

The other electronic modules that may affect horn system operation are as follows:

- **Body Control Module (BCM)** - Refer to **Body Control Module** in the Description and Operation section of Group 8E - Instrument Panel Systems for more information.
- **Electronic Vehicle Information Center (EVIC)** - Refer to **Electronic Vehicle Information Center** in the Description and Operation section of Group 8V - Overhead Console Systems for more information.

Refer to **Clockspring** in the Description and Operation section of Group 8M - Passive Restraint Systems for more information on this component. Refer to **Horn/Cigar Lighter/Power Outlet** in the Contents of Group 8W - Wiring Diagrams for complete circuit diagrams. Following are general descriptions

DESCRIPTION AND OPERATION (Continued)

of the remaining major components in the horn system.

OPERATION

The horn system is activated by a horn switch concealed beneath the driver side airbag module trim cover in the center of the steering wheel. Depressing the center of the driver side airbag module trim cover closes the horn switch. Closing the horn switch activates the horn relay. The activated horn relay then switches the battery current needed to energize the horns.

The BCM can also activate the horn system by energizing the horn relay through a single hard wired output circuit. The BCM energizes and de-energizes the horn relay in response to internal programming as well as message inputs received over the Programmable Communications Interface (PCI) data bus network. The BCM can energize the horn relay for a single chirp (RKE lock request), or for extended operation (RKE panic mode and VTSS alarm mode).

Refer to the owner's manual in the vehicle glove box for more information on the features, use and operation of the horn system.

HORN SWITCH

DESCRIPTION

A center-blow, normally open, resistive membrane-type horn switch is secured in a plastic tray that is inserted in a pocket sewn on the front of the driver side airbag retainer strap. The horn switch is concealed behind the driver side airbag module trim cover in the center of the steering wheel. The switch consists of two plastic membranes, one that is flat and one that is slightly convex. These two membranes are secured to each other around the perimeter. Inside the switch, the centers of the facing surfaces of these membranes each has a grid made with an electrically conductive material applied to it. One of the grids is connected to a circuit that provides it with continuity to ground at all times. The grid of the other membrane is connected to the horn relay control circuit.

The steering wheel and steering column must be properly grounded in order for the horn switch to function properly. The horn switch and plastic tray are serviced as a unit. If the horn switch is damaged or faulty, or if the driver side airbag is deployed, the horn switch and tray must be replaced as a unit.

OPERATION

When the center area of the driver side airbag trim cover is depressed, the electrically conductive grids on the facing surfaces of the horn switch membranes contact each other, closing the switch circuit. The completed horn switch circuit provides a ground for the control coil side of the horn relay, which activates the relay. When the horn switch is released, the resistive tension of the convex membrane separates the two electrically conductive grids and opens the switch circuit.

HORN RELAY

DESCRIPTION

The horn relay is a electromechanical device that switches battery current to the horn when the horn switch grounds the relay coil. The horn relay is located in the Power Distribution Center (PDC) in the engine compartment. If a problem is encountered with a continuously sounding horn, it can usually be quickly resolved by removing the horn relay from the PDC until further diagnosis is completed. See the fuse and relay layout label affixed to the inside surface of the PDC cover for horn relay identification and location.

The horn relay is a International Standards Organization (ISO) micro-relay. Relays conforming to the ISO specifications have common physical dimensions, current capacities, terminal patterns, and terminal functions. The ISO micro-relay terminal functions are the same as a conventional ISO relay. However, the ISO micro-relay terminal pattern (or footprint) is different, the current capacity is lower, and the physical dimensions are smaller than those of the conventional ISO relay.

The horn relay cannot be repaired or adjusted and, if faulty or damaged, it must be replaced.

OPERATION

The ISO relay consists of an electromagnetic coil, a resistor or diode, and three (two fixed and one movable) electrical contacts. The movable (common feed) relay contact is held against one of the fixed contacts (normally closed) by spring pressure. When the electromagnetic coil is energized, it draws the movable contact away from the normally closed fixed contact, and holds it against the other (normally open) fixed contact.

