

Instrument Panel, Gauges and Warning Indicators: Testing and Inspection

Warning Devices

Principles of Operation

PRINCIPLES OF OPERATION

Chime

The instrument cluster produces a repetitive chime for either a predetermined amount of time or continuously, under the following conditions:

- the driver safety belt is unbuckled and the ignition switch is in the RUN position
- the key is in the ignition switch and the driver door is open
- the headlamp switch is in the HEAD or PARK position, the driver door is open, and the key is not in the ignition switch
- the Safety Belt Minder feature is enabled and the appropriate parameters have been met

Air Bag Warning Chime

The air bag warning chime warns the driver that the air bag warning indicator lamp is not working and a fault occurred by sounding a chime when the ignition switch is in the RUN position for more than **20 seconds**. When these conditions exist, the restraint control module (RCM) sends a chime request through the communication network to the instrument cluster. The instrument cluster then activates the warning chime. The warning consists of 5 sets of **1-second** tone bursts. Each set is separated by **5 seconds** of silence.

Safety Belt Warning

The safety belt warning chime reminds the driver to fasten the safety belt. This occurs when the ignition switch is turned to the RUN position and the driver safety belt remains unbuckled. The chime is terminated by buckling the driver safety belt at any time during the **4-8 second** chime warning.

The chime works in conjunction with the safety belt warning indicator in the instrument cluster.

Key-in-Ignition Warning

The key-in-ignition warning chime sounds continuously when the ignition key is in the ignition lock cylinder with the key OFF and the driver door open. The chime continues to sound until the key is removed from the ignition lock cylinder or the driver door is closed.

Headlamps On Warning

The headlamps on warning chime sounds continuously when the headlamp switch is in the PARK or HEAD position, the driver door is open, and the key is not in the ignition lock cylinder.

The chime continues to sound until the headlamp switch is turned OFF or the driver door is closed.

Park Brake Warning

The park brake warning chime provides an audible indication to the driver that the park brake is engaged while the vehicle is in motion.

Safety Belt Minder

NOTE: The Safety Belt Minder can be configured with or without using a diagnostic tool. To configure this feature without using a diagnostic tool, refer to Belt Minder Deactivating/Activating.

The Safety Belt Minder feature supplements the safety belt warning function. The Safety Belt Minder feature is enabled after the current safety belt warning is complete. The Safety Belt Minder reminds the driver that the safety belt is unbuckled by intermittently sounding a chime and illuminating the safety belt warning lamp in the instrument cluster once the vehicle speed has exceeded **3 mph**. While activated, the Safety Belt Minder activates the chime and warning indicator for **6 seconds**, with a 30 second interval between activations.

The Safety Belt Minder stops when:

- the driver seat belt is buckled.
- the ignition switch is turned to OFF or ACC.
- **5 minutes** have elapsed since the belt minder started.

Inspection and Verification

INSPECTION AND VERIFICATION

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

VISUAL INSPECTION CHART

Electrical

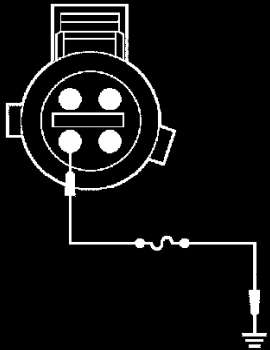
- Loose or corroded connections

- Circuits

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, verify the symptom and GO to Symptom Chart. See: Diagnosis By Symptom

