

# Advanced Natural Gas Vehicle Training

## **Module 3: John Deere Computerized Engine Management System**

### **Lesson 7: Solenoids**

**Lecture: 15 Minutes**

**Lab: None**

### **Classroom Instructional Objectives:**

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

- Explain how the electronic control unit (ECU) driver energizes solenoids.
- Explain how the ECU uses pulse-width modulation to control the waste gate control solenoid.
- Explain how the ECU energizes the lock-off solenoid
- Explain how to use the John Deere Operation and Diagnostic Manual.
- Explain how to perform fault code diagnostic routines.
- Explain how to perform no fault code diagnostic routines.
- List the fault codes specific to John Deere computer controlled solenoids
- Analyze John Deere wiring diagram sections specific to the waste gate control and lock-off solenoid.
- Explain how to test the waste gate control and lock-off solenoid for opens and shorts using a lab scope.
- Explain how to measure solenoid on-time using a lab scope.
- Explain how to test solenoids using a scan tool.

### **Key Classroom Objectives:**

- Explain how ECU inputs determine solenoid on-time.
- Explain different ECU control strategies for controlling solenoids.
- Explain how to use the John Deere operation and diagnostic manual.
- Explain how to perform fault code diagnostic routines.
- Explain how to perform no fault code diagnostic routines.
- List the fault codes specific to John Deere computer controlled solenoids
- Demonstrate how to read John Deere wiring diagrams specific to solenoid.
- Explain how to test the waste gate control and lock-off solenoids using a lab scope.
- Explain how to test the waste gate control and lock-off solenoids using a scan tool.
- Explain how to test the waste gate control and lock-off solenoid on-time using a lab scope.

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## **Lab Skill Objectives:**

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

- None

## **Key Lab Points:**

- None

## **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
- Wiring diagram

## **Instructor's notes:**

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