When the electromagnetic coil is de-energized, spring pressure returns the movable contact to the normally closed position. The resistor or diode is connected in parallel with the electromagnetic coil in the relay, and helps to dissipate voltage spikes that are produced when the coil is de-energized.

DESCRIPTION AND OPERATION (Continued)

HORN

DESCRIPTION

The dual electromagnetic diaphragm-type horns are standard equipment on this model. Both horns are secured to a mounting bracket. The mounting bracket is secured with a screw to the back side of the right extension of the radiator closure assembly, just ahead of the right front wheel house and below the front wheel house extension. The two horns are connected in parallel. Each horn is grounded through its wire harness connector and circuit to an eyelet secured to the right inner fender shield near the battery, and receives battery feed through the closed contacts of the horn relay.

The horns cannot be repaired or adjusted and, if faulty or damaged, they must be individually replaced.

OPERATION

Within the two halves of the molded plastic 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 electromagnet. The contact points control the current flow through the electromagnet.

When the horn is energized, electrical current flows through the closed contact points to the electromagnet. 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 outlet.

DIAGNOSIS AND TESTING

HORN SWITCH

For complete circuit diagrams, refer to **Horn/Cigar Lighter/Power Outlet** in the Contents of Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable. Remove the steering column opening cover from the instrument panel.

(2) Check for continuity between the metal steering column jacket and a good ground. There should be continuity. If OK, go to Step 3. If not OK, refer to **Steering Column** in the Removal and Installation section of Group 19 - Steering for proper installation of the steering column.

(3) Remove the driver side airbag module from the steering wheel. Disconnect the horn switch wire harness connectors from the driver side airbag module.

(4) Remove the horn relay from the Power Distribution Center (PDC). Check for continuity between the steering column half of the horn switch feed wire harness connector and a good ground. There should be no continuity. If OK, go to Step 5. If not OK, repair the shorted horn relay control circuit to the horn relay in the PDC as required.

(5) Check for continuity between the steering column half of the horn switch feed wire harness connector and the horn relay control circuit cavity for the horn relay in the PDC. There should be continuity. If OK, go to Step 6. If not OK, repair the open horn relay control circuit to the horn relay in the PDC as required.

(6) Check for continuity between the horn switch feed wire and the horn switch ground wire on the driver side airbag module. There should be no continuity. If OK, go to Step 7. If not OK, replace the faulty horn switch.

(7) Depress the center of the driver side airbag module trim cover and check for continuity between the horn switch feed wire and the horn switch ground wire on the driver side airbag module. There should now be continuity. If not OK, replace the faulty horn switch.

HORN RELAY

The horn relay (Fig. 1) is located in the Power Distribution Center (PDC) between the battery and the right inner fender shield on the passenger side of the engine compartment. If a problem is encountered with a continuously sounding horn, it can usually be quickly resolved by removing the horn relay from the PDC until further diagnosis is completed. See the fuse and relay layout label affixed to the inside surface of the PDC cover for horn relay identification and location. For complete circuit diagrams, refer to **Horn/Cigar Lighter/Power Outlet** in the Contents of Group 8W - Wiring Diagrams.

DIAGNOSIS AND TESTING (Continued)

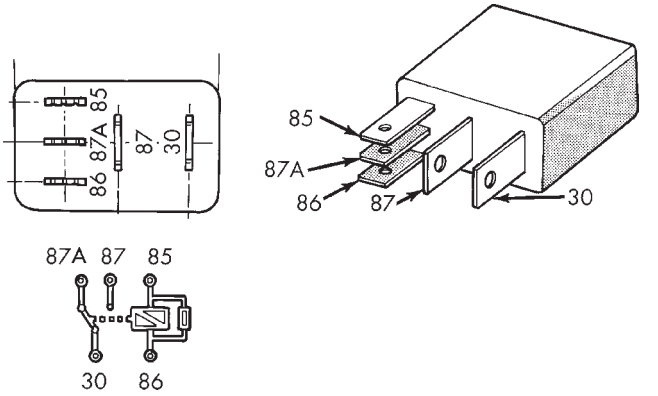
WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Remove the horn relay from the PDC. Refer to **Horn Relay** in the Removal and Installation section of this group for the procedures.