Test A: The Safety Belt Warning Chime Does Not Operate Correctly

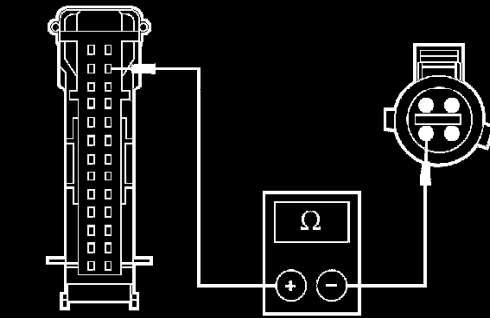
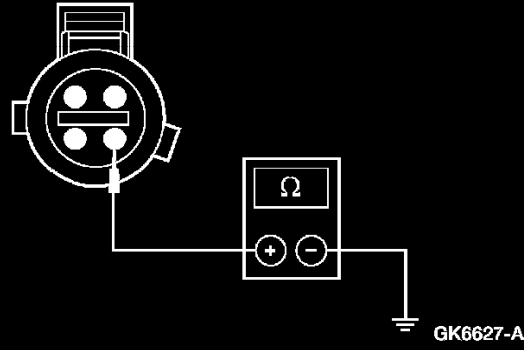
PINPOINT TEST A: THE SAFETY BELT WARNING CHIME DOES NOT OPERATE CORRECTLY

PINPOINT TEST A: THE SAFETY BELT WARNING CHIME DOES NOT OPERATE CORRECTLY		
Test Step		Result / Action to Take
A1	CHECK THE SAFETY BELT CHIME OPERATION NOTE: Verify the Safety Belt Minder is activated before beginning diagnosis. <ul style="list-style-type: none"> • Depower the supplemental restraint system (SRS). For additional information, refer to Air Bag Systems. • Key in OFF position. • Disconnect: Driver Safety Belt Pretensioner C323. • Connect a fused (10A) jumper wire between the driver safety belt pretensioner C323-4, circuit 85 (BN/LB), harness side and ground.  <p>N0012260</p> <ul style="list-style-type: none"> • Key in ON position. • Does the Safety Belt Minder warning chime sound? 	Yes GO to A3. No GO to A2.
A2	CHECK CIRCUIT 85 (BN/LB) FOR AN OPEN <ul style="list-style-type: none"> • Key in OFF position. • Disconnect: Instrument Cluster C220b. 	

(Continued)

A1-A2

DIAGNOSIS AND TESTING (Continued)**PINPOINT TEST A: THE SAFETY BELT WARNING CHIME DOES NOT OPERATE CORRECTLY (Continued)**

Test Step		Result / Action to Take
A2	CHECK CIRCUIT 85 (BN/LB) FOR AN OPEN (Continued) <ul style="list-style-type: none"> Measure the resistance between the instrument cluster C220b-25, circuit 85 (BN/LB), harness side and the driver safety belt pretensioner C323-4, circuit 85 (BN/LB), harness side.  <p>N0002800</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes GO to A4.</p> <p>No REPAIR the circuit. TEST the system for normal operation.</p>
A3	CHECK CIRCUIT 57 (BK) FOR AN OPEN <ul style="list-style-type: none"> Measure the resistance between the driver safety belt pretensioner C323-3, circuit 57 (BK), harness side and ground.  <p>GK6627-A</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes INSTALL a new driver safety belt pretensioner. TEST the system for normal operation.</p> <p>No REPAIR the circuit. TEST the system for normal operation.</p>
A4	CHECK FOR CORRECT INSTRUMENT CLUSTER OPERATION <ul style="list-style-type: none"> Disconnect all the instrument cluster connectors. Check for: <ul style="list-style-type: none"> corrosion pushed out pins Connect all the instrument cluster connectors and make sure they seat correctly. Operate the system and verify the concern is still present. Is the concern still present? 	<p>Yes INSTALL a new instrument cluster. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.</p>

A2-A4

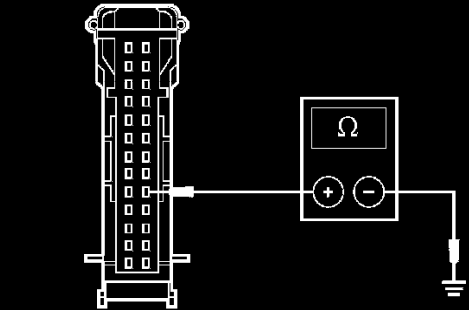
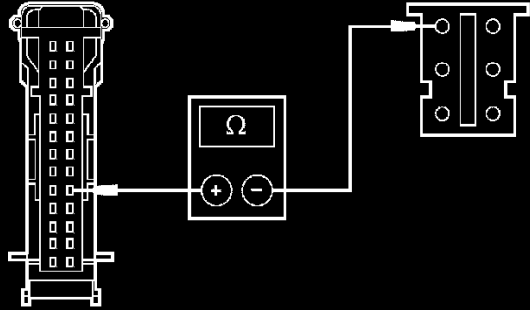
Test B: The Key-In-Ignition Chime Does Not Operate Correctly**PINPOINT TEST B: THE KEY-IN-IGNITION CHIME DOES NOT OPERATE CORRECTLY**

