POWERTECH E 4.5 & 6.8L Diesel Engines

Level 16 Electronic Fuel System With Denso HPCR

TECHNICAL MANUAL

POWERTECH E™ 4.5 & 6.8 L Diesel Engines—Level 16 Electronic Fuel System with Denso HPCR

CTM502 31MAY07 (ENGLISH)

For complete service information also see:

John Deere Power Systems

LITHO IN U.S.A.

Revised (10-12)

Introduction

Foreword

This manual is written for an experienced technician. Essential tools required in performing certain service work are identified in this manual and are recommended for use.

This manual (CTM502) covers only Level 16 Electronic Fuel System with the Denso High Pressure Common Rail (HPCR) and 2-valves per cylinder for PowerTech "E" engines. It is one of seven volumes on 4.5 L and 6.8 L engines. The following companion manual covers the base engine.

- CTM104—Base Engine

Live with safety: Read the safety messages in the introduction of this manual and the cautions presented throughout the text of the manual.

This is the safety-alert symbol. When you see this symbol on the machine or in this manual, be alert to the potential for personal injury.

Use this component technical manual in conjunction with the machine technical manual. An application listing in Section 01, Group 001 identifies product-model/component type-model relationship. See the machine technical manual for information on component removal and installation, and gaining access to the components.

Information is organized in sections and groups for the various components requiring service instruction. At the beginning of each group are summaries of the up coming group.

Before beginning repair on an engine, clean the engine.

This manual contains SI Metric units of measure followed immediately by the U.S. customary units of measure. Most hardware on these engines are metric sized.

Some components of this engine may be serviced without removing the engine from the machine. Refer to the specific machine technical manual for information on components that can be serviced without removing the engine from the machine and for engine removal and installation procedures.

Read each block of material completely before performing service to check for differences in procedures or specifications.

CALIFORNIA PROPOSITION 65 WARNING: Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

CD03523,000016D –19–30MAY07–1/1

Contents

All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

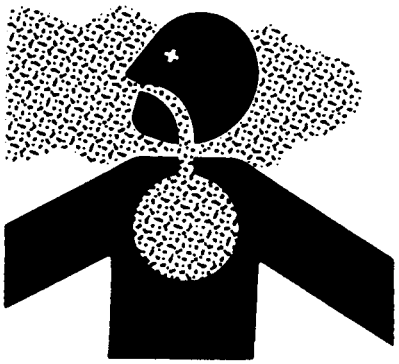
Section 01
General

Contents

Work In Ventilated Area

Engine exhaust fumes can cause sickness or death. If it is necessary to run an engine in an enclosed area, remove the exhaust fumes from the area with an exhaust pipe extension.

If you do not have an exhaust pipe extension, open the doors and get outside air into the area



TS220 –UN–23AUG88

DX,AIR –19–17FEB99–1/1

Recognize Safety Information

This is a safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.

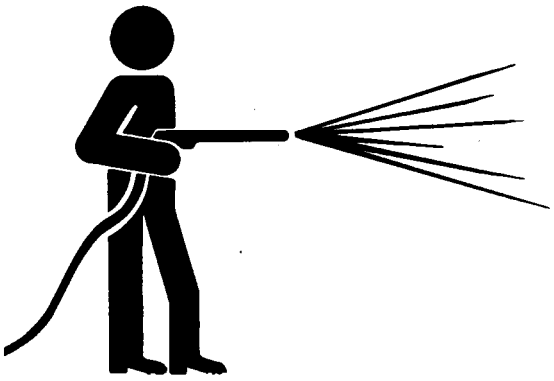
T81389 –UN–07DEC88

DX,ALERT –19–29SEP98–1/1

Work in Clean Area

Before starting a job:

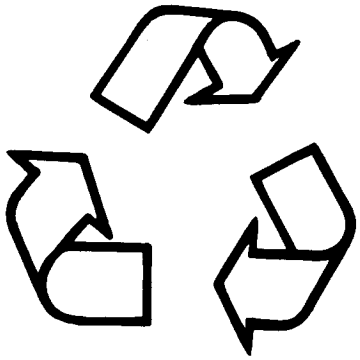
- Clean work area and machine.
- Make sure you have all necessary tools to do your job.
- Have the right parts on hand.
- Read all instructions thoroughly; do not attempt shortcuts.



T6642EJ –UN–18OCT88

DX,CLEAN –19–04JUN90–1/1

Dispose of Waste Properly



TS1133 –UN–26NOV90

Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with John Deere equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries.

Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

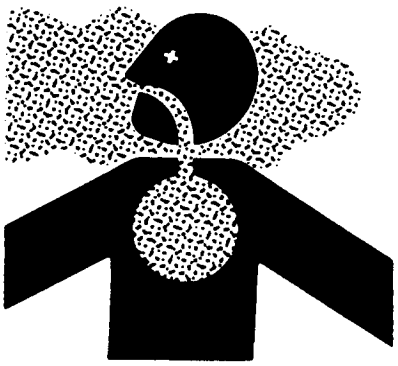
Do not pour waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.

Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your John Deere dealer.

DX,DRAIN –19–03MAR93–1/1

Avoid Harmful Asbestos Dust



TS220 –UN–23AUG88

Avoid breathing dust that may be generated when handling components containing asbestos fibers. Inhaled asbestos fibers may cause lung cancer.

Components in products that may contain asbestos fibers are brake pads, brake band and lining assemblies, clutch plates, and some gaskets. The asbestos used in these components is usually found in a resin or sealed in some way. Normal handling is not hazardous as long as airborne dust containing asbestos is not generated.

Avoid creating dust. Never use compressed air for cleaning. Avoid brushing or grinding material containing asbestos. When servicing, wear an approved respirator. A special vacuum cleaner is recommended to clean asbestos. If not available, apply a mist of oil or water on the material containing asbestos.

Keep bystanders away from the area.

DX,DUST –19–15MAR91–1/1

Handle Fuel Safely—Avoid Fires

Handle fuel with care: it is highly flammable. Do not refuel the machine while smoking or when near open flame or sparks.

Always stop engine before refueling machine. Fill fuel tank outdoors.

Prevent fires by keeping machine clean of accumulated trash, grease, and debris. Always clean up spilled fuel.

TS202 –UN–23AUG88

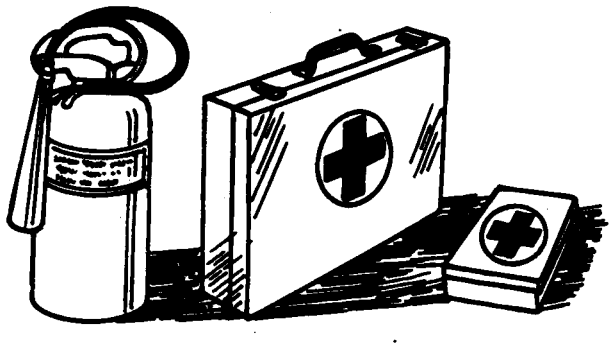
DX,FIRE1 –19–03MAR93–1/1

Prepare for Emergencies

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



TS291 –UN–23AUG88

DX,FIRE2 –19–03MAR93–1/1

Handle Starting Fluid Safely

Starting fluid is highly flammable.

Keep all sparks and flame away when using it. Keep starting fluid away from batteries and cables.

To prevent accidental discharge when storing the pressurized can, keep the cap on the container, and store in a cool, protected location.

Do not incinerate or puncture a starting fluid container.

TS1356 –UN–18MAR92

DX,FIRE3 –19–16APR92–1/1

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Handle Fluids Safely—Avoid Fires

When you work around fuel, do not smoke or work near heaters or other fire hazards.

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; they can ignite and burn spontaneously.

TS227 –UN–23AUG88

DX,FLAME –19–29SEP98–1/1

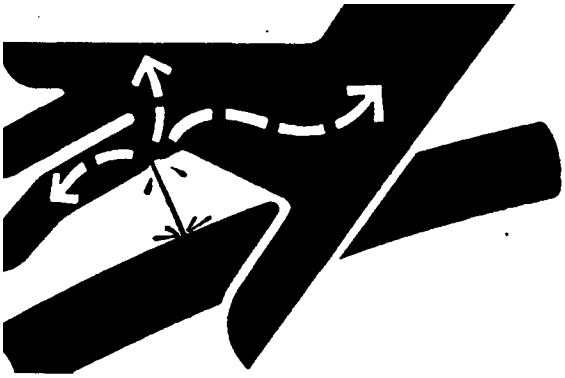
Avoid High-Pressure Fluids

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.



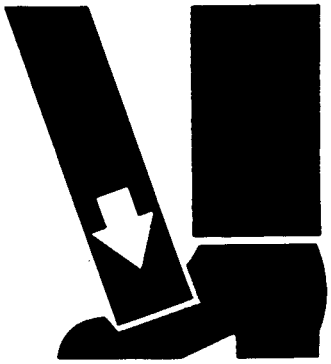
X9811 –UN–23AUG88

DX,FLUID –19–03MAR93–1/1

Use Proper Lifting Equipment

Lifting heavy components incorrectly can cause severe injury or machine damage.

Follow recommended procedure for removal and installation of components in the manual.

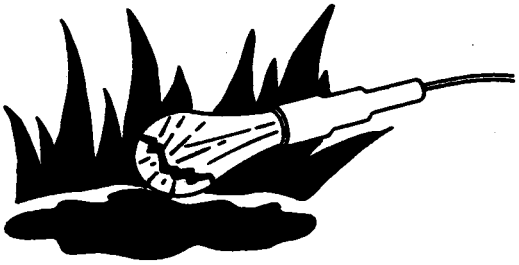


TS226 –UN–23AUG88

DX,LIFT –19–04JUN90–1/1

Illuminate Work Area Safely

Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.



TS223 –UN–23AUG88

DX,LIGHT –19–04JUN90–1/1

Live With Safety

Before returning machine to customer, make sure machine is functioning properly, especially the safety systems. Install all guards and shields.

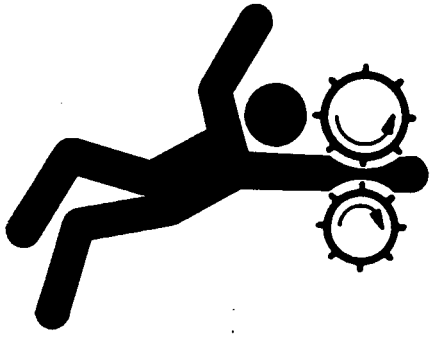
TS231 –19–07OCT88

DX,LIVE –19–25SEP92–1/1

Service Machines Safely

Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



TS228 –UN–23AUG88

DX,LOOSE –19–04JUN90–1/1

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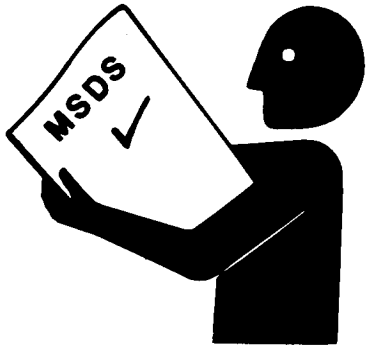
Handle Chemical Products Safely

Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with John Deere equipment include such items as lubricants, coolants, paints, and adhesives.

A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.

Check the MSDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and recommended equipment.

(See your John Deere dealer for MSDS's on chemical products used with John Deere equipment.)



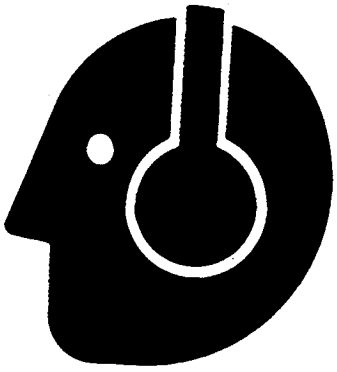
TS1132 –UN–26NOV90

DX,MSDS,NA –19–03MAR93–1/1

Protect Against Noise

Prolonged exposure to loud noise can cause impairment or loss of hearing.

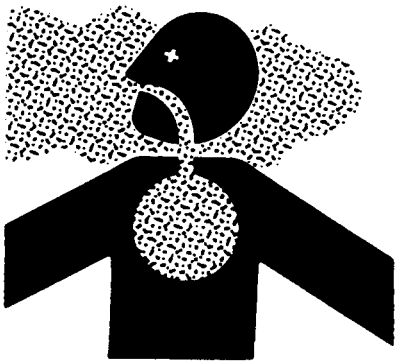
Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.



TS207 –UN–23AUG88

DX,NOISE –19–03MAR93–1/1

Remove Paint Before Welding or Heating



TS220 –UN–23AUG88

Avoid potentially toxic fumes and dust.

Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

Remove paint before heating:

- Remove paint a minimum of 100 mm (4 in.) from area to be affected by heating. If paint cannot be removed, wear an approved respirator before heating or welding.
- If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.
- If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

Do not use a chlorinated solvent in areas where welding will take place.

Do all work in an area that is well ventilated to carry toxic fumes and dust away.

Dispose of paint and solvent properly.

DX,PAINT –19–24JUL02–1/1

Stay Clear of Rotating Drivelines

TS1644 –UN–22AUG95

Entanglement in rotating driveline can cause serious injury or death.

Keep tractor master shield and driveline shields in place at all times. Make sure rotating shields turn freely.

Wear close fitting clothing. Stop the engine and be sure PTO driveline is stopped before making adjustments, connections, or cleaning out PTO driven equipment.

DX,PTO –19–12SEP95–1/1

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Service Cooling System Safely

Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off engine. Only remove filler cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.

TS281 –UN–23AUG88

DX,RCAP –19–04JUN90–1/1

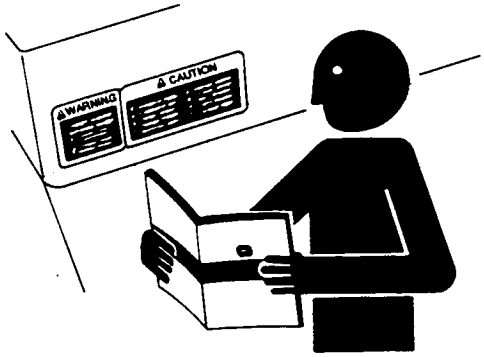
Follow Safety Instructions

Carefully read all safety messages in this manual and on your machine safety signs. Keep safety signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from your John Deere dealer.

Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.

Keep your machine in proper working condition. Unauthorized modifications to the machine may impair the function and/or safety and affect machine life.

If you do not understand any part of this manual and need assistance, contact your John Deere dealer.



TS201 –UN–23AUG88

DX,READ –19–03MAR93–1/1

Use Proper Tools

Use tools appropriate to the work. Makeshift tools and procedures can create safety hazards.

Use power tools only to loosen threaded parts and fasteners.

For loosening and tightening hardware, use the correct size tools. DO NOT use U.S. measurement tools on metric fasteners. Avoid bodily injury caused by slipping wrenches.

Use only service parts meeting John Deere specifications.

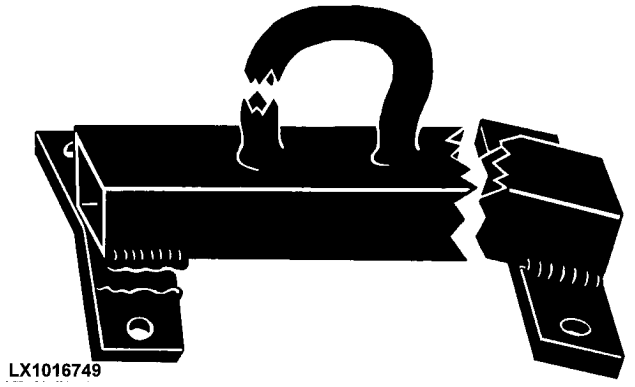
TS779 –UN–08NOV89

DX,REPAIR –19–17FEB99–1/1

Construct Dealer-Made Tools Safely

Faulty or broken tools can result in serious injury. When constructing tools, use proper, quality materials, and good workmanship.

Do not weld tools unless you have the proper equipment and experience to perform the job.



LX1016749 –UN–01JUL97

DX,SAFE,TOOLS –19–10OCT97–1/1

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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.

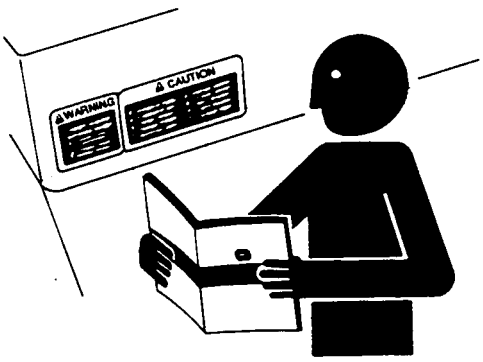
DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.

TS187 –19–30SEP88

DX,SIGNAL –19–03MAR93–1/1

Replace Safety Signs

Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.



TS201 –UN–23AUG88

DX,SIGNS1 –19–04JUN90–1/1

Protect Against High Pressure Spray

Spray from high pressure nozzles can penetrate the skin and cause serious injury. Keep spray from contacting hands or body.

If an accident occurs, see a doctor immediately. Any high pressure spray 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.

TS1343 –UN–18MAR92

DX,SPRAY –19–16APR92–1/1

Avoid Heating Near Pressurized Fluid Lines

Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can accidentally burst when heat goes beyond the immediate flame area.

TS953 –UN–15MAY90

DX,TORCH –19–10DEC04–1/1

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12

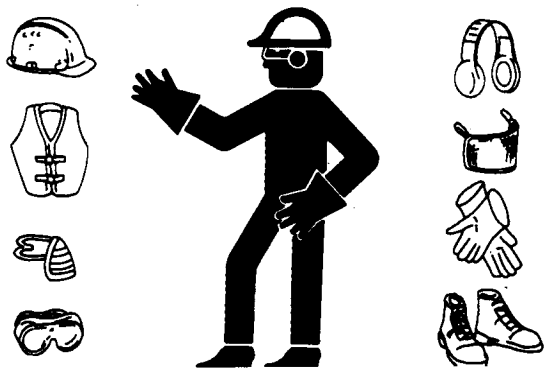
Wear Protective Clothing

Wear close fitting clothing and safety equipment appropriate to the job.

Prolonged exposure to loud noise can cause impairment or loss of hearing.

Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.

Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.



TS206 –UN–23AUG88

DX,WEAR –19–10SEP90–1/1

Wait Before Opening High-Pressure Fuel System

High-pressure fluid remaining in fuel lines can cause serious injury. Only technicians familiar with this type of system should perform repairs. Before disconnecting fuel lines, sensors, or any other components between the high-pressure fuel pump and nozzles on engines with High Pressure Common Rail (HPCR) fuel system, wait a minimum of 15 minutes after engine is stopped.

TS1343 –UN–18MAR92

DX,WW,HPCR2 –19–07JAN03–1/1

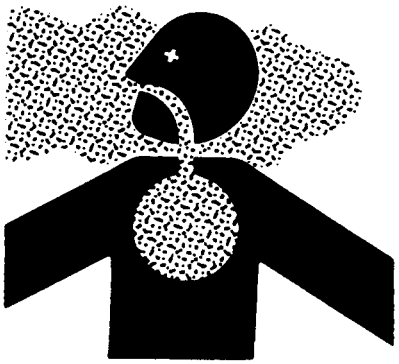
Handle Agricultural Chemicals Safely

Chemicals used in agricultural applications such as fungicides, herbicides, insecticides, pesticides, rodenticides, and fertilizers can be harmful to your health or the environment if not used carefully.

Always follow all label directions for effective, safe, and legal use of agricultural chemicals.

Reduce risk of exposure and injury:

- Wear appropriate personal protective equipment as recommended by the manufacturer. In the absence of manufacturer's instructions, follow these general guidelines:
  - Chemicals labeled **'Danger'**: Most toxic. Generally require use of goggles, respirator, gloves, and skin protection.
  - Chemicals labeled **'Warning'**: Less toxic. Generally require use of goggles, gloves, and skin protections.
  - Chemicals labeled **'Caution'**: Least toxic. Generally require use of gloves and skin protection.
- Avoid inhaling spray or dusts.
- Always have soap, water, and towel available when working with chemicals. If chemical contacts skin, hands, or face, wash immediately with soap and water. If chemical gets into eyes, flush immediately with water.
- Wash hands and face after using chemicals and before eating, drinking, smoking, or urination.
- Do not smoke or eat while applying chemicals.
- After handling chemicals, always bathe or shower and change clothes. Wash clothing before wearing again.
- Seek medical attention immediately if illness occurs during or shortly after use of chemicals.
- Keep chemicals in original containers. Do not transfer chemicals to unmarked containers or to containers used for food or drink.
- Store chemicals in a secure, locked area way from human or livestock food. Keep children away.
- Always dispose of containers properly. Triple rinse empty containers and puncture or crush containers and dispose of properly.



TS220 –UN–23AUG88

A34471

A34471 –UN–11OCT88

DX,WW,CHEM01 –19–05APR04–1/1

Handling Batteries Safely

CAUTION: Battery gas can explode. Keep sparks and flames away from batteries. Use a flashlight to check battery electrolyte level.

Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.

Always remove grounded (—) battery clamp first and replace it last.

TS204 –UN–23AUG88

Explosion

CAUTION: Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

Avoid the hazard by:

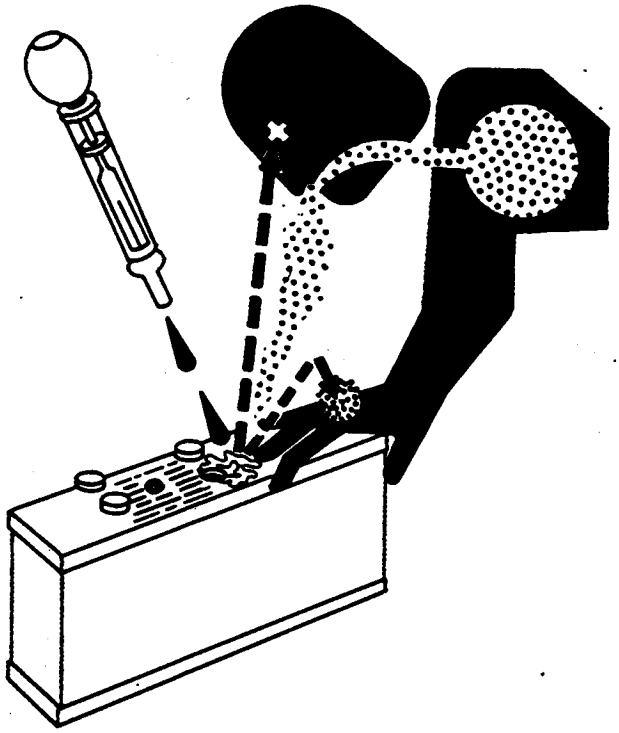
1. **Filling batteries in a well-ventilated area.**
2. **Wearing eye protection and rubber gloves.**
3. **Avoiding breathing fumes when electrolyte is added.**
4. **Avoiding spilling or dripping electrolyte.**
5. **Using proper jump start procedure.**

If you spill acid on yourself:

1. **Flush your skin with water.**
2. **Apply baking soda or lime to help neutralize the acid.**
3. **Flush your eyes with water for 15—30 minutes. Get medical attention immediately.**

If acid is swallowed:

1. **Do not induce vomiting.**
2. **Drink large amounts of water or milk, but do not exceed 2 L (2 qt.).**
3. **Get medical attention immediately.**



TS203 –UN–23AUG88

Acid

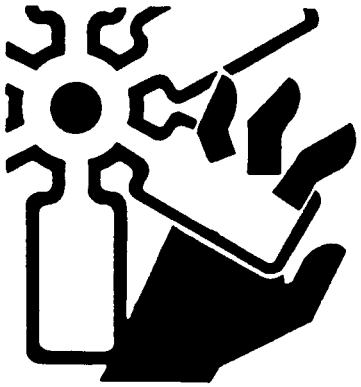
WARNING: Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. **Wash hands after handling.**

DPSG,OUO1004,2758 –19–23JAN07–1/1

Install Fan Guards

Rotating cooling system fans can cause serious injury.

Keep fan guards in place at all times during engine operation. Wear close fitting clothes. Stop engine and be sure fan is stopped before making adjustments or connections, or cleaning near the front of the engine.



TS677 –UN–21SEP89

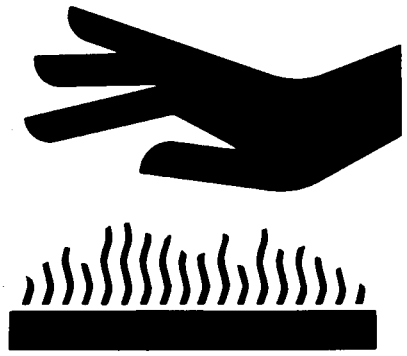
Rotating Fan

OUO1083,00005FE –19–17DEC03–1/1

Avoid Hot Parts

Avoid skin contact with exhaust manifolds, turbochargers and mufflers. Keep flammable materials clear of the turbocharger.

External dry exhaust parts become very hot during operation. Turbochargers may reach temperatures as high as 500°C (932°F) under full load, and naturally aspired exhaust manifolds may reach 600°C (1112°F) under full load. This may ignite paper, cloth or wooden materials. Parts on engines that have been at full load and reduced to no load idle will maintain approximately 150°C (302°F).

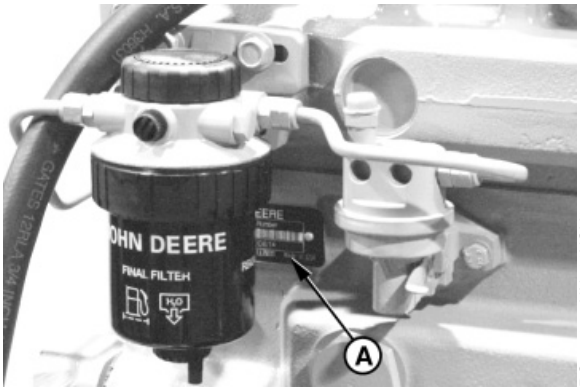


TS271 –UN–23AUG88

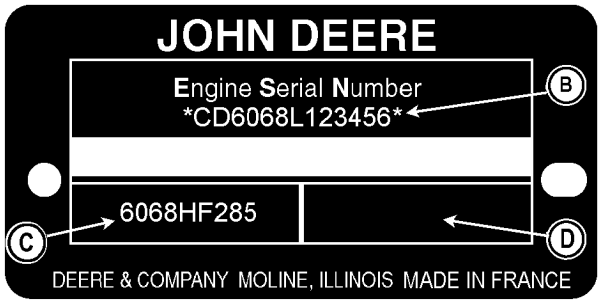
Hot Surface

OUO1083,00005FF –19–22DEC05–1/1

Engine Serial Number Plate Information



RG7778 –UN–11NOV97



CD30857 –UN–21AUG06

Engine Serial Number/Application Data Plate

A—Engine Serial Number Plate **B—Engine Serial Number (13 digits)** **C—Application Data or Type** **D—Internal Factory Identification (Saran engines only)**

IMPORTANT: The engine serial number plate can be easily destroyed. Remove the plate or record the information elsewhere, before "hot tank" cleaning the block.

Each engine has a 13-digit John Deere engine serial number identifying the producing factory, engine displacement, emission "Tier" level and sequential engine number. The following is an example:

Engine Serial Number (B)

CD6068L123456

CD	Factory producing engine
6	Number of Cylinders
068	Liter displacement (6.8 liters)
L	Emission Tier Level
123456	6-digit sequential engine number

Factory Producing Engine

CD	Saran, France
JO	Rosario, Argentina
PE	Torreon, Mexico

Emission Tier Level

L, M or N	Tier 3/Stage IIIA emission certified engine

Engine Application Data (C)

The second line of information on the serial number plate identifies the engine/machine or OEM relationship. See ENGINE APPLICATION CHARTS later in this group. The following is an example:

Continued on next page

6068HF285

6	Number of Cylinders
068	Liter displacement (6.8 liters)
H	Aspiration code
F	User factory code
285	Application code

Aspiration code

A	Turbocharged and Air-to-Coolant Aftercooled
D	Naturally aspirated
H	Turbocharged and Air-to-Air Aftercooled
T	Turbocharged, no aftercooling

User Factory Code

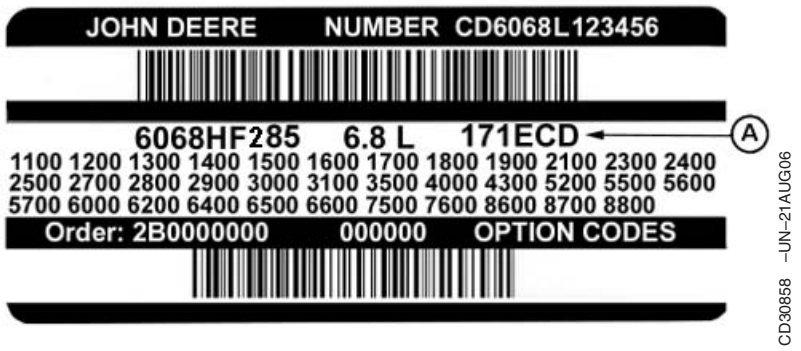
AP	Industries JohnDeere Mexico S.A. de C.V. (Saltillo/Monterrey, Mexico)
AT	Agritalia srl (Vittoria, Sicily, Italy)
BE	Bell EquipmnetCo. (Richards Bay, South Africa)
CQ	John Deere Brazil (Horizontina, Brazil)
DW	John Deere Davenport Works (Davenport, Iowa)
E	John Deere Ottumwa Works (Ottumwa, Iowa)
F	OEM (Outside Equipment Manufacturers)
FF	Deere-Hitachi (Kernersville, North Carolina)
FG	Goldoni S.P.A. (Modena, Italy)
FM	Marine Engines
FS	SDMO Applications
FU	Power Unit for Generator Set
H	John Deere Harvester Works (East Moline, Illinois)
KV	John Deere Commercial Worksite Products (Knoxville, Tennessee/ Dubuque, Iowa)
L	John Deere Werke Mannheim (Germany)
LV	John Deere Commercial Products (Augusta, Georgia)
N	John Deere Des Moines Works (Des Moines, Iowa)
P	Industrias John Deere Mexico S.A. de C.V. (Saltillo/Monterrey, Mexico)
PY	Larson & Toubro Ltd. (Pune, India)
RW	John Deere Waterloo Tractor Works (Waterloo, Iowa)
T	John Deere Dubuque Works (Dubuque, Iowa)
T8	Cameco Industries (Thibodaux, Louisiana)
TJ	John Deere Forestry (Timberjack, Sweden/Finland/Canada)
YC	John Deere Jialian Harvester Co. Limited (China)
Z	John Deere WERKE Zweibrucken (Germany)

Application Code

285 etc.	This is the specific engine model for a given application. In this example (285), “2” denotes 2-valves per cylinder and “85” denotes Tier 3 engines.

CD03523,000016E –19–04MAY07–2/2

OEM Engine Option Code Label



OEM Engine Option Code Label

A—Engine Base Code

An option code label is secured to the top of the valve cover and identifies the factory installed options on each OEM engine to ensure correct parts acquisition.

Always provide option code information and engine base code when ordering repair parts. A listing of option codes is given in parts catalogs and operator's manuals.

NOTE: Before "hot tank" cleaning, ensure that option codes are recorded elsewhere.

CD03523,000016F –19–21AUG06–1/1

Information Relative to Emissions Regulations

Depending on the final destination, engines can meet the emissions regulations according to the US Environmental Protection Agency (EPA), California Air Resources Board (CARB) and for Europe, the Directive 97/68/EC relating the measures against the emissions of particles and gaseous pollutant from internal combustion engines. Such engines are called "CERTIFIED" and receive an emission label stuck on the engine.

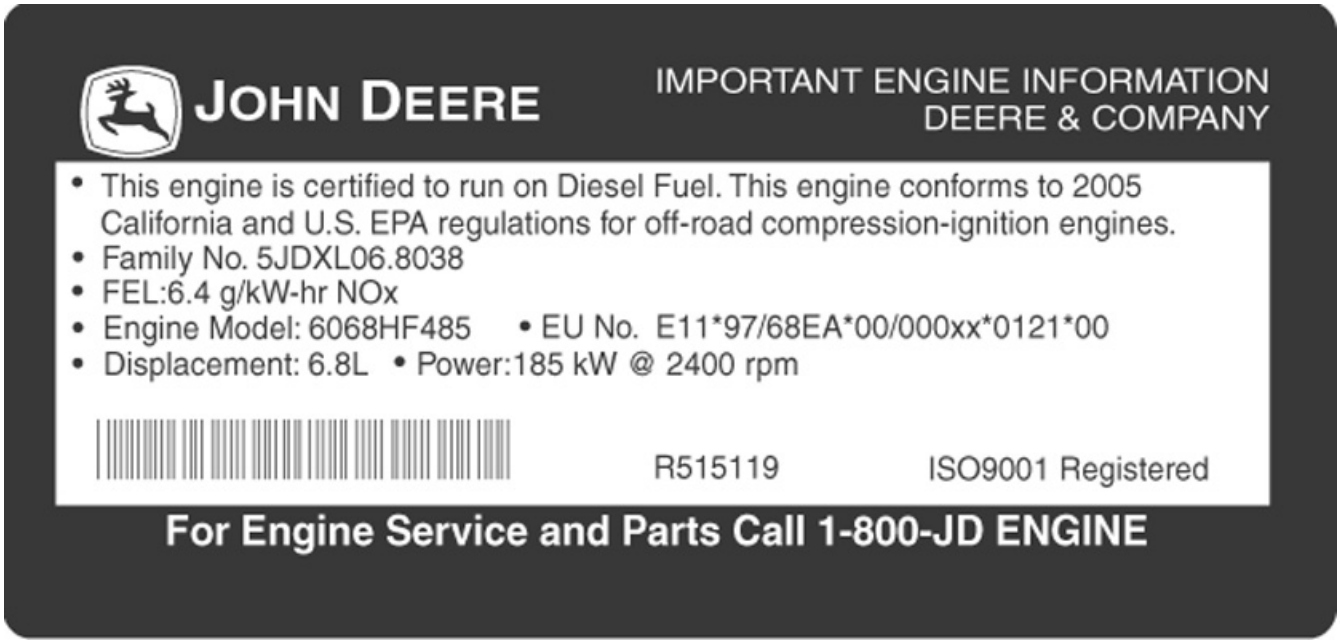
The regulations prohibit tampering with the emission-related components listed below which would render that component inoperative or to make any adjustment on the engine beyond published specifications. It is also illegal to install a part or component where the principle effect of that component is to bypass, defeat, or render inoperative any engine component or device which would affect the engine's conformance to the emission regulations. **To summarize, it is illegal to do anything except return the engine to its original published specifications.**

List of emission-related components:

- Fuel injection system
- Intake manifold
- Turbocharger
- Charge air cooling system
- Piston

RG40854,0000007 –19–10APR02–1/1

Emissions Control System Certification Label



6.8L Engine Emissions Label

CAUTION: Statutes providing severe penalties for tampering with emissions controls may apply at the user's location.

The emissions warranty described below applies only to those engines marketed by John Deere that have been certified by the United States Environmental Protection Agency (EPA) and/or California Air Resources Board (CARB); and used in the United States and Canada. The presence of an emissions label like the one shown signifies that the engine has been certified with the EPA and/or CARB. The EPA and CARB warranties only apply to new engines having the certification label affixed to the engine and sold as stated above in the geographic areas. The presence of an EU number in the third line of the label signifies that the engine has been certified with the European Union countries per Directive 97/68/EC. The emissions warranty does not apply to the EU countries.

NOTE: The hp/kW rating on the engine emissions certification label specifies the gross engine hp/kW, which is flywheel power without fan. In most applications this will not be the same rating as the advertised vehicle hp/kW rating.

RG19661,000022E –19–17APR07–1/1

Engine Application Charts

This component technical manual (CTM502) covers repair and diagnosis of Level 16 Electronic Fuel System on PowerTech “E” 4.5 & 6.8 L engines produced by John Deere SARAN “CD” (France) and John Deere TORREON “PE” (Mexico). Refer to the chart below to know which applications are covered by this manual.

NOTE: Information on how to remove and reinstall the engine in the vehicle is contained in the relevant machine Technical Manual.

JOHN DEERE AGRICULTURAL EQUIPMENT	
Machine Model	**Engine Model**
Tractor	
6230 Advantage Tractor	CD4045HL282
6230 Premium Tractor (North America)	CD4045HL280
6330 Advantage Tractor	CD4045HL283
6330 Premium Tractor (North America)	CD4045HL281
6430 Advantage Tractor	CD4045HL283
6430 Premium Tractor (North America)	CD4045HL281
7130 Advantage Tractor	CD6068HL280
7130 Premium Tractor (North America)	PE6068HRW72
7230 Advantage Tractor	CD6068HL280
7230 Premium Tractor (North America)	PE6068HRW72
7330 Premium Tractor (North America)	PE6068HRW74
Combine	
1450 CWS Combine	CD6068HCQ82
W330 Combine	CD6068HCQ82

JOHN DEERE CONSTRUCTION and FORESTRY EQUIPMENT	
Machine Model	**Engine Model**
Backhoe, Loader	
444J Loader	PE4045HDW53
544J Loader	PE4045HDW70
Crawler Dozer, Crawler Loader	
700J Crawler Dozer	PE6068HT066
750J Crawler Dozer	PE6068HT063
Excavator	
160DLC Excavator	PE4045HT056
200DLC Excavator	PE6068HT069

Continued on next page

JOHN DEERE OEM (OUTSIDE EQUIPMENT MANUFACTURERS)	
Engine Model	**Application**
4045TF285	
4045HF285	
4045HF279	Generator set
4045HFS73	Generator set
4045HFS82	Generator set
4045HFS83	Generator set
4045HFU79	Generator set
6086HF285	
6068HF279	Generator set
6068HFS73	Generator set
6068HFS82	Generator set
6068HFS83	Generator set
6068HFU79	Generator set

CD03523,0000170 –19–23MAY07–2/2

Diesel Fuel

Consult your local fuel distributor for properties of the diesel fuel available in your area.

In general, diesel fuels are blended to satisfy the low temperature requirements of the geographical area in which they are marketed.

Diesel fuels specified to EN 590 or ASTM D975 are recommended.

Required fuel properties

In all cases, the fuel shall meet the following properties:

Cetane number of 45 minimum. Cetane number greater than 50 is preferred, especially for temperatures below -20°C (-4°F) or elevations above 1500 m (5000 ft).

Cold Filter Plugging Point (CFPP) below the expected low temperature OR **Cloud Point** at least 5°C (9°F) below the expected low temperature.

Fuel lubricity should pass a minimum level of 3100 grams as measured by ASTM D6078 or maximum scar diameter of 0.45 mm as measured by ASTM D6079 or ISO 12156-1.

Sulfur content:

- Diesel fuel quality and fuel sulfur content must comply with all existing emissions regulations for the area in which the engine operates.
- Use of diesel fuel with sulfur content less than 0.10% (1000 ppm) is STRONGLY recommended.
- Use of diesel fuel with sulfur content 0.10% (1000 ppm to 0.50% (5000 ppm) may result in REDUCED oil and filter change intervals.
- BEFORE using diesel fuel with sulfur content greater than 0.50% (5000 ppm), contact your John Deere dealer.
- DO NOT use diesel fuel with sulfur content greater than 1.0%.

IMPORTANT: Do not mix used diesel engine oil or any other type of lubricating oil with diesel fuel.

IMPORTANT: Improper fuel additive usage may cause damage on fuel injection equipment of diesel engines.

DX,FUEL1 –19–17NOV05–1/1

Bio-Diesel Fuel

Consult your local fuel distributor for properties of the bio-diesel fuel available in your area.

Bio-diesel fuels may be used ONLY if the bio-diesel fuel properties meet the latest edition of ASTM D6751, EN 14214, or equivalent specification.

It is recommended to purchase bio-diesel fuel blended with B100 from a BQ-9000 Accredited Producer or a BQ-9000 Certified Marketer as recommended by the National Bio-diesel Board.

The maximum allowable bio-diesel concentration is a 5% blend (also known as B5) in petroleum diesel fuel. It has been found that bio-diesel fuels may improve lubricity in concentrations up to this 5% blend.

When using a blend of bio-diesel fuel, the engine oil level must be checked daily when the air temperature is –10°C (14°F) or lower. If oil becomes diluted with fuel, shorten oil change intervals accordingly.

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

These oils do not burn completely, and will cause engine failure by leaving deposits on injectors and in the combustion chamber.

A major environmental benefit of bio-diesel fuel is its ability to biodegrade. This makes proper storage and handling of bio-diesel fuel especially important. Areas of concern include:

- Quality of new fuel
- Water content of the fuel
- Problems due to aging of the fuel

Potential problems resulting from deficiencies in the above areas when using bio-diesel fuel in concentrations above 5% may lead to the following symptoms:

- Power loss and deterioration of performance
- Fuel leakage
- Corrosion of fuel injection equipment
- Coked and/or blocked injector nozzles, resulting in engine misfire
- Filter plugging
- Lacquering and/or seizure of internal components
- Sludge and sediments
- Reduced service life of engine components

Consult your fuel supplier for additives to improve storage and performance of bio-diesel fuels.

DX,FUEL7 –19–14NOV05–1/1

Minimizing the Effect of Cold Weather on Diesel Engines

John Deere diesel engines are designed to operate effectively in cold weather.

However, for effective starting and cold weather operation, a little extra care is necessary. The information below outlines steps that can minimize the effect that cold weather may have on starting and operation of your engine. See your John Deere dealer for additional information and local availability of cold weather aids

Use Winter Grade Fuel

When temperatures fall below 5°C (40°F), winter grade fuel (Grade No. 1-D fuel in North America) is best suited for cold weather operation. Winter grade fuel has a lower cloud point and a lower pour point.

Cloud point is the temperature at which wax will begin to form in the fuel and this wax causes fuel filters to plug. **Pour point** is the temperature at which fuel begins to thicken and becomes more resistant to flow through fuel pumps and lines.

NOTE: On an average, winter grade fuel has a lower BTU (heat content) rating. Using winter grade fuel may reduce power and fuel efficiency, but should not cause any other engine performance effects. Check the grade of fuel being used before troubleshooting for low power complaints in cold weather operation.

Air Intake Heater

An air intake heater is an available option to aid cold weather starting.

CAUTION: Do not use any starting fluid with an air intake heater.

Starting Fluid

A starting fluid port on the intake is available to aid cold weather starting.

CAUTION: Do not use any starting fluid with an engine equipped with glow plugs

Coolant Heater

An engine block heater (coolant heater) is an available option to aid cold weather starting.

Seasonal Viscosity Oil and Proper Coolant Concentration

Use seasonal grade viscosity engine oil based ion the expected air temperature range between oil changes and proper concentration of low silicate antifreeze as recommended. (See DIESEL ENGINE OIL and ENGINE COOLANT requirements this section.)

Diesel Fuel Flow Additive

Use John Deere Premium Diesel Fuel Conditioner (Winter) or equivalent to treat fuel during the cold weather season. This winter formulation is a combination diesel fuel conditioner and anti-gel additive.

IMPORTANT: Treat fuel when outside temperature drops below 0°C (32°F). For best results, use with untreated fuel. Follow all recommended instructions on label.

Winterfronts

Use of fabric, cardboard , or solid winterfronts is not recommended with any John Deere engine. Their use can result in excessive engine coolant, oil, and charge air temperatures. This can lead to reduced engine life, loss of power and poor fuel economy. Winterfronts may also put abnormal stress on fan and fan drive components potentially causing premature failures.

Continued on next page

If winterfronts are used, they should never totally close off the grill frontal area. Approximately 25% area in the center of the grill should remain open at all times. At no time should the air blockage device be applied directly to the radiator core.

Radiator Shutters

If equipped with a thermostatically controlled radiator shutter system, this system should be regulated in such a way that the shutters are completely open by the time the coolant reaches 93°C (200°F) to prevent excessive intake manifold temperatures. Manually controlled systems are not recommended.

If air-to-air aftercooling is used, the shutters must be completely open by the time the intake manifold air temperature reaches the maximum allowable temperature out of the charge air cooler.

For more information, see your John Deere dealer.

DX,FUEL10 –19–16DEC05–2/2

Handling and Storing Diesel Fuel

CAUTION: Handle fuel carefully. Do not fill the fuel tank when engine is running.

DO NOT smoke while you fill the fuel tank or service the fuel system.

Fill the fuel tank at the end of each day's operation to prevent water condensation and freezing during cold weather.

Keep all storage tanks as full as practicable to minimize condensation.

Ensure that all fuel tank caps and covers are installed properly to prevent moisture from entering.

Monitor water content of the fuel regularly.

When using bio-diesel fuel, the fuel filter may require more frequent replacement due to premature plugging.

Check engine oil level daily prior to starting engine. A rising oil level may indicate fuel dilution of the engine oil.

IMPORTANT: The fuel tank is vented through the filler cap. If a new filler cap is required, always replace it with an original vented cap.

When fuel is stored for an extended period or if there is a slow turnover of fuel, add a fuel conditioner to stabilize the fuel and prevent water condensation. Contact your fuel supplier for recommendations.

DX,FUEL4 –19–19DEC03–1/1

Lubricity of Diesel Fuel

Most diesel fuels manufactured in the United States, Canada, and the European Union have adequate lubricity to ensure proper operation and durability of fuel injection system components. However, diesel fuels manufactured in some areas of the world may lack the necessary lubricity.

IMPORTANT: Make sure the diesel fuel used in your machine demonstrates good lubricity characteristics.

Fuel lubricity should pass a minimum load level of 3100 grams as measured by ASTM D6078 or a maximum scar diameter of 0.45 mm as measured by ASTM D6079 or ISO 12156-1.

If fuel of low or unknown lubricity is used, add John Deere PREMIUM DIESEL FUEL CONDITIONER (or equivalent) at the specified concentration.

DX,FUEL5 –19–27OCT05–1/1

Testing Diesel Fuel

DIESELSCAN™ is a John Deere fuel analysis program that can be used to monitor the quality of your fuel. The DIESELSCAN analysis verifies fuel type, cleanliness, water content, suitability for cold weather operation, and whether the fuel meets specifications.

Check with your John Deere dealer for availability of DIESELSCAN kits.

DIESELSCAN is a trademark of Deere & Company

DX,FUEL6 –19–14NOV05–1/1

Engine Oil and Filter Service Intervals

See applicable operator's manual for service intervals.

DM80898,000025E –19–27NOV06–1/1

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Diesel Engine Oil

Use oil viscosity based on the expected air temperature range during the period between oil changes.

John Deere PLUS-50™ oil is preferred.

Oils meeting one of the following specifications are also recommended:

- ACEA Oil Sequence E7
- ACEA Oil Sequence E6

Extended service intervals may apply when John Deere PLUS-50™, ACEA E7, or ACEA E6 engine oils are used. Consult your John Deere dealer for more information.

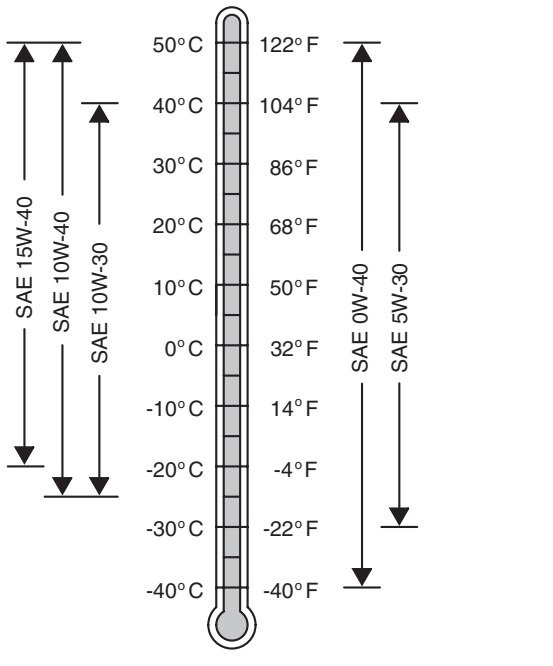
Other oils may be used if they meet one or more of the following:

- John Deere TORQ-GARD SUPREME™
- API Service Category CJ-4
- API Service Category CI-4 PLUS
- API Service Category CI-4
- ACEA Oil Sequence E5
- ACEA Oil Sequence E4

Multi-viscosity diesel engine oils are preferred.

Diesel fuel quality and fuel sulfur content must comply with all existing emissions regulations for the area in which the engine operates.

DO NOT use diesel fuel with sulfur content greater than 1.0% (10 000 ppm).



Oil Viscosities for Air Temperature Ranges

PLUS-50 is a trademark of Deere & Company
TORQ-GARD SUPREME is a trademark of Deere & Company

DX,ENOIL11 –19–13SEP06–1/1

Diesel Engine Break-In Oil

New engines are filled at the factory with John Deere ENGINE BREAK-IN OIL. During the break-in period, add John Deere ENGINE BREAK-IN OIL as needed to maintain the specified oil level.

Change the oil and filter after the first 100 hours of operation of a new or rebuilt engine.

After engine overhaul, fill the engine with John Deere ENGINE BREAK-IN OIL.

If John Deere ENGINE BREAK-IN OIL is not available, use a diesel engine oil meeting one of the following during the first 100 hours of operation:

- API Service Classification CE
- API Service Classification CD
- API Service Classification CC
- ACEA Oil Sequence E2
- ACEA Oil Sequence E1

After the break-in period, use John Deere PLUS-50™ or other diesel engine oil as recommended in this manual.

IMPORTANT: Do not use PLUS-50 oil or engine oils meeting any of the following during the first 100 hours of operation of a new or rebuilt engine:

API CJ-4	**ACEA E7**
API CI-4 PLUS	**ACEA E6**
API CI-4	**ACEA E5**
API CH-4	**ACEA E4**
API CG-4	**ACEA E3**
API CF-4	
API CF-2	
API CF	

These oils will not allow the engine to break-in properly.

PLUS-50 is a trademark of Deere & Company.

DX,ENOIL4 –19–13SEP06–1/1

Oil Filters

Filtration of oils is critical to proper operation and lubrication.

Always change filters regularly as specified in this manual.

Use filters meeting John Deere performance specifications.

DX,FILT –19–18MAR96–1/1

Alternative and Synthetic Lubricants

Conditions in certain geographical areas may require lubricant recommendations different from those printed in this manual.

Some John Deere brand coolants and lubricants may not be available in your location.

Consult your John Deere dealer to obtain information and recommendations.

Synthetic lubricants may be used if they meet the performance requirements as shown in this manual.

The temperature limits and service intervals shown in this manual apply to both conventional and synthetic oils.

Re-refined base stock products may be used if the finished lubricant meets the performance requirements.

DX,ALTER –19–15JUN00–1/1

Lubricant Storage

Your equipment can operate at top efficiency only when clean lubricants are used.

Use clean containers to handle all lubricants.

Whenever possible, store lubricants and containers in an area protected from dust, moisture, and other contamination. Store containers on their side to avoid water and dirt accumulation.

Make certain that all containers are properly marked to identify their contents.

Properly dispose of all old containers and any residual lubricant they may contain.

DX,LUBST –19–18MAR96–1/1

Mixing of Lubricants

In general, avoid mixing different brands or types of oil. Oil manufacturers blend additives in their oils to meet certain specifications and performance requirements.

Mixing different oils can interfere with the proper functioning of these additives and degrade lubricant performance.

Consult your John Deere dealer to obtain specific information and recommendations.

DX,LUBMIX –19–18MAR96–1/1

Grease

Use grease based on NLGI consistency numbers and the expected air temperature range during the service interval.

John Deere SD POLYUREA GREASE is preferred.

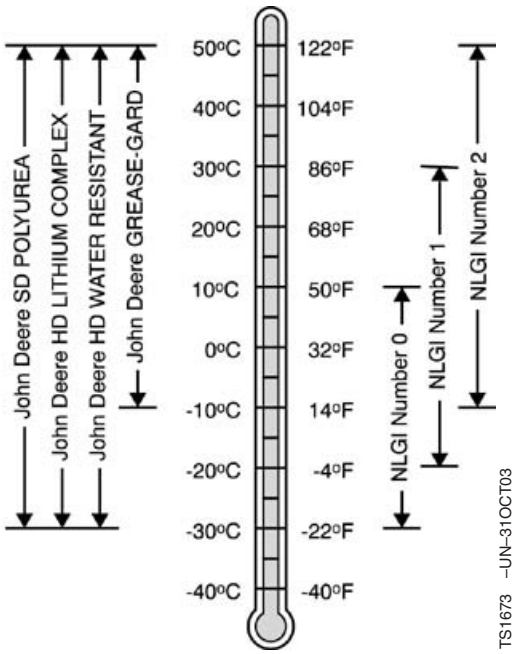
The following greases are also recommended

- John Deere HD LITHIUM COMPLEX GREASE
- John Deere HD WATER RESISTANT GREASE
- John Deere GREASE-GARD™

Other greases may be used if they meet the following:

NLGI Performance Classification GC-LB

IMPORTANT: Some types of grease thickeners are not compatible with others. Consult your grease supplier before mixing different types of grease



GREASE-GARD is a trademark of Deere & Company

DX,GREA1 –19–07NOV03–1/1

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Diesel Engine Coolant

The engine cooling system is filled to provide year-round protection against corrosion and cylinder liner pitting, and winter freeze protection to -37°C (-34°F). If protection at lower temperatures is required, consult your John Deere dealer for recommendations.

John Deere COOL-GARD™ Prediluted Coolant is preferred for service.

John Deere COOL-GARD Prediluted Coolant is available in a concentration of either 50% ethylene glycol or 55% propylene glycol.

Additional recommended coolants

The following engine coolant is also recommended:

- John Deere COOL-GARD Coolant Concentrate in a 40% to 60% mixture of concentrate with quality water.

John Deere COOL-GARD coolants do not require use of supplemental coolant additives, except for periodic replenishment of additives during the drain interval.

Other fully formulated coolants

Other fully formulated low silicate ethylene or propylene glycol base coolants for heavy-duty engines may be used if they meet one of the following specifications:

- ASTM D6210 prediluted (50%) coolant
- ASTM D6210 coolant concentrate in a 40% to 60% mixture of concentrate with quality water

Coolants meeting ASTM D6210 do not require use of supplemental coolant additives, except for periodic replenishment of additives during the drain interval.

Coolants requiring supplemental coolant additives

Other low silicate ethylene glycol base coolants for heavy-duty engines may also be used if they meet one of the following specifications:

- ASTM D4985 ethylene glycol base prediluted (50%) coolant
- ASTM D4985 ethylene glycol base coolant concentrate in a 40% to 60% mixture of concentrate with quality water

Coolants meeting ASTM D4985 require an initial charge of supplemental coolant additives, formulated for protection of heavy duty diesel engines against corrosion and cylinder liner erosion and pitting. They also require periodic replenishment of additives during the drain interval.

Other coolants

It is possible that neither John Deere COOL-GARD nor coolants meeting one of the coolant standards listed above is available in the geographical area where service is performed. If these coolants are unavailable, use a coolant concentrate or prediluted coolant with a quality additive package that provides cylinder liner cavitation protection and protects the cooling system metals (cast iron, aluminum alloys, and copper alloys such as brass) from corrosion.

The additive package must be part of one of the following coolant mixtures:

- ethylene glycol or propylene glycol base prediluted (40% to 60%) coolant
- ethylene glycol or propylene glycol base coolant concentrate in a 40% to 60% mixture of concentrate with quality water

Water quality

Continued on next page

Water quality is important to the performance of the cooling system. Distilled, deionized, or demineralized water is recommended for mixing with ethylene glycol and propylene glycol base engine coolant concentrate.

IMPORTANT: Do not use cooling system sealing additives or antifreeze that contains sealing additives.

IMPORTANT: Do not mix ethylene glycol and propylene glycol base coolants.

DX,COOL3 –19–27OCT05–2/2

Supplemental Coolant Additives

The concentration of coolant additives is gradually depleted during engine operation. For all recommended coolants, replenish additives between drain intervals by adding a supplemental coolant additive every 12 months or as determined necessary by coolant testing.

John Deere COOLANT CONDITIONER is recommended as a supplemental coolant additive in John Deere engines.

IMPORTANT: Do not add a supplemental coolant additive when the cooling system is drained and refilled with John DeereCOOL-GARD™.

If other coolants are used, consult the coolant supplier and follow the manufacturer's recommendation for use of supplemental coolant additives.

The use of non-recommended supplemental coolant additives may result in additive drop-out and gelation of the coolant.

Add the manufacturer's recommended concentration of supplemental coolant additive. DO NOT add more than the recommended amount.

COOL-GARD is a trademark of Deere & Company

DX,COOL4 –19–07NOV03–1/1

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Operating in Warm Temperature Climates

John Deere engines are designed to operate using glycol base engine coolants.

Always use a recommended glycol base engine coolant, even when operating in geographical areas where freeze protection is not required.

IMPORTANT: Water may be used as coolant *in emergency situations only.*

Foaming, hot surface aluminum and iron corrosion, scaling, and cavitation will occur when water is used as the coolant, even when coolant conditioners are added.

Drain cooling system and refill with recommended glycol base engine coolant as soon as possible.

DX,COOL6 –19–18MAR96–1/1

Additional Information About Diesel Engine Coolants and Supplemental Coolant Additives

Engine coolants are a combination of three chemical components: ethylene glycol or propylene glycol antifreeze, inhibiting coolant additives, and quality water.

Coolant specifications

Some products, including John Deere COOL-GARD™ Prediluted Coolant, are fully formulated coolants that contain all three components in their correct concentrations. Do not add an initial charge of supplemental coolant additives to these fully formulated products.

Coolants meeting ASTM D6210 do not require an initial charge of supplemental coolant additives.

Some coolant concentrates, including John Deere COOL-GARD Coolant Concentrate, contain both glycol antifreeze and inhibiting coolant additives. Mix these products with quality water, but do not add an initial charge of supplemental coolant additives.

Coolants meeting ASTM D4985 require an initial charge of supplemental coolant additives.

Replenish coolant additives

The concentration of coolant additives is gradually depleted during engine operation. Periodic replenishment of inhibitors is required, even when John Deere COOL-GARD or another fully formulated coolant is used. Follow the recommendations in this manual for the use of supplemental coolant additives.

Why use supplemental coolant additives?

Operating without proper coolant additives will result in increased corrosion, cylinder liner erosion and pitting, and other damage to the engine and cooling system. A simple mixture of ethylene glycol or propylene glycol and water will not give adequate protection.

Use of supplemental coolant additives reduces corrosion, erosion, and pitting. These chemicals reduce the number of vapor bubbles in the coolant and help form a protective film on cylinder liner surfaces. This film acts as a barrier against the harmful effects of collapsing vapor bubbles.

Avoid automotive-type coolants

Never use automotive-type coolants (such as those meeting ASTM D3306). These coolants do not contain the correct additives to protect heavy-duty diesel engines. They often contain a high concentration of silicates and may damage the engine or cooling system.

Water quality

Water quality is important to the performance of the cooling system. Distilled, deionized, or demineralized water is recommended for mixing with ethylene glycol and propylene glycol base engine coolant concentrate. All water used in the cooling system should meet the following minimum specifications for quality:

Chlorides	<40 mg/L
Sulfates	<100 mg/L
Total dissolved solids	<340 mg/L
Total hardness	<170 mg/L
pH	5.5 to 9.0

Freeze protection

The relative concentrations of glycol and water in the engine coolant determine its freeze protection limit.

Continued on next page

Ethylene Glycol	Freeze Protection Limit
40%	-24°C (-12°F)
50%	-37°C (-34°F)
60%	-52°C (-62°F)
Propylene Glycol	**Freeze Protection Limit**
40%	-21°C (-6°F)
50%	-33°C (-27°F)
60%	-49°C (-56°F)

DO NOT use a coolant-water mixture greater than 60% ethylene glycol or 60% propylene glycol.

DX,COOL7 –19–19DEC03–2/2

Testing Diesel Engine Coolant

Testing Diesel Engine Coolant

Maintaining adequate concentrations of glycol and inhibiting additives in the coolant is critical to protect the engine and cooling system against freezing, corrosion, and cylinder liner erosion and pitting.

Test the coolant solution at intervals of 12 months or less and whenever excessive coolant is lost through leaks or overheating.

Coolant test strips

Coolant test strips are available from your John Deere dealer. These test strips provide a simple, effective method to check the freeze point and additive levels of your engine coolant.

Compare the results to the supplemental coolant additive (SCA) chart to determine the amount of inhibiting additives in your coolant and whether more John Deere COOLANT CONDITIONER should be added.

COOLSCAN™ and COOLSCAN PLUS™

For a more thorough evaluation of your coolant, perform a COOLSCAN or COOLSCAN PLUS analysis, where available. See your John Deere dealer for information.

COOLSCAN is a trademark of Deere & Company
COOLSCAN PLUS is a trademark of Deere & Company

DX,COOL9 –19–19DEC03–1/1

Drain Intervals for Diesel Engine Coolant

Drain the factory fill engine coolant, flush the cooling system, and refill with new coolant after the first 3 years or 3000 hours of operation.

Subsequent drain intervals are determined by the coolant used for service. At each interval, drain the coolant, flush the cooling system, and refill with new coolant.

When John Deere COOL-GARD™ is used, the drain interval may be extended to 5 years or 5000 hours of operation, provided that the coolant is tested annually AND additives are replenished, as needed, by adding a supplemental coolant additive.

If John Deere COOL-GARD is used but the coolant is not tested OR additives are not replenished by adding a supplemental coolant additive, the drain interval is 3 years or 3000 hours of operation

If COOL-GARD is not used, the drain interval is reduced to 2 years or 2000 hours of operation.

COOL-GARD is a trademark of Deere & Company

DX,COOL11 –19–19DEC03–1/1

Section 02
Repair and Adjustments

Contents

Fuel System - General Information

The Level 16 Engine Control Unit (ECU) is used to control the High Pressure Common Rail (HPCR) fuel system. The HPCR fuel system includes the high pressure fuel pump, high pressure common rail, and electronic injectors.

The electronic injectors can not be serviced. If any part of the component fails, the entire injector must be replaced.

Electronic injectors cannot be tested for opening pressure, as they are controlled electronically.

When servicing injectors it is important to complete the injector calibration procedure. Each injector has a specific calibration and this information can be obtained by scanning the bar code on the service injector box and downloading the injector information from the John Deere Custom Performance™ web site. An alternative is to enter the injector serial number and part number stamped on the injector. If the ECU is not programmed with the correct information for each injector and the correct cylinder that it is in then engine performance and emissions will be affected.

CD03523,0000172 –19–15FEB07–1/1

Relieve Fuel System Pressure

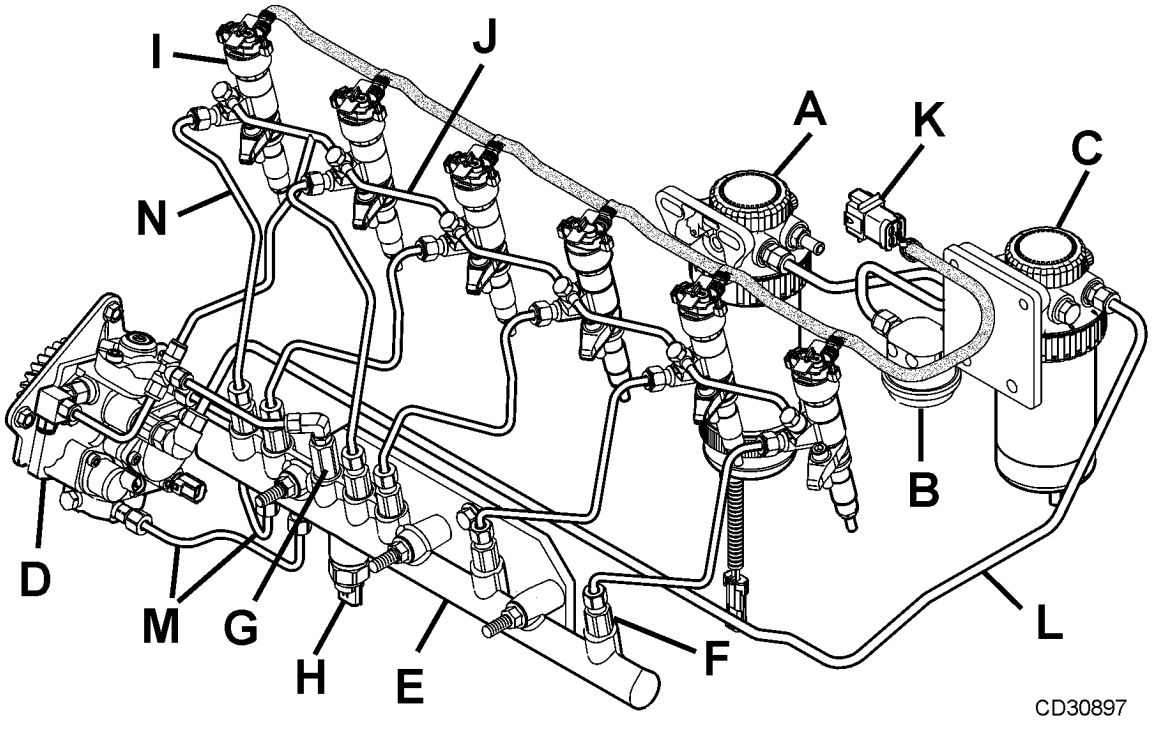
CAUTION: High-pressure fluid remaining in fuel lines can cause serious injury. Before disconnecting fuel lines, sensors, or any other components between the high-pressure fuel pump and nozzles on engines with High Pressure Common Rail (HPCR) fuel system, wait a minimum of 15 minutes after engine is stopped.

TS1343 –UN–18MAR92

Any time the fuel system has been opened up for service (lines disconnected or filters removed), it will be necessary to bleed air from the system. See BLEED THE FUEL SYSTEM in Section 04, Group 150 in this manual.

CD03523,0000173 –19–22AUG06–1/1

Fuel System Components

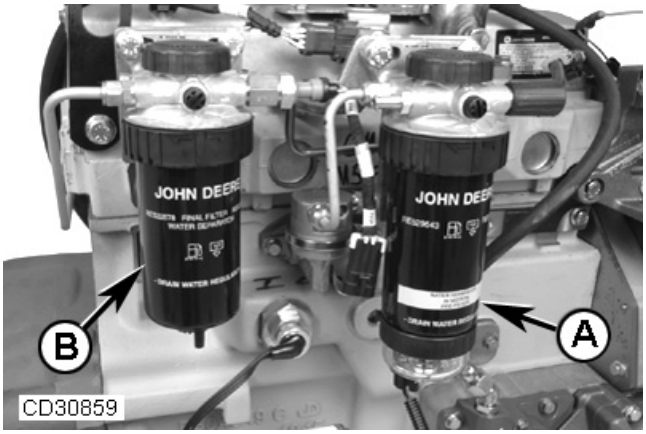


Fuel system components

A—Primary fuel filter
B—Fuel transfer pump
C—Final fuel filter
D—High pressure fuel pump
E—High pressure common rail (HPCR)
F—Flow damper
G—Fuel pressure limiter
H—Fuel pressure sensor
I—Electronic injector (EI)
J—Fuel leak-off line
K—Wiring harness
L—Fuel supply line
M—Pump-to-rail high pressure line
N—High pressure delivery line

CD03523,000017A –19–09OCT06–1/1

Replace Fuel Filter Element (Primary or Final)



CD30859 –UN–07SEP06

Fuel filter typical location

NOTE: Refer to operator's manual for proper servicing and (hourly) replacement intervals.

1. When applicable, disconnect water-in-fuel connector (H).
2. Loosen retaining ring (C) by lifting it, and remove filter element (D).

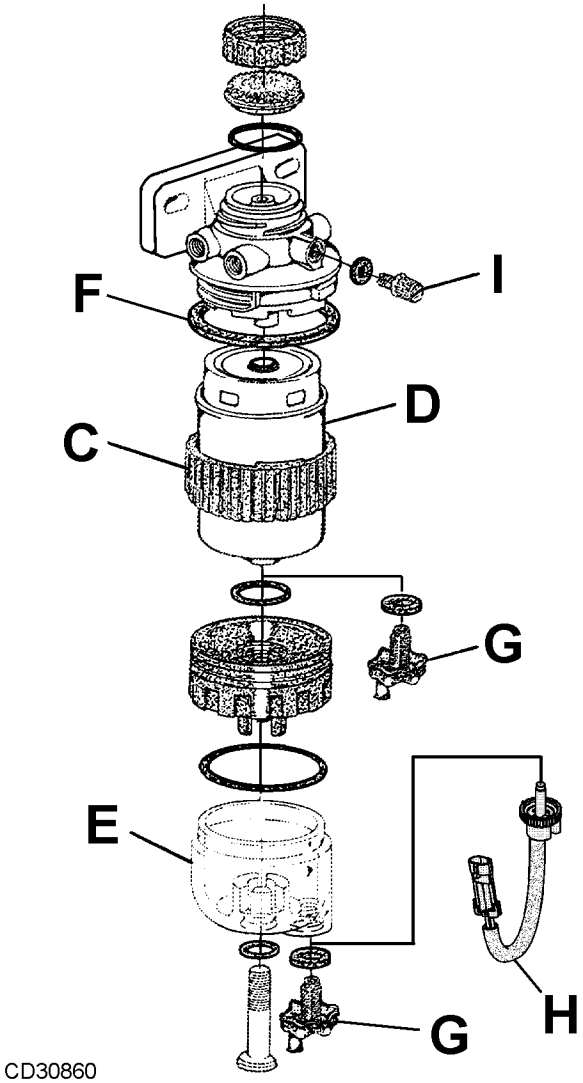
NOTE: To avoid spilling of fuel, seal old filter element using plug from new element.

3. If equipped, remove sediment glass bowl (E) from previous filter element and reinstall it onto the new element.

IMPORTANT: Install fuel filter element dry. Do not prefill new fuel filters as it could contaminate fuel system with unfiltered fuel.

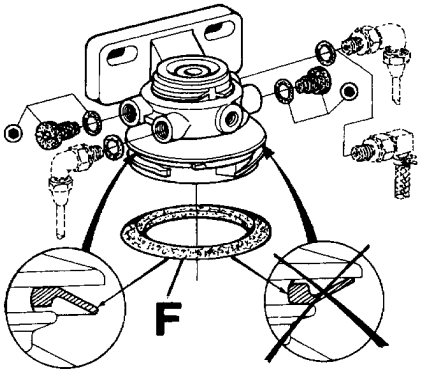
4. Install dust seal (F) as shown.

A—Primary fuel filter
B—Final fuel filter
C—Retaining ring
D—Filter element
E—Sediment bowl
F—Dust seal
G—Drain screw
H—Water-in-fuel connector
I—Bleed screw



CD30860 –UN–07SEP06

Replace fuel filter element - Exploded view



CD30667 –UN–17JUN98

Replace fuel filter element - Dust seal

Continued on next page

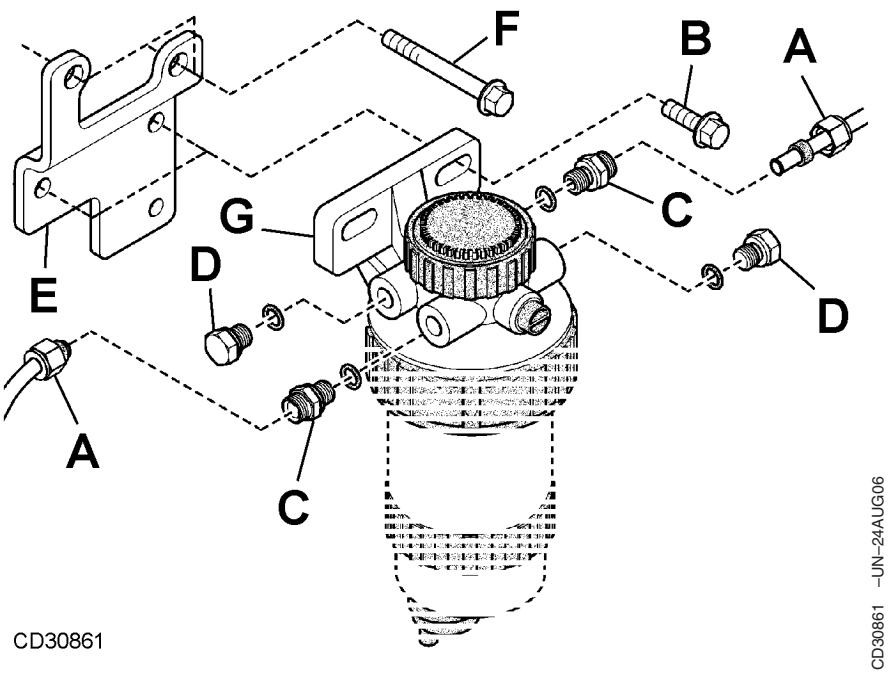
5. Position the new filter element in proper location inside the mounting base then tighten retaining ring about 1/3 turn until ring fits into the detent. DO NOT overtighten.

6. If applicable, connect water-in-fuel connector (H).

7. Bleed fuel system.

CD03523,0000174 –19–19DEC06–2/2

Remove and Install Fuel Filter Base (Primary and Final)



Fuel filter mounting base (primary and final)

A—Fuel lines
B—Fuel filter base-to-engine cap screws
C—Fitting
D—Plug
E—Bracket
F—Bracket-to-cylinder head cap screw
G—Fuel filter base

NOTE: Fuel filter base can be removed with or without filter element installed.

1. Disconnect fuel lines (A).
2. Loosen cap screws (B) and remove fuel filter base (G).
3. Remove bracket (E) from cylinder head if needed.
4. Replace and reinstall parts as necessary. Tighten cap screws to specification.

Fuel filter base—Specification

Bracket-to-cylinder head cap screw—Torque	70 N•m (52 lb-ft)
Fuel filter base-to-bracket cap screw—Torque	50 N•m (37 lb-ft)

NOTE: Fuel lines may be connected to different inlet and outlet ports depending on application.

5. Install fittings (C) and plugs (D), or optional accessories like fuel pressure sensor or fuel heater, on filter base as required. Tighten to specification.

Specification

Fittings,plugs or accessories-to-fuel filter base—Torque	10 N•m (7 lb-ft)

6. Install fuel lines then tighten tube nuts until seated on fitting shoulder.
7. If previously removed, install filter element then bleed fuel system.

CD03523,0000175 –19–08SEP06–1/1

Remove Fuel Transfer Pump

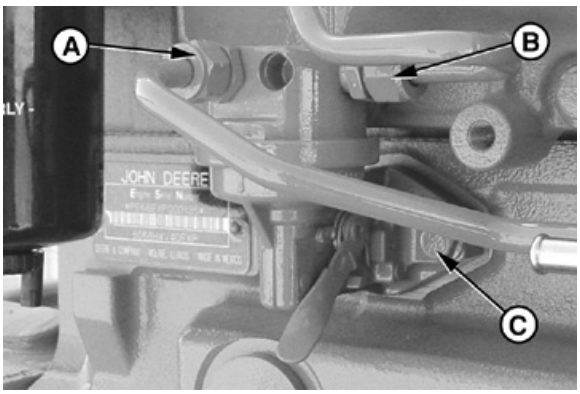
IMPORTANT: A backup wrench must always be used when disconnecting fittings or fuel lines from supply pump to avoid damage to fittings.

1. Disconnect fuel inlet line (A) and outlet line (B) and cap connections on fuel transfer pump and fuel lines to keep debris out of fuel system.
2. Remove cap screws (C) and remove fuel transfer pump assembly from cylinder block.

NOTE: The fuel transfer pump is driven by a push rod (D) that rides on an eccentric camshaft lobe. The cylinder head must be removed to remove this push rod.

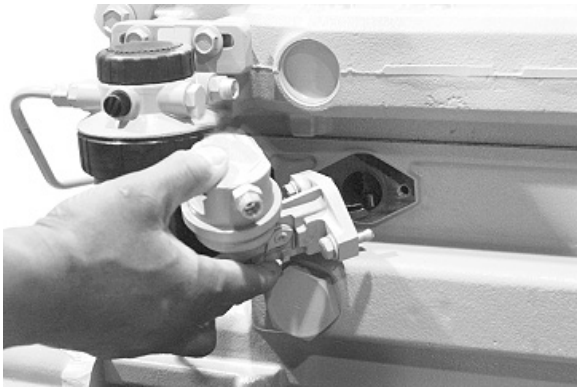
3. Cover opening on cylinder block to prevent dirt from entering the engine.
4. Inspect face of pump lever for wear. If lever face is worn flat or concave, replace pump.

A—Transfer Pump Inlet from Pre-Filter
B—Transfer Pump Outlet to Final Fuel Filter
C—Cap Screws
D—Push Rod



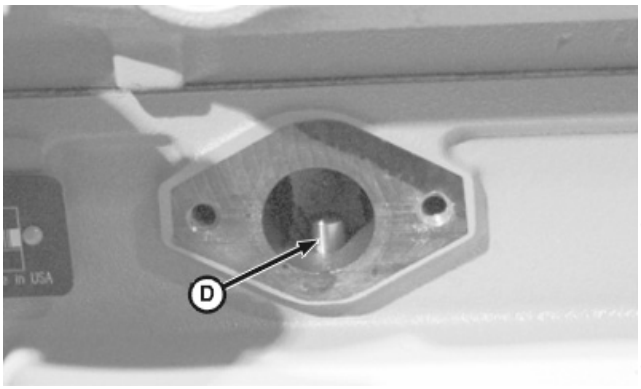
RG12453A –UN–14JUN02

Mechanical Fuel Transfer Pump Supply Lines



RG9051 –UN–16MAR98

Remove Mechanical Fuel Transfer Pump



RG12022 –UN–27NOV01

Mechanical Fuel Transfer Pump Push Rod

RG41183,00000CF –19–22JAN07–1/1

Install Fuel Transfer Pump

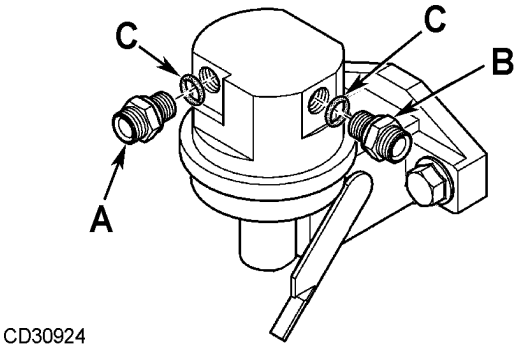
Assemble Fuel Transfer Pump

NOTE: If transfer pump is being replaced, inlet fitting (A) and outlet fitting (B) as well as respective O-rings (C) are not provided with the pump.

1. Remove and retain inlet (A) and outlet (B) fittings from old pump. Discard O-rings (C).
2. Install new O-rings and fittings into new transfer pump. Tighten fittings to specification.

Specification

Inlet and outlet fitting-to-fuel transfer pump—Torque ..... 10 N•m (7 lb-ft)



CD30924 –UN–18OCT06

Assemble Fuel Transfer Pump

A—Inlet fitting
B—Oulet fitting
C—O-ring

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RG41183,00000D0 –19–18OCT06–1/2

IMPORTANT: Apply LOCTITE 242 to threads of supply pump mounting cap screws (C) and fuel line fittings when reinstalling supply pump. DO NOT allow sealant to get into fuel system.

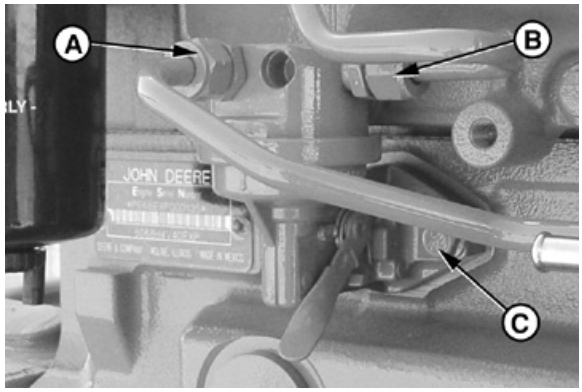
1. Install the fuel transfer pump to cylinder block with pumping lever resting on top of push rod, using a new O-ring. Tighten cap screws (C) to specifications.

Specification

Fuel Transfer Pump Cap Screws—Torque ..... 30 N•m (22 lb-ft)

IMPORTANT: Always use a backup wrench when installing fittings and/or fuel lines onto supply pump to avoid damage to fittings.

2. Connect supply pump inlet line (A) and outlet line (B) and tighten tube nut until seated on fitting shoulder.
3. Bleed the fuel system. See BLEED THE FUEL SYSTEM later in this Group.



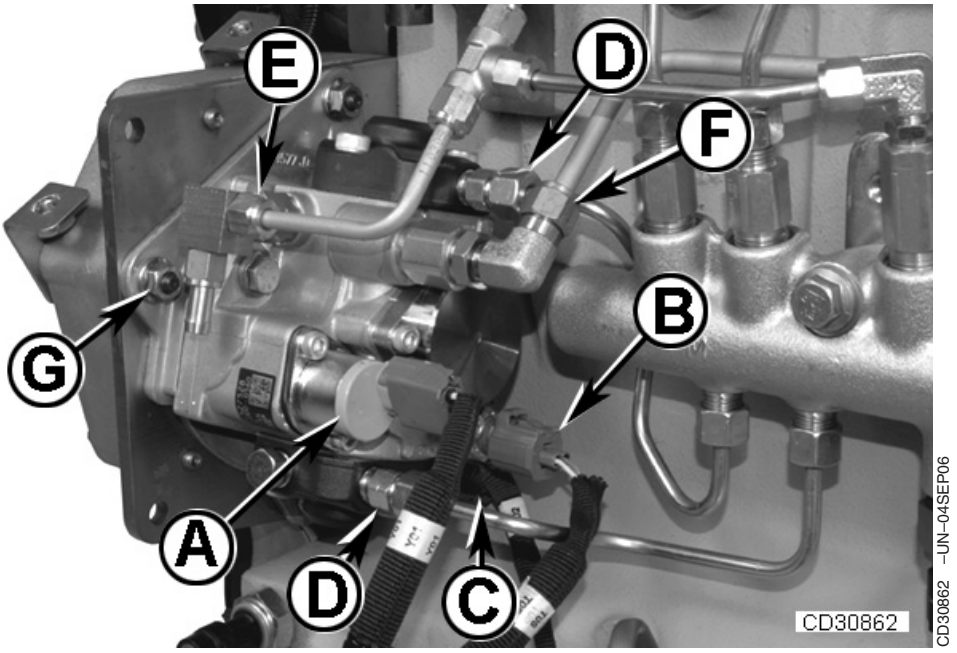
RG12453A –UN–14JUN02

Fuel Transfer Pump Lines

A—Fuel Transfer Pump Inlet from Pre-filter
B—Fuel Transfer Pump Outlet to Final Fuel Filter
C—Cap Screws

RG41183,00000D0 –19–18OCT06–2/2

Remove and Install High Pressure Fuel Pump

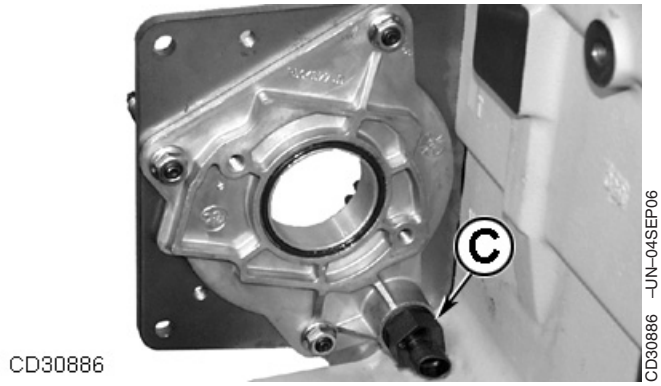


Remove high pressure fuel pump

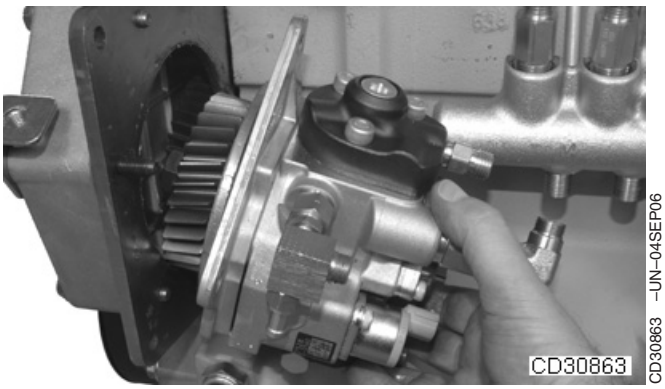
Remove High Pressure Fuel Pump

1. Disconnect wiring harness from suction control valve (A), from fuel temperature sensor (B) and from pump position sensor (C).
2. Remove high pressure fuel lines (D).
3. Remove fuel leak-off line (E).
4. Disconnect fuel supply line (F).
5. Remove the 3 nuts (G) fixing adapter plate on engine front plate.
6. Carefully remove high pressure pump assembly from engine.

A—Suction Control Valve
B—Fuel Temperature Sensor
C—Pump position sensor
D—High pressure fuel outlet
E—Leak-off line connection
F—Fuel supply inlet
G—Adapter plate nut



Pump position sensor (high pressure pump removed)



Remove high pressure fuel pump

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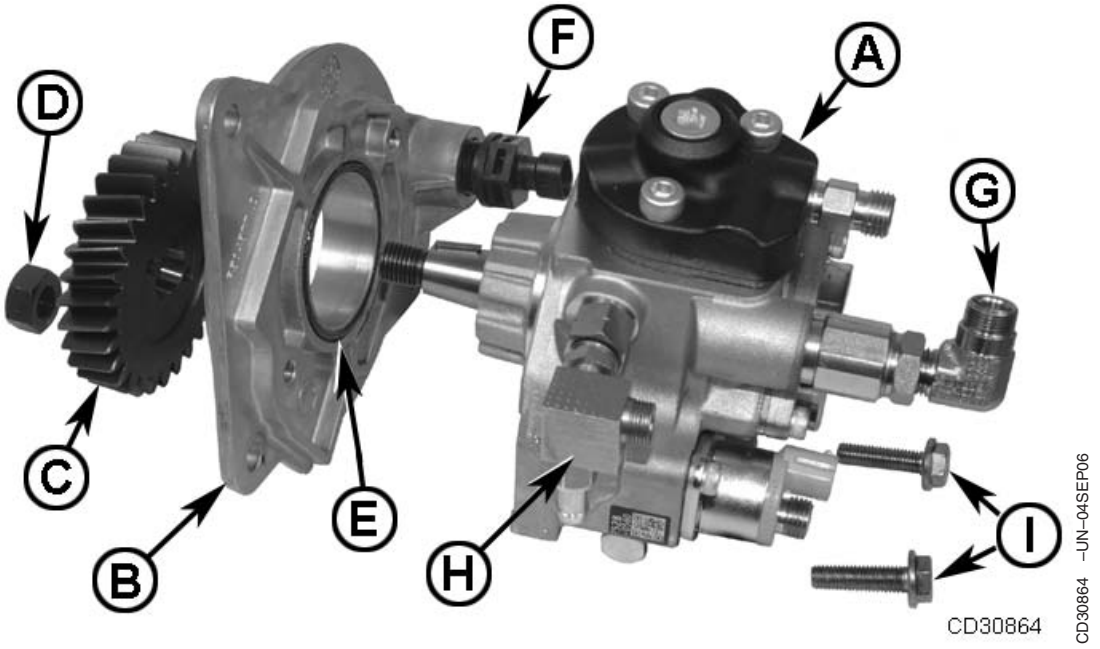

High pressure fuel pump exploded view

A—High pressure fuel pump
B—Adapter plate
C—Drive gear
D—Nut
E—O-ring
F—Pump position sensor
G—Fuel supply fitting
H—Fuel leak-off fitting
I—Cap screw (high pressure pump-to-adapter plate)

Disassemble and Reassemble High Pressure Fuel Pump

A) Disassembling

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

B) Reassembling

1. Install high pressure pump (A) on adapter plate (B) with a new O-ring (E). Tighten the 2 cap screws (I) to specification.

Specification

High pressure pump to adapter plate—Torque ..... 40 N•m (30 lb-ft)

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..... 70 N•m (52 lb-ft)

3. Install pump position sensor (F) onto adapter plate then tighten to specification.

Specification

Pump position sensor to adapter plate—Torque..... 15 N•m (11 lb-ft)

4. Install fuel supply elbow fitting (G) on high pressure pump. Orient fitting to be in line with fuel line. Tighten fitting nut to specification.

Specification

Fuel supply elbow fitting nut-to-high pressure pump—Torque..... 20 N•m (15 lb-ft)

5. Install fuel leak-off fitting (H) on high pressure pump. Orient fitting vertical pointing down. Tighten fitting nut to specification.

Specification

Fuel leak-off fitting nut-to-high pressure pump—Torque..... 15 N•m (11 lb-ft)

Continued on next page

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Install high pressure fuel pump

1. Rotate engine to Top Dead Center (TDC) of number 1 cylinder and install JDG1571 Timing Pin in flywheel.
2. Remove plug (A) to access gear timing mark.
3. Replace O-rings (B & C) on adapter plate then install high pressure pump so that timing mark (D) can be seen through the timing gear cover opening as shown.
4. Install the 3 nuts (H) and tighten to specification.

Specification

Adapter plate to engine front plate—Torque ..... 40 N•m (30 lb-ft)

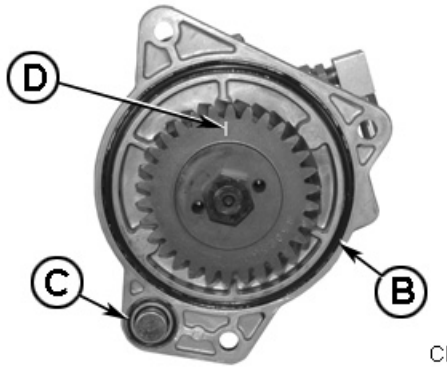
5. Install high pressure fuel lines (E) then tighten to specification.

Specification

High pressure fuel line (both ends)—Torque ..... 30 N•m (22 lb-ft)

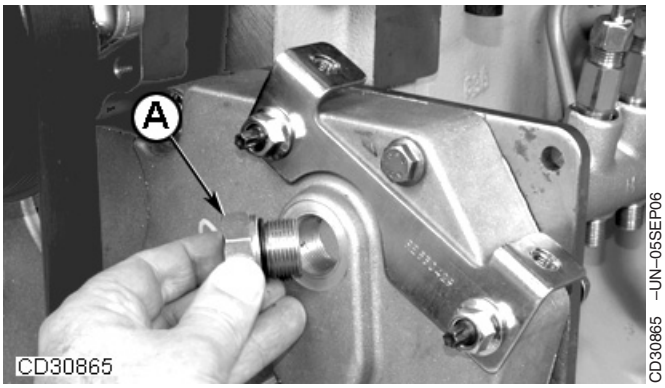
6. Install leak-off line (F) then tighten tube nuts until seated on fitting shoulder.
7. Install fuel supply line (G) then tighten tube nut until seated on fitting shoulder.
8. Reconnect wiring harness to suction control valve (I), to fuel temperature sensor (J) and to camshaft sensor (K).

A—Plug to access gear timing mark
B—O-ring (adapter plate-to-front plate
C—O-ring (camshaft sensor)
D—High pressure pump gear timing mark
E—High pressure fuel line
F—Leak-off line
G—Fuel supply line
H—Adapter plate nut
I—Suction control valve
J—Fuel temperature sensor
K—Camshaft sensor



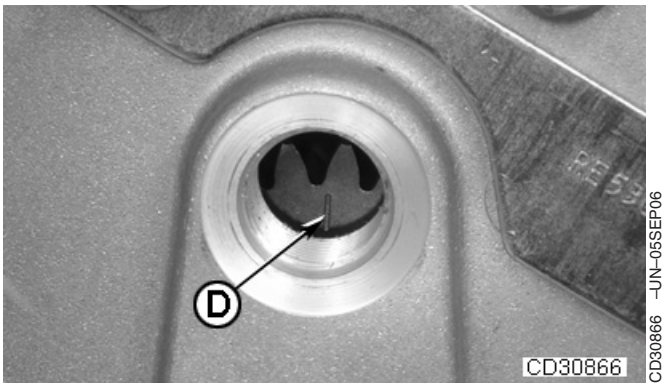
CD30868 –UN–05SEP06

Install O-rings on adapter plate



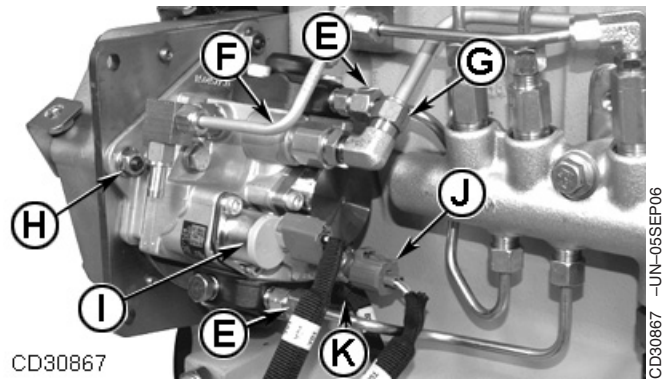
CD30865 –UN–05SEP06

Plug to access gear timing mark



CD30866 –UN–05SEP06

Gear timing mark



CD30867 –UN–05SEP06

Install high pressure pump

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9. Reinstall plug (A). Tighten to specification.

	Specification
Plug to access gear timing mark—Torque	50 N•m (37 lb-ft)

10. Bleed fuel system.

CD03523,0000176 –19–01FEB07–4/4

Remove and Install Suction Control Valve

IMPORTANT: Avoid contamination to the fuel high pressure pump or the suction control valve while removing and replacing. Failure to maintain a high level of cleanliness will cause further damage to the pump and other fuel system components.

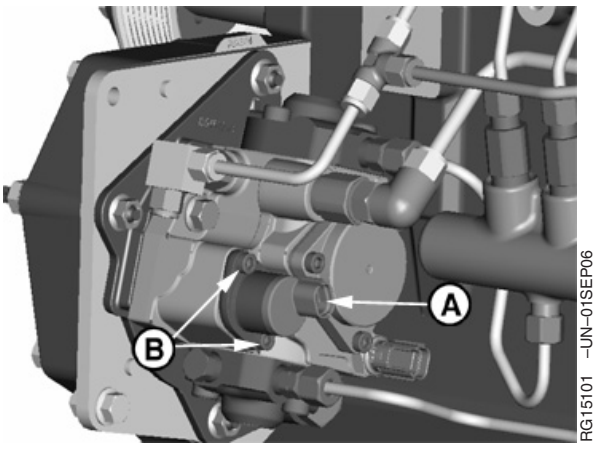
IMPORTANT: The high pressure fuel pump doesn't necessarily have to be removed from the engine to change the suction control valve. However, if the engine compartment is heavily contaminated, it is recommended that the pump be removed completely, cleaned, and have the service work completed off the engine. Cleanliness is very important. Once the suction control valve is replaced, install pump back to engine and reassemble fuel system.

1. Thoroughly clean suction control valve area - solenoid connector, suction control valve mounting area, and surrounding pump and engine surfaces with an engine cleaner and degreaser. **Be certain the suction control valve area is clean and free from dirt/debris/dust. If practical, remove paint from the suction control valve joint area between the suction control valve and pump housing.**

2. Disconnect the suction control valve wire connector (A). **Avoid damaging the connector and plastic cover. DO NOT twist the connector.**

3. Loosen 2 suction control valve retaining bolts (B) with a 5 mm Allen hex tool. **Do not completely remove bolts. Beware of paint chips and other possible contamination sources. If necessary, clean the joint area again.**

4. With the 2 retaining bolts loose but not removed, remove the suction control valve from the pump body by hand, pulling straight out from pump. **DO NOT twist the valve or pry with any tool.**



Remove Suction Control Valve Assembly

A—Suction Control Valve Wire Connector
B—Suction Control Valve Retaining Bolts

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IMPORTANT: Install a properly sized cap plug in the valve opening in the pump body to protect the pump from contamination.

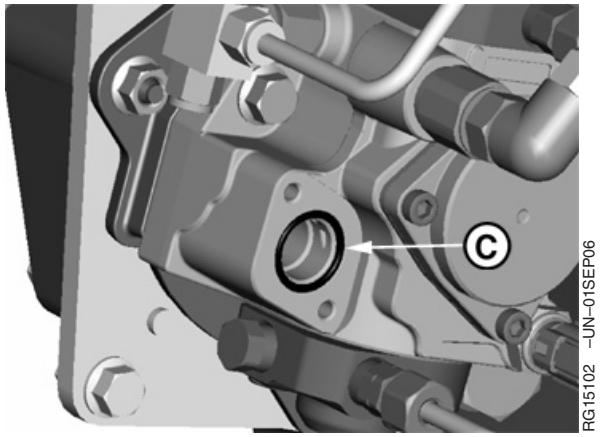
5. With the suction control valve separated from the pump, remove and discard the 2 retaining bolts.

RE38635,000013D –19–30MAY07–2/7

6. Check valve mounting surface on pump housing. Remove any residual gasket material from valve mounting surface. Exercise caution to not damage mounting surface. If o-ring (C) is stuck to pump housing surface rather than the suction control valve, remove o-ring.

7. Ensure the o-ring groove in pump housing is clean and free from debris.

C—O-Ring



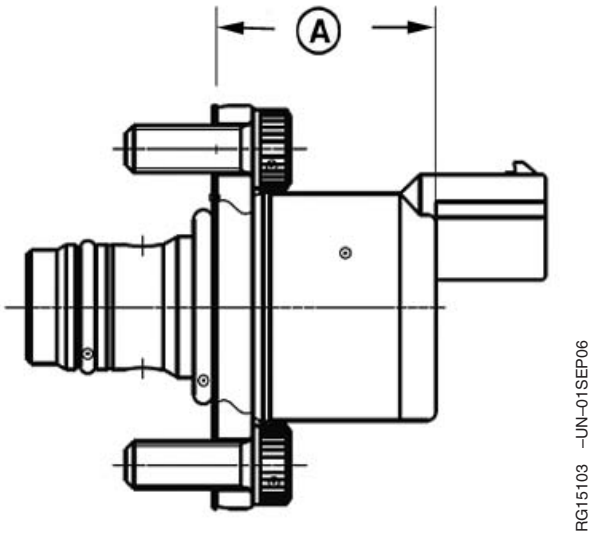
Suction Control Valve-to-Pump Housing O-Ring

RE38635,000013D –19–30MAY07–3/7

NOTE: If the length of the new valve is not 27.6 mm, it is the incorrect valve for the 4.5L & 6.8L pump.

8. Verify the overall reference length of the valve to be 27.6 mm (1.09 in.)

A—27.6 mm (1.09 in.)



Reference Length of Valve

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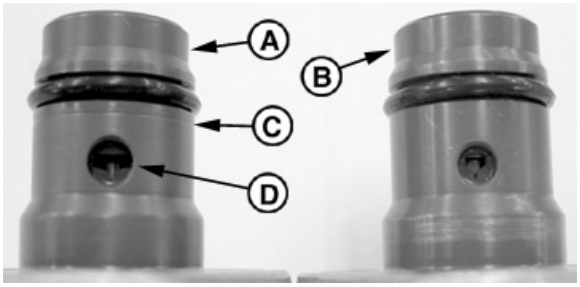
RE38635,000013D –19–30MAY07–4/7

9. In addition to checking length of the valve, a visual check can be made to determine if the correct valve is in the kit. As shown, the 9L valve (A) has a groove (C) on the valve body. The 4.5L/6.8L valve (B) has none. Additionally, the valve for the 9L has a different port geometry (D) than the valve for the 4.5L/6.8L.



A—9L Valve
B—4.5L/6.8L Valve
C—Groove on Valve Body
D—Port Geometry

RE38635,000013D –19–30MAY07–5/7

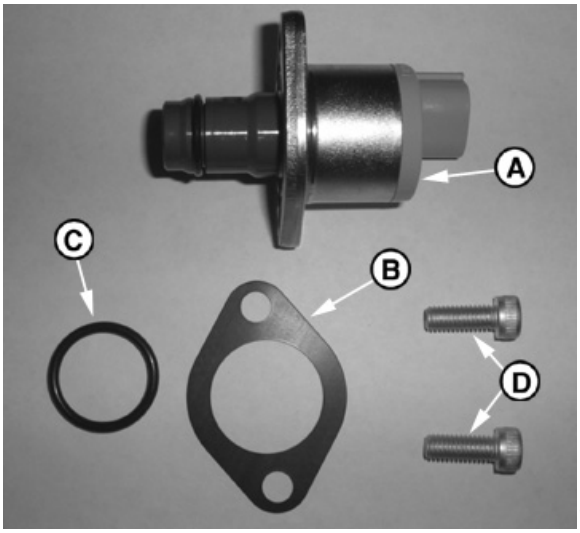
IMPORTANT: DO NOT handle replacement valve parts with dirty hands or gloves.

IMPORTANT: DO NOT allow engine coolant or brake fluid to contact o-rings.

10. Confirm replacement parts in kit, as shown.

11. Lubricate large and small o-rings with a small amount of diesel fuel. **Use just enough fuel to coat entire o-ring surfaces.**

12. Install large o-ring into groove in pump housing.



4.5L/6.8L Suction Control Kit

A—Suction Control Valve
B—Gasket
C—O-Ring (Valve to Pump Mounting Surface)
D—Valve Retaining Cap Screws -2-

Continued on next page

RE38635,000013D –19–30MAY07–6/7

13. Install the new suction control valve assembly into the pump body by hand until suction control valve flange nearly contacts pump housing. The flange may not contact because of the o-ring. **When installing valve, DO NOT twist the valve. Damage to o-rings will occur. Push valve straight into pump housing same as when valve was removed. The electrical connector (A) should be on the top side, facing rear of engine, as shown (A).**

14. Install new retainer bolts (B) through valve flange and into pump housing. Tighten both bolts evenly, then tighten to specification.

Specification

Suction Control Valve to Pump Housing—Torque..... 9 N•m (7 lb-ft)

IMPORTANT: DO NOT use any tool to connect wire harness. Damage to connector will occur. BE CERTAIN the electrical connector is in proper orientation. The electrical connector should be positioned on the top side, facing rear of engine. If the suction control valve is installed incorrectly, the valve will not function correctly

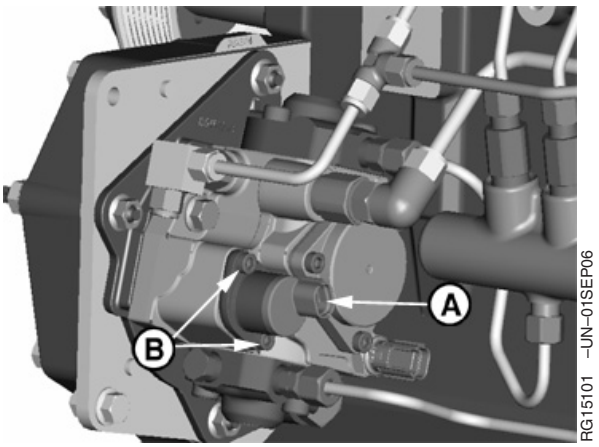
15. Connect suction control valve wire harness to electrical connector (A).

16. Connect negative (—) battery cable.

17. Start engine and perform computer diagnostics.

18. Check suction control valve - pump joint for fuel leaks. **Check for leaks on underside of suction control valve joint by hand and visually, using a small mirror.**

19. Perform the identical diagnostic procedure, as when troubleshooting, to verify proper operation of the replacement suction control valve and to prove the problem is solved.

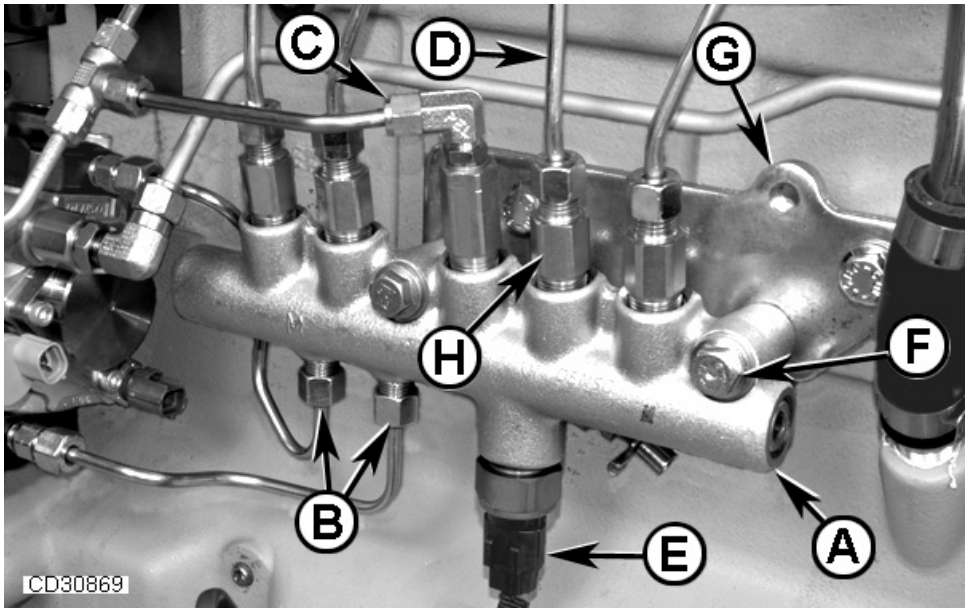


Install Suction Control Valve Assembly

A—Suction Control Valve Wire Connector
B—Suction Control Valve Retaining Bolts

RE38635,000013D –19–30MAY07–7/7

Remove and Install High Pressure Common Rail



Remove High Pressure Common Rail (HPCR)

A—High Pressure Common Rail (HPCR)
B—Pump-to-rail high pressure line
C—Leak-off line
D—High pressure delivery line
E—Pressure sensor
F—Cap screw
G—Bracket
H—Flow damper

Remove High Pressure Common Rail

CAUTION: Wait a minimum of 15 minutes after engine is stopped before disconnecting any high pressure fuel lines.

1. Disconnect pressure sensor wiring harness.
2. Disconnect leak-off line (C) from elbow fitting.
3. Remove pump-to-rail high pressure lines (B)
4. Remove high pressure delivery lines (D) from rail. Do not remove flow damper (H).
5. Loosen cap screw (F), then remove the high pressure common rail (A) from engine.

Install High Pressure Common Rail

1. Install bracket (G) on engine (if previously removed). Install high pressure common rail on bracket then tighten cap screw to specification.

Specification	
High pressure common rail bracket to engine—Torque	70 N•m (52 lb-ft)
High pressure common rail to bracket—Torque	70 N•m (52 lb-ft)

2. Install high pressure delivery lines (D). Tighten to specification.

Specification	
High pressure delivery lines to rail—Torque	30 N•m (22 lb-ft)

3. Install pump-to-rail high pressure lines (B). Tighten to specification.

Specification	
Pump-to-rail high pressure lines—Torque	30 N•m (22 lb-ft)

4. Connect leak-off line (C) to elbow fitting. Tighten tube nut until seated on fitting shoulder.

Continued on next page

5. Connect wiring harness to pressure sensor (E).

6. Bleed fuel system.

RG41183,00000D3 –19–07SEP06–2/2

Remove and Install Flow Dampers

CAUTION: Wait a minimum of 15 minutes after engine is stopped before disconnecting any high pressure fuel lines.

Remove Flow Dampers

IMPORTANT: Perform the following steps in a clean environment. Keep work area clean so no dirt or debris enters the fuel system which may cause injector failure.

1. Thoroughly clean all fuel lines, fittings, components, and chamfered area around the faulty flow damper.

2. Using a backup wrench on flow damper, loosen fuel line fitting (A).

IMPORTANT: Do NOT bend or force lines out of the way.

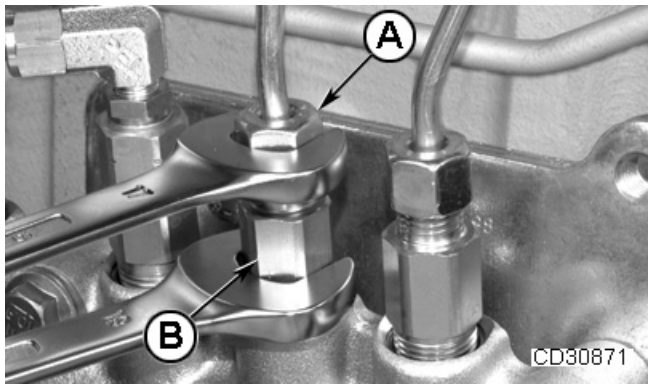
3. Loosen fuel line fitting on injector inlet connector. The line does not need to be removed.

4. Remove flow damper (B) keeping internal components (C) together.

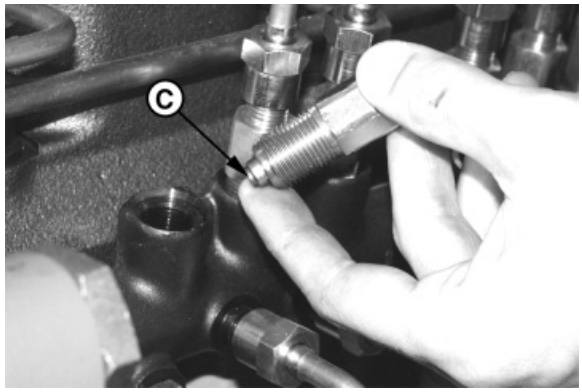
IMPORTANT: Make sure magnet is clean before using.

5. Remove orifice plate (E) from inside flow damper bore using a clean magnet (D).

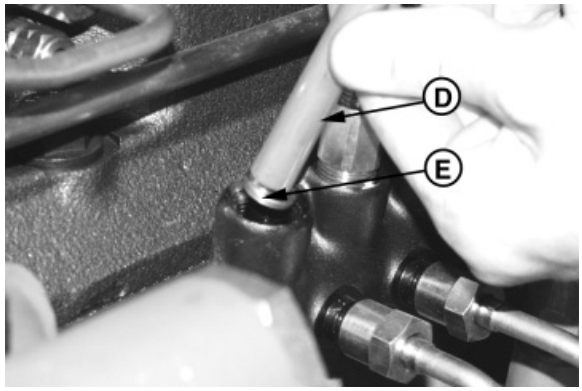
6. Replace complete flow damper as an assembly.



Remove flow damper



Flow Damper Internal Components



Removing Orifice Plate

A—Fuel line fitting
B—Flow damper
C—Internal Components
D—Magnet
E—Orifice Plate

Continued on next page

RG41183,00000D4 –19–22JAN07–1/2

Install Flow Dampers

IMPORTANT: Perform the following steps in a clean environment. Keep work area clean so no dirt or debris enters the fuel system which may cause injector failure.

1. Insert new orifice plate (A) inside bore on high pressure common rail.
2. Holding spring (C) and piston (B) inside flow damper body (D), install new flow damper on high pressure common rail. Tighten flow damper to specification.

Specification

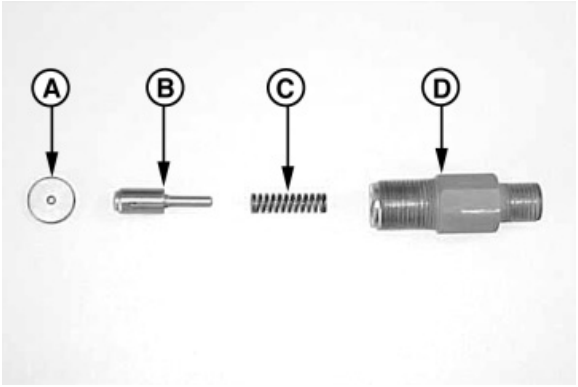
Flow damper—Torque..... 176 N•m (130 lb-ft)

3. Using a backup wrench, connect high pressure injection line to flow damper and to injector inlet connector. Tighten to specification.

Specification

High pressure injection line at both ends—Torque..... 30 N•m (22 lb-ft)

4. Bleed fuel system.

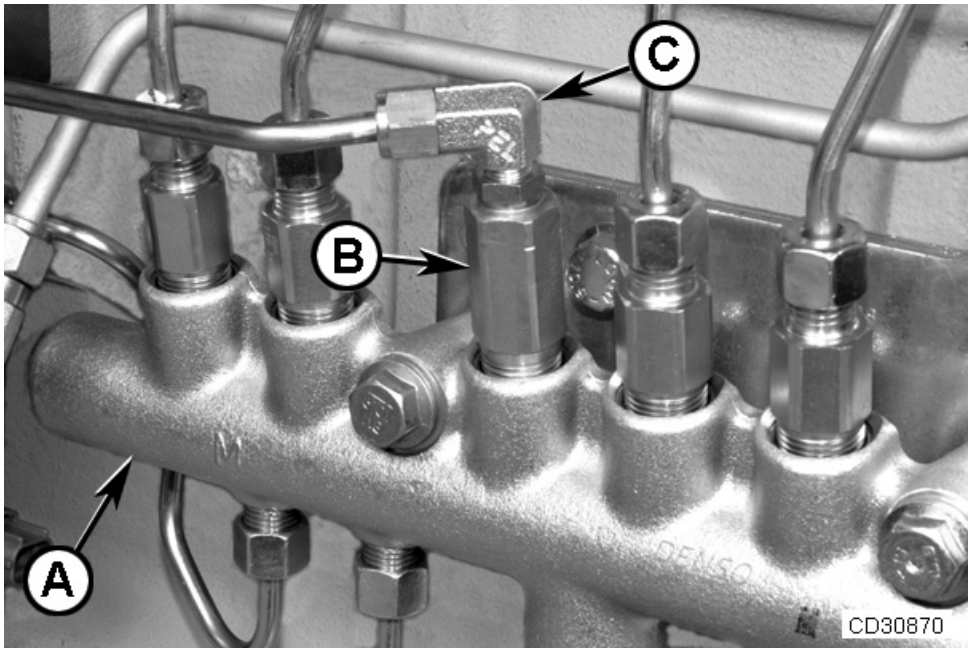


Flow Damper Exploded View

A—Orifice Plate
B—Piston
C—Spring
D—Flow Damper Body

RG41183,00000D4 –19–22JAN07–2/2

Remove and Install Pressure Limiter



Remove/Install Fuel Pressure Limiter

A—High Pressure Common Rail (HPCR) **B—Fuel pressure limiter** **C—Leak-off Line Fitting**

Remove Pressure Limiter

CAUTION: Wait a minimum of 15 minutes after engine is stopped before disconnecting any high pressure fuel lines.

IMPORTANT: Perform the following steps in a clean environment. Keep work area clean so no dirt or debris enters the fuel system which may cause injector failure.

1. Thoroughly clean all fuel lines, fittings, components, and chamfered area around the pressure limiter.
2. Disconnect leak-off line then remove fitting (C) from pressure limiter (B) using a backup wrench on the pressure limiter.

IMPORTANT: Clean magnet prior to removing pressure limiter.

3. Remove pressure limiter. The pressure limiter comes as an assembly. Due to the torque during installation, the crimp on the end of the assembly can come loose. When removing the pressure limiter check to see if the entire assembly is together. If not, use a clean magnet to remove the loose components from the bore. Make sure the ball valve does not fall into the rail.
4. Scrap the pressure limiter as it is not reusable due to the metal to metal seal concept.

Install Pressure Limiter

IMPORTANT: Do NOT reuse the pressure limiter once removed from the rail. Install a new one.

1. Install pressure limiter (B) into common rail (A). Tighten to specification.

Specification	
Pressure Limiter—Torque	176 N•m (130 lb-ft)

Continued on next page

2. Install leak-off line fitting (C) to pressure limiter using a backup wrench. Orient fitting to be in line with leak-off line then tighten nut to specification.

Specification

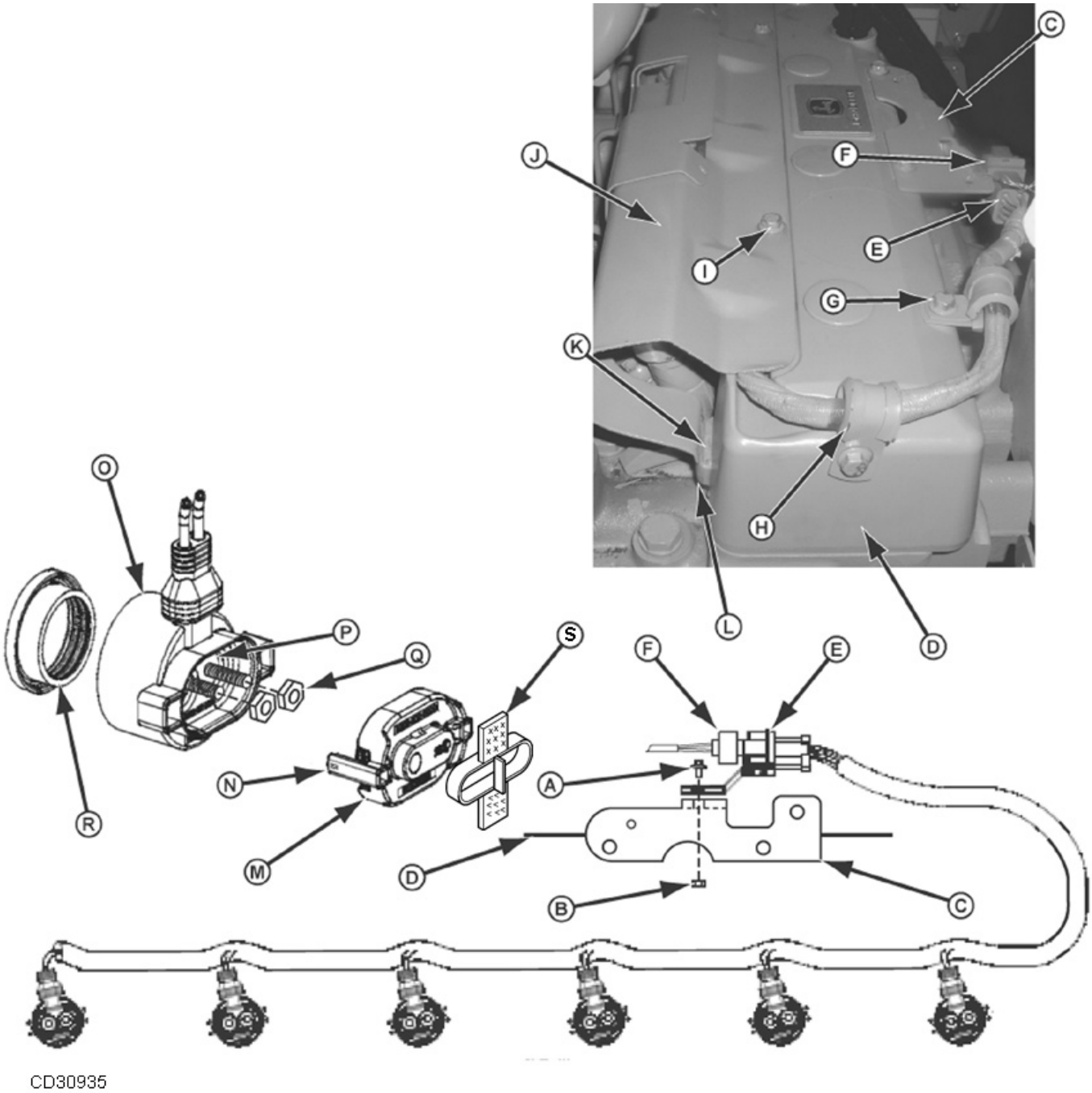
High Pressure Common Rail
Leak-off Line Fitting—Torque ..... 6 N•m (11 lb-ft)

3. Connect leak-off line then tighten tube nuts until seated on fitting shoulder.

4. Bleed fuel system.

RG41183,00000D5 –19–19DEC06–2/2

Remove and Install Fuel Injection Wire Harness Assembly



CD30935 –UN–11MAY07

Fuel Injection Wire Harness Assembly

A—Capscrew
B—Nut
C—Bracket
D—Valve Cover
E—Fuel Injection Wire Harness Assembly Connector
F—Engine Wire Harness Assembly Connector
G—Capscrew
H—P-clamp
I—Capscrew
J—EI Cover
K—Cover Tabs
L—Valve Cover Slot
M—Stud Connector Dust Cap
N—Tab
O—Injector Stud Connector Body
P—EI Terminal Nut
Q—EI Terminal
R—Seal
S—Identification Tag (if present)

Continued on next page

Removal Procedures

NOTE: It is not necessary to remove the wiring harness for the valve lash service.

1. Remove capscrew (A) and nut (B) from bracket (C) attached to valve cover (D), and retain for installation.
2. Unplug fuel injection wire harness assembly connector (E) from engine wire harness assembly connector (F).
3. Remove 2 each capscrews (G) from securing 2 each P-clamps (H) to valve cover, and retain for installation.
4. Remove 2 each P-clamps (H) from fuel injector wire harness assembly, and retain for installation.
5. Remove 3 each capscrews (I), attaching EI cover (J) to valve cover, and retain for installation.
6. Lift EI cover, until EI cover tabs (K) have cleared valve cover slots (L), and remove and retain for installation.
7. Remove connector stud dust cap (M).

NOTE: The stud connector dust cap is not reusable. Always install new one once removed from injector.

NOTE: Some injectors may have an identification tag (S) clipped on dust cap (M). This tag is needed for identification during the engine assembly at the factory. If present, it can be also used when servicing the engine. If you cannot ensure that the identification tag match the proper injector, drop it.

   a. Insert small tool, such as an O-ring pick, into the rectangular hole in one of the tabs (N) of the Injector stud cap assembly.
   b. Gently pull tab away from body, until that side of cap can be rocked up beyond tab-locked position.
   c. On opposite side of the injector stud cap assembly, repeat step b.
   d. Remove cap from injector stud connector body (O), and retain for installation.
   e. Unscrew EI terminal nuts (P), 2 each per EI, from EI terminals (Q), and retain for installation.

NOTE: If a leaking seal (R), or leaking seals, is the problem, defective seals can be removed and replaced individually, without removing the entire wire harness assembly. In this case, do only those steps that enable the removal and replacement of the damaged seals.

8. Lift injector stud connector body off EI. Seal (R) and injector stud connector body are removed as one piece.
9. Remove and discard Fuel injection wire harness assembly.

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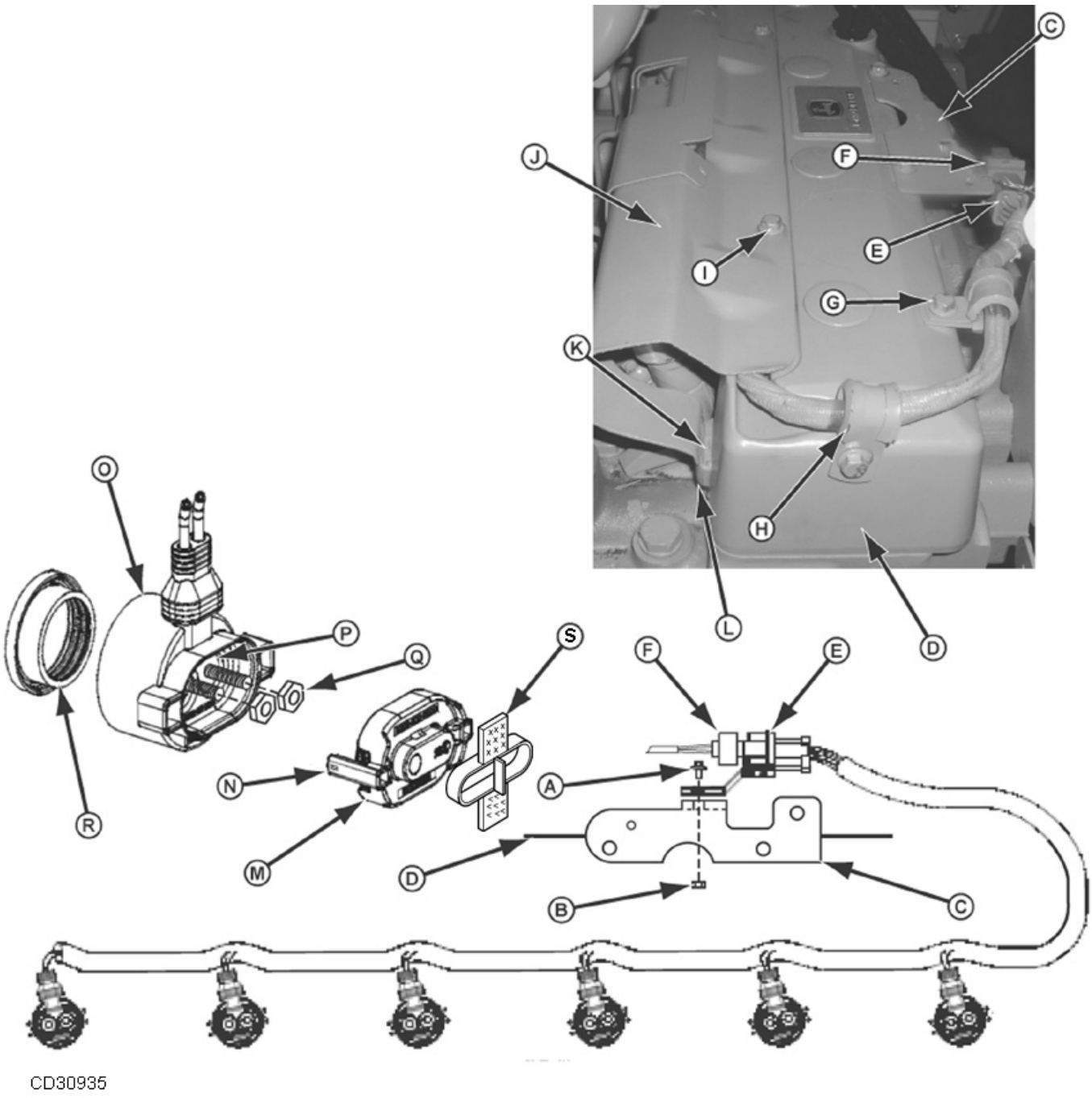


CD30935 –UN–11MAY07

Fuel Injection Wire Harness Assembly

A—Capscrew
B—Nut
C—Bracket
D—Valve Cover
E—Fuel Injection Wire Harness Assembly Connector
F—Engine Wire Harness Assembly Connector
G—Capscrew
H—P-clamp
I—Capscrew
J—Heat Shield
K—Cover Tabs
L—Valve Cover Slot
M—Stud Connector Dust Cap
N—Tab
O—Injector Stud Connector Body
P—EI Terminal Nut
Q—EI Terminal
R—Seal
S—Identification Tag (if present)

Continued on next page

Installation Procedures

1. Using a new fuel injection wire harness assembly, and with each seal (R) inserted into each injector stud connector body (O), Place each wire assembly injector stud connector body, over each EI terminal (Q).

2. Apply light coat of loctite 222 in injector teminal nut threads (Q), retained from removal procedure, and Install two EI terminal nuts onto two EI terminals on each EI. TORQUE TO 2.0-2.4 NM.Torque to specification.

Specification

Injector Terminal Nut—Torque ..... 2.2 ± 0.2 N•m (12.6 ± 1.0 lb-in)

3. Install a new dust cap (M) on each injector.

4. Attach P-clamps (H), retained in removal procedure, onto wire harness assembly.

5. Fasten P-clamps to valve cover (D), using capscrews (G). Torque capscrews to specification.

Specification

Injector Terminal Nut—Torque ..... 12.0 ± 1.0 N•m (68.0 ± 6.0 lb-in)

6. Insert tabs (N) of heat shield (J), retained from in removal procedure, into slots (L) of valve cover.

7. Fasten heat shield to valve cover, using capscrews (I), retained from removal procedure. Torque capscrews to specification.

Specification

Injector Terminal Nut—Torque ..... 12.0 ± 1.0 N•m (68.0 ± 6.0 lb-in)

8. Connect fuel injection wire harness assembly connector (E) to engine fuel injection connector (F).

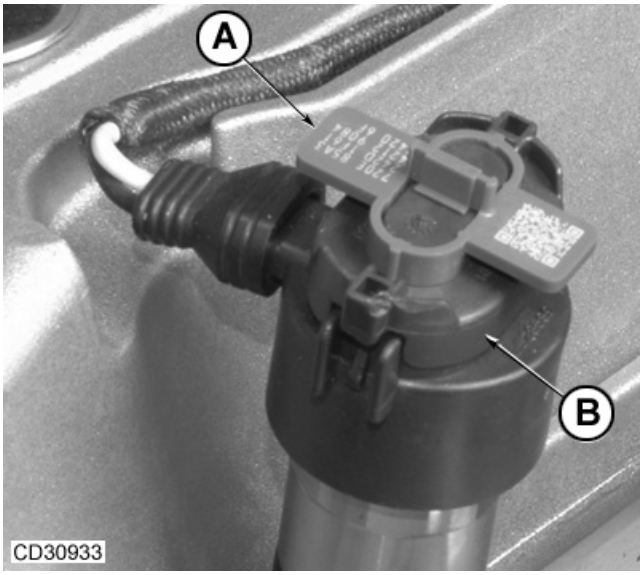
9. Using capscrew (A) and nut (B), retained from removal procedure, fasten fuel injection wire harness assembly connector to bracket (C), attached to valve cover. Torque capscrew and nut to specification.

Specification

Injector Terminal Nut—Torque ..... 25.0 ± 5.0 N•m (18.0 ± 4.0 lb-in)

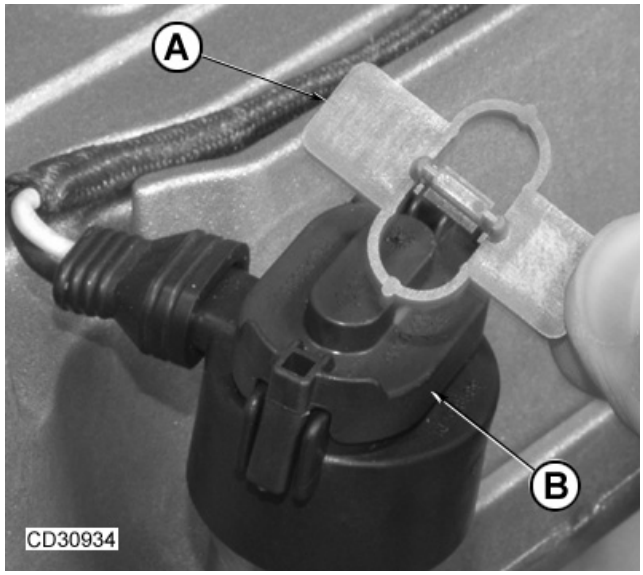
DB92450,000005A –19–30MAY07–4/4

Injector Identification Tag Information



CD30933 –UN–04MAY07

Identification tag clipped on dust cap



CD30934 –UN–04MAY07

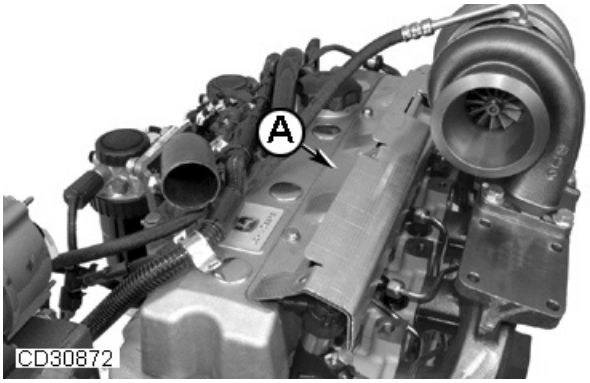
Identification tag removed

A—Identification Tag **B—Dust Cap**

NOTE: Some injectors may have an identification tag (A) clipped on the dust cap (B). This tag identifies the injector serial number and performance data used to program the ECU at the factory. When present, the tag must be kept with the respective injector. If you cannot ensure that the identification tag match the proper injector, discard tag.

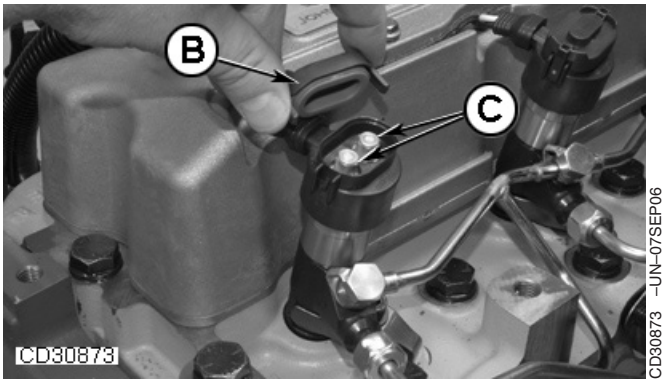
CD03523,0000195 –19–25MAY07–1/1

Remove Electronic Injector (EI)



CD30872 –UN–07SEP06

Remove heat shield



CD30873 –UN–07SEP06

Remove cap seal and nuts

A—Heat shield **B—Stud connector dust cap** **C—Terminal nuts**

NOTE: Injector and engine cylinder are matched in the ECU database. If a new injector is installed or injector is swapped with another one, the ECU must be updated with the new information using Service ADVISOR. See ELECTRONIC INJECTOR CALIBRATION in Section 04, Group 160.

IMPORTANT: Perform the following steps in a clean environment. Keep work area clean so no dirt or debris enters the fuel system which may cause injector failure.

1. Remove heat shield (A).
2. Remove stud connector cap seal (B). To disengage locking tab, insert a small tool into top opening of the cap assembly. While pressing down on the tool, lift up on the cap assembly. Repeat action for opposite tab.

NOTE: The stud connector dust cap is not reusable. Always install a new one once removed from injector.

3. Remove terminal nuts (C).

Continued on next page RE38635,0000041 –19–30MAY07–1/3

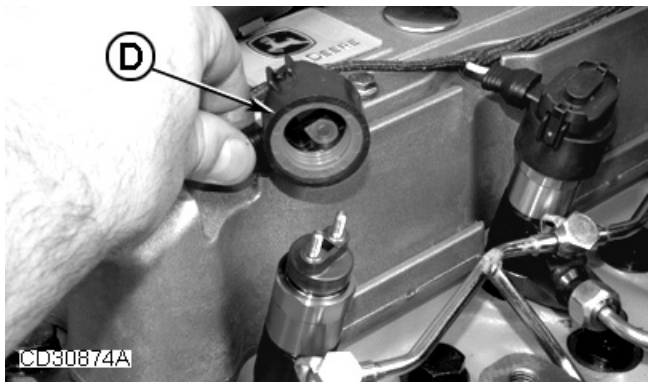
4. Remove wiring harness (D) from injector.

CAUTION: Wait a minimum of 15 minutes after engine is stopped before disconnecting any high pressure fuel lines.

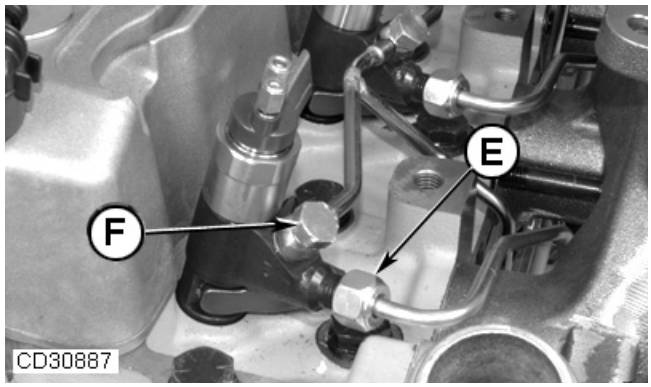
5. Remove high pressure fuel line (E).

