

# Automotive Technology 6<sup>th</sup> Edition

## Chapter 109 – Power Brake Unit Operation, Diagnosis, and Service

### Lesson Plan



#### **CHAPTER SUMMARY:**

1. The need for power brake assist, principles of vacuum, and vacuum booster theory
  2. Vacuum check valve, vacuum brake booster operation, and dual-diaphragm vacuum boosters
  3. Vacuum booster operation test, vacuum booster leak test, and hydraulic system leak test
  4. Pushrod clearance adjustment and vacuum booster disassembly and service
  5. Hydro-boost hydraulic brake booster and hydro-boost symptom-based guide
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#### **OBJECTIVES:**

1. Discuss the need for power brake assist.
  2. State the principles of vacuum and the vacuum booster theory.
  3. Discuss the operation of a vacuum check valve, vacuum brake booster, dual-diaphragm vacuum boosters, and brake assist system.
  4. Discuss the vacuum booster operation test, vacuum booster leak test and hydraulic system leak test.
  5. Describe how to adjust the pushrod length and disassemble the vacuum brake booster for service. explain the operation and diagnosis of Hydro-boost hydraulic brake booster.
  6. This chapter will help prepare for the Brakes (A5) ASE certification test content area "A" (Hydraulic, Power assist, and Parking Brake systems Diagnosis and repair).
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#### **RESOURCES:** (All resources may be found at <http://www.jameshalderman.com>)

1. **Task Sheet ASE (A5-E-1) P-2:** Vacuum Power Brake Booster Test
  2. **Task Sheet ASE (A5-E-2) P-1:** Vacuum Supply/Manifold or Auxiliary Pump
  3. **Task Sheet ASE (A5-E-3) P-1:** Vacuum-Type Power Booster
  4. **Task Sheet ASE (A5-E-4) P-3:** Hydro-Boost Test
  5. **Task Sheet ASE (A5-E-5) P-3:** Master Cylinder Pushrod Length
  6. Chapter PowerPoint
  7. Chapter Crossword Puzzle and Word Search
  8. Animations: Power Booster and Power Booster Vacuum Supply
  9. Videos: See list at the end of the lesson plan.
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#### **ACTIVITIES:**

1. **Task Sheet ASE (A5-E-1) P-2:** Have students complete Vacuum Power Brake Booster Test Task Sheet.
  2. **Task Sheet ASE (A5-E-2) P-1:** Have students complete Vacuum Supply/Manifold or Auxiliary Pump Task Sheet.
  3. **Task Sheet ASE (A5-E-3) P-1:** Have students complete Vacuum-Type Power Booster Task Sheet.
  4. **Task Sheet ASE (A5-E-4) P-3:** Have students complete Hydro-Boost Test Task Sheet.
  5. **Task Sheet ASE (A5-E-5) P-3:** Have students complete Master Cylinder Pushrod Length Task Sheet.
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#### **ASSIGNMENTS:**

1. Chapter crossword and word search puzzles.
  2. Complete end of chapter 10 question quiz.
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#### **CLASS DISCUSSION:**

1. Review and group discussion chapter Frequently Asked Questions and Tech Tips sections.
  2. Review and group discussion of the five (5) chapter Review Questions.
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#### **NOTES AND EVALUATION:**

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Videos: (at <http://www.jameshalderman.com>)

Hydro boost unit replacement (time 24:48)

Brake booster replacement (time 4:00)

Brake booster replacement (time 9:25)

Electronic brakes (time 2:21)

Electronic brake force distribution (time 1:19)

Electronic brake force distribution (time 2:34)

Brake booster (time 3:28)

Hydrovac (time 6:53)

Brake booster leak (time 1:48)

Brake booster check (time 4:07)

How to Replace a Brake Booster (time 2:28)