

SECTION 9T

REMOTE KEYLESS ENTRY AND ANTI-THEFT SYSTEM

REMOTE KEYLESS ENTRY AND PERIMETER/ULTRASONIC ANTI-THEFT SYSTEM

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IMMOBILIZER ANTI-THEFT SYSTEM

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CAUTION: Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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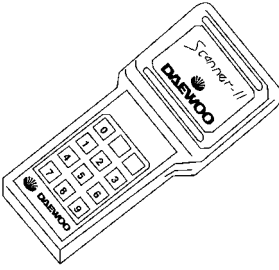
SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	N•m	Lb-Ft	Lb-In
Hood Open Switch Mounting Bolt	4	–	35
Siren Bracket Mounting Bolt	11	–	97
Siren Mounting Screws	3	–	27

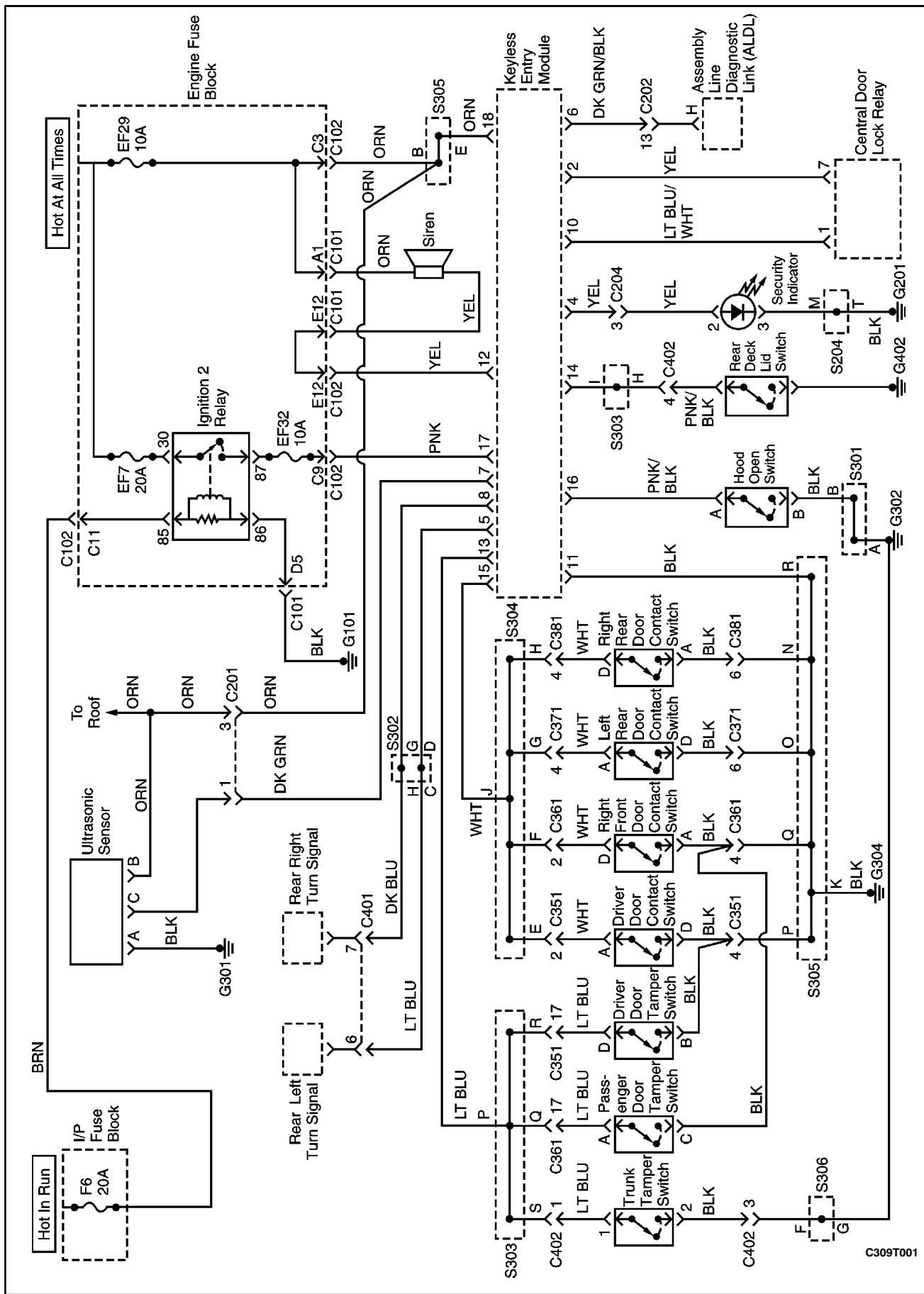
SPECIAL TOOLS

SPECIAL TOOLS TABLE

 <p>A110B003</p>	<p>Scan Tool</p>
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SCHEMATIC AND ROUTING DIAGRAMS