6. Remove fuel leak-off line banjo fitting bolt (F).

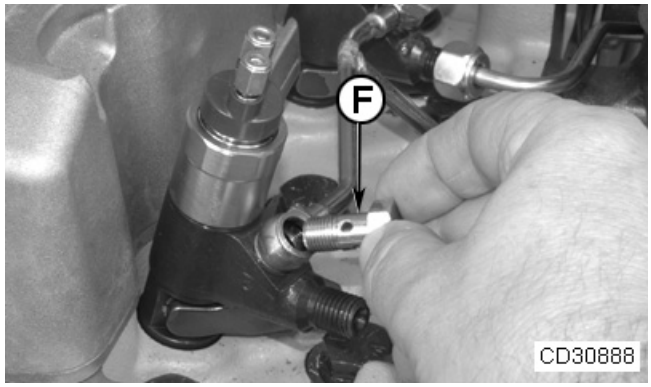
D—Wiring harness
E—High pressure fuel line
F—Leak-off banjo fitting bolt



Remove wiring harness



Remove fuel leak-off line



Remove banjo fitting bolt

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NOTE: It is not necessary to remove the complete fuel leak-off line.

7. Remove hold down clamp screw (G).

IMPORTANT: When removing electronic injector, do not twist at the top of the injector which may result in solenoid damage.

8. Using the clamp (H), turn injector counter clockwise until injector fuel inlet (I) is between rocker arm cover and fuel leak-off line.

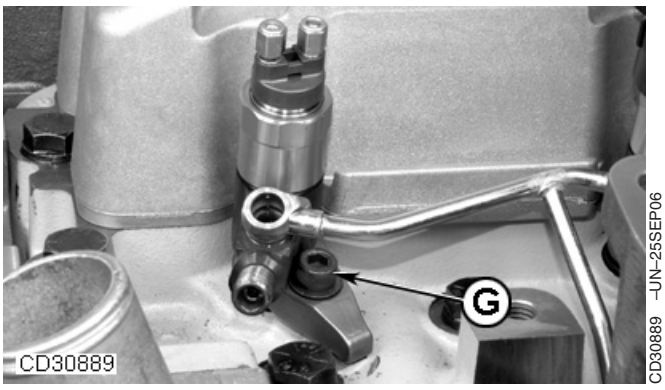
9. Remove the dual banjo sealing washer (J).

10. Install the clamp upside down as shown (K), then push down at the end of the clamp to help injector to come out.

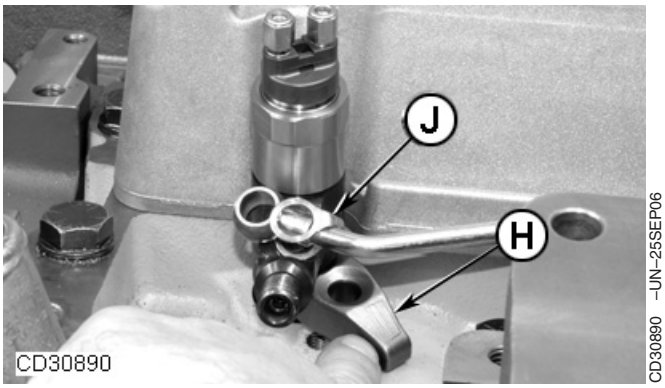
11. Immediately cover all openings in cylinder head and in injector.

NOTE: Electronic injector cannot be serviced nor tested for opening pressure as it is controlled electronically. If any component of the injector fails, the entire injector must be replaced.

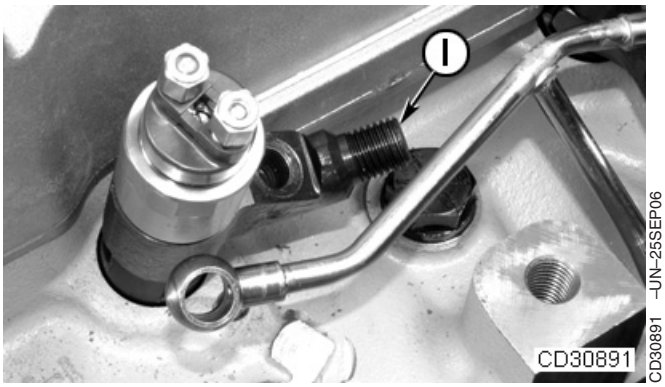
G—Hold down clamp screw
H—Injector clamp
I—Injector fuel inlet
J—Dual banjo sealing washer
K—Injector clamp upside down



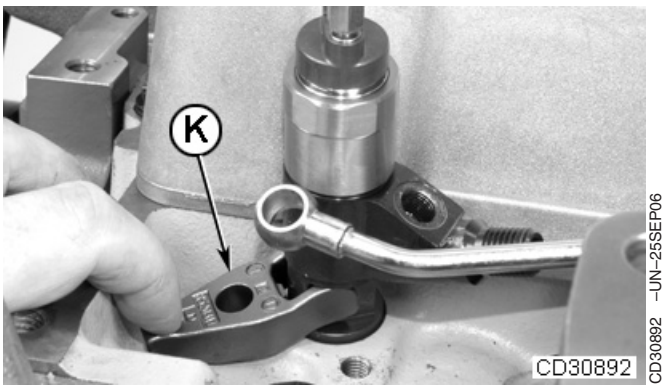
Remove clamp screw



Turn injector using clamp



Place injector fuel inlet between leak-off line and rocker arm cover



Pull out injector using clamp upside down

RE38635,0000041 –19–30MAY07–3/3

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.

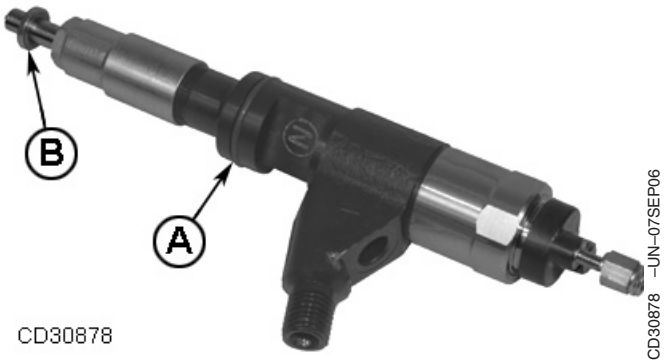
RG40854,0000116 –19–22JAN07–1/1

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

Install Electronic Injector (EI)



Replace seal and O-ring

A—O-ring

B—Combustion sealing washer

Install injector

NOTE: When servicing injectors it is important to complete the injector calibration procedure using Service ADVISOR. Each injector has a specific calibration and this information can be obtained by scanning the bar code on the service injector box and downloading the injector information from the John Deere Custom Performance™ web site. An alternative for obtaining the fuel calibration data from Custom Performance is to use the part number and injector serial number stamped on the injector. ECU can also be directly loaded with the 30 digits code of the identification tag, if present.

If the ECU is not programmed with the correct information for each injector and the correct cylinder that it is in then engine performance and emissions will be affected.

NOTE: Write down the injector part number and serial number for future reference.

IMPORTANT: Perform the following steps in a clean environment. Keep work area clean so no dirt or debris enters the fuel system which may cause injector failure.

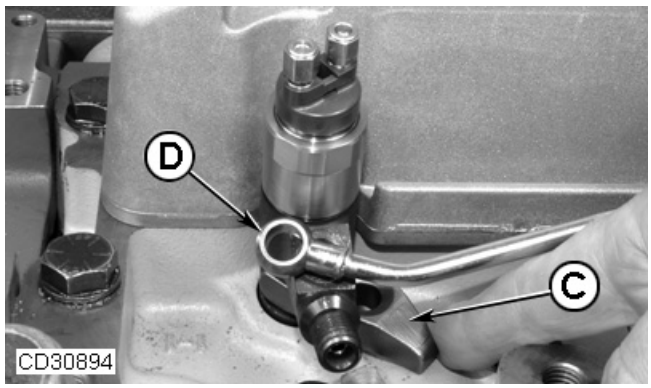
1. Replace O-ring (A) and combustion sealing washer (B).
2. Lubricate O-ring with petroleum grease.
3. Carefully insert injector into bore until it 'pops' into place.

Continued on next page

RE38635,0000042 –19–23MAY07–1/4

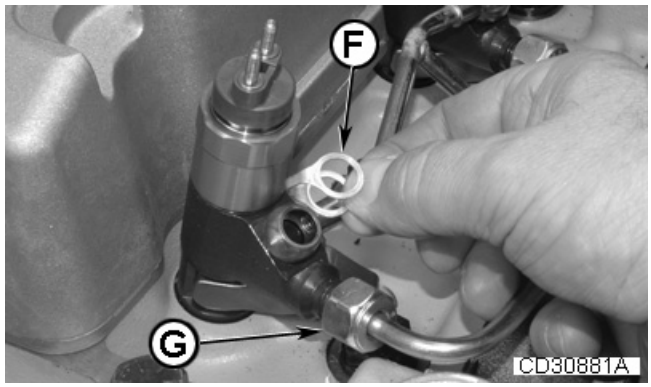
4. Using the clamp (C), turn injector clockwise until in line with the fuel leak-off line banjo bore (D).
5. Dip hold down clamp screw with spherical washer (E) in engine oil. Install screw then hand tighten.
6. Install banjo fitting bolt with new dual banjo sealing washers (F). Hand tighten at this stage.
7. Install high pressure fuel line (G). Hand tighten fitting nut.

C—Injector clamp
D—Fuel leak-off line
E—Clamp screw with spherical washer
F—Dual banjo sealing washer
G—High pressure fuel line



Turn injector using clamp

Install injector clamp



Install dual banjo sealing washer

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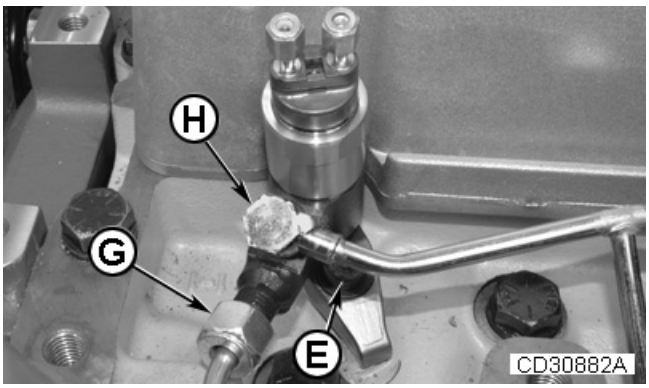
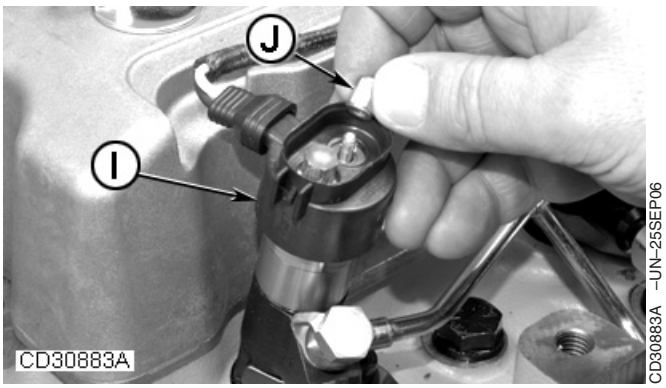


Tighten connections



Install wiring harness

E—Clamp screw **H—Leak-off banjo screw** **I—Wiring harness** **J—Terminal nut**
G—High pressure fuel line

8. Tighten injector clamp (E) to specification.

Electronic Injector—Specification

Clamp screw—Torque ..... 15 N•m (11 lb-ft)
Torque Turn ..... 90 degree

9. Tighten fuel leak-off banjo screw (H) to specification.

Specification

Fuel leak-off banjo screw—
Torque ..... 25 N•m (18 lb-ft)

10. Tighten high pressure fuel line (G) to specification at both ends.

Specification

High pressure fuel line—Torque ..... 30 N•m (22 lb-ft)

11. Install wiring harness (I) onto injector studs.

IMPORTANT: Do NOT use red or blue LOCTITE on solenoid studs. Bonding strength is too high for small studs, making future removal impossible without twisting off stud.

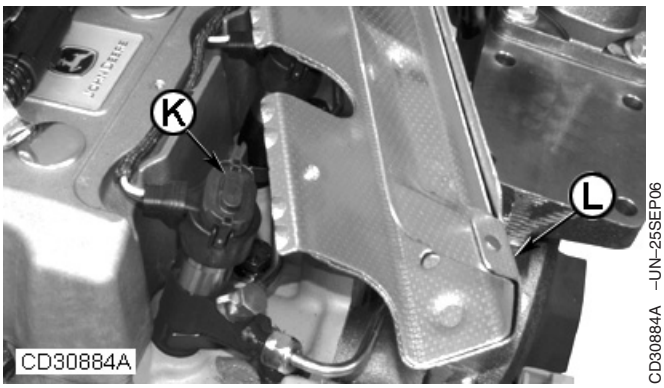
12. Apply LOCTITE 222 Small Thread Locker (PM38653) into injector nuts (J). Install and tighten nuts to specification.

Specification

Injector nut—Torque ..... 2 N•m (1.5 lb-ft)

Continued on next page

RE38635,0000042 –19–23MAY07–3/4



Install cap seal

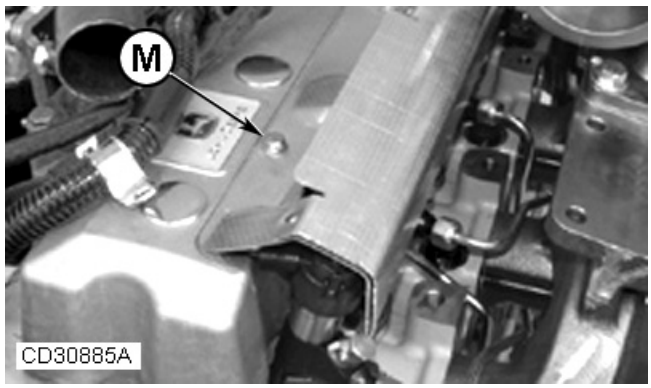
K—Stud connector dust cap **L—Heat shield**

13. Install a new dust cap (K) on injector connector.

14. Install heat shield (L). Tighten cap screw (M) to specification.

Specification

Heat shield cap screw—Torque ..... 10 N•m (7 lb-ft)



Install heat shield

M—Heat shield cap screw

15. Calibrate the ECU for proper electronic injector fueling. See ELECTRONIC INJECTOR CALIBRATION in Section 04, Group 160.

RE38635,0000042 –19–23MAY07–4/4

Remove and Install Fuel Leak-Off Line

NOTE: The fuel leak-off line is composed of several portions which can be serviced separately.

02
090
34

Lower portions between rail and high pressure pump

1. Remove leak off line portion concerned
2. Check and replace parts as necessary.
3. Install parts then tighten tube nut until seated on fitting shoulder.

Upper portion between T-fitting (C) and injector (D)

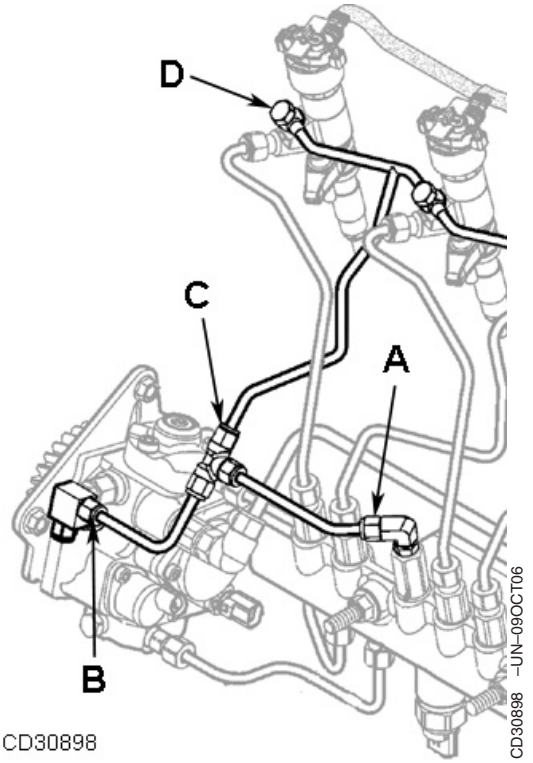
1. Disconnect fuel leak-off from T-fitting (C) and from injectors (D).
2. Remove the upper portion of leak-off line (E).
3. Check and replace parts as necessary.
4. Install banjo fitting bolt (G) with new dual banjo sealing washers (F) at each injector port.
5. Tighten fuel leak-off banjo bolt to specification.

Specification

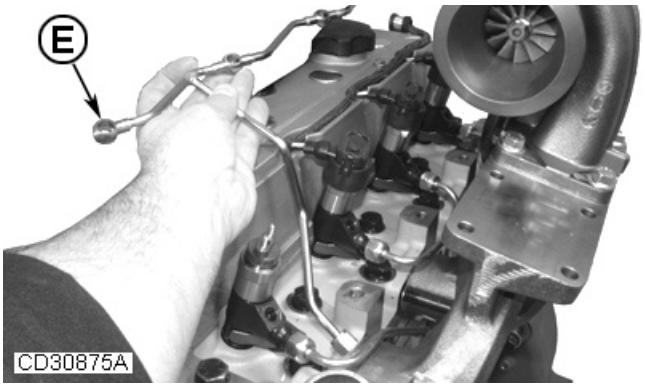
Fuel leak-off banjo bolt—Torque..... 25 N•m (18 lb-ft)

6. Install leak-off line in T-fitting connection (C) then tighten tube nut until tube nut seated on fitting shoulder.

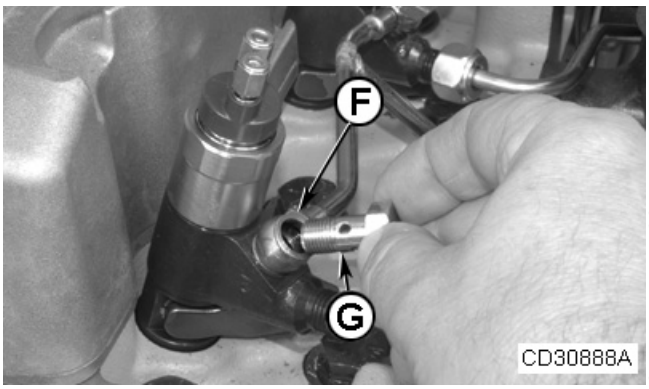
A—Rail connection
B—High pressure pump connection
C—T-fitting
D—Injector connection
E—Upper portion of leak-off line
F—Dual banjo sealing washer
G—Leak-off banjo fitting bolt



Fuel leak-off line



Remove/install fuel leak-off line



Install dual banjo sealing washer and banjo fitting bolt

CD03523,000017B –19–30MAY07–1/1

Engine Control Unit (ECU) Maintenance

IMPORTANT: DO NOT OPEN ENGINE CONTROL UNIT.

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

IMPORTANT: Before welding on engines with ECU, protect the ECU from high-current damage as follows:

1. **Disconnect ECU-to-vehicle frame ground connection.**
2. **Disconnect all other connectors from ECU.**
3. **Connect welder ground close to welding point and make sure ECU and other electrical components are not in the ground path.**

NOTE: For diagnosis and testing of the electronic engine control and sensors, refer to Section 04, Group 160, TROUBLE CODE DIAGNOSTICS AND TESTS.

NOTE: The sealed ECU assembly is the system component LEAST likely to fail. Before replacing, make sure that it is isolated and identified as the defective component.

The ECU is not repairable. If it is found to be defective, replace ECU.

The wiring connectors for the ECU are repairable. See REPAIR CINCH CONNECTORS later in this Group.

CD03523,0000179 –19–20FEB07–1/2

IMPORTANT: If an ECU is not programmed identically with the original (failed) ECU, misleading diagnostic messages, poor performance, or engine damage can occur.

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

CD30896

CD30896 –UN–05OCT06

Engine Control Unit, Level 16

CD03523,0000179 –19–20FEB07–2/2

Remove and Install Engine Control Unit (ECU) on Engine (Optional Equipment)

NOTE: Engine Control Unit (ECU) can be mounted on engine or remotely installed on the machine.

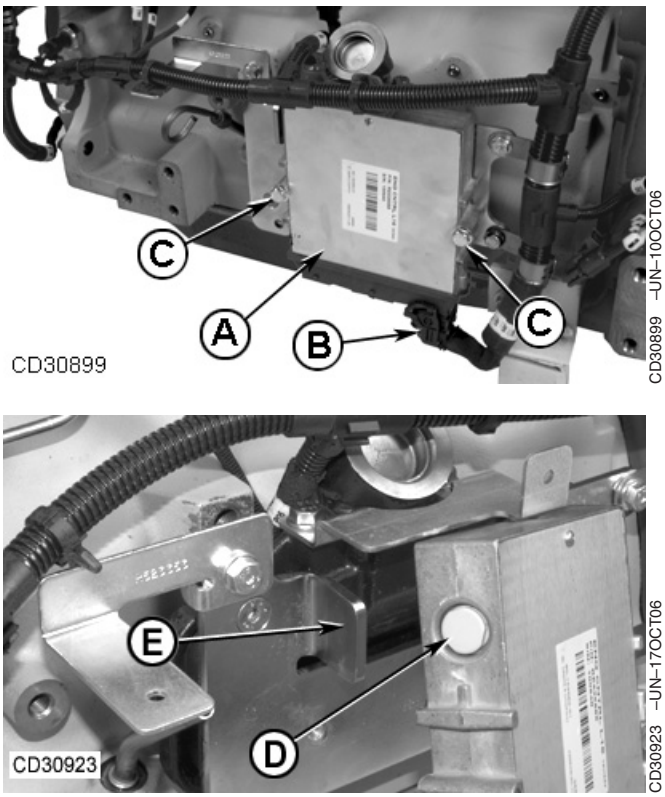
02
110
2

1. Disconnect wiring harness (B) from ECU (A).
2. Remove ECU from bracket.
3. Install ECU with vent plug (D) oriented towards bracket baffle (E). Tighten cap screws (C) to specification.

Specification

ECU cap screw—Torque..... 15 N•m (11 lb-ft)

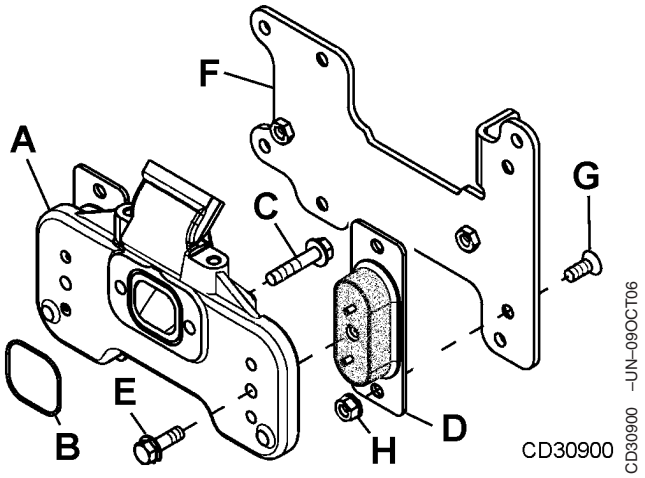
A—Engine Control Unit (ECU)
B—Wiring harness
C—Cap screw
D—Vent plug
E—Bracket baffle



ECU Installation

CD03523,000017C –19–17OCT06–1/1

Remove and Install Adaptation Parts for Engine Control Unit (ECU) Mounted on Engine (Optional Equipment)



ECU adaptation parts

NOTE: Depending on engine configuration, adapter (A) can be used as a filler neck.

1. Remove wiring harness clamping from bracket (F).
2. Remove bracket (F).
3. Remove adapter (A)/isolator (D) assembly.
4. Replace parts as necessary. Tighten isolator cap screws (E) to specification.

Specification

Isolator-to-adapter cap screws—
Torque ..... 35 N•m (26 lb-ft)

5. Install adapter (A)/isolator (D) assembly with a new O-ring (B) on cylinder block. Tighten cap screw (C) to specification.

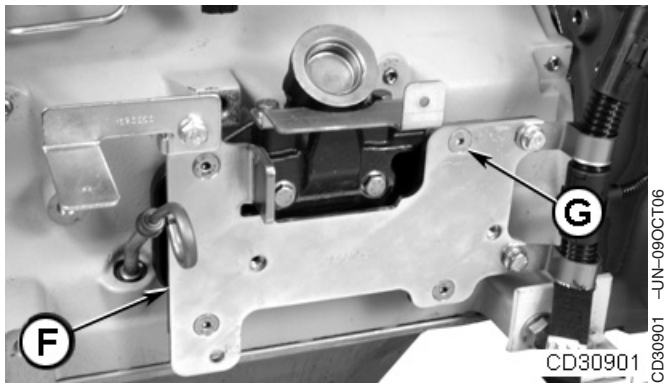
Specification

Adapter/isolator
assembly-to-cylinder block cap
screws—Torque..... 40 N•m (30 lb-ft)

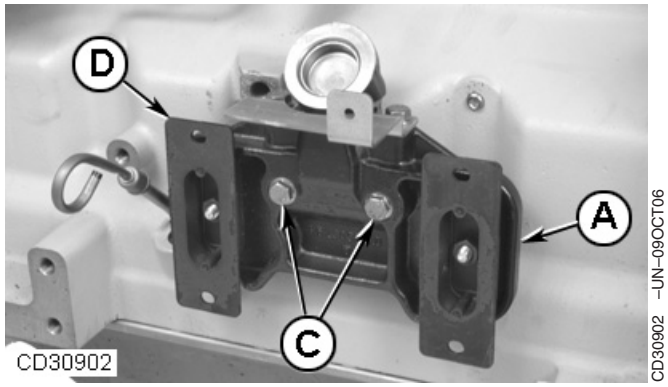
6. Install bracket (F) on adapter. Tighten nuts (H) to specification.

Specification

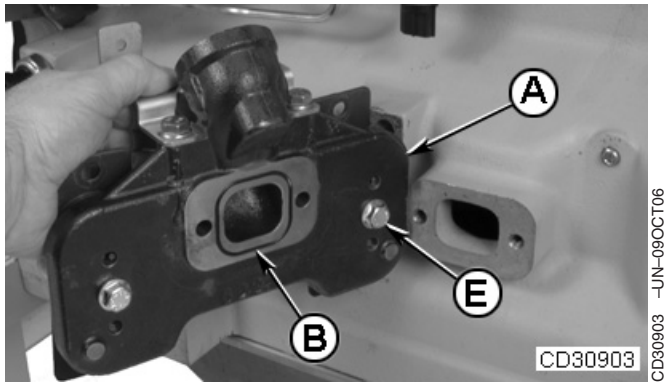
ECU bracket-to-adapter nuts—
Torque ..... 35 N•m (26 lb-ft)



Remove/install ECU bracket



Remove/install adapter with isolators



Install o-ring on ECU adapter/isolator assembly

A—Adapter
B—O-ring
C—Adapter-to-cylinder block cap screw
D—Isolator
E—Isolator-to-adapter cap screw
F—ECU bracket
G—ECU bracket-to-isolator screw
H—Nut

CD03523,000017D –19–15FEB07–1/1

Remove and Install Engine Coolant Temperature (ECT) Sensor

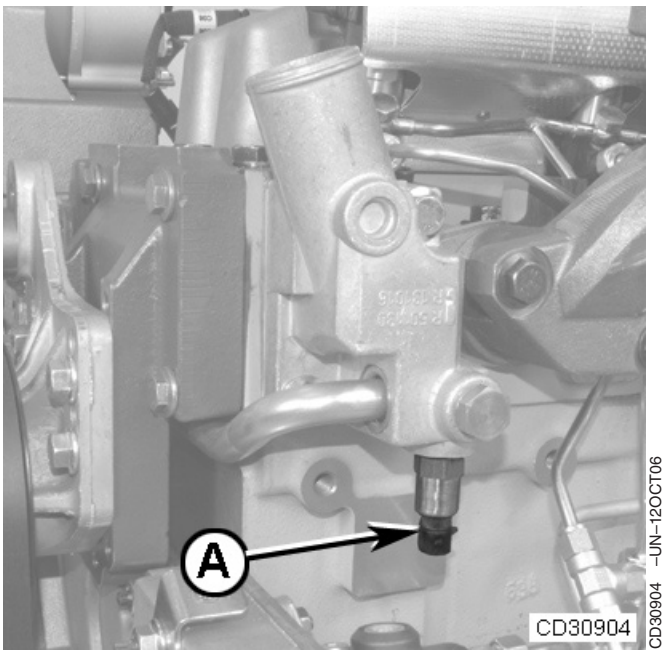
NOTE: For an expanded component location drawing, see ELECTRONIC CONTROL SYSTEM OVERVIEW in Section 03, Group 140 of this manual.

1. Disconnect ECT sensor (A) wiring connector and remove sensor.
2. Replace parts as necessary.
3. Coat new sensor O-ring with TY6333 High Temperature Grease and install sensor in thermostat housing. Tighten to specifications.

Specification

Coolant temperature sensor (in thermostat cover)—Torque..... 10 N•m (7 lb-ft)

4. Reconnect sensor wiring connection.



Engine Coolant Temperature Sensor

A—Engine coolant temperature sensor

CD03523,000017E –19–11OCT06–1/1

Remove and Install Fuel Temperature Sensor

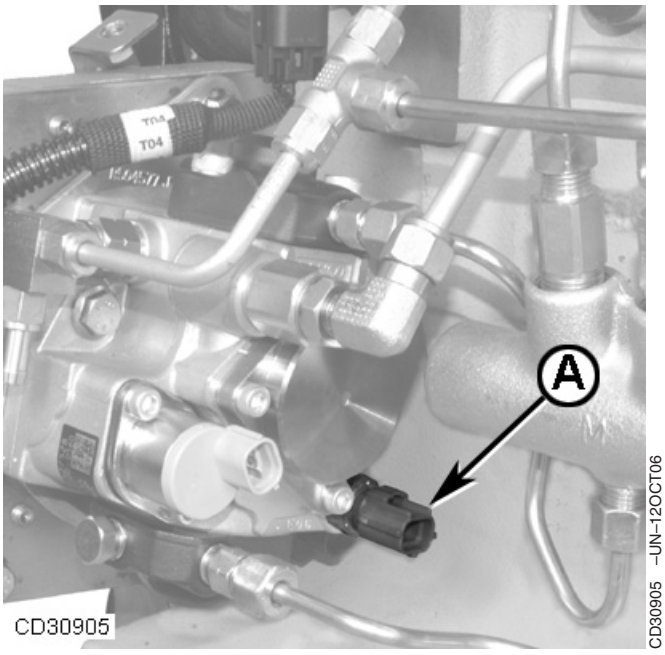
NOTE: For an expanded component location drawing, see ELECTRONIC CONTROL SYSTEM OVERVIEW in Section 03, Group 140 of this manual.

1. Disconnect fuel temperature sensor (A) wiring connector and remove sensor.
2. Replace parts as necessary.
3. Coat new sensor O-ring with TY6333 High Temperature Grease and install sensor in high pressure pump. Tighten to specifications.

Specification

Fuel temperature sensor (in high pressure pump)—Torque ..... 10 N•m (7 lb-ft)

4. Reconnect sensor wiring connection.



Fuel Temperature Sensor

A—Fuel temperature sensor

CD03523,000017F –19–11OCT06–1/1

Remove and Install Manifold Air Temperature (MAT) Sensor

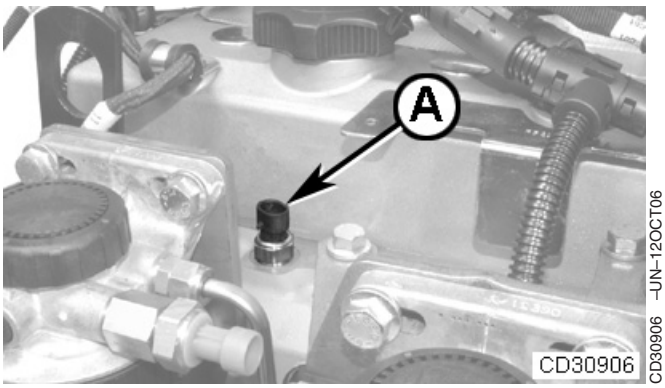
NOTE: For an expanded component location drawing, see ELECTRONIC CONTROL SYSTEM OVERVIEW in Section 03, Group 140 of this manual.

1. Disconnect manifold air temperature sensor (A) wiring connector and remove sensor.
2. Replace parts as necessary.
3. Coat new sensor O-ring with PM37418 High Temperature Grease and install sensor in cylinder head. Tighten to specifications.

Specification

Manifold air temperature sensor (in cylinder head)—Torque ..... 10 N•m (7 lb-ft)

4. Reconnect sensor wiring connection.



Manifold Air Temperature Sensor

A—Manifold air temperature sensor

CD03523,0000180 –19–30MAY07–1/1

Remove and Install Oil Pressure Sensor

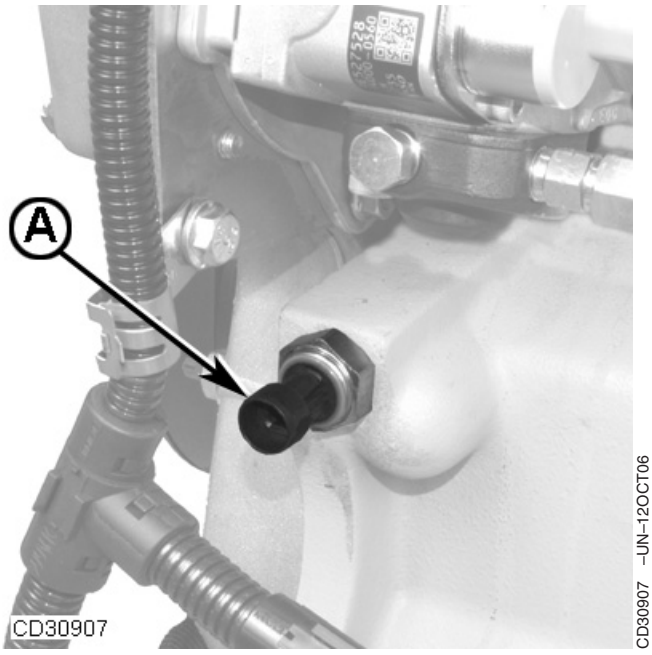
NOTE: For an expanded component location drawing, see ELECTRONIC CONTROL SYSTEM OVERVIEW in Section 03, Group 140 of this manual.

1. Disconnect oil pressure sensor (A) wiring connector and remove sensor.
2. Replace sensor if necessary.
3. Coat sensor threads with TY9370 Thread Lock (Medium Strength) and install sensor in cylinder block. Tighten to specifications.

Specification

Oil pressure sensor (in cylinder block)—Torque ..... 10 N•m (7 lb-ft)

4. Reconnect sensor wiring connection.



Oil Pressure Sensor

A—Oil pressure sensor

CD03523,0000181 –19–11OCT06–1/1

Remove and Install Fuel Rail Pressure Sensor

CAUTION: Wait a minimum of 15 minutes after engine is stopped before removing the fuel rail pressure sensor.

IMPORTANT: Perform the following steps in a clean environment. Keep work area clean so no dirt or debris enters the fuel system which may cause injector failure.

NOTE: For an expanded component location drawing, see ELECTRONIC CONTROL SYSTEM OVERVIEW in Section 03, Group 140 of this manual.

1. Disconnect fuel pressure sensor (A) wiring connector and remove sensor.

2. Replace parts as necessary.

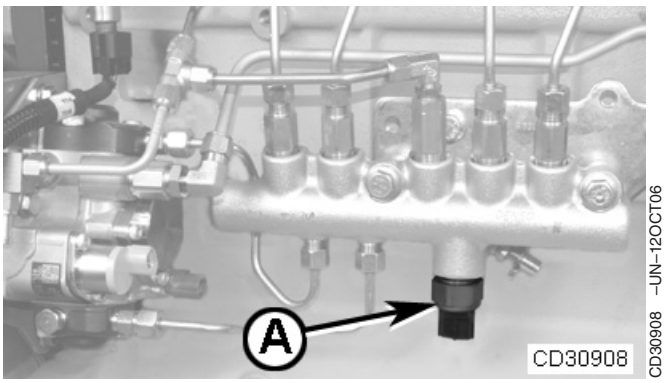
IMPORTANT: Do NOT reuse the fuel rail pressure sensor once removed from the rail. Install a new one.

3. Coat new sensor threads with a small amount of TY6333 High Temperature Grease and install sensor in fuel rail. Tighten to specifications.

Specification	
Fuel rail pressure sensor (in fuel rail)—Torque	100 N•m (74 lb-ft)

4. Reconnect sensor wiring connection.

5. Bleed fuel system.



CD30908 –UN–12OCT06

Fuel Rail Pressure Sensor

A—Fuel rail pressure sensor

CD03523,0000186 –19–19DEC06–1/1

Remove and Install Fuel Transfer Pump Pressure Sensor

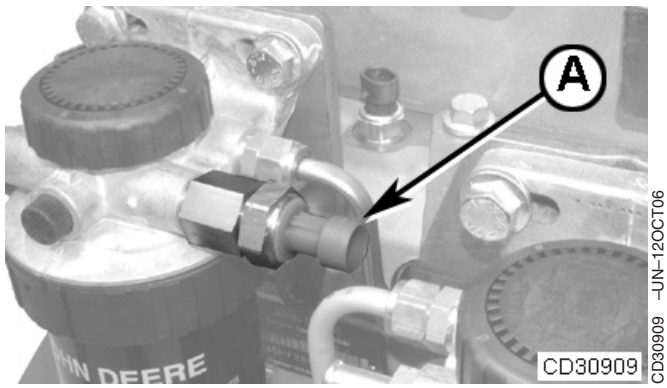
IMPORTANT: Perform the following steps in a clean environment. Keep work area clean so no dirt or debris enters the fuel system which may cause injector failure.

NOTE: For an expanded component location drawing, see ELECTRONIC CONTROL SYSTEM OVERVIEW in Section 03, Group 140 of this manual.

1. Disconnect fuel pressure sensor (A) wiring connector and remove sensor.
2. Replace parts as necessary.
3. Coat new sensor O-ring with TY6333 High Temperature Grease and install sensor in fuel filter base. Tighten to specifications.

Specification	
Fuel transfer pump pressure sensor (in fuel filter base)— Torque	10 N•m (7 lb-ft)

4. Reconnect sensor wiring connection.
5. Bleed fuel system.



Fuel Transfer Pump Pressure Sensor

A—Fuel transfer pump pressure sensor

CD03523,0000182 –19–19DEC06–1/1

Remove and Install Crankshaft Position Sensor

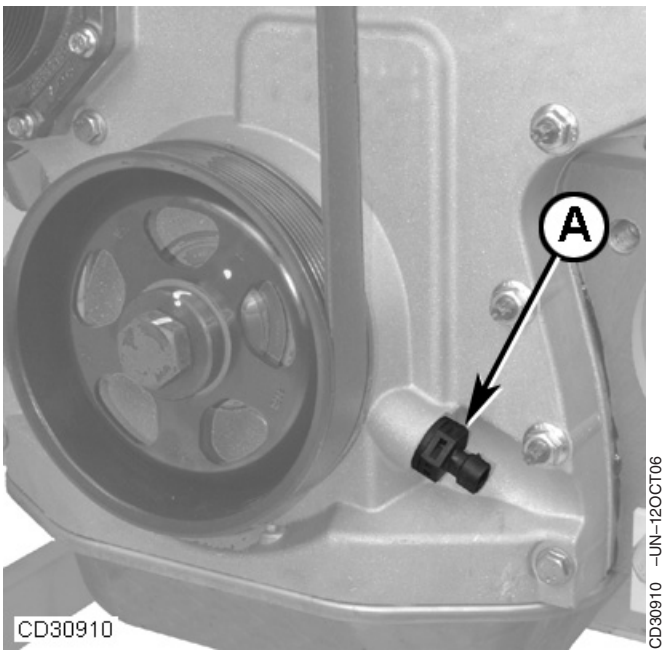
NOTE: For an expanded component location drawing, see ELECTRONIC CONTROL SYSTEM OVERVIEW in Section 03, Group 140 of this manual.

1. Disconnect crankshaft position sensor (A) wiring connector and remove sensor.
2. Replace parts as necessary.
3. Coat new sensor O-ring with TY6333 High Temperature Grease and install sensor in timing gear cover. Tighten to specifications.

Specification

Crankshaft position sensor (in timing gear cover)—Torque..... 15 N•m (11 lb-ft)

4. Reconnect sensor wiring connection.



Crankshaft Position Sensor

A—Crankshaft position sensor

CD03523,0000183 –19–11OCT06–1/1

Remove and Install Pump Position Sensor

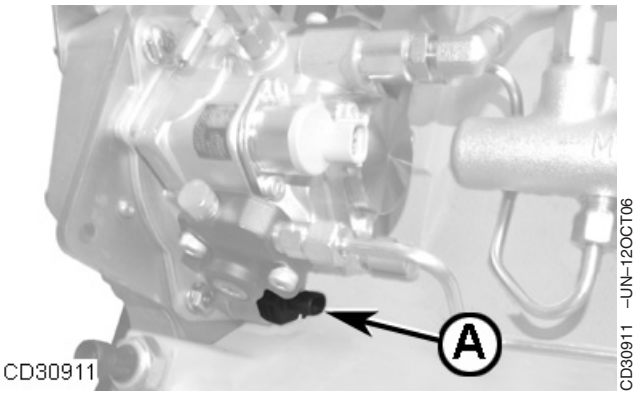
NOTE: For an expanded component location drawing, see ELECTRONIC CONTROL SYSTEM OVERVIEW in Section 03, Group 140 of this manual.

1. Disconnect pump position sensor (A) wiring connector and remove sensor.
2. Replace parts as necessary.
3. Coat new sensor O-ring with TY6333 High Temperature Grease and install sensor in high pressure pump adapter plate. Tighten to specifications.

Specification

Pump position sensor (in high pressure pump adapter plate)—Torque ..... 15 N•m (11 lb-ft)

4. Reconnect sensor wiring connection.



Pump Position Sensor

A—Pump position sensor

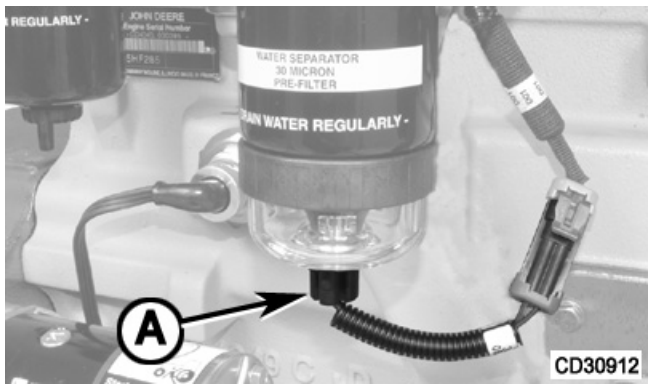
CD03523,0000184 –19–30MAY07–1/1

Remove and Install Water-In-Fuel (WIF) Sensor

NOTE: For an expanded component location drawing, see ELECTRONIC CONTROL SYSTEM OVERVIEW in Section 03, Group 140 of this manual.

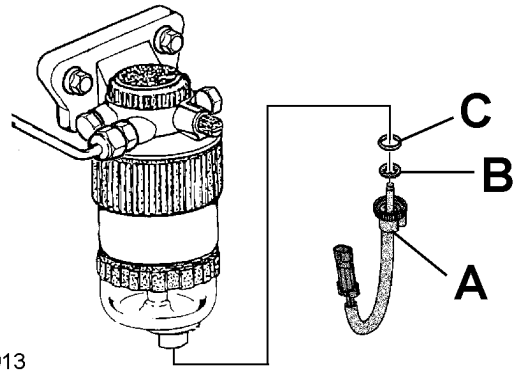
1. Disconnect water-in-fuel sensor (A) wiring connector and remove sensor.
2. Replace parts as necessary.
3. Install sensor in fuel filter then hand tighten.
4. Reconnect sensor wiring connection.

A—Water-In-Fuel sensor
B—Sealing washer
C—O-ring



CD30912 –UN–12OCT06

Water-In-Fuel Sensor



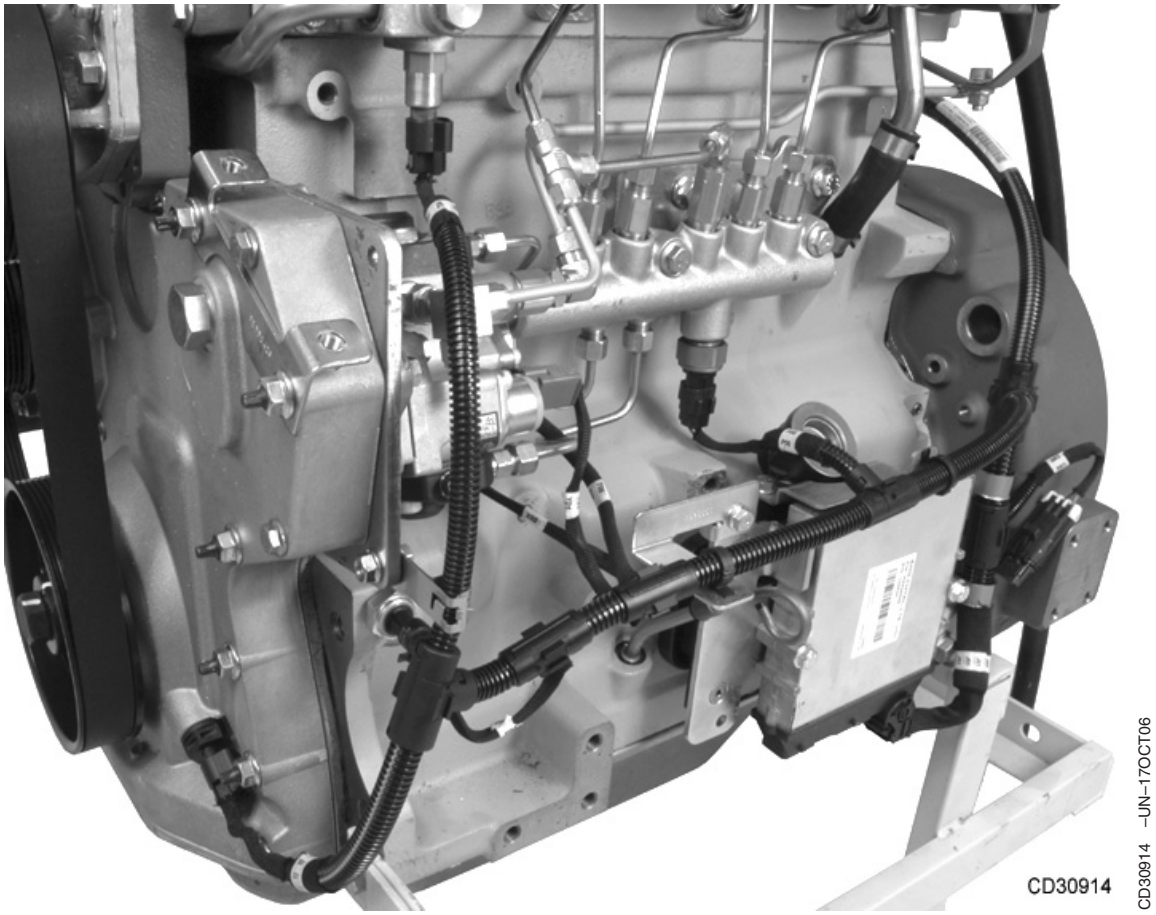
CD30913

CD30913 –UN–12OCT06

Water-In Fuel Sensor (removed)

CD03523,0000185 –19–11OCT06–1/1

Install Wiring Harness for Engine Mount ECU



Harness Routing on Left Side of Engine

Harness Routing on Left Side of Engine

NOTE: The procedure below is for engine mount ECU harness provided by the engine factory.

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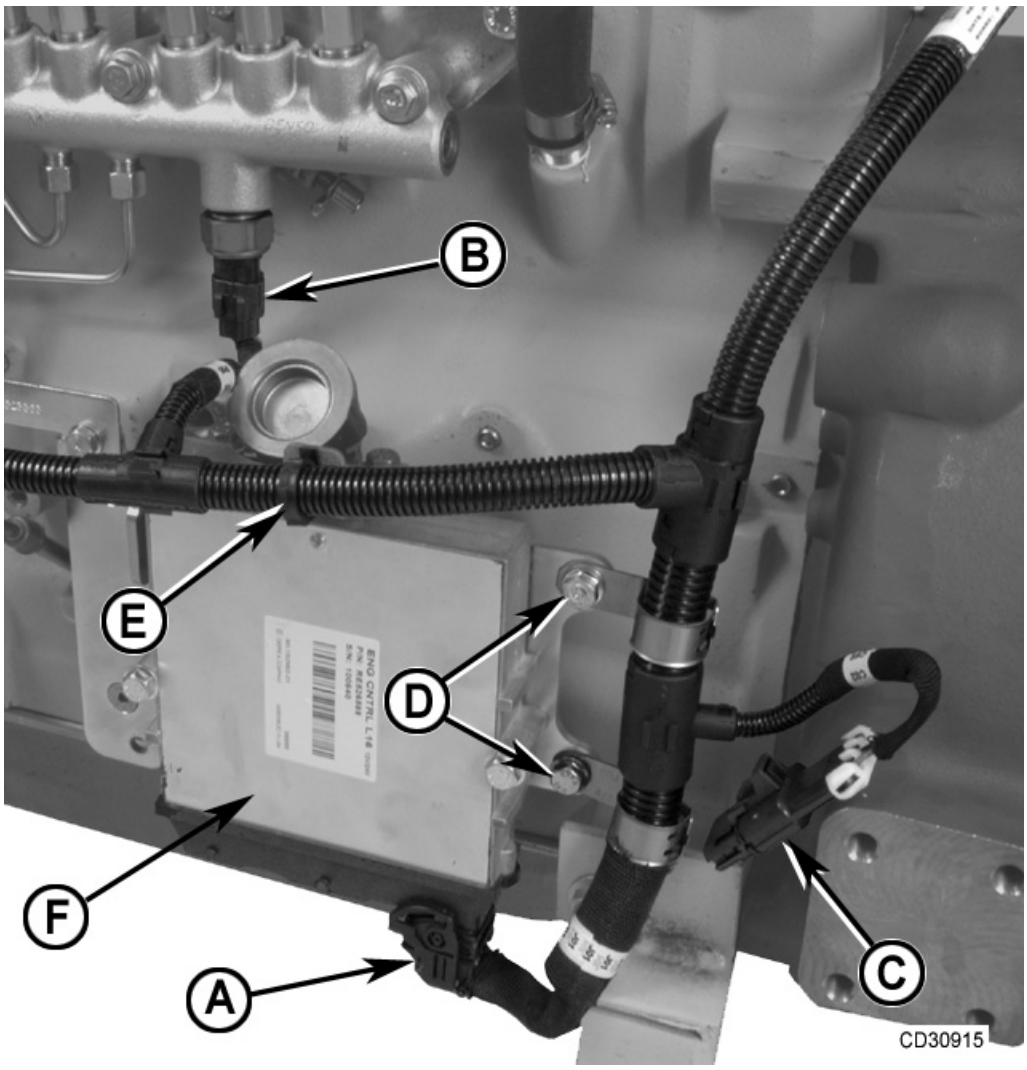
CD03523,0000188 –19–16OCT06–1/8



Harness Routing on Left Rear Side of Engine

A—ECU connector (J01)
B—Fuel rail pressure connector (P05)
C—Auxiliary power connector (C02)
D—Wiring harness to ECU bracket attachment
E—Harness clip
F—ECU

1. Route and connect engine harness at engine left, rear side, as shown, and as follows:
   a. Install ECU connector (A).
   b. Connect fuel rail pressure sensor (B).
   c. Attach wiring harness to ECU bracket (D).
   d. Insert harness clip (E) into harness mounting bracket.

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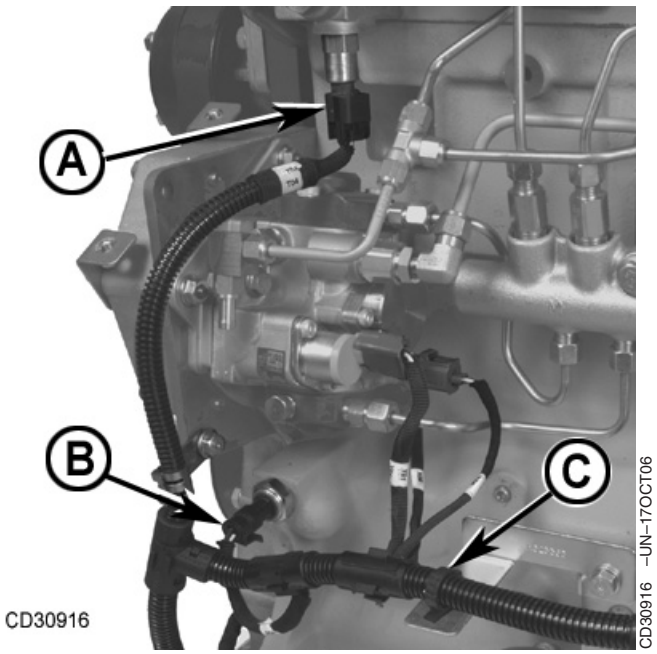
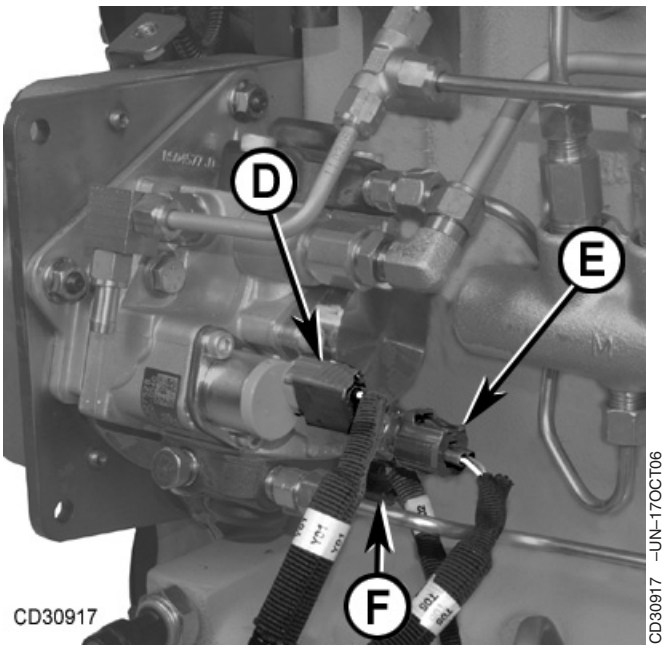


Harness Routing on Left Front Side of Engine

A—Coolant temperature connector (T04)
B—Oil pressure connector (P04)
C—Harness clip
D—Suction control valve connector (Y01)



Harness Routing at High Pressure Pump Area

E—Fuel temperature connector (T05)
F—Pump position connector (X02)

2. Route and connect harness at left, front side, as shown, and as follows:

   a. Connect coolant temperature sensor (A).

   b. Connect oil pressure sensor (B).

   c. Insert harness clip (C) into harness mounting bracket.

   d. Connect suction control valve sensor (D).

   e. Connect fuel temperature sensor (E).

   f. Connect pump position sensor (F).

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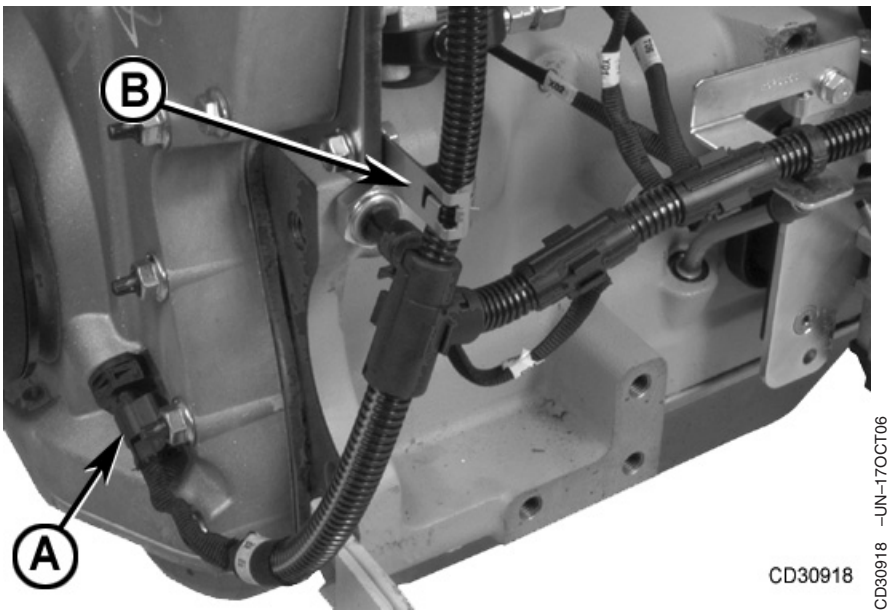
CD03523,0000188 –19–16OCT06–3/8



Harness Routing at Front of Engine

A—Engine crankshaft connector (X01)

B—Wiring harness-to-front plate attachment

g. Connect engine crankshaft sensor (A).

h. Attach wiring harness to engine front plate(B).

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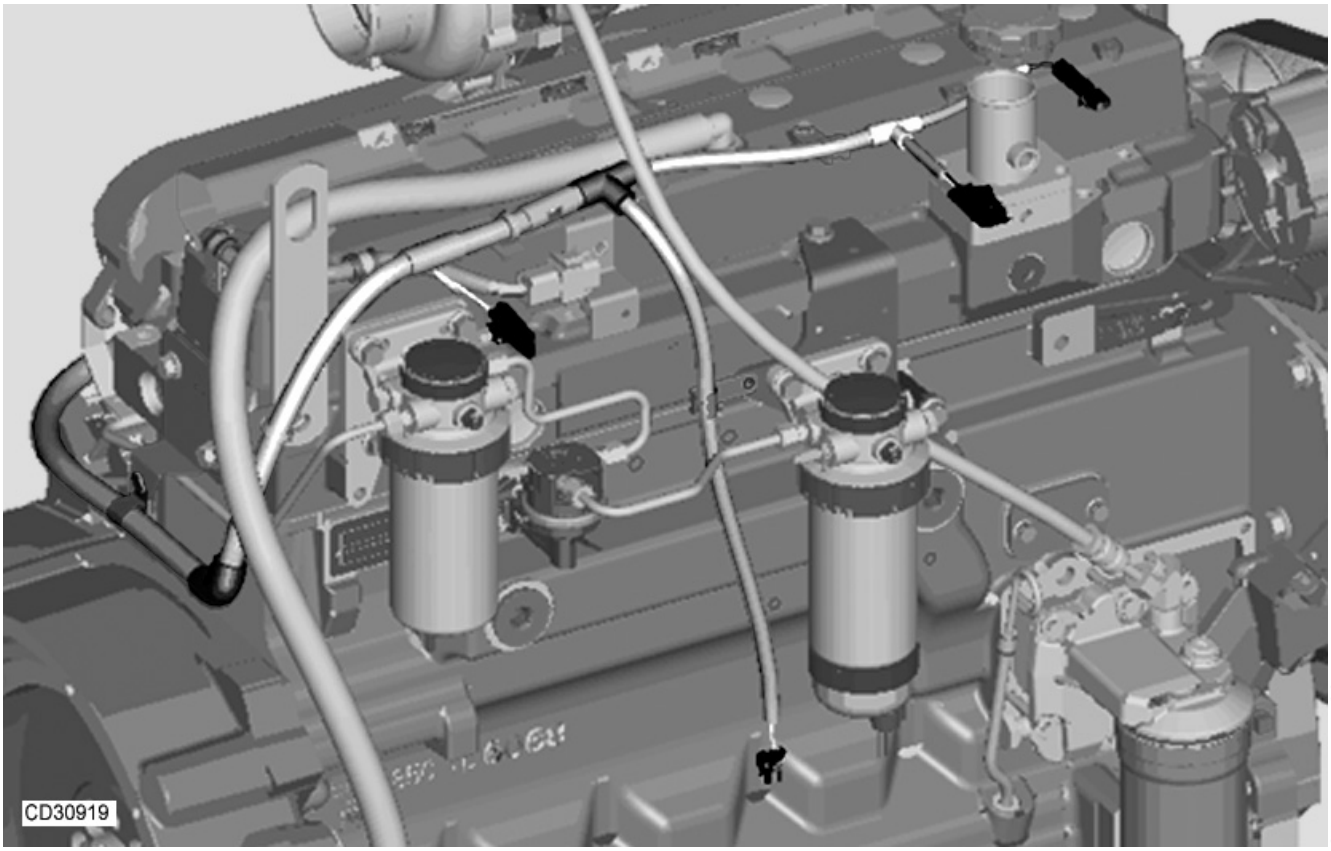
CD03523,0000188 –19–16OCT06–4/8



Harness Routing on Right Side of Engine

Harness Routing on Right Side of Engine

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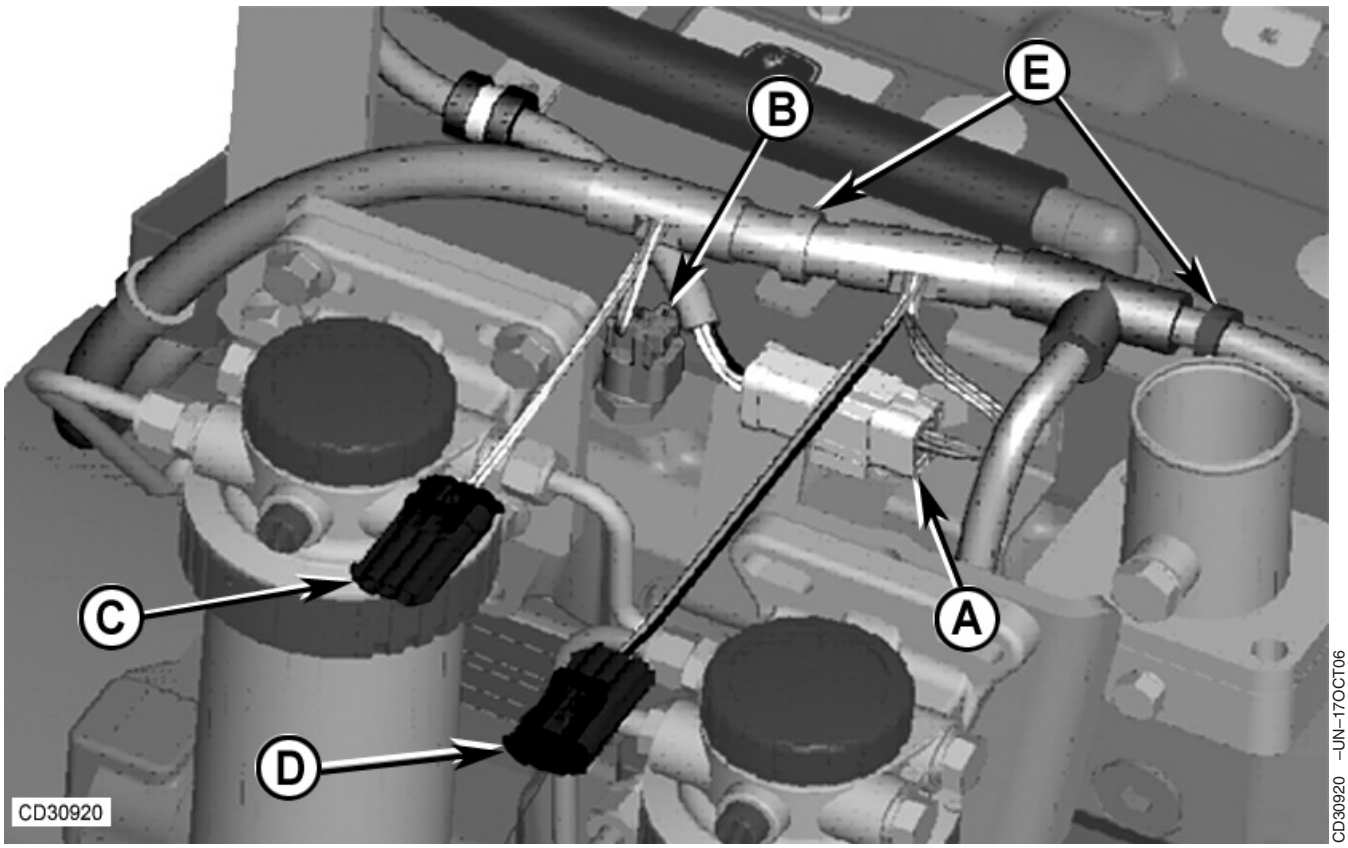
CD03523,0000188 –19–16OCT06–5/8



Harness Routing on Right Rear Side of Engine

A—Fuel injector connector (C01)
B—Manifold air temperature connector (T02)
C—Fuel pressure connector (P03) - Optional equipment
D—Air heater connector (C03) - Vehicle installation
E—Harness clips

1. Route and connect engine harness at engine right, rear side, as shown, and as follows:

   a. Connect engine harness to fuel injector connector (A).

   b. Connect manifold air temperature (MAT) sensor (B).

   c. Fuel pressure sensor option: connect fuel pressure connector (C) to fuel pressure sensor jumper harness.

   d. Connect air heater connector (D) to vehicle connection.

   e. Insert wiring harness clips (E) into harness mounting bracket.

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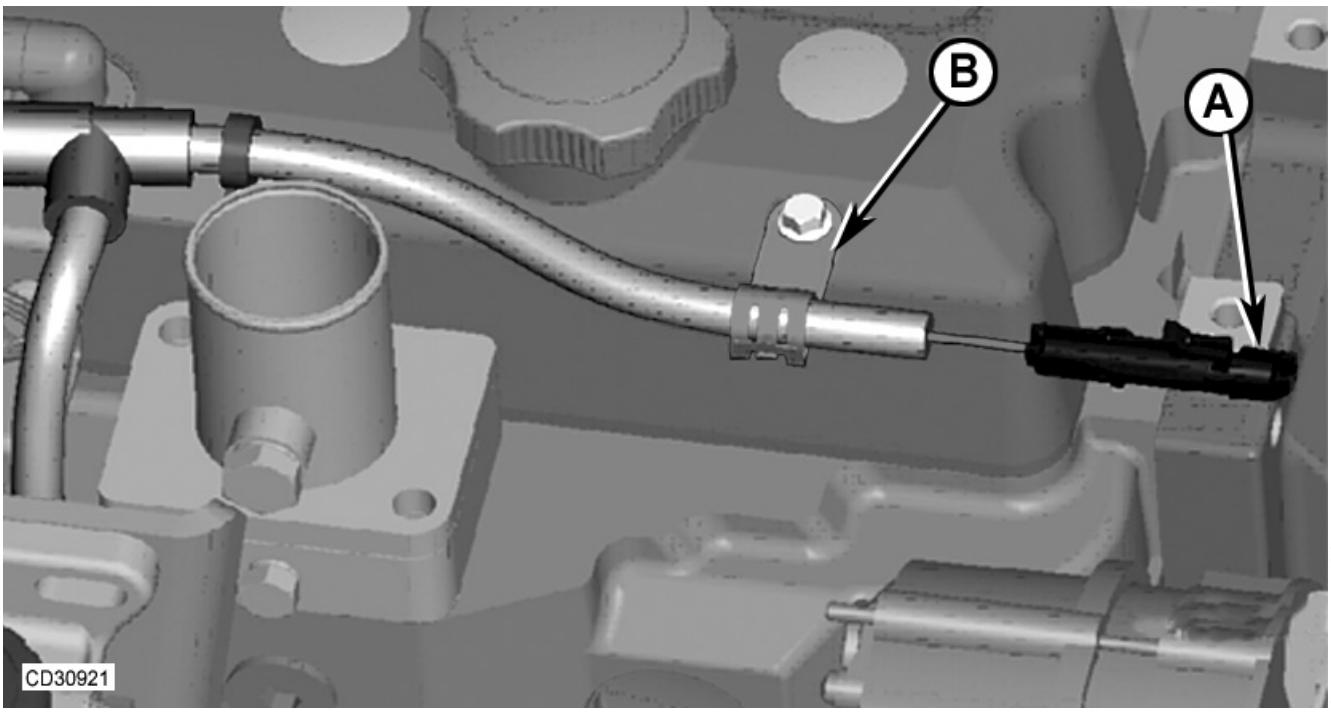


Harness Routing on Right Front Side of Engine

A—Alternator excitation connector (C06)

B—Wiring harness-to-rocker arm cover attachment

2. Route and connect engine harness at engine right, front side, as shown, and as follows:

   a. Connect alternator excitation connector (A) to alternator harness.

   b. Attach wiring harness to rocker arm cover (B).

Continued on next page

CD30922 –UN–17OCT06

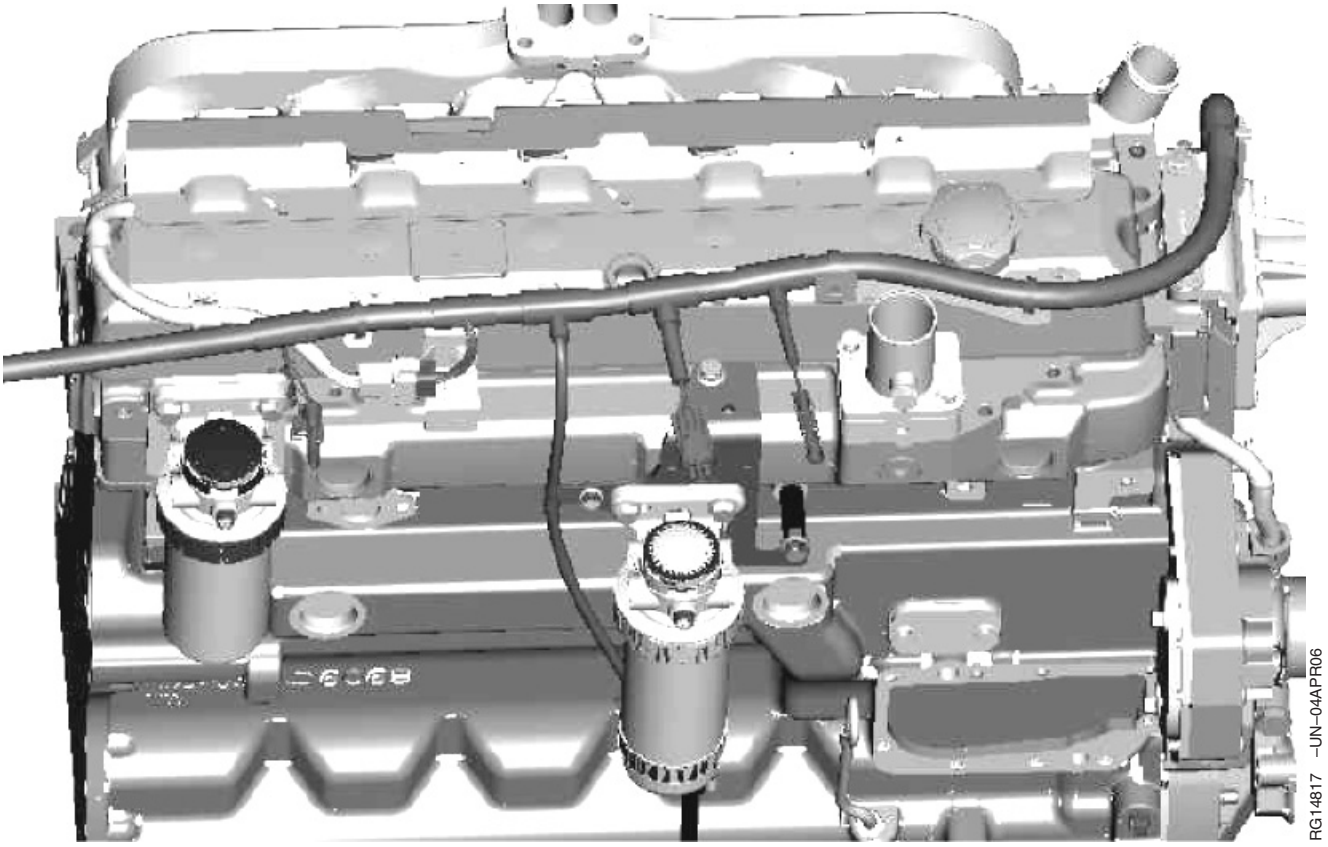
Connect Water-in-Fuel Sensor

A—Water-in-fuel sensor (D01)

3. Connect water-in-fuel sensor (A).

CD03523,0000188 –19–16OCT06–8/8

Install Wiring Harness for Remote ECU



Harness Routing on Right Side of Engine

Harness Routing on Right Side of Engine

NOTE: The procedure below is for remote harness provided by the engine factory.

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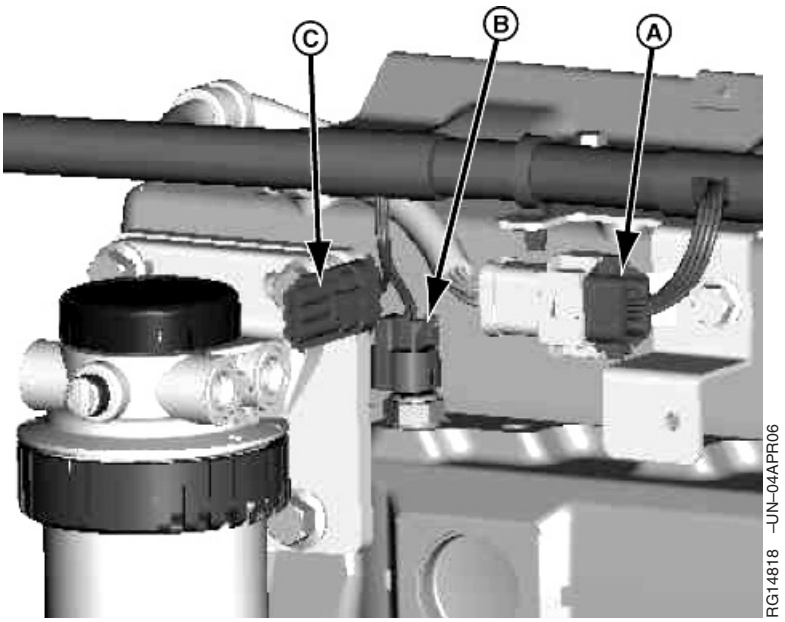

Harness Connectors on Right Rear Side of Engine

A—Fuel injector harness connector (C01)

B—Manifold air temperature sensor connector (T02)

C—Fuel pressure sensor connector (P03)

1. Connect engine harness to engine right, rear side, as shown, and as follows:

   a. Attach fuel injector harness connector (A).

   b. Attach manifold air temperature (MAT) sensor connector (B) to manifold air temperature sensor.

   c. Fuel pressure sensor option: Attach fuel pressure sensor connector (C) to fuel pressure sensor jumper harness.

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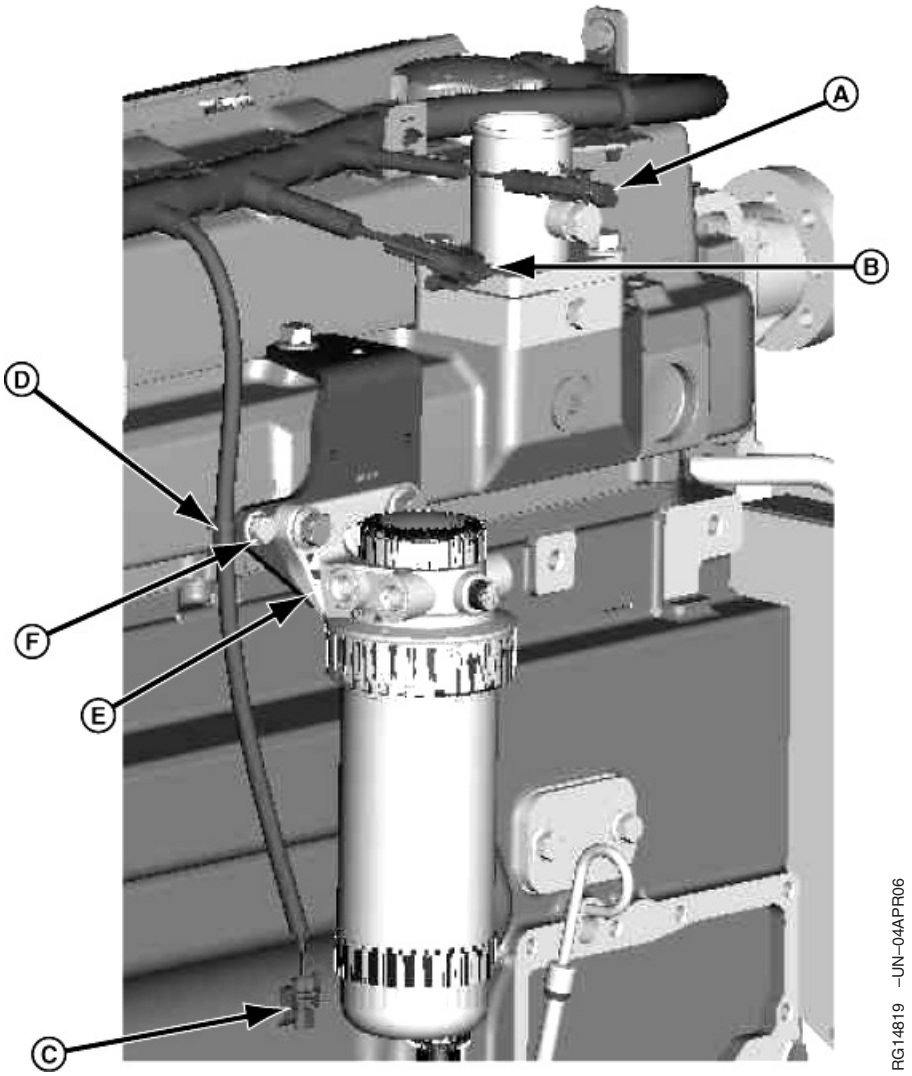

Harness Connection, Engine Right Side, Primary Filter Area

A—Alternator Excitation Connector (C06)
B—Air Heater Connector (C03)
C—Water in Fuel Sensor Connector (D01)
D—P-Clamp
E—Filter Bracket
F—M8 Cap screw

2. Connect engine harness to primary filter area, as shown, and as follows:

   a. Connect alternator excitation connector (A) to alternator excitation jumper harness.

   b. Connect air heater connector (B) to customer connection.

   c. Connect water in fuel (WIF) connector (C) to WIF lead on primary fuel filter.

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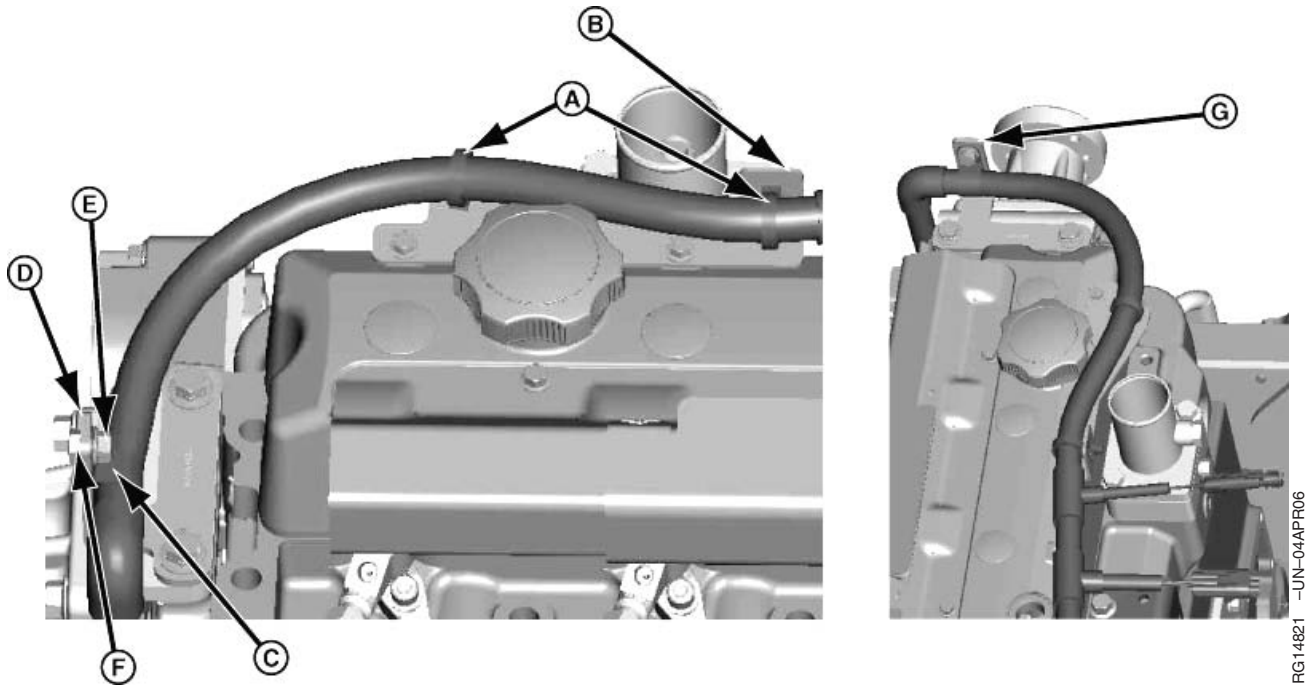

Harness Routing at Front of Engine

A—Harness Clips
B—Harness Mounting Bracket Near Air Intake
C—P-Clamp
D—Harness Mounting Bracket, Engine Front
E—M8 Cap screw
F—M8 Nut

Harness Routing at Front of Engine

1. For 6.8L engine, connect engine harness to front of engine, as shown, and as follows:

   a. Insert harness clips (A) into harness mounting bracket (B).

   b. Attach p-clamp (C) on engine harness to harness mounting bracket (D), by inserting cap screw (E) through p-clamp and harness mounting bracket into nut (F). Torque cap screw and nut according to specification.

Specification

Cap screw and nut—Torque ..... 30 N•m (22 lb-ft)

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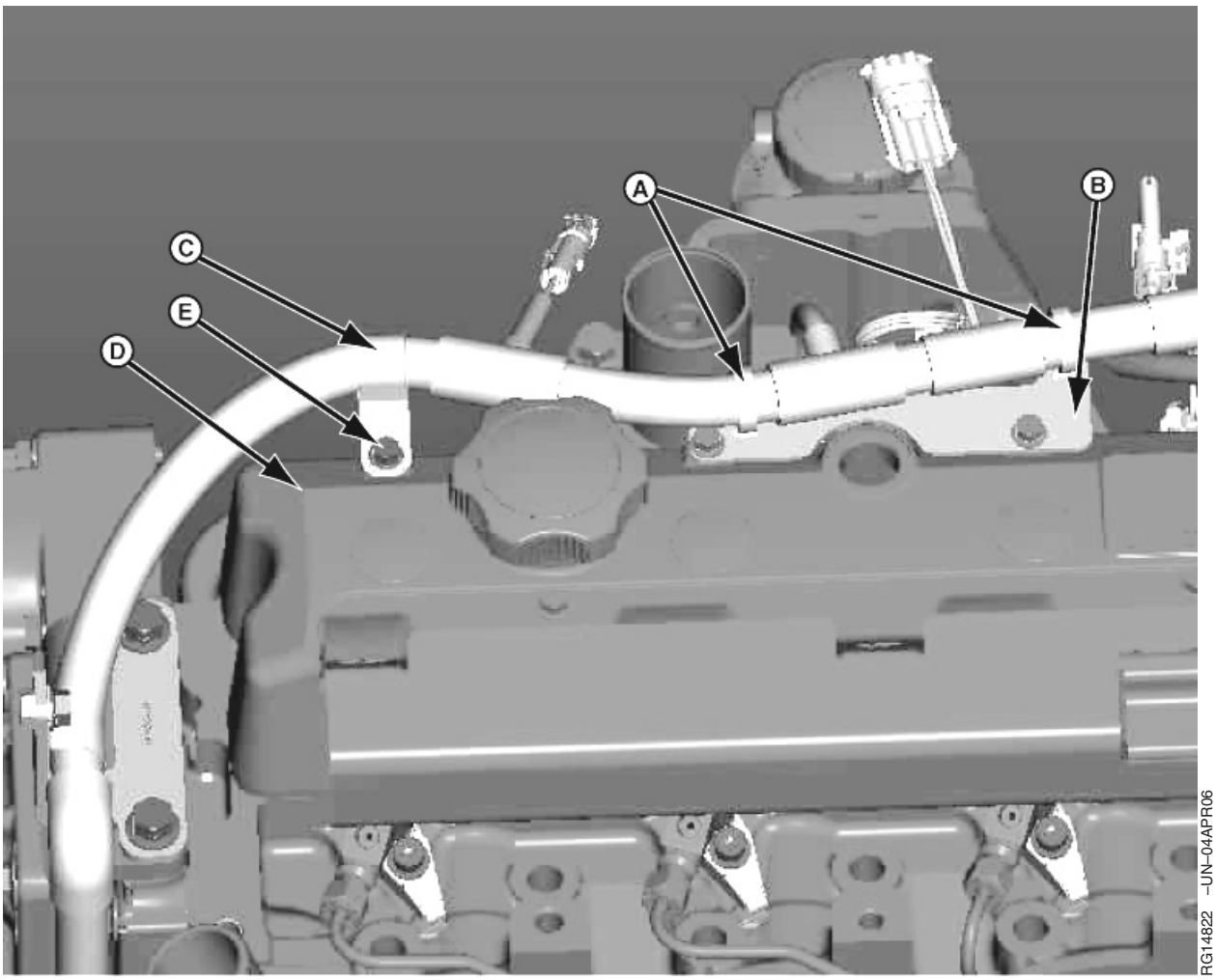

4.5L Harness Routing near Air Intake

A—Harness Clip
B—Engine Harness Mounting Bracket, Near Air Intake
C—P-clamp
D—Rocker Arm Cover
E—M6 Capscrew

2. For 4.5L engine, connect engine harness to front of engine, as shown, and as follows:

   a. Insert harness clips (A) into harness mounting bracket (B). Attach P-clamp (C) to rocker arm cover (D) by inserting capscrew (E) through P-clamp into rocker arm cover.

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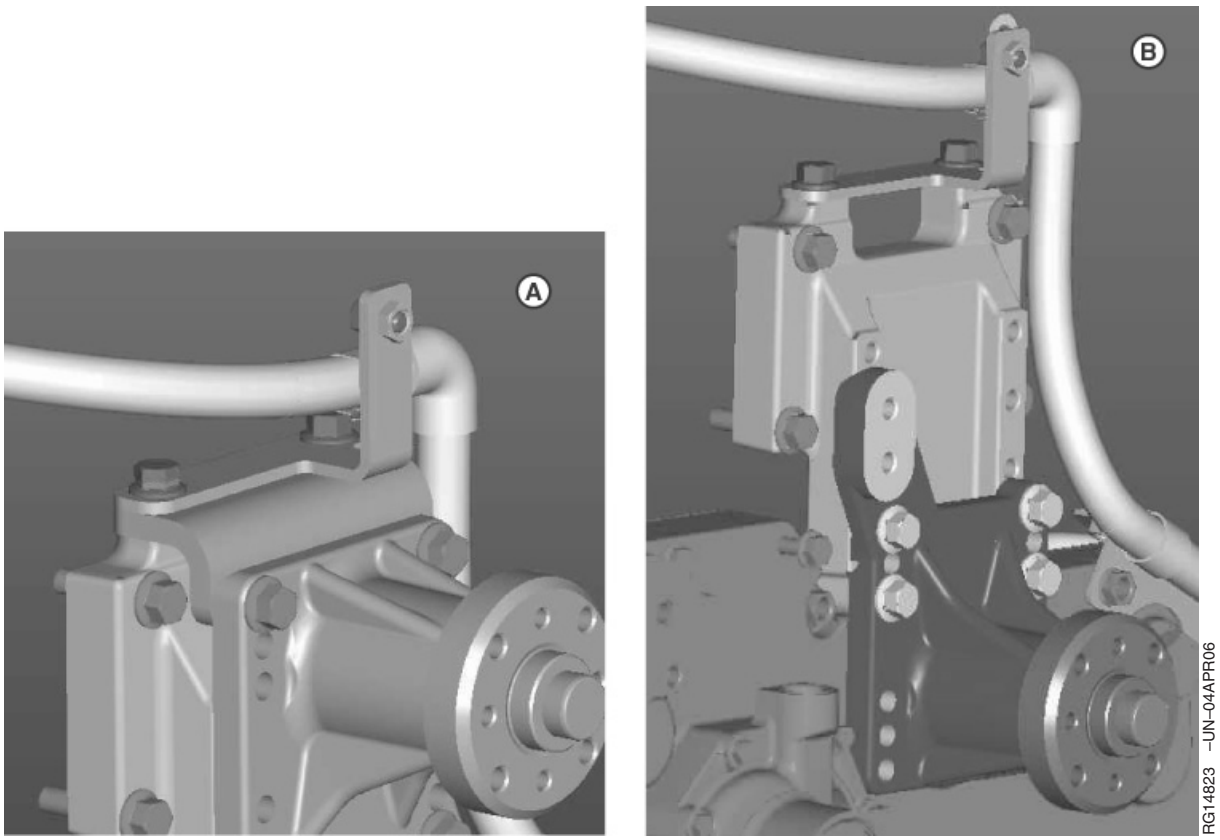

Elevation of Engine Harness

A—Harness bracket on top of fan bracket, for 402 mm fan height

B—Harness bracket on top of fan support casting, for fan heights less than 402 mm, or with aluminum fan bracket option

b. Prior to tightening cap screw and nut, position engine harness height to allow for fan height - 402 mm (A) or other (B), as shown. Torque capscrew according to specification.

Specification	
Cap screw—Torque	10 N•m (7 lb-ft)

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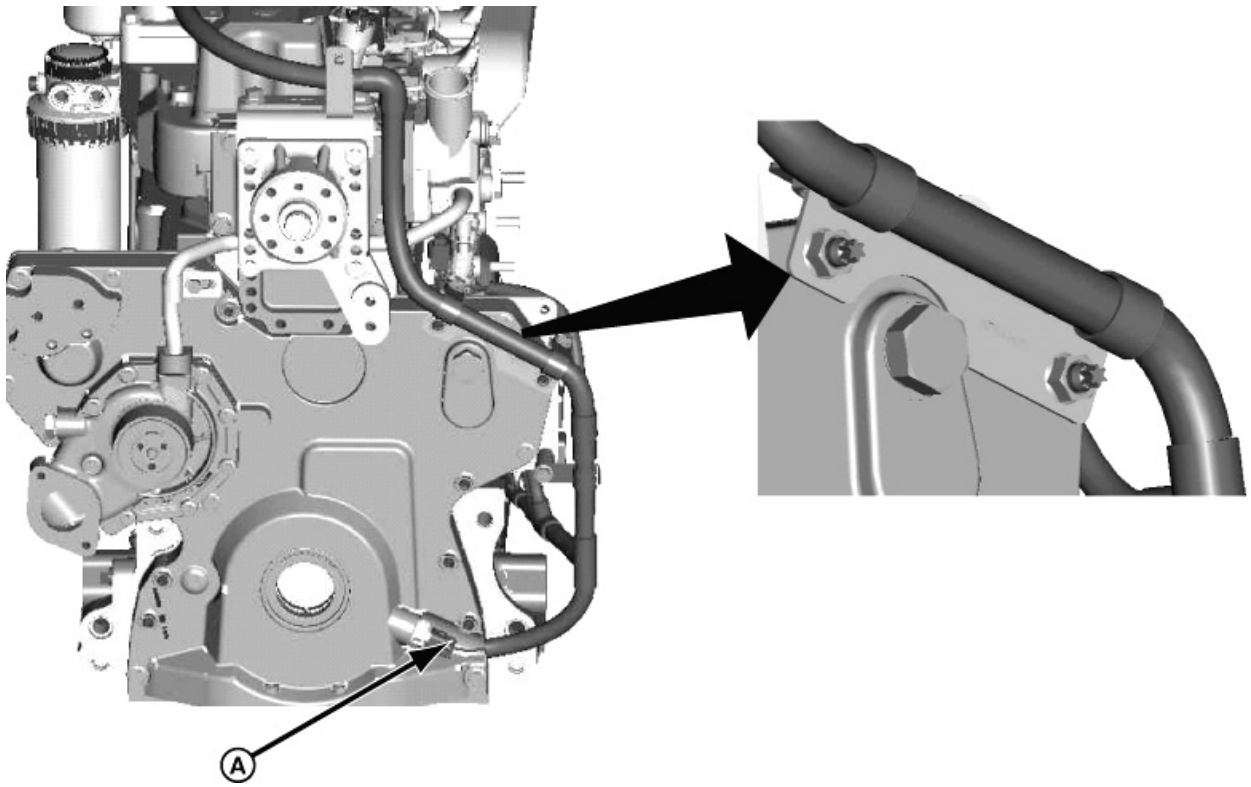

Harness Routing across Front of Engine

A—Engine Crankshaft Sensor Connector

c. Route engine harness across front of engine, as shown.

d. Attach engine crankshaft sensor connector (A) to engine crankshaft sensor.

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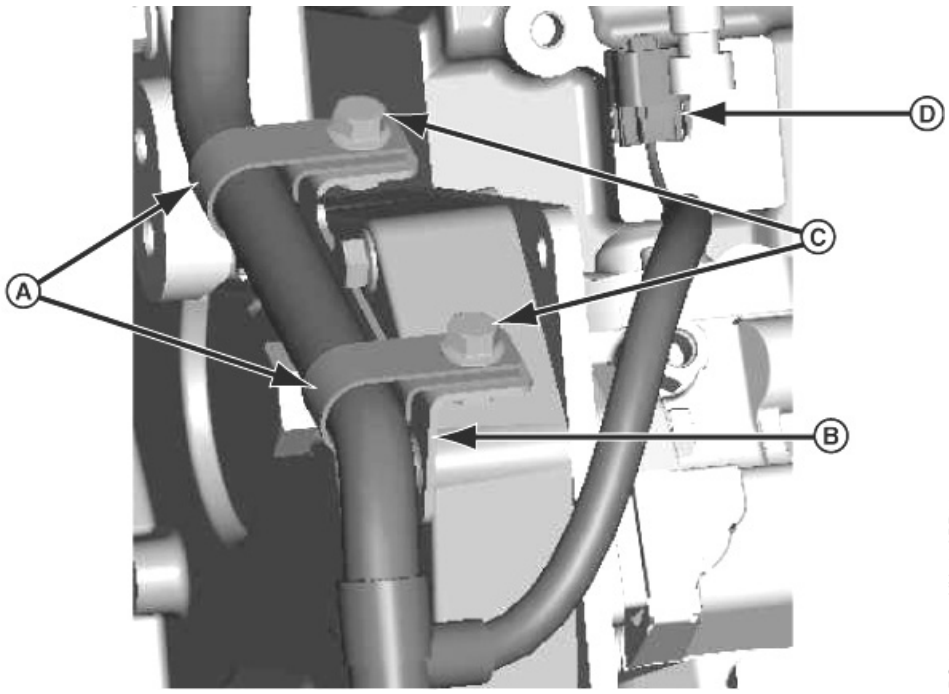

Harness Routing at Right Front of Engine

A—P-Clamps

B—Engine Harness Mounting Bracket, Front, Right Side

C—M8 Capscrew

D—Engine Coolant Temperature Sensor Connector (D)

3. Attach engine harness to right, front of engine, as shown, and as follows:

   a. Attach P-clamps (A) to engine harness.

   b. Align P-clamp holes with holes in mounting bracket (B). Push clamps and harness toward engine, as much as possible to have maximum clearance between harness and fan belt.

   c. Insert cap screws (C) through P-clamps and into mounting bracket. Torque cap screw according to specification.

Specification	
cap screw—Torque	30 N•m (22 lb-ft)

   d. Attach engine coolant temperature sensor connector (D) to engine coolant temperature sensor.

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CD03523,0000187 –19–17JAN07–8/11

e. Position spacer (A) between harness clamp (B) and front plate (C), as shown.

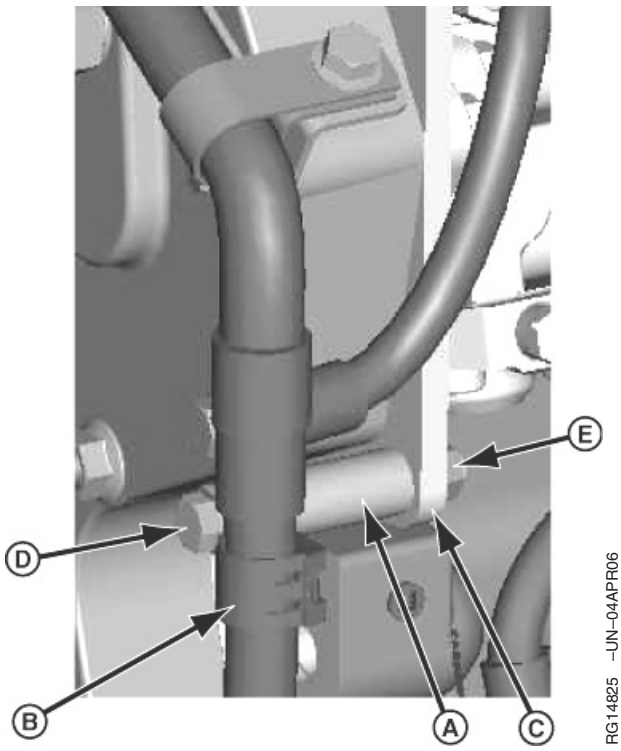
f. Insert cap screw (D) through harness clamp, spacer, and front plate. Torque nut according to specification.

02
110
26

Specification

Nut for spacer installation—
Torque ..... 40 N•m (30 lb-ft)

A—Spacer
B—Harness Clamp
C—Front Plate
D—M8 Capscrew
E—M8 Nut



Spacer Installation

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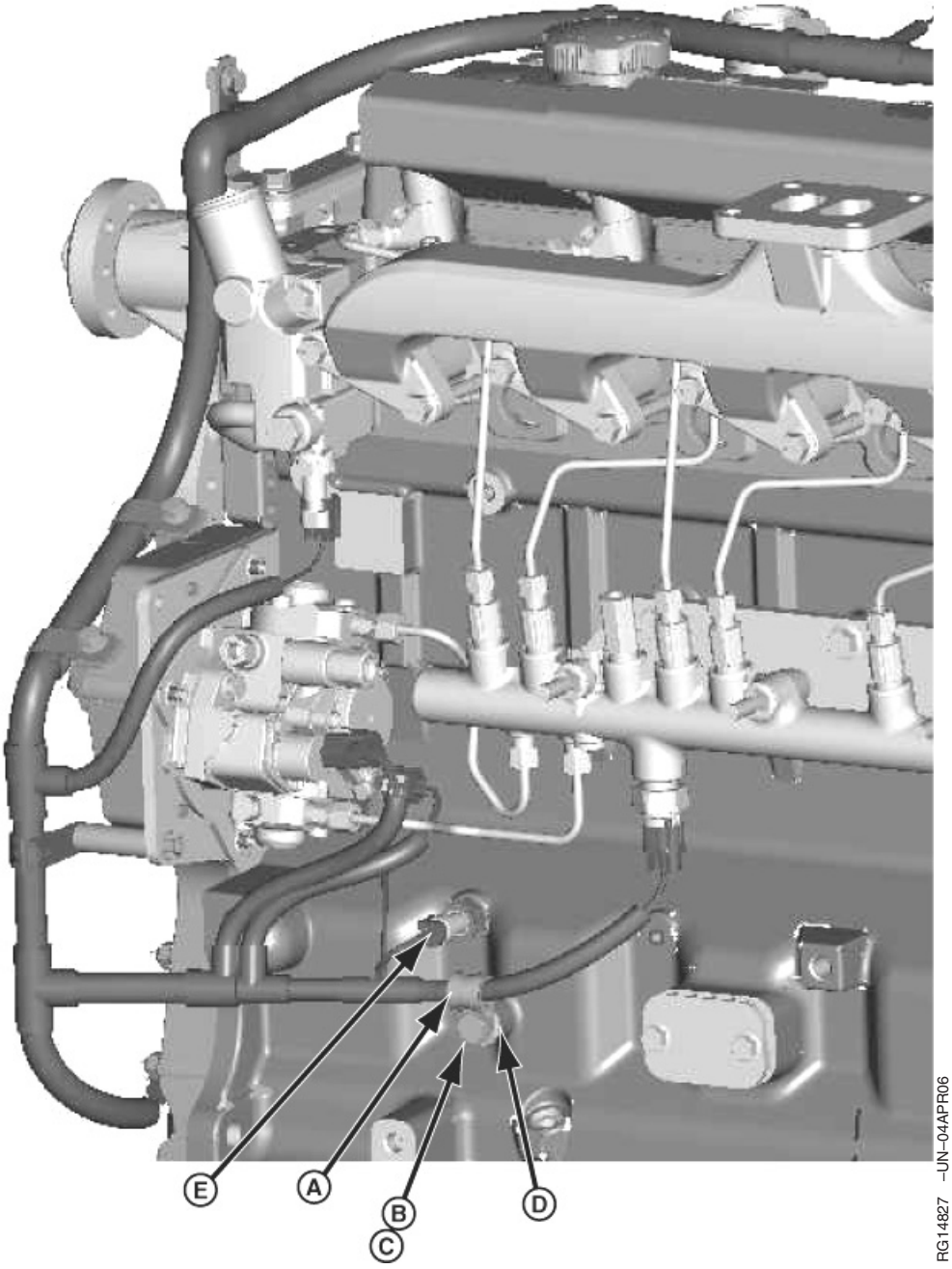

Harness Routing at Left Side of Engine

A—P-Clamp
B—Flat Washer
C—M10 cap screw
D—Mounting Hole in Block
E—Oil Pressure Sensor Connector (P04)

Harness Routing at Left Side of Engine

1. Install P-clamp (A) on Engine Harness, and insert capscrew (C) through flat washer (B) and P-clamp and into threaded mounting hole in block (D). Torque capscrew according to specification.

Specification	
Cap screw—Torque	70 N•m (52 lb-ft)

2. Attach oil pressure connector (E) to oil pressure sensor.

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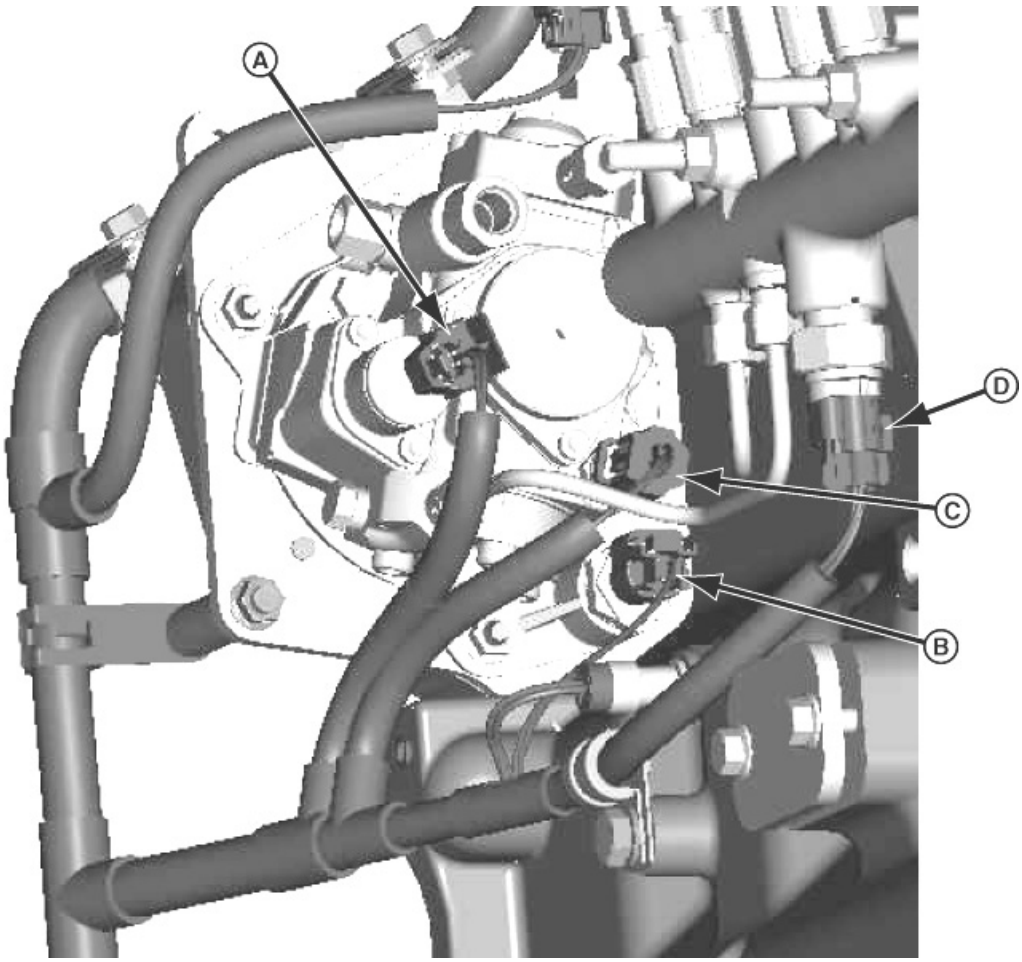


Harness Routing at High Pressure Pump and Rail Area

A—Suction Control Valve Connector (Y01) **B—Pump Position Sensor Connector (X02)** **C—Fuel Temperature Sensor Connector** **D—Rail Pressure Sensor Connector (P02)**

3. Route engine harness and attach fuel high pressure pump and rail connectors, as shown, and as follows:

   a. Attach suction control valve connector (A) to control valve.

   b. Attach pump position sensor connector (B) to pump position sensor.

   c. Attach fuel temperature sensor connector (C) to fuel temperature sensor.

   d. Attach fuel rail pressure sensor connector (D) to fuel rail pressure sensor.

CD03523,0000187 –19–17JAN07–11/11

Connectors

Connectors provide electrical conductivity between two devices. Connectors typically consist of an outer shell, terminals, and perhaps a seal and locking device. Connectors come in many shapes and sizes, the differences being the number and type of terminals, voltage and current ratings, and environmental characteristics. Connectors join together as pairs, one called the receptacle and the other called the plug.

For a connector to function properly, the terminals have to be kept clean and free of any foreign debris. Over time, moisture, dirt, and other contaminants can cause the terminals of the connector to erode and not make a good electrical connection. It is important that the seals around the connector pairs are functional when reconnecting the connector.

Certain precautions are required when working with connectors.

- Do not pull on wires to disconnect a connector.
- Observe the locking mechanism of the connector when disconnecting and reconnecting a connector.
- Do not force connectors into each other when reconnecting.
- Look for bent terminals before reconnecting connectors.
- If corrosion exists on any terminals, replace the terminal.
- Make sure the connector is free of dirt or grease.
- Make sure the connector is dry of any moisture before reconnecting.
- Do not probe through the wire insulation or through the back of the connector to make measurements.
- Always use Terminal Probe kit, JT07328 when making measurements on a connector terminal.

NOTE: For connector and sensor locations, see COMPONENT LOCATION in Section 03, Group 140 later in this manual.

NOTE: For wiring diagrams of connectors and harnesses, see ECU WIRING DIAGRAMS in Section 06, Group 210 later in this manual.

IMPORTANT: Do not use items such as paper clips or wires for inserting into connector terminals when making measurements. Damage can occur to the connector or terminal.

IMPORTANT: If a connector is not being used, apply the proper dust cap to protect it from foreign debris.

DB92450,0000048 –19–26MAY07–1/1

Connector Repair

Exposure to extreme weather conditions, excessive vibration, and changing environments make it important to apply the proper techniques in repairing a connector to keep an application running properly. Problems can arise from broken wires, corroded or dirty terminals, and bent or broken terminals. Wear and tear on terminals can cause a poor electrical connection between the terminal pairs.

Connector repair typically requires extracting the terminal from the connector shell, inserting a wire seal, crimping a new terminal onto a wire, and inserting the terminal back into the connector shell. If a connector shell needs replaced, all the terminals have to be extracted and inserted into the new shell. Different style connectors require specific tools and procedures for that connector. While there are many styles of connectors, certain practices can be applied to all connectors.

Some general guideline lines to follow are:

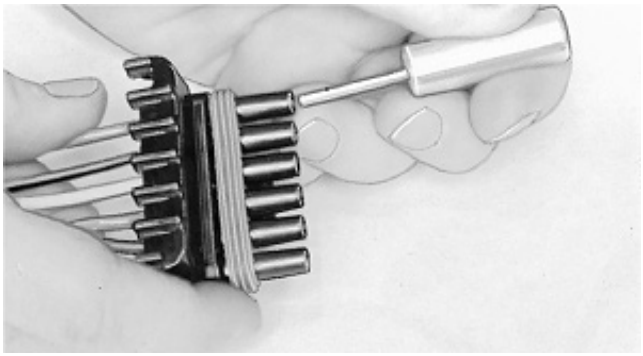
- Before removing a terminal, first label or record where the wire attaches.
- Before crimping a new terminal to a wire, make sure the wire is long enough to fit into the connector without straining it. Do not try stretching the wire longer by pulling it through the harness. It may be necessary to splice a new wire to the existing wire.
  - Use a Heat Shrinkable Insulated Splice for splicing wires together. Recommended part is JDP PM05240 for wire gauges 10-12 and PM05220 for smaller wires.
  - If a non heat shrinkable splice is used, apply heat shrink tubing over the splice to protect the wire from moisture and other contaminants.
- If applicable, apply the proper seal before crimping the wire onto the terminal.
- For a connector to function properly, the wire must be properly attached, or crimped, to the terminal.
  - Too loose of a crimp will allow the wire to pull out of the terminal and to tight of a crimp will cause the wire to break away from the terminal. A simple test is to gently pull on the wire to make sure it is securely crimped to the terminal.
  - On many terminals, the wire is crimped in two places, once around the insulation, and once around the bare metal. Visually inspect each crimp for proper alignment.
- When inserting a terminal into the connector housing, you should be able to feel it 'Lock' into place. Gently push and pull on the wire and make sure the terminal stays locked into the connector housing.
- Do not use excessive force when removing or inserting terminals into a connector housing.
- Make sure there is enough slack in the wires to account for vibration when the application is running.

NOTE: For information on inspecting connectors, see TERMINAL TEST in Section 04, Group 160 later in this manual.

NOTE: For repair procedures on specific manufacturers connectors, see the Connector Repair sections in this section of the manual.

DB92450,0000049 –19–30MAY07–1/1

Repair WEATHERPACK™ Connector


TS0128 –UN–23AUG88

1. Disconnect WEATHERPACK™ connector. Remove the tie bands and tape.
2. Open the secondary lock on the back of the connector.
3. Identify wire color/number to the connector cavity. Make sure each wire goes back to the correct cavity location.
4. Insert JDG364 Extraction Tool[1] over terminal contact in connector body. Extraction tool needs to be fully seated to unlock terminal tangs from the connector body. When tool is seated, gently pull the wire from the back of the connector. If the wire(s) or terminal(s) are being repaired, go to step 5. If the wires and terminals are OK and only the connector is being replaced, go to step 9.
5. Using JDG145 Universal Electrical Pliers[2], cut off wire directly behind the terminal seal crimp. If any part of the seal is still on the wire, dispose of it.
6. Using JDG145 Universal Electrical Pliers[2], strip 6 mm (1/4 in.) insulation from end of wire.

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[1] Included in JT07195B Electrical Repair Kit

[2]Included in JDG155 Electrical Repair Tool Kit

Continued on next page

7. Select correct size of seal. Slide the seal over the wire insulation with the smaller diameter side facing the end of the wire. Small diameter side of seal should line up with the outer edge of the insulation.

IMPORTANT: The seal must fit snug over the cable insulation without a gap between the cable seal and the insulation.

NOTE: Cable seals are color coded for three sizes of wire:

- *Green - 18—20 Gauge Wire*
- *Gray - 14—16 Gauge Wire*
- *Blue - 10—12 Gauge Wire*

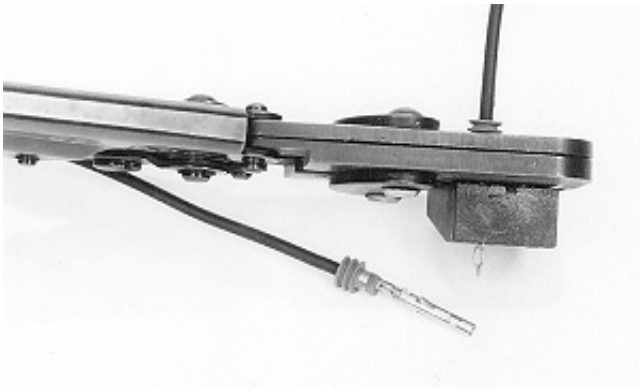
TS0136 –UN–23AUG88

DB92450,000004A –19–20FEB06–2/4

8. Select correct size terminal on wire and crimp in position with a W-type crimp using a JDG783 WEATHER PACK™ Crimping Tool.

NOTE: Terminals have numbered identification for two sizes of wire:

- *#15 - 14—16 Gauge Wire*
- *#19 - 18—20 Gauge Wire*



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DB92450,000004A –19–20FEB06–3/4

9. Insert terminal into connector. Terminal should click when it is fully seated. Make sure the wire is inserted into the correct connector cavity.

IMPORTANT: Terminal tangs must be carefully spread to ensure good seating on connector body. If terminal is being reused in a new connector, make sure tangs are spread.

NOTE: Connector bodies are "keyed" for correct terminals. Be sure terminals are correctly aligned.

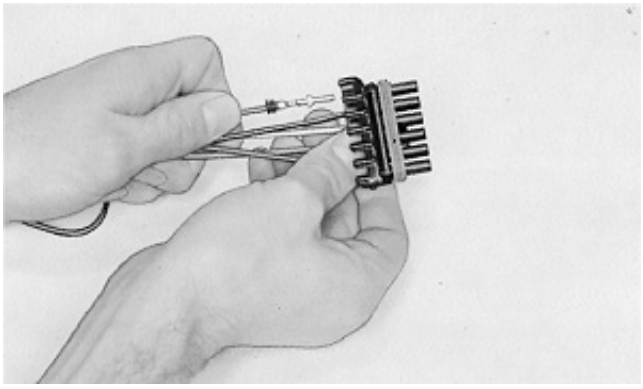
Correct terminal installation for sleeve (A) and pin (B) is illustrated.

10. Gently pull on wire to insure that the terminal is locked in position.

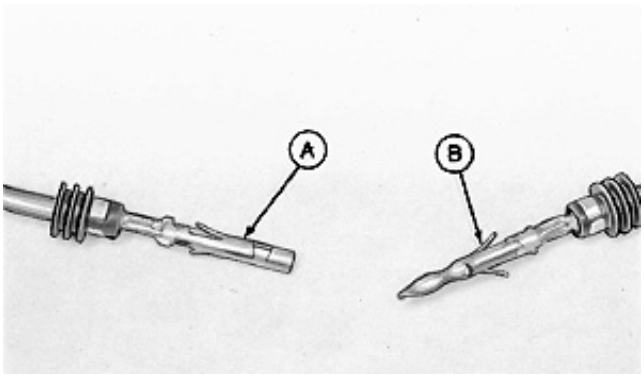
11. Repair or transfer remaining wires.

12. Close the secondary lock on the back of the connector.

13. Retape wires and add the required tie bands to the harness.



TS0130 –UN–23AUG88



TS0139 –UN–02DEC88

A—Sleeve
B—Pin

DB92450,000004A –19–20FEB06–4/4

Repair Cinch Flex Box Connector

Tools Required For Repair

- CINCH Crimper Tool JDG1727

CINCH Crimper Tool

RG41183,00000E9 –19–30MAY07–1/15

RG14579 –UN–21NOV05

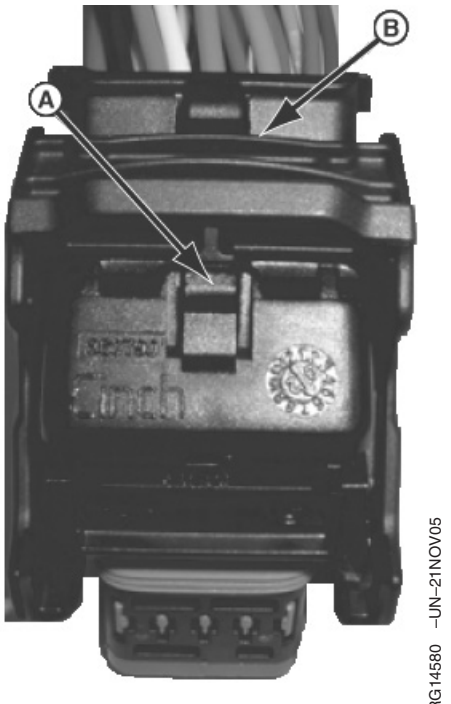
- CINCH Terminal Remover Tool JDG 1725
- Wire Stripper JDG145
- Jeweler's screwdriver (or equivalent, narrow, flat-bladed tool)

CINCH Terminal Remover Tool

RG41183,00000E9 –19–30MAY07–2/15

Repair CINCH Connector by Replacing Terminal (0.6 or 1.5 mm)

1. To unlock CINCH connector from ECU connector, press on tab (A), and push on connector lock (B) behind tab, allowing Lock rotation.



Tab and Connector Lock

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RG41183,00000E9 –19–30MAY07–3/15

2. Continue pushing on connector lock, until it has been rotated 90° clockwise (clicked into place).
3. Remove CINCH connector from ECU connector.

RG14592 –UN–01DEC05

Rotate lock 90 Degrees

RG41183,00000E9 –19–30MAY07–4/15

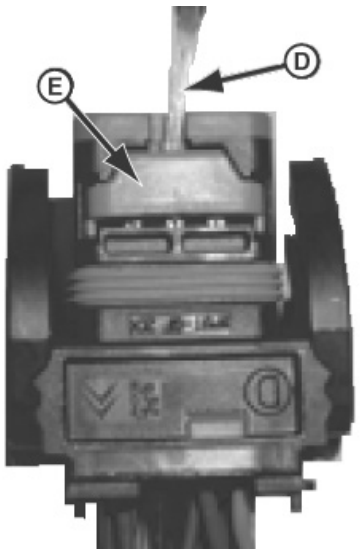
4. From wire side of connector, push on wire guard (C), and remove from connector.

RG14581 –UN–21NOV05

Slide Guard Forward

RG41183,00000E9 –19–30MAY07–5/15

5. Insert thinly bladed tool (D) in the slot at the mating end of the connector and under the green tab (E), as shown.



RG14582 –UN–21NOV05

Insert Thin-Bladed Tool Under Tab

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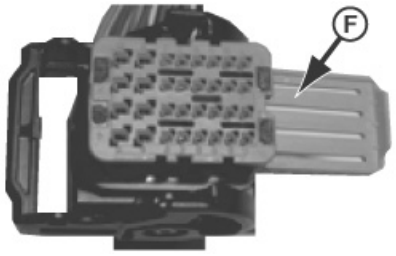
RG41183,00000E9 –19–30MAY07–6/15

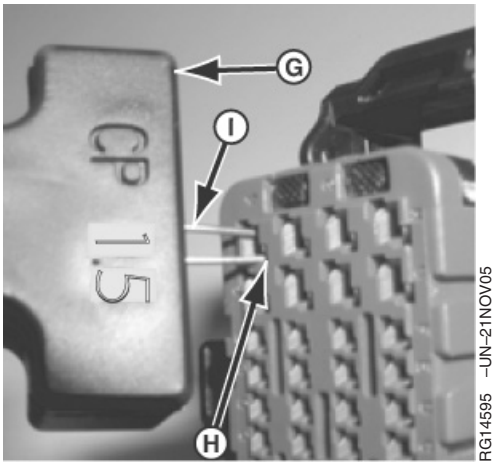
6. Gently pry tab out, and pull terminal retainer (F) out, until it can be moved no further.



Slide Terminal Retainer Out

RG41183,00000E9 –19–30MAY07–7/15

7. Insert CINCH Terminal extraction tool (G), as shown, into offset holes (H) on either side of the terminal to be extracted, tool wire sizes 1.5 mm end for larger wire size, and 0.6 mm end for smaller wire size (I). Press in until tool surface meets with connector surface.



Insert Terminal Extraction Tool

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RG41183,00000E9 –19–30MAY07–8/15

8. With one hand, grasp connector, and with the other, grasp wire of terminal to be extracted (J), firmly pull on wire, until Terminal has been removed from connector.

9. Remove terminal extraction tool from connector. If wire was pulled out during step 8, or if wire was already broken off, leaving terminal inside the connector, do the following:

   a. Insert a 0.813-0.643 mm (20-22 AWG) diameter, single-strand piece of stiff wire into mating-side (opposite wire-side) of connector.

   b. Continue to push on terminal with wire, until terminal is completely ejected from connector, or until terminal is exposed at wire side of connector.

   c. If terminal is only exposed, use long-nose pliers to pull it from the connector.

10. Cut back on insulated portion of wire, close to terminal-end of wire, but beyond any damage to either wire or insulation.

Remove Terminal and Wire

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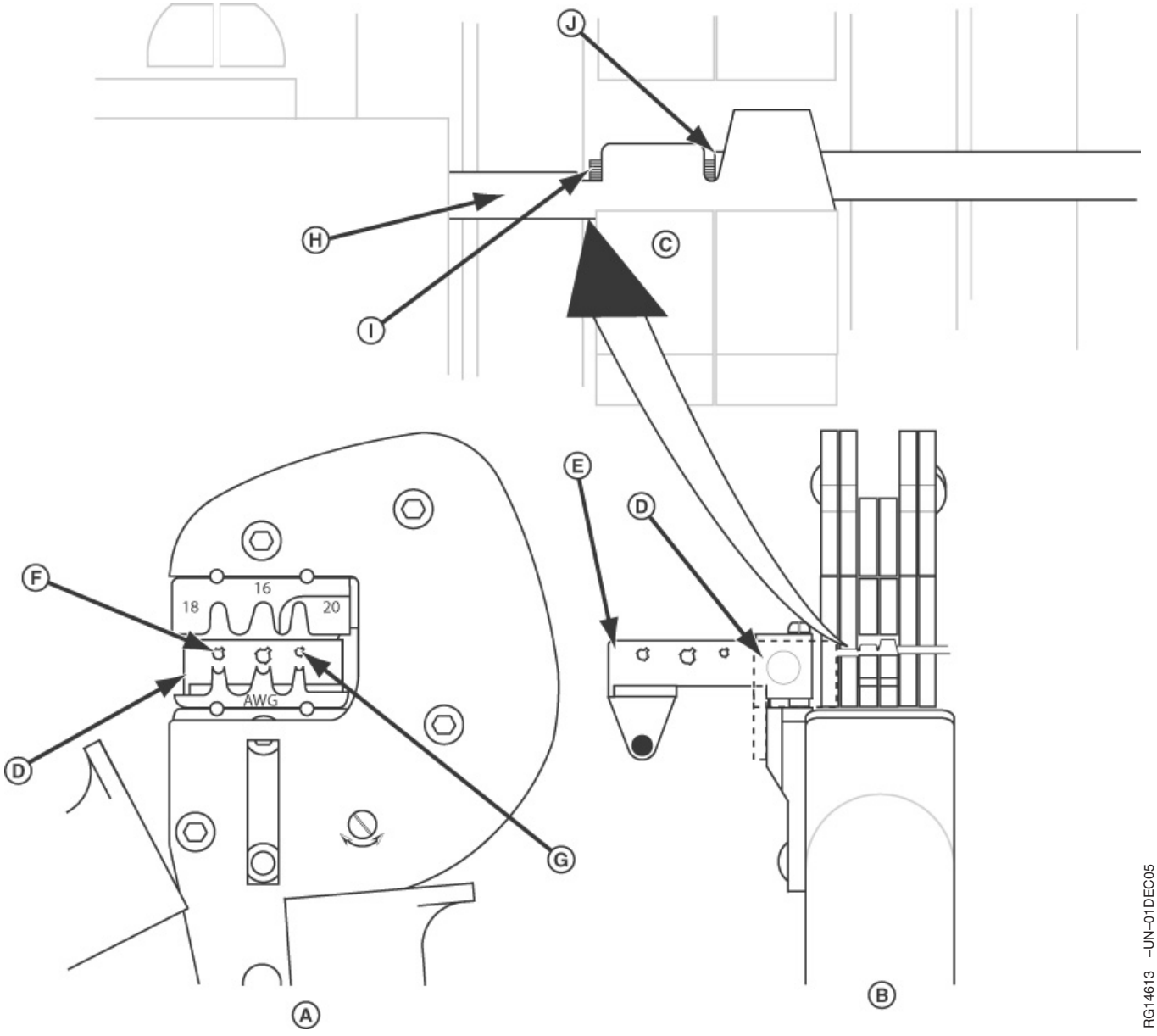
RG41183,00000E9 –19–30MAY07–9/15



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.

11.

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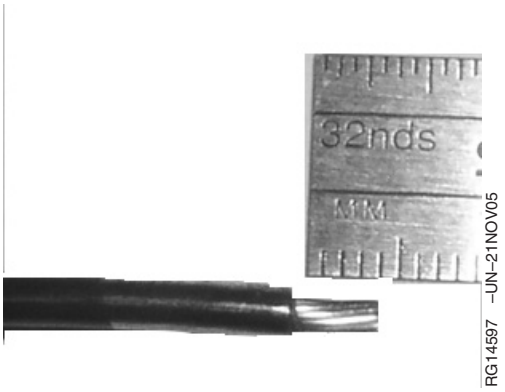
Using wire strippers, strip insulation from wire to expose approximately 4.0 mm (0.16 in.) length of wire, as shown.

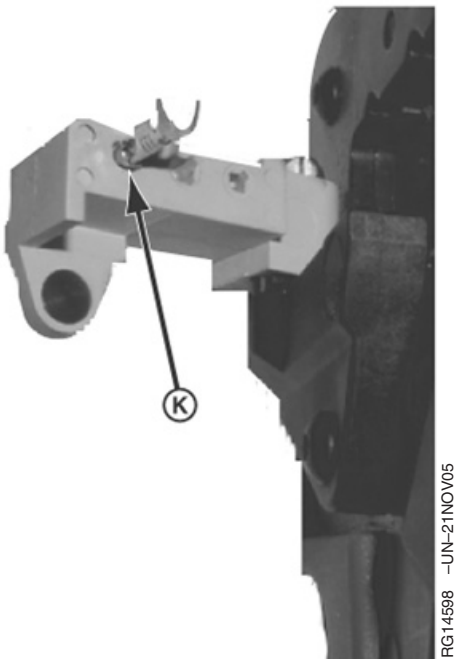


Strip 4.0 mm of Wire Insulation

RG41183,00000E9 –19–30MAY07–11/15

IMPORTANT: Use only JDG1727 Crimper. Use of another can result in an improper crimp. Attempting to insert an improperly crimped terminal can result in inability to fully seat, and to jam, the terminal inside the connector. This condition requires replacement of the entire connector.

12. Place female terminal in the matching recess (K) in crimper terminal block, as shown.



Terminal in Matching Recess of Crimper Terminal Block

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RG41183,00000E9 –19–30MAY07–12/15

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

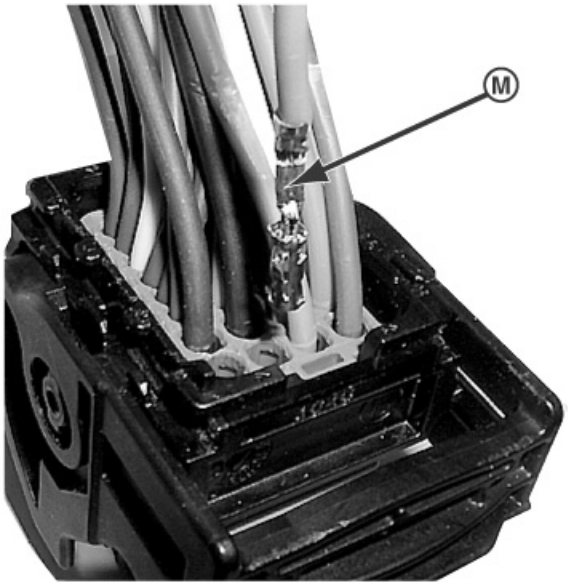
14. Squeeze crimper handles, until they automatically unlock. Remove wire and terminal from crimper.

RG14588 –UN–01DEC05

Wire Onto Terminal in Crimping Pliers

RG41183,00000E9 –19–30MAY07–13/15

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



RG14589 –UN–02DEC05

Correct Position For Terminal Insertion

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RG41183,00000E9 –19–30MAY07–14/15

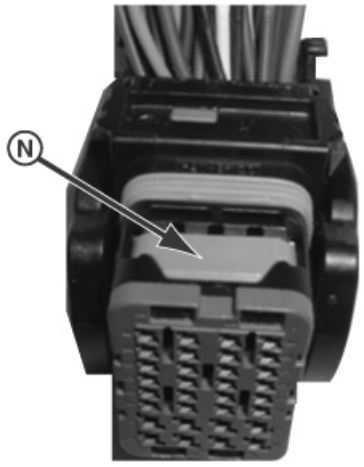
NOTE: If retainer does not slide fully into position, terminal has not been completely seated. Check seating again. Do not force retainer. Retainer slides closed only when all connector terminals are fully seated

16. Close green terminal retainer, until its tab (N) is flush with connector surface.

17. Slide wire guard back onto connector, until it clicks into place.

18. Reconnect CINCH connector to ECU connector.

19. Push on lock toward wire side of connector, and continue rotating it 90 degrees, counter-clockwise, until it clicks into place, behind tab.



RG14599 –UN–01DEC05

Push Tab Flush With Connector

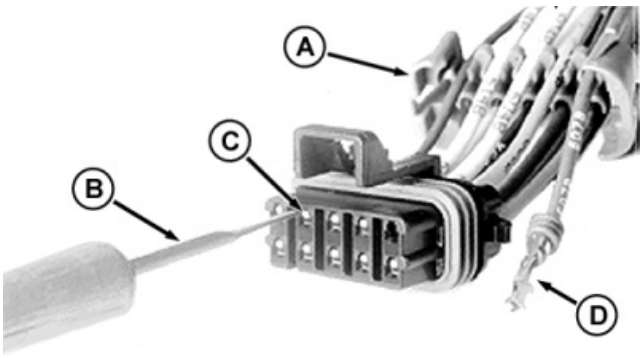
RG41183,00000E9 –19–30MAY07–15/15

METRI-PACK™ *(Push Type)*

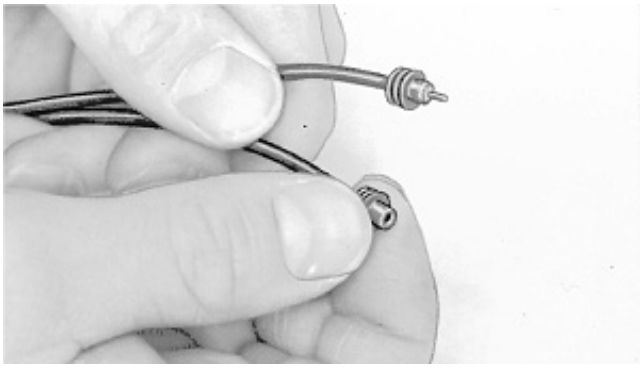
1. Disconnect the METRI-PACK connector. Remove the tie bands and tape.
2. Remove secondary lock (A).
3. Identify wire color/number to the connector cavity. Make sure each wire goes back to the correct cavity location.
4. Insert JDG776 or JDG777 Terminal Extraction Tool[1] (B) into connector cavity (C) pushing the terminal locking tab inward.

NOTE: Use JDG776 Extraction Tool with 56, 280, and 630 Series METRI-PACK terminals. Use JDG777 Extraction Tool with 150 Series METRI-PACK terminals.

5. Remove extraction tool and pull wire from the back of the connector.
6. Using JDG145 Universal Electrical Pliers[2], cut off wire directly behind the terminal.
7. Using JDG145 Universal Electrical Pliers[2] strip 6 mm (1/4 in.) insulation from end of wire.
8. Select the seal for the appropriate wire size (see note following). Slide the seal over the wire insulation with the smaller diameter side facing the end of the wire. Small diameter side of seal should line up with the outer edge of the insulation.



RW77137 –UN–08DEC98



TS0136 –UN–23AUG88

A—Connector Secondary Lock
B—Extraction Tool
C—Connector Body Socket
D—Terminal

METRI-PACK is a trademark of Delphi Packard Electric Systems

[1]Included in JT07195B Electrical Repair Kit

[2]Included in JDG155 Electrical Repair Tool Kit

Continued on next page

DB92450,000004B –19–23JAN07–1/2

IMPORTANT: The seal must fit snug over the cable insulation, without a gap between the cable seal and the insulation.

NOTE: Cable seals are color coded for three sizes of wire:

- *Green - 18—20 Gauge Wire*
- *Gray - 14—16 Gauge Wire*
- *Blue - 10—12 Gauge Wire*

Crimp contact (A) on wire with a “W” type crimp using JDG865 Crimping Tool (B).

9. Crimp cable seal (C) on contact using JDG865 Crimping Tool (B).

10. Make sure locking tang (D) on the new terminal is in the outward position.

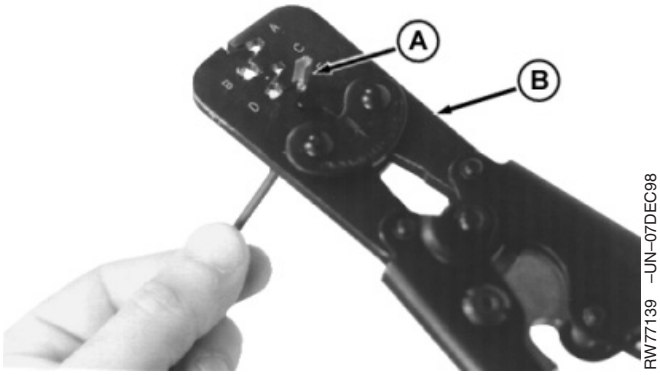
11. Push terminal into the correct connector cavity until terminal locks.

12. Gently pull on wire to verify terminal is locked into the connector.

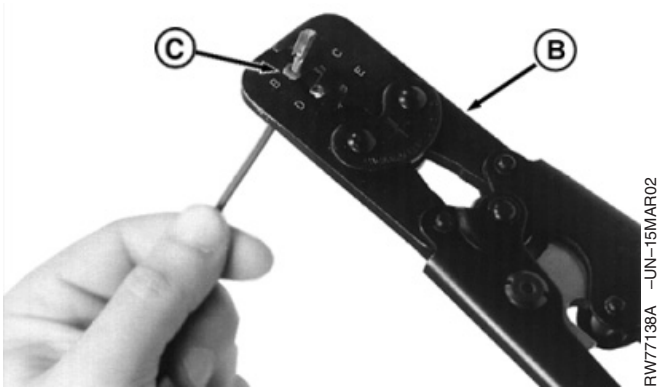
13. Place the secondary lock back on the connector.

