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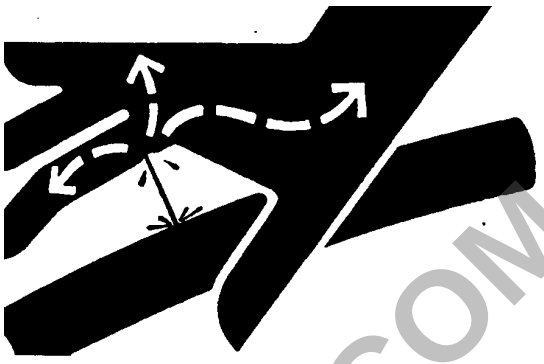
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Replacing Fuel Filter and Fuel Lubricating Dosing Element (6068)

CAUTION: Before performing any maintenance to fuel system related components, be sure that machine is in the Key OFF position AND that the electric fuel transfer (lift) pump or battery is disconnected. Whenever the machine is in the Key ON position, power is applied to the electric fuel transfer (lift) pump.

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting fuel or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand.

If any fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type injury or gangrene may result. Doctors unfamiliar with this type of injury may call the Deere & Company Medical Department in Moline, Illinois, or other knowledgeable medical source.



X9811 —UN—23AUG88

High-Pressure Fluids

IMPORTANT: Replace fuel filter elements anytime audible alarm sounds and trouble codes indicate plugged fuel filters (low fuel pressure). If no alarm sounds during the 12 month service interval, replace elements at that time, or after 250 hours operation, whichever comes first.

Engines are equipped with dual fuel filters: a primary filter with water separator bowl , and a final filter. Both filters and the fuel lubricating dosing element are replaced at the same 250-hour interval or every 12 months.

Continued on next page

PU00210,0000C3A -19-25AUG08-1/3

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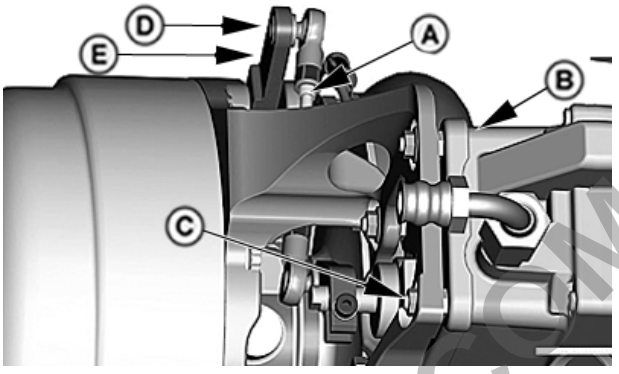
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Remove and Install Turbocharger Actuator Linkage — Ball Type

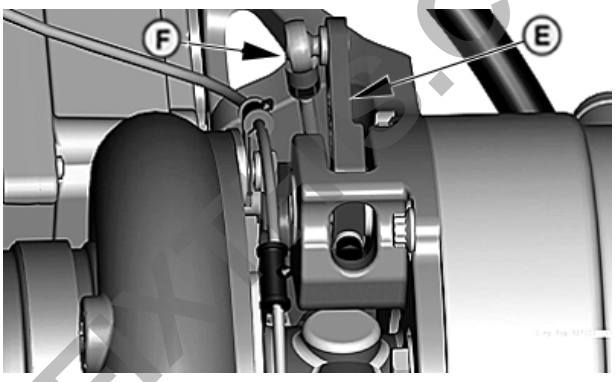
NOTE: Removal of turbocharger assembly from engine is not required to perform this repair.

Removal

1. Unplug turbocharger wiring harness from engine wiring harness.
2. Remove VGT lever nut (D) from actuator linkage (A), using a long 4 mm Allen wrench. Insert wrench into recessed hex area, located on ball stud of the linkage (F). Twist to remove the stud from the lever.
3. Pivot actuator linkage (A) out of the way, against spring pressure, to access blocked serrated lock nut (C). Linkage can be held in place using a tie strap against spring tension.
4. Remove four serrated lock nuts (C) using 10mm socket.
5. Pull actuator away from its mounting bracket while lifting up on the SRA linkage arm. Actuator shaft may require rotation or rocking motion to remove.
6. Move turbocharger lever (E) through its normal operating motion verifying that the open and closed vane end stops are reached. If turbocharger lever (E) is sticking or you cannot reach either end stop, do not proceed with actuator installation steps below, turbocharger assembly should be replaced.



RG16511 —UN—16OCT08



RG16510 —UN—16OCT08

A—Actuator Linkage
B—Actuator
C—Serrated Lock Nut (4)
D—VGT Lever Nut
E—VGT Lever
F—Recessed Hex Area on Ball Stud

Installation

1. Insert turbocharger linkage (A) through mounting bracket opening.
2. Slide actuator studs into mounting bracket holes Rotation of shaft or linkage will be required). Install four serrated lock nuts (C) on studs. Torque nuts to 13.6 N•m (120 lbf•in). (Cut tie strap holding actuator linkage, if used.)
3. Install VTG Lever nut (D) into hex pocket on VTG lever (E) with rounded side of the nut facing outward. Hold lock nut in place and insert 4mm allen wrench into recessed hex area (F) located on the ball stud. Torque ball stud to 8.5 N-m (75 lb-in).
4. Reconnect turbocharger wiring harness connector to engine wiring harness.