(2) A relay in the de-energized position should have continuity between terminals 87A and 30, and no continuity between terminals 87 and 30. If OK, go to Step 3. If not OK, replace the faulty relay.

(3) Resistance between terminals 85 and 86 (electromagnet) should be 75 ± 5 ohms. If OK, go to Step 4. If not OK, replace the faulty relay.

(4) Connect a battery to terminals 85 and 86. There should now be continuity between terminals 30 and 87, and no continuity between terminals 87A and 30. If OK, perform the Relay Circuit Test that follows. If not OK, replace the faulty relay.



TERMINAL LEGEND	
NUMBER	**IDENTIFICATION**
30	COMMON FEED
85	COIL GROUND
86	COIL BATTERY
87	NORMALLY OPEN
87A	NORMALLY CLOSED

Fig. 1 Horn Relay

RELAY CIRCUIT TEST

(1) The relay common feed terminal cavity (30) is connected to battery voltage and should be hot at all times. If OK, go to Step 2. If not OK, repair the open circuit to the fuse in the PDC as required.

(2) The relay normally closed terminal (87A) is connected to terminal 30 in the de-energized position, but is not used for this application. Go to Step 3.

(3) The relay normally open terminal (87) is connected to the common feed terminal (30) in the energized position. This terminal supplies battery voltage to the horn(s). There should be continuity between the cavity for relay terminal 87 and the horn relay output circuit cavity of each horn wire harness connector at all times. If OK, go to Step 4. If not OK, repair the open circuit to the horn(s) as required.

(4) The coil battery terminal (86) is connected to the electromagnet in the relay. It is connected to battery voltage and should be hot at all times. Check for battery voltage at the cavity for relay terminal 86. If OK, go to Step 5. If not OK, repair the open circuit to the fuse in the PDC as required.

(5) The coil ground terminal (85) is connected to the electromagnet in the relay. It is grounded through the horn switch when the horn switch is depressed. The horn relay coil ground terminal can also be grounded by the Body Control Module (BCM) in response to certain inputs related to the RKE system or the Vehicle Theft Security System. Check for continuity to ground at the cavity for relay terminal 85. There should be continuity with the horn switch depressed, and no continuity with the horn switch released. If not OK, refer to **Horn Switch** in the Diagnosis and Testing section of this group.

HORN

For complete circuit diagrams, refer to **Horn/Cigar Lighter/Power Outlet** in the Contents of Group 8W - Wiring Diagrams.

(1) Disconnect the wire harness connector(s) from the horn connector receptacle(s). Measure the resistance between the ground circuit cavity of the horn(s) wire harness connector(s) and a good ground. There should be no measurable resistance. 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 relay output circuit cavity of the horn(s) wire harness connector(s). There should be zero volts. If OK, go to Step 3. If not OK, repair the shorted horn relay output circuit or replace the faulty horn relay as required.

(3) Depress the horn switch. There should now be battery voltage at the horn relay output circuit cavity of the horn(s) wire harness connector(s). If OK, replace the faulty horns. If not OK, repair the open horn relay output circuit to the horn relay as required.

REMOVAL AND INSTALLATION

HORN SWITCH

WARNING:

• ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

• THE HORN SWITCH IS INTEGRAL TO THE DRIVER SIDE AIRBAG MODULE. SERVICE OF THIS COMPONENT SHOULD BE PERFORMED ONLY BY CHRYSLER-TRAINED AND AUTHORIZED DEALER SERVICE TECHNICIANS. FAILURE TO TAKE THE PROPER PRECAUTIONS OR TO FOLLOW THE PROPER PROCEDURES COULD RESULT IN ACCIDENTAL, INCOMPLETE, OR IMPROPER AIRBAG DEPLOYMENT AND POSSIBLE OCCUPANT INJURIES.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the trim cover from the driver side airbag module. Refer to **Driver Side Airbag Module Trim Cover** in the Removal and Installation section of Group 8M - Passive Restraint Systems for the procedures.