14. Retape the wires and add the required tie bands to the harness.

A—Contact
B—Tool
C—Cable Seal
D—Terminal Locking Tang



RW77139 –UN–07DEC98



RW77138A –UN–15MAR02

RW77140A –UN–15MAR02

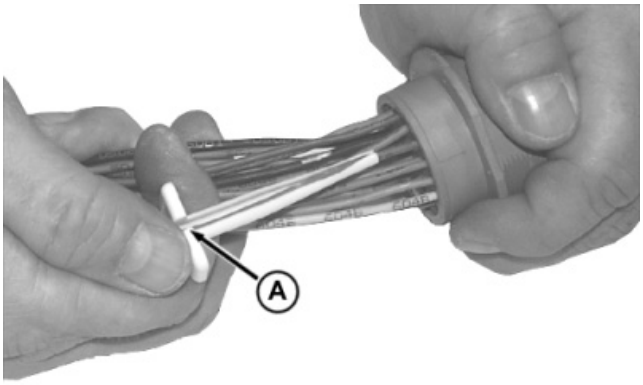
DB92450,000004B –19–23JAN07–2/2

Repair HD Series DEUTSCH Connectors

1. Disconnect the Deutsch connector. Remove the tie bands and tape.
2. Identify wire color/number to the connector cavity. Make sure each wire goes back to the correct cavity location.
3. Select correct size extractor tool for size of wire to be removed:
   - JDG361 Extractor Tool - 12—14 Gauge Wire[1]
   - JDG362 Extractor Tool - 16—18 Gauge Wire[1]
   - JDG363 Extractor Tool - 20 Gauge Wire[2]
   - JDG785 Extractor Tool - 6-8 Gauge Wire[3]
4. Insert the extractor tool (A) over the wire to be removed.
5. Slide extractor tool along wire until tool tip snaps onto wire.

IMPORTANT: DO NOT twist tool when inserting in connector.

6. Slide extractor tool connector body until tool is positioned over terminal contact.
7. Pull wire from connector body using extraction tool.
8. Using JDG145 Universal Electrical Pliers[4] cut off wire directly behind the terminal.
9. Using JDG145 Universal Electrical Pliers[4], strip 6 mm (1/4 in.) insulation from end of wire.



RW77142 –UN–07DEC98

A—Extractor Tool

[1]Included in JT07195B Electrical Repair Tool Kit and JDG359 DEUTSCH Electrical Repair Kit

[2]Included in JDG359 DEUTSCH Electrical Repair Kit

[3]Included in JT07195B Electrical Repair Tool Kit

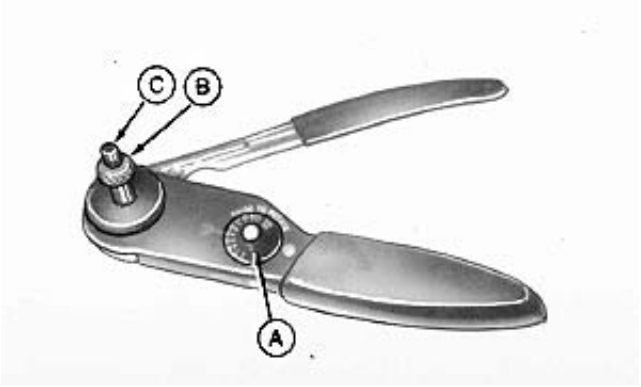
[4]Included in JDG155 Electrical Repair Tool Kit

Continued on next page

10. Adjust selector (A) on JDG360 Crimping Tool[1] for correct wire size .

11. Loosen lock nut (B) and turn adjusting screw (C) in until screw stops.

A—Selector
B—Lock Nut
C—Adjusting Screw



TS117 –UN–23AUG88

[1]*Included in JDG359 Deutsch Electrical Repair Kit*

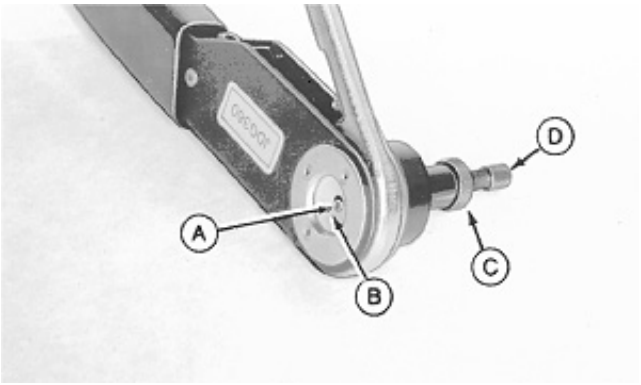
RG40854,00000CB –19–26MAY07–2/4

12. Insert terminal (A) and turn adjusting screw (D) until terminal is flush with cover (B).

IMPORTANT: Select correct size terminal to fit connector body.

13. Tighten lock nut (C).

A—Terminal
B—Cover
C—Lock Nut
D—Adjusting Screw



TS0134 –UN–23AUG88

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RG40854,00000CB –19–26MAY07–3/4

14. Insert wire in terminal and crimp until handle contacts stop.

IMPORTANT: Terminal must remain centered between indenters while crimping. Once a crimp is started, it must be completed.

15. Release handle and remove terminal.

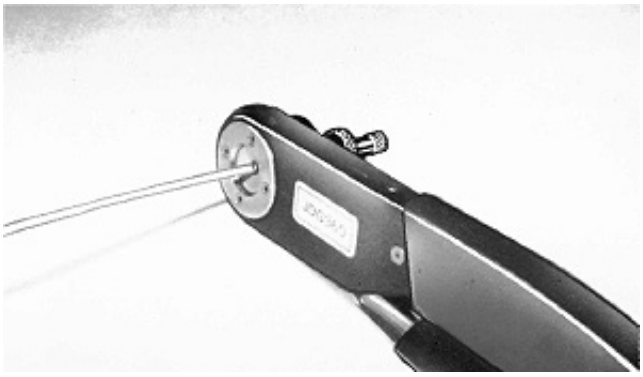
16. Inspect terminals to ensure all wires are in crimped barrel and insulation butts up to terminal .

IMPORTANT: If all wire strands are not crimped into terminal, cut off wire at terminal and repeat terminal installation procedures.

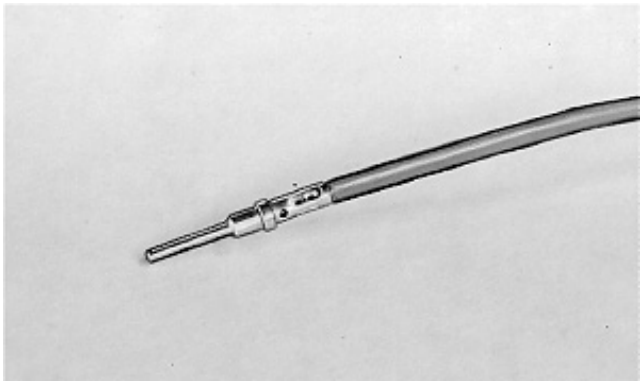
17. Push terminal straight into correct connector cavity until positive stop is felt.

18. Gently pull on wire to verify terminal is locked into the connector.

19. When all terminals have been replaced, tape wires and add the required tie bands to the harness .



TS118 –UN–23AUG88



TS0135 –UN–23AUG88

RW77141 –UN–07DEC98

RG40854,00000CB –19–26MAY07–4/4

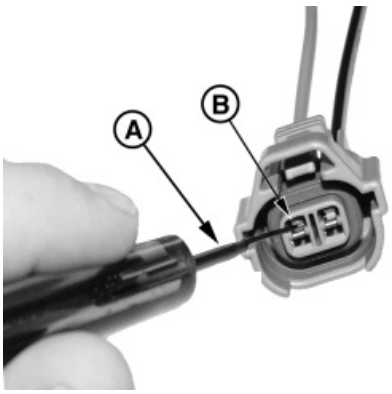
Repair SUMITOMO™ Connectors

1. Disconnect the SUMITOMO™ connector. Remove the tie bands and tape.
2. Identify wire color/number location with the connector cavity. Make sure each wire goes back to the correct cavity location.
3. Insert JDG777 Terminal Extraction Tool[1] (A) into connector body socket pushing the terminal locking tab upward (B).
4. Gently pull wire from the back of the connector. Then remove the extraction tool.
5. Remove old contact from wire using JDG145 Universal Electrical Pliers[2].
6. Using JDG145 Universal Electrical Pliers[2], strip 6 mm (1/4 in.) insulation from end of wire.
7. Select the correct seal. Slide the seal over the wire insulation with the smaller diameter side facing the end of the wire. Small diameter side of seal should line up with the outer edge of the insulation.

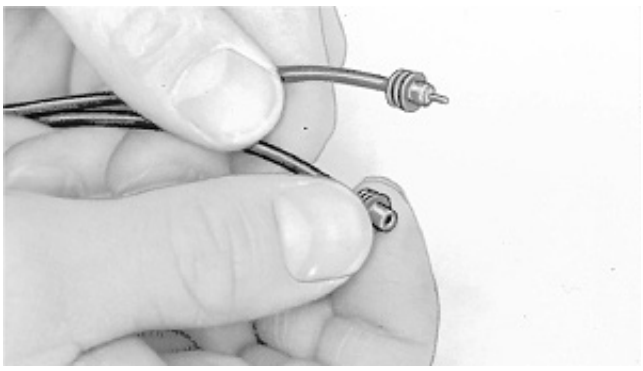
IMPORTANT: The seal must fit snug over the cable insulation, without a gap between the cable seal and the insulation.

8. Crimp contact on cable seal (D) using JDG707 Crimping Tool (C).

A—Terminal Extraction Tool
B—Connector Locking Tang
C—Terminal Crimping Tool
D—Crimped Cable Seal

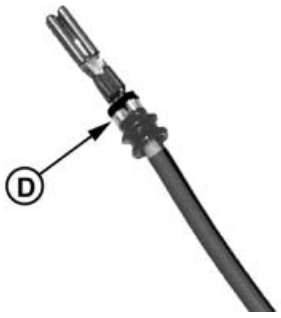


RG11676 –UN–05FEB01



TS0136 –UN–23AUG88

RG11678 –UN–05FEB01



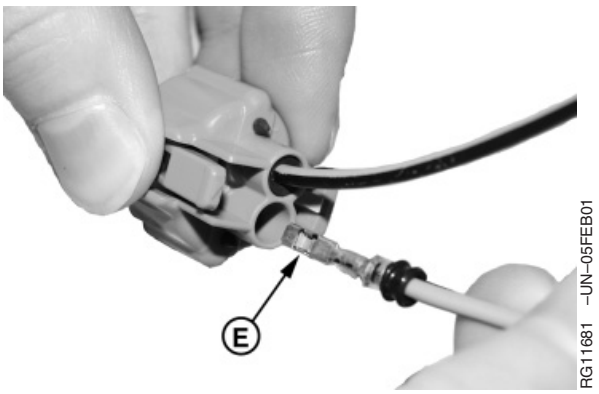
RG11680 –UN–05FEB01

[1]*Included in JT07195B Electrical Repair Tool Kit.*

[2]*Included in JDG155 Electrical Repair Tool Kit.*

Continued on next page

9. Make sure the terminal is positioned correctly (E) for the locking tang inside the connector.
10. Push terminal into correct connector cavity until terminal locks.
11. Gently pull on wire to verify terminal is locked into the connector.
12. Retape the wires and add the required tie bands to the harness.



E—Terminal Orientation

RG40854,00000C9 –19–20MAY02–2/2

Section 03
Theory Of Operation

Contents

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
- 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

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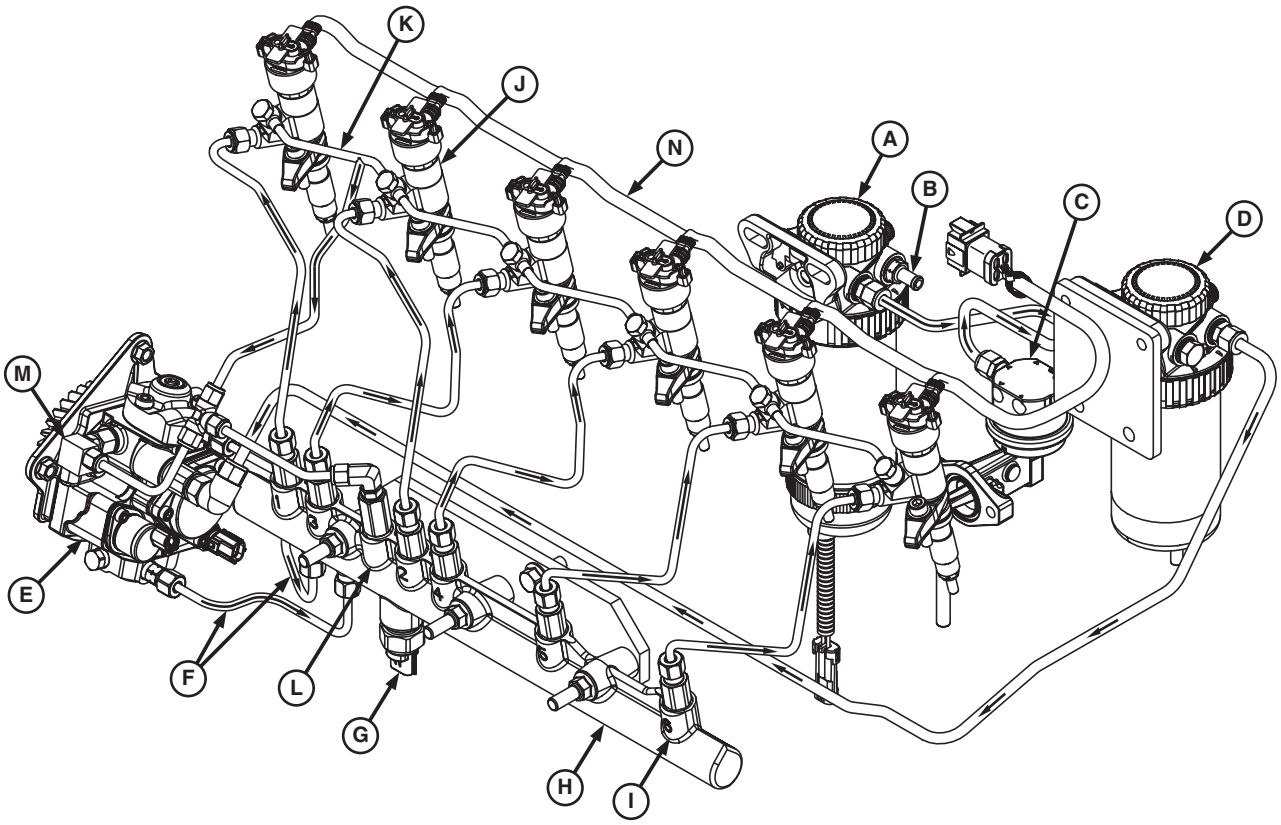
Fuel System Operation



RG15036 –UN–12SEP06

Fuel System Operation

A—Pre-Filter (Fuel)
B—Fuel Inlet
C—Fuel Transfer Pump (Mechanical)
D—Final Fuel Filter
E—High Pressure Fuel Pump
F—High Pressure Fuel Lines
G—Fuel Rail Pressure Sensor
H—High Pressure Common Rail (HPCR)
I—Flow Damper
J—Electronic Injector (EI)
K—Fuel Leak-off Line
L—Pressure Limiter
M—Overflow Orifice
N—Wiring Harness

Low Pressure Fuel

The fuel transfer pump (C) draws fuel from the fuel tank through the prefilter (A), and sends it through the final fuel filter (D) on its way to the high pressure fuel pump (E). The type and location of the prefilter and the fuel transfer pump may vary depending on application requirements.

High Pressure Fuel

This pump is timed consistent with the engine timing to ensure correct fuel delivery amount for optimum cylinder firing. The high pressure fuel pump raises fuel pressure to the required amount for injection. This high-pressure fuel is routed through the pressurized fuel lines (F) and into the High Pressure Common Rail (HPCR) (H). HPCR evenly distributes fuel to all of the Electronic Injectors (EIs) (J) through the flow dampers (I). The HPCR uses flow dampers to regulate a constant pressure to the EIs. EIs produce measured amounts of fuel into their respective cylinders to be fired.

Leak Off Fuel

If excess fuel pressure develops in the HPCR, the pressure limiter (L) opens and bleeds off fuel through the fuel leak-off line back to the tank. Excess fuel in the high pressure fuel pump exits the overflow orifice (M) and is routed back to tank through the fuel leak-off line (K).

Continued on next page

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

RE38635,0000131 –19–19SEP06–2/2

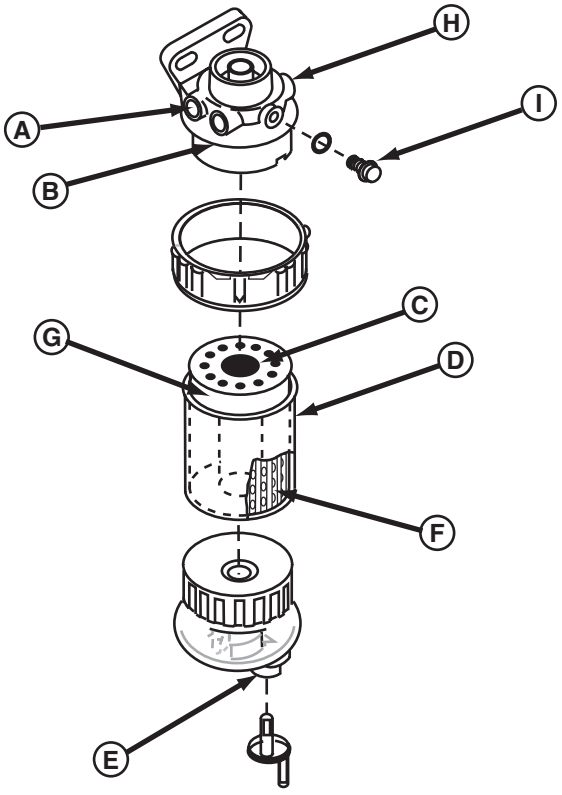
Prefilter Operation

The primary fuel filter is positioned to protect the fuel transfer pump from coarse contaminants, which could damage, clog, or get stuck in, its diaphragm.

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

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

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



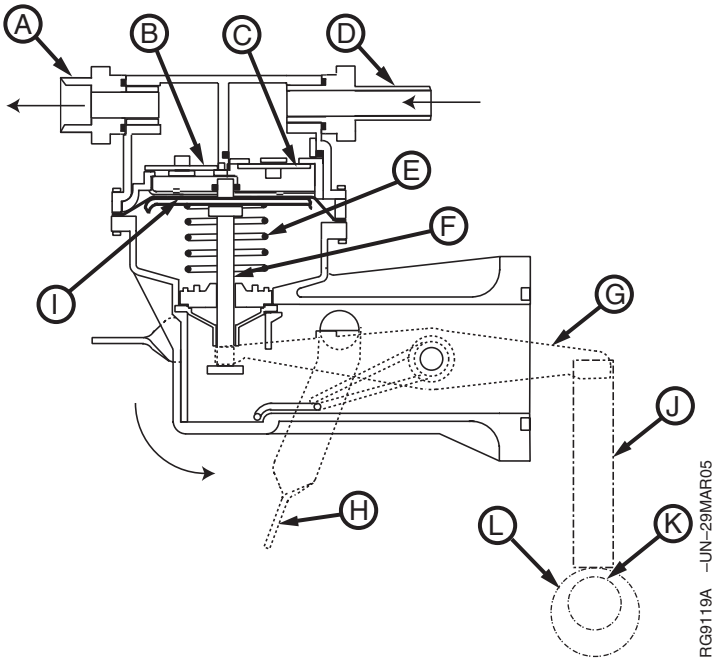
RG13767 –UN–29MAR05

Primary (Pre) Fuel Filter

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

RE38635,0000132 –19–08SEP06–1/1

Fuel Transfer Pump Operation



Fuel Transfer Pump

A—Fuel Outlet
B—Outlet Check Valve
C—Inlet Check Valve
D—Fuel Inlet
E—Return Spring
F—Rod
G—Lever Arm
H—Hand Primer Lever
I—Diaphragm
J—Push Rod
K—Eccentric Lobe
L—Engine Camshaft

The mechanical fuel transfer pump is operated by an eccentric lobe (K) on the engine camshaft (L). A push rod (J), positioned between the lobe and the pump's lever (G), is moved up and down, once every engine revolution, corresponding with the lobe's eccentricity. This action moves the lever arm on the transfer pump up and down. As the push rod side of the lever goes up, the lever's opposite side goes down. As the opposite side goes down, it pulls down the rod (F), the diaphragm (I) attached to the rod is also pulled down, and return spring (E) is compressed. Suction pressure from the diaphragm opens the inlet check valve (C), and draws fuel into the chamber above the diaphragm. As the eccentric lobe is turned past its peak height, return spring decompresses, pushing the diaphragm back into its original position. As the diaphragm is returned to its original position, the increased volume of fuel in the chamber above the diaphragm pushes shut the inlet check valve, and opens the outlet check valve, allowing fuel into the fuel outlet chamber. As this sequence is repeated, fuel pressure is developed in the fuel outlet chamber, causing fuel to exit the transfer pump and flow into the final filter.

As the camshaft lobe rotates to the low side, return spring (E) forces diaphragm upward. The resulting fuel pressure closes the inlet check valve and opens outlet check valve (B), delivering fuel through outlet (A) to the final fuel filter.

A hand primer lever (H) is provided for manually forcing fuel through the system to bleed air from the fuel filter, lines, etc.

RG40854,0000127 –19–04MAR05–1/1

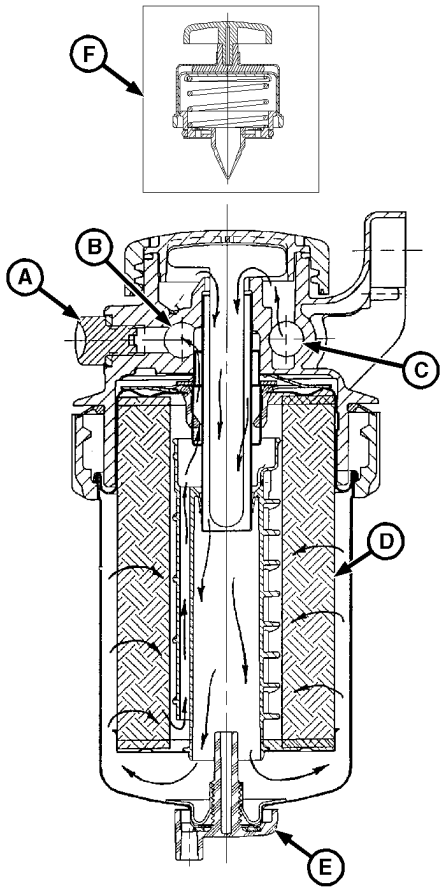
Final Fuel Filter Operation

Fuel enters the filter at inlet (C), flows through filter element (D) and exits through outlet (B) to the fuel injection pump. The 2-micron filter element is housed in a sediment bowl attached to the base with a threaded retaining ring.

Since water and contaminants settle at the bottom of the sediment bowl, a drain plug (E) is provided. On some options, a water bowl is attached to the bottom of the sediment bowl.

Air in the system can be expelled through the air vent when bleed screw (A) is loosened. Optional priming pump (F) draws fuel from the fuel tank to fill the filter bowl when the filter element is changed. The priming pump also supplies fuel from the filter to the injection pump.

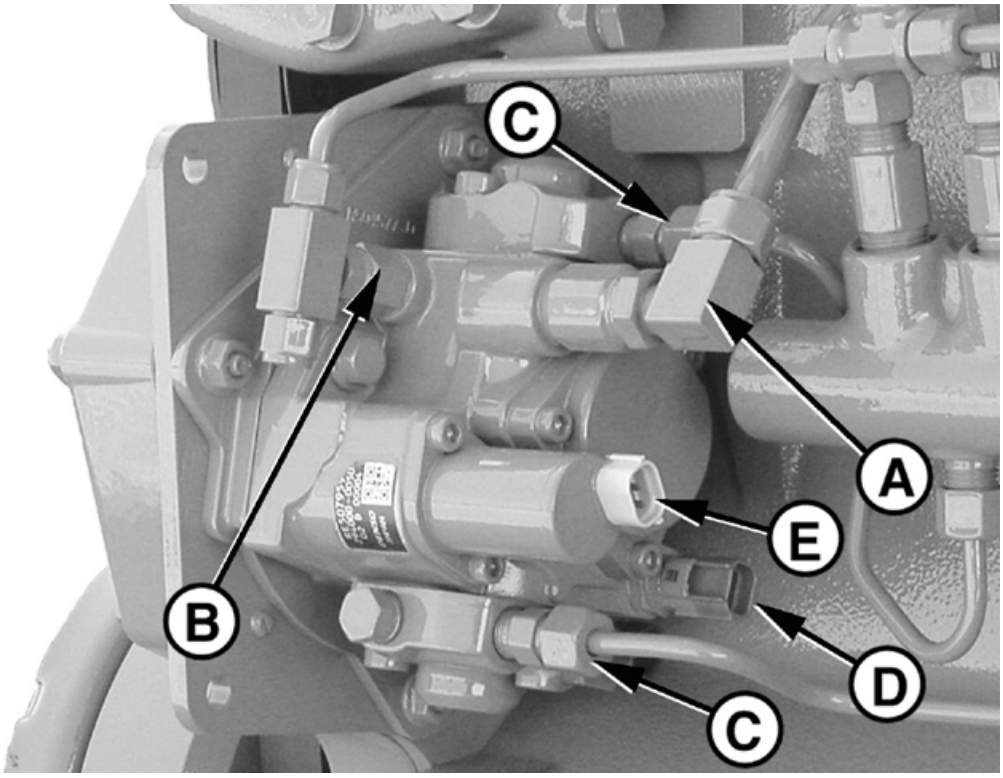
A—Bleed Screw
B—Fuel Outlet
C—Fuel Inlet
D—Filter Element
E—Drain Plug
F—Primer Pump



RG9090 –UN–27MAR98

RE38635,0000133 –19–08SEP06–1/1

High Pressure Fuel Pump Operation



A—Fuel Inlet
B—Overflow Valve
C—Fuel Outlets
D—Fuel Temperature Sensor
E—Suction Control Valve Solenoid

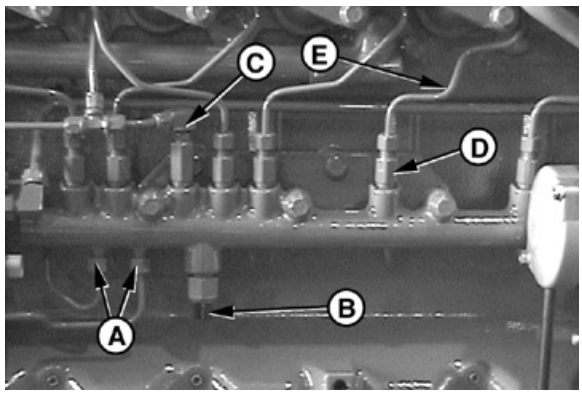
The high pressure common rail engine uses the Denso HP3 high pressure fuel pump. Filtered fuel enters the high pressure pump through the fuel inlet (A). Once fuel passes through the inlet, it goes through a fuel inlet filter and continues through an internal transfer pump. Fuel is then routed either to lubricate the pump crankcase or to the Suction Control Valve (E). The ECU supplies the suction control valve current when it is time to release fuel to the high pressure common rail. For more information on the Suction Control Valve Solenoid, see SUCTION CONTROL VALVE in Group 140 of this manual. There is one chamber on the top of the pump and another chamber on the bottom of the pump. Fuel in each chamber is pressurized when the pump camshaft rotates. Excess fuel leaves the pump through the overflow valve (B), so it can return to the fuel tank.

A fuel temperature sensor (D) is included on the pump to measure the fuel temperature in the pump housing. For more fuel temperature sensor information, see FUEL TEMPERATURE SENSOR in Section 03, Group 140 later in this manual.

RG40854,0000154 –19–14MAY07–1/1

High Pressure Common Rail (HPCR) Operation

High pressure fuel is delivered to the high pressure common rail (HPCR) through two high pressure pump delivery lines (A). The high pressure common rail delivery lines (E) transport the fuel to the Electronic Injectors (EIs). The fuel rail pressure sensor (B) detects the fuel pressure inside the rail. The Engine Control Unit (ECU) uses this sensor to monitor the fuel pressure to determine the timing of the suction control valve on the high pressure fuel pump. For more information on the fuel rail pressure sensor, see FUEL RAIL PRESSURE SENSOR in Section 03, Group 140 later in this manual. If an abnormally high pressure is generated within the HPCR, the pressure limiter (C) opens to release the excess pressure and drain fuel back to the tank. The flow dampers (D) are used to control the maximum fuel flow to the EIs and prevent damage if the EI should fail, or if a high pressure leak develops, by shutting off fuel flow to the failed EI.



A—High Pressure Pump Delivery Lines
B—Fuel Rail Pressure Sensor
C—Pressure Limiter
D—Flow Damper
E—High Pressure Common Rail Delivery Lines

RG40854,0000153 –19–14MAY07–1/1

Electronic Injector (EI) Operation

NOTE: For schematics graphics, reference Section 6 Group 210 ECU Engine Schematics later in this group.

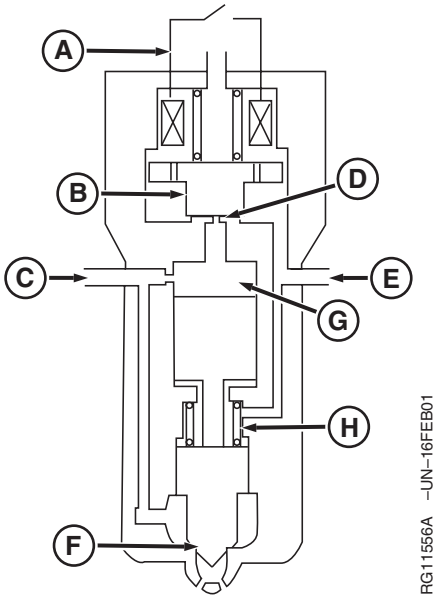
The electronic injectors (EIs) are located in the engine's cylinder head and are electronically controlled by the ECU. The amount of fuel delivered to the cylinder is controlled by the length of time current is supplied to the two-way electromagnetic valve (TWV) on each EI. The ECU sends signals in specific sequence to each EI. This controls the volume of fuel, and the timing of delivery for each EI.

RE38635,0000134 –19–08SEP06–1/4

EI - No Injection

Fuel from the HPCR enters the EI at the fuel inlet (C). When no current is supplied to the TWV (A), the valve spring (H) and the hydraulic pressure of the fuel in the control chamber (G) cause the hydraulic piston to push the needle down and close the nozzle. This holds the high pressure fuel from the common rail inside the nozzle until injection.

A—Two-Way Valve (TWV)
B—Solenoid Valve
C—Fuel Inlet
D—Orifice Seat
E—Fuel Leakoff
F—Nozzle
G—Control Chamber
H—Valve Spring



No/Ending Injection

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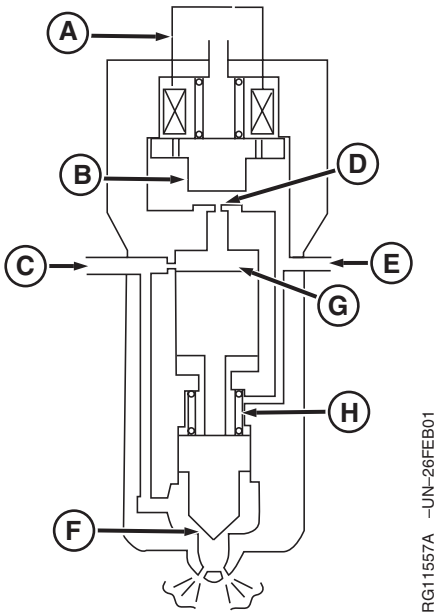
RE38635,0000134 –19–08SEP06–2/4

EI - Begin Injection

Injection begins when current is supplied from the ECU to the TWV (A). The electromagnetic force pulls the solenoid valve (B) up, causing the orifice seat (D) to open. The fuel in the control chamber (G) flows out of the injector to the fuel leak-off (E) line. Fuel is then routed back to the fuel tank. As the fuel exits the injector, the force is removed from the hydraulic piston, the nozzle needle lifts, allowing fuel through the nozzle (F) to start the injection process.

A—Two-Way Valve (TWV)
B—Solenoid Valve
C—Fuel Inlet
D—Orifice Seat
E—Fuel Leakoff
F—Nozzle
G—Control Chamber
H—Valve Spring



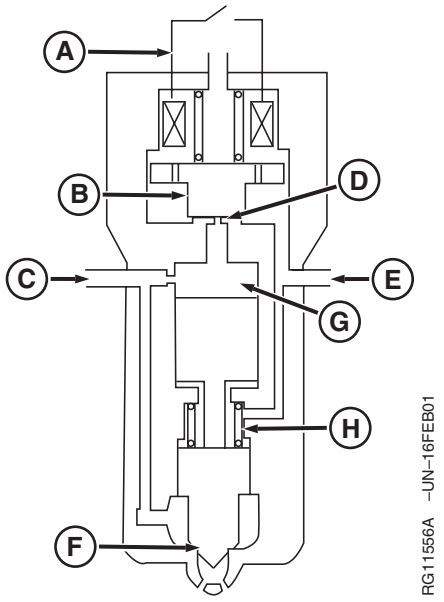
Begin Injection

RE38635,0000134 –19–08SEP06–3/4

EI - Ending Injection

Injection ends when the current is removed from the TWV (A). The solenoid valve (B) closes causing fuel to fill the control chamber (G). The valve spring and the hydraulic force from the fuel in the control chamber cause the hydraulic piston to push the needle down and close the nozzle. At this time the injection is complete.

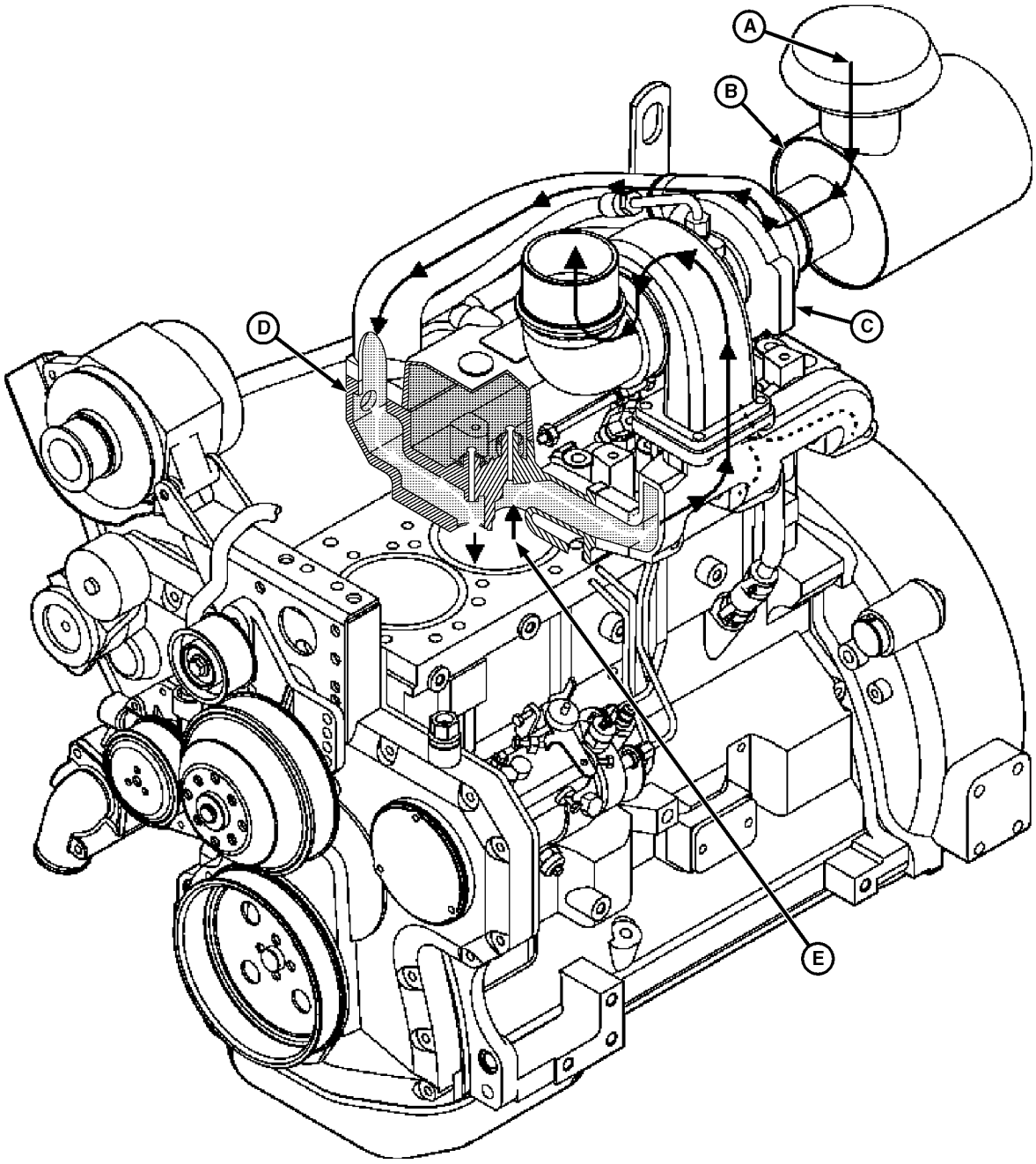
A—Two-Way Valve (TWV)
B—Solenoid Valve
C—Fuel Inlet
D—Orifice Seat
E—Fuel Leakoff
F—Nozzle
G—Control Chamber
H—Valve Spring



No/Ending Injection

RE38635,0000134 –19–08SEP06–4/4

Air Intake and Exhaust System Operation



RG12438 –UN–25NOV03

How Air Intake and Exhaust Systems Work - Two Valve Head Shown

A—Outside Intake Air
B—Air Cleaner
C—Turbocharger
D—Intake Side of Cylinder Head
E—Exhaust

Engine suction draws dust-laden outside air (A) through an air inlet stack into the air cleaner (B). Air is filtered through dry type primary and secondary (safety) filter elements in the air cleaner canister.

Clean air travels through the air intake hose to the turbocharger (C) and into the intake side of the cylinder head (D).

Continued on next page

Exhaust (E), drives the turbocharger to deliver a larger quantity of air to meet the engine requirements than what could be delivered under naturally aspirated (non-turbocharged) conditions.

On some engines, an air-to-air aftercooler cools the turbocharger compressor discharge air by routing it through a heat exchanger before it enters the engine. The heat exchanger uses no liquid coolant but relies on air flow to cool the charge air.

PowerTech E™ engines are not equipped with an exhaust gas recirculation (EGR) system or a variable geometry turbocharger (VGT) but do meet meet Tier 3/Stage IIIA emission levels. Sensors in the intake and exhaust system monitor operating conditions and provide information to the engine control unit.

RG19661,0000239 –19–22MAY07–2/2

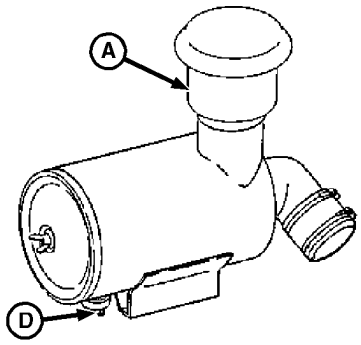
Air Cleaner Operation

Under suction generated by the engine, unfiltered air flows through air inlet tube (A) and is forced into a high-speed centrifugal motion by tilted fins in the element. By this circulating action most of the dust and dirt particles are separated from the air and collected in the dust unloading valve (D).

The remaining dirt is removed as the air flows through the primary element (C) and the secondary (safety) filter (B) before being drawn into the engine.

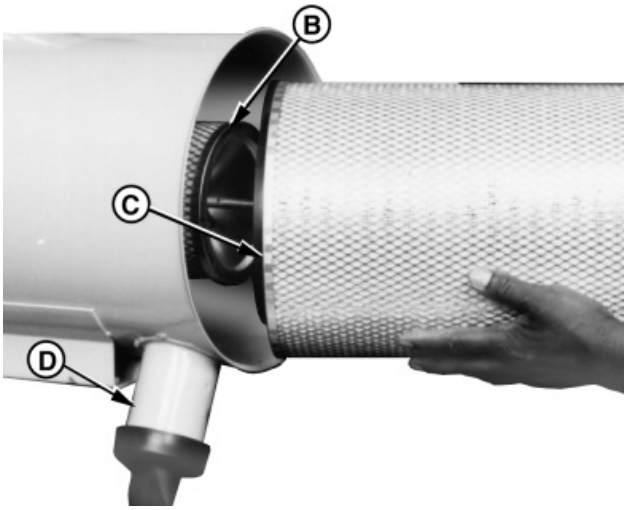
The secondary (safety) filter ensures that, should primary element fail, no unfiltered air is drawn into the engine.

A—Air Inlet Tube
B—Secondary (Safety) Filter
C—Primary Element
D—Dust Unloading Valve



RG9097 –UN–27MAR98

Air Cleaner Assembly



RG7766B –UN–10NOV97

Air Cleaner Primary and Secondary Elements

RG,110,JW7672 –19–24NOV97–1/1

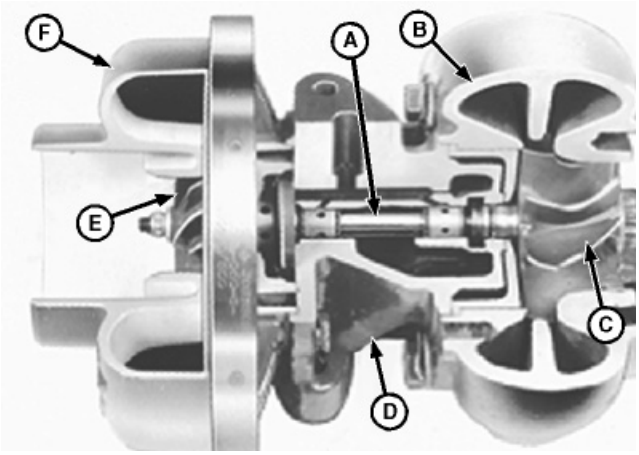
Turbocharger Operation

The turbocharger, which is basically an air pump that is driven by exhaust gases, allows the engine to produce added power without increasing displacement. Turbochargers are specially matched for the power ratio requirements of each specific application.

The turbine wheel (C) is driven by the hot engine exhaust gases. These gases flowing through the turbine housing (B) act on the turbine wheel causing shaft (A) to turn.

Compressor wheel (E) brings in filtered air and discharges the compressed air into the intake manifold where it is then delivered to engine cylinders.

Engine oil under pressure from the engine lubrication system is forced through passages in center housing (D) to bearings.



Turbocharger Components

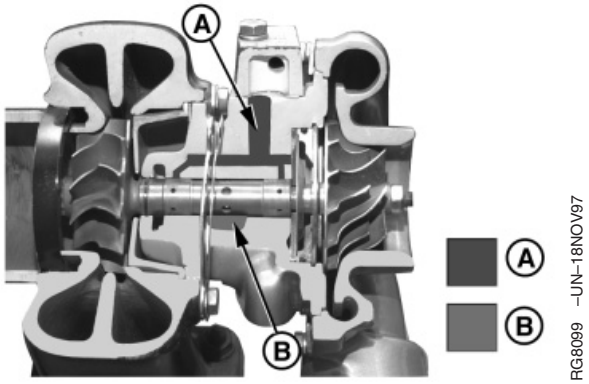
A—Shaft
B—Turbine Housing
C—Turbine Wheel
D—Center Housing
E—Compressor Wheel
F—Compressor Housing

RG,110,JW7669 –19–24NOV97–1/1

How the Turbocharger Is Lubricated

Engine oil under pressure from the engine lubrication system is pumped through a passage in the bearing housing and directed to the bearings, thrust plate, and thrust sleeve. Oil is sealed from the compressor and turbine by a piston ring at both ends of the bearing housing.

The turbocharger contains two floating bearings. These bearings have clearance between the bearing OD and the housing bore as well as clearance between the bearing ID and the shaft OD. These clearances are lubricated by the oil supply pressure oil (A) and the bearings are protected by a cushion of oil. Discharge oil (B) drains by gravity from the bearing housing to the engine crankcase.



Turbocharger Pressure and Discharge Oil

A—Pressure Oil
B—Discharge Oil

RG,110,JW7668 –19–23MAY00–1/1

About This Group

In this Group, the electronic control system is described in the following categories:

- Electronic Control System Terminology
- Electronic Control System Operation
- Component Location
- Engine Control Unit (ECU)
- Controller Area Network (CAN)
- Monitoring Engine Parameters
- Measuring Temperature
- Engine Control Unit (ECU) Temperature Sensor
- Engine Coolant Temperature (ECT) Sensor
- Fuel Temperature Sensor
- Intake Manifold Air Temperature
- Turbo Turbine Inlet Temperature
- Measuring Pressure
- Barometric Air Pressure (BAP) Sensor
- Fuel Rail Pressure Sensor
- Fuel Transfer Pump Pressure Sensor (optional)
- Manifold Air Pressure Sensor (optional)
- Oil Pressure Sensor
- Measuring Speed
- Crank Position Sensor
- Pump Position Sensor
- Throttle Descriptions
- CAN Throttle
- Pulse Width Modulated (PWM) Throttle
- Analog Throttle
- Digital Multi-State Throttle
- Dual-state Throttle
- Tri-state Throttle
- Ramp Throttle
- Throttle Adjustments
- Throttle Offsets
- Self-Calibration
- Combination Throttle
- Marine Throttle
- Engine Derate and Shutdown Protection
- Electronic Injector (EI) Wiring Harness Connector
- Intake Air Heater Operation (optional)
- Torque Curve Selection
- Governor Droop Mode Selection
- Suction Control Valve
- Water in Fuel (WIF) Sensor
- Engine Coolant Level Switch (optional)
- Cruise Control Operation
- Power Supply #1
- Power Supply #2
- Power Supply #3

DM80898,0000128 –19–18DEC06–1/1

Electronic Control System Terminology

Actuator	A device controlled by the ECU to perform a certain function.
Analog	Signal which has a continuous range of possible voltages, usually 0 volts (low) to 24 volts (high).
BAP	Barometric Air Pressure. Pressure of the atmosphere (atmospheric pressure).
Boost	Pressurized air in the intake manifold.
CAN	Controller Area Network. The network on vehicles that allows communication between controllers.
Circuit Power	This is power supplied to a device for use by its internal component circuits.
Crank Sensor	Used to determine the angular position and velocity of the crankshaft in the 360° field of rotation.
Digital	A signal which consists of only two levels of voltage — usually 0 volts (low) to 24 volts (high).
DTC	Diagnostic Trouble Code. This is a code that is stored in the ECU's memory when it detects a problem in the electronic control system. There are two types of codes: Active and Stored. These codes are displayed on monitor panels and can be recalled by the service tool.
ECT	Engine Coolant Temperature.The temperature of the engine coolant.
ECU	Engine Control Unit. Computer that controls the fuel, air, and ignition systems on the engine.
EI	An Electronic Injector that is regulated by the ECU to control the proper amount of fuel.
FMI	Failure Mode Identifier. The second part of a two-part code that identifies control system diagnostic trouble codes according to the J1939 standard. This two-digit code identifies the type of failure that has occurred. The first half of the code is the Suspect Parameter Number (SPN).
H-Bridge	Circuits in the ECU set up in an H-configuration. This allows for current to be reversed to drive DC motors forward and reverse.
HPCR	High Pressure Common Rail. A device that distributes high pressure fuel to the injectors.
Input	This identifies a signal as an input to a device or controller.
J1939	The Society of Automotive Engineers (SAE) standard for communication between the electronic controllers on heavy-duty vehicles, both on- and off-highway.
JDCP	John Deere Custom Performance Program allows the customer to select software features and feature combinations prior to loading the software into the ECU. It is also one way by which embedded software is managed and updated in controllers without removal of the controller from the machine.
JDPS	John Deere Power Systems.
MAP	Manifold Air Pressure. The pressure of the air in the intake manifold, sometimes referred to as "boost" pressure.
MAT	Manifold Air Temperature. The temperature of the air in the intake manifold.
Meter Zero	This is the value the multi-meter reads in the ohm position, when the meter lead tips are held together.
OOR	Out-of-Range. The signal received by the ECU is out of the expected range of the device.

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OORH	Out-of-Range High. Signal sensed by the ECU is higher than the component can produce (outside of acceptable limit). For some circuit types, this could be caused by an open input wire, an open ground wire, or an input wire shorted to a voltage higher than the ECU expects (+ battery).
OORL	Out-of-Range Low. Signal sensed by the ECU is lower than the component can produce (outside of acceptable limits). For some circuit types, this could be caused by an input wire or circuit power wire shorted to ground.
Output	This identifies a signal as an output from a device or controller.
PROM	Programmable, Read-Only Memory. A computer chip within the ECU that contains the calibration information for the engine control system.
Pump Position Sensor	The sensor used to identify the cylinder that is on the compression stroke.
PWM	Pulse Width Modulation. A digital electronic signal of a fixed frequency. The on-time of the signal is increased or decreased (modulated) to indicate a change in condition.
RAM	Random Access Memory. The portion of the computer memory within the ECU that is used when the ECU is running. All data in this memory is lost when the ECU is “OFF”.
Suction Control Valve	Suction Control Valve regulates the amount of fuel that the high pressure fuel pump supplies the HPCR.
SDS	Software Delivery System. Used by JDPS to maintain software and programming records.
Sensor	Device used by the ECU to monitor various engine parameters.
SPN	Suspect Parameter Number. The first half of a two-part code that identifies control system diagnostic trouble codes according to the J1939 Standard. The SPN identifies the system or component that has the failure. The second half of the code is the Failure Mode Identifier (FMI).
TDC	Top Dead Center. Point of uppermost piston travel.
Throttle Rate	How quickly the ECU changes the engine fuel rate in response to a throttle increase signal. Throttle rate has no impact on deceleration.
Trim Options	Options that can be enabled or disabled in the ECU programming, such as throttle selection, torque adjustment, governor gains, derates and shutdowns, etc.
TWV	Two-Way Valve. A component in the Electronic Injector (EI).
WIF	Water In Fuel. The WIF sensor sends a signal to the ECU when water is detected in the fuel.

DM80898,0000121 –19–30MAY07–2/2

Electronic Control System Operation

Main Components of the Engine Control Unit (ECU)

The ECU is the controller that follows a defined program to run the engine at the desired operating point while keeping within emissions regulation. This system is made up of input components (i.e. temperature and pressure sensors), and controlled components (i.e. injectors and actuators). The ECU consists of:

- Analog-to-digital converters (A/D)
- Digital-to-analog converters (D/A)
- Microprocessor (CPU)
- Memory (storage)
- Internal power supplies for external components

Analog-to-Digital and Digital-to-Analog Converters (A/D and D/A)

The A/D takes the analog input information from the external components and converts it to a digital value that the CPU can understand. The D/A converts the digital information from the CPU to analog information that is used by the external components.

Microprocessor (CPU)

The CPU is considered the “brains” of the ECU. It reads instructions from storage (memory) and interprets them. It receives information from external components, like sensors, through the A/D. It sends outputs to control external components, like actuators. It also performs mathematical computations and logical functions.

Memory

Memory is a component capable of retaining digital information. This information can be operation code, data files, or fragments of data.

Temporary memory (RAM) is used to hold data for short periods of time. This information is lost when the key is turned to OFF position.

Permanent memory (Flash) stores information for long periods of time. This is where the program and calibration information is stored. The information in this type of memory is not lost when power is completely removed or if the controller is removed from the engine harness.

Internal Power Supplies for External Components

The ECU has several internal power supplies commonly referred to as sensor supplies, that deliver reference voltages to the engine sensors, throttles, and switches. There are OOR high and OOR low voltage diagnostic trouble codes associated with each power supply. Multiple power supplies are used, because there are so many external components. This also keeps critical components from being affected by shorts in other components.

Functions of the ECU

Basic Functions of the Engine Control System

The electronic control system serves as an engine governor by controlling the Electronic Injectors (EIs) so that the fuel is delivered according to a given set of engine conditions, precise amounts, and at precise time in relation to piston position. In order to achieve this, the control system performs the following functions:

- Constantly monitor engine operating conditions.
- Precisely determines piston position
- Deliver optimum amount of fuel for a given set of operating conditions
- Deliver fuel at optimum piston position
- Provide multiple control modes
- Perform system diagnosis

Continued on next page

System Problem Diagnosis

The ECU can detect problems with external components and their associated wiring. There is a Harness Diagnostic Test that can be ran from Service ADVISOR to help diagnose some of the problems (see HARNESS DIAGNOSTIC MODE TEST later this section).

Sensor Monitoring

The ECU monitors its internal temperature to ensure the engine does not overheat and damage components. It monitors the power supplies to ensure they are operating at the proper voltage. Monitors proper running of stored programs. When the key is turned off, it even monitors its shut-down process to ensure it happens properly. If a problem exists, the ECU will generate a Diagnostic Trouble Code (DTC).

The ECU is continuously receiving real-time inputs from temperature, pressure, speed, and position sensors. The ECU compares these values with expected values for the operating conditions. If the ECU detects a problem, it will generate a DTC.

Diagnostic Trouble Codes (DTC)

These are codes that the ECU sends out over the CAN bus to tell the operator or service equipment it sees a problem (See DIAGNOSTIC TROUBLE CODES later in this group). Some of these codes contain a snapshot of certain parameters at the time the codes sets which will be stored in the ECU. There may also be a recording of more data that is stored depending on the DTC (See SNAPSHOT CAPTURE AND RECORDING later this section).

Engine Starting Mode

When the key is turned to the “ON” position, a switched power voltage is sent to the Engine Control Unit (ECU). This energizes the ECU and allows it to “boot-up” and ready itself for engine start.

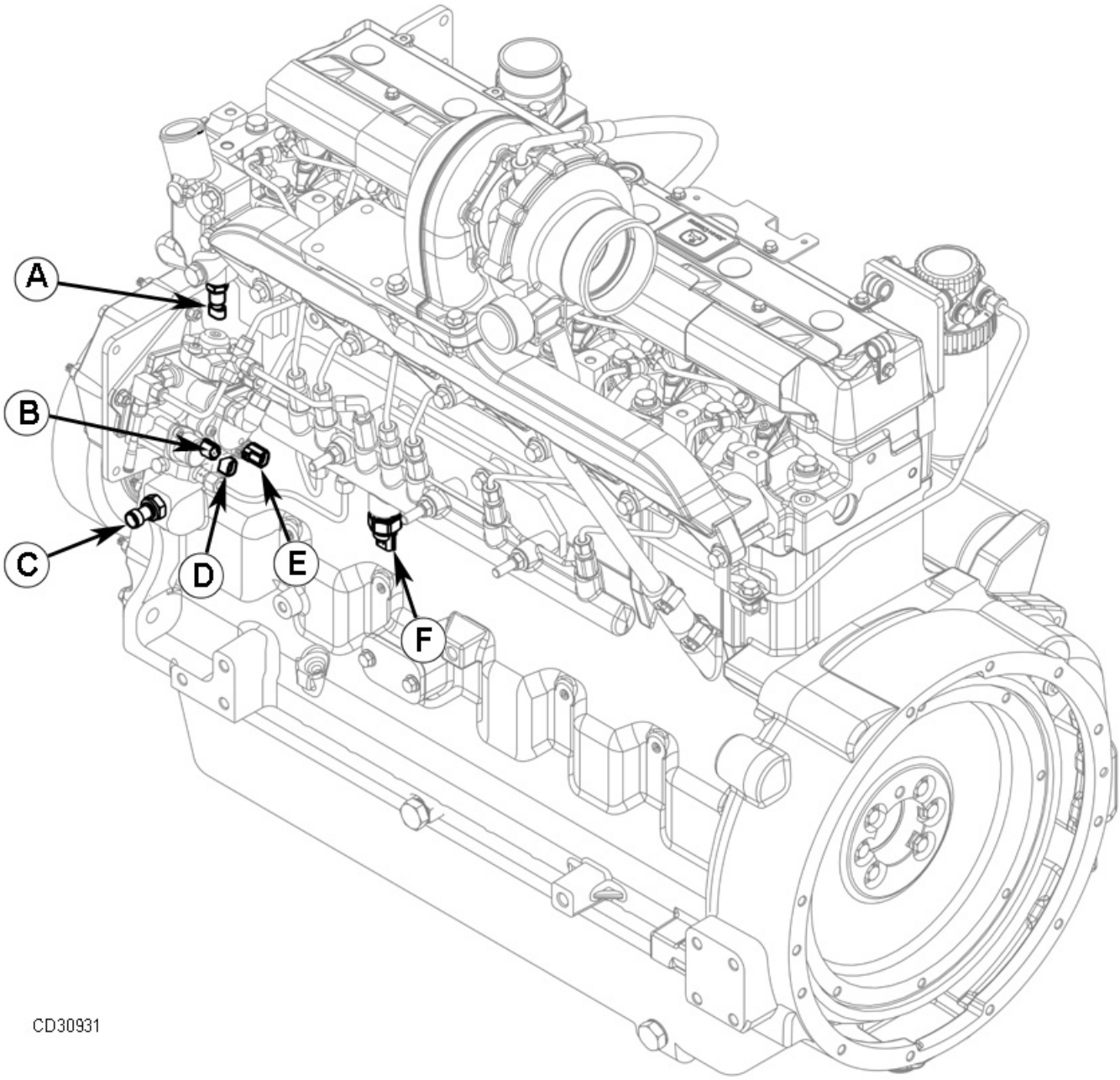
NOTE: If a wiring problem prevents the key ON signal from getting to the ECU, the engine will not start.

As soon as the ECU determines using the Crank Position Sensor input that the engine is cranking, it will determine using the Pump Position Sensor input when cylinder number 1 is coming to top-dead-center at the end of the compression stroke. It will then start injecting fuel when the next cylinder in the firing order (cylinder number 5) is at the correct position. At this point, the engine will start and the ECU will go into the running mode. To provide cold temperature enrichment, the amount of fuel injected is based on the temperature measured by the Engine Coolant Temperature (ECT) sensor.

Engine Running Mode

In the running mode, both the crank and pump position sensors allow the ECU to precisely determine piston position in relation to top-dead-center. The ECU uses this information to actuate each individual EI of the injection timing and rate. The ECU controls fuel delivery by energizing and de-energizing the two-way valve (TWV), which is located in the EI.

Component Location



CD30931 –UN–14FEB07

Electronic Controls, Injection Pump Side

A—Engine Coolant Temperature Sensor
B—Suction Control Valve
C—Oil Pressure Sensor
D—Pump Position Sensor
E—Fuel Temperature Sensor
F—Fuel Rail Pressure Sensor

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

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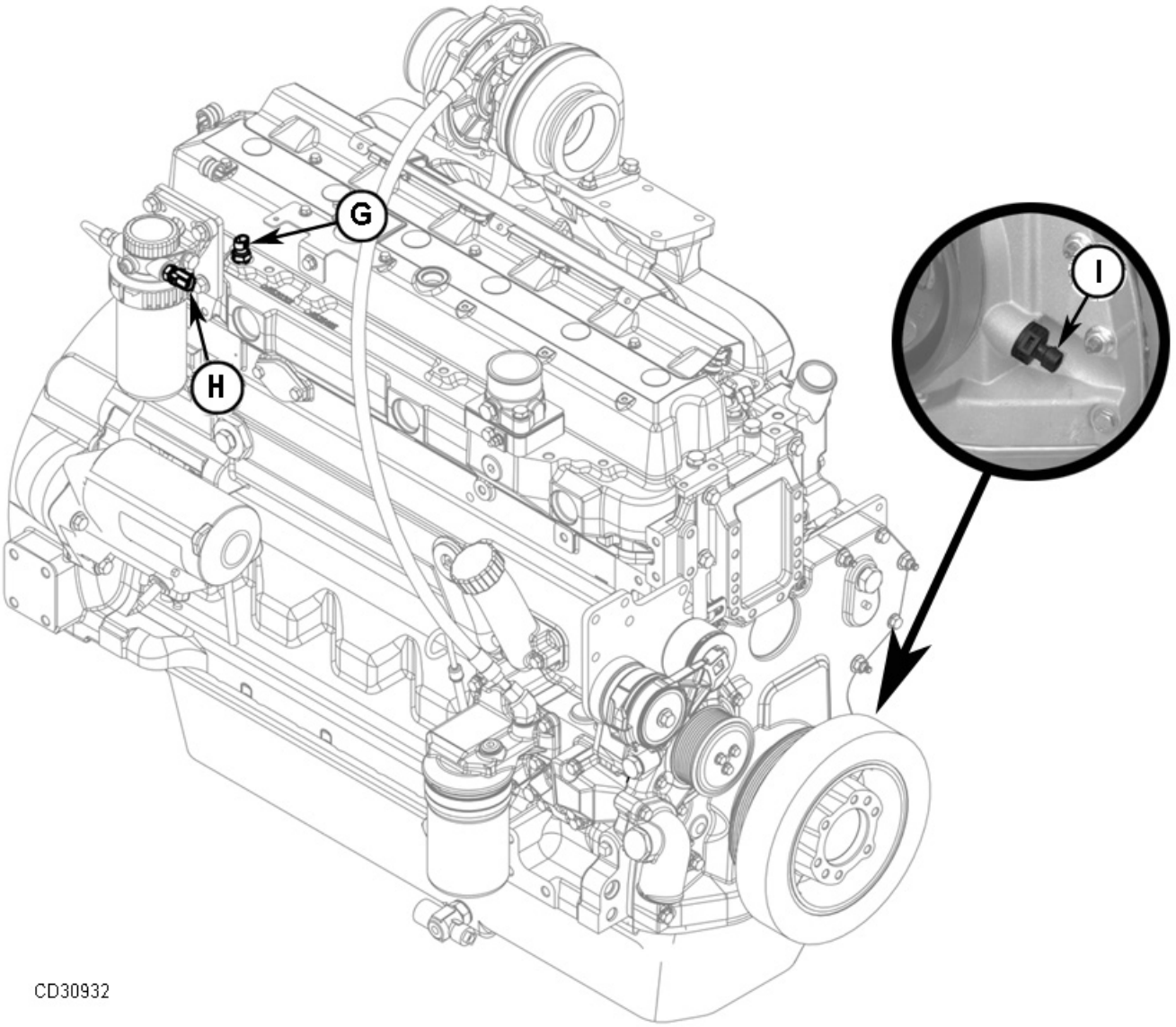


CD30932 –UN–14FEB07

Electronic Controls, Filters Side

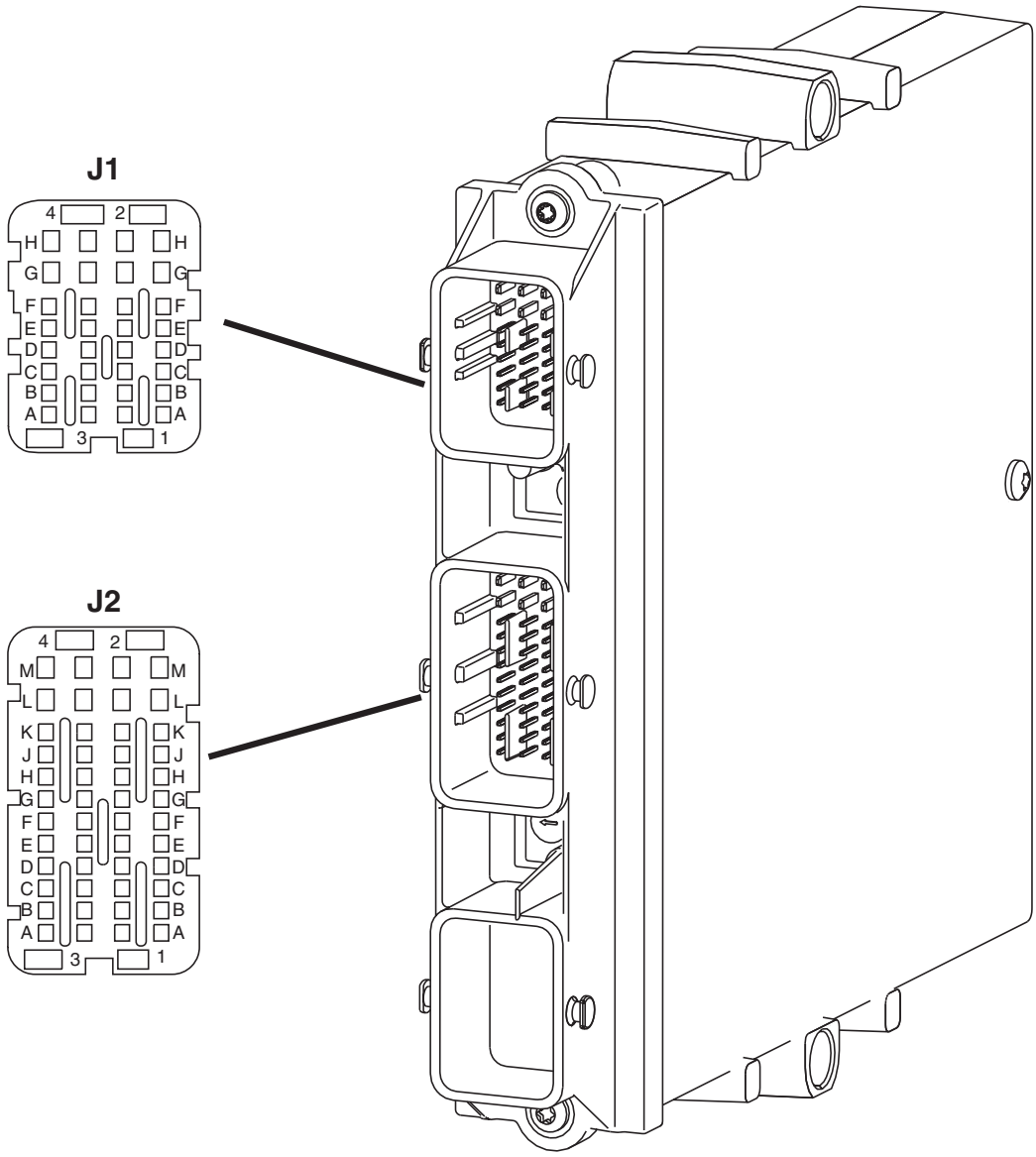
G—Manifold Air Temperature Sensor

H—Fuel Transfer Pump Pressure Sensor

I—Crankshaft Position Sensor

DM80898,00000F5 –19–14MAY07–2/2

Engine Control Unit (ECU)



Engine Control Unit (ECU)

J1—32 pin connector - black insert

J2—48 pin connector - brown insert

DM80898,000011F –19–18DEC06–1/1

Controller Area Network (CAN)

The CAN bus is a high-speed open interconnect network for electronic systems on the vehicle. It allows electronic systems to communicate with each other through a standard architecture of electronic signals over shielded twisted-pair wires. Just about any type of information can be communicated over the CAN Bus. Information such as throttle position, safety systems, engine condition, fuel system information, etc., can be transferred between vehicle controllers. Vehicles can communicate with laptop computers and other accessories. Information on the network can be displayed to the operator on a display panel, or relayed to another location via telemetry. Up to 30 Electronic Control Units or modules can be connected together through a single CAN network segment. A CAN connection (SAE J1939) is provided on the vehicle wiring harness. A round Deutsch 9-pin connector is provided primarily for service/diagnostic purposes. CAN also allows diagnostic software to communicate with the vehicle.

DM80898,00000E1 –19–20FEB07–1/1

Monitoring Engine Parameters

In order for the electronic control system to deliver fuel according to a given set of operating conditions and, on some applications to provide engine protection, the following engine parameters are monitored by the ECU:

- Engine Control Unit (ECU) Temperature
- Engine Coolant Temperature (ECT)
- Fuel Temperature
- Intake Manifold Air Temperature (MAT)
- Barometric Air Pressure (BAP)
- Fuel Rail Pressure
- Throttle Position
- Fuel Transfer Pump Pressure (optional)
- Manifold Air Pressure (MAP–optional)
- Oil Pressure
- Crank Position
- Pump Position
- Water in Fuel (WIF)
- Throttle Position
- Power Supply #1
- Power Supply #2
- Power Supply #3
- External Derate Commands
- External Shutdown Commands

DM80898,00000F6 –19–22MAY07–1/1

Measuring Temperature

Temperature sensors are generally thermisters–temperature-sensitive variable resistors. The resistance of the sensor decreases as temperature increases (negative temperature coefficient). As the temperature changes it causes the voltage (D) to change. The ECU compares this voltage with values programmed into its memory. If the value measured is near the expected value, the ECU assumes everything is correct. If the value is above or below the expected value, the ECU will set the appropriate diagnostic trouble code (DTC). For more information on DTCs, see DIAGNOSTIC TROUBLE CODES (DTC) in Section 4, Group 160.

The ECU has the ability to derate the engine power, engine speed, or to shut down the engine in an attempt to protect the engine and its components. If certain temperatures exceed the threshold, the ECU will enable the engine protection. For more information on engine protection and derate programs, see ENGINE DERATE AND SHUTDOWN PROTECTION later in this Group.

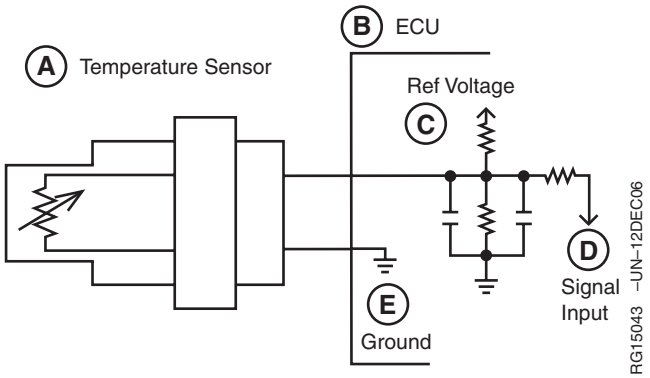


Figure 1

A—Temperature Sensor
B—ECU
C—Reference Voltage
D—Signal Input
E—Ground

RG40854,00000E4 –19–03JAN07–1/1

Engine Control Unit (ECU) Temperature Sensor

The ECU temperature sensor is located internal to the ECU. This sensor cannot be repaired or replaced without replacing the entire ECU. This sensor is used to determine the internal temperature of the ECU. If the temperature exceeds the temperature specification, the ECU will limit the speed of the engine in an attempt to protect the ECU from permanent damage.

RG41221,00002A7 –19–18DEC06–1/1

Engine Coolant Temperature (ECT) Sensor

The ECU monitors engine coolant temperature for:

- Engine protection purposes. Depending on the severity of the temperature increase, ECU transmits a diagnostic code for either moderate or extreme levels. The engine is derated correspondingly to each level of severity.
- If the ECU determines the coolant temperature is too low for the current operating conditions it will set an diagnostic trouble code. This normally indicates a thermostat that is stuck open.

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

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

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

DB92450,000000F –19–03JAN07–1/1

Fuel Temperature Sensor

The ECU uses this sensor input to calculate fuel density and adjust fuel delivery accordingly. The ECU also uses the fuel temperature sensor for engine protection purposes. In addition, the air heater operation is driven off of the fuel temperature. If the temperature of the fuel drops below specification, the air heater will turn on for a predetermine length of time.

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

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

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

For more air heater information, see AIR HEATER OPERATION later in this Group.

DM80898,00000F7 –19–18DEC06–1/1

Intake Manifold Air Temperature (MAT)

The MAT sensor is located on the air intake manifold. The ECU uses this sensor to measure the temperature of the air in the intake manifold. The MAT helps the ECU calculate the correct fueling for the engine. The manifold air is the air that will be used in the cylinder for engine combustion. The ECU also uses this sensor for engine protection purposes.

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

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

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

DM80898,0000439 –19–18DEC06–1/1

Turbo Turbine Inlet Temperature

There is no turbo turbine temperature sensor. This temperature is calculated by the ECU. The ECU uses the following parameters to create the model based temperature:

- Manifold Air Pressure
- Timing base on the crank position or the pump position sensor
- Fuel Rail Pressure
- Engine Speed
- Fresh Air to Fuel Ratio
- A software filter to represent a time delay for component heat up rate.

The ECU also uses this temperature for engine protection purposes.

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

RG41221,00002A8 –19–18DEC06–1/1

Measuring Pressure

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

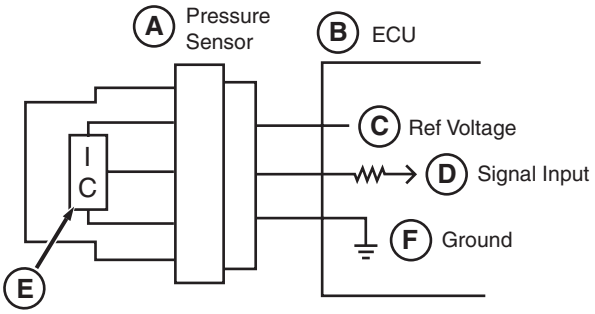
There are many types of devices, and depending on the circuitry (E) in the device, the ECU determines how to process the input signal.

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

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

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

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



Typical Pressure Sensor Schematic

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

RG40854,00000E5 –19–23JAN07–1/1

Barometric Air Pressure (BAP) Sensor

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

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

RG41221,00002A9 –19–18DEC06–1/1

Fuel Rail Pressure Sensor

The fuel rail pressure sensor sends a pressure equivalent signal to the ECU. The ECU monitors fuel pressure to control the amount and timing of fuel being transferred from the high pressure fuel pump to the high pressure common rail (HPCR). The ECU uses this signal input to determine if fuel rail pressure is adequate for the current operating condition. The ECU will command more or less fuel from the high pressure fuel pump by altering the signal to the suction control valve. The ECU also uses this sensor to determine if there is an electronic injector problem by measuring the drop of pressure every time the engine injects fuel to a specific cylinder. This sensor is used for engine protection.

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

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

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

For more information on the suction control valve, see SUCTION CONTROL VALVE later in this Group.

DB92450,0000015 –19–14MAY07–1/1

Fuel Transfer Pump Pressure Sensor

The fuel pressure sensor sends a pressure equivalent signal to the ECU. The ECU monitors fuel pressure to determine if fuel is continuously passing through the low pressure side of the fuel system, or if there is a leak or blockage in it.

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

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

DM80898,0000420 –19–18DEC06–1/1

Manifold Air Pressure (MAP) Sensor

The ECU uses manifold absolute pressure to help calculate the amount of airflow into the engine. The MAP sensor also supplies the ECU with a direct measurement of turbo boost.

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

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

DM80898,0000422 –19–18DEC06–1/1

Oil Pressure Sensor

The oil pressure sensor sends an oil pressure equivalent signal to the ECU. The ECU uses this signal to determine if engine oil pressure is adequate for the current operating conditions. The ECU monitors oil pressure for engine protection purposes.

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

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

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

DB92450,0000016 –19–20FEB07–1/1

Measuring Speed and Position

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

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

RG40854,00000E8 –19–20FEB07–1/1

Crank Position Sensor

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

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

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

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

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

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

RG41221,00002AF –19–30MAY07–1/1

Pump Position Sensor

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

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

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

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

DM80898,00000FB –19–18DEC06–1/1

Throttle Descriptions

John Deere engines can accept several types of throttle inputs and in several different connection schemes depending on the application. Types of throttles are:

- Analog
- Digital
- Pulse Width Modulated (PWM)
- CAN (messages on the CAN bus)

More than one throttle can be enabled at a time in the ECU software. For finer control of engine speed, a combination throttle can be enabled in the ECU software (discussed later in this group).

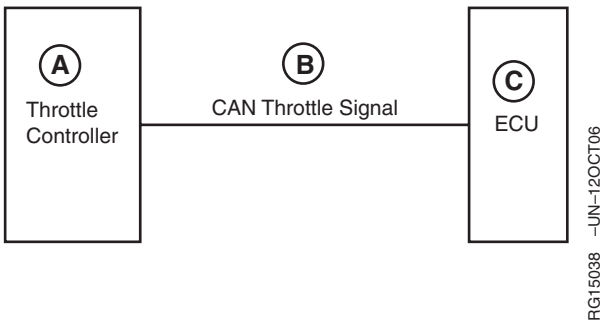
A description of each type follows later in this group.

DM80898,0000003 –19–18DEC06–1/1

CAN Throttle

CAN (Controller Area Network) throttle is information of the desired throttle position that is sent to the ECU by another controller over the CAN bus.

A—Throttle Controller
B—CAN Throttle Signal
C—ECU



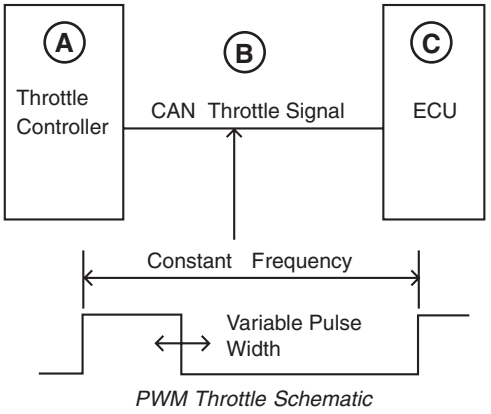
CAN Throttle Schematic

DM80898,0000045 –19–18DEC06–1/1

Pulse-Width-Modulated (PWM) Throttle

The PWM throttle signal is sent to the ECU by another controller. The PWM signal is a square wave signal with a constant frequency. The pulse width of the signal varies to indicate the desired throttle opening.

A—Throttle Controller
B—CAN Bus Throttle Signal
C—ECU



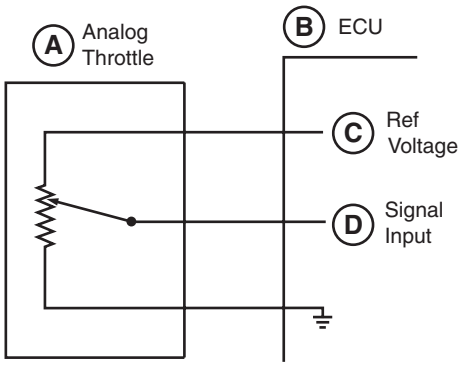
PWM Throttle Schematic

DM80898,000012A –19–18DEC06–1/1

Analog Throttle

An analog throttle uses a variable resistor (potentiometer) to supply voltage to the ECU. A reference voltage is sent to the throttle by the ECU. The resistance changes as the throttle position changes. In turn, input voltage to the ECU will vary according to the throttle position. The input voltage is monitored by the ECU which responds by sending out the appropriate control signals according to its programming.

A second analog throttle can also be enabled with the first (primary) analog throttle if that option has been set in the ECU software.



Position Sensor

A—Analog Throttle
B—ECU
C—Reference Voltage
D—Signal Input

RG41221,00002B7 –19–18DEC06–1/1

Digital Multi-State Throttle

The multi-state throttle is used when a few fixed engine speeds are desired. There are three types of multi-state throttles:

- Dual-State Throttle - See DUAL-STATE THROTTLE later in this Group.
- Tri-State Throttle - See TRI-STATE THROTTLE later in this Group.
- Ramp Throttle - See RAMP THROTTLE later in this Group.

DM80898,0000046 –19–18DEC06–1/1

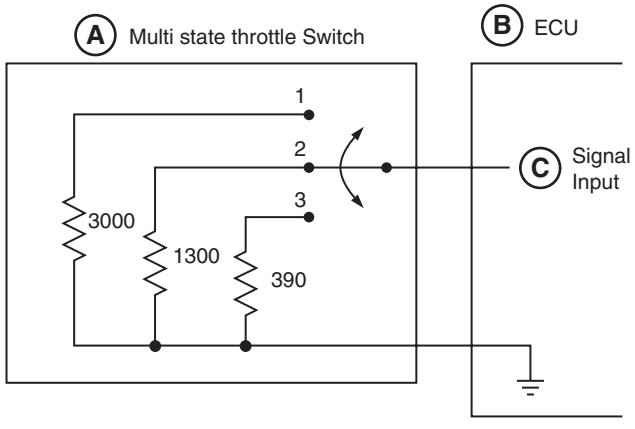
Dual-State Throttle

The dual-state throttle is used on applications that use two fixed engine speeds. The available positions are “Low Idle” (turtle) and “High Idle” (rabbit). The standard tri-state detent switch may be replaced with a 2-position detent switch with only the “turtle/low” and “rabbit/high” position resistance settings.

The switch uses two different resistors to change the voltage returned to the ECU. The ECU uses an internal conversion table to convert the voltage to a specific engine speed. When the switch is in the low idle position, the current is routed through a 390-ohm resistor. High idle position uses a 3000-ohm resistor.

If the panel has an analog throttle then the engine speed can be adjusted when the dual state throttle switch is in the low idle position.

NOTE: The three-position multi-state throttle switch may be used. The middle position is ignored.



Dual-State Throttle Switch Schematic

A—Multi state throttle switch
B—ECU
C—Signal input

DM80898,0000047 –19–18DEC06–1/1

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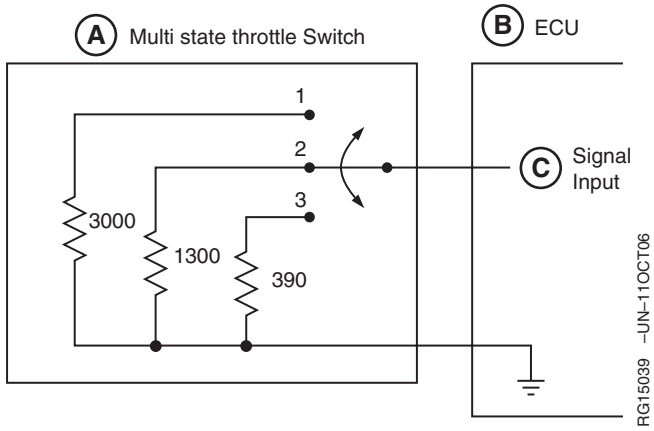
Tri-State Throttle

The digital tri-state (or “3-state”) throttle works similar to the dual-state throttle. This throttle uses a switch with three positions: minimum throttle (turtle–3), maximum throttle (Adj–2), and fast idle (rabbit–1). In the minimum throttle position, engine RPM defaults to a speed that has been set in the ECU according to the needs of the application. The fast idle (no-load) position speed is set in the ECU according to the needs of the application. In the maximum (Adj–2) throttle position, engine speed can be set within a range programmed into the ECU.

The switch uses three different resistors to change the voltage returned to the ECU. When the switch is in the minimum throttle position, current is routed through a 390-ohm resistor. The maximum throttle position uses a 1300-ohm resistor and the fast idle position uses a 3000-ohm resistor.

To change engine speed, the tri-state throttle must be in the Adj position and the “Bump Enable” switch must be in the “enable up” or “enable down” position while the “Idle Select” switch is held in the increase (+) or the decrease (–) position.



A—Multi-State throttle
B—ECU
C —Signal Input

DM80898,0000049 –19–18DEC06–1/1

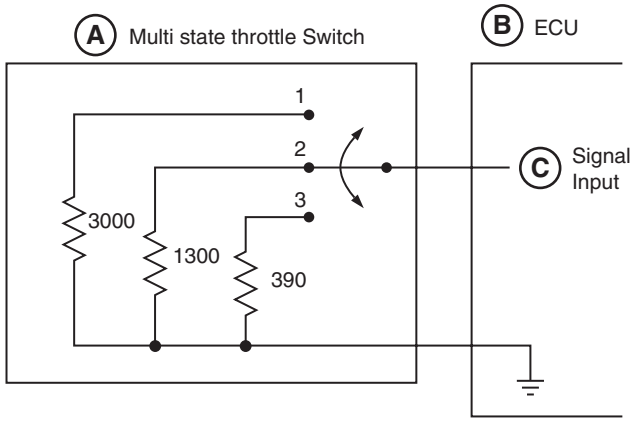
Ramp Throttle

The digital ramp throttle operates between minimum throttle and fast idle and uses a 3-position “Ramp Throttle” switch. If the switch is held in the “Increase Throttle” (rabbit–1) position, the engine speed will ramp up in small increments. If the switch is held in the “Decrease Throttle” (turtle–3) position, the engine speed will ramp down. As long as this switch is held in a momentary position, the engine continues to ramp up or down until the maximum high or low throttle speed setting is reached. When released, the switch returns to the center “Hold Throttle” position.

This is a 3-position, spring-loaded-to-center switch. The “Increase” speed position (1) uses a 3000-ohm resistor. The “Decrease” speed position (3) uses a 390-ohm resistor, and the “Hold” position (2) uses a 1300-ohm resistor. The ramp throttle settings are reset to the factory settings when the key is turned off and back on.

The ramp rate selection is a trim option and sets the rate of change for engine speed increases or decreases. There are four ramp rate options available.

- **3-Second Exponential:** Engine speed will start to increase/decrease at a slow rate and will accelerate/decelerate at an increasingly faster rate the longer the switch is held. The engine throttle setting will go from 0% to 100% throttle in 3 to 5 seconds.
- **5-Second Linear:** Engine speed will increase/decrease at a constant rate. With this setting the engine throttle setting will go from 0% to 100% throttle in 5 seconds.
- **7-Second Linear:** Engine speed will increase/decrease at a constant rate. With this setting the engine throttle setting will go from 0% to 100% throttle in 7 seconds.
- **9-Second Linear:** Engine speed will increase/decrease at a constant rate. With this setting the engine throttle setting will go from 0% to 100% throttle in 9 seconds.
- **25-Second Linear:** Engine speed will increase/decrease at a constant rate. With this setting the engine throttle setting will go from 0% to 100% throttle in 25 seconds.



A—Multi-State throttle
B—ECU
C—Signal Input

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Continued on next page

- **Custom Linear:**Engine speed will increase/decrease at a rate set by the user. With this setting the engine throttle setting will go from 0% to 100% throttle at a rate between 5 and 30 seconds determined by the user.

Ramp steps or “bumps” are minor increases or decreases, in the engine speed setting. When the ramp throttle switch is momentarily held in the “Increase Throttle” or “Decrease Throttle” positions, the engine speed will increase/decrease a selected percentage of the throttle range. The actual engine RPM speed change for each setting will vary.

Four ramp step rates are available:

- 0.4% of throttle range
- 0.8% of throttle range
- 1.6% of throttle range
- 2.8% of throttle range

DM80898,000004A –19–01FEB07–2/2

Throttle Adjustments

Throttle Rate

Throttle rate is how quickly the ECU changes the engine fuel rate in response to a throttle increase signal. Throttle rate has no impact on the deceleration. The ECU is shipped with the Maximum rate selected. Four rates are available: Maximum, Fast, Medium, and Slow.

NOTE: If Ramp Throttle is enabled, the Throttle Rate feature is disabled for all throttles.

Throttle Out-of-Range (OOR) Recovery

A throttle is determined to be Out-of-Range (OOR) when the ECU detects the input signal from that device is outside its expected normal limits (invalid). When the OOR condition is detected the ECU will set an diagnostic trouble code. The ECU will then ignore the input from the OOR throttle until it becomes valid, essentially setting its input to 0%. When the input becomes valid again the ECU will take appropriate action, which is determined by the recovery type programmed into the ECU. Typically, these errors occur when analog throttle endpoints are misaligned, but it can also be caused by faulty wiring.

Recovery types are:

- **Resume Recovery:** When a throttle Out-of-Range Error (OORE) condition is detected, only the OOR throttle input will be considered 0% until a valid input is received. The OOR throttle will immediately operate again as soon as the input is valid.

IMPORTANT: This setting can cause rapid changes in the throttle if an intermittent OOR condition exists.

- **Idle Recovery:** When a throttle OOR condition is detected, only the OOR throttle input will be considered 0%. If the input becomes valid again after the OOR condition, the OOR throttle must be returned to low idle position (0% throttle) before the output of the throttle is allowed to increase above 0%.
- **Locked Recovery:** When a throttle OOR condition is detected, only the OOR throttle input will be considered 0% and will not be allowed to operate again until the power is reset on the ECU and the throttle input is valid.

The Throttle Out-of-Range (OOR) Recovery applies to all throttles except ramp throttle.Because the ramp throttle resets itself to minimum throttle for any Out-of-Range condition, selecting a different “Throttle Out-of-Range Recovery” will have no effect on the ramp throttle.

DM80898,000004B –19–03JAN07–1/1

Throttle Offsets

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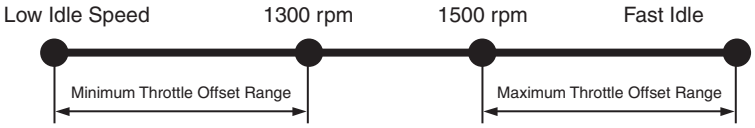

Minimum Throttle Offset

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.

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Self-Calibration

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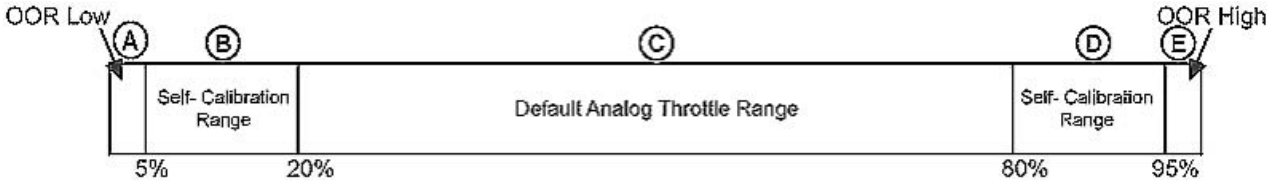


Analog Throttle Input Range

A—OOR (Out Of Range) Low
B—Self-Calibration Range
C—Default Analog Throttle Range
D—Self-Calibration Range
E—OOR (Out Of Range) High

With this feature enabled, it will automatically adjust throttle dead-band on every sweep of the throttle from idle to full throttle position. The Self-Calibration feature can adjust the 0% throttle setpoint from 20% to 5% of the Analog Throttle Input Range. Similarly, the 100% throttle setpoint can be adjusted between 80% and 95% of the Analog Throttle Input Range.

If the Self-Calibration feature is disabled, the operating range of the throttle will be limited to the Default Analog Throttle Range.

DM80898,0000004 –19–07FEB07–1/1

Combination Throttle

The combination throttle is the use of two or more throttle controls on an application to give coarse/fine/extra fine control. A maximum of 3 throttles may be combined. Normally, only two are used.

If the combination throttle is enabled, a master and a secondary throttle are selected. An additional third throttle can be selected as part of the combination. Each throttle can only be used once in the combination series (i.e.The Primary Analog Throttle selected as the master throttle cannot be selected as the second or third throttle in the combination).

Any type of throttle can be used in the combination. Currently, the only OEM throttle types used are 2-state, 3-state, ramp, and analog. PWM and CAN throttles can be used but are not currently configured for use within the software.

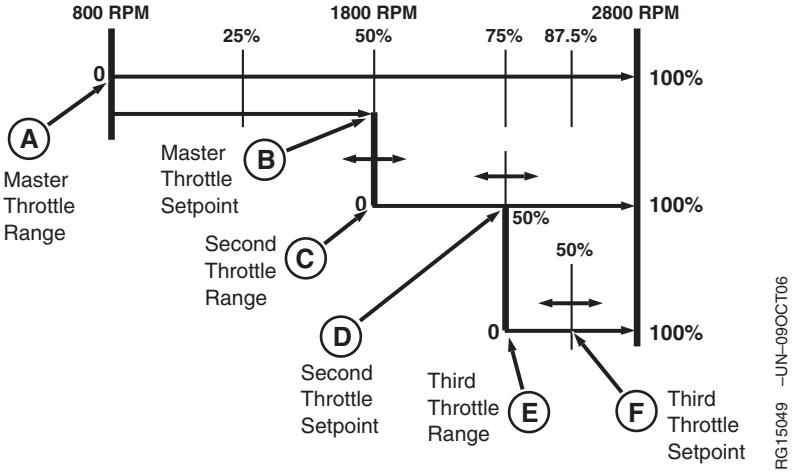
The ECU uses inputs from all enabled throttles to set engine speed. If a combination throttle with 2 throttles is enabled, and a third throttle is enabled, the ECU will look at the input from the combination throttle and compare it to the third throttle. The engine speed will then be set to whichever one is highest.

The basic role of the throttle controls is to act as accelerators. This means that, as the throttle input increases, the engine speed increases. The master throttle always functions in this fashion.

While not common, there are throttle controls that function as decelerators. This means as the throttle input increases, the engine speed decreases. However, this function is not compatible with 3-state throttles.

The combination throttle operates in the following fashion: each throttle has an available throttle range of 0-100% (low idle to high idle speed), and as each throttle is added to the master, a finer resolution in engine speed is defined (see figure below).

DM80898,0000005 –19–18DEC06–1/2



A—Master Throttle Range
B—Master Throttle Setpoint
C—Second Throttle Range
D—Second Throttle Setpoint
E—Third Throttle Range
F—Third Throttle Setpoint

DM80898,0000005 –19–18DEC06–2/2

Marine Throttle

The marine engine has two dual throttle options:

- Dual throttles with transfer control
- Engine synchronization control.

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

Dual-Throttle Transfer Control

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

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

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

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

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

Engine Synchronization Control

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

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

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

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

Continued on next page

When engine synchronization is successful, the ECU will have automatically disabled the tachometer of the follower engine and will have set each engine to isochronous governor operation. When an engine is above or below engine rpm demand, its governor sends a signal back to the engine's ECU and the ECU makes the appropriate adjustment.

During large demands for acceleration or deceleration, it is normal for the synchronization system to shut down. Synchronous operation may, at any time, be re-enabled, as long as the initial criteria are met.

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

DM80898,0000007 –19–18DEC06–2/2

Engine Derate and Shutdown Protection

The Engine Control Unit (ECU) will decrease the amount of fuel that is delivered to the engine (fuel derate), set the engine to a certain speed (speed derate), or shut the engine down when sensor inputs exceed normal operating ranges. A Diagnostic Trouble Code (DTC) always accompanies a derate.

See DIAGNOSTIC SPECIFICATIONS in Section 06, Group 210 later in this manual for derate specifications per application.

There are three ECU engine protection options:

- **No Protection**– Engine ECU's with "No Protection" do not derate or shut down the engine if a fault occurs. The standard fault lamp will illuminate when a "Warning" fault is detected by the ECU, and the standard stop-engine lamp will illuminate when a "Shutdown" fault is detected. The engine operator is responsible for reducing engine speed and power when a "Warning" fault exists and for shutting down the engine when a "Shutdown" fault exists.
- **Engine Derate Protection WITHOUT Shutdown**– In addition to illuminating the standard fault indicating lights, the ECU will derate the engine when certain "Warning" faults are detected (depending on application). It is the responsibility of the operator to decide if it is necessary to shut down the engine.
- **Engine Derate Protection with Shutdown**– In addition to illuminating the standard fault indicating lights, the ECU will derate the engine when certain "Warning" and "Shutdown" faults are detected (depending on application). If a DTC that requires shutdown is set, the ECU will severely derate the engine and shut down the engine either immediately or in 30 seconds, depending on the shutdown timer setting in the ECU. If the fault has a 30-second shutdown delay, and the problem is corrected within the 30-second delay period, the power will increase at a rate determined by the fault, until full power is reached.

NOTE: CAN wait-to-start enables the CAN bus messages for shutdown and for wait-to-start. Disabling this feature disables both the wait-to-start broadcast and the shutdown broadcast.

Shutdown Override

NOTE: Holding the shutdown override switch continuously "ON" will not reset the 30-second timer.

Shutdowns can be overridden for 30 seconds at a time. This can be used to move a vehicle to a safe location. Each time the switch is pushed, the shutdown timer is reset to 30 seconds and the engine will run in a derated power mode.

Similarly, if the key switch is turned off, the engine Shutdown feature will be reset, but when restarted only 30 seconds of running is allowed until the engine will shut down again. Engine will remain in shutdown mode until fault condition has been corrected.

External Derate

Wiring in provided on the engine harness for additional switches that control engine derate. These additional external switches can provide an additional level of engine control. The external switch type and derate rate are selectable:

- **External Derate Enable:** When enabled with an active external derate circuit, the external derate feature will derate the engine when activated by an external device.
- **External Derate Input:** Input can range from ground to 24V, depending on application battery voltage. Either a normally open switch, or normally closed switch is used for the external derate input.

Continued on next page

- **External Derate Rate:** Three external derate rates are available: 20% derate over 10 minutes, 20% derate over 1 minute, and 50% derate over 1 minute. Each provides a linear derate of engine power over the time selected. Derates are based on the 100% torque curve value, so operation below the derated power level is still possible.

NOTE: External Derate is not compatible with cruise control.

External Shutdown

Wiring is provided on the engine harness for additional engine shutdown switches. Either a normally-open or normally-closed switch can be used for the external shutdown input. When enabled and the external shutdown circuit is activated, the ECU will shut down the engine. Features include:

- **External Shutdown Timer:** The external shutdown timer can be set for either immediate shutdown, or a 30-second delayed shutdown. If the shutdown switch returns to normal before the end of the 30-second delay, the engine will resume normal running.
- **Override External Shutdown at Engine Start:** Some external shutdowns must be overridden when starting the engine. When enabled, the ECU will disable external shutdowns during engine startup.
- **Override External Shutdown Time:** Once the engine switches to “Run” mode (reaches low idle), the ECU will continue to disengage external shutdown for the time that has been selected. Three override times are available: 5 seconds, 30 seconds, and 1 minute.

DM80898,00000E5 –19–04JAN07–2/2

Electronic Injector (EI) Wiring Harness Connector

The EI wiring harness connector is located near Cylinder #1. This connector provides voltage and a ground from the ECU to the EI wiring harness internal to the cylinder head carrier.

For wiring information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

DM80898,0000101 –19–18DEC06–1/1

Intake Air Heater Operation

The Intake Air Heater function is not included on all engines. The intake air heater is used to increase intake manifold air temperature to improve cold starting. When the operator turns the key from “OFF” to “ON”, the ECU calculates the fuel, determines if the temperature is below the set point, turns on the “Air Heater Indicator” light on the dash, and energizes the air heater relay. The air heater relay will in turn energize the air heater coils located in the intake manifold. The ECU will keep the air heater relay energized for an amount of time that is determined by the measured temperature. When the ECU has determined that the preheat time is adequate, it will turn off the “Air Heater Indicator” light and de-energize the air heater relay. If the operator turns the ignition from “ON” to “START” at this time, the engine will crank and start.

If the operator turns the key from “START” to “ON” without waiting for the “Air Heater Indicator” light to turn off, the ECU will de-energize the air heater relay and a key-off/key-on cycle is required before preheating is allowed again.

Anytime the engine cranks but does not start, a key-off/key-on cycle will be required before preheating is allowed again.

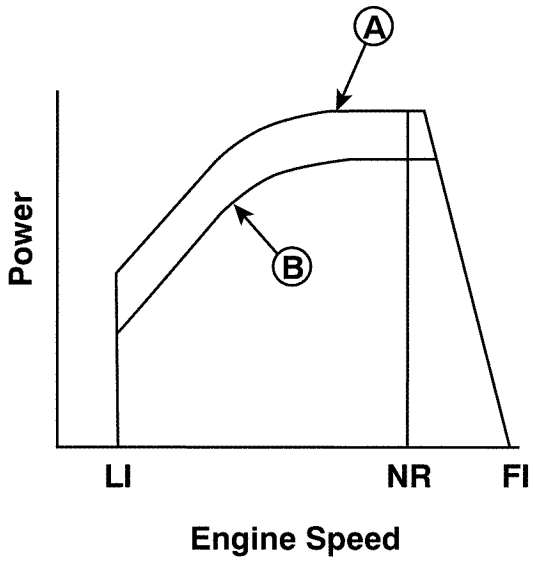
For application specific information on air heater times vs. temperatures, see APPLICATION SPECIFICATIONS in Section 06, Group 210 later in this manual.

RG41221,00002C3 –19–18DEC06–1/1

Torque Curve Selection

The ECU has the ability to select one of the multiple torque curves that are stored in its memory. The ECU can switch between torque curves while the engine is running. This provides the proper speed and torque for the current conditions. The other controllers on the vehicle can also send CAN messages to the ECU to change torque curves. There is usually one normal torque curve, and then there are others that reduce power for component protection (i.e. hitches, axles, transmissions). In some instances a power boost for a short period of time is an option (i.e. unloading a combine while still picking).

See APPLICATION SPECIFICATIONS in Section 06, Group 210 of this manual for torque curve selection specifications.



A–Normal Power Curve
B–Derated Power Curve
LI–Low (Slow) Idle
NR–Normal Rated
FI–Fast Idle

Torque Curves

RG8552 –19–18SEP98

RG40854,00000F2 –19–01FEB07–1/1

Governor Droop Mode Selection

The electronic control system provides all-speed governing. The Engine Control Unit (ECU) controls the engine speed based on the analog throttle input.

The ECU also has the ability to provide normal and isochronous (0%) droop governing. The normal droop gives a drop in engine speed with an increase in load or an increase in engine speed with a decrease in load. When in isochronous, the droop is set at 0%, and there is a no change in engine speed with changing loads until engine's torque limit is reached. The factory low idle speed is always set for isochronous governing. Droop selection can be determined by engine speed, load, and cruise control depending on the application.

See APPLICATION SPECIFICATIONS in Section 06, Group 210 of this manual for governor droop mode specifications.

RG40854,00000F3 –19–01FEB07–1/1

Suction Control Valve

The Suction Control Valve is located on the high pressure fuel pump. The ECU sends an electronic signal to the Suction Control Valve through the solenoid to regulate the delivery of fuel to the High Pressure Common Rail (HPCR). When the Suction Control Valve is energized, fuel is allowed into the pumping chamber of the high pressure fuel pump. The pressurized fuel is then sent to the high pressure common rail (HPCR). The ECU varies the ON-time of this signal to ensure the proper amount of fuel is available.

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

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

RG40854,00000EA –19–04MAY07–1/1

Water in Fuel (WIF) Sensor

The water in fuel (WIF) sensor is located on the bottom of the final fuel filter in the water separator bowl. When water is detected in the fuel, a signal is sent to the ECU. The WIF sensor uses the resistance of fuel and water in the fuel system along with the principle that water is a better conductor then fuel. If water is present, the voltage will be lower. The ECU monitors this for engine protection purposes.

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

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

RG41221,00000A8 –19–18DEC06–1/1

Cruise Control Operation

The ECU is available with and without the cruise control function. It is an off-road cruise control that maintains constant engine speed under varying load conditions. This function is especially intended for field applications where an operator faces the need to turn the vehicle around at the end of each row. This cruise control allows the driver to use the throttle and/or brake to turn the vehicle around. When ready to resume field operations, the operator brings the engine speed above 1300 rpm and activates the Cancel/Resume function again to resume cruise speed. An internal timer gives the operator one minute to complete the turnaround maneuver.

The cruise control has the normal functions of:

- Cruise control power “ON” or “OFF”
- “Set” or “Bump Up” engine speed
- “Resume” or “Bump Down” engine speed
- Vehicle brake or clutch pedal to disengage cruise control

On 12-volt ECUs, the engine speed can be set from two different locations. The primary location would normally be in the cab of the vehicle and is used to set a constant engine speed while the vehicle is being driven. The secondary cruise control is normally used in a location that provides PTO speed control and is used with the engine in “neutral” or out of gear. Both locations have the normal cruise control functions.

RG40854,00000EF –19–18DEC06–1/1

Power Supply #1

John Deere engine active sensors must have 5 volts and sensor return (ground) supplied to them to function properly. There are too many sensors for just one power supply and return to handle. To keep critical components from being affected by shorts in other components there are several sets of power supply voltages and returns.

The following sensors use Power Supply #1:

- Fuel Rail Pressure Sensor

DM80898,0000443 –19–30MAY07–1/1

Power Supply #2

John Deere engine active sensors must have 5 volts and sensor return (ground) supplied to them to function properly. There are too many sensors for just one power supply and return to handle. To keep critical components from being affected by shorts in other components there are several sets of power supply voltages and returns.

This supply has 2 separate fused outputs–one output is on J1 and the other on J2. The following sensors use Power Supply #2:

NOTE: Some sensors are not available or are optional for certain applications. The sensors in the following list may not all be available on this engine.

Fused Output 1

- Secondary Analog Throttle
- Multi-State Throttle
- Droop/ Isochronous Governor Switch
- Fan Speed (some applications)
- Override Shutdown (some applications)

Fused Output 2

- Oil Pressure Sensor
- Fuel Pressure Sensor (some applications)
- Manifold Air Pressure (some applications)

DM80898,0000444 –19–30MAY07–1/1

Power Supply #3

John Deere engine active sensors must have 5 volts and sensor return (ground) supplied to them to function properly. There are too many sensors for just one power supply and return to handle. To keep critical components from being affected by shorts in other components there are several sets of power supply voltages and returns.

The following sensors use Power Supply #3:

NOTE: Some sensors are not available or are optional for certain applications. The sensors in the following list may not all be available on this engine.

- Primary Analog Throttle Sensor
- Remote Throttle (some applications)
- PTO Speed (some applications)

DM80898,0000445 –19–30MAY07–1/1

Section 04
Diagnostics

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About This Group

This section of the manual contains necessary information for observable diagnostics and fuel-related test procedures. Use this information in conjunction with the Base Engine Manual.

NOTE: Follow the diagnostic procedure of an active or stored DTC before pursuing any observable diagnostic procedure.

- E1 - Engine Cranks/Won't Start
- E2 - Engine Misfires/Runs Irregularly
- E3 - Engine Does Not Develop Full Power
- E4 - Engine Emits Excessive White Exhaust Smoke
- E5 - Engine Emits Excessive Black Or Gray Exhaust Smoke
- E6 - Engine Will Not Crank
- E7 - Engine Idles Poorly
- E8 - Abnormal Engine Noise
- E9 - Analog Throttle (A) Will Not Respond
- E10 - Analog Throttle (B) Will Not Respond

- F1 - Low Pressure Fuel Supply System Test
- F2 - High Pressure Fuel Supply System Test
- F3 - Excessive Fuel Consumption
- F4 - Fuel in Oil

- D1 - ECU Does Not Communicate With SERVICE ADVISOR™
- D2 - Diagnostic Gauge Does Not Communicate With ECU
- D5 - ECU Does Not Program With Service ADVISOR

- A1 - Intake Air Heater Check

- Fuel System Procedures:
  - Check Fuel Supply Quality
  - Test for Air in Fuel
  - Check for Restricted Fuel Leak-off Line
  - Bleed the Fuel System
  - Check and Adjust High Pressure Fuel Pump Static Timing
- Intake and Exhaust System Procedures:
  - Excessive Engine Crankcase Pressure (Blow-By) Test

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DN22556,0000284 –19–30MAY07–1/1

E1 - Engine Cranks/Won't Start

DN22556,0000285 –19–24MAY07–1/1

E1 - Engine Cranks/Won't Start Diagnostic Procedure

NOTE: This procedure should be used if engine cranking speed is OK, but it will not start or starts only after prolonged cranking. If the engine will not crank, see E6 - ENGINE WILL NOT CRANK to diagnose the starting/charging system.

– – –1/1

❶ **E1 - Preliminary Check**	1. Check that fuel tank is not empty. 2. Check that there are no leaks in the fuel system. 3. Check that engine cranking speed is adequate to start engine. 4. Check that engine harness is connected to camshaft position sensor. 5. Check that engine harness is connected to crankshaft position sensor. 6. Check that all machine fuses are good. 7. Check connections at ECU and machine display panel. Was there a problem found?	**YES:** Repair as needed. **NO:** GO TO ❷

– – –1/1

❷ **Connect to SERVICE ADVISOR™™**	1. Connect to Service ADVISOR; see CONNECTING TO SERVICE ADVISOR later in this section. 2. Ignition ON, engine OFF. Were you able to connect with Service ADVISOR?	**YES:** GO TO ❸ **NO:** See D1 - ECU DOES NOT COMMUNICATE WITH SERVICE ADVISOR diagnostic procedure, later in this group.

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– – –1/1

❸ **Service ADVISOR Active Fault Codes**	1. Write down all active and inactive fault codes. 2. Resolve all active fault codes. *NOTE: The inactive fault codes can relate to existing problems. They might be an indication of a failing component.* *NOTE: When DTCs are cleared, snapshot information for all DTCs will also be cleared.* Were there active fault codes?	**YES:** GO TO and do the relative diagnostic procedure. **NO:** GO TO ❹ – – –1/1
❹ **Service ADVISOR Inactive Fault Codes**	Check the diagnostic procedure for any inactive fault codes as if they were active. Could any of the indicated troubles have prevented the engine from starting?	**YES:** GO TO and do the relative diagnostic procedure. **NO:** GO TO ❺ – – –1/1
❺ **Cranking Speed Test**	1. Start cranking engine. 2. Use Service ADVISOR to monitor engine cranking speed while cranking the engine over, then go to TEST ENGINE CRANKING SPEED in Section 04, Group 150 of the base engine manual. Was the engine cranking speed above minimum requirements?	**YES:** GO TO ❻ **NO:** GO TO applicable base engine manual procedure. Repair and verify problem is resolved. – – –1/1
❻ **Pump Position and Crank Position Indicator Position Test**	While cranking engine, use Service ADVISOR to observe: • Engine Crank Position Status – Should read 63. • Pump Position Status – Should read 63. Do either, or both sensors display anything other than the desired values?	**YES:** See applicable information in Section 3, Group 140 earlier in this manual. Repair and verify problem is resolved. **NO:** GO TO ❼ – – –1/1
❼ **Pump Position and Crank Position Indicator Noise Test**	While cranking engine, use Service ADVISOR to observe: • Pump Position Sensor Input Noise Indicator - Should read 0% • Crank Improper Pattern Indicator - Should read 0% Do either, or both sensors display above the desired values?	**YES:** GO TO ❽ **NO:** GO TO ❾ – – –1/1

8 Electro-Magnetic Interference (EMI)	1. Ensure that these two systems have been shielded from engine EMI. 2. Check for improperly installed radio equipment, or other electronic equipment. 3. Check for non-shielded (non-twisted pairs) wiring. Were any of the above conditions found?	**YES:** Properly reinstall and shield as required, then GO TO 7 **NO:** GO TO 9 – – –1/1

9 Air Heater Check	*NOTE: Air Heaters are an option. Not all engines have AIR HEATERS.* See INTAKE AIR HEATER OPERATION, Section 03, Group 140 earlier in this manual and determine if the Air Heaters are working. Were the Air Heaters working?	**YES:** GO TO 10 **NO:** GO TO A1 – INTAKE AIR HEATER CHECK DIAGNOSTIC PROCEDURE, later in this group. Repair and verify that problem is resolved. – – –1/1

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4

10 Low Pressure Fuel Supply System Test	See and do F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST, found later in this group. Was the problem resolved?	**YES:** Return engine to the customer. **NO:** GO TO 11 – – –1/1

11 High Pressure Fuel Supply System Test	See and do F2 - HIGH PRESSURE FUEL SUPPLY SYSTEM TEST, found later in this group. Was the problem resolved?	**YES:** Return engine to the customer. **NO:** GO TO 12 – – –1/1

⓬ Electronic Injector (EI) Cap Screw, Harness, and Connector Test	1. Ignition OFF. 2. Remove heat shield. 3. Verify that hold-down clamps are positioned correctly. 4. Check the hold-down clamp torque on all EI cap screws. See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 090 earlier in this manual. 5. Inspect EI harness and connector for damage. See REMOVE ELECTRONIC INJECTOR (EI) in Section 02, Group 090 earlier in this manual. 6. Reinstall heat shield with proper torque. See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 090 earlier in this manual. Are all components in proper working order?	**YES:** GO TO ⓭ **NO:** Repair or replace as needed and verify problem is resolved. See REMOVE ELECTRONIC INJECTOR (EI) and REMOVE ELECTRONIC INJECTOR (EI) in Section 02, Group 090 earlier in this manual. – – –1/1

⓭ ECU Programming	Check for corrupted ECU program, as follows: *NOTE: Download engine-applicable payload file before reprogramming ECU.* 1. See and do DOWNLOAD PAYLOAD FILE FOR SERVICE ADVISOR, later in this manual. 2. See REPROGRAMMING ENGINE CONTROL UNIT (ECU) WITH SERVICE ADVISOR, and reprogram the ECU. Did the engine start after reprogramming?	**YES:** Return to customer. **NO:** Submit a DTAC case. – – –1/1

E2 - Engine Misfires/Runs Irregularly

NOTE: When testing any harness connections, or measuring resistance, always use harness test kit JT07328.

DN22556,0000286 –19–18MAY07–1/1

E2 - Engine Misfires/Runs Irregularly Diagnostic Procedure

– – –1/1

❶ **Preliminary Check**	1. Check that fuel tank is not empty. 2. Check that there are no leaks in the fuel system. 3. Check for clogged fuel filters. 4. Check for clogged MAP sensor (if applicable). 5. Check for leaky air system, turbo boots. 6. Check connector for Suction Control Valve Solenoid. Was there a problem found?	**YES:** Repair and verify that problem is resolved. **NO:** GO TO ❷

– – –1/1

❷ **Connect to SERVICE ADVISOR™**	1. Connect to Service ADVISOR; See CONNECTING TO SERVICE ADVISOR, later in this section. 2. Ignition ON, engine OFF. Were you able to connect with Service ADVISOR?	**YES:** GO TO ❸ **NO:** See D1 - ECU DOES NOT COMMUNICATE WITH SERVICE ADVISOR diagnostic procedure later in this group, correct problem, and GO TO ❷

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– – –1/1

❸ **Service ADVISOR Fault Codes**	Write down all active and stored fault codes, and snapshot information before proceeding. *NOTE: Stored fault codes can relate to existing problems. They could be an indication of a failing component* *NOTE: When DTCs are cleared Snapshot information for all DTCs are also cleared.* Were there active fault codes?	**YES:** Diagnose active DTCs first. **NO:** GO TO ❹ – – –1/1
❹ **Stored Codes**	1. Review stored codes for possible connection to engine misfire. 2. Go to TROUBLE CODE DIAGNOSTIC AND TEST section of the manual. 3. Using harness test kit JT07328, do TERMINAL TEST on areas identified by relative stored codes. Was a problem with the harness identified?	**YES:** Repair problem and verify problem is resolved. **NO:** GO TO ❺ – – –1/1
❺ **Items Possibly Mistaken As Missing/Rough Running Engine**	Check for the following, related, potential problems. 1. Transmission problems (slipping, overheating). 2. Engine Accessories such as A/C cycling on and off or fan drives. 3. Electromagnetic interference (EMI) from the immediate area. 4. Alterations to the engine and/or machine harness such as radios or non-John-Deere accessories. Were you able to identify a problem?	**YES:** Resolve each concern and verify problem is resolved. **NO:** GO TO ❻ – – –1/1
❻ **Low Pressure Fuel Supply System Test**	See and do F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST, found later in this group. Was the problem resolved?	**YES:** Return engine to the customer. **NO:** GO TO ❼ – – –1/1
❼ **High Pressure Fuel Supply System Test**	See and do F2 - HIGH PRESSURE FUEL SUPPLY SYSTEM TEST, found later in this group. Was the problem resolved?	**YES:** Return engine to the customer. **NO:** GO TO ❽ – – –1/1

❽ Valve Adjustment	1. Check valve lash. Go to and do CHECK AND ADJUST VALVE CLEARANCE in Section 02, Group 020, in the base engine manual. 2. Check electronic injector clamp hold down torque. See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 090, earlier in this manual. Was the valve lash and injector clamp hold down torque correct?	**YES:** GO TO ❾ **NO:** Adjust and verify problem is resolved. – – –1/1

❾ Record Data	*NOTE: If doing this procedure leaves the stated problem unresolved, record the information listed below.* 1. Using Service ADVISOR, go to CONNECTIONS – READINGS and insert the information listed in the following groups in the recording window. • ECU – ENGINE PERFORMANCE • ECU – ECU IDENTIFICATION 2. Once the procedure in step 1 above has been completed, record a minimum of five minutes of engine performance in the problem area. Was this step done?	**YES:** Upon completion of this test, initiate a DTAC case, attach the recording to it, and submit it. This enables support personnel to analyze this "Engine Misfires/ Runs Irregularly" problem. – – –1/1

E3 - Engine Does Not Develop Full Power

DN22556,0000287 –19–24MAY07–1/1

E3 - Engine Does Not Develop Full Power Diagnostic Procedure

– – –1/1

❶ **Connect to SERVICE ADVISOR™**	1. Connect to Service ADVISOR; see CONNECTING TO SERVICE ADVISOR later in this section. 2. Ignition ON, engine OFF. Were you able to connect with Service ADVISOR?	**YES:** GO TO ❷ **NO:** See D1 - ECU DOES NOT CONNECT WITH SERVICE diagnostic procedure, later in this group.

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– – –1/1

❷ **Service ADVISOR Fault Codes**	1. Write down all active and inactive fault codes. 2. Save all snapshot information. (See SNAPSHOT INFORMATION later in this section.) 3. Resolve all active fault codes before proceeding. *NOTE: Inactive fault codes can relate to existing problems. They could be an indication of a failing component.* *NOTE: When DTCs are cleared, snapshot information for ALL DTCs will also be cleared.* Were there active fault codes?	**YES:** Go to and do the diagnostic procedure relating to the particular code. **NO:** GO TO ❸

– – –1/1

❸ **Preliminary Check**	*NOTE: A common occurrence regarding this fault can be one of operator perception of the suspect machine, rather than the engine not actually developing full power. Make sure the person entering the complaint has experience with the type of application for which the engine is being used.* Check the following items that apply to the machine under test. 1. Check the following machine-related, potential trouble areas: • Fluids, hydraulic and coolant. • Transmission problems, overheating or slipping. • Driven load has changed. • Auxiliary drives with abnormally high loads. 2. Check the following engine-related, potential, trouble areas: • Air filter plugged. • Fuel filters plugged. • Fuel quality. Was the problem identified?	**YES:** Correct problem(s) and verify problem is resolved. **NO:** GO TO ❹ – – –1/1
❹ **Exhaust Check**	Operate the machine under load, if possible full-load-rated speed. Did the engine produce abnormally excessive heavy black or white exhaust smoke?	**YES:** Heavy white smoke. See E4 - ENGINE EMITS EXCESSIVE WHITE SMOKE DIAGNOSTIC PROCEDURE, later in this group. **YES:** Heavy black smoke. See E5 - ENGINE EMITS EXCESSIVE BLACK OR GRAY SMOKE DIAGNOSTIC PROCEDURE, later in this group. **NO:** GO TO ❺ – – –1/1
❺ **Throttle Test**	1. Ignition on, engine off. 2. Determine type of throttle engine under test is using. 3. Advance throttle lever to fully open position, or select procedure that advances throttle to high idle. 4. Read throttle percentage on Service ADVISOR. Is throttle percentage 97% or higher?	**YES:** GO TO ❻ **NO:** See (E9 or E10) ANALOG THROTTLE DOES NOT RESPOND later in this group. – – –1/1

❻ **Low Pressure Fuel Supply System Test**	See and do F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST, found later in this group. Was the problem resolved?	**YES:** Return engine to the customer. **NO:** GO TO ❼ – – –1/1
❼ **High Pressure Fuel Supply System Test**	See and do F2 - HIGH PRESSURE FUEL SUPPLY SYSTEM TEST, found later in this group. Was the problem resolved?	**YES:** Return engine to the customer. **NO:** GO TO ❽ – – –1/1
❽ **Charge Air System Analysis**	Do CHARGE AIR SYSTEM DIAGNOSTIC PROCEDURE, later in this group. Does charge air system operate within procedure guidelines?	**YES:** GO TO ❾ **NO:** Repair and verify that problem is resolved. – – –1/1
❾ **Valve Adjustment**	Check valve lash – See CHECK AND ADJUST VALVE CLEARANCE procedures in the base engine manual. Was the valve lash within procedure specifications?	**YES:** GO TO ❿ **NO:** See Section 02, Group 20 CHECK AND ADJUST VALVE CLEARANCE in base engine manual. Repair and verify that problem is resolved. – – –1/1
❿ **OEM Hydraulic Components**	*NOTE: This procedure applies to only those OEM engines connected to a hydraulic system. If this procedure does not apply to your engine, proceed to* ⓫ 1. If engine is connected to a hydraulic system, have operator, or an OEM servicing agent, determine if the OEM manufacturer-supplied pump is operating properly. 2. Have operator, or an OEM servicing agent, examine the hydraulic valve to ensure that it is functioning as required. *NOTE: The relief valve could be loading before engine can reach operating speed.* Was the hydraulic system operating properly?	**YES:** GO TO ⓫ **NO:** Have the OEM servicing agent correct the problem and verify that problem is resolved. – – –1/1

⓫ DTAC Case	Engine continues to not develop full power. 1. In Service ADVISOR go to CONNECTIONS – READINGS and in the recording window enter the information listed in the following groups: • ECU - ENGINE PERFORMANCE • ECU – ECU IDENTIFICATION 2. Record a minimum of five minutes of engine underpowered performance. 3. Initiate a DTAC case, and attach engine performance recording to it. Is DTAC case complete?	**YES:** Submit DTAC case. – – –1/1

E4 - Engine Emits Excessive White Exhaust

DN22556,0000288 –19–18MAY07–1/1

E4 - Engine Emits Excessive White Exhaust Diagnostic Procedure

NOTE: This procedure should be used if the engine emits excessive white exhaust smoke. This type of smoke causes a burning sensation to the eyes. If engine emits a less heavy, bluish exhaust smoke, see L1 - EXCESSIVE OIL CONSUMPTION in Section 04, Group 150 of the Base Engine Manual.

– – –1/1

❶ **Active Fault Codes**	1. Using SERVICE ADVISOR™™, check for fault codes. 2. Record all active and inactive fault codes, and snapshot information. Were there any fault codes?	**YES:** Resolve all fault codes and verify that problem is resolved. **NO:** GO TO ❷

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❷ **Coolant Level**	1. Check the coolant level. 2. Ask the customer about coolant usage. 3. Check for head gasket failures. Was cooling system in good working order?	**YES:** GO TO ❸ **NO:** See HEAD GASKET INSPECTION AND REPAIR SEQUENCE in Group 020 of Base Engine Manual. Repair and verify that problem is resolved.

– – –1/1

❸ **Crankcase Vent**	Check the crankcase vent for pinching or blockage. Was the crankcase vent tube pinched or blocked?	**YES:** Repair and verify that problem is resolved. **NO:** GO TO ❹

– – –1/1

❹ **Low Pressure Fuel Supply System Test**	See and do F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST, found later in this group. Was the problem resolved?	**YES:** Return engine to the customer. **NO:** GO TO ❺ – – –1/1
❺ **High Pressure Fuel Supply System Test**	See and do F2 - HIGH PRESSURE FUEL SUPPLY SYSTEM TEST, found later in this group. Was the problem resolved?	**YES:** Return engine to the customer. **NO:** GO TO ❻ – – –1/1
❻ **Blow-By Analysis**	Do BLOW-BY DIAGNOSTIC PROCEDURE in this section. Did the engine pass?	**YES:** GO TO ❼ **NO:** If combustion failure, see TEST ENGINE COMPRESSION PRESSURE in Section 04, Group 150 of the base engine manual. If Turbocharger problem, see AIR INTAKE AND EXHAUST SYSTEM in Section 02, Group 080 of the base engine manual. – – –1/1
❼ **Injector Clamp Hold-Down Torque, Valve Adjustment**	Check injector clamp hold-down torque (See INSTALL ELECTRONIC INJECTOR (EI), Section 02, Group 090, earlier in this manual), and valve lash (See CHECK AND ADJUST VALVE CLEARANCE in Section 02, Group 20 of the base engine manual) Was the valve lash and injector clamp hold-down torque correct?	**YES:** GO TO ❽ **NO:** Adjust and verify that problem is resolved. – – –1/1
❽ **ECU Programming**	1. Check for corrupted ECU program. *NOTE: You will need to download a payload file before you can reprogram an ECU. See DOWNLOAD PAYLOAD FILE FOR SERVICE ADVISOR, later on in this section.* 2. Reprogram ECU. See REPROGRAMMING ENGINE CONTROL UNIT (ECU) WITH SERVICE ADVISOR. Did the engine start after reprogramming?	**YES:** Return to previous procedure or customer. **NO:** Initiate DTAC case. – – –1/1

E5 - Engine Emits Excessive Black or Gray Exhaust

DB92450,0000031 –19–18MAY07–1/1

E5 - Engine Emits Excessive Black or Gray Exhaust Diagnostic Procedure

NOTE: This procedure should be used only when the engine emits black or gray exhaust. If the engine emits a less heavy, bluish exhaust smoke, see L1 - EXCESSIVE OIL CONSUMPTION in base engine manual.

– – –1/1

❶ **Preliminary Check**	1. Ensure engine is not excessively loaded. 2. Ensure air filter is not restricted or plugged. 3. Check turbocharger air inlet for leaks or obstructions. 4. Check for any collapsed hoses or connections. 5. Check for loose clamps or poorly fit tubing. 6. Check the crankcase vent tube for pinching or blockage. 7. Check for loose exhaust manifold bolts, failed exhaust gaskets and exhaust soot buildup on the side of the engine. 8. Check for frozen exhaust stack cap, or damaged exhaust system components. 9. Ensure there is sufficient fuel meeting minimum-quality fuel standard. See CHECK FUEL SUPPLY QUALITY later in this group. Was the problem found?	**YES:** Repair, refit, or replace faulty items and verify that problem is resolved. **NO:** GO TO ❷ – – –1/1
❷ **SERVICE ADVISOR™**	1. Connect to Service ADVISOR. See CONNECTING TO SERVICE ADVISOR earlier in this group. 2. Ignition ON, engine OFF. Were you able to connect with Service ADVISOR?	**YES:** GO TO ❷ **NO:** GO TO ECU DOES NOT COMMUNICATE WITH SERVICE ADVISOR diagnostic procedure, later in this group.

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– – –1/1

❸ **Harness Test**	1. Record all snapshot and fault code data. This data will be lost when harness test is performed. 2. See Interactive tests in Service ADVISOR and perform a HARNESS DIAGNOSTIC TEST, located later in this section. Did the test identify any engine harness problems?	**YES:** Repair and verify that problem is resolved. **NO:** GO TO ❹ – – –1/1

❹ **Charge Air System Diagnostics**	Go to and do CHARGE AIR SYSTEM diagnostic procedure later in this group. Was the problem resolved?	**YES:** Return to the customer. **NO:** GO TO ❺ – – –1/1

❺ **Service ADVISOR Data**	1. Go to CONNECTIONS – READINGS in Service ADVISOR, and in the recording window, select: • ECU - ENGINE PERFORMANCE • ECU – ECU IDENTIFICATION 2. Record a minimum of 5 minutes of engine performance. 3. Initiate a DTAC case, and attach the recording. Is DTAC case complete?	**YES:** Submit DTAC case. – – –1/1

E6 - Engine Will Not Crank

Symptom	Problem	Solution
E6 - Engine Will Not Crank	Weak battery	Replace battery.
	Corroded or loose battery connections	Clean battery terminals and connections.
	Defective main switch or start safety switch	Repair switch as required.
	Starter solenoid defective	Replace solenoid.
	Starter defective	Replace starter.
	Start circuit defective	Check wiring, fuses, and relays.
	Engine is seized up	Check by rotating engine by hand.

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E7 - Engine Idles Poorly

DB92450,0000061 –19–18MAY07–1/1

E7 - Engine Idles Poorly

– – –1/1

❶ **Fault Codes**	Use Service ADVISOR or the DIAGNOSTIC GAUGE to identify and resolve fault codes. See information on connecting to Service ADVISOR and related information later in this manual. Were there any active or inactive codes?	**YES:** Resolve all fault codes verify problem is resolved. **NO:** GO TO ❷

– – –1/1

❷ **Preliminary check**	*NOTE: For fuel system operation information, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.* 1. Check that fuel tank is not empty. 2. Check that there are no leaks in the fuel system. 3. Check for clogged fuel filters. 4. Check for a restricted vent in fuel tank. 5. Check for clogged MAP sensor (if applicable). 6. Check for leaky air system, turbo boots. 7. Check connector for Suction Control Valve Solenoid. Was the problem identified?	**YES:** Repair and verify problem is resolved. **NO:** GO TO ❸

– – –1/1

❸ **Low Pressure Fuel Supply System Test**	See and do F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST, found later in this group. Was the problem resolved?	**YES:** Return engine to the customer. **NO:** GO TO ❹

– – –1/1

❹ **High Pressure Fuel Supply System Test**	See and do F2 - HIGH PRESSURE FUEL SUPPLY SYSTEM TEST, found later in this group. Was the problem resolved?	**YES:** Return engine to the customer. **NO:** GO TO ❺

– – –1/1

❺ **Check Fuel Quality**	See CHECK FUEL SUPPLY QUALITY later in this group. Was the fuel quality within John Deere guidelines listed in the owner's manual for this engine?	**YES:** GO TO ❻ **NO:** Replace the fuel and verify problem is resolved. – – –1/1

❻ **Air in fuel**	See TEST FOR AIR IN FUEL later in this group. Did fuel system pass test?	**YES:** GO TO ❼ **NO:** GO TO and do BLEED THE FUEL SYSTEM, later in this group and verify that problem is resolved. – – –1/1

❼ **Fuel Return System**	See CHECK FOR RESTRICTED FUEL LEAK-OFF LINE, later in this group. Was the return fuel line pressure higher than recommended?	**YES:** Resolve the concern and verify problem is resolved. **NO:** See E1 - Engine Misfires/Runs Irregularly earlier in this group. – – –1/1

E8 - Abnormal Engine Noise

Symptom	Problem	Solution
E8 - Abnormal Engine Noise	Worn main or connecting rod bearings	Determine bearing clearance. See CYLINDER BLOCK, LINERS, PISTONS, AND RODS SPECIFICATIONS in Section 06, Group 200 or CRANKSHAFT, MAIN BEARINGS, AND FLYWHEEL SPECIFICATIONS in Section 06, Group 200 of the base engine manual.
	Excessive crankshaft end play	Check crankshaft end play. See CHECK CRANKSHAFT END PLAY in Section 02, Group 040 of the base engine manual.
	Loose main bearing caps	Check bearing clearance; replace bearings and bearing cap screws as required. See CRANKSHAFT, MAIN BEARINGS, AND FLYWHEEL SPECIFICATIONS in Section 06, Group 200 of the base engine manual.
	Worn connecting rod bushings and piston pins	Inspect piston pins and bushings. See INSPECT PISTON PINS AND BUSHINGS in Section 02, Group 030 of the base engine manual.
	Scored pistons	Inspect pistons. See INSPECT PISTON PINS AND BUSHINGS in Section 02, Group 030 of the base engine manual.
	Worn timing gears or excess back lash	Check timing gear back lash. See and MEASURE CAMSHAFT END PLAY and MEASURE TIMING GEAR BACKLASH in Section 02, Group 050 of the base engine manual.

Continued on next page

Symptom	Problem	Solution
	Excessive valve clearance	Check and adjust valve clearance. See CHECK AND ADJUST VALVE CLEARANCE in Section 02, Group 020 of the base engine manual.
	Worn camshaft	Inspect camshaft. See VISUALLY INSPECT CAMSHAFT in Section 02, Group 050 of the base engine manual.
	Worn rocker arm shaft(s)	Inspect rocker arm shafts. See DISASSEMBLE AND INSPECT ROCKER ARM SHAFT ASSEMBLY in Section 02, Group 020 of the base engine manual.
	Insufficient engine lubrication	See L2 - ENGINE OIL PRESSURE LOW in Section 04, Group 150 of the base engine manual.
	Turbocharger noise	See TURBOCHARGER INSPECTION in Section 02, Group 080 of the base engine manual.

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E9 - Analog Throttle (A) Does Not Respond

NOTE: This procedure is necessary for OEM applications only. For other applications, check for Diagnostic Trouble Codes (DTCs) and follow the corresponding procedure.

Symptom	Problem	Solution
E9 - Analog Throttle (A) Does Not Respond	Active DTC Check	Read DTCs on SERVICE ADVISOR™. Go to the diagnostic procedure for the corresponding DTC.
	Analog Throttle (A) Check	See T4 - ANALOG THROTTLE (A) INPUT LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 later in this manual.

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E10 - Analog Throttle (B) Does Not Respond

NOTE: This procedure is necessary for OEM applications only. For other applications, check for Diagnostic Trouble Codes (DTCs) and follow the corresponding procedure.

Symptom	Problem	Solution
E10 - Analog Throttle (B) Does Not Respond	Active DTC Check	Read DTCs on SERVICE ADVISOR™. Go to the diagnostic procedure for the corresponding DTC.
	Analog Throttle (B) Check	See T6 - ANALOG THROTTLE (B) INPUT LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 later in this manual.

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F1 - Low Pressure Fuel Supply System Test

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F1 - Low Pressure Fuel Supply System Test Diagnostic Procedure

NOTE: For fuel system operation information, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.

– – –1/1

❶ **Preliminary Check**	1. If not done previously, diagnose active DTCs first. 2. Check for ruptured fuel lines. 3. Check for restricted vent in fuel tank or fuel cap. 4. Check that the fuel pick-up line is submerged in fuel. 5. Check that additional in-line filters are not plugged (if applicable). 6. Check that engine is primed and that bleeder screw is screwed in on fuel filter(s). 7. If fuel system has been recently opened (filter changed, line removed etc.) perform fuel system bleed procedure. See BLEED THE FUEL SYSTEM later in this group. 8. Ensure fuel quantity and quality are OK. See CHECK FUEL SUPPLY QUALITY later in this group. Was the problem found?	**YES:** Repair and verify problem is resolved. **NO:** GO TO ❷

– – –1/1

❷ **Connect to SERVICE ADVISOR™**	1. Connect to Service ADVISOR; see CONNECTING TO SERVICE ADVISOR later in this section. 2. Ignition ON, engine OFF. Were you able to connect with Service ADVISOR?	**YES:** GO TO ❸ **NO:** See D1 - ECU DOES NOT CONNECT WITH SERVICE diagnostic procedure, later in this group.

