

# CHIME/BUZZER

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## CHIME/BUZZER - ELECTRICAL DIAGNOSTICS

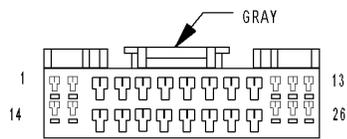
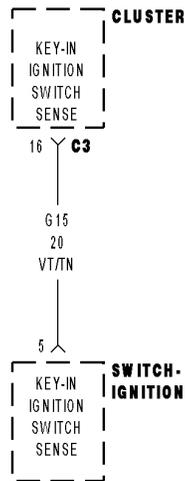
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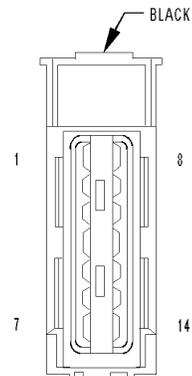
## **CHIME/BUZZER - ELECTRICAL DIAGNOSTICS**

### **DIAGNOSIS AND TESTING**

**\*CHIME SOUNDS WITH DRIVER DOOR OPEN KEY REMOVED**



**CLUSTER C3**



**SWITCH-IGNITION**

813e9091

For a complete wiring diagram Refer to Section 8W.

<b>Possible Causes</b>
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KEY-IN IGN SW STATUS IGNITION SWITCH SHORTED (G26) KEY-IN IGNITION SW SENSE SHORT TO GROUND CLUSTER
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## Diagnostic Test

### 1. READ KEY-IN IGNITION SWITCH STATUS

**NOTE:** Ensure the exterior lamps turn on and off properly and are off before continuing this test.

With the scan tool select: CCN.

Read the Key-In Ign Sw.

Remove the key from the ignition switch.

**Does the scan tool show Key-In Ign: False?**

**Yes** >> Replace and program the Cluster in accordance with the Service Information.  
 Perform BODY VERIFICATION TEST - VER 1 (Refer to BODY VERIFICATION TEST - VER 1).

**No** >> Go To 2

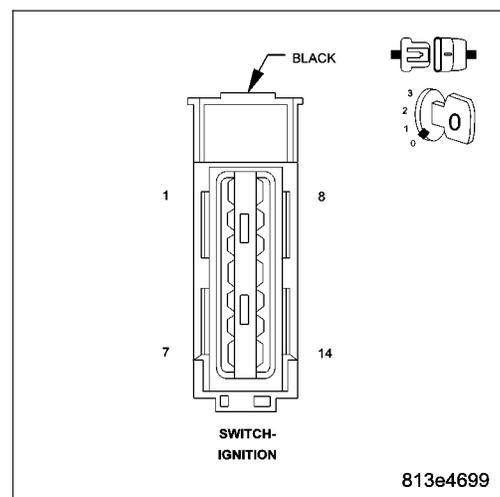
### 2. KEY-IN IGN SWITCH SHORTED

Disconnect the Ignition Switch connector.

**Did the chime turn off?**

**Yes** >> Check the Ignition Lock Cylinder for damage. If OK replace the Ignition Switch.  
 Perform BODY VERIFICATION TEST - VER 1 (Refer to BODY VERIFICATION TEST - VER 1).

**No** >> Go To 3



### 3. (G26) KEY-IN IGNITION SWITCH SENSE WIRE SHORT TO GROUND

Turn ignition off.

Disconnect the Ignition Switch connector.

Disconnect the Cluster C3 connector.

Measure the resistance of the (G26) Key-in Ignition Switch Sense circuit to ground at the Ignition Switch connector.

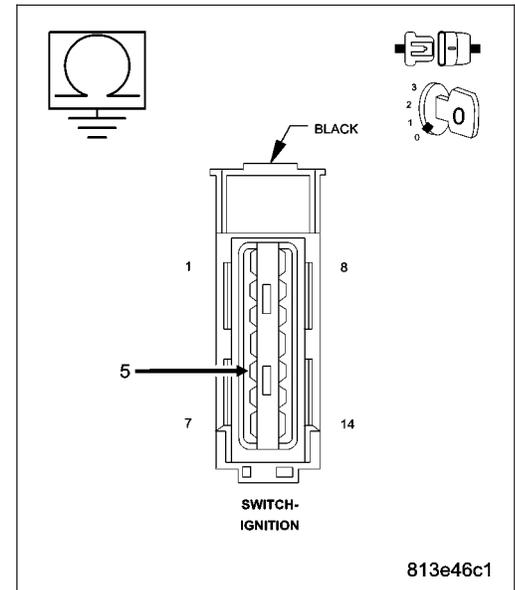
**Is the resistance below 100.0 ohms?**

**Yes** >> Repair the (G26) Key-In Ignition Switch Sense wire for a short to ground.

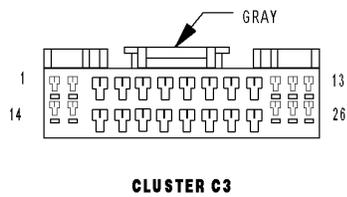
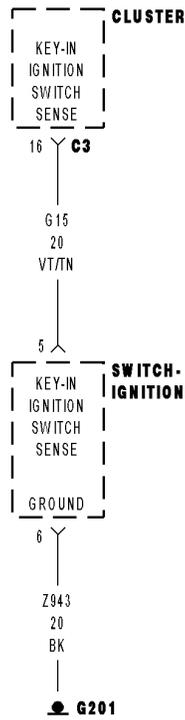
Perform BODY VERIFICATION TEST - VER 1 (Refer to BODY VERIFICATION TEST - VER 1).

**No** >> Replace and program the Cluster in accordance with the Service Information.

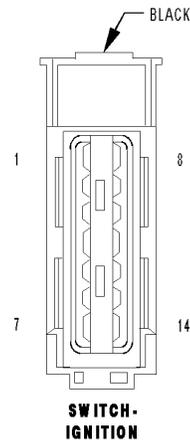
Perform BODY VERIFICATION TEST - VER 1 (Refer to BODY VERIFICATION TEST - VER 1).



**\*KEY IN IGNITION AND DRIVER'S DOOR OPEN CHIME INOPERATIVE**



**CLUSTER C3**



**SWITCH-IGNITION**

814533c5

For a complete wiring diagram Refer to Section 8W.

<b>Possible Causes</b>
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(Z42) GROUND OPEN (G26) KEY-IN IGNITION SWITCH OPEN IGNITION SWITCH CLUSTER
--

## Diagnostic Test

### 1. READ KEY-IN IGNITION SWITCH STATUS

**NOTE: The driver's door ajar switch must be operational for the result of this test to be valid.**

Ensure that the Key is still in the Ignition Switch.

With the scan tool select CCN.

Read the Key-In Ign Sw.

**Does the scan tool display Key-In Ign: True?**

**Yes** >> Replace and program the Cluster in accordance with the Service Information.  
 Perform BODY VERIFICATION TEST - VER 1 (Refer to BODY VERIFICATION TEST - VER 1).

**No** >> Go To 2

### 2. IGNITION SWITCH GROUND CIRCUIT OPEN

Turn the ignition off.

Disconnect the Ignition Switch connector.

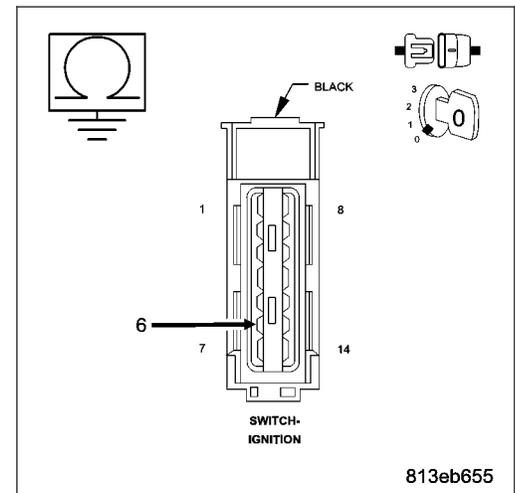
Turn all lights off.