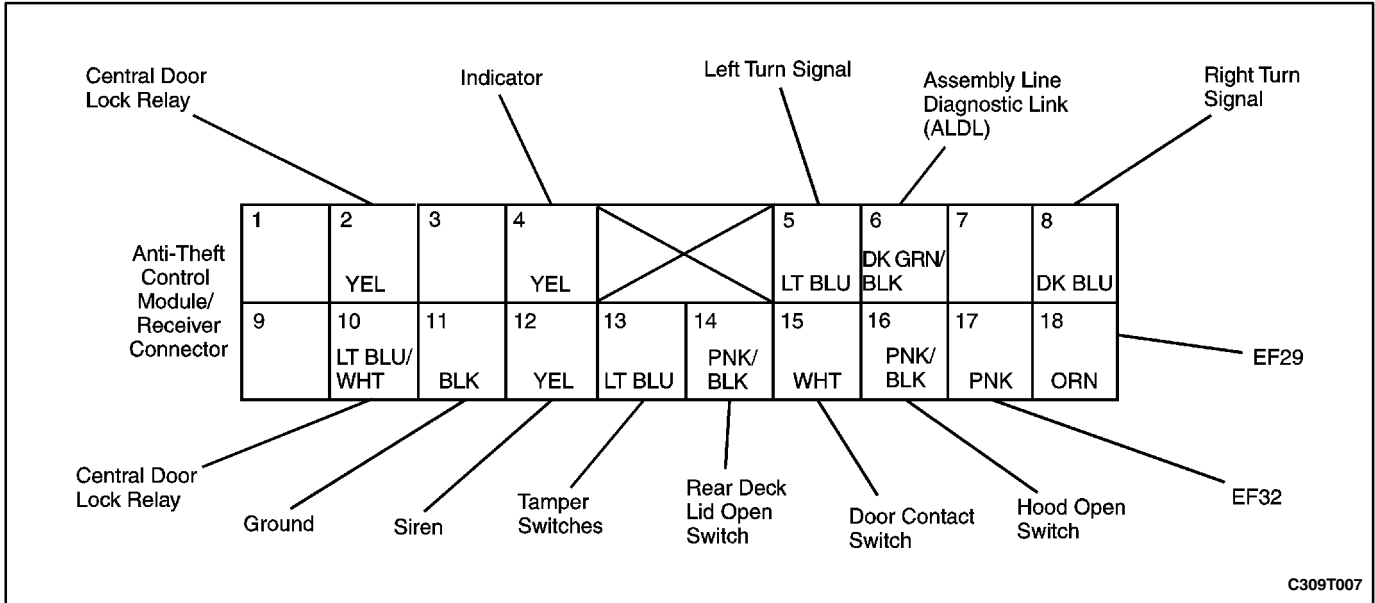
REMOTE KEYLESS ENTRY AND ANTI-THEFT SYSTEM



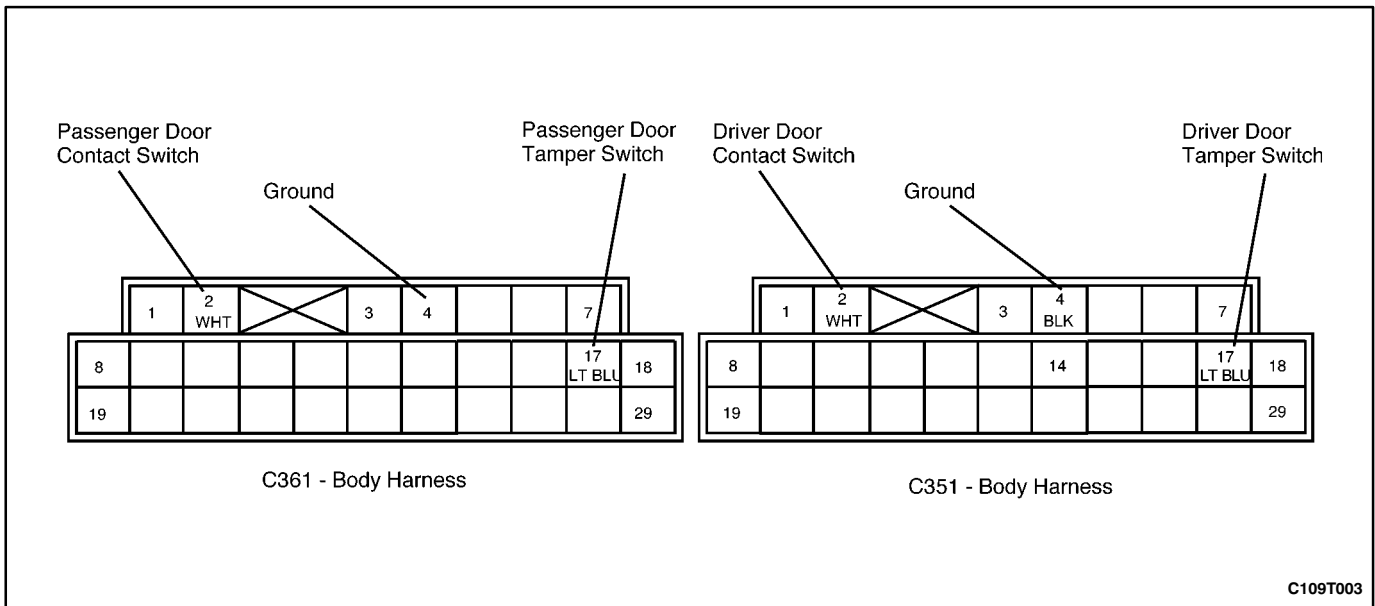
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MODULE/RECEIVER CONNECTOR

9T-4 REMOTE KEYLESS ENTRY AND ANTI-THEFT SYSTEM



WIRING HARNESS CONNECTORS



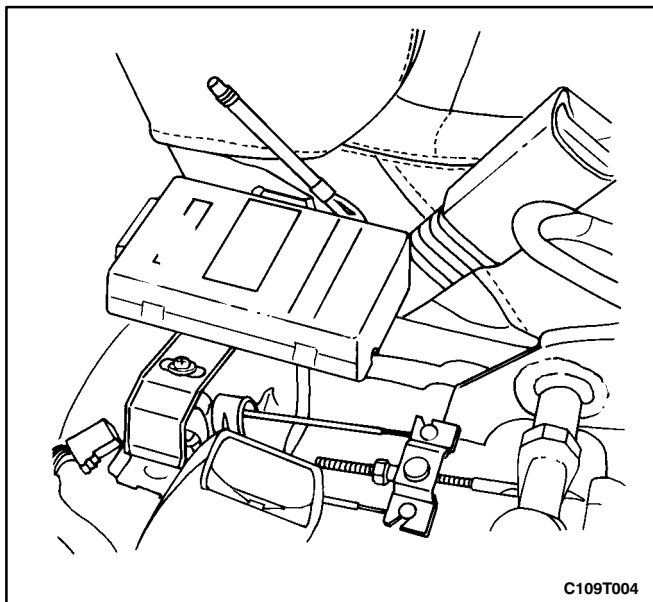
MAINTENANCE AND REPAIR

ON-VEHICLE SERVICE

MODULE/RECEIVER

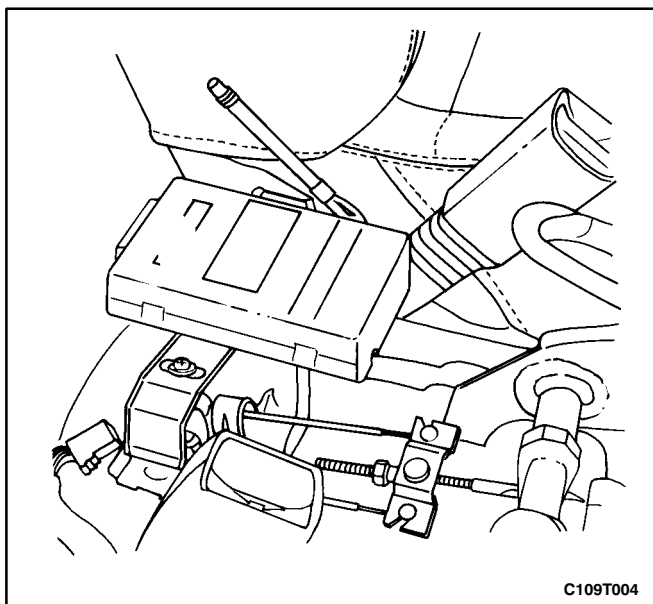
Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the floor console. Refer to *Section 9G, Interior Trim*.
3. Disconnect the module/receiver electrical connector.
4. Remove the module/receiver by sliding it toward the front of the vehicle until it disengages from its mounting bracket.



Installation Procedure

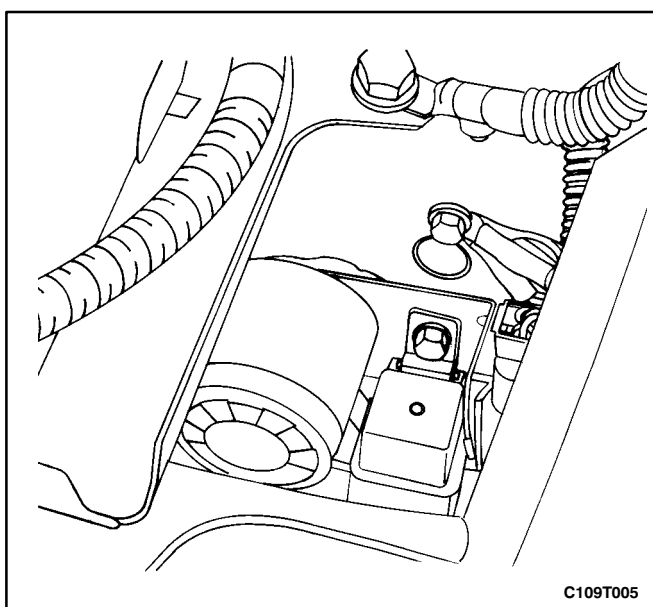
1. Install the module/receiver by sliding it on to its mounting bracket and pushing it toward the rear of the vehicle until it is secure.
2. Connect the module/receiver electrical connector.
3. Install the floor console. Refer to *Section 9G, Interior Trim*.
4. Connect the negative battery cable.

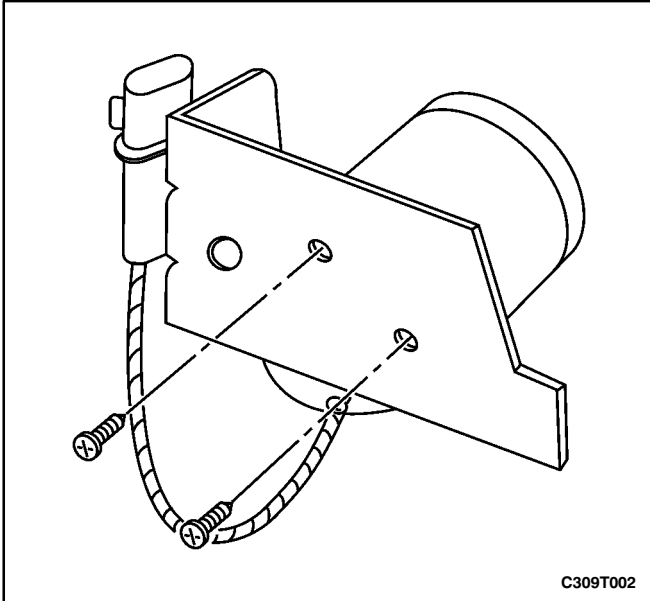


SIREN

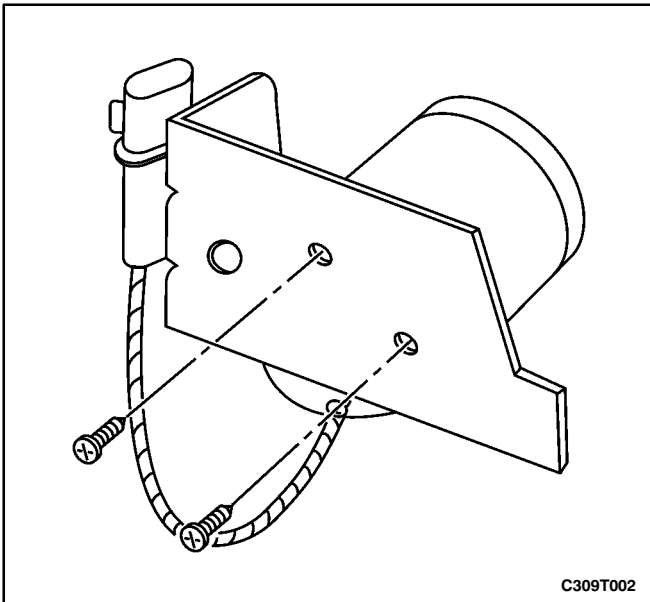
Removal Procedure

1. Disconnect the negative battery cable.
2. Disconnect the siren electrical connector.
3. Remove the siren bracket mounting bolt.





