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

04DEC08 (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

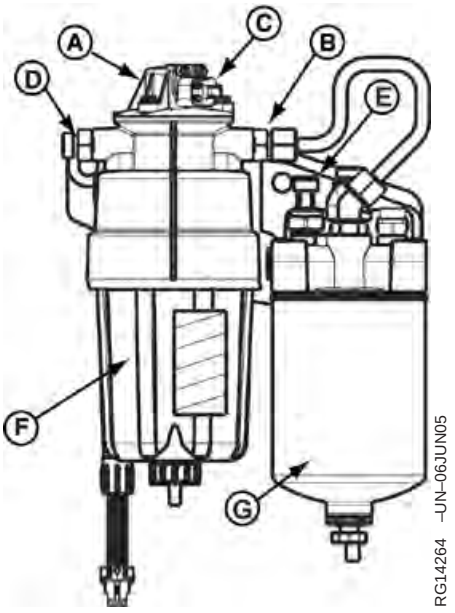
- Possible compatibility issues with other materials (including copper, lead, zinc, tin, brass, and bronze) used in fuel systems and fuel handling equipment
- Possible reduction in water separator efficiency
- Potential high acid levels within fuel system
- Possible damage to paint if exposed to biodiesel

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

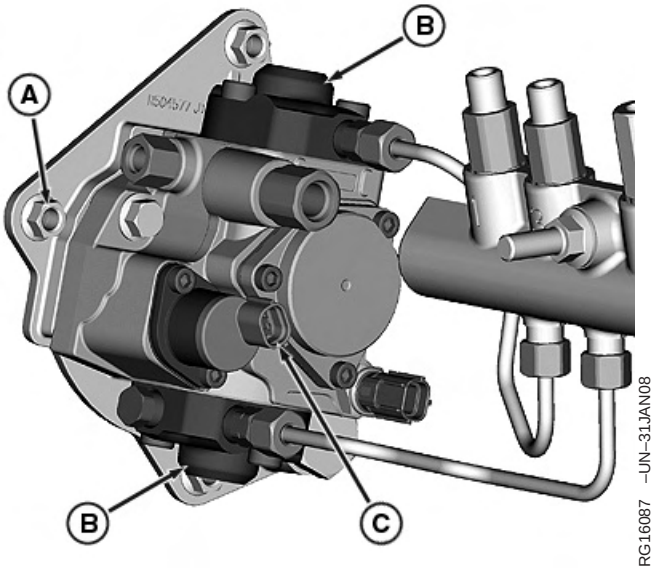
JB81757,0000083 –19–01FEB08–1/1

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 fuel lubricating dosing element (C) using a suitable filter or strap wrench to remove. Discard the element.

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

13. Remove cap from new fuel lubricating dosing element canister.

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

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

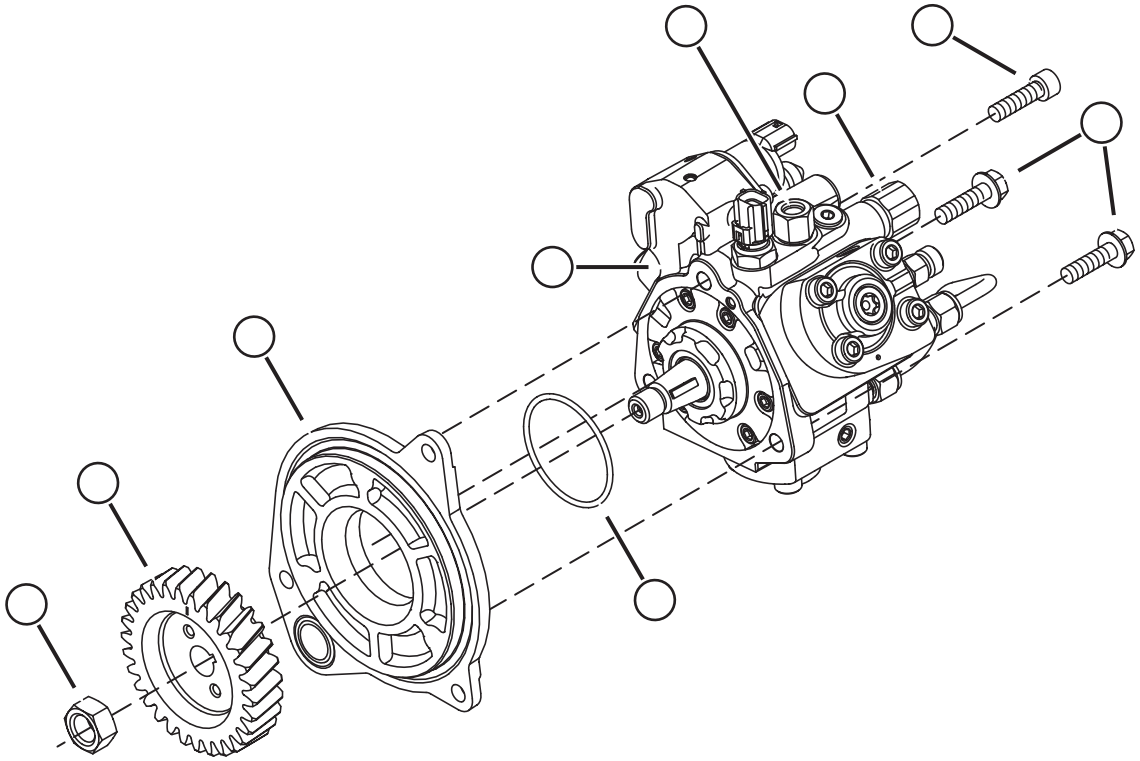
16. Reconnect water in fuel sensor wiring.

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 –19–25AUG08–3/3



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.

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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)

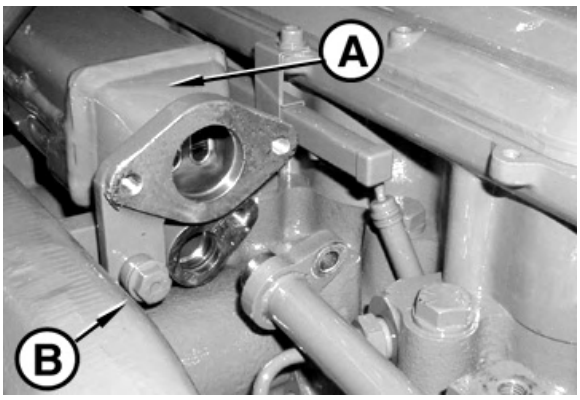
8. Install EGR cooler and outlet tube by carefully sliding the assembly forward and inserting the coolant tube into the thermostat housing (E).

9. Align the back of the EGR cooler and install the rear support bushing with cap screw and tighten to specifications.

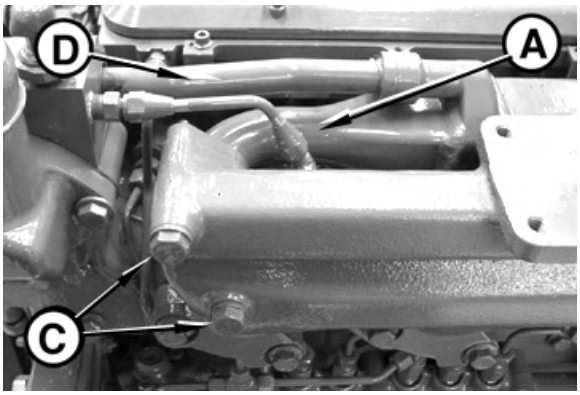
Specification

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

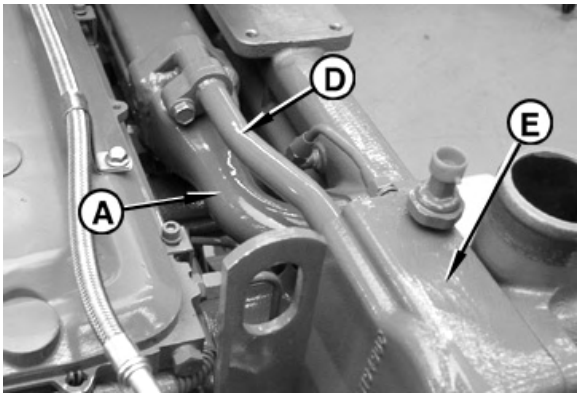
A—EGR Cooler
B—Rear Support Bushing
C—Front Cap Screws
D—EGR Coolant Outlet Tube
E—Thermostat Housing



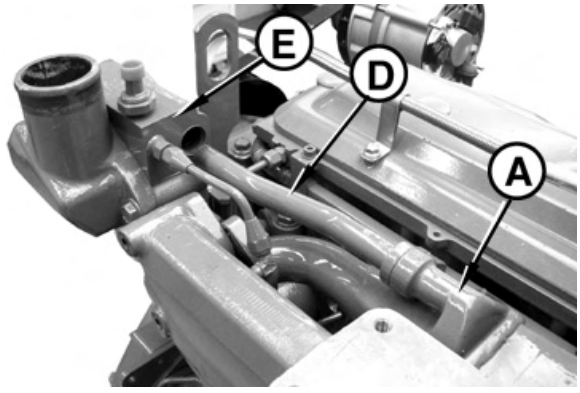
EGR Cooler Rear Support Bushing Cap Screw



EGR Cooler Front Cap Screws



EGR Coolant Outlet Tube



EGR Coolant Outlet Tube

Continued on next page

3. Install VTG Lever nut (D) into hex pocket on VTG lever (E) with rounded side of the nut facing outward. Hold lock nut in place and insert 4mm allen wrench into recessed hex area (F) located on the ball stud. Torque ball stud to 8.5 N-m (75 lb-in).

4. Reconnect turbocharger wiring harness connector to engine wiring harness.

SS01820,00003DD –19–16OCT08–2/2

Remove and Install Pump Position Sensor

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

1. Disconnect pump position sensor wiring connector and remove sensor.
2. Coat new sensor O-ring with TY6333 High Temperature Grease and install sensor. Tighten to specification.
3. Reconnect sensor wiring connection.

Specification

Pump Position Sensor—Torque..... 15 N•m (11 lb-ft)

RG41183,00000E6 –19–04OCT07–1/1

Remove and Install Turbo Speed Sensor

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

1. Disconnect turbo speed pressure sensor wiring connector and remove sensor.
2. Install sensor. Tighten to specifications.

Specification

4.5L - Turbo Speed Sensor—
Torque ..... 13.6 ± 0.6 N•m (10 ± 0.5 lb-ft)

Specification

6.8L - Turbo Speed Sensor—
Torque ..... 12 ± 0.6 N•m (9 ± 0.4 lb-ft)

3. Install sensor wiring connector.

RG41183,00000E7 –19–04OCT07–1/1

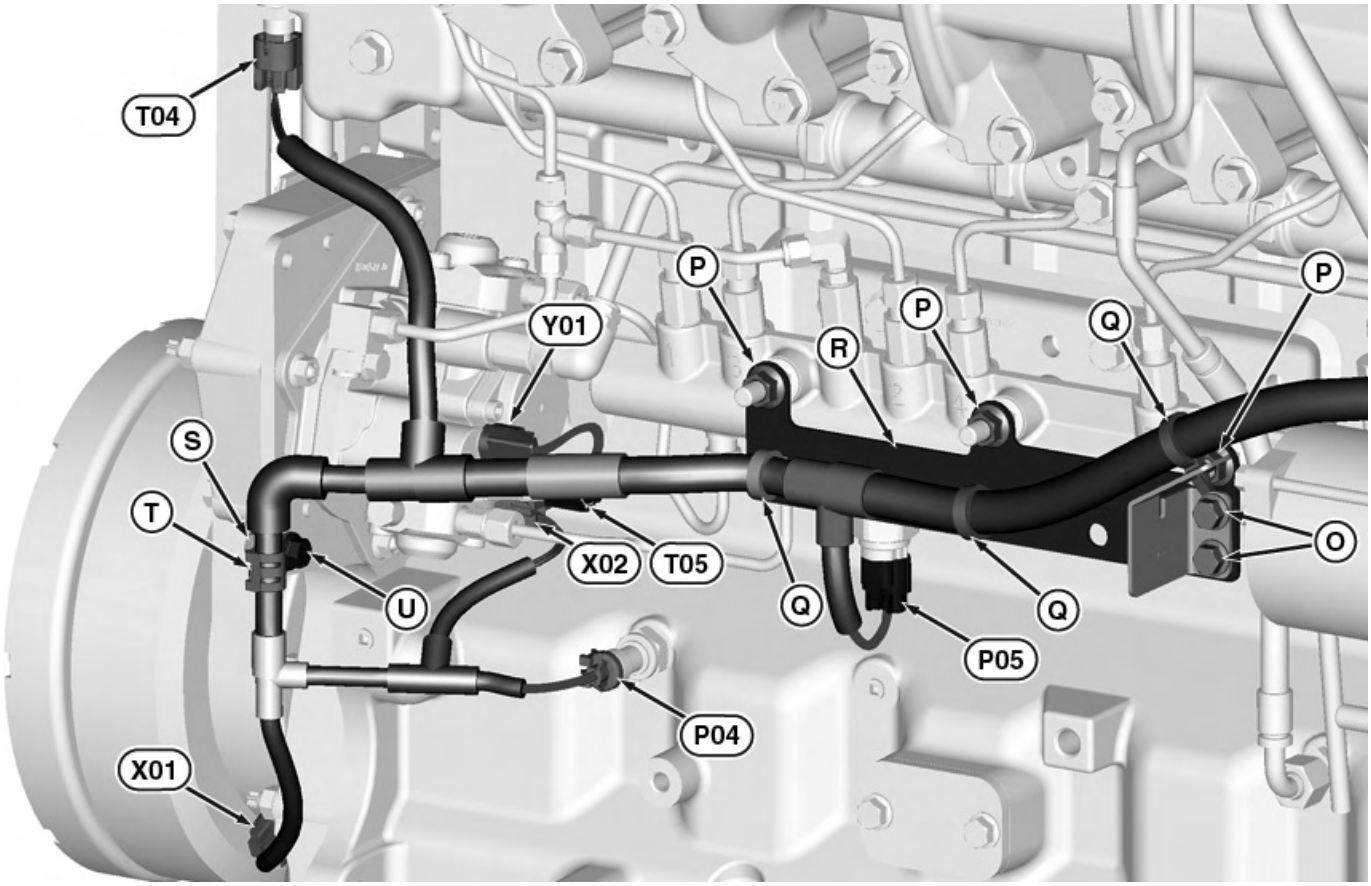


Diagram 5- Wire Harness, Left Side of Engine

O—Harness Bracket
P—Flange nut
Q—Harness Clip
R—Harness Bracket
S—Nut
T—Harness Clamp
U—Cap Screw
P04—Oil Pressure Sensor Connector
P05—Fuel Rail Pressure 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