Measure the resistance between ground and the (Z42) Ground circuit in the ignition switch harness connector.

**Is the resistance below 5.0 ohms?**

**Yes** >> Go To 3

**No** >> Repair the (Z42) Ground circuit for an open.  
 Perform BODY VERIFICATION TEST - VER 1 (Refer to BODY VERIFICATION TEST - VER 1).



### 3. IGNITION SWITCH OPEN

Connect the ignition switch connector if disconnected.

Turn ignition on.

With the ignition switch connector connected, back jumper the (G26) Key-In Ignition Switch Sense circuit to ground at the ignition switch connector.

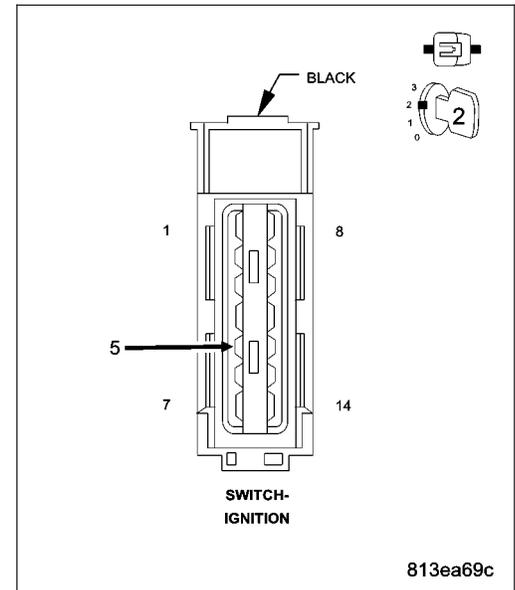
With the scan tool observe the Key-In Ign Sw status.

#### Does the scan tool display Key-In Ign SW: True?

**Yes** >> Replace the Ignition Switch.

Perform BODY VERIFICATION TEST - VER 1 (Refer to BODY VERIFICATION TEST - VER 1).

**No** >> Go To 4



### 4. KEY-IN IGNITION SWITCH SENSE CIRCUIT OPEN

Turn the ignition off.

Disconnect the Ignition Switch harness connector.

Disconnect the Cluster C3 harness connector.

Measure the resistance of the (G26) Key-In Ignition Switch Sense circuit between the ignition switch connector and the Instrument Cluster C3 connector.

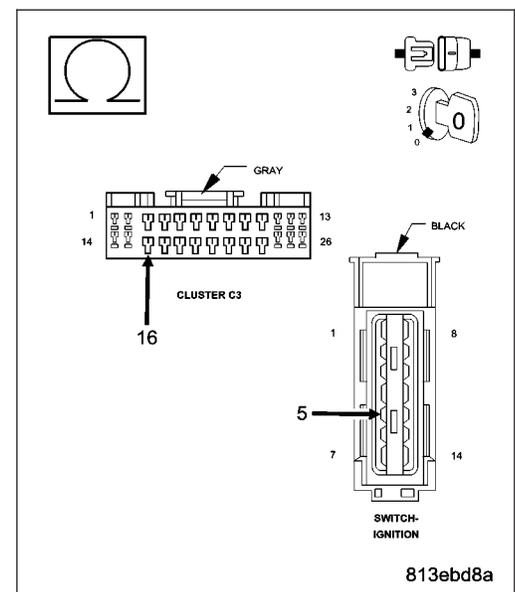
#### Is the resistance below 5.0 ohms?

**Yes** >> Replace and program the Instrument Cluster in accordance with the Service Information.

Perform BODY VERIFICATION TEST - VER 1 (Refer to BODY VERIFICATION TEST - VER 1).

**No** >> Repair the (G26) Key-In Ignition Switch Sense circuit for an open

Perform BODY VERIFICATION TEST - VER 1 (Refer to BODY VERIFICATION TEST - VER 1).



**\*CHIME INOPERATIVE**

For a complete wiring diagram **Refer to Section 8W.**

Possible Causes
CLUSTER

**Diagnostic Test****1. ACTUATE THE CHIME**

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Turn the ignition on.