4. Remove the siren bracket.
5. Remove the siren mounting screws.
6. Remove the siren.

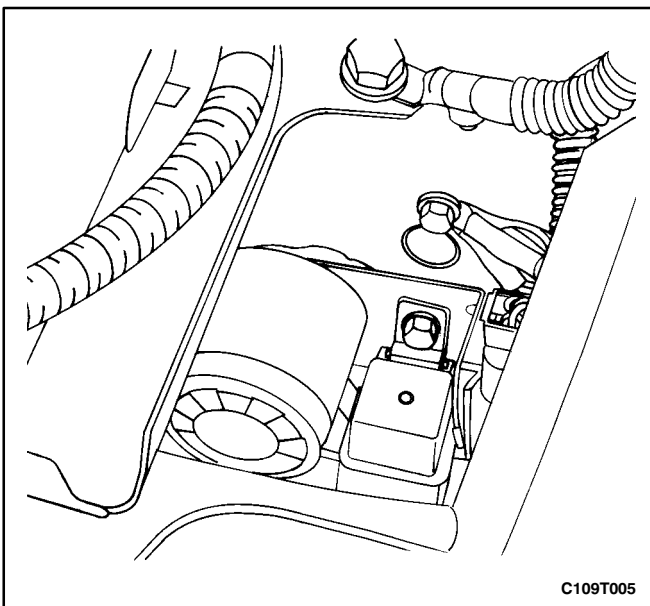


Installation Procedure

1. Install the siren on the siren bracket with the mounting screws.

Tighten

Tighten the siren mounting screws to 3 N•m (27 lb-in).



2. Install the siren bracket with the mounting bolt. Make sure that the siren bracket mounting bolt also fastens the auxiliary fan relay.

Tighten

Tighten the siren bracket mounting bolt to 11 N•m (97 lb-in).

3. Connect the siren electrical connector.
4. Connect the negative battery cable.

FRONT DOOR TAMPER AND DOOR CONTACT SWITCHES

Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the front door trim panel. Refer to *Section 9G, Interior Trim*.
3. Remove the front door lock with the integral door tamper and door contact switches. Refer to *Section 9P, Doors*.

Installation Procedure

1. Install the front door lock with the integral door tamper and door contact switches. Refer to *Section 9P, Doors*.
2. Install the front door trim panel. Refer to *Section 9G, Interior Trim*.
3. Connect the negative battery cable.

REAR DECK LID TAMPER SWITCH

Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the deck lid lock cylinder and integral rear deck lid tamper switch. Refer to *Section 9S, Body Rear End*.

Installation Procedure

1. Install the deck lid lock cylinder and integral rear deck lid tamper switch. Refer to *Section 9S, Body Rear End*.
2. Connect the negative battery cable.

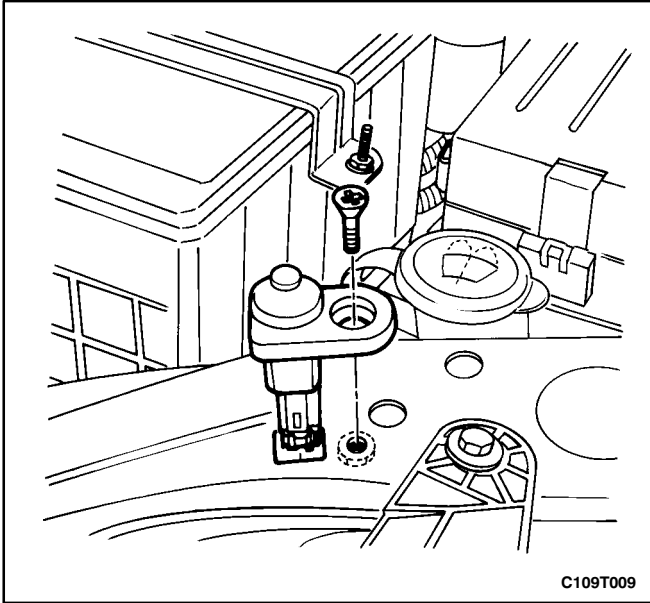
REAR DECK LID OPEN SWITCH

Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the rear deck lid lock and integral rear deck lid open switch. Refer to *Section 9S, Body Rear End*.

Installation Procedure

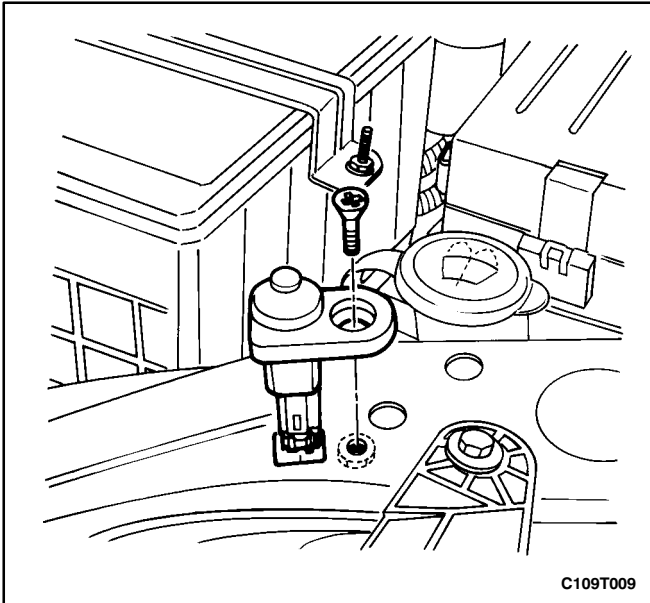
1. Install the deck lid lock and integral rear deck lid open switch. Refer to *Section 9S, Body Rear End*.
2. Connect the negative battery cable.



HOOD OPEN SWITCH

Removal Procedure

1. Disconnect the negative battery cable.
2. Reach underneath the hood open switch and hold the mounting nut while removing the hood open mounting bolt.
3. After the mounting bolt and nut are removed, push the hood open switch upward from below.
4. Disconnect the electrical connector from the hood open switch.
5. Remove the hood open switch.



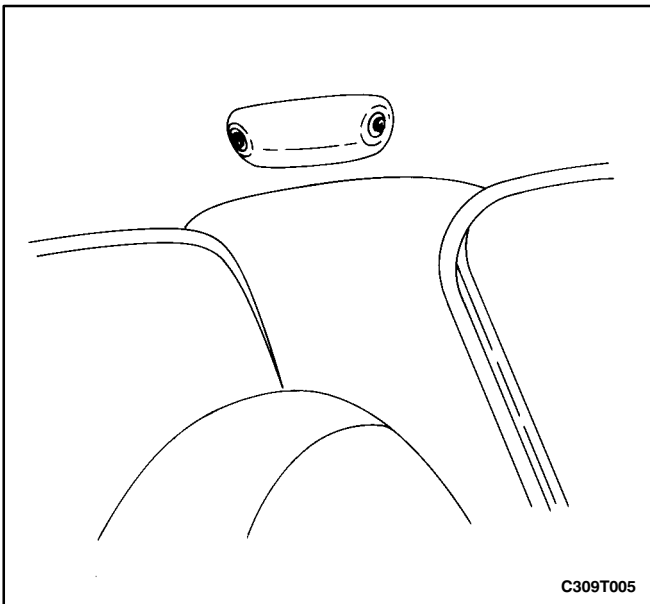
Installation Procedure

1. Install the hood open switch with the mounting bolt and nut.

Tighten

Tighten the hood open switch mounting bolt to 4 N•m (35 lb-in).