15. Disconnect connectors P04, P05, T04, and T05.

16. Disconnect connectors X01, X02, and Y01.

17. Remove Nut (S) and Cap Screw (U) from cable clamp (T).

18. Remove three harness clips (Q)) from harness brackets (O) and (R).

19. Carefully remove harness from engine.

Install Engine Wire Harness

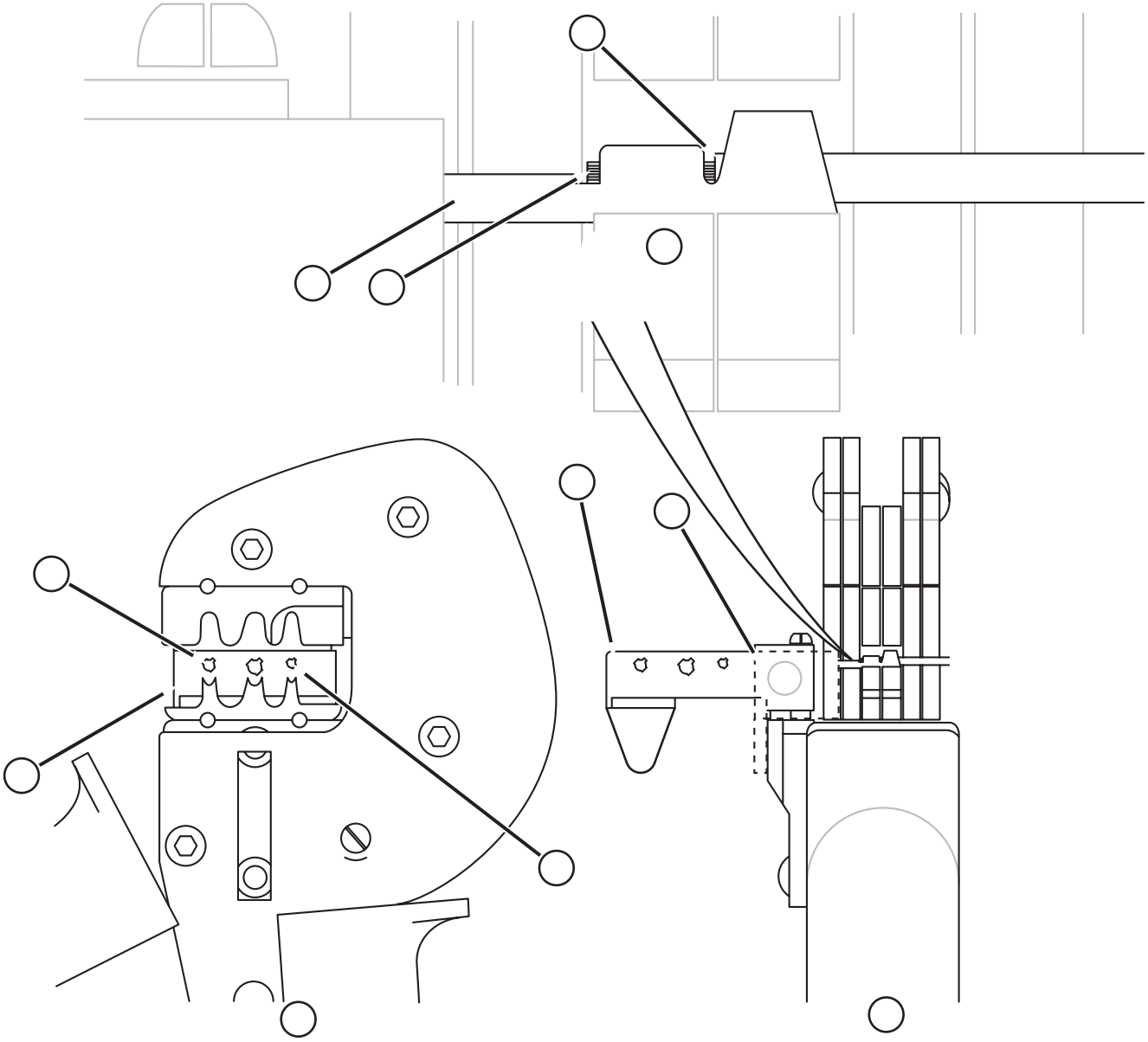
NOTE: Disconnect cable from the negative battery terminal before installing wire harness or any other major electrical components. Secure cable to prevent accidental shorts.

NOTE: Refer to the previous diagrams for reference locations for the install procedure.

1. Place harness over engine. Refer to ECU WIRING HARNESS ROUTING FOR 6.8L ENGINE earlier in this section of the manual for proper harness placement.

2. Connect three harness clips (Q) to harness brackets (O) and (R). See diagram 5.

Continued on next page



RG14613A –UN–01OCT08

CINCH Crimper Elements

A—Crimper Side View
B—Crimper Front View
C—Wire-in-Terminal Blowup
D—Terminal Block (Closed)
E—Terminal Block (Open)
F—1.5 mm Terminal Recess
G—0.6 mm Terminal Recess
H—Terminal Seated in Block Recess
I—Wire in Terminal (4.0 mm Insulation Stripped)
J—Wire in Terminal (insulation end)

NOTE: The above figure is intended to only illustrate crimper and wire-loading elements. Its callouts relate only to its own legend, and not to the callouts in the procedural steps.

12.

Continued on next page

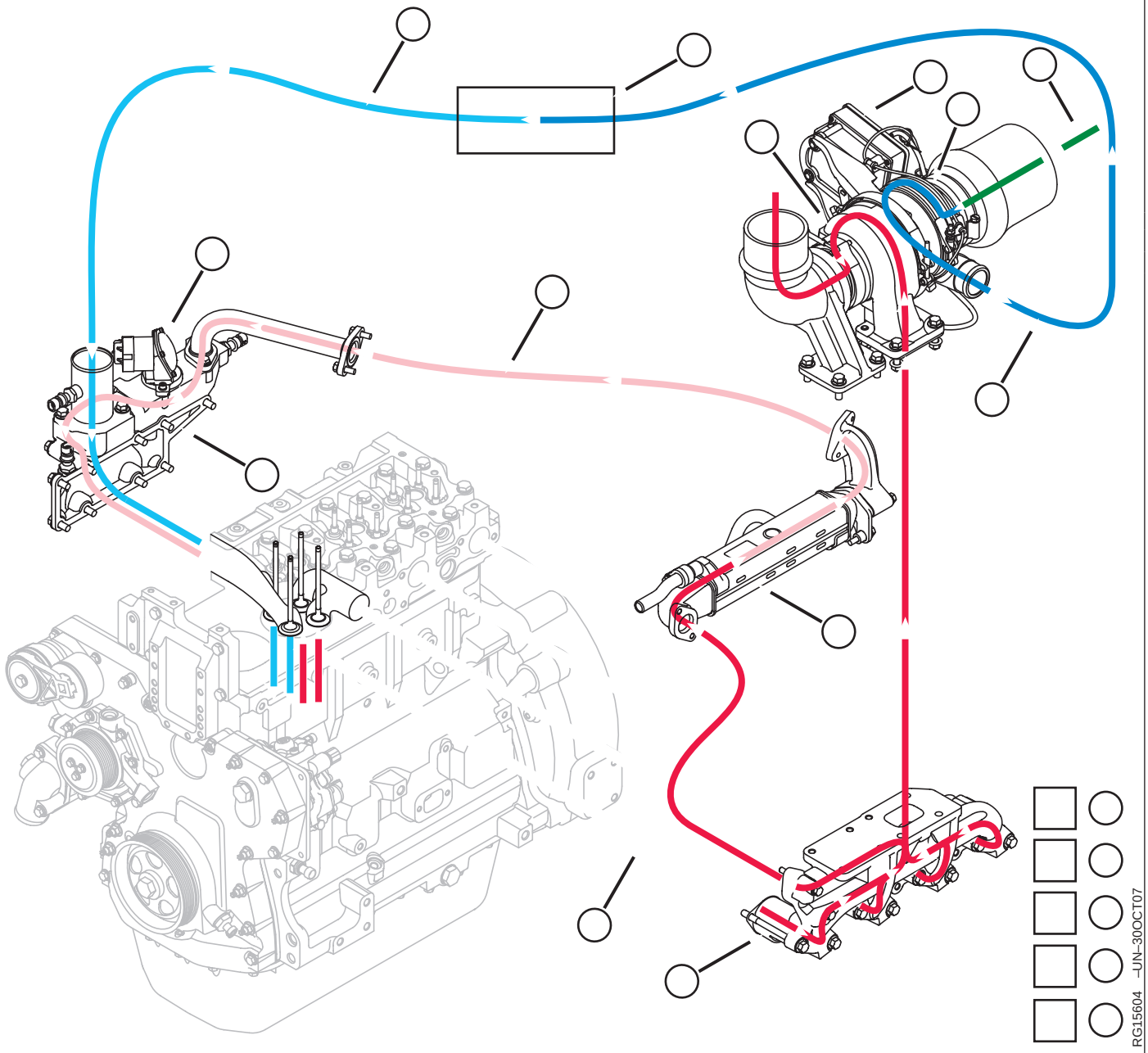
About This Group

In this group, the fuel system information is described in the following categories:

- Fuel System Operation
- Pre-filter Operation
- Fuel Transfer Pump Operation
- Electronic Fuel Transfer Pump Operation
- Final Fuel Filter Operation
- High Pressure Fuel Pump Operation
- High Pressure Common Rail (HPCR)
- Electronic Injector (EI) Operation
  - EI - No Injection
  - EI - Begin Injection
  - EI - Ending Injection

RE38635,000014A –19–04AUG07–1/1

Electronic Air System Control Operation



A—Cooled charge air
B—Charge air cooler
C—VGT actuator
D—Turbocharger compressor
E—Fresh air in from filter
F—Turbocharger turbine
G—EGR valve
H—Cooled exhaust gas
I—Compressed air
J—Air intake manifold
K—EGR cooler
L—Hot exhaust gas
M—Exhaust manifold

Air System with EGR

As the piston reaches the intake stroke it, sucks air (E) through the intake air filter, turbocharger compressor (D), which compresses and heats the air (I), charge air cooler (B), which cools the compressed air (A), into the air intake manifold (J), through ports in the head and into the piston cylinder. On the exhaust stroke the engine pushes exhaust gas (L) into the exhaust manifold (M), then into two different directions:

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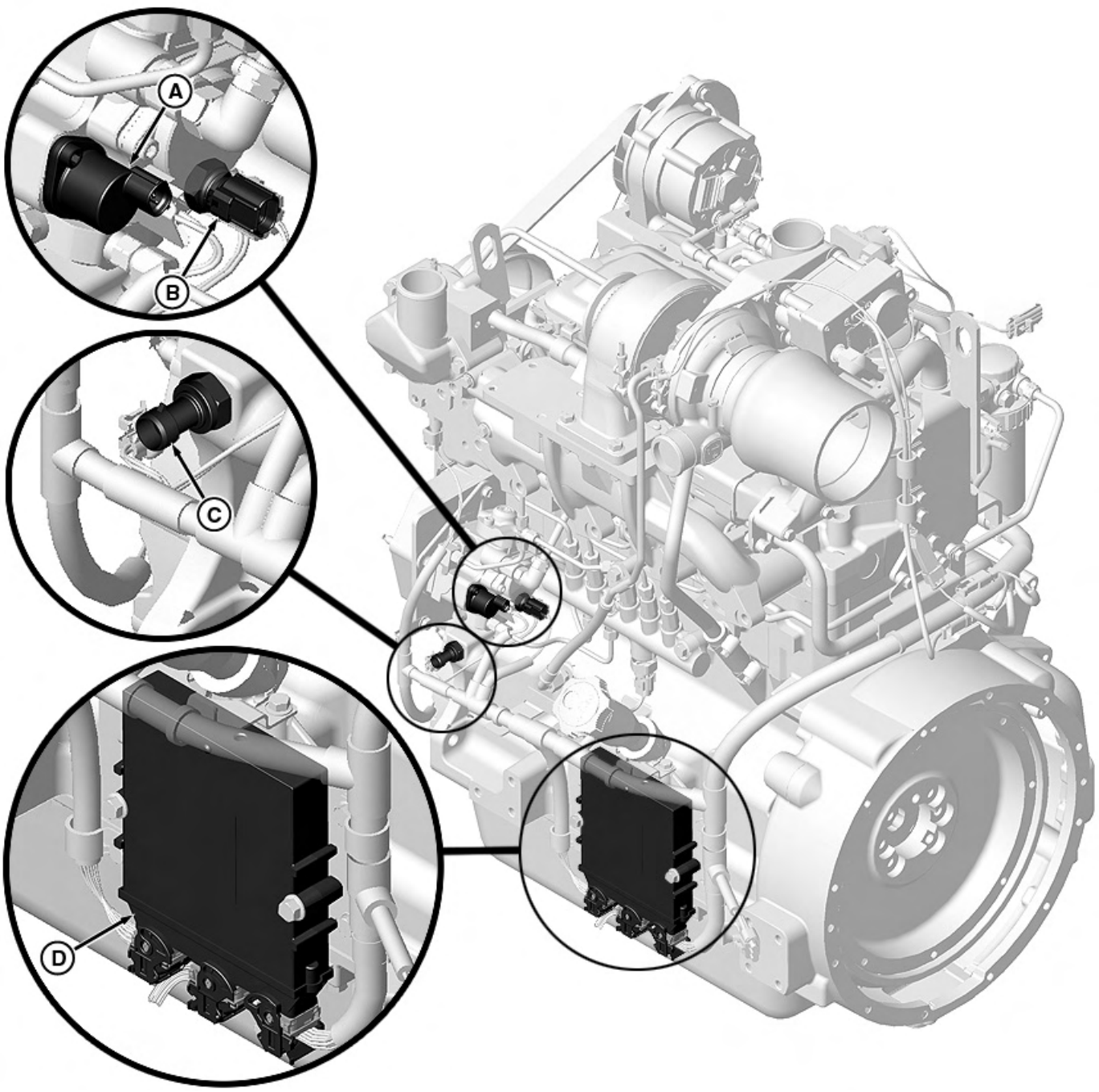
Component Location Diagram 1



RG15021 –UN–27JUN07

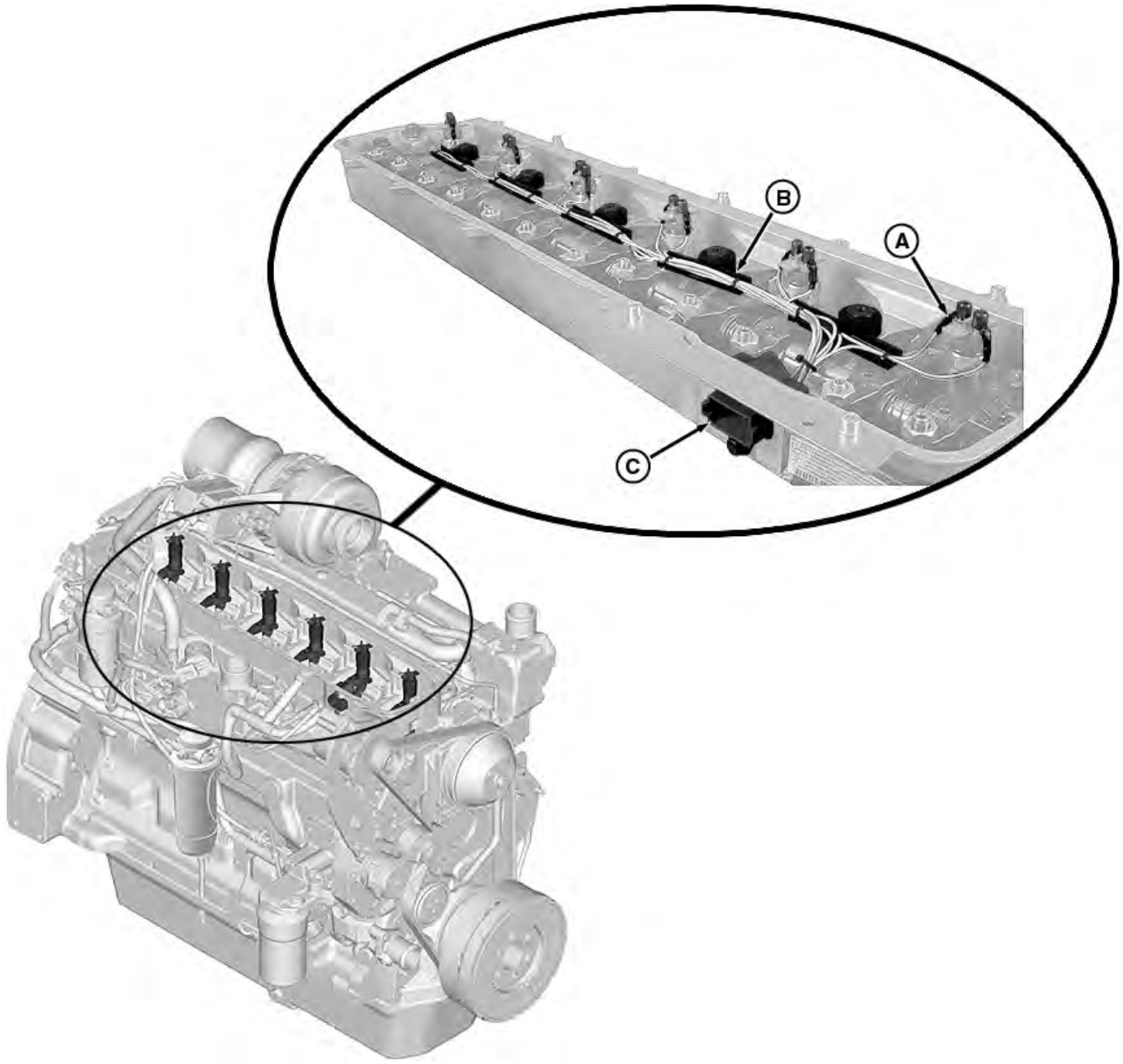
4.5L Engine

A—Suction Control Valve **B—Fuel Temperature Sensor** **C—Oil Pressure Sensor** **D—ECU**

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

RG40854,00000E2 –19–18JAN08–1/1

Component Location Diagram 12



RG15069 –UN–27JUN07

6.8L Engine

A—Eyelets

B—Wire Assembly Stiffeners

C—Fuel Injector Wire Harness Assembly Connector

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

BK53208,0000030 –19–04AUG07–1/1

For more information on sensor locations, see COMPONENT LOCATION DIAGRAM 4 component (A) for the 4.5L engine or COMPONENT LOCATION DIAGRAM 10 component (A) for the 6.8L engine earlier in this Group.

RG41221,00002A6 –19–23OCT07–2/2

Turbo Compressor Inlet Temperature Sensor

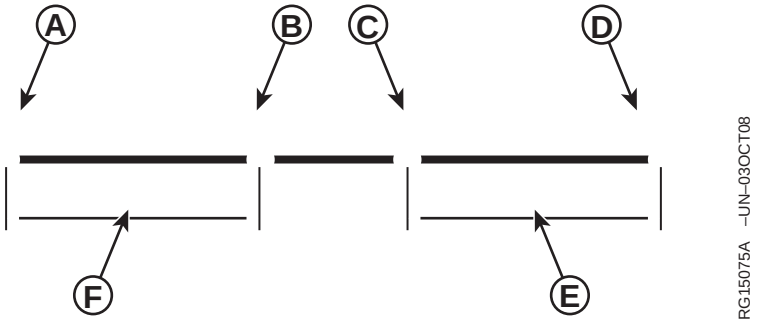
The ECU uses this sensor to calculate the ambient air temperature into the turbo. The ECU also uses this sensor in addition to the charge air cooler outlet air temperature to calculate the temperature of the turbo compressor outlet temperature. From these calculations, the ECU can determine if the air/fuel ration is correct, or if changes are required.

For more information on how temperature sensors operate, see MEASURING TEMPERATURE earlier in this Group.

For more information on sensor locations, see COMPONENT LOCATION DIAGRAM 1 earlier in this Group.

DN22556,000003D –19–15OCT07–1/1

Throttle Offsets



Minimum Throttle Offset

The Minimum Throttle Offset is used to pre-set the low speed idle bump. The number entered into the field on the Trim Page will be the rpm increase from the standard factory setting of the idle speed. This offset will apply to all active throttles. The maximum setting for the Minimum Throttle Offset is the difference between the Low Idle speed and 1300 rpm.

Maximum Throttle Offset (Tri-State Throttle Only)
The Maximum Throttle Offset is used to pre-set the high-speed idle bump. The number entered into the field on the Trim Page will be the amount of rpm below the fast idle speed. The engine will operate in the “mid” position only if the 3-state throttle option is selected. This offset will apply to all active throttles, but only if the 3-state throttle is active. The maximum setting for the Maximum Throttle Offset is the difference between the fast idle speed and 1500 rpm.

DM80898,000004C –19–03OCT08–1/1

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E2 - Engine Misfires - Runs Irregularly

RG41221,00000F1 –19–02JUN08–1/1

E2 - Engine Misfires/Runs Irregularly Diagnostic Procedure

– – –1/1

❶ **Check for Active DTCs**	Were you referred to this test while performing the diagnostic procedures for a diagnostic trouble code (DTC)?	**YES:** GO TO 2 **NO:** Check for and resolve any active DTCs prior to performing this test. – – –1/1

❷ **Items Possibly Mistaken As Misfire or Irregular Running Engine**	Check for the following items which may be mistaken for a misfire: • Engine accessories such as A/C clutch or fan drives cycling on and off. • Alterations to the engine and/or machine harness such as radios or non-John-Deere accessories. Does disabling or switching off these devices temporarily restore engine performance?	**YES:** Problem fixed. **NO:** GO TO 3 – – –1/1

❸ **Misfire and Cut-Out Test**	1. Perform ENGINE TEST INSTRUCTIONS - CYLINDER MISFIRE TEST in Service ADVISOR. 2. Perform ENGINE TEST INSTRUCTIONS - CYLINDER CUTOUT TEST in Service ADVISOR with engine at low idle. Is each cylinder's contribution within 10 percent of the others during the Cylinder Misfire Test and does the sound of the engine change equally when each injector is disabled during the Cylinder Cut-Out Test?	**YES:** GO TO 5 **NO:** GO TO 4 – – –1/1

❹ **Check Compression**	Perform ENGINE TEST INSTRUCTIONS - COMPRESSION TEST in Service ADVISOR. Is compression in the cylinder(s) with low contribution identified in Step 3 also at least 10 percent less than the other cylinders (compression is low and contribution is low in the same cylinder)?	**YES:** Check compression with mechanical gauge. **NO:** Replace injector(s) in cylinder(s) with low contribution. – – –1/1

❶ **Check for Active DTCs**	Were you referred to this test while performing the diagnostic procedures for a diagnostic trouble code (DTC)?	**YES:** GO TO 2 **NO:** Check for and resolve any active DTCs prior to performing this test. GO TO 2 – – –1/1
❷ **Harness Diagnostic Mode Test**	1. Ignition ON, engine OFF. 2. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Were any active DTCs generated during Harness Diagnostic Mode Test?	**YES:** Discontinue this test and perform test for the active DTC. **NO:** GO TO 3 – – –1/1
❸ **Check Charge Air System**	Perform CHARGE AIR SYSTEM. Is black smoke still present when engine is operated under conditions where black smoke was observed?	**YES:** GO TO 4 **NO:** Problem fixed. – – –1/1
❹ **Intake and Exhaust Restriction and Air Leak Test**	Check for intake and exhaust restrictions and leaks. See CHECK FOR INTAKE AND EXHAUST RESTRICTIONS and CHECK FOR EXHAUST AIR LEAKS in Section 04 of the base engine manual. Is black smoke still present when engine is operated under conditions where black smoke was observed?	**YES:** GO TO 5 **NO:** Problem fixed. – – –1/1
❺ **Check VGT System**	Part 1 Is engine equipped with a VGT and EGR valve? *NOTE: For component location see COMPONENT LOCATION DIAGRAM 1, VGT Actuator (E) for the 4.5L engine or COMPONENT LOCATION DIAGRAM 11 VGT Actuator (D) for the 6.8L engine in Section 03, Group 140 earlier in this manual.*	**YES:** Part 2 **NO:** GO TO 11
	Perform VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST. Is black smoke still present when engine is operated under conditions where black smoke was observed?	**YES:** GO TO 6 **NO:** Problem fixed. – – –1/1