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– – –1/1

❸ **Service ADVISOR Fault Codes**	1. Write down all active and inactive fault codes. 2. Save all snapshot information. (See SNAPSHOT INFORMATION later in this section.) 3. Resolve all active fault codes before proceeding. *NOTE: Inactive fault codes can relate to existing problems. They could be an indication of a failing component.* *NOTE: When DTCs are cleared, snapshot information for ALL DTCs will also be cleared.* Were there active fault codes?	**YES:** Go to and do the diagnostic procedure relating to the particular code. **NO:** GO TO ❹ – – –1/1
❹ **Fuel Rail Pressure Check**	1. Ignition ON, engine cranking. 2. Using Service ADVISOR or the ECU diagnostic software, read Fuel Rail Pressure - Actual. Is the fuel rail pressure - actual 20 MPa (200 bar) (2900 psi) or above?	**YES:** Problem does not appear to be in the low pressure fuel supply system. See F2 - HIGH PRESSURE FUEL SUPPLY SYSTEM TEST later in this group. **NO:** GO TO ❺ – – –1/1
❺ **Replace Fuel Filters**	1. Replace the primary and final fuel filters. (Also replace any other in-line fuel filters, if applicable.) 2. Ignition ON, engine cranking. 3. Using Service ADVISOR or the ECU diagnostic software, read Fuel Rail Pressure - Actual. Is the fuel rail pressure - actual 20 MPa (200 bar) (2900 psi) or above?	**YES:** Verify problem is resolved. **NO:** GO TO ❻ – – –1/1
❻ **Final Fuel Filter Header Check**	Check for leaks or obstructions in the primary and final fuel filter headers. Are there any leaks or obstructions?	**YES:** Repair and verify problem is resolved. **NO:** GO TO ❼ – – –1/1

❼ Fuel Pressure at Final Fuel Filter Check	1. Ignition OFF 2. Remove plug and connect proper pressure gauge from Universal Pressure Kit JT05412 to final fuel filter outlet, which is the outermost port on the fuel filter header, using an M12 x 1.5 fitting. (This port is either unused or, if applicable, can be equipped with a pressure sensor.) 3. Ignition ON, engine cranking. 4. Using gauge, read pressure. Is the fuel pressure 30 kPa (0.3 bar) (4.4 psi) or above?	**YES:** GO TO ❿ **NO:** GO TO ❽ – – –1/1

❽ Fuel Line Check	Check for a partially restricted fuel line between the following: • Fuel tank and primary filter • Primary filter and transfer pump inlet • Transfer pump outlet and final fuel filter inlet Are there any fuel restrictions?	**YES:** Repair fuel line and verify problem is resolved. **NO:** GO TO ❾ – – –1/1

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❾ New Fuel Supply	Install a temporary fuel system - fill clean container, suitable for diesel fuel, with fuel; remove fuel inlet line from transfer pump, and install temporary line from transfer pump inlet to container; and remove return line from tee on injection pump, and install temporary line from tee to container. Then perform the following check: 1. Ignition OFF 2. Remove plug and connect proper pressure gauge from Universal Pressure Kit JT05412 to final fuel filter outlet, which is the outermost port on the fuel filter header, using an M12 x 1.5 fitting. (This port is either unused or, if applicable, can be equipped with a pressure sensor.) 3. Ignition ON, engine cranking or running at low idle. 4. Using gauge, read pressure. Is the fuel pressure 30 kPa (0.3 bar) (4.4 psi) or above?	**YES:** Check that there are no restrictions in fuel pick-up line. Reassemble and verify problem is resolved, then return to previous diagnostic procedure. **NO:** Remove and replace fuel transfer pump (See REMOVE FUEL TRANSFER PUMP and INSTALL FUEL TRANSFER PUMP procedure in Section 02, Group 090 earlier in this manual). – – –1/1

❿ Fuel Line Check at High Pressure Pump Inlet	Check for a partially restricted fuel line between the final fuel filter outlet and high pressure fuel pump inlet. Are there any fuel restrictions?	**YES:** Repair fuel line and verify the problem is resolved. **NO:** Return to previous diagnostic procedure. – – –1/1

F2 - High Pressure Fuel Supply System Test

BK34394,0000031 –19–29MAY07–1/1

F2 - High Pressure Fuel Supply System Test Diagnostic Procedure

NOTE: For fuel system operation information, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.

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.

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❶ **Preliminary Check**	1. If not done previously, diagnose active DTCs first. 2. If not done previously, check that low pressure portion of fuel system is working correctly. See F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST earlier in this group. Was the problem found?	**YES:** Repair and GO TO ❷ **NO:** GO TO ❷

– – –1/1

❷ **High Pressure Fuel Pump Overflow Orifice Test**	1. Ignition OFF 2. Disconnect the fuel leak-off line between the tee coming from the injector and fuel rail leak-off lines, and the high pressure fuel pump overflow orifice fitting. Be sure to run hose from open fuel leak-off line to a suitable container for diesel. 3. Connect a clear hose to the overflow orifice, routing the other end into a suitable container for diesel fuel. 4. Ignition ON, engine cranking or running at low idle. Is fuel flow through overflow orifice greater than ?? oz. (?? mL) per minute?	**YES:** Faulty high pressure fuel pump. Replace high pressure fuel pump (See REMOVE AND INSTALL HIGH PRESSURE FUEL PUMP in Section 02, Group 090 earlier in this manual). **NO:** If there was no fuel flow, pump is not lubricating. Replace high pressure fuel pump (See REMOVE AND INSTALL HIGH PRESSURE FUEL PUMP in Section 02, Group 090 earlier in this manual). **NO:** If there was fuel flow, GO TO ❸ – – –1/1

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❸ **Injector Leak-off Check**	1. Ignition OFF 2. Disconnect injector fuel leak-off line at tee. 3. Connect a clear hose to the injector leak off line, routing the other end into a suitable container for diesel fuel. 4. Ignition ON, engine cranking or running at low idle. Is fuel flow from injector leak-off line greater than 20 ounces (591 mL) in 2.5 minutes?	**YES:** Possible injector problem. Recheck for active DTCs and determine which injector is damaged, then see REMOVE ELECTRONIC INJECTOR (EI) and INSTALL ELECTRONIC INJECTOR (EI). **NO:** If there was no fuel flow, check for restrictions in the fuel leak-off line and repair. If no restrictions were found, GO TO ❹ **NO:** If there was fuel flow, GO TO ❹ – – –1/1

❹ **Fuel Rail Pressure Test**	1. Ignition ON, engine cranking or running at low idle. 2. Using Service ADVISOR or the ECU diagnostic software, read Fuel Rail Pressure - Actual. Is the fuel rail pressure - actual 20 MPa (200 bar) (2900 psi) or above?	**YES:** Return to previous diagnostic procedure. **NO:** GO TO ❺ – – –1/1

❺ **Pressure Limiter Test**	**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.** 1. Before removing fuel line from pressure limiter, turn engine OFF and let sit for at least 5 minutes. This will relieve fuel pressure from the High Pressure Common Rail. 2. Thoroughly clean all fuel lines, fittings, components, and chamfered area around the pressure limiter. 3. Disconnect fuel return line fitting at the fuel leak-off line from the pressure limiter valve. DO NOT remove the pressure limiter valve. 4. Run a clear line from a suitable container for diesel fuel to the pressure limiter valve. 5. Ignition ON, engine running. 6. Check fuel flow at pressure limiter valve. Is there more than minimal fuel flow present?	**YES:** Faulty pressure limiter valve. Replace pressure limiter (See REMOVE AND INSTALL PRESSURE LIMITER in Section 02, Group 090 earlier in this manual). **NO:** Faulty high pressure fuel pump. Replace high pressure fuel pump (See REMOVE AND INSTALL HIGH PRESSURE FUEL PUMP in Section 02, Group 090 earlier in this manual). – – –1/1

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F3 - Excessive Fuel Consumption

System	Problem	Solution
NOTE: *Contact your local John Deere representative for your engine's fuel consumption specifications.*		
F3 - Excessive Fuel Consumption	Poor fuel quality	Drain fuel and replace with quality fuel of the proper grade.
	Engine overloaded	Reduce engine load.
	Air cleaner restricted or dirty	Replace air cleaner element as required.
	Compression too low	Determine cause of low compression and repair as required.
	Leaks in fuel supply system	Locate source of leak and repair as required.
	Engine break-in procedure is not complete or not properly done	Drain oil and perform engine break-in procedure per applicable engine Operator's Manual.

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F4 - Fuel in Oil

DB92450,0000027 –19–24MAY07–1/1

F4 - Fuel in Oil Diagnostic Procedure

– – –1/1

❶ **Oil Contamination Test**	1. Check for increase in engine oil level. 2. Determine that contaminant is present in oil. 3. Send oil sample to laboratory to identify contaminant. Is contaminant fuel?	**YES:** GO TO ❷ **NO:** GO TO solution for identified contaminant; or if no contaminant present, return to original diagnostic procedure. – – –1/1
❷ **High Pressure Pump Return Fuel Checkout**	Go to and do CHECK FOR RESTRICTED FUEL LEAK-OFF LINE in this group. Did return fuel system pass CHECK FOR RESTRICTED FUEL LEAK-OFF LINE test?	**YES:** GO TO ❸ **NO:** Locate and remove restriction (See REMOVE AND INSTALL LEAK-OFF LINES in Section 02, Group 090), then verify problem is resolved. – – –1/1
❸ **High Pressure Pump Front Seal Checkout**	*NOTE: For removal and installation procedures, see REMOVE AND INSTALL HIGH PRESSURE FUEL PUMP, Section 02, Group 090 in this CTM.* Remove high pressure pump and check for fuel leakage and seal damage. Was there evidence of fuel leakage or seal damage?	**YES:** Replace high pressure pump and verify that problem is resolved. **NO:** Reinstall pump, and GO TO ❹ – – –1/1

❹ **Loose injector clamp Check**	Remove heat shield and check for loose Electronic Injector (EI) clamps. Were the clamps tight?	**YES:** GO TO ❺ **NO:** Tighten all loose EI clamps, and replace heat shield. For torque specifications, see INSTALL ELECTRONIC INJECTORS (EI) in section 2, group 090 earlier in this manual. – – –1/1

❺ **Injection Nozzle Check**	Check for fuel leaking past the rings, causing black exhaust and/or engine misfire. Repair if necessary and verify that problem is resolved. Was there heavy black smoke and/or engine misfire?	**YES:** Heavy black smoke. See E5 - ENGINE EMITS EXCESSIVE BLACK OR GRAY SMOKE DIAGNOSTIC PROCEDURE earlier in this group. **YES:** Engine misfire. See E2 - ENGINE MISFIRES/RUNS IRREGULARLY DIAGNOSTIC PROCEDURE earlier in this group. **NO:** Return to original diagnostic procedure. – – –1/1

D1 - ECU Does Not Communicate with Service ADVISOR

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D1 - ECU Does Not Communicate with Service ADVISOR Diagnostic Procedure

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

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

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

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

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

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

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

– – –1/1

❶ **Preliminary Checks**	Perform as many of these preliminary checks as possible to help determine if problem is related to the PC, cables, or adaptor: • Verify all connections between diagnostic connector and service tool are properly connected and fully seated. • Verify that the adaptor type shown in the Select Readings Option in Service ADVISOR matches the adaptor being used (PDM or EDL) and the type of communication between PC and adaptor (parallel, USB, or Bluetooth). • Close Service ADVISOR and shut down PC. Restart PC, open Service ADVISOR and attempt to connect to ECU. • Attempt to connect to the ECU on a different application, if one is available. • Try to connect using a different USB port (EDL or PDM with USB adaptor). • Try to connect using a different USB or parallel cable, if available. • Try to connect using Bluetooth, if using EDL and PC has Bluetooth capability. • Try to connect using a different adaptor or different type of adaptor, if available. • Try to connect using a different PC, if available. Does Service ADVISOR now connect to the original ECU?	**YES:** Determine which cable or adaptor is defective and replace, if applicable. **NO:** No other application available to verify equipment. GO TO ❷ **NO:** Service ADVISOR connected to ECU on a different application. GO TO ❷ **NO:** Service ADVISOR would not connect to ECU on a different application and you have narrowed down problem to PC. Contact JDIS for support. – – –1/1

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❷ **Check Adaptor Type**	Are you using an EDL adaptor?	**YES:** GO TO ❸ **NO:** PDM GO TO ❻ – – –1/1

❸ **Check for Red Error Light - EDL**	1. For USB connection, attach the USB cable to the EDL and the PC. 2. Attach the EDL cable to the EDL and the application diagnostic connector. 3. Ignition ON engine OFF. 4. Open Service ADVISOR and attempt to connect to the ECU. Is the EDL red error indicator light ON?	**YES:** Replace EDL. GO TO ㉖ **NO:** EDL with USB GO TO ❹ **NO:** EDL with Bluetooth GO TO ❺ – – –1/1

❹ **Check for Green Power Light - EDL with USB**	*NOTE: EDL receives its power supply from either the USB cable or the diagnostic connector.* Is the EDL green power light ON?	**YES:** GO TO ❾ **NO:** Try a different USB cable. GO TO ❶ **NO:** No other USB cable available. GO TO ❼ – – –1/1

❺ **Check for Green Power Light - EDL with Bluetooth**	Is the EDL green power light ON?	**YES:** GO TO ⑩ **NO:** Connect with a USB cable instead of Bluetooth. GO TO ❶ **NO:** No USB cable available. GO TO ❼ – – –1/1
❻ **Check for Green Power Light - PDM**	1. Attach the parallel cable to the PDM and the PC or USB adaptor. 2. If using USB adaptor, attach the USB cable to the adaptor and the PC. 3. Attach the PDM cable to the PDM and application diagnostic connector. 4. Ignition ON engine OFF. Is the PDM green power indicator light ON?	**YES:** GO TO ⑪ **NO:** GO TO ❼ – – –1/1
❼ **Check Diagnostic Connector Voltage Supply**	1. Disconnect EDL or PDM cable from diagnostic connector. 2. On the harness, measure the voltage from the 9-pin diagnostic connector battery supply (terminal B) to ground (terminal A). Is the voltage greater than 10V?	**YES:** GO TO ❽ **NO:** Fix problem. GO TO ㉖ – – –1/1
❽ **Check Cable**	1. Disconnect cable from EDL or PDM. 2. Perform Terminal Test on cable. 3. On the cable, measure the resistance between the 26-pin connector power (terminal 9) and the 9-pin connector power (terminal B). 4. On the cable, measure the resistance between the 26-pin connector ground (terminal 8) and the 9-pin connector ground (terminal A). Were Terminal Test results good and are both resistance measurements less than 10 ohms?	**YES:** Replace EDL or PDM. GO TO ㉖ **NO:** Replace cable. GO TO ㉖ – – –1/1

9 Check for Amber Data Transfer Light - EDL with USB	1. Monitor EDL amber data transfer light closely. 2. Attempt to connect Service ADVISOR to the ECU. Did amber data transfer light flash ON briefly or is the amber light ON continuous?	**YES:** Amber light flashed ON briefly. GO TO 12 **YES:** Amber light is ON continuous. Service ADVISOR is connected to the ECU. **NO:** Amber light did not illuminate at all. No communication between PC and EDL. GO TO 1 – – –1/1
10 Check for Amber Data Transfer Light - EDL with Bluetooth	1. Monitor EDL amber data transfer light closely. 2. Attempt to connect Service ADVISOR to the ECU. Did amber data transfer light flash ON briefly or is the amber light ON continuous?	**YES:** Amber light flashed ON briefly. GO TO 12 **YES:** Amber light is ON continuous. Service ADVISOR is connected to the ECU. **NO:** Amber light did not illuminate at all. Use USB cable. GO TO 1 – – –1/1
11 Check for Red CAN Light - PDM	1. Monitor PDM red CAN light. 2. Attempt to connect Service ADVISOR to the ECU. Did red CAN light flash several times or is red CAN light ON continuous?	**YES:** Red CAN light flashed several times. GO TO 12 **YES:** Red CAN light is ON continuous. Service ADVISOR is connected to the ECU. **NO:** Red CAN light did not illuminate at all. No communication between PC and PDM. GO TO 1 – – –1/1
12 Check Engine Operation	Attempt to start engine. Does engine start?	**YES:** GO TO 13 **NO:** GO TO 14 – – –1/1

⓭ Test ECU Terminals	1. Ignition OFF, engine OFF. 2. Disconnect ECU connector J2. 3. Perform Terminal Test on J2. Were any problems found?	**YES:** Fix problem. GO TO ㉖ **NO:** GO TO ⓱ – – –1/1

⓮ Check ECU Fuses and Voltages	1. Ignition ON, engine OFF. 2. Check ECU ignition and ECU battery supply fuses. 3. Measure voltage from ECU ignition fuse to single point ground. 4. Measure voltage from ECU battery supply fuse to single point ground. Are both fuses good and are both voltage measurements within 1V of battery voltage?	**YES:** GO TO ⓯ **NO:** Fix problem. GO TO ㉖ – – –1/1

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⓯ Test ECU Terminals	1. Ignition OFF, engine OFF. 2. Disconnect ECU connector J2. 3. Perform Terminal Test on J2. Were any problems found?	**YES:** Fix problem. GO TO ㉖ **NO:** GO TO ⓰ – – –1/1

⓰ Check ECU Voltages	1. Ignition ON, engine OFF. 2. On the harness, measure voltage from ECU ignition (terminal J2-B2) to ECU ground (terminal J2-L2). 3. On the harness, measure voltage from ECU battery supply (terminal J2-L1) to ECU ground (terminal J2-L2). Are both measurements within 1V of battery voltage?	**YES:** GO TO ⓱ **NO:** Fix problem. GO TO ㉖ – – –1/1

17 Check CAN Wiring for Open Circuit	1. Ignition OFF, engine OFF. 2. Disconnect application battery negative cable. 3. On the harness, measure the resistance between ECU CAN High (terminal J2-A1) and diagnostic connector CAN High (terminal C). 4. On the harness, measure the resistance between ECU CAN Low (terminal J2-B1) and diagnostic connector CAN Low (terminal D). *NOTE: If BOTH readings are approximately 60 ohms or 120 ohms, CAN High and CAN Low are likely swapped between the ECU and the diagnostic connector.* Were both measurement less than 10 ohms?	**YES:** Reconnect ECU J2 connector. GO TO 18 **NO:** Fix problem. GO TO 26 – – –1/1
18 Check CAN for Short to Ground	1. On the harness, measure the resistance between the diagnostic connector CAN High (terminal C) and single point ground. 2. On the harness, measure the resistance between the diagnostic connector CAN Low (terminal D) and single point ground. Were both measurements greater than 1k ohms?	**YES:** GO TO 19 **NO:** Repair short to ground of CAN wiring. GO TO 26 – – –1/1
19 Check CAN Terminator(s)	On the harness, measure the resistance between diagnostic connector CAN High (terminal C) and CAN Low (terminal D). Is the resistance between 50 and 130 ohms?	**YES:** GO TO 20 **NO:** Resistance is greater than 130 ohms. GO TO 21 **NO:** Resistance is less than 50 ohms: Repair short between CAN High and CAN Low. GO TO 26 – – –1/1
20 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 CAN High (terminal C) to single point ground. 4. On the harness, measure the voltage from the application diagnostic connector CAN Low (terminal D) to single point ground. Were both measurements less than 4 volts?	**YES:** GO TO 23 **NO:** Repair short to power of CAN wiring. GO TO 26 – – –1/1

21 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. A second terminator may be located near the diagnostic gauge or diagnostic connector. 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 CAN High (terminal C) and terminator connector(s) CAN High. 5. On the harness, measure the resistance between diagnostic connector CAN Low (terminal D) and terminator connector(s) CAN Low. Are all measurements less than 10 ohms and are terminal test results OK?	**YES:** GO TO 22 **NO:** Fix problem. GO TO 26 – – –1/1
22 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 26 **NO:** Replace defective CAN terminator(s). GO TO 26 – – –1/1
23 Disconnect Other Modules	1. Ignition OFF, engine OFF. 2. If applicable, disconnect diagnostic gauge and all other devices that are connected to CAN, except ECU. 3. Ignition ON, engine OFF. 4. Attempt to connect Service ADVISOR to ECU. Did Service ADVISOR connect to ECU?	**YES:** Determine which device is causing CAN communication problem. GO TO 26 **NO:** GO TO 24 – – –1/1
24 Reprogram ECU	1. Download payload for the ECU. 2. Attempt to reprogram the ECU. Was Service ADVISOR able to reprogram ECU?	**YES:** GO TO 26 **NO:** GO TO 25 – – –1/1

㉕ **Replace ECU**	*NOTE: Verify that Service ADVISOR connects to the ECU on a different application with the equipment you are using prior to replacing ECU.* 1. Replace ECU and program with payload. 2. Attempt to connect Service ADVISOR to ECU. Did Service ADVISOR connect to ECU?	**YES:** GO TO ㉖ **NO:** Open DTAC case. – – –1/1

㉖ **Verification**	1. Ignition OFF, engine OFF. 2. Reconnect all connectors and negative battery cable, if removed 3. Ignition ON, engine OFF. 4. Attempt to connect Service ADVISOR to ECU. Did Service ADVISOR connect to the ECU?	**YES:** Problem fixed. **NO:** GO TO ❶ – – –1/1

D2 - Diagnostic Gauge Does Not Communicate With ECU

DN22556,0000293 –19–29MAY07–1/1

D2 - Diagnostic Gauge Does Not Communicate With ECU Diagnostic Procedure

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

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

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

– – –1/1

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

– – –1/1

❷ **Check Diagnostic Gauge Voltage Supply**	1. Ignition OFF, engine OFF. 2. Disconnect diagnostic gauge 6-pin connector. 3. Perform Terminal Test on connector. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage from the diagnostic gauge connector ignition supply (terminal 1) to the connector ground (terminal 6). Are terminal test results good and is voltage within 1V of battery voltage?	**YES:** Replace diagnostic gauge. ❻ **NO:** Fix problem. GO TO ❻

– – –1/1

❸ **Check ECU Communication**	1. Ignition ON, engine OFF. 2. Attempt to connect Service ADVISOR to ECU. Does Service ADVISOR connect to the ECU?	**YES:** GO TO ❹ **NO:** Discontinue this test and perform test D1.

– – –1/1

❹ **Check Connector**	1. Ignition OFF, engine OFF. 2. Access view of rear of diagnostic gauge and determine which of the two connectors on the diagnostic gauge that the wire harness is connected. *NOTE: The diagnostic gauge left-side connector, as viewed from the rear of the gauge, should be connected to the wire harness containing the CAN wires. The right-side connector is used to connect the diagnostic gauge to optional analog gauges.* Is application wire harness 6-way connector containing the CAN wires connected to the diagnostic gauge left-side connector, as viewed from the rear of the gauge?	**YES:** GO TO ❺ **NO:** Connect to the left-side connector. GO TO ❻ – – –1/1
❺ **Check CAN Wiring**	1. Disconnect diagnostic gauge connector. 2. On the harness, measure the resistance between the diagnostic gauge CAN High (terminal 2) and diagnostic connector CAN High (terminal C). 3. On the harness, measure the resistance between the diagnostic gauge CAN Low (terminal 3) and diagnostic connector CAN Low (terminal D). Are both resistance measurements less than 10 ohms?	**YES:** Replace diagnostic gauge. GO TO ❻ **NO:** Fix CAN wiring. GO TO ❻ – – –1/1
❻ **Verification**	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine ON. 4. Check diagnostic gauge operation. Does diagnostic gauge display engine information?	**YES:** Problem fixed. **NO:** GO TO ❶ – – –1/1

D5 - ECU Does Not Program With Service ADVISOR

JB81757,0000007 –19–18MAY07–1/1

D5 - ECU Does Not Program with Service ADVISOR Diagnostic Procedure

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

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

– – –1/1

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

– – –1/1

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

– – –1/1

❸ **Check for New ECU**	Are you attempting to program a new replacement ECU?	**YES:** GO TO ❹ **NO:** Attempting to reprogram the original ECU. GO TO ❺ – – –1/1
❹ **Parameters**	Were you able to successfully retrieve the parameters from the old ECU when prompted in Service ADVISOR?	**YES:** Consult WebHelpR in Service ADVISOR help menu. **NO:** Old ECU is available and operational. GO TO ❺ **NO:** Old ECU is not available or is not operational. Consult WebHelpR in Service ADVISOR help menu. – – –1/1
❺ **Check for Service Advisor Communication**	*NOTE: A live connection in Service ADVISOR cannot be obtained with a new ECU until it has been programmed.* 1. Ignition OFF, engine OFF. 2. Connect old or original ECU to wire harness. 3. Ignition ON, engine OFF. 4. Attempt to connect to ECU (live connection) using Service ADVISOR. Does Service ADVISOR connect to the old or original ECU?	**YES:** Attempting to reprogram original ECU. Replace original ECU. **YES:** Attempting to program a new ECU. Consult WebHelpR in Service ADVISOR help menu. **NO:** Discontinue test D5 and start test D1. – – –1/1

A1 - Intake Air Heater Check

RG41221,00002C6 –19–18MAY07–1/1

A1 - Intake Air Heater Check Diagnostic Procedure

Related Information
The intake air heater is located between the intake pipe and intake manifold. Its function is to heat the intake air during cold starting conditions. Its operation time is dependent on the engine coolant temperature that the ECU detects at key-on.

Alarm Level:
N/A

04
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Control Unit Response:
If coolant temperature is below the setpoint (typically 0-5°C), the ECU will turn on the intake air heater when the operator turns the ignition switch to ON. The ECU will turn the heater off during cranking, then turn it back on during run-up and for a period of time after run-up.

Additional References:
For further intake air heater information, see INTAKE AIR HEATER OPERATION in Section 03, Group 140 earlier in this manual.

For application-specific information on intake air heater times vs. temperatures, see APPLICATION SPECIFICATIONS in Section 06, Group 210 later in this manual.

NOTE: The air heater indicator light is the same light that trouble codes are displayed on. If the light stays on past 25 seconds, check for trouble codes or a short to ground in the air heater indicator light wire.

– – –1/1

❶ **Connection Check**	**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.** *NOTE: For wiring and theory of operation information, see INTAKE AIR HEATER OPERATION in Section 03, Group 140 earlier in this manual.* Perform a preliminary inspection of the ECU connector, air heater relay connector, air heater connector, and all connections in between. Look for dirty, damaged, or poorly positioned terminals. Was the problem found?	**YES:** Repair faulty connection(s) and verify problem is resolved. **NO:** GO TO ❷

– – –1/1

❷ **Air Heater Indicator Light Check**	*NOTE: Do not run engine during this diagnostic procedure.* *NOTE: For wiring and theory of operation information, see INTAKE AIR HEATER OPERATION in Section 03, Group 140 earlier in this manual.* 1. Key ON, engine OFF 2. Verify that the air heater indicator light is working. Does the light illuminate?	**YES:** GO TO ❸ **NO:** Faulty air heater indicator light wiring OR Faulty air heater indicator light – – –1/1

❸ **Active DTC Test**	*NOTE: For wiring and theory of operation information, see INTAKE AIR HEATER OPERATION in Section 03, Group 140 earlier in this manual.* 1. Connect to SERVICE ADVISOR™. For instructions on connecting to the SERVICE ADVISOR™, see CONNECTING TO SERVICE ADVISOR in Group 160 later in this manual. 2. Ignition ON, engine OFF 3. Start the ECU Communication Software. 4. Make note of any DTCs, then clear all DTCs. 5. Key ON, engine OFF 6. Read DTCs using SERVICE ADVISOR. Does the diagnostic software display any DTCs?	**YES:** Go to appropriate diagnostic procedure and resolve active DTCs. **NO:** GO TO ❹

SERVICE ADVISOR is a trademark of Deere & Company

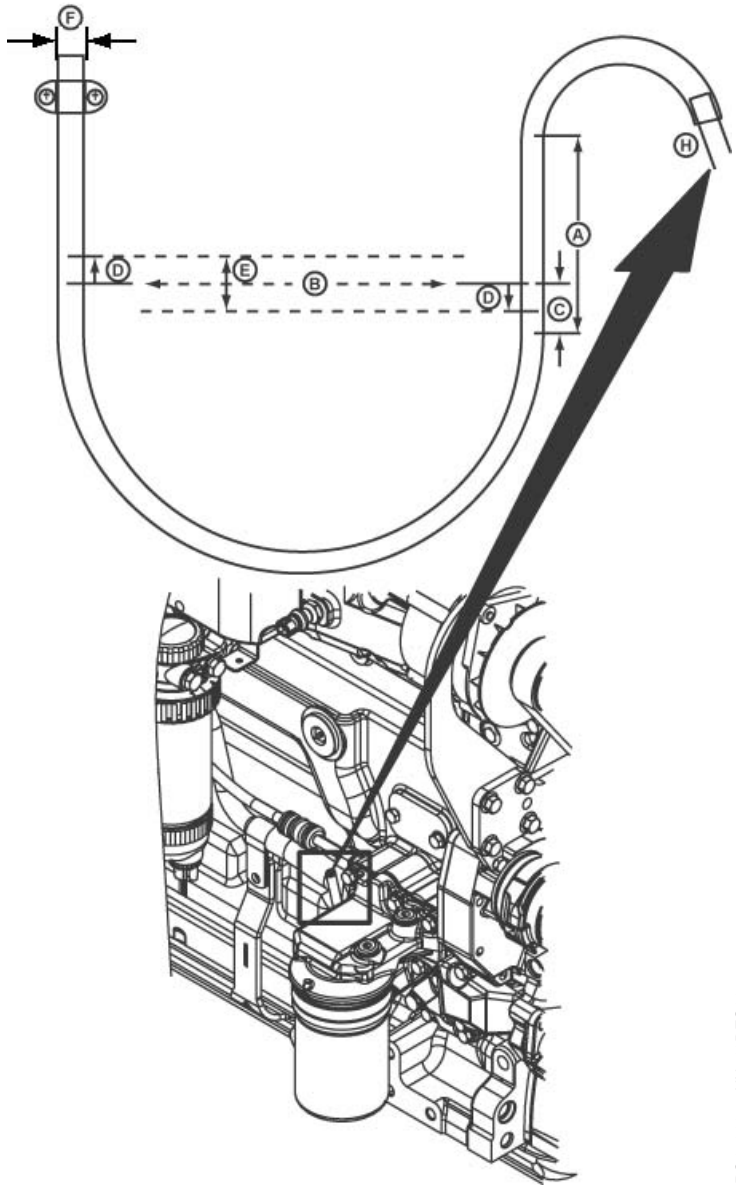
– – –1/1

❹ **Engine Coolant Temperature Check**	*NOTE: For wiring and theory of operation information, see INTAKE AIR HEATER OPERATION in Section 03, Group 140 earlier in this manual.* 1. Key ON, engine OFF 2. Using the diagnostic software, read engine coolant temperature. Is the engine coolant temperature -5°C (23°F) or less?	**YES:** GO TO ❺ **NO:** Air heater will not come on if temperature is above -5°C (23°F). – – –1/1

❺ **Air Heater Check**	*NOTE: For wiring and theory of operation information, see INTAKE AIR HEATER OPERATION in Section 03, Group 140 earlier in this manual.* 1. Key OFF 2. Monitor the temperature of air heater housing. 3. Key ON, engine OFF 4. Continue to monitor temperature of air heater housing. Does the air heater housing temperature increase?	**YES:** No air heater related problem found. **NO:** GO TO ❻ – – –1/1

❻ **Air Heater Relay Check**	*NOTE: For wiring and theory of operation information, see INTAKE AIR HEATER OPERATION in Section 03, Group 140 earlier in this manual.* 1. Key OFF 2. Listen for air heater relay to click while turning key ON (engine OFF). Does the relay click?	**YES:** Faulty power wire to relay OR Faulty wire between relay and heater OR Faulty air heater relay **NO:** Faulty air heater enable wire OR Faulty relay ground OR Faulty relay – – –1/1

Excessive Engine Crankcase Pressure (Blow-By) Test



Blow-by Test Setup

A—30.5 cm (12 in.) Vertical Tubing, Both Sides
B—Fluid Level Prior to Start of Test
C—Minimum 76.2 mm (3 in.) Vertical Fluid Prior to Start of Test
D—Maximum Allowable Vertical Fluid Travel 25.4 mm (1.0 in.) Each Side
E—Max. Allow. Total Vertical Fluid Travel 50.8 mm (2.0 in.) Both Sides
F—9.53 mm (0.375 in.) o.d. (outer dimension) 6.35 mm (1/4 in) i.d. (inner dimension) Tubing (minimum length 91.4 cm (3 ft))
G—Oil Dipstick Tube

Continued on next page

Most blow-by comes from combustion gas leakage past any of three places: piston rings, valve guides, or sealing ring in the turbocharger. As blow-by increases, crankcase pressure also increases. Measuring crankcase pressure is the best way to determine whether or not there is excess leakage past the piston rings, valve guides, or turbocharger seal.

NOTE: the following items are required

- *A small amount of antifreeze or colored water.*
- *Minimum 91.44 cm (3 ft) clear, flexible, plastic tubing 6.35 mm (1/4 in) inner dimension (id) diameter.*
- *Marking pen, pencil, or crayon.*

DB92450,0000022 –19–18MAY07–2/2

Excessive Engine Crankcase Pressure (Blow-By) Diagnostic Procedure

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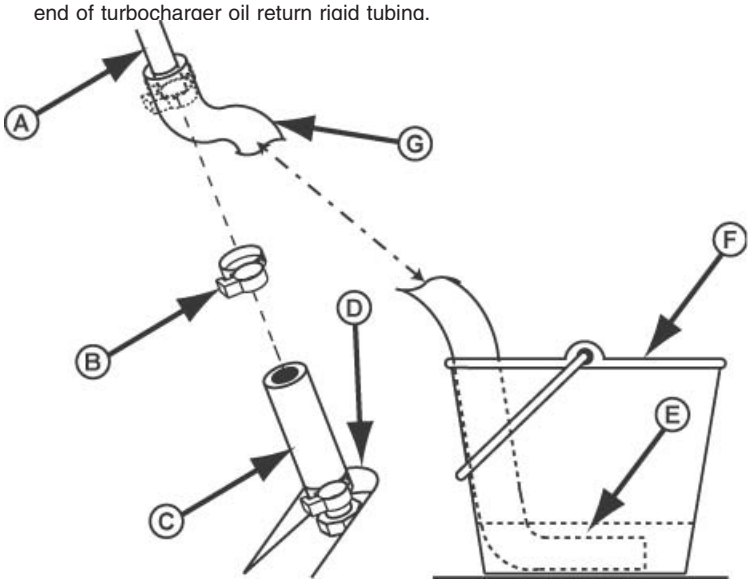
❶ **Measure Crankcase Pressure Test**	Before doing the test: 1. Ensure that crankcase vent tube is open to the atmosphere. 2. Remove dipstick and attach tubing (F) to dipstick tube (H). 3. Attach other end of tubing to a fixed panel, brace, or other firm surface, forming a “U”, as shown above. On both sides, and opposite each other, the tubing must be vertical (A) for 30.5 cm (12 in.). Ensure that tubing is completely open, with no kinks or pinches in it. 4. Pour enough liquid into tube to allow a level of from 76.2 mm (3 in.) to 152.4 mm (6 in.) up both vertical sides of the tube (C). Mark the fluid level. Measure down 25.4 mm (1 in.) from fluid level in tube side nearest to the dipstick tube, and mark it. Measure up 25.4 mm (1 in.) from fluid level in tube side farthest from the dipstick tube, and mark it (D). *NOTE: If at any time during this test, prior to the end, fluid travel exceeds the total (50.8 mm (2.0 in.) both sides) maximum allowable travel, it is not necessary to continue this test* Perform crankcase pressure test, as follows: 1. Ignition ON, engine ON. Let engine stabilize, at low idle, and observe total fluid travel for both sides (E). 2. If possible, slowly load the engine. If not possible, slowly advance idle. Stop at 25% load, or approximate idle increase, and allow engine to stabilize. When engine is stabilized, observe total fluid travel for both sides. 3. Increase load, or advance idle and stop every, additional 25%. When engine is stabilized, observe total fluid travel for both sides. 4. Continue to as near as possible to full load, or to high idle. When engine is stabilized, and observe total fluid travel for both sides. At any time during test, did total fluid travel exceed 50.8 mm (2 in.)?	**YES:** GO TO ❷ **NO:** The crankcase pressure meets John Deere application guidelines. Either return to original diagnostic procedure, or return to customer.

– – –1/1

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:

	a. Ignition ON, engine ON. Let engine stabilize, at low idle, and observe total fluid travel for both sides (E). b. If possible, slowly load the engine. If not possible, slowly advance idle. Stop at 25% load, or approximate idle increase, and allow engine to stabilize. When engine is stabilized, observe total fluid travel for both sides. c. Increase load, or advance idle and stop every, additional 25%. When engine is stabilized, observe total fluid travel for both sides. d. Continue to as near as possible to full load, or to high idle. When engine is stabilized, and observe total fluid travel for both sides. 9. Monitor oil level in bucket to avoid oil spills. 10. Check for bubbles appearing in bucket. 11. When test is completed: *NOTE: If engine blow-by is found, to determine area of engine, remove head, and examine rings and valve guides, see CYLINDER HEAD in base engine CTM.* a. Remove cap or plug from end of turbocharger oil return flexible tubing. b. Loosen clamp, remove flexible tubing drain line from rigid tubing, and remove clamp from test flexible tubing. c. Reattach turbocharger oil return flexible tubing and clamp to turbocharger oil return rigid tubing. Tighten clamp. For torque specification, see Section 6, Group 200 Electronic Fuel System Repair and Adjustment Specifications in this CTM. Did bubbles appear in the bucket water?	**YES:** Remove and replace turbocharger, see AIR INTAKE AND EXHAUST SYSTEM in Section 02, Group 080 of the base engine manual and verify problem is resolved. **NO:** To locate engine blow-by, see TEST ENGINE COMPRESSION PRESSURE in Section 04, Group 150 of the base engine manual. (If possible, do compression test with digital gauge.) –19– –2/2

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Check Fuel Supply Quality

The quality of diesel fuel affects engine performance. Check your operators manual for correct fuel specifications.

Poor quality or contaminated fuel will make the engine hard to start, misfire, run rough or produce low power.

If poor quality or contaminated fuel is suspected, perform the following:

1. Drain primary filter into a clean container, see operators manual.
2. Check for water or debris in the drained fuel.
3. Drain secondary filter into a clean container, see operators manual.
4. Check for water or debris in the drained fuel.
5. Key ON for 1 minute to prime fuel system.
6. Repeat steps 1-5 above.
7. If water or debris is still found replace filters as per operators manual and repeat steps 1-5. If water and or debris is still found drain and clean fuel tank as per machine maintenance manual, else go to step 8.
8. Run engine for 1 minute at 1500 rpm.
9. Operate under load for 1 minute, observing engine performance. If problems still occur go step 10.
10. Reduce engine speed to idle and shutdown engine.
11. Disconnect fuel line from inlet side of primary fuel filter, and fuel return line from fuel pump return, as per operator's manual.

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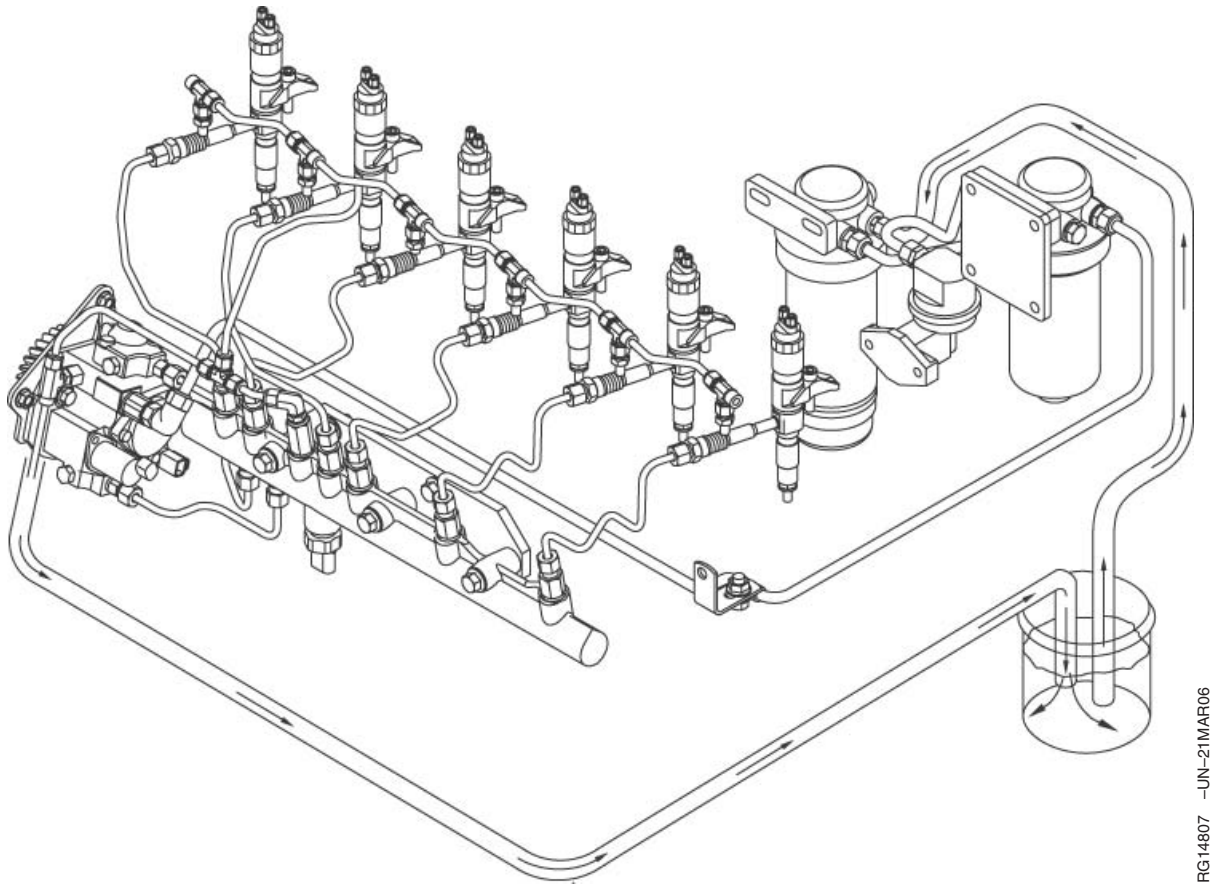

Test Quality of Fuel

12. Connect one hose to inlet port of primary fuel filter, and connect another hose to fuel pump return, as shown.
13. Submerge hose in a container of good quality, clean fuel meeting engine specifications.
14. Operate engine under load and observe performance. If performance improves, fuel is contaminated or not of the proper grade. Check fuel source.

DN22556,0000295 –19–18MAY07–2/2

Test for Air in Fuel

The fuel system will self-purge of air, but a large amount of air entering the fuel system can cause the engine to be hard to start, run rough, misfire, knock, smoke, or produce low power.

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

1. Preliminary checks:
   - Check for loose fittings between fuel tank and fuel supply pump.
   - Check for loose fittings on the fuel cooler, if applicable.
   - Make sure primary filter element is on tight and gasket is intact.
   - Check for damaged fuel pick-up tube in tank.
   - Check for low fuel level in tank.
   - Check for foaming in tank. Foaming strongly suggests air leaking past injectors. If there is foaming, inspect the injector hold down clamp torque, O-rings and seals. See REMOVE AND INSTALL ELECTRONIC INJECTORS in Section 2 of this manual.
   - Air may enter system when engine is turned off: Make sure lines are properly tightened between the secondary filter and the high pressure fuel pump and between high pressure fuel pump leak-off port and cylinder head.
2. Check for air in fuel system:
   a. Disconnect the return-to-tank line from the T-connector located next to the #6 injector fuel line (on some applications the T-connector will be located between injector fuel lines #1 and #2).

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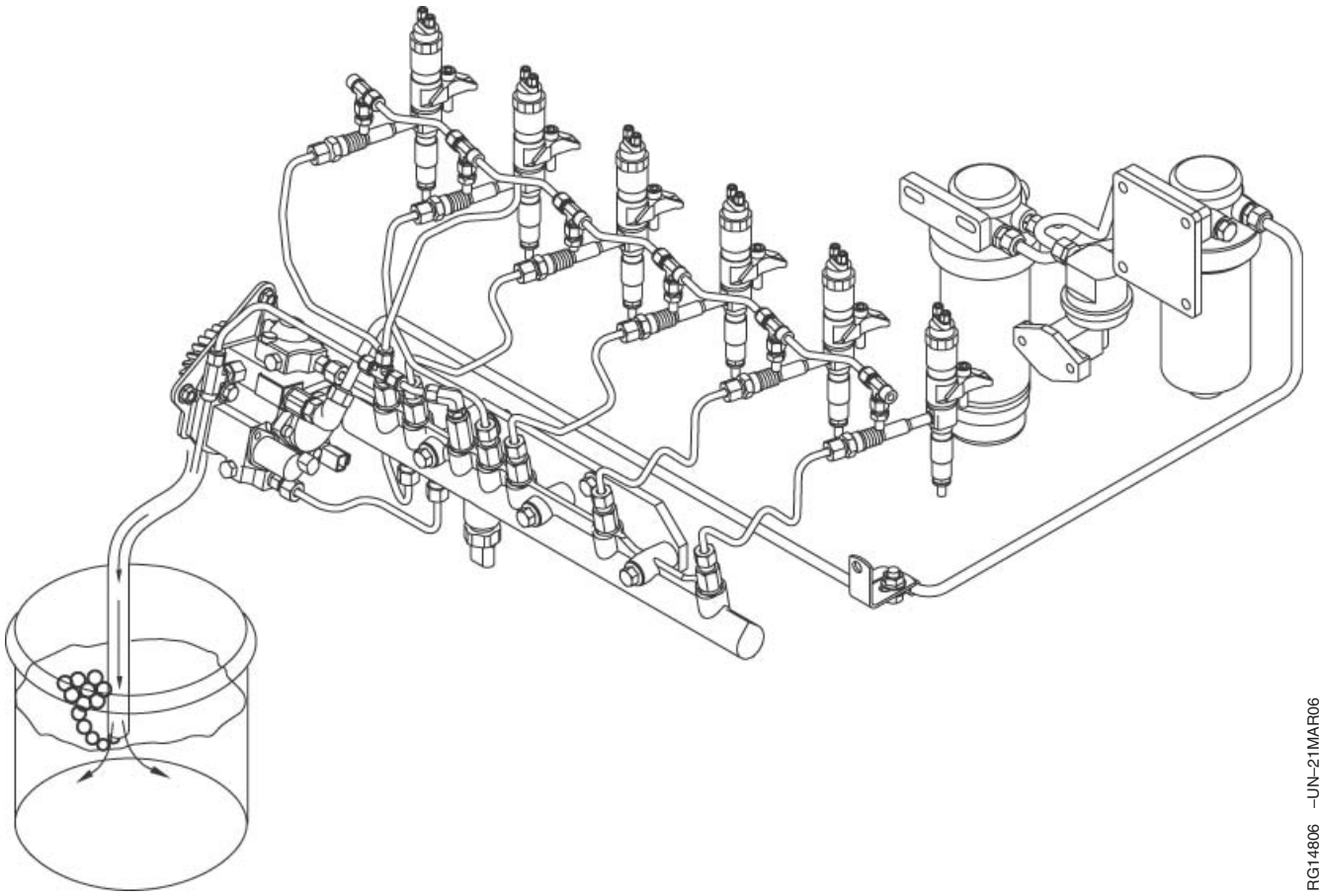

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Check For Air in Fuel System

b. Install a clear plastic hose with proper fittings between the T-connector and the return-to-tank line, OR submerge hose in a container of clean fuel, as shown.
c. Start engine. Run engine for 1 minute at 1500 rpm. Observe hose and container (if used) for bubbles. Stop engine.
d. If there are bubbles, go to the next step to determine source of the air. Reconnect fuel lines.

3. Check for air in fuel tank supply line:
   a. Disconnect the fuel tank supply line from the fuel supply pump.
   b. Install a clear plastic hose with proper fittings between the fuel tank supply line and the fuel supply pump. Tool JT03513C Fuel Supply System Test Kit is designed for this task.
   c. Operate engine and check for air bubbles in hose. If there are bubbles, check for damaged tank, damaged tank components, and for loose or damaged fuel supply lines and hoses.
   d. If no problem was found, go to the next step. Reconnect fuel lines.
4. Check for air in the high pressure pump fuel supply line:
   a. Disconnect the line between the secondary filter and the high pressure fuel pump.
   b. Install a clear plastic hose with proper fittings between the filter and the pump.
   c. Operate engine and allow hose to fill with fuel, then check for air bubbles in hose. If there are bubbles, check for damaged primary filter head or gasket, and for loose or damaged primary filter.

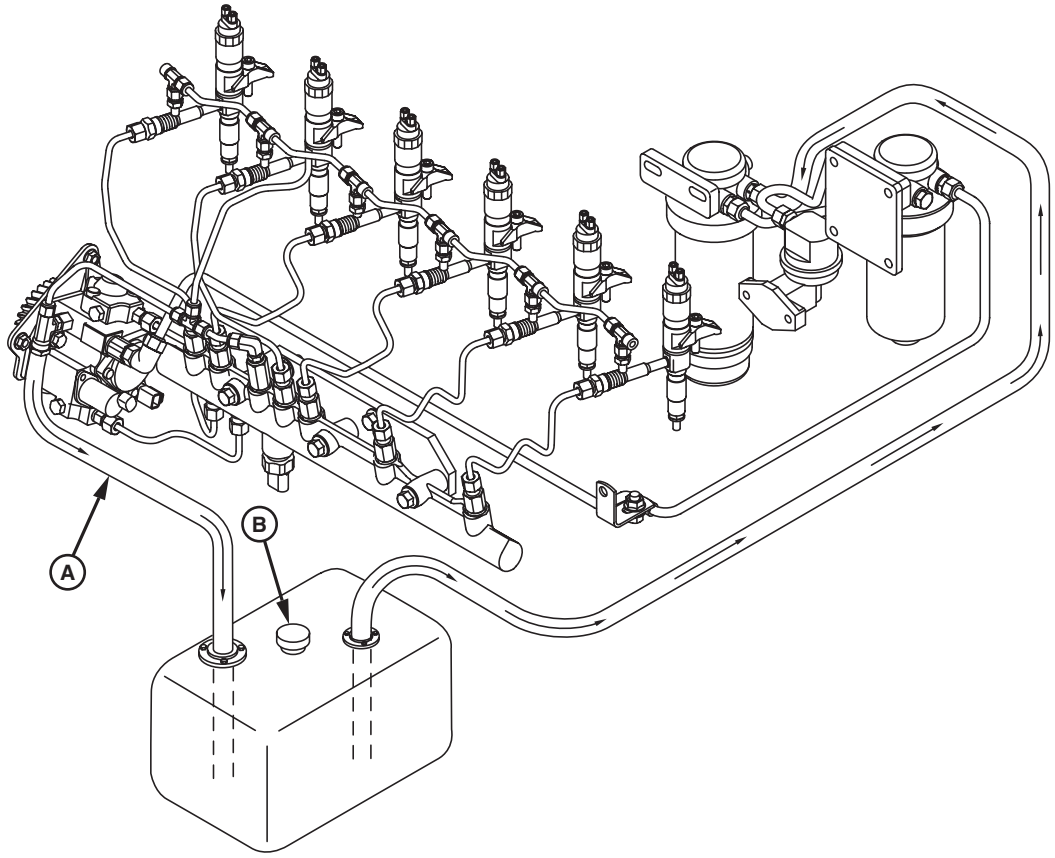
Continued on next page

d. If source of air was not found, a likely cause is air leaking past one or more injectors. Inspect the injector hold down clamp torque, O-rings and seals. See REMOVE AND INSTALL ELECTRONIC INJECTORS in Section 2 of this manual. Reconnect fuel lines.

NOTE: If the engine has a fuel cooler, rule out air entering from the fuel cooler before removing injectors.

DN22556,0000296 –19–27FEB07–3/3

Check for Restricted Fuel Leak-off Line



RG12311 –UN–24JUN02

A—Fuel Leak-off Line **B—Fuel Tank Cap**

This check will help determine if the fuel leak-off line is restricted.

1. Disconnect fuel leak-off line (A) from the fuel leak-off line at the engine.

Continued on next page

2. Remove fuel tank cap (B).
3. Force compressed air through the fuel leak-off line while listening at the fuel tank filler neck.

CAUTION: Maximum air pressure should be 100 kPa (1 bar) (14.5 psi) when performing this test.

4. If the leak-off line is not restricted, the compressed air bubbling into the fuel tank should be audible through the tank filler neck.
5. If no air bubbling through the tank is audible, completely check fuel leak-off line for any possible restrictions.

DN22556,0000298 –19–27FEB07–2/2

Bleed the Fuel System

CAUTION: If the engine has been run out of fuel, or after you have serviced the fuel filters, DO NOT PRESSURIZE THE FUEL TANK to prime the fuel system! Doing this causes the seal on the front of the high pressure pump to rupture. When such a rupture occurs, fuel passes around the seal, and fills the engine crankcase. This condition causes severe damage to the engine and requires replacement of the high pressure pump.

NOTE: A fuel system always must be bled, after the engine has been run out of fuel, fuel filters have been serviced, or the fuel system has been opened.

Any time the fuel system has been opened for service (lines disconnected or filters removed), it will be necessary to bleed air from the system.

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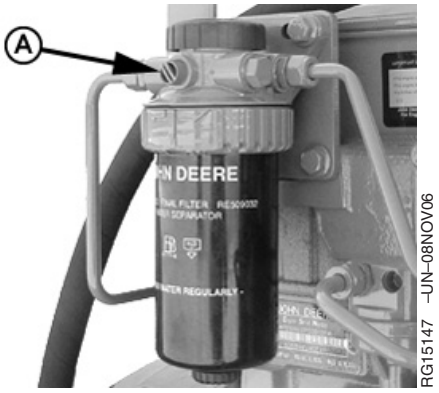
A—Bleed Vent Screw



Final Fuel Filter

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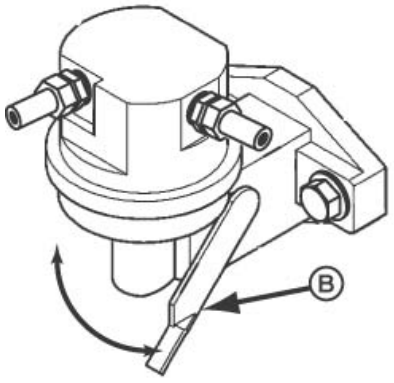
DN22556,0000299 –19–18MAY07–2/3

CAUTION: Do not crack any fuel lines to bleed the fuel system. This fuel system is sensitive to fuel contamination.

1. On the final fuel filter header, by hand, turn the air bleed vent screw (A) counter-clockwise, two full turns.
2. Operate fuel transfer pump primer lever (B), or primer button on fuel filter (if equipped), until fuel flows out of bleed vent screw.
3. Hand-tighten bleed vent screw (clockwise) securely.
4. Continue operating primer until pumping action is not felt.
5. Start engine and check for leaks.

If engine does not start, see F1 - LOW PRESSURE FUEL SUPPLY SYSTEM CHECK and F2 - HIGH PRESSURE FUEL SUPPLY SYSTEM CHECK, earlier in this group.



Fuel Transfer Pump

B—Primer Lever

DN22556,0000299 –19–18MAY07–3/3

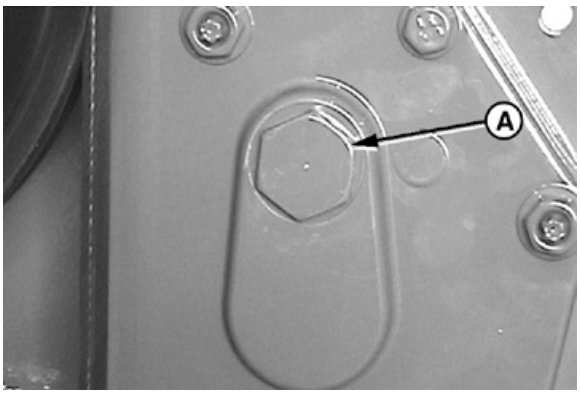
Check and Adjust High Pressure Fuel Pump Static Timing

1. Rotate engine with JDG820 Flywheel Turning Tool until JDE81-4 Timing Pin engages timing hole in flywheel. Engine should be at No.1 “TDC-Compression”.

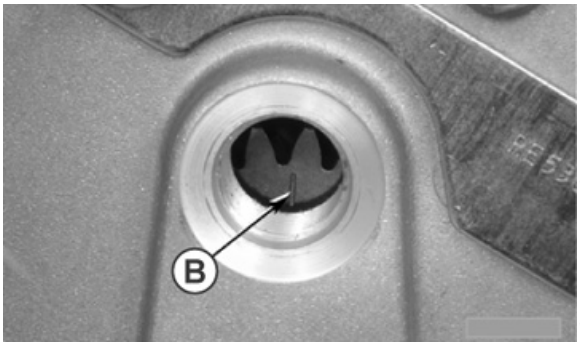
2. Verify engine is at No.1 “TDC-Compression”. Remove screw (A) for window on high pressure pump gear. A marked line on the gear (B) should be visible through the window.

NOTE: If line is not visible, engine may be at No. 6 “TDC-Compression”. Rotate engine one full revolution in running direction until JDE81-4 Timing Pin engages in flywheel again.

A—High Pressure Pump Gear Window Screw
B—High Pressure Pump Gear Timing Mark



High pressure pump window screw



High pressure pump gear timing mark

DN22556,000029A –19–27FEB07–1/1

About This Group

This group of the manual contains necessary information to diagnose the electronic control system. Use this information in conjunction with the Base Engine Manual.

See the Base Engine Manual for:

- Removal of base engine components
- Base engine repair procedures
- Base engine disassembly
- Base engine inspection
- Base engine assembly

Parts such as sensors, actuators, connectors, and wiring harnesses are serviceable and available.

To help diagnose electronic control system problems, see APPLICATION SPECIFICATIONS in Section 06, Group 210 of this manual. It contains useful information, such as system wiring schematic and ECU terminal identification.

IMPORTANT: Not under any circumstances, should the Engine Control Unit (ECU) be opened.

NOTE: Instruction is given throughout the diagnostic charts to make resistance and voltage measurements in the ECU/Cab connector and the ECU/Engine connector. Note that these measurements are normally made in the harness connector. Measurements made on the ECU itself will specifically call that out.

DN22556,00001D4 –19–10JAN07–1/1

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.

RG11126 –UN–19JUN00

Digital Multimeter

RG41221,00001DE –19–29MAY07–1/1

Electrical Circuit Malfunctions

Circuit Malfunctions

There are four major circuit malfunctions. They are:

1. High-resistance circuit
2. Open circuit
3. Grounded circuit
4. Shorted circuit

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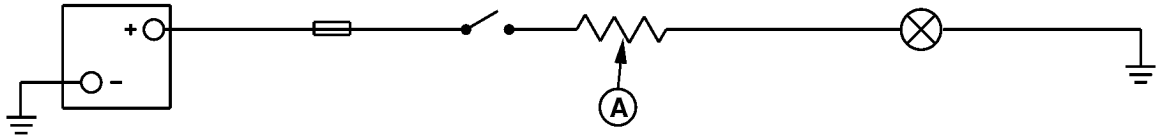
RG9891 –UN–06JAN99



High Resistance Circuit

A—Unwanted Resistance

Definition of Circuit Malfunctions

1. **High Resistance Circuit:**
   A circuit having unwanted resistance (A) that causes a voltage drop and reduces current flow.

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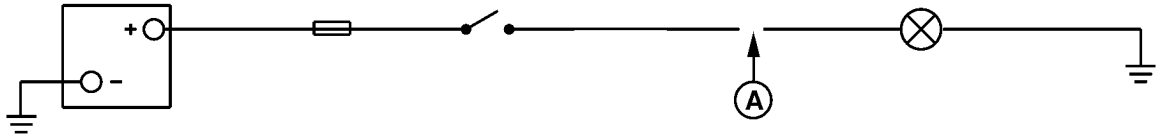
RG9892 –UN–06JAN99



Open Circuit

A—Break or Separation in Circuit

2. **Open Circuit:**
   A circuit having a break or a separation (A) that prevents current from flowing in the circuit.

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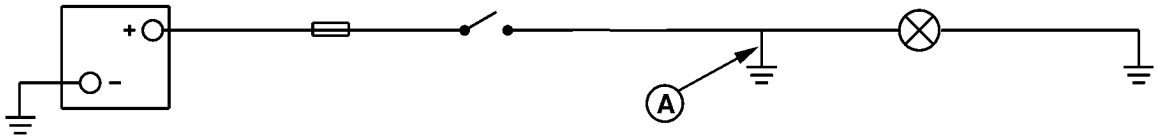

Grounded Circuit

A—Voltage Wire in Contact with Machine Frame

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

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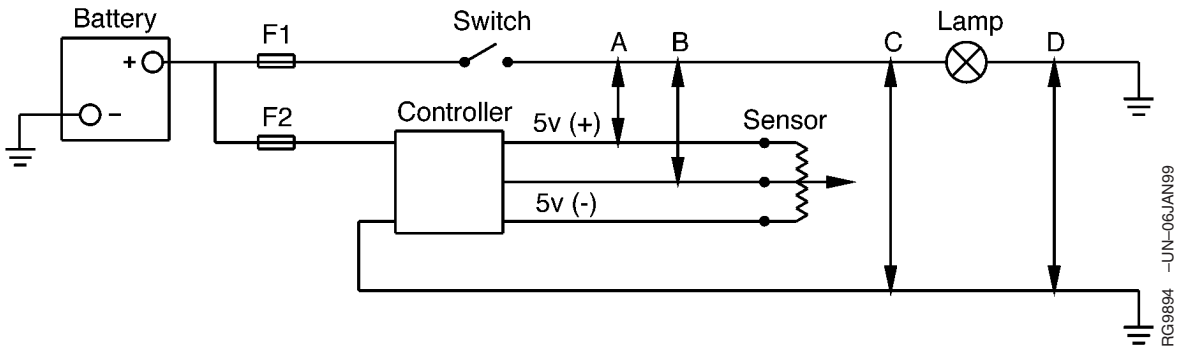

Shorted Circuit

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

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

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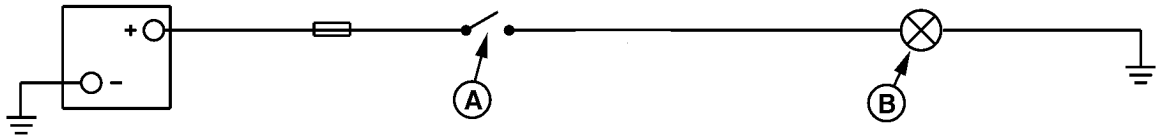

Locations of Circuit Malfunctions

A—Controlling Switch **B—Load**

Locations of Circuit Malfunctions:

In a “Simple Electrical Circuit” the circuit malfunctions occur at only three locations. They are:

1. Before the controlling switch (A).

2. Between the controlling switch (A) and the load (B).

3. After the load (B).

Electrical components can become faulty with the same three circuit malfunctions. Sometimes component malfunctions can easily be confused with circuit malfunctions. Therefore, care must be exercised when isolating the cause of the problem.

Example: A component may not operate before disconnecting an electrical connection, but it operates after reconnecting the connector.

Reason: Oxidation of the terminals created “High Resistance” and a voltage drop that prevents the proper amount of current flow to the component. Disconnecting and reconnecting the connector, removed some oxidation and reestablished good continuity through the connector.

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Troubleshooting Circuit Malfunctions

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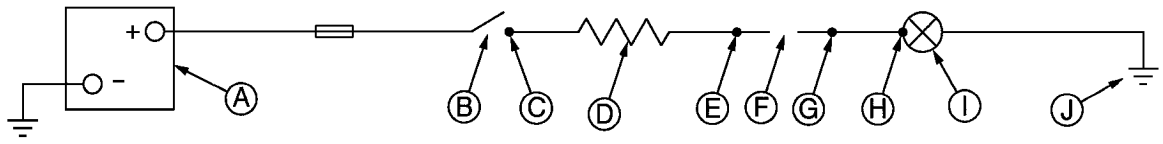

Troubleshooting Circuit Malfunctions

A—Battery
B—Switch
C—Component Terminal
D—Unwanted Resistance
E—Circuit Connector
F—Open Circuit
G—Circuit Connector
H—Component Terminal
I—Load (Lamp)
J—Ground

1. **High Resistance Circuit:**

   A “High Resistance” circuit can result in slow, dim or no component operation (for example: loose, corroded, dirty or oily terminals, gauge of wire too small or broken strands of wire).

2. **Open Circuit:**

   An “Open” circuit results in no component operation because the circuit is incomplete (for example: broken wire, terminals disconnected, open protective device or open switch).

   Do the following to isolate the location of a “High Resistance” or “Open” circuit:

   a. With the controlling switch (B) closed (on) and the load (I) connected into the circuit, check for proper voltage at a location easily accessible between (C) and (H).

      - If voltage is low, move toward the voltage source (A) to locate the point of voltage drop.
      - If voltage is correct, move toward the load (I) and ground terminal (J) to locate the voltage drop.

   NOTE: The example shows high resistance (D) between (C) and (E) and the open circuit (F) between (E) and (G).

   b. Repair the circuit as required.

   c. Perform an operational check-out on the component after completing the repair.

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RG41221,00001E0 –19–03APR05–1/4

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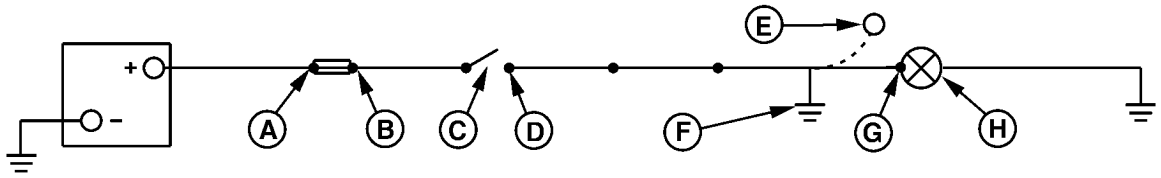

Ground Circuit

A—Fuse "A" Terminal
B—Fuse "B" Terminal
C—Switch
D—Component Terminal
E—Wire Terminal
F—Grounded Circuit
G—Component Terminal
H—Load (Lamp)

3. **Ground Circuit:**

   A "Grounded" circuit (F) results in no component operation and the fuse or circuit breaker opens (for example: a power wire contacting the machine frame, chassis or component housing).

   Do the following to isolate the location of a "Grounded" circuit:

   a. Switch (C) must be open (off). Check for continuity to ground between (B) and (C).

      - If there is continuity, there is a grounded circuit between (B) and (C). Repair the circuit.
      - No continuity, go to step b .

   b. Disconnect the load (H) at component terminal (G).

   c. With the controlling switch (C) open (off), check for continuity to ground between (D) and (E).

      - If there is continuity, there is a grounded circuit between (D) and (E). Repair the circuit.

   NOTE: The example is grounded between (D) and (E) at (F).

      - Perform an operational check-out on the component after completing the repair.

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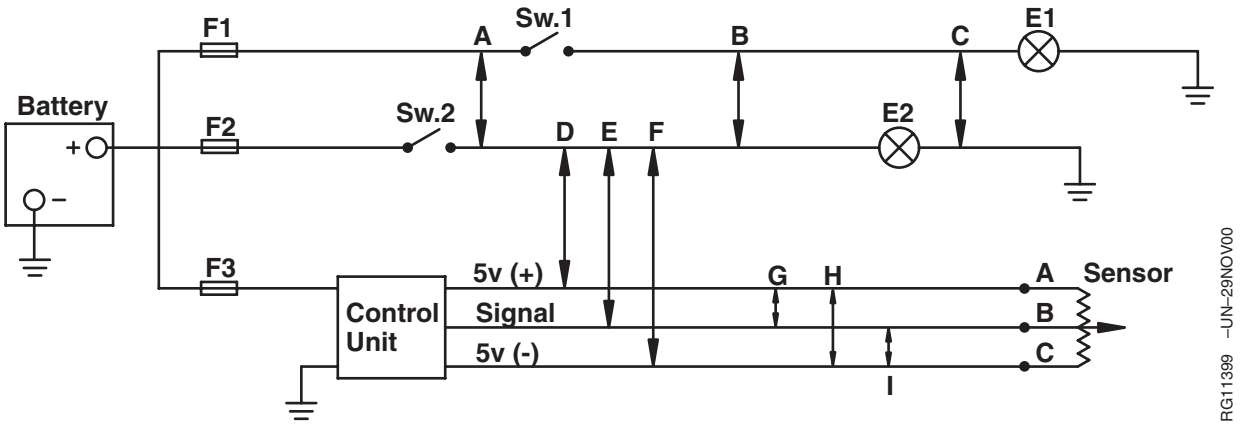
04
160
7



4. **Shorted Circuit:**

Machines equipped with several electronic control devices contain wiring harnesses that can become shorted by one of the following ways shown above.

1. Battery wire from fuse (F1) is shorted at (A) to another battery wire after switch (Sw.2).
   - Result: Lamp (E2) is on all of the time.

2. Battery wire from fuse (F1) is shorted at (B) to another battery wire after switches (Sw.1 & 2).
   - Result: Both lamps (E1 & E2) operate on either switch (Sw. 1 or 2).

3. Battery wire from fuse (F1) is shorted at (C) to a ground wire.
   - Result: Fuse (F1) opens after closing switch (Sw. 1)

4. Battery wire from switch (Sw. 2) is shorted at (D) to a regulated voltage wire.
   - Result: The sensor signal voltage is distorted.[1]

5. Battery wire from switch (Sw. 2) is shorted at (E) to the sensor signal voltage wire.
   - Result: The sensor signal is distorted.[1]

6. Battery wire from switch (Sw. 2) is shorted at (F) to the sensor ground wire.
   - Result: Fuse (F2) opens after closing switch (Sw. 2) and the sensor signal is distorted.[1]

7. Controller regulated voltage wire is shorted at (G) to the sensor signal voltage wire.
   - Result: The sensor signal is distorted.

8. Controller regulated voltage wire is shorted at (H) to the sensor ground wire.
   - Result: The sensor signal is distorted.[1]

9. Sensor voltage wire is shorted at (I) to the sensor ground wire.
   - Result: The sensor signal is distorted.[1]

Do the following to isolate a "Shorted Circuit:"

a. Review the machine electrical schematic to identify the circuits for the component that does not operate.

b. Disconnect the components at each end of the circuits, to single out the affected wires.

c. To prevent damage to connector terminals, obtain mating connector terminals from repair parts. DO NOT force meter probes into connector terminals.

[1]The sensor signal voltage goes out of range and a fault code may be restored. The controller may shut down or provide limited operation for its function.

Continued on next page

d. Connect the meter leads across two of the affected circuits. The meter should show no continuity between the two circuits. Repeat the check across another combination of two circuits until all affected circuits have been checked.

e. Then, connect a meter lead to each affected circuit one at a time and touch the other meter leads to all terminals in the connector. The meter should show no continuity between any two circuits.

   Example: A 37 pin connector contains three wires to a sensor. With one meter probe attached to each of the three wires, one at a time, touch the other meter probe to the remaining 36 wires. If there is continuity between any two wires, the circuit is shorted. Repair the circuit.

f. Alternate Method to Check for Shorted Circuit.

   With the components disconnected at each end of the suspected circuits, turn the key switch on.

   Connect one meter lead to a good frame ground. With the other meter probe, touch each of the suspected circuits one at a time. If there is a voltage reading, the circuit is shorted to another voltage wire. Repair the circuit.

g. Repair the “Shorted Circuit” as follows:

   - Wires not in a loom: Wrap individual wires with electrical tape or replace the damaged wire and band as required.
   - Wires in a loom: If hot spots exist in shorted area of the harness, replace the harness. If hot sports are not noticeable, install a new wire of proper gauge between the last two connections. Use tie bands to secure the wire to outside of the harness.

h. Perform an operational check-out on the component after completing the repair.

RG41221,00001E0 –19–03APR05–4/4

Connecting to Service ADVISOR with PDM

The Parallel Data Module (PDM) adapter is used to provide communication between the PC and the ECU.

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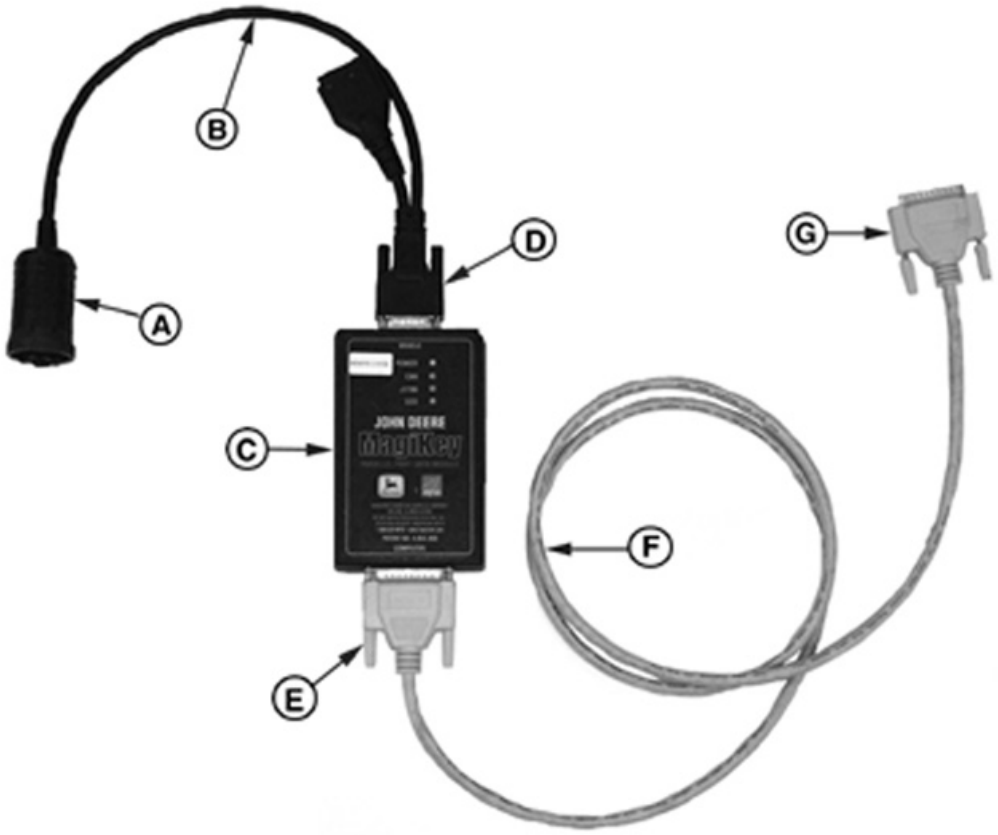

Connecting to Service ADVISOR

A—Diagnostic Connector Mate
B—John Deere Controller Cable
C—PDM (Parallel Data Module)
D—26 Pin PDM Connector
E—25 Pin PDM Connector
F—Parallel Cable
G—PC Connector

The PDM is connected to the engine ECU through the diagnostic connector. The diagnostic connector is a 9-pin circular connector with a square mounting flange and a dust cap. The location of the diagnostic connector may vary depending on application. On OEM engines, the connector is located near the ECU on the engine wiring harness.

DS10023 ECU Communication Hardware Kit or JDIS121 ECU Communication Hardware Kit is required to connect Service ADVISOR to the ECU.

Instructions for connecting to Service ADVISOR with PDM:

1. Locate diagnostic connector on engine and remove dust cap.
2. Connect John Deere Controller Cable (B) to the diagnostic connector on the engine harness using the diagnostic connector mate (A).
3. Connect the other end of the John Deere Controller Cable to the PDM (C) module at the 26 pin PDM connector (D).
4. Connect the parallel cable (F) to the PDM module at the 25 pin PDM connector (E).
5. Connect the other end of the parallel cable to the PC with Service ADVISOR installed.
6. Key ON, engine off or running.

Continued on next page

7. Start Service ADVISOR and select Connect to Model(s) from the Readings menu, or press the connect icon on the toolbar.
8. Select Parallel Data Module (PDM) as the current adapter in the Select Readings Adapter box.
9. Select the engine model. Press the Change Models button in this box to see a list of engine models if the engine model is not listed.
10. Press the Connect button after selecting the engine model.
11. If Service ADVISOR does not connect, see D1 - ECU DOES NOT COMMUNICATE WITH SERVICE ADVISOR diagnostic procedure in Group 150 of this manual.
12. If power to the PDM is lost while cranking the engine for the Compression Test, use the Power Adapter. The Power Adapter connects between the PDM and the 26 pin PDM connector.
13. When finished, replace the dust cap on the diagnostic connector.

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Power Adapter

JB81757,0000012 –19–30MAY07–3/3

Connecting to Service ADVISOR with PDM and USB Adapter

The Parallel Data Module (PDM) adapter is used to provide communication between the PC and the ECU. The USB adapter is used to permit the PDM to connect to a USB port on the PC.

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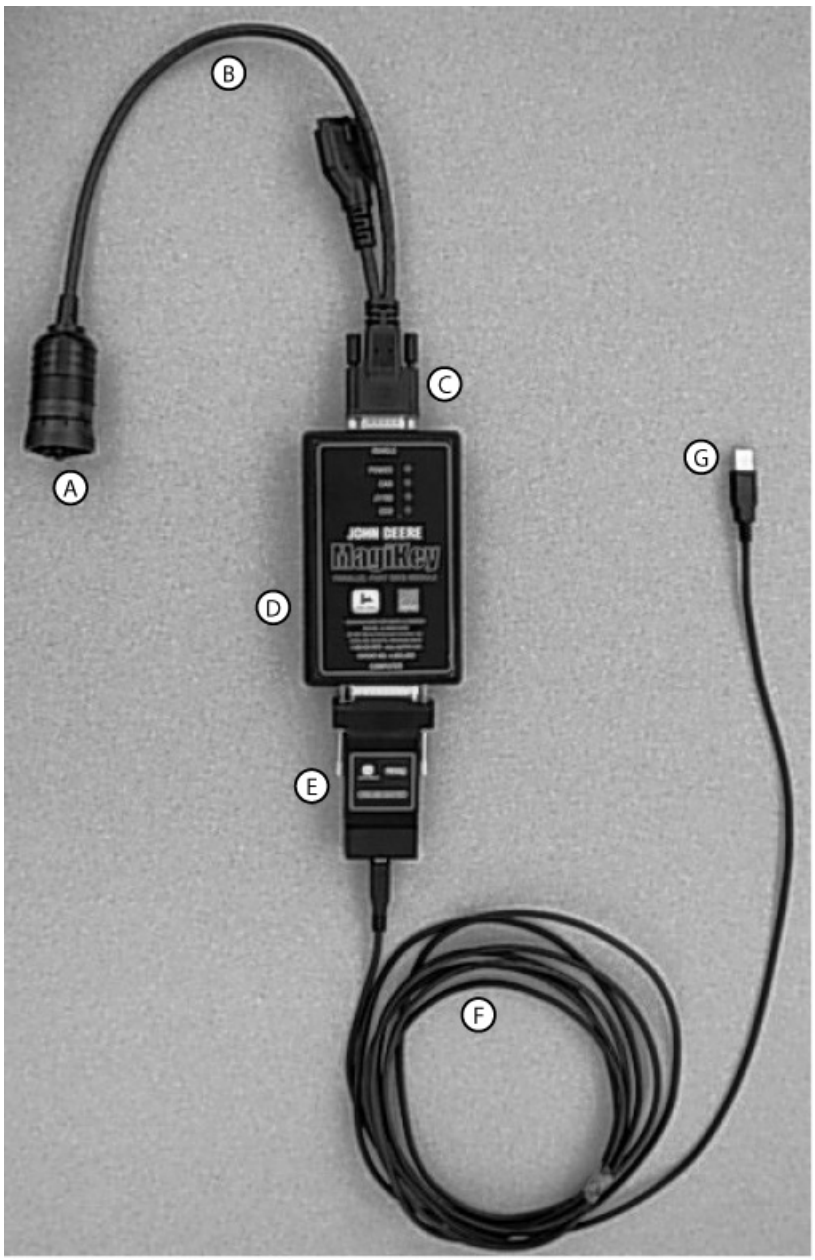

A—Diagnostic Connector Mate
B—John Deere Controller Cable
C—26 Pin PDM Connector
D—Parallel Data Module (PDM)
E—USB Adapter
F—USB Cable
G—PC Connector

The PDM is connected to the engine ECU through the diagnostic connector. The diagnostic connector is a 9-pin circular connector with a square mounting flange and a dust cap. The location of the diagnostic connector may vary depending on application. On OEM engines, the connector is located near the ECU on the engine wiring harness.

DS10023 ECU Communication Hardware Kit or JDIS121 ECU Communication Hardware Kit is required to connect Service ADVISOR to the ECU.

Instructions for connecting Service ADVISOR:

Continued on next page

1. Locate diagnostic connector on engine and remove dust cap.
2. Connect John Deere Controller Cable (B) to the diagnostic connector on the engine harness using the diagnostic connector mate (A).
3. Connect the other end of the John Deere Controller Cable to the PDM (D) module at the 26 pin PDM connector (C).
4. Connect the USB adaptor (E) to the PDM module.
5. Connect the USB cable (F) to the USB adapter.
6. Connect the USB cable PC connector (G) to the USB port on the PC.
7. Key ON, engine off or running.
8. Start Service ADVISOR and select Connect to Model(s) from the Readings menu, or press the connect icon on the toolbar.
9. Select Parallel Data Module (PDM) with USB Adapter as the current adapter in the Select Readings Adapter box.
10. Select the engine model. Press the Change Models button in this box to see a list of engine models if the engine model is not listed.
11. Press the Connect button after selecting the engine model.
12. If Service ADVISOR does not connect, see D1 - ECU DOES NOT COMMUNICATE WITH SERVICE ADVISOR diagnostic procedure in Group 150 of this manual.
13. When finished, replace the dust cap on the diagnostic connector.

JB81757,0000013 –19–30MAY07–3/3

Connecting to Service ADVISOR with the EDL using USB Cable

The Electronic Data Link (EDL) adapter is used to provide communication between the PC and the ECU.

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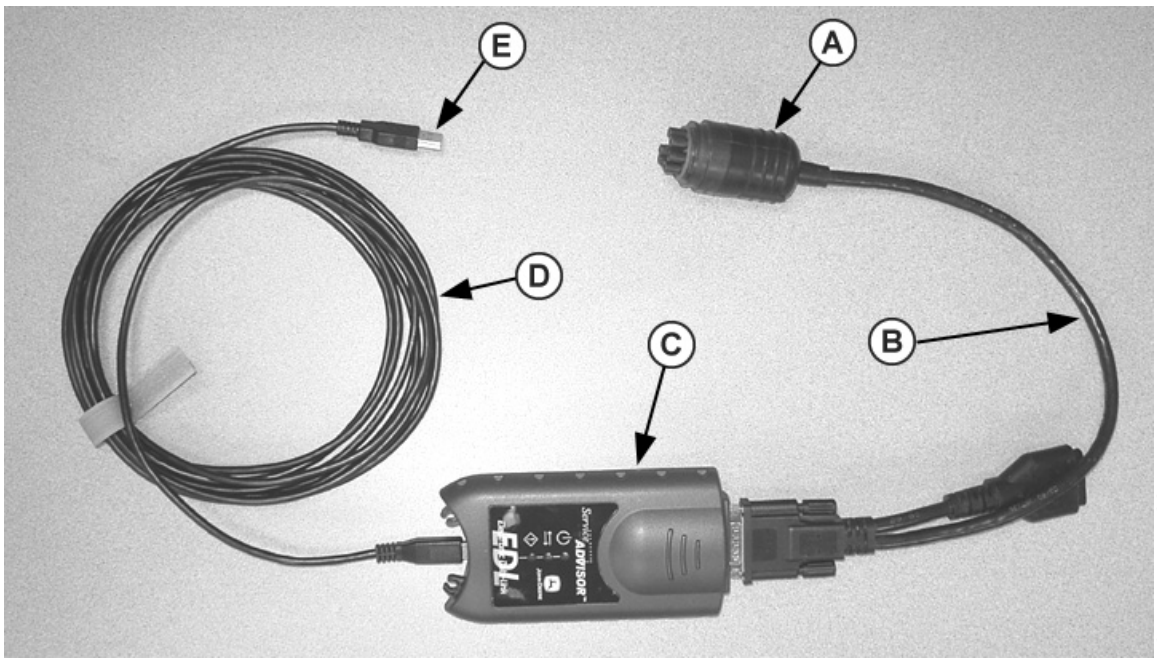

Connecting to Service ADVISOR

A—to 9-Pin Diagnostic Connector on Engine
B—John Deere Controller Cable
C—EDL (Electronic Data Link)
D—USB Cable
E—to PC with Service ADVISOR

The EDL is connected to the engine ECU through the diagnostic connector. The diagnostic connector is a 9-pin circular connector with a square mounting flange and a dust cap. The location of the diagnostic connector may vary depending on application. On OEM engines, the connector is located near the ECU on the engine wiring harness.

DS10117 ECU Communication Hardware Kit contains the EDL and cables necessary to connect Service ADVISOR to the ECU.

Instructions for connecting Service ADVISOR to the ECU:

1. Locate diagnostic connector on engine and remove dust cap.
2. Connect John Deere Controller Cable (B) to the diagnostic connector on the engine harness.
3. Connect the other end of the John Deere Controller Cable to the EDL (C).
4. Connect the USB cable (D) to the EDL.
5. Connect the other end of the USB cable to the PC with Service ADVISOR installed.
6. Key ON, engine off or running.
7. Start Service ADVISOR and select Connect to Model(s) from the Readings menu, or press the connect icon on the toolbar.
8. Select Electronic Data Link (EDL) Stand-alone USB Device as the current adapter in the Select Readings Adapter box.
9. Select the engine model. Press the Change Models button in this box to see a list of engine models if the engine model is not listed.
10. Press the Connect button after selecting the engine model.
11. If Service ADVISOR does not connect, see D1 - ECU DOES NOT COMMUNICATE WITH SERVICE ADVISOR diagnostic procedure in Group 150 of this manual.
12. When finished, replace the dust cap on the diagnostic connector.

Connecting to Service ADVISOR with the EDL using Bluetooth

The Electronic Data Link (EDL) adapter is used to provide communication between the PC and the ECU.

The PDM is connected to the engine ECU through the diagnostic connector. The diagnostic connector is a 9-pin circular connector with a square mounting flange and a dust cap. The location of the diagnostic connector may vary depending on application. On OEM engines, the connector is located near the ECU on the engine wiring harness.

DS10117 ECU Communication Hardware Kit contains the EDL and cables necessary to connect Service ADVISOR to the ECU.

Instructions for connecting Service ADVISOR to the ECU using Bluetooth wireless:

1. Locate diagnostic connector on engine and remove dust cap.
2. Connect John Deere Controller Cable to the diagnostic connector on the engine harness.
3. Connect the other end of the John Deere Controller Cable to the EDL.
4. Key ON, engine off or running.
5. Start Service ADVISOR and select Connect to Model(s) from the Readings menu, or press the connect icon on the toolbar.
6. Select Electronic Data Link (EDL) using Bluetooth as the current adapter in the Select Readings Adapter box.
7. Select the engine model. Press the Change Models button in this box to see a list of engine models if the engine model is not listed.
8. Press the Connect button after selecting the engine model.
9. If Service ADVISOR does not connect, see D1 - ECU DOES NOT COMMUNICATE WITH SERVICE ADVISOR diagnostic procedure in Group 150 of this manual.
10. When finished, replace the dust cap on the diagnostic connector.

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Viewing Data Parameters with Power View Diagnostic Gauge

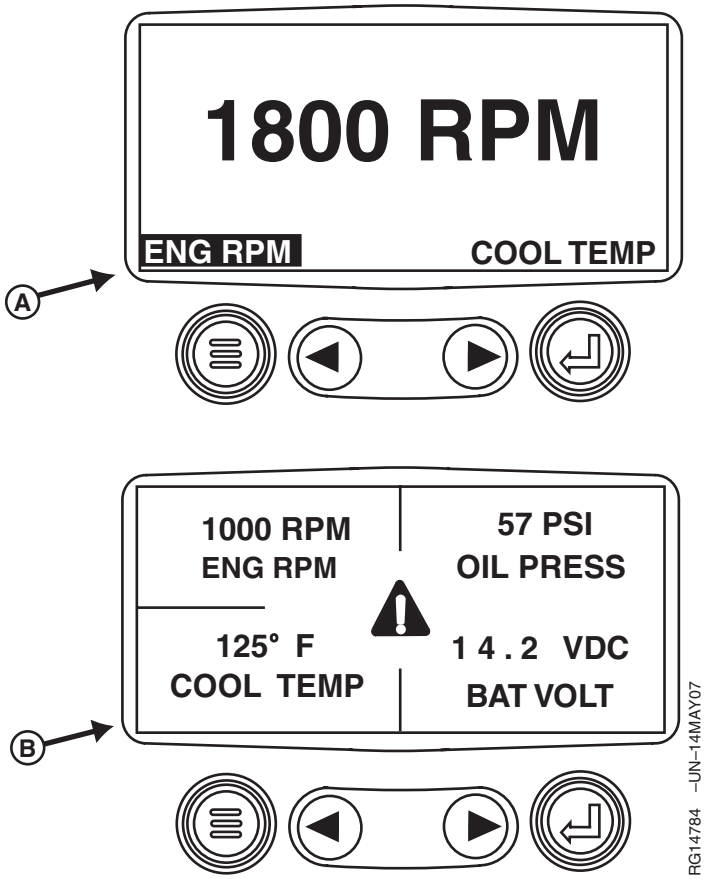

Figure 1. One and Four Parameter Displays

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

NOTE: When the one-parameter display is selected, main menu shows "GO TO 4-UP DISPLAY", and when the four-parameter display is selected, main menu shows "GO TO 1-UP DISPLAY" in the top line.

1. Changing to the 4 parameter display. See figure 2.
   a. Press the MENU KEY (F). Main Menu is displayed.
   b. With the SCROLL KEYS (G,H), select "GO TO 4-UP DISPLAY" (B).
   c. Press the ENTER KEY (I).
   d. The 4-Up Display will be shown.

2. Selecting engine parameters for 4-UP Dispaly.
   a. Press the MENU KEY (F). Main menu is displayed.
   b. Using the SCROLL KEYS (G,H), select SETUP 4-UP DISPLAY (B). Press ENTER KEY (I).
   c. In the next screen, select CUSTOM SETUP and press ENTER KEY (I). The 4-Up Display appears.
   d. With the SCROLL KEYS (G,H), select the window on the display you want to change. Press ENTER KEY (I).
   e. Scroll through the parameter list and select the parameter you want to display. Press ENTER KEY (I).
   f. The number of the display window will appear next to the selected parameter.
   g. Press MENU KEY (F) to return to the 4-Up Display. The new parameter should be displayed on the screen.

NOTE: The same method is used for selecting the default parameter for the 1-UP Display.

3. Changing units of measure.
   a. Press the MENU KEY (F). Main menu is displayed.

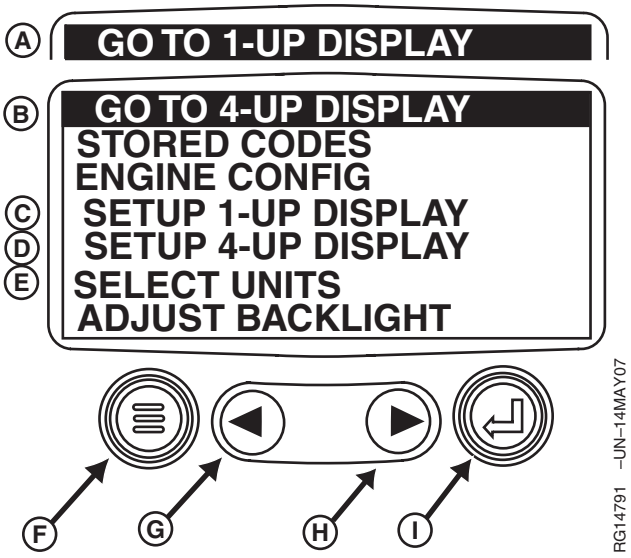

Figure 2. Main Menu.

A—Go To 1-Up Display
B—Go To 4-Up Display
C—Setup 1-Up Display
D—Setup 4-Up Display
E—Select Units
F—Menu Key
G—Left/Up Scroll Key
H—Right/DownScroll Key
I—Enter Key

Continued on next page

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

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

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

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Viewing Active DTCs on Power View Diagnostic Gauge

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

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

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

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

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

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

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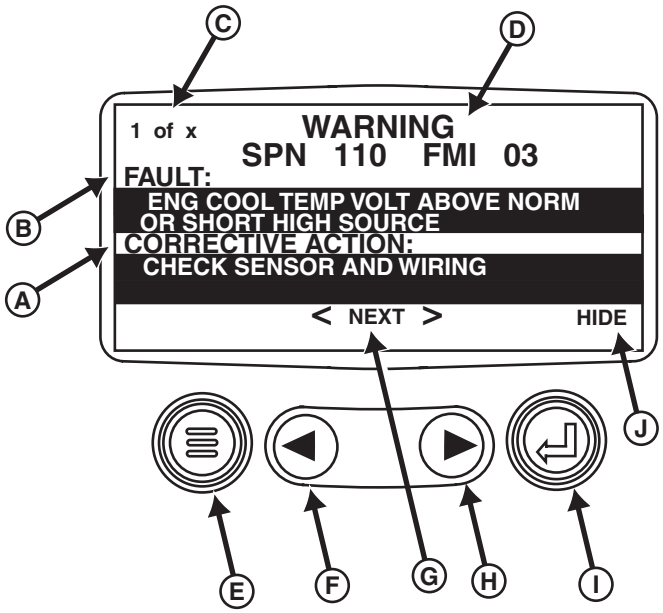

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Figure 1. Active Code Diagnostic Screen

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

1. When the diagnostic gauge receives a diagnostic trouble code, the engine parameter screen is replaced with the "Warning" screen. See figure 1.

2. Display features for the Active Codes Diagnostic Screen are described below:

   - SPN/FMI code (D). Refers to the trouble shooting diagnostic procedure.
   - Name of diagnostic code (B) referenced in manual.
   - A brief description for corrective action (A).
   - The word “NEXT” (G) indicates there are more fault codes to be viewed.
   - Two SCROLL KEYS (F,H) are used to cycle through the codes.
   - “1 of x” (C) indicates the current diagnostic code displayed of the total number.
   - To hide (J) this screen and return to the parameter display screen, press the "Enter" Key (I). Pressing the Enter Key again returns to the warning screen.

NOTE: To clear an active code, you must return to the 1-UP or 4-UP screen.

3. To return to the Main Menu screen, press the menu button (E), shown in figure 4.

Continued on next page

4. The parameter display screen displays one of the following icons when a DTC is active. See figure 2.

An amber light sets when a DTC becomes active and a red light sets when the engine has derated or shutdown.

A—Warning
B—Engine Derate or Shutdown

RG14795 –UN–14MAY07

Figure 2. Icons Indicates a Fault Warning, Engine Derate, or Shutdown

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Viewing Stored DTCs on Power View Diagnostic Gauge

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

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

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

Stored Diagnostic Trouble Codes (DTCs) are a history of DTCs that were once active. When a DTC becomes inactive, it is saved as a 'STORED' code. Stored codes can be reviewed and used as a trouble shooting aid in diagnosing intermittent problems and in range operating conditions. A count is kept of how many times a code has been active. Stored codes can be cleared from the diagnostic gauge. See CLEARING STORED CODES later in this section of the manual. Instructions for viewing stored codes are described below.

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1. Press MENU KEY (B). Main menu is displayed. See figure 1.
2. Using the SCROLL KEYS (C,D), navigate the menu until STORED CODES (A) is highlighted. Press the ENTER KEY (E).
3. REQUESTING FAULT CODES will momentarily be displayed on the display screen.
4. A new screen showing stored code information appears. See figure 2. If there are no stored fault codes, "No Stored Fault Codes" screen is momentarily displayed. Power View then returns to main menu display. Press the MENU KEY (E) to get back to the parameter display screen.

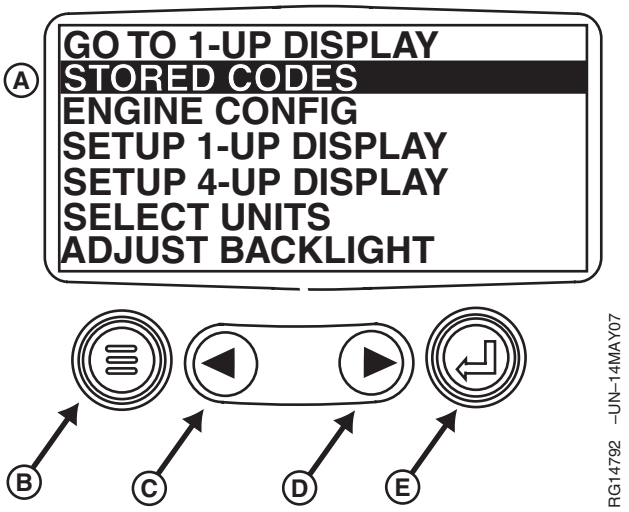

Figure 1. Main Menu

A—Stored Codes
B—Menu Key
C—Left/Up Scroll Key
D—Right/Down Scroll Key
E—Enter Key

Continued on next page

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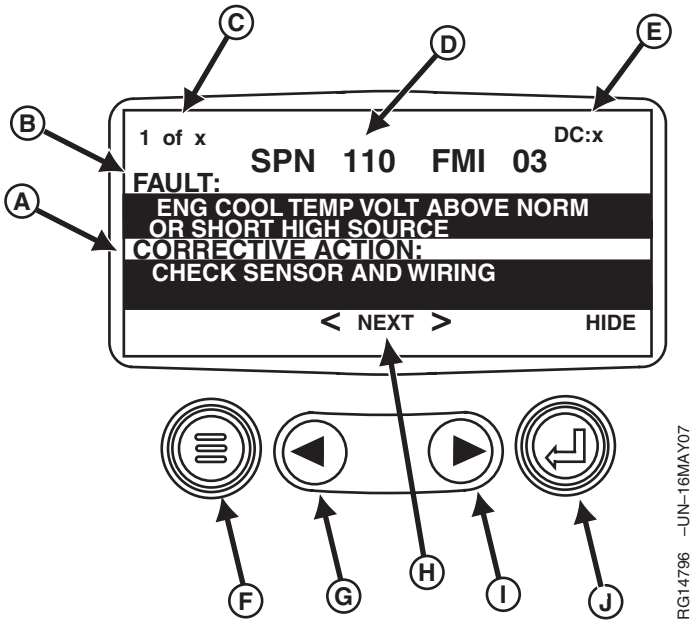

Figure 2. Stored Code Diagnostic Screen

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

5. Display features for the Stored Codes Diagnostic Screen are described below:

   - SPN/FMI code (D). Refers to the trouble shooting diagnostic procedure.
   - Name of diagnostic code (B) referenced in manual.
   - A brief corrective action (A).
   - The word “NEXT” (H) indicates there are more stored codes to can be viewed.
   - The two ARROW KEYS (G,I) are used to cycle through the codes.
   - “1 of x” (C) indicates the current diagnostic code displayed of the total number.
   - Diagnostic Count (E) indicates how many times the code has been active since it was lasted cleared.

6. Press the MENU KEY (F) to return to the main menu. Press the MENU KEY (E) again to return to the parameter screen.

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Clearing Stored DTCs on Power View Diagnostic Gauge

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

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

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

Procedure for clearing stored diagnostic codes on Power View diagnostic gauge.

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1. Turn power to diagnostic gauge OFF.
2. Turn power to diagnostic gauge ON. As soon as screen backlight comes on, simultaneously press and hold MENU (C) and ENTER (F) keys. See figure 1.
3. If successful, the screen shown in figure 1 will appear.

NOTE: If the screen in figure 1 does not appear, repeat step 2. This may take several attempts due to the short timing window.

4. Select CLEAR FAULT CODES (A). Press ENTER (F) key.

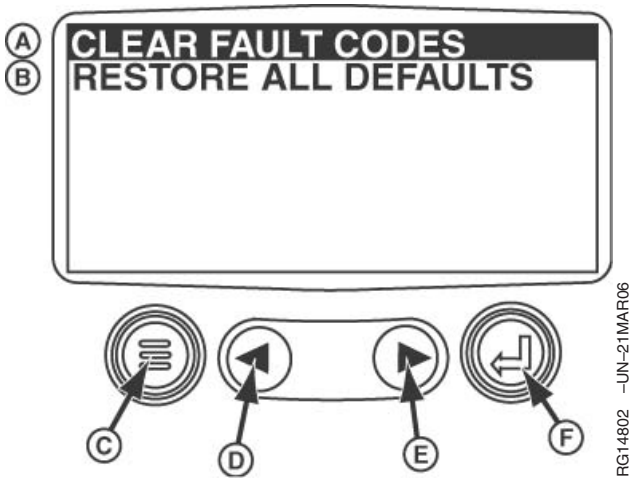

Figure 1. Clear Stored Fault Codes Screen

A—Clear Fault Codes
B—Restore All Defaults
C—Menu Key
D—Left/Up Scroll Key
E—Right/Down Scroll Key
F—Enter Key

Continued on next page

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5. Screen shows stored fault codes have been cleared. See figure 2.

6. Cycle power to the diagnostic gauge again for normal operation.

A—Cleared All Fault Codes

Figure 2. Clear All Fault Codes Screen

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Service Advisor Data Parameter Description

Following is a list of the data parameters that can be read in Service ADVISOR. Included in the list is a brief description of each parameter and each parameter's unit of measurement.

Continued on next page

Parameter	Units Metric (Eng)	Description
Air Heater Status	N/A	Indicates if air heater relay is ON.
Air Heater Time Remaining	sec	Amount of time the air heater remains ON.
Air Heater Wait Lamp	N/A	Indicates if the air heater wait lamp is turned ON.
Analog Throttle A Input Voltage	Volts	Voltage from analog throttle (A) position sensor.
Analog Throttle B Input Voltage	Volts	Voltage from analog throttle (B) position sensor.
Analog Throttle C Input Voltage	Volts	Voltage from analog throttle (C) position sensor.
Barometric Air Pressure (Absolute)	kPa (psi)	Barometric Air Pressure (BAP) value.
Battery Voltage	Volts	Switched battery voltage to ECU .
Charge Air Cooler Outlet Temperature	degC (degF)	Charge air cooler outlet temperature value.
Charge Air Cooler Outlet Temperature Input Voltage	Volts	Charge air cooler outlet temperature voltage to ECU.
Crank Position Sensor Improper Pattern Indicator	N/A	Value of 0 indicates proper operation.
Crank Position Sensor Input Noise Indicator	N/A	Value of 0 indicates proper operation.
Crank Position Sensor Status	N/A	Value of 16 (engine off) or 47 (engine on) indicates proper operation.
Cruise Accelerate	N/A	Indicates the status of the cruise accelerator switch.
Cruise Brake Switch	N/A	Indicates the status of the cruise brake switch.
Cruise Clutch Switch	N/A	Indicates the status of the cruise clutch switch.
Cruise Coast Switch	N/A	Indicates the status of the cruise coast switch.
Cruise Control Active	N/A	Indicates if the cruise control is active.
Cruise Control On/Off	N/A	Indicates if the cruise control is ON oe OFF.
Cruise Control State	N/A	
Cruise Resume Switch	N/A	Indicates the status of the cruise resume switch.
Cruise Set Switch	N/A	Indicates the status of the cruise set switch.
Desired Speed Governor Curve	N/A	The mode selected is dependent on the application. See APPLICATION SPECIFICATIONS in Section 06, Group 210 of this manual.
ECU Boot Block Part Number	N/A	File name of the Engine Control Unit (ECU) boot block.
ECU Configuration File Part Number	N/A	File name of the configuration file in the ECU.
ECU EOL Data Part Number	N/A	File name of the data programmed into the ECU at the end of the assembly line (EOL).
ECU Part Number	N/A	Part number for the Engine Control Unit (ECU) hardware.
ECU Serial Number	N/A	Serial number of the Engine Control Unit (ECU).
ECU Software Assembly Part Number	N/A	Revision number of the Engine Control Unit (ECU) software.
ECU Software Part Number	N/A	File name of the Engine Control Unit (ECU) software.
ECU Temperature	degC (degF)	The internal temperature of the ECU.
Engine Coolant Temperature	degC (degF)	Engine Coolant Temperature value.
Engine Coolant Temperature Input Voltage	Volts	Engine coolant temperature sensor voltage to ECU.
Engine Hourmeter	hr	Total hours the has run eith this ECU.
Engine Load at Current Speed	%	Percentage of load on the engine at a given speed.

Continued on next page

Parameter	Units Metric (Eng)	Description
Engine Model Number	N/A	The model number for the engine.
Engine Oil Pressure	kPa (psi)	Engine Oil Pressure value.
Engine Oil Pressure Input Voltage	Volts	Engine oil pressure sensor voltage to the ECU.
Engine Serial Number	N/A	Serial number of the engine.
Engine Speed	rev/m	The speed the crank sensor detects the crank timing wheel to be rotating.
Fuel Mode	N/A	This code explains the operation mode of the engine.
Fuel Rail Pressure - Actual (Absolute)	MPa (psi)	The fuel rail pressure value displayed in absolute pressure.
Fuel Rail Pressure - Desired (Absolute)	MPa (psi)	The desired fuel rail pressure calculated by the ECU.
Fuel Rail Pressure Output Voltage	Volts	Fuel rail pressure sensor voltage to the ECU.
Fuel System Part Number	N/A	The part number for the fuel system used on the engine.
Fuel System Serial Number	N/A	The serial number for the fuel system used on the engine.
Fuel Temperature	degC (degF)	Fuel temperature value.
Fuel Temperature Input Voltage	Volts	Fuel Temperature Sensor voltage to the ECU.
Fuel Transfer Pump Pressure - Actual	kPa (psi)	Measured fuel transfer pump pressure displayed in absolute pressure.
Fuel Transfer Pump Pressure - Desired	kPa (psi)	The desired fuel transfer pump pressure calculated by the ECU.
Fuel Transfer Pump Pressure Input Voltage	Volts	Fuel Transfer Pump Pressure sensor input voltage to the ECU.
Fuel Usage Rate	L/hr (gal/hr)	Rate of fuel used calculated by the ECU.
Manifold Air Pressure	kPa (psi)	Manifold Air Pressure value.
Manifold Air Pressure Input Voltage	Volts	The Manifold Absolute Pressure sensor voltage to the ECU.
Manifold Air Temperature	degC (degF)	Manifold air temperature value.
Manifold Air Temperature Input Voltage	degC (degF)	Manifold air temperature sensor voltage to the ECU.
Maximum Speed Governor Curve	N/A	The mode selected is dependent on the application. See APPLICATION SPECIFICATIONS in Section 06, Group 210 of this manual.
Option Assembly Part Number	N/A	Part number of application options programmed into the ECU.
Performance Option Part Number	N/A	These are the engine performance specific options relate to power and torque.
Pump Position Sensor Improper Pattern Indicator	%	Value of 0 indicates proper operation.
Pump Position Sensor Input Noise Indicator	N/A	Value of 0 indicates proper operation.
Pump Position Sensor Speed	rev/m	Engine RPM.
Pump Position Sensor Status	N/A	Value of 16 (engine off) or 47 (engine on) indicates proper operation..
Sensor Supply #1 Voltage	Volts	Voltage of ECU power supply #1.
Sensor Supply #2 Voltage	Volts	Voltage of ECU power supply #2.
Sensor Supply #3 Voltage	Volts	Voltage of ECU power supply #3.
Start of Injection Position	DEG	Position of crank when ECU sends signal to injector to fire.
Throttle Position	%	Percent of the throttle being used.
Throttle Type	N/A	Type of throttle being used on this application.

Continued on next page

Parameter	Units Metric (Eng)	Description
Torque Curve Number	N/A	Torque curve the ECU is currently using to limit fuel. For definition of the possible torque curves, see APPLICATION SPECIFICATIONS in Section 06, Group 210 of this manual.
Total Fuel Consumption	L gal	The amount of fuel consumed calculated by the ECU.
Turbo Compressor Inlet Air Temperature	degC (degF)	Turbo Compressor Inlet Air Temperature value.
Turbo Compressor Inlet Air Temperature Input Voltage	Volts	Turbo compressor inlet air temperature sensor voltage to the ECU.
Unswitched Battery Power	Volts	
Vehicle Driveshaft Speed	rev/m	The speed of the vehicle drive shaft.
Vehicle Option Part Number	N/A	Part number of payload options programmed into the ECU.
Vehicle Serial Number	N/A	The serial number of the vehicle that this engine is located in.
Vehicle Speed - Calculated	km/h (mph)	Vehicle speed calculated by ECU from wheel speed PWM signal.
Vehicle Speed - CAN	km/h (mph)	Vehicle speed ECU detects over CAN.
Water In Fuel Sensor	N/A	Indicates if water level in fuel is too high.

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Snapshot Instructions

NOTE: To view Snapshot information Service ADVISOR is required.

Snapshot information is categorized in two types, Snapshot Capture, and Snapshot Recording. Snapshot information is generated when an engine DTC is set.

- **Snapshot Capture** - Is a snapshot of specific parameters at the exact instant in time that the DTC was set. All engine DTCs will have a Snapshot Capture associated with it. This information will also contain the engine hours for the first and latest occurrence of the DTC.
- **Snapshot Recording** - Is a short recording of specific parameters when certain DTCs are set. The recording will include parameter readings for a short period before and after the DTC was set. These are normally two to five seconds long, depending on the DTC that was set. Only specific DTCs will have a Snapshot Recordings associated with it when the DTC is set. If the DTC Count is greater than one then the snapshot recording could contain playbacks of the first and latest occurrences and can be played back by selecting the occurrence to be viewed.

IMPORTANT: It is important to save all Snapshot information before clearing DTCs or running the HARNESS DIAGNOSTIC MODE TEST. Once codes have been cleared then the Snapshot information is also cleared. For help in troubleshooting engine DTCs it is recommended not to clear codes until the problem has been resolved.

Viewing a Snapshot Capture

1. With a live connection already established with Service ADVISOR, click on the icon to get codes.
2. The window will display all active and stored codes. In this window there is a column for Snapshot Capture. If there is a “Yes” in the Snapshot Capture column then there is Snapshot Capture data available for that DTC.
3. Click once on the DTC to highlight that row and then click on the “Snapshot Capture” button below to view the information. At the same time the information is being displayed in the Service ADVISOR window it is downloading this information for viewing off-line.

Viewing a Snapshot Recordings

1. With a live connection already established with Service ADVISOR, click on the icon to get codes.
2. The window will display all active and stored codes. In this window there is a column for Snapshot Recordings. If there is a “Yes” in the Snapshot Recording column then there is Snapshot Recording available for that DTC.
3. Click once on the DTC to highlight that row and then click on the “Snapshot Recording” button below to view the information. At the same time the information is being displayed in the Service ADVISOR window it is downloading this information for viewing off-line.
4. Click on the play button to start the playback of the recording. Refer to the online help in Service ADVISOR for more information about playing a recording and other options available.

Importing a Snapshot Recording for playback when off-line can be found in “C:|Program Files|Service ADVISOR|xvds|TierIII|recs”.

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Internal Data Monitor (IDM)

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.

04
160
33

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

Continuous

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.
4. The recording will continue to record until the “Abort” button is selected. Once the recording is stopped then Service ADVISOR with begin to upload the information from the ECU to the PC.
5. 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.

Internal

1. In the pull down menu select Data Point for Start Trigger.
2. In the Data Point pull down menu select the data point that is to be designated as trigger 1.
3. Select the Comparison Operator for this trigger. Note: When triggering off of engine speed it is recommended to use “>” or “<” for a comparison operator.
4. Enter the comparison value for this trigger.
5. Set up Trigger 2. If a second start trigger is not required then select “None” and click on “Next”. If a second start trigger is desired then in the pull down menu select “Data Point”.
6. In the Data Point pull down menu select the data point that is to be designated as trigger 2.
7. Select the Comparison Operator for this trigger.
8. Enter the comparison value for this trigger. Click “Next”.
9. If a stop trigger is not desired then click “Next”. If the stop trigger is desired select the type of stop trigger in the pull down menu. If the stop trigger is with a data point then setup is similar to start trigger setup. A second stop trigger can be used. If a second stop trigger is desired then repeat this step to setup Stop Trigger 2.
10. Confirm recording setup and click “Back” to make changes or “Next”.
11. When ready to arm the recording triggers click “Start”. When all triggers that were configured are met then the recording will begin and it will record until the stop trigger setting is met.
12. Once the recording is complete, Service ADVISOR will automatically begin to upload the recording from the ECU to the PC.
13. 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.

Recording Playback

The IDM recording is stored in c: program files Service ADVISOR xvds tierIII recs. The folder name for the recording is created using a date and time format. The .IDM extension means that it is an IDM recording. Example:
“Rec_01252007_113025.IDM” was created on January 25, 2007 at 11:30:25 AM.

Continued on next page

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

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Terminal Test

The purpose of this test is to check for electrical terminal and connector problems.

Terminal Basics

Terminals are typically made from a base metal that is plated with tin or an alloy. The plating material helps protect the base metal of the terminal from corroding. There are two main varieties of terminals; pins (male) and sockets (female). The male pins are inserted into the female sockets to provide the electrical connection between wires or electrical devices. The female socket terminals typically contain one or more contact springs which provide firm contact points with the male pin terminal.

Terminal Problems

The five main types of terminal problems are corrosion, loose fit, bent terminals, pushed out terminals, and crimp problems.

Corrosion or foreign material on terminals acts as a series resistance between the contact spring and the mating terminal. This series resistance can decrease the voltage measured by the ECU at its inputs. Corrosion, liquids, or other foreign material in a connector may also provide a parallel resistance that permits current to flow between other terminals in the connector. This parallel path can increase or decrease the voltage measured by the ECU at its inputs. Once terminals are corroded, they must be replaced. Scraping the layer of corrosion from the terminal will also remove any remaining plating material resulting in a rapid reappearance of the corrosion.

A loose fit between the pin and the socket terminals may result in an intermittent open circuit. The loose fit is usually due to a damaged or worn contact spring inside the female socket terminal. Loose fitting terminals may be caused by misaligned terminals or by previous troubleshooting procedures where a probe was inserted into the female socket terminal to obtain a measurement.

Bent male pin terminals may cause an open circuit and possibly a short circuit with adjacent pins in the connector. Bent terminals are often caused by connector alignment or improper terminal crimping techniques.

Terminals that are partially pushed out of the connector may cause an open circuit or an intermittent connection if the tip of the partially pushed out terminal makes electrical contact with the tip of the mating terminal. Pushed out terminals are caused by misaligned terminals or by terminals that were not fully seated in the connector during assembly.

Terminals are crimped to wire ends to provide electrical and mechanical connection to the wire. The wire end may pull out of the terminal if not crimped correctly or if the wire has been pulled on with too much force. This results in an open circuit or an intermittent open circuit if the wire end makes contact with the terminal.

Terminal Test Visual Inspection

Inspect the terminals on both sides of the connection including the ECU or sensor for the following problems:

- Corrosion on the terminals or in the connector.
- Water or other foreign material in the connector.
- Bent terminals.
- Pushed out terminals.

Replace or reinsert terminals. Replace connector if damaged.

Terminal Test Loose Fit Check

- Select the proper terminal adapter probe from JT07328 that matches the terminal you are testing.
- Gently insert the male pin terminal fully into the female socket terminal without twisting or bending.

Continued on next page

- Slowly pull the male pin terminal out of the female socket terminal. There should be a noticeable tension as terminal probe is withdrawn.

Replace terminals that have a loose fit.

Terminal Test Crimp Check

- Remove connector back shell to gain access to wire insertion end of connector, if applicable.
- Gently pull on each wire in the connector.

Replace terminal if wire end pulls out of the terminal.

Terminal Tips

- Use the specified extraction tools to remove terminals.
- Always use the specified terminal as a replacement. The plating on mating terminals must be compatible or corrosion could occur.
- Always use the correct crimping tool to attach replacement terminals.
- After crimping a terminal to the wire end, pull gently on the terminal to make sure it is securely crimped.

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Engine Test Instructions—Cylinder Misfire Test

For instructions on connecting to Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.

The Cylinder Misfire Test is used to compare the performance of each cylinder relative to each of the other cylinders. The test will help identify problems such as an engine misfire or irregularly running engine. During the test, the Engine Control Unit (ECU) will disable a cylinder, then accelerate the engine with a fixed amount of fuel and measure the time taken to accelerate the engine from one speed to the next with that cylinder disabled. The ECU will then repeat the procedure for the remaining cylinders.

The Cylinder Misfire Test cannot determine if an engine is delivering low power. The test results are only a guide to help determine if there is a problem in a cylinder. The results alone should not be used as a conclusive reason for replacing parts. Other information such as the results of a Compression Test, Cylinder Cutout Test, and other engine diagnostic procedures should be used along with this test information to accurately determine the source of an engine problem.

Before executing the Cylinder Misfire Test

- Warm engine to normal operating temperature.
- Repair the cause of any Diagnostic Trouble Codes (DTCs) if possible.

NOTE: The ECU will not allow the test to run if there is an active engine timing error code (any 637 code), an active engine position error code (any 636 code), coolant temperature is below 40° C (104° F) or above 110° C (230° F). If the engine goes into an overspeed condition while running test, the test will stop.

- Remove any load to the engine that may change during the test. For example, turn the air conditioner off.

Performing the Cylinder Misfire Test

1. Engine idling.

2. Select Cylinder Misfire Test in Service ADVISOR.

3. Follow instruction given by the diagnostic software. The software will instruct users that the throttle lever be moved from low idle position to wide open throttle position, then back to low idle position once for each cylinder tested.

The diagnostic software will inform the test operator if the test was not successfully completed. If the test was successfully completed, the results will be displayed on the screen.

Results shown will represent each cylinders' performance as a percentage in relation to the average of all cylinders. If any cylinder is above or below the average by more than 10%, it indicates the cylinder is contributing either too much (above average) or not enough (below average) in relation to the average engine performance.

NOTE: Run this test at least 3 times to ensure repeatable, accurate results.

The Compression Test and Cylinder Cutout Test should also be performed to help determine that there is a problem in a specific cylinder.

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Engine Test Instructions—Compression Test

For instructions on connecting to Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.

The Compression Test is used to compare the compression of each cylinder to the average compression of all cylinders. The test will help determine if a cylinder has low compression compared to all other cylinders. During the test, the Engine Control Unit (ECU) will disable the engine from starting, then measure the time it takes the piston of each cylinder to accelerate through and past TDC. A piston that accelerated faster than the rest would indicate that cylinder has lower compression than the other cylinders.

The Compression Test cannot determine the true compression pressure of any cylinder, it can only compare each cylinder to the average. The test results are only a guide to help determine if a cylinder has low average compression. The results alone should not be used as a conclusive reason for performing any major engine work. Other information such as the results of the Cylinder Misfire Test, Cylinder Cutout Test, and other engine diagnostic procedures should be used to accurately determine the source of an engine problem.

Before executing the Compression Test

- Warm engine to normal operating temperature.
- Repair the cause of any Diagnostic Trouble Codes (DTCs) if possible.

NOTE: The ECU will not allow the test to run if there is an active engine timing error code (any 637 code), the engine cranking speed is below 100 rpm, coolant temperature is below -30° C (-22° F) or above 200° C (392° F).

- Ensure that the battery and starter are in good working condition

Performing the Compression Test

1. Engine OFF.

2. Select Compression Test in the Service ADVISOR.

3. Follow instruction given by the diagnostic software. The software will instruct that the engine be cranked for up to 15 seconds. Typically, it should take less than 5 seconds. Service ADVISOR should be observed carefully for instructions during the test.

   Error messages and test results will be displayed on the Service ADVISOR screen.

   Results shown will represent each cylinders' compression as a percentage in relation to the average of all cylinders.

   Any cylinder reading that is more than 10% below the rest indicates the cylinder's compression is possibly low.

   Any cylinder reading that is more than 10% greater than the rest indicates a possible injector leaking fuel into the cylinder.

NOTE: Run this test at least 3 times to ensure repeatable, accurate results.

   Further engine diagnostics should be performed to determine the cause of low compression.

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Engine Test Instructions— Cylinder Cutout Test

For instructions on connecting to Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.

The Cylinder Cutout Test is used to aid in identifying a cylinder that is having a problem or to help in diagnosing mechanical or intermittent problems. During the test, the Engine Control Unit (ECU) will disable the cylinder that the technician selects. The test can be performed while operating the vehicle under the conditions that the problem occurs.

The Cylinder Cutout Test can not determine if an engine is developing low power. The test is only a guide to help determine if there is a problem in a cylinder. The results alone should not be used as a conclusive reason for replacing parts. Other information such as the results of a Compression Test, Cylinder Misfire Test, and other engine diagnostic procedures should be used along with this test information to accurately determine the source of the engine problem.

Before executing the Cylinder Cutout Test

- Warm engine to normal operating temperature.
- Repair the cause of any Diagnostic Trouble Codes (DTCs) if possible.

NOTE: The ECU will not allow the test to run if there is an active engine timing error code (any 637 code), an active engine position error code (any 636 code), coolant temperature is below 40° C (104° F) or above 110° C (230° F). If the engine goes into an overspeed condition while running test, the test will stop.

- Ensure that the battery and starter are in good working condition

Performing the Cylinder Cutout Test

1. Engine idling or under the conditions that the problem occurred.
2. Select Cylinder Cutout Test in Service ADVISOR.
3. Follow instructions given by Service ADVISOR.
4. Observe engine operation and the parameters displayed on the Service ADVISOR screen. These parameters include: engine load at current speed, engine speed, and manifold air pressure.
5. Use this data and observations to help in the diagnosis of the problem.

NOTE: Run this test at least 3 times to ensure repeatable, accurate results.

Analysis

A contribution below 70% means that the cylinder is probably not working at all. If a switched-off cylinder does not make any difference to the engine sound, this cylinder is probably not working at all.

A contribution between 70%-90% means that the cylinder does not give its full potential. If the sound slightly changes when the cylinder is cutout the cylinder is working but not to the full potential. To confirm this diagnostic, perform a Cylinder Misfire Test and Compression Test to help confirm the cylinder has a problem.

If the sound is better with a cylinder cutoff, this cylinder is probably firing at the wrong time. This may be due to a damaged injector or a bad electrical connection between ECU and injector. If the results of the Cylinder Cutout Test and Cylinder Misfire Test lead to the same cylinder, and the Compression Test checks good for that cylinder, then the injector wiring or injector is probably bad. First check the electrical connections, looking for shorts to the chassis especially, then if no problems are found, replace faulty injector.

Harness Diagnostic Mode Test

NOTE: Before running this test, ensure you have saved all Snapshot Captures and Recordings. For more information see SNAPSHOT INFORMATION earlier in this group.

Purpose:
This procedure is designed to test the engine wiring harness and associated components for numerous types of errors. Including opens, shorts, actuator communication, and cycling.

Test Conditions:
This test can only be run when the engine is not running. Cylinder fueling is disabled for all cylinders when the test is initiated. If the ECU senses an engine start request, the Harness Diagnostic Mode Test will be aborted and the engine will start. Test Operation: The ECU continuously monitors all the sensors for normal operation while power is applied to the ECU. During the Harness Diagnostic Mode Test, the ECU will set up and trigger some special tests, also. These are tests that the ECU can not perform while the engine is running. When the test starts, all codes and related Snapshot information is erased from the ECU memory. The test starts and checks are made of various components. You may hear various actuators move, as the actuators do a learn cycle. The ECU compares these new learned values with the original values that were created when the part was new. If the ECU determines the values are good, it will store them as the last good values, but not change the original values. The ECU gathers test information as it runs the various tests. If it finds any problems during the test, it will store the code and display it at the end of the test.

Test Procedures:

1. Select Harness Diagnostic Mode Test in Service ADVISOR. A screen appears with a list of all the ECU codes (active and stored).

2. Press “Next” to start the test, “Cancel” to exit the test, or “Print” to print a list of the codes. After pressing “Next” follow the directions on the screen.

3. At the end of the test, another list of codes will be presented. **Currently this screen does not update properly**. Do NOT compare this list with the initial list to see if there are any additional codes.

4. Go the Diagnostic Trouble Codes tab in Service ADVISOR and select the “Refresh” button. Compare these codes to the original list going into the Harness Diagnostic Mode Test.

5. Go to those DTC(s) displayed and troubleshoot them to fix the problem(s), starting with the active codes.

NOTE: If a stored code does not show back up after the test, it may be a bad or intermittent connection. You may want to run the test again and manipulate the wiring harness to see if the code reappears. If it does, check the harness and connector for problems.

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Downloading Electronic Injector Calibration Files

NOTE: This procedure requires an internet connection.

Electronic injectors in this engine have specific settings for optimum performance. To maintain this performance when any of the electronic injectors are replaced or swapped the ECU will need to be reprogrammed with the correct setting for each cylinder. This is done by using the Injector Calibration Tool in Service ADVISOR.

1. Connect to the John Deere Custom Performance web site.
2. 2.On the Fuel System Search page, enter in the Sequence number from the parts label or from the sheet included with the part. If there is no sequence number available, then enter in the part number and serial number of the injector and click on submit.
3. 3.Verify the information about the injector and click in the check box if the information matches the injector. If the information does not match then go back to step 2 and re-enter the injector information.
4. 4.When the search is complete click in the check box to select the injector to be downloaded.
5. 5.Click on Download Selected button and the injector payload will be copied to the local computer.

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Electronic Injector Calibration

A connection with must be made with Service ADVISOR. In the Calibrations tab select Injector Calibration.

The screen will show a table of the existing injector information that is stored in the ECU.

Options to perform:

- Swap Injectors
- Change Injectors
- View Calibration History

Swapping Injectors:

Swapping injectors is used for testing suspected injector problems only. This is used for moving injectors from one cylinder to another to see if the symptom moves cylinders with the injector. Information in the ECU is specific for each injector and the cylinder that it is installed in. When injectors are moved to different cylinders, then the ECU needs to be updated with this information also. Since the information for the existing injectors is already in the ECU and just needs to be moved to a different cylinder number, there are pull down menus that allow the injector information to be transferred from one cylinder to the other. Service ADVISOR will display the original injector information, and the new injector information and ask for confirmation before actually moving the injector information.

Changing Injectors

If an injector is being replaced, then the information for that injector must be loaded into the ECU. This is done by selecting the Change Injector button in Service ADVISOR. The screen will display a table showing the existing information that is stored in the ECU and will have pull down menus available in the serial number field if there are injector calibration files available on the Service ADVISOR computer. For downloading injector calibration files, see Downloading Electronic Injector Calibration Files earlier in this group. If the injector calibration file is available, then selecting the file that corresponds with the injector serial number installed in the cylinder will automatically populate all information fields for that cylinder. If there are no calibration files available on the Service ADVISOR computer, then the information for each field can be entered manually. If the specific calibration file for the injector was not downloaded then select Unlisted and the data fields will allow the information to be entered manually. Once all the injector information has been updated, click the Next button, verify that the data entered is correct, and then click on the Submit button.

View Calibration History

Anytime an injector calibration is performed with Service ADVISOR a history is kept for reviewing any injector changes in the past. This information is only kept on the computer that performed the injector calibration procedure. So if multiple computers are used, not all information will be in one history report.

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Downloading Payload File For Service ADVISOR

NOTE: An Internet connection will be needed.

See E-LEARNING under the Service ADVISOR help section. Also, refer to the training material provided with your Service ADVISOR training course. All authorized Service ADVISOR users have received this training. On-line training is available at John Deere University, which is an internet-based distance-learning application.

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Reprogramming Engine Control Unit (ECU)

The ECU may be reprogrammed using Service ADVISOR. See E-LEARNING under the Service ADVISOR help section. Also, refer to the training material provided with your Service ADVISOR training course. All authorized Service ADVISOR users have received this training. On-line training is available at John Deere University, which is an internet-based distance-learning application.

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Diagnostic Trouble Code List

The following chart is the list of DTCs that are covered in this manual.

Continued on next page

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DTC	Description
000029.03	Throttle #2 Signal Out of Range High
000029.04	Throttle #2 Signal Out of Range Low
000029.14	Throttle #2 Signal Out of Range
000091.03	Throttle #1 Signal Out of Range High
000091.04	Throttle #1 Signal Out of Range Low
000091.14	Throttle #1 Signal Out of Range
000094.17	Low Pressure Fuel System--Pressure Slightly Low
000097.03	Water-in-Fuel Signal Out of Range High
000097.04	Water-in-Fuel Signal Out of Range Low
000097.16	Water in Fuel Detected
000100.01	Engine Oil Pressure Signal Extremely Low
000100.04	Engine Oil Pressure Signal Out of Range Low
000100.18	Engine Oil Pressure Signal Moderately Low
000100.31	Engine Oil Pressure Invalid
000105.00	Intake Manifold Air Temperature Signal Extremely High
000105.03	Intake Manifold Air Temperature Signal Out of Range High
000105.04	Intake Manifold Air Temperature Signal Out of Range Low
000105.15	Intake Manifold Air Temperature Signal Slightly High
000105.16	Intake Manifold Air Temperature Signal Moderately High
000108.02	Barometric Pressure Signal Invalid
000110.00	Engine Coolant Temperature Signal Extremely High
000110.03	Engine Coolant Temperature Signal Out of Range High
000110.04	Engine Coolant Temperature Signal Out of Range Low
000110.15	Engine Coolant Temperature Signal Slightly High
000110.16	Engine Coolant Temperature Signal Moderately High
000157.03	Fuel Rail Pressure Signal Out of Range High
000157.04	Fuel Rail Pressure Signal Out of Range Low
000157.10	Fuel Rail Pressure Rate of Change Abnormal
000157.17	Fuel Rail Pressure Not Developed
000158.17	ECU Power Down Error
000171.05	Ambient Air Temperature Circuit Has High Resistance
000171.06	Ambient Air Temperature Circuit Has Low Resistance
000174.00	Fuel Temperature Signal Extremely High
000174.03	Fuel Temperature Signal Out of Range High
000174.04	Fuel Temperature Signal Out of Range Low
000174.16	Fuel Temperature Signal Moderately High
000189.00	Engine Speed Derate Condition Exists
000569.03	Rear Axle differential Lock Signal Out of Range High
000569.04	Rear Axle differential Lock Signal Out of Range Low
000611.03	Injector Shorted to Power

Continued on next page

000611.04	Injector Shorted to Ground
000627.01	All Injector Circuits Have High Resistance
000629.12	ECU EEPROM Error
000629.13	ECU Boot Block Error
000636.02	Engine Position Sensor Signal Invalid
000636.05	Engine Position Sensor Circuit Has High Resistance
000636.06	Engine Position Sensor Circuit Has Low Resistance
000636.08	Engine Position Sensor Signal Missing
000636.10	Engine Position Signal Rate of Change Abnormal
000637.02	Engine Timing Sensor Signal Invalid
000637.05	Engine Position Sensor Circuit Has High Resistance
000637.06	Engine Position Sensor Circuit Has Low Resistance
000637.07	Engine Timing and Position Signals Out of Sync
000637.08	Engine Timing Sensor Signal Missing
000637.10	Engine Timing Signal Rate of Change Abnormal
000651.02	Injector #1 Part # Data Invalid
000651.05	Injector #1 Circuit Has High Resistance
000651.06	Injector #1 Circuit Has Low Resistance
000651.07	Injector #1 Not Responding
000651.13	Injector #1 Calibration Fault
000652.02	Injector #2 Part # Data Invalid
000652.05	Injector #2 Circuit Has High Resistance
000652.06	Injector #2 Circuit Has Low Resistance
000652.07	Injector #2 Not Responding
000652.13	Injector #2 Calibration Fault
000653.02	Injector #3 Part # Data Invalid
000653.05	Injector #3 Circuit Has High Resistance
000653.06	Injector #3 Circuit Has Low Resistance
000653.07	Injector #3 Not Responding
000653.13	Injector #3 Calibration Fault
000654.02	Injector #4 Part # Data Invalid
000654.05	Injector #4 Circuit Has High Resistance
000654.06	Injector #4 Circuit Has Low Resistance
000654.07	Injector #4 Not Responding
000654.13	Injector #4 Calibration Fault
000655.02	Injector #5 Part # Data Invalid
000655.05	Injector #5 Circuit Has High Resistance
000655.06	Injector #5 Circuit Has Low Resistance
000655.07	Injector #5 Not Responding
000655.13	Injector #5 Calibration Fault
000656.02	Injector #6 Part # Data Invalid

Continued on next page

000656.05	Injector #6 Circuit Has High Resistance
000656.06	Injector #6 Circuit Has Low Resistance
000656.07	Injector #6 Not Responding
000656.13	Injector #6 Calibration Fault
000676.03	Glow Plugs Signal Received When Not Expected
000676.05	Glow Plugs Signal Not Received When Expected
000970.02	Auxiliary Engine Shutdown Switch Signal Invalid
001075.05	Low Pressure Fuel Pump Circuit has High Resistance
001075.06	Low Pressure Fuel Pump Circuit has Low Resistance
001136.00	ECU Temperature Signal Extremely High
001136.16	ECU Temperature Signal Moderately High
001321.05	Engine Starter Solenoid Lockout Rely Drive Circuit Has High Resistance
001321.06	Engine Starter Solenoid Lockout Rely Drive Circuit Has Low Resistance
001321.30	Engine Starter Solenoid Lockout Rely Drive Circuit Reserved for SAE Assignment
001347.03	High Pressure Fuel Pump Control Valve Signal Out of Range High
001347.05	High Pressure Fuel Pump Solenoid #1 Circuit Has High Resistance
001347.07	High Pressure Fuel Pump Not Able to Meet Required Rail Pressure
001569.31	Engine in Derate Condition
002023.09	No CAN Message Received From Source Address 17 Within Time Out Period
002071.09	No CAN Message Received From Source Address 71 Within Time Out Period
003509.03	Sensor Supply #1 Voltage Out of Range High
003509.04	Sensor Supply #1 Voltage Out of Range Low
003510.03	Sensor Supply #2 Voltage Out of Range High
003510.04	Sensor Supply #2 Voltage Out of Range Low
003511.03	Sensor Supply #3 Voltage Out of Range High
003511.04	Sensor Supply #3 Voltage Out of Range Low
524037.02	MFWD Switch Circuit Fault
524223.03	Rear Axle Differential Lock Circuit Fault
524225.31	Engine Start Protection Bypass Detected
524235.03	MFWD Solenoid Circuit Voltage High
524235.04	MFWD Solenoid Circuit Voltage Low

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Diagnostic Trouble Codes (DTCs)

SPN/FMI CODES

SPN/FMI codes are written from the SAE J1939 standard as a two-part code. The first part is called the Suspect Parameter Number (SPN). Typically, it contains between 2 and 4 digits. The SPN identifies the system or the component that has the failure; for example SPN 110 indicates a failure in the engine coolant temperature circuit. The second part of the code is called the Failure Mode Identifier (FMI) code. The FMI contains 2 digits and identifies the type of failure that has occurred. For example, FMI 03 indicates value Out of Range High (OORH). In order to determine the exact failure, both the SPN and FMI are required. Combining SPN 110 with FMI 03 yields "engine coolant temperature input voltage out of range high."

On these applications the ECU transmits SPN/FMI codes over the Controller Area Network (CAN). This allows for service tools such as Service ADVISOR to display active and stored DTCs. When using Service ADVISOR, the codes will be displayed in a 000000.00 format. For example, code 110.03 will be displayed as 000110.03. For an explanation of FMI codes, see FAILURE MODE INDICATOR DESIGNATIONS later in this Group.

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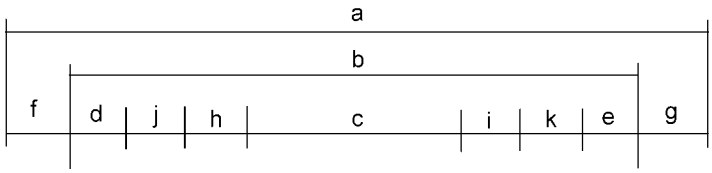
Failure Mode Indicator Designations

RG14537 –UN–31OCT05



Relationship of FMI Designations and Range of Sensor Input

Region a: Total signal input range possible that can be seen by an electronic module.

Region b: Total signal range physically possible as defined by an application.

Region c: Range defined as normal for a given real world measurement.

Region d: Range defined as Extremely below normal, of what is considered normal for the given real world measurement. Associated with FMI 01.

Region e: Range defined as Extremely above normal, of what is considered normal for the given real world measurement. Associated with FMI 00.

Region f: Range which is low outside the range of what is considered physically possible for a given system. Associated with FMI 04 (Out Of Range Low, OORL).

Region g: Range which is high outside the range of what is considered physically possible for a given system. Associated with FMI 03 (Out Of Range High, OORH), 05, 06.

Region h: Range defined as Slightly below normal, of what is considered normal for a given real-world measurement. Associated with FMI 17.

Region i: Range defined as Slightly above normal, of what is considered normal for a given real-world measurement. Associated with FMI 15.

Region j: Range defined as Moderately below normal, of what is considered normal for a given real-world measurement. Associated with FMI 18.

Region k: Range defined as Moderately above normal, of what is considered normal for a given real-world measurement. Associated with FMI 16.