PINPOINT TEST B: THE KEY-IN-IGNITION CHIME DOES NOT OPERATE CORRECTLY		
Test Step		Result / Action to Take
B1	CHECK THE COURTESY LAMPS <ul style="list-style-type: none"> Key in OFF position. Open the driver door. Do the courtesy lamps illuminate? 	<p>Yes GO to B2.</p> <p>No REFER to Lighting and Homs.</p>
B2	CHECK THE KEY-IN-IGNITION SWITCH OPERATION <ul style="list-style-type: none"> Disconnect: Instrument Cluster C220b. 	

(Continued)

B1-B2

DIAGNOSIS AND TESTING (Continued)**PINPOINT TEST B: THE KEY-IN-IGNITION CHIME DOES NOT OPERATE CORRECTLY (Continued)**

Test Step		Result / Action to Take
B2	CHECK THE KEY-IN-IGNITION SWITCH OPERATION (Continued) <ul style="list-style-type: none"> Measure the resistance between the instrument cluster C220b-18, circuit 159 (BK/PK), harness side and ground, while inserting and removing the key.  <p>N0002801</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms with the key in, and greater than 10,000 ohms with the key out? 	<p>Yes GO to B4.</p> <p>No GO to B3.</p>
B3	CHECK CIRCUIT 159 (RD/PK) FOR AN OPEN <ul style="list-style-type: none"> Disconnect: Clockspring C218b. Measure the resistance between the instrument cluster C220b-18, circuit 158 (BK/PK), harness side and the clockspring C218b-3, circuit 158 (BK/PK), harness side.  <p>N0012342</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes INSTALL a ignition lock cylinder. TEST the system for normal operation.</p> <p>No REPAIR the circuit. TEST the system for normal operation.</p>
B4	CHECK FOR CORRECT INSTRUMENT CLUSTER OPERATION <ul style="list-style-type: none"> Disconnect all the instrument cluster connectors. Check for: <ul style="list-style-type: none"> corrosion pushed out pins Connect all the instrument cluster connectors and make sure they seat correctly. Operate the system and verify the concern is still present. Is the concern still present? 	<p>Yes INSTALL a new instrument cluster. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.</p>

B2-B4

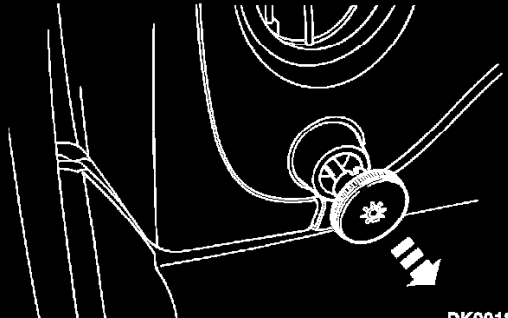
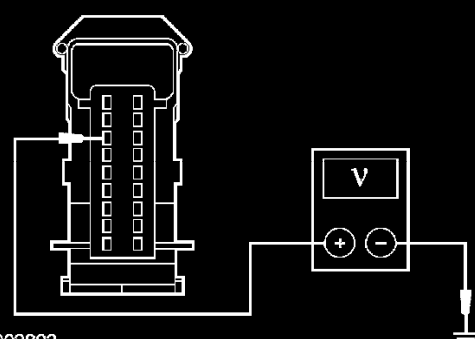
Test C: The Headlamp On Reminder Chime Does Not Operate Correctly**PINPOINT TEST C: THE HEADLAMP ON REMINDER CHIME DOES NOT OPERATE CORRECTLY**

PINPOINT TEST C: THE HEADLAMP ON REMINDER CHIME DOES NOT OPERATE CORRECTLY		
Test Step		Result / Action to Take
C1	CHECK CIRCUIT 14 (BN) FOR AN OPEN <ul style="list-style-type: none"> Key in OFF position. Disconnect: Instrument Cluster C220a. 	