❸ **High Pressure Fuel Test**	Perform high pressure fuel test, see F2 - HIGH PRESSURE FUEL SUPPLY SYSTEM TEST later in this Section. Did test pass?	**YES:** GO TO 4 **NO:** Return to F2 - HIGH PRESSURE FUEL SYSTEM CHECK procedure and perform tests. – – –1/1

❹ **Throttle Response Test**	1. Ignition ON, Engine ON. 2. Adjust throttle to different speed points. Did engine respond to throttle movement?	**YES:** Problem fixed, return to service. **NO:** GO TO 5 – – –1/1

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❺ **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 6 **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

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

32 Barometric Pressure Check	Monitor Barometric Air Pressure and Manifold Air Pressure- Absolute data points. Are the two data points within 10 kPa (1.5 psi) of each other?	**YES:** GO TO 33 **NO:** Perform procedure for 000108.02 as though DTC was active. – – –1/1

33 Low Pressure Fuel Sensor Harness Checks	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and low pressure fuel sensor connector. 3. Perform TERMINAL TEST on J3 and low pressure fuel sensor connectors. 4. On the harness, measure the resistance between the ECU fuel pressure signal (J3-C2) and fuel pressure connector signal (P03-3). 5. On the harness, measure the resistance between the ECU fuel pressure return (J3-H3) and fuel pressure connector return (P03-1). 6. On the harness, measure the resistance between the ECU fuel pressure 5V supply (J3-H4) and fuel pressure connector 5V supply (P03-2). Were Terminal Test results good and were all resistance measurements less than 10 ohms?	**YES:** Replace low pressure fuel sensor. GO TO 34 **NO:** Fix problem. GO TO 34 – – –1/1

34 Recheck Fuel Pressure	1. Reinstall low pressure fuel sensor, if removed. 2. Monitor Fuel Low Pressure Fuel - Actual Pressure data point in Service ADVISOR. 3. Ignition ON, engine cranking or running at low idle. Is the fuel pressure that was indicated by the gauge within 30 kPa (4 psi) of the Low Pressure Fuel - Actual Pressure data point?	**YES:** Low pressure fuel system is functioning correctly. **NO:** Verify accuracy of pressure gauge. Open DTAC case if DTC 000094.17 is being generated. – – –1/1

18 Suction Control Valve and Pressure Limiter Check

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

NOTE: For pressure limiter replacement, see REMOVE AND INSTALL PRESSURE LIMITER in Section 02, Group 090 earlier in this manual.

NOTE: A sticking suction control valve (SCV) causes low power, DTC 001347.07, and black smoke. The SCV may only stick intermittently, and usually occurs after the engine is at low idle for a period of time and throttle is then advanced. If the SCV sticks open, the fuel rail pressure will rapidly increase to 220 MPa (32,000 psi) or more, causing the pressure limiter to open. Fuel rail pressure is then limited to approximately 50 MPa (7250 psi) with the pressure limiter open. Shutting the engine down and restarting should reset the pressure limiter and temporarily restore performance. The sticking SCV may also fail such that it causes fuel rail pressure to be erratic resulting in poor performance and possibly generating DTC 001347.07.

1. Ignition OFF, engine OFF for at least 5 minutes to permit rail pressure to decrease.
2. Thoroughly clean all fuel lines, fittings, components, and chamfered area around the pressure limiter.
3. Disconnect fuel return line from the pressure limiter valve. DO NOT remove the pressure limiter valve from fuel rail.
4. Cap the return line fitting that was originally connected to the pressure limiter. DO NOT cap the pressure limiter.
5. Connect a temporary fuel line to the pressure limiter outlet and route to a suitable container for diesel fuel.
6. Ignition ON, engine OFF.
7. Using the graph feature in SERVICE ADVISOR, record the following data points:
   - Fuel Rail Pressure - Actual
   - Fuel Rail Pressure – Desired
8. Start engine and operate at low idle for two minutes.

   NOTE: If any fuel flow is present through pressure limiter; discontinue test, replace pressure limiter, and return to this step.
9. Snap throttle several times.
10. Operate engine at speed and load where problem occurs.
11. Compare graph of Fuel Rail Pressure - Actual and Fuel Rail Pressure - Desired to those shown in the examples below.

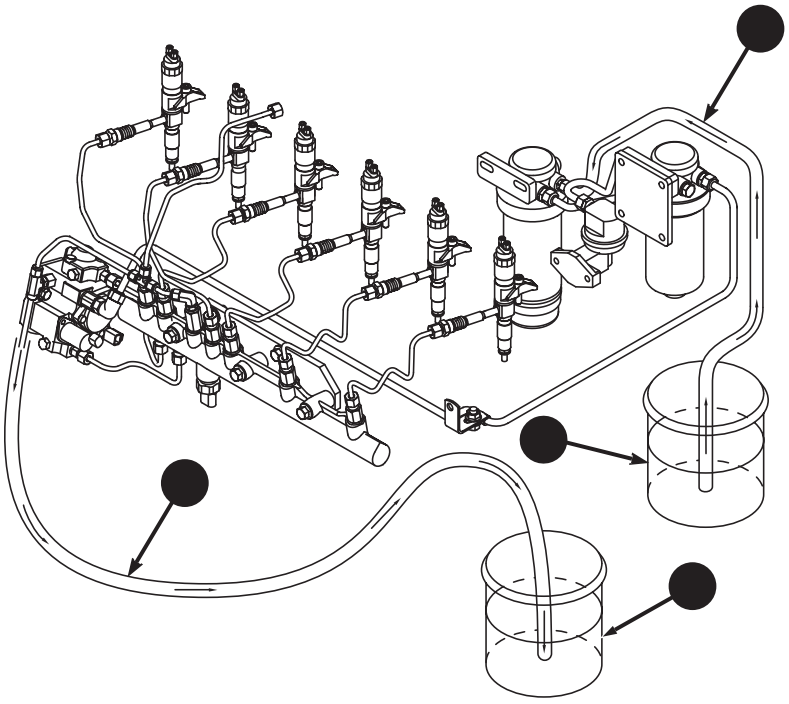
– – –1/3

19 Check CAN for Short to Voltage	1. Reconnect application battery negative cable. 2. Ignition ON, engine OFF. 3. On the harness, measure the voltage from the application diagnostic connector C11 CAN High (C11-C) to single point ground. 4. On the harness, measure the voltage from the application diagnostic connector C11 CAN Low (C11- D) to single point ground. Were both measurements less than 4 volts?	**YES:** GO TO 22 **NO:** Repair short to power of CAN wiring. GO TO 25 – – –1/1
20 Check CAN Wiring for Open Circuit	1. Locate CAN terminator(s) in application wire harness. One terminator is typically located near the ECU J2 connector (C10). A second terminator may be located near the diagnostic gauge or near some other electronic module on the application. Consult application technical information for the location of the second terminator, if applicable. 2. Disconnect the CAN terminator(s). 3. Perform TERMINAL TEST on CAN terminator(s) and connector(s). 4. On the harness, measure the resistance between diagnostic connector C11 CAN High (C11-C) and terminator connector(s) CAN High. 5. On the harness, measure the resistance between diagnostic connector C11 CAN Low (C11- D) and terminator connector(s) CAN Low. Are all measurements less than 10 ohms and are terminal test results OK?	**YES:** GO TO 21 **NO:** Fix problem. GO TO 25 – – –1/1
21 Check Terminator Resistance	Measure resistance of CAN terminator(s). Is the resistance of each terminator between 110 and 130 ohms?	**YES:** Recheck CAN harness resistance and Terminal Tests. Fix problem. GO TO 25 **NO:** Replace defective CAN terminator(s). GO TO 25 – – –1/1

❺ Temporary Known Good Fuel Supply Installation

NOTE: Use a clean hose and fresh fuel that has known-good quality in a clean container for this step. Do not use fuel from the fuel tank.

1. Ignition OFF, engine OFF.
2. Disconnect fuel inlet line from the primary fuel filter.
3. Install a hose on primary filter housing fuel inlet port and place other end of hose in a container of at least 3.8L (1 gal) of clean fuel.



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Temporary Fuel Supply

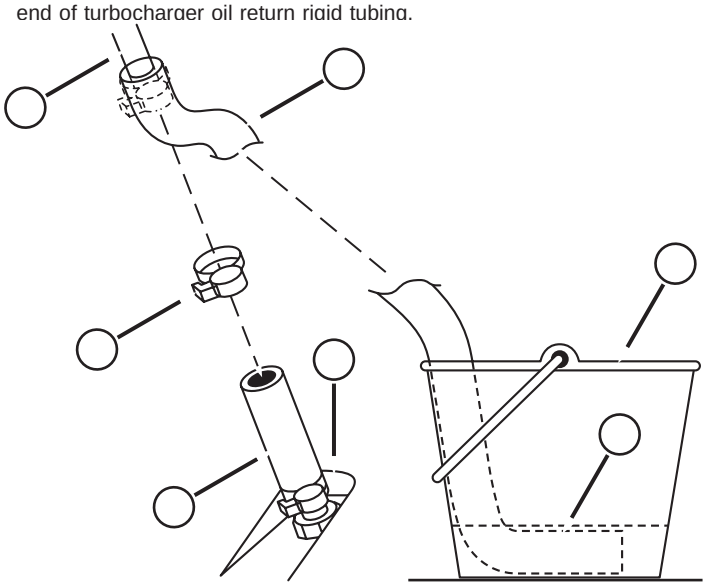
A—Temporary Fuel Supply Hose at Primary Filter Inlet
B—Temporary Fuel Return Hose
C—Contaminated Fuel
D—Known Good Fuel

4. Disconnect fuel line between secondary filter outlet and high pressure pump inlet.
5. Reposition fuel line and place high pressure pump inlet end in a 3.8L (1 gal) or larger container suitable for diesel fuel.
6. Reconnect fuel line to secondary filter outlet.
7. Ignition ON, engine OFF for 60 seconds.
8. Ignition OFF, engine OFF.
9. Repeat steps 7-8 until 1.9L (1/2 gal) of new fuel has been pulled into the fuel system.
10. Reinstall fuel line between secondary filter and high pressure pump.

IF OK: GO TO 6

❷ Turbocharger Test

1. On turbocharger oil return rigid tubing (A) side of turbocharger oil return flexible tubing (C), remove and retain clamp (B), and remove end of flexible tubing from end of turbocharger oil return rigid tubing.



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Remove Turbocharger Oil Return Flexible Hose

A—Turbocharger Oil Return Rigid Tubing
B—Clamp
C—Turbocharger Oil Return Flexible Tubing
D—Crankcase
E—Water, 3.8 Liters (1.0 gallon)
F—19 Liter (5-gallon) Bucket
G—Test Flexible Tubing

2. Plug or cap open end of turbocharger oil return flexible tubing (C).

3. Obtain 19-liter (5-gallon) bucket (F), and place on ground or floor, near turbocharger oil drain line.

4. Measure outer dimension of rigid tubing (A), and obtain length of flexible tubing (G), of same inner dimension as rigid tubing outer dimension, and of sufficient length to place between rigid tubing and bucket as follows:

   a. Attach one end of flexible tubing to open end of rigid tubing.

   b. Secure flexible tubing to rigid tubing using clamp, from step 1.

   c. Place other end of flexible tubing in bucket.

5. Pour approximately 3.8 liters (1.0 gallons) of water (E) into bucket. Bucket-end of flexible tubing must be completely submerged.

6. Check that crankcase engine oil level is full.

7. Using John-Deere-approved oil test kit, obtain an engine oil sample, and send off for oil scan analysis.

   NOTE: This test should not exceed 3 minutes without shutting engine down. Then check engine oil level, and refill if necessary. Pour out bucket contents, and refill with 3.8 liters (1.0 gallons) of water.

8. Perform crankcase pressure test, as follows:

Electrical Concepts

Tests will include making measurements of voltage and resistance and making checks for open circuits and short circuits. An understanding of the following concepts is required to use the diagnostic procedures:

- Voltage (volts)
- Current (amps)
- Resistance (ohms)
- Open Circuit
- Short Circuit

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Using a Digital Multimeter

It is recommended that a digital multimeter (JT07306 or equivalent with an analog display) be used to make the required measurements in the diagnostic procedures. A knowledge of the operation of the particular meter used is assumed.