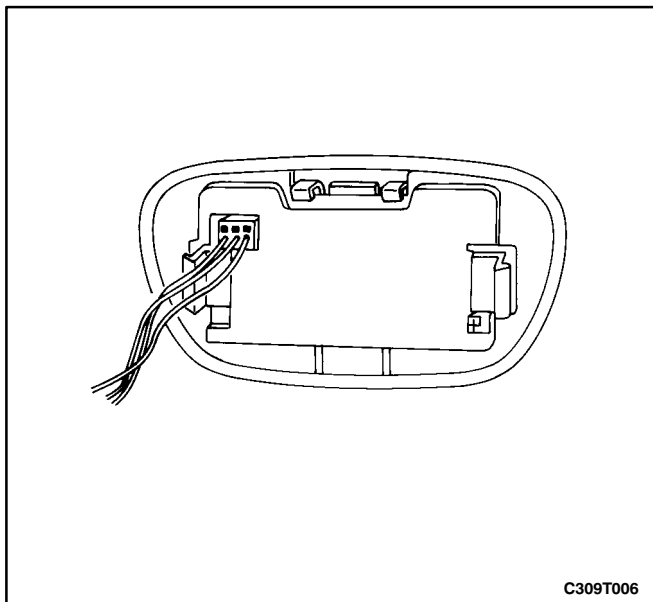
2. Connect the electrical connector to the hood open switch.
3. Connect the negative battery cable.



ULTRASONIC SENSOR

Removal Procedure

1. Slide the ultrasonic sensor in a sideways direction to loosen the retaining clip while simultaneously pulling the sensor away from the B-pillar.
2. Disconnect the electrical connector from the ultrasonic sensor.



Installation Procedure

1. Connect the electrical connector to the ultrasonic sensor.
2. Install the ultrasonic sensor by pushing it into the opening in the B-pillar until the retaining clips lock into place.

PASSWORD PROGRAMMING

If a transmitter is lost or damaged, the module/receiver must be reprogrammed to communicate with a new transmitter. The passwords recorded in the module/receiver should not be deleted when power is off in the module/receiver.

Each module/receiver should be able to record five passwords. The following method is used to record new passwords in the module/receiver.

1. Connect the scan tool to the assembly line diagnostic link (ALDL) connector.
2. Turn the ignition ON.
3. Send the programming mode message to the module/receiver.
4. Press three times any button on the transmitter to generate a data code including a password which will be recorded by the module/receiver. The module/receiver sends a response message to the scan tool to indicate that the first password has been recorded.
5. Repeat step 4 until the module/receiver has responded that the second, third, fourth, and fifth passwords have been recorded.
6. Turn the ignition OFF.
7. Disconnect the scan tool.

The module/receiver will exit the programming mode and switch to the normal operating mode when either of the following conditions occurs:

- The scan tool is disconnected from the ALDL.
- Five passwords have been recorded in the module/receiver.

GENERAL DESCRIPTION AND SYSTEM OPERATION

REMOTE KEYLESS ENTRY AND PERIMETER/ULTRASONIC ANTI-THEFT SYSTEM

The remote keyless entry and anti-theft system can perform the following functions:

- Remotely lock and unlock the vehicle doors by means of a hand-held, high-frequency transmitter.
- Sense intrusion into the vehicle through the doors, the trunk, or the hood.
- Activate a warning if an intrusion is detected.
- Automatically re-lock the doors if the door or the trunk is not opened within 30 seconds after the vehicle has been unlocked by remote keyless entry.
- Help the driver find the vehicle in a parking area.
- Communicate serial data to a scan tool to help diagnose system faults.
- Sense movement inside the vehicle if it is equipped with the optional ultrasonic motion detector.

The remote keyless entry/anti-theft system consists of the following components:

- Keyless entry and anti-theft module/receiver.
- Hand-held transmitter.
- SECURITY indicator.
- Rear deck lid open switch.
- Rear deck lid tamper switch.
- Front door tamper switch.
- Door contact switch.
- Central locking unit.
- Turn signals.
- Siren.
- Hood open switch.
- Ultrasonic sensor (optional)

REMOTE LOCKING AND UNLOCKING

The hand-held transmitter locks and unlocks the vehicle doors by sending radio waves to the module/receiver in the vehicle. The effective range of the transmitter varies between 5 and 10 meters (approximately 16 to 32 feet), depending on whether or not objects such as other vehicles are blocking the path of the radio waves.

The transmitter has a LOCK button and an UNLOCK button which function only when the ignition is OFF and all openings (doors, engine hood, rear deck lid) are closed. Pressing the UNLOCK button has the following effects:

- The doors are unlocked.
- The turn signals flash twice.
- The module is disarmed.

Pressing the LOCK button has the following effects:

- The doors are locked.

- The turn signals flash once.
- The module is armed.

The transmitter has a replaceable battery. The battery is designed to last at least three years before replacement is necessary.

SECURITY INDICATOR

There is a SECURITY indicator on the instrument panel. After the LOCK button of the transmitter is pressed, the module/receiver is placed in the armed mode, and the SECURITY indicator flashes. The SECURITY indicator turns ON for 0.1 second and OFF for 0.7 second, and it flashes at that frequency until the module/receiver is disarmed.

INTRUSION SENSING

The anti-theft function is armed if the transmitter sends the LOCK message to the module/receiver when the ignition is OFF. If the hood, the door, or the rear deck lid is opened, the hood open, the door contact, or the rear deck lid open switch will change its input to the module/receiver, and the alarm will be activated unless either of the following conditions has occurred:

- An UNLOCK message was received from the transmitter.
- The front door tamper or the rear deck lid tamper switches indicate key operation.

The alarm will also be activated if the ignition input is changed to battery voltage before either of the following conditions occurs:

- An UNLOCK message was received from the transmitter.
- The front door tamper or the rear deck lid tamper switches indicate key operation.
- The alarm will also be activated if the anti-theft function has been armed and the ultrasonic sensor (optional) detects movement within the vehicle before the front door or rear deck lid tamper switches have indicated key operation.

SIREN

The remote keyless entry system is armed when the LOCK message is received from the transmitter when the ignition is OFF. When the system is armed, it will activate the siren and flash the turn signals for 28 seconds if any of the following conditions occurs:

- A door is opened without using the key before an UNLOCK signal is received from the transmitter.
- The rear deck lid is opened without using the key before an UNLOCK signal is received from the transmitter.
- The hood is opened before an UNLOCK signal is received from the transmitter and before a door or the rear deck lid is unlocked.
- The ignition switch input indicates battery voltage before either a key is used to unlock the vehicle or an UNLOCK signal is received from the transmitter.

The siren is disarmed after it begins to sound an alarm if any of the following conditions occurs:

- The door is opened with the key.
- The rear deck lid is opened with the key.
- The UNLOCK or LOCK button on the remote transmitter is pressed.

VEHICLE LOCATOR

The remote keyless entry system assists the driver in locating the vehicle. When the vehicle is unlocked with the remote control, the turn signals flash twice to indicate the location of the vehicle. The duration of the flashes and the length of time between flashes is used to indicate certain vehicle conditions. Refer to "Fault or Alarm Indication" in this section.

AUTOMATIC LOCKING (SAFETY LOCK)

The remote keyless entry system has an automatic locking feature. If the doors are unlocked with the remote transmitter while the control module/receiver is armed, the doors are automatically re-locked after 30 seconds unless any of the following events occurs:

- The door is opened.
- The ignition switch is turned ON.
- The rear deck lid is opened.
- The hood is opened.

MODULE/RECEIVER

The remote keyless entry module/receiver is contained in the floor console. The module/receiver processes signals from the remote transmitter and the intrusion sensors, and it activates the alarm if an invasion is detected. The module/receiver also has a

self-diagnostic function which will display trouble codes. In order to display trouble codes, a scan tool must be connected to the assembly line diagnostic link (ALDL) connector.

The module/receiver will not communicate with transmitters from other vehicles because there are over four billion possible electronic password combinations. The module/receiver has an attached antenna to detect signals from the transmitter.