Close the doors.

With the scan tool select CCN and actuate the Chime.

**Does the chime sound when actuated?**

- Yes** >> If the chime operates as it should, check for other reasons that the chime is being inoperative.  
Perform BODY VERIFICATION TEST - VER 1 (Refer to BODY VERIFICATION TEST - VER 1).
- No** >> Replace and program the Cluster in accordance with the Service Information.  
Perform BODY VERIFICATION TEST - VER 1 (Refer to BODY VERIFICATION TEST - VER 1).

**\*VEHICLE SPEED WARNING CHIME PROBLEM**

For a complete wiring diagram Refer to Section 8W.

Possible Causes
INCORRECT COUNTRY CODE PROGRAMMED IN TIPM CLUSTER

**Diagnostic Test****1. WITH THE SCAN TOOL CHECK THE COUNTRY CODE SETTING**

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**NOTE: The high speed warning chime is for Gulf Coast Countries only.**

Turn the ignition on.

With the scan tool check the country code setting in the TIPM.

**Is the country code incorrect?**

- Yes** >> Program the correct country code.  
Perform BODY VERIFICATION TEST - VER 1 (Refer to BODY VERIFICATION TEST - VER 1).
- No** >> Replace and program the Cluster in accordance with the Service Information.  
Perform BODY VERIFICATION TEST - VER 1 (Refer to BODY VERIFICATION TEST - VER 1).