04
160
50

Continued on next page

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FMI	Description
00	**Data Valid but Above Normal Operational Range—Extreme Level.** The signal communicating information is within a defined acceptable and valid range, but the real world condition is above what would be considered normal as determined by the predefined extreme level limits for that particular measure of the real world condition. Broadcast of data values is continued as normal.
01	**Data Valid but Below Normal Operational Range—Extreme Level** The signal communicating information is within a defined acceptable and valid range, but the real world condition is below what would be considered normal as determined by the predefined extreme level limits for that particular measure of the real world condition. Broadcast of data values is continued as normal.
02	**Data Erratic, Intermittent or Incorrect** Measurements that change at a rate that is not considered possible in the real world condition and caused by improper operation of the measuring device or its connection to the module. Broadcast of data value is substituted with the "error indicator" value. Incorrect data includes any data not received and any data that is exclusive of the situations covered by FMIs 3, 4, 5 and 6 below. Data may also be considered incorrect if it is inconsistent with other information collected or known about the system.
03	**Value Out of Range High (OORH)** A voltage signal, data or otherwise, is above the predefined limits that bound the range. Broadcast of data value is substituted with the "error indicator" value. Any signal external to an electronic control module whose voltage remains at a high level when the ECM commands it to low. Broadcast of data value is substituted with the "error indicator" value.
04	**Value Out of Range Low (OORL)** A voltage signal, data or otherwise, is below the predefined limits that bound the range. Broadcast of data value is substituted with the "error indicator" value. Any signal external to an electronic control module whose voltage remains at a low level when the ECM commands it to high. Broadcast of data value is substituted with the "error indicator" value.
05	**Current Below Normal** A current signal, data or otherwise, is below the predefined limits that bound the range. Broadcast of data value is substituted with the "error indicator" value. Any signal external to an electronic control module whose current remains off when the ECM commands it on. Broadcast of data value is substituted with the "error indicator" value.
06	**Current Above Normal** A current signal, data or otherwise, is above the predefined limits that bound the range. Broadcast of data value is substituted with the "error indicator" value. Any signal external to an electronic control module whose current remains on when the ECM commands it off. Broadcast of data value is substituted with the "error indicator" value.
07	**Mechanical System not Responding or Out of Adjustment** Any fault that is detected as the result of an improper mechanical adjustment or an improper response or action of a mechanical system that, with a reasonable confidence level, is not caused by an electronic or electrical system failure. This type of fault may or may not be directly associated with the value of general broadcast information.
08	**Abnormal Frequency or Pulse Width or Period** To be considered in cases of FMI 4 and 5. Any frequency or PWM signal that is outside the predefined limits which bound the signal range for frequency or duty cycle (outside region b of the signal range). Also if the signal is an ECM output, any signal whose frequency or duty cycle is not consistent with the signal which is emitted. Broadcast of data value is substituted with the "error indicator" value.
09	**Abnormal Update Rate** Any failure that is detected when receipt of data via the data link or as input from a smart actuator or smart sensor is not at the update rate expected or required by the ECM (outside region c of the signal range). Also any error that causes the ECM not to send information at the rate required by the system. This type of fault may or may not be directly associated with the value of general broadcast information.
10	**Abnormal Rate of Change** Any data, exclusive of the abnormalities covered by FMI 2, that is considered valid but whose data is changing at a rate that is outside the predefined limits that bound the rate of change for a properly functioning system (outside region c of the signal range). Broadcast of data values is continued as normal.
11	**Root Cause Not Known** It has been detected that a failure has occurred in a particular subsystem but the exact nature of the fault is not known. Broadcast of data value is substituted with the "error indicator" value.
12	**Bad Intelligent Device or Component** Inconsistency of data indicates that a device with some internal intelligence, such as a controller, module, smart sensor or smart actuator, is not properly functioning. This data may be internal to a module or external from a data link message or from various system responses. Broadcast of data value is substituted with the "error indicator" value. This error is to include all internal controller trouble codes that cannot be caused by connections or systems external to the controller.

Continued on next page

13	**Out of Calibration**A failure that can be identified to be the result of not being properly calibrated. This may be the case for a subsystem which can identify that the calibration attempting to be used by the controller is out of date. Or it may be the case that the mechanical subsystem is determined to be out of calibration. This failure mode does not relate to a signal range.
14	**Special Instructions**SPNs 611 through 615 are defined as "System Diagnostic Codes" and are used to identify failures that cannot be tied to a specific field-replaceable component. Specific subsystem fault isolation is the goal of any diagnostic system, but for various reasons this cannot always be accomplished. These SPNs allow the manufacturer some flexibility to communicate non-"specific component" diagnostic information. Because SPN 611-615 use the standard SPN/FMI format, it allows the use of standard diagnostic tools, electronic dashboards, satellite systems and other advanced devices that scan Parameter Groups containing the SPN/FMI formats. Because manufacturer-defined codes are not desirable in terms of standardization, the use of these codes should only occur when diagnostic information cannot be communicated as a specific component and failure mode. This failure mode does not relate to the signal range, and may or may not be directly associated with the value of general broadcast information.
15	**Data Valid but Above Normal Operating Range—Slight Level**The signal communicating information is within a defined acceptable and valid range, but the real world condition is above what would be considered normal as determined by the predefined slight level limits for that particular message of the real world condition. Broadcast of data values is continued as normal.
16	**Data Valid but Above Normal Operating Range—-Moderate Level**The signal communicating information is within a defined acceptable and valid range, but the real world condition is above what would be considered normal as determined by the predefined moderate level limits for that particular message of the real world condition. Broadcast of data values is continued as normal.
17	**Data Valid but Below Normal Operating Range—Slight Level**The signal communicating information is within a defined acceptable and valid range, but the real world condition is below what would be considered normal as determined by the predefined slight level limits for that particular message of the real world condition. Broadcast of data values is continued as normal.
18	**Data Valid but Below Normal Operating Range—Moderate Level**The signal communicating information is within a defined acceptable and valid range, but the real world condition is below what would be considered normal as determined by the predefined moderate level limits for that particular message of the real world condition. Broadcast of data values is continued as normal.
19	**Received Network Data In Error**Any failure that is detected when the data received via the network is found substituted with the "error indicator" value (i.e. FE (16), see J1939/71). This type of failure is associated with received network data. The component used to measure the real world signal is wired directly to the module sourcing the data to the network and not to the module receiving the data via the network. This type of fault may or may not be directly associated with the value of general broadcast information.
20-30	**Reserved for SAE Assignment**
31	**Not Available or Condition Exists**Used to indicate that the FMI is not available or that the condition that is identified by the SPN exists. When no applicable FMI exists for the reported SPN, FMI 31 can be used. Also in cases when the reported SPN name has the failure information in it, FMI 31 can be used to indicated that the condition reported by the SPN exists. This type of fault may or may not be directly associated with the value of general broadcast information.

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Intermittent Fault Diagnostics

Intermittent faults are problems that periodically “go away”. A problem such as a loose terminal that intermittently does not make contact is a likely cause of an intermittent fault. Other intermittent faults may be set only under certain operating conditions such as heavy load, extended idle, etc. When diagnosing intermittent faults, take special note of the condition of wiring and connectors since a high percentage of intermittent problems originate here. Check for loose, dirty, or disconnected connectors. Inspect the wiring routing looking for possible shorts caused by contact with external parts (for example, rubbing against sharp sheet metal edges). Inspect the connector vicinity looking for wires that have pulled out of connector terminals, damaged connectors, poorly positioned terminals, and corroded or damaged terminals. Look for broken wires, damaged splices, and wire-to-wire shorts. Use good judgement if component replacement is thought to be required.

NOTE: The ECU is the component LEAST likely to fail.

Suggestions for diagnosing intermittent faults:

- If diagnostic chart indicates that the problem is intermittent, try to reproduce the operating conditions that were present when the DTC set. Service ADVISOR can be used to help locate intermittent problems, as it includes a function called Recording. The Recording function permits the recording of data parameter values during a diagnostic session. If a DTC sets during a certain diagnostic session, the parameters can be played back and observed to see what each parameter’s value was when the DTC occurred.
- If a faulty connection or wire is suspected to be the cause of the intermittent problem: clear DTCs, then check the connection or wire by wiggling it while watching Service ADVISOR to see if the fault resets.

Possible Causes of Intermittent Faults:

- Faulty connection between sensor or actuator and harness.
- Faulty contact between terminals in connector.
- Faulty terminal/wire connection.
- Electromagnetic interference (EMI) from an improperly installed 2-way radio, etc. can cause faulty signals to be sent to the ECU.

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John Deere Trimmable Options

Trimmable options are features that can be turned ON or Off during an ECU programming cycle. These features will customize an engine for each individual customer. Not all engines have the trim feature.

To update trimmable features, download the software payload file and start the programming sequence through the service tool. The trim page automatically appears if the payload has trim incorporated.

For more information to help select the correct option, use the help documentation available in each section of the trim page.

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000029.03 — Throttle #2 Signal Out of Range High

Throttle voltage is above the high voltage specification.

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000029.03 — Throttle #2 Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:
003510.03
000029.03

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

Related Information:
The throttle #2 input voltage increases above its high voltage specification.

Alarm Level:
Warning

Control Unit Response:
The ECU will continue to operate normally.

Additional References:
For more Throttle #2 information, see ANALOG THROTTLE 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 5
- see 4.5L 24V ECU WIRING DIAGRAM 5
- see 6.8L 12V ECU WIRING DIAGRAM 5
- see 6.8L 24V ECU WIRING DIAGRAM 5

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.

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 Codes. Did 000029.03 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓭ – – –1/1
❷ **Throttle Linkage Check**	1. Ignition OFF, Engine OFF 2. Check throttle linkage for any slipping. 3. Check throttle linkage for misalignment. *NOTE: Use application manual for linkage and alignment procedures.* Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❸ – – –1/1
❸ **Terminal Test**	1. Disconnect throttle #2 connector. 2. Perform Terminal Test on Throttle #2 harness connector. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❹ – – –1/1

❹ **Analog Throttle Disconnected Test**	*NOTE: Leave throttle connector disconnected.* 1. Ignition ON, Engine OFF. 2. Refresh codes. Did 00029.04 appear active and 00029.03 go stored?	**YES:** GO TO ❺ **NO:** GO TO ❼ – – –1/1
❺ **Throttle potentiometer Resistance Check**	1. Ignition OFF, Engine OFF. 2. On the throttle potentiometer, measure the resistance between: • power (terminal C) and signal (terminal B). **Specification** Throttle Potentiometer—Resistance ..... Between 350 and 550 ohms • power (terminal C) and return (terminal A). **Specification** Throttle Potentiometer—Resistance ..... Between 4.2k and 6.2k ohms Were the resistance measurements within specifications?	**YES:** GO TO ❻ **NO:** Replace throttle #2 potentiometer. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1
❻ **Harness Resistance Check**	1. Ignition OFF, Engine OFF. 2. On the harness, measure the resistance between the return (terminal A) and application single point ground. Is resistance greater than 10 ohms?	**YES:** Repair open terminal A wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❼ – – –1/1
❼ **Throttle #2 Circuit Resistance Check**	On the harness, measure the resistance between the throttle #2 connector power (terminal C) and signal (terminal B). Is resistance less than 10 ohms?	**YES:** GO TO ❽ **NO:** GO TO ❿ – – –1/1

❽ **Terminal Test**	1. Disconnect ECU connector J2. 2. Perform Terminal Test on Throttle #2 harness connector. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❾ – – –1/1
❾ **Terminal to Terminal Resistance Check**	1. Disconnect all ECU connectors. 2. On the harness, measure the resistance between the signal (terminal J2-F3) and all other terminals in all ECU connectors. were any measurements less than 100 ohms?	**YES:** Repair short to terminal J2-F3 in wiring harness. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1
❿ **Terminal Test**	1. Disconnect ECU connector J2. 2. Perform TERMINAL TEST on Throttle #2 harness connector. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓫ – – –1/1
⓫ **Throttle #2 Circuit Resistance Check, ECU Disconnected**	*NOTE: Leave throttle connector disconnected.* On the harness, measure the resistance between the throttle #2 connector power (terminal C) and signal (terminal B). Is resistance greater than 10M ohms?	**YES:** GO TO ⓬ **NO:** Repair shorted wiring problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1

⓬ **ECU Resistance Check**	On the ECU, measure the resistance between the power (terminal J2-G2) and signal (terminal J2-F3). Was the resistance between 120k and 180k ohms?	**YES:** Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1

⓭ **Occurrence Count Check**	Review stored information and look at occurrence count for 000029.03. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ⓮ **NO:** GO TO ⓯ – – –1/1

⓮ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Perform Terminal Test on the Throttle #2 harness connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓯ – – –1/1

⓯ **Further Review of Snapshot Information**	1. Ignition ON, Engine OFF 2. 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 ⓰ **NO:** GO TO ⓱ – – –1/1

⑯ Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes. Did 000029.03 reappear when engine operating point was reached?	**YES:** Replace throttle #2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⑮ – – –1/1

⑰ Terminal Test	1. Ignition OFF, Engine OFF 2. Disconnect throttle #2 connector and ECU connector J2. 3. Perform Terminal Test on the Throttle #2 harness connector and ECU J2 connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⑱ – – –1/1

⑱ Software Updates	1. Download latest payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000029.03 active?	**YES:** Replace throttle #2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Problem fixed, bad ECU program. – – –1/1

000029.04 — Throttle #2 Signal Out of Range Low

Throttle voltage is below the low voltage specification.

DN22556,000049F –19–23MAY07–1/1

000029.04 — Throttle #2 Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:
003510.04
000029.04

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

Related Information:
The throttle #2 input voltage decreases below its low voltage specification.

Alarm Level:
Warning

Control Unit Response:
The ECU will continue to operate normally.

Additional References:
For more Throttle #2 information, see ANALOG THROTTLE 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 4
- see 4.5L 24V ECU WIRING DIAGRAM 4
- see 6.8L 12V ECU WIRING DIAGRAM 4
- see 6.8L 24V ECU WIRING DIAGRAM 4

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

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

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 Codes. Did 000029.04 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓰ – – –1/1

❷ **Throttle Linkage Check**	1. Ignition OFF, Engine OFF 2. Check throttle linkage for any slipping. 3. Check throttle linkage for misalignment. *NOTE: Use application manual for linkage and alignment procedures.* Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❸ – – –1/1

❸ **Terminal Test**	1. Disconnect throttle #2 connector. 2. Perform TERMINAL TEST on Throttle #2 harness connector. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❹ – – –1/1

❹ **Throttle potentiometer Resistance Check**	On the throttle potentiometer, measure the resistance between: • power (terminal C) and signal (terminal B). **Specification** Throttle Potentiometer—Resistance ..... Between 350 and 550 ohms • power (terminal C) and return (terminal A). **Specification** Throttle Potentiometer—Resistance ..... Between 4.2k and 6.2k ohms Were the resistance measurements within specifications?	**YES:** GO TO ❺ **NO:** Replace throttle #2 potentiometer. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1
❺ **Throttle #2 Circuit Resistance Check Part 1**	On the harness, measure the resistance between the throttle #2 harness connector signal (terminal B) and return (terminal A). Is resistance between 120k and 180k ohms?	**YES:** GO TO ❻ **NO:** Measurement is greater than 180k ohms. GO TO ❿ **NO:** Measurement is less than 10 ohms. GO TO ⓬ – – –1/1
❻ **Throttle #2 Circuit Resistance Check Part 2**	On the harness, measure the resistance between the throttle #2 harness connector power (terminal C) and return (terminal A). Is resistance between 90k and 130k ohms?	**YES:** Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR **NO:** GO TO ❼ – – –1/1
❼ **Terminal Test**	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J2. 3. Perform Terminal Test on the ECU harness connector J2. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❽ – – –1/1

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❽ **Terminal to Terminal Resistance Check**	On the harness, measure the resistance between the throttle #2 harness connector power (terminal C) and the ECU harness connector power (terminal J2-A3). Is the resistance greater than 10 ohms?	**YES:** Repair open to in wiring harness. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❾ – – –1/1

❾ **ECU Resistance Check**	On the ECU, measure the resistance between the power (terminal J2-A3) and return (terminal J2-C3). Was the resistance between 120k and 180k ohms?	**YES:** Reconnect all connectors. GO TO ❶ **NO:** Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1

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❿ **Terminal to Terminal Resistance Check**	1. Disconnect ECU connector J2. 2. On the harness, measure the resistance between the throttle #2 harness connector signal (terminal B) and the ECU harness connector signal (terminal J2-A4). Is the resistance greater than 10 ohms?	**YES:** Repair open to in wiring harness. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓫ – – –1/1

⓫ **Terminal Test**	Perform Terminal Test on the ECU harness connector J2. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓮ – – –1/1

⓬ **Harness Resistance Check, ECU Disconnected**	1. Disconnect ECU connector J2. 2. On the harness, measure the resistance between the throttle #2 harness connector signal (terminal B) and return (terminal A). Is resistance less than 10 ohms?	**YES:** GO TO ⓭ **NO:** GO TO ⓮ – – –1/1
⓭ **Terminal Test**	Perform Terminal Test on the ECU harness connector J2. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓯ – – –1/1
⓮ **ECU Resistance Check**	On the ECU, measure the resistance between the signal (terminal J2-A4) and return (terminal J2-C3). Was the resistance between 120k and 180k ohms?	**YES:** Reconnect all connectors. GO TO ❶ **NO:** Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1
⓯ **Terminal to Terminal Resistance Check**	On the harness, measure the resistance between the ECU harness connector J2 signal (terminal J2-A4) and all other ECU connector terminals. Is the resistance less than 100 ohms on any terminal?	**YES:** Repair wiring for all measurements less than 100 ohms. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Reconnect all connectors. GO TO ❶ – – –1/1
⓰ **Occurrence Count Check**	Review stored information and look at occurrence count for 000029.04. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ⓱ **NO:** GO TO ⓲ – – –1/1

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⓱ Terminal Test	1. Ignition OFF, Engine OFF 2. Perform Terminal Test on the Throttle #2 harness connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓲ – – –1/1
⓲ Further Review of Snapshot Information	1. Ignition ON, Engine OFF 2. 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 ⓳ **NO:** GO TO ⓴ – – –1/1
⓳ Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes. Did 000029.04 reappear when engine operating point was reached?	**YES:** Replace throttle #2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓲ – – –1/1
⓴ Terminal Test	1. Ignition OFF, Engine OFF 2. Disconnect throttle #2 connector and ECU connector J2. 3. Perform Terminal Test on the Throttle #2 harness connector and ECU J2 connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ㉑ – – –1/1

21 Software Updates	1. Download latest payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000029.04 active?	**YES:** Replace throttle #2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Problem fixed, bad ECU program. – – –1/1

000029.14 — Throttle #2 Voltage Out of Range

Throttle voltage is above or below the specification.

This code is just an informative code telling you that the primary analog throttle is either above or below the Out Of Range specification.

To get the engine to change speed you must either set the throttle to them minimum position then increase it or cycle the ignition key to off then back on.

This is a safety feature used to keep the engine from running away when not commanded to after a throttle problem.

DN22556,00004A0 –19–22MAY07–1/1

000091.03 — Throttle #1 Signal Out of Range High

Throttle voltage is above the high voltage specification.

DN22556,00004A1 –19–22MAY07–1/1

000091.03 — Throttle #1 Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:
003511.03
000091.03

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

Related Information:
The throttle #1 input voltage increases above its high voltage specification.

Alarm Level:
Warning

Control Unit Response:
The ECU will continue to operate normally.

Additional References:
For more Throttle #1 information, see ANALOG THROTTLE 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 5
- see 4.5L 24V ECU WIRING DIAGRAM 5
- see 6.8L 12V ECU WIRING DIAGRAM 5
- see 6.8L 24V ECU WIRING DIAGRAM 5

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.

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 Codes. Did 000091.03 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓭ – – –1/1
❷ **Throttle Linkage Check**	1. Ignition OFF, Engine OFF 2. Check throttle linkage for any slipping. 3. Check throttle linkage for misalignment. *NOTE: Use application manual for linkage and alignment procedures.* Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❸ – – –1/1
❸ **Terminal Test**	1. Disconnect throttle #1 connector. 2. Perform TERMINAL TEST on Throttle #1 harness connector. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❹ – – –1/1

❹ **Analog Throttle Disconnected Test**	*NOTE: Leave throttle connector disconnected.* 1. Ignition ON, Engine OFF. 2. Refresh codes. Did 00091.04 appear active and 00091.03 go stored?	**YES:** GO TO ❺ **NO:** GO TO ❼ – – –1/1
❺ **Throttle potentiometer Resistance Check**	1. Ignition OFF, Engine OFF. 2. On the throttle potentiometer, measure the resistance between: • power (terminal C) and signal (terminal B). **Specification** Throttle Potentiometer—Resistance ..... Between 350 and 550 ohms • power (terminal C) and return (terminal A). **Specification** Throttle Potentiometer—Resistance ..... Between 4.2k and 6.2k ohms Were the resistance measurements within specifications?	**YES:** GO TO ❻ **NO:** Replace throttle #1 potentiometer. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1
❻ **Harness Resistance Check**	1. Ignition OFF, Engine OFF. 2. On the harness, measure the resistance between the return (terminal A) and application single point ground. Is resistance greater than 10 ohms?	**YES:** Repair open terminal A wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❼ – – –1/1
❼ **Throttle #1 Circuit Resistance Check**	On the harness, measure the resistance between the throttle #1 connector power (terminal C) and signal (terminal B). Is resistance less than 10 ohms?	**YES:** GO TO ❽ **NO:** GO TO ❿ – – –1/1

8 Terminal Test	1. Disconnect ECU connector J2. 2. Perform TERMINAL TEST on Throttle #1 harness connector. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 9 – – –1/1
9 Terminal to Terminal Resistance Check	1. Disconnect all ECU connectors. 2. On the harness, measure the resistance between the signal (terminal J2-A4) and all other terminals in all ECU connectors. were any measurements less than 100 ohms?	**YES:** Repair short to terminal J2-A4 in wiring harness. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1
10 Terminal Test	1. Disconnect ECU connector J2. 2. Perform TERMINAL TEST on Throttle #1 harness connector. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 11 – – –1/1
11 Throttle #1 Circuit Resistance Check, ECU Disconnected	*NOTE: Leave throttle connector disconnected.* On the harness, measure the resistance between the throttle #1 connector power (terminal C) and signal (terminal B). Is resistance greater than 10M ohms?	**YES:** GO TO 12 **NO:** Repair shorted wiring problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1

⓬ **ECU Resistance Check**	On the ECU, measure the resistance between the power (terminal J2-A3) and signal (terminal J2-A4). Was the resistance between 120k and 180k ohms?	**YES:** Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1

⓭ **Occurrence Count Check**	Review stored information and look at occurrence count for 000091.03. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ⓮ **NO:** GO TO ⓯ – – –1/1

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⓮ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Perform Terminal Test on the Throttle #1 harness connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓯ – – –1/1

⓯ **Further Review of Snapshot Information**	1. Ignition ON, Engine OFF 2. 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 ⓰ **NO:** GO TO ⓱ – – –1/1

⑯ Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes. Did 000091.03 reappear when engine operating point was reached?	**YES:** Replace throttle #1. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⑮ – – –1/1

⑰ Terminal Test	1. Ignition OFF, Engine OFF 2. Disconnect throttle #1 connector and ECU connector J2. 3. Perform Terminal Test on the Throttle #1 harness connector and ECU J2 connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⑱ – – –1/1

⑱ Software Updates	1. Download latest payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000091.03 active?	**YES:** Replace throttle #1. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Problem fixed, bad ECU program. – – –1/1

000091.04 — Throttle #1 Signal Out of Range Low

Throttle voltage is below the low voltage specification.

DN22556,00004A2 –19–23MAY07–1/1

000091.04 — Throttle #1 Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:
003511.04
000091.04

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

Related Information:
The throttle #1 input voltage decreases below its low voltage specification.

Alarm Level:
Warning

Control Unit Response:
The ECU will continue to operate normally.

Additional References:
For more Throttle #1 information, see ANALOG THROTTLE 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 5
- see 4.5L 24V ECU WIRING DIAGRAM 5
- see 6.8L 12V ECU WIRING DIAGRAM 5
- see 6.8L 24V ECU WIRING DIAGRAM 5

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.

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 Codes. Did 000091.04 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓰ – – –1/1

❷ **Throttle Linkage Check**	1. Ignition OFF, Engine OFF 2. Check throttle linkage for any slipping. 3. Check throttle linkage for misalignment. *NOTE: Use application manual for linkage and alignment procedures.* Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❸ – – –1/1

❸ **Terminal Test**	1. Disconnect throttle #1 connector. 2. Perform TERMINAL TEST on Throttle #1 harness connector. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❹ – – –1/1

❹ **Throttle potentiometer Resistance Check**	On the throttle potentiometer, measure the resistance between: • power (terminal C) and signal (terminal B). **Specification** Throttle Potentiometer—Resistance ..... Between 350 and 550 ohms • power (terminal C) and return (terminal A). **Specification** Throttle Potentiometer—Resistance ..... Between 4.2k and 6.2k ohms Were the resistance measurements within specifications?	**YES:** GO TO ❺ **NO:** Replace throttle #1 potentiometer. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1
❺ **Throttle #1 Circuit Resistance Check Part 1**	On the harness, measure the resistance between the throttle #1 harness connector signal (terminal B) and return (terminal A). Is resistance between 120k and 180k ohms?	**YES:** GO TO ❻ **NO:** Measurement is greater than 180k ohms. GO TO ❿ **NO:** Measurement is less than 10 ohms. GO TO ⓬ – – –1/1
❻ **Throttle #1 Circuit Resistance Check Part 2**	On the harness, measure the resistance between the throttle #1 harness connector power (terminal C) and return (terminal A). Is resistance between 90k and 130k ohms?	**YES:** Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR **NO:** GO TO ❼ – – –1/1
❼ **Terminal Test**	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J2. 3. Perform Terminal Test on the ECU harness connector J2. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❽ – – –1/1

❽ **Terminal to Terminal Resistance Check**	On the harness, measure the resistance between the throttle #1 harness connector power (terminal C) and the ECU harness connector power (terminal J2-A3). Is the resistance greater than 10 ohms?	**YES:** Repair open to in wiring harness. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❾ – – –1/1

❾ **ECU Resistance Check**	On the ECU, measure the resistance between the power (terminal J2-A3) and return (terminal J2-C3). Was the resistance between 120k and 180k ohms?	**YES:** Reconnect all connectors. GO TO ❶ **NO:** Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1

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❿ **Terminal to Terminal Resistance Check**	1. Disconnect ECU connector J2. 2. On the harness, measure the resistance between the throttle #1 harness connector signal (terminal B) and the ECU harness connector signal (terminal J2-A4). Is the resistance greater than 10 ohms?	**YES:** Repair open to in wiring harness. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓫ – – –1/1

⓫ **Terminal Test**	Perform Terminal Test on the ECU harness connector J2. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓮ – – –1/1

⓬ **Harness Resistance Check, ECU Disconnected**	1. Disconnect ECU connector J2. 2. On the harness, measure the resistance between the throttle #1 harness connector signal (terminal B) and return (terminal A). Is resistance less than 10 ohms?	**YES:** GO TO ⓭ **NO:** GO TO ⓮ – – –1/1
⓭ **Terminal Test**	Perform Terminal Test on the ECU harness connector J2. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓯ – – –1/1
⓮ **ECU Resistance Check**	On the ECU, measure the resistance between the signal (terminal J2-A4) and return (terminal J2-C3). Was the resistance between 120k and 180k ohms?	**YES:** Reconnect all connectors. GO TO ❶ **NO:** Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1
⓯ **Terminal to Terminal Resistance Check**	On the harness, measure the resistance between the ECU harness connector J2 signal (terminal J2-A4) and all other ECU connector terminals. Is the resistance less than 100 ohms on any terminal?	**YES:** Repair wiring for all measurements less than 100 ohms. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Reconnect all connectors. GO TO ❶ – – –1/1
⓰ **Occurrence Count Check**	Review stored information and look at occurrence count for 000091.04. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ⓱ **NO:** GO TO ⓲ – – –1/1

17 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform Terminal Test on the Throttle #1 harness connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 18 – – –1/1
18 Further Review of Snapshot Information	1. Ignition ON, Engine OFF 2. 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 19 **NO:** GO TO 20 – – –1/1
19 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes. Did 000091.04 reappear when engine operating point was reached?	**YES:** Replace throttle #1. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 18 – – –1/1
20 Terminal Test	1. Ignition OFF, Engine OFF 2. Disconnect throttle #1 connector and ECU connector J2. 3. Perform Terminal Test on the Throttle #1 harness connector and ECU J2 connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 21 – – –1/1

21 Software Updates	1. Download latest payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000091.04 active?	**YES:** Replace throttle #1. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Problem fixed, bad ECU program. – – –1/1

000091.14 — Throttle #1 Voltage Out of Range

Throttle voltage is above or below the specification.

This code is just an informative code telling you that the primary analog throttle is either above or below the Out Of Range specification.

To get the engine to change speed you must either set the throttle to them minimum position then increase it or cycle the ignition key to off then back on.

This is a safety feature used to keep the engine from running away when not commanded to after a throttle problem.

DN22556,00004A4 –19–22MAY07–1/1

000094.17 — Low Pressure Fuel System--Pressure Slightly Low

The ECU detects water in the fuel.

DN22556,0000623 –19–08MAY07–1/1

000094.17 — Low Pressure Fuel System--Pressure Slightly Low Diagnostic Procedure

Troubleshooting Sequence:
000094.17

Related Information:
The ECU detects the low pressure system pressure is slightly low.

Alarm Level:
Warning

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

Additional References:
For more water in fuel sensor information, see FUEL TRANSFER PUMP 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 JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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 000094.17 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❻ – – –1/1

❷ **Fuel Level Check**	1. Ignition OFF, Engine OFF. 2. Check for fuel in the tank, gage could be bad. Does the tank have fuel in it?	**YES:** GO TO ❸ **NO:** Put quality fuel in tank. GO TO ❶ – – –1/1
❸ **Filter Replacement**	1. Replace fuel filters. *NOTE: Ensure the o-ring on the primary filter comes off with the old one and put a new o-ring on the new filter.* 2. Ignition ON, Engine ON. 3. Refresh codes Is 000094.17 active?	**YES:** GO TO ❹ **NO:** Replace low pressure fuel sensor. GO TO ❶ – – –1/1
❹ **Fuel System Check**	Check fuel system, see F1 - FUEL SUPPLY SYSTEM CHECK in Section 4 Group 150 earlier in this manual. Did check pass?	**YES:** GO TO ❺. **NO:** see F1 - FUEL SUPPLY SYSTEM CHECK in Section 4 Group 150 earlier in this manual. – – –1/1

❺ **DTC Code Check**	1. Ignition ON, Engine ON. 2. Refresh Codes. Is 000094.17 active?	**YES:** GO TO ❻ **NO:** Problem fixed. – – –1/1
❻ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Perform Terminal Test on the low pressure fuel sensor harness connector. Were any problems found?	**YES:** Repair problem. GO TO ❶. **NO:** GO TO ❼ – – –1/1
❼ **Mechanical Pressure Check**	1. Install a mechanical gage, using a "T", in line with the output of the low pressure fuel pump. 2. Crank or run engine. Is the fuel pressure greater than 30 kPa (4.35psi)	**YES:** Pressure checks good. GO TO ❶ **NO:** GO TO ❽ – – –1/1
❽ **Mechanical Pump Check**	1. Remove fuel transfer pump, see REMOVE FUEL TRANSFER PUMP in Section 2 Group 90 earlier in this manual. 2. Crank or run engine. Is the fuel pressure greater than 30 kPa (4.35psi)?	**YES:** Pressure checks good. GO TO ❶ **NO:** GO TO ❽ – – –1/1
❾ **Occurrence Count Check**	Review stored information and look at occurrence count for 0000094.17. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ❿ **NO:** GO TO ⓫ – – –1/1
❿ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Perform Terminal Test on the low pressure fuel sensor harness connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓫ – – –1/1
⓫ **Time Between Occurrences Check**	Compare last occurrence engine hours against current engine hours. Is difference greater than 50 hours?	**YES:** Return application to service. **YES:** GO TO ⓬ – – –1/1

⓬ **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 ⓭ **NO:** GO TO ⓮ – – –1/1

⓭ **Engine Error Operating Point Test**	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000094.17 reappear when engine operating point was reached?	**YES:** GO TO ❷ **NO:** GO TO ⓬ – – –1/1

⓮ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Disconnect low pressure fuel pressure sensor connector and ECU connector J1 (black face). 3. Perform terminal test on the low pressure fuel pressure sensor harness connector and ECU J1 connector. Were any problems found?	**YES:** Repair problem. GO TO ❶ **NO:** GO TO ⓯ – – –1/1

⓯ **Reconnect and Retest**	1. Reconnect all connectors. 2. Ignition ON, Engine ON. 3. Refresh codes. Is 000094.17 active?	**YES:** GO TO ⓰. **NO:** Problem fixed. – – –1/1

⓰ **Software Updates**	1. Download latest ECU software using Service ADVISOR. 2. Reprogram ECU. 3. Ignition ON, Engine ON. 4. Refresh codes. Is 000094.17 active?	**YES:** Replace ECU. GO TO ❶ **NO:** Problem fixed, bad ECU program. – – –1/1

000097.03 — Water-in-Fuel Signal Out of Range High

The Water in Fuel input voltage exceeds the sensor's high voltage specification.

DN22556,00004A7 –19–24MAY07–1/1

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 JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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 Codes. Did 000097.03 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓬ – – –1/1
❷ **Short to Voltage Check**	1. Ignition OFF, Engine OFF. 2. Disconnect WIF sensor connector. 3. On the harness, measure the voltage between the WIF sensor connector signal (terminal A) and return (terminal B). Was the voltage measurement less than 0.5 volts?	**YES:** GO TO ❸ **NO:** Repair shorted wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1
❸ **Terminal Test**	1. Ignition OFF, Engine OFF. 2. Perform Terminal Test on Water-in-Fuel sensor harness connector. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❹ – – –1/1

❹ **Sensor Resistance Check**	On the WIF sensor, measure the resistance between signal (terminal A) and return (terminal B). Was the resistance between 200k and 240k ohms?	**YES:** GO TO ❺ **NO:** Replace WIF sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1

❺ **WIF Sensor Circuit Resistance Check**	On the harness, measure the resistance between the WIF sensor connector signal (terminal A) and return (terminal B). Was the resistance between 6M and 7M ohms?	**YES:** GO TO ❻ **NO:** GO TO ❽. – – –1/1

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❻ **Terminal Test**	1. Disconnect ECU connectors J1 and J2. 2. Perform Terminal Test on ECU connectors J1 and J2. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❼ – – –1/1

❼ **Terminal to Terminal Resistance Check**	On the harness, measure the resistance between the ECU connector signal (terminal J1-B2) and all other ECU harness connector terminals . Were any resistance less than 100 ohms?	**YES:** Look for pinched or melted harness and repair wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR **NO:** Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR – – –1/1

❽ **Harness Return Wire Resistance Check**	On the harness, measure the resistance between the WIF sensor connector return (terminal B) and application single point ground. Was the resistance less than 5 ohms?	**YES:** GO TO ❾ **NO:** GO TO ❿. – – –1/1

❾ **Harness Return Wire Resistance Check**	On the harness, measure the resistance between the WIF sensor harness connector return (terminal B) and ECU J1 connector return (terminal J1-D2). Was the resistance less than 5 ohms?	**YES:** GO TO ❿ **NO:** Repair open wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR – – –1/1
❿ **Harness Signal Wire Resistance Check**	On the harness, measure the resistance between the WIF sensor harness connector signal (terminal A) and ECU connector J1 signal (terminal J1-B2). Was the resistance less than 5 ohms?	**YES:** GO TO ⓫ **NO:** Repair open wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR – – –1/1
⓫ **ECU Resistance Check**	On the ECU, measure the resistance between return (terminal J1-D2) and signal (terminal J1-B2). Was the resistance between 6M and 7M ohms?	**YES:** Reconnect all connectors and GO TO ❷. **NO:** Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1
⓬ **Occurrence Count Check**	Review stored information and look at occurrence count for 000097.03. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ⓭ **NO:** GO TO ⓮ – – –1/1

⓭ Terminal Test	1. Ignition OFF, Engine OFF 2. Disconnect WIF sensor connector. 3. Perform Terminal Test on the WIF sensor harness connector. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓮ – – –1/1
⓮ 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 ⓯ **NO:** GO TO ⓰ – – –1/1
⓯ Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000097.03 reappear when engine operating point was reached?	**YES:** Replace WIF sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓮ – – –1/1
⓰ Terminal Test	1. Ignition OFF, Engine OFF 2. Disconnect WIF sensor connector and ECU connector J1. 3. Perform terminal test on the WIF sensor harness connector and ECU connector J1. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓱ – – –1/1

⓱ **Software Updates**	1. Download latest ECU software payload. 2. Reprogram ECU using Service ADVISOR. 3. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000097.03 active?	**YES:** Replace WIF sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Problem fixed. – – –1/1

000097.04 — Water-in-Fuel Signal Out of Range Low

The Water in Fuel input voltage drops below the sensor's low voltage specification.

DN22556,00004A8 –19–26MAY07–1/1

000097.04 — Water-in-Fuel Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:
000097.04

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

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

Alarm Level:
Warning

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

Additional References:
For further water-in-fuel sensor information, see WATER-IN-FUEL 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 JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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 Codes. Did 000097.04 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❾ – – –1/1

❷ **Monitor Code Test**	1. Ignition OFF, Engine OFF. 2. Disconnect the water-in-fuel sensor connector. 3. Ignition ON, Engine OFF 4. Refresh codes. Did 000097.03 become active and 000097.04 move to stored?	**YES:** GO TO ❸ **NO:** GO TO ❹ – – –1/1

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

❹ **Sensor Short to Ground Test**	Measure the resistance from terminal A to chassis ground and terminal B to chassis ground on the water-in-fuel sensor. Was either resistance value less than 1k ohm?	**YES:** Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❷ – – –1/1
❺ **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 ❻ – – –1/1
❻ **Harness Resistance Check**	Measure the resistance between the return (terminal B) and signal (terminal A) in the water-in-fuel sensor harness connector. Was the resistance less than 100 ohms?	**YES:** GO TO ❼ **NO:** Reconnect all connectors and GO TO ❷. – – –1/1
❼ **Harness Resistance Check ECU Disconnected**	1. Disconnect ECU connector J1. 2. Measure the resistance between the return (terminal B) and signal (terminal A) in the water-in-fuel sensor harness connector. Was the resistance less than 100 ohms?	**YES:** GO TO ❽ **NO:** GO TO ❾. – – –1/1
❽ **Harness Physical Check**	Terminal A has low resistance to ground, check for: • Melted harness and wiring • Pinched harness and wiring. Was the problem found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❺. – – –1/1

❾ ECU Resistance Check	Measure the resistance between the return (terminal J1-D2) and signal (terminal J1-B2) in the ECU connector. Was the resistance less than 100 ohms?	**YES:** Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Reconnect all connectors and GO TO ❷. – – –1/1

❿ Occurrence Count Check	Review stored information and look at occurrence count for 000097.04. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ⓫ **NO:** GO TO ⓬ – – –1/1

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⓫ 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 ⓬ – – –1/1

⓬ 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 ⓭ **NO:** GO TO ⓯ – – –1/1

⓭ 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:** GO TO ⓮ **NO:** GO TO ⓬ – – –1/1

⓮ Sensor Temperature Test	1. Ignition OFF, Engine OFF 2. Check temperature of the water-in-fuel sensor and surrounding ares. Is everything hot?	**YES:** Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓯ – – –1/1
⓯ Terminal Test	1. Ignition OFF, Engine OFF 2. Perform terminal test on the water-in-fuel sensor harness connector and ECU J1 connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓰ – – –1/1
⓰ Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, Engine OFF. 3. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 4. Refresh codes. Is 000097.04 active?	**YES:** GO TO ⓱. **NO:** GO TO ⓯. – – –1/1
⓱ Software Updates	1. Check custom performance for possible software updates. If new software is available, reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000097.04 active?	**YES:** Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Problem fixed, bad ECU program. – – –1/1

000097.16 — Water in Fuel Detected

The ECU detects water in the fuel.

DN22556,00004A9 –19–24MAY07–1/1

000097.16 — Water in Fuel Detected Diagnostic Procedure

Troubleshooting Sequence:
000097.16

Related Information:
The ECU detects water in fuel.

Alarm Level:
Warning

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

Additional References:
For more water in fuel sensor information, see WATER IN FUEL (WIF) 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 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 JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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 000097.16 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❻ – – –1/1

❷ Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the water in fuel sensor connector. 3. Perform Terminal Test on the harness and sensor connector. Are there any problems with the wiring or connectors?	**YES:** Repair problem. GO TO ❶ **NO:** GO TO ❸ – – –1/1

❸ WIF Sensor Check	1. Drain all fuel and water from the water separator bowl on the bottom of the final fuel filter into a suitable container for fuel. 2. Wipe off the end of the WIF sensor with a clean dry rag. 3. On the WIF sensor, measure resistance between signal (terminal A) and return (terminal B). Is the resistance between 200k and 240k ohms?	**YES:** GO TO ❹ **NO:** Replace WIF sensor. GO TO ❶ – – –1/1

❹ **Check for Engine Related Causes**	Check the following items that can cause the water in fuel sensor to trip: • Water and debris in the filter water separator bowl. • Dirty tip of sensor, clean with clean dry cloth. • Water in fuel tank. • Loose fuel tank cap. • Missing or damaged fuel tank cap seal. • Water in fuel source. • If application was washed with a high pressure washer be sure to let connector sit and dry off. Was cause of water in fuel determined?	**YES:** Repair problem. GO TO ❶. **NO:** GO TO ❺ – – –1/1
❺ **Fuel Quality Check**	Preform fuel quality check, see CHECK FUEL SUPPLY QUALITY in Section 4 Group 150. Did the fuel pass the quality check?	**YES:** GO TO ❽ **NO:** See CHECK FUEL SUPPLY QUALITY in Section 4 Group 150. – – –1/1
❻ **Occurrence Count Check**	Review stored information and look at occurrence count for 0000097.16. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ❼ **NO:** GO TO ❽ – – –1/1
❼ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Perform Terminal Test on the coolant sensor harness connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❽ – – –1/1
❽ **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 ❾ **NO:** GO TO ❿ – – –1/1

9 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000097.16 reappear when engine operating point was reached?	**YES:** Replace WIF sensor. GO TO 1 **NO:** GO TO 8 – – –1/1

10 Terminal Test	1. Ignition OFF, Engine OFF 2. Disconnect coolant temperature sensor connector and ECU connector J1. 3. Perform Terminal Test on the coolant sensor harness connector and ECU J1 connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 11 – – –1/1

11 Software Updates	1. Download latest ECU software payload, reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000097.16 active?	**YES:** Replace WIF sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Problem fixed, return to service. – – –1/1

000100.01 — Engine Oil Pressure Signal Extremely Low

The ECU senses the Engine Oil Pressure to be extremely low.

DN22556,00004AA –19–21MAY07–1/1

000100.01 — Engine Oil Pressure Signal Extremely Low Diagnostic Procedure

Trouble Shooting Sequence:
000100.01

Related Information:

NOTE: OEM engines are programmed using trimmable features. The customer had the option to choose an engine shutdown feature. If this feature was programmed into the ECU , the ECU will shut the engine down if this code sets. If the shutdown feature was not selected, a standard derate will be activated.

The ECU senses a lower than expected engine oil pressure.
The engine must be running for the code to be set.
The code is set when the pressure drops below 2.6psi (18kPa).
001569.31 is set when this code is active and engine has not shut down.
001110.31 is set if the shutdown feature is enabled.
001109.31 code is set 30 seconds before the ECU shuts down the engine.

Alarm Level:
STOP

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

Additional references:
For further 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 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. Ignition ON, Engine ON. 5. Refresh Codes. Did 000100.01 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❾

– – –1/1

❷ **Measure Engine Oil Pressure With External Gauge**	1. Ignition OFF, Engine OFF. 2. Attach a pressure gauge to an available gallery hole on the engine. See CHECK ENGINE OIL PRESSURE in CTM104, Section 04, Group 150. 3. Ignition ON, Engine ON. 4. Record pressure reading from pressure gauge. 5. Monitor the Engine Oil Pressure using Service ADVISOR. *NOTE: Pressure readings can be indicated in Atmosphere or Absolute. To convert from Atmosphere to Absolute, add 14 PSI (100kPa)* Is the pressure gauge value approximately the same as the Service ADVISOR value?	**YES:** Engine oil pressure sensor is OK. Diagnose problem why engine has low oil pressure. Refer to ENGINE OIL PRESSURE LOW in the Base Engine Manual CTM104, Section 04, Group 150 for further assistance. **NO:** GO TO ❸

– – –1/1

❸ Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the engine oil sensor connector. 3. Perform Terminal Test on the harness and sensor connector. Are there any problems with the wiring or connectors?	**YES:** Repair problem. GO TO ❽ **NO:** GO TO ❹ – – –1/1
❹ Check Oil Pressure Sensor	1. Remove engine oil sensor. See REMOVE and INSTALL OIL PRESSURE SENSOR in Section 02, Group 110 earlier in this section. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	**YES:** Replace defective part. GO TO ❽ **NO:** GO TO ❺ – – –1/1
❺ Oil Pressure Sensor Wiring Test	1. Ignition OFF, Engine OFF. 2. With engine oil pressure sensor still removed from engine, reconnect sensor to its harness connector. 3. Ignition ON, Engine OFF. 4. Monitor the Engine Oil Pressure Input Voltage using Service ADVISOR. Is the voltage between 0.3 and 0.7 volts?	**YES:** Wire harness OK. GO TO❶ **NO:** Engine oil pressure sensor already been replaced. GO TO ❻ **NO:** Replace engine oil pressure sensor. GO TO ❽ – – –1/1
❻ Check ECU	*NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000100.04* 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J1. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000100.04 become active?	**YES:** Problem in harness. Perform Terminal Test on ECU connector J1. Diagnose and fix harness problem. GO TO ❽ **NO:** Problem with ECU. GO TO❼ – – –1/1

❼ **Reprogram ECU**	Check with Custom Performance for possible software updates. Is there an update available?	**YES:** ECU has already been reprogrammed. Replace ECU. GO TO ❽ **YES:** Reprogram ECU using Service ADVISOR. See REPROGRAMMING ENGINE CONTROL UNIT (ECU) in Section 04, Group 160 earlier in this manual. GO TO ❽ **NO:** Replace ECU. GO TO ❽ – – –1/1

❽ **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. Refresh DTCs. 6. Operate engine through normal speed and load. Did DTC 000100.01 reappear as active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

❾ **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. Try to determine cause. Repair and retest. **NO:** GO TO ❷ – – –1/1

000100.04 — Engine Oil Pressure Signal Out of Range Low

DN22556,00004AC –19–26MAY07–1/1

000100.04 — Engine Oil Pressure Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:
000100.04

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

Related Information:
The oil pressure input voltage drops below the sensor's low voltage specification. The voltage corresponds to a pressure that is lower than what is physically possible for oil pressure.

Alarm Level:
Warning

Control Unit Response:
ECU's will operate normally.

Additional References:
For further temperature 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.

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.

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 Codes. Did 000100.04 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓬ – – –1/1

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

❸ **Sensor Short to Ground Test**	Measure the resistance from signal (terminal C) to chassis ground on the engine oil pressure sensor. Was the resistance value less than 100 ohms?	**YES:** Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❹ – – –1/1

❹ **Sensor Internal Short Test**	Measure the resistance between return (terminal A) and signal (terminal C) on the engine oil pressure sensor. Was the resistance value less than 100 ohms?	**YES:** Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❺ – – –1/1
❺ **Harness Resistance Check**	Measure the resistance between the return (terminal A) and signal (terminal C) in the engine oil pressure sensor harness connector. Was the resistance less than 100 ohms?	**YES:** GO TO ❻ **NO:** GO TO ❾ – – –1/1
❻ **Harness Resistance Check ECU Disconnected**	1. Disconnect ECU connector J1. 2. Perform TERMINAL TEST on the ECU J1 harness connector. 3. Measure the resistance between the return (terminal A) and signal (terminal C) in the engine oil pressure sensor harness connector. Was the resistance less than 100 ohms?	**YES:** GO TO ❼ **NO:** GO TO ❽. – – –1/1
❼ **Harness Physical Check**	Signal (terminal C) has low resistance to ground, check for: • Melted harness and wiring • Pinched harness and wiring. Was the problem found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Reconnect ECU connector. GO TO ❷. – – –1/1

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❽ ECU Resistance Check	Measure the resistance between the return (terminal J1-D2) and signal (terminal J1-A3) on the ECU. Was the resistance less than 100 ohms?	**YES:** Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Reconnect all connectors and GO TO ❷. – – –1/1

❾ Harness Resistance Check	Measure the resistance between the return (terminal A) and power (terminal B) in the engine oil pressure sensor harness connector. Was the resistance between 50k and 150k ohms?	**YES:** Reconnect all connectors and GO TO ❷. **NO:** GO TO ❿ – – –1/1

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❿ Harness Resistance Check ECU Disconnected	1. Disconnect ECU connector J1. 2. Perform TERMINAL TEST on the ECU J1 harness connector. 3. Measure the resistance between the power (terminal B) in the engine oil pressure sensor harness connector and power (terminal J1-F3). Was the resistance less than 5 ohms?	**YES:** GO TO ⓫ **NO:** Check for pinched or melted wiring, repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1

⓫ ECU Resistance Check	Measure the resistance between the return (terminal J1-D2) and signal (terminal J1-F3) on the ECU. Was the resistance between 50k and 150k ohms?	**YES:** Reconnect ECU connector and GO TO ❷. **NO:** Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1

⓬ Occurrence Count Check	Review stored information and look at occurrence count for 000100.04. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ⓭ **NO:** GO TO ⓮ – – –1/1

13 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on the engine oil pressure sensor harness connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 14 – – –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:** Repair problem if found. **YES:** If a certain operating point exists when error occurs GO TO 15 **NO:** GO TO 17 – – –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 000100.04 reappear when engine operating point was reached?	**YES:** GO TO 16 **NO:** GO TO 14 – – –1/1
16 Sensor Temperature Test	1. Ignition OFF, Engine OFF 2. Check temperature of the engine oil pressure sensor and surrounding ares. Is everything hot?	**YES:** Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 17 – – –1/1

⓱ Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on the engine oil pressure sensor harness connector and ECU J1 connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓲ – – –1/1

⓲ Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, Engine OFF. 3. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 4. Refresh codes. Is 000100.04 active?	**YES:** GO TO ⓳. **NO:** GO TO ⓱. – – –1/1

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⓳ Software Updates	1. Check custom performance for possible software updates. If new software is available, reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000100.04 active?	**YES:** Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Problem fixed, bad ECU program. – – –1/1

000100.18 — Engine Oil Pressure Signal Moderately Low

The ECU senses the Engine Oil Pressure to be moderately low.

DM59778,0000004 –19–21MAY07–1/1

000100.18 — Engine Oil Pressure Signal Moderately Low Diagnostic Procedure

Trouble Shooting Sequence:
000100.18

Related Information:
The ECU senses a lower than expected engine oil pressure.
The engine must be running for the code to be set.
The code is set when the pressure drops below 4.6PSI (32kPa).
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 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.

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.

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. Ignition ON, Engine ON. 5. Refresh Codes. Did 000100.18 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❾

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❷ **Measure Engine Oil Pressure With External Gauge**	1. Ignition OFF, Engine OFF. 2. Attach a pressure gauge to an available gallery hole on the engine. See CHECK ENGINE OIL PRESSURE in CTM104, Section 04, Group 150. 3. Ignition ON, Engine ON. 4. Record pressure reading from pressure gauge. 5. Monitor the Engine Oil Pressure using Service ADVISOR. *NOTE: Pressure readings can be indicated in Atmosphere or Absolute. To convert from Atmosphere to Absolute, add 14 PSI (100kPa)* Is the pressure gauge value approximately the same as the Service ADVISOR value?	**YES:** Engine oil pressure sensor is OK. Diagnose problem why engine has low oil pressure. Refer to ENGINE OIL PRESSURE LOW in the Base Engine Manual CTM104, Section 04, Group 150 for further assistance. **NO:** GO TO ❸

– – –1/1

❸ **Terminal Test**	1. Ignition OFF, Engine OFF. 2. Disconnect the engine oil sensor connector. 3. Perform Terminal Test on the harness and sensor connector. Are there any problems with the wiring or connectors?	**YES:** Repair problem. GO TO ❽ **NO:** GO TO ❹

– – –1/1

❹ **Check Oil Pressure Sensor**	1. Remove engine oil sensor. See REMOVE and INSTALL OIL PRESSURE SENSOR in Section 02, Group 110 earlier in this section. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	**YES:** Replace defective part. GO TO ❽ **NO:** GO TO ❺ – – –1/1
❺ **Oil Pressure Sensor Wiring Test**	1. Ignition OFF, Engine OFF. 2. With engine oil pressure sensor still removed from engine, reconnect sensor to its harness connector. 3. Ignition ON, Engine OFF. 4. Monitor the Engine Oil Pressure Input Voltage using Service ADVISOR. Is the voltage between 0.3 and 0.7 volts?	**YES:** Wire harness OK. GO TO❶ **NO:** Engine oil pressure sensor already been replaced. GO TO ❻ **NO:** Replace engine oil pressure sensor. GO TO ❽ – – –1/1
❻ **Check ECU**	*NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000100.04* 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J1. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000100.04 become active?	**YES:** Problem in harness. Perform Terminal Test on ECU connector J1. Diagnose and fix harness problem. GO TO ❽ **NO:** Problem with ECU. GO TO❼ – – –1/1
❼ **Reprogram ECU**	Check with Custom Performance for possible software updates. Is there an up date available?	**YES:** ECU has already been reprogrammed. Replace ECU. GO TO ❽ **YES:** Reprogram ECU using Service ADVISOR. See REPROGRAMMING ENGINE CONTROL UNIT (ECU) in Section 04, Group 160 earlier in this manual. GO TO ❽ **NO:** Replace ECU. GO TO ❽ – – –1/1

❽ **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. Refresh DTCs. 6. Operate engine through normal speed and load. Did DTC 000100.18 reappear as active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

❾ **Review Stored Code and 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. Try to determine cause. Repair and retest. **NO:** GO TO ❷ – – –1/1

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000100.31 — Engine Oil Pressure is Not Zero with engine Stopped

The ECU senses an engine oil pressure when engine speed is zero.

DM59778,0000005 –19–21MAY07–1/1

000100.31 — Engine Oil Pressure Invalid Diagnostic Procedure

Trouble Shooting Sequence:
000100.31

Related Information:
The ECU senses an engine oil pressure when engine is not running.
Code is not set with engine running.

Alarm Level:
Warning

Control Unit Response:
The ECU continues to operate normally.

Additional references:
For further 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.

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.

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.

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 Codes. Did 000100.31 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❽ – – –1/1

❷ Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the engine oil sensor connector. 3. Perform Terminal Test on the harness and sensor connector. Are there any problems with the wiring or connectors?	**YES:** Repair problem. GO TO ❼ **NO:** GO TO ❸ – – –1/1

❸ Check Oil Pressure Sensor Ground Wire	1. Ignition OFF, Engine OFF. 2. Measure the resistance from sensor harness connector terminal A to single point ground. Is the resistance less than 5 ohms?	**YES:** GO TO❹ **NO:** Open wire in harness or corrosion in connector terminals. Perform Terminal Test on ECU connector J1. Look for loose wire crimps or terminal connections within mating connectors. GO TO ❼ – – –1/1

❹ **Check Oil Pressure Sensor Signal Wire**	1. Ignition ON, Engine OFF. 2. In harness, measure voltage between signal (terminal C) and ground (terminal A) of engine oil pressure sensor connector. Is the voltage greater than 0.5 volts?	**YES:** GO TO ❺ **NO:** Replace engine oil sensor. See REMOVE and INSTALL OIL PRESSURE SENSOR in Section 02, Group 110 earlier in this section. GO TO ❼ – – –1/1
❺ **Check ECU**	*NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000100.04* 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J1. 3. Ignition ON, engine OFF. 4. Refresh Codes from within Service ADVISOR. 5. Monitor DTCs from within Service ADVISOR. Did DTC 100.04 become active?	**YES:** Recheck harness for open ground wire or a short to signal wire between engine oil pressure sensor connector and ECU. GO TO ❼ **YES:** If engine oil sensor has not been replaced, replace engine oil sensor. See REMOVE and INSTALL OIL PRESSURE SENSOR in Section 02, Group 110 earlier in this section. GO TO ❼ **NO:** Problem with ECU. GO TO ❻ – – –1/1
❻ **Reprogram ECU**	Check with Custom Performance for possible software updates. Is there an up date available?	**YES:** ECU has already been reprogrammed. Replace ECU. GO TO ❼ **YES:** Reprogram ECU using Service ADVISOR. See REPROGRAMMING ENGINE CONTROL UNIT (ECU) in Section 04, Group 160 earlier in this manual. GO TO ❼ **NO:** Replace ECU. GO TO ❼ – – –1/1

❼ **Verification**	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors. 3. Ignition ON, Engine OFF. 4. Monitor DTCs in Service ADVISOR. 5. Refresh DTCs. Did DTC 000100.31 reappear as active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

❽ **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. Try to determine cause. Repair and retest. **NO:** GO TO ❷ – – –1/1

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000105.00 — Intake Manifold Air Temperature Signal Extremely High

The ECU senses the Intake Manifold Air Temperature to be extremely high.

DN22556,0000540 –19–21MAY07–1/1

000105.00 — Intake Manifold Air Temperature Signal Extremely High Diagnostic Procedure

Trouble Shooting Sequence:
000110.00
000105.15

Related Information:

NOTE: OEM engines are programmed using trimmable features. The customer had the option to choose an engine shutdown feature. If this feature was programmed into the ECU , the ECU will shut the engine down if this code sets. If the shutdown feature was not selected, a standard derate will be activated.

The ECU senses an intake manifold air temperature at or above 91° C (196° F) on OEM engines.
The engine has to be running for the code to be set.
001569.31 is set when this code is active and engine has not shut down.
001110.31 is set if the shutdown feature is enabled. The engine has to be running for 3 minutes before the code is set.
001109.31 is set 30 seconds before the ECU shuts down the engine.

Alarm Level:
STOP

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

Additional References:
For further intake manifold air temperature sensor information, see INTAKE MANIFOLD AIR TEMPERATURE (MAT) in Section 03, Group 140 earlier in this manual.
For further temperature sensor information, see MEASURING TEMPERATURE 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 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. 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 000105.00 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓫

– – –1/1

❷ **Preliminary Check of Air Intake System**	Visually inspect components related to air intake system. • Restricted air intake plumbing. See CHECK AIR INTAKE SYSTEM in Base Engine Manual CTM104, Section 04, Group 150 and REMOVE and INSPECT AIR INTAKE PIPE in Base Engine Manual CTM104, Section 02, Group 080. • Restricted, dirty, or damaged charge air cooler. Refer to VEHICLE MAINTENANCE MANUAL for more information. • Loose cooling fan belt. See CHECKING BELT TENSIONER SPRING TENSION and BELT WEAR in Base Engine Manual CTM104, Section 02, Group 070. • Damaged cooling fan shroud. • Excessively high ambient air temperature. Were any problems found?	**YES:** Fix problem(s). GO TO ⓾ **NO:** GO TO ❸

– – –1/1

❸ **Terminal Test**	*NOTE: From here on through the manual, the intake manifold air temperature will be referred to as MAT* 1. Ignition OFF, Engine OFF. 2. Disconnect the MAT sensor connector. 3. Perform Terminal Test on the harness and sensor connector. Are there any problems with the wiring or connectors?	**YES:** Repair problem. GO TO ❶ **NO:** GO TO ❹ – – –1/1

❹ **Check Intake Manifold Air Temperature Sensor**	1. Remove MAT sensor. See REMOVE and INSTALL MANIFOLD AIR TEMPERATURE (MAT) SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	**YES:** Replace defective part. GO TO ❿ **NO:** GO TO ❺ – – –1/1

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❺ **Check Intake 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 intake 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 ❽ **NO:** MAT sensor has already been replaced. GO TO ❻ **NO:** Replace MAT sensor. GO TO ❿ – – –1/1

❻ **Check Signal Wire In Harness**	*NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000105.03* 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. GO TO ❶ **NO:** GO TO ❼ – – –1/1

❼ **Check ECU**	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J1. 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 J1. Diagnose and fix harness problem. GO TO ❿ **NO:** Replace ECU. GO TO❿ – – –1/1
❽ **Check for Engine Related Causes**	Check the following items that can cause high intake manifold air temperature: • Test for leaks. See TEST FOR INTAKE LEAKS in Base Engine Manual CTM 104, Section 04, Group 150. • Malfunctioning turbocharger compressor. See TURBOCHARGER INSPECTION in Base Engine Manual CTM104, Section 02, Group 080. Was cause of high intake manifold air temperature determined?	**YES:** Repair problem. GO TO ❿. **NO:** GO TO ❾ – – –1/1
❾ **Reprogram ECU**	Check with Custom Performance for possible software updates. Is there an up date available?	**YES:** Reprogram ECU using Service ADVISOR. See REPROGRAMMING ENGINE CONTROL UNIT (ECU) in Section 04, Group 160 earlier in this manual. GO TO ❿ **NO:** No update available. GO TO ❶ – – –1/1

❿ **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 000105.00 reappear as active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

⓫ **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. Try to determine cause. Repair and retest. **NO:** GO TO ❷ – – –1/1

000105.03 — Intake Manifold Air Temperature Signal Out of Range High

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

DN22556,0000541 –19–26MAY07–1/1

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

Troubleshooting Sequence:
000105.03

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

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

Alarm Level:
Warning

Control Unit Response:
The ECU uses a default intake manifold air temperature of 60° C (140° F).

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

For more intake manifold air temperature sensor information, see INTAKE MANIFOLD AIR TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

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

For wiring information:
- see 4.5L 12V ECU WIRING DIAGRAM 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 JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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 Codes. Did 000105.03 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❿ – – –1/1

❷ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Perform Terminal Test on intake manifold air temperature sensor harness connector. 3. Inspect harness for melted or pinched areas near the intake manifold air temperature sensor. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❸ – – –1/1
❸ **Sensor Open Test**	Measure the resistance between terminal A and terminal B on the intake manifold air temperature sensor. Was the resistance value greater than 7.5M ohms?	**YES:** Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❹ – – –1/1
❹ **Harness Resistance Check**	Measure the resistance between the return (terminal B) and signal (terminal A) in the intake manifold air temperature sensor harness connector. Was the resistance between 1k and 3k ohms?	**YES:** GO TO ❺ **NO:** GO TO ❻. – – –1/1

❺ **Terminal to Terminal Resistance Check**	1. Disconnect all ECU connectors. 2. Measure the resistance between the signal (terminal J1-C2) and all other ECU connector terminals in the ECU harness connectors. Was any resistance less than 100 ohms?	**YES:** Look for pinched or melted harness and repair wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR **NO:** Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR – – –1/1
❻ **Harness Return Wire Resistance Check**	Measure the resistance between the return (terminal B) in the intake manifold air temperature sensor harness connector and application single point ground. Was the resistance less than 5 ohms?	**YES:** GO TO ❼ **NO:** GO TO ❽. – – –1/1
❼ **Harness Signal Wire Resistance Check ECU Disconnected**	Measure the resistance between the signal (terminal J1-C2) in the ECU connector and the signal (terminal A) in the intake manifold air temperature sensor harness connector. Was the resistance less than 5 ohms?	**YES:** GO TO ❾ **NO:** Repair open wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR – – –1/1
❽ **Harness Return Wire Resistance Check ECU Disconnected**	Measure the resistance between the return (terminal J1-D2) in the ECU connector and the return (terminal B) in the intake manifold air temperature sensor harness connector. Was the resistance less than 5 ohms?	**YES:** GO TO ❾ **NO:** Repair open wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR – – –1/1

9 ECU Resistance Check	Measure the resistance between the return (terminal J1-D2) and signal (terminal J1-C2) in the ECU connector. Was the resistance between 1k and 3k ohms?	**YES:** Reconnect all connectors and GO TO 2. **NO:** Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1
10 Occurrence Count Check	Review stored information and look at occurrence count for 000105.03. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO 11 **NO:** GO TO 12 – – –1/1
11 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform Terminal Test on the intake manifold air temperature sensor harness connector. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 12 – – –1/1
12 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 13 **NO:** GO TO 15 – – –1/1
13 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000105.03 reappear when engine operating point was reached?	**YES:** GO TO 14 **NO:** GO TO 12 – – –1/1

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⓮ Sensor Temperature Test	1. Ignition OFF, Engine OFF 2. Check temperature of the intake manifold air temperature sensor and surrounding ares. Is everything hot?	**YES:** Replace manifold air temperature sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓯ – – –1/1

⓯ Terminal Test	1. Ignition OFF, Engine OFF 2. Perform terminal test on the intake manifold air temperature sensor harness connector and ECU J1 connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓰ – – –1/1

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⓰ Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, Engine OFF. 3. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 4. Refresh codes. Is 000105.03 active?	**YES:** GO TO ⓱. **NO:** GO TO ⓯. – – –1/1

⓱ Software Updates	1. Check custom performance for possible software updates. If new software is available, reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000105.03 active?	**YES:** Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Problem fixed, bad ECU program. – – –1/1

000105.04 — Intake Manifold Air Temperature Signal Out of Range Low

The intake manifold air temperature input voltage drops below the sensor's low voltage specification.

DN22556,0000542 –19–26MAY07–1/1

000105.04 — Intake Manifold Air Temperature Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:
000105.04

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

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

Alarm Level:
Warning

Control Unit Response:
The ECU uses a default intake manifold air temperature of 60° C (140° F).

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

For more intake manifold air temperature sensor information, see INTAKE MANIFOLD AIR TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

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

For wiring information:
- see 4.5L 12V ECU WIRING DIAGRAM 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 JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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 Codes. Did 000105.04 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❾ – – –1/1

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❷ **Monitor Code Test**	1. Ignition OFF, Engine OFF. 2. Disconnect the intake manifold air temperature sensor connector. 3. Ignition ON, Engine OFF 4. Refresh codes. Did 000105.03 become active and 000105.04 move to stored?	**YES:** GO TO ❸ **NO:** GO TO ❹ – – –1/1

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

❹ **Sensor Short to Ground Test**	Measure the resistance from terminal A to chassis ground and terminal B to chassis ground on the intake manifold air temperature sensor. Was either resistance value less than 1k ohm?	**YES:** Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❷ – – –1/1
❺ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Perform Terminal Test on the intake manifold air temperature sensor harness connector. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❻ – – –1/1
❻ **Harness Resistance Check**	Measure the resistance between the return (terminal B) and signal (terminal A) in the intake manifold air temperature sensor harness connector. Was the resistance less than 100 ohms?	**YES:** GO TO ❼ **NO:** Reconnect all connectors and GO TO ❷. – – –1/1
❼ **Harness Resistance Check ECU Disconnected**	1. Disconnect ECU connector J1. 2. Measure the resistance between the return (terminal B) and signal (terminal A) in the intake manifold air temperature sensor harness connector. Was the resistance less than 100 ohms?	**YES:** GO TO ❽ **NO:** GO TO ❾. – – –1/1
❽ **Harness Physical Check**	Terminal A has low resistance to ground, check for: • Melted harness and wiring • Pinched harness and wiring. Was the problem found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❺. – – –1/1

❾ **ECU Resistance Check**	Measure the resistance between the return (terminal J1-D2) and signal (terminal J1-C2) in the ECU connector. Was the resistance less than 100 ohms?	**YES:** Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Reconnect all connectors and GO TO ❷. – – –1/1

❿ **Occurrence Count Check**	Review stored information and look at occurrence count for 000105.04. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ⓫ **NO:** GO TO ⓬ – – –1/1

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⓫ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Perform Terminal Test on the intake manifold air temperature sensor harness connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓬ – – –1/1

⓬ **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 ⓭ **NO:** GO TO ⓯ – – –1/1

⓭ **Engine Error Operating Point Test**	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000105.04 reappear when engine operating point was reached?	**YES:** GO TO ⓮ **NO:** GO TO ⓬ – – –1/1

⓮ Sensor Temperature Test	1. Ignition OFF, Engine OFF 2. Check temperature of the intake manifold air temperature sensor and surrounding ares. Is everything hot?	**YES:** Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓯ – – –1/1
⓯ Terminal Test	1. Ignition OFF, Engine OFF 2. Perform terminal test on the intake manifold air temperature sensor harness connector and ECU J1 connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓰ – – –1/1
⓰ Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, Engine OFF. 3. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 4. Refresh codes. Is 000105.04 active?	**YES:** GO TO ⓱. **NO:** GO TO ⓯. – – –1/1
⓱ Software Updates	1. Check custom performance for possible software updates. If new software is available, reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000105.04 active?	**YES:** Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Problem fixed, bad ECU program. – – –1/1

000105.15 — Intake Manifold Air Temperature Signal Slightly High

The ECU senses the Intake Manifold Air Temperature to be above specification.

DN22556,0000543 –19–21MAY07–1/1

000105.15 — Intake Manifold Air Temperature Signal Slightly High Diagnostic Procedure

Trouble Shooting Sequence:
000110.00
000105.15

Related Information:
The ECU senses an intake manifold air temperature of 88° C (190° F) on OEM engines.
The engine has to be running for the code to be set.

Alarm Level:
Warning

Control Unit Response:
The ECU will continue to run normally.

Additional References:
For further intake manifold air temperature sensor information, see INTAKE MANIFOLD AIR TEMPERATURE (MAT) in Section 03, Group 140 earlier in this manual.
For further temperature sensor information, see MEASURING TEMPERATURE 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.

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.

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. 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 000105.15 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓫ – – –1/1

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❷ **Preliminary Check of Air Intake System**	Visually inspect components related to air intake system. • Restricted air intake plumbing. See CHECK AIR INTAKE SYSTEM in Base Engine Manual CTM104, Section 04, Group 150 and REMOVE and INSPECT AIR INTAKE PIPE in Base Engine Manual CTM104, Section 02, Group 080. • Restricted, dirty, or damaged charge air cooler. Refer to VEHICLE MAINTENANCE MANUAL for more information. • Loose cooling fan belt. See CHECKING BELT TENSIONER SPRING TENSION and BELT WEAR in Base Engine Manual CTM104, Section 02, Group 070. • Damaged cooling fan shroud. • Excessively high ambient air temperature. Were any problems found?	**YES:** Fix problem(s). GO TO ⓾ **NO:** GO TO ❸ – – –1/1

❸ **Terminal Test**	*NOTE: From here on through the manual, the intake manifold air temperature will be referred to as MAT* 1. Ignition OFF, Engine OFF. 2. Disconnect the MAT sensor connector. 3. Perform Terminal Test on the harness and sensor connector. Are there any problems with the wiring or connectors?	**YES:** Repair problem. GO TO ❶ **NO:** GO TO ❹ – – –1/1

❹ **Check Intake Manifold Air Temperature Sensor**	1. Remove MAT sensor. See REMOVE and INSTALL MANIFOLD AIR TEMPERATURE (MAT) SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	**YES:** Replace defective part. GO TO ⓾ **NO:** GO TO ❺ – – –1/1

❺ **Check Intake 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 intake 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 ❽ **NO:** MAT sensor has already been replaced. GO TO ❻ **NO:** Replace MAT sensor. GO TO ❿ – – –1/1
❻ **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. GO TO ❶ **NO:** GO TO ❼ – – –1/1
❼ **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 J1. 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 J1. Diagnose and fix harness problem. GO TO ❿ **NO:** Replace ECU. GO TO❿ – – –1/1
❽ **Check for Engine Related Causes**	Check the following items that can cause high intake manifold air temperature: • Test for leaks. See TEST FOR INTAKE LEAKS in Base Engine Manual CTM 104, Section 04, Group 150. • Malfunctioning turbocharger compressor. See TURBOCHARGER INSPECTION in Base Engine Manual CTM104, Section 02, Group 080. Was cause of high intake manifold air temperature determined?	**YES:** Repair problem. GO TO ❿. **NO:** GO TO ❾ – – –1/1

❾ **Reprogram ECU**	Check with Custom Performance for possible software updates. Is there an up date available?	**YES:** Reprogram ECU using Service ADVISOR. See REPROGRAMMING ENGINE CONTROL UNIT (ECU) in Section 04, Group 160 earlier in this manual. GO TO ❿ **NO:** No update available. GO TO ❶ – – –1/1

❿ **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 000105.15 reappear as active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

⓫ **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. Try to determine cause. Repair and retest. **NO:** GO TO ❷ – – –1/1

000105.16 — Intake Manifold Air Temperature Signal Moderately High

The ECU senses the Intake Manifold Air Temperature to be moderately high.

DN22556,00004BC –19–30MAY07–1/1

000105.16 — Intake Manifold Air Temperature Signal Moderately High Diagnostic Procedure

Troubleshooting Sequence:
000110.00
000105.16

Related Information:
The ECU senses an intake manifold air temperature of 89.5° C (193.1° F) on OEM engines.
The engine has to be running for the code to be set.
001569.31 is 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 intake manifold air temperature sensor information, see INTAKE MANIFOLD AIR TEMPERATURE (MAT) in Section 03, Group 140 earlier in this manual.
For further temperature sensor information, see MEASURING TEMPERATURE 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.

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.

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. 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 000105.16 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓫ – – –1/1

❷ **Preliminary Check of Air Intake System**	Visually inspect components related to air intake system. • Restricted air intake plumbing. See CHECK AIR INTAKE SYSTEM in Base Engine Manual CTM104, Section 04, Group 150 and REMOVE and INSPECT AIR INTAKE PIPE in Base Engine Manual CTM104, Section 02, Group 080. • Restricted, dirty, or damaged charge air cooler. Refer to VEHICLE MAINTENANCE MANUAL for more information. • Loose cooling fan belt. See CHECKING BELT TENSIONER SPRING TENSION and BELT WEAR in Base Engine Manual CTM104, Section 02, Group 070. • Damaged cooling fan shroud. • Excessively high ambient air temperature. Were any problems found?	**YES:** Fix problem(s). GO TO ⓾ **NO:** GO TO ❸ – – –1/1

❸ **Terminal Test**	*NOTE: From here on through the manual, the intake manifold air temperature will be referred to as MAT* 1. Ignition OFF, Engine OFF. 2. Disconnect the MAT sensor connector. 3. Perform Terminal Test on the harness and sensor connector. Are there any problems with the wiring or connectors?	**YES:** Repair problem. GO TO ❶ **NO:** GO TO ❹ – – –1/1

❹ **Check Intake Manifold Air Temperature Sensor**	1. Remove MAT sensor. See REMOVE and INSTALL MANIFOLD AIR TEMPERATURE (MAT) SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	**YES:** Replace defective part. GO TO ⓾ **NO:** GO TO ❺ – – –1/1

❺ **Check Intake 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 intake 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 ❽ **NO:** MAT sensor has already been replaced. GO TO ❻ **NO:** Replace MAT sensor. GO TO ❿ – – –1/1
❻ **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. GO TO ❶ **NO:** GO TO ❼ – – –1/1
❼ **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 J1. 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 J1. Diagnose and fix harness problem. GO TO ❿ **NO:** Replace ECU. GO TO❿ – – –1/1
❽ **Check for Engine Related Causes**	Check the following items that can cause high intake manifold air temperature: • Test for leaks. See TEST FOR INTAKE LEAKS in Base Engine Manual CTM 104, Section 04, Group 150. • Malfunctioning turbocharger compressor. See TURBOCHARGER INSPECTION in Base Engine Manual CTM104, Section 02, Group 080. Was cause of high intake manifold air temperature determined?	**YES:** Repair problem. GO TO ❿. **NO:** GO TO ❾ – – –1/1

❾ Reprogram ECU	Check with Custom Performance for possible software updates. Is there an up date available?	**YES:** Reprogram ECU using Service ADVISOR. See REPROGRAMMING ENGINE CONTROL UNIT (ECU) in Section 04, Group 160 earlier in this manual. GO TO ❿ **NO:** No update available. GO TO ❶ – – –1/1

❿ 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:** GO TO ❶ **NO:** Problem fixed. – – –1/1

⓫ 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. Try to determine cause. Repair and retest. **NO:** GO TO ❷ – – –1/1

000108.02 — Barometric Pressure Signal Invalid

The ECU receives an invalid pressure from the barometric air pressure sensor.

DN22556,00004BE –19–10MAY07–1/1

000108.02 — Barometric Pressure Signal Invalid Diagnostic Procedure

Troubleshooting Sequence:
000108.02

Related Information:
The barometric air pressure sensor is an internal ECU sensor.

Alarm Level:
Warning

Control Unit Response:
If this code sets, the ECU uses intake manifold air pressure for the barometric pressure value. If the intake manifold air pressure is invalid, a default value of 101 kPA (14.6PSI) is used as barometric air pressure to run the engine.

Additional References:
For further barometric air pressure sensor information, see BAROMETRIC AIR PRESSURE SENSOR in Section 03, Group 140 earlier in this manual.

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

For wiring information:
- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

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

For further information on connector and terminal testing see TERMINAL TEST 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.

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 DTC list. Is 000108.02 error code active?	**YES:** GO TO ❷ **NO:** Abnormal condition set code. GO TO ❹ – – –1/1

❷ **Preliminary Check**	Inspect the air vent located on the side of the ECU. Clear any debris blocking the passage. Is vent free of debris?	**YES:** GO TO ❸ **NO:** Clear debris from air vent. GO TO ❶ – – –1/1
❸ **Reprogram ECU**	Has the ECU been reprogrammed.	**YES:** Replace ECU. **NO:** Reprogram ECU. See Reprogramming Engine Control Unit (ECU) earlier in this section. – – –1/1
❹ **Occurrence Count Check**	1. Ignition ON, 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:** Replace ECU. **NO:** If no other active or stored codes exists, clear codes. Return to service and monitor further. – – –1/1

000110.00 — Engine Coolant Temperature Signal Extremely High

The ECU senses the Engine Coolant Temperature to be extremely high.

DN22556,00004BF –19–21MAY07–1/1

000110.00 — Engine Coolant Temperature Signal Extremely High Diagnostic Procedure

Troubleshooting Sequence:
000110.00

Related Information:

NOTE: OEM engines are programmed using trimmable features. The customer had the option to choose an engine shutdown feature. If this feature was programmed into the ECU , the ECU will shut the engine down if this code sets. If the shutdown feature was not selected, a standard derate will be activated.

The ECU senses an engine coolant temperature at or above 113° C (235° 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 and engine has not shut down.
001110.31 is set if the shutdown feature is enabled.
001109.31 is set 30 seconds before the ECU shuts down the engine.

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 coolant temperature sensor information, see ENGINE COOLANT TEMPERATURE (ECT) 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 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 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. 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 000110.00 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓫ – – –1/1

❷ **Preliminary Check of Cooling System**	Visually inspect cooling system components. • Remove any blockage on or near radiator. • Inspect radiator hoses for signs of leakage or cracks. • Loose cooling fan belt. See CHECKING BELT TENSIONER SPRING TENSION and BELT WEAR in Base Engine Manual CTM104, Section 02, Group 070. • Malfunctioning cooling fan. See INSPECT and INSTALL FAN ASSEMBLY in Base Engine Manual CTM104, Section 02, Group 070 • Inspect radiator cap for failure. • Check radiator coolant is filled to proper level. • Inspect cooling fan shroud for damage. • Excessively high ambient air temperature. Were any problems found?	**YES:** Fix problem(s). GO TO ⓾ **NO:** GO TO ❸ – – –1/1

❸ **Terminal Test**	1. Ignition OFF, Engine OFF. 2. Disconnect the coolant temperature sensor connector. 3. Perform Terminal Test on the harness and sensor connectors. Are there any problems with the wiring or connectors?	**YES:** Repair problem. GO TO ❿ **NO:** GO TO ❹ – – –1/1
❹ **Check Coolant Temperature Sensor**	1. Remove coolant temperature sensor. See REMOVE AND INSTALL ENGINE COOLANT TEMPERATURE (ECT) SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	**YES:** Replace defective part. GO TO❿ **NO:** GO TO ❺ – – –1/1
❺ **Check Coolant Temperature Sensor Operation**	1. With coolant sensor removed from engine, reconnect coolant temperature sensor to its harness connector. 2. Ignition ON, Engine OFF. 3. Monitor the coolant temperature from within Service ADVISOR. 4. If necessary, let the sensor cool down to the ambient temperature. Does the sensor reading closely match the ambient temperature?	**YES:** Coolant temperature sensor is OK. Diagnose engine cooling system. GO TO ❽ **NO:** Coolant temperature sensor has already been replaced. GO TO ❻ **NO:** Replace coolant temperature sensor . GO TO ❿ – – –1/1
❻ **Check Signal Wire In Harness**	1. Ignition OFF, Engine OFF. 2. Disconnect the coolant temperature sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 110.03 become active?	**YES:** Wire harness is OK. GO TO ❶ **NO:** GO TO ❼ – – –1/1

❼ Check ECU	*NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000110.03* 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J1. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000110.03 become active?	**YES:** Problem in harness. Perform Terminal Test on ECU connector J1. Diagnose and fix harness problem. GO TO ❿ **NO:** Replace ECU. GO TO❿ – – –1/1

❽ Check for Engine Related Causes	Check the following items that can cause high coolant temperature: • Inspect cooling system. See CHECK AND SERVICE COOLING SYSTEM in Base Engine Manual CTM104, Section 04, Group 150. • Inspect cooling system components. See C1- ENGINE COOLANT TEMPERATURE ABOVE NORMAL in Base Engine Manual CTM104, Section 04, Group 150. Was cause of high coolant temperature determined?	**YES:** Repair problem. GO TO❿ **NO:** GO TO ❾ – – –1/1

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❾ Reprogram ECU	Check with Custom Performance for possible software updates. Is there an up date available?	**YES:** Reprogram ECU using Service ADVISOR. See REPROGRAMMING ENGINE CONTROL UNIT (ECU) in Section 04, Group 160 earlier in this manual. GO TO ❿ **NO:** No update available. GO TO ❶ – – –1/1

❿ **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 000110.00 reappear as active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

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⓫ **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. Try to determine cause. Repair and retest. **NO:** GO TO ❷ – – –1/1

000110.03 — Engine Coolant Temperature Signal Out of Range High

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

DN22556,00004C0 –19–22MAY07–1/1

000110.03 — Engine Coolant Temperature Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:
000110.03

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

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

Alarm Level:
Warning

Control Unit Response:
The ECU uses a default engine coolant temperature of 90° C (194° F).

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

For further engine coolant temperature sensor information, see ENGINE COOLANT TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

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

For wiring information:
- see 4.5L 12V ECU WIRING DIAGRAM 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 JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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 Codes. Did 000110.03 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❿ – – –1/1

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

❸ **Sensor Open Test**	Measure the resistance between terminal A and terminal B on the coolant sensor. Was the resistance value greater than 7.5M ohms?	**YES:** Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❹ – – –1/1

❹ **Harness Resistance Check**	Measure the resistance between the return (terminal B) and signal (terminal A) in the coolant sensor harness connector. Was the resistance between 1k and 3k ohms?	**YES:** GO TO ❺ **NO:** GO TO ❻. – – –1/1

❺ **Terminal to Terminal Resistance Check**	1. Disconnect all ECU connectors. 2. Measure the resistance between the signal (terminal J1-C4) and all other ECU connector terminals in the ECU harness connectors. Was any resistance less than 100 ohms?	**YES:** Look for pinched or melted harness and repair wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR **NO:** Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR – – –1/1
❻ **Harness Return Wire Resistance Check**	Measure the resistance between the return (terminal B) in the coolant sensor harness connector and application single point ground. Was the resistance less than 5 ohms?	**YES:** GO TO ❼ **NO:** GO TO ❽. – – –1/1
❼ **Harness Signal Wire Resistance Check ECU Disconnected**	Measure the resistance between the signal (terminal J1-C4) in the ECU connector and the signal (terminal A) in the coolant sensor harness connector. Was the resistance less than 5 ohms?	**YES:** GO TO ❾ **NO:** Repair open wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR – – –1/1
❽ **Harness Return Wire Resistance Check ECU Disconnected**	Measure the resistance between the return (terminal J1-D2) in the ECU connector and the return (terminal B) in the coolant sensor harness connector. Was the resistance less than 5 ohms?	**YES:** GO TO ❾ **NO:** Repair open wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR – – –1/1

9 ECU Resistance Check	Measure the resistance between the return (terminal J1-D2) and signal (terminal J1-C4) in the ECU connector. Was the resistance between 1k and 3k ohms?	**YES:** Reconnect all connectors and GO TO 2. **NO:** Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1

10 Occurrence Count Check	Review stored information and look at occurrence count for 000110.03. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO 11 **NO:** GO TO 12 – – –1/1

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11 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform Terminal Test on the coolant sensor harness connector. Were any problems found?	**YES:** Fix problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO 12 – – –1/1

12 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 13 **NO:** GO TO 15 – – –1/1

13 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000110.03 reappear when engine operating point was reached?	**YES:** GO TO 14 **NO:** GO TO 12 – – –1/1

⓮ Sensor Temperature Test	1. Ignition OFF, Engine OFF 2. Check temperature of the coolant sensor and surrounding ares. Is everything hot?	**YES:** Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓯ – – –1/1
⓯ Terminal Test	1. Ignition OFF, Engine OFF 2. Perform terminal test on the coolant sensor harness connector and ECU J1 connector. Were any problems found?	**YES:** Fix problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓰ – – –1/1
⓰ Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, Engine OFF. 3. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 4. Refresh codes. Is 000110.03 active?	**YES:** GO TO ❶. **NO:** GO TO ⓱. – – –1/1
⓱ Software Updates	1. Check custom performance for possible software updates. If new software is available, reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000110.03 active?	**YES:** Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Problem fixed, bad ECU program. – – –1/1

000110.04 — Engine Coolant Temperature Signal Out of Range Low

The engine coolant temperature input voltage drops below the sensor's low voltage specification.

DN22556,00004C1 –19–26MAY07–1/1

000110.04 — Engine Coolant Temperature Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:
000110.04

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

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

Alarm Level:
Warning

Control Unit Response:
The ECU uses a default engine coolant temperature of 90° C (194° F).

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

For more engine coolant temperature sensor information, see ENGINE COOLANT TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

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

For wiring information:
- see 4.5L 12V ECU WIRING DIAGRAM 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 JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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 Codes. Did 000110.04 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❾ – – –1/1

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

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

❹ **Sensor Short to Ground Test**	Measure the resistance from terminal A to chassis ground and terminal B to chassis ground on the engine coolant temperature sensor. Was either resistance value less than 1k ohm?	**YES:** Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❷ – – –1/1
❺ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Perform Terminal Test on the engine coolant temperature sensor harness connector. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❻ – – –1/1
❻ **Harness Resistance Check**	Measure the resistance between the return (terminal B) and signal (terminal A) in the engine coolant temperature sensor harness connector. Was the resistance less than 100 ohms?	**YES:** GO TO ❼ **NO:** Reconnect all connectors and GO TO ❷. – – –1/1
❼ **Harness Resistance Check ECU Disconnected**	1. Disconnect ECU connector J1. 2. Measure the resistance between the return (terminal B) and signal (terminal A) in the engine coolant temperature sensor harness connector. Was the resistance less than 100 ohms?	**YES:** GO TO ❽ **NO:** GO TO ❾. – – –1/1
❽ **Harness Physical Check**	Terminal A has low resistance to ground, check for: • Melted harness and wiring • Pinched harness and wiring. Was the problem found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❺. – – –1/1

❾ **ECU Resistance Check**	Measure the resistance between the return (terminal J1-D2) and signal (terminal J1-C4) in the ECU connector. Was the resistance less than 100 ohms?	**YES:** Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Reconnect all connectors and GO TO ❷.

– – –1/1

❿ **Occurrence Count Check**	Review stored information and look at occurrence count for 000110.04. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ⓫ **NO:** GO TO ⓬

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– – –1/1

⓫ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Perform Terminal Test on the engine coolant temperature sensor harness connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓬

– – –1/1

⓬ **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 ⓭ **NO:** GO TO ⓯

– – –1/1

⓭ **Engine Error Operating Point Test**	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000110.04 reappear when engine operating point was reached?	**YES:** GO TO ⓮ **NO:** GO TO ⓬

– – –1/1

⓮ Sensor Temperature Test	1. Ignition OFF, Engine OFF 2. Check temperature of the engine coolant temperature sensor and surrounding ares. Is everything hot?	**YES:** Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓯ – – –1/1
⓯ Terminal Test	1. Ignition OFF, Engine OFF 2. Perform terminal test on the engine coolant temperature sensor harness connector and ECU J1 connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓰ – – –1/1
⓰ Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, Engine OFF. 3. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 4. Refresh codes. Is 000110.04 active?	**YES:** GO TO ⓱. **NO:** GO TO ⓯. – – –1/1
⓱ Software Updates	1. Check custom performance for possible software updates. If new software is available, reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000110.04 active?	**YES:** Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Problem fixed, bad ECU program. – – –1/1

000110.15 — Engine Coolant Temperature Signal Slightly High

The ECU senses the Engine Coolant Temperature to be slightly above specification.

DN22556,00004C2 –19–21MAY07–1/1

000110.15 — Engine Coolant Temperature Signal Slightly High Diagnostic Procedure

Troubleshooting Sequence:
000110.15

Related Information:
The ECU senses an engine coolant temperature of 110° C (230° F) on OEM engines.
The engine has to be running for 3 minutes before the code is set.

Alarm Level:
Warning

Control Unit Response:
The ECU will continue to operate normally.

Additional References:
For further coolant temperature sensor information, see ENGINE COOLANT TEMPERATURE (ECT) SENSOR in Section 03, Group 140 earlier in this manual.
For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

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

For wiring information:
- see 4.5L 12V ECU WIRING DIAGRAM 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 JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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. 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 000110.15 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓫ – – –1/1

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❷ **Preliminary Check of Cooling System**	Visually inspect cooling system components. • Remove any blockage on or near radiator. • Inspect radiator hoses for signs of leakage or cracks. • Loose cooling fan belt. See CHECKING BELT TENSIONER SPRING TENSION and BELT WEAR in Base Engine Manual CTM104, Section 02, Group 070. • Malfunctioning cooling fan. See INSPECT and INSTALL FAN ASSEMBLY in Base Engine Manual CTM104, Section 02, Group 070 • Inspect radiator cap for failure. • Check radiator coolant is filled to proper level. • Inspect cooling fan shroud for damage. • Excessively high ambient air temperature. Were any problems found?	**YES:** Fix problem(s). GO TO ⓾ **NO:** GO TO ❸ – – –1/1

❸ **Terminal Test**	1. Ignition OFF, Engine OFF. 2. Disconnect the coolant temperature sensor connector. 3. Perform Terminal Test on the harness and sensor connectors. Are there any problems with the wiring or connectors?	**YES:** Repair problem. GO TO ⓾ **NO:** GO TO ❹ – – –1/1

❹ **Check Coolant Temperature Sensor**	1. Remove coolant temperature sensor. See REMOVE AND INSTALL ENGINE COOLANT TEMPERATURE (ECT) SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	**YES:** Replace defective part. GO TO ❿ **NO:** GO TO ❺ – – –1/1
❺ **Check Coolant Temperature Sensor Operation**	1. With coolant sensor removed from engine, reconnect coolant temperature sensor to its harness connector. 2. Ignition ON, Engine OFF. 3. Monitor the coolant temperature from within Service ADVISOR. 4. If necessary, let the sensor cool down to the ambient temperature. Does the sensor reading closely match the ambient temperature?	**YES:** Coolant temperature sensor is OK. Diagnose engine cooling system. GO TO ❽ **NO:** Coolant temperature sensor has already been replaced. GO TO ❻ **NO:** Replace coolant temperature sensor . GO TO ❿ – – –1/1
❻ **Check Signal Wire In Harness**	1. Ignition OFF, Engine OFF. 2. Disconnect the coolant temperature sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 110.03 become active?	**YES:** Wire harness is OK. GO TO ❶ **NO:** GO TO ❼ – – –1/1
❼ **Check ECU**	*NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000110.03* 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J1. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000110.03 become active?	**YES:** Problem in harness. Perform Terminal Test on ECU connector J1. Diagnose and fix harness problem. GO TO❿ **NO:** Replace ECU. GO TO❿ – – –1/1

❽ Check for Engine Related Causes	Check the following items that can cause high coolant temperature: • Inspect cooling system. See CHECK AND SERVICE COOLING SYSTEM in Base Engine Manual CTM104, Section 04, Group 150. • Inspect cooling system components. See C1- ENGINE COOLANT TEMPERATURE ABOVE NORMAL in Base Engine Manual CTM104, Section 04, Group 150. Was cause of high coolant temperature determined?	**YES:** Repair problem. GO TO❿ **NO:** GO TO ❾ – – –1/1

❾ Reprogram ECU	Check with Custom Performance for possible software updates. Is there an up date available?	**YES:** Reprogram ECU using Service ADVISOR. See REPROGRAMMING ENGINE CONTROL UNIT (ECU) in Section 04, Group 160 earlier in this manual. GO TO ❿ **NO:** No update available. GO TO ❶ – – –1/1

❿ 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 000110.15 reappear as active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

⓫ **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. Try to determine cause. Repair and retest. **NO:** GO TO ❷ – – –1/1

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000110.16 — Engine Coolant Temperature Signal Moderately High

The ECU senses the Engine Coolant Temperature to be moderately high.

DN22556,00004C3 –19–21MAY07–1/1

000110.16 — Engine Coolant Temperature Signal Moderately High Diagnostic Procedure

Troubleshooting Sequence:
00110.16

Related Information:

NOTE: OEM engines are programmed using trimmable features. The customer had the option to choose an engine shutdown feature. If this feature was programmed into the ECU , the ECU will shut the engine down if this code sets. If the shutdown feature was not selected, a standard derate will be activated.

The ECU senses a engine coolant temperature of 111° C (232° 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:
Warning

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

Additional References:
For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.
For further coolant temperature sensor information, see ENGINE COOLANT TEMPERATURE (ECT) 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 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 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. 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 000110.16 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓫ – – –1/1

❷ **Preliminary Check of Cooling System**	Visually inspect cooling system components. • Remove any blockage on or near radiator. • Inspect radiator hoses for signs of leakage or cracks. • Loose cooling fan belt. See CHECKING BELT TENSIONER SPRING TENSION and BELT WEAR in Base Engine Manual CTM104, Section 02, Group 070. • Malfunctioning cooling fan. See INSPECT and INSTALL FAN ASSEMBLY in Base Engine Manual CTM104, Section 02, Group 070 • Inspect radiator cap for failure. • Check radiator coolant is filled to proper level. • Inspect cooling fan shroud for damage. • Excessively high ambient air temperature. Were any problems found?	**YES:** Fix problem(s). GO TO ⓾ **NO:** GO TO ❸ – – –1/1

❸ **Terminal Test**	1. Ignition OFF, Engine OFF. 2. Disconnect the coolant temperature sensor connector. 3. Perform Terminal Test on the harness and sensor connectors. Are there any problems with the wiring or connectors?	**YES:** Repair problem. GO TO ❿ **NO:** GO TO ❹ – – –1/1
❹ **Check Coolant Temperature Sensor**	1. Remove coolant temperature sensor. See REMOVE AND INSTALL ENGINE COOLANT TEMPERATURE (ECT) SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	**YES:** Replace defective part. GO TO ❿ **NO:** GO TO ❺ – – –1/1
❺ **Check Coolant Temperature Sensor Operation**	1. With coolant sensor removed from engine, reconnect coolant temperature sensor to its harness connector. 2. Ignition ON, Engine OFF. 3. Monitor the coolant temperature from within Service ADVISOR. 4. If necessary, let the sensor cool down to the ambient temperature. Does the sensor reading closely match the ambient temperature?	**YES:** Coolant temperature sensor is OK. Diagnose engine cooling system. GO TO ❽ **NO:** Coolant temperature sensor has already been replaced. GO TO ❻ **NO:** Replace coolant temperature sensor . GO TO ❿ – – –1/1
❻ **Check Signal Wire In Harness**	1. Ignition OFF, Engine OFF. 2. Disconnect the coolant temperature sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 110.03 become active?	**YES:** Wire harness is OK. GO TO ❶ **NO:** GO TO ❼ – – –1/1

❼ Check ECU	*NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000110.03* 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J1. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000110.03 become active?	**YES:** Problem in harness. Perform Terminal Test on ECU connector J1. Diagnose and fix harness problem. GO TO❿ **NO:** Replace ECU. GO TO❿ – – –1/1

❽ Check for Engine Related Causes	Check the following items that can cause high coolant temperature: • Inspect cooling system. See CHECK AND SERVICE COOLING SYSTEM in Base Engine Manual CTM104, Section 04, Group 150. • Inspect cooling system components. See C1- ENGINE COOLANT TEMPERATURE ABOVE NORMAL in Base Engine Manual CTM104, Section 04, Group 150. Was cause of high coolant temperature determined?	**YES:** Repair problem. GO TO❿ **NO:** GO TO ❾ – – –1/1

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❾ Reprogram ECU	Check with Custom Performance for possible software updates. Is there an up date available?	**YES:** Reprogram ECU using Service ADVISOR. See REPROGRAMMING ENGINE CONTROL UNIT (ECU) in Section 04, Group 160 earlier in this manual. GO TO ❿ **NO:** No update available. GO TO ❶ – – –1/1

❿ **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 000110.16 reappear as active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

⓫ **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. Try to determine cause. Repair and retest. **NO:** GO TO ❷ – – –1/1

000111.01 — Engine Coolant Level Low

The ECU detects a low engine coolant level.

DN22556,00004C5 –19–16OCT06–1/1

000111.01 — Engine Coolant Level Low Diagnostic Procedure

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NOTE: OEM engines are programmed using trimmable features. The customer had the option to install a "Normally Open" or a "Normally Closed" engine coolant level switch. The ECU's software must correlate the type of switch being used to properly protect the engine. For more information on trimmable features, see JOHN DEERE TRIMMABLE OPTIONS earlier in this Group.

Related Information:
The loss of coolant switch is not submerged into coolant causing the ECU to sense continuity to ground on the loss of coolant temperature input circuit.

The engine coolant level switch is a trimmable option. Depending on the engine, if this option is selected, the engine can support both normally open and normally closed switches. This is defined during ECU programming.

Alarm Level:
STOP

Control Unit Response:
The ECU will derate 50% per minute until the engine is running at 50% of full power. For more information on engine protection, see ENGINE PROTECTION in Section 04, Group 140 earlier in this manual.

For derate and shutdown information on non-OEM applications, see APPLICATION SPECIFICATIONS in Section 06, Group 210 later in this manual.

Additional References:
For further engine coolant temperature switch information, see ENGINE COOLANT LEVEL SWITCH in Section 03, Group 140 earlier in this manual.

For wiring information related to other applications, see APPLICATION SPECIFICATIONS in Section 06, Group 210 later in this manual.

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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 Codes. Did 000111.01 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❼

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❷ **Connection Check**	**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.** *NOTE: For wiring and theory of operation, see ENGINE COOLANT LEVEL SWITCH in Section 03, Group 140 earlier in this manual.* Perform a preliminary inspection of the ECU connectors and the engine coolant level switch connector looking for dirty, damaged, or poorly positioned terminals. Are there any problems with the wiring or connectors?	**YES:** Repair faulty connection(s). **NO:** GO TO ❸

– – –1/1

❸ **Coolant Level Check**	*NOTE: For wiring and theory of operation, see ENGINE COOLANT LEVEL SWITCH in Section 03, Group 140 earlier in this manual.* **CAUTION: Explosive release of fluids from pressurized cooling system can cause serious burns. Shut off engine. Only remove filler cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.** • Check the coolant level. Is the coolant level at proper level?	**YES:** GO TO ❹ **NO:** Determine cause of low coolant level, repair problem, refill coolant, and retest.

– – –1/1

❹ **Loss of Coolant Temperature Switch Test**	*NOTE: For wiring and theory of operation, see ENGINE COOLANT LEVEL SWITCH in Section 03, Group 140 earlier in this manual.* 1. Ignition OFF 2. Disconnect loss of coolant switch connector. 3. Ignition ON, engine OFF 4. Using the ECU diagnostic software, read DTCs. Did 000111.01 reoccur?	**YES:** Short to ground in loss of coolant temperature switch input circuit. **NO:** GO TO ❺ – – –1/1

❺ **Loss of Coolant Temperature Switch (Normally Closed) Test**	*NOTE: For wiring and theory of operation, see ENGINE COOLANT LEVEL SWITCH in Section 03, Group 140 earlier in this manual.* 1. Ignition OFF 2. Loss of coolant switch still disconnected. 3. Install a jumper wire between terminal A in the loss of coolant switch connector on the engine harness and a good chassis ground. 4. Ignition ON, engine OFF 5. Using the ECU diagnostic software, read DTCs. Did 000111.01 reoccur?	**YES:** Faulty coolant level switch (normally closed) **NO:** GO TO ❻ – – –1/1

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❻ **Loss of Coolant Temperature Switch (Normally Open) Test**	*NOTE: For wiring and theory of operation, see ENGINE COOLANT LEVEL SWITCH in Section 03, Group 140 earlier in this manual.* 1. Ignition OFF 2. Loss of coolant switch still disconnected. 3. Disconnect ECU connector #J2. 4. Using a multimeter, measure resistance between terminal A in the coolant level switch connector and terminal G4 in the ECU connector #2 on the engine harness. Is the resistance 5 ohms or less?	**YES:** Faulty coolant level switch (normally open) **NO:** Open in loss of coolant temperature switch input circuit. OR Faulty ECU – – –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

000157.03 — Fuel Rail Pressure Signal Out of Range High

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

DN22556,00004C6 –19–26MAY07–1/1

000157.03 — Fuel Rail Pressure Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:
003509.03
000157.03

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

Related Information:
The fuel rail pressure input voltage corresponds to a pressure that is higher than what is physically possible for fuel rail pressure.

Alarm Level:
STOP

Control Unit Response:
The ECU will derate the engine until it is running at 50% of full power.

The ECU will command the high pressure fuel pump to a default pressure of 200 MPa (2000 bar) (29,000 psi).

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

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

For more information on engine protection, see ENGINE PROTECTION in Section 04, Group 140 earlier in this manual.

For derate and shutdown values see APPLICATION SPECIFICATIONS in Section 06, Group 210 later in this manual.

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

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

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 Codes. Did 000157.03 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❻

– – –1/1

❷ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Perform terminal test on fuel rail pressure sensor connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO ❶ **NO:** GO TO ❸

– – –1/1

❸ **Measure and Record Sensor Resistances**	1. Ignition OFF, Engine OFF 2. Measure the following resistances on the sensor to verify they are within range. 3. Between signal (terminal 1) and ground (terminal 2) on the sensor (should be between 8k ohms and 17k ohms). 4. Between signal (terminal 1) and power (terminal 3) on the sensor (should be between 1k ohms and 3k ohms). 5. Between ground (terminal 2) and power (terminal 3) on the sensor (should be between 10k ohms and 15k ohms) Are all resistances within range?	**YES:** GO TO ❹ **NO:** Remove and replace sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor, and GO TO ❶ – – –1/1
❹ **Fuel Rail Pressure Input To Ground Test**	1. Ignition OFF, Engine OFF 2. Measure the resistance between signal (terminal 1) and ground (terminal 2) on the sensor harness connector. Is the resistance between 250k and 270k ohms?	**YES:** GO TO ❺ **NO:** GO TO ❽ – – –1/1
❺ **Fuel Rail Pressure Input To Supply Test**	1. Ignition OFF, Engine OFF 2. Measure the resistance between signal (terminal 1) and power (terminal 3) on the sensor harness connector. Is the resistance between 140k and 160k ohms?	**YES:** GO TO ❻ **NO:** GO TO ⓬ – – –1/1
❻ **Fuel Rail Pressure Ground To Supply Test**	1. Ignition OFF, Engine OFF 2. Measure the resistance between ground (terminal 2) and power (terminal 3) on the sensor harness connector. Is the resistance between 90k and 120k ohms?	**YES:** GO TO ❼ **NO:** GO TO ⓰ – – –1/1
❼ **Fuel Rail Pressure Ground To Supply Voltage Test**	1. Ignition ON, Engine OFF 2. Measure the voltage between ground (terminal 2) and input signal (terminal 3) on the sensor harness connector. Is the voltage below 5.5 volt	**YES:** Reconnect all connectors and GO TO ❶ **NO:** GO TO ⓴ – – –1/1
❽ **ECU and ECU Connector Terminal Test**	Perform a terminal test on ECU connectors (J1), and ECU terminals. Are there any problems with the connector terminals or ECU terminals?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO ❶ **NO:** GO TO ❾ – – –1/1

9 Fuel Rail Pressure Ground Wire Test	1. Disconnect ECU connector J1 2. Measure the resistance between J1-E2 and sensor connector ground (terminal 2). Is the resistance greater than 5 ohms	**YES:** Repair open wire, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 **NO:** GO TO 10 – – –1/1
10 Fuel Rail Input Wire Test	Measure the resistance between J1-E3 and sensor connector signal (terminal 1). Is the resistance greater than 5 ohms	**YES:** Repair open wire, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 **NO:** GO TO 11 – – –1/1
11 ECU Input To Ground Test	Measure the resistance between ECU J1- E2 to J1-E3 Is the resistance between 250k to 270k ohms?	**YES:** Reconnect connectors, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 **NO:** Remove and Replace ECU – – –1/1
12 ECU and ECU Connector Terminal Test	Perform a terminal test on ECU connectors (J1), and ECU terminals. Are there any problems with the connector terminals or ECU terminals?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 **NO:** GO TO 13 – – –1/1

⓭ Fuel Rail Pressure Power Wire Test	1. Disconnect ECU connector J1 2. Measure the resistance between J1-D3 and sensor connector power (terminal 3). Is the resistance greater than 5 ohms	**YES:** Repair open wire, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO ❶ **NO:** GO TO ⓮ – – –1/1
⓮ Fuel Rail Input Wire Test	Measure the resistance between J1-E3 and sensor connector signal (terminal 1) on the sensor harness connector. Is the resistance greater than 5 ohms	**YES:** Repair open wire, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO ❶ **NO:** GO TO ⓯ – – –1/1
⓯ ECU Input To Supply Test	Measure the resistance between ECU J1- E3 to J1-D3 Is the resistance between 140k to 160k ohms?	**YES:** Reconnect connectors, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO ❶ **NO:** Remove and replace ECU – – –1/1
⓰ ECU and ECU Connector Terminal Test	Perform a terminal test on ECU connectors (J1), and ECU terminals. Are there any problems with the connector terminals or ECU terminals?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO ❶ **NO:** GO TO ⓱ – – –1/1

17 Fuel Rail Pressure Power Wire Test	1. Disconnect ECU connector J1 2. Measure the resistance between J1-D3 and sensor connector power (terminal 3). Is the resistance greater than 5 ohms	**YES:** Repair open wire, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 **NO:** GO TO 18 – – –1/1

18 Fuel Rail Ground Wire Test	Measure the resistance between J1-E2 and sensor connector ground (terminal 2). Is the resistance greater than 5 ohms	**YES:** Repair open wire, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 **NO:** GO TO 19 – – –1/1

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19 ECU Ground To Supply Test	Measure the resistance between ECU J1- D3 to J1-E2 Is the resistance between 90k to 120k ohms?	**YES:** Reconnect connectors, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 **NO:** Remove and replace ECU – – –1/1

20 ECU and ECU Connector Terminal Test	Perform a terminal test on ECU connectors (J1), and ECU terminals. Are there any problems with the connector terminals or ECU terminals?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 **NO:** GO TO 21 – – –1/1

21 Fuel Rail Pressure Input Shorted To High Voltage	1. Ignition OFF Engine OFF 2. Disconnect all ECU connectors. 3. Measure the resistance between J1-E3 and all other terminals in the other ECU connectors. Were any readings less than 5 ohms?	**YES:** Repair short in wiring and GO TO 1 **NO:** GO TO 22 – – –1/1
22 Wiring Harness Check	Look for pinched or melted wiring Was a wiring problem found?	**YES:** Repair wiring, and GO TO 1 **NO:** Remove and replace ECU – – –1/1
23 Occurrence Count Check	Review stored information and look at occurrence count Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO 24 **NO:** GO TO 25 – – –1/1
24 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform terminal test on fuel rail pressure sensor connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 **NO:** GO TO 25 – – –1/1
25 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	**YES:** Repair problem if found. If a certain operating point exists when error occurs then GO TO 26 **NO:** GO TO 28 – – –1/1

㉖ Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 157.03 reappear when engine operating point was reached?	**YES:** GO TO ㉗ **NO:** GO TO ㉕ – – –1/1
㉗ Terminal Test	1. Ignition OFF, Engine OFF 2. Perform terminal test on fuel rail pressure sensor connector and ECU connector J1. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO ❶ **NO:** Remove and replace Sensor – – –1/1
㉘ Terminal Test	1. Ignition OFF, Engine OFF 2. Perform terminal test on fuel rail pressure sensor connector and ECU connector J1. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO ❶ **NO:** GO TO ㉙ – – –1/1
㉙ Software Updates	1. Check custom performance for possible software updates. If new software is available, 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 ❶ **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

000157.04 — Fuel Rail Pressure Signal Out of Range Low

The rail pressure input voltage drops below the sensor's low voltage specification.

DN22556,00004C7 –19–26MAY07–1/1

000157.04 — Fuel Rail Pressure Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:
003509.04
000157.04

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

Related Information:
The fuel rail pressure input voltage corresponds to a pressure that is lower than what is physically possible for fuel rail pressure.

Alarm Level:
STOP

Control Unit Response:
The ECU will derate the engine until it is running at 50% of full power.

The ECU will command the high pressure fuel pump to a default pressure of 200 MPa (2000 bar) (29,000 psi).

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

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

For more information on engine protection, see ENGINE PROTECTION in Section 04, Group 140 earlier in this manual.

For derate and shutdown values see APPLICATION SPECIFICATIONS in Section 06, Group 210 later in this manual.

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

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

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 Codes. Did 000157.04 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓭ – – –1/1
❷ **Supply Voltage Test**	1. Ignition ON, Engine OFF 2. Monitor Power Supply #1 Voltage using Service ADVISOR Is the voltage above 4.5 volts?	**YES:** GO TO ❸ **NO:** GO TO ❾ – – –1/1
❸ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Perform terminal test on fuel rail pressure sensor connector. Were any problems found?	**YES:** Repair problem, run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR and GO TO ❶ **NO:** GO TO ❹ – – –1/1

❹ **Measure and Record Sensor Resistances**	1. Ignition OFF, Engine OFF 2. Measure the following resistances on the sensor to verify they are within range. 3. Between signal (terminal 1) and ground (terminal 2), (between 8k ohms and 17k ohms). 4. Between signal (terminal 1) and power (terminal 3), (between 1k ohms and 3k ohms). 5. Between ground (terminal 2) and power (terminal 3), (between 10k ohms and 15k ohms) Are all resistances within range?	**YES:** GO TO ❺ **NO:** Remove and replace sensor, run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR, and GO TO ❶ – – –1/1
❺ **Fuel Rail Pressure Input to Ground Test**	1. Ignition OFF, Engine OFF 2. Measure the resistance between signal (terminal 1) and ground (terminal 2) on the sensor harness connector. Is the resistance between 240k and 270k ohms?	**YES:** GO TO ❻ **NO:** GO TO ❽ – – –1/1
❻ **Fuel Rail Pressure Power to Ground Test**	Measure the resistance between ground (terminal 2) and power (terminal 3) on the sensor harness connector. Is the resistance between 90k and 120k?	**YES:** Reconnect all connectors and GO TO ❶ **NO:** GO TO ❼ – – –1/1
❼ **Fuel Rail Pressure Power to Ground Short Test**	1. Disconnect ECU connector J1. 2. Measure the resistance between ground (terminal 2) and power (terminal 3) on the sensor connector. Is the resistance 5 ohms or less?	**YES:** Repair shorted wire, run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR and GO TO ❶. **NO:** Check for pinched or melted wiring, repair, and reconnect all connectors and GO TO ❶. – – –1/1
❽ **Fuel Rail Pressure Signal to Ground Short Test**	1. Disconnect ECU connector J1. 2. Measure the resistance between signal (terminal 1) and ground (terminal 2) on the sensor connector. Is the resistance 5 ohms or less?	**YES:** Repair shorted wire, run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR and GO TO ❶ **NO:** Check for pinched or melted wiring, repair, and reconnect all connectors and GO TO ❶. – – –1/1

9 Fuel Rail Pressure Open and Short Test	Measure the resistance between ground (terminal 2) and power (terminal 3) on the sensor connector. Is the resistance near 0 ohms (shorted)? Is the resistance near infinity (open)?	**YES:** If (shorted) GO TO 10 **YES:** If (open) GO TO 11 **NO:** Reconnect connectors and GO TO 1. – – –1/1
10 Wiring Harness Short Test	1. Ignition OFF, Engine OFF. 2. Disconnect all ECU connectors. 3. Measure the resistance between J1-D3 and all other terminals in the other ECU connectors Were any readings less than 5 ohms?	**YES:** Repair wiring (short) and GO TO 1 **NO:** Check for pinched or melted wiring and repair then GO TO 1 – – –1/1
11 Wiring Harness Power Wire Resistance Test	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J1. 3. Measure the resistance between J1-D3 and the power (terminal 3) in the Rail Pressure Sensor connector Was the reading less than 5 ohms?	**YES:** GO TO 12 **NO:** Repair wiring and GO TO 1. – – –1/1
12 Wiring Harness Ground Wire Resistance Test	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J1. 3. Measure the resistance between J1-E3 and the ground (terminal 2) in the Rail Pressure Sensor connector Was the reading less than 5 ohms?	**YES:** Reconnect connectors and GO TO 1 **NO:** Repair wiring and GO TO 1. – – –1/1
13 Occurrence Count Check	Review stored information and look at occurrence count Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO 14 **NO:** GO TO 15 – – –1/1

⓮ Terminal Test	1. Ignition OFF, Engine OFF 2. Perform terminal test on fuel rail pressure sensor connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR and GO TO ❶ **NO:** GO TO ⓯ – – –1/1
⓯ Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	**YES:** Repair problem if found. If a certain operating point exists when error occurs then GO TO ⓰ **NO:** GO TO ⓲ – – –1/1
⓰ Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 157.04 reappear when engine operating point was reached?	**YES:** GO TO ⓱ **NO:** GO TO ⓯ – – –1/1
⓱ Terminal Test	1. Ignition OFF, Engine OFF 2. Perform terminal test on fuel rail pressure sensor connector and ECU connector J1. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR and GO TO ❶ **NO:** Remove and replace Sensor – – –1/1

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

⓳ Software Updates	1. Check custom performance for possible software updates. If new software is available, reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000157.04 active?	**YES:** Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR and GO TO ❶ **NO:** Problem fixed, bad ECU program. – – –1/1

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⓴ 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. GO TO ❶. **YES:** Found operating point at which the code becomes active. Try to determine cause. Repair and GO TO ❶. **NO:** Contact dealer or DTAC. – – –1/1

000157.10 — Fuel Rail Pressure Rate of Change Abnormal

The ECU detects a sudden decrease in fuel pressure while the engine is not injecting or pumping.

DN22556,00004C8 –19–21MAY07–1/1

000157.10 — Fuel Rail Pressure Rate of Change Abnormal Diagnostic Procedure

Trouble Shooting Sequence:
All 000094 Codes
000157.10

Related Information:
The ECU detects a sudden decrease in fuel rail pressure while engine is not injecting or pumping fuel. This usually occurs when the engine is shifted from high idle to low idle. The engine may run normal when no load is applied to engine.

Alarm Level:
Warning

Control Unit Response:
The ECU will continue to operate normally.

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Additional References:
Additional References:
For further fuel rail pressure sensor information, see FUEL RAIL 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 further fuel system information, See FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.
For further high pressure fuel system information, See HIGH PRESSURE COMMON RAIL (HPCR) OPERATION in Section 03, Group 130 earlier in this manual.
For more information on injectors, see ELECTRONIC INJECOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

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

For wiring information:
- see 4.5L 12V ECU WIRING DIAGRAM 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.

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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. Refresh Codes. Did 000157.10 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❿ – – –1/1
❷ **Terminal Test**	1. Ignition OFF, Engine OFF. 2. Disconnect the fuel rail pressure sensor connector. 3. Disconnect ECU connector J1. 4. Perform Terminal Test on both harness and sensor connectors. Are there any problems with the wiring or connectors?	**YES:** Repair problem. GO TO ❾ **NO:** GO TO ❺ – – –1/1
❸ **Fuel Lines/Fittings Leakage Test**	1. Ignition ON, Engine ON. 2. Inspect all fuel lines and fittings for leakage. Pay close attention to the high pressure lines between the high pressure fuel pump and injectors. Is there any fuel leakage present?	**YES:** Tighten loose fitting to proper specification or replace faulty fuel line and retest. GO TO ❾ **NO:** GO TO ❹ – – –1/1

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❹ **Pressure Limiter Test**	**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.** **CAUTION: Fuel in the high pressure common rail is under extremely high pressure. Do NOT start this procedure until the engine has been turned OFF for at least 5 minutes.** 1. Ignition OFF, Engine OFF. 2. Let engine sit 5 minutes with cranking or running to relieve fuel pressure. 3. Disconnect fuel line from pressure limiter valve on high pressure common rail. 4. Ignition ON, Engine ON. 5. Observe the pressure limiter valve for fuel leakage. Is fuel present at the pressure limiter valve?	**YES:** Faulty fuel pressure limiter valve. Replace pressure limiter valve. See REMOVE AND INSTALL PRESSURE LIMITER in Section 02, Group 090 earlier in this manual. GO TO ❾ **NO:** GO TO ❺ – – –1/1
❺ **Faulty Electronic Injector Test**	1. Ignition OFF, Engine OFF. 2. Disconnect leak-off line at each electronic injector. 3. Ignition ON, Engine ON. 4. Connect Service ADVISOR, perform the Cylinder Cutout Test. See ENGINE TEST INSTRUCTIONS - CYLINDER CUTOUT TEST in this section of the manual. Do any cylinders show a slight misfire?	**YES:** Replace suspected injector on cylinder. Calibrate new injector. See ELECTRONIC INJECTOR CALIBRATION in this section of the manual. GO TO ❾ **NO:** GO TO ❻ – – –1/1
❻ **Injector Calibration**	1. Ignition ON, Engine OFF. 2. Connect Service ADVISOR. Select INJECTOR CALIBRATION. See ELECTRONIC INJECTOR CALIBRATION in this section of the manual. See INSTALL and REMOVE ELECTRONIC INJECTOR (EI) in Section 02, group 090 earlier in this manual. 3. Verify each injector is in the right cylinder by matching the serial number from the calibration table. Do the serial numbers of the injectors correspond to the proper cylinder?	**YES:** GO TO❼ **NO:** Install injector in proper cylinder. See INSTALL and REMOVE ELECTRONIC INJECTOR (EI) in Section 02, group 090 earlier in this manual. GO TO ❾ **NO:** Injectors's serial number not in calibration table. Calibrate new injector. GO TO ❾ – – –1/1

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❼ **Reprogram ECU**	Check with Custom Performance for possible software updates. Is there an update available?	**YES:** ECU has already been reprogrammed. GO TO ❽ **YES:** Reprogram ECU using Service ADVISOR. See REPROGRAMMING ENGINE CONTROL UNIT (ECU) in Section 04, Group 160 earlier in this manual. GO TO ❾ **NO:** GO TO ❽ – – –1/1

❽ **Replace Sensor**	1. Skip this step if it has already has been performed. 2. Ignition OFF, Engine OFF. 3. Replace fuel rail pressure sensor. See REMOVE AND INSTALL FUEL RAIL PRESSURE SENSOR in Section 02, Group 110 earlier in this manual. 4. Ignition ON, Engine ON. Cycle engine from high RPMs to Low RPMs. 5. Monitor DTC codes with Service ADVISOR. Is DTC 157.10 still active?	**YES:** Contact dealer or open DTAC case. **NO:** GO TO ❾ – – –1/1

❾ **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. Refresh DTCs. 6. Operate engine. Cycle engine from high RPMS to Low RPMS. Did DTC 000157.10 reappear as active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

❿ **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. Try to determine cause. Repair and retest. **NO:** Contact dealer or DTAC. – – –1/1

000157.17 — Fuel Rail Pressure Not Developed While Start of Cranking

The ECU detects low fuel rail pressure after cranking the engine for approximately 3 seconds.

DN22556,00004C9 –19–21MAY07–1/1

000157.17 — Fuel Rail Pressure Not Developed Diagnostic Procedure

Trouble Shooting Sequence:
All 000094 Codes
All 001347 Codes
000157.17

Related Information:
The ECU does not detect 1000 kPa (1450 psi) of fuel rail pressure after cranking the engine for approximately 3 seconds.

Alarm Level:
Warning

Control Unit Response:
The ECU will continue to operate normally.

Additional References:
For further fuel rail pressure sensor information, see FUEL RAIL 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 further fuel system information, See FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.
For further high pressure fuel system information, See HIGH PRESSURE COMMON RAIL (HPCR) OPERATION in Section 03, Group 130 earlier in this manual.
For more information on injectors, see ELECTRONIC INJECOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

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

For wiring information:
- see 4.5L 12V ECU WIRING DIAGRAM 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 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 Codes. Did 000157.17 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓭ – – –1/1
❷ **Preliminary Check**	Has the fuel system been recently opened or the fuel tank ran dry prior to this code setting?	**YES:** Bleed the fuel system. See BLEED THE FUEL SYSTEM in Section 04, Group 150 earlier in this manual. GO TO ⓬ **NO:** GO TO ❸ – – –1/1
❸ **Fuel Lines/Fittings Leaking Test**	1. Ignition ON, Engine ON. 2. Inspect all fuel lines and fittings for leakage. Were any problems found?	**YES:** Repair fuel line. GO TO ⓬ **NO:** GO TO ❹ – – –1/1

❹ **Terminal Test**	1. Ignition OFF, Engine OFF. 2. Disconnect the fuel rail pressure sensor connector. 3. Perform Terminal Test on both harness and sensor connector. Are there any problems with the wiring or connector?	**YES:** Repair problem. GO TO ⓬ **NO:** GO TO ❺ – – –1/1
❺ **Check Harness**	1. Ignition ON, Engine OFF. 2. Monitor the DTC codes from within Service ADVISOR. Did 000157.03 become active?	**YES:** Harness OK. Check fuel system. GO TO❽ **NO:** GO TO ❻ – – –1/1
❻ **Check ECU**	*NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000157.03* 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J1 from ECU. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000157.03 become active?	**YES:** Perform Terminal Test on ECU connector J1. Inspect harness for damage. GO TO ⓬ **NO:** Problem with ECU GO TO❼ – – –1/1
❼ **Reprogram ECU**	Check with Custom Performance for possible software updates. Is there an update available?	**YES:** ECU has already been reprogrammed. Replace ECU. GO TO ⓬ **YES:** Reprogram ECU using Service ADVISOR. See REPROGRAMMING ENGINE CONTROL UNIT (ECU) in Section 04, Group 160 earlier in this manual. GO TO ⓬ **NO:** Replace ECU. GO TO ⓬ – – –1/1

8 Check Fuel Transfer Pump Pressure	1. Reconnect all connectors. 2. Ignition ON, Engine ON. 3. From Service ADVISOR, read Fuel Transfer Pump Pressure - (Actual). Is the fuel pressure grater than 30 kPa (4.4 psi)?	**YES:** GO TO 9 **NO:** Check fuel system. For further information on checking fuel system, see F1-LOW PRESSURE FUEL SUPPLY SYSTEM TEST in Section 04, Group 150 earlier in this manual. – – –1/1

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9 Check Fuel Rail Pressure Sensor	1. Ignition OFF, Engine OFF. 2. Remove fuel rail pressure sensor. See REMOVE AND INSTALL FUEL RAIL PRESSURE SENSOR in section 02, Group 110 earlier in this manual. 3. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	**YES:** Fix defected part. GO TO 12 **NO:** Replace fuel rail pressure sensor. See REMOVE AND INSTALL FUEL RAIL PRESSURE SENSOR in Section 02, Group 110 earlier in this manual. GO TO 12 **NO:** Fuel rail pressure sensor has been replaced. GO TO 10 – – –1/1

10 Check High Pressure Fuel Supply System	Verify that the high pressure rail system is working properly. See F2-HIGH PRESSURE FUEL SUPPLY SYSTEM TEST in group 04, Section 150 earlier in this manual. Were any problems found?	**YES:** Repair problem as described in F2-HIGH PRESSURE FUEL SUPPLY SYSTEM TEST. 12 **NO:** No problem found. GO TO 11 – – –1/1

11 Check Injectors	Remove rocker arm cover. Check for loose Electronic Injector (EI) clamps and fuel leaking into the area under the valve. Is fuel leaking around the injector area?	**YES:** See FUEL IN OIL in Section 04, Group 150 earlier in this manual. Repair problem. GO TO 12 **NO:** GO TO 1 – – –1/1

⓬ **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. Refresh DTCs. 6. Operate engine through normal speed and load. Did DTC 000157.17 reappear as active starting engine?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

⓭ **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. Try to determine cause. Repair and retest. **NO:** Contact dealer or DTAC. – – –1/1

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000158.17 — ECU Power Down Error

The ECU is unable to complete proper power down procedures after detecting that ignition is OFF.

DN22556,00004CA –19–25MAY07–1/1

000158.17 — ECU Power Down Error Diagnostic Procedure

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Troubleshooting Sequence:
000158.17

When DTC is Displayed:
DTC is active 164 seconds after ECU commands an internal electronic switch OFF.

Related Information:
The ECU contains an electronic switch which is commanded OFF several seconds after the ECU detects ignition as being OFF to reduce the amount of current drawn by the ECU.
This DTC is generated if the ECU commands the internal electronic switch OFF but the switch does not respond within 164 seconds.
This DTC is only active when ignition is OFF.

Alarm Level:
Warning

Control Unit Response:
The application battery may be discharged because the ECU will not power down.

Additional References:
For further ECU information, see ENGINE CONTROL UNIT in Section 03, Group 140 earlier in this manual.

– – –1/1

❶ **Reprogram ECU 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. Download latest ECU payload and reprogram ECU. 5. Clear DTCs. 6. Disconnect Service ADVISOR. 7. Ignition OFF, engine OFF for 5 minutes. 8. Ignition ON, engine OFF. 9. Connect Service ADVISOR and check for stored or active DTCs Did 000158.17 reappear as an active or stored DTC?	**YES:** GO TO ❷ **NO:** Problem fixed. – – –1/1

❷ **Replace ECU**	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Clear DTCs. 4. Disconnect Service ADVISOR. 5. Ignition OFF, engine OFF for 5 minutes. 6. Ignition ON, engine OFF. 7. Connect Service ADVISOR and check for stored or active DTCs Did 000158.17 reappear as an active or stored DTC?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

000171.05 — Ambient Air Temperature Circuit Has High Resistance

For troubleshooting procedures please see the application troubleshooting manual.

DN22556,000061C –19–24MAY07–1/1

000171.06 — Ambient Air Temperature Circuit Has Low Resistance

For troubleshooting procedures please see the application troubleshooting manual.

DN22556,000061D –19–24MAY07–1/1

000174.00 — Fuel Temperature Signal Extremely High

The ECU senses a fuel temperature above specification.

DN22556,00004CB –19–30MAY07–1/1

000174.00 — Fuel Temperature Signal Extremely High Diagnostic Procedure

Trouble Shooting Sequence:
000110.00
000105.00 or 000105.16
000174.00

Related Information:
The ECU senses a fuel temperature of 100° C (212° F) on OEM engines.
The engine has to running for 3 minutes for the code to set.

Alarm Level:
Warning

Control Unit Response:
The ECU will operate normally.

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

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.

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. 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 000174.00 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓮ – – –1/1

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❷ **Terminal Test**	1. Ignition OFF, Engine OFF. 2. Disconnect the fuel temperature sensor connector. 3. Perform Terminal Test on the harness and sensor connectors. Are there any problems with the wiring or connectors?	**YES:** Repair problem. GO TO ⓭ **NO:** GO TO ❸ – – –1/1

❸ **Fuel Cooler Check**	Perform this step if engine has a fuel cooler. If no fuel cooler exists, GO TO ❹ 1. Remove the fuel cooler. 2. Inspect the fuel cooler for damage or restrictions. 3. Check that the cooler fan is operational. Is the fuel cooler operational and free of damage or restrictions?	**YES:** GO TO ❹ **NO:** Repair problem. GO TO ⓭ – – –1/1

❹ **Fuel Level**	Is the fuel level less than a quarter full?	**YES:** Add more fuel. GO TO ⓭ **NO:** GO TO ❺ – – –1/1

❺ **Check Fuel Temperature Sensor**	1. Remove fuel temperature sensor. See REMOVE AND INSTALL FUEL TEMPERATURE SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	**YES:** Replace defective part. GO TO ⓭ **NO:** GO TO ❻ – – –1/1
❻ **Check Fuel Temperature Sensor Operation**	1. With fuel sensor removed from engine, reconnect fuel temperature sensor to its harness connector. 2. Ignition ON, Engine OFF. 3. Monitor the fuel 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:** Fuel temperature sensor is OK. Diagnose engine fuel system. GO TO ❾ **NO:** Fuel temperature sensor has already been replaced. GO TO ❼ **NO:** Replace fuel temperature sensor. GO TO ⓭ – – –1/1
❼ **Check Signal Wire In Harness**	1. Ignition OFF, Engine OFF. 2. Disconnect the fuel temperature sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 174.03 become active?	**YES:** Wire harness is OK. GO TO ❶ **NO:** GO TO ❽ – – –1/1
❽ **Check ECU**	*NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000174.03* 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J1. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 174.03 become active?	**YES:** Problem in harness. Perform Terminal Test on ECU connector J1. Diagnose and fix harness problem. GO TO ⓭ **NO:** ECU has not been reprogrammed. Reprogram ECU using Service ADVISOR. See REPROGRAMMING ENGINE CONTROL UNIT (ECU) in Section 04, Group 160 earlier in this manual. GO TO ⓭ **NO:** Replace ECU. GO TO ⓭ – – –1/1

9 Restricted Fuel Leak-off Line Test	Check for restricted fuel leak-off line. See CHECK FOR RESTRICTED FUEL LEAK-OFF LINE in Section 04, Group 150 earlier in this manual. Is fuel restriction found?	**YES:** Determine cause of restriction. Fix problem. GO TO 13 **NO:** GO TO 10 – – –1/1

10 Fuel Supply Pressure Test	Determine the fuel supply pressure. See CHECK FUEL SUPPLY PRESSURE in Section 04, Group 150 earlier in this manual. Is the fuel pressure below specification?	**YES:** Determine cause of low supply pressure. See F1 - FUEL SUPPLY SYSTEM CHECK DIAGNOSTIC PROCEDURE in Section 04, Group 150 earlier in this manual. Fix problem. GO TO 13 **NO:** GO TO 11 – – –1/1

11 Overflow Valve Test	1. Ignition OFF, Engine OFF. 2. Remove the fuel line form the high pressure fuel pump overflow valve. 3. Connect one end of a clear line to the high pressure fuel pump overflow valve and direct the other end to a suitable container for diesel fuel. 4. Ignition ON, Engine ON. Is fuel flow present from the overflow valve?	**YES:** GO TO 12 **NO:** Faulty high pressure fuel pump overflow valve. Fix problem. GO TO 13 – – –1/1

12 Reprogram ECU	Check with Custom Performance for possible software updates. Is there an up date available?	**YES:** Reprogram ECU using Service ADVISOR. See REPROGRAMMING ENGINE CONTROL UNIT (ECU) in Section 04, Group 160 earlier in this manual. GO TO 13 **NO:** No update available. GO TO 1 – – –1/1

⓭ **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 000174.00 reappear as active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

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⓮ **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. Try to determine cause. Repair and retest. **NO:** GO TO ❷ – – –1/1

000174.03 — Fuel Temperature Signal Out of Range High

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

DN22556,00004CC –19–26MAY07–1/1

000174.03 — Fuel Temperature Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:
000174.03

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

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

Alarm Level:
Warning

Control Unit Response:
The ECU uses a default fuel temperature of xx° C (xxx° F).

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

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

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

For wiring information:
- see 4.5L 12V ECU WIRING DIAGRAM 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 JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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 Codes. Did 000174.03 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❾ – – –1/1

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

❸ **Sensor Open Test**	Measure the resistance between terminal 1 and terminal 2 on the fuel temperature sensor. Was the resistance value greater than 7.5M ohms?	**YES:** Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❹ – – –1/1

❹ **Harness Resistance Check**	Measure the resistance between the return (terminal 2) and signal (terminal 1) in the fuel sensor harness connector. Was the resistance between 1k and 3k ohms?	**YES:** GO TO ❺ **NO:** GO TO ❻. – – –1/1

❺ **Terminal to Terminal Resistance Check**	1. Disconnect all ECU connectors. 2. Measure the resistance between the signal (terminal J1-F4) and all other ECU connector terminals in the ECU harness connectors. Was any resistance less than 100 ohms?	**YES:** Look for pinched or melted harness and repair wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR **NO:** Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR – – –1/1
❻ **Harness Return Wire Resistance Check**	Measure the resistance between the return (terminal 2) in the fuel sensor harness connector and application single point ground. Was the resistance less than 5 ohms?	**YES:** GO TO ❼ **NO:** GO TO ❽. – – –1/1
❼ **Harness Signal Wire Resistance Check ECU Disconnected**	Measure the resistance between the signal (terminal J1-F4) in the ECU connector and the signal (terminal 1) in the fuel sensor harness connector. Was the resistance less than 5 ohms?	**YES:** GO TO ❾ **NO:** Repair open wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR – – –1/1
❽ **Harness Return Wire Resistance Check ECU Disconnected**	Measure the resistance between the return (terminal J1-D2) in the ECU connector and the return (terminal 2) in the fuel sensor harness connector. Was the resistance less than 5 ohms?	**YES:** GO TO ❾ **NO:** Repair open wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR – – –1/1

❾ ECU Resistance Check	Measure the resistance between the return (terminal J1-D2) and signal (terminal J1-F4) in the ECU connector. Was the resistance between 1k and 3k ohms?	**YES:** Reconnect all connectors and GO TO ❷. **NO:** Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. – – –1/1

❿ Occurrence Count Check	Review stored information and look at occurrence count for 000174.03. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ⓫ **NO:** GO TO ⓬ – – –1/1

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

⓬ 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 ⓭ **NO:** GO TO ⓯ – – –1/1

⓭ Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000174.03 reappear when engine operating point was reached?	**YES:** GO TO ⓮ **NO:** GO TO ⓬ – – –1/1

⓮ Sensor Temperature Test	1. Ignition OFF, Engine OFF 2. Check temperature of the fuel temperature sensor and surrounding ares. Is everything hot?	**YES:** Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓯ – – –1/1
⓯ Terminal Test	1. Ignition OFF, Engine OFF 2. Perform terminal test on the fuel temperature sensor, harness and connector also ECU J1 and connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓰ – – –1/1
⓰ Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, Engine OFF. 3. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 4. Refresh codes. Is 000174.03 active?	**YES:** GO TO ⓱. **NO:** GO TO ⓯. – – –1/1
⓱ Software Updates	1. Check custom performance for possible software updates. If new software is available, reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000174.03 active?	**YES:** Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Problem fixed, bad ECU program. – – –1/1

000174.04 — Fuel Temperature Signal Out of Range Low

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

DN22556,00004CD –19–26MAY07–1/1

000174.04 — Fuel Temperature Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:
000174.04

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

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

Alarm Level:
Warning

Control Unit Response:
The ECU uses a default fuel temperature of 40° C (104° F).