FAULT OR ALARM INDICATION

When the UNLOCK button on the remote transmitter is pressed, the module/receiver will flash the parking lights to indicate information about the remote keyless entry and anti-theft system.

Normal Condition: If there has not been an intrusion and no fault has been detected, the module/receiver will signal a normal condition when the UNLOCK button is pressed. The parking lights will flash twice for 0.5-second, with a 0.5-second pause between flashes.

USS Fault Indication: If there is a fault in the ultra sonic sensor, the module/receiver will signal the fault when the UNLOCK button is pressed. The parking lights will flash twice for 1 second with a 0.5-second pause between flashes.

Alarm Indication: If there has been an intrusion since the last time the LOCK button was pressed, the module/receiver will signal that there has been an intrusion when the UNLOCK button is pressed. The parking lights will flash twice for 0.5-second, and there will be a 1.5-second pause between flashes.

Alarm and fault information in the module/receiver will be erased the next time the module/receiver enters the armed condition after receiving a LOCK message from the transmitter.

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SECTION 9T

IMMOBILIZER ANTI-THEFT SYSTEM

CAUTION: Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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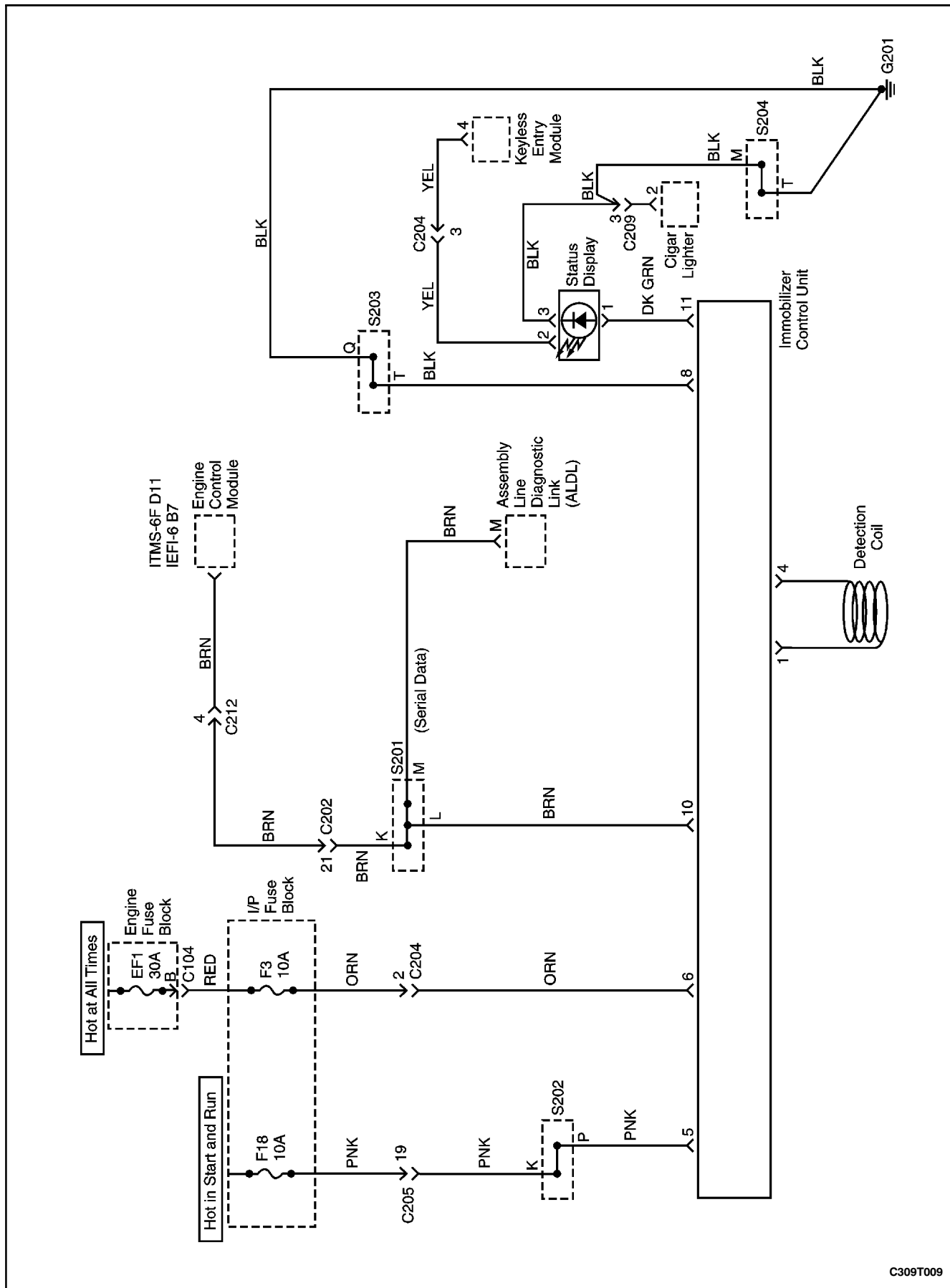
SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	N•m	Lb-Ft	Lb-In
Hood Release Handle Screw	2.5	-	22
Immobilizer Control Unit	4	-	35

SCHEMATIC AND ROUTING DIAGRAMS

IMMOBILIZER ANTI-THEFT SYSTEM



C309T009

DIAGNOSIS

ANTI-THEFT IMMOBILIZER SYSTEM

The anti-theft immobilizer system requires diagnosis when it is not possible to start the engine. If the no-start condition occurs because of the immobilizer system, a diagnostic trouble code (DTC) 53 should be set. The immobilizer control unit monitors the detection and reading of the ignition key. The self-test capability is limited to those functions. Faults are communicated to a scan tool during diagnosis, but they are not stored in the immobilizer control unit's memory. Unauthorized use of a scan tool could be a method of defeating the anti-theft immobilizer system, so certain scan tool procedures

require the use of a password. The following functions are password protected:

- Coding of an additional key.
- Deleting all key codes.
- Deletion of the immobilizer identification (ID) Code.
- Deletion of the electronic control module (ECM) identification (ID) code.

The following functions do not require a password:

- Reading an ignition key to determine if the transponder is working or if a key is authorized.
- Reading the immobilizer ID-code to verify that it matches the ECM ID-code.

DTC 53 – ECM Immobilized Error

Step	Action	Value	Yes	No
1	Connect the scan tool using the following procedure: 1. Insert the immobilizer data cartridge into the scan tool. 2. Turn the ignition switch to the OFF position. 3. Connect the scan tool to the assembly line diagnostic link (ALDL). 4. Connect the scan tool's power cord to the cigar lighter socket. 5. Turn the ignition ON, but do not start the engine. Is communication established between the scan tool and the immobilizer control unit?	-	Go to <i>Step 2</i>	Go to "Communication Between Immobilizer and Test Equipment".
2	Select SYSTEM DIAGNOSIS from the scan tool menu. Does the KEY STATUS message indicate position number (POS NR) 00?	-	Go to "Key Status Errors".	Go to <i>Step 3</i>
3	Read the IMMO & ECM ID-CODE message that was displayed after requesting SYSTEM DIAGNOSIS. Does the message ID-CODE DIFFERENT appear?	-	Go to "Identification (ID) Code Reprogramming"	Go to <i>Step 4</i>
4	Check for an open circuit between the immobilizer control unit and the ECM. Is the circuit open?	-	Go to <i>Step 5</i>	Go to <i>Step 6</i>
5	Repair the open circuit between the ECM and the immobilizer control unit. Is the repair complete?	-	System OK	-
6	1. Replace the ECM. 2. Reprogram the ID code. Is the repair complete?	-	System OK	-

KEY STATUS ERRORS

The following KEY STATUS messages may be shown on the scan tool after commanding SYSTEM DIAGNOSIS :

- **IGNITION OFF STATUS.** This message informs the technician that the ignition is off during the key coding process. Turn the ignition ON during key coding, but do not start the engine.
- **KEY IS OCCUPIED.** Only five keys may be coded. If a new key is desired, the previous key codes must be deleted. Up to five keys may then be authorized.
- **ALREADY AUTHORIZED.** Key coding is being attempted with a key that is already authorized.
- **ERROR NO. 001, 002, 003.** There is no communication between the transponder in the ignition key and the detection coil. Follow the steps below to diagnose the problem:
 1. Try a different key. If a different key works, the problem was in the original key.
 2. If trying a different key resulted in the same error message, replace the detection coil.
- **INVALID KEY.** The communication between the immobilizer control unit and the key transponder has

not validated the key. Follow the steps below to diagnose the problem:

1. Code the key. Refer to "Key Coding Procedure" in this section.
 2. If the same message is received after key coding, check the connection of the detection coil.
 3. If the detection coil is OK, replace the immobilizer. Refer to "Immobilizer Control Unit" in this section.
- **NO TRANSPONDER DETECTED.** The fault may be in the ignition key transponder, the detection coil, or the immobilizer. Follow the steps below to diagnose the problem:
 1. Try a different key. If a different key works, the problem was in the original key.
 2. If trying a different key resulted in the same error message, check the connection of the detection coil.
 3. If the connection of the detection coil is OK, disconnect the detection coil and use an ohmmeter to check for an open detection coil.