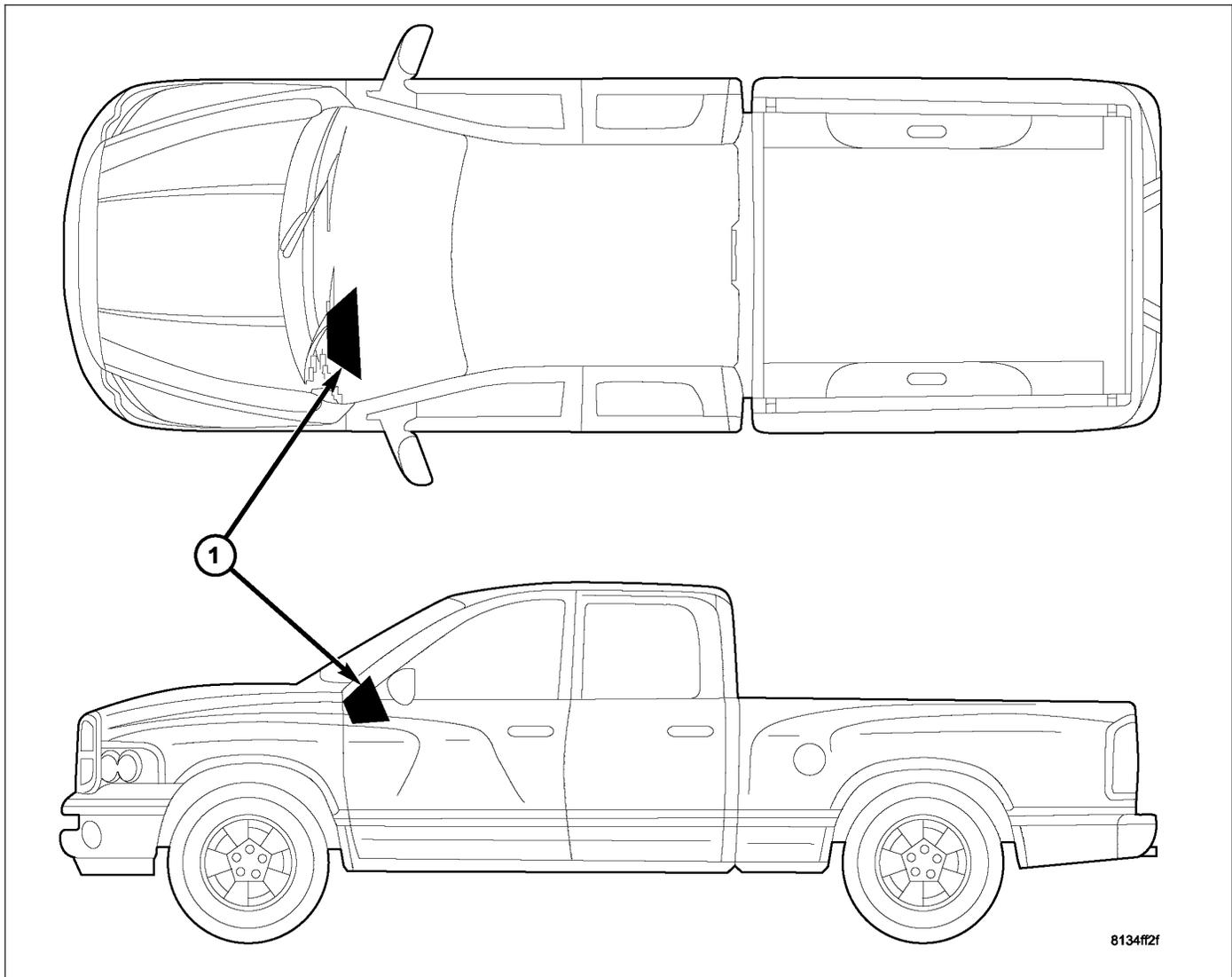
# CHIME/BUZZER - SERVICE INFORMATION

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## CHIME/BUZZER - SERVICE INFORMATION

### DESCRIPTION



A chime warning system is standard factory-installed equipment. The chime warning system uses an electromechanical transducer and an electromechanical relay that are soldered onto the electronic circuit board inside of the ElectroMechanical Instrument Cluster (EMIC) (1) to provide audible indications of various vehicle conditions that may require the attention of the vehicle operator or occupants. The EMIC also includes the hardware and software necessary to serve as the electronic body control module and is sometimes referred to as the Cab Compartment Node or CCN.

The electromechanical transducer generates beep tones and chime tones, while the electromechanical relay generates click tones to emulate the sounds associated with conventional turn signal and hazard warning flasher operation. The microprocessor-based EMIC utilizes electronic chime request messages received from other modules in the vehicle over the Controller Area Network (CAN) data bus along with hard wired inputs to monitor many sensors and switches throughout the vehicle. In response to those inputs, the circuitry and programming of the EMIC allow it to control the audible outputs that are produced through its on-board transducer and relay.

The EMIC is capable of producing the following audible outputs:

- **Slow Rate Repetitive Click** - Repeated **click** tones that are issued at a slow rate of about 50 clicks per minute.
- **Fast Rate Repetitive Click** - Repeated **click** tones that are issued at a fast rate of more than about 100 clicks per minute.
- **Fixed Duration Beep** - A short, sharp, single tactile **beep** tone.

- **Single Chime Tone** - A single **chime** tone.
- **Slow Rate Repetitive Chime** - Repeated **chime** tones that are issued at a slow rate of about 50 chimes per minute.
- **Fast Rate Repetitive Chime** - Repeated **chime** tones that are issued at a fast rate of about 180 chimes per minute.

Hard wired circuitry connects the EMIC and the various chime warning system switch and sensor inputs to their modules and 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, to the vehicle electrical system and to the EMIC 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.

The EMIC chime warning system circuits and components cannot be adjusted or repaired. If the EMIC circuitry, the on-board transducer or the relay are damaged or ineffective, the EMIC unit must be replaced.

## OPERATION

The chime warning system operates on battery voltage received through a fuse in the Totally Integrated Power Module (TIPM) on a non-switched fused B(+) circuit so that the system may operate regardless of the ignition switch position. The chime warning system also monitors the ignition switch position so that some chime features are functional only with the ignition switch in the ON position, while others are functional regardless of the ignition switch position.