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

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

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

For wiring information:
- see 4.5L 12V ECU WIRING DIAGRAM 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 JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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 Codes. Did 000174.04 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❾ – – –1/1

❷ **Monitor Code Test**	1. Ignition OFF, Engine OFF. 2. Disconnect the fuel temperature sensor connector. 3. Ignition ON, Engine OFF 4. Refresh codes. Did 000174.03 become active and 000174.04 move to stored?	**YES:** GO TO ❸ **NO:** GO TO ❹ – – –1/1

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

❹ **Sensor Short to Ground Test**	Measure the resistance from terminal A to chassis ground and terminal B to chassis ground on the fuel temperature sensor. Was either resistance value less than 1k ohm?	**YES:** Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❷ – – –1/1
❺ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Perform Terminal Test on the fuel temperature sensor harness connector. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❻ – – –1/1
❻ **Harness Resistance Check**	Measure the resistance between the return (terminal B) and signal (terminal A) in the fuel temperature sensor harness connector. Was the resistance less than 100 ohms?	**YES:** GO TO ❼ **NO:** Reconnect all connectors and GO TO ❷. – – –1/1
❼ **Harness Resistance Check ECU Disconnected**	1. Disconnect ECU connector J1. 2. Measure the resistance between the return (terminal B) and signal (terminal A) in the fuel temperature sensor harness connector. Was the resistance less than 100 ohms?	**YES:** GO TO ❽ **NO:** GO TO ❾. – – –1/1
❽ **Harness Physical Check**	Terminal A has low resistance to ground, check for: • Melted harness and wiring • Pinched harness and wiring. Was the problem found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❺. – – –1/1

❾ ECU Resistance Check	Measure the resistance between the return (terminal J1-D2) and signal (terminal J1-C2) in the ECU connector. Was the resistance less than 100 ohms?	**YES:** Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Reconnect all connectors and GO TO ❷. – – –1/1

❿ Occurrence Count Check	Review stored information and look at occurrence count for 000174.04. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ⓫ **NO:** GO TO ⓬ – – –1/1

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⓫ Terminal Test	1. Ignition OFF, Engine OFF 2. Perform Terminal Test on the fuel temperature sensor harness connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓬ – – –1/1

⓬ 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 ⓭ **NO:** GO TO ⓯ – – –1/1

⓭ Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000174.04 reappear when engine operating point was reached?	**YES:** GO TO ⓮ **NO:** GO TO ⓬ – – –1/1

⓮ Sensor Temperature Test	1. Ignition OFF, Engine OFF 2. Check temperature of the fuel temperature sensor and surrounding ares. Is everything hot?	**YES:** Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓯ – – –1/1
⓯ Terminal Test	1. Ignition OFF, Engine OFF 2. Perform terminal test on the fuel temperature sensor harness connector and ECU J1 connector. Were any problems found?	**YES:** Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓰ – – –1/1
⓰ Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, Engine OFF. 3. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 4. Refresh codes. Is 000174.04 active?	**YES:** GO TO ⓱. **NO:** GO TO ⓯. – – –1/1
⓱ Software Updates	1. Check custom performance for possible software updates. If new software is available, reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000174.04 active?	**YES:** Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Problem fixed, bad ECU program. – – –1/1

000174.16 — Fuel Temperature Signal Moderately High

The ECU senses the Fuel Temperature above specification.

DN22556,00004CE –19–21MAY07–1/1

000174.16 — Fuel Temperature Signal Moderately High Diagnostic Procedure

Trouble Shooting Sequence:
000157.10 or 000157.17
000110.00 or 000105.16
000105.00 or 000105.16
000174.16

Related Information:
The ECU senses a fuel temperature of 95° C (203° F) on OEM engines.
The engine has to running for 3 minutes for the code to set.

Alarm Level:
Warning

Control Unit Response:
The ECU will operate normally.

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

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.

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. 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 000174.16 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓮ – – –1/1

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❷ **Terminal Test**	1. Ignition OFF, Engine OFF. 2. Disconnect the fuel temperature sensor connector. 3. Perform Terminal Test on the harness and sensor connectors. Are there any problems with the wiring or connectors?	**YES:** Repair problem. GO TO ⓭ **NO:** GO TO ❸ – – –1/1

❸ **Fuel Cooler Check**	Perform this step if engine has a fuel cooler. If no fuel cooler exists, GO TO ❹ 1. Remove the fuel cooler. 2. Inspect the fuel cooler for damage or restrictions. 3. Check that the cooler fan is operational. Is the fuel cooler operational and free of damage or restrictions?	**YES:** GO TO ❹ **NO:** Repair problem. GO TO ⓭ – – –1/1

❹ **Fuel Level**	Is the fuel level less than a quarter full?	**YES:** Add more fuel. GO TO ⓭ **NO:** GO TO ❺ – – –1/1

❺ **Check Fuel Temperature Sensor**	1. Remove fuel temperature sensor. See REMOVE AND INSTALL FUEL TEMPERATURE SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	**YES:** Replace defective part. GO TO ⓭ **NO:** GO TO ❻ – – –1/1
❻ **Check Fuel Temperature Sensor Operation**	1. With fuel sensor removed from engine, reconnect fuel temperature sensor to its harness connector. 2. Ignition ON, Engine OFF. 3. Monitor the fuel 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:** Fuel temperature sensor is OK. Diagnose engine fuel system. GO TO ❾ **NO:** Fuel temperature sensor has already been replaced. GO TO ❼ **NO:** Replace fuel temperature sensor. GO TO ⓭ – – –1/1
❼ **Check Signal Wire In Harness**	1. Ignition OFF, Engine OFF. 2. Disconnect the fuel temperature sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 174.03 become active?	**YES:** Wire harness is OK. GO TO ❶ **NO:** GO TO ❽ – – –1/1
❽ **Check ECU**	*NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000174.03* 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J1. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 174.03 become active?	**YES:** Problem in harness. Perform Terminal Test on ECU connector J1. Diagnose and fix harness problem. GO TO ⓭ **NO:** ECU has not been reprogrammed. Reprogram ECU using Service ADVISOR. See REPROGRAMMING ENGINE CONTROL UNIT (ECU) in Section 04, Group 160 earlier in this manual. GO TO ⓭ **NO:** Replace ECU. GO TO ⓭ – – –1/1

9 Restricted Fuel Leak-off Line Test	Check for restricted fuel leak-off line. See CHECK FOR RESTRICTED FUEL LEAK-OFF LINE in Section 04, Group 150 earlier in this manual. Is fuel restriction found?	**YES:** Determine cause of restriction. Fix problem. GO TO 13 **NO:** GO TO 10 – – –1/1

10 Fuel Supply Pressure Test	Determine the fuel supply pressure. See CHECK FUEL SUPPLY PRESSURE in Section 04, Group 150 earlier in this manual. Is the fuel pressure below specification?	**YES:** Determine cause of low supply pressure. See F1 - FUEL SUPPLY SYSTEM CHECK DIAGNOSTIC PROCEDURE in Section 04, Group 150 earlier in this manual. Fix problem. GO TO 13 **NO:** GO TO 11 – – –1/1

11 Overflow Valve Test	1. Ignition OFF, Engine OFF. 2. Remove the fuel line form the high pressure fuel pump overflow valve. 3. Connect one end of a clear line to the high pressure fuel pump overflow valve and direct the other end to a suitable container for diesel fuel. 4. Ignition ON, Engine ON. Is fuel flow present from the overflow valve?	**YES:** GO TO 12 **NO:** Faulty high pressure fuel pump overflow valve. Fix problem. GO TO 13 – – –1/1

12 Reprogram ECU	Check with Custom Performance for possible software updates. Is there an up date available?	**YES:** Reprogram ECU using Service ADVISOR. See REPROGRAMMING ENGINE CONTROL UNIT (ECU) in Section 04, Group 160 earlier in this manual. GO TO 13 **NO:** No update available. GO TO 1 – – –1/1

⓭ **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 000174.16 reappear as active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

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⓮ **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. Try to determine cause. Repair and retest. **NO:** GO TO ❷ – – –1/1

000189.00 — Engine Speed Derate Condition Exists

The ECU detects a condition that requires an engine speed derate.

Related Information:
The engine speed derate diagnostic trouble code is information to the operator that the ECU has detected a condition and is derating the engine by limiting the maximum amount of engine speed available to the engine. This code will only set as a result of another DTC setting.

Alarm Level:
Warning

Control Unit Response:
The ECU will limit the amount of engine speed in an attempt to protect the engine.

Additional References:
For more information on derates see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 3 Group 140 earlier in this manual.

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DN22556,00004CF –19–30MAY07–1/1

000569.03 — Rear Axle Differential Lock Signal Out of Range High

For troubleshooting procedures please see the application troubleshooting manual.

DN22556,0000615 –19–24MAY07–1/1

000569.04 — Rear Axle Differential Lock Signal Out of Range Low

For troubleshooting procedures please see the application troubleshooting manual.

DN22556,0000616 –19–24MAY07–1/1

000611.03 — Injector Shorted to Power

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

DN22556,00004D9 –19–30MAY07–1/1

000611.03 — Injector Shorted to Power Diagnostic Procedure

Troubleshooting Sequence:
000611.03

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

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

Alarm Level:
Stop

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

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

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

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

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

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

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least 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.

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 000611.03 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓬ – – –1/1
❷ **Check for DTC Change with Injector Harness Disconnected**	⚠ **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 8-way injector 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. Is DTC 000611.03 still active? *NOTE: Ignore DTCs for high resistance in all injector circuits that may now be active because of this test.*	**YES:** GO TO ❺ **NO:** GO TO ❸ – – –1/1
❸ **Injector 8-Way Connector Terminal Test**	1. Ignition OFF, engine OFF. 2. Perform Terminal Test on injector harness to engine harness 8-way connectors. Were any problems found?	**YES:** Fix problem. GO TO ⓫ **NO:** GO TO ❹ – – –1/1
❹ **Check Injector Harness for Short to Voltage Source**	1. Ignition ON, engine OFF. 2. On the injector harness, measure the voltage between the each terminal of the 8-way connector (male pin terminals) and single point ground. Was any voltage measurement greater than 0.5V?	**YES:** Fix problem. GO TO ⓫ **NO:** Inspect injector harness for damage. If none found, GO TO ❺ – – –1/1

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❺ ECU Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform Terminal Test on J1 connector. Were any problems found?	**YES:** Fix problem. GO TO ⓫ **NO:** GO TO ❻ – – –1/1

❻ Check Engine Harness for Open Circuit	On the engine harness, measure the resistance between the following injector circuit terminals in the J1 connector and the 8-way injector connector: • Terminal J1-G1 to 8-way terminal 7 • Terminal J1-G2 to 8-way terminal 8 • Terminal J1-A1 to 8-way terminal 4 (only with 6.8L) • Terminal J1-B1 to 8-way terminal 2 (only with 6.8L) • Terminal J1-C1 to 8-way terminal 6 • Terminal J1-D1 to 8-way terminal 3 • Terminal J1-E1 to 8-way terminal 1 • Terminal J1-F1 to 8-way terminal 5 Are all resistance readings less than 10 ohms?	**YES:** GO TO ❼ **NO:** Fix problem. GO TO ⓫ – – –1/1

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❼ Check Engine Harness for Short to Voltage Source	1. Reconnect engine harness to injector harness 8-way connector. 2. Ignition ON, engine OFF. 3. On the harness, measure the voltage from injector voltage supply 1 (J1-G1) to single point ground. 4. On the harness, measure the voltage from injector voltage supply 2 (J1-G2) to single point ground. Is any voltage greater than 0.5V?	**YES:** Fix problem. GO TO ⓫ **NO:** GO TO ❽ – – –1/1

8 Check Engine Harness for Wire-to-Wire Short	1. Ignition OFF, engine OFF. 2. On the harness, measure the resistance between injector voltage supply 1 (J1-G1) and all other terminals in the J1 connector EXCEPT the following terminals: • J1-A1 • J1-B1 • J1-C1 • J1-D1 • J1-E1 • J1-F1 3. On the harness, measure the resistance between injector voltage supply 2 (J1-G2) and all other terminals in the J1 connector EXCEPT the following terminals: • J1-A1 • J1-B1 • J1-C1 • J1-D1 • J1-E1 • J1-F1 Are all resistance readings greater than 1k ohms?	**YES:** GO TO 9 **NO:** Fix problem. GO TO 11 – – –1/1

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9 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 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 000611.03 reappear active?	**YES:** GO TO 10 **NO:** Problem fixed. – – –1/1

10 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 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 000611.03 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

⓫ Verification	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 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 000611.03 reappear active?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

⓬ 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 ⓭ **NO:** GO TO ⓮ – – –1/1

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⓭ Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh codes. Did 000611.03 reappear active when engine operating point was reached?	**YES:** GO TO ❶ **NO:** GO TO ⓮ – – –1/1

⓮ 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 8-way injector harness connector. 3. Inspect engine wire harness and injector harness carefully for damage which may cause an intermittent short to a voltage source. Were any problems found?	**YES:** Fix problem. GO TO ⓫ **NO:** GO TO ⓯ – – –1/1

⓯ **Reconnect and Retest**	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Is 000611.03 active with engine running?	**YES:** GO TO ❶. **NO:** GO TO ⓰. – – –1/1

⓰ **Reprogram ECU**	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine ON. 3. Refresh DTCs. Is 000611.03 active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed or conditions to generate 000611.03 have not been duplicated. – – –1/1

000611.04 — Injector Shorted to Ground

The ECU detects that injector wiring is shorted to ground.

DN22556,00004DA –19–30MAY07–1/1

000611.04 — Injector Shorted to Ground Diagnostic Procedure

Troubleshooting Sequence:
000611.04

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

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

Alarm Level:
Stop

Control Unit Response:
The ECU will not permit the engine to operate when this DTC is active.

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

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

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

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

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

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least 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.

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 000611.04 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓮ – – –1/1
❷ **Check for DTC Change with Injector Harness Disconnected**	⚠ **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 8-way injector 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. Is DTC 000611.04 still active? *NOTE: Ignore DTCs for high resistance in all injector circuits that may now be active because of this test.*	**YES:** GO TO ❼ **NO:** GO TO ❸ – – –1/1
❸ **Injector 8-Way Connector Terminal Test**	1. Ignition OFF, engine OFF. 2. Perform Terminal Test on injector harness to engine harness 8-way connectors. Were any problems found?	**YES:** Fix problem. GO TO ⓭ **NO:** GO TO ❹ – – –1/1
❹ **Check Injector Harness for Short to Ground**	On the injector harness (male pin terminals), measure the resistance between each terminal of the 8-way connector and single point ground. Are all resistance readings greater than 1k ohms?	**YES:** Inspect injector harness for damage. If none found, GO TO ❼ **NO:** GO TO ❺ – – –1/1

❺ **Inspect Injector Harness**	1. Remove injector heat shield. 2. Inspect injector harness for damage that would cause a short to ground. Were any problems found?	**YES:** Replace injector harness. GO TO ⓭ **NO:** GO TO ❻ – – –1/1
❻ **Check Injector Coils for Short to Ground**	*NOTE: See REMOVE ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for connector dust cap removal instructions.* 1. Remove injector connector dust caps and terminal nuts from all injectors. 2. Lift injector connectors away from injector studs. 3. On each injector, measure the resistance between all injector studs and single point ground. Are all resistance readings greater than 1k ohms?	**YES:** Replace injector harness. GO TO ⓭ **NO:** Replace injector(s) having less than 1k ohms of resistance to ground. GO TO ⓭ – – –1/1
❼ **ECU Terminal Test**	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform Terminal Test on J1 Were any problems found?	**YES:** Fix problem. GO TO ⓭ **NO:** GO TO ❽ – – –1/1
❽ **Check Engine Harness for Correct Pin Out**	On the engine harness, measure the resistance between the following injector circuit terminals in the J1 connector and the 8-way injector connector: • Terminal J1-G1 to 8-way terminal 7 • Terminal J1-G2 to 8-way terminal 8 • Terminal J1-A1 to 8-way terminal 4 (only with 6.8L) • Terminal J1-B1 to 8-way terminal 2 (only with 6.8L) • Terminal J1-C1 to 8-way terminal 6 • Terminal J1-D1 to 8-way terminal 3 • Terminal J1-E1 to 8-way terminal 1 • Terminal J1-F1 to 8-way terminal 5 Are all resistance readings less than 10 ohms?	**YES:** GO TO ❾ **NO:** Fix problem. GO TO ⓭ – – –1/1

9 Check Engine Harness for Short to Ground	1. Reconnect engine harness to injector harness 8-way connector. 2. On the harness, measure the resistance between injector voltage supply 1 (J1-G1) and single point ground. 3. On the harness, measure the resistance between injector voltage supply 2 (J1-G2) and single point ground. Are all resistance readings greater than 1k ohms?	**YES:** GO TO 10 **NO:** Fix problem. GO TO 13 – – –1/1

10 Check Engine Harness for Wire-to-Wire Short	1. On the harness, measure the resistance between injector voltage supply 1 (J1-G1) and all other terminals in the J1 connector EXCEPT the following terminals: • J1-A1 • J1-B1 • J1-C1 • J1-D1 • J1-E1 • J1-F1 2. On the harness, measure the resistance between injector voltage supply 2 (J1-G2) and all other terminals in the J1 connector EXCEPT the following terminals: • J1-A1 • J1-B1 • J1-C1 • J1-D1 • J1-E1 • J1-F1 Are all resistance readings greater than 1k ohms?	**YES:** GO TO 11 **NO:** Fix problem. GO TO 13 – – –1/1

11 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 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 12 **NO:** Problem fixed. – – –1/1

⓬ **Replace ECU**	1. Ignition OFF, engine OFF. 2. Replace ECU. 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 000611.04 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1
⓭ **Verification**	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 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 ❶ **NO:** Problem fixed. – – –1/1
⓮ **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 ⓯ **NO:** GO TO ⓰ – – –1/1
⓯ **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 ❶ **NO:** GO TO ⓰ – – –1/1

⓰ 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 8-way injector harness connector (if not already performed). 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 ⓭ **NO:** GO TO ⓱ – – –1/1

⓱ Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine OFF. 3. Refresh DTCs. Is 000611.04 active with engine running?	**YES:** GO TO ❶. **NO:** GO TO ⓲. – – –1/1

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⓲ Reprogram ECU	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine OFF. 3. Refresh DTCs. Is 000611.04 active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed or conditions to generate 000611.04 have not been duplicated. – – –1/1

000627.01 — All Injector Circuits Have High Resistance

The ECU detects that all injector circuits have high resistance.

JB81757,000000C –19–30MAY07–1/1

000627.01— All Injector Circuits Have High Resistance Diagnostic Procedure

Troubleshooting Sequence:
000627.01

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

Related Information:
The ECU detects high resistance in all injector circuits.
The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.
The ECU switches the low side (ground) to control each individual injector.
This DTC can be caused by an open circuit or by a few additional ohms of resistance in the injector circuits.
This DTC can also be caused by a low ECU voltage supply.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to control the engine in a normal manner, but the engine may not run due to low injector current.

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

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

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

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

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

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least 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.

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 000627.01 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓬ – – –1/1

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❷ **Check ECU Battery Voltage Supply**	Monitor Battery Voltage data point in Service ADVISOR. Is the voltage greater than 11.7V for 12V systems or 23.5V for 24V systems?	**YES:** GO TO ❸ **NO:** Recharge application batteries or determine cause of low ECU voltage. GO TO ⓫ – – –1/1
❸ **Check Connectors**	⚠ **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. Verify injector harness 8-way connector is fully attached to engine harness connector. 3. Verify ECU J1 connector is fully attached to ECU. Were any problems found?	**YES:** GO TO ❹ **NO:** Fix problem. GO TO ⓫ – – –1/1
❹ **Injector 8-Way Connector Terminal Test**	Perform Terminal Test on injector harness to engine harness 8-way connectors. Were any problems found?	**YES:** Fix problem. GO TO ⓫ **NO:** GO TO ❺ – – –1/1
❺ **Check Injector #1 Circuit for High Resistance**	On the injector harness 8-way connector (male pin terminals), measure the resistance between injector voltage supply (terminal 7) and injector #1 control (terminal 1). Is resistance reading less than 2 ohms?	**YES:** GO TO ❻ **NO:** Repair problem. GO TO ⓫ – – –1/1

❻ **ECU Terminal Test**	Perform Terminal Test on J1 connector. Were any problems found?	**YES:** Fix problem. GO TO ⓫ **NO:** GO TO ❼ – – –1/1
❼ **Check Engine Harness for High Resistance**	On the engine harness, measure the resistance between the following injector circuit terminals in the J1 connector and the 8-way injector connector: • Terminal J1-G1 to 8-way terminal 7 • Terminal J1-G2 to 8-way terminal 8 • Terminal J1-A1 to 8-way terminal 4 (only with 6.8L) • Terminal J1-B1 to 8-way terminal 2 (only with 6.8L) • Terminal J1-C1 to 8-way terminal 6 • Terminal J1-D1 to 8-way terminal 3 • Terminal J1-E1 to 8-way terminal 1 • Terminal J1-F1 to 8-way terminal 5 Are all resistance readings less than 2 ohms?	**YES:** GO TO ❽ **NO:** Fix problem. GO TO ⓫ – – –1/1
❽ **Check Injector Circuits for High Resistance**	1. Reconnect engine harness to injector harness 8-way connector. 2. On the engine harness, measure the resistance between the following injector circuit terminals in the J1 connector: • Terminal J1-G1 to J1-B1 (only with 6.8L) • Terminal J1-G1 to J1-D1 • Terminal J1-G1 to J1-E1 • Terminal J1-G2 to J1-A1 (only with 6.8L) • Terminal J1-G2 to J1-C1 • Terminal J1-G2 to J1-F1 Are all resistance readings less than 2 ohms?	**YES:** GO TO ❾ **NO:** Fix problem. GO TO ⓫ – – –1/1
❾ **Reprogram ECU**	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 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 000627.01 reappear active?	**YES:** GO TO ❿ **NO:** Problem fixed. – – –1/1

⑩ **Replace ECU**	1. Ignition OFF, engine OFF. 2. Replace ECU. 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 000627.01 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

⑪ **Verification**	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 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 000627.01 reappear active?	**YES:** GO TO ① **NO:** Problem fixed. – – –1/1

⑫ **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 ⑬ **NO:** GO TO ⑭ – – –1/1

⑬ **Engine Error Operating Point Test**	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh codes. Did 000627.01 reappear active when engine operating point was reached?	**YES:** GO TO ① **NO:** GO TO ⑭ – – –1/1

⓮ 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 8-way injector harness connector. 3. Inspect engine wire harness and injector harness carefully for damage which may cause an intermittent open circuit. Were any problems found?	**YES:** Fix problem. GO TO ⓫ **NO:** GO TO ⓯ – – –1/1

⓯ Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine OFF. 3. Refresh DTCs. Is 000627.01 active with engine running?	**YES:** GO TO ❶. **NO:** GO TO ⓰. – – –1/1

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⓰ Reprogram ECU	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine OFF. 3. Refresh DTCs. Is 000627.01 active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed or conditions to generate 000627.01 have not been duplicated. – – –1/1

000629.12 — ECU EEPROM Error

The ECU detects an internal problem.

DN22556,00004DD –19–29MAY07–1/1

000629.12 — ECU EEPROM Error Diagnostic Procedure

Troubleshooting Sequence:
000629.12

When DTC is Displayed:
The ECU detects an internal memory problem.

Related Information:
This may be generated after ECU has been reprogrammed.

Alarm Level:
Stop

Control Unit Response:
The ECU will attempt to control the engine in a normal manner. Engine may not run or may run poorly.

– – –1/1

❶ **Reprogram ECU 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. Monitor Battery Voltage data point in Service ADVISOR. Is the voltage greater than 11.7V for 12V systems or 23.5V for 24V systems?	**YES:** GO TO ❷ **NO:** Recharge application batteries or determine cause of low ECU voltage. GO TO ❷

– – –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 ❸ **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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000629.13 — ECU Boot Block Error

The ECU detects an internal problem.

JB81757,000000D –19–26MAY07–1/1

000629.13 — ECU Boot Block Error Diagnostic Procedure

Troubleshooting Sequence:
000629.13

When DTC is Displayed:
The ECU detects an internal memory problem.

Related Information:
This DTC may be generated after ECU has been reprogrammed.

Alarm Level:
Stop

Control Unit Response:
The ECU will not permit engine to run.

– – –1/1

❶ **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 000629.13 reappear active?	**YES:** GO TO ❷ **NO:** Problem fixed. – – –1/1

❷ **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 000629.13 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

000636.02 — Pump Position Sensor Signal Invalid

The ECU detects excessive noise (extra pulses) on the pump position sensor input.

DN22556,00004DE –19–30MAY07–1/1

000636.02 — Pump Position Sensor Signal Invalid Diagnostic Procedure

Troubleshooting Sequence:
000636.08
000636.02

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

Related Information:
The ECU detects extra pulses (electrical noise) in the pump position sensor signal.

The extra pulses may be caused by electromagnetic interference or by a sensor signal wire that is shorted to some other signal wire.

Wiring problems such as loose terminals or water in connectors may also cause this DTC.

Alarm Level:
Warning

Control Unit Response:
Prolonged cranking time may be required to start the engine.
The ECU will use the crank sensor input to determine camshaft and pump position.
If a crank sensor DTC accompanies 000636.02, the engine cannot be started and will stall if running until at least one of the two codes is repaired.

Additional References:
For more pump position sensor information, see PUMP POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED AND POSITION 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 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.

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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 000636.02 reappear active with engine running or cranking?	**YES:** GO TO ❷ **NO:** GO TO ⓴

– – –1/1

❷ **Check Speed Sensor Data Points**	1. Monitor the following Data Points in Service ADVISOR: • Pump Position Sensor Noise Indicator • Pump Position Sensor Improper Pattern Indicator • Pump Position Sensor Status 2. Operate engine through normal speed and load ranges. 3. Switch ON and OFF any electrical devices on the application. *NOTE: The Pump Position Sensor Noise Indicator has a value of 0 if the pump position signal is good. The value will temporarily increase if noise is detected in the sensor signal. The Pump Position Sensor Improper Pattern Indicator is 0% if recent pump position signal patterns were good. The percentage will increase if errors in the signal pattern are detected and will count down to 0% once the signal pattern is error-free. The Pump Position Sensor Status has a value of 47 if the pump position signal is good with engine speed above 400 rpm. The value will be something other than 47 if a sensor signal problem is detected. These data points can be used to locate intermittent problems with the pump position sensor signal which are too brief to cause a DTC to become active.* *NOTE: Internal Data Monitor in Service ADVISOR may also be used to locate intermittent speed sensor circuit problems. See INTERNAL DATA MONITOR (IDM) earlier in this group for more information on using this feature. Select the data points defined earlier in this step and set sample rate to 5 ms.* Were you able to find some mode of operation or an intermittent wiring problem which causes the Speed Sensor Data Points to indicate a signal problem?	**YES:** Found engine wiring problem. Repair problem. GO TO ⓳ **YES:** Some device on application causes the electrical noise. Open DTAC case. **NO:** GO TO ❸

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❸ **Test Sensor Terminals**	1. Ignition OFF, engine OFF. 2. Disconnect pump position sensor. 3. Perform Terminal Test on pump position sensor and connector. Were any problems found?	**YES:** Fix problem. GO TO ⓳ **NO:** GO TO ❹ – – –1/1
❹ **Inspect Target**	1. Remove pump 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 ⓳ **NO:** GO TO ❺ – – –1/1
❺ **Inspect Pump Position Sensor**	*NOTE: See REMOVE AND INSTALL PUMP POSITION SENSOR in Section 02, Group 110 earlier in this manual for sensor replacement instructions.* Examine tip of pump position sensor for damage due to contact with upper idler gear Does sensor appear damaged due to contact with gear?	**YES:** Replace pump position sensor. Determine cause if replacement sensor also becomes damaged. GO TO ⓳ **NO:** GO TO ❻ – – –1/1
❻ **Check Sensor Resistance**	On the pump position sensor, measure the resistance between the signal (B) and return (A). Is the resistance between 2500 ohms and 3500 ohms?	**YES:** Reinstall pump position sensor. Do not reconnect to harness. GO TO ❼ **NO:** Replace pump position sensor. GO TO ⓳ – – –1/1

❼ Test ECU Terminals	1. Disconnect ECU J1 connector. 2. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO ⓳ **NO:** GO TO ❽ – – –1/1
❽ Check for Shorted to Ground Sensor Return	On the harness, measure the resistance between the ECU connector pump position sensor return (J1-E4) and single point ground. Is the resistance greater than 1k ohms?	**YES:** GO TO ❾ **NO:** Fix problem. GO TO ⓳ – – –1/1
❾ Check Sensor Circuit Resistance	*NOTE: Verify that pump position sensor signal and return wires are in the specified connector cavities (not swapped).* 1. On the harness, measure the resistance between ECU pump position sensor signal (J1-A4) and the pump position sensor connector signal (B). 2. On the harness, measure the resistance between ECU pump position sensor return (J1-E4) and the pump position sensor connector return (A). Are both resistance measurements less than 10 ohms?	**YES:** GO TO ❿ **NO:** Fix problem. GO TO ⓳ – – –1/1
❿ Test ECU Terminals	1. Disconnect ECU J2 connector. 2. Perform Terminal Test on J2. Examine ECU battery supply (J2-L1), ignition (J2-B2), and ground (J2-L2) terminals carefully. Were any problems found?	**YES:** Fix problem. GO TO ⓳ **NO:** GO TO ⓫ – – –1/1
⓫ Check for Intermittent ECU Power Supply Problem	1. Ignition ON, engine OFF. 2. Measure the voltage from ECU battery supply (J2-L1) to ECU ground (J2-L2) while gently moving wire harness. 3. Measure the voltage from ECU ignition (J2-B2) to ECU ground (J2-L2) while gently moving wire harness. Were any intermittent wiring problems found?	**YES:** Fix problem. GO TO ⓳ **NO:** GO TO ⓬ – – –1/1
⓬ Check for Wire-to-Wire Short	1. Ignition OFF, engine OFF. 2. On the harness, measure the resistance between the ECU J1 connector pump position sensor signal (J1-A4) and all other terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	**YES:** GO TO ⓭ **NO:** Fix problem. GO TO ⓳ – – –1/1

⓭ **Check Sensor Wiring**	Examine pump position sensor wiring between the pump position sensor and the ECU. Check for the following: • Verify that pump position sensor signal and return wires are twisted together throughout the harness. • Verify that no physical damage to pump position sensor signal and return wires is evident. Were any problems found?	**YES:** Replace pump position sensor wiring with twisted pair or repair problem. GO TO ⓳ **NO:** GO TO ⓮ – – –1/1
⓮ **Check Wire Harness Routing**	Examine routing of pump position sensor wiring between pump position sensor and ECU. Is pump position sensor wiring routed near sources of strong electric or magnetic fields such as 2-way radio antenna, alternator, inverter, a.c. generator, or other similar device on the application?	**YES:** Reroute pump position sensor wires away from device. GO TO ⓳ **NO:** GO TO ⓯ – – –1/1
⓯ **Check for Alternator Noise**	1. Disconnect negative battery cable. 2. Disconnect alternator positive output cable and insulate cable terminal. 3. Disconnect all other alternator connectors. 4. Reconnect negative battery cable. 5. Reconnect ECU and sensor connectors. 6. Ignition ON, engine ON. Did DTC 000636.02 reappear active with engine running?	**YES:** GO TO ⓰ **NO:** Repair alternator problem. GO TO ⓳ – – –1/1
⓰ **Replace Pump Position Sensor**	Has pump position sensor been replaced during this procedure?	**YES:** GO TO ⓱ **NO:** Replace pump position sensor. GO TO ⓳ – – –1/1
⓱ **Reprogram ECU**	Download latest ECU payload and reprogram ECU. Did DTC 000636.02 reappear active with engine running?	**YES:** GO TO ⓲ **NO:** Problem fixed. – – –1/1
⓲ **Replace ECU**	1. Ignition OFF, engine OFF. 2. Replace ECU. Did DTC 000636.02 reappear active with engine running?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

⓳ **Verification**	1. Ignition OFF, engine OFF. 2. Reconnect all connectors (disconnect battery negative cable prior to reinstalling alternator positive cable, if applicable). 3. Ignition ON, engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Refresh DTCs. 6. Operate engine through normal speed and load. Did DTC 000636.02 reappear active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

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

000636.05 — Pump Position Sensor Circuit Has High Resistance

The ECU detects high resistance in the pump position sensor circuit.

DN22556,00004DF –19–29MAY07–1/1

000636.05 — Pump Position Sensor Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:
000636.05

Related Information:
The ECU detects high resistance or an open circuit in the pump position circuit during the Harness Diagnostic Mode Test in Service ADVISOR.

Alarm Level:
Warning

Control Unit Response:
DTC 000636.08 may also be active when engine is running.

Additional References:
For more pump position sensor information, see PUMP POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED AND POSITION 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 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.

❶ **Test Sensor Terminals**	1. Ignition OFF, engine OFF. 2. Disconnect pump position sensor. 3. Perform Terminal Test on pump position sensor and connector. Were any problems found?	**YES:** Fix problem. GO TO ⓬ **NO:** GO TO ❷ – – –1/1
❷ **Check Sensor Resistance**	On the pump position sensor, measure the resistance between the signal (B) and return (A). Is the resistance between 2500 ohms and 3500 ohms?	**YES:** GO TO ❸ **NO:** Remove pump position sensor. GO TO ⓫ – – –1/1
❸ **Test ECU Terminals**	1. Disconnect ECU J1 connector. 2. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO ⓬ **NO:** GO TO ❹ – – –1/1
❹ **Check Sensor Circuit Resistance**	1. On the harness, measure the resistance between ECU pump position sensor signal (J1-A4) and the pump position sensor connector signal (B). 2. On the harness, measure the resistance between ECU pump position sensor return (J1-E4) and the pump position sensor connector return (A). Are both resistance measurements less than 10 ohms?	**YES:** GO TO ❺ **NO:** Fix problem. GO TO ⓬ – – –1/1
❺ **Check for Wire-to-Wire Short**	1. Disconnect ECU J2 connector. 2. On the harness, measure the resistance between the ECU J1 connector pump position sensor signal (J1-A4) and all other terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	**YES:** GO TO ❻ **NO:** Fix problem. GO TO ⓬ – – –1/1
❻ **Check for Short to Voltage**	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU J1 connector pump position sensor signal (J1-A4) and single point ground. Is voltage less than 0.5V?	**YES:** GO TO ❼ **NO:** Fix problem.. GO TO ⓬ – – –1/1

❼ **Check for Intermittent Open Circuit**	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform Harness Diagnostic Test in Service ADVISOR. Did 000636.05 reappear active?	**YES:** GO TO ❽ **NO:** Recheck for intermittent open circuit. GO TO ❶ – – –1/1
❽ **Replace Pump Position Sensor**	Has pump position sensor been replaced during this diagnostic procedure?	**YES:** GO TO ❾ **NO:** Remove pump position sensor. GO TO ⓫ – – –1/1
❾ **Reprogram ECU**	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine OFF. 3. Perform Harness Diagnostic Test in Service ADVISOR. Did 000636.05 reappear active?	**YES:** GO TO ❿ **NO:** Problem fixed. – – –1/1
❿ **Replace ECU**	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Perform Harness Diagnostic Test in Service ADVISOR. Did 000636.05 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

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

⓬ Verification	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform Harness Diagnostic Test in Service ADVISOR. Did 000636.05 reappear active?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

000636.06 — Pump Position Sensor Circuit Has Low Resistance

The ECU detects low resistance in the pump position sensor circuit.

DN22556,00004E0 –19–29MAY07–1/1

000636.06 — Pump Position Sensor Circuit Has Low Resistance Diagnostic Procedure

Troubleshooting Sequence:
000636.06

Related Information:
The ECU detects low resistance or a short to ground in the pump position circuit during the Harness Diagnostic Mode Test in Service ADVISOR.

Alarm Level:
Warning

Control Unit Response:
DTC 000636.08 may also be active when engine is running.

Additional References:
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For more pump position sensor information, see PUMP POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED AND POSITION 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 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.

❶ **Check for DTC Change with Sensor Disconnected**	1. Ignition ON, engine OFF. 2. Disconnect pump position sensor connector. 3. Perform Harness Diagnostic Mode Test in Service ADVISOR. Is 000636.05 now an active DTC?	**YES:** Remove pump position sensor. GO TO ⓭ **NO:** GO TO ❷ – – –1/1
❷ **Test Sensor Terminals**	1. Ignition OFF, engine OFF. 2. Disconnect pump position sensor. 3. Perform Terminal Test on pump position sensor and connector. Were any problems found?	**YES:** Fix problem. GO TO ⓮ **NO:** GO TO ❸ – – –1/1
❸ **Check Sensor Resistance**	On the pump position sensor, measure the resistance between the signal (B) and return (A). Is the resistance between 2500 ohms and 3500 ohms?	**YES:** Do not reconnect sensor to harness. GO TO ❹ **NO:** Remove pump position sensor. GO TO ⓭ – – –1/1
❹ **Test ECU Terminals**	1. Disconnect ECU J1 connector. 2. Perform Terminal Test on connector J1. Were any problems found?	**YES:** Fix problem. GO TO ⓮ **NO:** GO TO ❺ – – –1/1
❺ **Check Sensor Circuit Resistance**	1. On the harness, measure the resistance between ECU pump position sensor signal (J1-A4) and the pump position sensor connector signal (B). 2. On the harness, measure the resistance between ECU pump position sensor return (J1-E4) and the pump position sensor connector return (A). Are both resistance measurements less than 10 ohms?	**YES:** GO TO ❻ **NO:** Fix problem. GO TO ⓮ – – –1/1

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❻ **Check for Wire-to-Wire Short**	1. Verify pump position sensor is disconnected. 2. On the harness, measure the resistance between ECU J1 connector pump position sensor signal (J1-A4) and return (J1-E4). Is the resistance greater than 1k ohms?	**YES:** GO TO ❼ **NO:** Fix problem. GO TO ⓮ – – –1/1
❼ **Check for Short to Ground of Sensor Signal**	On the harness, measure the resistance between ECU J1 connector pump position sensor signal (J1-A4) and single point ground. Is the resistance greater than 1k ohms?	**YES:** GO TO ❽ **NO:** Fix problem. GO TO ⓮ – – –1/1
❽ **Check for Wire-to-Wire Short**	1. Disconnect ECU J2 connector. 2. On the harness, measure the resistance between the ECU J1 connector pump position sensor signal (J1-A4) and all other terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	**YES:** GO TO ❾ **NO:** Fix problem. GO TO ⓮ – – –1/1
❾ **Check for Intermittent Shorted Circuit**	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform Harness Diagnostic Test in Service ADVISOR. Did 000636.06 reappear active?	**YES:** GO TO ❿ **NO:** Recheck for intermittent shorted circuit. GO TO ❶ – – –1/1
❿ **Replace Pump Position Sensor**	Has pump position sensor been replaced during this diagnostic procedure?	**YES:** GO TO ⓫ **NO:** Remove pump position sensor. GO TO ⓭ – – –1/1
⓫ **Reprogram ECU**	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine OFF. 3. Perform Harness Diagnostic Test in Service ADVISOR. Did 000636.06 reappear active?	**YES:** GO TO ⓬ **NO:** Problem fixed. – – –1/1

⓬ **Replace ECU**	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Perform Harness Diagnostic Test in Service ADVISOR. Did 000636.06 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

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

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⓮ **Verification**	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform Harness Diagnostic Test in Service ADVISOR. Did 000636.06 reappear active?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

000636.08 — Pump Position Sensor Signal Missing

The ECU does not detect the pump position sensor input.

DN22556,00004E1 –19–30MAY07–1/1

000636.08 — Pump Position Sensor Signal Missing Diagnostic Procedure

Troubleshooting Sequence:
000636.05 or 000636.06
000636.08

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

Related Information:
The ECU does not detect a pump position sensor signal when engine is cranking or running.
This DTC can be caused by an open or shorted circuit in the sensor wiring.

Alarm Level:
Warning

Control Unit Response:
Prolonged cranking time may be required to start the engine.
The ECU will use the crank sensor input to determine camshaft and pump position.
If a crank sensor DTC accompanies 000636.08, the engine cannot be started and will stall if running until at least one of the two codes is repaired.

Additional References:
For more pump position sensor information, see PUMP POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED AND POSITION 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 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.

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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 000636.08 reappear active with engine running or cranking?	**YES:** GO TO ❷ **NO:** GO TO ⓳ – – –1/1
❷ **Check for Open or Shorted Sensor Circuit**	1. Ignition ON, engine OFF. 2. Perform Harness Diagnostic Mode Test in Service ADVISOR. Is 000636.05 or 000636.06 active?	**YES:** Discontinue test for 000636.08 and perform test for 000636.05 or 000636.06. **NO:** GO TO ❸ – – –1/1
❸ **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 pump position sensor connector. 3. Verify pump position sensor installation torque. Was pump position sensor fully threaded into mounting hole?	**YES:** GO TO ❹ **NO:** Torque sensor to specified value. GO TO ⓲ – – –1/1

❹ **Test Sensor Terminals**	1. Ignition OFF, engine OFF. 2. Disconnect pump position sensor. 3. Perform Terminal Test on pump position sensor and connector. Were any problems found?	**YES:** Fix problem. GO TO ⓲ **NO:** GO TO ❺ – – –1/1
❺ **Check Sensor Resistance**	On the pump position sensor, measure the resistance between the signal (B) and return (A). Is the resistance between 2500 ohms and 3500 ohms?	**YES:** Do not reconnect sensor to harness. GO TO ❻ **NO:** Remove pump position sensor. GO TO ⓱ – – –1/1
❻ **Check for Recent Mechanical Repair**	Has an internal engine repair requiring removal of upper idler gear been performed just prior to 000636.08 appearing?	**YES:** GO TO ❼ **NO:** GO TO ❽ – – –1/1
❼ **Inspect Target**	1. Remove pump position sensor. 2. Verify that webs are visible through the pump position sensor mounting hole as engine is rotated. *NOTE: Webs on upper idler gear would not be visible if gear or thrust washer were installed incorrectly.* Are webs on upper idler gear visible?	**YES:** GO TO ❽ **NO:** Fix mechanical problem, GO TO ⓲ – – –1/1
❽ **Test ECU Terminals**	1. Disconnect ECU J1 connector. 2. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO ⓲ **NO:** GO TO ❾ – – –1/1

9 Check Sensor Circuit Resistance	1. On the harness, measure the resistance between ECU pump position sensor signal (J1-A4) and the pump position sensor connector signal (B). 2. On the harness, measure the resistance between ECU pump position sensor return (J1-E4) and the pump position sensor connector return (A). Are both resistance measurements less than 10 ohms?	**YES:** GO TO 10 **NO:** Fix problem. GO TO 18 – – –1/1
10 Check for Wire-to-Wire Short	1. Verify pump position sensor is disconnected. 2. On the harness, measure the resistance between ECU J1 connector pump position sensor signal (J1-A4) and return (J1-E4). Is the resistance greater than 1k ohms?	**YES:** GO TO 11 **NO:** Fix problem.. GO TO 18 – – –1/1
11 Check for Short to Ground of Sensor Signal	On the harness, measure the resistance between ECU J1 connector pump position sensor signal (J1-A4) and single point ground. Is the resistance greater than 1k ohms?	**YES:** GO TO 12 **NO:** Fix problem.. GO TO 18 – – –1/1
12 Check for Wire-to-Wire Short	1. Disconnect ECU J2 connector. 2. On the harness, measure the resistance between the ECU J1 connector pump position sensor signal (J1-A4) and all other terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	**YES:** GO TO 13 **NO:** Fix problem. GO TO 18 – – –1/1
13 Check for Short to Voltage Source	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU J1 connector pump position sensor signal (J1-A4) and single point ground. Is the voltage less than 0.5V?	**YES:** GO TO 14 **NO:** Fix problem. GO TO 18 – – –1/1
14 Replace Pump Position Sensor	Has pump position sensor been replaced during this diagnostic procedure?	**YES:** GO TO 15 **NO:** Remove pump position sensor. GO TO 17 – – –1/1

⓯ Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Download latest ECU payload and reprogram ECU. Did 000636.08 reappear active with engine running?	**YES:** GO TO ⓰ **NO:** Problem fixed. – – –1/1
⓰ Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. Did DTC 000636.08 reappear active with engine running?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1
⓱ Inspect Pump Position Sensor	Examine tip of pump position sensor for damage due to contact with upper idler gear Does sensor appear damaged due to contact with gear?	**YES:** Replace pump position sensor. Determine cause if replacement sensor also becomes damaged. GO TO ⓲ **NO:** Replace pump position sensor. GO TO ⓲ – – –1/1
⓲ Verification	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine ON. Did 000636.08 reappear active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

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

000636.10 — Pump Position Signal Rate of Change Abnormal

The ECU detects an improper pattern on the pump position sensor input.

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000636.10 — Pump Position Sensor Signal Rate of Change Abnormal Diagnostic Procedure

Troubleshooting Sequence:
000636.08
000636.10

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

Related Information:
The ECU detects an improper pattern (pulses missing) on the pump position sensor input.
Inadvertently swapping the pump position sensor harness connector with the crank sensor harness connector may cause this DTC along with 000637.10.
Wiring problems such as loose terminals and water in connectors may also cause this DTC.
A loose crankshaft timing wheel may also cause this DTC.

Alarm Level:
Warning

Control Unit Response:
Prolonged cranking time may be required to start the engine.
The ECU will use the crank sensor input to determine camshaft and pump position.
If a crank sensor DTC accompanies 000636.10, the engine cannot be started and will stall if running until at least one of the two codes is repaired.

Additional References:
For more pump position sensor information, see PUMP POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED AND POSITION 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 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.

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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 000636.10 reappear active with engine running or cranking?	**YES:** GO TO ❷ **NO:** GO TO ㉓ – – –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 000636.05 or 000636.06 now active?	**YES:** Discontinue test for 000636.10 and perform test for 000636.05 or 000636.06. **NO:** GO TO ❸ – – –1/1

❸ **Check for Loose Crank Sensor Timing Wheel**	1. Ignition OFF, engine OFF. 2. Disconnect crank sensor and secure connector away from rotating components. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Attempt to start engine. 6. Operate engine for one minute through rpm range and monitor DTCs, if engine started. 7. Ignition OFF, engine OFF. 8. Reconnect crank sensor. Did engine start and run without generating 000636.10?	**YES:** Crankshaft timing wheel may be loose. Repair per instructions in CTM 104. **NO:** GO TO ❹

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❹ **Check Speed Sensor Data Points**	1. Monitor the following Data Points in Service ADVISOR: • Pump Position Sensor Noise Indicator • Pump Position Sensor Improper Pattern Indicator • Pump Position Sensor Status 2. Operate engine through normal speed and load ranges. 3. Switch ON and OFF any electrical devices on the application. *NOTE: The Pump Position Sensor Noise Indicator has a value of 0 if the pump position signal is good. The value will temporarily increase if noise is detected in the sensor signal. The Pump Position Sensor Improper Pattern Indicator is 0% if recent pump position signal patterns were good. The percentage will increase if errors in the signal pattern are detected and will count down to 0% once the signal pattern is error-free. The Pump Position Sensor Status has a value of 47 with engine speed above 400 rpm if the pump position signal is good. The value will be something other than 47 if a sensor signal problem is detected. These data points can be used to locate intermittent problems with the pump position sensor signal which are too brief to cause a DTC to become active.* *NOTE: Internal Data Monitor in Service ADVISOR may also be used to locate intermittent speed sensor circuit problems. See INTERNAL DATA MONITOR (IDM) earlier in this group for more information on using this feature. Select the data points defined earlier in this step and set sample rate to 5 ms.* Were you able to find some mode of operation or an intermittent wiring problem which causes the Speed Sensor Data Points to indicate a signal problem?	**YES:** Engine wiring problem. Repair problem. GO TO ㉒ **YES:** Some device on application causes the noise. Open DTAC case. **NO:** GO TO ❺

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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 pump position sensor connector. 3. Verify pump position sensor installation torque. Was pump position sensor fully threaded into mounting hole?	**YES:** GO TO ❻ **NO:** Torque sensor to specified value. GO TO ㉒ – – –1/1
❻ **Test Sensor Terminals**	1. Ignition OFF, engine OFF. 2. Perform Terminal Test on pump position sensor and connector. Were any problems found?	**YES:** Fix problem. GO TO ㉒ **NO:** GO TO ❼ – – –1/1
❼ **Inspect Target**	1. Remove pump 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 ❽ – – –1/1
❽ **Inspect Sensor**	Examine tip of pump position sensor for damage due to contact with upper idler gear Does sensor appear damaged due to contact with gear?	**YES:** Replace pump position sensor. Determine cause if replacement sensor also becomes damaged. GO TO ㉒ **NO:** GO TO ❾ – – –1/1

9 Check Sensor Resistance	On the pump position sensor, measure the resistance between the signal (B) and return (A). Is the resistance between 2500 ohms and 3500 ohms?	**YES:** Reinstall pump position sensor. Do not reconnect to harness. GO TO 10 **NO:** Replace pump position sensor. GO TO 22 – – –1/1
10 Test ECU Terminals	1. Disconnect ECU J1 connector. 2. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO 22 **NO:** GO TO 11 – – –1/1
11 Check for Shorted Sensor Return	On the harness, measure the resistance between the ECU connector pump position sensor return (J1-E4) and single point ground. Is the resistance greater than 1k ohms?	**YES:** GO TO 12 **NO:** Fix problem. GO TO 22 – – –1/1
12 Check Sensor Circuit Resistance	*NOTE: Verify that pump position sensor signal and return wires are in the specified connector cavities (not swapped).* 1. On the harness, measure the resistance between ECU pump position sensor signal (J1-A4) and the pump position sensor connector signal (B). 2. On the harness, measure the resistance between ECU pump position sensor return (J1-E4) and the pump position sensor connector return (A). Are both resistance measurements less than 10 ohms?	**YES:** GO TO 13 **NO:** Fix problem. GO TO 22 – – –1/1
13 Check for Intermittent Short Between Signal and Return	1. Verify pump position sensor is disconnected. 2. On the harness, measure the resistance between the ECU connector pump position sensor signal (J1-A4) and the pump position sensor return (J1-E4) while gently moving wire harness. Is resistance greater than 1k ohms?	**YES:** GO TO 14 **NO:** Fix problem. GO TO 22 – – –1/1

14 Test ECU Terminals	1. Disconnect ECU J2 connector. 2. Perform Terminal Test on J2. Examine ECU battery supply (J2-L1), ignition (J2-B2), and ground (J2-L2) terminals carefully. Were any problems found?	**YES:** Fix problem. GO TO 22 **NO:** GO TO 15 – – –1/1
15 Check for Intermittent ECU Power Supply Problem	1. Ignition ON, engine OFF. 2. Measure the voltage from ECU battery supply (J2-L1) to ECU ground (J2-L2) while gently moving wire harness. 3. Measure the voltage from ECU ignition (J2-B2) to ECU ground (J2-L2) while gently moving wire harness. Were any intermittent wiring problems found?	**YES:** Fix problem. GO TO 22 **NO:** GO TO 16 – – –1/1
16 Check for Wire-to-Wire Short	1. Ignition OFF, engine OFF. 2. On the harness, measure the resistance between the ECU J1 connector pump position sensor signal (J1-A4) and all other terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	**YES:** GO TO 17 **NO:** Fix problem. GO TO 22 – – –1/1
17 Check Sensor Resistance at ECU	1. Reconnect pump position sensor connector. 2. On the harness, measure the resistance between ECU J1 connector pump position sensor signal (J1-A4) and return (J1-E4). Is the resistance between 2500 ohms and 3500 ohms?	**YES:** GO TO 18 **NO:** Fix problem. GO TO 22 – – –1/1
18 Inspect Sensor Wiring	Examine pump position sensor wiring between the pump position sensor and the ECU. Check for the following: • Verify that pump position sensor signal and return wires are twisted together throughout the harness. • Verify that no physical damage to pump position sensor signal and ground wires is evident. Were any problems found?	**YES:** Replace pump position sensor wiring with twisted pair or repair problem. GO TO 22 **NO:** GO TO 19 – – –1/1
19 Replace Pump Position Sensor	Has pump position sensor been replaced during this procedure?	**YES:** GO TO 20 **NO:** Replace pump position sensor. GO TO 22 – – –1/1

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⓴ Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reinstall ECU connectors. 3. Download latest ECU payload and reprogram ECU. Did DTC 000636.10 reappear active with engine running?	**YES:** GO TO ㉑ **NO:** Problem fixed. – – –1/1
㉑ Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. Did DTC 000636.10 reappear active with engine running?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1
㉒ Verification	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Refresh DTCs. 6. Operate engine through normal speed and load. Did DTC 000636.10 reappear active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1
㉓ Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	**YES:** Found a possible problem. Repair possible problem. Retest. **YES:** Found operating point at which the code becomes active. Try to determine cause. Repair and retest. **NO:** GO TO ❹ – – –1/1

000637.02 — Crank Sensor Signal Invalid

The ECU detects excessive noise (extra pulses) on the crank sensor input.

DN22556,00004E3 –19–30MAY07–1/1

000637.02 — Crank Position Sensor Signal Invalid Diagnostic Procedure

Troubleshooting Sequence:
000637.08
000637.02

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

Related Information:
The ECU detects extra pulses (electrical noise) in the crank sensor signal.
The extra pulses may be caused by electromagnetic interference or by a sensor signal wire that is shorted to some other signal wire.
Wiring problems such as loose terminals and water in connectors may also cause this DTC.

Alarm Level:
Warning

Control Unit Response:
The ECU will use the pump position sensor input to determine piston position.
Prolonged cranking time may be required to start the engine.
If a pump position sensor DTC accompanies 000637.02, the engine cannot be started and will stall if running until at least one of the two codes is repaired.
Maximum engine power is derated up to 50 percent.

Additional References:
For more crank sensor information, see CRANK POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED AND POSITION 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 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.

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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 000637.02 reappear active with engine running or cranking?	**YES:** GO TO ❷ **NO:** GO TO ⓴

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❷ **Check Speed Sensor Data Points**	1. Monitor the following Data Points in Service ADVISOR: • Crank Position Input Noise Indicator • Crank Improper Pattern Indicator 2. Operate engine through normal speed and load ranges. 3. Switch ON and OFF any electrical devices on the application. *NOTE: The Crank Position Input Noise Indicator has a value of 0 if the crank signal is good. The value will temporarily increase if noise is detected in the sensor signal. The Crank Improper Pattern Indicator is 0 if recent crank sensor signal patterns were good. The value will increase if errors in the signal pattern are detected and will count down to 0 once the signal pattern is error-free. These data points can be used to locate intermittent problems with the crank sensor signal which are too brief to cause a DTC to become active.* *NOTE: Internal Data Monitor in Service ADVISOR may also be used to locate intermittent speed sensor circuit problems. See INTERNAL DATA MONITOR (IDM) earlier in this group for more information on using this feature. Select the data points defined earlier in this step and set sample rate to 5ms.* Were you able to find some mode of operation or an intermittent wiring problem which causes the Speed Sensor Data Points to indicate a signal problem?	**YES:** Engine wiring problem. Repair problem. GO TO ⓳ **YES:** Some device on application causes the noise. Open DTAC case. **NO:** GO TO ❸

– – –1/1

❸ **Test Sensor Terminals**	1. Ignition OFF, engine OFF. 2. Disconnect crank sensor connector. 3. Perform Terminal Test on crank sensor and connector. Were any problems found?	**YES:** Fix problem. GO TO ⓳ **NO:** GO TO ❹ – – –1/1
❹ **Inspect Target**	1. Remove crank sensor. 2. Visually inspect timing wheel teeth for damage or debris as engine is rotated. Were any problems found?	**YES:** Fix problem. GO TO ⓳ **NO:** GO TO ❺ – – –1/1
❺ **Inspect Sensor**	*NOTE: See REMOVE AND INSTALL CRANKSHAFT POSITION SENSOR in Section 02, Group 110 earlier in this manual for sensor replacement instructions.* Examine tip of crank sensor for damage due to contact with timing wheel Does sensor appear damaged due to contact with timing wheel?	**YES:** Replace crank sensor. Determine cause if replacement sensor also becomes damaged. GO TO ⓳ **NO:** GO TO ❻ – – –1/1
❻ **Check Sensor Resistance**	On the crank sensor, measure the resistance between the signal (A) and return (B). Is the resistance between 2500 ohms and 3500 ohms?	**YES:** Reinstall crank sensor. Do not reconnect to harness. GO TO ❼ **NO:** Replace crank sensor. GO TO ⓳ – – –1/1
❼ **Test ECU Terminals**	1. Disconnect ECU J1 connector. 2. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO ⓳ **NO:** GO TO ❽ – – –1/1
❽ **Check for Shorted Sensor Return**	On the harness, measure the resistance between the ECU connector crank sensor return (J1-D4) and single point ground. Is the resistance greater than 1k ohms?	**YES:** GO TO ❾ **NO:** Fix problem. GO TO ⓳ – – –1/1

9 Check Sensor Circuit Resistance	*NOTE: Verify that crank sensor signal and return wires are in the specified connector cavities (not swapped).* 1. On the harness, measure the resistance between ECU crank sensor signal (J1-B4) and the crank sensor connector signal (A). 2. On the harness, measure the resistance between ECU crank sensor return (J1-D4) and the crank sensor connector return (B). Are both resistance measurements less than 10 ohms?	**YES:** GO TO 10 **NO:** Fix problem. GO TO 19 – – –1/1
10 Test ECU Terminals	1. Disconnect ECU J2 connector. 2. Perform Terminal Test on J2. Examine ECU battery supply (J2-L1), ignition (J2-B2), and ground (J2-L2) terminals carefully. Were any problems found?	**YES:** Fix problem. GO TO 19 **NO:** GO TO 11 – – –1/1
11 Check for Intermittent ECU Power Supply Problem	1. Ignition ON, engine OFF. 2. Measure the voltage from ECU battery supply (J2-L1) to ECU ground (J2-L2) while gently moving wire harness. 3. Measure the voltage from ECU ignition (J2-B2) to ECU ground (J2-L2) while gently moving wire harness. Were any intermittent wiring problems found?	**YES:** Fix problem. GO TO 19 **NO:** GO TO 12 – – –1/1
12 Check for Wire-to-Wire Short	1. Ignition OFF, engine OFF. 2. On the harness, measure the resistance between the ECU J1 connector crank sensor signal (J1-B4) and all other terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	**YES:** GO TO 13 **NO:** Fix problem. GO TO 19 – – –1/1
13 Check Sensor Wiring	Examine crank sensor wiring between the crank sensor and the ECU. Check for the following: • Verify that crank sensor signal and return wires are twisted together throughout the harness. • Verify that no physical damage to crank sensor signal and return wires is evident. Were any problems found?	**YES:** Replace crank sensor wiring with twisted pair or repair problem. GO TO 19 **NO:** GO TO 14 – – –1/1

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⓮ Check Wire Harness Routing	Examine routing of crank sensor wiring between crank sensor and ECU. Is crank sensor wiring routed near sources of strong electric or magnetic fields such as 2-way radio antenna, alternator, inverter, a.c. generator, or other similar device on the application?	**YES:** Reroute crank sensor wires away from device. GO TO ⓳ **NO:** GO TO ⓯ – – –1/1
⓯ Check for Alternator Noise	1. Disconnect negative battery cable. 2. Disconnect alternator positive output cable and insulate cable terminal. 3. Disconnect all other alternator connectors. 4. Reconnect negative battery cable. 5. Reconnect ECU and sensor connectors. 6. Ignition ON, engine ON. Did DTC 000637.02 reappear active with engine running?	**YES:** GO TO ⓰ **NO:** Repair alternator problem. GO TO ⓳ – – –1/1
⓰ Replace Crank Position Sensor	Has crank sensor been replaced during this procedure?	**YES:** GO TO ⓱ **NO:** Replace crank sensor. GO TO ⓳ – – –1/1
⓱ Reprogram ECU	Download latest ECU payload and reprogram ECU. Did DTC 000637.02 reappear active with engine running?	**YES:** GO TO ⓲ **NO:** Problem fixed. – – –1/1
⓲ Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. Did DTC 000637.02 reappear active with engine running?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1
⓳ Verification	1. Ignition OFF, engine OFF. 2. Reconnect all connectors (disconnect battery negative cable prior to reinstalling alternator positive cable, if applicable). 3. Ignition ON, engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Refresh DTCs. 6. Operate engine through normal speed and load. Did DTC 000637.02 reappear active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

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

000637.05 — Crank Sensor Circuit Has High Resistance

The ECU detects high resistance in the crank sensor circuit.

DN22556,00004E4 –19–29MAY07–1/1

000637.05 — Crank Sensor Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:
000637.05

Related Information:
The ECU detects high resistance or an open circuit in the crank sensor circuit during the Harness Diagnostic Mode Test in Service ADVISOR.

Alarm Level:
Warning

Control Unit Response:
DTC 000637.08 may also be active when engine is running.

Additional References:
For more crank sensor information, see CRANK POSITION SENSOR in Section 03, Group 140 earlier in this manual.
For more information on speed sensors, see MEASURING SPEED AND POSITION 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 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.

❶ **Test Sensor Terminals**	1. Ignition OFF, engine OFF. 2. Disconnect crank sensor. 3. Perform Terminal Test on crank sensor and connector. Were any problems found?	**YES:** Fix problem. GO TO ⓬ **NO:** GO TO ❷ – – –1/1
❷ **Check Sensor Resistance**	On the crank sensor, measure the resistance between the signal (A) and return (B). Is the resistance between 2500 ohms and 3500 ohms?	**YES:** GO TO ❸ **NO:** Remove crank sensor. GO TO ⓫ – – –1/1
❸ **Test ECU Terminals**	1. Disconnect ECU J1 connector. 2. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO ⓬ **NO:** GO TO ❹ – – –1/1
❹ **Check Sensor Circuit Resistance**	1. On the harness, measure the resistance between ECU crank sensor signal (J1-B4) and the crank sensor connector signal (A). 2. On the harness, measure the resistance between ECU crank sensor return (J1-D4) and the crank sensor connector return (B). Are both resistance measurements less than 10 ohms?	**YES:** GO TO ❺ **NO:** Fix problem. GO TO ⓬ – – –1/1
❺ **Check for Wire-to-Wire Short**	1. Disconnect ECU J2 connector. 2. On the harness, measure the resistance between the ECU J1 connector crank sensor signal (J1-B4) and all other terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	**YES:** GO TO ❻ **NO:** Fix problem. GO TO ⓬ – – –1/1
❻ **Check for Short to Voltage**	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU J1 connector crank sensor signal (J1-B4) and single point ground. Is voltage less than 0.5V?	**YES:** GO TO ❼ **NO:** Fix problem. GO TO ⓬ – – –1/1

❼ **Check for Intermittent Open Circuit**	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform Harness Diagnostic Test in Service ADVISOR. Did 000637.05 reappear active?	**YES:** GO TO ❽ **NO:** Recheck for intermittent open circuit. GO TO ❶ – – –1/1
❽ **Replace Crank Sensor**	Has crank sensor been replaced during this diagnostic procedure?	**YES:** GO TO ❾ **NO:** Remove crank sensor. GO TO ⓫ – – –1/1
❾ **Reprogram ECU**	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine OFF. 3. Perform Harness Diagnostic Test in Service ADVISOR. Did 000637.05 reappear active?	**YES:** GO TO ❿ **NO:** Problem fixed. – – –1/1
❿ **Replace ECU**	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Perform Harness Diagnostic Test in Service ADVISOR. Did 000637.05 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

⓫ **Inspect Crank Sensor**	Examine tip of crank sensor for damage due to contact with timing wheel Does sensor appear damaged due to contact with timing wheel?	**YES:** Replace crank sensor. Determine cause if replacement sensor also becomes damaged. GO TO ⓬ **NO:** Replace crank sensor. GO TO ⓬

– – –1/1

⓬ **Verification**	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform Harness Diagnostic Test in Service ADVISOR. Did 000637.05 reappear active?	**YES:** GO TO ❶ **NO:** Problem fixed.

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000637.06 — Crank Sensor Circuit Has Low Resistance

The ECU detects low resistance in the crank sensor circuit.

JB81757,0000005 –19–29MAY07–1/1

000637.06 — Crank Sensor Circuit Has Low Resistance Diagnostic Procedure

Troubleshooting Sequence:
000637.06

Related Information:
The ECU detects low resistance or a short to ground in the crank sensor circuit during the Harness Diagnostic Mode Test in Service ADVISOR.

Alarm Level:
Warning

Control Unit Response:
DTC 000637.08 may also be active when engine is running.

Additional References:
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For more crank sensor information, see CRANK POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED AND POSITION 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 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.

❶ **Check for DTC Change with Sensor Disconnected**	1. Ignition ON, engine OFF. 2. Disconnect crank sensor connector. 3. Perform Harness Diagnostic Mode Test in Service ADVISOR. Is 000637.05 now an active DTC?	**YES:** Remove crank sensor. GO TO ⓭ **NO:** GO TO ❷ – – –1/1
❷ **Test Sensor Terminals**	1. Ignition OFF, engine OFF. 2. Disconnect crank sensor. 3. Perform Terminal Test on crank sensor and connector. Were any problems found?	**YES:** Fix problem. GO TO ⓮ **NO:** GO TO ❸ – – –1/1
❸ **Check Sensor Resistance**	On the crank sensor, measure the resistance between the signal (A) and return (B). Is the resistance between 2500 ohms and 3500 ohms?	**YES:** Do not reconnect sensor to harness. GO TO ❹ **NO:** Remove crank sensor. GO TO ⓭ – – –1/1
❹ **Test ECU Terminals**	1. Disconnect ECU J1 connector. 2. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO ⓮ **NO:** GO TO ❺ – – –1/1
❺ **Check Sensor Circuit Resistance**	1. On the harness, measure the resistance between ECU crank sensor signal (J1-B4) and the crank sensor connector signal (A). 2. On the harness, measure the resistance between ECU crank sensor return (J1-D4) and the crank sensor connector return (B). Are both resistance measurements less than 10 ohms?	**YES:** GO TO ❻ **NO:** Fix problem. GO TO ⓮ – – –1/1

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❻ Check for Wire-to-Wire Short	1. Verify crank sensor is disconnected. 2. On the harness, measure the resistance between ECU J1 connector crank sensor signal (J1-B4) and return (J1-D4). Is the resistance greater than 1k ohms?	**YES:** GO TO ❼ **NO:** Fix problem. GO TO ⓮ – – –1/1
❼ Check for Short to Ground of Sensor Signal	On the harness, measure the resistance between ECU J1 connector crank sensor signal (J1-B4) and single point ground. Is the resistance greater than 1k ohms?	**YES:** GO TO ❽ **NO:** Fix problem. GO TO ⓮ – – –1/1
❽ Check for Wire-to-Wire Short	1. Disconnect ECU J2 connector. 2. On the harness, measure the resistance between the ECU J1 connector crank sensor signal (J1-B4) and all other terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	**YES:** GO TO ❾ **NO:** Fix problem. GO TO ⓮ – – –1/1
❾ Check for Intermittent Shorted Circuit	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform Harness Diagnostic Test in Service ADVISOR. Did 000637.06 reappear as active?	**YES:** GO TO ❿ **NO:** Recheck for intermittent shorted circuit. GO TO ❶ – – –1/1
❿ Replace Crank Sensor	Has crank sensor been replaced during this diagnostic procedure?	**YES:** GO TO ⓫ **NO:** Remove crank sensor. GO TO ⓭ – – –1/1
⓫ Reprogram ECU	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine OFF. 3. Perform Harness Diagnostic Test in Service ADVISOR. Did 000637.06 reappear active?	**YES:** GO TO ⓬ **NO:** Problem fixed. GO TO ⓮ – – –1/1

⓬ **Replace ECU**	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Perform Harness Diagnostic Test in Service ADVISOR. Did 000637.06 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

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

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⓮ **Verification**	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform Harness Diagnostic Test in Service ADVISOR. Did 000637.06 reappear active?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

000637.07 — Crank and Pump Position Signals Out of Sync

The ECU detects that the pump position and crank sensor inputs are not in sync with each other.

DN22556,00004E6 –19–30MAY07–1/1

000637.07 — Crank and Pump Position Signals Out of Sync Diagnostic Procedure

Troubleshooting Sequence:
000636.08 or 000637.08
000636.10, 000637.10, 000636.02 or 000637.02
000637.07

When DTC is Displayed:
The engine is running above 400 rpm and the error condition is active.

Related Information:
The ECU detects that the pump position sensor signal is not correctly timed relative to the crank sensor signal. This DTC may be caused by incorrect upper idler gear timing or by a damaged timing wheel.
Wiring problems such as loose terminals or water in connectors may also cause this DTC to be active intermittently.

Alarm Level:
Warning

Control Unit Response:
Prolonged cranking time may be required to start the engine.

Additional References:
For more crank sensor information, see CRANK POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more pump position sensor information, see PUMP POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED AND POSITION 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 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: 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.

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 engine. 5. Refresh DTCs. Did 000637.07 reappear active with engine running?	**YES:** GO TO ❷ **NO:** GO TO ⓯ – – –1/1

❷ **Check for Recent Mechanical Repair**	Has an internal engine repair requiring timing gear removal been performed just prior to DTC 000637.07 appearing and does the DTC reappear repeatedly after refreshing active DTCs with engine running?	**YES:** Check crankshaft to upper idler gear timing. GO TO ⓮ **NO:** GO TO ❸ – – –1/1

❸ **Check for Loose Crank Sensor Timing Wheel**	1. Ignition OFF, engine OFF. 2. Disconnect crank sensor and secure connector away from rotating components. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Attempt to start engine. 6. Operate engine for one minute through rpm range and monitor DTCs, if engine started. 7. Ignition OFF, engine OFF. 8. Reconnect crank sensor. Did engine start, run, and have good performance?	**YES:** Crankshaft timing wheel may be loose. Repair per instructions in CTM 104. **NO:** GO TO ❹ – – –1/1

❹ **Check Speed Sensor Data Points**	1. Monitor the following Data Points in Service ADVISOR: • Pump Position Sensor Noise Indicator • Pump Position Sensor Improper Pattern Indicator • Crank Position Input Noise Indicator • Crank Improper Pattern Indicator 2. Operate engine through normal speed and load ranges. 3. Switch ON and OFF any electrical devices on the application. *NOTE: The Crank Position Input Noise Indicator and Pump Position Sensor Noise Indicator have a value of 0 if the signal is good. The value will temporarily increase if noise is detected in the sensor signal. The Crank Improper Pattern Indicator and Pump Position Sensor Improper Pattern Indicator are 0 if recent sensor signal patterns were good. The value will increase if errors in the signal pattern are detected and will count down to 0 once the signal pattern is error-free. These data points can be used to locate intermittent problems with the crank sensor signal which are too brief to cause a DTC to become active.* *NOTE: Internal Data Monitor in Service ADVISOR may also be used to locate intermittent speed sensor circuit problems. See INTERNAL DATA MONITOR (IDM) earlier in this group for more information on using this feature. Select the data points defined earlier in this step and set sample rate to 5 ms.* Were you able to find some mode of operation or an intermittent wiring problem which causes the Speed Sensor Data Points to indicate a signal problem?	**YES:** Engine wiring problem. Repair problem. GO TO ⓮ **YES:** Some device on application causes the noise. Open DTAC case. **NO:** GO TO ❺ – – –1/1
❺ **Test Crank Sensor Terminals**	1. Ignition OFF, engine OFF. 2. Disconnect crank sensor. 3. Perform Terminal Test on crank sensor and connector. Were any problems found?	**YES:** Fix problem. GO TO ⓮ **NO:** GO TO ❻ – – –1/1
❻ **Test Pump Position Sensor Terminals**	1. Ignition OFF, engine OFF. 2. Disconnect pump position sensor. 3. Perform Terminal Test on pump position sensor and connector. Were any problems found?	**YES:** Fix problem. GO TO ⓮ **NO:** GO TO ❼ – – –1/1

❼ Test ECU Terminals	1. Disconnect ECU J1 connector. 2. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO ⓮ **NO:** GO TO ❽ – – –1/1

❽ Check Pump Position Sensor Circuit Resistance	*NOTE: Verify that pump position sensor signal and return wires are in the specified connector cavities (not swapped).* 1. On the harness, measure the resistance between ECU pump position sensor signal (J1-A4) and the pump position sensor connector signal (B). 2. On the harness, measure the resistance between ECU pump position sensor return (J1-E4) and the pump position sensor connector return (A). Are both resistance measurements less than 10 ohms?	**YES:** GO TO ❾ **NO:** Fix problem. GO TO ⓮ – – –1/1

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❾ Check Crank Position Sensor Circuit Resistance	*NOTE: Verify that crank sensor signal and return wires are in the specified connector cavities (not swapped).* 1. On the harness, measure the resistance between ECU crank sensor signal (J1-B4) and the crank sensor connector signal (A). 2. On the harness, measure the resistance between ECU crank sensor return (J1-D4) and the crank sensor connector return (B). Are both resistance measurements less than 10 ohms?	**YES:** GO TO ❿ **NO:** Fix problem. GO TO ⓮ – – –1/1

❿ Check for Intermittent Short Between Signal and Return	1. Crank sensor and pump position sensors are disconnected. 2. On the harness, measure the resistance between the ECU connector crank sensor signal (J1-B4) and the crank sensor return (J1-D4) while gently moving harness. 3. On the harness, measure the resistance between the ECU connector pump position sensor signal (J1-A4) and the pump position sensor return (J1-E4) while gently moving harness. Is resistance greater than 1k ohms?	**YES:** GO TO ⓫ **NO:** Fix problem. GO TO ⓮ – – –1/1

⓫ Check for Intermittent Short Between Signal and Ground	1. Crank sensor and pump position sensors are disconnected. 2. On the harness, measure the resistance between the ECU connector crank sensor signal (J1-B4) and single point ground while gently moving harness. 3. On the harness, measure the resistance between the ECU connector pump position sensor signal (J1-A4) and single point ground while gently moving harness . Is resistance greater than 1k ohms?	**YES:** GO TO ⓬ **NO:** Fix problem. GO TO ⓮ – – –1/1
⓬ Reprogram ECU	1. Reinstall all connectors. 2. Download latest ECU payload and reprogram ECU. Did 000637.07 reappear active with engine running?	**YES:** GO TO ⓭ **NO:** Problem fixed. – – –1/1
⓭ Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. Did 000637.07 reappear active with engine running?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1
⓮ Verification	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Refresh DTCs. 6. Operate engine through normal speed and load. Did 000637.07 reappear active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1
⓯ Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	**YES:** Found a possible problem. Repair possible problem. Retest. **YES:** Found operating point at which the code becomes active. Try to determine cause. Repair and retest. **NO:** GO TO ❹ – – –1/1

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000637.08 — Crank Sensor Signal Missing

The ECU does not detect the crank sensor input.

DN22556,00004E7 –19–30MAY07–1/1

000637.08 — Crank Sensor Signal Missing Diagnostic Procedure

Troubleshooting Sequence:
000637.05 or 000637.06
000637.08

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

Related Information:
The ECU does not detect a crank sensor signal when engine is cranking or running.
This DTC can be caused by an open or shorted circuit in the sensor wiring.

Alarm Level:
Warning

Control Unit Response:
The ECU will use the pump position sensor input to determine piston position.
Prolonged cranking time may be required to start the engine.
If a pump position sensor DTC accompanies 000637.08, the engine cannot be started and will stall if running until at least one of the two codes is repaired.
Maximum engine power is derated up to 50 percent.

Additional References:
For more crank sensor information, see CRANK POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED AND POSITION 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 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.

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 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 ❷ **NO:** GO TO ⓳ – – –1/1

❷ **Check for Open or Shorted Sensor Circuit**	1. Ignition ON, engine OFF. 2. Perform Harness Diagnostic Mode Test in Service ADVISOR. Is DTC 000637.05 or 000637.06 now an active DTC?	**YES:** Discontinue test for 000637.08 and perform test for 000637.05 or 000637.06. **NO:** GO TO ❸ – – –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 crank sensor connector. 3. Verify crank sensor installation torque. Was crank sensor fully threaded into mounting hole?	**YES:** GO TO ❹ **NO:** Torque sensor to specified value. GO TO ⓲ – – –1/1

❹ **Test Sensor Terminals**	1. Ignition OFF, engine OFF. 2. Disconnect crank sensor. 3. Perform Terminal Test on crank sensor and connector. Were any problems found?	**YES:** Fix problem. GO TO ⓲ **NO:** GO TO ❺ – – –1/1
❺ **Check Sensor Resistance**	On the crank sensor, measure the resistance between the signal (A) and return (B). Is the resistance between 2500 ohms and 3500 ohms?	**YES:** Do not reconnect sensor to harness. GO TO ❻ **NO:** Remove crank sensor. GO TO ⓱ – – –1/1
❻ **Check for Recent Mechanical Repair**	Has an internal engine repair requiring removal of timing wheel been performed just prior to DTC 000637.08 appearing?	**YES:** GO TO ❼ **NO:** GO TO ❽ – – –1/1
❼ **Inspect Target**	1. Remove crank sensor. 2. Verify that timing wheel teeth are visible through the crank sensor mounting hole as engine is barred. Are teeth on timing wheel visible?	**YES:** GO TO ❽ **NO:** Fix mechanical problem, GO TO ⓲ – – –1/1
❽ **Test ECU Terminals**	1. Disconnect ECU J1 connector. 2. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO ⓲ **NO:** GO TO ❾ – – –1/1
❾ **Check Sensor Circuit Resistance**	1. On the harness, measure the resistance between ECU crank sensor signal (J1-B4) and the crank sensor connector signal (A). 2. On the harness, measure the resistance between ECU crank sensor return (J1-D4) and the crank sensor connector return (B). Are both resistance measurements less than 10 ohms?	**YES:** GO TO ⓾ **NO:** Fix problem. GO TO ⓲ – – –1/1

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⑩ **Check for Wire-to-Wire Short**	1. Verify crank sensor is disconnected. 2. On the harness, measure the resistance between ECU J1 connector crank sensor signal (J1-B4) and return (J1-D4). Is the resistance greater than 1k ohms?	**YES:** GO TO ⑪ **NO:** Fix problem. GO TO ⑱ – – –1/1
⑪ **Check for Short to Ground of Signal**	On the harness, measure the resistance between ECU J1 connector crank sensor signal (J1-B4) and single point ground. Is the resistance greater than 1k ohms?	**YES:** GO TO ⑫ **NO:** Fix problem. GO TO ⑱ – – –1/1
⑫ **Check for Wire-to-Wire Short**	1. Disconnect ECU J2 connector. 2. On the harness, measure the resistance between the ECU J1 connector crank sensor signal (J1-B4) and all other terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	**YES:** GO TO ⑬ **NO:** Fix problem. GO TO ⑱ – – –1/1
⑬ **Check for Short to Voltage Source**	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU J1 connector crank sensor signal (J1-B4) and single point ground. Is the voltage less than 0.5V?	**YES:** GO TO ⑭ **NO:** Fix problem. GO TO ⑱ – – –1/1
⑭ **Replace Crank Sensor**	Has crank sensor been replaced during this diagnostic procedure?	**YES:** GO TO ⑮ **NO:** Remove crank sensor. GO TO ⑰ – – –1/1
⑮ **Reprogram ECU**	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Download latest ECU payload and reprogram ECU. Did DTC 000637.08 reappear active with engine running?	**YES:** GO TO ⑯ **NO:** Problem fixed. – – –1/1
⑯ **Replace ECU**	1. Ignition OFF, engine OFF. 2. Replace ECU. Did DTC 000637.08 reappear active with engine running?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

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

⓲ Verification	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine ON. Did DTC 000637.08 reappear active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

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

000637.10 — Crank Signal Rate of Change Abnormal

The ECU detects an improper pattern on the crank sensor input.

DN22556,00004E8 –19–30MAY07–1/1

000637.10 — Crank Sensor Signal Rate of Change Abnormal Diagnostic Procedure

Troubleshooting Sequence:
000637.08
000637.10

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

Related Information:
The ECU detects an improper pattern (pulses missing) on the crank sensor input.
Swapping the pump position sensor harness connector with the crank position sensor harness connector may cause this DTC along with 000636.10.
Wiring problems such as loose terminals and water in connectors may also cause this DTC.

Alarm Level:
Warning

Control Unit Response:
Prolonged cranking time may be required to start the engine.
The ECU will use the pump position sensor input to determine piston position.
If a pump position sensor DTC accompanies 000637.10, the engine cannot be started and will stall if running until at least one of the two codes is repaired.
Maximum engine power is derated up to 50 percent.

Additional References:
For more crank sensor information, see CRANK POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED AND POSITION 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 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.

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 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 000637.10 reappear active with engine running or cranking?	**YES:** GO TO ❷ **NO:** GO TO ㉒ – – –1/1

❷ **Check for Open or Shorted Sensor Circuit**	1. Ignition ON, engine OFF. 2. Perform Harness Diagnostic Mode Test in Service ADVISOR. Is DTC 000637.05 or 000637.06 now an active DTC?	**YES:** Discontinue test for 000637.10 and perform test for 000637.05 or 000637.06. **NO:** GO TO ❸ – – –1/1

❸ **Check Speed Sensor Data Points**	1. Monitor the following Data Points in Service ADVISOR: • Crank Position Input Noise Indicator • Crank Improper Pattern Indicator 2. Operate engine through normal speed and load ranges. 3. Switch ON and OFF any electrical device on the application. *NOTE: The Crank Position Input Noise Indicator has a value of 0 if the crank signal is good. The value will temporarily increase if noise is detected in the sensor signal. The Crank Improper Pattern Indicator is 0 if recent crank sensor signal patterns were good. The value will increase if errors in the signal pattern are detected and will count down to 0 once the signal pattern is error-free. These data points can be used to locate intermittent problems with the crank sensor signal which are too brief to cause a DTC to become active.* *NOTE: Internal Data Monitor in Service ADVISOR may also be used to locate intermittent speed sensor circuit problems. See INTERNAL DATA MONITOR (IDM) earlier in this group for more information on using this feature. Select the data points defined earlier in this step and set sample rate to 5 ms.* Were you able to find some mode of operation or an intermittent wiring problem which causes the Speed Sensor Data Points to indicate a signal problem?	**YES:** Engine wiring problem. Repair problem. GO TO ㉑ **YES:** Some device on application causes the noise. Open DTAC case. **NO:** GO TO ❹ – – –1/1
❹ **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 crank sensor connector. 3. Verify crank sensor installation torque. Was crank sensor fully threaded into mounting hole?	**YES:** GO TO ❺ **NO:** Torque sensor to specified value. GO TO ㉑ – – –1/1
❺ **Test Sensor Terminals**	1. Ignition OFF, engine OFF. 2. Perform Terminal Test on crank sensor and connector. Were any problems found?	**YES:** Fix problem. GO TO ㉑ **NO:** GO TO ❻ – – –1/1
❻ **Inspect Target**	1. Remove crank sensor. 2. Visually inspect timing wheel teeth for damage or debris as engine is rotated. Were any problems found?	**YES:** Fix problem. GO TO ㉑ **NO:** GO TO ❼ – – –1/1

❼ **Inspect Sensor**	Examine tip of crank sensor for damage due to contact with timing wheel Does sensor appear damaged due to contact with timing wheel?	**YES:** Replace crank sensor. Determine cause if replacement sensor also becomes damaged. GO TO ㉑ **NO:** GO TO ❽ – – –1/1
❽ **Check Sensor Resistance**	On the crank sensor, measure the resistance between the signal (A) and return (B). Is the resistance between 2500 ohms and 3500 ohms?	**YES:** Reinstall crank sensor. Do not reconnect to harness. GO TO ❾ **NO:** Replace crank sensor. GO TO ㉑ – – –1/1
❾ **Test ECU Terminals**	1. Disconnect ECU J1 connector. 2. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO ㉑ **NO:** GO TO ❿ – – –1/1
❿ **Check for Shorted Sensor Return**	On the harness, measure the resistance between the ECU connector crank sensor return (J1-D4) and single point ground. Is the resistance greater than 1k ohms?	**YES:** GO TO ⓫ **NO:** Fix problem. GO TO ㉑ – – –1/1
⓫ **Check Sensor Circuit Resistance**	*NOTE: Verify that crank sensor signal and return wires are in the specified connector cavities (not swapped).* 1. On the harness, measure the resistance between ECU crank sensor signal (J1-B4) and the crank sensor connector signal (A). 2. On the harness, measure the resistance between ECU crank sensor return (J1-D4) and the crank sensor connector return (B). Are both resistance measurements less than 10 ohms?	**YES:** GO TO ⓬ **NO:** Fix problem. GO TO ㉑ – – –1/1
⓬ **Check for Intermittent Short Between Signal and Return**	1. Verify crank sensor is disconnected. 2. On the harness, measure the resistance between the ECU connector crank sensor signal (J1-B4) and the crank sensor return (J1-D4). Is resistance greater than 1k ohms?	**YES:** GO TO ⓭ **NO:** Fix problem. GO TO ㉑ – – –1/1

13 Test Terminals	1. Disconnect ECU J2 connector. 2. Perform Terminal Test on J2. Examine ECU battery supply (J2-L1), ignition (J2-B2), and ground (J2-L2) terminals carefully. Were any problems found?	**YES:** Fix problem. GO TO 21 **NO:** GO TO 14 – – –1/1
14 Check for Intermittent ECU Power Supply Problem	1. Ignition ON, engine OFF. 2. Measure the voltage from ECU battery supply (J2-L1) to ECU ground (J2-L2) while gently moving wire harness. 3. Measure the voltage from ECU ignition (J2-B2) to ECU ground (J2-L2) while gently moving wire harness. Were any intermittent wiring problems found?	**YES:** Fix problem. GO TO 21 **NO:** GO TO 15 – – –1/1
15 Check for Wire-to-Wire Short	1. Ignition OFF, engine OFF. 2. On the harness, measure the resistance between the ECU J1 connector crank sensor signal (J1-B4) and all other terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	**YES:** GO TO 16 **NO:** Fix problem. GO TO 21 – – –1/1
16 Check Sensor Resistance at ECU	1. Reconnect crank sensor connector. 2. On the harness, measure the resistance between ECU J1 connector crank sensor signal (J1-B4) and return (J1-D4). Is the resistance between 2500 ohms and 3500 ohms?	**YES:** GO TO 17 **NO:** Fix problem. GO TO 21 – – –1/1
17 Inspect Crank Sensor Wiring	Examine crank sensor wiring between the crank sensor and the ECU. Check for the following: • Verify that crank sensor signal and return wires are twisted together throughout the harness. • Verify that no physical damage to crank sensor signal and return wires is evident. Were any problems found?	**YES:** Replace crank sensor wiring with twisted pair or repair problem. GO TO 21 **NO:** GO TO 18 – – –1/1
18 Replace Crank Sensor	Has crank sensor been replaced during this procedure?	**YES:** GO TO 19 **NO:** Replace crank sensor. GO TO 21 – – –1/1

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⓳ Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reinstall ECU connectors. 3. Download latest ECU payload and reprogram ECU. Did DTC 000637.10 reappear active with engine running?	**YES:** GO TO ⓴ **NO:** Problem fixed. – – –1/1
⓴ Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. Did DTC 000637.10 reappear active with engine running?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1
㉑ Verification	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Refresh DTCs. 6. Operate engine through normal speed and load. Did DTC 000637.10 reappear as active with engine running?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1
㉒ Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	**YES:** Found a possible problem. Repair possible problem. Retest. **YES:** Found operating point at which the code becomes active. Try to determine cause. Repair and retest. **NO:** GO TO ❸ – – –1/1

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000651.02 — Injector #1 Part Number Invalid

The ECU detects an incorrect injector part number was installed or calibrated into cylinder #1.

DN22556,00004EF –19–23MAY07–1/1

000651.02 — Injector #1 Part Number Invalid Diagnostic Procedure

Troubleshooting Sequence:
000651.02

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to run the engine normally.

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 ❷ **NO:** GO TO ❽

– – –1/1

❷ **Part Number Check**	1. Select Injector Calibration in Service ADVISOR. 2. Check the part number on the injector data sheet against the one displayed. Are the part numbers the same?	**YES:** GO TO ❸ **NO:** GO TO ❹ – – –1/1
❸ **Part Verification**	Verify with parts department that the injector that was installed is the correct one for the application. Is the injector the correct one?	**YES:** GO TO ❺ **NO:** Remove injector and order proper injector. – – –1/1
❹ **Physical Verification of Part Number**	1. Remove injector from engine, see REMOVE ELECTRONIC INJECTOR (EI) in Section 2 Group 090 earlier in this manual. 2. Compare the inscribed part number against the datasheet and ordered injector. Is the injector the proper one for the application?	**YES:** Start a DTAC case. **NO:** Remove injector and order proper one. – – –1/1
❺ **Input Injector Data Again**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000651.02 active?	**YES:** GO TO ❻ **NO:** Problem fixed, return application to service. – – –1/1
❻ **ECU Programming Check**	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO ❼ **NO:** Check payload and try again. – – –1/1

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❼ **Input Injector Data Again**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000651.02 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, return application to service. – – –1/1

❽ **Automatic Input of Injector Data**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000651.02 active?	**YES:** GO TO ❾ **NO:** Problem fixed, return application to service. – – –1/1

❾ **Download Injector Calibration File**	Download a new injector calibration file, see DOWNLOADING INJECTOR CALIBRATION FILES earlier in this Group. Were you able to get a new file?	**YES:** GO TO ❿ **NO:** Contact John Deere Custom Performance. – – –1/1

⑩ **Automatic Input of Injector Data**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000651.02 active?	**YES:** GO TO ⑪ **NO:** Problem fixed, return application to service. – – –1/1

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⑪ **ECU Programming Check**	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO ⑫ **NO:** Check payload and try again. – – –1/1

⑫ **Automatic Input of Injector Data**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000651.02 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, return application to service. – – –1/1

000651.05 — Injector #1 Circuit Has High Resistance

The ECU detects high resistance in the cylinder #1 electronic injector circuit.

DN22556,00004F0 –19–30MAY07–1/1

000651.05 — Injector #1 Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:
000627.01
000651.05

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

Related Information:
The ECU detects high resistance in the cylinder #1 electronic injector circuit.
The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.
The ECU switches the low side (ground) to control each individual injector.
This DTC can be caused by an open circuit or by a few ohms of additional series resistance anywhere in the injector #1 circuit.
An open circuit in the injector high voltage supply may also cause active DTCs indicating high resistance in this and other injector circuits.

Alarm Level:
Warning

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

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

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

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

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

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

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 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 ❷ **NO:** GO TO ❿ – – –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 8-way injector connector between engine harness and injector harness. Do not remove the injector heat shield. 3. Perform Terminal Test on engine harness and injector harness 8-way connectors. Were any problems found?	**YES:** Fix problem. GO TO ❾ **NO:** GO TO ❸ – – –1/1
❸ **Check Injector Harness Resistance**	On the injector harness (male pin terminals), measure the resistance between injector high voltage supply (terminal 7) and injector #1 low side control (terminal 1). Is resistance less than 2 ohms?	**YES:** GO TO ❺ **NO:** GO TO ❹ – – –1/1

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❹ **Check Injector Coil Resistance**	*NOTE: See REMOVE ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for connector dust cap removal instructions.* 1. Remove injector heat shield. 2. Inspect injector harness for damage. 3. Remove injector #1 connector dust cap. Do not remove terminals from injector. 4. On the injector, measure the resistance between the two injector studs. *NOTE: Contact injector studs or injector harness terminals with meter test leads for this measurement, not terminal nuts. Terminal nuts are installed with thread locking agent which may affect the resistance measurement.* Is the resistance less than 2 ohms?	**YES:** Replace injector wire harness. GO TO ❾ **NO:** Replace injector. GO TO ❾ – – –1/1

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❺ **ECU Terminal Test**	1. Disconnect ECU J1 connector. 2. Perform Terminal Test on J1 connector. Were any problems found?	**YES:** Fix problem. GO TO ❾ **NO:** GO TO ❻ – – –1/1

❻ **Check Engine Harness Resistance**	1. On the harness, measure the resistance between the ECU injector #1 control (terminal J1-E1) and the injector harness 8-way connector (terminal 1).. 2. On the harness, measure the resistance between the ECU high voltage supply (terminal J1-G1) and the injector harness 8-way connector (terminal 7). Are both resistance readings less than 2 ohms?	**YES:** GO TO ❼ **NO:** Fix problem. GO TO ❾ – – –1/1

❼ **Reprogram ECU**	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 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 000651.05 reappear active?	**YES:** GO TO ❽ **NO:** Problem fixed. – – –1/1

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❽ **Replace ECU**	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform Harness Diagnostic Mode Test in Service ADVISOR. Did DTC 000651.05 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

❾ **Verification**	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform Harness Diagnostic Mode Test in Service ADVISOR. Did DTC 000651.05 reappear active?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

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

⑪ **Engine Error Operating Point Test**	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000651.05 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 #1, and 8-way 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 000651.05 reappear active with engine running?	**YES:** GO TO ①. **NO:** GO TO ⑭. – – –1/1

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

000651.06 — Injector #1 Circuit Has Low Resistance

The ECU detects a low resistance in the cylinder #1 electronic injector circuit.

DN22556,00004F1 –19–30MAY07–1/1

000651.06 — Injector #1 Circuit Has Low Resistance Diagnostic Procedure

Troubleshooting Sequence:
000651.06

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

Related Information:
The ECU detects low resistance in the cylinder #1 electronic injector circuit.
The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.
The ECU switches the low side (ground) to control each individual injector.
This DTC can be caused by a wire-to-wire short. A short between the low side wiring of two injectors will cause active DTCs indicating low resistance in both injectors.
This DTC can also be caused by an injector that has low coil resistance (coil windings are shorted together).

Alarm Level:
Warning

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

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

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

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

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

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

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least 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.

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 000651.06 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓫ – – –1/1

❷ Check for DTC Change with Open Injector Harness	**CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON!** *NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.* 1. Ignition OFF, engine OFF. 2. Disconnect 8-way injector connector between engine harness and injector harness. Do not remove injector heat shield. 3. Ignition ON, engine OFF. 4. Refresh DTCs 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform Harness Diagnostic Mode Test in Service ADVISOR. Did DTC 000651.05, high injector #1 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 ❸ **NO:** GO TO ❺ – – –1/1

❸ **Injector Harness Terminal Test and Inspection**	1. Ignition OFF, engine OFF. 2. Perform Terminal Test on engine harness and injector harness 8-way connectors. 3. Remove injector heat shield. 4. Inspect injector harness for damage. Were any problems found?	**YES:** Fix problem. GO TO ❿ **NO:** GO TO ❹ – – –1/1
❹ **Check Injector Harness for Wire to Wire Short**	*NOTE: See REMOVE ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for connector dust cap removal instructions.* 1. Remove injector #1 connector dust cap and terminal nuts. 2. Lift injector #1 connector away from injector studs. 3. On the injector harness 8-way connector (male pin terminals), measure the resistance between injector #1 control (terminal 1) and all other terminals in the 8-way connector. Are all resistance readings greater than 1k ohms?	**YES:** Replace injector. GO TO ❿ **NO:** Replace injector harness. GO TO ❿ – – –1/1
❺ **ECU Terminal Test**	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO ❿ **NO:** GO TO ❻ – – –1/1
❻ **Check Engine Harness for Wire-to-Wire Short**	1. Disconnect ECU J2 connector. 2. On the harness, measure the resistance between the ECU injector #1 control (terminal J1-E1) and all terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	**YES:** GO TO ❼ **NO:** Fix problem. GO TO ❿ – – –1/1
❼ **Check Engine Harness for Short to Voltage Source**	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU injector #1 control (terminal J1-E1) and single point ground. Is voltage greater than 0.5V?	**YES:** Fix problem. GO TO ❿ **NO:** GO TO ❽ – – –1/1

❽ Reprogram ECU	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 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 000651.06 reappear active?	**YES:** GO TO ❾ **NO:** Problem fixed. – – –1/1

❾ Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform Harness Diagnostic Mode Test in Service ADVISOR. Did DTC 000651.06 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

❿ Verification	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform Harness Diagnostic Mode Test in Service ADVISOR. Did DTC 000651.06 reappear active?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

⓫ 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 ⓾ **YES:** If a certain operating point exists when error occurs then GO TO ⓬ **NO:** GO TO ⓭ – – –1/1

⓬ Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000651.06 reappear active when engine operating point was reached?	**YES:** GO TO ❶ **NO:** GO TO ⓭ – – –1/1

⓭ Terminal Test	**CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON!** 1. Ignition OFF, engine OFF 2. Perform Terminal Test on the ECU J1 connector, injector #1, and 8-way injector harness connector. Were any problems found?	**YES:** Fix problem. GO TO ⓾ **NO:** GO TO ⓮ – – –1/1

⓮ Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000651.06 reappear active with engine running?	**YES:** GO TO ❶. **NO:** GO TO ⓯. – – –1/1

⓯ **Reprogram ECU**	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000651.06 reappear active with engine running?	**YES:** GO TO ❶ **NO:** Replace injector #1. GO TO ⓾ – – –1/1

000651.07 — Injector #1 Not Responding

The fuel rail pressure does not drop at the injection of fuel to cylinder #1.

DN22556,00004F2 –19–31MAY07–1/1

000651.07 — Injector #1 Not Responding Diagnostic Procedure

Troubleshooting Sequence:
000651.07

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

Related Information:
The ECU does not detects a drop in fuel rail pressure when cylinder #1 injects fuel.

Alarm Level:
Warning

Control Unit Response:
Engine will run rough and misfire since the injector in cylinder #1 is not injecting fuel.

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

– – –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. Ignition ON, Engine ON. 5. Refresh Codes. Did 000651.07 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❺ – – –1/1

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❷ Fuel Line Inspection	1. Ignition ON, Engine ON. **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.** **CAUTION: Escaping fluid under pressure can penetrate skin causing serious injury. Avoid the hazard be relieving pressure before disconnecting hydraulic or other high pressure 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 fluids injected into the skin must be surgically removed within 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, USA.** 2. Check for injector #1 fuel supply line leak. 3. Ignition OFF, Engine OFF. 4. Check for over bent/pinched or cracked fuel line between the rail and the injector. **IMPORTANT: If a cracked line is found replace flow damper also. For flow damper replacement see, REMOVE AND INSTALL FLOW DAMPERS in Section 2 Group 090.** Were any problems found?	**YES:** Repair problem. GO TO ⓫ **NO:** GO TO ❸ – – –1/1

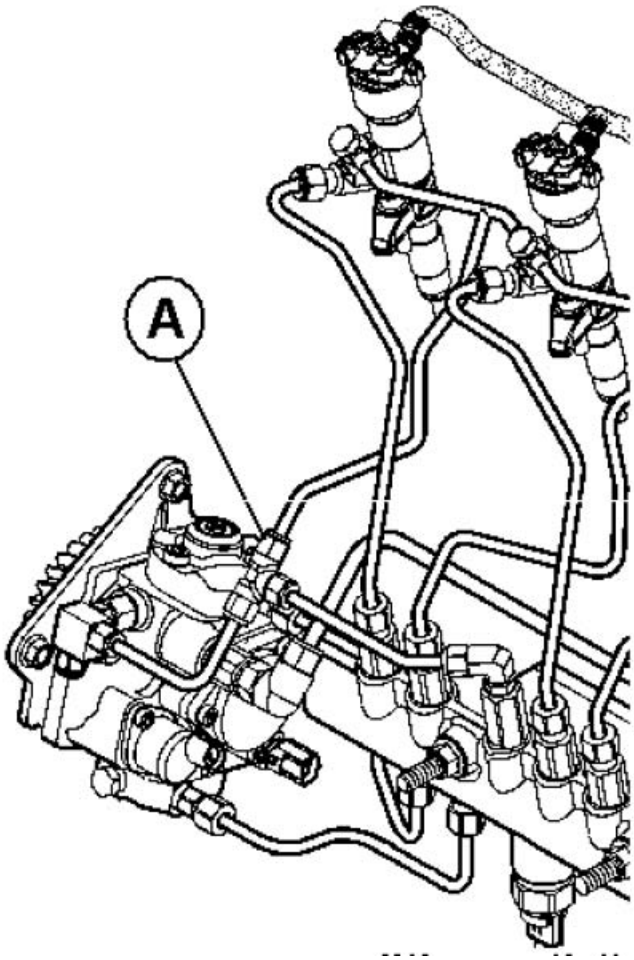
❸ **Misfire Test**	1. Ignition ON, Engine OFF. 2. Perform Cylinder Cutout Test and record results. 3. Perform Cylinder Misfire Test and record results. Do tests confirm a bad injector #1?	**YES:** Replace injector #1. GO TO ⓫ **NO:** GO TO ❹ – – –1/1

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 ⓫

NO: GO TO ❺

❺ **Occurrence Count Check**	Review stored information and look at occurrence count for 000651.07. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ❻ **NO:** GO TO ❼ – – –1/1
❻ **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 #1?	**YES:** Replace injector #1. GO TO ⓫ **NO:** GO TO ❽ – – –1/1
❼ **Time Between Occurrences Check**	Compare last occurrence engine hours with current engine hours. Is the difference greater than 50 hours?	**YES:** Return application to service. **NO:** GO TO ❽ – – –1/1
❽ **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 ❾ **NO:** GO TO ⓾ – – –1/1
❾ **Engine Error Operating Point Test**	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000651.07 reappear when engine operating point was reached?	**YES:** GO TO ❷ **NO:** GO TO ❽ – – –1/1
⓾ **Reprogram ECU**	Download latest ECU software payload and reprogram ECU using Service ADVISOR. Was reprogramming successful?	**YES:** GO TO ⓫ **NO:** Replace ECU, GO TO ⓫ – – –1/1

11 DTC Check	Ignition ON, Engine Idling. Is 000651.07 active?	**YES:** Start a DTAC case. **NO:** Problem fixed. – – –1/1

000651.13 — Injector #1 Calibration Fault

The ECU detects an incorrect QR Code was calibrated into the ECU.

DN22556,00004F3 –19–24MAY07–1/1

000651.13 — Injector #1 Calibration Fault Diagnostic Procedure

Troubleshooting Sequence:
000651.13

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to run the engine normally.

Related Information:
The ECU detects an incorrect QR Code 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.

– – –1/1

❶ **QR Code Input Method Check**	Was the QR code typed in manually?	**YES:** GO TO ❷ **NO:** GO TO ❸

– – –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 ❸ – – –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 ❹ – – –1/1
❹ **Retrieve New Injector Calibration File**	Download a new injector calibration file, see DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILE earlier in this Group. Were you able to get a new calibration file?	**YES:** GO TO ❺ **NO:** GO TO ❻ – – –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 ❻ – – –1/1
❻ **ECU Programming**	1. Download the latest ECU software. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO ❼ **NO:** Replace ECU. GO TO ❸ – – –1/1

❼ **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:** Start a DTAC case. – – –1/1

000652.02 — Injector #2 Part Number Invalid

The ECU detects an incorrect injector part number was installed or calibrated into cylinder #2.

DN22556,00004F4 –19–23MAY07–1/1

000652.02 — Injector #2 Part Number Invalid Diagnostic Procedure

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Troubleshooting Sequence:
000652.02

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to run the engine normally.

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.

– – –1/1

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

– – –1/1

❷ **Part Number Check**	1. Select Injector Calibration in Service ADVISOR. 2. Check the part number on the injector data sheet against the one displayed. Are the part numbers the same?	**YES:** GO TO ❸ **NO:** GO TO ❹ – – –1/1
❸ **Part Verification**	Verify with parts department that the injector that was installed is the correct one for the application. Is the injector the correct one?	**YES:** GO TO ❺ **NO:** Remove injector and order proper injector. – – –1/1
❹ **Physical Verification of Part Number**	1. Remove injector from engine, see REMOVE ELECTRONIC INJECTOR (EI) in Section 2 Group 090 earlier in this manual. 2. Compare the inscribed part number against the datasheet and ordered injector. Is the injector the proper one for the application?	**YES:** Start a DTAC case. **NO:** Remove injector and order proper one. – – –1/1
❺ **Input Injector Data Again**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000652.02 active?	**YES:** GO TO ❻ **NO:** Problem fixed, return application to service. – – –1/1
❻ **ECU Programming Check**	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO ❼ **NO:** Check payload and try again. – – –1/1

❼ **Input Injector Data Again**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000652.02 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, return application to service. – – –1/1

❽ **Automatic Input of Injector Data**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000652.02 active?	**YES:** GO TO ❾ **NO:** Problem fixed, return application to service. – – –1/1

❾ **Download Injector Calibration File**	Download a new injector calibration file, see DOWNLOADING INJECTOR CALIBRATION FILES earlier in this Group. Were you able to get a new file?	**YES:** GO TO ❿ **NO:** Contact John Deere Custom Performance. – – –1/1

⑩ **Automatic Input of Injector Data**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000652.02 active?	**YES:** GO TO ⑪ **NO:** Problem fixed, return application to service. – – –1/1

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⑪ **ECU Programming Check**	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO ⑫ **NO:** Check payload and try again. – – –1/1

⑫ **Automatic Input of Injector Data**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000652.02 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, return application to service. – – –1/1

000652.05 — Injector #2 Circuit Has High Resistance

The ECU detects a High resistance in the cylinder #2 electronic injector circuit.

DN22556,00004F5 –19–30MAY07–1/1

000652.05 — Injector #2 Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:
000627.01
000652.05

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

Related Information:
The ECU detects high resistance in the cylinder #2 electronic injector circuit.
The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.
The ECU switches the low side (ground) to control each individual injector.
This DTC can be caused by an open circuit or by a few ohms of additional series resistance anywhere in the injector #2 circuit.
An open circuit in the injector high voltage supply may also cause active DTCs indicating high resistance in this and other injector circuits.

Alarm Level:
Warning

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

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

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

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

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

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

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 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 000652.05 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❿ – – –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 8-way injector connector between engine harness and injector harness. Do not remove the injector heat shield. 3. Perform Terminal Test on engine harness and injector harness 8-way connectors. Were any problems found?	**YES:** Fix problem. GO TO ❾ **NO:** GO TO ❸ – – –1/1

❸ **Check Injector Harness Resistance**	With 6.8L - On the injector harness (male pin terminals), measure the resistance between injector high voltage supply (terminal 7) and injector #2 low side control (terminal 2). With 4.5L - On the injector harness (male pin terminals), measure the resistance between injector high voltage supply (terminal 8) and injector #2 low side control (terminal 6). Is resistance less than 2 ohms?	**YES:** GO TO ❺ **NO:** GO TO ❹ – – –1/1

❹ **Check Injector Coil Resistance**	*NOTE: See REMOVE ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for connector dust cap removal instructions.* 1. Remove injector heat shield. 2. Inspect injector harness for damage. 3. Remove injector #2 connector dust cap. Do not remove terminals from injector. 4. On the injector, measure the resistance between the two injector studs. *NOTE: Contact injector studs or injector harness terminals with meter test leads for this measurement, not terminal nuts. Terminal nuts are installed with thread locking agent which may affect the resistance measurement.* Is the resistance less than 2 ohms?	**YES:** Replace injector wire harness. GO TO ❾ **NO:** Replace injector. GO TO ❾ – – –1/1

❺ **ECU Terminal Test**	1. Disconnect ECU J1 connector. 2. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO ❾ **NO:** GO TO ❻ – – –1/1

❻ Check Engine Harness Resistance	With 6.8L: 1. On the harness, measure the resistance between the ECU injector #2 control (terminal J1-B1) and the injector harness 8-way connector (terminal 2). 2. On the harness, measure the resistance between the ECU high voltage supply (terminal J1-G1) and the injector harness 8-way connector (terminal 7). Are both resistance readings less than 2 ohms? With 4.5L: 1. On the harness, measure the resistance between the ECU injector #2 control (terminal J1-C1) and the injector harness 8-way connector (terminal 6) 2. On the harness, measure the resistance between the ECU high voltage supply (terminal J1-G2) and the injector harness 8-way connector (terminal 8). Are both resistance readings less than 2 ohms?	**YES:** GO TO ❼ **NO:** Fix problem. GO TO ❾ – – –1/1

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❼ Reprogram ECU	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 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 000652.05 reappear active?	**YES:** GO TO ❽ **NO:** Problem fixed. – – –1/1

❽ Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 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 000652.05 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

❾ Verification	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 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 000652.05 reappear active?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

❿ 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 ❾ **YES:** If a certain operating point exists when error occurs then GO TO ⓫ **NO:** GO TO ⓬ – – –1/1

⓫ 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 ❶ **NO:** GO TO ⓬ – – –1/1

⓬ 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 8-way injector harness connector. Were any problems found?	**YES:** Fix problem. GO TO ❾ **NO:** GO TO ⓭ – – –1/1

⓭ **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 ❶. **NO:** GO TO ⓮. – – –1/1

⓮ **Reprogram ECU**	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000652.05 reappear active with engine running?	**YES:** GO TO ❶ **NO:** Replace injector #2. GO TO ❾ – – –1/1

000652.06 — Injector #2 Circuit Has Low Resistance

The ECU detects a low resistance in the cylinder #2 electronic injector circuit.

DN22556,00004F6 –19–30MAY07–1/1

000652.06 — Injector #2 Circuit Has Low Resistance Diagnostic Procedure

Troubleshooting Sequence:
000652.06

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

Related Information:
The ECU detects low resistance in the cylinder #2 electronic injector circuit.
The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.
The ECU switches the low side (ground) to control each individual injector.
This DTC can be caused by a wire-to-wire short. A short between the low side wiring of two injectors will cause active DTCs indicating low resistance in both injectors.
This DTC can also be caused by an injector that has low coil resistance (coil windings are shorted together).

Alarm Level:
Warning

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

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

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

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

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

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

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least 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.

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 000652.06 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓫ – – –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 8-way injector connector between engine harness and injector harness. Do not remove injector heat shield. 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 000652.05, high injector #2 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 ❸ **NO:** GO TO ❺ – – –1/1

❸ **Injector Harness Terminal Test and Inspection**	1. Ignition OFF, engine OFF. 2. Perform Terminal Test on engine harness and injector harness 8-way connectors. 3. Remove injector heat shield. 4. Inspect injector harness for damage. Were any problems found?	**YES:** Fix problem. GO TO ❿ **NO:** GO TO ❹ – – –1/1

❹ **Check Injector Harness for Wire to Wire Short**	*NOTE: See REMOVE ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for connector dust cap removal instructions.* With 6.8L: 1. Remove injector #2 connector dust cap and terminal nuts. 2. Lift injector #2 connector away from injector studs. 3. On the injector harness 8-way connector (male pin terminals), measure the resistance between injector #2 control (terminal 2) and all other terminals in the 8-way connector. Are all resistance readings greater than 1k ohms? With 4.5L: 1. Remove injector #2 connector dust cap and terminal nuts. 2. Lift injector #2 connector away from injector studs. 3. On the injector harness 8-way connector (male pin terminals), measure the resistance between injector #2 control (terminal 6) and all other terminals in the 8-way connector. Are all resistance readings greater than 1k ohms?	**YES:** Replace injector. GO TO ❿ **NO:** Replace injector harness. GO TO ❿ – – –1/1

❺ **ECU Terminal Test**	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO ❿ **NO:** GO TO ❻ – – –1/1

❻ **Check Engine Harness for Wire-to-Wire Short**	With 6.8L: 1. Disconnect ECU J2 connector. 2. On the harness, measure the resistance between the ECU injector #2 control (terminal J1-B1) and all terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms? With 4.5L: 1. Disconnect ECU J2 connector. 2. On the harness, measure the resistance between the ECU injector #2 control (terminal J1-C1) and all terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	**YES:** GO TO ❼ **NO:** Fix problem. GO TO ❿ – – –1/1

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❼ **Check Engine Harness for Short to Voltage Source**	With 6.8L: 1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU injector #2 control (terminal J1-B1) and single point ground. Is voltage greater than 0.5V? With 4.5L: 1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU injector #2 control (terminal J1-C1) and single point ground. Is voltage greater than 0.5V?	**YES:** Fix problem. GO TO ❿ **NO:** GO TO ❽ – – –1/1

❽ **Reprogram ECU**	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 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 000652.06 reappear active?	**YES:** GO TO ❾ **NO:** Problem fixed. – – –1/1

❾ **Replace ECU**	1. Ignition OFF, engine OFF. 2. Replace ECU. 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 000652.06 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

❿ **Verification**	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 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 000652.06 reappear active?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

⓫ 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 ⓾ **YES:** If a certain operating point exists when error occurs then GO TO ⓬ **NO:** GO TO ⓭ – – –1/1
⓬ Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000652.06 reappear active when engine operating point was reached?	**YES:** GO TO ❶ **NO:** GO TO ⓭ – – –1/1
⓭ 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 8-way injector harness connector. Were any problems found?	**YES:** Fix problem. GO TO ⓾ **NO:** GO TO ⓮ – – –1/1
⓮ Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000652.06 reappear active with engine running?	**YES:** GO TO ❶. **NO:** GO TO ⓯. – – –1/1

⓯ **Reprogram ECU**	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000652.06 reappear active with engine running?	**YES:** GO TO ❶ **NO:** Replace injector #2. GO TO ⓾ – – –1/1

000652.07 — Injector #2 Not Responding

The fuel rail pressure does not drop at the injection of fuel to cylinder #2.

DN22556,00004F7 –19–31MAY07–1/1

000652.07 — Injector #2 Not Responding Diagnostic Procedure

Troubleshooting Sequence:
000652.07

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

Related Information:
The ECU does not detects a drop in fuel rail pressure when cylinder #2 injects fuel.

Alarm Level:
Warning

Control Unit Response:
Engine will run rough and misfire since the injector in cylinder #2 is not injecting fuel.

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

– – –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. Ignition ON, Engine ON. 5. Refresh Codes. Did 000652.07 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❺ – – –1/1

❷ **Fuel Line Inspection**	1. Ignition ON, Engine ON. **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.** **CAUTION: Escaping fluid under pressure can penetrate skin causing serious injury. Avoid the hazard be relieving pressure before disconnecting hydraulic or other high pressure 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 fluids injected into the skin must be surgically removed within 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, USA.** 2. Check for injector #2 fuel supply line leak. 3. Ignition OFF, Engine OFF. 4. Check for over bent/pinched or cracked fuel line between the rail and the injector. **IMPORTANT: If a cracked line is found replace flow damper also. For flow damper replacement see, REMOVE AND INSTALL FLOW DAMPERS in Section 2 Group 090.** Were any problems found?	**YES:** Repair problem. GO TO ⓫ **NO:** GO TO ❸ – – –1/1

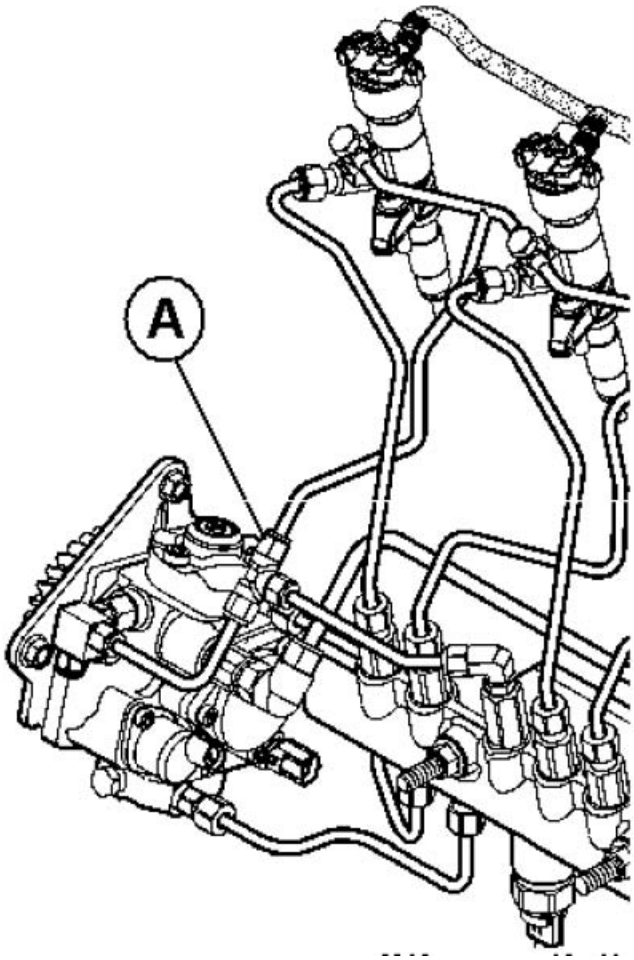
❸ **Misfire Test**	1. Ignition ON, Engine OFF. 2. Perform Cylinder Cutout Test and record results. 3. Perform Cylinder Misfire Test and record results. Do tests confirm a bad injector #2?	**YES:** Replace injector #2. GO TO ⓫ **NO:** GO TO ❹ – – –1/1

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 #2. GO TO ⓫

NO: GO TO ❺

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❺ **Occurrence Count Check**	Review stored information and look at occurrence count for 000652.07. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ❻ **NO:** GO TO ❼ – – –1/1
❻ **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 #2?	**YES:** Replace injector #2. GO TO ⓫ **NO:** GO TO ❽ – – –1/1
❼ **Time Between Occurrences Check**	Compare last occurrence engine hours with current engine hours. Is the difference greater than 50 hours?	**YES:** Return application to service. **NO:** GO TO ❽ – – –1/1
❽ **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 ❾ **NO:** GO TO ⓾ – – –1/1
❾ **Engine Error Operating Point Test**	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000652.07 reappear when engine operating point was reached?	**YES:** GO TO ❷ **NO:** GO TO ❽ – – –1/1
⓾ **Reprogram ECU**	Download latest ECU software payload and reprogram ECU using Service ADVISOR. Was reprogramming successful?	**YES:** GO TO ⓫ **NO:** Replace ECU, GO TO ⓫ – – –1/1

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

000652.13 — Injector #2 Calibration Fault

The ECU detects an incorrect QR Code was calibrated into the ECU.

DN22556,00004F8 –19–24MAY07–1/1

000652.13 — Injector #2 Calibration Fault Diagnostic Procedure

Troubleshooting Sequence:
000652.13

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to run the engine normally.

Related Information:
The ECU detects an incorrect QR Code 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.

– – –1/1

❶ **QR Code Input Method Check**	Was the QR code typed in manually?	**YES:** GO TO ❷ **NO:** GO TO ❸

– – –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 ❸ – – –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 ❹ – – –1/1
❹ **Retrieve New Injector Calibration File**	Download a new injector calibration file, see DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILE earlier in this Group. Were you able to get a new calibration file?	**YES:** GO TO ❺ **NO:** GO TO ❻ – – –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 ❻ – – –1/1
❻ **ECU Programming**	1. Download the latest ECU software. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO ❼ **NO:** Replace ECU. GO TO ❸ – – –1/1

❼ **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:** Start a DTAC case. – – –1/1

000653.02 — Injector #3 Part Number Invalid

The ECU detects an incorrect injector part number was installed or calibrated into cylinder #3.

DN22556,00004F9 –19–23MAY07–1/1

000653.02 — Injector #3 Part Number Invalid Diagnostic Procedure

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Troubleshooting Sequence:
000653.02

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to run the engine normally.

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 ❷ **NO:** GO TO ❽

– – –1/1

❷ Part Number Check	1. Select Injector Calibration in Service ADVISOR. 2. Check the part number on the injector data sheet against the one displayed. Are the part numbers the same?	**YES:** GO TO ❸ **NO:** GO TO ❹ – – –1/1
❸ Part Verification	Verify with parts department that the injector that was installed is the correct one for the application. Is the injector the correct one?	**YES:** GO TO ❺ **NO:** Remove injector and order proper injector. – – –1/1
❹ Physical Verification of Part Number	1. Remove injector from engine, see REMOVE ELECTRONIC INJECTOR (EI) in Section 2 Group 090 earlier in this manual. 2. Compare the inscribed part number against the datasheet and ordered injector. Is the injector the proper one for the application?	**YES:** Start a DTAC case. **NO:** Remove injector and order proper one. – – –1/1
❺ Input Injector Data Again	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000653.02 active?	**YES:** GO TO ❻ **NO:** Problem fixed, return application to service. – – –1/1
❻ ECU Programming Check	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO ❼ **NO:** Check payload and try again. – – –1/1

❼ **Input Injector Data Again**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000653.02 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, return application to service. – – –1/1

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❽ **Automatic Input of Injector Data**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000653.02 active?	**YES:** GO TO ❾ **NO:** Problem fixed, return application to service. – – –1/1

❾ **Download Injector Calibration File**	Download a new injector calibration file, see DOWNLOADING INJECTOR CALIBRATION FILES earlier in this Group. Were you able to get a new file?	**YES:** GO TO ❿ **NO:** Contact John Deere Custom Performance. – – –1/1

⑩ Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000653.02 active?	**YES:** GO TO ⑪ **NO:** Problem fixed, return application to service. – – –1/1

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⑪ ECU Programming Check	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO ⑫ **NO:** Check payload and try again. – – –1/1

⑫ Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000653.02 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, return application to service. – – –1/1

000653.05 — Injector #3 Circuit Has High Resistance

The ECU detects an high resistance in the cylinder #3 electronic injector circuit.

DN22556,00004FA –19–30MAY07–1/1

000653.05 — Injector #3 Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:
000627.01
000653.05

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

Related Information:
The ECU detects high resistance in the cylinder #3 electronic injector circuit.
The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.
The ECU switches the low side (ground) to control each individual injector.
This DTC can be caused by an open circuit or by a few ohms of additional series resistance anywhere in the injector #3 circuit.
An open circuit in the injector high voltage supply may also cause active DTCs indicating high resistance in this and other injector circuits.

Alarm Level:
Warning

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

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

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

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

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

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

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 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 000653.05 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❿ – – –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 8-way injector connector between engine harness and injector harness. Do not remove the injector heat shield. 3. Perform Terminal Test on engine harness and injector harness 8-way connectors. Were any problems found?	**YES:** Fix problem. GO TO ❾ **NO:** GO TO ❸ – – –1/1

❸ **Check Injector Harness Resistance**	With 6.8L - On the injector harness (male pin terminals), measure the resistance between injector high voltage supply (terminal 7) and injector #3 low side control (terminal 3). With 4.5L - On the injector harness (male pin terminals), measure the resistance between injector high voltage supply (terminal 8) and injector #3 low side control (terminal 5). Is resistance less than 2 ohms?	**YES:** GO TO ❺ **NO:** GO TO ❹ – – –1/1

❹ **Check Injector Coil Resistance**	*NOTE: See REMOVE ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for connector dust cap removal instructions.* 1. Remove injector heat shield. 2. Inspect injector harness for damage. 3. Remove injector #3 connector dust cap. Do not remove terminals from injector. 4. On the injector, measure the resistance between the two injector studs. *NOTE: Contact injector studs or injector harness terminals with meter test leads for this measurement, not terminal nuts. Terminal nuts are installed with thread locking agent which may affect the resistance measurement.* Is the resistance less than 2 ohms?	**YES:** Replace injector wire harness. GO TO ❾ **NO:** Replace injector. GO TO ❾ – – –1/1

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❺ **Terminal Test**	1. Disconnect ECU J1 connector. 2. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO ❾ **NO:** GO TO ❻ – – –1/1

❻ Check Engine Harness Resistance	With 6.8L: 1. On the harness, measure the resistance between the ECU injector #3 control (terminal J1-D1) and the injector harness 8-way connector (terminal 3).. 2. On the harness, measure the resistance between the ECU high voltage supply (terminal J1-G1) and the injector harness 8-way connector (terminal 7). Are both resistance readings less than 2 ohms? With 4.5L: 1. On the harness, measure the resistance between the ECU injector #3 control (terminal J1-F1) and the injector harness 8-way connector (terminal 5) 2. On the harness, measure the resistance between the ECU high voltage supply (terminal J1-G2) and the injector harness 8-way connector (terminal 8). Are both resistance readings less than 2 ohms?	**YES:** GO TO ❼ **NO:** Fix problem. GO TO ❾ – – –1/1

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❼ Reprogram ECU	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 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 000653.05 reappear active?	**YES:** GO TO ❽ **NO:** Problem fixed. – – –1/1

❽ Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 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 000653.05 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

❾ Verification	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 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 000653.05 reappear active?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

❿ 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 ❾ **YES:** If a certain operating point exists when error occurs then GO TO ⓫ **NO:** GO TO ⓬ – – –1/1

⓫ Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000653.05 reappear active when engine operating point was reached?	**YES:** GO TO ❶ **NO:** GO TO ⓬ – – –1/1

⓬ 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 #3, and 8-way injector harness connector. Were any problems found?	**YES:** Fix problem. GO TO ❾ **NO:** GO TO ⓭ – – –1/1

⓭ **Reconnect and Retest**	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000653.05 reappear active with engine running?	**YES:** GO TO ❶. **NO:** GO TO ⓮. – – –1/1

⓮ **Reprogram ECU**	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000653.05 reappear active with engine running?	**YES:** GO TO ❶ **NO:** Replace injector #3. GO TO ❾ – – –1/1

000653.06 — Injector #3 Circuit Has Low Resistance

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

DN22556,00004FB –19–30MAY07–1/1

000653.06 — Injector #3 Circuit Has Low Resistance Diagnostic Procedure

Troubleshooting Sequence:
000653.06

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

Related Information:
The ECU detects low resistance in the cylinder #3 electronic injector circuit.
The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.
The ECU switches the low side (ground) to control each individual injector.
This DTC can be caused by a wire-to-wire short. A short between the low side wiring of two injectors will cause active DTCs indicating low resistance in both injectors.
This DTC can also be caused by an injector that has low coil resistance (coil windings are shorted together).

Alarm Level:
Warning

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

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

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

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

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

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

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least 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.

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 000653.06 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓫ – – –1/1
❷ Check for DTC Change with Open Injector Harness	**CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON!** *NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.* 1. Ignition OFF, engine OFF. 2. Disconnect 8-way injector connector between engine harness and injector harness. Do not remove injector heat shield. 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 000653.05, high injector #3 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 ❸ **NO:** GO TO ❺ – – –1/1

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❸ **Injector Harness Terminal Test and Inspection**	1. Ignition OFF, engine OFF. 2. Perform Terminal Test on engine harness and injector harness 8-way connectors. 3. Remove injector heat shield. 4. Inspect injector harness for damage. Were any problems found?	**YES:** Fix problem. GO TO ❿ **NO:** GO TO ❹ – – –1/1

❹ **Check Injector Harness for Wire to Wire Short**	*NOTE: See REMOVE ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for connector dust cap removal instructions.* With 6.8L: 1. Remove injector #3 connector dust cap and terminal nuts. 2. Lift injector #3 connector away from injector studs. 3. On the injector harness 8-way connector (male pin terminals), measure the resistance between injector #3 control (terminal 3) and all other terminals in the 8-way connector. Are all resistance readings greater than 1k ohms? With 4.5L: 1. Remove injector #3 connector dust cap and terminal nuts. 2. Lift injector #3 connector away from injector studs. 3. On the injector harness 8-way connector (male pin terminals), measure the resistance between injector #3 control (terminal 5) and all other terminals in the 8-way connector. Are all resistance readings greater than 1k ohms?	**YES:** Replace injector. GO TO ❿ **NO:** Replace injector harness. GO TO ❿ – – –1/1

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❺ **ECU Terminal Test**	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO ❿ **NO:** GO TO ❻ – – –1/1

❻ **Check Engine Harness for Wire-to-Wire Short**	With 6.8L: 1. Disconnect ECU J2 connector. 2. On the harness, measure the resistance between the ECU injector #3 control (terminal J1-D1) and all terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms? With 4.5L: 1. Disconnect ECU J2 connector. 2. On the harness, measure the resistance between the ECU injector #3 control (terminal J1-F1) and all terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	**YES:** GO TO ❼ **NO:** Fix problem. GO TO ❿ 04 160 ,419 – – –1/1

❼ **Check Engine Harness for Short to Voltage Source**	With 6.8L: 1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU injector #3 control (terminal J1-D1) and single point ground. Is voltage greater than 0.5V? With 4.5L: 1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU injector #3 control (terminal J1-F1) and single point ground. Is voltage greater than 0.5V?	**YES:** Fix problem. GO TO ❿ **NO:** GO TO ❽ – – –1/1

❽ Reprogram ECU	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 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 000653.06 reappear active?	**YES:** GO TO ❾ **NO:** Problem fixed. – – –1/1
❾ Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 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 000653.06 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1
❿ Verification	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 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 000653.06 reappear active?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

⓫ 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 ⓾ **YES:** If a certain operating point exists when error occurs then GO TO ⓬ **NO:** GO TO ⓭ – – –1/1

⓬ Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000653.06 reappear active when engine operating point was reached?	**YES:** GO TO ❶ **NO:** GO TO ⓭ – – –1/1

⓭ 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 #3, and 8-way injector harness connector. Were any problems found?	**YES:** Fix problem. GO TO ⓾ **NO:** GO TO ⓮ – – –1/1

⓮ Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000653.06 reappear active with engine running?	**YES:** GO TO ❶. **NO:** GO TO ⓯. – – –1/1

⓯ **Reprogram ECU**	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000653.06 reappear active with engine running?	**YES:** GO TO ❶ **NO:** Replace injector #3. GO TO ⓾ – – –1/1

000653.07 — Injector #3 Not Responding

The fuel rail pressure does not drop at the injection of fuel to cylinder #3.

DN22556,00004FC –19–31MAY07–1/1

000653.07 — Injector #3 Not Responding Diagnostic Procedure

Troubleshooting Sequence:
000653.07

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

Related Information:
The ECU does not detects a drop in fuel rail pressure when cylinder #3 injects fuel.

Alarm Level:
Warning

Control Unit Response:
Engine will run rough and misfire since the injector in cylinder #3 is not injecting fuel.

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

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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. Ignition ON, Engine ON. 5. Refresh Codes. Did 000653.07 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❺ – – –1/1

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❷ Fuel Line Inspection	1. Ignition ON, Engine ON. **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.** **CAUTION: Escaping fluid under pressure can penetrate skin causing serious injury. Avoid the hazard be relieving pressure before disconnecting hydraulic or other high pressure 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 fluids injected into the skin must be surgically removed within 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, USA.** 2. Check for injector #3 fuel supply line leak. 3. Ignition OFF, Engine OFF. 4. Check for over bent/pinched or cracked fuel line between the rail and the injector. **IMPORTANT: If a cracked line is found replace flow damper also. For flow damper replacement see, REMOVE AND INSTALL FLOW DAMPERS in Section 2 Group 090.** Were any problems found?	**YES:** Repair problem. GO TO ⓫ **NO:** GO TO ❸ – – –1/1

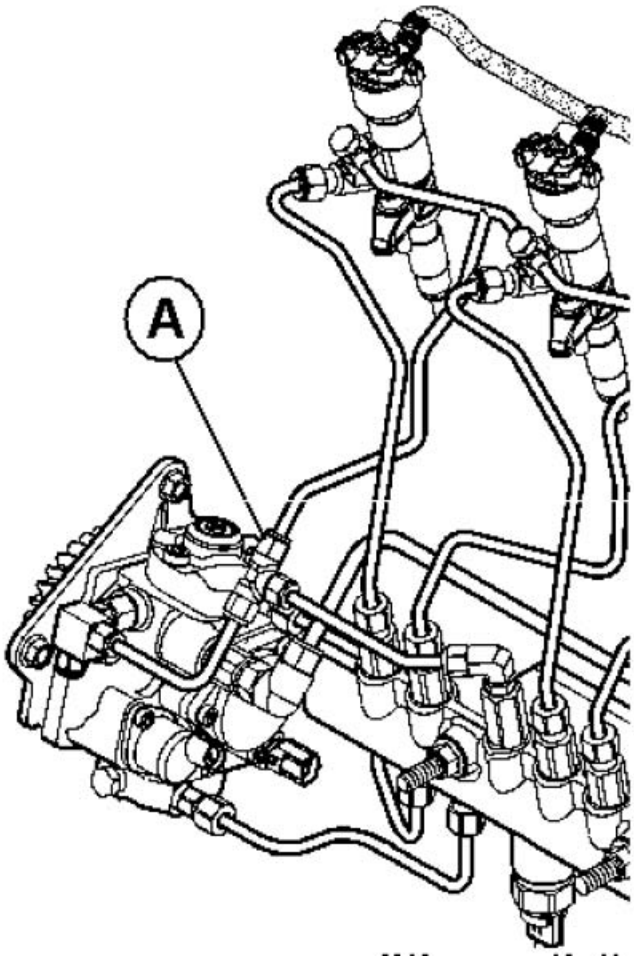
❸ **Misfire Test**	1. Ignition ON, Engine OFF. 2. Perform Cylinder Cutout Test and record results. 3. Perform Cylinder Misfire Test and record results. Do tests confirm a bad injector #3?	**YES:** Replace injector #3. GO TO ⓫ **NO:** GO TO ❹ – – –1/1

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.



RG14958 –UN–31MAY07

A—Leak off line "T" fitting

3. Place leak off line into a container suitable for fuel.

4. Ignition ON, Engine Idling.

5. Collect fuel for 2 minutes.

6. Measure the amount of fuel collected in the container.

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 #3. GO TO ⓫

NO: GO TO ❺

– – –1/1

❺ **Occurrence Count Check**	Review stored information and look at occurrence count for 000653.07. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ❻ **NO:** GO TO ❼ – – –1/1
❻ **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 #3?	**YES:** Replace injector #3. GO TO ⓫ **NO:** GO TO ❽ – – –1/1
❼ **Time Between Occurrences Check**	Compare last occurrence engine hours with current engine hours. Is the difference greater than 50 hours?	**YES:** Return application to service. **NO:** GO TO ❽ – – –1/1
❽ **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 ❾ **NO:** GO TO ⓾ – – –1/1
❾ **Engine Error Operating Point Test**	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000653.07 reappear when engine operating point was reached?	**YES:** GO TO ❷ **NO:** GO TO ❽ – – –1/1
⓾ **Reprogram ECU**	Download latest ECU software payload and reprogram ECU using Service ADVISOR. Was reprogramming successful?	**YES:** GO TO ⓫ **NO:** Replace ECU, GO TO ⓫ – – –1/1

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11 DTC Check	Ignition ON, Engine Idling. Is 000653.07 active?	**YES:** Start a DTAC case. **NO:** Problem fixed. – – –1/1

000653.13 — Injector #3 Calibration Fault

The ECU detects an incorrect QR Code was calibrated into the ECU.

DN22556,00004FD –19–24MAY07–1/1

000653.13 — Injector #3 Calibration Fault Diagnostic Procedure

Troubleshooting Sequence:
000653.13

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to run the engine normally.

Related Information:
The ECU detects an incorrect QR Code 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.

– – –1/1

❶ **QR Code Input Method Check**	Was the QR code typed in manually?	**YES:** GO TO ❷ **NO:** GO TO ❸

– – –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 ❸ – – –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 ❹ – – –1/1
❹ **Retrieve New Injector Calibration File**	Download a new injector calibration file, see DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILE earlier in this Group. Were you able to get a new calibration file?	**YES:** GO TO ❺ **NO:** GO TO ❻ – – –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 ❻ – – –1/1
❻ **ECU Programming**	1. Download the latest ECU software. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO ❼ **NO:** Replace ECU. GO TO ❸ – – –1/1

❼ **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:** Start a DTAC case. – – –1/1

000654.02 — Injector #4 Part Number Invalid

The ECU detects an incorrect injector part number was installed or calibrated into cylinder #4.