4. If the detection coil was not open, replace the immobilizer control unit. Refer to "Immobilizer Control Unit" in this section.

COMMUNICATION BETWEEN IMMOBILIZER CONTROL UNIT AND TEST EQUIPMENT

1. Connect the test equipment as described in the *Scan Tool Equipment Manual*.
2. If communication between the scan tool and the test equipment was unsuccessful, wait 30 seconds and try again.

3. If communication was not successful on the second try, turn the ignition OFF and check the wire and connectors between the immobilizer control unit terminal 10 and the assembly line diagnostic link (ALDL) terminal M.
4. If the wire and the connectors between the ALDL and the immobilizer control unit are OK, replace the immobilizer control unit. Refer to "Immobilizer Control Unit" in this section.

MAINTENANCE AND REPAIR

ON-VEHICLE SERVICE

KEY CODING PROCEDURE

1. Install the immobilizer control unit cartridge in the scan tool.
2. Turn the ignition OFF.
3. Connect the scan tool.
4. Turn the ignition ON with the key to be coded.
5. Enter the four-digit password that enables service personnel to use the scan tool for coding keys.
6. A lost key can be deleted only by deleting all keys and reauthorizing the remaining keys as new keys. If a key was lost, go to Step 7. If no keys have been lost, but an additional key is desired, go to Step 8.
7. Use the scan tool command DELETE ALL KEY CODES.
8. Use the scan tool command AUTHORIZE ONE ADDITIONAL KEY.
9. Repeat Steps 4, 5, and 6 until the immobilizer control unit has recorded all of the new keys or reauthorized all of the remaining keys after a deletion. The immobilizer control unit can record a maximum of five keys.
10. Return the system to the normal mode.
11. Turn OFF the ignition.
12. Turn ON the ignition.
13. Verify that the key coding was successful by starting the engine with each of the authorized keys.

IDENTIFICATION CODE REPROGRAMMING

Reprogram the ID code in the following situations:

- An immobilizer control unit is replaced.
- An electronic control module (ECM) is replaced.

If a valid key has been lost, refer to “Key Coding Procedure” in this section.

Reprogramming Procedure:

1. Turn the ignition OFF. Reprogramming is not allowed while the engine is running.
2. Insert the immobilizer control unit cartridge into the scan tool.
3. Do not start the vehicle, but turn the ignition ON.
4. Enter the four-digit password that enables service personnel to use the scan tool for ID code reprogramming.
5. Use the scan tool to command RESET ID CODE.

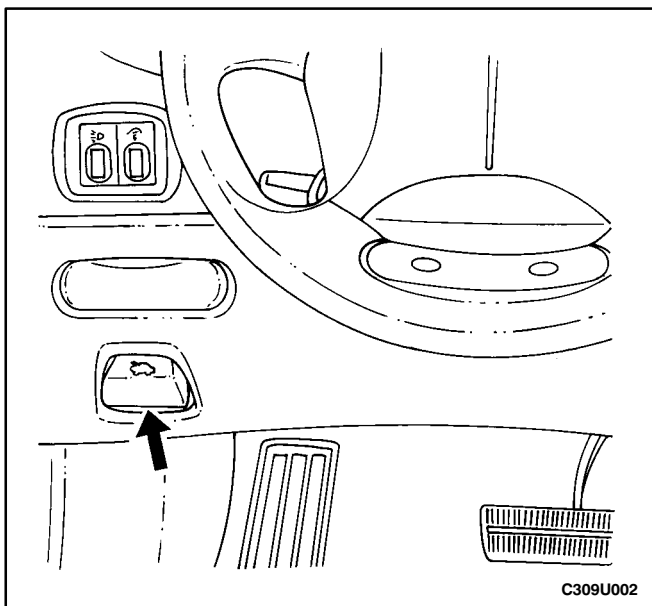
6. Turn the ignition OFF and ON again, but do not crank or start the engine. The ECM will reset the ECM ID code to match the new ID code that was calculated and sent by the immobilizer control unit when the ignition was first turned ON after the reset command.
7. Return the system to the normal mode.
8. Turn OFF the ignition.
9. Turn ON the ignition.
10. Start the engine.

After reprogramming the ID code, the scan tool SYSTEM DIAGNOSIS command can verify that the ECM ID code matches the immobilizer control unit ID code.

If the reprogramming procedure does not result in matching ID codes, check the electrical connectors for the serial data wire between the immobilizer control unit and the ECM.

IGNITION KEY TRANSPONDER

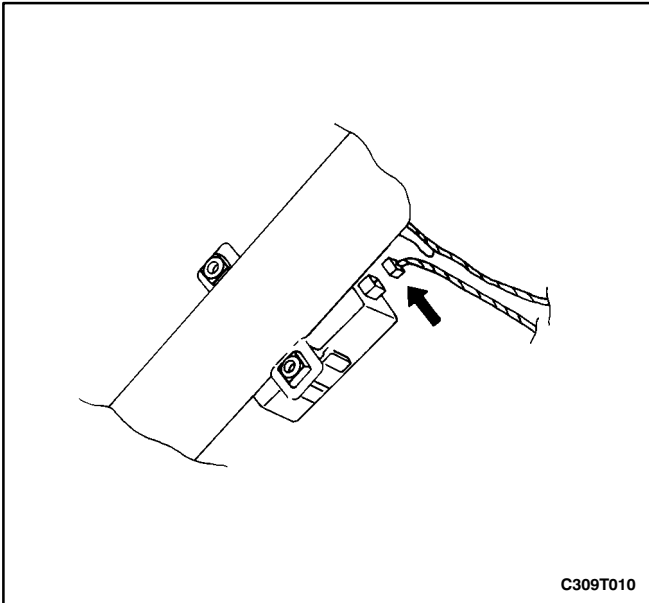
If a transponder is faulty, the ignition key must be replaced. It is not possible to install a new transponder into a key.



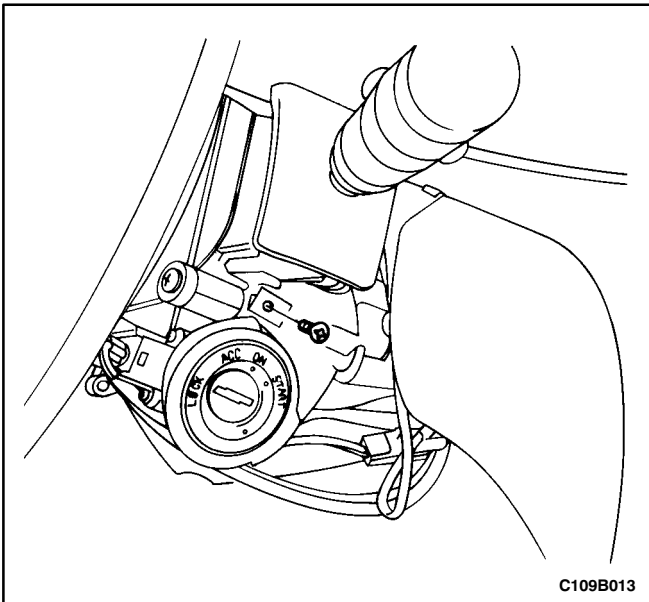
DETECTION COIL

Removal Procedure

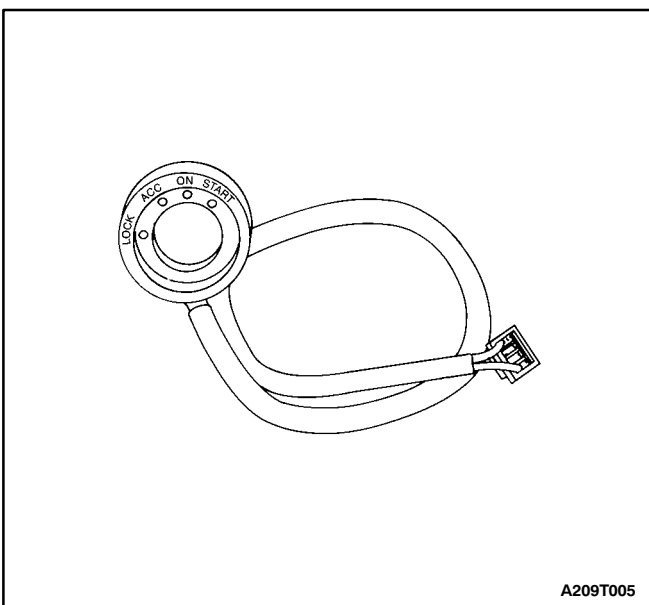
1. Remove the screw that attaches the hood release handle.



