

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

## Chapter 72 – Ignition System Diagnosis and Service

### Lesson Plan



#### **CHAPTER SUMMARY:**

1. Checking for spark and electronic ignition troubleshooting procedure
  2. Ignition coil testing using an ohmmeter, testing magnetic sensors, and testing hall-effect sensors
  3. Ignition system diagnosis using visual inspection and testing for poor performance
  4. Testing for a no-start condition, distributor indexing, secondary ignition inspection, and spark plug service
  5. Quick and easy secondary ignition tests, ignition timing, and scope-testing the ignition system
  6. Scope-testing a waste-spark ignition system and scope-testing a coil-on-plug ignition system
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#### **OBJECTIVES:**

1. Describe the procedure used to check for spark.
  2. Diagnose ignition system-related problems.
  3. Inspect and test ignition coils, magnetic sensors, and Hall-effect sensors.
  4. Discuss what to inspect and look for during a visual inspection of the ignition system.
  5. Describe how to test for poor performance and for a no-start condition.
  6. Explain how to verify the distributor position.
  7. Inspect and test secondary ignition system circuit and components.
  8. Discuss the purpose and function of ignition timing and spark advance.
  9. Describe how to test the ignition system using an oscilloscope. this chapter will help prepare for engine repair (A8) ASE certification test content area “B” (Ignition System Diagnosis and repair).
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#### **RESOURCES:** (All resources may be found at <http://www.jameshalderman.com>)

1. **Task Sheet ASE (A8-C-1) P-2, A8-C-3) P-3:** Electronic Ignition Diagnosis
  2. **Task Sheet ASE (A8-C-1) P-2:** Scan Tool Testing of the Ignition System
  3. **Task Sheet ASE (A8-A-9) P-2:** Ignition Scope Analysis
  4. **Task Sheet ASE (A8-C-2) P-1:** Primary Ignition Inspection and Testing
  5. **Task Sheet ASE (A8-C-4) P-1:** Spark Plugs Inspection
  6. **Task Sheet ASE (A8-C-4) P-1:** Ignition Coil Testing
  7. **Task Sheet ASE (A8-C-2) P-1:** Position Sensor Diagnosis
  8. **Task Sheet ASE (A8-C-2) P-1:** Position Sensor Waveform Testing
  9. **Task Sheet ASE (A8-C-2) P-1:** Primary Ignition Inspection and Testing
  10. Chapter PowerPoint
  11. Chapter Crossword Puzzle and Word Search
  12. Animations: Test Spark Plug Wire
  13. Videos: See list at the end of the lesson plan.
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DEMO

#### ACTIVITIES:

1. Task Sheet ASE (A8-C-1) P-2, A8-C-3) P-3: Have students complete Electronic Ignition Diagnosis Task Sheet.
  2. Task Sheet ASE (A8-C-1) P-2: Have students complete Scan Tool Testing of the Ignition System Task Sheet.
  3. Task Sheet ASE (A8-A-9) P-2: Have students complete Ignition Scope Analysis Task Sheet.
  4. Task Sheet ASE (A8-C-2) P-1: Have students complete Primary Ignition Inspection and Testing Task Sheet.
  5. Task Sheet ASE (A8-C-4) P-1: Have students complete Spark Plugs Inspection Task Sheet.
  6. Task Sheet ASE (A8-C-4) P-1: Have students complete Ignition Coil Testing Task Sheet.
  7. Task Sheet ASE (A8-C-2) P-1: Have students complete Position Sensor Diagnosis Task Sheet.
  8. Task Sheet ASE (A8-C-2) P-1: Have students complete Position Sensor Waveform Testing Task Sheet.
  9. Task Sheet ASE (A8-C-2) P-1: Have students complete Primary Ignition Inspection and Testing 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>)

NGC ignition codes (time 4:21)

Crank no start (time 6:15)

Distributor installation (time 2:34)

Coil testing (time 14:39)

COP misfire diagnosis (time 11:01)

Spark plug thread repair (time 6:55)

Ignition fault codes (time 10:00)

Check for spark (time 1:58)

Distributor cap and rotor (time 2:57)

Spark plugs (time 3:25)

Nissan cam sensor fault (time 4:16)

Crankshaft sensor (time 5:12)

Scope testing a crankshaft sensor (time 6:47)

Cam sensor circuit test (time 1:02)

Chrysler hall effect sensor testing part 1 (time 14:55)

Chrysler hall effect sensor testing part 2 (time 6:10)

Knock sensor testing (time 16:09)

Camshaft sensor (time 6:59)

VRS bypass testing (time 6:15)

Testing crankshaft sensors (time 4:39)

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

Ignition coil (time 3:40)	Testing crankshaft sensors (time 5:00)
Setting ignition timing (time 1:44)	Camshaft position sensor testing (time 2:43)
Spark plug tube repair (time 7:08)	Cam sensor (time 8:57)
Finding an ignition voltage leak (time 6:28)	Camshaft timing (time 4:09)
Misfire diagnosis (time 8:12)	Install cam bearings (time 2:24)
Subaru no spark (time 13:25)	Ignition triggers (time 1:03)
Ignition system primary testing (time 5:04)	Ignition control module (time 1:02)
Scanning to detect misfires (time 5:03)	Transformers (time 0:49)
Spark plugs (time 6:56)	IAC test with a scope (time 7:17)
Spark plug replacement (time 3:11)	COP ignition system (time 3:00)
Ignition coil (time 0:53)	Misfire diagnosis (time 11:38)
Crankshaft position sensor (time 3:55)	How To Change Spark Plugs And Ignition Coil (time 13:37)
Crankshaft position sensor (time 4:07)	Replacing a Distributor Cap (time 2:11)
P0340 and P0341 (time 3:44)	Basic Tune Up For A Car or Truck (time 23:09)
Crankshaft position sensor (time 3:32)	How to find a misfire when a scanner isn't any help (time 2:41)
Crankshaft sensor (time 9:57)	How to Check Ignition Spark (time 2:23)