Instructions for measuring voltages take the following form:

- Measure voltage from Point A (+) to Point (B) (-)

Select 'V' with the selector knob. The display indicates the selected function. In this example, the positive test lead from the volt-ohm input of the meter should be connected to Point A and the negative test lead from the common input of the meter should be connected to Point B.

Unless otherwise stated, all voltage measurements are direct current (D.C.).

When making a resistance measurement, make sure the circuit is not powered on. Select Ω with the selector knob. Disconnect appropriate connectors or turn off key switch, as directed by diagnostic procedures. Some procedures may require the meter leads to be reversed to get the proper measurement.

Digital Multimeter

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Diagnostic Gauge Data Parameters Viewing Instructions

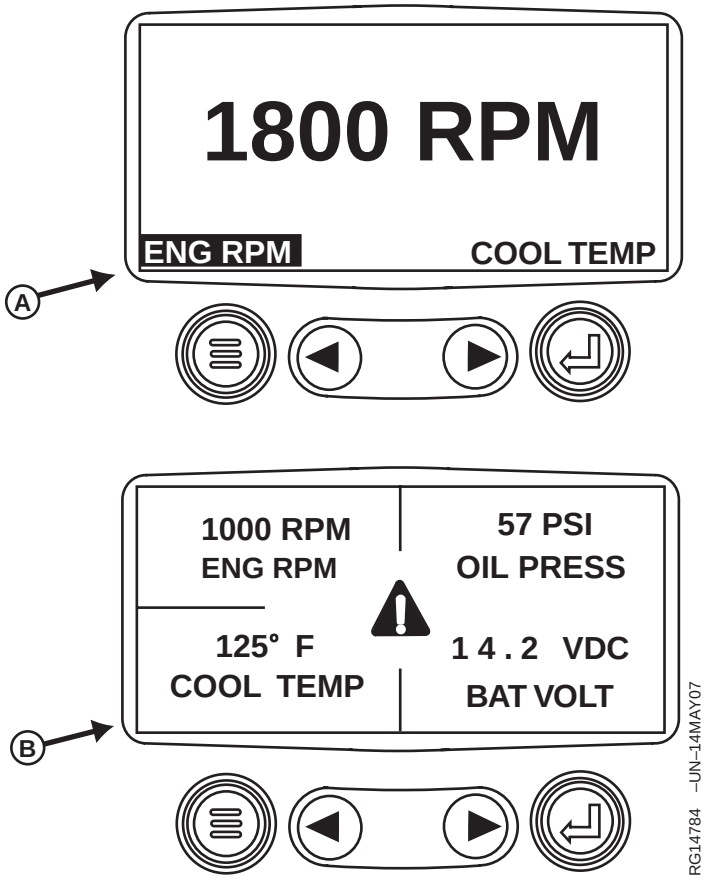

Figure 1. One and Four Parameter Displays

A—1-Up Display **B—4-Up Display**

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.

The Power View diagnostic gauge can be used for displaying engine parameters. Two display modes can be selected, one showing a single parameter, called 1-Up Display (A), and the other showing 4 selectable parameters, called 4-Up Display (B). At power up, the gauge defaults to the mode that was last used. Examples of both are shown in figure 1.

Continued on next page

Internal Data Monitor Instructions

Internal Data Monitor (IDM) is a feature in Service ADVISOR that is for recording multiple data points monitored by the Engine Control Unit (ECU) at a selectable sample rate. Depending on the number of data points selected to record and the sample rate that is selected determines the length of the recording in memory. These recording are completed internally in the ECU and then uploaded to Service ADVISOR.

Configuration Options:

- **One Time** - This recording method will record the data points selected until the memory buffer in the ECU is full and then end the recording. To select more than one data point hold down the Ctrl key on the keyboard and click on the data points to be recorded.
- **Continuous** - This recording method will record the selected data points until the user stops the recording session. The memory space for this data is limited and depending on the number of data points selected to record, determines the length of the recording. This uses the first in first out (FIFO) method with the data in memory.
- **Internal** – This recording method will record the selected data points based on selected data point value as a trigger. There are three options for setting the trigger and they are equal too, greater than, and less than the entered threshold value. It allows up to two different data points to be triggered off of. Example is that trigger one is Engine RPM greater than 1000 rpm and engine load greater than 50%. The recording will begin when both data points are greater than the specified value.

NOTE: To select more than one data point hold down the Ctrl key on the keyboard and click on the data points to be recorded.

Recordings made with IDM are created in the ECU memory, so if there is a power interruption while the recording is being made or downloaded to Service ADVISOR, the recording will be lost.

1. Make a live connection with Service ADVISOR to the ECU.
2. Go to Interactive Tests and select Internal Data Monitor.
3. Select the data points that are to be recorded. Hold the Ctrl key done when selecting more than one data point.
4. Select the sample rate that the data points are to be recorded at. The number of data points selected and the sample rate will determine the length of the recording.
5. Select the Start Trigger mode. There are three options, One Time, Continuous, and Internal. For rest of the procedure refer to the option that was selected.

One Time

1. Validate the IDM setup Information for the correct number of parameters selected and sample rate. Note that it will estimate the length of the recording. Click “Next”.
2. Validate that the correct Start Trigger Mode has been selected and click “Next”.
3. Click “Start” when you want the recording to begin. The recording will automatically stop when completed and begin to upload the information from the ECU to the PC.
4. Once Service ADVISOR has completed the upload of the recording select “Yes” or “No” to create another recording.

See “RECORDING PLAYBACK” later in this procedure to play recording.

Continued on next page

001075.06	Low Pressure Fuel Pump Error Detected
001075.12	Low Pressure Fuel Pump Status Error
001109.31	Engine Protection Approaching Shutdown
001110.31	Engine Protection Shutdown
001136.00	ECU Temperature Signal Extremely High
001136.16	ECU Temperature Signal Moderately High
001172.03	Compressor Inlet Temperature Signal Out of Range High
001172.04	Compressor Inlet Temperature Signal Out of Range Low
001180.00	Turbine Inlet Temperature Signal Extremely High
001180.16	Turbine Inlet Temperature Signal Moderately High
001347.03	High Pressure Fuel Pump Control Valve Signal Out of Range High
001347.05	High Pressure Fuel Pump Solenoid Circuit Has High Resistance
001347.07	High Pressure Fuel Pump Not Able to Meet Required Rail Pressure
001347.10	High Pressure Fuel Pump Pressurizing Assembly Rate of Change Abnormal
001569.31	Engine in Derate Condition
001638.00	Hydraulic Oil Temperature Signal Extremely High
001638.03	Hydraulic Oil Temperature Signal Out of Range High
001638.04	Hydraulic Oil Temperature Signal Out of Range Low
001638.09	Hydraulic Oil Temperature Signal Erratic
001638.16	Hydraulic Oil Temperature Signal Moderately High
001639.01	Fan Speed Signal Extremely Low
001639.16	Fan Speed Signal Moderately High
001639.18	Fan Speed Signal Moderately Low
002005.14	Incorrect ACU Message Received
002030.09	A/C Clutch Status Signal Missing
002071.09	CCU Message Missing
002580.03	Brake Pressure Signal Out of Range High
002580.04	Brake Pressure Signal Out of Range Low
002630.00	Charge Air Cooler Outlet Temperature Signal Extremely High
002630.03	Charge Air Cooler Outlet Temperature Signal Out of Range High
002630.04	Charge Air Cooler Outlet Temperature Signal Out of Range Low
002630.15	Charge Air Cooler Outlet Temperature Signal Slightly High
002630.16	Charge Air Cooler Outlet Temperature Signal Moderately High
002659.02	EGR Mass Flow Rate Data Invalid
002659.15	EGR Mass Flow Rate Data Slightly High
002659.17	EGR Mass Flow Rate Data Slightly Low
002790.16	Calculated Compressor Outlet Temperature Moderately High
002791.02	EGR Valve Position Signal Invalid
002791.03	EGR Valve Position Signal Out of Range High
002791.04	EGR Valve Position Signal Out of Range Low
002791.07	EGR Valve Not Reaching Expected Position

Continued on next page

000028.03 — Digital Throttle Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:
000028.03

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

Related Information:
The digital throttle input voltage increases above its high voltage specification.

Alarm Level:
Warning

Control Unit Response:
The ECU will try to maintain the engine operating envelope if there are more than one throttle set up in the Trim Options.

Additional References:
For more digital throttle information, see DIGITAL MULTI-STATE THROTTLE, see DUAL-STATE THROTTLE, see TRI-STATE THROTTLE, or see RAMP THROTTLE in Section 03, Group 140 earlier in this manual, depending on the type of digital throttle employed on the application.

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 6
- see 4.5L 24V ECU WIRING DIAGRAM 6
- see 6.8L 12V ECU WIRING DIAGRAM 6
- see 6.8L 24V ECU WIRING DIAGRAM 6

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.

13 Check Signal Circuit for Wire-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU connectors J01 and J03. 3. Measure the resistance between J02-F3 and all other terminals in ECU harness connectors J01, J02 and J03. Was any measurement less than 100k ohms?	**YES:** Locate and repair wire-wire short. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 14 – – –1/1
14 Check for Intermittent Short to Voltage	1. Reconnect all electrical connectors. 2. Ignition ON, engine OFF. 3. Monitor DTCs in Service ADVISOR while gently wiggling on the wiring harness between harness connector C08 and ECU connector J02. Does the status of DTC 000029.03 toggle between active and stored?	**YES:** There is an intermittent wiring problem. Locate and repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1
15 Check for Intermittent Short to Voltage	1. Ignition ON, engine OFF. 2. Monitor DTCs in Service ADVISOR while gently wiggling on the wiring harness between harness connector C08 and ECU connector J02. Does the status of DTC 000029.03 toggle between active and stored?	**YES:** There is an intermittent wiring problem. Locate and repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 16 – – –1/1
16 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 000029.03 now active?	**YES:** GO TO 2 **NO:** GO TO 17 – – –1/1

17 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect harness connector C09. 3. 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 18 – – –1/1
18 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 19 – – –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 000091.03 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 000091.03. 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

17 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect low pressure fuel sensor connector P03. 3. Perform Terminal Test on P03. 4. Disconnect ECU J03 connector. 5. Perform Terminal Test on J03-H3, J03-H4, and J03-C2. Were Terminal Test results good?	**YES:** GO TO 18 **NO:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1

18 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 000094.03 now active?	**YES:** GO TO 2 **NO:** GO TO 19 – – –1/1

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19 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 000094.03. Were any applicable solutions found?	**YES:** Perform steps identified in DTAC solution. **NO:** GO TO 20 – – –1/1

20 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

000097.03 — Water In Fuel Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:
000097.03

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

Related Information:
The water in fuel input voltage increases above the sensor's high voltage specification.

Alarm Level:
Warning

Control Unit Response:
The ECU will try to operate in a normal manner.

Additional References:
For more 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 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 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
- Water in Fuel Sensor D01 - Purple/Red

❺ **Occurrence Count Check**	Review stored information and look at occurrence count for 000097.16. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO 6 **NO:** GO TO 7 – – –1/1
❻ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on the water in fuel sensor harness connector. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 7 – – –1/1
❼ **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. **YES:** If a certain operating point exists when error occurs then 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 of failure and refresh codes Did 000097.04 reappear when engine operating point was reached?	**YES:** Replace WIF sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 7 and confirm operating point. – – –1/1

000100.18 — Engine Oil Pressure Signal Moderately Low Diagnostic Procedure

Trouble Shooting Sequence:
000100.18

When DTC is Displayed:
When the engine is on and the error is active.

Related Information:
The ECU senses a lower than expected engine oil pressure.
The engine must be running for the code to be set.
The warning value set point is dependent on engine speed.
001569.31 is also set when this code is active.

Alarm Level:
Warning

Control Unit Response:
Maximum engine power is derated up to 20 percent.

Additional references:
For further engine oil pressure sensor information, see OIL PRESSURE SENSOR in Section 03, Group 140, earlier in this manual.
For further pressure sensor information, see MEASURING PRESSURE 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 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 in Section 04, Group 160 earlier in this manual.