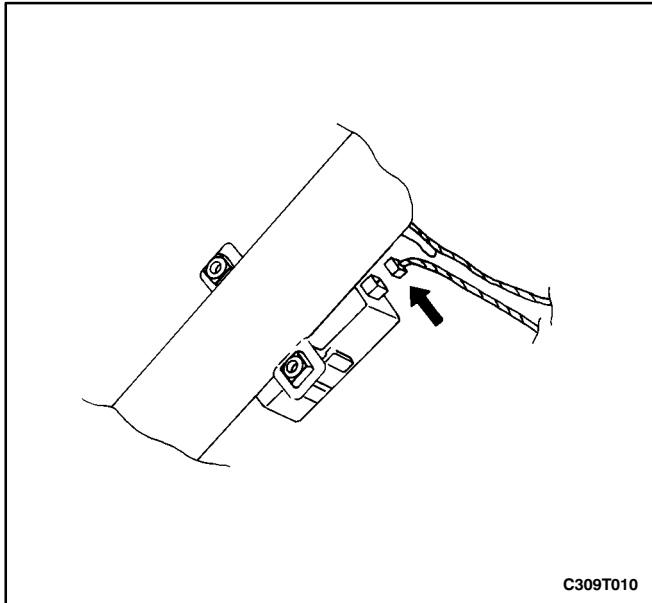
2. Carefully remove the instrument panel lower cover by pulling until the retaining clips are free from the slots in the instrument panel.
3. Remove the steering column lower cover. Refer to *Section 6E, Steering Wheel and Column*.
4. Disconnect the two-pin connector from the immobilizer.



5. Remove the ignition switch keyhole lamp retaining screw and the lamp.

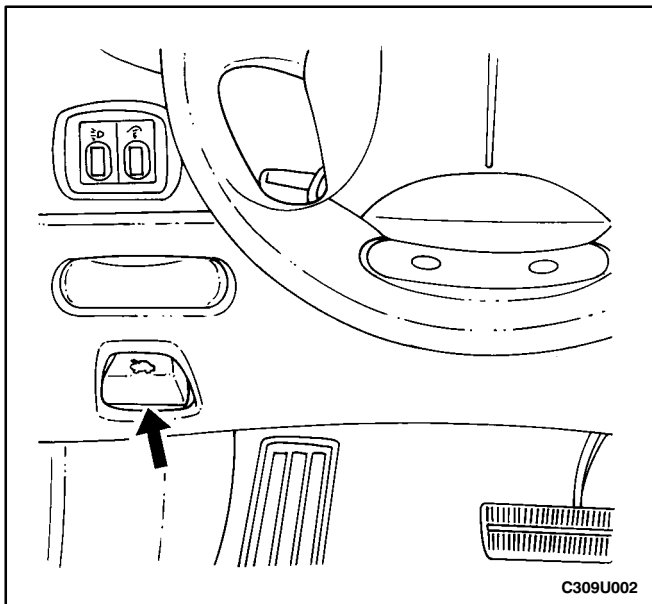


6. Pry the detection coil away from the lock cylinder. If the detection coil will be replaced with a new one, it does not matter if the key position trim ring is damaged during removal. A new trim ring is part of the new detection coil.



Installation Procedure

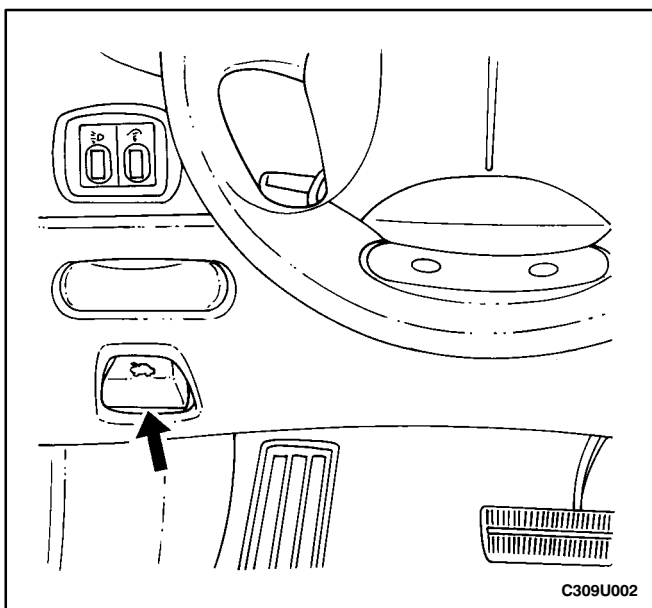
1. Install the detection coil by pressing it onto the lock cylinder until it snaps in place.
2. Install the ignition switch keyhole lamp with the retaining screw.
3. Connect the two-pin connector to the immobilizer.



4. Install the steering column lower cover. Refer to *Section 6E, Steering Wheel and Column*.
5. Install the instrument panel lower cover.
6. Install the screw that attaches the hood release handle.

Tighten

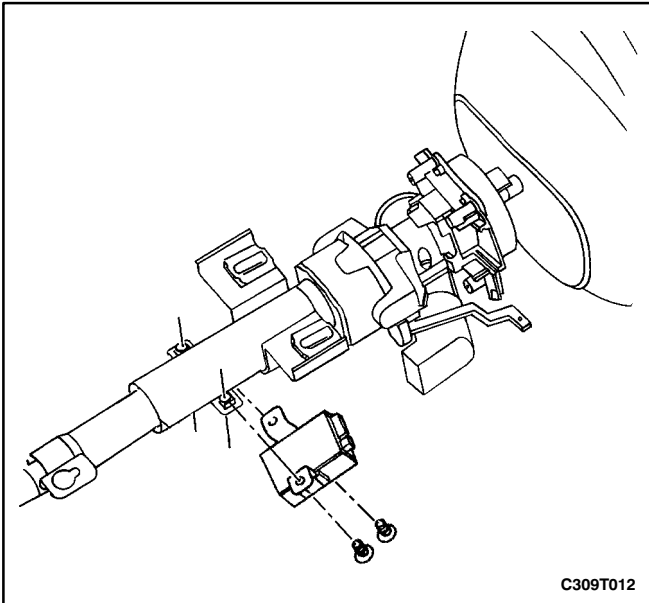
Tighten the hood release handle screw to 2.5 N•m (22 lb-in).



IMMOBILIZER CONTROL UNIT

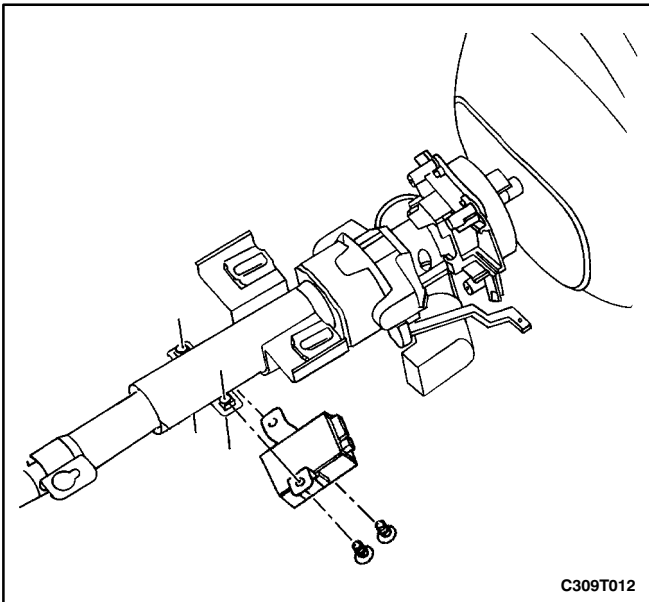
Removal Procedure

1. Remove the screw that attaches the hood release handle.



C309T012

2. Carefully remove the instrument panel lower cover by pulling until the retaining clips are free from the slots in the instrument panel.
3. Remove the steering column lower cover. Refer to *Section 6E, Steering Wheel and Column*.
4. Disconnect the two electrical connectors from the immobilizer control unit.
5. Remove the immobilizer control unit.