The chime warning system provides an audible indication to the vehicle operator or occupants under the following conditions:

- **Airbag Indicator Warning** - The ElectroMechanical Instrument Cluster (EMIC) transducer will generate one short chime when the ignition switch is in the ON position, and an electronic message is received over the Controller Area Network (CAN) data bus from the Occupant Restraint Controller (ORC) requesting airbag indicator illumination. This warning will only occur following completion of the airbag indicator bulb test, and will only occur once during any ignition cycle.
- **Compass Mini-Trip Computer Global Reset** - The EMIC transducer will generate one short chime when the ignition switch is in the ON position, and an electronic message is received over the CAN data bus from the optional Compass Mini-Trip Computer (CMTC) requesting that the CMTC average fuel economy, trip odometer and distance to empty data be reset. The CMTC monitors hard wired inputs from the **US/M** and **RESET** button switches to determine the proper reset messages to send to the EMIC.
- **Door Ajar Indicator Warning** - The EMIC transducer will generate one short chime when the ignition switch is in the ON position, a hard wired input is received indicating that the status of any door ajar switch has changed, and an electronic message is received over the CAN data bus indicating that the vehicle is moving.
- **Engine Coolant Temperature High Warning (Diesel Engine Only)** - The EMIC transducer will generate a single chime tone when the check gauges indicator is illuminated for a high or critical engine coolant temperature condition. The instrument cluster uses engine coolant temperature message inputs received from the diesel Engine Control Module (ECM) over the CAN data bus to illuminate the check gauges indicator for a coolant temperature high condition.
- **Fasten Seat Belt Indicator Warning** - The EMIC transducer will generate repetitive chimes at a slow rate to announce that a hard wired input from the seat belt switch indicates that the driver side front seat belt is not fastened with the ignition switch in the ON position. The chime warning system also supports the enhanced seatbelt reminder (beltminder) when this feature is enabled. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER/SEATBELT INDICATOR - OPERATION).
- **Head/Park Lamps-On Warning** - The EMIC transducer will generate repetitive chimes at a fast rate to indicate that hard wired inputs from the driver door ajar switch, the headlamp switch, and the ignition switch indicate that the exterior lamps are turned ON with the driver side front door opened and the ignition switch in the OFF position. The chimes will continue to sound until the exterior lamps are turned OFF, the driver side front door is closed, or the ignition switch is turned to the ON position, whichever occurs first.
- **Key-In-Ignition Warning** - The EMIC transducer will generate repetitive chimes at a fast rate to indicate that hard wired inputs from the driver door ajar switch, the ignition switch, and the key-in ignition switch circuitry of the ignition switch indicate that the key is in the ignition lock cylinder with the driver side front door open and the ignition switch in the OFF position. The chimes will continue to sound until the key is removed from the

ignition lock cylinder, the driver side front door is closed, or the ignition switch is turned to the ON position, whichever occurs first.

