

Automotive Technology 6th Edition

Chapter 123 ELECTRIC POWER STEERING

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.	<p>Explain learning objectives to students as listed below:</p> <ol style="list-style-type: none"> 1. Describe the purpose, and function, and types of electric power steering systems. 2. Explain how electric power steering systems operate. 3. Discuss how to diagnose electric power steering system faults. 4. Describe the self-parking feature and its relationship to power steering. 5. Describe electro-hydraulic power steering. 6. This chapter will help prepare for the Steering and Suspension (A4) ASE certification test content area "A" (Steering Systems Diagnosis and Repair).
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

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

ICONS



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1. SLIDE 1 CH123 ELECTRIC POWER STEERING

Check for **ADDITIONAL VIDEOS & ANIMATIONS**
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Crossword Puzzle (Microsoft Word) (PDF)
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Videos

2. **SLIDE 2 EXPLAIN FIGURE 123–1** A rack mounted electric power steering gear on a Lexus RX 400 h taken from underneath the vehicle.
3. **SLIDE 3 EXPLAIN FIGURE 123–2.** Honda electric power steering unit cutaway, which is an example of pinion-mounted electric power steering system.

DEMONSTRATION: Show examples of electric power steering (EPS) assemblies FIGURE 123-1

4. **SLIDE 4 EXPLAIN FIGURE 123–3** A Ford electric power steering rack-mounted motor that drives the rack through a toothed belt. This assembly is located on the passenger side vehicle opposite to where steering column shaft is attached to the rack.
5. **SLIDE 5 EXPLAIN FIGURE 123–4** The torque sensor converts the torque the driver is applying to the steering wheel into a voltage signal..
6. **SLIDE 6 EXPLAIN FIGURE 123–5** A cutaway view showing the operation of torque sensor used in electric power steering systems..
7. **SLIDE 7 EXPLAIN FIGURE 123–6** The power steering control module (PSCM) is attached to the motor of the electric power steering assembly..
8. **SLIDE 8 EXPLAIN FIGURE 123–7** Schematic showing the electric power steering and the torque/position sensor.

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DISCUSS CASE STUDY: *Hard Steering*

Chevrolet HHR. The owner of a Chevrolet HHR complained that steering wheel was harder to turn after the battery was jump started. The tow truck driver did not know what to do and advised owner to take it to a shop to have it looked at but the driver did not think that jump starting the vehicle could affect power steering. A technician at shop determined that electric power steering did not work because of a blown fuse. Apparently, the vehicle was jump started by connecting the positive jump cable to the main terminal toward the rear of the engine compartment instead of the terminal designed to be used to jump start the vehicle as the battery is located at the rear of this vehicle. • **SEE FIGURE 123-8.**

After the blown fuse was replaced, the electric power steering worked correctly.

Summary:

- **Complaint—Owner complained that steering felt stiff after vehicle was jump started.**
- **Cause—jump start cables were connected to wrong terminal which caused the fuse to blow that controlled electric power steering.**
- **Correction—blown fuse was replaced and power steering system operation was restored to normal**

9. **SLIDE 9 EXPLAIN FIGURE 123-8** The blown fuse is the yellow 60-amp fuse next to the terminal at the top.

10. **SLIDE 10 EXPLAIN FIGURE 123-9** electrohydraulic power steering assembly on Chevrolet hybrid P/U

DEMONSTRATION: Show the students an example of a scan tool and explain how it works to diagnose electric power steering



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ON-VEHICLE ASE EDUCATION TASK B18:

Inspect, test and diagnose electrically-assisted power steering systems (including using a scan tool); determine needed action.

ON-VEHICLE ASE EDUCATION TASK B19:

Identify hybrid vehicle power steering system electrical circuits and safety precautions.