(3) Remove the horn switch and tray as a unit from the pouch on the retaining strap of the driver side airbag module (Fig. 2).

INSTALLATION

(1) Install the horn switch and tray as a unit into the pouch on the retaining strap of the driver side airbag module. Be certain that the tray is facing the airbag module, that the horn switch is facing the trim cover, that the horn switch feed wire is on the left, and that the horn switch ground wire is on the right.

(2) Install the trim cover onto the driver side airbag module. Refer to **Driver Side Airbag Module Trim Cover** in the Removal and Installation section of Group 8M - Passive Restraint Systems for the procedures.

(3) Reconnect the battery negative cable.

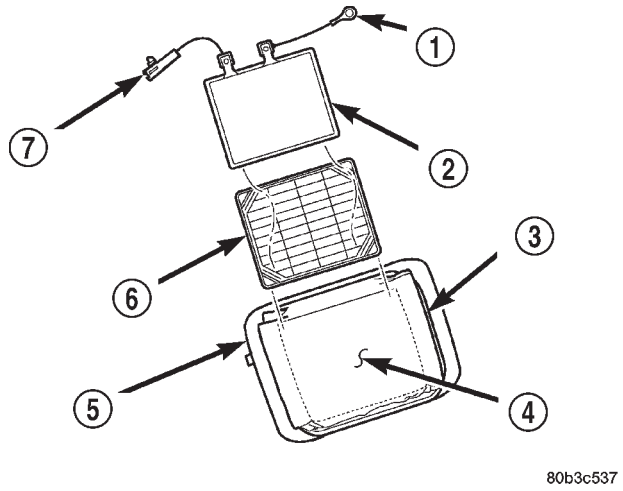


Fig. 2 Horn Switch Remove/Install

1 – HORN SWITCH GROUND WIRE EYELET
2 – HORN SWITCH
3 – AIRBAG RETAINING STRAP
4 – POUCH
5 – DRIVER SIDE AIRBAG MODULE (TRIM COVER REMOVED)
6 – TRAY
7 – HORN SWITCH FEED WIRE CONNECTOR

HORN RELAY

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the cover from the Power Distribution Center (PDC) (Fig. 3).

(3) See the fuse and relay layout label affixed to the underside of the PDC cover for horn relay identification and location.

(4) Remove the horn relay from the PDC.

INSTALLATION

(1) See the fuse and relay layout label affixed to the underside of the PDC cover for the proper horn relay location.

(2) Position the horn relay in the proper receptacle in the PDC.

(3) Align the horn relay terminals with the terminal cavities in the PDC receptacle.

(4) Push down firmly on the horn relay until the terminals are fully seated in the terminal cavities in the PDC receptacle.

(5) Install the cover onto the PDC.

(6) Reconnect the battery negative cable.

REMOVAL AND INSTALLATION (Continued)

