

Automotive Technology 6th Edition

Chapter 59 Security and Immobilizer Systems

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This Automotive Technology 6th text provides complete coverage of automotive components, operation, design, and troubleshooting. It correlates material to task lists specified by ASE and ASEEducation (NATEF) and emphasizes a problem-solving approach. Chapter features include Tech Tips, Frequently Asked Questions, Case Studies, Videos, Animations, and ASEEducation (NATEF) Task Sheets.
Motivate Learners	Explain how the knowledge of how something works translates into the ability to use that knowledge to figure why the engine does not work correctly and how this saves diagnosis time, which translates into more money.
State the learning objectives for the chapter or course you are about to cover and explain this is what they should be able to do as a result of attending this session or class.	Explain learning objectives to students as listed on NEXT SLIDE. <ol style="list-style-type: none"> 1. Describe the purpose and function of a security system. 2. Explain how an immobilizer system works and identify its major component. 3. Compare immobilizer systems in Chrysler, Ford, and General Motors vehicles. 4. Explain how to diagnose a fault with an immobilizer system.
Establish the Mood or Climate	Provide a WELCOME , Avoid put downs and bad jokes.
Complete Essentials	Restrooms, breaks, registration, tests, etc.
Clarify and Establish Knowledge Base	Do a round robin of the class by going around the room and having each student give their backgrounds, years of experience, family, hobbies, career goals, or anything they want to share.

NOTE: Lesson plan is based on 6th Edition Chapter Images found on Jim's web site @ www.jameshalderman.com

DOWNLOAD Chapter 59 Chapter Images: From http://www.jameshalderman.com/automotive_principles.html

NOTE: You can use Chapter Images or possibly Power Point files:

ICONS



Chapter 59 Security/Immobilizer Systems

1. SLIDE 1 Chapter 59 Security and Immobilizer Systems

Check for **ADDITIONAL VIDEOS & ANIMATIONS**
@ <http://www.jameshalderman.com/>
WEB SITE IS CONSTANTLY UPDATED

http://www.jameshalderman.com/automotive_principles.html
DOWNLOAD

Crossword Puzzle (Microsoft Word) (PDF)

Word Search Puzzle (Microsoft Word) (PDF)

<http://www.jameshalderman.com/videos.html#a6>

DISCUSS FREQUENTLY ASKED QUESTION:

What Is Content Thief Protection? Content

Thief protection is a security system that includes sensors that detect glass breakage or entry into the vehicle and sounds an alarm when these occur. Purpose of content theft system is to prevent theft of objects inside vehicle and sound an alarm when someone enters the vehicle without using proper remote or key. Most systems use a motion detector for content theft protection, as well as switches in doorjamb, trunk, and hood that provide an input signal to the control module. Some antitheft systems are more complex and also have electronic sensors that trigger alarm if glass is broken or a change in battery current draw occurs. These sensors also provide an input signal to the control module, which may be a separate antitheft unit, or may be incorporated into the PCM or BCM.

• **SEE FIGURE 59-1.**

ICONS



Chapter 59 Security/Immobilizer Systems

2. **SLIDE 2 EXPLAIN FIGURE 59–1** A shock sensor used in alarm and **antitheft systems**. If the vehicle is moved, the magnet moves relative to the coil, inducing a small voltage that triggers the alarm.

[Antitheft System \(View\) \(Download\)](#)

DISCUSS CASE STUDY:

3. **SLIDE 3 EXPLAIN FIGURE 59–2** The security system symbol used on a Ford. The symbol varies by make, model, and year, so check service information to determine what symbol is used on the vehicle being diagnosed.
4. **SLIDE 4 EXPLAIN FIGURE 59–3** A typical key with the cover removed showing the battery used to power the door lock and the antenna used for the immobilizer system.
5. **SLIDE 5 EXPLAIN FIGURE 59–4** remote keyless entry is used to unlock the doors as well as create the signals to the powertrain control module (PCM) used to control the starter motor and/ or fuel system and the warning lamp on the instrument panel cluster (IPC).

[Antitheft System \(View\) \(Download\)](#)

6. **SLIDE 6 EXPLAIN FIGURE 59–5** A typical immobilizer circuit showing communication between key and the transceiver. Transceiver then communicates with immobilizer module over data lines.

EXPLAIN TECH TIP: Do Not Have Other Keys Near
Whenever diagnosing an immobilizer system, keep other key fobs away from the area. If another key fob were close, it could be transmitting a signal that is not recognized by the vehicle and the security system could prevent proper vehicle operation. Even having other metal objects near the key can affect the strength of the electromagnetic pulses and could interfere with the immobilizer

ICONS



Education Foundation



Chapter 59 Security/Immobilizer Systems

system and prevent it from working as designed. •
SEE FIGURE 59-6.