Continued on next page

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:
- Manifold Air Pressure Sensor P01 - 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 000102.03 reappear active?	**YES:** GO TO 2 **NO:** GO TO 15

– – –1/1

❷ **Sensor Disconnected Test**	1. Ignition OFF, Engine OFF 2. Disconnect MAP sensor connector P01. 3. Ignition ON, Engine OFF 4. Refresh codes. Did 000102.03 go to stored and 000102.04 become active?	**YES:** GO TO 3 **NO:** GO TO 7

– – –1/1

❹ **Test Sensor Terminals**	1. Disconnect turbo speed sensor 3-way connector X05. 2. Perform TERMINAL TEST on turbo speed sensor connector. Were any problems found?	**YES:** Fix problem. GO TO 15 **NO:** GO TO 5 – – –1/1
❺ **Check Sensor Resistance**	On the turbo speed sensor, measure the resistance between the signal (1) and return (2). *NOTE: Turbo speed sensor resistance will increase significantly when turbo is at operating temperature. Permit a hot turbo to cool and recheck sensor resistance before replacing sensor, if hot resistance is greater than 1300 ohms.* Is the resistance between 600 ohms and 1300 ohms?	**YES:** Do not reconnect sensor to harness. GO TO 6 **NO:** GO TO 14 – – –1/1
❻ **Test ECU Terminals**	1. Disconnect ECU J1 connector. 2. Perform TERMINAL TEST on J1. Were any problems found?	**YES:** Fix problem. GO TO 15 **NO:** GO TO 7 – – –1/1
❼ **Check Wire Harness Continuity**	*NOTE: Verify that turbo speed sensor signal and return wires are in the specified connector cavities (not swapped).* 1. On the harness, measure the resistance between ECU turbo speed sensor signal (J1-B4) and the turbo speed sensor connector signal (1). 2. On the harness, measure the resistance between ECU turbo speed sensor return (J1-B3) and the turbo speed sensor connector return (2). Are both resistance measurements less than 10 ohms?	**YES:** GO TO 8 **NO:** Fix problem. GO TO 15 – – –1/1
❽ **Check for Sensor Return Shorted to Ground**	On the harness, measure the resistance between ECU turbo speed sensor return (J1-B3) and single point ground. Is the resistance greater than 10k ohms?	**YES:** GO TO 9 **NO:** Fix problem. GO TO 15 – – –1/1
❾ **Check for Wire-to-Wire Short**	1. Disconnect ECU J2 and J3 connectors. 2. On the harness, measure the resistance between ECU turbo speed sensor signal (J1-B4) and all other terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 10k ohms?	**YES:** GO TO 10 **NO:** Fix problem. GO TO 15 – – –1/1

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000103.31 — Turbo Speed Signal Missing Diagnostic Procedure

Troubleshooting Sequence:
000103.05
000103.31

Related Information:
This DTC may be caused by an open or shorted turbo speed sensor circuit.
This DTC may also be caused by a seized or broken turbo shaft or other turbo damage.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to control the engine in a normal manner.

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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.

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 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.

❸ **Check MAT Return Circuit Resistance**	On the harness, measure the resistance between MAT sensor connector T02-B and single point ground. Is the resistance less than 5 ohms?	**YES:** GO TO 4 **NO:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1
❹ **Check For MAT Signal Circuit Shorted to Voltage Source**	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between MAT sensor connector T02-A (+) and T02-B (-). Is the voltage greater than 5.5V?	**YES:** GO TO 5 **NO:** GO TO 7 – – –1/1
❺ **Terminal Test**	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform TERMINAL TEST on connector J03. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 6 – – –1/1
❻ **Check for Wire-Wire Short**	1. Ignition OFF, engine OFF. 2. Disconnect ECU connectors J01 and J02. 3. Measure the resistance between ECU J03-F1 and all other terminals in 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:** Inspect harness for short to some voltage source. If none found, reinstall connectors and recheck procedure. GO TO 1 – – –1/1
❼ **Check for DTC Change with MAT Signal Shorted to Return**	1. Ignition OFF, engine OFF. 2. On the harness, install flex probes on MAT sensor connector terminals T02-A and T02-B. 3. Connect jumper wire between flex probes. 4. Ignition ON, engine OFF. 5. Refresh DTCs Is DTC 000105.04 now an active DTC?	**YES:** GO TO 8 **NO:** GO TO 9 – – –1/1

❼ **Check Manifold Air Temperature Sensor Operation**	1. With MAT sensor removed from engine, reconnect MAT sensor to its harness connector. 2. Ignition ON, Engine OFF. 3. Monitor the Manifold Air 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:** MAT sensor is OK. Diagnose engine air intake cooling system. GO TO 10 **NO:** MAT sensor has already been replaced. GO TO 8 **NO:** Replace MAT sensor. GO TO 12 – – –1/1
❽ **Check Signal Wire In Harness**	1. Ignition OFF, Engine OFF. 2. Disconnect the MAT sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 105.03 become active?	**YES:** Wire harness is OK. Problem not fixed. Recheck connectors and air intake system. GO TO 12 **NO:** GO TO 9 – – –1/1
❾ **Check ECU**	*NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000105.03* 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 000105.03 become active?	**YES:** Problem in harness. Perform TERMINAL TEST on ECU connector J3. Diagnose and fix harness problem. GO TO 12 **NO:** Replace ECU. GO TO 12 – – –1/1
❿ **Check for Engine Related Causes**	Check the following items that can cause high intake manifold air temperature: • Test for leaks. See TEST FOR INTAKE AIR LEAKS in base engine manual, Section 04, Group 150. • Malfunctioning turbocharger compressor. See TURBOCHARGER INSPECTION in base engine manual, Section 02, Group 080. Was cause of high intake manifold air temperature determined?	**YES:** Repair problem. GO TO 12 **NO:** GO TO 11 – – –1/1

15 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all wiring, 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 ranges if possible. Did DTC 000107.31 reappear as active with engine running?	**YES:** GO TO 1 **NO:** Problem fixed. – – –1/1

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16 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

8 Check for DTC 000110.03 with Sensor Reconnected	1. Ignition OFF, engine OFF. 2. Remove flex probes from T04. 3. Reconnect T04 to coolant temperature sensor. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000110.03 now an active DTC?	**YES:** Replace coolant temperature sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 11 – – –1/1

9 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform TERMINAL TEST on terminals J03-D3 and J03-H3. Were Terminal Test results good?	**YES:** GO TO 10 **NO:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1

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10 Check Coolant Temperature Sensor Circuit Continuity	1. Disconnect coolant temperature sensor connector T04. 2. On the harness, measure the resistance between ECU J03-D3 and coolant temperature sensor connector T04-A. 3. On the harness, measure the resistance between ECU J03-H3 and coolant temperature sensor connector T04-B. Were both resistance measurements less than 10 ohms?	**YES:** GO TO 11 **NO:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1

11 Check for Intermittent Connection	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor the Coolant Temperature Input Voltage data point in Service ADVISOR while gently wiggling the wiring harness between the coolant temperature sensor and ECU J03 connector. *NOTE: The coolant temperature input voltage will increase to approximately 5V when the sensor circuit is open.* Was the source of the intermittent connection found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 12 – – –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

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. 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 000111.01 reappear active?	**YES:** GO TO 2 **NO:** GO TO 16

– – –1/1

❷ **Coolant Level Check**	**CAUTION: Release of fluids from pressurized cooling system can cause serious burns. Before removing radiator cap, shut off engine and let cool. Use dry towel over radiator cap and slowly loosen cap to first stop to relieve pressure before removing completely.** 1. Ignition OFF, Engine OFF. 2. Remove radiator cap and check cooling system for proper level. Is coolant at proper level?	**YES:** GO TO 4 **NO:** Coolant level is low. GO TO 3

– – –1/1

29 Software Updates	1. Download latest ECU software payload and reprogram ECU using Service Advisor. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor. Is 000157.03 active?	**YES:** Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 **NO:** Problem fixed, bad ECU program. – – –1/1

30 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

000157.17 — Fuel Rail Pressure Not Developed Diagnostic Procedure

Troubleshooting Sequence:
000157.10

When DTC is Displayed:
When ever the engine is cranking and the error is active.

Related Information:
The ECU does not detect 10 MPa (1450 psi) of fuel rail pressure after cranking the engine for approximately 5 seconds.

Alarm Level:
Warning

Control Unit Response:
The ECU will continue to try to start the engine.

Additional References:
For more fuel rail pressure sensor information, see FUEL RAIL PRESSURE SENSOR in Section 03, Group 140 earlier in this manual.

For more pressure sensor information, see MEASURING PRESSURE 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 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 000174.03 reappear active?	**YES:** GO TO 2 **NO:** GO TO 10 – – –1/1

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❷ **Terminal Test**	1. Ignition OFF, engine OFF. 2. Perform TERMINAL TEST on fuel temperature sensor connector T05 and fuel temperature sensor. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 3 – – –1/1

❸ **Check Fuel Temperature Return Circuit Resistance**	On the harness, measure the resistance between fuel temperature sensor connector T05-2 and single point ground. Is the resistance less than 5 ohms?	**YES:** GO TO 4 **NO:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1

❹ **Check For Fuel Temperature Signal Circuit Shorted to Voltage Source**	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between fuel temperature sensor connector T05-1 (+) and T05-2 (-). Is the voltage greater than 5.5V?	**YES:** GO TO 5 **NO:** GO TO 7 – – –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

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

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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

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

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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

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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

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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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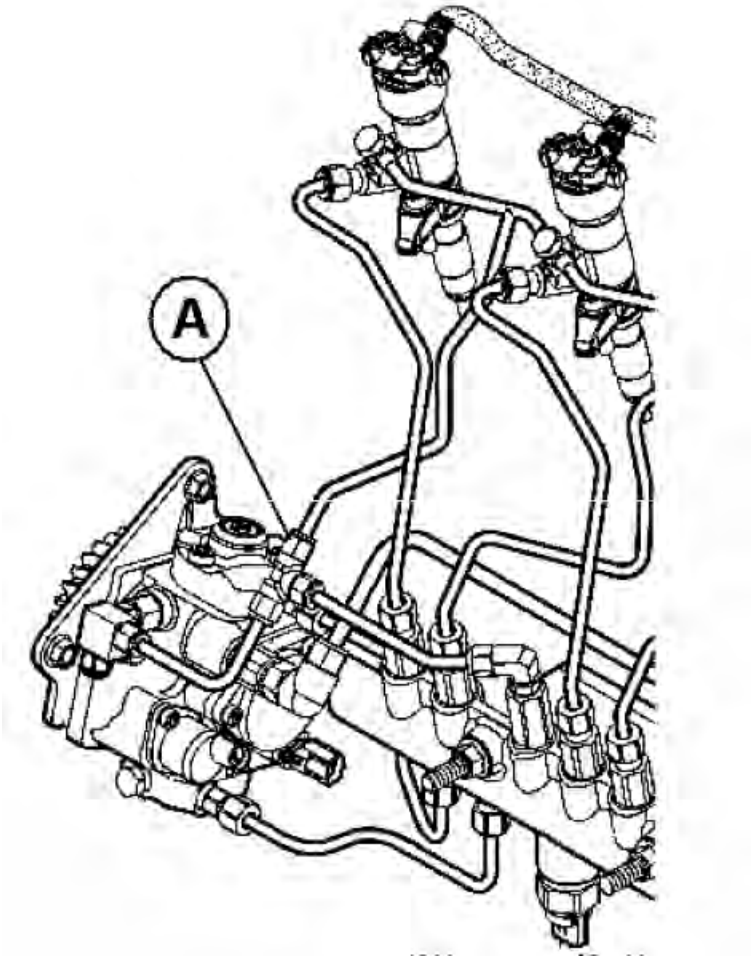
❶ **Read DTCs and Store Snapshot Information**	1. Ignition ON, engine OFF. *NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.* 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any 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

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

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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

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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

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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

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

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

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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
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

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

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

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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

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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.

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.

16 Replace Dual Fuel Rail Pressure Sensor	1. Replace the Dual Fuel Rail Pressure Sensor and reconnect all connectors. 2. Check for the DTC 001349.02 under the conditions where it was previously active. Is the problem gone?	**YES:** Problem Solved. **NO:** Replace ECU. – – –1/1
17 Check for Intermittent Short	1. Ignition ON, engine OFF. 2. Monitor the Fuel Rail Pressure and Redundant Fuel Rail Pressure Input Voltage data points in Service ADVISOR while gently wiggle wire harness between Dual Fuel Rail Pressure Sensor and ECU J03 connector. *NOTE: Both voltages will decrease to approximately 0V when the sensor circuit is shorted to ground and increase to approximately 5V when the sensor circuit is shorted to voltage.* Was the source of the intermittent short found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 18 – – –1/1
18 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 001349.02 now active?	**YES:** GO TO 2 **NO:** GO TO 19 – – –1/1
19 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect Dual Fuel Rail Pressure Sensor connector P05. 3. Perform Terminal Test on P05. 4. Disconnect ECU J03 connector. 5. Perform TERMINAL TEST on terminals J03-A3, J03-E1, J03-G1, J03-C1, J03-A2 and J03-G2. Were Terminal Test results good?	**YES:** GO TO 20 **NO:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1
20 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 001349.02 now active?	**YES:** GO TO 2 **NO:** GO TO 21 – – –1/1
21 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 001349.02. Were any applicable solutions found?	**YES:** Perform steps identified in DTAC solution. **NO:** Contact DTAC for support. – – –1/1

001638.00 — Hydraulic Oil Temperature Extremely High

For troubleshooting procedures please see the application troubleshooting manual.

DM59778,000000F –19–04AUG07–1/1

002630.00 - Charge Air Cooler Outlet Temperature Signal Extremely 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
002630.00

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

Related Information:
The ECU senses an charged air cooler outlet temperature of 91° C (195° F) on OEM engines.
The engine has to be running for 3 minutes before the code is set.
001569.31 is set when this code is active.

Alarm Level:
Stop

Control Unit Response:
Maximum engine power is derated up to 60 percent.

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.
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 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.

Continued on next page

9 Check Sensor Circuit Continuity	1. On the harness, measure the resistance between ECU J03-F2 and charge air cooler outlet temperature sensor T01-A. 2. On the harness, measure the resistance between ECU J03-B2 and charge air cooler outlet temperature sensor T01-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-F2 and single point ground. Was the resistance less than 100k ohms?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 11 – – –1/1
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 002630.04.* 1. Verify ECU J03 connector is still disconnected. 2. Ignition ON, Engine OFF. 3. Refresh codes. Is DTC 002630.04 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-F2 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

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002659.02 — Calculated EGR Flow Rate Invalid

The ECU senses a mismatch between the calculation methods used to determine exhaust gas recirculation flow.

RG41221,0000288 –19–28MAY08–1/1

❺ **Check Charge Air Cooler Outlet Circuit Resistance**	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and charge air cooler outlet sensor connector. 3. Perform TERMINAL TEST on J3 and charge air cooler sensor connector. 4. On the harness, measure the resistance between the ECU charge air cooler outlet signal (J3-F2) and the charge air cooler outlet sensor connector signal (T01-A). 5. On the harness, measure the resistance between the ECU charge air cooler outlet reference (J3-B2) and the charge air cooler outlet sensor connector reference (T01-B). Are Terminal Test results good and are both resistance measurements less than 10 ohms?	**YES:** GO TO 6 **NO:** Fix problem. GO TO 4 – – –1/1

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❻ **Check Charge Air Cooler Outlet Circuit**	1. Verify charge air cooler outlet sensor is disconnected. 2. On the harness, measure the resistance between the ECU charge air cooler outlet signal (J3-F2) and reference (J3-B2). 3. On the harness, measure the resistance between the ECU charge air cooler outlet signal (J3-F2) and single point ground. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage between the ECU charge air cooler outlet signal (J3-F2) and single point ground. Are both resistance measurements greater than 10k ohms and is the voltage measurement less than 0.5V?	**YES:** Replace charge air cooler outlet sensor. GO TO 11 **NO:** Fix problem. GO TO 4 – – –1/1

16 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 17 **NO:** DTC with SPN 002791 is now active. Discontinue test for 2659.17 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 17 – – –1/1

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17 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 18 **NO:** Step 3 or 4 was performed earlier during this procedure. GO TO 20 **NO:** Step 3 or 4 was NOT performed earlier during this procedure. GO TO 4 – – –1/1

18 Recreate Operating Point	Recreate the engine operating point where 002659.17 became active as indicated by the snapshot capture and snapshot recording obtained in Step 1 and maintain for at least 10 minutes. Is 002659.17 active?	**YES:** ECU has NOT been reprogrammed during this procedure. GO TO 19 **YES:** ECU was reprogrammed during this procedure. Open DTAC case. **NO:** Problem fixed. – – –1/1

⑨ **EGR Valve Cleaning Cycle**	1. Reconnect EGR valve connector. 2. Ignition ON, Engine ON. 3. Warm engine to normal operating temperature. 4. Run EGR VALVE CLEAN CYCLE test. 5. Ignition ON, Engine OFF. 6. Run HARNESS DIAGNOSTIC MODE TEST. 7. Refresh codes. Did 002791.03 or 002791.04 appear active?	**YES:** Troubleshoot that DTC. **NO:** No DTCs appeared. Cleaning fixed problem. Return to service. **NO:** DTC 002791.02 appeared. Remove and replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. – – –1/1

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⑩ **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 12. – – –1/1

⑪ **Engine Error Operating Point Test**	1. Ignition ON, Engine ON. 2. Set engine to operating point that caused error. Did Code reappear active?	**YES:** GO TO 12. **NO:** GO TO 10 and review the data again. – – –1/1

❻ **EGR Valve Connector Check**	1. Ignition OFF, Engine OFF. 2. Disconnect the ECU connector that has the EGR valve signal input wire connected to it, J3 (blue face). 3. Perform a terminal test, see TERMINAL TEST earlier in this Group. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. **NO:** GO TO 7 – – –1/1

❼ **Short To Ground Test**	1. ECU J3 still disconnected. 2. Ignition ON, Engine OFF. 3. Refresh codes. Did 002791.04 go stored and 002791.03 become active??	**YES:** Repair short in harness. Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST. **NO:** Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST. – – –1/1

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❽ **Occurrence Count Check**	1. Ignition OFF, Engine OFF. 2. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 3. Review occurrence counts in the snapshot capture information for this code. Is count greater that five?	**YES:** GO TO 9. **NO:** GO TO 10. – – –1/1

❾ **EGR Valve Connector Test**	1. Disconnect EGR valve connector. 2. Perform TERMINAL TEST. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. **NO:** GO TO 10. – – –1/1

❺ **EGR Valve Cleaning Cycle**	1. Reconnect EGR valve connector. 2. Ignition ON, Engine ON. 3. Warm engine to normal operating temperature. 4. Run EGR VALVE CLEANING TEST. 5. Ignition ON, Engine OFF. 6. Run HARNESS DIAGNOSTIC MODE TEST. 7. Refresh codes. Did any DTC with an SPN of 002791 appear active other than 002791.13?	**YES:** Refer to Trouble Shooting Sequence earlier in this procedure. **NO:** No DTCs with an SPN or 002791 appeared active. Cleaning cycle fixed problem. Return to service **NO:** Only 002791.13 appeared active. GO TO 6

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❻ **Visual Inspection of EGR Valve**	1. Remove EGR valve. 2. Perform a visual inspection of the valve looking for damaged or broken parts or the poppet not seated against the flange. 3. Check for an obstruction in the manifold that would keep the valve from opening all the way. Where any problems found?	**YES:** Damaged EGR valve. Replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. **YES:** Obstruction in manifold. Remove obstruction and clean manifold. Run HARNESS DIAGNOSTIC MODE TEST. **NO:** GO TO 7

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❼ **Visual Inspection of EGR Valve Movement**	1. Reconnect EGR valve connector and leave valve out so you can watch it move. **IMPORTANT: Pinch hazard, keep hands away from valve while it cycles.** 2. Ignition ON, Engine OFF. 3. Watch EGR valve for full closure and smooth movement. 4. Run HARNESS DIAGNOSTIC MODE TEST. Did valve move smoothly, open and close fully and 002791.13 reappear active?	**YES:** Replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. **NO:** Moved smoothly and DTC 002791.31 did not reappear. Reinstall EGR valve. Run HARNESS DIAGNOSTIC MODE TEST.

– – –1/1

003509.03 — Sensor Supply #1 Voltage Out of Range High

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

RG41183,000012C –19–04OCT07–1/1

❼ **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. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **YES:** If a certain operating point exists when error occurs, 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 of failure and refresh codes. Did 003510.03 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

04
160
,977

❾ **Retest**	1. Ignition ON, Engine OFF. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 3. Refresh codes. Is 003510.03 active?	**YES:** GO TO 2 **NO:** GO TO 10 – – –1/1

❿ **Software Updates**	1. Download latest software and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 003510.03 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, bad ECU program. – – –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 in Section 04, Group 160, earlier in this manual. 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 in Section 04, Group 160, earlier in this manual. 4. Refresh Codes. Did 003511.04 reappear active?	**YES:** GO TO 2 **NO:** GO TO 9 – – –1/1

❷ **Disconnect Related Components**	*NOTE: New codes will appear as sensors are disconnected. Disregard all codes except 3511.04.* Part 1 1. Ignition OFF, Engine OFF. 2. Disconnect one of the related sensors/components listed below. • *Primary Analog Throttle* 3. Ignition ON, Engine OFF. 4. Monitor Sensor Supply #3 Voltage in Service ADVISOR. 5. Refresh codes. Has 003511.04 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 003511.04 still active?	**YES:** GO TO 6 **NO:** GO TO Part 1, Step 1. – – –1/1

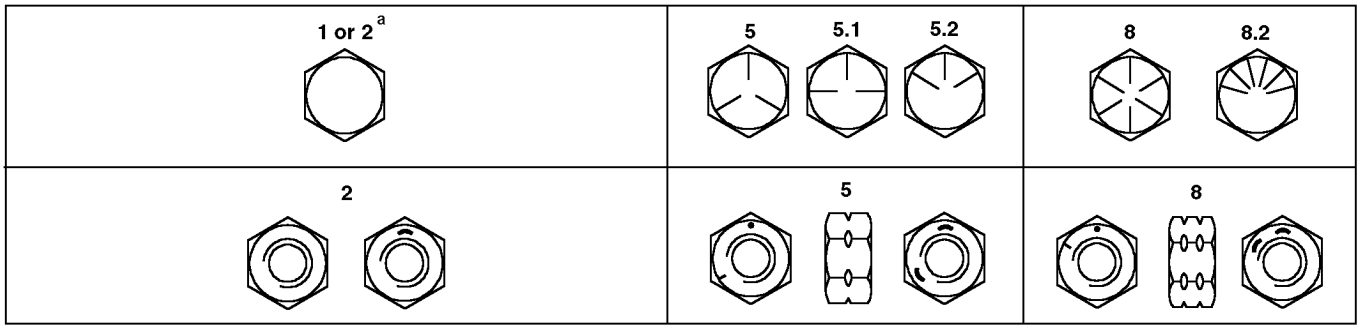
❸ **Terminal Test**	1. Ignition OFF, Engine OFF. 2. Perform TERMINAL TEST on the connector of the sensor just removed. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. **NO:** GO TO 4 – – –1/1

003513.03 — Sensor Supply #5 Voltage Out of Range High

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

RG41183,0000133 –19–03OCT07–1/1

Unified Inch Bolt and Cap Screw Torque Values



TORQ1A –UN–27SEP99

Top, SAE Grade and Head Markings; Bottom, SAE Grade and Nut Markings

	Grade 1 (No Mark)		Grade 2[a] (No Mark)		Grade 5, 5.1 or 5.2		Grade 8 or 8.2	
Size	**Lubricated[b] N•m(lb-ft)**	**Dry[c] N•m(lb-ft)**	**Lubricated[b] N•m(lb-ft)**	**Dry[c] N•m(lb-ft)**	**Lubricated[b] N•m(lb-ft)**	**Dry[c] N•m(lb-ft)**	**Lubricated[b] N•m(lb-ft)**	**Dry[c] N•m(lb-ft)**
1/4	3.8 (2.8)	4.7 (3.5)	6 (4.4)	7.5 (5.5)	9.5 (7)	12 (9)	13.5 (10)	17 (12.5)
5/16	7.7 (5.7)	9.8 (7.2)	12 (9)	15.5 (11.5)	19.5 (14.5)	25 (18.5)	28 (20.5)	35 (26)
3/8	13.5 (10)	17.5 (13)	22 (16)	27.5 (20)	35 (26)	44 (32.5)	49 (36)	63 (46)
7/16	22 (16)	28 (20.5)	35 (26)	44 (32.5)	56 (41)	70 (52)	80 (59)	100 (74)
1/2	34 (25)	42 (31)	53 (39)	67 (49)	85 (63)	110 (80)	120 (88)	155 (115)
9/16	48 (35.5)	60 (45)	76 (56)	95 (70)	125 (92)	155 (115)	175 (130)	220 (165)
5/8	67 (49)	85 (63)	105 (77)	135 (100)	170 (125)	215 (160)	240 (175)	305 (225)
3/4	120 (88)	150 (110)	190 (140)	240 (175)	300 (220)	380 (280)	425 (315)	540 (400)
7/8	190 (140)	240 (175)	190 (140)	240 (175)	490 (360)	615 (455)	690 (510)	870 (640)
1	285 (210)	360 (265)	285 (210)	360 (265)	730 (540)	920 (680)	1030 (760)	1300 (960)
1-1/8	400 (300)	510 (375)	400 (300)	510 (375)	910 (670)	1150 (850)	1450 (1075)	1850 (1350)
1-1/4	570 (420)	725 (535)	570 (420)	725 (535)	1280 (945)	1630 (1200)	2050 (1500)	2600 (1920)
1-3/8	750 (550)	950 (700)	750 (550)	950 (700)	1700 (1250)	2140 (1580)	2700 (2000)	3400 (2500)
1-1/2	990 (730)	1250 (930)	990 (730)	1250 (930)	2250 (1650)	2850 (2100)	3600 (2650)	4550 (3350)

[a] Grade 2 applies for hex cap screws (not hex bolts) up to 6 in. (152 mm) long. Grade 1 applies for hex cap screws over 6 in. (152 mm) long, and for all other types of bolts and screws of any length.

[b] "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings.

[c] "Dry" means plain or zinc plated without any lubrication.