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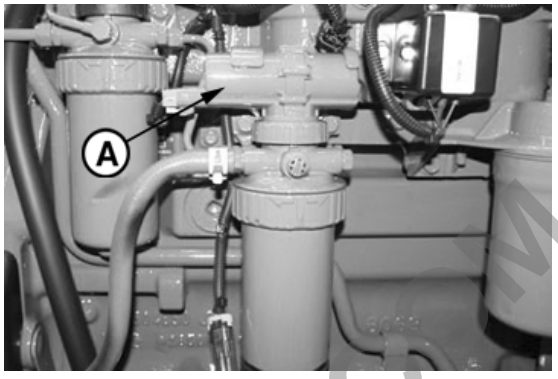
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Electric Fuel Transfer Pump Operation (Stanadyne)

Some applications, such as the large frame 7030 tractors, utilize an electric fuel pump option on 350 Series PowerTech engines to aid in cold starting. The electric fuel pump (A) is located on the primary fuel filter, and is an integral part of the primary fuel filter assembly design. If the electric fuel transfer pump requires replacement, the entire primary fuel filter assembly must also be replaced. Service of the electric fuel transfer pump as an individual component is not recommended do to the risk of fuel leaks.

The electric pump is powered when the operator turns the ignition key to the “on” position. This activates the pump to draw fuel from the tank, through the low pressure system to prime the primary and final fuel filters and the low pressure fuel line leading to the high pressure pump.



RG15080 —UN—29SEP06

The electric fuel transfer pump is also used when bleeding air from the fuel system.

RE38635,000014C -19-04AUG07-1/1

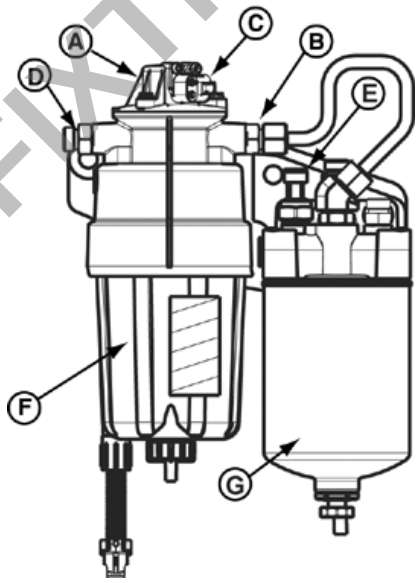
Electric Fuel Transfer Pump Operation (Racor)

NOTE: This pump is not repairable.

The speed of the fuel transfer pump (A) is controlled by the ECU through the fuel transfer pump power connector (C) and varies from 1600 to 4200 rpm. Suction pulls fuel from the fuel tank through the fuel inlet (D) and through the primary filter (F). The pump pushes fuel through the outlet (B) into the secondary filter (G) and on to the high pressure fuel pump.

To keep the low-pressure fuel error from setting, pump speed is controlled to keep a constant pressure of 20 kPa (2.9 psi) gauge at the outlet of the secondary filter (G). The low-fuel-pressure-system fuel pressure sensor (E) is used to indicate a low pressure fuel system problem. It could be a plugged primary filter, secondary filter, an air leak between the fuel tank and the low pressure pump fuel inlet, or a plugged fuel tank screen.

There is a pressure limiter in the pump to protect the filters from damage.



RG14264 —UN—06JUN05

Fuel Transfer Pump Assembly

A—Fuel Transfer Pump
B—Fuel Outlet
C—Fuel Transfer Pump Power Connector
D—Fuel Inlet
E—Low Pressure Fuel Pressure Sensor
F—Primary Filter
G—Secondary Filter

RE38635,0000064 -19-04AUG07-1/1

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Measuring Speed

The camshaft position sensor measures engine speed by detecting the rotating teeth of a timing wheel mounted on the front of the camshaft drive gear. It can also measure the position of the rotation of the engine because it can detect a gap in teeth of the timing wheel where two of the teeth have been removed. This gap corresponds to top-dead-center of piston #1.

The sensor uses a coil wound around a magnet to create a voltage signal. As the tooth in the timing wheel passes directly under the sensor, the magnetic field is pulled towards the tooth. As the tooth passes the sensor, the magnetic field moves back toward the sensor. This creates a voltage in the coil that is sent to the ECU. By monitoring the frequency of these signals, the ECU calculates the component speed. When the gap in the teeth of the timing wheel is detected, the ECU interprets this change in the voltage pattern to be top-dead-center.

RG40854,00000E8 -19-15OCT07-1/1

Crank Position Sensor

It is an inductive type pickup sensor that detects teeth on the crankshaft timing gear. The ECU uses the crank position input to determine engine speed and the angular position of the crankshaft in its 360° field of rotation. The crankshaft timing gear is composed of 45 evenly-spaced teeth. There is a 3-tooth section with no notches. The 3-tooth section helps the ECU determine when cylinder #1 is at Top-Dead-Center (TDC).

The ECU uses the inputs of both the crank position and pump position sensors to precisely control the timing and duration of fuel injection.

If there is a problem with the crank position sensor, the ECU will use the pump position sensor to determine engine timing. This may require prolonged engine cranking to start the engine. The ECU provides engine protection for crank position sensor problems.

For more information on how speed sensors operate, see MEASURING SPEED earlier in this Group.

For more information on engine protection and derate programs, see ENGINE DERATE AND SHUTDOWN PROTECTION later in this Group.

For more information on sensor locations, see COMPONENT LOCATION earlier in this Group.

RG41221,00002AF -19-30AUG07-1/1

Pump Position Sensor

It is an inductive type pickup sensor that detects teeth on the upper idler gear. The upper idler gear is composed of 12 evenly-spaced notches with one additional notch offset to tell the ECU that cylinder #1 is approaching Top-Dead-Center.

If there is a problem with the Pump Position Sensor, the ECU will use the Crank Position Sensor to determine engine timing. This may require prolonged engine cranking to start the engine.

For more information on how speed sensors operate, see MEASURING SPEED earlier in this Group.

For more information on sensor locations, see COMPONENT LOCATION earlier in this Group.

DM80898,00000FB -19-30AUG07-1/1

Turbo Speed Sensor

The turbo speed sensor is located on the turbocharger. The turbo speed sensor uses a flat spot on the shaft to measure turbo speed. The ECU monitors turbo speed to ensure that turbo is running within acceptable range. At most severe high turbo speed levels, the ECU will use this sensor for engine protection.

For more information on how speed sensors operate, see MEASURING SPEED earlier in this Group.

For more information on engine protection and derate programs, see ENGINE DERATE AND SHUTDOWN PROTECTION later in this Group.

For more information on sensor locations, see COMPONENT LOCATION DIAGRAM 3 earlier in this Group.

RG41221,00002B1 -19-15OCT07-1/1

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4 Load Test Batteries	1. Ignition OFF, engine OFF.	
	2. Load test batteries.	**YES:** Check for internal starter problem Check for hydro locked or seized engine, or load not disengaged.
	Do batteries pass load test?	**NO:** Recharge or replace batteries. GO TO 13

RG41221,00000F5 -19-09APR08-6/15

5 Check Starter Relay Battery Supply Voltage	1. Ignition OFF, engine OFF.	
	2. Measure the voltage from the starter relay battery voltage supply terminal to single point ground.	**YES:** GO TO 6
	Is the voltage within 1V of battery terminal voltage?	**NO:** Fix problem. GO TO 13

RG41221,00000F5 -19-09APR08-7/15

6 Check Voltage at Starter Relay Coil	*NOTE: Some applications may have safety switches or other interlocks which interrupt the starter relay control circuit (high side or ground). Consult equipment manufacturer's information to determine if application has any starter interlocks.*	
	1. Monitor the voltage between the starter relay coil high side terminal (wire between key switch and relay) and single point ground.	
	2. Hold key switch in start position for 3 seconds.	**YES:** GO TO 7
	Is the voltage within 2V of battery terminal voltage while attempting to crank engine?	**NO:** GO TO 11

RG41221,00000F5 -19-09APR08-8/15

7 Check Starter Relay Coil Ground	1. Monitor the voltage between the starter relay coil high side terminal and starter relay coil ground terminal.	
	2. Hold key switch in start position for 3 seconds.	**YES:** GO TO 8
	Is the voltage within 2V of battery terminal voltage while attempting to crank engine?	**NO:** Fix open ground circuit. GO TO 13

RG41221,00000F5 -19-09APR08-9/15

8 Check Starter Relay Output Voltage	1. Monitor the voltage between the starter relay output terminal and single point ground.	
	2. Hold key switch in start position for 3 seconds.	**YES:** GO TO 9
	Is the voltage within 2V of battery terminal voltage while attempting to crank engine?	**NO:** Replace starter relay. GO TO 13

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RG41221,00000F5 -19-09APR08-10/15

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D5 - ECU Does Not Program with Service ADVISOR

JB81757,000002B -19-06AUG07-1/7

D5 - ECU Does Not Program with Service ADVISOR Diagnostic Procedure

Additional References:
For information on connecting to Service ADVISOR see CONNECTING TO SERVICE ADVISOR in Section 04, Group 160 later in this manual.

For information on reprogramming ECU see REPROGRAMMING ENGINE CONTROL UNIT (ECU) in Section 04, Group 160 later in this manual.

JB81757,000002B -19-06AUG07-2/7

1 Preliminary Checks	Perform these checks: • Verify all connections between diagnostic connector and service tool are properly connected and fully seated. • Verify that the adaptor type shown in the Available Adapters menu in Service ADVISOR matches the adaptor being used (PDM or EDL) and the type of communication between PC and adaptor (parallel or USB). • Close Service ADVISOR and shut down PC. Restart PC, open Service ADVISOR and attempt to reprogram the ECU. • Check engine payload file name for correct engine serial number. Download the correct payload if engine serial number does not match payload file name. • If replacing the ECU, verify that the new ECU serial number was correctly entered when downloading the payload. Were you able to reprogram the ECU?	**YES:** Problem solved. **NO:** GO TO 2

JB81757,000002B -19-06AUG07-3/7

2 Communication Error Message	Does an error message appear in Service ADVISOR indicating “Error Communicating and Programming the ECU”?	**YES:** GO TO 3 **NO:** Perform steps indicated in error message. Consult WebHelpR in Service ADVISOR help menu.

JB81757,000002B -19-06AUG07-4/7

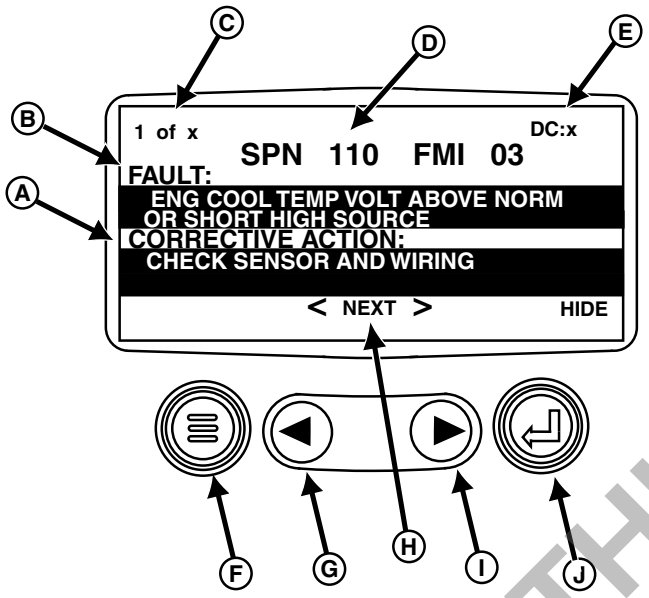
3 Check for New ECU	Are you attempting to program a new replacement ECU?	**YES:** GO TO 4 **NO:** Attempting to reprogram the original ECU. GO TO 5

Continued on next page

JB81757,000002B -19-06AUG07-5/7

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RG14796 —UN—16MAY07

Figure 2. Stored Code Diagnostic Screen

A—Corrective Action
B—Diagnostic Code Description
C—Current and Total number of Stored Codes
D—SPN (Suspect Parameter Number) FMI (Failure Mode Identifier) Diagnostic Code
E—Diagnostic Count
F—Menu Key
G—Left/Up Scroll Key
H—Next
I— Right/Down Scroll Key
J— Enter Key

5. Display features for the Stored Codes Diagnostic Screen are described below:
   - SPN/FMI code (D). Refers to the trouble shooting diagnostic procedure.
   - Name of diagnostic code (B) referenced in manual.
   - A brief corrective action (A).
   - The word “NEXT” (H) indicates there are more stored codes to can be viewed.
   - The two ARROW KEYS (G,I) are used to cycle through the codes.
   - “1 of x” (C) indicates the current diagnostic code displayed of the total number.
   - Diagnostic Count (E) indicates how many times the code has been active since it was lasted cleared.
6. Press the MENU KEY (F) to return to the main menu. Press the MENU KEY (E) again to return to the parameter screen.

DB92450,0000060 -19-18APR08-2/2

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1 Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. *NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.* 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000028.04 reappear active?	**YES:** GO TO 2 **NO:** GO TO 12

RG41221,00001FE -19-16JUL09-3/19

2 Check Digital Throttle Wiring	1. Ignition OFF, engine OFF. 2. Check wiring connections on digital throttle. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 3

RG41221,00001FE -19-16JUL09-4/19

3 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect connector C09 on the control panel. 3. Perform TERMINAL TEST on C09 harness connector and panel connector. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 4

RG41221,00001FE -19-16JUL09-5/19

4 Check for DTC 00028.04	1. Ignition ON, Engine OFF. 2. Refresh codes. Is DTC 00028.04 still an active DTC?	**YES:** GO TO 7 **NO:** GO TO 5

RG41221,00001FE -19-16JUL09-6/19

5 Check for DTC 00028.03	Is DTC 00028.03 now an active DTC with harness connector C09 still disconnected?	**YES:** Replace digital throttle switch. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 6

Continued on next page

RG41221,00001FE -19-16JUL09-7/19

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1 Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. *NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.* 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000097.04 reappear active?	**YES:** GO TO 2 **NO:** GO TO 17

RG41221,0000209 -19-16JUL09-3/24

2 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect the WIF sensor connector D01. 3. Perform TERMINAL TEST on WIF sensor connector D01 and WIF sensor. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 3

RG41221,0000209 -19-16JUL09-4/24

3 Check for DTC 000097.04 Active Status Change with Sensor Disconnected	1. Ignition ON, Engine OFF. 2. Refresh codes. Is DTC 000097.04 still an active DTC?	**YES:** GO TO 9 **NO:** GO TO 4

RG41221,0000209 -19-16JUL09-5/24

4 Check for DTC 000097.03	Is DTC 000097.03 now an active DTC with WIF sensor connector D01 still disconnected?	**YES:** GO TO 5 **NO:** GO TO 9

RG41221,0000209 -19-16JUL09-6/24

5 Sensor Shorted to Ground Test	On the WIF sensor, measure the resistance between either terminal and single point ground. Is the resistance less than 100k ohms?	**YES:** Replace WIF sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 6

RG41221,0000209 -19-16JUL09-7/24

6 Sensor Internal Short Test	On the WIF sensor, measure the resistance between terminal A and terminal B. Is the resistance between 200K and 240K ohms?	**YES:** GO TO 7. **NO:** Replace WIF sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.

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RG41221,0000209 -19-16JUL09-8/24

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8 Check for Wire-to-Wire Short	1. Disconnect ECU J2 and J3 connectors.	
	2. On the harness, measure the resistance between ECU turbo speed sensor signal (J1-B4) and all other terminals in the J1, J2, and J3 connectors.	**YES:** GO TO 9
	Are all resistance measurements greater than 10k ohms?	**NO:** Fix problem. GO TO 14

RG41221,0000217 -19-07JUL09-10/17

9 Check for Twisted Pair	Inspect turbo speed signal and return wires between the turbo speed sensor connector and ECU J1 connector.	**YES:** GO TO 10
	Are the turbo speed signal and return wires twisted together throughout the wire harness?	**NO:** Replace wires with twisted pair. GO TO 14

RG41221,0000217 -19-07JUL09-11/17

10 Inspect Turbo Speed Sensor and Target	*NOTE: See REMOVE AND INSTALL TURBO SPEED SENSOR in Section 02, Group 110 earlier in this manual for sensor replacement instructions.*	
	1. Remove turbo speed sensor.	
	2. Remove turbo compressor air inlet hose.	
	3. Spin turbo compressor and look for sensor target (one flat spot on turbo shaft) through sensor mounting hole. Examine shaft for damage which sensor may detect as another target.	
	4. Examine tip of turbo speed sensor for damage due to contact with turbo shaft.	**YES:** Replace turbo speed sensor and other damaged parts. GO TO 14
	Were any problems found?	**NO:** Replace turbo speed sensor. GO TO 11

RG41221,0000217 -19-07JUL09-12/17

11 Reprogram ECU	1. Ignition OFF, engine OFF.	
	2. Reconnect all electrical connectors and reinstall turbo air inlet hose.	
	3. Download latest ECU payload and reprogram ECU.	
	4. Clear DTCs.	
	5. Start engine and increase speed to 1500 rpm. Place engine under load, if possible.	**YES:** GO TO 12
	Did 000103.08 reappear active or stored with engine running?	**NO:** Problem fixed.

RG41221,0000217 -19-07JUL09-13/17

12 Replace ECU	1. Ignition OFF, engine OFF.	
	2. Replace ECU.	
	3. Ignition ON, engine OFF.	
	4. Clear DTCs.	
	5. Start engine and increase speed to 1500 rpm. Place engine under load, if possible.	**YES:** Open DTAC case.
	Did DTC 000103.08 reappear active or stored with engine running?	**NO:** Problem fixed.

Continued on next page

RG41221,0000217 -19-07JUL09-14/17

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1 Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. *NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.* 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000110.04 reappear active?	**YES:** GO TO 2 **NO:** GO TO 10

RG41221,0000222 -19-07JUL09-3/19

2 Monitor Code Test	1. Ignition OFF, Engine OFF. 2. Disconnect the coolant temperature sensor connector. 3. Ignition ON, Engine OFF 4. Refresh codes. Did 000110.03 become active and 000110.04 move to stored?	**YES:** GO TO 3 **NO:** GO TO 5

RG41221,0000222 -19-07JUL09-4/19

3 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on coolant temperature sensor harness connector. 3. Inspect harness for melted or pinched areas near the coolant temperature sensor. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 4

RG41221,0000222 -19-07JUL09-5/19

4 Sensor Short Internally or to Ground Test	Measure the resistance from each terminal on the sensor to chassis ground. **Specification** Check for short to ground—Resistance..... Greater than 1k ohm Measure the resistance between the two sensor terminals. **Specification** Check for internal short—Resistance..... Greater than 50 ohms Is either measurement out of specification?	**YES:** Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Problem not found, reconnect all connectors. GO TO 2 and confirm your findings. Look closely at connectors, wiring and terminal numbers where measurements were made.

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RG41221,0000222 -19-07JUL09-6/19

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000174.03 — Fuel Temperature Signal Out of Range High

The fuel temperature input voltage exceeds the sensor's high voltage specification.

RG41221,000022C -19-07JUL09-1/20

000174.03 — Fuel Temperature Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:
000174.03

When DTC is Displayed:
When ever the ignition is on and the error is active.

Related Information:
The fuel temperature input voltage increases above the sensor's high voltage specification. This corresponds to a temperature that is lower than what is physically possible for fuel temperature.

Alarm Level:
Warning

Control Unit Response:
The ECU uses a default fuel temperature of 40° C (104° F). The ECU will try to maintain the engine operating envelope.

Additional References:
For more fuel temperature sensor information, see FUEL TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

For more temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:
- see 4.5L 12V ECU WIRING DIAGRAM 3
- see 4.5L 24V ECU WIRING DIAGRAM 3
- see 6.8L 12V ECU WIRING DIAGRAM 3
- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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RG41221,000022C -19-07JUL09-2/20

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000611.03 — Injector Shorted to Voltage Source

The ECU detects that injector wiring is shorted to a power source.

RG41221,0000236 -19-07JUL09-1/18

000611.03 — Injector Shorted to Voltage Source Diagnostic Procedure

Troubleshooting Sequence:
000611.03

When DTC is Displayed:
The engine is cranking or running and the error condition is active. The DTC may also be displayed during the Harness Diagnostic Mode Test in Service ADVISOR, provided fuel rail pressure is below 5 MPa (725 psi).

Related Information:
The ECU detects that injector wiring is shorted to a voltage source.
The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors. The ECU switches the low side (ground) to control each individual injector.
This DTC can be caused by either the injector high side wiring or injector low side wiring being shorted to a voltage source.

Alarm Level:
Stop

Control Unit Response:
The ECU will attempt to control the engine in a normal manner. Engine may run poorly or stall, depending on the location of short.

Additional References:
For further electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:
- see 4.5L 12V ECU WIRING DIAGRAM 1
- see 4.5L 24V ECU WIRING DIAGRAM 1
- see 6.8L 12V ECU WIRING DIAGRAM 1
- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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RG41221,0000236 -19-07JUL09-2/18

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11 Check for Intermittent ECU Power Supply Problem	1. Ignition ON, engine OFF. 2. Measure the voltage from ECU battery supply (J2-L1) to ECU ground (J2-L2) while gently wiggling wire harness. 3. Measure the voltage from ECU ignition (J2-B2) to ECU ground (J2-L2) while gently wiggling wire harness. Were any intermittent wiring problems found?	**YES:** Fix problem. GO TO 19 **NO:** GO TO 12

RG41221,0000243 -19-02JUN08-13/22

12 Check for Wire-to-Wire Short	1. Ignition OFF, engine OFF. 2. On the harness, measure the resistance between the ECU crankshaft position sensor signal (J3-F4) and all other terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 1k ohms?	**YES:** GO TO 13 **NO:** Fix problem. GO TO 19

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13 Check Sensor Wiring	Examine crankshaft position sensor wiring between the crankshaft position sensor and the ECU. Check for the following: • Verify that crankshaft position sensor signal and return wires are twisted together throughout the harness. • Verify that no physical damage to crankshaft position sensor signal and return wires is evident. Were any problems found?	**YES:** Replace crankshaft position sensor wiring with twisted pair or repair problem. GO TO 19 **NO:** GO TO 14

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14 Check Wire Harness Routing	Examine routing of crankshaft position sensor wiring between crankshaft position sensor and ECU. Is crankshaft position sensor wiring routed near sources of strong electric or magnetic fields such as 2-way radio antenna, alternator, inverter, a.c. generator, or other similar device on the application?	**YES:** Reroute crankshaft position sensor wires away from device. GO TO 19 **NO:** GO TO 15

RG41221,0000243 -19-02JUN08-16/22

15 Check for Alternator Noise	1. Disconnect negative battery cable. 2. Disconnect alternator positive output cable and insulate cable terminal. 3. Disconnect all other alternator connectors. 4. Reconnect negative battery cable. 5. Reconnect ECU and sensor connectors. 6. Ignition ON, engine ON. Did DTC 000637.02 reappear active with engine running?	**YES:** GO TO 16 **NO:** Repair alternator problem. GO TO 19

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9 Verification	*NOTE: See INSTALL ELECTRONIC INJECTORS (EIs) in Section 02, Group 90 earlier in this manual for injector terminal torque specification.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors and reinstall rocker cover, if removed. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000651.05 reappear active?	**YES:** GO TO 1 **NO:** Problem fixed.

RG41221,000024F -19-06JAN09-11/16

10 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	**YES:** Fix problem if found. GO TO 9 **YES:** If a certain operating point exists when error occurs then GO TO 11 **NO:** GO TO 12

RG41221,000024F -19-06JAN09-12/16

11 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000651.05 reappear active when engine operating point was reached?	**YES:** GO TO 1 **NO:** GO TO 12

RG41221,000024F -19-06JAN09-13/16

12 Terminal Test	**CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON!** 1. Ignition OFF, engine OFF 2. Perform TERMINAL TEST on the ECU J1 connector, injector #1, and injector harness connector. Were any problems found?	**YES:** Fix problem. GO TO 9 **NO:** GO TO 13

RG41221,000024F -19-06JAN09-14/16

13 Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000651.05 reappear active with engine running?	**YES:** GO TO 1. **NO:** GO TO 14.

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14 Reprogram ECU	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000651.05 reappear active with engine running?	**YES:** GO TO 1 **NO:** Replace injector #1. GO TO 9

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5 Input Injector Data Again	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000654.02 active?	**YES:** GO TO 6 **NO:** Problem fixed, return application to service.

RG41221,000025D -19-09APR08-7/14

6 ECU Programming Check	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO 7 **NO:** Check payload and try again.

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7 Input Injector Data Again	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000654.02 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, return application to service.

RG41221,000025D -19-09APR08-9/14

8 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000654.02 active?	**YES:** GO TO 9 **NO:** Problem fixed, return application to service.

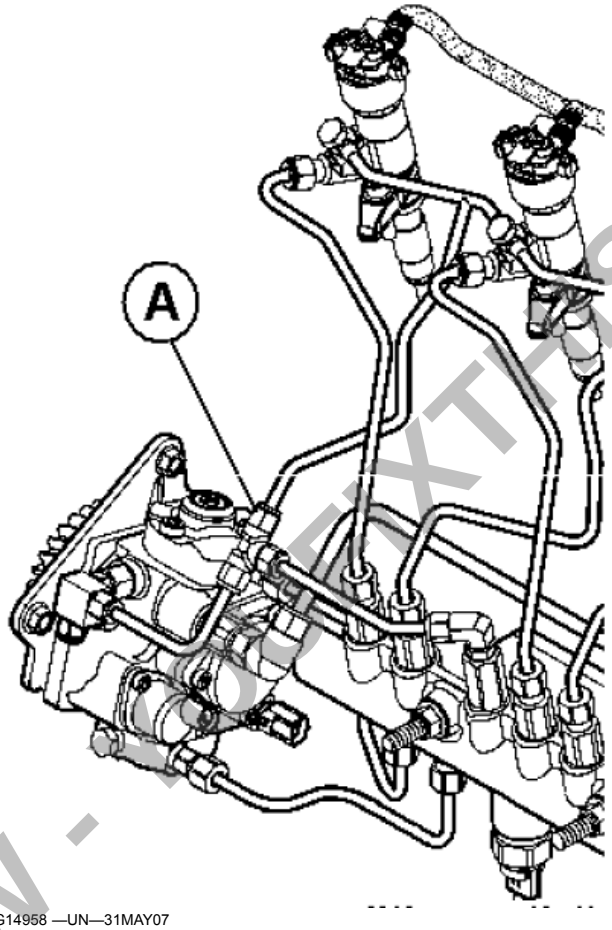
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4 Injector Flow Rate Test	1. Ignition OFF, Engine OFF. **CAUTION: Fuel lines may be under high pressure. Use extreme caution while opening fuel lines. Let the engine sit for several minutes after cranking or running prior to opening fuel lines.** 2. Disconnect the fuel leak off line at the High Pressure Pump “T” connector.	



RG14958 —UN—31MAY07

A—Leak off line "T" fitting

3. Place leak off line into a container suitable for fuel. 4. Ignition ON, Engine Idling. 5. Collect fuel for 2 minutes. 6. Measure the amount of fuel collected in the container.	**YES:** Replace injector #6. GO TO 11
Specification 6.8L—Volume.....0.7 L (24 oz)	
Is the collected amount more than the specification?	**NO:** GO TO 5

RG41221,0000265 -19-04MAR08-6/13

5 Occurrence Count Check	Review stored information and look at occurrence count for 000656.07.	**YES:** GO TO 6
	Is occurrence recorded in step 1 greater than 5?	**NO:** GO TO 7

Continued on next page

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001172.04 — Compressor Inlet Temperature Signal Out of Range Low

The compressor inlet temperature input voltage drops below the sensor's low voltage specification.

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001172.04 — Compressor Inlet Temperature Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:
001172.04

When DTC is Displayed:
When ever the ignition is on and the error is active.

Related Information:
The compressor inlet temperature input voltage drops below the sensor's low voltage specification. This corresponds to a temperature that is higher than what is physically possible for compressor inlet temperature.

Alarm Level:
Warning

Control Unit Response:
The ECU uses a default compressor inlet temperature of 30° C (86° F). The ECU will try to maintain the engine operating envelope.

Additional References:
For more compressor inlet temperature sensor information, see TURBO COMPRESSOR INLET TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

For more temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:
- see 4.5L 12V ECU WIRING DIAGRAM 3
- see 4.5L 24V ECU WIRING DIAGRAM 3
- see 6.8L 12V ECU WIRING DIAGRAM 3
- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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001638.03 — Hydraulic Oil Temperature Signal Out of Range High

For troubleshooting procedures please see the application troubleshooting manual.

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9 Check Manifold Air Temperature Circuit	1. Verify manifold air temperature sensor is disconnected. 2. On the harness, measure the resistance between the ECU manifold air temperature signal (J3-F1) and reference (J3-B2). 3. On the harness, measure the resistance between the ECU manifold air temperature signal (J3-F1) and single point ground. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage between the ECU manifold air temperature signal (J3-F1) and single point ground. Are both resistance measurements greater than 10k ohms and is the voltage measurement less than 0.5V?	**YES:** Replace manifold air temperature sensor. GO TO 12 **NO:** Fix problem. GO TO 5

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10 Check EGR Temperature Circuit Resistance	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and EGR temperature sensor connector. 3. Perform TERMINAL TEST on J3 and EGR temperature sensor connector. 4. On the harness, measure the resistance between the ECU EGR temperature signal (J3-E2) and the EGR temperature sensor connector signal (T03-A). 5. On the harness, measure the resistance between the ECU EGR temperature reference (J3-B2) and the EGR temperature sensor connector reference (T03-B). Are Terminal Test results good and are both resistance measurements less than 10 ohms?	**YES:** GO TO 11 **NO:** Fix problem. GO TO 5

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11 Check EGR Temperature Circuit	1. Verify EGR temperature sensor is disconnected. 2. On the harness, measure the resistance between the ECU EGR temperature signal (J3-E2) and reference (J3-B2). 3. On the harness, measure the resistance between the ECU EGR temperature signal (J3-E2) and single point ground. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage between the ECU EGR temperature signal (J3-E2) and single point ground. Are both resistance measurements greater than 10k ohms and is the voltage measurement less than 0.5V?	**YES:** Replace EGR temperature sensor. GO TO 12 **NO:** Fix problem. GO TO 5

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5 EGR Valve Stored Positions Values Check	1. Ignition ON, Engine OFF.	
	2. Monitor the following parameters: • EGR Valve Last Valid Open Position **Specification** —Typical Open Values.....84.0000 - 88.0000 • EGR Valve Last Valid Closed Position **Specification** —Typical Closed Values .....18.0000 - 22.0000 Are the values within specifications?	**YES:** GO TO 19 **NO:** GO TO 6

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6 EGR Valve Drive Motor Resistance Test	1. Ignition OFF, Engine OFF.	
	2. Measure the resistance between the EGR valve PWM drive #1 (terminal 3) and EGR valve PWM drive #2 (terminal 4) on the EGR valve. Is resistance between 2.5 and 4.5 ohms?	**YES:** GO TO 7 **NO:** Bad drive motor in EGR valve. Replace valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION.

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7 EGR Valve Position Circuit Resistance Test	1. Disconnect EGR valve connector.	
	2. On the EGR valve measure the resistance of the EGR valve position circuit power (terminal 1) to ground (terminal 5) and write down the value. 3. On the EGR valve measure the resistance of the EGR valve position circuit power (terminal 1) to position input (terminal 6) and write down the value. 4. On the EGR valve measure the resistance of the EGR valve position circuit ground (terminal 5) to position input (terminal 6) and write down the value. Are all values between 20k and 95k ohms?	**YES:** GO TO 8 **NO:** Bad position circuit in EGR valve. Replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION.

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9 Harness Check	1. Ignition OFF, Engine OFF.	
	2. Disconnect ECU connector J2. Inspect harness wiring for pinched or melted wires.	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.
	Were any problems found?	**NO:** Reconnect all connectors. GO TO 10

RG41183,0000132 -19-06JAN09-11/15

10 Further Review of Snapshot Information	Review stored information collected in step 1.	**YES:** Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.
	Does stored information lead to a possible problem or is there a certain operating point where error occurs?	**YES:** If a certain operating point exists when error occurs, GO TO 11 **NO:** GO TO 12

RG41183,0000132 -19-06JAN09-12/15

11 Engine Error Operating Point Test	1. Ignition ON, Engine ON.	**YES:** Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.
	2. Set engine to operating point of failure and refresh codes.	**YES:** GO TO 2
	Did 003512.04 reappear when engine operating point was reached?	**NO:** GO TO 10

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12 Retest	1. Ignition ON, Engine OFF.	
	2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.	
	3. Refresh codes.	**YES:** GO TO 2
	Is 003512.04 active?	**NO:** GO TO 13

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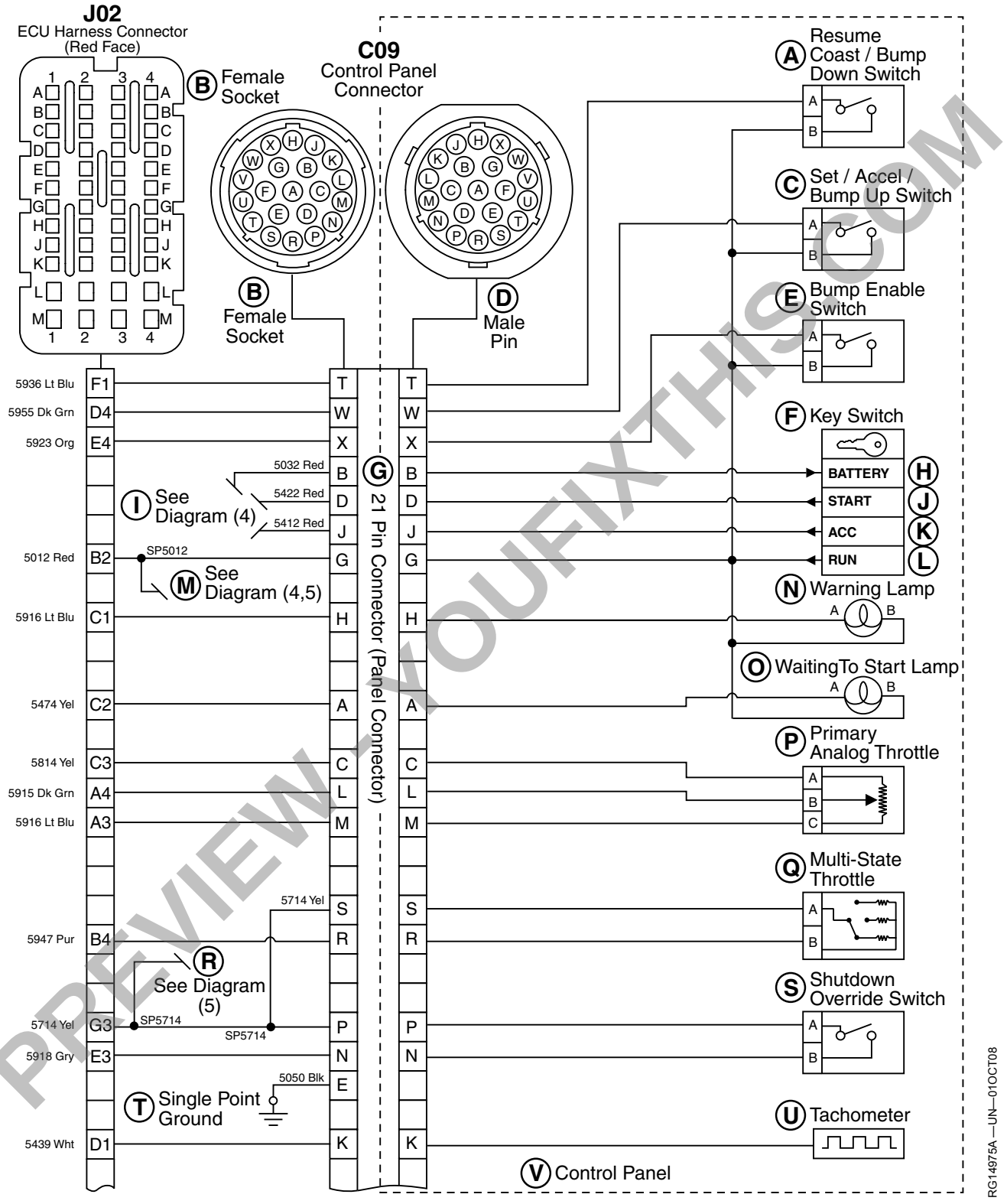
13 Software Updates	1. Download the latest ECU software payload and reprogram ECU using Service ADVISOR.	
	2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.	**YES:** Start a DTAC case.
	Is 003512.04 active?	**NO:** Problem fixed, bad ECU program.

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4.5L 12V ECU Wiring Diagram 6



4.5 Liter 12 Volt ECU Wiring Diagram 6 (PT+)

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A—Resume Coast/Bump Down Switch
B—Female Socket
C—Set Accel/Bump Up Switch
D—Male Pin
E—Bump Enable Switch
F—Key Switch
G—21 Pin Connector (Panel Connector)
H—Battery
I— See Diagram (4)
J—Start
K—Accessory
L—Run
M—See Diagram (4,5)
N—Warning Lamp
O—Wait to Start Lamp
P—Primary Analog Throttle
Q—Multi-State Throttle
R—See Diagram (5)
S—Shutdown Override Switch
T—Single Point Ground
U—Tachometer
V—Control Panel
C09— Control Panel Connector
J02— ECU Harness Connector (Red Face)
J2-A3—[5616 Light Blue] 5 Volt Power Supply #3 Positive
J2-A4—[5915 Dark Green] Primary Analog Throttle Signal
J2-B2—[5012A Red] Ignition Key Start/Run Switch
J2-B4—[5947 Purple] Mulitstate Throttle Signal
J2-C1—[5916 Light Blue] Warning Lamp Drive
J2-C2—[5474 Yellow] Wait To Start Lamp Drive Return
J2-C3—[5814 Yellow] 5 Volt Power Supply #3 Return
J2-D1—[5439 White] Tachometer Pulse Output
J2-D4—[5955 Dark green] Set/Accel/Bump Up Switch
J2-E3—[5913 Orange] Secondary Analog Throttle Signal
J2-E4—[5923 Orange] Bump Enable Switch
J2-F1—[5936 Light Blue] Resume Coast/Bump Down Switch
J2-G3—[5714A Yellow] 5 Volt Power Supply #4 Return

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