(Continued)

C1

DIAGNOSIS AND TESTING (Continued)**PINPOINT TEST C: THE HEADLAMP ON REMINDER CHIME DOES NOT OPERATE CORRECTLY
(Continued)**

Test Step		Result / Action to Take
C1	CHECK CIRCUIT 14 (BN) FOR AN OPEN (Continued)	
	<ul style="list-style-type: none"> Pull the headlamp switch to the PARK position.  <p style="text-align: right;">DK0018-A</p> <ul style="list-style-type: none"> Measure the voltage between the instrument cluster C220a-7, circuit 14 (BN), harness side and ground.  <p style="text-align: left;">N0002803</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? 	<p>Yes GO to C2.</p> <p>No REPAIR the circuit. TEST the system for normal operation.</p>
C2	CHECK FOR CORRECT INSTRUMENT CLUSTER OPERATION	
	<ul style="list-style-type: none"> Disconnect all the instrument cluster connectors. Check for: <ul style="list-style-type: none"> corrosion pushed out pins Connect all the instrument cluster connectors and make sure they seat correctly. Operate the system and verify the concern is still present. Is the concern still present? 	<p>Yes INSTALL a new instrument cluster. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.</p>

C1-C2

Symptom Chart		
Condition	Possible Sources	Action
<ul style="list-style-type: none"> All the chimes are inoperative 	<ul style="list-style-type: none"> Instrument cluster 	<ul style="list-style-type: none"> MONITOR the warning lamps. If the warnings lamps do not operate correctly, REFER to Instrument Cluster to continue diagnosis of the instrument cluster.
<ul style="list-style-type: none"> The safety belt warning chime does not operate correctly (warning indicator operates properly) 	<ul style="list-style-type: none"> Circuitry Safety belt switch Instrument cluster 	<ul style="list-style-type: none"> GO to Pinpoint Test A.
<ul style="list-style-type: none"> The key-in-ignition chime does not operate correctly 	<ul style="list-style-type: none"> Circuitry Key-in-ignition switch Instrument cluster Courtesy lamp switch 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
<ul style="list-style-type: none"> The headlamp on reminder chime does not operate correctly 	<ul style="list-style-type: none"> Circuitry Instrument cluster Courtesy lamp switch Headlamp switch 	<ul style="list-style-type: none"> VERIFY the operation of the exterior lamps. If the exterior lamps do not operate correctly, REFER to Lighting and Horns. Otherwise, GO to Pinpoint Test C.
<ul style="list-style-type: none"> The air bag chime does not operate correctly 	<ul style="list-style-type: none"> Restraint control module (RCM) Instrument cluster 	<ul style="list-style-type: none"> CHECK the operation of the safety belt and air bag warning indicators. <ul style="list-style-type: none"> If the safety belt and air bag warning indicators operate correctly, INSTALL a new instrument cluster. If the safety belt and air bag warning indicators do not operate correctly, REFER to Instrument Cluster to continue diagnosis of the warning indicators.

Symptom Chart (Part 1)

Symptom Chart (Continued)		
Condition	Possible Sources	Action
<ul style="list-style-type: none"> The park brake warning chime does not operate correctly 	<ul style="list-style-type: none"> Parking brake switch Instrument cluster 	<ul style="list-style-type: none"> CHECK the operation of the brake warning indicator. <ul style="list-style-type: none"> If the brake warning indicator operates correctly, INSTALL a new instrument cluster. TEST the system for normal operation. If the brake warning indicator does not operate correctly, REFER to Instrument Cluster to continue diagnosis of the brake warning indicator.

Symptom Chart (Part 2)