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

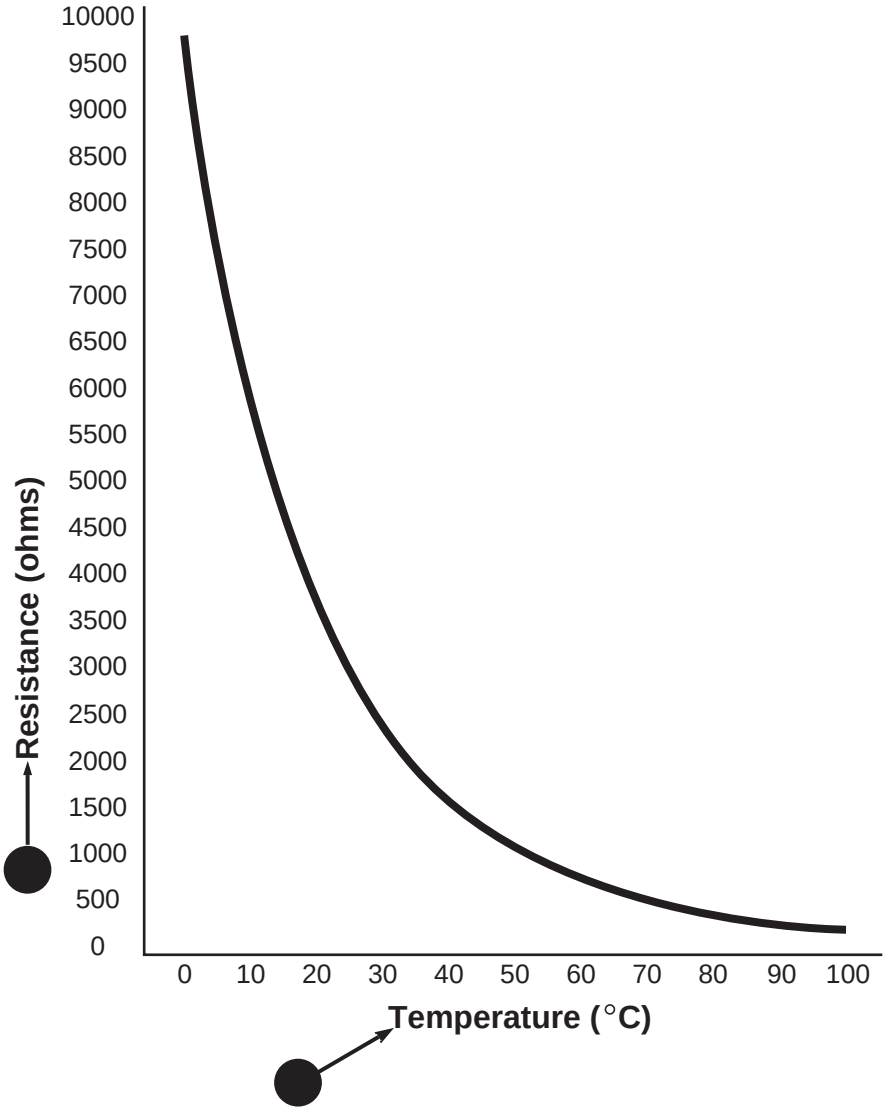
Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fastener threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

RG41221,00001CC –19–15OCT07–1/1

Manifold Air Temperature Sensor and Charged Air Cooler Outlet Temperature Sensor Characteristics



TEMP (°C)	TEMP (°F)	RESISTANCE (OHMS)
0	32	9795
5	41	7616
10	50	5970
15	59	4712
20	68	3747
25	77	3000
30	86	2417
35	95	1959
40	104	1598
45	113	1311
50	122	1081
55	131	895.9
60	140	746.4
65	149	624.9
70	158	525.6
75	167	444.4
80	176	377.4
85	185	321.7
90	194	275.3
95	203	236.6
100	212	204.0

RG15347 –UN–28JUN07

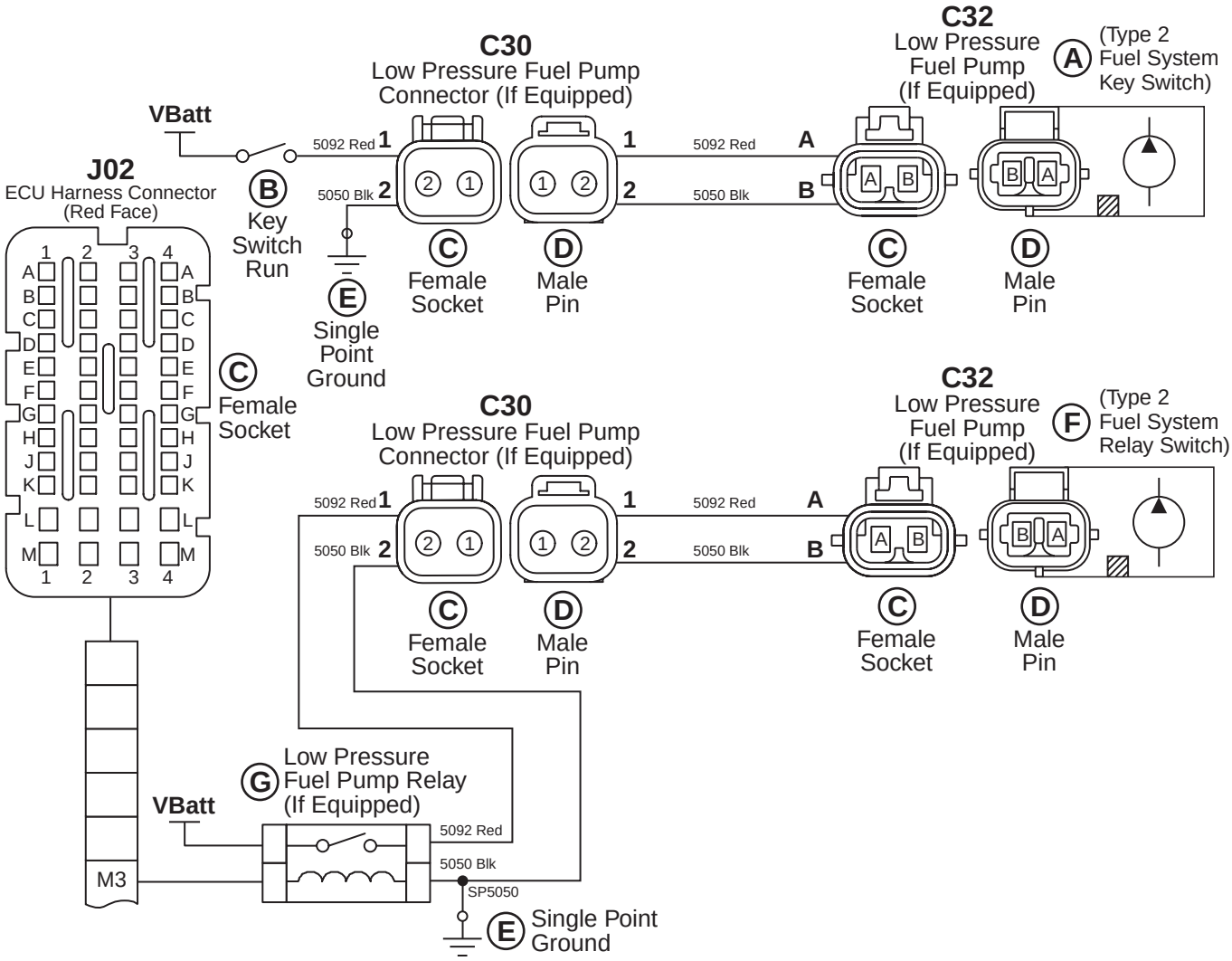
A—Resistance (ohms)

B—Temperature (degrees Celsius)

C—Temperature (degrees Fahrenheit)

BK53208,0000033 –19–04AUG07–1/1

4.5L 12V ECU Wiring Diagram 8



4.5 Liter 12 Volt ECU Wiring Diagram 8 (PT+)

A—(Type 2 Fuel System, Key Switch)
B—Key Switch Run
C—Female Socket
D—Male Pin
E—Single Point Ground
F—(Type 2 Fuel System, Relay Switch)
G—Low Pressure Fuel Pump Relay (If Equipped)
C30—Low Pressure Fuel Pump Connector (If Equipped)
C32—Low Pressure Fuel Pump (If Equipped)
J02—ECU Harness Connector (Red Face)
J2-M3—Low Pressure Fuel Pump Relay Drive
VBatt—Battery Positive

BK53208,0000009 –19–02OCT08–1/1

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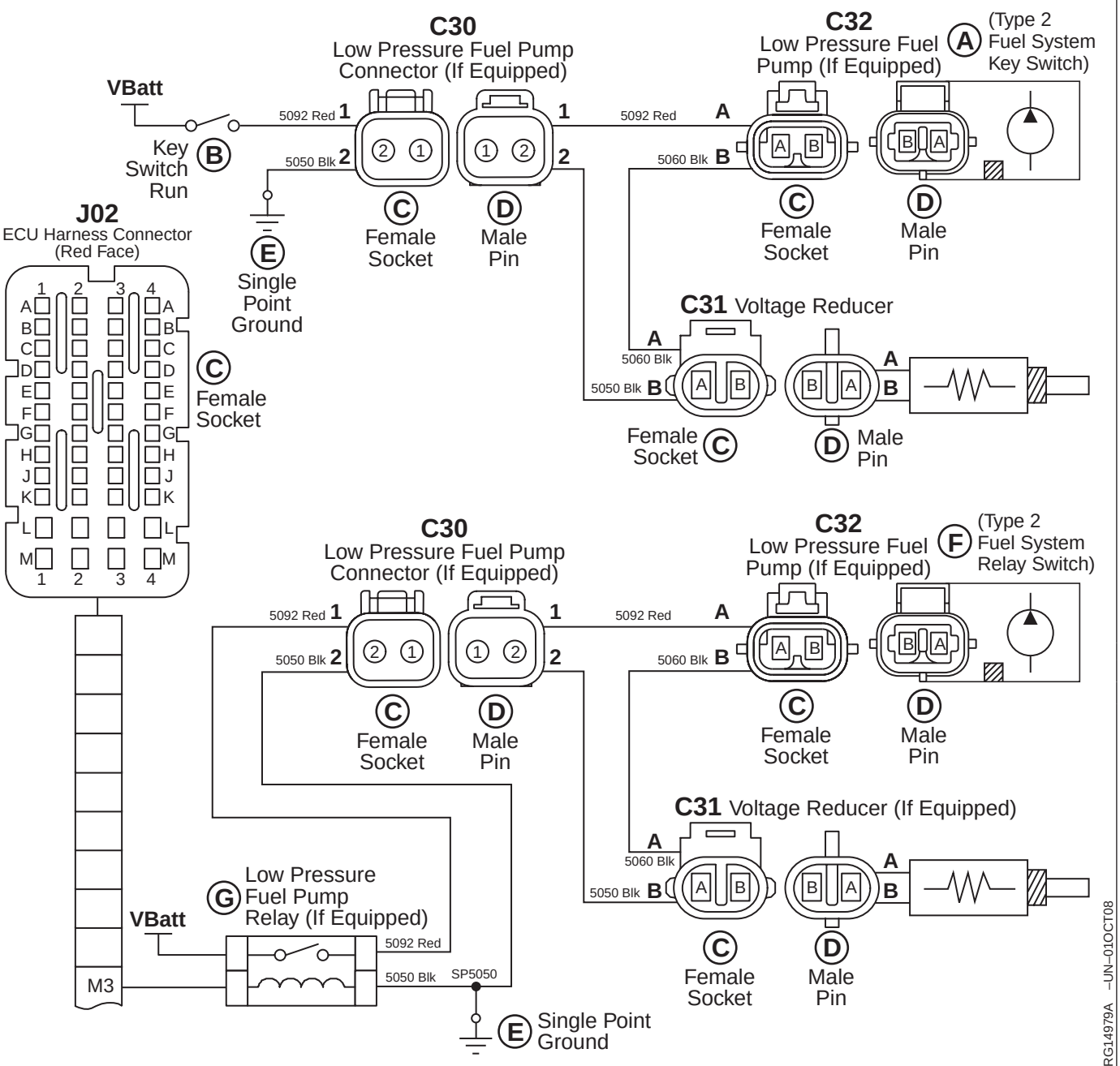
25

RG14970A –UN–01OCT08

4.5L 24V ECU Wiring Diagram 8



4.5 Liter 24 Volt ECU Wiring Diagram 8 (PT+)

A—(Type 2 Fuel System, Key Switch)
B—Key Switch Run
C—Female Socket
D—Male Pin
E—Single Point Ground
F—(Type 2 Fuel System, Relay Switch)
G—Low Pressure Fuel Pump Relay (If Equipped)
C30—Low Pressure Fuel Pump Connector (If Equipped)
C31—Voltage Reducer (If Equipped)
C32—Low Pressure Fuel Pump (If Equipped)
J02—ECU Harness Connector (Red Face)
J2-M3—Low Pressure Fuel Pump Relay Control
VBatt—Battery Positive

BK53208,0000011 –19–02OCT08–1/1