7. **SLIDE 7 EXPLAIN FIGURE 59-6** (a) Avoid using a key where the key ring is over the top of the key, which can interfere with the operation of the immobilizer system. (b) Do not angle another key upward from the key being used to help prevent interference with the magnetic field used to energize the key. (c) Do not have the keys from another vehicle near the key being used.

ON-VEHICLE ASE EDUCATION TASK Diagnose operation of security/anti-theft systems and related circuits (such as: theft deterrent, door locks, remote keyless entry, remote start, and starter/fuel disable); determine needed repairs.

DEMONSTRATION: Obtain several remote keyless entry fobs or transmitters to show to your students. Separate the cases of the fobs to let students see the internal components, especially keypad touch areas on circuit board. Discuss range of remote keyless entry key fobs. What is meant by "line of sight"?

DISCUSSION: Have students talk about **ROLLING CODE TRANSMITTERS.** What other component uses rolling code technology?

8. **SLIDE 8 EXPLAIN FIGURE 59-7** Check service information for the exact wiring diagram (schematic) for the vehicle being tested. Highlighting the wires and noting their color helps when following the specified testing procedures.

ON-VEHICLE TASK: Have student download the exact wiring diagram (schematic) for the vehicle being tested. Highlighting the wiring to be tested

9. **SLIDE 9 EXPLAIN FIGURE 59-8** A special tool is needed to diagnose a General Motors VATS security system and special keys that contain a resistor pellet.
10. **SLIDE 10 EXPLAIN FIGURE 59-9** Passlock series of General Motors security systems uses a conventional key. The magnet is located in ignition lock cylinder and triggers Hall-effect sensors.

ICONS

DEMO



QUESTION



QUESTION



QUESTION



Chapter 59 Security/Immobilizer Systems

DEMONSTRATION: If available, show **YOUR** students an example of **GM Passkey** with exposed resistor. Demonstrate how to measure resistance of resistor

DISCUSSION: Discuss **GM Passlock** antitheft system. How does this lock cylinder send a signal to instrument cluster OR BCM?

DISCUSSION: Have students talk about the use of **special keys for antitheft systems**. What happens if an unprogrammed key is used?

DISCUSSION: Discuss diagnostic steps used for **troubleshooting antitheft system**. Why is it important to have accurate service data before troubleshooting any electronic system?

EXPLAIN TECH TIP: *Look for DTCs in “Body” and “Chassis”* Whenever diagnosing a customer concern with the immobilizer system, check for diagnostic trouble codes (DTCs) under chassis and body systems. A global or generic scan tool that can read only “P” codes is not suitable for diagnosing many faults with the immobilizer system. Engine or emission control-type codes are “P” codes, whereas module communications are “U” codes. These are most often found when looking for DTCs under chassis or body systems. Chassis-related codes are labeled “C” and body system-related codes are labeled “B” codes and these can cause an immobilizer issue if they affect sensor that is used by system. • **SEE FIGURE 59-10.**

- 11. SLIDE 11 EXPLAIN FIGURE 59-10** Scan tools, such as this factory tool being used on a BMW, are capable of many diagnostic functions that can help the technician zero in on the root cause of a problem.
- 12. SLIDE 12 EXPLAIN FIGURE 59-11** After checking for stored diagnostic trouble codes (DTCs), the wise technician checks service information for any technical service bulletins (TSBs) that may relate to the vehicle being serviced.

ICONS



Chapter 59 Security/Immobilizer Systems

DISCUSS CHART 59-1 Sample diagnostic trouble codes for an immobilizer system. These codes vary by make, model, and year of manufacture, so check service information for the exact vehicle being diagnosed.

EXPLAIN TECH TIP: *Use an Antenna Coil Tester to Save Time:* The procedure for testing the antenna coil using an antenna tester includes:

- Insert the ignition key into ignition lock cylinder. On some vehicles, inserting the key causes the transceiver to activate. On some vehicles, the key must be rotated to the ON position.
- Use a handheld tester to check that transceiver is able to transmit a signal. A coil detector is used to check immobilizer coil that surrounds lock cylinder. The coil is working normally if LED lights up as key is inserted into lock cylinder. If coil is defective, this can save technician a lot of time troubleshooting system. The coil can be replaced without the need to reprogram keys.
 - **SEE FIGURE 59-12.**

13. SLIDE 13 **EXPLAIN** FIGURE 59-12 Immobilizer coil detectors can be found online by searching for immobilizer transponder coil detector.

Most antitheft keys now have a transponder chip embedded in plastic head of key