DN22556,00004FE –19–23MAY07–1/1

000654.02 — Injector #4 Part Number Invalid Diagnostic Procedure

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Troubleshooting Sequence:
000654.02

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to run the engine normally.

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 ❷ **NO:** GO TO ❽

– – –1/1

❷ **Part Number Check**	1. Select Injector Calibration in Service ADVISOR. 2. Check the part number on the injector data sheet against the one displayed. Are the part numbers the same?	**YES:** GO TO ❸ **NO:** GO TO ❹ – – –1/1
❸ **Part Verification**	Verify with parts department that the injector that was installed is the correct one for the application. Is the injector the correct one?	**YES:** GO TO ❺ **NO:** Remove injector and order proper injector. – – –1/1
❹ **Physical Verification of Part Number**	1. Remove injector from engine, see REMOVE ELECTRONIC INJECTOR (EI) in Section 2 Group 090 earlier in this manual. 2. Compare the inscribed part number against the datasheet and ordered injector. Is the injector the proper one for the application?	**YES:** Start a DTAC case. **NO:** Remove injector and order proper one. – – –1/1
❺ **Input Injector Data Again**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000654.02 active?	**YES:** GO TO ❻ **NO:** Problem fixed, return application to service. – – –1/1
❻ **ECU Programming Check**	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO ❼ **NO:** Check payload and try again. – – –1/1

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

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

❾ **Download Injector Calibration File**	Download a new injector calibration file, see DOWNLOADING INJECTOR CALIBRATION FILES earlier in this Group. Were you able to get a new file?	**YES:** GO TO ❿ **NO:** Contact John Deere Custom Performance. – – –1/1

⑩ Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000654.02 active?	**YES:** GO TO ⑪ **NO:** Problem fixed, return application to service. – – –1/1

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⑪ ECU Programming Check	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO ⑫ **NO:** Check payload and try again. – – –1/1

⑫ Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000654.02 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, return application to service. – – –1/1

000654.05 — Injector #4 Circuit Has High Resistance

The ECU detects an high resistance in the cylinder #4 electronic injector circuit.

DN22556,00004FF –19–30MAY07–1/1

000654.05 — Injector #4 Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:
000627.01
000654.05

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

Related Information:
The ECU detects high resistance in the cylinder #4 electronic injector circuit.
The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.
The ECU switches the low side (ground) to control each individual injector.
This DTC can be caused by an open circuit or by a few ohms of additional series resistance anywhere in the injector #4 circuit.
An open circuit in the injector high voltage supply may also cause active DTCs indicating high resistance in this and other injector circuits.

Alarm Level:
Warning

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

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

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

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

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

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

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 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 000654.05 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❿ – – –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 8-way injector connector between engine harness and injector harness. Do not remove the injector heat shield. 3. Perform Terminal Test on engine harness and injector harness 8-way connectors. Were any problems found?	**YES:** Fix problem. GO TO ❾ **NO:** GO TO ❸ – – –1/1

❸ **Check Injector Harness Resistance**	With 6.8L - On the injector harness (male pin terminals), measure the resistance between injector high voltage supply (terminal 8) and injector #4 low side control (terminal 4). With 4.5L - On the injector harness (male pin terminals), measure the resistance between injector high voltage supply (terminal 7) and injector #4 low side control (terminal 3). Is resistance less than 2 ohms?	**YES:** GO TO ❺ **NO:** GO TO ❹ – – –1/1

❹ **Check Injector Coil Resistance**	*NOTE: See REMOVE ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for connector dust cap removal instructions.* 1. Remove injector heat shield. 2. Inspect injector harness for damage. 3. Remove injector #4 connector dust cap. Do not remove terminals from injector. 4. On the injector, measure the resistance between the two injector studs. *NOTE: Contact injector studs or injector harness terminals with meter test leads for this measurement, not terminal nuts. Terminal nuts are installed with thread locking agent which may affect the resistance measurement.* Is the resistance less than 2 ohms?	**YES:** Replace injector wire harness. GO TO ❾ **NO:** Replace injector. GO TO ❾ – – –1/1

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❺ **ECU Terminal Test**	1. Disconnect ECU J1 connector. 2. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO ❾ **NO:** GO TO ❻ – – –1/1

❻ Check Engine Harness Resistance	With 6.8L: 1. On the harness, measure the resistance between the ECU injector #4 control (terminal J1-A1) and the injector harness 8-way connector (terminal 4).. 2. On the harness, measure the resistance between the ECU high voltage supply (terminal J1-G2) and the injector harness 8-way connector (terminal 8). Are both resistance readings less than 2 ohms? With 4.5L: 1. On the harness, measure the resistance between the ECU injector #4 control (terminal J1-D1) and the injector harness 8-way connector (terminal 3) 2. On the harness, measure the resistance between the ECU high voltage supply (terminal J1-G1) and the injector harness 8-way connector (terminal 7). Are both resistance readings less than 2 ohms?	**YES:** GO TO ❼ **NO:** Fix problem. GO TO ❾ – – –1/1

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❼ Reprogram ECU	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 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 000654.05 reappear active?	**YES:** GO TO ❽ **NO:** Problem fixed. – – –1/1

❽ Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 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 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

❾ Verification	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 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 reappear active?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

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❿ 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 ❾ **YES:** If a certain operating point exists when error occurs then GO TO ⓫ **NO:** GO TO ⓬ – – –1/1

⓫ Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000654.05 reappear active when engine operating point was reached?	**YES:** GO TO ❶ **NO:** GO TO ⓬ – – –1/1

⓬ 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 #4, and 8-way injector harness connector. Were any problems found?	**YES:** Fix problem. GO TO ❾ **NO:** GO TO ⓭ – – –1/1

⓭ **Reconnect and Retest**	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000654.05 reappear active with engine running?	**YES:** GO TO ❶. **NO:** GO TO ⓮. – – –1/1

⓮ **Reprogram ECU**	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000654.05 reappear active with engine running?	**YES:** GO TO ❶ **NO:** Replace injector #4. GO TO ❾ – – –1/1

000654.06 — Injector #4 Circuit Has Low Resistance

The ECU detects a Low resistance in the cylinder #4 electronic injector circuit.

DN22556,0000500 –19–30MAY07–1/1

000654.06 — Injector #4 Circuit Has Low Resistance Diagnostic Procedure

Troubleshooting Sequence:
000654.06

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

Related Information:
The ECU detects low resistance in the cylinder #4 electronic injector circuit.
The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.
The ECU switches the low side (ground) to control each individual injector.
This DTC can be caused by a wire-to-wire short. A short between the low side wiring of two injectors will cause active DTCs indicating low resistance in both injectors.
This DTC can also be caused by an injector that has low coil resistance (coil windings are shorted together).

Alarm Level:
Warning

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

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

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

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

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

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

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least 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.

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 ❷ **NO:** GO TO ⓫ – – –1/1
❷ Check for DTC Change with Open Injector Harness	**CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON!** *NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.* 1. Ignition OFF, engine OFF. 2. Disconnect 8-way injector connector between engine harness and injector harness. Do not remove injector heat shield. 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 ❸ **NO:** GO TO ❺ – – –1/1

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❸ **Injector Harness Terminal Test and Inspection**	1. Ignition OFF, engine OFF. 2. Perform Terminal Test on engine harness and injector harness 8-way connectors. 3. Remove injector heat shield. 4. Inspect injector harness for damage. Were any problems found?	**YES:** Fix problem. GO TO ❿ **NO:** GO TO ❹ – – –1/1

❹ **Check Injector Harness for Wire to Wire Short**	*NOTE: See REMOVE ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for connector dust cap removal instructions.* With 6.8L: 1. Remove injector #4 connector dust cap and terminal nuts. 2. Lift injector #4 connector away from injector studs. 3. On the injector harness 8-way connector (male pin terminals), measure the resistance between injector #4 control (terminal 4) and all other terminals in the 8-way connector. Are all resistance readings greater than 1k ohms? With 4.5L: 1. Remove injector #4 connector dust cap and terminal nuts. 2. Lift injector #4 connector away from injector studs. 3. On the injector harness 8-way connector (male pin terminals), measure the resistance between injector #4 control (terminal 3) and all other terminals in the 8-way connector. Are all resistance readings greater than 1k ohms?	**YES:** Replace injector. GO TO ❿ **NO:** Replace injector harness. GO TO ❿ – – –1/1

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❺ **ECU Terminal Test**	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO ❿ **NO:** GO TO ❻ – – –1/1

❻ **Check Engine Harness for Wire-to-Wire Short**	With 6.8L: 1. Disconnect ECU J2 connector. 2. On the harness, measure the resistance between the ECU injector #4 control (terminal J1-A1) and all terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms? With 4.5L: 1. Disconnect ECU J2 connector. 2. On the harness, measure the resistance between the ECU injector #4 control (terminal J1-D1) and all terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	**YES:** GO TO ❼ **NO:** Fix problem. GO TO ❿ – – –1/1

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❼ **Check Engine Harness for Short to Voltage Source**	With 6.8L: 1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU injector #4 control (terminal J1-A1) and single point ground. Is voltage greater than 0.5V? With 4.5L: 1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU injector #4 control (terminal J1-D1) and single point ground. Is voltage greater than 0.5V?	**YES:** Fix problem. GO TO ❿ **NO:** GO TO ❽ – – –1/1

❽ **Reprogram ECU**	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 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 000654.06 reappear active?	**YES:** GO TO ❾ **NO:** Problem fixed. – – –1/1

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❾ **Replace ECU**	1. Ignition OFF, engine OFF. 2. Replace ECU. 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 000654.06 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

❿ **Verification**	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 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 000654.06 reappear active?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

⓫ **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 ⓾ **YES:** If a certain operating point exists when error occurs then GO TO ⓬ **NO:** GO TO ⓭ – – –1/1

⓬ **Engine Error Operating Point Test**	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000654.06 reappear active when engine operating point was reached?	**YES:** GO TO ❶ **NO:** GO TO ⓭ – – –1/1

⓭ **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 #4, and 8-way injector harness connector. Were any problems found?	**YES:** Fix problem. GO TO ⓾ **NO:** GO TO ⓮ – – –1/1

⓮ **Reconnect and Retest**	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000654.06 reappear active with engine running?	**YES:** GO TO ❶. **NO:** GO TO ⓯. – – –1/1

⓯ **Reprogram ECU**	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000654.06 reappear active with engine running?	**YES:** GO TO ❶ **NO:** Replace injector #4. GO TO ⓾ – – –1/1

000654.07 — Injector #4 Not Responding

The fuel rail pressure does not drop at the injection of fuel to cylinder #4.

DN22556,0000501 –19–31MAY07–1/1

000654.07 — Injector #4 Not Responding Diagnostic Procedure

Troubleshooting Sequence:
000654.07

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

Related Information:
The ECU does not detects a drop in fuel rail pressure when cylinder #4 injects fuel.

Alarm Level:
Warning

Control Unit Response:
Engine will run rough and misfire since the injector in cylinder #4 is not injecting fuel.

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

– – –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. Ignition ON, Engine ON. 5. Refresh Codes. Did 000654.07 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❺ – – –1/1

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❷ Fuel Line Inspection	1. Ignition ON, Engine ON. **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.** **CAUTION: Escaping fluid under pressure can penetrate skin causing serious injury. Avoid the hazard be relieving pressure before disconnecting hydraulic or other high pressure 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 fluids injected into the skin must be surgically removed within 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, USA.** 2. Check for injector #4 fuel supply line leak. 3. Ignition OFF, Engine OFF. 4. Check for over bent/pinched or cracked fuel line between the rail and the injector. **IMPORTANT: If a cracked line is found replace flow damper also. For flow damper replacement see, REMOVE AND INSTALL FLOW DAMPERS in Section 2 Group 090.** Were any problems found?	**YES:** Repair problem. GO TO ⓫ **NO:** GO TO ❸ – – –1/1

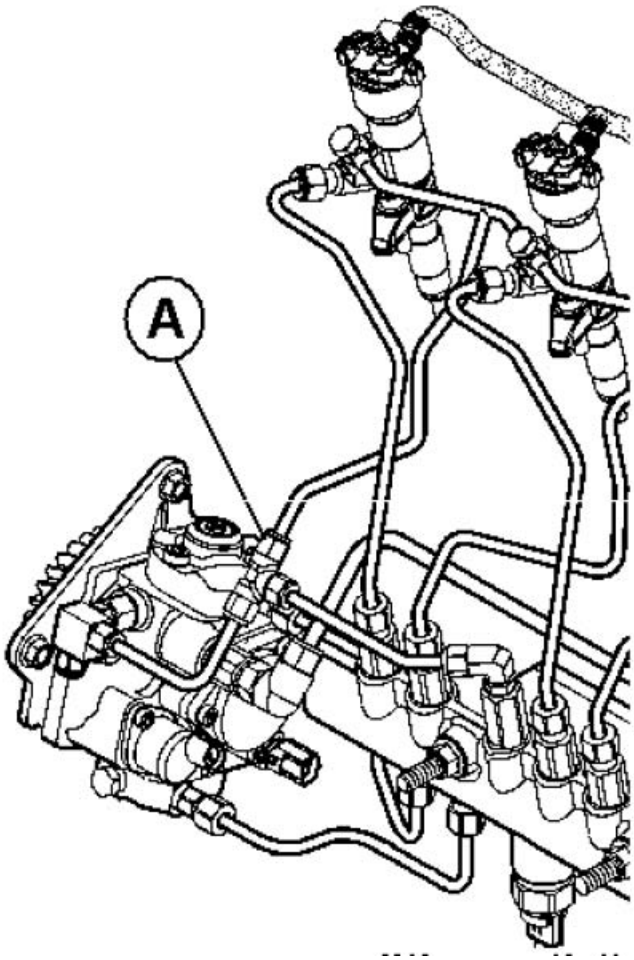
❸ **Misfire Test**	1. Ignition ON, Engine OFF. 2. Perform Cylinder Cutout Test and record results. 3. Perform Cylinder Misfire Test and record results. Do tests confirm a bad injector #4?	**YES:** Replace injector #4. GO TO ⓫ **NO:** GO TO ❹ – – –1/1

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 #4. GO TO ⓫

NO: GO TO ❺

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❺ **Occurrence Count Check**	Review stored information and look at occurrence count for 000654.07. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ❻ **NO:** GO TO ❼ – – –1/1
❻ **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 #4?	**YES:** Replace injector #4. GO TO ⓫ **NO:** GO TO ❽ – – –1/1
❼ **Time Between Occurrences Check**	Compare last occurrence engine hours with current engine hours. Is the difference greater than 50 hours?	**YES:** Return application to service. **NO:** GO TO ❽ – – –1/1
❽ **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 ❾ **NO:** GO TO ⓾ – – –1/1
❾ **Engine Error Operating Point Test**	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000654.07 reappear when engine operating point was reached?	**YES:** GO TO ❷ **NO:** GO TO ❽ – – –1/1
⓾ **Reprogram ECU**	Download latest ECU software payload and reprogram ECU using Service ADVISOR. Was reprogramming successful?	**YES:** GO TO ⓫ **NO:** Replace ECU, GO TO ⓫ – – –1/1

11 DTC Check	Ignition ON, Engine Idling. Is 000654.07 active?	**YES:** Start a DTAC case. **NO:** Problem fixed. – – –1/1

000654.13 — Injector #4 Calibration Fault

The ECU detects an incorrect QR Code was calibrated into the ECU.

DN22556,0000502 –19–24MAY07–1/1

000654.13 — Injector #5 Calibration Fault Diagnostic Procedure

Troubleshooting Sequence:
000654.13

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to run the engine normally.

Related Information:
The ECU detects an incorrect QR Code 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.

– – –1/1

❶ **QR Code Input Method Check**	Was the QR code typed in manually?	**YES:** GO TO ❷ **NO:** GO TO ❸

– – –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 ❸ – – –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 ❹ – – –1/1
❹ **Retrieve New Injector Calibration File**	Download a new injector calibration file, see DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILE earlier in this Group. Were you able to get a new calibration file?	**YES:** GO TO ❺ **NO:** GO TO ❻ – – –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 ❻ – – –1/1
❻ **ECU Programming**	1. Download the latest ECU software. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO ❼ **NO:** Replace ECU. GO TO ❸ – – –1/1

❼ **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:** Start a DTAC case. – – –1/1

000655.02 — Injector #5 Part Number Invalid

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

DN22556,0000503 –19–23MAY07–1/1

000655.02 — Injector #5 Part Number Invalid Diagnostic Procedure

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Troubleshooting Sequence:
000655.02

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to run the engine normally.

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 ❷ **NO:** GO TO ❽

– – –1/1

❷ **Part Number Check**	1. Select Injector Calibration in Service ADVISOR. 2. Check the part number on the injector data sheet against the one displayed. Are the part numbers the same?	**YES:** GO TO ❸ **NO:** GO TO ❹ – – –1/1
❸ **Part Verification**	Verify with parts department that the injector that was installed is the correct one for the application. Is the injector the correct one?	**YES:** GO TO ❺ **NO:** Remove injector and order proper injector. – – –1/1
❹ **Physical Verification of Part Number**	1. Remove injector from engine, see REMOVE ELECTRONIC INJECTOR (EI) in Section 2 Group 090 earlier in this manual. 2. Compare the inscribed part number against the datasheet and ordered injector. Is the injector the proper one for the application?	**YES:** Start a DTAC case. **NO:** Remove injector and order proper one. – – –1/1
❺ **Input Injector Data Again**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000655.02 active?	**YES:** GO TO ❻ **NO:** Problem fixed, return application to service. – – –1/1
❻ **ECU Programming Check**	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO ❼ **NO:** Check payload and try again. – – –1/1

❼ **Input Injector Data Again**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000655.02 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, return application to service. – – –1/1

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❽ **Automatic Input of Injector Data**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000655.02 active?	**YES:** GO TO ❾ **NO:** Problem fixed, return application to service. – – –1/1

❾ **Download Injector Calibration File**	Download a new injector calibration file, see DOWNLOADING INJECTOR CALIBRATION FILES earlier in this Group. Were you able to get a new file?	**YES:** GO TO ❿ **NO:** Contact John Deere Custom Performance. – – –1/1

⑩ Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000655.02 active?	**YES:** GO TO ⑪ **NO:** Problem fixed, return application to service. – – –1/1

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⑪ ECU Programming Check	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO ⑫ **NO:** Check payload and try again. – – –1/1

⑫ Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000655.02 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, return application to service. – – –1/1

000655.05 — Injector #5 Circuit Has High Resistance

The ECU detects an high resistance in the cylinder #5 electronic injector circuit.

DN22556,0000504 –19–30MAY07–1/1

000655.05 — Injector #5 Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:
000627.01
000655.05

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

Related Information:
The ECU detects high resistance in the cylinder #5 electronic injector circuit.
The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.
The ECU switches the low side (ground) to control each individual injector.
This DTC can be caused by an open circuit or by a few ohms of additional series resistance anywhere in the injector #5 circuit.
An open circuit in the injector high voltage supply may also cause active DTCs indicating high resistance in this and other injector circuits.

Alarm Level:
Warning

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

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

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

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

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

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

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 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 000655.05 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❿ – – –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 8-way injector connector between engine harness and injector harness. Do not remove the injector heat shield. 3. Perform Terminal Test on engine harness and injector harness 8-way connectors. Were any problems found?	**YES:** Fix problem. GO TO ❾ **NO:** GO TO ❸ – – –1/1
❸ **Check Injector Harness Resistance**	On the injector harness (male pin terminals), measure the resistance between injector high voltage supply (terminal 8) and injector #5 low side control (terminal 5). Is resistance less than 2 ohms?	**YES:** GO TO ❺ **NO:** GO TO ❹ – – –1/1

❹ **Check Injector Coil Resistance**	*NOTE: See REMOVE ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for connector dust cap removal instructions.* 1. Remove injector heat shield. 2. Inspect injector harness for damage. 3. Remove injector #5 connector dust cap. Do not remove terminals from injector. 4. On the injector, measure the resistance between the two injector studs. *NOTE: Contact injector studs or injector harness terminals with meter test leads for this measurement, not terminal nuts. Terminal nuts are installed with thread locking agent which may affect the resistance measurement.* Is the resistance less than 2 ohms?	**YES:** Replace injector wire harness. GO TO ❾ **NO:** Replace injector. GO TO ❾ – – –1/1

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❺ **Terminal Test**	**CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON!** 1. Disconnect ECU J1 connector. 2. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO ❾ **NO:** GO TO ❻ – – –1/1

❻ **Check Engine Harness Resistance**	1. On the harness, measure the resistance between the ECU injector #5 control (terminal J1-F1) and the injector harness 8-way connector (terminal 5). 2. On the harness, measure the resistance between the ECU high voltage supply (terminal J1-G2) and the injector harness 8-way connector (terminal 8). Are both resistance readings less than 2 ohms?	**YES:** GO TO ❼ **NO:** Fix problem. GO TO ❾ – – –1/1

❼ **Reprogram ECU**	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 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 000655.05 reappear active?	**YES:** GO TO ❽ **NO:** Problem fixed. – – –1/1
❽ **Replace ECU**	1. Ignition OFF, engine OFF. 2. Replace ECU. 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 000655.05 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1
❾ **Verification**	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 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 000655.05 reappear active?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

⑩ **Further Review of Snapshot Information**	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	**YES:** Fix problem if found. GO TO ⑨ **YES:** If a certain operating point exists when error occurs then GO TO ⑪ **NO:** GO TO ⑫ – – –1/1
⑪ **Engine Error Operating Point Test**	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000655.05 reappear active when engine operating point was reached?	**YES:** GO TO ① **NO:** GO TO ⑫ – – –1/1
⑫ **Terminal Test**	1. Ignition OFF, engine OFF 2. Perform Terminal Test on the ECU J1 connector, injector #5, and 8-way 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 000655.05 reappear active with engine running?	**YES:** GO TO ①. **NO:** GO TO ⑭. – – –1/1
⑭ **Reprogram ECU**	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000655.05 reappear active with engine running?	**YES:** GO TO ① **NO:** Replace injector #5. GO TO ⑨ – – –1/1

000655.06 — Injector #5 Circuit Has Low Resistance

The ECU detects a low resistance in the cylinder #5 electronic injector circuit.

DN22556,0000505 –19–30MAY07–1/1

000655.06 — Injector #5 Circuit Has Low Resistance Diagnostic Procedure

Troubleshooting Sequence:
000655.06

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

Related Information:
The ECU detects low resistance in the cylinder #5 electronic injector circuit.
The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.
The ECU switches the low side (ground) to control each individual injector.
This DTC can be caused by a wire-to-wire short. A short between the low side wiring of two injectors will cause active DTCs indicating low resistance in both injectors.
This DTC can also be caused by an injector that has low coil resistance (coil windings are shorted together).

Alarm Level:
Warning

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

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

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

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

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

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

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least 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.

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 000655.06 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓫ – – –1/1

❷ Check for DTC Change with Open Injector Harness	**CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON!** *NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.* 1. Ignition OFF, engine OFF. 2. Disconnect 8-way injector connector between engine harness and injector harness. Do not remove injector heat shield. 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 000655.05, high injector #5 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 ❸ **NO:** GO TO ❺ – – –1/1

❸ **Injector Harness Terminal Test and Inspection**	1. Ignition OFF, engine OFF. 2. Perform Terminal Test on engine harness and injector harness 8-way connectors. 3. Remove injector heat shield. 4. Inspect injector harness for damage. Were any problems found?	**YES:** Fix problem. GO TO ❿ **NO:** GO TO ❹ – – –1/1
❹ **Check Injector Harness for Wire to Wire Short**	*NOTE: See REMOVE ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for connector dust cap removal instructions.* 1. Remove injector #5 connector dust cap and terminal nuts. 2. Lift injector #5 connector away from injector studs. 3. On the injector harness 8-way connector (male pin terminals), measure the resistance between injector #5 control (terminal 5) and all other terminals in the 8-way connector. Are all resistance readings greater than 1k ohms?	**YES:** Replace injector. GO TO ❿ **NO:** Replace injector harness. GO TO ❿ – – –1/1
❺ **ECU Terminal Test**	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform Terminal Test on J1. Did you find a problem?	**YES:** Fix problem. GO TO ❿ **NO:** GO TO ❻ – – –1/1
❻ **Check Engine Harness for Wire-to-Wire Short**	1. Disconnect ECU J2 connector. 2. On the harness, measure the resistance between the ECU injector #5 control (terminal J1-F1) and all terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	**YES:** GO TO ❼ **NO:** Fix problem. GO TO ❿ – – –1/1
❼ **Check Engine Harness for Short to Voltage Source**	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU injector #5 control (terminal J1-F1) and single point ground. Is voltage greater than 0.5V?	**YES:** Fix problem. GO TO ❿ **NO:** GO TO ❽ – – –1/1

❽ **Reprogram ECU**	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 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 000655.06 reappear active?	**YES:** GO TO ❾ **NO:** Problem fixed. – – –1/1
❾ **Replace ECU**	1. Ignition OFF, engine OFF. 2. Replace ECU. 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 000655.06 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1
❿ **Verification**	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 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 000655.06 reappear active?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

⓫ 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 ⓾ **YES:** If a certain operating point exists when error occurs then GO TO ⓬ **NO:** GO TO ⓭ – – –1/1

⓬ 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 ❶ **NO:** GO TO ⓭ – – –1/1

⓭ 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 8-way injector harness connector. Were any problems found?	**YES:** Fix problem. GO TO ⓾ **NO:** GO TO ⓮ – – –1/1

⓮ 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 ❶. **NO:** GO TO ⓯. – – –1/1

⓯ **Reprogram ECU**	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000655.06 reappear active with engine running?	**YES:** GO TO ❶ **NO:** Replace injector #5. GO TO ⓾ – – –1/1

000655.07 — Injector #5 Not Responding

The fuel rail pressure does not drop at the injection of fuel to cylinder #5.

DN22556,0000506 –19–31MAY07–1/1

000655.07 — Injector #5 Not Responding Diagnostic Procedure

Troubleshooting Sequence:
000655.07

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

Related Information:
The ECU does not detects a drop in fuel rail pressure when cylinder #5 injects fuel.

Alarm Level:
Warning

Control Unit Response:
Engine will run rough and misfire since the injector in cylinder #5 is not injecting fuel.

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

– – –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. Ignition ON, Engine ON. 5. Refresh Codes. Did 000655.07 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❺ – – –1/1

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❷ Fuel Line Inspection	1. Ignition ON, Engine ON. **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.** **CAUTION: Escaping fluid under pressure can penetrate skin causing serious injury. Avoid the hazard be relieving pressure before disconnecting hydraulic or other high pressure 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 fluids injected into the skin must be surgically removed within 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, USA.** 2. Check for injector #5 fuel supply line leak. 3. Ignition OFF, Engine OFF. 4. Check for over bent/pinched or cracked fuel line between the rail and the injector. **IMPORTANT: If a cracked line is found replace flow damper also. For flow damper replacement see, REMOVE AND INSTALL FLOW DAMPERS in Section 2 Group 090.** Were any problems found?	**YES:** Repair problem. GO TO ⓫ **NO:** GO TO ❸ – – –1/1

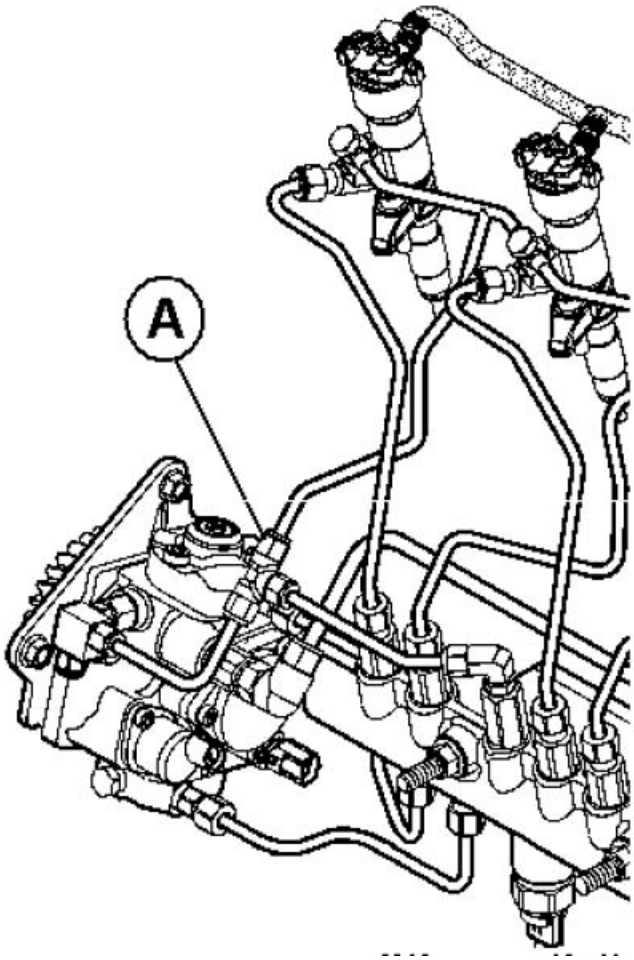
❸ **Misfire Test**	1. Ignition ON, Engine OFF. 2. Perform Cylinder Cutout Test and record results. 3. Perform Cylinder Misfire Test and record results. Do tests confirm a bad injector #5?	**YES:** Replace injector #5. GO TO ⓫ **NO:** GO TO ❹ – – –1/1

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 #5. GO TO ⓫

NO: GO TO ❺

– – –1/1

❺ **Occurrence Count Check**	Review stored information and look at occurrence count for 000655.07. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ❻ **NO:** GO TO ❼ – – –1/1
❻ **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 #5?	**YES:** Replace injector #5. GO TO ⓫ **NO:** GO TO ❽ – – –1/1
❼ **Time Between Occurrences Check**	Compare last occurrence engine hours with current engine hours. Is the difference greater than 50 hours?	**YES:** Return application to service. **NO:** GO TO ❽ – – –1/1
❽ **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 ❾ **NO:** GO TO ⓾ – – –1/1
❾ **Engine Error Operating Point Test**	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000655.07 reappear when engine operating point was reached?	**YES:** GO TO ❷ **NO:** GO TO ❽ – – –1/1
⓾ **Reprogram ECU**	Download latest ECU software payload and reprogram ECU using Service ADVISOR. Was reprogramming successful?	**YES:** GO TO ⓫ **NO:** Replace ECU, GO TO ⓫ – – –1/1

11 DTC Check	Ignition ON, Engine Idling. Is 000655.07 active?	**YES:** Start a DTAC case. **NO:** Problem fixed. – – –1/1

000655.13 — Injector #5 Calibration Fault

The ECU detects an incorrect QR Code was calibrated into the ECU.

DN22556,0000507 –19–24MAY07–1/1

000655.13 — Injector #5 Calibration Fault Diagnostic Procedure

Troubleshooting Sequence:
000655.13

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to run the engine normally.

Related Information:
The ECU detects an incorrect QR Code 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.

– – –1/1

❶ **QR Code Input Method Check**	Was the QR code typed in manually?	**YES:** GO TO ❷ **NO:** GO TO ❸

– – –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 ❸ – – –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 ❹ – – –1/1
❹ **Retrieve New Injector Calibration File**	Download a new injector calibration file, see DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILE earlier in this Group. Were you able to get a new calibration file?	**YES:** GO TO ❺ **NO:** GO TO ❻ – – –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 ❻ – – –1/1
❻ **ECU Programming**	1. Download the latest ECU software. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO ❼ **NO:** Replace ECU. GO TO ❸ – – –1/1

❼ **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:** Start a DTAC case. – – –1/1

000656.02 — Injector #6 Part # Data Invalid

The ECU detects an incorrect injector part number was installed or calibrated into cylinder #6.

DN22556,0000508 –19–23MAY07–1/1

000656.02 — Injector #6 Part Number Invalid Diagnostic Procedure

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Troubleshooting Sequence:
000656.02

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to run the engine normally.

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.

– – –1/1

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

– – –1/1

❷ **Part Number Check**	1. Select Injector Calibration in Service ADVISOR. 2. Check the part number on the injector data sheet against the one displayed. Are the part numbers the same?	**YES:** GO TO ❸ **NO:** GO TO ❹ – – –1/1
❸ **Part Verification**	Verify with parts department that the injector that was installed is the correct one for the application. Is the injector the correct one?	**YES:** GO TO ❺ **NO:** Remove injector and order proper injector. – – –1/1
❹ **Physical Verification of Part Number**	1. Remove injector from engine, see REMOVE ELECTRONIC INJECTOR (EI) in Section 2 Group 090 earlier in this manual. 2. Compare the inscribed part number against the datasheet and ordered injector. Is the injector the proper one for the application?	**YES:** Start a DTAC case. **NO:** Remove injector and order proper one. – – –1/1
❺ **Input Injector Data Again**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000656.02 active?	**YES:** GO TO ❻ **NO:** Problem fixed, return application to service. – – –1/1
❻ **ECU Programming Check**	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO ❼ **NO:** Check payload and try again. – – –1/1

❼ **Input Injector Data Again**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000656.02 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, return application to service. – – –1/1

❽ **Automatic Input of Injector Data**	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000656.02 active?	**YES:** GO TO ❾ **NO:** Problem fixed, return application to service. – – –1/1

❾ **Download Injector Calibration File**	Download a new injector calibration file, see DOWNLOADING INJECTOR CALIBRATION FILES earlier in this Group. Were you able to get a new file?	**YES:** GO TO ❿ **NO:** Contact John Deere Custom Performance. – – –1/1

⑩ Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000656.02 active?	**YES:** GO TO ⑪ **NO:** Problem fixed, return application to service. – – –1/1

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⑪ ECU Programming Check	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO ⑫ **NO:** Check payload and try again. – – –1/1

⑫ Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000656.02 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, return application to service. – – –1/1

000656.05 — Injector #6 Circuit Has High Resistance

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

DN22556,0000509 –19–30MAY07–1/1

000656.05 — Injector #6 Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:
000627.01
000656.05

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

Related Information:
The ECU detects high resistance in the cylinder #6 electronic injector circuit.
The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.
The ECU switches the low side (ground) to control each individual injector.
This DTC can be caused by an open circuit or by a few ohms of additional series resistance anywhere in the injector #6 circuit.
An open circuit in the injector high voltage supply may also cause active DTCs indicating high resistance in this and other injector circuits.

Alarm Level:
Warning

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

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

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

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

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

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

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 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 000656.05 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❿ – – –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 8-way injector connector between engine harness and injector harness. Do not remove the injector heat shield. 3. Perform Terminal Test on engine harness and injector harness 8-way connectors. Were any problems found?	**YES:** Fix problem. GO TO ❾ **NO:** GO TO ❸ – – –1/1
❸ **Check Injector Harness Resistance**	On the injector harness (male pin terminals), measure the resistance between injector high voltage supply (terminal 8) and injector #6 low side control (terminal 6). Is resistance less than 2 ohms?	**YES:** GO TO ❺ **NO:** GO TO ❹ – – –1/1

❹ **Check Injector Coil Resistance**	*NOTE: See REMOVE ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for connector dust cap removal instructions.* 1. Remove injector heat shield. 2. Inspect injector harness for damage. 3. Remove injector #6 connector dust cap. Do not remove terminals from injector. 4. On the injector, measure the resistance between the two injector studs. *NOTE: Contact injector studs or injector harness terminals with meter test leads for this measurement, not terminal nuts. Terminal nuts are installed with thread locking agent which may affect the resistance measurement.* Is the resistance less than 2 ohms?	**YES:** Replace injector wire harness. GO TO ❾ **NO:** Replace injector. GO TO ❾ – – –1/1

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❺ **ECU Terminal Test**	1. Disconnect ECU J1 connector. 2. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO ❾ **NO:** GO TO ❻ – – –1/1

❻ **Check Engine Harness Resistance**	1. On the harness, measure the resistance between the ECU injector #6 control (terminal J1-C1) and the injector harness 8-way connector (terminal 6). 2. On the harness, measure the resistance between the ECU high voltage supply (terminal J1-G2) and the injector harness 8-way connector (terminal 8). Are both resistance readings less than 2 ohms?	**YES:** GO TO ❼ **NO:** Fix problem. GO TO ❾ – – –1/1

❼ **Reprogram ECU**	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 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 000656.05 reappear active?	**YES:** GO TO ❽ **NO:** Problem fixed. – – –1/1

❽ **Replace ECU**	1. Ignition OFF, engine OFF. 2. Replace ECU. 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 000656.05 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

❾ **Verification**	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 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 000656.05 reappear active?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

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

⑪ **Engine Error Operating Point Test**	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000656.05 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 #6, and 8-way 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 000656.05 reappear active with engine running?	**YES:** GO TO ①. **NO:** GO TO ⑭. – – –1/1

⓮ **Reprogram ECU**	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000656.05 reappear active with engine running?	**YES:** GO TO ❶ **NO:** Replace injector #6. GO TO ❾ – – –1/1

000656.06 — Injector #6 Circuit Has Low Resistance

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

DN22556,000050A –19–30MAY07–1/1

000656.06 — Injector #6 Circuit Has Low Resistance Diagnostic Procedure

Troubleshooting Sequence:
000656.06

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

Related Information:
The ECU detects low resistance in the cylinder #6 electronic injector circuit.
The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.
The ECU switches the low side (ground) to control each individual injector.
This DTC can be caused by a wire-to-wire short. A short between the low side wiring of two injectors will cause active DTCs indicating low resistance in both injectors.
This DTC can also be caused by an injector that has low coil resistance (coil windings are shorted together).

Alarm Level:
Warning

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

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

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

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

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

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

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least 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.

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 000656.06 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓫ – – –1/1
❷ **Check for DTC Change with Open Injector Harness**	**CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON!** *NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.* 1. Ignition OFF, engine OFF. 2. Disconnect 8-way injector connector between engine harness and injector harness. Do not remove injector heat shield. 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 000656.05, high injector #6 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 ❸ **NO:** GO TO ❺ – – –1/1

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❸ **Injector Harness Terminal Test and Inspection**	1. Ignition OFF, engine OFF. 2. Perform Terminal Test on engine harness and injector harness 8-way connectors. 3. Remove injector heat shield. 4. Inspect injector harness for damage. Were any problems found?	**YES:** Fix problem. GO TO ❿ **NO:** GO TO ❹ – – –1/1
❹ **Check Injector Harness for Wire to Wire Short**	*NOTE: See REMOVE ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for connector dust cap removal instructions.* 1. Remove injector #6 connector dust cap and terminal nuts. 2. Lift injector #6 connector away from injector studs. 3. On the injector harness 8-way connector (male pin terminals), measure the resistance between injector #6 control (terminal 6) and all other terminals in the 8-way connector. Are all resistance readings greater than 1k ohms?	**YES:** Replace injector. GO TO ❿ **NO:** Replace injector harness. GO TO ❿ – – –1/1
❺ **ECU Terminal Test**	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform Terminal Test on J1. Were any problems found?	**YES:** Fix problem. GO TO ❿ **NO:** GO TO ❻ – – –1/1
❻ **Check Engine Harness for Wire-to-Wire Short**	1. Disconnect ECU J2 connector. 2. On the harness, measure the resistance between the ECU injector #6 control (terminal J1-C1) and all terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	**YES:** GO TO ❼ **NO:** Fix problem. GO TO ❿ – – –1/1
❼ **Check Engine Harness for Short to Voltage Source**	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU injector #6 control (terminal J1-C1) and single point ground. Is voltage greater than 0.5V?	**YES:** Fix problem. GO TO ❿ **NO:** GO TO ❽ – – –1/1

❽ **Reprogram ECU**	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 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 000656.06 reappear active?	**YES:** GO TO ❾ **NO:** Problem fixed. – – –1/1

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❾ **Replace ECU**	1. Ignition OFF, engine OFF. 2. Replace ECU. 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 000656.06 reappear active?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

❿ **Verification**	*NOTE: See INSTALL ELECTRONIC INJECTOR (EI) in Section 02, Group 90 earlier in this manual for injector for injector terminal installation instructions.* 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 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 000656.06 reappear active?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

⓫ 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 ⓾ **YES:** If a certain operating point exists when error occurs then GO TO ⓬ **NO:** GO TO ⓭ – – –1/1

⓬ Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000656.06 reappear active when engine operating point was reached?	**YES:** GO TO ❶ **NO:** GO TO ⓭ – – –1/1

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⓭ 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 #6, and 8-way injector harness connector. Were any problems found?	**YES:** Fix problem. GO TO ⓾ **NO:** GO TO ⓮ – – –1/1

⓮ Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000656.06 reappear active with engine running?	**YES:** GO TO ❶. **NO:** GO TO ⓯. – – –1/1

⓯ **Reprogram ECU**	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000656.06 reappear active with engine running?	**YES:** GO TO ❶ **NO:** Replace injector #6. GO TO ⓾ – – –1/1

000656.07 — Injector #6 Not Responding

The fuel rail pressure does not drop at the injection of fuel to cylinder #6.

DN22556,000050B –19–31MAY07–1/1

000656.07 — Injector #6 Not Responding Diagnostic Procedure

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Troubleshooting Sequence:
000656.07

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

Related Information:
The ECU does not detects a drop in fuel rail pressure when cylinder #6 injects fuel.

Alarm Level:
Warning

Control Unit Response:
Engine will run rough and misfire since the injector in cylinder #6 is not injecting fuel.

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

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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. Ignition ON, Engine ON. 5. Refresh Codes. Did 000656.07 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❺

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❷ **Fuel Line Inspection**	1. Ignition ON, Engine ON. **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.** **CAUTION: Escaping fluid under pressure can penetrate skin causing serious injury. Avoid the hazard be relieving pressure before disconnecting hydraulic or other high pressure 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 fluids injected into the skin must be surgically removed within 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, USA.** 2. Check for injector #6 fuel supply line leak. 3. Ignition OFF, Engine OFF. 4. Check for over bent/pinched or cracked fuel line between the rail and the injector. **IMPORTANT: If a cracked line is found replace flow damper also. For flow damper replacement see, REMOVE AND INSTALL FLOW DAMPERS in Section 2 Group 090.** Were any problems found?	**YES:** Repair problem. GO TO ⓫ **NO:** GO TO ❸

– – –1/1

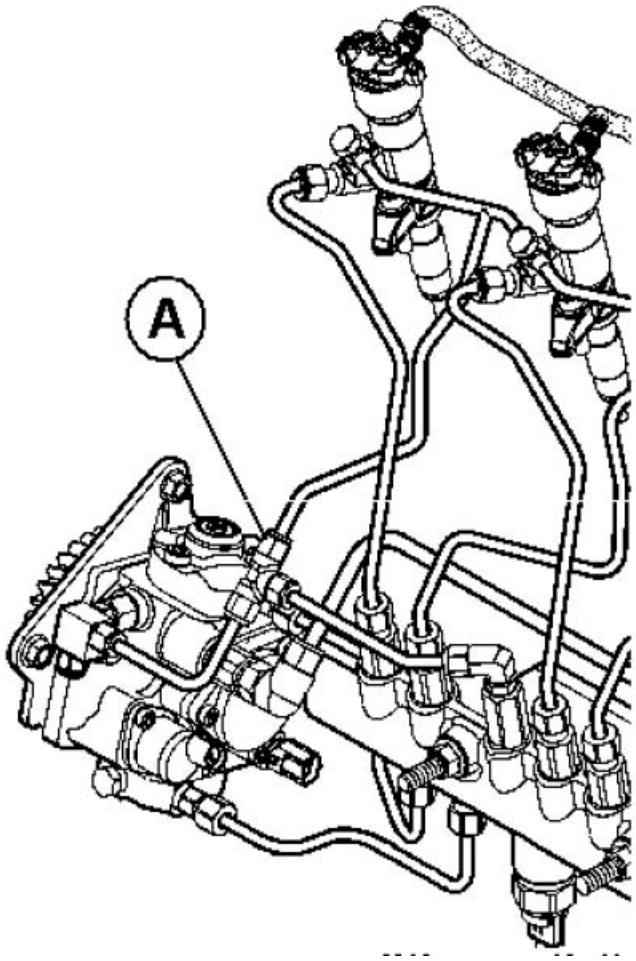
❸ **Misfire Test**	1. Ignition ON, Engine OFF. 2. Perform Cylinder Cutout Test and record results. 3. Perform Cylinder Misfire Test and record results. Do tests confirm a bad injector #6?	**YES:** Replace injector #6. GO TO ⓫ **NO:** GO TO ❹ – – –1/1

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.



RG14958 –UN–31MAY07

A—Leak off line "T" fitting

3. Place leak off line into a container suitable for fuel.

4. Ignition ON, Engine Idling.

5. Collect fuel for 2 minutes.

6. Measure the amount of fuel collected in the container.

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 #6. GO TO ⓫

NO: GO TO ❺

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

❻ **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 ⓫ **NO:** GO TO ❽ – – –1/1

❼ **Time Between Occurrences Check**	Compare last occurrence engine hours with current engine hours. Is the difference greater than 50 hours?	**YES:** Return application to service. **NO:** GO TO ❽ – – –1/1

❽ **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 ❾ **NO:** GO TO ⓾ – – –1/1

❾ **Engine Error Operating Point Test**	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000656.07 reappear when engine operating point was reached?	**YES:** GO TO ❷ **NO:** GO TO ❽ – – –1/1

⓾ **Reprogram ECU**	Download latest ECU software payload and reprogram ECU using Service ADVISOR. Was reprogramming successful?	**YES:** GO TO ⓫ **NO:** Replace ECU, GO TO ⓫ – – –1/1

11 DTC Check	Ignition ON, Engine Idling. Is 000656.07 active?	**YES:** Start a DTAC case. **NO:** Problem fixed. – – –1/1

000656.13 — Injector #6 Calibration Fault

The ECU detects an incorrect QR Code was calibrated into the ECU.

DN22556,000050C –19–24MAY07–1/1

000656.13 — Injector #6 Calibration Fault Diagnostic Procedure

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Troubleshooting Sequence:
000656.13

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to run the engine normally.

Related Information:
The ECU detects an incorrect QR Code 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.

– – –1/1

❶ **QR Code Input Method Check**	Was the QR code typed in manually?	**YES:** GO TO ❷ **NO:** GO TO ❸

– – –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 ❸ – – –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 ❹ – – –1/1
❹ **Retrieve New Injector Calibration File**	Download a new injector calibration file, see DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILE earlier in this Group. Were you able to get a new calibration file?	**YES:** GO TO ❺ **NO:** GO TO ❻ – – –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 ❻ – – –1/1
❻ **ECU Programming**	1. Download the latest ECU software. 2. Reprogram ECU. Was the ECU programming successful?	**YES:** GO TO ❼ **NO:** Replace ECU. GO TO ❸ – – –1/1

❼ **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:** Start a DTAC case. – – –1/1

001075.05 — Low Pressure Fuel Pump Circuit Has High Resistance

The ECU detects high resistance in the low pressure fuel pump control circuit.

JB81757,0000008 –19–30MAY07–1/1

001075.05 — Low Pressure Fuel Pump Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:
001075.05

When DTC is Displayed:
The ignition is ON, ECU low pressure fuel pump output is OFF, and the error condition is active.

Related Information:
The ECU detects high resistance (open circuit) in the low pressure fuel pump (transfer pump) control circuit.

This DTC may also be set if the low pressure fuel pump control circuit is shorted to a voltage source.

ECU supplies a high side output to energize the low pressure fuel pump relay. The ECU switches the output OFF if ignition is ON for 60 seconds and engine is not running. The ECU will only check for high resistance in the low pressure fuel pump relay control circuit when the low pressure fuel pump relay control output is OFF and ignition is ON.

Alarm Level:
Warning

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

Additional References:

NOTE: Consult application manual for more information on low pressure fuel pump system.

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: 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.

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. Ignition OFF, engine OFF for at least 5 seconds. 5. Ignition ON, engine OFF. 6. Wait 60 seconds for ECU to switch off low pressure fuel pump output. Did 001075.05 reappear active 60 seconds after ignition was cycled from OFF to ON?	**YES:** GO TO ❷ **NO:** GO TO ❿ – – –1/1

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❷ **Check Relay**	*NOTE: Consult application manual for information on relay and wire harness.* 1. Ignition OFF, engine OFF. 2. Inspect terminals at low pressure fuel pump relay connector. 3. Check for open circuit in low pressure fuel pump relay control coil. 4. Check for open circuit in low pressure fuel pump relay ground wire. Did you find an open ground circuit, shorted or open low pressure fuel pump relay coil, or a terminal problem?	**YES:** Fix problem. GO TO ❾ **NO:** Do not reconnect relay connector. GO TO ❸ – – –1/1
❸ **Test ECU Terminals**	1. Ignition OFF, engine OFF. 2. Disconnect ECU J2 connector. 3. Perform Terminal Test on J2. Were any problems found?	**YES:** Fix problem. GO TO ❾ **NO:** GO TO ❹ – – –1/1
❹ **Check Relay Control Circuit**	On the harness, measure the resistance between ECU low pressure fuel pump control output (terminal J2-M3) and the high side of the low pressure fuel pump relay connector. Is the resistance less than 10 ohms?	**YES:** GO TO ❺ **NO:** Fix problem. GO TO ❾ – – –1/1

❺ **Check Harness for Short to Voltage Source**	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage from the ECU J2 connector low pressure fuel pump relay control (terminal J2-M3) to single point ground. Is voltage less than 0.5V?	**YES:** GO TO ❻ **NO:** Fix problem. GO TO ❾ – – –1/1
❻ **Check Harness for Wire-to-Wire Short**	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. On the harness, measure the resistance between the ECU J2 connector low pressure fuel pump relay control (terminal J2-M3) and all other terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	**YES:** GO TO ❼ **NO:** Fix problem. GO TO ❾ – – –1/1
❼ **Reprogram ECU**	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Download latest ECU payload and reprogram ECU. 5. Ignition OFF, engine OFF for at least 5 seconds. 6. Ignition ON, engine OFF. 7. Wait 60 seconds for ECU to switch off low pressure fuel pump output. Did 001075.05 reappear active 60 seconds after ignition was cycled from OFF to ON?	**YES:** GO TO ❽ **NO:** Problem fixed. – – –1/1

❽ **Replace ECU**	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Download latest ECU payload and reprogram ECU. 5. Ignition OFF, engine OFF for at least 5 seconds. 6. Ignition ON, engine OFF. 7. Wait 60 seconds for ECU to switch off low pressure fuel pump output. Did 001075.05 reappear active 60 seconds after ignition was cycled from OFF to ON?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1

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❾ **Verification**	1. Ignition OFF, engine OFF for at least 5 seconds. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Wait 60 seconds for ECU to switch off low pressure fuel pump output. Did 001075.05 reappear active 60 seconds after ignition was cycled from OFF to ON?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

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

001075.06 — Low Pressure Fuel Pump Circuit Has Low Resistance

The ECU detects low resistance in the low pressure fuel pump control circuit.

JB81757,0000009 –19–30MAY07–1/1

001075.06 — Low Pressure Fuel Pump Circuit Has Low Resistance Diagnostic Procedure

Troubleshooting Sequence:
001075.06

When DTC is Displayed:
The ignition is ON, the ECU low pressure fuel pump output is ON, and the error condition is active.

Related Information:
The ECU detects low resistance (short to ground) in the low pressure fuel pump (transfer pump) control circuit.

ECU supplies a high side output to energize the low pressure fuel pump relay. The ECU switches the output OFF if ignition is ON for 60 seconds and engine is not running. The ECU will only check for low resistance in the low pressure fuel pump relay control circuit when the low pressure fuel pump relay control output is ON.

Alarm Level:
Warning

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

Additional References:

NOTE: Consult application manual for more information on low pressure fuel pump system.

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: 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.

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. Ignition OFF, engine OFF for at least 5 seconds. 5. Ignition ON, engine OFF. Did 001075.06 reappear active within 60 seconds of ignition ON?	**YES:** GO TO ❷ **NO:** GO TO ❾ – – –1/1

❷ **Check Relay**	*NOTE: Consult application manual for information on relay and wire harness.* 1. Ignition OFF, engine OFF. 2. Disconnect low pressure fuel pump relay coil connector. 3. Inspect relay terminals. 4. Check for a shorted (low resistance) low pressure fuel pump relay control coil. Is low pressure fuel pump relay coil shorted?	**YES:** Replace relay. GO TO ❽ **NO:** Do not reconnect relay connector. GO TO ❸ – – –1/1

❸ **Test ECU Terminals**	1. Disconnect ECU J2 connector. 2. Perform Terminal Test on J2. Were any problems found?	**YES:** Fix problem. GO TO ❽ **NO:** GO TO ❹ – – –1/1

❹ **Check Harness for Short to Ground**	On the harness, measure the resistance between ECU low pressure fuel pump control output (terminal J2-M3) and single point ground. Is the resistance greater than 1k ohms?	**YES:** GO TO ❺ **NO:** Fix problem. GO TO ❽ – – –1/1

❺ **Check for Wire-to-Wire Short**	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. On the harness, measure the resistance between the ECU J2 connector low pressure fuel pump relay control (J2-M3) and all other terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	**YES:** GO TO ❻ **NO:** Fix problem. GO TO ❽ – – –1/1
❻ **Reprogram ECU**	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Download latest ECU payload and reprogram ECU. 5. Ignition OFF, engine OFF for at least 5 seconds. 6. Ignition ON, engine OFF. Did 001075.06 reappear active within 60 seconds of ignition ON?	**YES:** GO TO ❼ **NO:** Problem fixed. – – –1/1
❼ **Replace ECU**	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Download latest ECU payload and reprogram ECU. 5. Ignition OFF, engine OFF for at least 5 seconds. 6. Ignition ON, engine OFF. Did 001075.06 reappear active within 60 seconds of ignition ON?	**YES:** Open DTAC case. **NO:** Problem fixed. – – –1/1
❽ **Verification**	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Ignition OFF, engine OFF for at least 5 seconds. 5. Ignition ON, engine OFF. Did 001075.06 reappear active within 60 seconds of ignition ON?	**YES:** GO TO ❶ **NO:** Problem fixed. – – –1/1

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

001136.00 — ECU Temperature Signal Extremely High

The ECU detects its internal temperature above specification.

DN22556,0000514 –19–09MAY07–1/1

001136.00 — ECU Temperature Signal Extremely High Diagnostic Procedure

Troubleshooting Sequence:
All xxxxxx.06 codes
000611.04
001347.05
001136.00

Related Information:
The ECU senses an internal ECU temperature of 135° C (275° F) on OEM engines.

Alarm Level:
STOP

Control Unit Response:
The ECU limits the engine to 1200 RPMs.

Additional References:
For further ECU information, see ENGINE CONTROL UNIT (ECU) MAINTENANCE in Section 02, Group 110 earlier in this manual.
For further ECU temperature sensor information, see ECU 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 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.

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.

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 Codes. Did 001136.00 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❼ – – –1/1

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❷ **Check Physical Environment**	1. Ignition OFF, Engine OFF. 2. Make the following checks: • Remove any items that are restricting the air flow around the ECU. • Remove dirt and debris from the ECU. Be cautious not to damage the connectors or strike ECU housing. Do not use a pressure wash to clean the ECU. • Verify the ECU is not mounted near high temperature components or in the path of high temperature air flow. Do any of the above conditions exist?	**YES:** Correct environment. GO TO ❻ **NO:** ❸ – – –1/1

❸ **Direct Sunlight**	Is the ECU in direct sunlight?	**YES:** Shade the ECU. GO TO ❻ **NO:** GOT TO❹ – – –1/1

❹ **Test ECU**	If a Programming Harness is available, perform the following steps. 1. Ignition OFF, Engine OFF 2. Disconnect all connectors from ECU. 3. Remove ECU from application. 4. Connect ECU to programming harness 5. Power ECU on from the Programming Harness. 6. Wait for 20 minutes. 7. Refresh codes from within Service ADVISOR. Is 001136.00 still active?	**YES:** Bad sensor. Replace ECU. GO TO ❻ **NO:** Programming Harness not available. GO TO ❺ **NO:** 001136.00 not active. Recheck physical environment. GO TO ❶ – – –1/1

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❺ **Test ECU**	1. Ignition OFF, Engine OFF. 2. Disconnect all connectors from ECU. 3. Remove ECU from application. Isolate ECU from any hot areas. 4. Reconnect ECU connector J2. 5. Ignition ON, Engine OFF. 6. Wait 20 minutes. 7. Refresh codes from within Service ADVISOR. Is 001136.00 still active?	**YES:** Bad sensor. Replace ECU. GO TO ❻ **NO:** Recheck physical environment. GO TO ❶ – – –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 ❶ **NO:** Problem fixed. – – –1/1

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

001136.16 — ECU Temperature Signal Moderately High

The ECU detects an internal temperature above specification.

DN22556,0000515 –19–09MAY07–1/1

001136.16 — ECU Temperature Signal Moderately High Diagnostic Procedure

Troubleshooting Sequence:
All xxxxxx.06 codes
000611.04
001347.05
001136.00

Related Information:
The ECU senses an internal ECU temperature of 125° C (257° F) on OEM engines.

Alarm Level:
Warning

Control Unit Response:
The ECU will continue to operate normally.

Additional References:
For further ECU information, see ENGINE CONTROL UNIT (ECU) MAINTENANCE in Section 02, Group 110 earlier in this manual.
For further ECU temperature sensor information, see ECU TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual..

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

For wiring information:
- see 4.5L 12V ECU WIRING DIAGRAM 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.

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.

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 Codes. Did 001136.16 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❼ – – –1/1

❷ **Check Physical Environment**	1. Ignition OFF, Engine OFF. 2. Make the following checks: • Remove any items that are restricting the air flow around the ECU. • Remove dirt and debris from the ECU. Be cautious not to damage the connectors or strike ECU housing. Do not use a pressure wash to clean the ECU. • Verify the ECU is not mounted near high temperature components or in the path of high temperature air flow. Do any of the above conditions exist?	**YES:** Correct environment. GO TO ❻ **NO:** ❸ – – –1/1

❸ **Direct Sunlight**	Is the ECU in direct sunlight?	**YES:** Shade the ECU. GO TO ❻ **NO:** GOT TO❹ – – –1/1

❹ **Test ECU**	If a Programming Harness is available, perform the following steps. 1. Ignition OFF, Engine OFF 2. Disconnect all connectors from ECU. 3. Remove ECU from application. 4. Connect ECU to programming harness 5. Power ECU on from the Programming Harness. 6. Wait for 20 minutes. 7. Refresh codes from within Service ADVISOR. Is 001136.16 still active?	**YES:** Bad sensor in ECU. Replace ECU. GO TO ❻ **NO:** Programming Harness not available. GO TO ❺ **NO:** 001136.00 not active. Recheck physical environment. GO TO ❶ – – –1/1

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❺ **Test ECU**	1. Ignition OFF, Engine OFF. 2. Disconnect all connectors from ECU. 3. Remove ECU from application. Isolate ECU from any hot areas. 4. Reconnect ECU connector J2. 5. Ignition ON, Engine OFF. 6. Wait 20 minutes. 7. Refresh codes from within Service ADVISOR. Is 001136.16 still active?	**YES:** Bad sensor in ECU. Replace ECU. GO TO ❻ **NO:** Recheck physical environment. GO TO ❶ – – –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 001136.16 reappear as active with engine running?	**YES:** GO TO ❶ **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

001321.05 — Engine Starter Solenoid Lockout Relay Drive Circuit Has High Resistance

For troubleshooting procedures please see the application troubleshooting manual.

DN22556,0000620 –19–24MAY07–1/1

001321.06 — Engine Starter Solenoid Lockout Relay Drive Circuit Has Low Resistance

For troubleshooting procedures please see the application troubleshooting manual.

DN22556,0000621 –19–24MAY07–1/1

001321.30 — Engine Starter Solenoid Lockout Relay Drive Circuit Fault

For troubleshooting procedures please see the application troubleshooting manual.

DN22556,0000622 –19–24MAY07–1/1

001347.03 — High Pressure Fuel Suction Control Valve Signal Out of Range High

ECU detects high current in the suction control valve return wire.

DN22556,000051B –19–15MAY07–1/1

001347.03 — High Pressure Fuel Suction Control Valve Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:
001347.03

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 power in the suction control valve circuit. The engine will probably not start because the valve is shut off when power is applied to it.

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.

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 Codes. Did 001347.03 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❼ – – –1/1

❷ **Voltage Measurement With Ignition Key OFF**	1. Monitor and write down the Battery Voltage displayed on Service ADVISOR. 2. Ignition OFF, Engine OFF. 3. Disconnect the high pressure fuel pump suction control valve connector. 4. On the harness, measure the voltage between Drive + (terminal 1) and Drive - (terminal 2) Does the voltage equal battery voltage ± 2v?	**YES:** GO TO ❸ **NO:** GO TO ❹ – – –1/1

❸ **Wiring Check**	1. Ignition OFF, Engine OFF. 2. Disconnect all ECU connectors. 3. On the ECU harness, measure the voltage between Drive - (terminal J1-H2) and all other terminals in all ECU connectors. *NOTE: The battery is connected to J2 – L1, J2 – L4, J2 – M1, and J2 – M4.* Does the voltage equal battery voltage ± 2v?	**YES:** Short in suction control valve supply wire with terminal that measured same voltage. **NO:** GO TO ❷ – – –1/1

❹ **Voltage Measurement With Ignition Key ON**	1. Ignition ON, Engine OFF. 2. On the harness, measure the voltage between Drive + (terminal 1) and Drive - (terminal 2) Does the voltage equal battery voltage ± 2v?	**YES:** GO TO ❺ **NO:** GO TO ❻ – – –1/1

❺ **Wiring Check**	1. Ignition OFF, Engine OFF. 2. Disconnect all ECU connectors. 3. Ignition ON, Engine OFF. 4. On the ECU harness, measure the voltage between Drive - (terminal J1-H2) and all other terminals in all ECU connectors. *NOTE: The battery is connected to J2 – L1, J2 – L4, J2 – M1, and J2 – M4. Ignition is connected to J2 – B2.* Does any measurement equal battery voltage ± 2v?	**YES:** Short in suction control valve supply wire with terminal that measured same voltage. **NO:** GO TO ❹ – – –1/1
❻ **ECU Drive Circuit Resistance Check**	On the ECU, measure the resistance between Drive + (terminal J1-H1) and Drive - (terminal J1-H2). Is the resistance infinite ohms?	**YES:** Start a DTAC case. **NO:** Replace ECU. GO TO ❶ – – –1/1
❼ **Occurrence Count Check**	Review stored information and look at occurrence count for 001347.03. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ❽ **NO:** GO TO ❾ – – –1/1
❽ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Perform Terminal Test on the suction control valve harness connector. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ❿ – – –1/1
❾ **Review Engine Hours**	Compare engine hours of last occurrence of the snapshot capture data with the current engine hours. Is the difference greater than 50 hours?	**YES:** Return application to service. **NO:** GO TO ❿ – – –1/1

⓾ **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 ⓫ **NO:** GO TO ⓬ – – –1/1

⓫ **Engine Error Operating Point Test**	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 001347.03 reappear when engine operating point was reached?	**YES:** Replace high pressure fuel pump suction control valve. GO TO ❶ **NO:** GO TO ⓾ – – –1/1

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⓬ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Perform terminal test on the high pressure fuel pump suction control valve connector and ECU J1 connector. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** GO TO ⓭ – – –1/1

⓭ **Software Updates**	1. Download latest software, reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 3. Ignition ON, Engine OFF. 4. Refresh codes. Is 001347.03 active?	**YES:** Start a DTAC Case. **NO:** Problem fixed, faulty ECU program. – – –1/1

001347.05 — High Pressure Fuel Pump Solenoid #1 Circuit Has High Resistance

The ECU is unable to match the measured pump current with the commanded pump current.

DN22556,000051C –19–15MAY07–1/1

001347.05 — High Pressure Fuel Pump Solenoid #1 Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:
001347.03
001347.05

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

Alarm Level:
Warning

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

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

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

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

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

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

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

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

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

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

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. Cycle the ignition key OFF then ON. 5. Refresh Codes. Did 001347.05 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ⓫ – – –1/1

❷ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Disconnect the high pressure fuel pump suction control valve connector. 3. Perform Terminal Test on the suction control valve harness connector. Were any problems found?	**YES:** Repair problem. GO TO ❷ **NO:** GO TO ❸ – – –1/1

❸ **Valve Resistance Check**	On the Suction Control Valve, measure the resistance between drive + (terminal 1) and drive - (terminal 2). **Specification** Suction Control Valve Coil—Resistance ..... 2.5 ± 1.0 ohms Is the measurement within specification?	**YES:** GO TO ❹ **NO:** Replace suction control valve. GO TO ❶ – – –1/1

❹ **Short to Ground Wiring Check**	On the harness, measure the resistance between: • drive + (terminal 1) and drive - (terminal 2). • drive + (terminal 1) and application single point ground. **Specification** Total resistance—Resistance..... Less than 10 ohms? Are values within specification?	**YES:** GO TO ❺ **NO:** GO TO ❽ – – –1/1
❺ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Disconnect the ECU connector J1. 3. Perform Terminal Test on connector ECU J1. Were any problems found?	**YES:** Repair problem. GO TO ❶ **NO:** GO TO ❻ – – –1/1
❻ **Short to Ground Wiring, ECU Disconnected Check**	On the harness, measure the resistance between: • drive + (terminal 1) and drive - (terminal 2). • drive + (terminal 1) and application single point ground. Is either measurement less than 1000 ohms?	**YES:** Repair shorted wire that measured less than 1000 ohms. GO TO ❶ **NO:** GO TO ❼ – – –1/1
❼ **ECU Drive Circuit Resistance Check**	On the ECU, measure the resistance between Drive + (terminal J1-H1) and Drive - (terminal J1-H2). Is the resistance infinite ohms?	**YES:** Start a DTAC case. **NO:** Replace ECU. GO TO ❶ – – –1/1
❽ **Terminal Test**	1. Ignition OFF, Engine OFF 2. Disconnect the ECU connector J1. 3. Perform Terminal Test on connector ECU J1. Were any problems found?	**YES:** Repair problem. GO TO ❶ **NO:** GO TO ❾ – – –1/1

9 Open Wiring Check	On the harness, measure the resistance between: • suction control valve drive + (terminal 1) and ECU drive + (terminal J1-H1). • suction control valve drive - (terminal 2) and ECU drive - (terminal J1-H2). Is either measurement greater than 10 ohms?	**YES:** Repair open wire that measured greater than 10 ohms. GO TO 1 **NO:** GO TO 10 – – –1/1
10 Software Updates	1. Download latest software, reprogram ECU using Service ADVISOR. 2. Cycle the ignition key OFF then ON. 3. Refresh codes. Is 001347.05 active?	**YES:** Start a DTAC Case. **NO:** Problem fixed, faulty ECU program. – – –1/1
11 Occurrence Count Check	Review stored information and look at occurrence count for 001347.05. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO 12 **NO:** GO TO 13 – – –1/1
12 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform Terminal Test on the suction control valve harness connector. Were any problems found?	**YES:** Repair problem. GO TO 1 **NO:** GO TO 14 – – –1/1
13 Review Engine Hours	Compare engine hours of last occurrence of the snapshot capture data with the current engine hours. Is the difference greater than 50 hours?	**YES:** Return application to service. **NO:** GO TO 14 – – –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:** Repair 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 001347.05 reappear when engine operating point was reached?	**YES:** Replace high pressure fuel pump suction control valve. GO TO 1 **NO:** GO TO 14 – – –1/1

16 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform terminal test on the high pressure fuel pump suction control valve connector and ECU J1 connector. Were any problems found?	**YES:** Repair problem. GO TO 114 **NO:** GO TO 17 – – –1/1

17 Software Updates	1. Download latest software, reprogram ECU using Service ADVISOR. 2. Cycle the ignition key OFF then ON. 3. Refresh codes. Is 001347.05 active?	**YES:** Start a DTAC Case. **NO:** Problem fixed, faulty ECU program. – – –1/1

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001347.07 — High Pressure Fuel Pump Not Able to Meet Required Rail Pressure

The ECU detects fuel rail pressure 5 MPa (725 psi) above or below the expected pressure.

DN22556,000051D –19–26MAY07–1/1

001347.07 — High Pressure Fuel Pump Not Able to Meet Required Rail Pressure Diagnostic Procedure

Troubleshooting Sequence:
000094.17
000157.03 or 000157.04
000157.10
001347.03
001347.05
001347.07

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

Related Information:
The ECU detects fuel rail pressure 5 MPa (725 psi) above or below the expected pressure.
Engine could miss or run rough.
Engine may have low power.
Engine may have black smoke.

Alarm Level:
Warning

Control Unit Response:
The ECU will command the high pressure fuel pump to increase or decrease the amount of fuel supplied to the HPCR.

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 information on pressure sensors, 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

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. Ignition ON, Engine ON. 5. Refresh Codes. Did 001347.07 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❻

– – –1/1

❷ **Rail Pressure Voltage Check**	1. Ignition ON, Engine OFF. *NOTE: Let engine stand for at least 15 minutes to allow the high pressure fuel system to bleed off the pressure.* 2. Monitor Rail Pressure Output Voltage and Rail Pressure - Actual. Is the voltage between 0.9v and 1.1v, and the pressure between 0.0kPa (0.0psi)?	**YES:** GO TO ❸ **NO:** GO TO ⓫

– – –1/1

❸ **Fuel Filter Replacement**	1. Ignition OFF, Engine OFF. 2. Replace fuel filters, see REPLACE FUEL FILTER ELEMENT (PRIMARY OR FINAL) in Section 2 Group 090 earlier in this manual. **IMPORTANT: Be sure to replace the dust washer properly.** 3. Ignition ON, Engine ON. 4. Refresh codes. Is 001347.07 active?	**YES:** Problem fixed, return to service. **NO:** GO TO ❹ – – –1/1

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❹ **Fuel Rail Pressure Relief Valve Check**	1. Ignition OFF, Engine OFF. *NOTE: Let engine stand for at least 15 minutes to allow the high pressure fuel system to bleed off the pressure.* 2. Disconnect the fuel return line from the pressure limiter, see REMOVE AND INSTALL PRESSURE LIMITER in Section 2 Group 090 earlier in this manual. 3. Connect a clear line to the end of the pressure limiter and the other end into a suitable fuel container. 4. Ignition ON, Engine ON. Is there fuel coming out of the line into the container?	**YES:** Replace Fuel Limiter. GO TO ❶ **NO:** Reconnect fuel return line to pressure limiter. GO TO ❺ – – –1/1

❺ **High Pressure Fuel Leak Check**	1. Perform the Cylinder Cutout, Cylinder Misfire and Compression Test, procedures earlier in this section. 2. Use the values from the tests to determine if there is a problem in one or more cylinders. *NOTE: As an example: High compression in a cylinder may indicate a fuel leak.* Did all tests pass?	**YES:** GO TO ❻ **NO:** Look at test results, perform suspect test(s) again? – – –1/1

❻ **Record Parameters for Review**	1. Ignition ON, Engine ON. **IMPORTANT: Warm engine to normal operating temperature, coolant temperature approximately 75° C (167° F).** 2. Record the following parameters over a wide variety or speed and load conditions. *NOTE: Total recording time should be at least 3 minutes. The error condition must exist for at least 30 seconds to set the code. You may be able to visually see a problem without the code setting.* • Fuel Rail Pressure - Actual • Fuel Rail Pressure - Desired • Engine Speed • Load at Current Speed • Fuel Transfer Pump Pressure 3. Review recording to ensure all parameters were recorded. Did you get a good recording?	**YES:** GO TO ❼ **NO:** Make another recording. – – –1/1

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❼ **Fuel Transfer Pump Pressure Check**	1. Ignition ON, Engine OFF. 2. Review Fuel Transfer Pump Pressure in recording from step 6. Is the pressure consistently between 15kPa and 40kPa?	**YES:** GO TO ❽ **NO:** Go to DTC 000094.17 and follow the trouble shooting procedure. – – –1/1

❽ **Desired and Actual Rail Pressure Check**	Review Rail Pressure Desired and Actual in recording from step 6. Are pressures within 5MPa of one another at all times.	**YES:** Start a DTAC case. **NO:** GO TO ❾ – – –1/1

❾ **Replace High Pressure Pump Suction Control Valve**	1. Ignition OFF, Engine OFF. 2. Replace High Pressure Pump Suction Control Valve, see REMOVE AND INSTAL SUCTION CONTROL VALVE in Section 2 Group 090 earlier in this manual. 3. Ignition ON, Engine ON. 4. Refresh codes. Is 001347.07 active?	**YES:** GO TO ❿ **NO:** Problem fixed, return to service. – – –1/1

⑩ **Replace High Pressure Fuel Pump**	1. Ignition OFF, Engine OFF. 2. Replace High Pressure Fuel Pump, see REMOVE AND INSTAL HIGH PRESSURE FUEL PUMP in Section 2 Group 090 earlier in this manual. 3. Ignition ON, Engine ON. 4. Refresh codes. Is 001347.07 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, return to service. – – –1/1

⑪ **Rail Pressure Sensor Terminal Test**	1. Ignition OFF, Engine OFF. 2. Disconnect fuel rail pressure sensor connector. 3. Perform Terminal Test.	**YES:** Repair problem. GO TO ❶ **NO:** GO TO ⑫ – – –1/1

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⑫ **Rail Pressure Sensor Resistance Checks**	On the rail pressure sensor make the following resistance measurements and record the values. **Specification** Signal (terminal 1) and return (terminal 2).—Resistance ..... 8k - 16.4k ohms **Specification** Signal (terminal 1) and supply (terminal 3).—Resistance ..... 1k - 3k ohms **Specification** Signal (terminal 1) and sensor body.—Resistance ..... Infinite **Specification** Return (terminal 2) and sensor body.—Resistance ..... Infinite **Specification** Signal (terminal 3) and sensor body.—Resistance ..... Infinite Are all values within specification?	**YES:** GO TO ⑬ **NO:** Replace rail pressure sensor. GO TO ❶ – – –1/1

⓭ **Reconnect and Retest**	1. Reconnect fuel rail pressure connector. 2. Ignition ON, Engine ON. 3. Refresh codes. Is 001347.07 active?	**YES:** GO TO ❸ **NO:** Problem fixed, bad connection. – – –1/1

001569.31 — Engine in Power Derate Condition

The ECU detects a condition that requires an engine power derate.

Related Information:
The engine power derate diagnostic trouble code is information to the operator that the ECU has detected a condition such as high coolant temperature and is derating the engine by limiting the maximum amount of fuel available to the engine. This code will only set as a result of another DTC setting.

Alarm Level:
Warning

Control Unit Response:
The ECU will limit the amount of engine power in an attempt to protect the engine.

Additional References:
For more information on derates see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 3 Group 140 earlier in this manual.

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002023.09 — No CAN Message Received From Source Address 17 Within Time Out Period

For troubleshooting procedures please see the application troubleshooting manual.

DN22556,000061E –19–26MAY07–1/1

002071.09 — No CAN Message Received From Source Address 71 Within Time Out Period

For troubleshooting procedures please see the application troubleshooting manual.

DN22556,000061F –19–24MAY07–1/1

003509.03 — Sensor Supply #1 Voltage Out of Range High

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

DN22556,0000626 –19–26MAY07–1/1

003509.03 — Sensor Supply #1 Voltage Out of Range High Diagnostic Procedure

Troubleshooting Sequence:
003509.03

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

Related Information:
The ECU detects a supply voltage greater than 5.26 volts on the Sensor Supply #1 circuit.

The output from this supply comes out of J1 of the ECU.

Alarm Level:
Warning

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Sensors Using Sensor Supply #1 Voltage:
Manifold Air Pressure Sensor.

Control Unit Response:
The ECU will try to operate normally. Engine performance may be affected.

Additional References:
For more sensor supply #1 information, see SENSOR SUPPLY #1 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 JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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 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 003509.03 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❺ – – –1/1

❷ **No Load Sensor Supply Voltage Check**	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J1. *NOTE: New error codes will appear in the next step. Disregard all codes except for 003509.03* 3. Ignition ON, Engine OFF. 4. Refresh codes. Is 003509.03 still active?	**YES:** Replace ECU. Run HARNESS DIAGNOSTICS MODE TEST in Service ADVISOR. **NO:** GO TO ❸ – – –1/1

❸ **Wiring Harness Short to Battery Check**	1. Ignition OFF, Engine OFF. 2. Measure voltage from power terminal (J1-A4) on the ECU harness connector to chassis ground. Was the voltage greater than 5.5 volts?	**YES:** Look for shorted wires in harness and repair wiring. Run HARNESS DIAGNOSTICS MODE TEST in Service ADVISOR. **NO:** GO TO ❹ – – –1/1

❹ **Wiring Harness Check**	1. Disconnect all ECU connectors. 2. Measure resistance from power terminal (J1-A4) on the ECU harness connector to all other terminals of J1 and J2 on the ECU harness. Were any measurements less than 10 ohms?	**YES:** Look for shorted wires in harness and repair wiring. Run HARNESS DIAGNOSTICS MODE TEST in Service ADVISOR. **NO:** Reconnect all connectors. Run HARNESS DIAGNOSTICS MODE TEST in Service ADVISOR. – – –1/1

❺ **Occurrence Count Check**	Review stored information and look at occurrence count for 003509.03. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ❻ **NO:** GO TO ❼ – – –1/1

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❻ **Harness Check**	1. Ignition OFF, Engine OFF. 2. Inspect ECU connectors and harness wiring for pinched or melted wiring. If necessary, remove connectors to get a better visual inspection. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Reconnect all ECU connectors. GO TO ❼ – – –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 ❽ **NO:** GO TO ❾ – – –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 003509.03 reappear when engine operating point was reached?	**YES:** Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **YES:** GO TO ❷ **NO:** GO TO ❼ – – –1/1

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

❿ **Software Updates**	1. Check Custom Performance for possible software updates. If new software is available, reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 003509.03 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, bad ECU program. – – –1/1

003509.04 — Sensor Supply #1 Voltage Out of Range Low

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

DN22556,0000627 –19–26MAY07–1/1

003509.04 — Sensor Supply #1 Voltage Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:
003509.04

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

Related Information:
The ECU detects a supply voltage lower than 4.59 volts on the Sensor Supply #1 circuit.

Output from this supply comes from J1 of the ECU.

Alarm Level:
Warning

Sensors Using Sensor Supply #1 Voltage:
Manifold Air Pressure Sensor.

Control Unit Response:
The ECU will try to operate normally. Engine performance may be affected.

Additional References:
For more Sensor Supply #1 information, see SENSOR SUPPLY #1 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 JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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 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 003509.04 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❽ – – –1/1

❷ Disconnect Related Components	*NOTE: New codes will appear as sensors are disconnected. Disregard all codes except 3509.04.* Part 1 1. Ignition OFF, Engine OFF. 2. Disconnect one of the related sensors/components listed below. • *Manifold Air Pressure Sensor* 3. Ignition ON, Engine OFF. 4. Monitor Sensor Supply #1 Voltage in Service ADVISOR. 5. Refresh codes. Has 003509.04 moved to the stored list?	**YES:** GO TO ❸ **NO:** GO TO Part 2.
	Part 2 Have all related sensors from step 1 been disconnected and 003509.04 still active?	**YES:** GO TO ❻ **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 ❹ – – –1/1

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

❺ **Wiring Harness Check**	Check wiring harness for pinched or melted wiring. Were any problems found?	**YES:** Repair wiring. Run HARNESS DIAGNOSTICS MODE TEST. **NO:** Reconnect all connectors. Run HARNESS DIAGNOSTICS MODE TEST. – – –1/1

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❻ **No Load Sensor Supply Voltage Check**	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J1. *NOTE: Many new codes will appear in the next step. Disregard all codes except 3509.04.* 3. Ignition ON, Engine OFF. 4. Monitor Sensor Supply #1 Voltage in Service ADVISOR. 5. Refresh codes. Is 003509.04 still active?	**YES:** Replace ECU. Run HARNESS DIAGNOSTICS MODE TEST. **NO:** GO TO❼ – – –1/1

❼ **Harness Resistance Check With ECU Disconnected**	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J2. 3. Measure the resistance between signal (terminal J1-A4) in the ECU harness connector, to all other terminals in the ECU harness connectors J1 and J2. Were any of the measurements less than 10 ohms?	**YES:** Check for melted or pinched wire in harness and repair. Run HARNESS DIAGNOSTICS MODE TEST. **NO:** Reconnect all connectors. GO TO❷ – – –1/1

❽ **Occurrence Count Check**	Review stored information and look at occurrence count for 003509.04. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ❾ **NO:** GO TO ❿ – – –1/1
❾ **Harness Check**	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J1. Inspect harness wiring for pinched or melted wires. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Reconnect all connectors. GO TO ❿ – – –1/1
❿ **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 ⓫ **NO:** GO TO ⓬ – – –1/1
⓫ **Engine Error Operating Point Test**	1. Ignition ON, Engine ON. 2. Set engine to operating point of failure and refresh codes. Did 003509.04 reappear when engine operating point was reached?	**YES:** Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **YES:** GO TO ❷ **NO:** GO TO ❿ – – –1/1

⓬ **Retest**	1. Ignition ON, Engine OFF. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 3. Refresh codes. Is 003509.04 active?	**YES:** GO TO ❷ **NO:** GO TO ⓭ – – –1/1

⓭ **Software Updates**	1. Check Custom Performance for possible software updates. If new software is available, reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 003509.04 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, bad ECU program. – – –1/1

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003510.03 — Sensor Supply #2 Voltage Out of Range High

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

DN22556,0000628 –19–26MAY07–1/1

003510.03 — Sensor Supply #2 Voltage Out of Range High Diagnostic Procedure

Troubleshooting Sequence:
003510.03

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

Related Information:
The ECU detects a supply voltage greater than 5.26 volts on the Sensor Supply #2 circuit.

There are two outputs from this supply. One from J1 and the other from J2.

Alarm Level:
Warning

Sensors Using Sensor Supply #2 Voltage from ECU connector J1:
Manifold Air Pressure (optional).
Low Pressure Fuel Pressure (optional).
Oil Pressure Sensor.
Sensors Using Sensor Supply #2 Voltage from ECU connector J2:
Secondary Analog Throttle.

Control Unit Response:
The ECU will try to operate normally. Engine performance may be affected.

Additional References:
For more Sensor Supply #2 information, see SENSOR SUPPLY #2 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 DIAGRAMS 2 and 4
- see 4.5L 24V ECU WIRING DIAGRAMS 2 and 4
- see 6.8L 12V ECU WIRING DIAGRAMS 2 and 4
- see 6.8L 24V ECU WIRING DIAGRAMS 2 and 4

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

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 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 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 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 003510.03 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❺

– – –1/1

❷ **ECU Programming Harness Availability**	Is the ECU programming harness available for use?	**YES:** GO TO ❸ **NO:** GO TO ❹

– – –1/1

❸ **No Load Sensor Supply Voltage Check**	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connectors J1 and J2. 3. Connect ECU Programming Harness. *NOTE: New error codes will appear in the next step. Disregard all codes except for 003510.03* 4. Turn Programming Harness Key Switch to ON. 5. Refresh codes. Is 003510.03 still active?	**YES:** Replace ECU. Run HARNESS DIAGNOSTICS MODE TEST in Service ADVISOR. **NO:** GO TO ❹

– – –1/1

❹ **Wiring Harness Short to Battery Check**	1. Turn Programming Harness Key Switch to OFF and wait for the red LED to turn OFF. 2. Remove ECU Programming Harness. 3. Look for voltage on Sensor Power Supply #2 Terminal on ECU harness connectors. • Measure voltage from power terminal (J1-A1) on the ECU harness connector to chassis ground. • Measure voltage from power terminal (J2-G2) on the ECU harness connector to chassis ground. Was either voltage greater than 5.5 volts?	**YES:** Look for shorted wires in harness and repair wiring. Run HARNESS DIAGNOSTICS MODE TEST in Service ADVISOR. **NO:** GO TO ❺ – – –1/1
❺ **Wiring Harness Check**	Look for shorted wires from Sensor Power Supply #2 to other wires in harness. • Measure resistance from power terminal (J1-A1) on the ECU harness connector to all other terminals of J1 and J2 on the ECU harness. • Measure resistance from power terminal (J2-G2) on the ECU harness connector to all other terminals of J1 and J2 on the ECU harness. Were any measurements less than 10 ohms?	**YES:** Look for shorted wires in harness and repair wiring. Run HARNESS DIAGNOSTICS MODE TEST in Service ADVISOR. **NO:** Reconnect all connectors. Run HARNESS DIAGNOSTICS MODE TEST in Service ADVISOR. – – –1/1
❻ **Occurrence Count Check**	Review stored information and look at occurrence count for 003510.03. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ❼ **NO:** GO TO ❽ – – –1/1
❼ **Harness Check**	1. Ignition OFF, Engine OFF. 2. Inspect ECU connectors and harness wiring for pinched or melted wiring. If necessary, remove connectors to get abetter visual inspection. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Reconnect all connectors. GO TO ❽ – – –1/1

❽ **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 ❾ **NO:** GO TO ❿ – – –1/1

❾ **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 ❷ **NO:** GO TO ❽ – – –1/1

❿ **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 ❷ **NO:** GO TO ⓫ – – –1/1

⓫ **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

003510.04 — Sensor Supply #2 Voltage Out of Range Low

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

DN22556,0000629 –19–26MAY07–1/1

003510.04 — Sensor Supply #2 Voltage Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:
003510.04

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

Related Information:
The ECU detects a supply voltage lower than 4.59 volts on the Sensor Supply #2 circuit.

The output from this supply comes from both ECU connectors, J1 (black face) and J2 (brown face).

Alarm Level:
Warning

Sensors Using Sensor Supply #2 Voltage from ECU connector J1:
Oil Pressure Sensor.
Manifold Air Pressure (optional).
Low Pressure Fuel Pressure (optional).
Sensors Using Sensor Supply #2 Voltage from ECU connector J2:
Secondary Analog Throttle.

Control Unit Response:
The ECU will try to operate normally. Engine performance may be affected.

Additional References:
For more Sensor Supply #2 information, see SENSOR SUPPLY #2 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 DIAGRAMS 2 and 4
- see 4.5L 24V ECU WIRING DIAGRAMS 2 and 4
- see 6.8L 12V ECU WIRING DIAGRAMS 2 and 4
- see 6.8L 24V ECU WIRING DIAGRAMS 2 and 4

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

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 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 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 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 003510.04 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❽

– – –1/1

❷ **Disconnect Related Components**	*NOTE: New codes will appear as sensors are disconnected. Disregard all codes except 3510.04.* Part 1 1. Ignition OFF, Engine OFF. 2. Disconnect one of the related sensors/components listed below. • *Oil Pressure Sensor* • *Secondary Analog Throttle.* • *Low Pressure Fuel Pressure (optional).* • *Manifold Air Pressure (optional).* 3. Ignition ON, Engine OFF. 4. Monitor Sensor Supply #2 Voltage in Service ADVISOR. 5. Refresh codes. Has 003510.04 moved to the stored list?	**YES:** GO TO ❸ **NO:** GO TO Part 2.
	Part 2 Have all related sensors from step 1 been disconnected and 003510.04 still active?	**YES:** GO TO ❻ **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 ❹ – – –1/1
❹ **Check For Shorted Wires on Related Component**	Part 1 Measure the resistance between each of the terminals on the sensor and record . Were any measurements less than 10 ohms?	**YES:** Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST. **NO:** GO TO Part 2.
	Part 2 Measure the resistance from each terminal on the sensor to chassis ground Were any measurements less than 10 ohms?	**YES:** Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST. **NO:** GO TO ❺ – – –1/1

❺ **Wiring Harness Check**	Check wiring harness for pinched or melted wiring. Were any problems found?	**YES:** Repair wiring. Run HARNESS DIAGNOSTICS MODE TEST. **NO:** Reconnect all connectors. Run HARNESS DIAGNOSTICS MODE TEST. – – –1/1

❻ **ECU Programming Harness Availability**	Is the ECU programming harness available for use?	**YES:** GO TO ❼ **NO:** GO TO ❽ – – –1/1

❼ **No Load Sensor Supply Voltage Check**	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connectors J1 and J2. 3. Connect ECU Programming Harness. *NOTE: Many new codes will appear in the next steps. Disregard all codes except 3510.04.* 4. Turn Programming Harness Key Switch to ON. 5. Refresh codes. Is 003510.04 still active?	**YES:** Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST. **NO:** GO TO❽ – – –1/1

❽ **Harness Resistance Check With ECU Disconnected**	1. Turn Programming Harness Key Switch to OFF and wait for red LED to turn OFF. 2. Disconnect ECU Programming Harness. *NOTE: Signal wire for Sensor Supply #2 comes from both ECU connectors, J1 and J2.* 3. Look for shorted wires from Sensor Supply #2 to other wires in ECU harness. • Measure resistance from power (terminal J1-A1) of ECU harness connector to all other terminals of harness connectors J1 and J2 • Measure resistance from power (terminal J2-G2) of ECU harness connector to all other terminals of harness connectors J1 and J2 Were any of the measurements less than 10 ohms?	**YES:** Check for melted or pinched wire in harness and repair. Run HARNESS DIAGNOSTICS MODE TEST. **NO:** Reconnect all connectors. GO TO ❷ – – –1/1

9 Occurrence Count Check	Review stored information and look at occurrence count for 003510.04. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO 10 **NO:** GO TO 11 – – –1/1

10 Harness Check	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connectors. Inspect wiring harness for pinched or melted wiring. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Reconnect all connectors. GO TO 10 – – –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:** Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **YES:** If a certain operating point exists when error occurs, 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 codes. Did 003510.04 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 11 – – –1/1

⓭ Retest	1. Ignition ON, Engine OFF. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 3. Refresh codes. Is 003510.04 active?	**YES:** GO TO ❷ **NO:** GO TO ⓮ – – –1/1

⓮ Software Updates	1. Check Custom Performance for possible software updates. If new software is available, reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 003510.04 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, bad ECU program. – – –1/1

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003511.03 — Sensor Supply #3 Voltage Out of Range High

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

DN22556,000062A –19–26MAY07–1/1

003511.03 — Sensor Supply #3 Voltage Out of Range High Diagnostic Procedure

Troubleshooting Sequence:
003511.03

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

Related Information:
The ECU detects a supply voltage greater than 5.26 volts on the Sensor Supply #3 circuit.

The output from this supply comes out of J2 of the ECU.

Alarm Level:
Warning

Sensors Using Sensor Supply #3 Voltage:
Primary Analog Throttle.

Control Unit Response:
The ECU will try to operate normally. Engine performance may be affected.

Additional References:
For more Sensor Supply #3 information, see SENSOR SUPPLY #3 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 JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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 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 003511.03 reappear active?	**YES:** GO TO ❷ **NO:** GO TO ❻ – – –1/1
❷ **ECU Programming Harness Availability**	Is the ECU programming harness available for use?	**YES:** GO TO ❸ **NO:** GO TO ❹ – – –1/1
❸ **No Load Sensor Supply Voltage Check**	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J2. *NOTE: New error codes will appear in the next step. Disregard all codes except for 003511.03* 3. Connect ECU Programming Harness. 4. Turn Programming Harness Key Switch to ON. 5. Refresh codes. Is 003511.03 still active?	**YES:** Replace ECU. Run HARNESS DIAGNOSTICS MODE TEST in Service ADVISOR. **NO:** GO TO ❹ – – –1/1
❹ **Wiring Harness Short to Battery Check**	1. Turn Programming Harness Key Switch to OFF and wait for the red LED to turn OFF. 2. Remove ECU Programming Harness. 3. Measure voltage from power terminal (J2-A3) on the ECU harness connector to chassis ground. Was the voltage greater than 5.5 volts?	**YES:** Look for shorted wires in harness and repair wiring. Run HARNESS DIAGNOSTICS MODE TEST in Service ADVISOR. **NO:** GO TO ❺ – – –1/1

❺ **Wire Harness Check**	Measure resistance from power terminal (J2-A3) on the ECU harness connector to all other terminals of J1 and J2 on the ECU harness. Were any measurements less than 10 ohms?	**YES:** Look for shorted wires in harness and repair wiring. Run HARNESS DIAGNOSTICS MODE TEST in Service ADVISOR. **NO:** Reconnect all connectors. Run HARNESS DIAGNOSTICS MODE TEST in Service ADVISOR. – – –1/1

❻ **Occurrence Count Check**	Review stored information and look at occurrence count for 003511.03. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ❼ **NO:** GO TO ❽ – – –1/1

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❼ **Harness Check**	1. Ignition OFF, Engine OFF. 2. Inspect ECU connectors and harness wiring for pinched or melted wiring. If necessary, remove connectors to get a better visual inspection. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Reconnect all connectors. GO TO ❽ – – –1/1

❽ **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 ❾ **NO:** GO TO ❿ – – –1/1

❾ **Engine Error Operating Point Test**	1. Ignition ON, Engine ON. 2. Set engine to operating point of failure and refresh codes. Did 003511.03 reappear when engine operating point was reached?	**YES:** Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **YES:** GO TO ❷ **NO:** GO TO ❽ – – –1/1

❿ **Retest**	1. Ignition ON, Engine OFF. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 3. Refresh codes. Is 003511.03 active?	**YES:** GO TO ❷ **NO:** GO TO ⓫ – – –1/1

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⓫ **Software Updates**	1. Download latest payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 003511.03 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, bad ECU program. – – –1/1

003511.04 — Sensor Supply #3 Voltage Out of Range Low

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

DN22556,000062B –19–26MAY07–1/1

003511.04 — Sensor Supply #3 Voltage Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:
003511.04

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

Related Information:
The ECU detects a supply voltage lower than 4.59 volts on the Sensor Supply #3 circuit.

The output of this supply comes from J2 of the ECU.

Alarm Level:
Warning

Sensors Using Sensor Supply #3 Voltage:
Primary Analog Throttle.

Control Unit Response:
The ECU will try to operate normally. Engine performance may be affected.

Additional References:
For more Sensor Supply #3 information, see SENSOR SUPPLY #3 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 JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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 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 ❷ **NO:** GO TO ❽ – – –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 ❸ **NO:** GO TO Part 2.
	Part 2 Have all related sensors from step 1 been disconnected and 003511.04 still active?	**YES:** GO TO ❻ **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 ❹ – – –1/1

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

❺ **Wiring Harness Check**	Check wiring harness for pinched or melted wiring. Were any problems found?	**YES:** Repair wiring. Run HARNESS DIAGNOSTICS MODE TEST. **NO:** Reconnect all connectors. Run HARNESS DIAGNOSTICS MODE TEST. – – –1/1

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❻ **ECU Programming Harness Availability**	Is the ECU programming harness available for use?	**YES:** GO TO ❼ **NO:** GO TO ❽ – – –1/1

❼ **No Load Sensor Supply Voltage Check**	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J2. 3. Connect ECU Programming Harness. *NOTE: Many new codes will appear in the next step. Disregard all codes except 3511.04.* 4. Turn Programming Harness Key Switch to ON. 5. Refresh codes. Is 003511.04 still active?	**YES:** Replace ECU. Run HARNESS DIAGNOSTICS MODE TEST. **NO:** GO TO❽ – – –1/1

❽ **Harness Resistance Check With ECU Disconnected**	1. Turn Programming Harness Key Switch to OFF and wait for red LED to turn OFF. 2. Disconnect ECU Programming Harness. 3. Disconnect ECU connector J1. 4. Measure resistance from signal (terminal J2-A3) of ECU harness connector to all other terminals of harness connectors J1 and J2. Were any of the measurements less than 10 ohms?	**YES:** Check for melted or pinched wire in harness and repair. Run HARNESS DIAGNOSTICS MODE TEST. **NO:** Reconnect all connectors. GO TO ❷ – – –1/1
❾ **Occurrence Count Check**	Review stored information and look at occurrence count for 003511.04. Is occurrence recorded in step 1 greater than 5?	**YES:** GO TO ❿ **NO:** GO TO ⓫ – – –1/1
❿ **Harness Check**	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J2. Inspect wiring harness for pinched or melted wiring. Were any problems found?	**YES:** Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **NO:** Reconnect all connectors. GO TO ⓫ – – –1/1
⓫ **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 ⓬ **NO:** GO TO ⓭ – – –1/1

⓬ **Engine Error Operating Point Test**	1. Ignition ON, Engine ON. 2. Set engine to operating point of failure and refresh codes. Did 003511.04 reappear when engine operating point was reached?	**YES:** Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. **YES:** GO TO ❷ **NO:** GO TO ⓾ – – –1/1

⓭ **Retest**	1. Ignition ON, Engine OFF. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 3. Refresh codes. Is 003511.04 active?	**YES:** GO TO ❷ **NO:** GO TO ⓮ – – –1/1

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⓮ **Software Updates**	1. Download latest ECU payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 003511.04 active?	**YES:** Start a DTAC case. **NO:** Problem fixed, bad ECU program. – – –1/1

524037.02 — MFWD Switch Circuit Fault

For troubleshooting procedures please see the application troubleshooting manual.

DN22556,0000617 –19–24MAY07–1/1

524223.03 — Rear Axle Differential Lock Circuit Fault

For troubleshooting procedures please see the application troubleshooting manual.

DN22556,0000618 –19–24MAY07–1/1

524225.31 — Engine Start Protection Bypass Detected

For troubleshooting procedures please see the application troubleshooting manual.

DN22556,0000619 –19–24MAY07–1/1

524235.03 — MFWD Solenoid Circuit Voltage High

For troubleshooting procedures please see the application troubleshooting manual.

DN22556,000061A –19–24MAY07–1/1

524235.04 — MFWD Solenoid Circuit Voltage Low

For troubleshooting procedures please see the application troubleshooting manual.

DN22556,000061B –19–24MAY07–1/1

Section 05
Tools

Contents

Repair and Adjustment Tools

NOTE: Order tools according to information given in the U.S. SERVICEGARD™ Catalog or from the European Microfiche Tool Catalog (MTC).

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RE38635,0000137 –19–30MAY07–1/9

Universal Pressure Test Kit JT05470

Used for testing engine oil pressure, intake manifold pressure (turbo boost), and fuel transfer pump pressure.

RG5162 –UN–14OCT05

Universal Pressure Test Kit

RE38635,0000137 –19–30MAY07–2/9

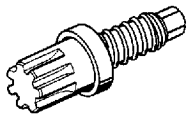
NOTE: JT05470 contains SAE adapters and one Metric adapter (M12x1.5 mm) that can be used to test the fuel transfer pump pressure. FKM10002 contains a set of SAE adpaters and a set of Metric adapters.

Continued on next page

RE38635,0000137 –19–30MAY07–3/9

RG7056 –UN–17JUN05

Flywheel Turning Tool JDG820

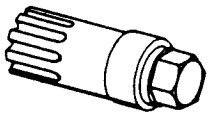


Used to rotate engine flywheel to lock engine at “TDC” to check high pressure fuel pump timing. Use on flywheels with 129 teeth and 29.9 mm flywheel housing guide bore.

RE38635,0000137 –19–30MAY07–4/9

Flywheel Turning Tool JDE83

Used to rotate engine flywheel to lock engine at “TDC” to check high pressure fuel pump timing. Use on flywheels with 142 teeth and 26.5 mm flywheel housing guide bore.



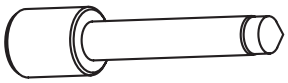
RG6251 –UN–22JUL92

Flywheel Turning Tool

RE38635,0000137 –19–30MAY07–5/9

Timing Pin JDG1571

Used to lock engine at TDC.



RG12031 –UN–20DEC01

Timing Pin

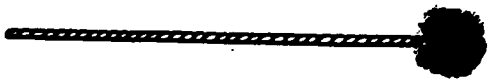
Continued on next page

RE38635,0000137 –19–30MAY07–6/9

RG5099 –UN–23AUG88

Thread Cleaning Brush. D17030BR

Used to clean threads in cylinder head.

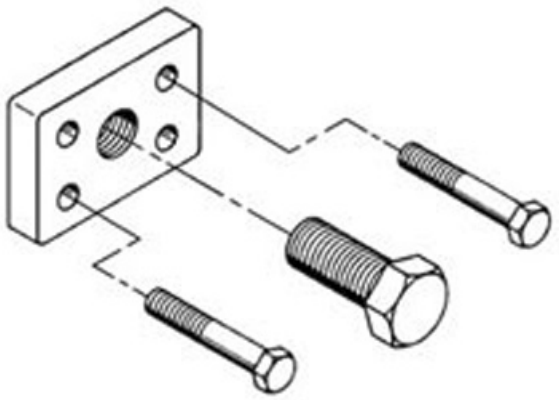


Thread Cleaning Brush

RE38635,0000137 –19–30MAY07–7/9

High Pressure Pump Drive Gear Puller JDG1560

Remove drive gear from tapered shaft on Denso HP4 high pressure fuel pump.



RG15110 –UN–15SEP06

Fuel Pump Drive Gear Puller

RE38635,0000137 –19–30MAY07–8/9

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Injector Removal Tool JDG1652A

Used to remove electronic injector from cylinder head.

RG12410 –UN–19JUN02

Injector Removal Tool

RE38635,0000137 –19–30MAY07–9/9

Connector Repair Tools

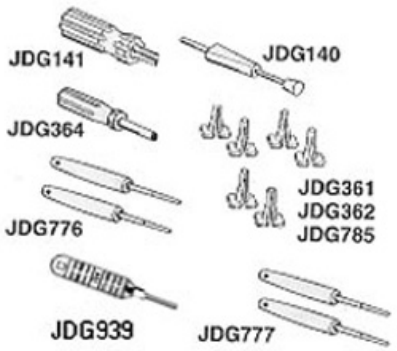
NOTE: Order tools according to information given in the U.S. SERVICEGARD™ Catalog or from the European Microfiche Tool Catalog (MTC).

SERVICEGARD is a trademark of Deere & Company

RE38635,0000138 –19–25MAY07–1/8

Technician's Electrical Repair Kit JT07195B

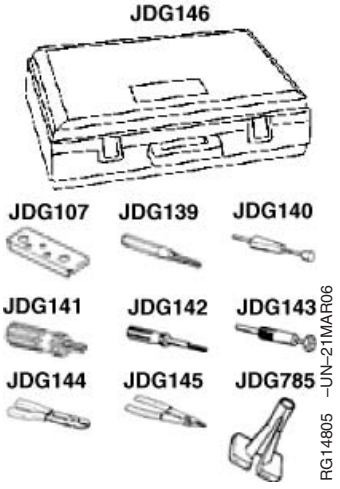
This kit is assembled with the most commonly used tools used to repair wiring harnesses. This kit includes the following: **JDG140** - CPC and Metrimate terminal extraction tool, **JDG141** - CPC Blade Type terminal extraction tool, **JDG361** - Deutsch 12-14 gauge terminal extraction/insertion tool, **JDG362** - Deutsch 16-18 gauge terminal extraction/insertion tool, **JDG364** - WEATHERPACK terminal extraction tool, **JDG776** - Metripack terminal extraction tool - Wide, **JDG777** - METRI-PACK terminal extraction tool - Narrow, **JDG785** - Deutsch 6-8 gauge terminal extraction/insertion tool, and **JDG939** Metri-Pack Extraction Tool.



RE38635,0000138 –19–25MAY07–2/8

Technician's Electrical Repair Kit JDG155

This kit is assembled with the most commonly used terminal extraction tools used to repair wiring harnesses on John Deere applications. This kit includes the following: **JDG107** - Holding Plate, **JDG139** - Sure-Seal terminal insertion tool, **JDG140** - CPC and Metrimate terminal extraction tool, **JDG141** - CPC Blade Type terminal extraction tool, **JDG142** - Mate-N-Lock terminal extraction tool, **JDG143** - Mate-N-Lock terminal extraction tool, **JDG144** - Universal Crimping Pliers, **JDG145** - Electrician's Pliers, **JDG146** - Carrying Case, and **JDG785** - Deutsch 6-8 gauge terminal extraction/insertion tool.



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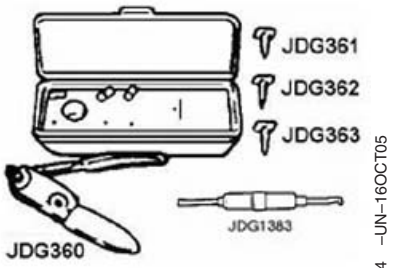
RE38635,0000138 –19–25MAY07–3/8

DEUTSCH™ Electrical Repair Tool Kit JDG359

Used to extract terminals from DEUTSCH™ electrical connectors. A special crimping tool is also included to crimp DEUTSCH terminals on wires. The following tools are included: **JDG360** - Deutsch Terminal Crimping Tool, **JDG361** - Deutsch 12-14 gauge terminal extraction/insertion tool (set of 2), **JDG362** - Deutsch 16-18 gauge terminal extraction/insertion tool (set of 2), **JDG363** - Deutsch 20-24 gauge terminal extraction/insertion tool (set of 2), and **JDG1383** - Deutsch Terminal Tool



RG14534 –UN–16OCT05

DEUTSCH is a trademark of Deutsch Co.

RE38635,0000138 –19–25MAY07–4/8

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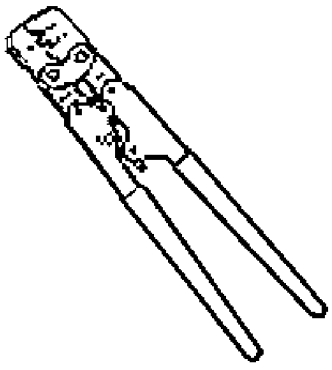
Flex Box Terminal Repair Kit JDG1744

Used for extracting and crimping Cinch terminals from Flex Box ECU connectors. A tool is also provided to unlock the connector cover for removal. The following tools are included: **JDG1727** - Crimper Tool, **JDG 1725** - Removal Tool, **JDG 1866** - Jaw Set for Crimper (3 Pieces), **JDG1868** - Terminal Extraction Tool, **JDG1869** - Connector Cover Unlock Tool (Set of Two).

RE38635,0000138 –19–25MAY07–5/8

WEATHER PACK™ Crimping Tool JDG783

Used to crimp WEATHER PACK™ male and female terminals on 14-20 gauge wires. This tool crimps both the wire and the seal retainer at the same time.



RW25542A –UN–07MAR02

WEATHER PACK is a trademark of Packard Electric

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RE38635,0000138 –19–25MAY07–6/8

METRI-PACK™ Crimping Tool JDG865

Used to crimp push-type METRI-PACK™ male and female terminals on 14-20 gauge wires.

RG14531 –UN–14OCT05

METRI-PACK is a trademark of Packard Electric Inc.

RE38635,0000138 –19–25MAY07–7/8

Packard Crimper JDG707

Used to crimp WEATHER PACK, METRIPACK, SUMITOMO, and YAZAKI male and female terminals on 12-20 gauge wires. This tool crimps the wire and the seal retainer separately.

RG11679 –UN–05FEB01

RE38635,0000138 –19–25MAY07–8/8

Other Materials (Consumables)

Number	Name	Use
TY6333 (U.S.)	High Temperature Moly Grease	Sensor O-rings.
PM37418 (U.S.) PM38621 (Canadian) 242 (LOCTITE®)	Thread Lock and Sealer, medium strength (6 ml)	Applied to screw threads
AT66865 (U.S.)	Lubricant	Insulate electrical connectors.

LOCTITE is a registered trademark of Loctite Corp.

RE38635,0000139 –19–29MAY07–1/1

Electronic System Diagnostic Tools

NOTE: Order tools (non-ECU communication parts and kits) according to information given in the U.S. SERVICEGARD™ Catalog or in the European Microfiche Tool Catalog (MTC) unless otherwise noted.

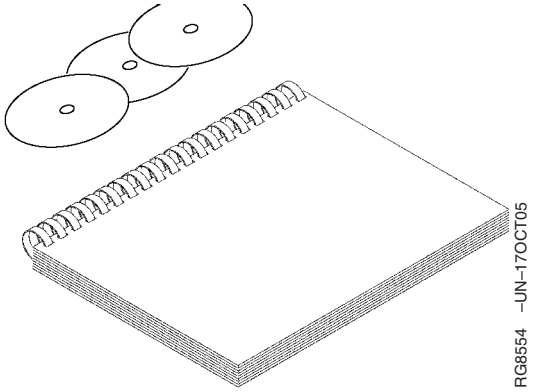
NOTE: ECU communication parts and kits are available from John Deere Distribution Service Center (DSC). **United States and Canadian Agricultural dealers DO NOT ORDER without first contacting your Branch or TAM.**

SERVICEGARD is a trademark of Deere & Company.

CD03523,0000196 –19–22MAY07–1/6

ECU Communication Software . . . . . .

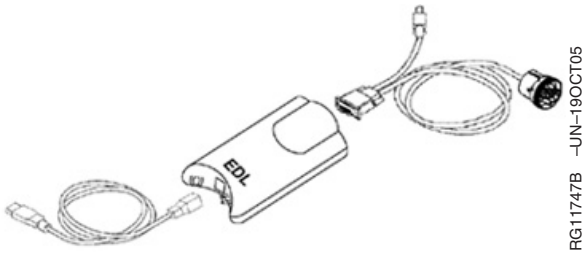
Please refer to your John Deere Dealer website for information on obtaining the latest version of software.



CD03523,0000196 –19–22MAY07–2/6

ECU Communication Hardware Mini Kit DS10117

Used with ECU Communication Software Kit, this kit enables a Windows-compatible computer to read information from the Engine Control Unit (ECU). The computer must be at least a Pentium 1 with 512 of RAM and a USB port. This kit allows communication with applications that use the black 9-pin Deutsch diagnostic connector. Kit includes USB cable, Electronic Data Link (EDL), and cable to connect to the 9-pin diagnostic connector on the engine harness. Kit parts may be purchased separately.

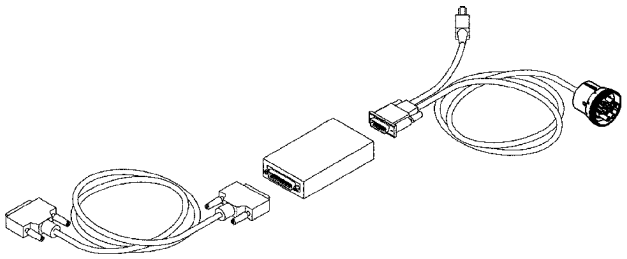


Continued on next page

CD03523,0000196 –19–22MAY07–3/6

ECU Communication Hardware Kit
(Discontinued) DS10023

Used with ECU Communication Software Kit, this kit enables a Windows-compatible computer to read information from the Engine Control Unit (ECU). The computer must be at least a Pentium 1 with 512 of RAM and an IEEE 1284 compliant parallel port. This kit allows communication with applications that use the black 9-pin Deutsch diagnostic connector.



RG11747 –UN–19OCT05

CD03523,0000196 –19–22MAY07–4/6

Digital Multimeter JT07306

Test electrical components for voltage, resistance, current flow, or temperature. It is especially good for measuring low voltage or high resistance circuits.

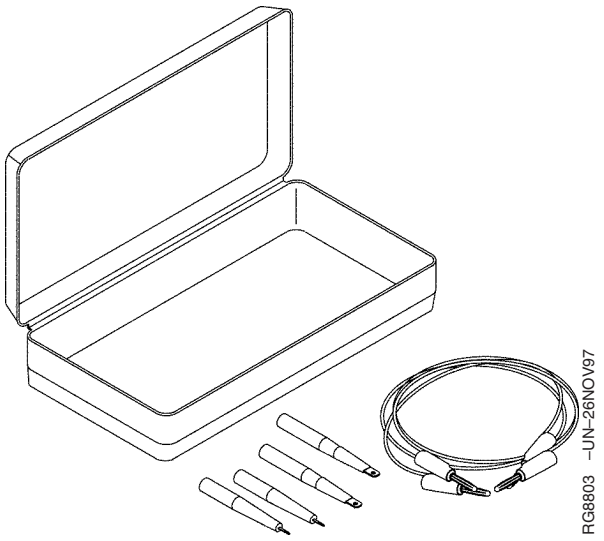
RG11126 –UN–19JUN00

JT07306 - Digital Multimeter

CD03523,0000196 –19–22MAY07–5/6

Connector Adapter Test Kit JT07328

Used with a digital multimeter to make voltage and resistance measurements in control system wiring harness connectors. Can also be used to test terminals for proper fit.



RG8803 –UN–26NOV97

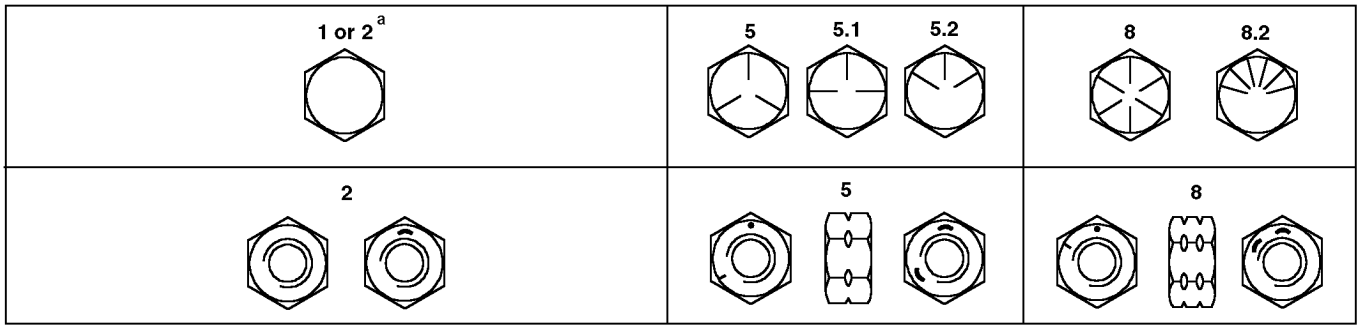
JT07328

CD03523,0000196 –19–22MAY07–6/6

Section 06
Specifications

Contents

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.

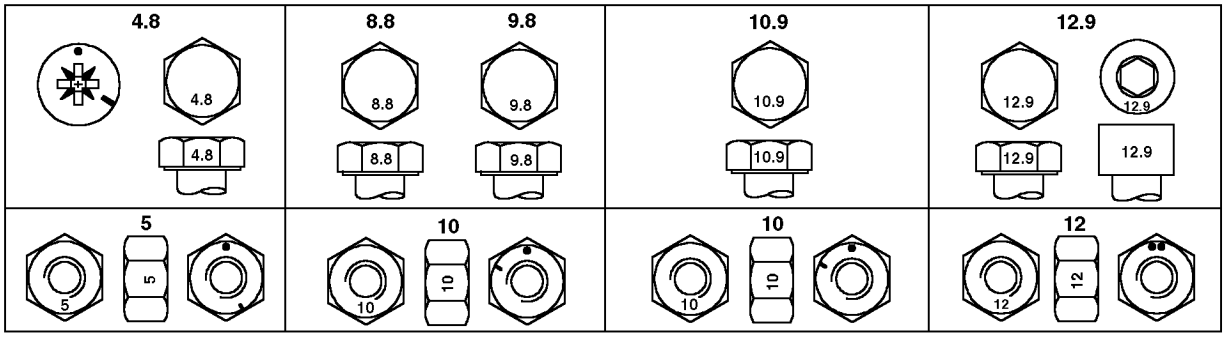
Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

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 –19–23FEB06–1/1

Metric Bolt and Cap Screw Torque Values



TORQ2 –UN–07SEP99

Top, Property Class and Head Markings; Bottom, Property Class and Nut Markings

	Class 4.8		Class 8.8 or 9.8		Class 10.9		Class 12.9	
Size	**Lubricated[a] N•m(lb-ft)**	**Dry[b] N•m(lb-ft)**	**Lubricated[a] N•m(lb-ft)**	**Dry[b] N•m(lb-ft)**	**Lubricated[a] N•m(lb-ft)**	**Dry[b] N•m(lb-ft)**	**Lubricated[a] N•m(lb-ft)**	**Dry[b] N•m(lb-ft)**
M6	4.7 (3.5)	6 (4.4)	9 (6.6)	11.5 (8.5)	13 (9.5)	16.5 (12.2)	15.5 (11.5)	19.5 (14.5)
M8	11.5 (8.5)	14.5 (10.7)	22 (16)	28 (20.5)	32 (23.5)	40 (29.5)	37 (27.5)	47 (35)
M10	23 (17)	29 (21)	43 (32)	55 (40)	63 (46)	80 (59)	75 (55)	95 (70)
M12	40 (29.5)	50 (37)	75 (55)	95 (70)	110 (80)	140 (105)	130 (95)	165 (120)
M14	63 (46)	80 (59)	120 (88)	150 (110)	175 (130)	220 (165)	205 (150)	260 (190)
M16	100 (74)	125 (92)	190 (140)	240 (175)	275 (200)	350 (255)	320 (235)	400 (300)
M18	135 (100)	170 (125)	265 (195)	330 (245)	375 (275)	475 (350)	440 (325)	560 (410)
M20	190 (140)	245 (180)	375 (275)	475 (350)	530 (390)	675 (500)	625 (460)	790 (580)
M22	265 (195)	330 (245)	510 (375)	650 (480)	725 (535)	920 (680)	850 (625)	1080 (800)
M24	330 (245)	425 (315)	650 (480)	820 (600)	920 (680)	1150 (850)	1080 (800)	1350 (1000)
M27	490 (360)	625 (460)	950 (700)	1200 (885)	1350 (1000)	1700 (1250)	1580 (1160)	2000 (1475)
M30	660 (490)	850 (625)	1290 (950)	1630 (1200)	1850 (1350)	2300 (1700)	2140 (1580)	2700 (2000)
M33	900 (665)	1150 (850)	1750 (1300)	2200 (1625)	2500 (1850)	3150 (2325)	2900 (2150)	3700 (2730)
M36	1150 (850)	1450 (1075)	2250 (1650)	2850 (2100)	3200 (2350)	4050 (3000)	3750 (2770)	4750 (3500)

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

[b] *"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 property class.

Fasteners should be replaced with the same or higher property class. If higher property class 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.

RG41221,00001CD –19–19DEC06–1/1

Electronic Fuel System Repair and Adjustment Specifications

Item	Measurement	Specification
Fuel Filter Mounting Bracket-to-Cylinder Head Cap Screws	Torque	70 N•m (52 lb-ft)
Fuel Filter Base-to-Bracket Cap Screws	Torque	50 N•m (37 lb-ft)
Fittings, Plugs or Accessories-to-Fuel Filter Base	Torque	10 N•m (7 lb-ft)
Inlet and Outlet Fitting-to-Fuel Transfer Pump	Torque	10 N•m (7 lb-ft)
Fuel Transfer Pump Cap Screws	Torque	30 N•m (22 lb-ft)
High Pressure Fuel Pump to Adapter Plate	Torque	40 N•m (29.5 lb-ft)
High Pressure Fuel Pump Gear Nut	Torque	70 N•m (52 lb-ft)
Pump Position Sensor-to-adapter plate	Torque	15 N•m (11 lb-ft)
Fuel Supply Elbow Fitting Nut-to-High Pressure Pump	Torque	20 N•m (15 lb-ft)
Fuel Leak-off Fitting Nut-to-High Pressure Pump	Torque	15 N•m (11 lb-ft)
High Pressure Fuel Pump Adapter Plate-to-Engine Front Plate	Torque	40 N•m (30 lb-ft)
High Pressure Fuel Lines (both ends)	Torque	30 N•m (22 lb-ft)
Plug to access Gear Timing Mark	Torque	50 N•m (37 lb-ft)
Suction Control Valve-to-Pump Housing	Torque	10 N•m (7 lb-ft)
High Pressure Common Rail Bracket to Engine	Torque	70 N•m (52 lb-ft)
High Pressure Common Rail to Bracket	Torque	70 N•m (52 lb-ft)

Continued on next page

Item	Measurement	Specification
High Pressure Delivery Lines to Rail	Torque	30 N•m (22 lb-ft)
High Pressure Delivery Lines toPump	Torque	30 N•m (22 lb-ft)
Flow Damper	Torque	176 N•m (130 lb-ft)
Pressure Limiter	Torque	176 N•m (130 lb-ft)
Electronic Injector Clamp Screw	Torque Torque Turn	15 N•m (11 lb-ft) 90°
Fuel Leak-off Banjo Screwt	Torque	25 N•m (18 lb-ft)
Injector Solenoid Wire Retaining Nut	Torque	2 N•m (1.5 lb-ft) (18 lb-in.)
Heat Shield-to-Rocker Arm Cover	Torque	10 N•m (7 lb-ft)

RG41221,00001CE –19–14MAY07–2/2

Electronic Engine Control Repair and Adjustment Specifications

Item	Measurement	Specification
ECU-to-Bracket	Torque	15 N•m (11 lb-ft)
ECU Isolator-to-Adapter	Torque	35 N•m (26 lb-ft)
Adapter/Isolator assembly-to-Cylinder Block	Torque	40 N•m (30 lb-ft)
ECU Bracket to Adapter	Torque	35 N•m (26 lb-ft)
Engine Coolant Temperature Sensor	Torque	10 N•m (7 lb-ft)
Fuel Temperature Sensor	Torque	10 N•m (7 lb-ft)
Manifold Air Temperature (MAT) Sensor	Torque	10 N•m (7 lb-ft)
Oil Pressure Sensor	Torque	10 N•m (7 lb-ft)
Fuel Rail Pressure Sensor	Torque	100 N•m (74 lb-ft)
Fuel Transfer Pump Pressure Sensor	Torque	10 N•m (7 lb-ft)
Crankshaft Position Sensor	Torque	15 N•m (11 lb-ft)
Pump Position Sensor	Torque	15 N•m (11 lb-ft)

RG41221,00001CF –19–04MAY07–1/1

Fuel System Diagnostic Specifications

Item	Measurement	Specification
Minimum Fuel Transfer Pump Pressure	Cranking	30 kPa (0.3 bar) (4.4 psi)
	Running (Low Idle)	40 kPa (0.4 bar) (5.8 psi)
Minimum Fuel Rail Pressure	Cranking	20 MPa (200 bar) (2900 psi)
	Running (Low Idle)	35 MPa (350 bar) (5076 psi)

RG41221,00001D0 –19–02APR05–1/1

Application Specifications

Below is an overview of the specifications listed for applications in the next few pages.

- **OEM Engines**
  - Torque Curve Selection - See OEM ENGINES - TORQUE CURVE SELECTION later in this Group.
  - Governor Mode Selection - See OEM ENGINES - GOVERNOR MODE SELECTION later in this Group.
  - Electronic Control System Wiring Diagrams - See OEM ENGINES - WIRING DIAGRAMS later in this Group.
  - John Deere Instrument Panel/Engine Start Components Electrical Wiring Diagram - See OEM ENGINES -OEM INSTRUMENT PANEL/ENGINE START COMPONENTS ELECTRICAL WIRING DIAGRAM later in this Group.

RG41221,00001D1 –19–30MAY07–1/1

OEM Engines - Derate Specifications

NOTE: The PEAK POWER LEVEL of an application is identified on the Emissions Information Label located near the valve cover. See INFORMATION RELATIVE TO EMISSIONS REGULATIONS in section 01, Group 001 earlier in this manual.

Listed below are the parameters that the Engine Control Unit (ECU) uses to derate the engine.

Continued on next page

DN22556,0000470 –19–30MAY07–1/2

Parameter	SPN-FMI	Value that Triggers Fault	Derate Limit (% Power or RPM)
Air Filter Restriction Switch. (Customer Trim Option)	000107.31	Air Filter Restriction Switch Active.	50%
Crankshaft Sensor Faults.	000637.02 000637.08 000637.10	Noise, Invalid Pattern, or Missing Pulse.	50%
Engine Coolant Level Switch. (Customer Trim Option)	000111.01	Engine Coolant Level Low Switch Active	50%
Engine Coolant Temperature (ECT) for 4.5L. Peak Power Level Above 78kw(104hp)..	000110.16	111°C (232°F)	20%
Engine Coolant Temperature (ECT) for 4.5L.Peak Power Under 78kw (104hp).	000110.16	114°C (237°F)	20%
Engine Coolant Temperature (ECT) for 6.8L. Peak Power Above 112kw (150hp).	000110.16	111°C (232°F)	20%
Engine Coolant Temperature (ECT) for 6.8L.Peak. Power Under 112kw (150hp).	000110.16	114°C (237°F)	20%
Engine Coolant Temperature (ECT) for 4.5L. Peak Power. Level Above 78kw(104hp).	000110.00	113°C (235°F)	60%
Engine Coolant Temperature (ECT) for 4.5L.Peak Power Under 78kw (104hp).	000110.00	116°C (241°F)	60%
Engine Coolant Temperature (ECT) for 6.8L. Peak Power Above 112kw (150hp).	000110.00	113°C (235°F)	60%
Engine Coolant Temperature (ECT) for 6.8L.Peak Power Under 112kw (150hp)	000110.00	116°C (241°F)	60%
Fuel Temperature.	000174.00	100°C (212°F)	20%
Manifold Air Temperature (MAT).	000105.16	89.5°C (193°F)	20%
Manifold Air Temperature (MAT).	000105.00	123°C (253°F)	60%
Oil Pressure.	000100.18	Less than 1kPa (0.14): 770 rpm . Less than 132kPa (19psi): 775 rpm Less than 212kPa (31psi): 1500 rpm: Less than 256kPa (37psi): 2000 rpm. Less than 291kPa (42psi): 2500 rpm	20%
Oil Pressure.	000100.01	Less than 1kPa (0.14psi): 770 rpm Less than 118kPa (17psi): 775 rpm Less than 205kPa (29psi): 1500 rpm Less than 240kPa (35psi): 2000 rpm	60%
Fuel Rail Pressure	000157.03 000157.04	Out of Range Code Detected.	50%
Water-in-Fuel	000097.16	Water Detected	50%

OEM Engines - Torque Curve Selection

Torque Curve Selection for OEM Engines	
Torque Curve # on SERVICE ADVISOR™	Conditions for Torque Curve
1	Normal Curve

SERVICE ADVISOR is a trademark of Deere & Company

RG41221,00001D3 –19–15NOV05–1/1

OEM Engines - Governor Mode Selection

Desired Speed Governor Selection for OEM Engines	
Mode Selected on SERVICE ADVISOR™	Conditions
0	Normal Droop (Default Gainset)
1	Isochronous Droop (Default Gainset)
2	Normal Droop (Selectable Gainset)
3	Isochronous Droop (Selectable Gainset)
6	Engine Cruise

Max. Speed Governor Selection for OEM Engines	
Mode Selected on SERVICE ADVISOR™	Conditions:
9	Normal droop with default gainset
10	Isochronous droop with default gainset
11	Normal droop with selectable gainset
12	Isochronous droop with selectable gainset
15	Absolute Maxspeed (used for speed derates)

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210
7

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RG41221,00001D4 –19–07FEB07–1/1

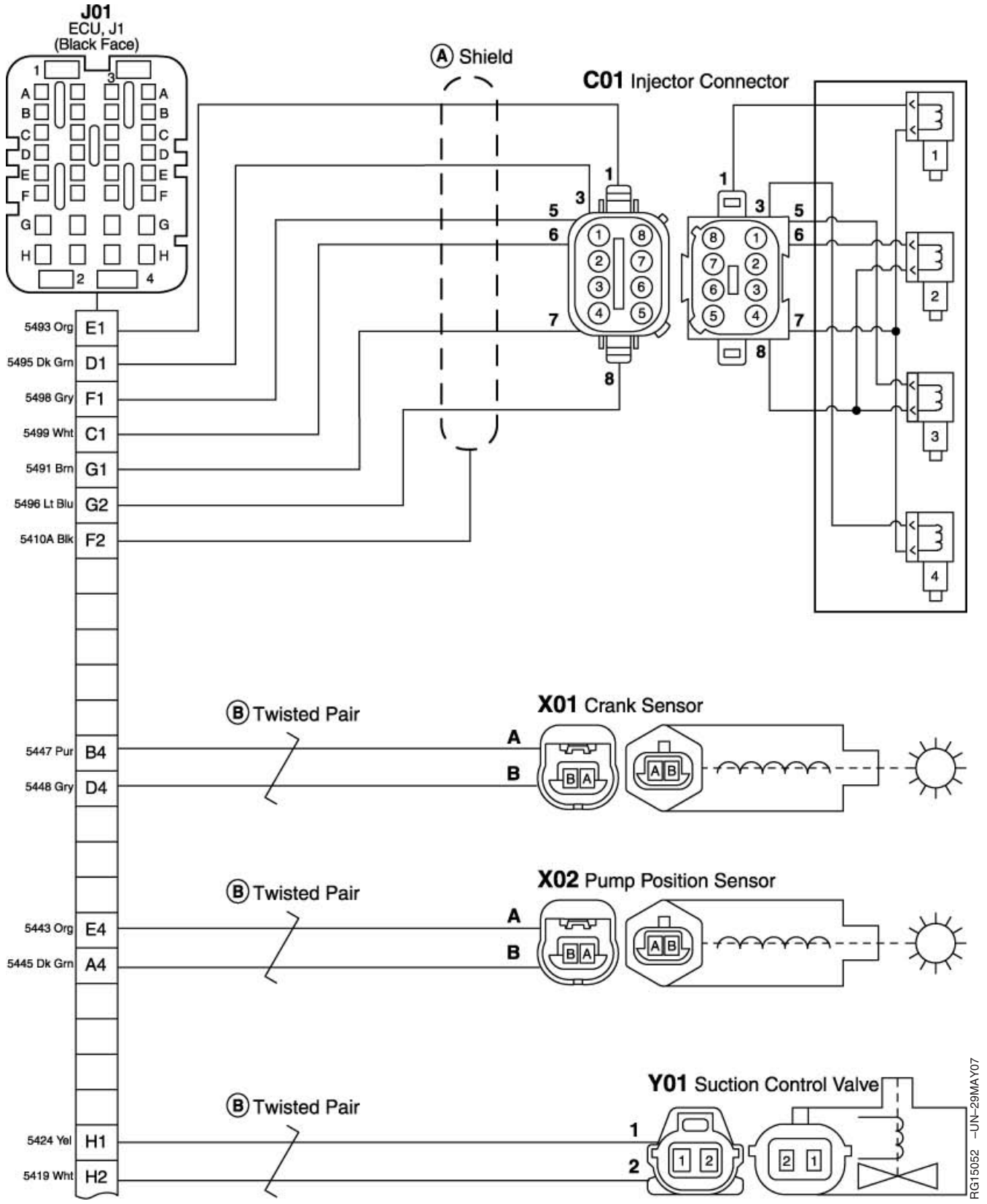
OEM Engines - Air Heater Specifications

NOTE: Preheat time has an additional 5 seconds after the light turns off.

