

Advanced Natural Gas Vehicle Training

Module 3: John Deere Computerized Engine Management System

Lesson 3: Position Sensors

Lecture: 15 Minutes

Lab: 15 Minutes

Classroom Instructional Objectives:

Upon completion of this unit of instruction the student will be able to:

- Explain the operational characteristics of position sensors.
- Recognize the difference between foot pedal position 1 (FPP1), foot pedal position 2 (FPP2) and throttle position sensors (TPS).
- Compare and contrast voltage output signals from John Deere FPP1, FPP2, and TPS sensors.
- Graph the relationship between throttle position and voltage output.
- Explain how to use the John Deere Operation and Diagnostic Manual.
- Explain how to perform symptom and fault code driveability checks.
- Explain how to perform symptom and no fault code driveability checks.
- List the fault codes specific to position sensors.
- Use John Deere diagnostic manuals to locate specifications.
- Analyze John Deere wiring diagrams specific to position sensors.
- Explain how to test the five-volt reference wire using a lab scope and scan tool.
- Explain how to test the sensor signal wire using a lab scope and scan tool.
- Explain how to test the sensor ground wire using a lab scope.

Key Classroom Points:

- Explain the operational characteristics of position sensors.
- Explain the difference between John Deere FPP1, FPP2, and TPS sensors.
- Demonstrate how to read John Deere wiring diagrams specific to position sensors.
- Explain how to use the John Deere Operation and Diagnostic Manual.
- Explain how to perform symptom and fault code driveability checks.
- Explain how to perform symptom and no fault code driveability checks.
- List the fault codes specific to position sensors.
- Provide specific examples of John Deere position sensors.

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- Explain how to test the sensor five-volt reference signal using a lab scope and scan tool.
- Explain how to test the sensor signal using a lab scope and scan tool.
- Explain how to test the sensor ground using a lab scope.

Lab Skill Objectives:

Upon completion of this unit of instruction the student will be able to:

- Create a chart of the position/voltage relationship between FPP1, FPP2, and TPS sensors.
- Locate on a vehicle FPP1, FPP2, and TPS sensors.
- Use the John Deere Operation and Diagnostic Manual.
- Use John Deere diagnostic manuals to review specifications.
- Retrieve fault codes specific to position sensors.
- Perform no fault code diagnostic routine.
- Explain fault code diagnostic routine.
- Diagnose position sensors by using wiring diagrams.
- Test FPP1, FPP2, and TPS sensor five-volt reference using a lab scope and scan tool.
- Test FPP1, FPP2, and TPS sensor signal using a lab scope and scan tool.
- Test FPP1, FPP2, and TPS sensor ground using a lab scope.

Key Lab Points:

- Explain the position/voltage relationship of FPP1, FPP2, and TPS sensors on the vehicle.
- Explain the differences between FPP1, FPP2, and TPS sensors.
- Compare and contrast the voltage output from FPP1, FPP2, and TPS sensors.
- Explain how to read John Deere wiring diagrams specific to FPP1, FPP2, and TPS sensors.
- Demonstrate how to test FPP1, FPP2, and TPS sensors.
- Demonstrate how to test the five-volt reference using a scan tool.
- Demonstrate how to test the five-volt reference using a lab scope.
- Demonstrate how to test the sensor signal using a scan tool.
- Demonstrate how to test the sensor signal using a lab scope.
- Demonstrate how to test the sensor ground using a scan tool.
- Demonstrate how to test the sensor ground using a lab scope.
- Explain fault codes related to John Deere position sensors.

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Classroom Materials:

- Attendance sheet
- Power Point presentation CD
- Lap-top
- Projector
- Instructor's guide
- White board marking pens
- Projection screen

Handouts:

- Power Point slide materials
- Lab activity sheet 27
- Wiring diagram

Instructor's notes:
