PowerTech Plus 4.5L and 6.8L Diesel Engines Level 14 Electronic Fuel System With Denso HPCR

TECHNICAL MANUAL

PowerTech Plus 4.5 L and 6.8 L Diesel Engines—Level 14 Electronic Fuel System with Denso HPCR

CM320 - 04JUN08 (ENGLISH)

For complete service information also see:

PowerTech Plus 4.5 L and 6.8 L Diesel Engines—Base Engine CTM104
Alternators and Starter Motors. CTM77
OEM Engine Accessories . . . . . CTM67 (English Only)

John Deere Power Systems

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Practice Safe Maintenance

Understand service procedure before doing work. Keep area clean and dry.

Never lubricate, service, or adjust machine while it is moving. Keep hands, feet , and clothing from power-driven parts. Disengage all power and operate controls to relieve pressure. Lower equipment to the ground. Stop the engine. Remove the key. Allow machine to cool.

Securely support any machine elements that must be raised for service work.

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.

On self-propelled equipment, disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.

On towed implements, disconnect wiring harnesses from tractor before servicing electrical system components or welding on machine.

TS218 –UN–23AUG88

DX,SERV –19–17FEB99–1/1

Understand Signal Words

A signal word—DANGER, WARNING, or CAUTION—is used with the safety-alert symbol. DANGER identifies the most serious hazards.

DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.

TS187 –19–30SEP88

DX,SIGNAL –19–03MAR93–1/1

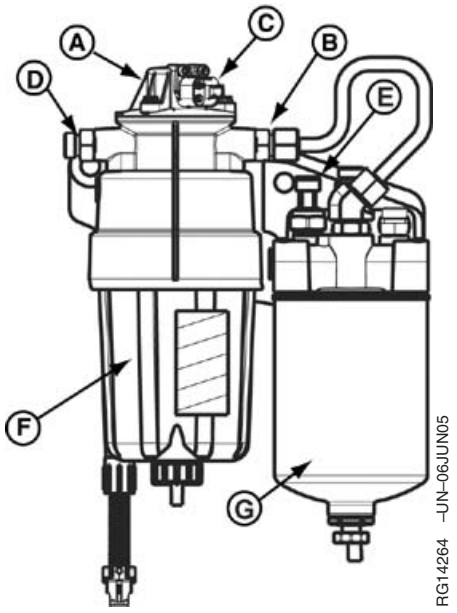
- Possible compatibility issues with other materials (including copper, lead, zinc, tin, brass, and bronze) used in fuel systems and fuel handling equipment
- Possible reduction in water separator efficiency
- Potential high acid levels within fuel system
- Possible damage to paint if exposed to biodiesel

IMPORTANT: Raw pressed vegetable oils are NOT acceptable for use as fuel in any concentration in John Deere engines. Their use could cause engine failure.

DX,FUEL7 –19–04OCT07–2/2

Low Pressure Fuel System Type 3

Option Codes:
3503, 3504, 3510, 3511



Low Pressure Fuel System Type 3

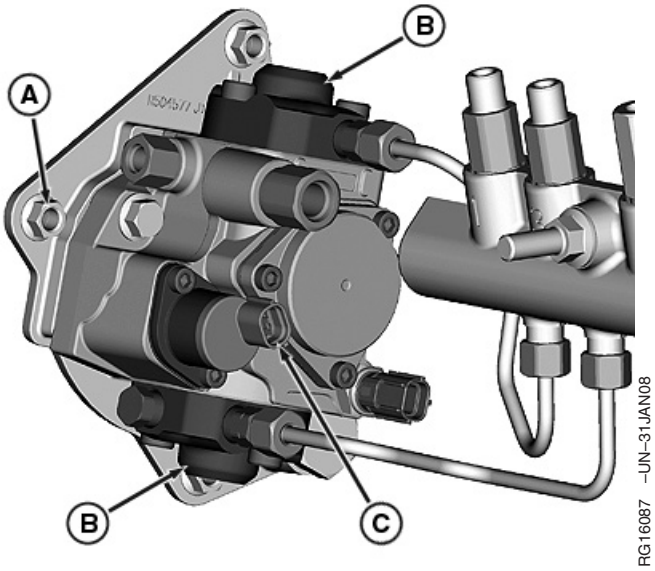
JB81757,0000083 –19–01FEB08–1/1

High Pressure Fuel System Type 1

Option Codes:
169D, 167D, 16C7

Identify your fuel system components.

A—Lock Nut (3 used)
B—Two Pumping Elements
C—Suction Control Valve



High Pressure Fuel Pump Type 1

PU00210,0000001 –19–01FEB08–1/1

NOTE: The proper installation is indicated when a "click" is heard and a release of the retaining ring is felt.

A plug is provided with the new element for plugging the used element.

11. Install water separator bowl on primary fuel filter and tighten ring.

12. Turn dosing element (C) using a suitable filter or strap wrench to remove. Discard dosing element.

NOTE: New dosing element canister should come around 3/4 full of lubricating additive. Be sure that when removing cap, that the canister is held right side up so as not to spill the fluid.

13. Remove cap from new dosing element canister.

14. Wipe the sealing surfaces of the header with a clean rag.

15. Install and tighten dosing element by hand until firmly against the header. Apply an extra 3/4 turn after gasket contact is made.

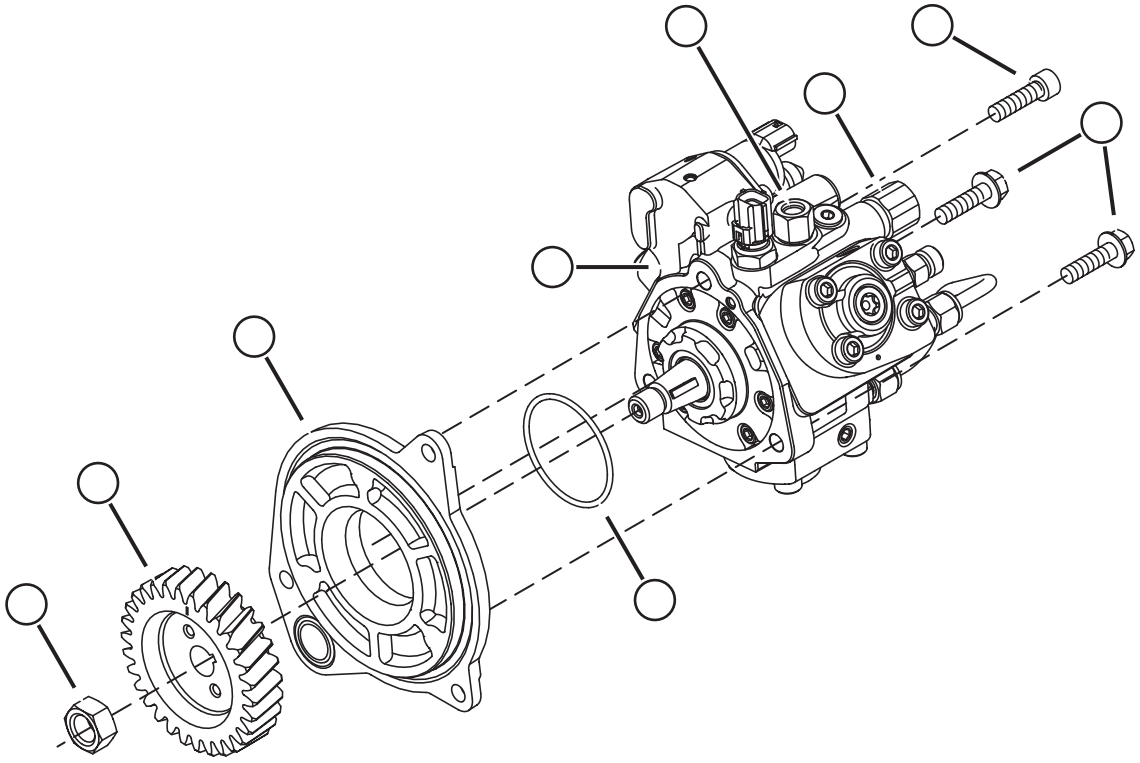
16. Reconnect water in fuel sensor wiring.

17. Open fuel shut-off valve, if equipped.

NOTE: The electric fuel transfer (lift) pump (E) and constant air bleed (F) enables the fuel system to self prime.

18. Key on for 30 seconds to prime fuel system, then start engine and check for possible leaks.

PU00210,0000C39 –19–09APR08–3/3



RG16067 –UN–18FEB08

High Pressure Fuel Pump Exploded View

A—High Pressure Fuel Pump
B—Adapter Plate
C—Drive Gear
D—Nut
E—O-ring
F—Fuel Supply Fitting
G—Fuel Leak-off Fitting
H—Cap Screw (High Pressure Pump-to-Adapter Plate)
I—Allen Screw

Disassemble and Reassemble High Pressure Fuel Pump

A) Disassembling

1. Remove nut (D). Use a vise with claws to block the gear when removing gear.
2. Remove gear (C) using JDG1560 tool.
3. Remove the two cap screws (H) and one allen screw (I) and separate high pressure pump (A) from adapter plate (B).
4. Replace parts as necessary.

.

B) Reassembling

1. Install high pressure pump (A) on adapter plate (B) with a new O-ring (E). Tighten the two cap screws (H) and one allen screw (I) to specification.

Specification

High Pressure Pump to Adapter Plate—Torque ..... 35 N•m (26 lb.-force)

2. Install gear (C) on pump shaft then tighten nut (D) to specification. Use a vise with claws to block the gear when tightening.

Specification

High Pressure Pump Gear Nut—Torque ..... 68 N•m (50 lb.-force)

Continued on next page

Clean Electronic Injector (EI) Bore

1. Clean light deposits out of electronic injector bore using an electric drill and D17030BR Thread Cleaning brush.
2. Work brush up and down several times to clean bore.

RG40854,0000118 –19–22JAN07–1/1

Clean Electronic Injector (EI) Orifice

Electronic injector orifice cannot be cleaned. If orifice is plugged, replace electronic injector.

RG40854,0000117 –19–22JAN07–1/1

Clean Electronic Injector (EI) Body

IMPORTANT: Never use a steel brush to clean electronic injectors. Steel brush may damage electronic injectors.

1. Clean new or used electronic injectors by washing in diesel fuel.
2. If necessary, use a brass wire brush to remove carbon deposits.

RG40854,0000116 –19–22JAN07–1/1

Inspect Electronic Injector (EI) Body

1. Inspect electronic injector body to see that it is not scratched or scored.
2. If electronic injector is scratched or scored, replace electronic injector.

RG40854,0000115 –19–22JAN07–1/1

Remove and Install Exhaust Gas Recirculation (EGR) Cooler

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1. Remove the EGR exhaust tube. See REMOVE AND INSTALL EGR EXHAUST TUBE earlier in this Group.
2. Remove the EGR coolant inlet tube. See REMOVE AND INSTALL EGR COOLANT INLET TUBE earlier in this Group.
3. Loosen EGR cooler rear support bushing cap screw (B).
4. Remove front EGR cooler cap screws (C).
5. Remove rear support bushing. Carefully remove the EGR cooler (A) and coolant outlet tube (D) as an assembly by sliding to the rear of the engine. If required, coolant outlet tube can be removed from the EGR cooler.
6. Inspect EGR cooler for damage and leaks.
7. Install coolant outlet tube to EGR cooler, if removed. Tighten cap screw to specifications.

Specification

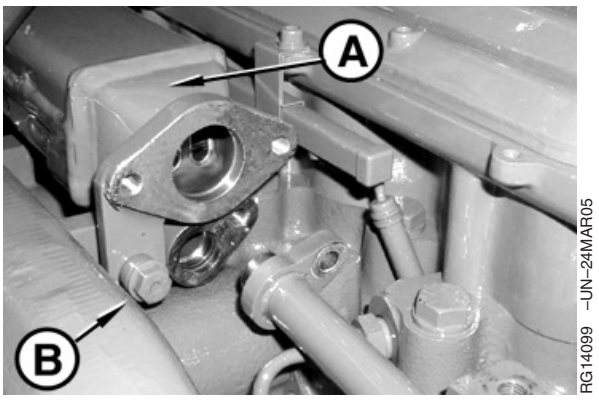
EGR Cooler Outlet Tube Cap Screw—Torque ..... 35 N•m (25 lb-ft)

8. Install EGR cooler and outlet tube by carefully sliding the assembly forward and inserting the coolant tube into the thermostat housing (E).
9. Align the back of the EGR cooler and install the rear support bushing with cap screw and tighten to specifications.

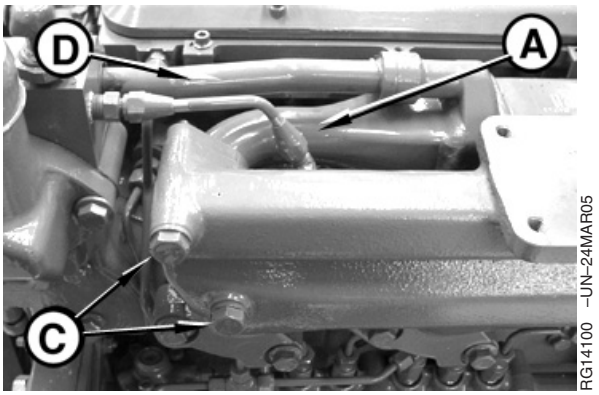
Specification

Rear Support Bushing Cap Screw—Torque ..... 35 N•m (25 lb-ft)

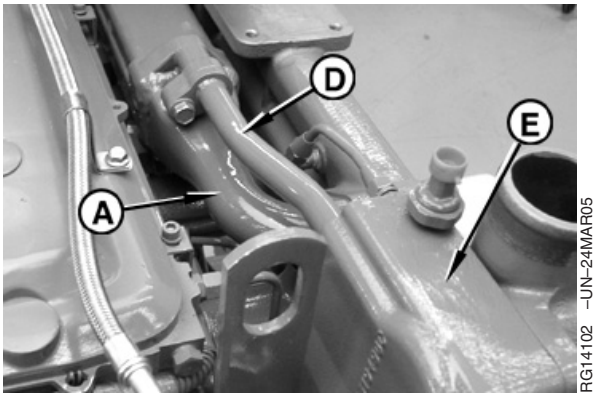
A—EGR Cooler
B—Rear Support Bushing
C—Front Cap Screws
D—EGR Coolant Outlet Tube
E—Thermostat Housing



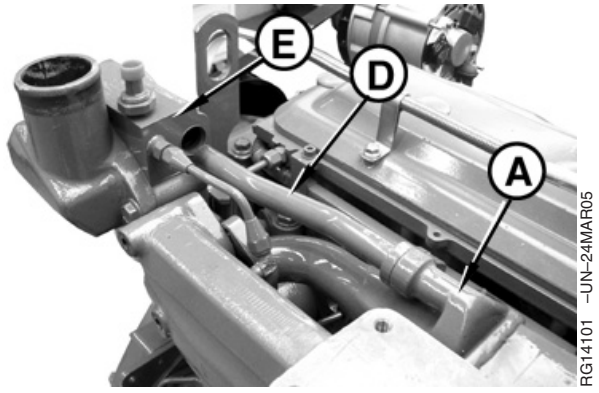
EGR Cooler Rear Support Bushing Cap Screw



EGR Cooler Front Cap Screws



EGR Coolant Outlet Tube



EGR Coolant Outlet Tube

Continued on next page

Engine Control Unit (ECU) Maintenance

IMPORTANT: DO NOT OPEN ENGINE CONTROL UNIT.

IMPORTANT: Do not pressure wash the Engine Control Unit (ECU).

IMPORTANT: Before welding on engines with ECU, remove ECU from Engine.

NOTE: For diagnosis and testing of the electronic engine control and sensors, refer to Group 160, TROUBLE CODE DIAGNOSTICS AND TESTS.

NOTE: The ECU is the system component LEAST likely to fail. Follow proper trouble shooting procedures and isolate the problem before replacing the ECU.

Normal operating conditions do not require any ECU maintenance. The ECU is not repairable. In the event that the ECU fails, it has to be replaced.
Harness connectors to the ECU are repairable. See REPAIR CINCH FLEX BOX CONNECTOR later in this Group.

Precautions

- Before welding on application, remove ECU from application and disconnect all connectors from ECU
- Avoid high pressure spay onto ECU. Do not spray directly into connectors.
- Avoid locating ECU near high temperature areas. Cooling or shielding may have to be provided to keep the ECU within its operating temperature range.
- The ECU must have a ground connection to the engine block. Provide a grounding strap if necessary.
- Avoid high vibration areas.
- Orient the ECU so moisture will not collect on its chassis or into the harness connectors. Keep the vent plug free of dirt and moisture.
- Protect ECU from road splash, foreign debris, and high pressure impact.
- Mount the ECU so the harness exits the chassis in a downward direction.
- If possible, mount the ECU in a vertical orientation (connectors in a vertical plane) with vent plug pointing downwards.

For theory of operation on the ECU, see ELECTRONIC CONTROL UNIT (ECU) SYSTEM OPERATION in Section 03, Group 140 later in this manual.

DM59778,0000026 –19–22JAN08–1/1

Remove and Install Glow Plugs

NOTE: For an expanded component location drawing, see COMPONENT LOCATION DIAGRAM 2 (4.5L Engine) (B) or COMPONENT LOCATION DIAGRAM 8 (6.8L Engine) (B) in Section 03, Group 140 of this manual.

Removal of Glow Plugs

1. Disconnect glow plug wiring connector to glow plug(s).
2. Remove glow plug(s)

Installation of Glow Plugs

1. Install glow plug(s). Torque to specification.

Specification	
Glow Plug—Torque	15 N•m (11 lb-ft)

2. Connect glow plug wiring connector to glow plug(s).

RG41183,00000E8 –19–04OCT07–1/1

Turbocharger Interconnect

1. Connect two harness clips (E) to harness bracket (F) on rocker arm cover.

Specification

Harness Bracket -to-Rocker Arm Cover. Two M6 Socket Head Cap Screws and Washers.—Torque ..... 7 ±1.5 N•m (5 lb-ft)

2. Attach cable clamp (C) to harness bracket (D) on VGT actuator.

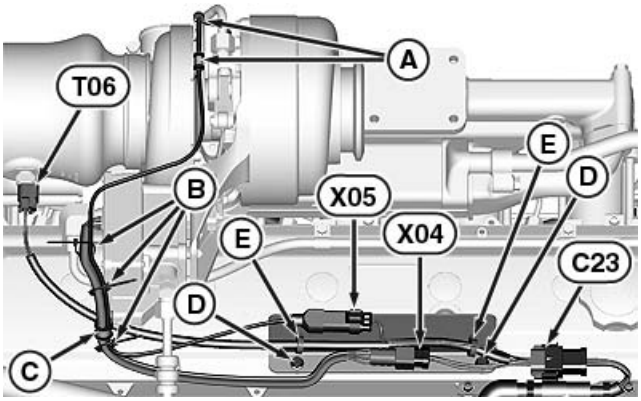
Specification

Harness Bracket Near Air Intake Area. Two M6 Socket Head Cap Screws and Washers.—Torque ..... 20 ±4 N•m (15 lb-ft)

3. Connect connectors C23, T06, X04, and X05 to their associated components.

4. Attach 3 cable ties (B) around harnesses from T06, X04 and X05 components.

5. Attach two cable clamps (A) around X05 sensor harness on turbocharger assembly.



Turbocharger Interconnect Harness

A—Harness Clamp
B—Cable Tie Wrap
C—Harness Clamp
D—Harness Bracket
E—Harness Clip
C23—Turbocharger Interconnect Connector
T06—Compressor Inlet Temperature Sensor Connector
X04—VGT Actuator Connector
X05—Turbo Speed Sensor Connector

DM59778,00000B4 –19–28JAN08–8/8

14. Lay stripped end of wire onto end of terminal to be crimped, with insulation overlapping, as shown (L).

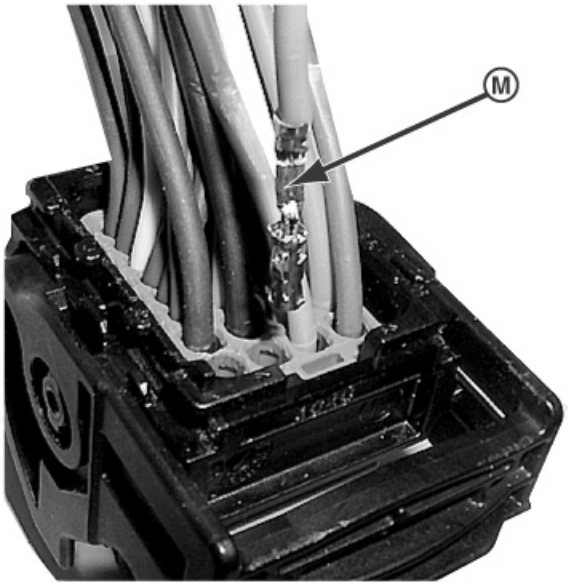
15. Squeeze crimper handles, until they automatically unlock. Remove wire and terminal from crimper.

RG14588 –UN–01DEC05

Wire Onto Terminal in Crimping Pliers

RG41183,00000E9 –19–15OCT07–15/17

16. Fully insert terminal into connector (M), with crimped side of terminal facing away from the terminal retainer side of the connector and tabs on terminal aligned with offsets in connector, terminal hole, as shown.



RG14589 –UN–02DEC05

Correct Position For Terminal Insertion

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RG41183,00000E9 –19–15OCT07–16/17

The Engine Control Unit (ECU) (A) sends a signal in specific sequence to each EI. This controls the volume of fuel, the timing of delivery, and the rate of delivery for each EI. Once the fuel enters the EI, the high pressure overcomes the nozzle valve allowing the fuel to spray into the respective cylinder. Excess fuel from the nozzle routes through the fuel return line (K) and back to the fuel tank. On some applications the fuel goes through a fuel cooler prior to returning to the fuel tank.

RE38635,0000135 –19–04AUG07–2/2

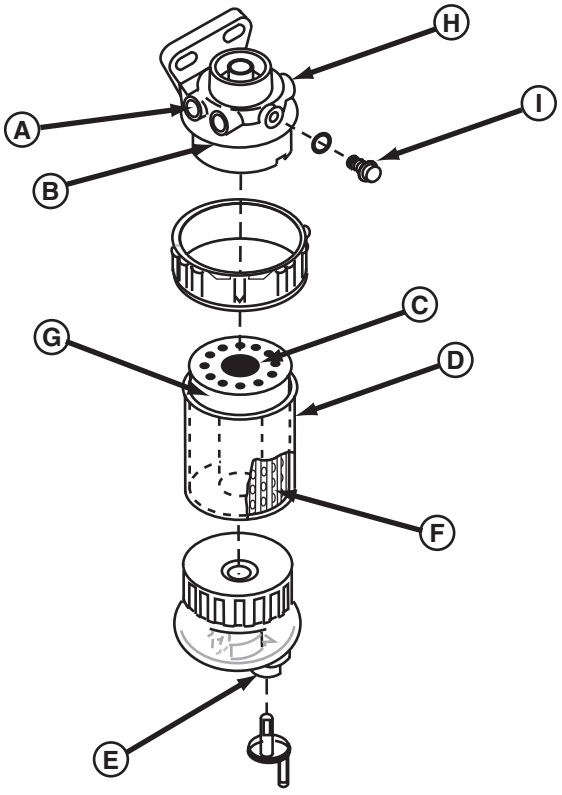
Prefilter Operation

This optional fuel filter is called the prefilter. It is called this whenever it has been placed between the fuel tank and the fuel transfer pump. It is positioned to protect the pump from coarse contaminants, which could damage, clog, or get stuck in, its diaphragm. This filter is also called the primary fuel filter. This is because it is the first filter through which fuel must pass on its way to the fuel high pressure pump. Being the first filter in line, it captures the coarsest of, and most, fuel contaminants.

Fuel enters the filter through inlet (A) at filter head (B), and flows down through the tube (C) in the center of the canister (D). Water and the heavier fuel contaminants settle to the bottom of the canister, and from there, they pass into the water/sediment bowl (E). Water can be drained off, and contaminants removed, from the bowl, without removing the filter assembly.

Fuel flows up a passage (F) between the outside of the filter element and the inside of the canister, and up through the 30-micron particle filter element (G) and out of the holes in the filter element. From there, fuel exits through the outlet (H) at the filter head.

Air can be bled from this part of the fuel system by loosening the plug (I) in the front of the filter head.

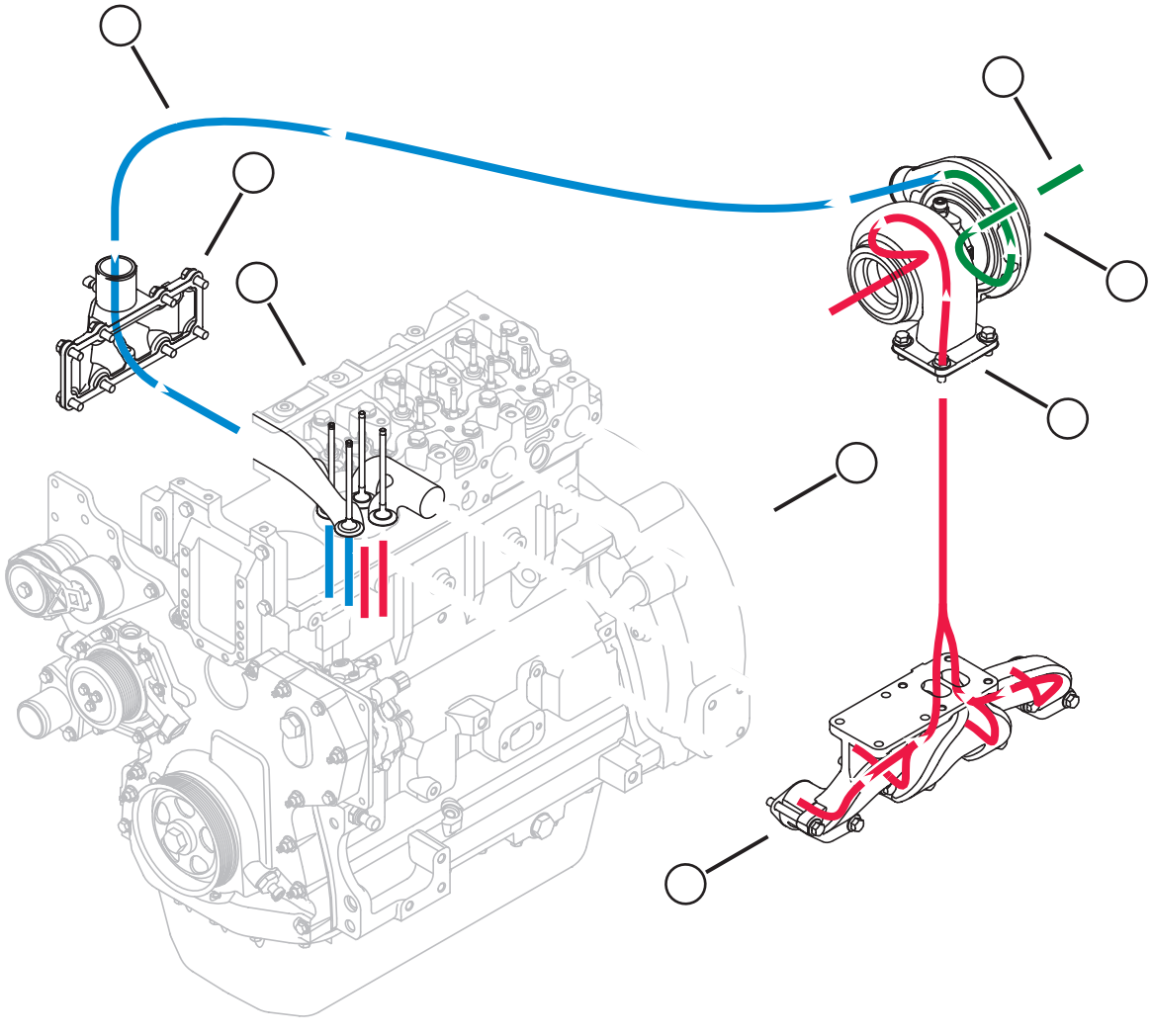


RG13767 –UN–29MAR05

Primary (Pre) Fuel Filter

A—Fuel Inlet
B—Filter Head
C—Tube
D—Canister
E—Water/Sediment Bowl
F—Passage Between Filter and Canister
G—Filter Element
H—Fuel Outlet
I—Bleed Screw

RG40854,0000124 –19–04AUG07–1/1



RG15605 –UN–25OCT07

A—Compressed air
B—Fresh air in from filter
C—Intake air manifold
D—Turbocharger compressor
E—Head
F—Turbocharger turbine
G—Hot exhaust gas
H—Exhaust manifold

IMPORTANT: The EGR valve is normally in either the fully closed or fully open condition. There are some instances where it may be at other positions but normally fully open or fully closed. The EGR valve is normally closed at startup, low load and high load low speed conditions.

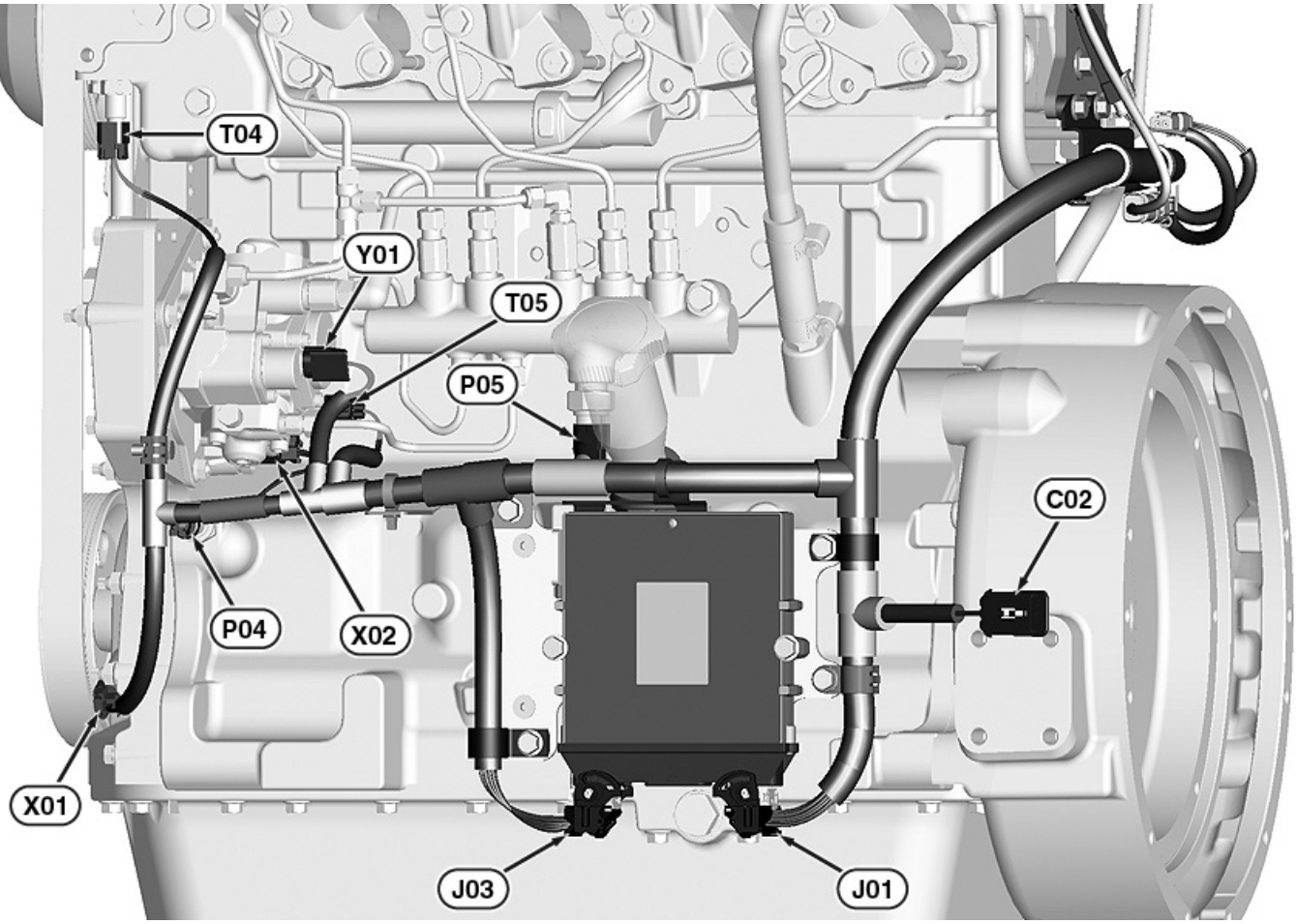
NOTE: Mixing of charge air and exhaust gas helps lower the NOX emissions released to the atmosphere after combustion.

NOTE: During normal operation, the vanes never close completely, as they provide the only path for exhaust gas to escape to the atmosphere.

Air System without EGR

Continued on next page

Component Location Diagram 14



4.5L Engine

C02—Accessory Connector A
J01—ECU Harness Connector, Black Face
J03—ECU Harness Connector, Blue Face
P04—Engine Oil Pressure Sensor Connector
P05—Fuel Rail Pressure Sensor Connector
T04—Coolant Temperature Sensor Connector
T05—Fuel Temperature Sensor Connector
X01—Crank Position Sensor Connector
X02—Pump Position Sensor Connector
Y01—Suction Control Valve Connector

NOTE: Some of the components shown are optional and are NOT used on all applications.

BK53208,0000074 –19–31MAR08–1/1

Measuring Pressure

All engine pressure sensors (A) are 3-wire devices. As pressure changes, output changes. The ECU (B) supplies the sensor with a reference voltage (C) and ground (F). It monitors the output voltage from the sensor signal output wire (D). As the pressure changes, it causes the input to the ECU to change. The ECU compares the input value to a pre-programmed value in the ECU's memory.

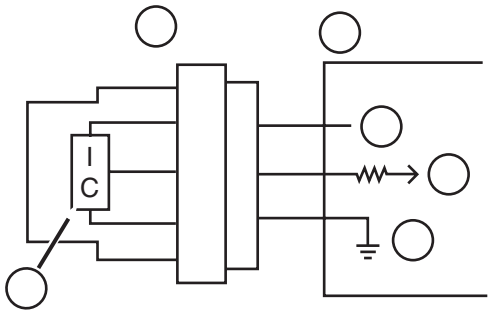
There are many types of devices, and depending on the circuitry (E) in the device, the ECU determines how to process the input signal.

If the input value is near the expected value, then the ECU assumes everything is functioning properly. If the value is above or below the expected value, the ECU will set the appropriate diagnostic trouble code (DTC).

The ECU has the ability to derate the engine power, engine speed, or shut down the engine in an attempt to protect the engine and its components. If certain pressures exceed the threshold, the ECU will enable the engine protection.

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

For more information on DTC's, see DIAGNOSTIC TROUBLE CODES LIST in Section 4, Group 160.



RG15044 –UN–05DEC06

Typical Pressure Sensor Schematic

A—Pressure Sensor
B—ECU
C—Ref Voltage
D—Signal Input
E—IC (Integrated Circuit)
F—Ground

RG40854,00000E5 –19–04JAN08–1/1

Barometric Air Pressure (BAP) Sensor

The BAP sensor is located internal to the ECU. This sensor cannot be repaired or replaced without replacing the entire ECU. This sensor is used to determine the pressure of the ambient air at the mounting location of the ECU. This helps the ECU determine the air density for calculating the correct air/fuel ratio.

For more information on how pressure sensors operate, see MEASURING PRESSURE earlier in this Group.

RG41221,00002A9 –19–15OCT07–1/1

Marine Throttle

The marine engine has two dual throttle options:

- Dual throttles with transfer control
- Engine synchronization control.

To operate either option requires a variation of the marine transition harness. Which variation depends on feature configuration(s). Both options cannot operate simultaneously. Operation of each option is described as follows:

Dual-Throttle Transfer Control

This feature allows throttle control from one of two locations: the wheelhouse, or a secondary (auxiliary) station. when the ECU is initialized at key ON, throttle control defaults to the station selected via the trim options and is set up in the ECU during programming.

To change throttle control location during engine operation, the station select push-button switch at the requesting throttle is held engaged. The indicator lamp will briefly flash, indicating the throttle control transfer has started. The push-button is held engaged until the station indicator lamp is solid, indicating that throttle control transfer has been successful.

For transfer of throttle control to be successful, the position of the requested throttle must be within 2% of the active throttle position. For example, if the ECU is sampling a throttle command of 55% at the active throttle, then the ECU must receive a throttle command between 53% and 57% at the requesting throttle. If the requesting throttle is not within 2% (approximately 33 rpm) of the active throttle, the lamp flashes on and off. If the station select push-button switch is held engaged and the operator moves the requesting throttle to within 2%, transfer will occur. The lamp will go from flashing to solid and the switch at the requesting throttle can be released.

If the requesting throttle position is outside normal operating range, its lamp momentarily lights, then shuts off and remains off. If the switch contacts of both throttles are simultaneously closed, the ECU selects the “highest priority location”, which has been designated during ECU programming, via trim options.

At key ON, a test of the lamps at the throttle station(s) will occur. If any lamp does not briefly come on, replace the bulb. The lamp test will occur only if the key has been OFF for at least 30 seconds.

Engine Synchronization Control

The Engine Sync feature is selected via trim options and is set up in the ECU during programming. This feature allows the synchronous operation of two engines through a two-throttle, lead-follow system; one ECU is programmed as the Lead, and the other as the Follower. When the system is successfully engaged, the follower ECU runs off the lead ECU’s signal. On engines that also have the dual throttle option described above, auxiliary throttle location input is automatically deselected when the engine synchronization is in operation.

In order to enable this system, the following three criteria must be met and sustained for at least two seconds:

1. Both engines must be running at greater than, or equal to, 975 rpm.
2. The engines must be running to within 100 rpm, or less, of each other.
3. The individual throttle commands of each ECU must be within 5% of each other’s value.

When the synchronous throttle switch is turned on with the initial criteria met, the throttle station lamp comes on. If at least one of the three criteria is not met, the throttle station lamp flashes on and off until the failing condition has been corrected.

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000652.02 — Injector #2 Part # Data Invalid Diagnostic Procedure 04-160-550

Continued on next page

⑩ Check for Crank Sensor Pattern Problem	1. Ignition OFF, engine OFF. 2. Disconnect crank sensor and secure connector away from rotating components. 3. Ignition ON, engine OFF. 4. Operate engine at speed and load where problem occurs. 5. Ignition OFF, engine OFF. 6. Reconnect crank sensor. Was engine performance restored?	**YES:** Perform diagnostic procedure for 000637.02 as though DTC were active. **NO:** GO TO 11 – – –1/1

⑪ Check for Pump Position Pattern Problem	1. Verify crank sensor is reconnected. 2. Disconnect pump position sensor and secure connector away from rotating components. 3. Ignition ON, engine OFF. 4. Operate engine at speed and load where problem occurs. 5. Ignition OFF, engine OFF. 6. Reconnect pump position sensor. Was engine performance restored?	**YES:** Perform diagnostic procedure for 000636.02 as though DTC were active. **NO:** GO TO 12 – – –1/1

⑫ Check Throttle	1. Engine running at speed where misfire or irregular running occurs. 2. Throttle held at a steady position. 3. Monitor Throttle Position data point in Service ADVISOR. Does Throttle Position data point indicate throttle signal is changing by more than 3 percent?	**YES:** Check for throttle circuit problem. **NO:** GO TO 13 – – –1/1

9 Check Pressure Sensors	1. Check MAP sensor wiring and terminals. 2. Replace MAP sensor if no wiring problems found. 3. Ignition ON, engine OFF. 4. Compare Manifold Absolute Pressure data point to Barometric Pressure data point. Are the Manifold Absolute Pressure and Barometric Pressure within 10 kPa (1.5 psi) of each other with ignition ON, engine OFF?	**YES:** Recheck for black smoke. **NO:** Replace ECU and recheck for black smoke. – – –1/1
10 Check EGR Valve	*NOTE: For EGR valve removal and installation instructions, see REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) VALVE in Section 02, Group 100 earlier in this manual.* 1. Operate engine under load until coolant temperature is above 79°C (174°F). 2. Operate engine unloaded at low idle for five minutes. 3. Ignition OFF, engine OFF. 4. Remove EGR valve. 5. Check for stuck open or broken EGR valve. 6. Inspect EGR valve and O-rings for damage. 7. Inspect intake and exhaust passages for damage which would permit EGR flow with EGR valve closed. 8. Verify that the part number of the EGR valve removed is the correct part for the engine. 9. Inspect EGR cooler for indication of coolant leakage. Were any problems found?	**YES:** Fix problem or replace incorrect EGR valve. Recheck for black smoke. **NO:** GO TO 11 – – –1/1
11 Cut-Out Test	Perform ENGINE TEST INSTRUCTIONS - CYLINDER CUTOUT TEST in Service ADVISOR and watch for a decease in exhaust smoke when each cylinder is cut out. Did smoke decrease substantially when a cylinder was cut-out?	**YES:** Replace injector in the affected cylinder and recheck for black smoke. **NO:** GO TO 11 – – –1/1
12 Fuel Quality	Perform CHECK FUEL SUPPLY QUALITY procedure found later in this section. Is black smoke still present when engine is operated under conditions where black smoke was observed?	**YES:** GO TO 12 **NO:** Problem fixed. – – –1/1

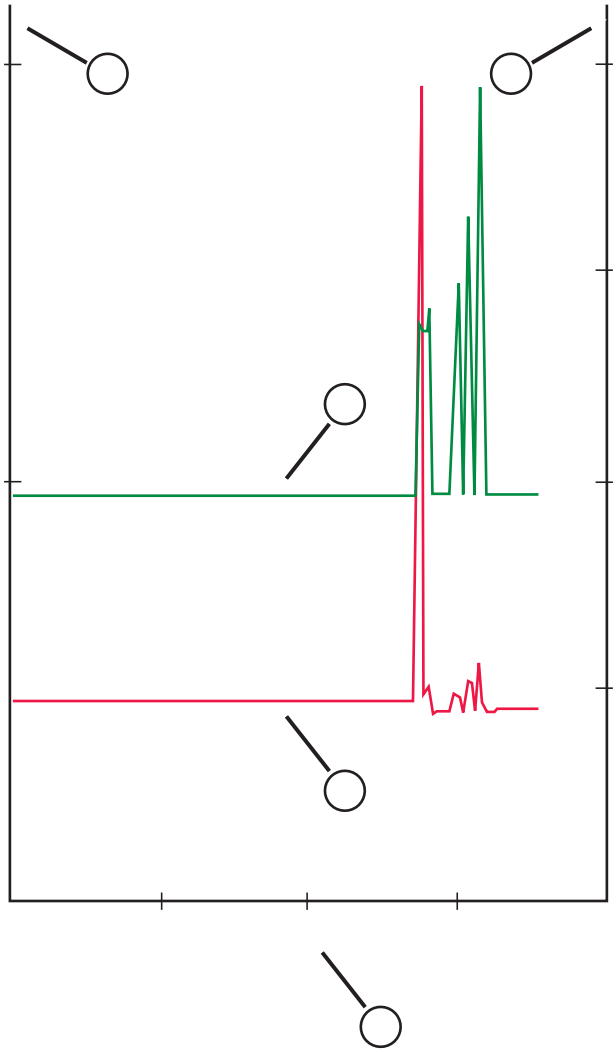
❸ **Throttle Response Test**	1. Ignition ON, Engine ON. 2. Select secondary analog throttle. 3. Adjust secondary analog throttle to different speed points. Did engine respond to throttle movement?	**YES:** Problem fixed, return to service. **NO:** GO TO 4 – – –1/1

❹ **Reprogram ECU**	1. Download latest ECU software payload file. 2. Program ECU and ensure the correct throttle options are set on the trim page as you start the programming sequence. Was programming successful?	**YES:** GO TO 5 **NO:** Repeat this step. If ECU will still not program, see ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in Section 4 Group 160 later in this manual. – – –1/1

❺ **Throttle Response Test**	1. Ignition ON, Engine ON. 2. Adjust secondary analog throttle to different speed points. Did engine respond to throttle movement?	**YES:** Problem fixed, return to service. **NO:** Start a DTAC case. – – –1/1

38 Temporary Fuel Supply Check	*NOTE: Use a clean hose and fuel that has known-good quality in a clean container for this step.* 1. Ignition OFF, engine OFF. 2. Disconnect fuel inlet line from the primary fuel filter. 3. Inspect fuel inlet at primary filter header for debris. 4. Install a hose on primary filter housing fuel inlet port and place other end of hose in a container of clean fuel. 5. Ignition ON, engine OFF. 6. Monitor Low Pressure Fuel - Actual Pressure. Does the Low Pressure Fuel - Actual Pressure data point indicate 15 kPa (2.2 psi) or above?	**YES:** Repair restriction or air leak between fuel pick-up line and primary filter. GO TO 43 **NO:** GO TO 39 04 150 55 – – –1/1

39 Check Fuel Flow	1. Ignition OFF, engine OFF. 2. Disconnect low pressure fuel sensor connector to cause ECU to command pump to 45 percent speed. Ignore DTC 000094.04 which will be set when fuel sensor is disconnected. 3. Disconnect fuel line between secondary filter outlet and high pressure pump inlet. **IMPORTANT: Do NOT crank engine with high pressure pump inlet fuel line disconnected.** 4. Reposition fuel line and place high pressure pump inlet end in a container suitable for diesel fuel. 5. Reconnect fuel line to secondary filter outlet. 6. Ignition ON, engine OFF for 30 seconds. 7. Ignition OFF, engine OFF. Is fuel flow at least 0.5L (17 oz) in 30 seconds?	**YES:** GO TO 40 **NO:** Check for restrictions in fuel filter headers. If none found, GO TO 42 – – –1/1



RG15372 –UN–26JUL07

Sticking SCV Causing Pressure Limiter to Open. Note Difference in Pressure Scales.

A—Fuel Rail Pressure - Desired scale (MPa)
B—Fuel Rail Pressure - Actual scale (MPa)
C—Fuel Rail Pressure - Desired (Green)
D—Fuel Rail Pressure - Actual (Red)
E—Time Scale (HH:MM:SS)

Is the graph that is generated similar to the examples of a sticking SCV or was any fuel flow present through pressure limiter?

YES: Replace SCV and pressure limiter. Reprogram ECU with latest payload.

NO: GO TO 19

–19– –3/3

D2 - ECU Does Not Communicate with Diagnostic Gauge or Gauge Displays CAN Bus Error

RG41221,00000FF –19–03OCT07–1/1

D2 - ECU Does Not Communicate with Diagnostic Gauge or Gauge Displays CAN Bus Error 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

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 4
- see 4.5L 24V ECU WIRING DIAGRAM 4
- see 6.8L 12V ECU WIRING DIAGRAM 4
- see 6.8L 24V ECU WIRING DIAGRAM 4
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 later in this manual.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JDG10466 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

– – –1/1

❶ **Check for Blank Diagnostic Gauge**	1. Ignition ON, engine OFF. 2. View diagnostic gauge display. Is diagnostic gauge display blank?	**YES:** GO TO 2 **NO:** GO TO 3

– – –1/1

Test for Air in Fuel

To check for air in the fuel system, follow the procedure below.

1. Preliminary checks:
   - Check for loose fittings between fuel tank and fuel supply pump.
   - Check for loose fittings on the fuel cooler, if applicable.
   - Make sure primary filter element is on tight and gasket is intact.
   - Check for damaged fuel pick-up tube in tank.
   - Check for low fuel level in tank.
   - Check for foaming in tank. Foaming strongly suggests air leaking past injectors. If there is foaming, inspect the injector hold down clamp torque, O-rings and seals. See REMOVE ELECTRONIC INJECTORS (EIs) and INSTALL ELECTRONIC INJECTORS (EIs) in Section 2 of this manual.
   - Air may enter system when engine is turned off. Verify lines are properly tightened between the secondary filter and the high pressure fuel pump and between high pressure fuel pump leak-off port and cylinder head.

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Continued on next page

DB92450,0000066 –19–12OCT07–1/3

Exhaust Gas Recirculation (EGR) System Diagnostic

IMPORTANT: Be sure to run coolant in specified operating levels at all times. Running the engine low on coolant could cause an EGR cooler failure.

JB81757,000007D –19–04JUN08–1/1

Exhaust Gas Recirculation (EGR) System Diagnostic

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– – –1/1

❶ **EGR Temperature Sensors (In Place) Temperature Comparison**	*NOTE: If the engine has been run recently, GO TO 2* 1. Ignition ON, engine OFF. 2. With the engine cold (engine has not been run for last 12 hrs), using Service ADVISOR™, compare the following ECU EGR temperatures. • Charge Air Cooler Outlet Temperature • Manifold Air Temperaturer • EGR Temperature Were the temperatures of the three sensors within ±2º Celsius (4º F) of one another?	**YES:** GO TO 3 **NO:** GO TO 2

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– – –1/1

❷ **EGR Temperature Sensors (Removed) Temperature Comparison**	1. Ignition OFF, engine OFF. 2. Individually remove Charge Air Cooler Outlet, Manifold Air, and EGR temperature sensors from the engine. *NOTE: If while removing a sensor it was necessary to disconnect the harness assembly connector, reconnect it.* 3. Hold each sensor tightly inside your fist for an equal amount of time. 4. Using Service ADVISOR, monitor temperatures of each sensor. Were the temperatures of the three sensors within ±2º Celsius (4º F) of one another?	**YES:** GO TO 3 **NO:** GO TO 10

– – –1/1

❸ **Intake Manifold Pressure Sensor**	1. Key ON, engine OFF. 2. Using Service ADVISOR, compare Barometric Air Pressure and Manifold Air Pressure. Were they within ±14 kPa (2 psi) of each other?	**YES:** GO TO 4 **NO:** GO TO 10

– – –1/1

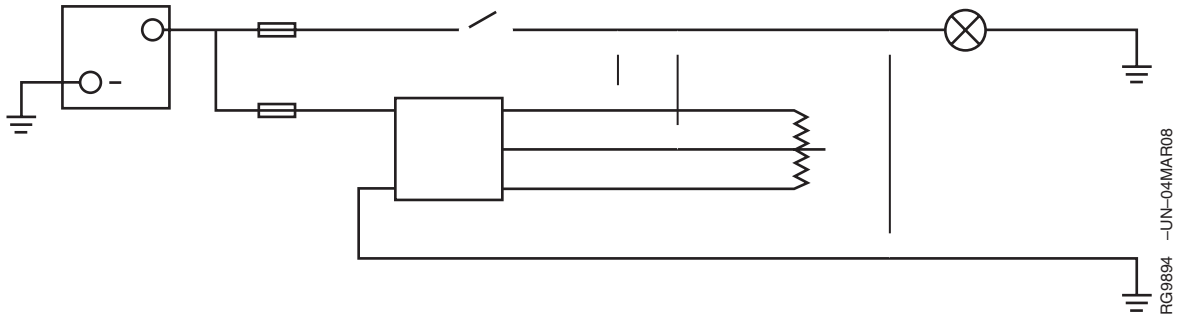
RG9893 –UN–04MAR08

Grounded Circuit

A—Voltage Wire in Contact with Machine Frame

3. **Grounded Circuit:**
   A voltage wire in contact with the machine frame (A), providing continuity with the battery ground terminal.

RG41221,00001DF –19–18APR08–4/6



RG9894 –UN–04MAR08

Shorted Circuit

4. **Shorted Circuit:**
   A wire-to-wire contact of two adjacent wires that provides unwanted continuity between the two wires. The following are types of short circuits:
   - (A) Voltage wire shorted to another voltage wire (wires of equal or unequal voltage).
   - (B) Voltage wire shorted to a sensor signal wire (wires of unequal voltage).
   - (C) Voltage wire shorted to a ground wire (wires of battery voltage or regulated voltage, shorted to a ground wire connecting a component to the battery negative terminal).
   - (D) Ground wire shorted to another ground wire (wires of zero voltage).

NOTE: This type of short does not create an observable malfunction. Therefore, no further explanation for trouble shooting is necessary.

Continued on next page

RG41221,00001DF –19–18APR08–5/6

b. Scroll through the menu to SELECT UNITS (E). Press ENTER KEY (I).

c. With the SCROLL KEYS (G,H), select the desired unit of measure. Press ENTER KEY (I).

d. Press MENU KEY (F) to return to the parameter display.

DM59778,000001C –19–18APR08–3/3

Diagnostic Gauge Active DTC Viewing Instructions

NOTE: For complete Power View operating instructions, refer to the Operator's Manual, associated with this application.

NOTE: The engine does not need to be running to navigate the diagnostic gauge screens.

NOTE: For more information fault codes, see DIAGNOSTIC TROUBLE CODES LIST later in this section of the manual.

IMPORTANT: Ignoring active trouble codes can result in severe engine damage.

Refer to the trouble shooting procedures later in this section for fixing active DTCs.

A Diagnostic Trouble Code (DTCs) is set when an operating condition is not within a specified range. This is an indicator to the operator that a problem area needs to be corrected. The diagnostic gauge alerts the operator when a DTC is active by turning on a warning light and changing to the WARNING screen showing information about the DTC. The warning screen is described below.

Continued on next page

DB92450,000005F –19–18APR08–1/3

To playback recording disconnect “Live” connection to the ECU. In the menu bar, click on Readings, Recordings, and Open / Manage Recordings. The Open / Manage Recordings window will appear, select Import. Go to c: program files Service ADVISOR xvds tierIII recs and select the recording that is to be imported into the available recordings window. The recording can be played immediately or at a later time.

RG41183,0000002 –19–18APR08–3/3

000111.01	Coolant Level Extremely Low
000157.03	Fuel Rail Pressure Signal Out of Range High
000157.04	Fuel Rail Pressure Signal Out of Range Low
000157.10	Fuel Rail Pressure Rate of Change Abnormal
000157.17	Fuel Rail Pressure Not Developed
000158.17	ECU Power Down Error
000174.00	Fuel Temperature Signal Extremely High
000174.03	Fuel Temperature Signal Out of Range High
000174.04	Fuel Temperature Signal Out of Range Low
000174.16	Fuel Temperature Signal Moderately High
000183.00	Extreme Over Fueling
000183.16	Moderate Over Fueling
000189.00	Engine Speed Derate Condition Exists
000190.00	Engine Speed Extremely High
000190.16	Engine Speed Moderately High
000237.02	VIN Security Data Invalid
000237.13	VIN Option Code Security Data Conflict
000237.31	VIN Security Data Missing
000412.00	EGR Temperature Signal Extremely High
000412.03	EGR Temperature Signal Out of Range High
000412.04	EGR Temperature Signal Out of Range Low
000412.15	EGR Temperature Signal Slightly High
000412.16	EGR Temperature Signal Moderately High
000611.03	Injector Shorted to Power
000611.04	Injector Shorted to Ground
000627.01	All Injector Circuits Have High Resistance
000627.18	Battery Voltage Moderately Low
000629.12	ECU EEPROM Error
000629.13	ECU Boot Block Error
000636.02	Engine Position Sensor Signal Invalid
000636.05	Engine Position Sensor Circuit Has High Resistance
000636.06	Engine Position Sensor Circuit Has Low Resistance
000636.08	Engine Position Sensor Signal Missing
000636.10	Engine Position Signal Rate of Change Abnormal
000637.02	Engine Timing Sensor Signal Invalid
000637.05	Engine Position Sensor Circuit Has High Resistance
000637.06	Engine Position Sensor Circuit Has Low Resistance
000637.07	Engine Timing and Position Signals Out of Sync
000637.08	Engine Timing Sensor Signal Missing
000637.10	Engine Timing Signal Rate of Change Abnormal
000641.04	VGT Actuator Supply Vlotage Out of Range Low

Continued on next page

Engine Hour Updating Instructions Using Service ADVISOR

This procedure will explain how to update the engine hours in the ECU. The screen will show you the current engine hours and ask for you to input the new hour's value.

NOTE: The new hours can not be less than the current hours displayed.

You can use whole and tenths of hours. You can change the value before you save it to the ECU if you have made a mistake or you can change it after you save it but if you wanted it lower than you put in it will not accept it. To actually write the hours to the ECU the key needs t be turned off for 30 seconds then back on.

NOTE: If you do not cycle the key the screen will display "Calibration was successfully completed" even though it was not. Note: Be sure to select "OK" before cycling the key.

You can run the calibration if you select "Yes" on the last screen. You can also select "Print" if you want to save the information. To print the information see, INTERACTIVE TESTS AND CALIBRATION RESULTS PRINTING INSTRUCTIONS earlier in this section.

1. From the Short Cut bar select "Calibrations".
2. From the list select "ECU – Engine Hourmeter Calibration".
3. Next enter the new engine hours.
4. Select the "Send" button.
5. The next screen asks if you want to proceed. Select the "Yes" button.
6. The next screen displays the value you entered if it is correct select the "OK" button. If not select the "Not OK" button.
7. Next screen says to turn the Ignition OFF for 30 seconds then back ON.
   - Be sure to cycle the key before selecting OK.
8. 9.Last screen says "Calibration was successfully completed". Select "No" to complete the test. If you want to run it again select "Yes".

DN22556,00006A9 –19–18APR08–1/1

❹ **Terminal Test**	1. Ignition OFF, Engine OFF. 2. Perform a TERMINAL TEST on C08-A, C08-C, and C08-F. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 5 – – –1/1
❺ **Check Secondary Analog Throttle Return Circuit Continuity**	On the harness, measure the resistance between C08-C and single point ground. Is the resistance less than 5 ohms?	**YES:** GO TO 6 **NO:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1
❻ **Check Secondary Analog Throttle 5V Supply**	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between C08-A (+) and C08-C (-). Is the voltage greater than 5.5V?	**YES:** Discontinue this test and perform tests for DTC 003510.03 as though DTC was active. **NO:** GO TO 7 – – –1/1
❼ **Check for DTC 000102.03 with Secondary Analog Throttle Reconnected**	1. Ignition OFF, engine OFF. 2. Reconnect C08. 3. Ignition ON, engine OFF. 4. Refresh DTCs. Is DTC 000029.03 still active?	**YES:** GO TO 8 **NO:** GO TO 15 – – –1/1
❽ **Check Secondary Analog Throttle Wiring**	Check the wiring between the secondary analog throttle potentiometer and C08 harness connector. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Replace secondary analog throttle. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1

9 Terminal Test	1. Ignition OFF, Engine OFF. 2. Perform a TERMINAL TEST on C09-M, C09-C, and C09-L. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 10 – – –1/1
10 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU connector J02. 3. Perform TERMINAL TEST on J02-A3, J02-A4, and J02-C3.. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 11 – – –1/1
11 Check Primary Analog Throttle Circuit Continuity	1. On the harness, measure the resistance between ECU J02-A3 and harness connector C09-M. 2. On the harness, measure the resistance between ECU J02-A4 and harness connector C09-L. 3. On the harness, measure the resistance between ECU J02-C3 and harness connector C09-C. Were all resistance measurements less than 10 ohms?	**YES:** GO TO 12 **NO:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1
12 Check for Short to Voltage	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between ECU J02-A4 and single point ground. Is the voltage greater than 0.5V?	**YES:** Locate and repair short to voltage in sensor signal circuit. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 13 – – –1/1

8 Check Low Pressure Fuel Sensor Circuit Continuity	1. On the harness, measure the resistance between ECU J03-H3 and low pressure fuel sensor connector P03-1. 2. On the harness, measure the resistance between ECU J03-H4 and low pressure fuel sensor connector P03-2. 3. On the harness, measure the resistance between ECU J03-C2 and low pressure fuel sensor connector P03-3. Were all resistance measurements less than 10 ohms?	**YES:** GO TO 9 **NO:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1
9 Check for Short to Voltage	1. Ignition ON, engine OFF. 2. Measure the voltage between ECU J03-C2 and single point ground. Is the voltage greater than 0.5V?	**YES:** Locate and repair short to voltage in sensor signal circuit. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 10 – – –1/1
10 ECU J03 Disconnected Code Change Test	*NOTE: Many new error codes will appear in the next step. Disregard all codes except 0000094.03.* 1. ECU connector J03 still disconnected. 2. Ignition ON, Engine OFF. 3. Refresh codes. Is DTC 000094.03 still active?	**YES:** GO TO 14 **NO:** GO TO 11 – – –1/1
11 Check Signal Circuit for Wire-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU connectors J01 and J02. 3. Measure the resistance between J03-C2 and all other terminals in ECU harness connectors J01, J02 and J03. Were any measurements less than 100k ohms?	**YES:** Locate wire-wire short. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 12 – – –1/1

❼ Further Review of Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	**YES:** Found a possible problem. Repair possible problem. GO TO 1 **YES:** Found operating point at which the code becomes active. GO TO 8 **NO:** GO TO 9 – – –1/1

❽ Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point that caused error. Did 000094.17 reappear active?	**YES:** GO TO 2 **NO:** GO TO 7 and review the data again. – – –1/1

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❾ Connector Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect low pressure fuel sensor connector and ECU J1 connector. 3. Perform TERMINAL TEST on low pressure fuel sensor connector and ECU J1 connector. Were any problems found?	**YES:** Repair problem. GO TO 1 **NO:** GO TO 10 – – –1/1

❿ ECU Reprogram	1. Using Service ADVISOR download the latest software payload for your application. 2. Reprogram the ECU with the payload just downloaded. 3. Ignition ON, Engine ON. 4. Refresh DTC list. Is 000094.17 active?	**YES:** Start a DTAC case. **NO:** Problem fixed. Return to service. – – –1/1

000097.16 — Water In Fuel Detected Diagnostic Procedure

Troubleshooting Sequence:
000097.04

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

Related Information:
The water in fuel voltage drops below the minimum threshold. The voltage is lower than what is physically possible for the water in fuel sensor to achieve.

Alarm Level:
Warning

Control Unit Response:
The ECU's will continue to work normally.

Additional References:
For further water in fuel sensor information, see WATER IN FUEL (WIF) SENSOR 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 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

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

For further information on connector and terminal testing see TERMINAL TEST earlier in this Group.

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 room temperature 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.

16 Check for Intermittent Wiring Problem	1. Ignition ON, engine OFF. 2. Monitor Engine Oil Pressure Input Voltage data point in Service ADVISOR while gently wiggle wire harness between engine oil pressure sensor and ECU J03 connector. *NOTE: The engine oil pressure input voltage will decrease to approximately 0V when the sensor circuit is open or shorted to ground.* Was the source of the intermittent problem found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 17 – – –1/1
17 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 000100.04 now active?	**YES:** GO TO 2 **NO:** GO TO 18 – – –1/1
18 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect engine oil pressure sensor connector P04. 3. Perform TERMINAL TEST on P04. 4. Disconnect ECU J03 connector. 5. Perform TERMINAL TEST on terminals J03-C3, J03-H3, and J03-H4. Were Terminal Test results good?	**YES:** GO TO 19 **NO:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR – – –1/1
19 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 000100.04 now active?	**YES:** GO TO 2 **NO:** GO TO 20 – – –1/1
20 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 000100.04. Were any applicable solutions found?	**YES:** Perform steps identified in DTAC solution. **NO:** GO TO 21 – – –1/1
21 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	**YES:** Reprogram ECU with latest version of software. **NO:** Contact DTAC for support. – – –1/1

000102.03 — Manifold Air Pressure Signal Out of Range High

The manifold air pressure input voltage exceeds the sensor's high voltage specification.

RG41221,0000211 –19–29MAY08–1/1

000103.00 — Turbo Speed Signal Extremely High Diagnostic Procedure

Troubleshooting Sequence:
000107.00 or 000107.31
002795.07
000641.04 or 000641.12 or 000641.13
000102.03 or 000102.04
000103.00

Related Information:
The ECU detects that turbo speed is above 155,000 rpm or some other programmed value.
This DTC may be caused by intake air (boost) leaks or turbo problems.
This DTC may also be caused by high altitude operation combined with high engine loads.

Alarm Level:
Warning

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Control Unit Response:
Maximum engine power is derated up to 50 percent.

Additional References:
For more turbo speed sensor information, see TURBO SPEED SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION 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 7
- see 4.5L 24V ECU WIRING DIAGRAM 7
- see 6.8L 12V ECU WIRING DIAGRAM 7
- see 6.8L 24V ECU WIRING DIAGRAM 7

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

For more information on charge air system test, see CHARGE AIR SYSTEM in Section 04, Group 150 earlier in this manual.

For more information on variable geometry turbo test, see VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST in Section 04, Group 150 earlier in this manual.

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

Continued on next page

15 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	**YES:** Found a possible problem. Repair possible problem. Retest. **YES:** Found operating point at which the code becomes active. Try to determine cause. Repair and retest. **NO:** GO TO 3 – – –1/1

000105.03 — Manifold Air Temperature Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:
000105.03

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

Related Information:
The manifold air 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 manifold air temperature.

Alarm Level:
Warning

Control Unit Response:
The ECU uses a default manifold air temperature of 60° C (140° F). The ECU will try to maintain the engine operating envelope.

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

For more manifold air temperature sensor information, see INTAKE MANIFOLD AIR TEMPERATURE (MAT) SENSOR 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.

Continued on next page

❶ **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 000105.15 reappear active?	**YES:** GO TO 2 **NO:** GO TO 13

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❷ **Check EGR Temperature**	Part 1 Is engine equipped with an EGR temperature sensor? *NOTE: For component location see COMPONENT LOCATION DIAGRAM 1 component (B) for the 4.5L engine or COMPONENT LOCATION DIAGRAM 7 component (B) for the 6.8L engine in Section 03, Group 140 earlier in this manual.*	**YES:** GO TO Part 2 **NO:** GO TO 4
	1. Ignition ON, Engine ON. 2. Let engine run for 3 minutes. 3. Refresh codes from within Service Advisor. Are any DTCs related to high EGR temperature active. (412.15, 412.16, or 412.00)?	**YES:** GO TO 3 **NO:** GO TO 4

– – –1/1

8 Check Auxiliary Harness for Open Wire	1. Ignition OFF, Engine OFF. 2. On auxiliary harness connector C08, measure resistance from terminal N to each individual wire of the air filter restriction switch. 3. On auxiliary harness connector C08, measure resistance from terminal Q to each individual wire of the air filter restriction switch. Does each terminal, Nand Q measure less than 5 ohms to one of the wires?	**YES:** GO TO 9 **NO:** Fix open wire in auxiliary harness. GO TO 15 – – –1/1
9 Check Auxiliary Harness for Shorted Wire	*NOTE: Make sure the wires to the air filter restriction switch are disconnected from the switch and not touching each other.* 1. Ignition OFF, Engine OFF. 2. On auxiliary harness connector C08, measure resistance from terminal N to each terminal of C08. Were any measurements less than 100 ohms?	**YES:** Fix shorted wire in auxiliary harness. GO TO 15 **NO:** Problem in main harness. GO TO 8 – – –1/1
10 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J2. 3. Perform TERMINAL TEST on ECU harness connector J2. 4. Inspect harness for pinched or melted wires near J2 ECU connector. Are there any problems with the wiring or connector?	**YES:** Fix problem. GO TO 15 **NO:** GO TO 11 – – –1/1
11 Check ECU Harness for Open Wire	1. Ignition OFF, Engine OFF. 2. On ECU harness, measure resistance from connector C08, terminal N to ECU connector J2, terminal D3. 3. On ECU harness, measure resistance from connector C08, terminal Q to ECU connector J2, terminal G3. Was either measurements greater than 5 ohms?	**YES:** GO TO 12 **NO:** Fix open wire in harness cable. GO TO 15 – – –1/1

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 room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JDG10466 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Flex probe information:
- ECU small terminal - Orange/Blue
- ECU large terminal - Orange/Green
- Coolant temperature sensor T04 - Purple/Gray

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❶ **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 000110.03 reappear active?	**YES:** GO TO 2 **NO:** GO TO 13

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❷ **Terminal Test**	1. Ignition OFF, engine OFF. 2. Perform TERMINAL TEST on coolant temperature sensor connector T04 and coolant temperature sensor. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 3

– – –1/1

❹ **Check Coolant Temperature Sensor**	1. Remove coolant temperature sensor. See REMOVE AND INSTALL ENGINE COOLANT TEMPERATURE (ECT) SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	**YES:** Replace defective part. GO TO 10 **NO:** GO TO 5 – – –1/1
❺ **Check Coolant Temperature Sensor Operation**	1. With coolant sensor removed from engine, reconnect coolant temperature sensor to its harness connector. 2. Ignition ON, Engine OFF. 3. Monitor Coolant Temperature from within Service ADVISOR. 4. If necessary, let the sensor cool down to the ambient temperature. Does the sensor reading closely match the ambient temperature?	**YES:** Coolant temperature sensor is OK. Diagnose engine cooling system. GO TO 8 **NO:** Coolant temperature sensor has already been replaced. GO TO 6 **NO:** Replace coolant temperature sensor. GO TO 10 – – –1/1
❻ **Check Signal Wire In Harness**	1. Ignition OFF, Engine OFF. 2. Disconnect the coolant temperature sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 110.03 become active?	**YES:** Wire harness is OK. GO TO 8 **NO:** GO TO 7 – – –1/1
❼ **Check ECU**	*NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000110.03* 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000110.03 become active?	**YES:** Problem in harness. Perform TERMINAL TEST on ECU connector J3. Diagnose and fix harness problem. GO TO 10 **NO:** Replace ECU. GO TO 10 – – –1/1

000111.01 — Engine Coolant Level Extremely Low

The ECU detects low engine coolant level.

RG41221,0000225 –19–09APR08–1/1

20 ECU and ECU Connector Terminal Test	Perform a terminal test on ECU connectors (J3), and ECU terminals. Are there any problems with the connector terminals or ECU terminals?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 **NO:** GO TO 21 – – –1/1
21 Fuel Rail Pressure Input Shorted To High Voltage	1. Ignition OFF Engine OFF 2. Disconnect all ECU connectors. 3. Measure the resistance between J3-C1 and all other terminals in the other ECU connectors. Were any readings less than 5 ohms?	**YES:** Repair short in wiring and GO TO 1 **NO:** GO TO 22 – – –1/1
22 Wiring Harness Check	Look for pinched or melted wiring Was a wiring problem found?	**YES:** Repair wiring, and GO TO 1 **NO:** Remove and replace ECU – – –1/1
23 Occurrence Count Check	Review stored information and look at occurrence count Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO 24 **NO:** GO TO 25 – – –1/1
24 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on fuel rail pressure sensor connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 **NO:** GO TO 25 – – –1/1

9 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:** Repair problem if found. If a certain operating point exists when error occurs then GO TO 10 **NO:** GO TO 11 – – –1/1

10 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 157.10 reappear when engine operating point was reached?	**YES:** GO TO 2 **NO:** GO TO 9 and confirm operating point. – – –1/1

11 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on fuel rail pressure sensor connector and ECU connector J1. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor. **NO:** GO TO 12 – – –1/1

12 Software Updates	1. Download latest ECU software payload. 2. Ignition ON, Engine OFF. 3. Reprogram ECU using Service Advisor. 4. Ignition ON, Engine ON. 5. Warm up engine then set throttle to high idle. 6. Rapidly return to low idle. Is 000157.10 active?	**YES:** Replace rail pressure sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor. **NO:** Problem fixed, bad ECU program. – – –1/1

000174.03 — Fuel Temperature Signal Out of Range High

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

RG41221,000022C –19–09APR08–1/1

13 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 3 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load. Did DTC 000105.16 reappear as active with engine running?	**YES:** Problem not fixed. Verify cooling and fuel system and related parameters are functioning properly. GO TO 1 **NO:** Problem fixed. – – –1/1

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14 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	**YES:** Found a possible problem. Repair possible problem. Retest. **YES:** Found operating point at which the code becomes active. Try to determine cause. Repair and retest. **NO:** Contact dealer or DTAC. – – –1/1

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 room temperature 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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❶ **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. Ignition ON, Engine ON. 4. Let engine idle for 3 minutes before proceeding. 5. 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. 6. Refresh Codes. Did 000412.00 reappear active?	**YES:** GO TO 2 **NO:** GO TO 14 – – –1/1

❷ **Check Intake Manifold Air Temperature**	1. Ignition ON, Engine ON. 2. Let engine run for 3 minutes. 3. Refresh codes from within Service Advisor. Are any DTCs related to high intake manifold air temperature active. (105.15, 105.16, or 105.00)?	**YES:** GO TO 3 **NO:** GO TO 5 – – –1/1

9 Check Sensor Circuit Continuity	1. On the harness, measure the resistance between ECU J03-E2 and EGR exhaust temperature sensor T03-A. 2. On the harness, measure the resistance between ECU J03-B2 and EGR exhaust temperature sensor T03-B. Were both resistance measurements less than 10 ohms?	**YES:** GO TO 10 **NO:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1

10 Check for Signal Shorted to Ground	On the harness, measure the resistance between ECU J03-E2 and single point ground. Was the resistance less than 1k ohms?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 11 – – –1/1

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11 Check for DTC Active Status Change with J03 Disconnected	*NOTE: Many new error codes will appear in the next step. Disregard all codes except 000412.04.* 1. Verify ECU J03 connector is still disconnected. 2. Ignition ON, Engine OFF. 3. Refresh codes. Is DTC 000412.04 still active with J03 disconnected?	**YES:** GO TO 15 **NO:** GO TO 12 – – –1/1

12 Check for Wire-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU connectors J01 and J02. 3. Measure the resistance between ECU J03-E2 and all other terminals in the ECU harness connectors J01, J02, and J03. Was any measurement less than 100k ohms?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 13 – – –1/1

⑩ Check Signal Wire In Harness	*NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000412.03* 1. Ignition OFF, Engine OFF. 2. Disconnect the EGR temperature sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 000412.03 become active?	**YES:** ECU has not been reprogrammed. GO TO 12 **YES:** ECU has been reprogrammed. Wire harness is OK. Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 **NO:** GO TO 11 – – –1/1

⑪ Check ECU	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000412.03 become active?	**YES:** Problem in harness. Perform TERMINAL TEST on ECU connector J3. Diagnose and fix harness problem. GO TO 13 **NO:** ECU has not been reprogrammed. GO TO 12 **NO:** ECU has been reprogrammed. Replace ECU. GO TO 13 – – –1/1

⑫ Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 000412.16 still active?	**YES:** Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 **NO:** Verify problem is fixed. GO TO 13 – – –1/1

13 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. Monitor DTCs in Service ADVISOR. 5. Refresh DTCs. 6. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 7. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000611.04 reappear active?	**YES:** GO TO 1 **NO:** Problem fixed. – – –1/1

14 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. **YES:** If a certain operating point exists when error occurs then GO TO 15 **NO:** GO TO 16 – – –1/1

15 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh codes. Did 000611.04 reappear active when engine operating point was reached?	**YES:** GO TO 1 **NO:** GO TO 16 – – –1/1

16 Terminal Test and Harness Inspection	**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 and injector harness connector. 3. Inspect engine wire harness and injector harness carefully for damage which may cause an intermittent short to ground. Were any problems found?	**YES:** Fix problem. GO TO 13 **NO:** GO TO 17 – – –1/1

❷ **Reprogram ECU**	1. Download latest ECU payload and reprogram ECU. 2. Disconnect Service ADVISOR. 3. Ignition OFF, engine OFF for 5 minutes. 4. Ignition ON, engine OFF. 5. Connect Service ADVISOR Did 000629.12 reappear active?	**YES:** GO TO 3 **NO:** Problem fixed. – – –1/1

❸ **Replace ECU**	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Disconnect Service ADVISOR. 4. Ignition OFF, engine OFF for 5 minutes. 5. Ignition ON, engine OFF. 6. Connect Service ADVISOR Did 000629.12 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

000636.06 — Camshaft Position Circuit Has Low Resistance

The ECU detects high current on the camshaft position sensor wiring.

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❺ Check for Loose Sensor	*NOTE: See REMOVE AND INSTALL PUMP POSITION SENSOR in Section 02, Group 110 earlier in this manual for sensor torque specifications.* 1. Ignition OFF, engine OFF. 2. Disconnect camshaft position sensor connector. 3. Verify camshaft position sensor installation torque. Was camshaft position sensor fully threaded into mounting hole?	**YES:** GO TO 6 **NO:** Torque sensor to specified value. GO TO 22 – – –1/1

❻ Test Sensor Terminals	Perform TERMINAL TEST on camshaft position sensor and connector. Were any problems found?	**YES:** Fix problem. GO TO 22 **NO:** GO TO 7 – – –1/1

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❼ Inspect Target	1. Remove camshaft position sensor. 2. Using mirror, visually inspect webs on rear face of upper idler gear through the sensor mounting hole as engine is rotated. Look for burs, chips, or debris on webs and rear face of gear. Were any problems found?	**YES:** Fix problem. GO TO 22 **NO:** GO TO 8 – – –1/1

❽ Inspect Sensor	Examine tip of camshaft position sensor for damage due to contact with upper idler gear Does sensor appear damaged due to contact with gear?	**YES:** Replace camshaft position sensor. Determine cause if replacement sensor also becomes damaged. GO TO 22 **NO:** GO TO 9 – – –1/1

11 Inspect Crank Sensor	Examine tip of crankshaft position sensor for damage due to contact with timing wheel Does sensor appear damaged due to contact with timing wheel?	**YES:** Replace crankshaft position sensor. Determine cause if replacement sensor also becomes damaged. GO TO 12 **NO:** Replace crankshaft position sensor. GO TO 12 – – –1/1

12 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000637.05 reappear active?	**YES:** GO TO 1 **NO:** Problem fixed. – – –1/1

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 room temperature 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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❶ **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. Start or crank engine. 5. Refresh DTCs. Did 000637.08 reappear active with engine running or cranking?	**YES:** GO TO 2 **NO:** GO TO 19 – – –1/1
❷ **Check for Open or Shorted Sensor Circuit**	1. Ignition ON, engine OFF. 2. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is DTC 000637.05 or 000637.06 now an active DTC?	**YES:** Discontinue test for 000637.08 and perform test for 000637.05 or 000637.06. **NO:** GO TO 3 – – –1/1
❸ **Check for Loose Sensor**	*NOTE: See REMOVE AND INSTALL CRANKSHAFT POSITION SENSOR in Section 02, Group 110 earlier in this manual for sensor torque specifications.* 1. Ignition OFF, engine OFF. 2. Disconnect crankshaft position sensor connector. 3. Verify crankshaft position sensor installation torque. Was crankshaft position sensor fully threaded into mounting hole?	**YES:** GO TO 4 **NO:** Torque sensor to specified value. GO TO 18 – – –1/1

❻ **Power Connection Check Two**	Measure resistance between VGT actuator power (terminal 1) and the ECU VGT power (J1 terminal H4) in the engine harness. Is resistance less than 1 ohm?	**YES:** GO TO 7 **NO:** Repair connection. Reconnect all connectors and retest. – – –1/1
❼ **ECU Internal Resistance Check**	Measure resistance between the ECU VGT power (J1 terminal H4) and ECU ground (J2 terminal M2) on the ECU. Is resistance between 4.5k and 5.5k ohms?	**YES:** Everything checks good. Reconnect all connectors and retest. **NO:** Wiring checks good. Replace ECU and retest. – – –1/1
❽ **Occurrence Count Check**	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review occurrence counts in the snapshot capture information for this code. Is count greater than five?	**YES:** GO TO 9 **NO:** GO TO 10 – – –1/1
❾ **VGT Actuator and ECU Connector Terminal Test**	1. Disconnect VGT actuator connector and all ECU connectors. 2. Perform TERMINAL TEST on all connectors. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. **NO:** GO TO 10 – – –1/1
❿ **Further Review of Snapshot Information**	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	**YES:** Found a possible problem. Repair possible problem. Run HARNESS DIAGNOSTIC MODE TEST. **YES:** Found operating point at which the code becomes active. GO TO 11 **NO:** GO TO 13 – – –1/1
⓫ **Engine Error Operating Point Test**	1. Ignition ON, Engine ON. 2. Set engine to operating point that caused error. Is 000641.04 active?	**YES:** GO TO 12 **NO:** GO TO 17 – – –1/1

000641.13 — VGT Actuator Learn Error Diagnostic Procedure

Troubleshooting Sequence:
000641.13

When DTC is Displayed:
After running the HARNESS DIAGNOSTIC MODE TEST or INSTALL TURBOCHARGER ACTUATOR.

Related Information:
The ECU receives a message from the actuator stating it could not reach its expected end points during the turbo learn portion of the HARNESS DIAGNOSTIC MODE TEST or TURBOCHARGER ACTUATOR CALIBRATION.

Alarm Level:
Warning

Control Unit Response:
Engine will continue to operate without any performance loss.

Additional References:
For more turbo actuator information, see TURBOCHARGER ACTUATOR in Section 03, Group 135 earlier in this manual.

For more turbocharger information, see VARIABLE GEOMETRY TURBOCHARGER (VGT) OPERATION (TIER 3/STAGE IIIA) in the base engine 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 7
- see 4.5L 24V ECU WIRING DIAGRAM 7
- see 6.8L 12V ECU WIRING DIAGRAM 7
- see 6.8L 24V ECU WIRING DIAGRAM 7

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 or INSTALL TURBOCHARGER ACTUATOR the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). These tests are 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. See TERMINAL TEST.

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 room temperature 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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❶ 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 DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). *NOTE: Fuel Rail Pressure - Actual must be below 5 MPa (725 psi) or the HARNESS DIAGNOSTIC MODE TEST results will be invalid.* 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000651.05 reappear active?	**YES:** GO TO 2 **NO:** GO TO 10 – – –1/1
❷ Terminal Test	**CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON!** *NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.* 1. Ignition OFF, engine OFF. 2. Disconnect 12-way (6.8L) or 6-way (4.5L) connector between engine harness and injector harness. 3. Perform TERMINAL TEST on injector harness connector. Were any problems found?	**YES:** Fix problem. GO TO 9 **NO:** GO TO 3 – – –1/1

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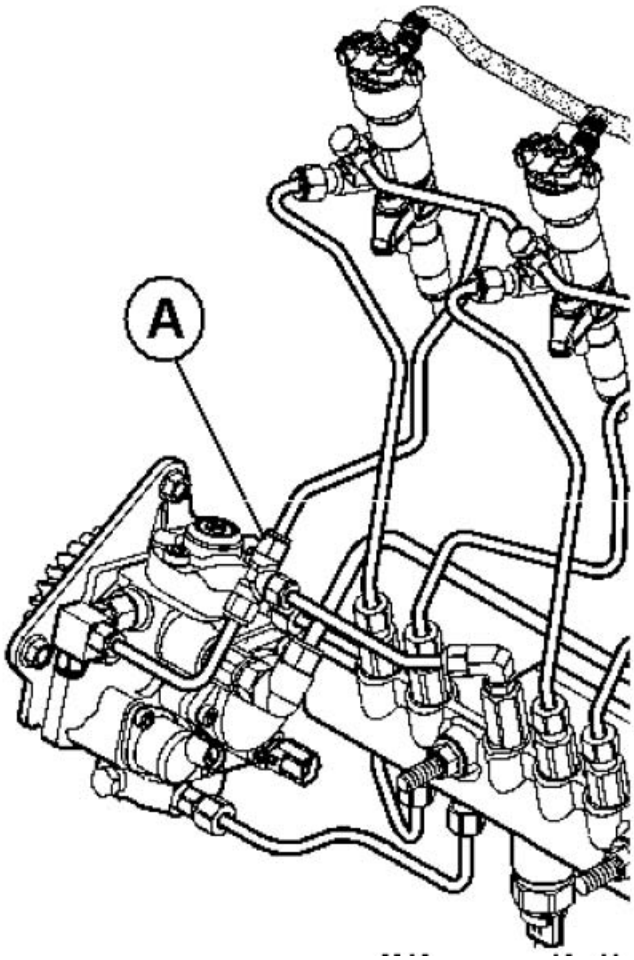
❹ Injector Flow Rate Test

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.



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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.

Specification

4.5L—Volume ..... 0.6 L (20 oz)

Specification

6.8L—Volume ..... 0.7 L (24 oz)

Is the collected amount more than the specification?

YES: Replace injector #1. GO TO 11

NO: GO TO 5

– – –1/1

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 – – –1/1
11 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000652.05 reappear active when engine operating point was reached?	**YES:** GO TO 1 **NO:** GO TO 12 – – –1/1
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 #2, and injector harness connector. Were any problems found?	**YES:** Fix problem. GO TO 9 **NO:** GO TO 13 – – –1/1
13 Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000652.05 reappear active with engine running?	**YES:** GO TO 1. **NO:** GO TO 14. – – –1/1

11 DTC Check	Ignition ON, Engine Idling. Is 000652.07 active?	**YES:** Start a DTAC case. **NO:** Problem fixed. – – –1/1

000653.06 — Injector #3 Circuit Has Low Resistance

The ECU detects a low resistance in the cylinder #3 electronic injector circuit.

RG41221,000025A –19–04OCT07–1/1

❷ **Verification and Reentry of QR Code**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Check the written code against the one displayed. 4. Type it back in again. Did the ECU accept the QR code?	**YES:** Problem fixed. **NO:** GO TO 3 – – –1/1
❸ **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 installed from the list. Did the ECU accept the QR code?	**YES:** Problem fixed. **NO:** GO TO 4 – – –1/1
❹ **Retrieve New Injector Calibration File**	Download a new injector calibration file, see DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILES earlier in this Group. Were you able to get a new calibration file?	**YES:** GO TO 5 **NO:** GO TO 6 – – –1/1
❺ **Automatic Input of Injector Data**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the serial number of the injector file downloaded from the list of injectors. Did the ECU accept the QR code?	**YES:** Problem fixed. **NO:** GO TO 6 – – –1/1
❻ **ECU Programming**	1. Download the latest ECU software. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO 7 **NO:** Replace ECU. GO TO 3 – – –1/1

❶ **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 DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). *NOTE: Fuel Rail Pressure - Actual must be below 5 MPa (725 psi) or the Harness Diagnostic Mode Test results will be invalid.* 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000654.06 reappear active?	**YES:** GO TO 2 **NO:** GO TO 11 – – –1/1
❷ **Check for DTC Change with Open Injector Harness**	**CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON!** *NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.* 1. Ignition OFF, engine OFF. 2. Disconnect 12-way (6.8L) or 6-way (4.5L) connector between engine harness and injector harness. 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 000654.05, high injector #4 resistance, become active? *NOTE: Ignore DTCs for high resistance in the other injector circuits that may now be active because of this test.*	**YES:** GO TO 3 **NO:** Do not reconnect injector harness connector. GO TO 5 – – –1/1

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000655.02 — Injector #5 Part # Data Invalid

The ECU detects an incorrect injector part number was installed or calibrated into cylinder #5.

RG41221,0000262 –19–09APR08–1/1

000655.02 — Injector #5 Part # Data Invalid Diagnostic Procedure

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Troubleshooting Sequence:
000655.02

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will try to maintain the engine operating envelope.

Related Information:
The ECU detects an incorrect injector part number was programmed into the ECU. The engine performance may be drastically effected. The engine will also be out of compliance with Tier 3 emission requirements.

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

For more information on the fuel system, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.

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❶ **Part Number Input Method Check**	Was the part number typed in manually?	**YES:** GO TO 2 **NO:** GO TO 8

– – –1/1

11 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 10 **YES:** If a certain operating point exists when error occurs then GO TO 12 **NO:** GO TO 13 – – –1/1

12 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000655.06 reappear active when engine operating point was reached?	**YES:** GO TO 1 **NO:** GO TO 13 – – –1/1

13 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 #5, and injector harness connector. Were any problems found?	**YES:** Fix problem. GO TO 10 **NO:** GO TO 14 – – –1/1

14 Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000655.06 reappear active with engine running?	**YES:** GO TO 1. **NO:** GO TO 15. – – –1/1

000656.05 — Injector #6 Circuit Has High Resistance

The ECU detects a high resistance in the cylinder #6 electronic injector circuit.

RG41221,0000263 –19–04OCT07–1/1

❸ **Misfire Test**	1. Ignition ON, Engine OFF. 2. Perform Cylinder Cutout Test and record results. 3. Perform Cylinder Misfire Test and record results. Do tests confirm a bad injector #6?	**YES:** Replace injector #6. GO TO 11 **NO:** GO TO 4 – – –1/1

❶ 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. Disconnect fuel temperature sensor connector to cause the ECU to attempt to energize the cold start aid relay at next key cycle. *NOTE: Ignore DTC 000174.03 which will be generated due to fuel temperature sensor being disconnected.* 5. Clear DTCs. 6. Ignition OFF, engine OFF for 10 seconds. 7. Ignition ON, engine OFF. 8. Refresh DTCs. Did 000676.05 reappear active or stored?	**YES:** GO TO 2 **NO:** GO TO 11 – – –1/1

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❷ Check Cold Start Aid Relay Voltage Supply	1. Ignition OFF, engine OFF. 2. Measure the voltage from the cold start aid relay battery voltage supply terminal (cable between alternator output and cold start aid relay) to single point ground. Is voltage within 1V of battery terminal voltage?	**YES:** GO TO 3 **NO:** Check for blown or missing cold start aid fuse, loose connections, or open circuit. Fix problem. GO TO 10 – – –1/1

❸ Check Cold Start Aid Relay Output Voltage	1. Verify fuel temperature sensor is still disconnected. 2. Ignition ON, engine OFF. Cold Start Aid relay should be energized for approximately 15 seconds. 3. Measure voltage from cold start aid relay output terminal (C05) to single point ground while ECU is attempting to energize relay. Is voltage within 5V of battery terminal voltage?	**YES:** GO TO 4 **NO:** GO TO 5 – – –1/1

❶ **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 000970.31 reappear active?	**YES:** GO TO 2 **NO:** GO TO 14 – – –1/1

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❷ **Check Condition That Set Switch**	1. Ignition OFF, Engine OFF. 2. Refer to application manual to find what device is connected to external derate switch. 3. Inspect device for parameter that may have caused external fuel derate switch to be activated. Depending on application, this may be wiring, mechanical linkage, or an environmental condition. Was a possible problem or operating point found that could cause the external derate switch to be activated?	**YES:** Repair problem. Retest application to verify DTC 971.31 is inactive. **NO:** No problem found. GO TO 3 – – –1/1

❸ **Terminal Test**	1. Ignition OFF, Engine OFF. 2. Remove wires or connector from external derate switch. 3. Perform TERMINAL TEST on connector and external derate switch. 4. Inspect surrounding area for pinched or melted wires. Were any problems found with the wiring or connectors?	**YES:** Repair problem. GO TO 13 **NO:** GO TO 4 – – –1/1

001075.12 — Low Pressure Fuel Pump Status Error

The ECU detects an error in the low pressure fuel pump system.

DN22556,0000630 –19–28MAY08–1/1

❻ **Verification**	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 10 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load. Did DTC 001136.00 reappear as active with engine running?	**YES:** GO TO 1 **NO:** Problem fixed. – – –1/1

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❼ **Review Snapshot Information**	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	**YES:** Found a possible problem. Repair possible problem. Retest. **YES:** Found operating point at which the code becomes active. Try to determine cause. Repair and retest. **NO:** Contact dealer or DTAC. – – –1/1

❺ **Sensor Shorted to Ground Test**	On the compressor inlet temperature sensor, measure the resistance between either terminal and single point ground. Is the resistance less than 1k ohms?	**YES:** Replace compressor inlet temperature sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 6 – – –1/1

❻ **Sensor Internal Short Test**	On the compressor inlet temperature sensor, measure the resistance between terminal A and terminal B. Is the resistance less than 50 ohms?	**YES:** Replace compressor inlet temperature sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 7 – – –1/1

❼ **Check for Intermittent Short to Ground**	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor Turbo Compressor Inlet Temperature Input Voltage data point in Service ADVISOR while gently wiggle wire harness between compressor inlet temperature sensor and ECU J03 connector. *NOTE: The turbo compressor inlet temperature input voltage will decrease to approximately 0V when the sensor circuit is shorted to ground.* Was the source of the intermittent short to ground found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Replace compressor inlet temperature sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1

❽ **Terminal Test**	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform TERMINAL TEST on terminals J03-D1 and J03-H3. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 9 – – –1/1

001180.16 — Calculated Turbine Inlet Temperature Signal Moderately High Diagnostic Procedure

Troubleshooting Sequence:
Any DTC with SPN 000107
Any DTC with SPN 000102
Any DTC with SPN 000103
Any DTC with SPN 000105
000108.02
Any DTC with SPN 000110
Any DTC with SPN 000157
Any DTC with SPN 000412
Any DTC with SPN 000641
Any DTC with SPN 001172
Any DTC with SPN 002630
Any DTC with SPN 002791
002795.07
001180.16

When DTC is Displayed:
The engine is running and the error condition is active.

Related Information:
The ECU calculates that the turbo turbine inlet temperature is greater than a programmed value.
There is no physical turbine inlet temperature sensor. The ECU uses information from the manifold air temperature sensor, MAP sensor, and other measured or calculated values to calculate the turbine inlet temperature.
This DTC may be caused by any condition that limits intake air flow including intake air restrictions, charge air (boost) leaks, or turbo problems.
A false measurement obtained from one of the sensors used to calculate turbine inlet temperature may cause DTC 001180.16 to be falsely generated.

Alarm Level:
Warning

Control Unit Response:
Maximum engine power is derated up to 5 percent.

Additional References:
For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

For more information on charge air system test, see CHARGE AIR SYSTEM in Section 04, Group 150 earlier in this manual.

For more information on variable geometry turbo test, see VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST in Section 04, Group 150 earlier in this manual.

Continued on next page

001347.05 — Suction Control Valve Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:
001347.03
001347.05

When DTC is Displayed:
The engine is cranking or running, during Harness Diagnostic Mode Test, at key ON ECU startup process and the error condition is active.

Alarm Level:
Warning

Control Unit Response:
The ECU will not be able to control the high pressure pump suction control valve.

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Related Information:
Typically this means that there is a short to ground or an open in the high pressure fuel pump suction control valve circuit. The engine will probably not start because the valve is wide open which will cause maximum pressure which will trip the pressure relief valve on the rail.

Additional References:
For more suction control valve information, see SUCTION CONTROL VALVE in Section 03, Group 140 earlier in this manual.

For more information on the fuel system, see FUEL SYSTEM 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 room temperature 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.

001639.01 — Fan Speed Signal Extremely Low

For troubleshooting procedures please see the application troubleshooting manual.

WL30140,0000035 –19–28MAY08–1/1

9 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 002630.00 still active?	**YES:** Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 **NO:** Verify problem is fixed. GO TO 10 – – –1/1
10 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 3 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load. Did DTC 002630.00 reappear as active with engine running?	**YES:** Problem not fixed. Recheck connectors and engine parameters that effect the exhaust system. GO TO 1 **NO:** Problem fixed. – – –1/1
11 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active. 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	**YES:** Found a possible problem. Repair possible problem. Retest. **YES:** Found operating point at which the code becomes active. GO TO 2 **NO:** Start DTAC case. – – –1/1

002630.15 — Charge Air Cooler Outlet Temperature Signal Slightly High Diagnostic Procedure

Troubleshooting Sequence:
Any DTC with SPN 000102
Any DTC with SPN 000103
Any DTC with SPN 001172
Any DTC with SPN 000110
002630.15

When DTC is Displayed:
When the engine has been running 3 minutes and the error is active.

Related Information:
The ECU senses an charge air cooler outlet temperature of 88° C (190° F) on OEM engines.
The engine has to be running for 3 minutes before the code is set.

Alarm Level:
Warning

Control Unit Response:
The ECU continues to control the engine in normal operating parameters.

Additional References:
For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.
For further charge air cooler outlet air temperature sensor information, see CHARGE AIR COOLER OUTLET AIR TEMPERATURE SENSOR 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 further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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❹ Check Air Temperature Sensors on a Warm Engine	1. Ignition OFF, engine OFF. 2. Remove the following sensors from the engine and permit sensors to cool to ambient temperature for 20 minutes: a. Charge air cooler outlet sensor b. Manifold air temperature sensor c. EGR temperature sensor 3. Reconnect each sensor to the respective harness connector. Do not permit sensor to contact warm engine components and do not touch the sensor probes during reconnection. *NOTE: The charge air cooler outlet sensor (connector T01) and the manifold air temperature sensor (connector T02) are identical parts and are located close to each other. Verify that the sensors are connected to the harness correctly.* 4. Ignition ON, engine OFF. 5. Monitor the temperature reported by the following data points in Service ADVISOR: a. Charge Air Cooler Outlet Temperature b. Manifold Air Temperature c. EGR Temperature Are the temperatures reported by these data points within the following specifications? • Charge Air Cooler Outlet Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of Charge Air Cooler Outlet Temperature or Manifold Air Temperature.	**YES:** GO TO 15 **NO:** GO TO 5 – – –1/1

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❺ Temperature Sensor Validity Test	Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors while monitoring the applicable data point: • Charge air cooler outlet sensor (Charge Air Cooler Outlet Temperature data point) • Manifold air temperature sensor (Manifold Air Temperature data point) • EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • Charge Air Cooler Outlet Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of Charge Air Cooler Outlet Temperature or Manifold Air Temperature.	**YES:** GO TO 15 **NO:** Charge Air Cooler Outlet Temperature is higher or lower than the other two temperatures. GO TO 6 **NO:** Manifold Air Temperature is higher or lower than the other two temperatures. GO TO 8 **NO:** EGR Temperature is higher or lower than the other two temperatures. GO TO 10 – – –1/1

15 Check EGR Valve Operation	1. Reconnect EGR valve connector and secure EGR valve to the engine. Do not permit valve to be suspended from wire harness. 2. Reconnect all other electrical connectors. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR while observing EGR valve. Did EGR valve open and close one time without generating any DTCs with SPN 002791?	**YES:** Reinstall EGR valve. GO TO 16 **NO:** DTC with SPN 002791 is now active. Discontinue test for 2659.15 and perform test for DTC with SPN 002791. **NO:** EGR valve did not open and close but no DTCs with SPN 002791 were generated. Replace EGR valve. GO TO 16 – – –1/1

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16 EGR-VGT System Temperature and Flow Test	1. Ignition OFF, engine OFF. 2. Reinstall all sensors. 3. Reconnect all electrical connectors. 4. Perform EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST. Were EGR-VGT System Temperature and Flow Test results good?	**YES:** GO TO 17 **NO:** Step 2 or 3 was performed earlier during this procedure. GO TO 19 **NO:** Step 2 or 3 was NOT performed earlier during this procedure. GO TO 3 – – –1/1

17 Recreate Operating Point	Recreate the engine operating point where 002659.15 became active as indicated by the snapshot capture and snapshot recording obtained in Step 1 and maintain for at least 10 minutes. Is 002659.15 active?	**YES:** ECU has NOT been reprogrammed during this procedure. GO TO 18 **YES:** ECU was reprogrammed during this procedure. Open DTAC case. **NO:** Problem fixed. – – –1/1

- see 4.5L 24V ECU WIRING DIAGRAM 2, 4.5L 24V ECU WIRING DIAGRAM 3
- see 6.8L 12V ECU WIRING DIAGRAM 2, 6.8L 12V ECU WIRING DIAGRAM 3
- see 6.8L 24V ECU WIRING DIAGRAM 2, 6.8L 24V ECU WIRING DIAGRAM 3

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

For more information on charge air system test, see CHARGE AIR SYSTEM in Section 04, Group 150 earlier in this manual.

For more information on variable geometry turbo test, see VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST in Section 04, Group 150 earlier in this manual.

For more information on air temperature and flow system test, see EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST in Section 04, Group 150 earlier in this manual.

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

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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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. Is 000103.00 or 000103.08 a stored DTC which occurred at nearly the same engine hours as 002790.16?	**YES:** Discontinue test for 002790.16 and perform test for 000103.00 or 000103.08. **NO:** GO TO 2

IMPORTANT: When replacing the EGR valve be sure to:

- Change gasket and O-rings.
- Lubricate O-rings with clean engine oil.
- Clean O-ring lands if necessary with a non metallic instrument.
- Inspect intake manifold for debris and buildup.
- Vacuum debris from intake manifold.

IMPORTANT: Ensure valve seats easily by hand when installing.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST or EXHAUST GAS RECIRCULATION VALVE CALIBRATION the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). These tests are 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. See TERMINAL TEST for information on use.

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❶ 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 002791.03 reappear active?	**YES:** GO TO 2 **NO:** GO TO 19
		– – –1/1
❷ Valve Position Check	Using Service ADVISOR read EGR valve position input voltage. Is voltage below 5.5 volts?	**YES:** GO TO 3 **NO:** GO TO 16
		– – –1/1

002791.07 - EGR Valve Not Reaching Expected Position Diagnostic Procedure

Troubleshooting Sequence:
003513.03 or 003513.04
002791.03 or 002791.04
002791.07

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

Related Information
The ECU detects that the exhaust gas recirculation valve is not responding or is out or adjustment.

Alarm Level:
Warning

Control Unit Response:
The ECU will try to maintain the engine operating envelope.

Additional References:
For more information on the EGR valve, see EXHAUST GAS RECIRCULATION VALVE in Section 03, Group 135 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 7
- see 4.5L 24V ECU WIRING DIAGRAM 7
- see 6.8L 12V ECU WIRING DIAGRAM 7
- see 6.8L 24V ECU WIRING DIAGRAM 7
located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST earlier in this Group.

For component location information see COMPONENT LOCATION in Section 3 Group 140 earlier in this manual.

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002791.31 — EGR Valve Calibration Change over a Long Time Diagnostic Procedure

Troubleshooting Sequence:
003513.03 or 003513.04
002791.03 or 002791.04
002791.13
002791.07
002791.02
002791.31

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

Related Information
This code indicates the EGR valve Open and Closed learned values have moved out side of programmed tolerance over a long period of time.

The ECU detects the EGR valve end points are out of specification.

Alarm Level:
Warning

Control Unit Response:
The ECU will try to maintain the engine operating envelope.

Additional References:
For more information on the EGR valve see EXHAUST GAS RECIRCULATION VALVE in Section 03, Group 135 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 7
- see 4.5L 24V ECU WIRING DIAGRAM 7
- see 6.8L 12V ECU WIRING DIAGRAM 7
- see 6.8L 24V ECU WIRING DIAGRAM 7

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

For more information on connector and terminal testing see TERMINAL TEST earlier in this Group.

For component location information see COMPONENT LOCATION in Section 3 Group 140 earlier in this manual.

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❽ **Engine Error Operating Point Test**	1. Ignition ON, Engine ON. 2. Set engine to operating point of failure and refresh codes. Did 003509.03 reappear when engine operating point was reached?	**YES:** Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **YES:** GO TO 2 **NO:** GO TO 7 and confirm the operating point. – – –1/1

❾ **Retest**	1. Ignition ON, Engine OFF. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 3. Refresh codes. Is 003509.03 active?	**YES:** GO TO 2 **NO:** GO TO 10 – – –1/1

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❿ **Software Updates**	1. Download latest ECU software payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 003509.03 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, bad ECU program. – – –1/1

❷ **Disconnect Related Components**	*NOTE: New codes will appear as sensors are disconnected. Disregard all codes except 3510.04.* Part 1 1. Ignition OFF, Engine OFF. 2. Disconnect one of the related sensors/components listed below. • *Oil Pressure Sensor* • *Manifold Air Pressure.* • *Low Pressure Fuel Pressure (optional).* 3. Ignition ON, Engine OFF. 4. Refresh codes. Has 003510.04 moved to the stored list?	**YES:** GO TO 3 **NO:** GO TO Part 2.
	Part 2 Have all related sensors from step 1 been disconnected and 003510.04 still active?	**YES:** GO TO 6 **NO:** GO TO Part 1, Step 1. – – –1/1

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,949

❸ **Terminal Test**	1. Ignition OFF, Engine OFF. 2. Perform TERMINAL TEST on the connector of the sensor just removed. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. **NO:** GO TO 4 – – –1/1

❹ **Check For Shorted Component**	Part 1 Measure the resistance between each of the terminals on the component just disconnected and record. Were any measurements less than 10 ohms?	**YES:** Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST. **NO:** GO TO Part 2.
	Part 2 Measure the resistance from each terminal on the component to chassis ground Were any measurements less than 10 ohms?	**YES:** Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST. **NO:** GO TO 5 – – –1/1

003512.03 — Sensor Supply #4 Voltage Out of Range High

The ECU detects a supply voltage above specification on the ECU 5 volt supply circuit.

RG41183,0000131 –19–04OCT07–1/1

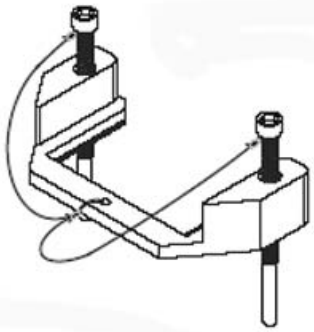
❽ **Engine Error Operating Point Test**	1. Ignition ON, Engine ON. 2. Set engine to operating point of failure and refresh codes. Did 003513.03 reappear when engine operating point was reached?	**YES:** Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **YES:** GO TO 2 **NO:** GO TO 7 – – –1/1

❾ **Retest**	1. Ignition ON, Engine OFF. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 3. Refresh codes. Is 003513.03 active?	**YES:** GO TO 2 **NO:** GO TO 10 – – –1/1

❿ **Software Updates**	1. Download latest ECU software payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 003513.03 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, bad ECU program. – – –1/1

EGR Removal Tool JDG10194

Used to remove EGR valve without damaging O-rings.



RG14880 –UN–08AUG06

EGR Removal Tool

RE38635,000014B –19–04AUG07–10/10

Item	Measurement	Specification
High Pressure Common Rail to Bracket	Torque	70 N•m (52 lb-ft)
High Pressure Delivery Lines to Rail	Torque	30 N•m (22 lb-ft)
High Pressure Delivery Lines to Pump	Torque	30 N•m (22 lb-ft)
Flow Damper	Torque	176 N•m (130 lb-ft)
High Pressure Injector Line (both ends)	Torque	30 N•m (22 lb-ft)
Pressure Limiter	Torque	176 N•m (130 lb-ft)
High Pressure Common Rail Leak Off Line	Torque	6 N•m (4 lb-ft), (53 lb-in.)
Injector Terminal Nut	Torque	2.2 N•m (19.5 lb-in.)
Injector Connector	Torque	2.2 N•m (19.5 lb-in.)
Rocker Arm Cover	Torque	10 N•m (7 lb-in.)
Side Feed Tube Fitting, First Torque	Torque	5 N•m (3.7 lb-ft) (44 lb-in.)
Electronic Injector Clamp Screw	Torque	47 N•m (35 lb-ft)
Side Feed Tube Fitting, Second Torque	Torque	35 N•m (26 lb-ft)
HPCR Delivery Line	Torque	27 N•m (20 lb-ft)
Injector Solenoid Wire Retaining Nut	Torque	2 N•m (1.5 lb-ft) (18 lb-in.)
Heat Shield Cylinder Head Cap Screw	Torque	60 N•m (44 lb-ft)
Heat Shield-to-Rocker Arm Cover	Torque	10 N•m (7 lb-ft)
Suction Control Valve to Pump Housing	Torque	9 N•m (7 lb-in.)

RG41221,00001CE –19–26SEP07–2/2

A—Female Socket
B—Male Pin
C—See Diagram (3)
D—Twisted Pair
D01—Water In Fuel Sensor
J03—ECU Harness Connector (Blue Face)
J3-C1—[5475 Dark Green] Fuel Rail Pressure Signal
J3-C2—[5469 White] Low Pressure Fuel Signal
J3-C3—[5467 Purple] Engine Oil Pressure Signal
J3-C4—[5468 Gray] Intake Manifold Air Pressure Signal
J3-D2—[5453 Orange] Water In Fuel Signal
J3-F3—[5448 Gray] Crank Position Return
J3-F4—[5447 Purple] Crank Position Pulse
J3-G1—[5946 Light Blue] 5 Volt Power Supply #1 Positive
J3-G2—[5427 Purple] 5 Volt Power Supply #1 Negative
J3-G3—[5443 Orange] Pump Position Return
J3-G4—[5445 Dark Green] Pump Position Pulse
J3-H3—[5414A Yellow] 5 Volt Power Supply #2 Negative
J3-H4—[5416A Light Blue] 5 Volt Power Supply #2 Positive
P01—Intake Manifold Air Pressure Sensor
P03—Low Pressure Fuel Sensor (If Equipped)
P03A—Low Pressure Fuel Sensor Interconnect Option
P04—Engine Oil Pressure Sensor
P05—Fuel Rail Pressure Sensor
X01—Crank Position Sensor
X02—Pump Position Sensor

BK53208,0000003 –19–25JAN08–2/2

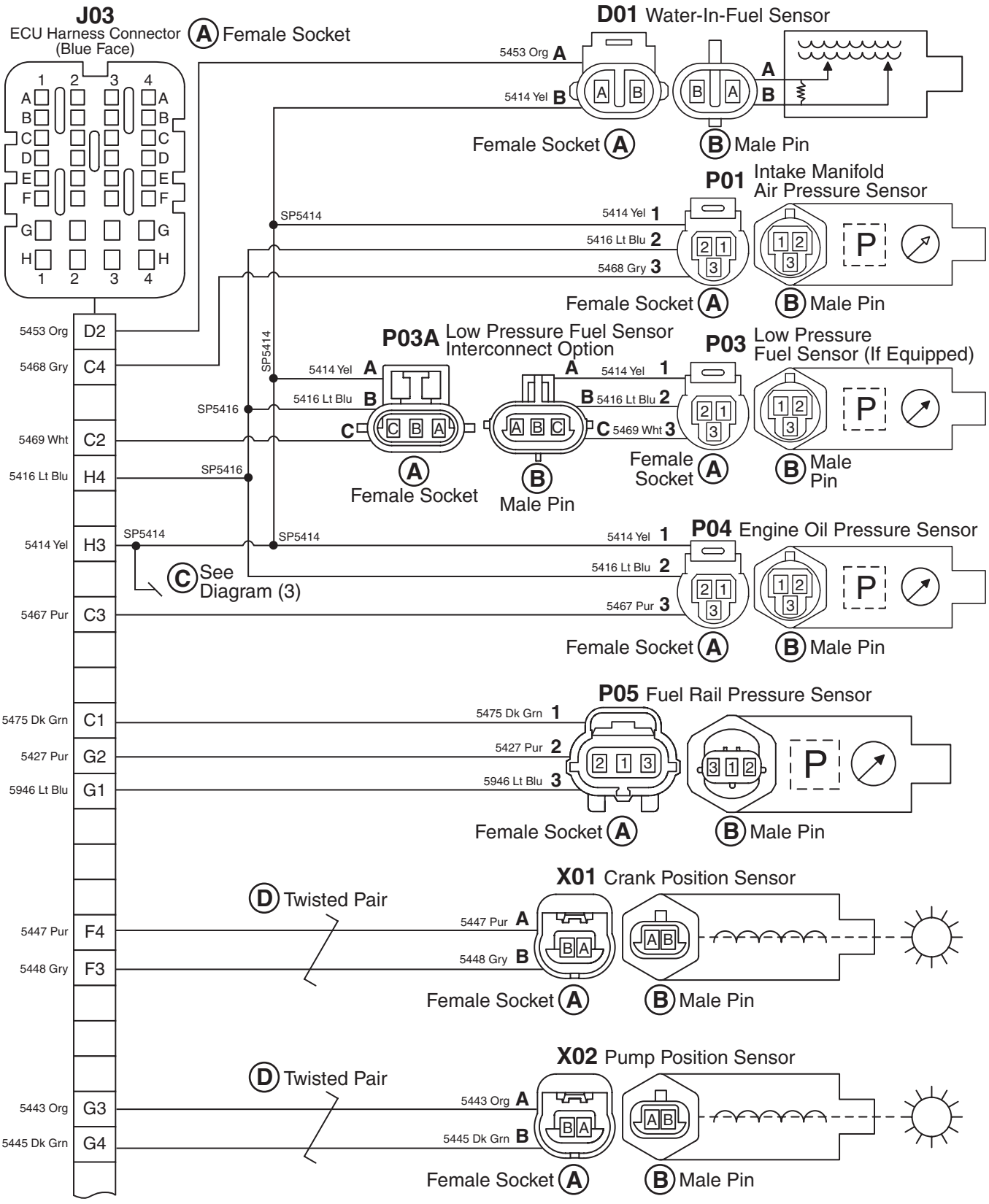
A—Female Socket
B—Male Pin
C—See Diagram (3)
D—Twisted Pair
D01—Water In Fuel Sensor
J03—ECU Harness Connector (Blue Face)
J3-C1—[5475 Dark Green] Fuel Rail Pressure Signal
J3-C2—[5469 White] Low Pressure Fuel Signal
J3-C3—[5467 Purple] Engine Oil Pressure Signal
J3-C4—[5468 Gray] Intake Manifold Air Pressure Signal
J3-D2—[5453 Orange] Water In Fuel Signal
J3-F3—[5448 Gray] Crank Position Return
J3-F4—[5447 Purple] Crank Position Pulse
J3-G1—[5946 Light Blue] 5 Volt Power Supply #1 Positive
J3-G2—[5427 Purple] 5 Volt Power Supply #1 Return
J3-G3—[5443 Orange] Pump Position Return
J3-G4—[5445 Dark Green] Pump Position Pulse
J3-H3—[5414A Yellow] 5 Volt Power Supply #2 Return
J3-H4—[5416A Light Blue] 5 Volt Power Supply #2 Positive
P01—Intake Manifold Air Pressure Sensor
P03—Low Pressure Fuel Sensor (If Equipped)
P03A—Low Pressure Fuel Sensor Interconnect Option
P04—Engine Oil Pressure Sensor
P05—Fuel Rail Pressure Sensor
X01—Crank Sensor
X02—Pump Position Sensor

BK53208,000000B –19–26JAN08–2/2

A—Female Socket
B—Male Pin
C—See Diagram (3)
D—Twisted Pair
D01—Water In Fuel Sensor
J03—ECU Harness Connector (Blue Face)
J3-C1—[5475 Dark Green] Fuel Rail Pressure Signal
J3-C2—[5469 White] Low Pressure Fuel Signal
J3-C3—[5467 Purple] Engine Oil Pressure Signal
J3-C4—[5468 Gray] Intake Manifold Air Pressure Signal
J3-D2—[5453 Orange] Water In Fuel Signal
J3-F3—[5448 Gray] Crank Position Return
J3-F4—[5447 Purple] Pump Position Pulse
J3-G1—[5946 Light Blue] 5 Volt Power Supply #1 Positive
J3-G2—[5427 Purple] 5 Volt Power Supply #1 Return
J3-G3—[5443 Orange] Pump Position Return
J3-G4—[5445 Dark Green] Pump Position Pulse
J3-H3—[5414A Yellow] 5 Volt Power Supply #2 Return
J3-H4—[5416A Light Blue] 5 Volt Power Supply #2 Positive
P01—Intake Manifold Air Pressure Sensor
P03—Low Pressure Fuel Sensor (If Equipped)
P03A—Low Pressure Fuel Sensor Interconnect Option
P04—Engine Oil Pressure Sensor
P05—Fuel Rail Pressure Sensor
X01—Crank Position Sensor
X02—Pump Position Sensor

BK53208,0000013 –19–24JAN08–2/2

6.8L 24V ECU Wiring Diagram 2

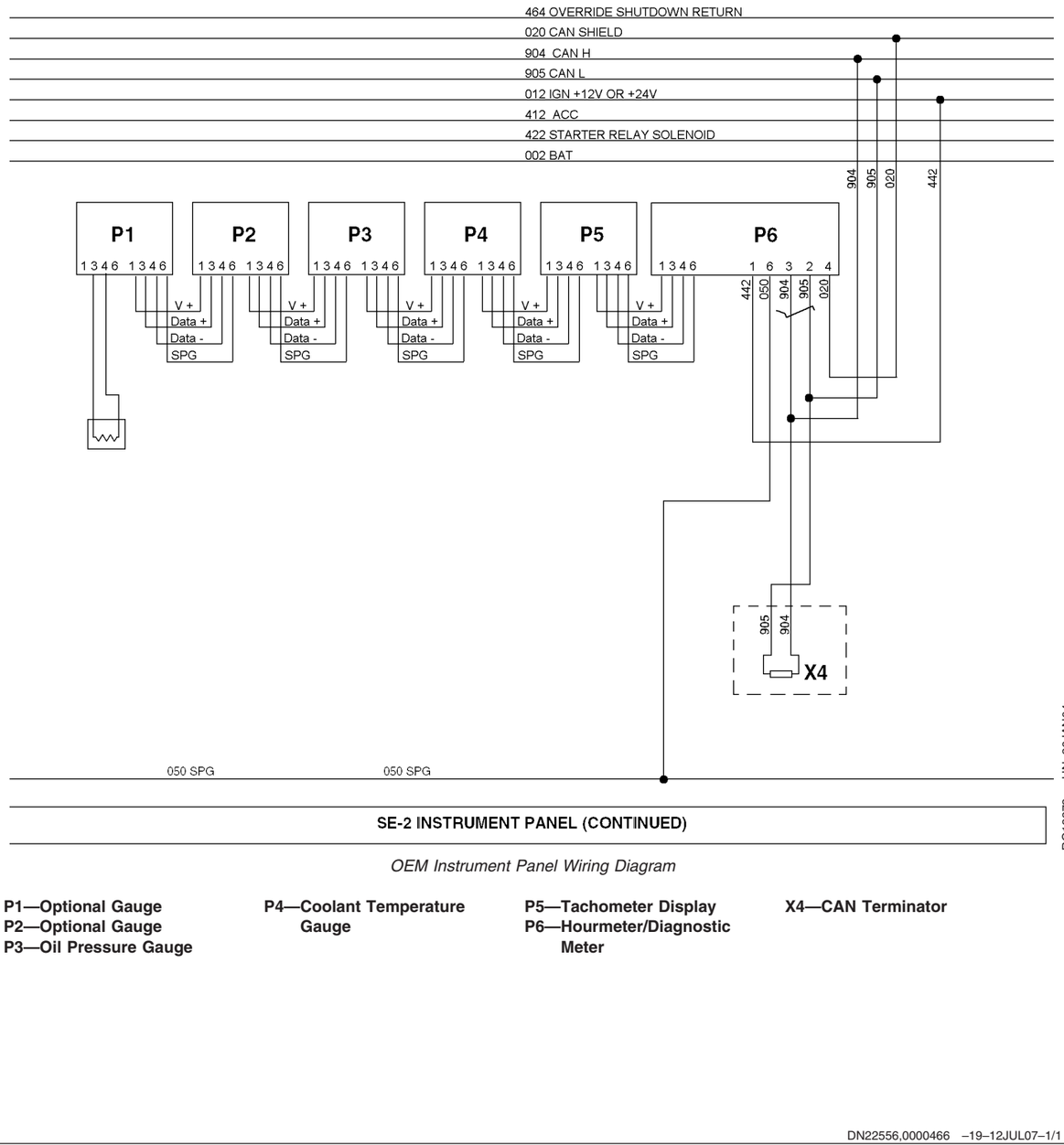


6.8 Liter 24 Volt ECU Wiring Diagram 2 (PT+)

Continued on next page

BK53208,000001B –19–24JAN08–1/2

OEM Instrument Panel / Engine Start Components Electrical Wiring Diagram - Continued



SE-2 INSTRUMENT PANEL (CONTINUED)

OEM Instrument Panel Wiring Diagram

P1—Optional Gauge
P2—Optional Gauge
P3—Oil Pressure Gauge
P4—Coolant Temperature Gauge
P5—Tachometer Display
P6—Hourmeter/Diagnostic Meter
X4—CAN Terminator

DN22556,0000466 –19–12JUL07–1/1