C309T012

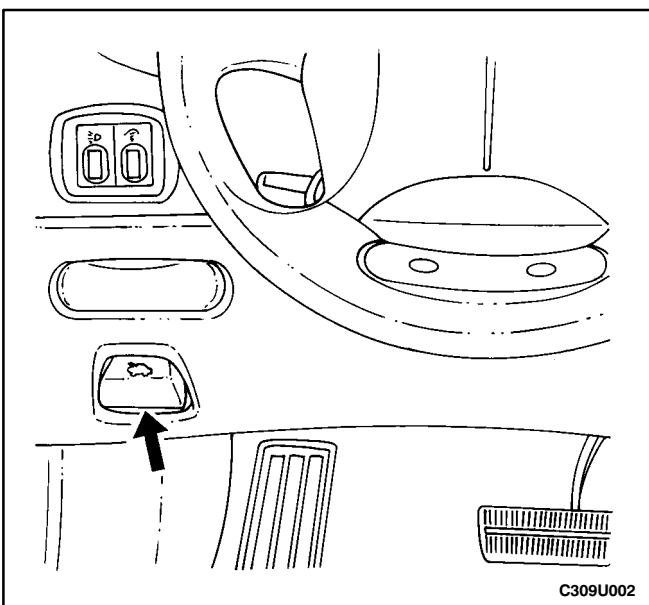
Installation Procedure

Important: After replacing the immobilizer, the ignition keys must be re-authorized using the key coding procedure. Refer to "Key Coding Procedure" in this section. Also, the electronic control module (ECM) identification (ID) code must be reset. Refer to "Identification Code Reprogramming" in this section.

1. Install the immobilizer control unit.

Tighten

Tighten the immobilizer control unit mounting bolts to 4 N•m (35 lb-in).



C309U002

2. Connect the electrical connectors to the immobilizer control unit.
3. Install the steering column lower cover. Refer to *Section 6E, Steering Wheel and Column*.
4. Install the instrument panel lower cover.
5. Install the screw that attaches the hood release handle.

Tighten

Tighten the hood release handle screw to 2.5 N•m (22 lb-in).

GENERAL DESCRIPTION AND SYSTEM OPERATION

IMMOBILIZER SYSTEM

The purpose of the immobilizer system is to prevent the vehicle from being stolen or driven by unauthorized users.

Authorization is accomplished by the use of an electronically coded key. When the ignition is turned ON, the key is tested by the immobilizer system. While the key code is being read by the immobilizer control unit the engine can start and run with any key that will turn the lock cylinder. The key code is read and compared with key codes that have been stored in the immobilizer control unit's memory. If a valid key is detected, the immobilizer control unit sends a serial data release message to the electronic control module (ECM). Included in the release message is an identification (ID) code which assures that neither the immobilizer control unit nor the ECM have been substituted to defeat the system. If the ECM does not receive a release message within a specified time, or if the ID-codes do not match, the ECM performs the following actions:

- Disables the fuel injector circuit.
- Disables the fuel pump circuit.
- Disables the ignition coil.
- Sets Diagnostic Trouble Code (DTC) 53.

The above conditions are maintained until the ignition is turned OFF.

The immobilizer control unit system consists of the following components:

- Electronically coded keys.
- Detection coil.
- Immobilizer control unit.
- ECM.
- Instrument cluster indicator.
- Assembly line diagnostic link (ALDL) connector to provide serial data access for a scan tool.

An ECM for a vehicle without an immobilizer control unit cannot be interchanged for an ECM that is used with an immobilizer control unit system. The immobilizer control unit and ECM must have a matching ID code. ID coding and key coding are accomplished by using a scan tool.

ELECTRONICALLY CODED KEYS

Each valid ignition key has an internal transponder which transmits a unique code. When a key is inserted into the ignition lock, the transponder is inductively coupled to the detection coil. The transponder interacts with the detection coil to generate an amplitude modulated signal which is conducted from the detection coil to the immobilizer control unit. The immobilizer control unit reads the radio frequency signal and a release message is sent to the electronic control module if the key is authorized.

New keys are coded by using a scan tool. Refer to "Key Coding Procedure" in this section.

DETECTION COIL

A detection coil is mounted at the ignition lock as an integral part of the key position trim ring. The wires to and from the detection coil are connected to the immobilizer. When the ignition is turned ON, the immobilizer energizes the detection coil and the coil is coupled inductively to the transponder in the ignition key. The immobilizer sends a modulated signal to the detection coil and the signal is changed by interaction with the internal transponder in the ignition key. The immobilizer reads the signal from the detection coil and determines whether or not the key is authorized.

IMMOBILIZER CONTROL UNIT

The immobilizer control unit is an electronic module in the instrument panel which verifies the validity of an ignition key when the ignition is turned ON. To accomplish its purpose, the immobilizer control unit performs the following actions:

- Learns and stores the codes of valid keys.
- Reads the radio frequency input from the ignition key.
- Compares the received code with the codes of the valid keys.
- Sends a release message to the electronic control module (ECM) if a valid key has been inserted.
- Calculates and transmits identification (ID) codes within each release message.
- Controls the status indicator in the instrument cluster.
- Monitors system faults.
- Supports system test functions.

Normal Operation

When the ignition is turned ON, the immobilizer control unit reads the key code transmitted by the transponder in the ignition key. If a valid key is detected, the immobilizer control unit sends a release message to the ECM, and the immobilizer control unit switches to the inactive mode. The release message contains an ID code. Immobilization will be performed by the ECM if no release message is received, or if the ID code in the ECM does not match the immobilizer control unit ID code. If a non-valid key is detected, the release message is not sent to the ECM.

Assembly Line Diagnostic Link (ALDL) Mode

When the ignition is on, a scan tool can switch the immobilizer control unit to the assembly line diagnostic link (ALDL) mode for the purpose of diagnostics, key coding, or ID coding.

ID-Code Handling

One of 65,535 possible ID codes is stored in the immobilizer control unit's memory. The ID code can be erased by using the scan tool's RESET ID CODE command. When the immobilizer control unit calculates a new ID code, the ECM ID code must be reset to match the immobilizer control unit ID code. To reset the ID code refer to "Identification Code Reprogramming." During diagnostic procedures, the ID code can be read for

comparison with the ECM ID code by using the scan tool's READ IMMOBILIZER CONTROL UNIT ID-CODE command.

SERIAL DATA LINK

Serial data can be exchanged between a scan tool, electronic control module (ECM), and the immobilizer control unit. The scan tool connection is the assembly line diagnostic link (ALDL).

ELECTRONIC CONTROL MODULE (ECM)

When the electronic control module (ECM) detects that the ignition is being turned ON, the ECM waits for a release message from the immobilizer control unit. If a release message is not received within a specified time, the ECM disables the engine. The engine is also disabled if the identification (ID) code transmitted by the immobilizer control unit does not match the code stored

in the ECM's memory. Immobilization remains in effect until the ignition is turned OFF or battery power is removed.

To prevent the vehicle from being driven, the ECM applies the following strategy:

- The ignition module is put in a bypass mode.
- The ECM will not create an electronic spark timing (EST) output, so no spark will be generated by the ignition coil.
- The ECM will not enable the fuel pump.
- The ECM will not enable the fuel injectors.
- The ECM sets Diagnostic Trouble Code (DTC) 53.

Serial data communication is transmitted on a single wire between the immobilizer control unit and the ECM. During diagnostic procedures or ID code changing, a scan tool is added to the communication system.

An ECM with an immobilizer control unit is not exchangeable with the ECM without an immobilizer control unit.