- **Low Fuel Indicator Warning** - The EMIC transducer will generate one short chime when the low fuel indicator is illuminated by the instrument cluster circuitry. This chime will only occur once during any ignition cycle.
- **Low Oil Pressure Warning (Diesel Engine Only)** - The EMIC transducer will generate repetitive chimes at a fast rate when the check gauges indicator is illuminated for a low oil pressure condition. The instrument cluster uses engine speed and oil pressure message inputs received from the diesel Engine Control Module (ECM) over the CAN data bus indicating that the engine is running and that the oil pressure is low to illuminate the check gauges indicator. The chimes will continue to sound for five seconds, until the engine oil pressure message indicates that the oil pressure is not low, or until the engine speed message indicates that the engine is not running, whichever occurs first. This chime will only occur once during any ignition cycle.
- **Low Wash Indicator Warning** - The EMIC transducer will generate one short chime when the low washer fluid indicator is illuminated by the instrument cluster circuitry. This chime will only occur once during any ignition cycle.
- **Overspeed Warning** - The EMIC transducer will generate repetitive chimes at a slow rate to indicate that the vehicle speed is over a pre-programmed speed value. The EMIC monitors electronic vehicle speed messages received over the CAN data bus. This feature is only enabled on an EMIC that has been programmed with a Middle East Gulf Coast Country (GCC) country code.
- **Park Brake Reminder** - The EMIC transducer will generate one short chime to announce that the hard wired input from the park brake switch and a vehicle speed message input received over the CAN data bus indicate that the park brake is applied and the vehicle is moving. This chime will repeat each time the input conditions are met.
- **Sentry Key Customer Learn Mode Announcement** - The EMIC transducer will generate one short chime to confirm that an electronic **Customer Learn** mode message has been received over the CAN data bus to indicate the Sentry Key REmote Entry Module (SKREEM) is prepared for programming additional sentry key transponders. This chime feature is only active on vehicles equipped with the optional Sentry Key system, and sold in a market where Customer Learn programming is an allowed feature.
- **Trans Overtemp Indicator Warning (Automatic Transmission Only)** - The EMIC transducer will generate repetitive chimes at a slow rate when the transmission overtemp indicator is illuminated by the instrument cluster for a high or critical transmission fluid temperature condition. This chime will repeat each time the trans overtemp indicator is cycled from off to on.
- **Turn Signal/Hazard Warning Flasher Emulation** - The EMIC relay will generate repetitive clicks at a slow rate to emulate an electromechanical flasher when the turn signal or hazard warning system are operating. The EMIC relay will generate repetitive clicks at a fast rate to indicate that the right or left turn signal are operating with one or more bulbs inoperative. In either case, the clicks will continue until the turn signal and hazard warning systems are turned OFF.
- **Turn Signal On Warning** - The EMIC transducer will generate repetitive chimes at a slow rate to indicate that a turn signal has been active continuously for 1.6 kilometers (one mile) with the vehicle speed greater than 22 kilometers-per-hour (15 miles-per hour). Vehicles built for markets other than the United States and Canada have a revised distance threshold of 4 kilometers for this feature. The chime will continue until the turn signal input becomes inactive or until the vehicle speed message indicates that the speed is less than 22 kilometers-per-hour (15 miles-per-hour), whichever occurs first. The hazard warning flashers will not activate this chime feature.
- **Warning Indicator Announcement** - The EMIC transducer will generate one short chime each time the check gauges indicator is illuminated by the instrument cluster circuitry. The check gauges indicator may be illuminated when any critical engine or transmission systems are operating outside of their normal parameters. The instrument cluster monitors electronic messages received over the CAN data bus to determine when to illuminate the check gauges indicator.

The EMIC provides chime service for all available features in the chime warning system. The EMIC relies upon its internal programming, numerous hard wired inputs, and electronic message inputs received from other modules over the CAN data bus network to provide the chime warning system features. The internal programming of the EMIC determines the priority of each chime request input that is received, as well as the rate and duration of each chime that is to be generated.

The hard wired chime warning system inputs to the EMIC may be diagnosed and tested using conventional diagnostic tools and procedures. However, conventional diagnostic methods may not prove conclusive in the diagnosis of the EMIC, the CAN data bus, or the electronic messages received by the EMIC from other modules. The most reliable, efficient and accurate means to diagnose the EMIC, the CAN data bus, or the electronic message inputs

used for the chime warning system requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

## DIAGNOSIS AND TESTING

### CHIME WARNING SYSTEM

**WARNING:** To avoid personal injury or death, on vehicles equipped with airbags, disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, 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 supplemental restraint system. Failure to take the proper precautions could result in accidental airbag deployment.

The hard wired chime warning system inputs to the ElectroMechanical Instrument Cluster (EMIC), as well as other hard wired circuits for this system may be diagnosed and tested 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 may not prove conclusive in the diagnosis of the EMIC, the Controller Area Network (CAN) data bus, or the electronic message inputs used by the EMIC to provide chime warning system service. The most reliable, efficient, and accurate means to diagnose the EMIC, the CAN data bus, and the electronic message inputs for the chime warning system requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