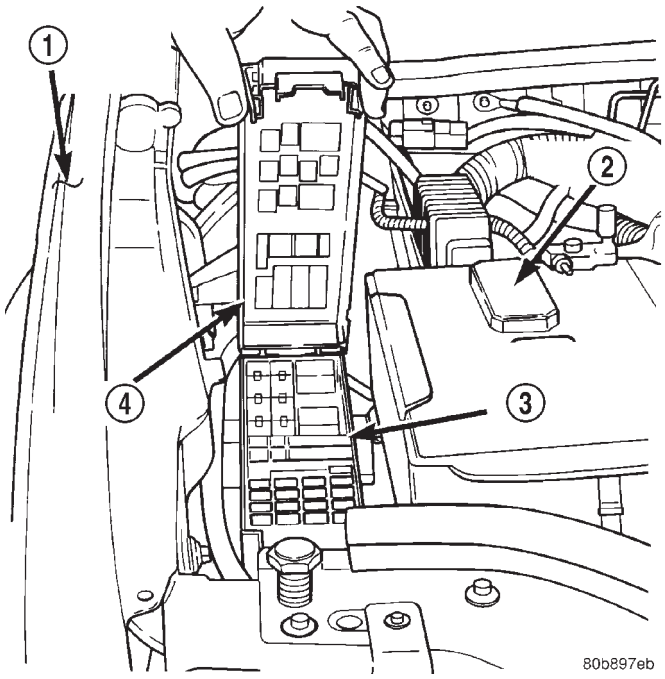


Fig. 3 Power Distribution Center

1 – RIGHT FENDER
2 – BATTERY
3 – POWER DISTRIBUTION CENTER
4 – COVER

HORN

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Raise and support the vehicle.

(3) Remove the lower front half of the inner liner from the right front fender wheel house. Refer to **Front Fender** in the Removal and Installation section of Group 23 - Body for the procedures.

(4) Reach through the front of the right front fender wheel house opening to access and disconnect the two right headlamp and dash wire harness connectors from the horn connector receptacles (Fig. 4). Be certain to disengage the connector lock tabs before disconnecting them from the horn connector receptacles.

(5) Remove the screw that secures the horn mounting bracket to the right extension of the radiator closure assembly.

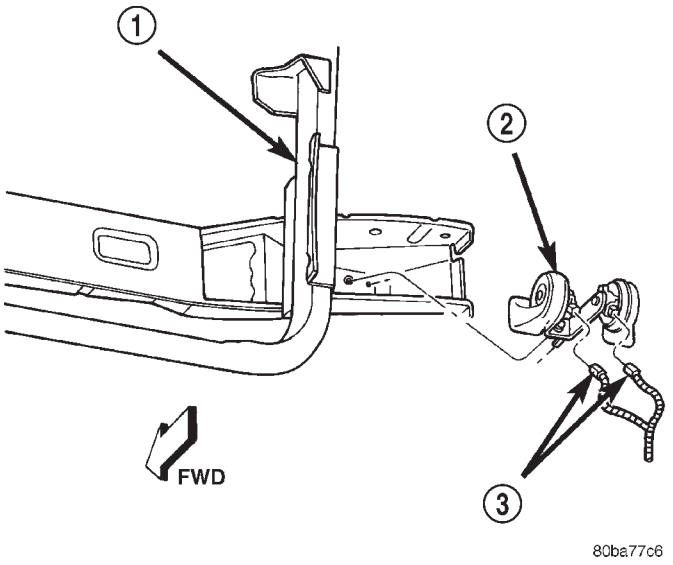


Fig. 4 Horns Remove/Install

1 – RADIATOR CLOSURE ASSEMBLY
2 – HORNS AND MOUNTING BRACKET
3 – RIGHT HEADLAMP AND DASH WIRE HARNESS CONNECTORS

(6) Remove both horns and the mounting bracket from the right extension of the radiator closure assembly as a unit.

INSTALLATION

(1) Position both horns and the mounting bracket onto the right extension of the radiator closure assembly as a unit.

(2) Install and tighten the screw that secures the horn mounting bracket to the right extension of the radiator closure assembly. Tighten the screw to 11.3 N·m (100 in. lbs.).

(3) Reconnect the two right headlamp and dash wire harness connectors to the horn connector receptacles. Be certain to engage the connector lock tabs after reconnecting them to the horn connector receptacles.

(4) Install the lower front half of the inner liner to the right front fender wheel house. Refer to **Front Fender** in the Removal and Installation section of Group 23 - Body for the procedures.

(5) Lower the vehicle.

(6) Reconnect the battery negative cable.