FUEL SUPPLY OPERATION

Function:

To start or stop the supply of fuel to the engine.

Operating Conditions (Starting Tractor):

- Key switch must be in the START position.
- Operator ON seat
- PTO in NEUTRAL
- Transmission in NEUTRAL

Operating Conditions (Running Tractor):

- Key switch must be in the RUN position.
- Operator ON seat
- PTO ENGAGED
- Transmission in any GEAR

Operating Conditions (Running Tractor):

- Key switch must be in the RUN position.
- Operator ON seat
- PTO DISENGAGED
- Park brake ENGAGED

Operator can leave seat. (See “ENGINE SHUTOFF CIRCUIT OPERATION” on page 48.)

- PTO can be ENGAGED

Fuel Supply Theory of Operation

The fuel system is designed to inject fuel into the piston cylinder where heat from compression ignites the fuel and air mixture.

Fuel is provided to the engine when the fuel shutoff solenoid is energized. The fuel shutoff solenoid contains two coils to open the fuel valve. The pull-in coil, in conjunction with the hold-in coil, overcomes the spring loaded fuel valve. The hold-in coil keeps the fuel valve open after the pull-in coil current is reduced through the R2 thermistor.

The fuel shutoff solenoid is initially energized and pulled in when the engine run relay contacts close. Voltage is provided to both of the fuel shutoff solenoid coils (pull-in and hold-in), which provide enough pull on the solenoid plunger to overcome the shutoff solenoid spring.

The fuel shutoff solenoid pull-in coil needs a high current pulse through it to overcome the solenoid spring. After the solenoid opens (overcomes the spring) a lower current will hold the solenoid open. The combination of the K3 fuel shutoff relay and R2 variable thermistor provide a means to reduce the current flow through the fuel shutoff solenoid pull-in coil after the solenoid opens.

The initial high current flows through the 329A Wht wire to the K3 fuel pull-in relay (terminal 30), through the contacts, and through the 319 Wht wire to the R2 variable thermistor. The thermistor has a low resistance to the current initially (lower than the resistance through the K3 fuel shutoff relay coil). As the current flows through the thermistor, it heats up and the resistance through it increases (higher than the resistance through the K3 fuel shutoff relay coil).

While the current flow through the thermistor is reduced, the voltage difference across the thermistor is increased. When the voltage difference is increased enough to activate the coil of the K3 fuel shutoff relay (329B Wht), the coil opens the relay contacts and the variable thermistor is removed from the circuit..

NOTE: The variable thermistor will heat to a maximum temperature of approximately 180° F (82° C) during the brief period of time required to overcome the fuel shutoff solenoid spring.

With the thermistor removed from the circuit, the ground path is removed from the fuel shutoff solenoid pull-in coil through the 329A and 329B Wht wires, the fuel shutoff relay coil, and the 010F, 010E, 010D and 010C Blk wires. A ground path for the fuel shutoff solenoid hold-in coil is provided through the 010N Blk wire.

A latching circuit is provided to maintain voltage to the engine run relay after the PTO is ENGAGED. The latching circuit is energized only if the operator is OFF the seat, the PTO is DISENGAGED, and the park brake is ENGAGED. The latching circuit remains energized while the park brake is ENGAGED after the PTO is ENGAGED. This circuit allows the operator to leave the seat, with the park brake ENGAGED and the transmission in NEUTRAL, and ENGAGE the PTO. (See “ENGINE SHUTOFF CIRCUIT OPERATION” on page 48.)

Fuel is provided to the engine through the Y2 fuel shutoff solenoid provided that operating conditions are met. If the operating criteria are not met, the engine run relay opens and stops voltage energizing the fuel shutoff solenoid coils. The fuel shutoff solenoid closes and fuel to the engine is shut off. (See “ENGINE SHUTOFF CIRCUIT OPERATION” on page 48.)

NOTE: The S3 transmission neutral switch is shown in this diagnostic section. This switch is used in conjunction with the jumper wire in the X3 connector for tractors with a hydrostatic (HST) transmission. For tractors with a gear shift or PowrReverser™ transmission, the jumper wire is used in the X2 connector and the S4 transmission neutral switch is used in the X3 connector.