CONDITION	POSSIBLE CAUSES	CORRECTION
NO SEAT BELT WARNING CHIME WITH SEAT BELT UNBUCKLED, BUT OTHER CHIME FEATURES OKAY	<ol style="list-style-type: none"> <li>1. Seat belt switch ground circuit open.</li> <li>2. Seat belt switch sense circuit open.</li> <li>3. Ineffective seat belt switch.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check for continuity between the ground circuit for the driver seat belt switch and a good ground. Repair open ground circuit, if required.</li> <li>2. Check for continuity between the seat belt switch sense circuit for the driver seat belt switch and the instrument cluster connector. Repair the open seat belt switch sense circuit, if required.</li> <li>3. Check for continuity between the ground circuit and the driver seat belt switch sense circuit of the seat belt switch. There should be continuity with the seat belt unbuckled. Replace the seat belt switch, if required.</li> </ol>
SEAT BELT WARNING CHIME WITH SEAT BELT BUCKLED	<ol style="list-style-type: none"> <li>1. Seat belt switch sense circuit shorted.</li> <li>2. Ineffective seat belt switch.</li> </ol>	<ol style="list-style-type: none"> <li>1. With the driver seat belt switch and the instrument cluster connector disconnected, there should be no continuity between the seat belt switch sense circuit and a good ground. Repair the shorted seat belt switch sense circuit, if required.</li> <li>2. Check for continuity between the ground circuit cavity and the seat belt switch sense circuit of the driver seat belt switch. There should be no continuity with the seat belt buckled. Replace the seat belt switch, if required.</li> </ol>

CONDITION	POSSIBLE CAUSES	CORRECTION
NO KEY-IN IGNITION WARNING CHIME, BUT OTHER CHIME FEATURES OKAY	<ol style="list-style-type: none"> <li>1. Driver door ajar switch sense circuit open.</li> <li>2. Key-in ignition switch sense circuit open.</li> <li>3. Key-in ignition switch ground circuit open.</li> <li>4. Ineffective ignition switch.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check for continuity between the driver door ajar switch sense circuit connector and the instrument cluster connector. Repair the open driver door ajar switch sense circuit, if required.</li> <li>2. Check for continuity between the key-in ignition switch sense circuit connector and instrument cluster connector. Repair the open key-in ignition switch sense circuit, if required.</li> <li>3. Check for continuity between the ground circuit cavity of the ignition switch connector and a good ground. Repair the open ground circuit, if required</li> <li>4. Check for continuity between the ground circuit terminal and the key-in ignition switch sense circuit terminal in the ignition switch connector. There should be continuity with a key in the ignition lock cylinder. Replace the ignition switch, if required.</li> </ol>
NO EXTERIOR LAMPS-ON WARNING CHIME, BUT OTHER CHIME FEATURES OKAY	<ol style="list-style-type: none"> <li>1. Driver door ajar switch sense circuit open.</li> <li>2. Headlamp switch signal circuit open.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check for continuity between the driver door ajar switch sense circuit connector and the instrument cluster connector. Repair the open driver door ajar switch sense circuit, if required.</li> <li>2. Check for continuity between the headlamp switch output circuit connector and the and the instrument cluster connector. Repair the open headlamp switch signal circuit, if required.</li> </ol>
NO CHIMES AND OTHER INSTRUMENT CLUSTER FEATURES ERRATIC OR DISABLED	<ol style="list-style-type: none"> <li>1. Instrument cluster ground circuit(s) open.</li> <li>2. Instrument cluster fused B(+) circuit(s) open.</li> <li>3. Instrument cluster fused ignition switch output (run-start) circuit open.</li> <li>4. Ineffective instrument cluster.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check for continuity between the ground circuits of the instrument cluster connector and a good ground. Repair the open ground circuits(s), if required.</li> <li>2. Check for battery voltage at the B(+) circuits of the instrument cluster connector. Repair the open fused B(+) circuit(s), if required.</li> <li>3. With the ignition switch in the ON position, check for battery voltage at the fused ignition switch output (run-start) circuit of the instrument cluster connector. Repair the open fused ignition switch output (run-start) circuit, if required.</li> <li>4. Replace the instrument cluster, if required.</li> </ol>
NO CHIMES, BUT ALL OTHER INSTRUMENT CLUSTER FEATURES OKAY	<ol style="list-style-type: none"> <li>1. Ineffective instrument cluster.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace the instrument cluster, if required.</li> </ol>