Air Heater Operating Conditions - OEM -Air Heater Operation - OEM		
Fuel Temperature	**Preheat Time**	**Reheat Time**
-20°C (-4°F)	30 sec.	20 sec
-15°C (5°F)	20 sec.	20 sec
-10°C (14°F)	15 sec.	15 sec
-5°C (23°F)	10 sec.	10 sec
0°C (32°F)	0 sec	0 sec

OUOD006,0000051 –19–19DEC06–1/1

4.5L 12V Wiring Diagram 1



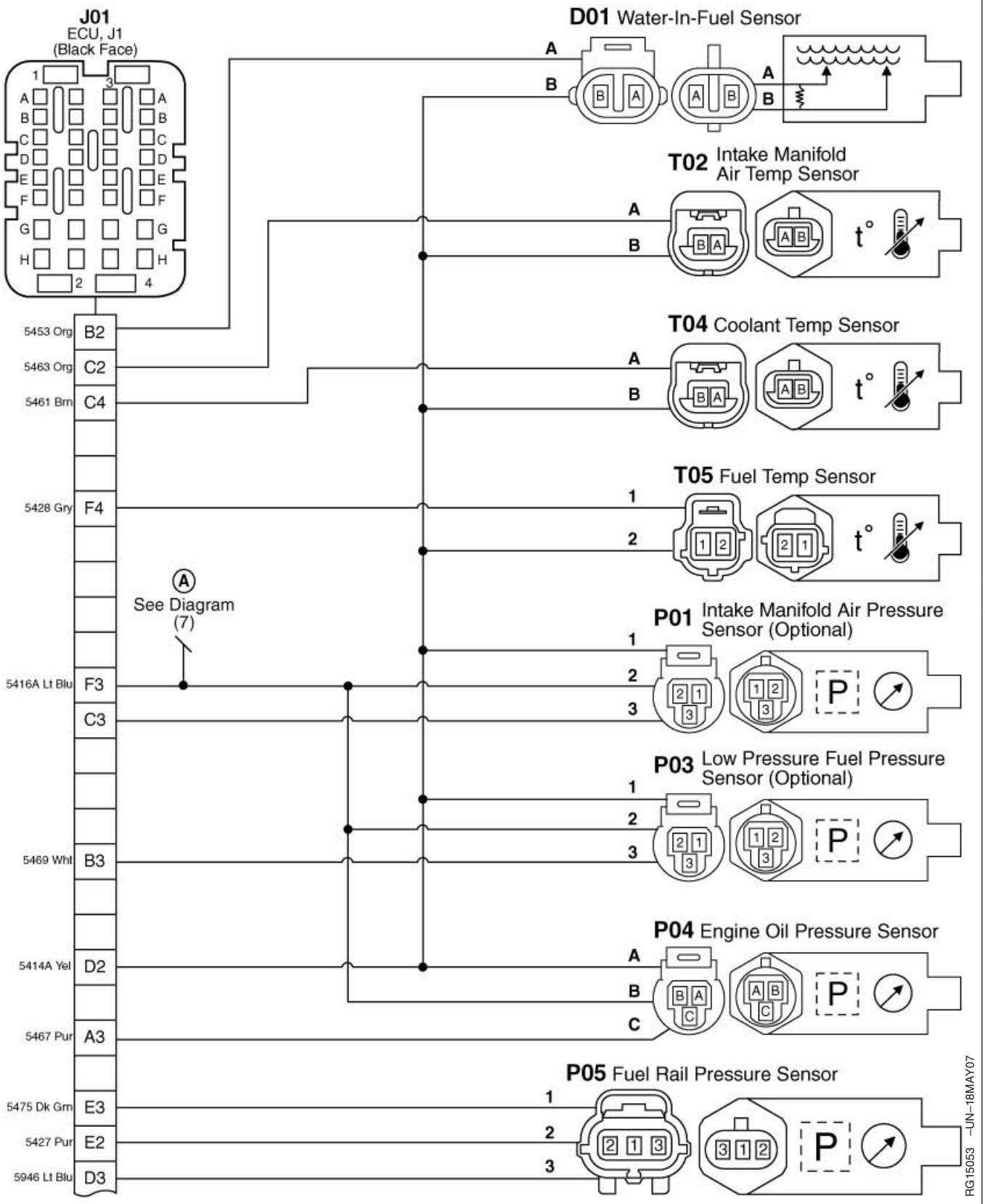
4.5 Liter 12 Volt Wiring Diagram 1

Continued on next page

C01—Injector Connector
X01 —Crank Sensor
X02—Pump Position Sensor
Y01—Suction Control Valve
A—Shield
B—Twisted Pair
J01—ECU, J1 (Black Face)
J1-A4—[5445 Dark Green] Pump Position Pulse
J1-B4—[5447 Purple] Crank Position Pulse
J1-C1—[5499 White] Injector #2 Inject Pulse
J1-D1—[5495 Dark Green] Injector #4 Inject Pulse
J1-D4—[5448 Gray] Crank Position Return
J1-E1—[5493 Orange] Injector #1 Inject Pulse
J1-E4—[5443 Orange] Pump Position Return
J1-F1—[5498 Gray] Injector #3 Inject Pulse
J1-F2—[5410A Black] Wiring Shield
J1-G1—[5491 Brown] Injector #1 & #4 Power
J1-G2—[5496 Light Blue] Injector #2 & #3 Power
J1-H1—[5424 Yellow] HP Pump Suction Control Valve Drive +
J1-H2—[5419 White] HP Pump Suction Control Valve Drive --

DB92450,000003D –19–19MAY07–2/2

4.5L 12V Wiring Diagram 2



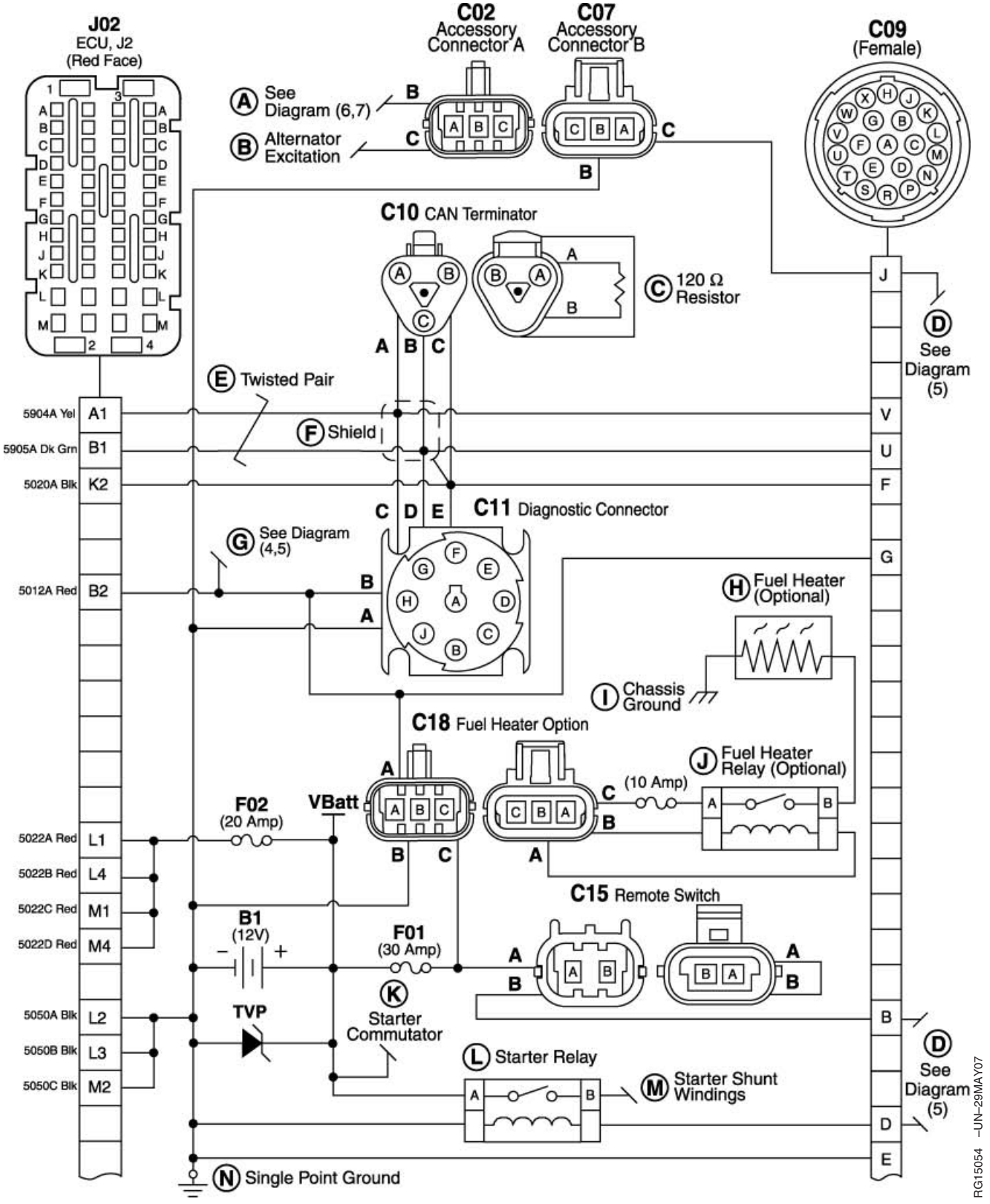
4.5 Liter 12 Volt Wiring Diagram 2

Continued on next page

D01—Water In Fuel Sensor
P01—Intake Manifold Air Pressure Sensor (Optional)
P03—Low Pressure Fuel Pressure Sensor (Optional)
P04—Engine Oil Pressure Sensor
P05—Fuel Rail Pressure Sensor
T02—Intake Manifold Air Temperature Sensor
T04—Coolant Temperature Sensor
T05—Fuel Temperature Sensor
A—See Diagram (7)
J01—ECU, J1 (Black Face)
J1-A3—[5467 Purple] Engine Oil Pressure Signal
J1-B2—[5453 Orange] Water In Fuel Signal
J1-B3—[5469 White] Fuel Pressure Signal
J1-C2—[5463 Orange] Intake Manifold Air Temperature Signal
J1-C3—Intake Manifold Air Pressure Signal
J1-C4—[5461 Brown] Coolant Temperature Signal
J1-D2—[5414A Yellow] Power Supply #2B --
J1-D3—[5946 Lt Blue] Power Supply #1 +
J1-E2—[5427 Orange] Power Supply #1--
J1-E3—[5475 Dark Green] Fuel Rail Pressure Signal
J1-F3—[5416A Light Blue] Power Supply #2B +
J1-F4—[5428 Gray] Fuel Temperature Signal

DB92450,000003E –19–19MAY07–2/2

4.5L 12V Wiring Diagram 3



4.5 Liter 12 Volt Wiring Diagram 3

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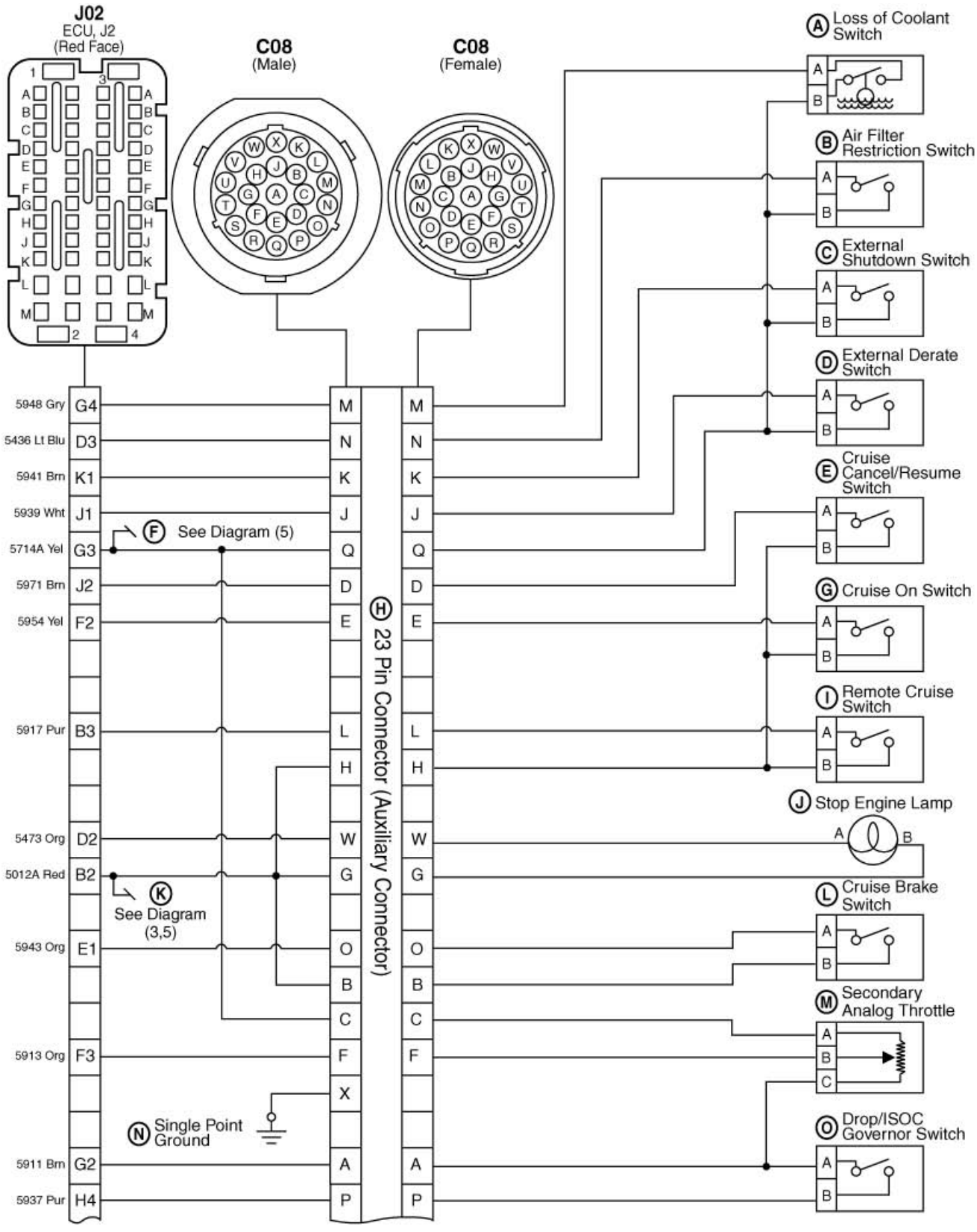
B1—12 Volt
C02—Accessory Connector A
C07—Accessory Connector B
C09—21 Pin Connector (Panel Connector)
C10—CAN Terminator
C11—Diagnostic Connector
C15—Remote Switch
C18—Fuel Heater Option
F01—30 Amp
F02—20 Amp
TVP—Transient Voltage Protection
A—See Diagram (6,7)
B—Alternator Excitation
C—120 Resister
D—See Diagram (5)
E—Twisted Pair
F—Shield
G—See Diagram (4,5)
H—Fuel Heater (Optional)
I—Chassis Ground
J—Fuel Heater Relay (Optional)
K—Starter Commutator
L—Starter Relay
M—Starter Shunt Windings
N—Single Point Ground
J02—ECU, J2 (Red Face)
J2-A1—[5904A Yellow] CAN High
J2-B1—[5905A Dark Green] CAN Low
J2-B2—[5012A Red] Ignition Key Start/Run Switch
J2-K2—[5020A Black] CAN Shield
J2-L1—[5022A Red] Battery +
J2-L2—[5050A Black] Battery --
J2-L3—[5050B Black] Battery --
J2-L4—[5022B Red]Battery +
J2-M1—[5022C Red]Battery +
J2-M2—[5050C Black] Battery --
J2-M4—[5022D Red]Battery +

DB92450,000003F –19–19MAY07–2/2

4.5L 12V Wiring Diagram 4



4.5 Liter 12 Volt Wiring Diagram 4

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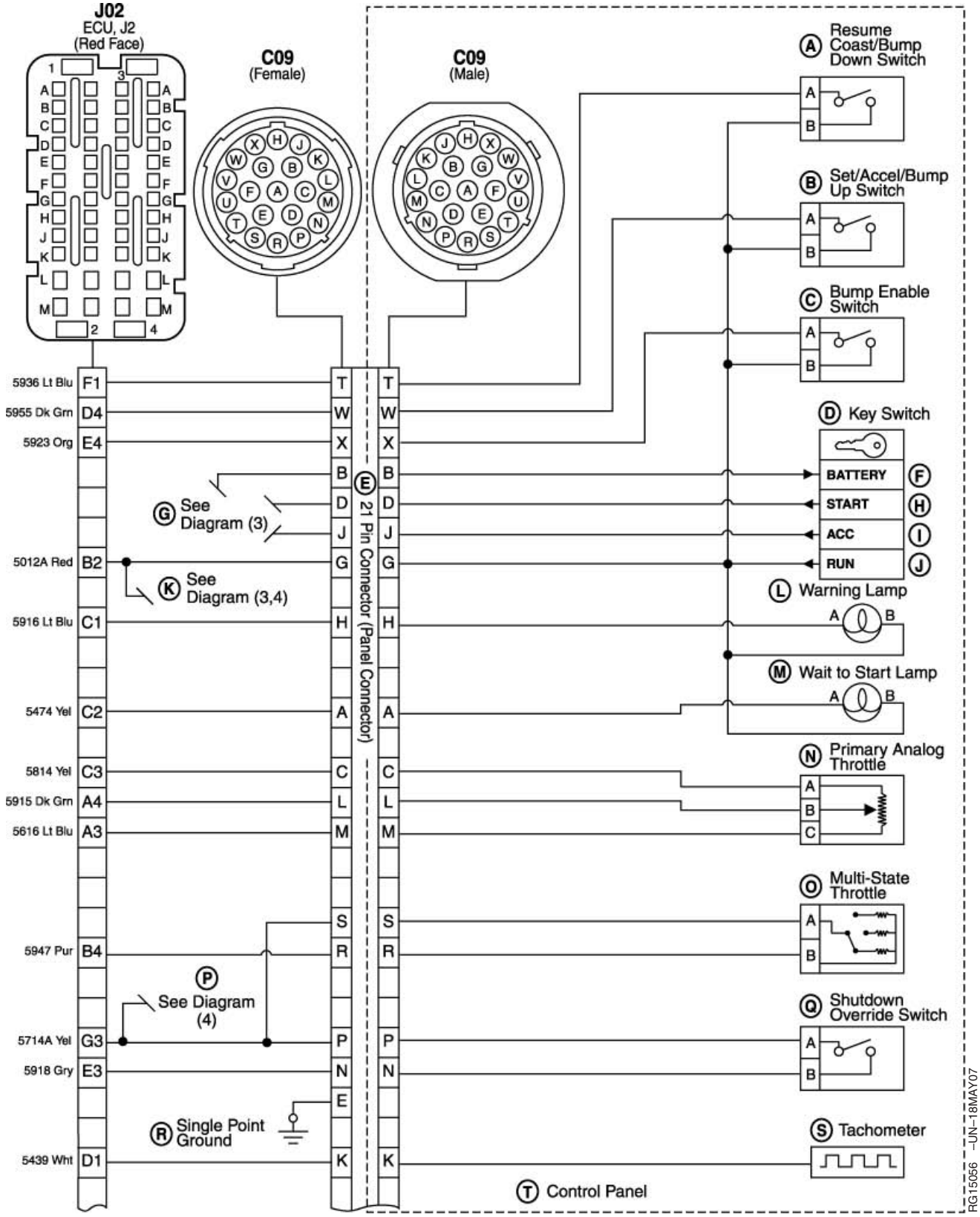
C08—23 Pin Connector (Auxiliary Connector)
A—Loss of Coolant Switch
B—Air Filter Restriction Switch
C—External Shutdown Switch
D—External Derate Switch
E—Cruise Cancel/Resume Switch
F—See Diagram (5)
G—Cruise On Switch
H—23 Pin Connector (Auxiliary Connector)
I—Remote Cruise Switch
J—Stop Engine Lamp
K—See Diagram (3,5)
L—Cruise Brake Switch
M—Secondary Analog Throttle
N—Single Point Ground
O—Drop/Isoc (Isochronous) Governor Switch
J02—ECU, J2 (Red Face)
J2-B2—[5012A Red] Ignition Key Start/Run Switch
J2-B3—[5917 Purple] Remote Cruise On/Off Switch
J2-D2—[5473 Orange] Stop Engine Lamp Return
J2-D3—[5436 Light Blue] Air Filter Restriction Switch
J2-E1—[5943 Orange] Cruise Brake Switch
J2-F2—[5954 Yellow] Cruise On/Off Switch
J2-F3—[5913 Orange] Secondary Analog Throttle Signal
J2-G2—[5911 Brown] Power Supply #2A +
J2-G3—[5714A Yellow] Power Supply #2A --
J2-G4—[5948 Gray] Low Coolant Level Switch
J2-H4—[5937 Purple] Droop/Isochronous Governor Switch
J2-J1—[5939 White] External Derate Switch
J2-J2—[5971 Brown] Cruise Cancel/Resume Switch
J2-K1—[5941 Brown] External Shutdown Switch

DB92450,0000040 –19–19MAY07–2/2

4.5L 12V Wiring Diagram 5



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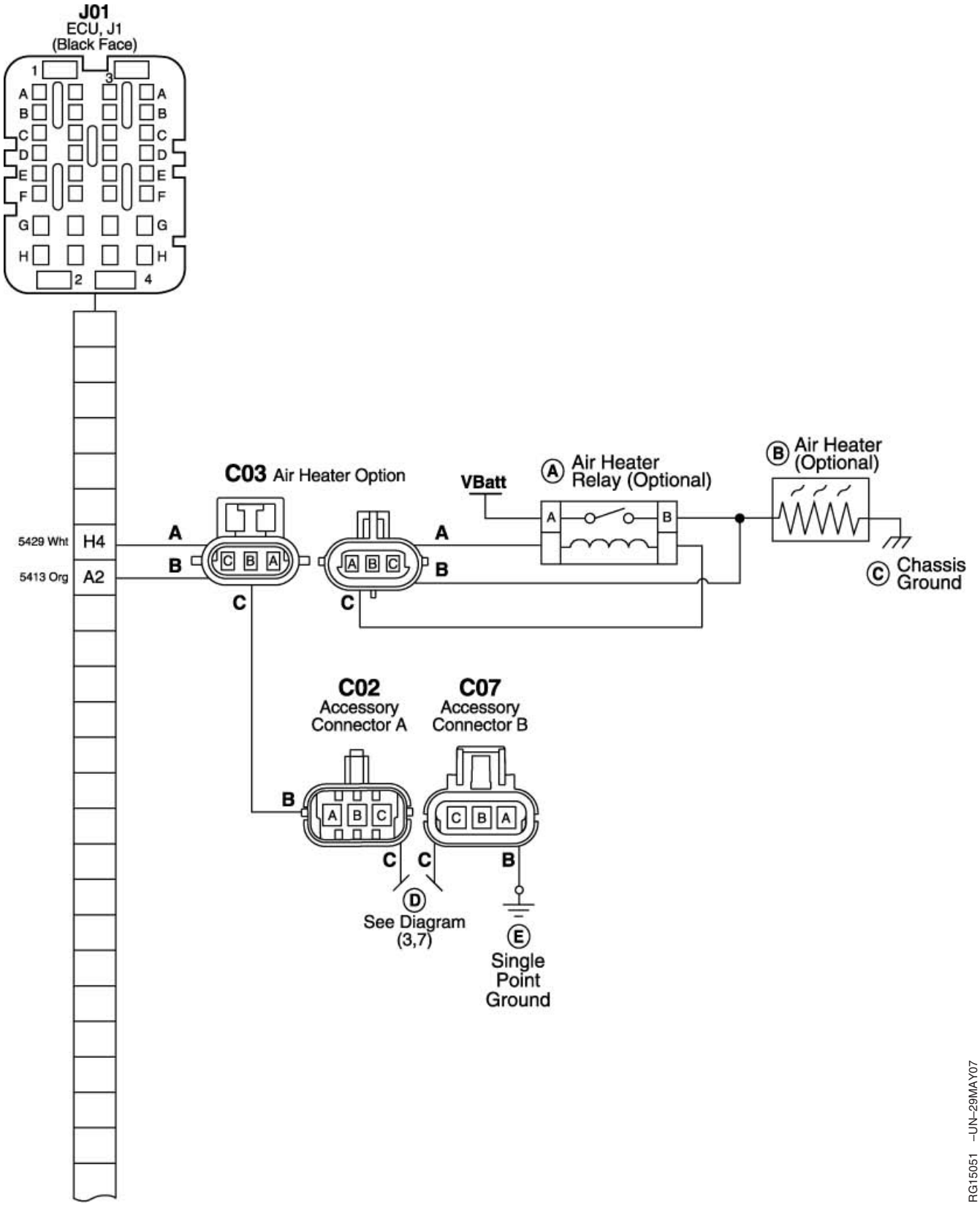
C09—21 Pin Connector (Panel Connector)
A—Resume Coast/Bump Down Switch
B—Set Accel/Bump Up Switch
C—Bump Enable Switch
D—Key Switch
E—21 Pin Connector (Panel Connector)
F—Battery
G—See Diagram (3)
H—Start
I—Accessory
J—Run
K—See Diagram (3,4)
L—Warning Lamp
M—Wait to Start Lamp
N—Primary Analog Throttle
O—Multi-State Throttle
P—See Diagram (4)
Q—Shutdown Override Switch
R—Single Point Ground
S—Tachometer
T—Control Panel
J02—ECU, J2 (Red Face)
J2-A3—[5616 Light Blue] Power Supply #3 +
J2-A4—[5915 Dark Green] Primary Analog Throttle Signal
J2-B2—[5012A Red] Ignition Key Start/Run Switch
J2-B4—[5947 Purple] Mulitstate Throttle Signal
J2-C1—[5916 Light Blue] Warning Lamp Drive --
J2-C2—[5474 Yellow] Wait To Start Lamp Drive --
J2-C3—[5814 Yellow] Power Supply #3 --
J2-D1—[5439 White] Tachometer Pulse Output
J2-D4—[5955 Dark green] Set/Accel/Bump Up Switch
J2-E3—[5913 Orange] Secondary Analog Throttle Signal
J2-E4—[5923 Orange] Bump Enable Switch
J2-F1—[5936 Light Blue] Resume Coast/Bump Down Switch
J2-G3—[5714A Yellow] Power Supply #2A --

DB92450,0000041 –19–19MAY07–2/2

4.5L 12V Wiring Diagram 6



4.5 Liter 12 Volt Wiring Diagram 6

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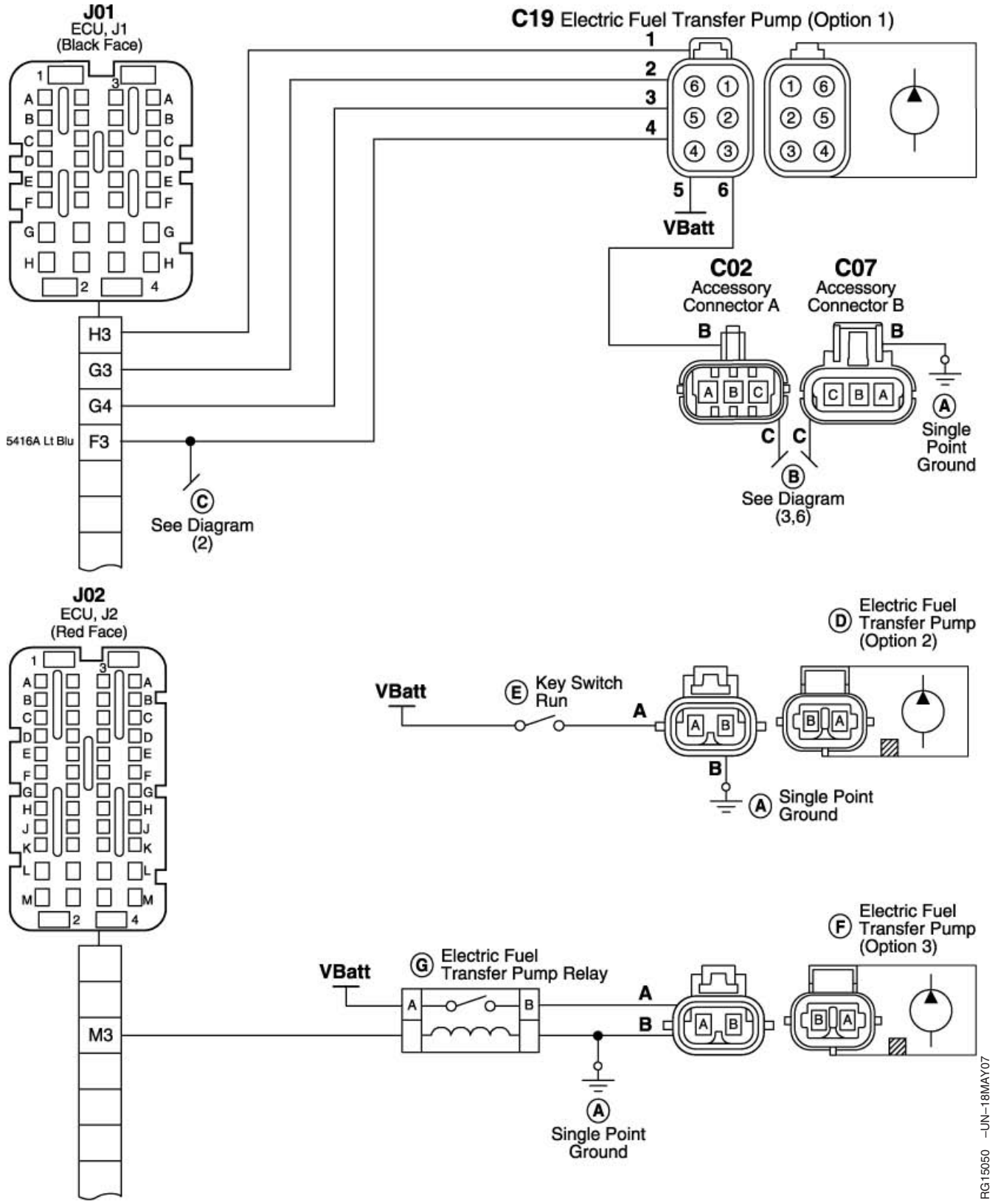
DB92450,000003C –19–19MAY07–1/2

C02—Accessory Connector A
C03—Air Heater Option
C07—Accessory Connector B
A—Air Heater Relay (Optional)
B—Air Heater (Optional)
C—Chassis Ground
D—See Diagram (3,7)
E—Single Point Ground
J01—ECU, J1 (Black Face)
J1-A2—[5413 Orange] Air Heater Relay Status
J1-H4—[5429 White] Air Heater Relay Control

DB92450,000003C –19–19MAY07–2/2

4.5L 12V Wiring Diagram 7



4.5 Liter 12 Volt Wiring Diagram 7

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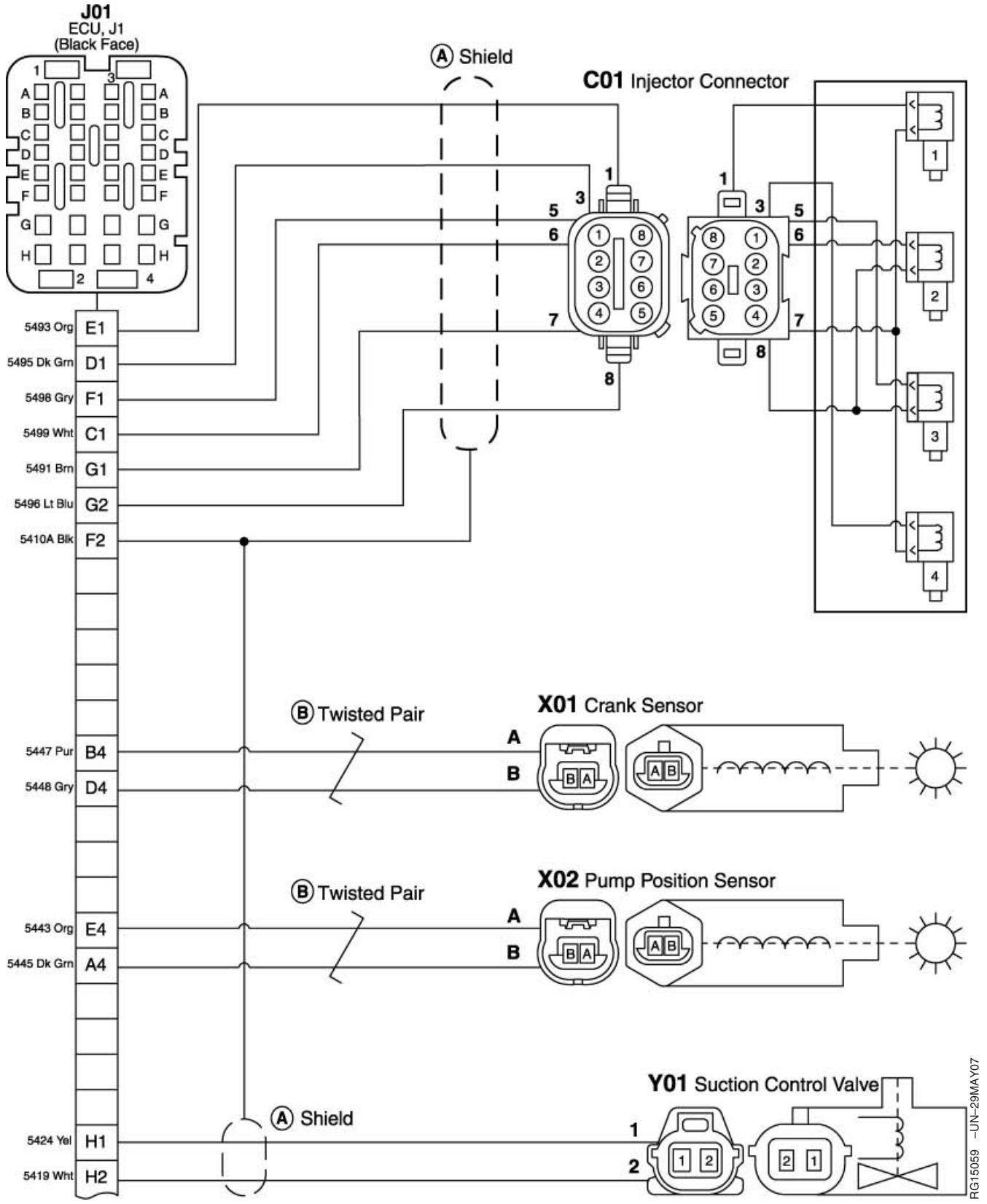
C02—Accessory Connector A
C07—Accessory Connector B
C19—Electric Fuel Transfer Pump (Option 1)
A—Single Point Ground
B—See Diagram (3,6)
C—See Diagram (2)
D—Electric Fuel Transfer Pump (Option 2)
E—Key Switch Run
F—Electric Fuel Transfer Pump (Option 3)
G—Electric Fuel Transfer Pump Relay
J01—ECU , J1 (Black Face)
J02—ECU J2, (Red Face)
J1-F3—[5416A Light Blue] Power Supply #2B +
J1-G3—Electric Fuel Transfer Pump Current Feedback
J1-G4—Electric Fuel Transfer Pump Status
J1-H3—Low Pressure Fuel Pump Speed Command
J2-M3—Fuel Transfer Pump Relay

DB92450,000003B –19–19MAY07–2/2

4.5L 24V Wiring Diagram 1



4.5 Liter 24 Volt Wiring Diagram 1

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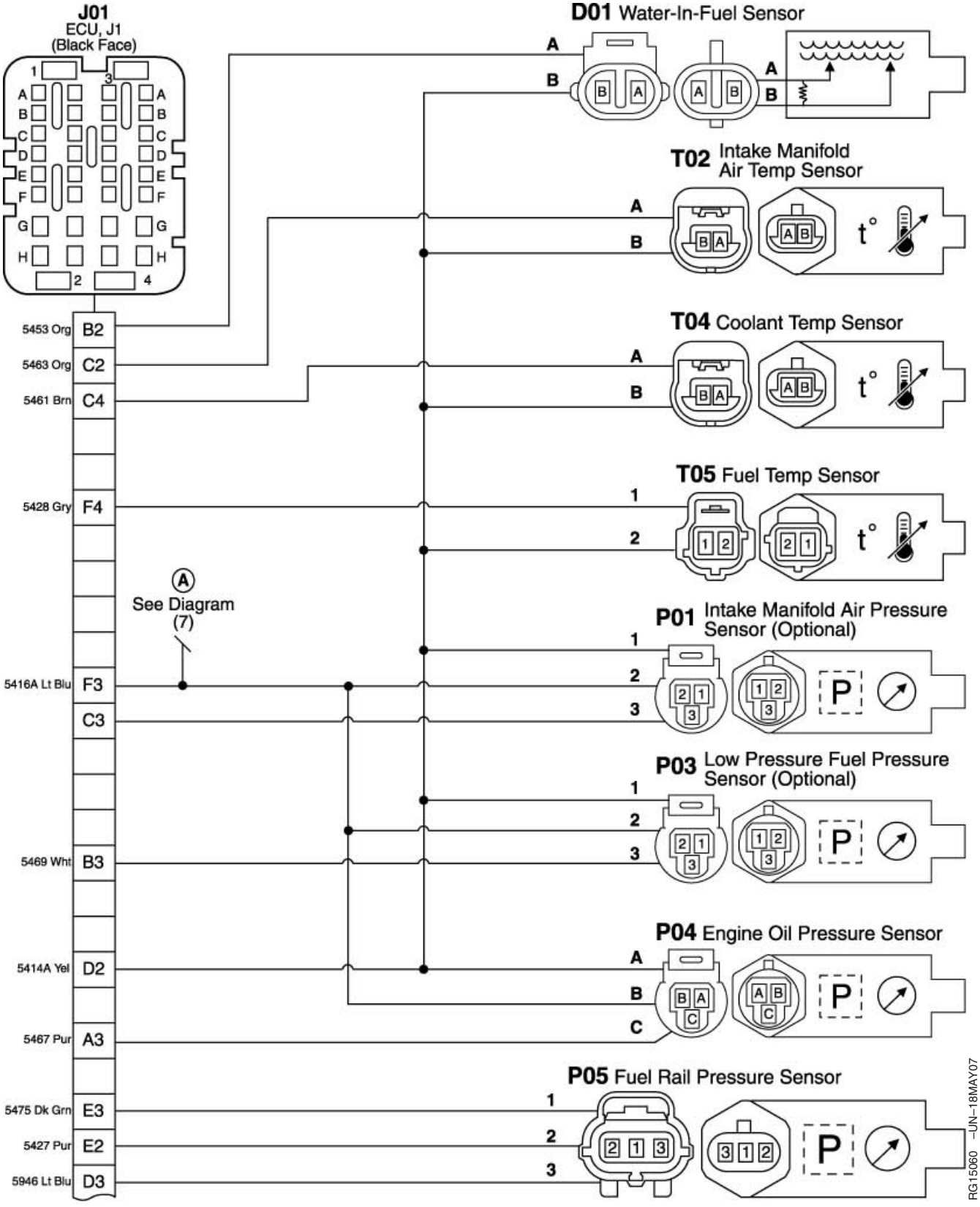
C01—Injector Connector
X01 —Crank Sensor
X02—Pump Position Sensor
Y01—Suction Control Valve
A—Shield
B—Twisted Pair
J01—ECU, J1 (Black Face)
J1-A4—[5445 Dark Green] Pump Position Pulse
J1-B4—[5447 Purple] Crank Position Pulse
J1-C1—[5499 White] Injector #2 Inject Pulse
J1-D1—[5495 Dark Green] Injector #4 Inject Pulse
J1-D4—[5448 Gray] Crank Position Return
J1-E1—[5493 Orange] Injector #1 Inject Pulse
J1-E4—[5443 Orange] Pump Position Return
J1-F1—[5498 Gray] Injector #3 Inject Pulse
J1-F2—[5410A Black] Wiring Shield
J1-G1—[5491 Brown] Injector #1 & #4 Power
J1-G2—[5496 Light Blue] Injector #2 & #3 Power
J1-H1—[5424 Yellow] HP Pump Suction Control Valve Drive +
J1-H2—[5419 White] HP Pump Suction Control Valve Drive --

DB92450,0000052 –19–19MAY07–2/2

4.5L 24V Wiring Diagram 2



4.5 Liter 24 Volt Wiring Diagram 2

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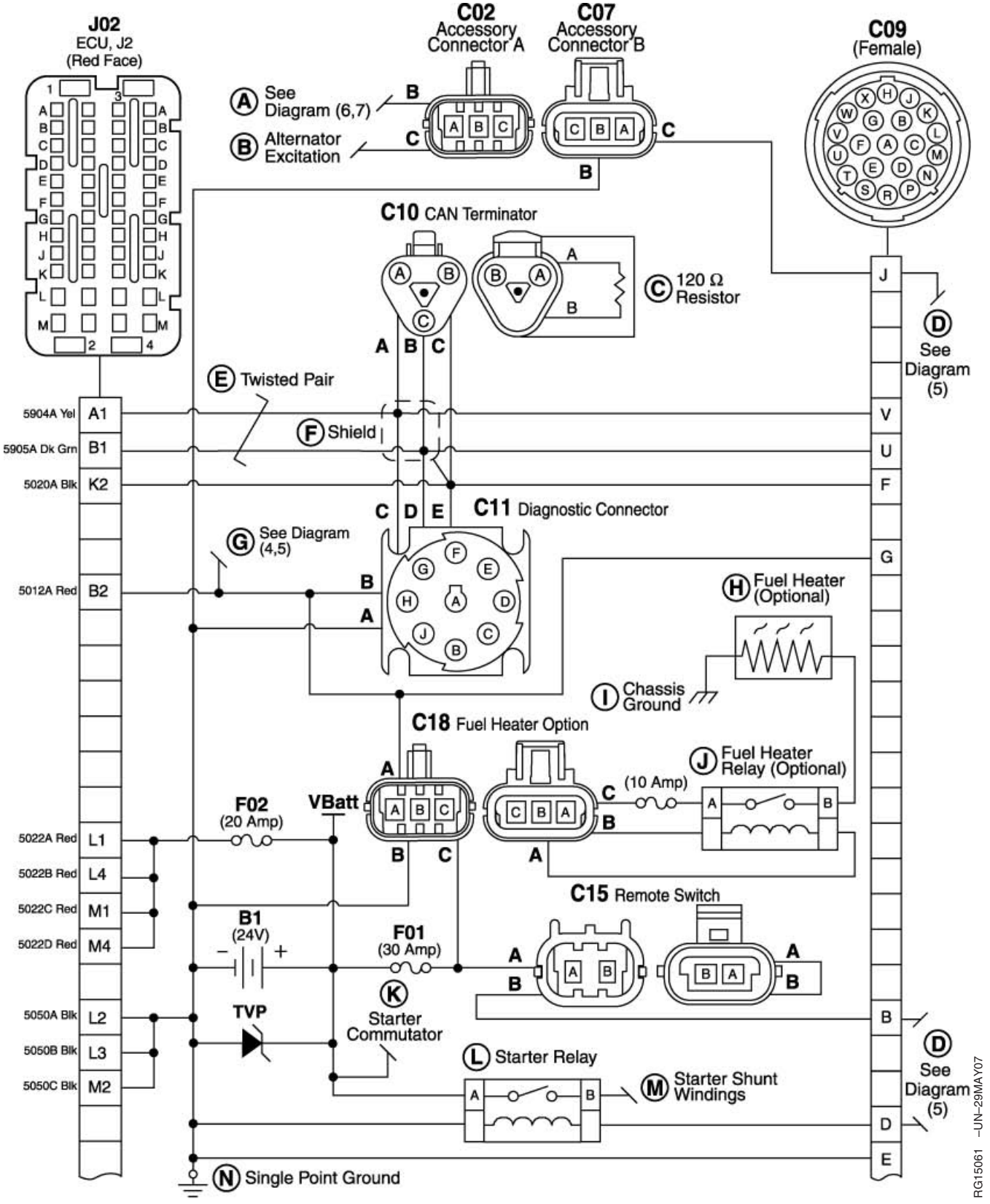
D01—Water In Fuel Sensor
P01—Intake Manifold Air Pressure Sensor (Optional)
P03—Low Pressure Fuel Pressure Sensor (Optional)
P04—Engine Oil Pressure Sensor
P05—Fuel Rail Pressure Sensor
T02—Intake Manifold Air Temperature Sensor
T04—Coolant Temperature Sensor
T05—Fuel Temperature Sensor
A—See Diagram (7)
J01—ECU, J1 (Black Face)
J1-A3—[5467 Purple] Engine Oil Pressure Signal
J1-B2—[5453 Orange] Water In Fuel Signal
J1-B3—[5469 White] Fuel Pressure Signal
J1-C2—[5463 Orange] Intake Manifold Air Temperature Signal
J1-C3—Intake Manifold Air Pressure Signal
J1-C4—[5461 Brown] Coolant Temperature Signal
J1-D2—[5414A Yellow] Power Supply #2B --
J1-D3—[5946 Lt Blue] Power Supply #1 +
J1-E2—[5427 Orange] Power Supply #1--
J1-E3—[5475 Dark Green] Fuel Rail Pressure Signal
J1-F3—[5416A Light Blue] Power Supply #2B +
J1-F4—[5428 Gray] Fuel Temperature Signal

DB92450,0000053 –19–19MAY07–2/2

4.5L 24V Wiring Diagram 3



4.5 Liter 24 Volt Wiring Diagram 3

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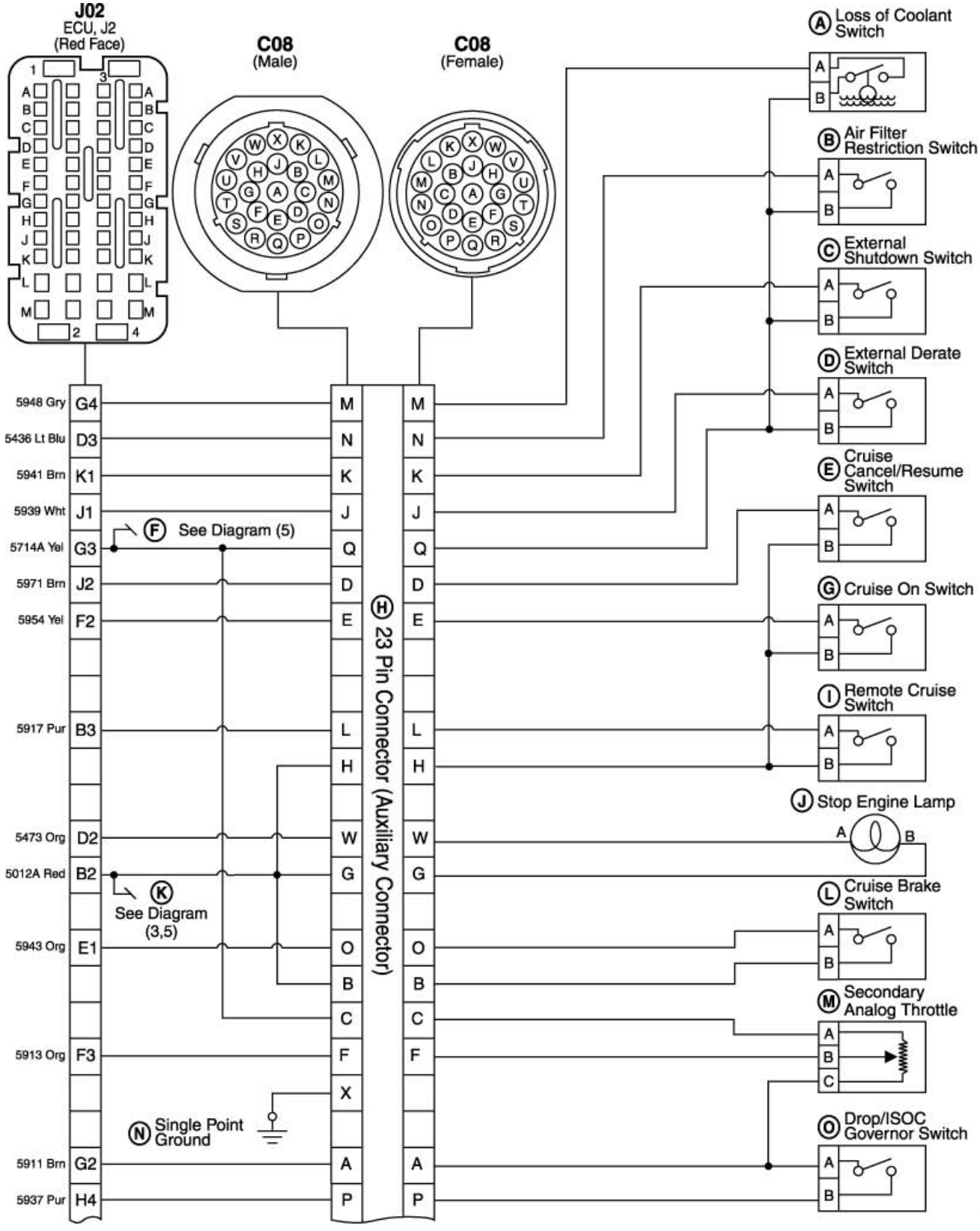
B1—24 Volt
C02—Accessory Connector A
C07—Accessory Connector B
C09—21 Pin Connector (Panel Connector)
C10—CAN Terminator
C11—Diagnostic Connector
C15—Remote Switch
C18—Fuel Heater Option
F01—30 Amp
F02—20 Amp
TVP—Transient Voltage Protection
A—See Diagram (6,7)
B—Alternator Excitation
C—120 Resister
D—See Diagram (5)
E—Twisted Pair
F—Shield
G—See Diagram (4,5)
H—Fuel Heater (Optional)
I—Chassis Ground
J—Fuel Heater Relay (Optional)
K—Starter Commutator
L—Starter Relay
M—Starter Shunt Windings
N—Single Point Ground
J02—ECU, J2 (Red Face)
J2-A1—[5904A Yellow] CAN High
J2-B1—[5905A Dark Green] CAN Low
J2-B2—[5012A Red] Ignition Key Start/Run Switch
J2-K2—[5020A Black] CAN Shield
J2-L1—[5022A Red] Battery +
J2-L2—[5050A Black] Battery --
J2-L3—[5050B Black] Battery --
J2-L4—[5022B Red]Battery +
J2-M1—[5022C Red]Battery +
J2-M2—[5050C Black] Battery --
J2-M4—[5022D Red]Battery +

DB92450,0000054 –19–19MAY07–2/2

4.5L 24V Wiring Diagram 4



4.5 Liter 24 Volt Wiring Diagram 4

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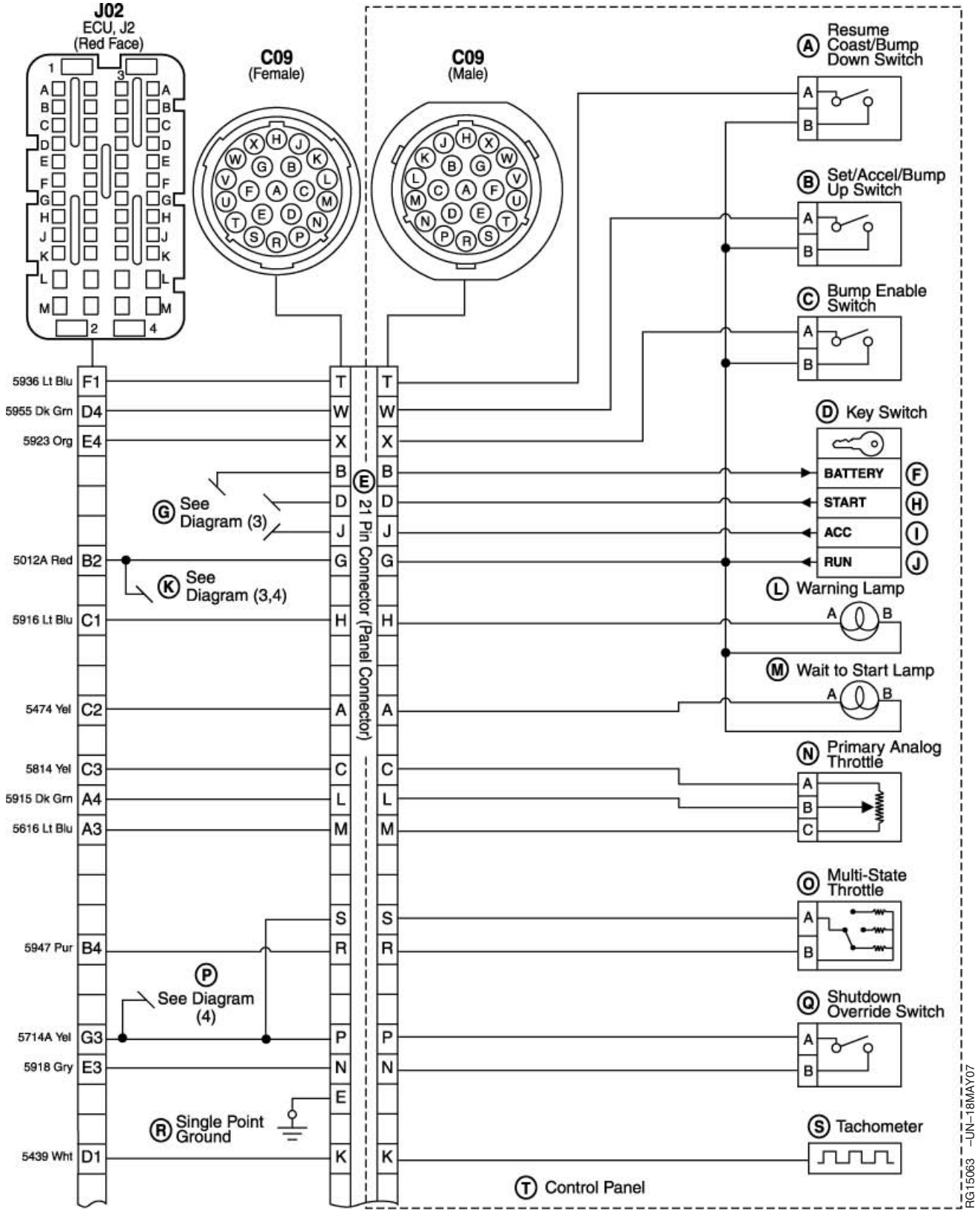
C08—23 Pin Connector (Auxiliary Connector)
A—Loss of Coolant Switch
B—Air Filter Restriction Switch
C—External Shutdown Switch
D—External Derate Switch
E—Cruise Cancel/Resume Switch
F—See Diagram (5)
G—Cruise On Switch
H—23 Pin Connector (Auxiliary Connector)
I—Remote Cruise Switch
J—Stop Engine Lamp
K—See Diagram (3,5)
L—Cruise Brake Switch
M—Secondary Analog Throttle
N—Single Point Ground
O—Drop/Isoc (Isochronous) Governor Switch
J02—ECU, J2 (Red Face)
J2-B2—[5012A Red] Ignition Key Start/Run Switch
J2-B3—[5917 Purple] Remote Cruise On/Off Switch
J2-D2—[5473 Orange] Stop Engine Lamp Return
J2-D3—[5436 Light Blue] Air Filter Restriction Switch
J2-E1—[5943 Orange] Cruise Brake Switch
J2-F2—[5954 Yellow] Cruise On/Off Switch
J2-F3—[5913 Orange] Secondary Analog Throttle Signal
J2-G2—[5911 Brown] Power Supply #2A +
J2-G3—[5714A Yellow] Power Supply #2A --
J2-G4—[5948 Gray] Low Coolant Level Switch
J2-H4—[5937 Purple] Droop/Isochronous Governor Switch
J2-J1—[5939 White] External Derate Switch
J2-J2—[5971 Brown] Cruise Cancel/Resume Switch
J2-K1—[5941 Brown] External Shutdown Switch

DB92450,0000055 –19–19MAY07–2/2

4.5L 24V Wiring Diagram 5



4.5 Liter 24 Volt Wiring Diagram 5

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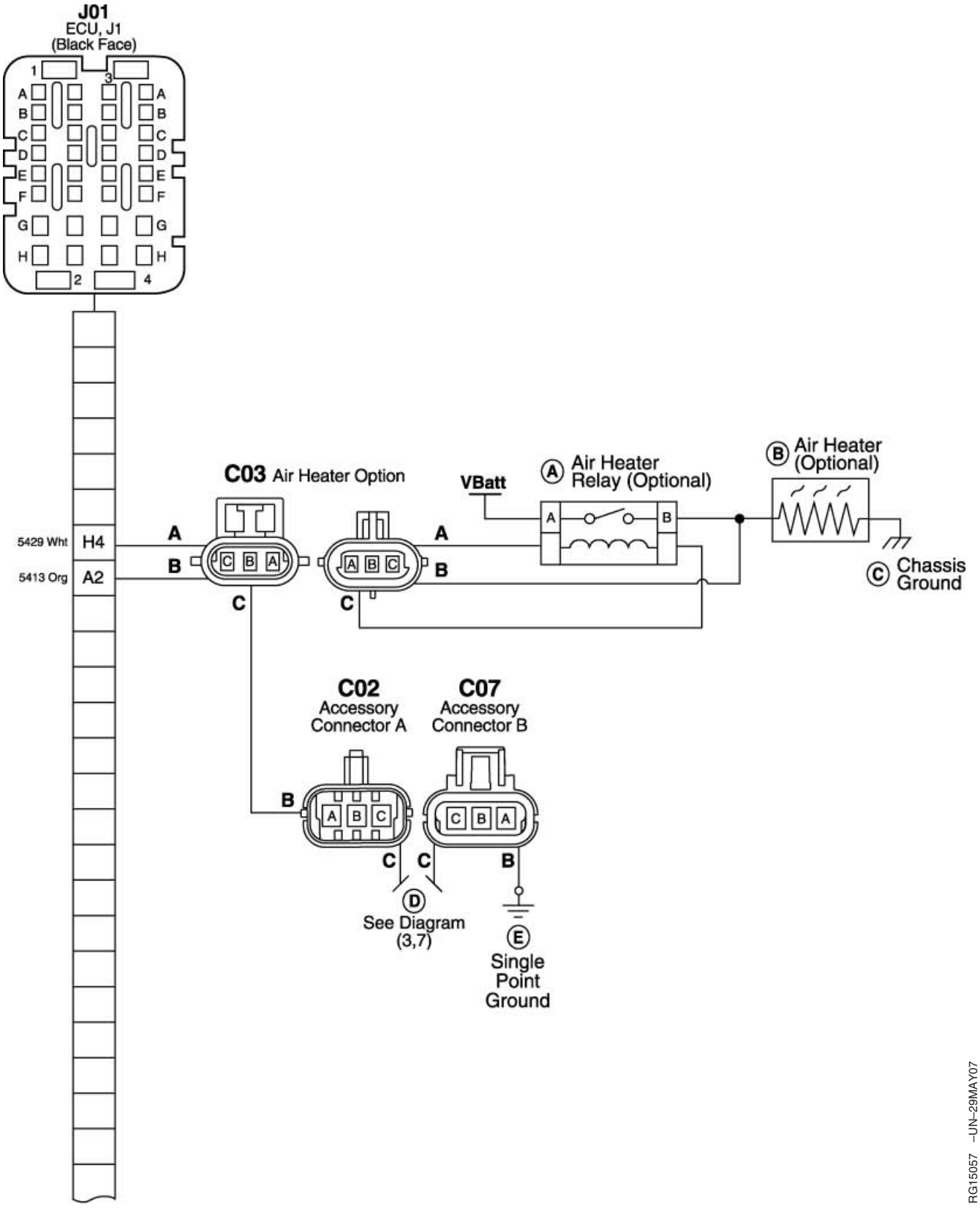
C09—21 Pin Connector (Panel Connector)
A—Resume Coast/Bump Down Switch
B—Set Accel/Bump Up Switch
C—Bump Enable Switch
D—Key Switch
E—21 Pin Connector (Panel Connector)
F—Battery
G—See Diagram (3)
H—Start
I—Accessory
J—Run
K—See Diagram (3,4)
L—Warning Lamp
M—Wait to Start Lamp
N—Primary Analog Throttle
O—Multi-State Throttle
P—See Diagram (4)
Q—Shutdown Override Switch
R—Single Point Ground
S—Tachometer
T—Control Panel
J02—ECU, J2 (Red Face)
J2-A3—[5616 Light Blue] Power Supply #3 +
J2-A4—[5915 Dark Green] Primary Analog Throttle Signal
J2-B2—[5012A Red] Ignition Key Start/Run Switch
J2-B4—[5947 Purple] Mulitstate Throttle Signal
J2-C1—[5916 Light Blue] Warning Lamp Drive --
J2-C2—[5474 Yellow] Wait To Start Lamp Drive --
J2-C3—[5814 Yellow] Power Supply #3 --
J2-D1—[5439 White] Tachometer Pulse Output
J2-D4—[5955 Dark green] Set/Accel/Bump Up Switch
J2-E3—[5913 Orange] Secondary Analog Throttle Signal
J2-E4—[5923 Orange] Bump Enable Switch
J2-F1—[5936 Light Blue] Resume Coast/Bump Down Switch
J2-G3—[5714A Yellow] Power Supply #2A --

DB92450,0000056 –19–19MAY07–2/2

4.5L 24V Wiring Diagram 6



4.5 Liter , 24 Volt Wiring Diagram 6

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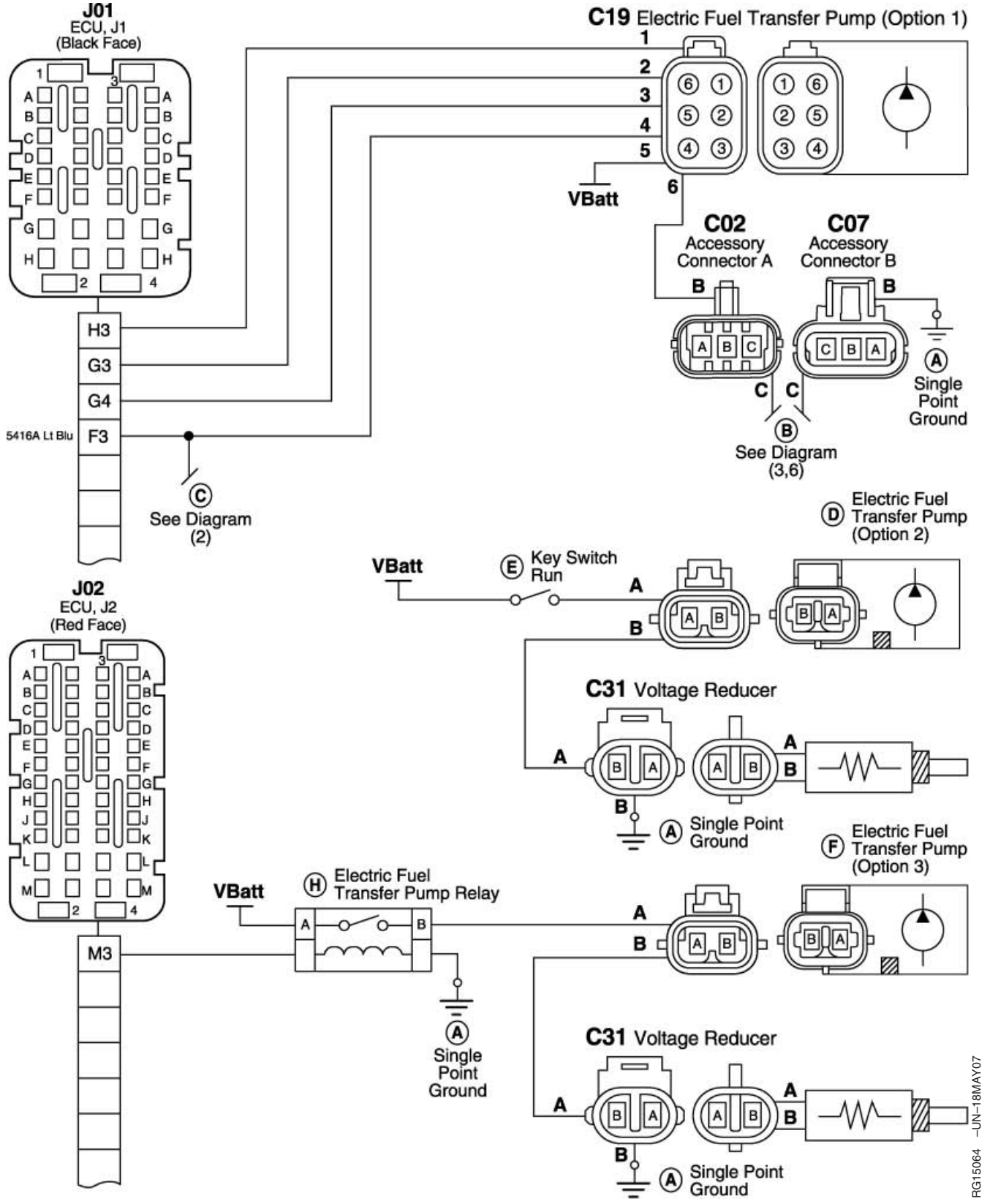
DB92450,0000050 –19–19MAY07–1/2

C02—Accessory Connector A
C03—Air Heater Option
C07—Accessory Connector B
A—Air Heater Relay (Optional)
B—Air Heater (Optional)
C—Chassis Ground
D—See Diagram (3,7)
E—Single Point Ground
J01—ECU, J1 (Black Face)
J1-A2—[5413 Orange] Air Heater Relay Status
J1-H4—[5429 White] Air Heater Relay Control

DB92450,0000050 –19–19MAY07–2/2

4.5L 24V Wiring Diagram 7



4.5L 24V Wiring Diagram 7

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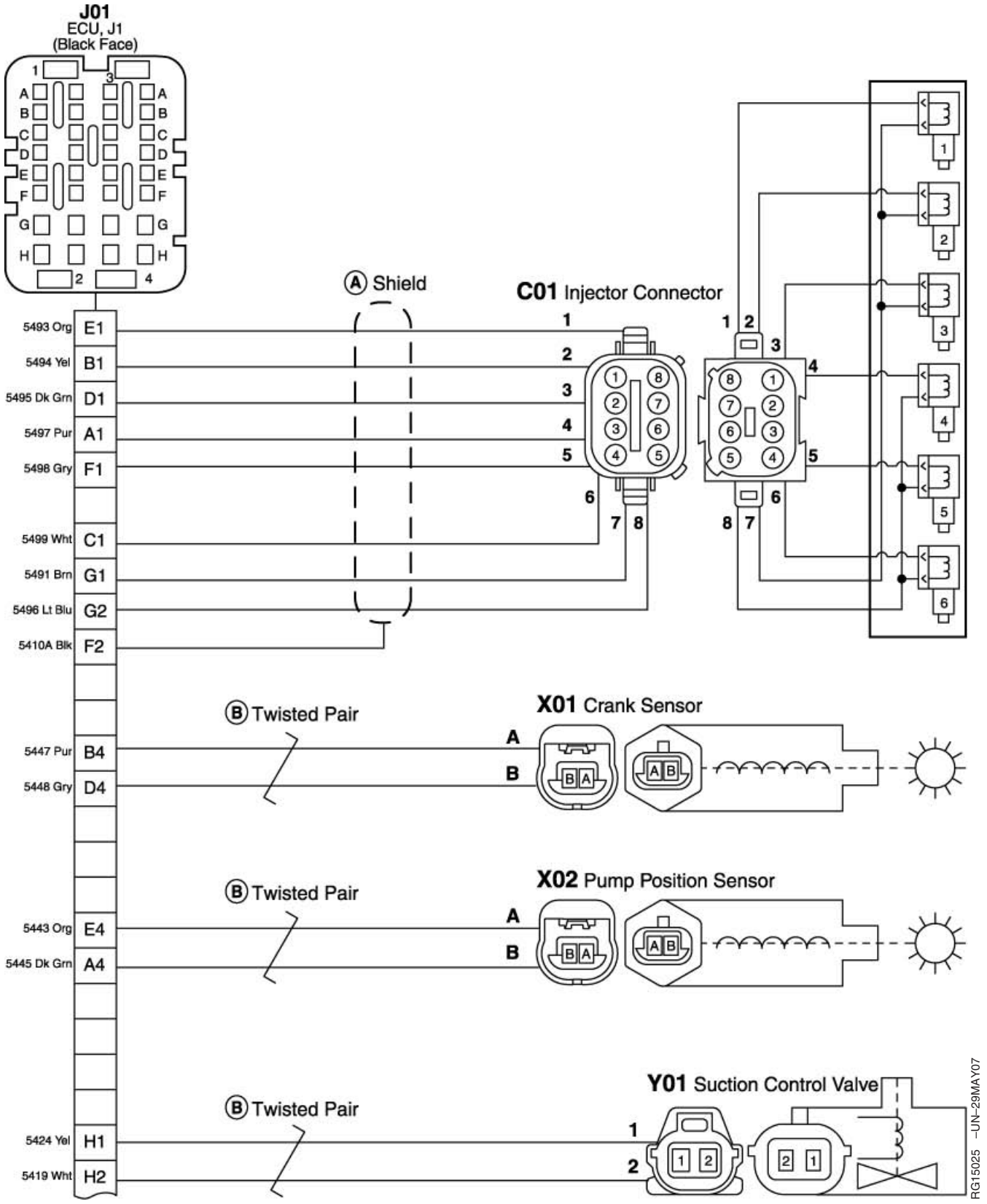
C02—Accessory Connector A
C07—Accessory Connector B
C19—Electric Fuel Transfer Pump (Option 1)
C31—Voltage Reducer
A—Single Point Ground
B—See Diagram (3,6)
C—See Diagram (2)
D—Electric Fuel Transfer Pump (Option 2)
E—Key Switch Run
F—Resister
G—Electric Fuel Transfer Pump Relay
H—Electric Fuel Transfer Pump (Option 3)
J01—ECU , J1 (Black Face)
J02—ECU J2, (Red Face)
J1-F3—[5416A Light Blue] Power Supply #2B +
J1-G3—Electric Fuel Transfer Pump Current Feedback
J1-G4—Electric Fuel Transfer Pump Status
J1-H3—Low Pressure Fuel Pump Speed Command
J2-M3—Fuel Transfer Pump Relay

DB92450,0000051 –19–19MAY07–2/2

6.8L 12V Wiring Diagram 1



6.8 Liter 12 Volt Wiring Diagram 1

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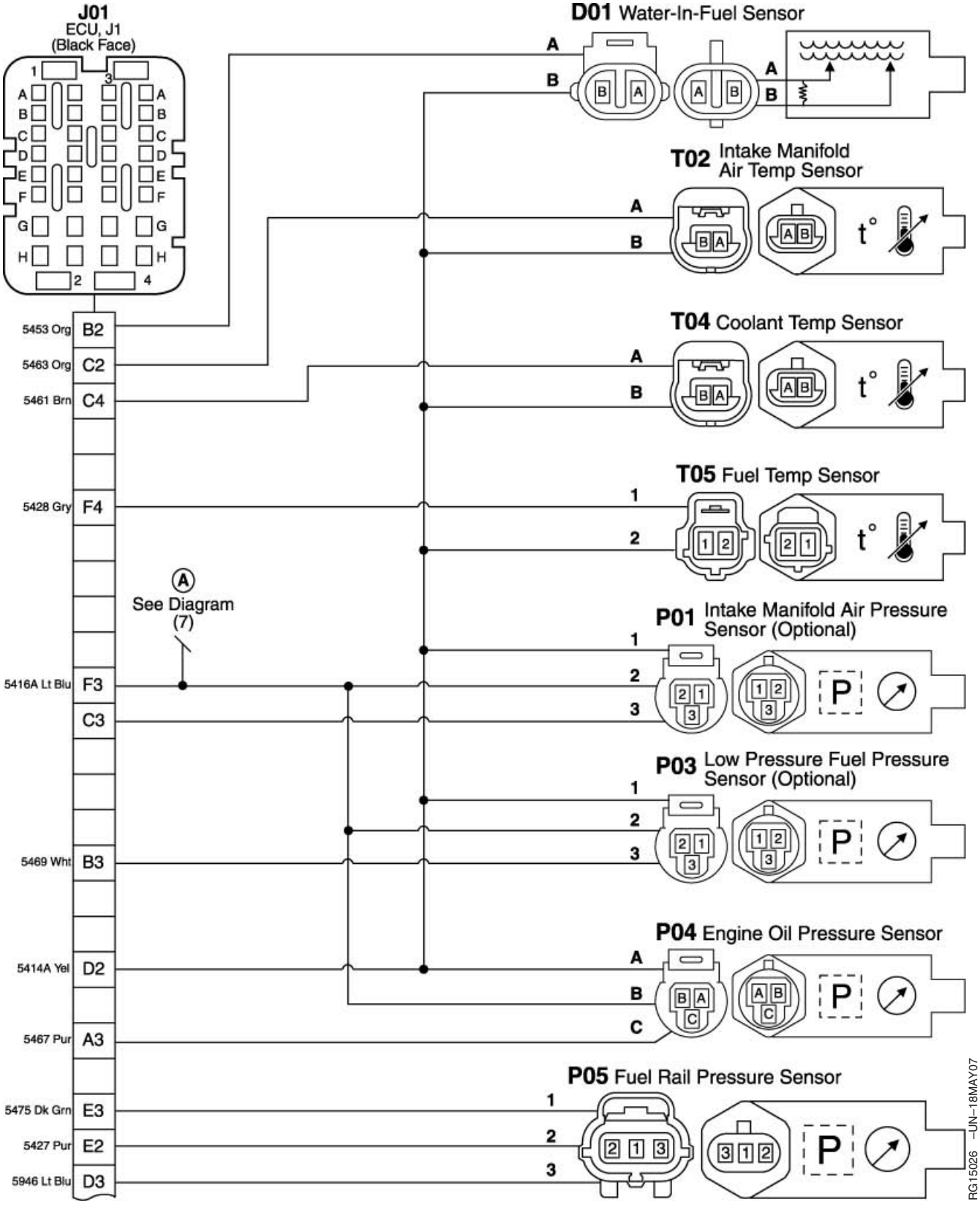
C01—Injector Connector
X01 —Crank Sensor
X02—Pump Position Sensor
Y01—Suction Control Valve
A—Shield
B—Twisted Pair
J01—ECU, J1 (Black Face)
J1-A1—[5497 Purple] Injector #4 Inject Pulse
J1-A4—[5445 Dark Green] Pump Position Pulse
J1-B1—[5494 Yellow] Injector #2 Inject Pulse
J1-B4—[5447 Purple] Crank Position Pulse
J1-C1—[5499 White] Injector #6 Inject Pulse
J1-D1—[5495 Dark Green] Injector #3 Inject Pulse
J1-D4—[5448 Gray] Crank Position Return
J1-E1—[5493 Orange] Injector #1 Inject Pulse
J1-E4—[5443 Orange] Pump Position Return
J1-F1—[5498 Gray] Injector #5 Inject Pulse
J1-F2—[5410A Black] Wiring Shield
J1-G1—[5491 Brown] Injector #1& #2 & #3 Power
J1-G2—[5496 Light Blue] Injector #4& #5 & #6 Power
J1-H1—[5424 Yellow] HP Pump Suction Control Valve Drive +
J1-H2—[5419 White] HP Pump Suction Control Valve Drive --

DB92450,0000044 –19–19MAY07–2/2

6.8L 12V Wiring Diagram 2



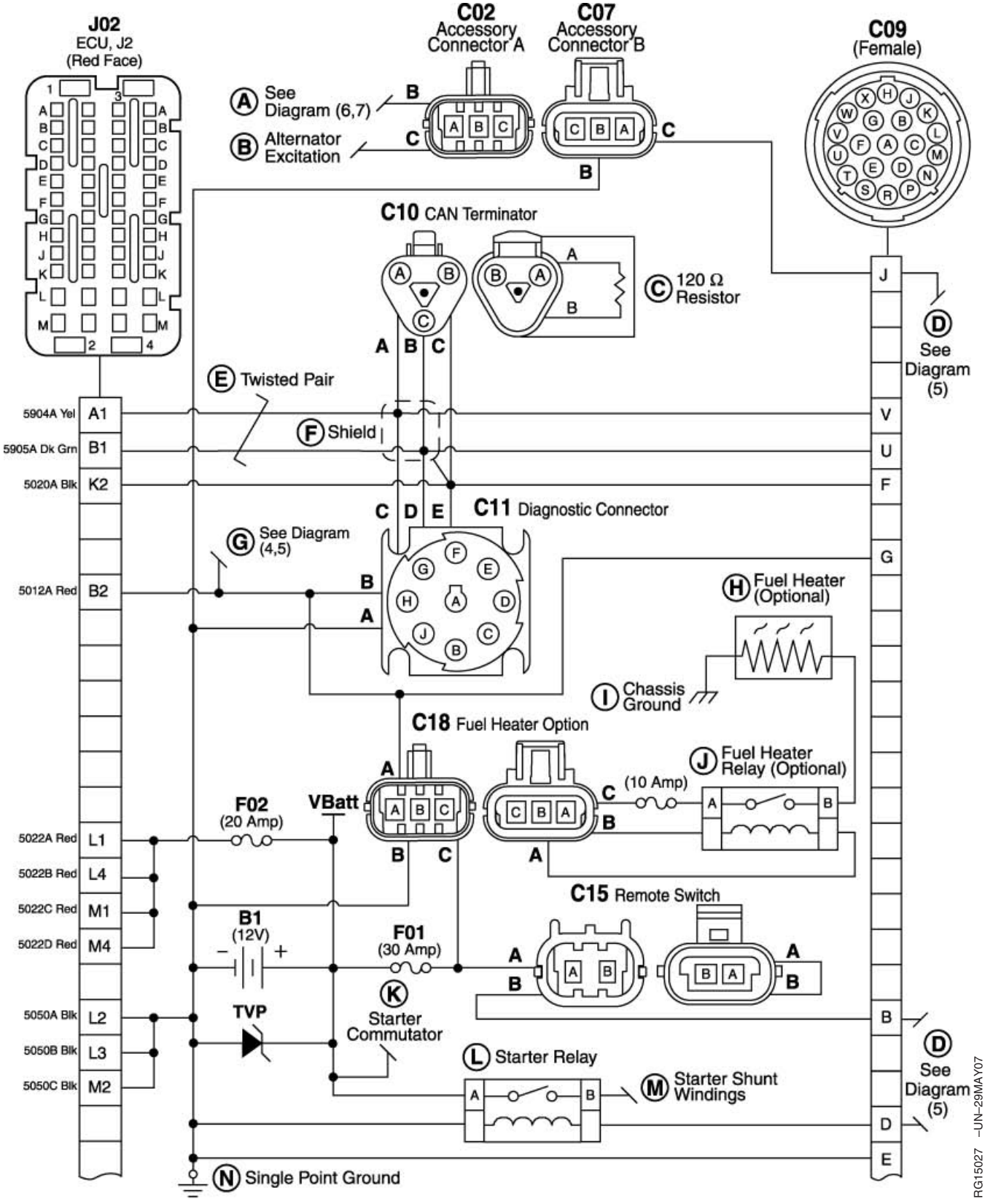
6.8 Liter 12 Volt Wiring Diagram 2

Continued on next page

D01—Water In Fuel Sensor
P01—Intake Manifold Air Pressure Sensor (Optional)
P03—Low Pressure Fuel Pressure Sensor (Optional)
P04—Engine Oil Pressure Sensor
P05—Fuel Rail Pressure Sensor
T02—Intake Manifold Air Temperature Sensor
T04—Coolant Temperature Sensor
T05—Fuel Temperature Sensor
A—See Diagram (7)
J01—ECU, J1 (Black Face)
J1-A3—[5467 Purple] Engine Oil Pressure Signal
J1-B2—[5453 Orange] Water In Fuel Signal
J1-B3—[5469 White] Fuel Pressure Signal
J1-C2—[5463 Orange] Intake Manifold Air Temperature Signal
J1-C3—Intake Manifold Air Pressure Signal
J1-C4—[5461 Brown] Coolant Temperature Signal
J1-D2—[5414A Yellow] Power Supply #2B --
J1-D3—[5946 Lt Blue] Power Supply #1 +
J1-E2—[5427 Orange] Power Supply #1--
J1-E3—[5475 Dark Green] Fuel Rail Pressure Signal
J1-F3—[5416A Light Blue] Power Supply #2B +
J1-F4—[5428 Gray] Fuel Temperature Signal

DB92450,0000045 –19–19MAY07–2/2

6.8L 12V Wiring Diagram 3



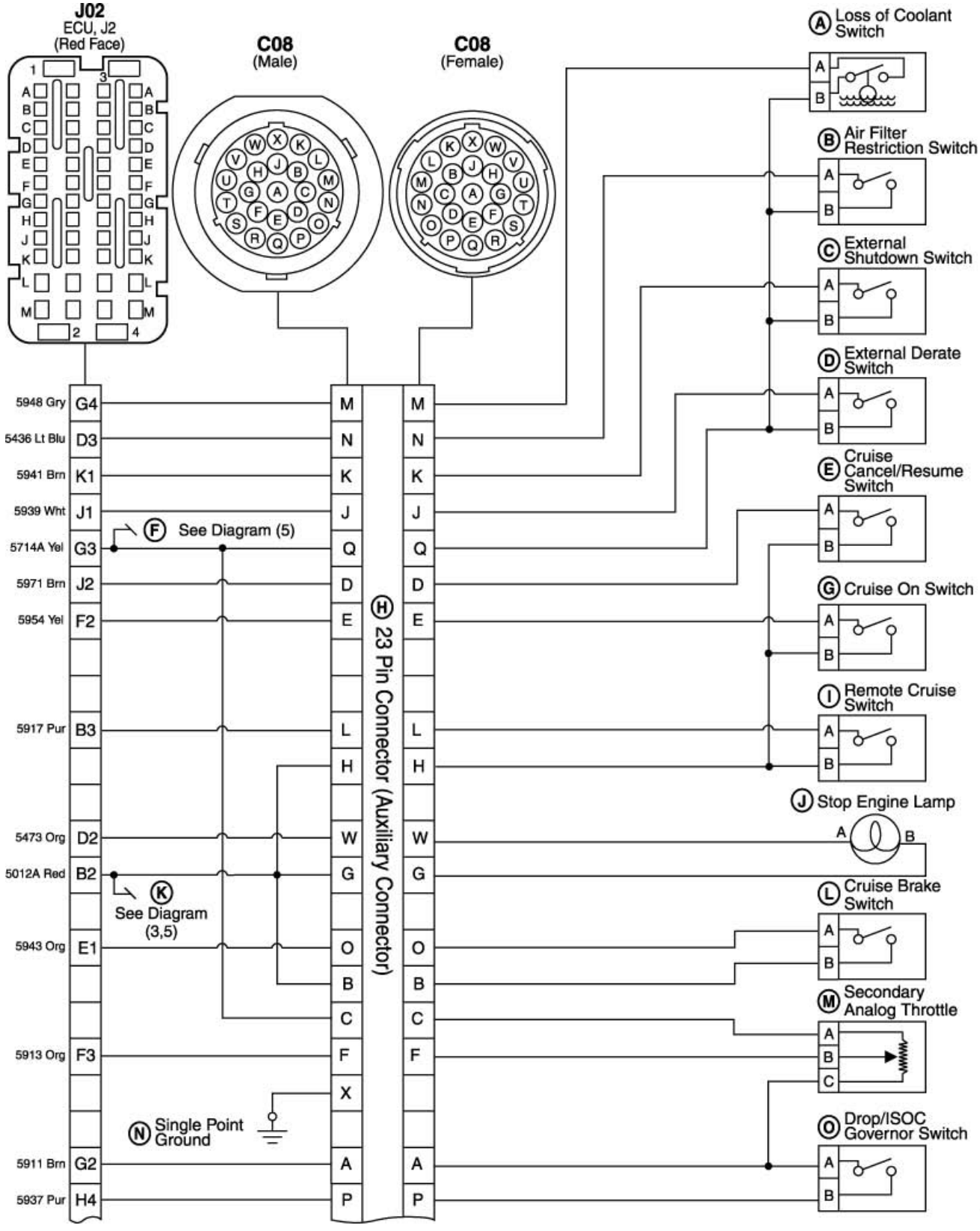
6.8 Liter 12 Volt Wiring Diagram 3

Continued on next page

B1—12 Volt
C02—Accessory Connector A
C07—Accessory Connector B
C09—21 Pin Connector (Panel Connector)
C10—CAN Terminator
C11—Diagnostic Connector
C15—Remote Switch
C18—Fuel Heater Option
F01—30 Amp
F02—20 Amp
TVP—Transient Voltage Protection
A—See Diagram (6,7)
B—Alternator Excitation
C—120 Resister
D—See Diagram (5)
E—Twisted Pair
F—Shield
G—See Diagram (4,5)
H—Fuel Heater (Optional)
I—Chassis Ground
J—Fuel Heater Relay (Optional)
K—Starter Commutator
L—Starter Relay
M—Starter Shunt Windings
N—Single Point Ground
J02—ECU, J2 (Red Face)
J2-A1—[5904A Yellow] CAN High
J2-B1—[5905A Dark Green] CAN Low
J2-B2—[5012A Red] Ignition Key Start/Run Switch
J2-K2—[5020A Black] CAN Shield
J2-L1—[5022A Red] Battery +
J2-L2—[5050A Black] Battery --
J2-L3—[5050B Black] Battery --
J2-L4—[5022B Red]Battery +
J2-M1—[5022C Red]Battery +
J2-M2—[5050C Black] Battery --
J2-M4—[5022D Red]Battery +

DB92450,0000046 –19–19MAY07–2/2

6.8L 12V Wiring Diagram 4



6.8 Liter 12 Volt Wiring Diagram 4

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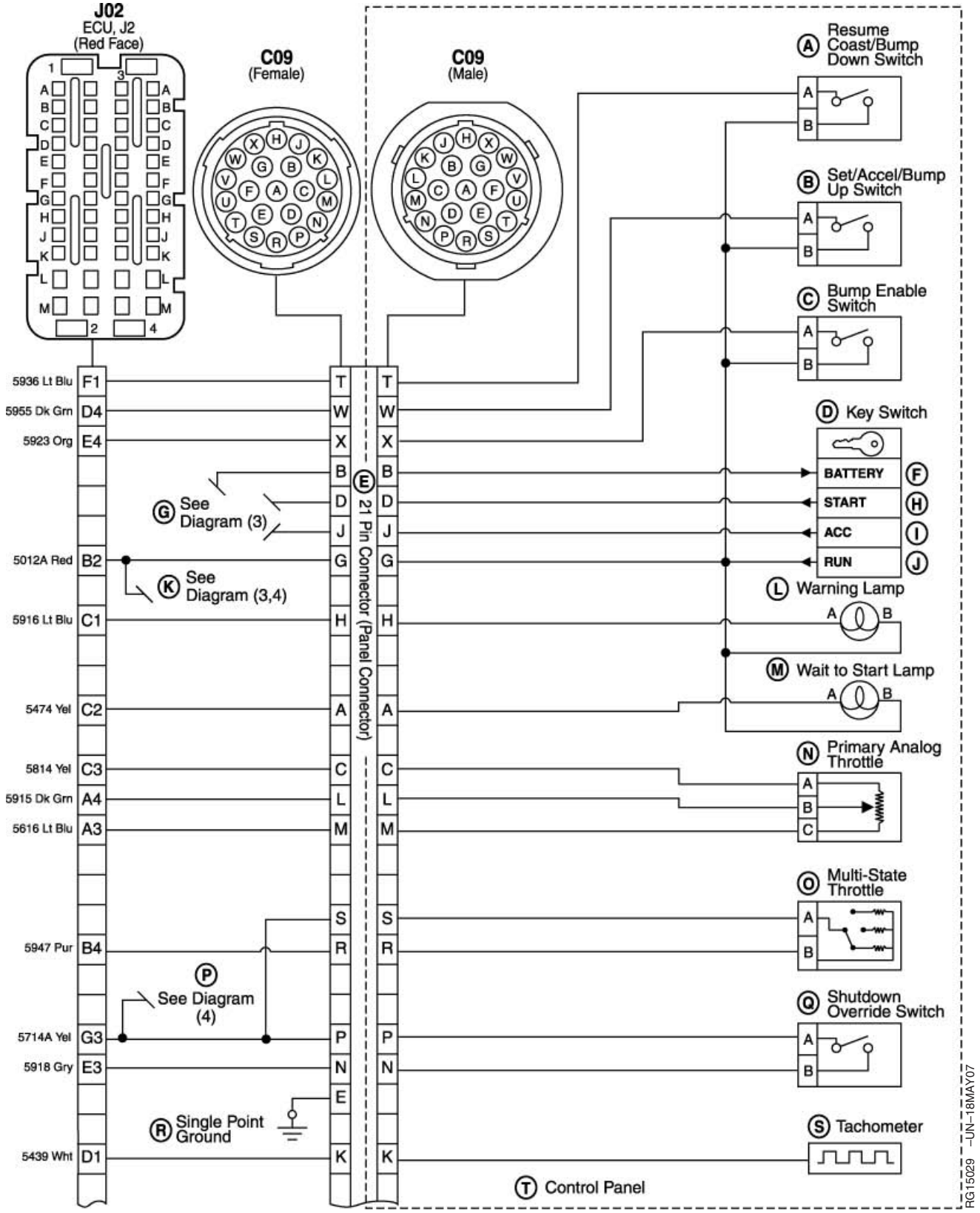
DB92450,0000047 –19–19MAY07–1/2

C08—23 Pin Connector (Auxiliary Connector)
A—Loss of Coolant Switch
B—Air Filter Restriction Switch
C—External Shutdown Switch
D—External Derate Switch
E—Cruise Cancel/Resume Switch
F—See Diagram (5)
G—Cruise On Switch
H—23 Pin Connector (Auxiliary Connector)
I—Remote Cruise Switch
J—Stop Engine Lamp
K—See Diagram (3,5)
L—Cruise Brake Switch
M—Secondary Analog Throttle
N—Single Point Ground
O—Drop/Isoc (Isochronous) Governor Switch
J02—ECU, J2 (Red Face)
J2-B2—[5012A Red] Ignition Key Start/Run Switch
J2-B3—[5917 Purple] Remote Cruise On/Off Switch
J2-D2—[5473 Orange] Stop Engine Lamp Return
J2-D3—[5436 Light Blue] Air Filter Restriction Switch
J2-E1—[5943 Orange] Cruise Brake Switch
J2-F2—[5954 Yellow] Cruise On/Off Switch
J2-F3—[5913 Orange] Secondary Analog Throttle Signal
J2-G2—[5911 Brown] Power Supply #2A +
J2-G3—[5714A Yellow] Power Supply #2A --
J2-G4—[5948 Gray] Low Coolant Level Switch
J2-H4—[5937 Purple] Droop/Isochronous Governor Switch
J2-J1—[5939 White] External Derate Switch
J2-J2—[5971 Brown] Cruise Cancel/Resume Switch
J2-K1—[5941 Brown] External Shutdown Switch

DB92450,0000047 –19–19MAY07–2/2

6.8L 12V Wiring Diagram 5



6.8 Liter 12 Volt Wiring Diagram 5

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C09—21 Pin Connector (Panel Connector)
A—Resume Coast/Bump Down Switch
B—Set Accel/Bump Up Switch
C—Bump Enable Switch
D—Key Switch
E—21 Pin Connector (Panel Connector)
F—Battery
G—See Diagram (3)
H—Start
I—Accessory
J—Run
K—See Diagram (3,4)
L—Warning Lamp
M—Wait to Start Lamp
N—Primary Analog Throttle
O—Multi-State Throttle
P—See Diagram (4)
Q—Shutdown Override Switch
R—Single Point Ground
S—Tachometer
T—Control Panel
J02—ECU, J2 (Red Face)
J2-A3—[5616 Light Blue] Power Supply #3 +
J2-A4—[5915 Dark Green] Primary Analog Throttle Signal
J2-B2—[5012A Red] Ignition Key Start/Run Switch
J2-B4—[5947 Purple] Mulitstate Throttle Signal
J2-C1—[5916 Light Blue] Warning Lamp Drive --
J2-C2—[5474 Yellow] Wait To Start Lamp Drive --
J2-C3—[5814 Yellow] Power Supply #3 --
J2-D1—[5439 White] Tachometer Pulse Output
J2-D4—[5955 Dark green] Set/Accel/Bump Up Switch
J2-E3—[5913 Orange] Secondary Analog Throttle Signal
J2-E4—[5923 Orange] Bump Enable Switch
J2-F1—[5936 Light Blue] Resume Coast/Bump Down Switch
J2-G3—[5714A Yellow] Power Supply #2A --

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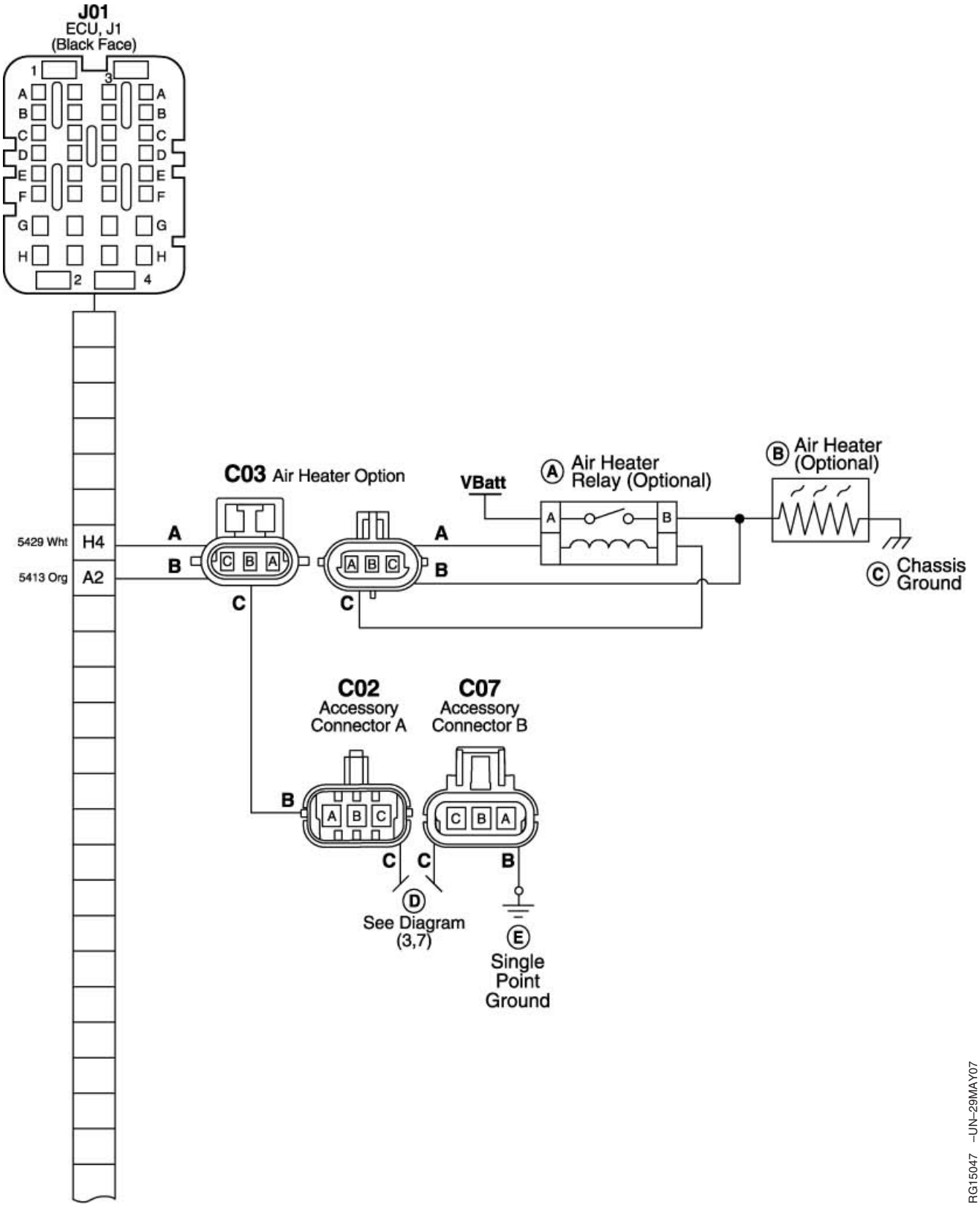
6.8L 12V Wiring Diagram 6



6.8 Liter 12 Volt Wiring Diagram 6

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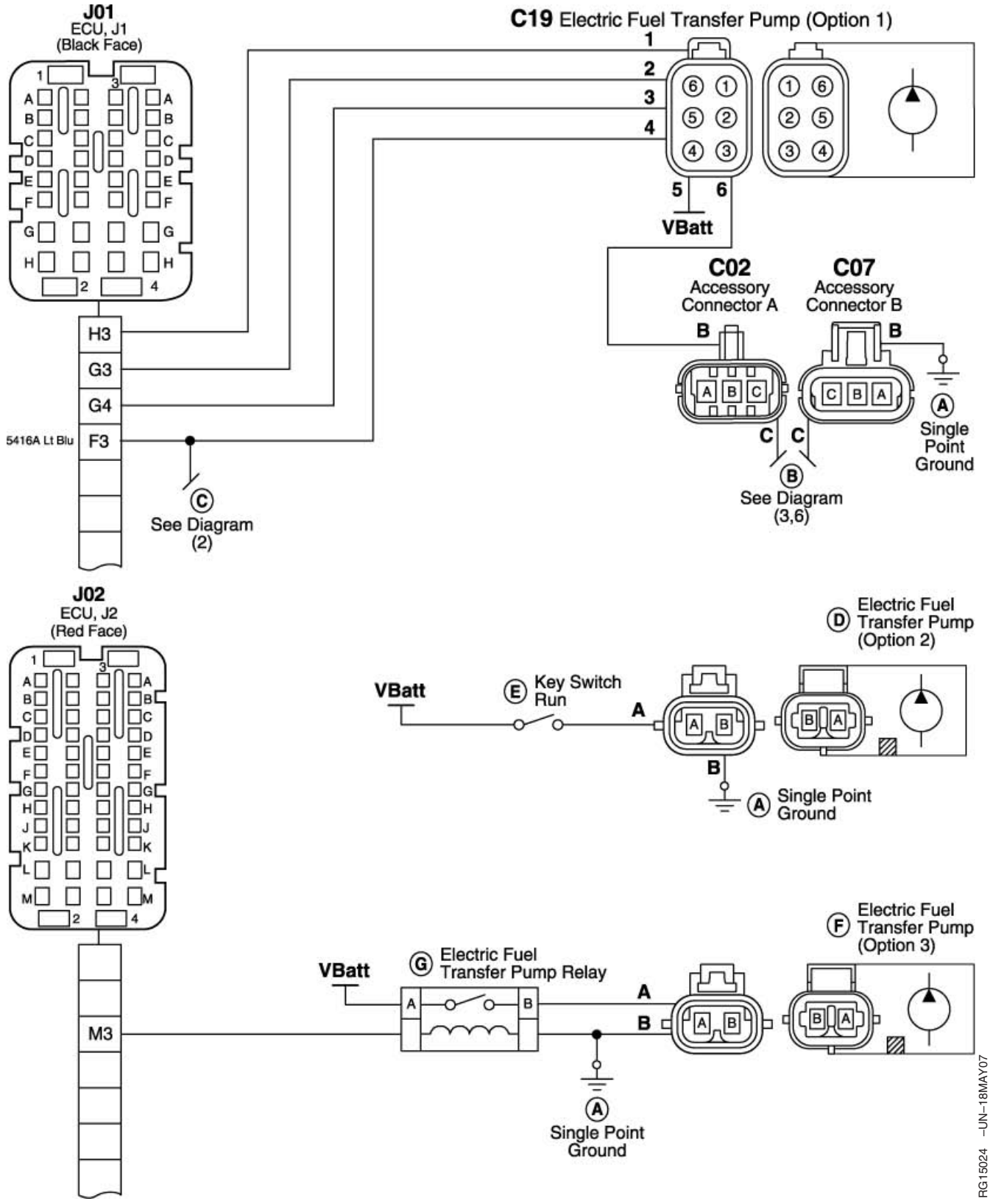
DB92450,0000043 –19–19MAY07–1/2

C02—Accessory Connector A
C03—Air Heater Option
C07—Accessory Connector B
A—Air Heater Relay (Optional)
B—Air Heater (Optional)
C—Chassis Ground
D—See Diagram (3,7)
E—Single Point Ground
J01—ECU, J1 (Black Face)
J1-A2—[5413 Orange] Air Heater Relay Status
J1-H4—[5429 White] Air Heater Relay Control

DB92450,0000043 –19–19MAY07–2/2

6.8L 12V Wiring Diagram 7



6.8 Liter 12 Volt Wiring Diagram 7

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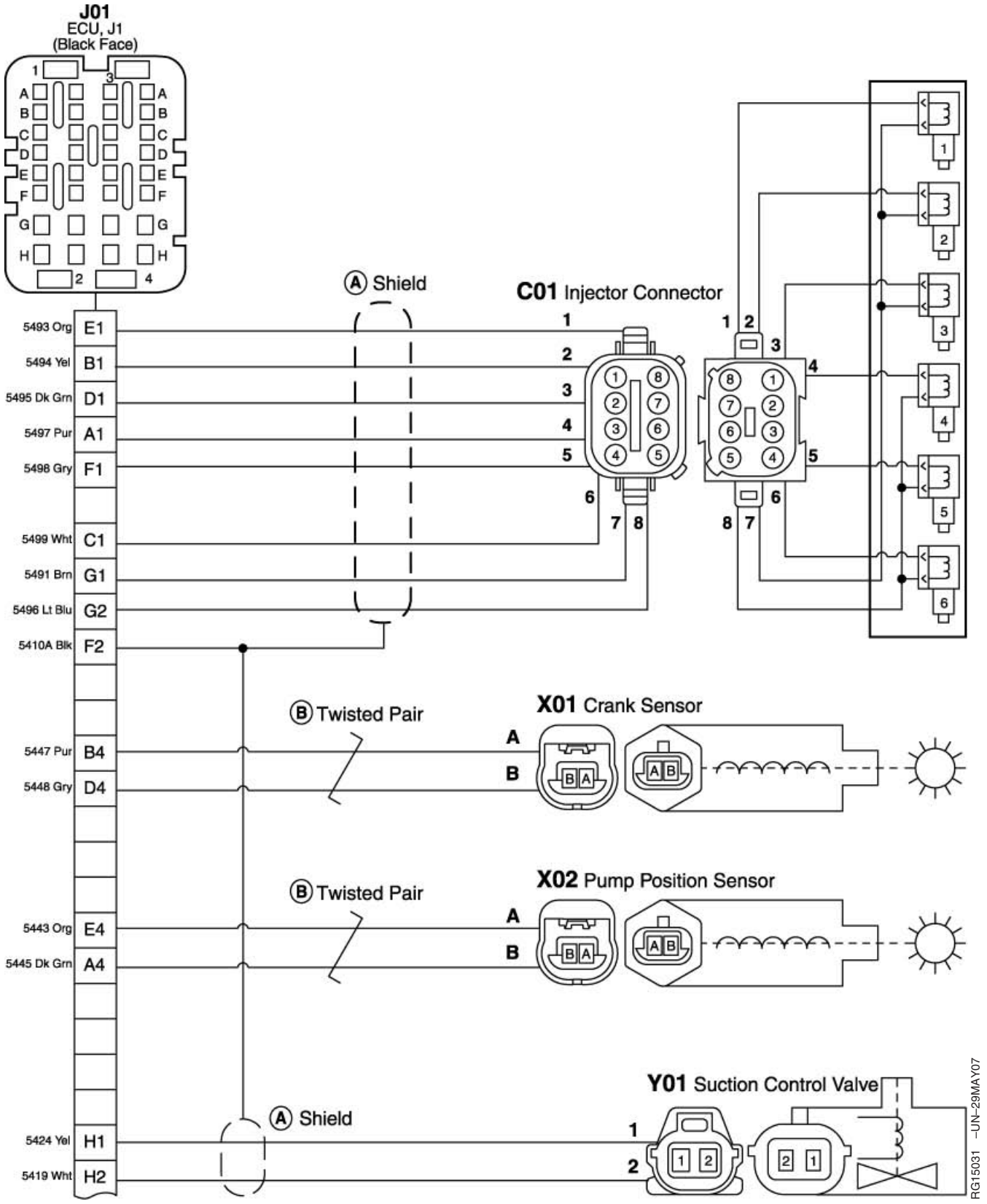
C02—Accessory Connector A
C07—Accessory Connector B
C19—Electric Fuel Transfer Pump (Option 1)
A—Single Point Ground
B—See Diagram (3,6)
C—See Diagram (2)
D—Electric Fuel Transfer Pump (Option 2)
E—Key Switch Run
F—Electric Fuel Transfer Pump (Option 3)
G—Electric Fuel Transfer Pump Relay
J01—ECU , J1 (Black Face)
J02—ECU J2, (Red Face)
J1-F3—[5416A Light Blue] Power Supply #2B +
J1-G3—Electric Fuel Transfer Pump Current Feedback
J1-G4—Electric Fuel Transfer Pump Status
J1-H3—Low Pressure Fuel Pump Speed Command
J2-M3—Fuel Transfer Pump Relay

DB92450,0000042 –19–19MAY07–2/2

6.8L 24V Wiring Diagram 1



6.8 Liter 24 Volt Wiring Diagram 1

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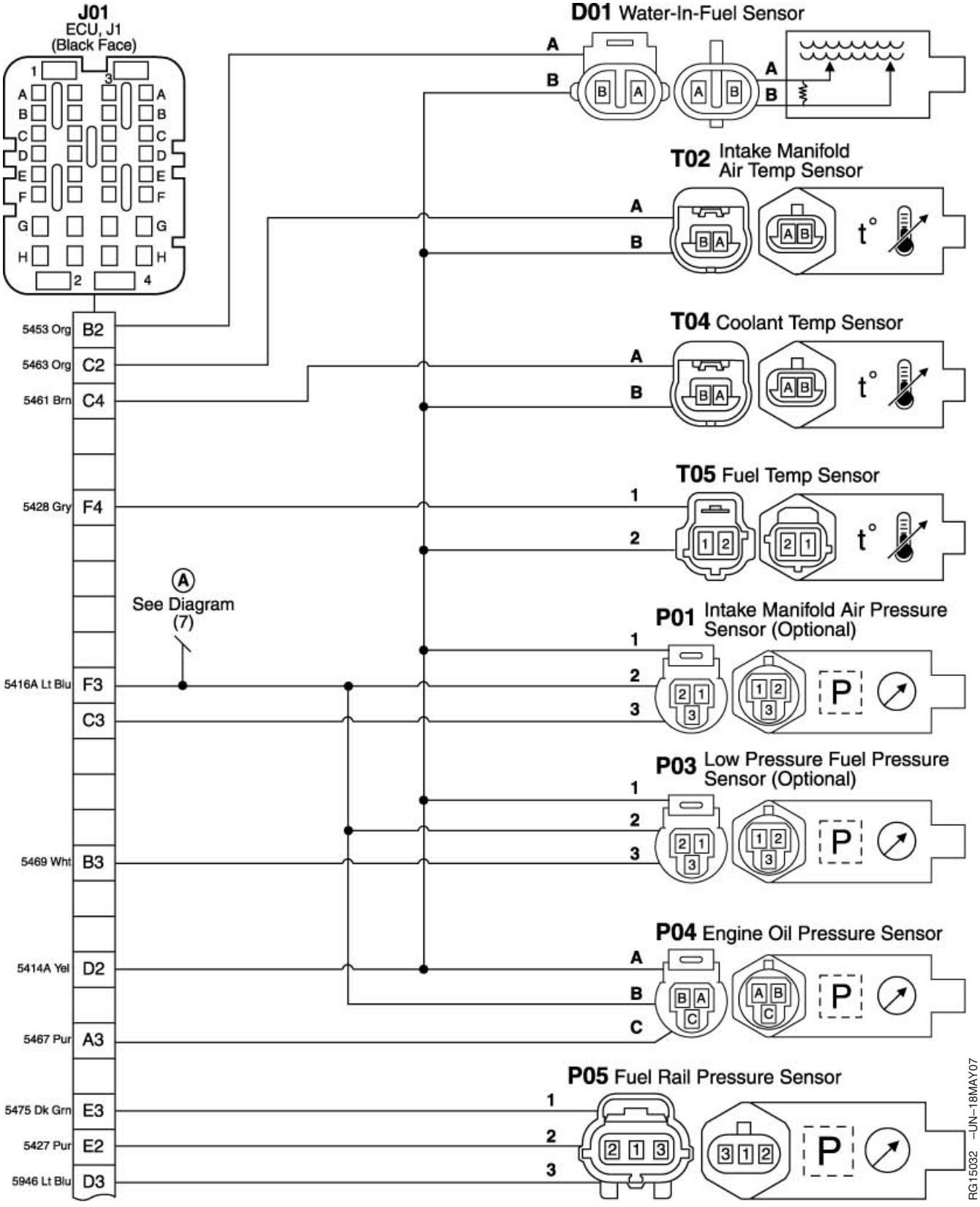
C01—Injector Connector
X01 —Crank Sensor
X02—Pump Position Sensor
Y01—Suction Control Valve
A—Shield
B—Twisted Pair
J01—ECU, J1 (Black Face)
J1-A1—[5497 Purple] Injector #4 Inject Pulse
J1-A4—[5445 Dark Green] Pump Position Pulse
J1-B1—[5494 Yellow] Injector #2 Inject Pulse
J1-B4—[5447 Purple] Crank Position Pulse
J1-C1—[5499 White] Injector #6 Inject Pulse
J1-D1—[5495 Dark Green] Injector #3 Inject Pulse
J1-D4—[5448 Gray] Crank Position Return
J1-E1—[5493 Orange] Injector #1 Inject Pulse
J1-E4—[5443 Orange] Pump Position Return
J1-F1—[5498 Gray] Injector #5 Inject Pulse
J1-F2—[5410A Black] Wiring Shield
J1-G1—[5491 Brown] Injector #1& #2 & #3 Power
J1-G2—[5496 Light Blue] Injector #4& #5 & #6 Power
J1-H1—[5424 Yellow] HP Pump Suction Control Valve Drive +
J1-H2—[5419 White] HP Pump Suction Control Valve Drive --

DB92450,000004B –19–19MAY07–2/2

6.8L 24V Wiring Diagram 2



6.8 Liter 24 Volt Wiring Diagram 2

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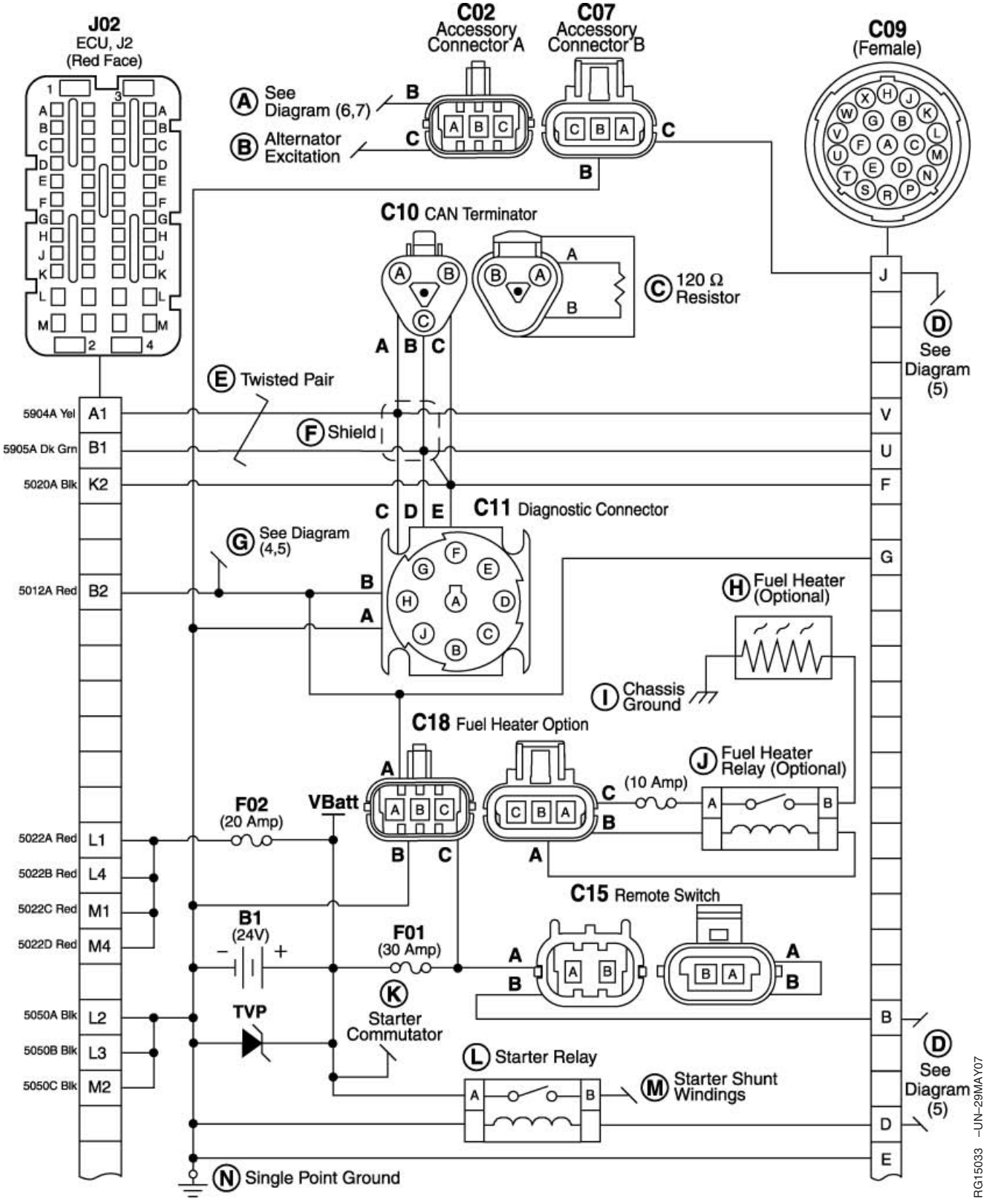
D01—Water In Fuel Sensor
P01—Intake Manifold Air Pressure Sensor (Optional)
P03—Low Pressure Fuel Pressure Sensor (Optional)
P04—Engine Oil Pressure Sensor
P05—Fuel Rail Pressure Sensor
T02—Intake Manifold Air Temperature Sensor
T04—Coolant Temperature Sensor
T05—Fuel Temperature Sensor
A—See Diagram (7)
J01—ECU, J1 (Black Face)
J1-A3—[5467 Purple] Engine Oil Pressure Signal
J1-B2—[5453 Orange] Water In Fuel Signal
J1-B3—[5469 White] Fuel Pressure Signal
J1-C2—[5463 Orange] Intake Manifold Air Temperature Signal
J1-C3—Intake Manifold Air Pressure Signal
J1-C4—[5461 Brown] Coolant Temperature Signal
J1-D2—[5414A Yellow] Power Supply #2B --
J1-D3—[5946 Lt Blue] Power Supply #1 +
J1-E2—[5427 Orange] Power Supply #1--
J1-E3—[5475 Dark Green] Fuel Rail Pressure Signal
J1-F3—[5416A Light Blue] Power Supply #2B +
J1-F4—[5428 Gray] Fuel Temperature Signal

DB92450,000004C –19–19MAY07–2/2

6.8L 24V Wiring Diagram 3



6.8 Liter 24 Volt Wiring Diagram 3

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B1—24 Volt
C02—Accessory Connector A
C07—Accessory Connector B
C09—21 Pin Connector (Panel Connector)
C10—CAN Terminator
C11—Diagnostic Connector
C15—Remote Switch
C18—Fuel Heater Option
F01—30 Amp
F02—20 Amp
TVP—Transient Voltage Protection
A—See Diagram (6,7)
B—Alternator Excitation
C—120 Resister
D—See Diagram (5)
E—Twisted Pair
F—Shield
G—See Diagram (4,5)
H—Fuel Heater (Optional)
I—Chassis Ground
J—Fuel Heater Relay (Optional)
K—Starter Commutator
L—Starter Relay
M—Starter Shunt Windings
N—Single Point Ground
J02—ECU, J2 (Red Face)
J2-A1—[5904A Yellow] CAN High
J2-B1—[5905A Dark Green] CAN Low
J2-B2—[5012A Red] Ignition Key Start/Run Switch
J2-K2—[5020A Black] CAN Shield
J2-L1—[5022A Red] Battery +
J2-L2—[5050A Black] Battery --
J2-L3—[5050B Black] Battery --
J2-L4—[5022B Red]Battery +
J2-M1—[5022C Red]Battery +
J2-M2—[5050C Black] Battery --
J2-M4—[5022D Red]Battery +

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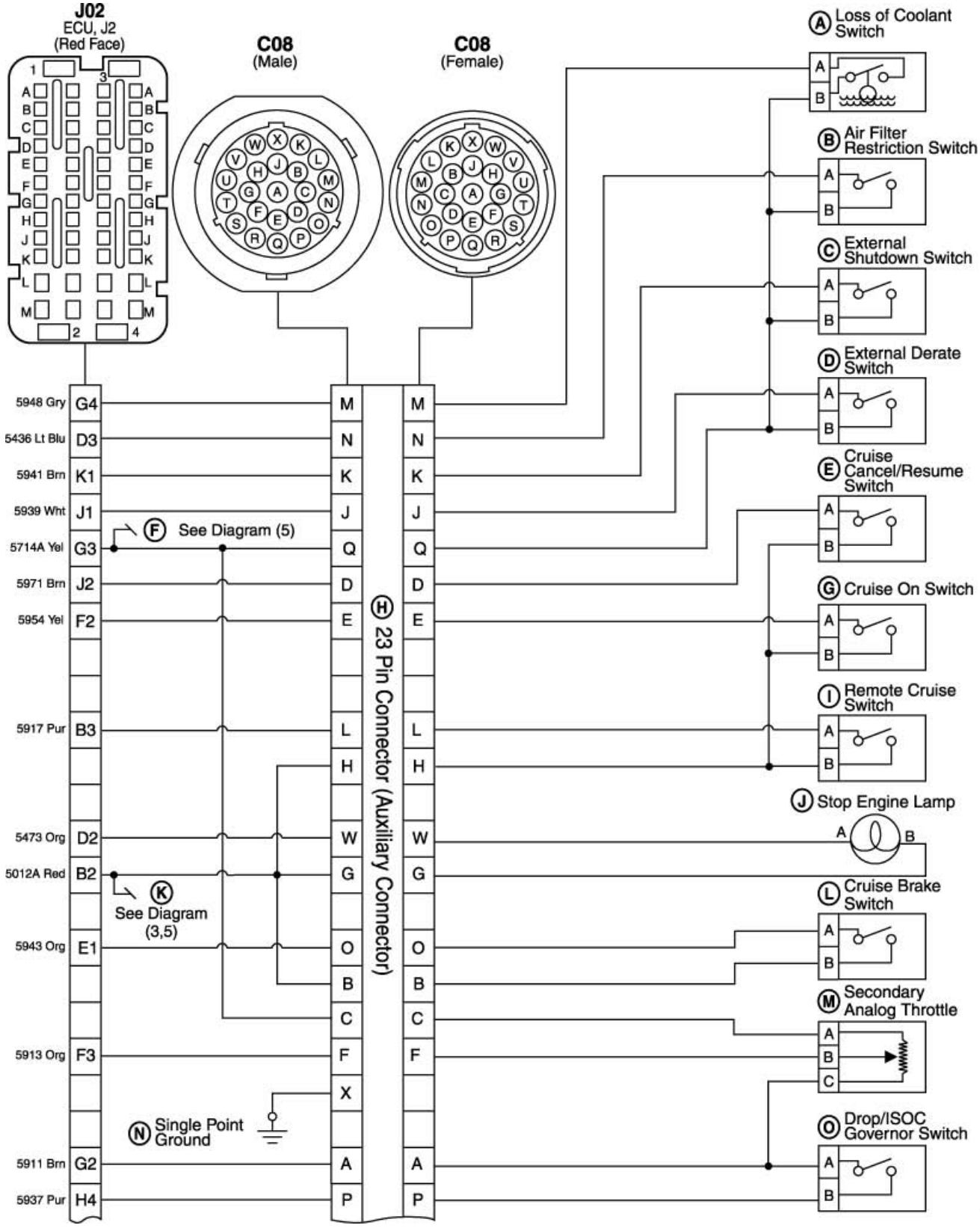
6.8L 24V Wiring Diagram 4



6.8 Liter 24 Volt Wiring Diagram 4

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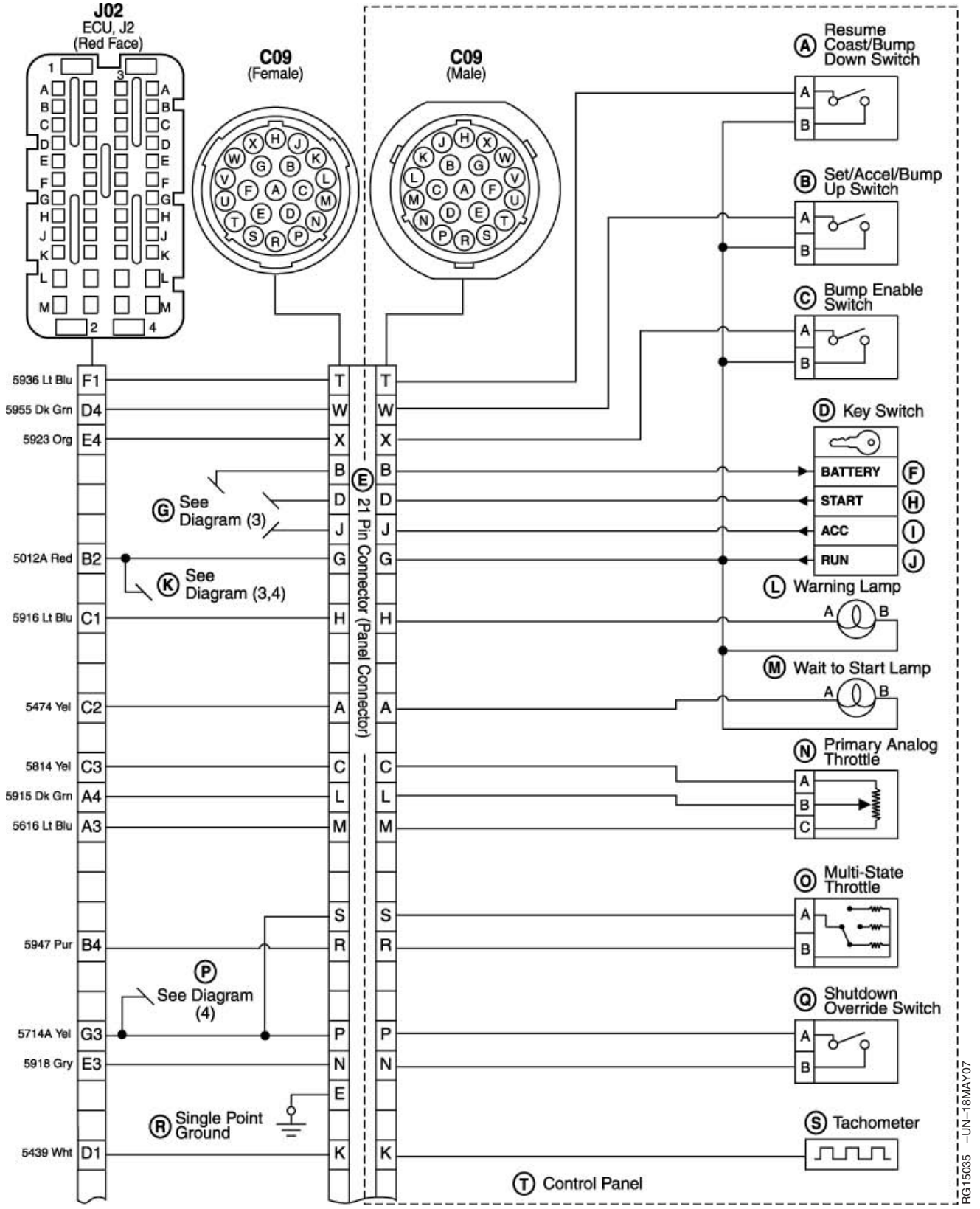
C08—23 Pin Connector (Auxiliary Connector)
A—Loss of Coolant Switch
B—Air Filter Restriction Switch
C—External Shutdown Switch
D—External Derate Switch
E—Cruise Cancel/Resume Switch
F—See Diagram (5)
G—Cruise On Switch
H—23 Pin Connector (Auxiliary Connector)
I—Remote Cruise Switch
J—Stop Engine Lamp
K—See Diagram (3,5)
L—Cruise Brake Switch
M—Secondary Analog Throttle
N—Single Point Ground
O—Drop/Isoc (Isochronous) Governor Switch
J02—ECU, J2 (Red Face)
J2-B2—[5012A Red] Ignition Key Start/Run Switch
J2-B3—[5917 Purple] Remote Cruise On/Off Switch
J2-D2—[5473 Orange] Stop Engine Lamp Return
J2-D3—[5436 Light Blue] Air Filter Restriction Switch
J2-E1—[5943 Orange] Cruise Brake Switch
J2-F2—[5954 Yellow] Cruise On/Off Switch
J2-F3—[5913 Orange] Secondary Analog Throttle Signal
J2-G2—[5911 Brown] Power Supply #2A +
J2-G3—[5714A Yellow] Power Supply #2A --
J2-G4—[5948 Gray] Low Coolant Level Switch
J2-H4—[5937 Purple] Droop/Isochronous Governor Switch
J2-J1—[5939 White] External Derate Switch
J2-J2—[5971 Brown] Cruise Cancel/Resume Switch
J2-K1—[5941 Brown] External Shutdown Switch

DB92450,000004E –19–19MAY07–2/2

6.8L 24V Wiring Diagram 5



6.8 Liter 24 Volt Wiring Diagram 5

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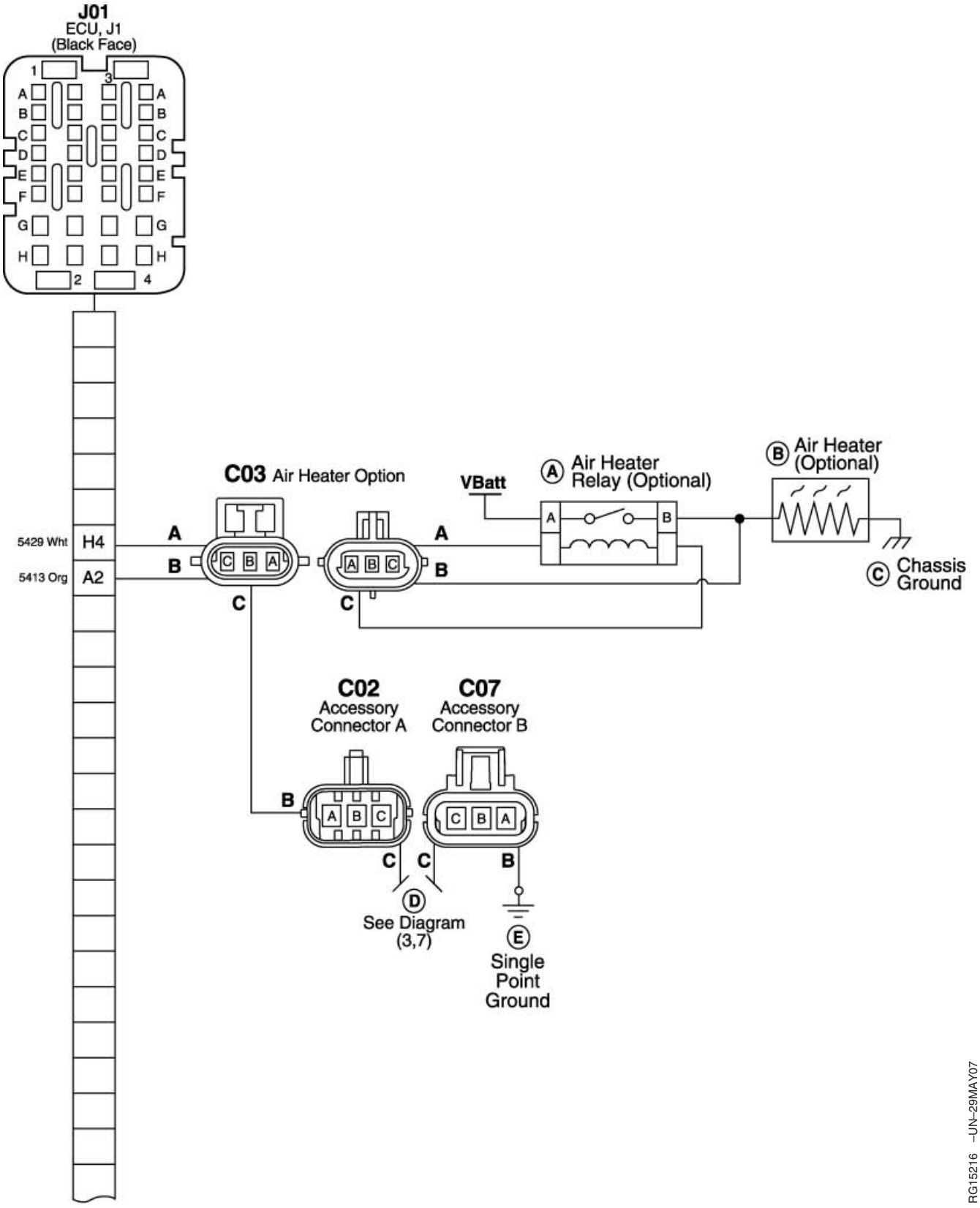
C09—21 Pin Connector (Panel Connector)
A—Resume Coast/Bump Down Switch
B—Set Accel/Bump Up Switch
C—Bump Enable Switch
D—Key Switch
E—21 Pin Connector (Panel Connector)
F—Battery
G—See Diagram (3)
H—Start
I—Accessory
J—Run
K—See Diagram (3,4)
L—Warning Lamp
M—Wait to Start Lamp
N—Primary Analog Throttle
O—Multi-State Throttle
P—See Diagram (4)
Q—Shutdown Override Switch
R—Single Point Ground
S—Tachometer
T—Control Panel
J02—ECU, J2 (Red Face)
J2-A3—[5616 Light Blue] Power Supply #3 +
J2-A4—[5915 Dark Green] Primary Analog Throttle Signal
J2-B2—[5012A Red] Ignition Key Start/Run Switch
J2-B4—[5947 Purple] Mulitstate Throttle Signal
J2-C1—[5916 Light Blue] Warning Lamp Drive --
J2-C2—[5474 Yellow] Wait To Start Lamp Drive --
J2-C3—[5814 Yellow] Power Supply #3 --
J2-D1—[5439 White] Tachometer Pulse Output
J2-D4—[5955 Dark green] Set/Accel/Bump Up Switch
J2-E3—[5913 Orange] Secondary Analog Throttle Signal
J2-E4—[5923 Orange] Bump Enable Switch
J2-F1—[5936 Light Blue] Resume Coast/Bump Down Switch
J2-G3—[5714A Yellow] Power Supply #2A --

DB92450,000004F –19–19MAY07–2/2

6.8L 24V Wiring Diagram 6



6.8 Liter 24 Volt Wiring Diagram 6

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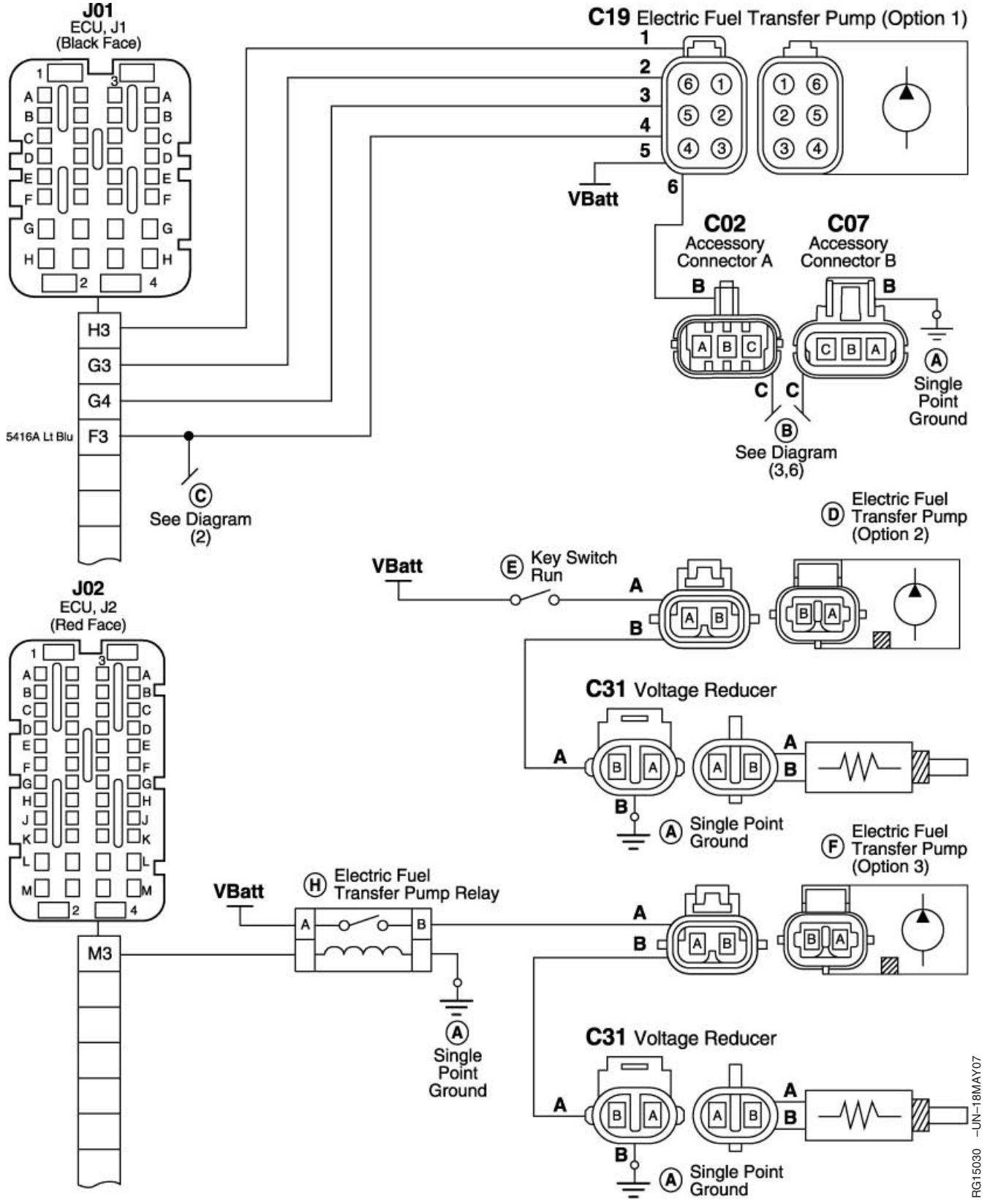
DB92450,000004A –19–19MAY07–1/2

C02—Accessory Connector A
C03—Air Heater Option
C07—Accessory Connector B
A—Air Heater Relay (Optional)
B—Air Heater (Optional)
C—Chassis Ground
D—See Diagram (3,7)
E—Single Point Ground
J01—ECU, J1 (Black Face)
J1-A2—[5413 Orange] Air Heater Relay Status
J1-H4—[5429 White] Air Heater Relay Control

DB92450,000004A –19–19MAY07–2/2

6.8L 24V Wiring Diagram 7



6.8 Liter 24 Volt Wiring Diagram 7

Continued on next page

C02—Accessory Connector A
C07—Accessory Connector B
C19—Electric Fuel Transfer Pump (Option 1)
C31—Voltage Reducer
A—Single Point Ground
B—See Diagram (3,6)
C—See Diagram (2)
D—Electric Fuel Transfer Pump (Option 2)
E—Key Switch Run
F—Resister
G—Electric Fuel Transfer Pump Relay
H—Electric Fuel Transfer Pump (Option 3)
J01—ECU , J1 (Black Face)
J02—ECU J2, (Red Face)
J1-F3—[5416A Light Blue] Power Supply #2B +
J1-G3—Electric Fuel Transfer Pump Current Feedback
J1-G4—Electric Fuel Transfer Pump Status
J1-H3—Low Pressure Fuel Pump Speed Command
J2-M3—Fuel Transfer Pump Relay

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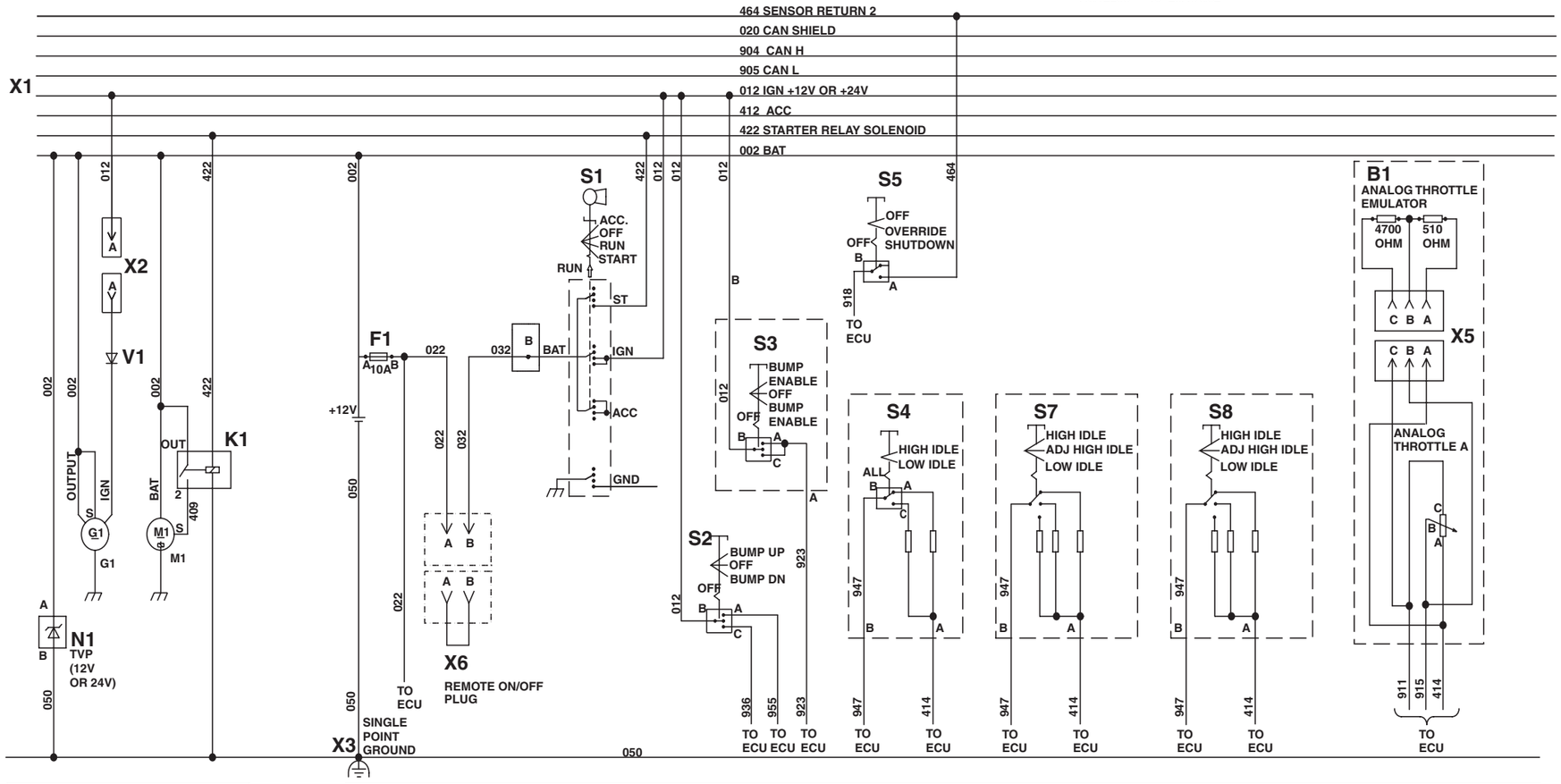
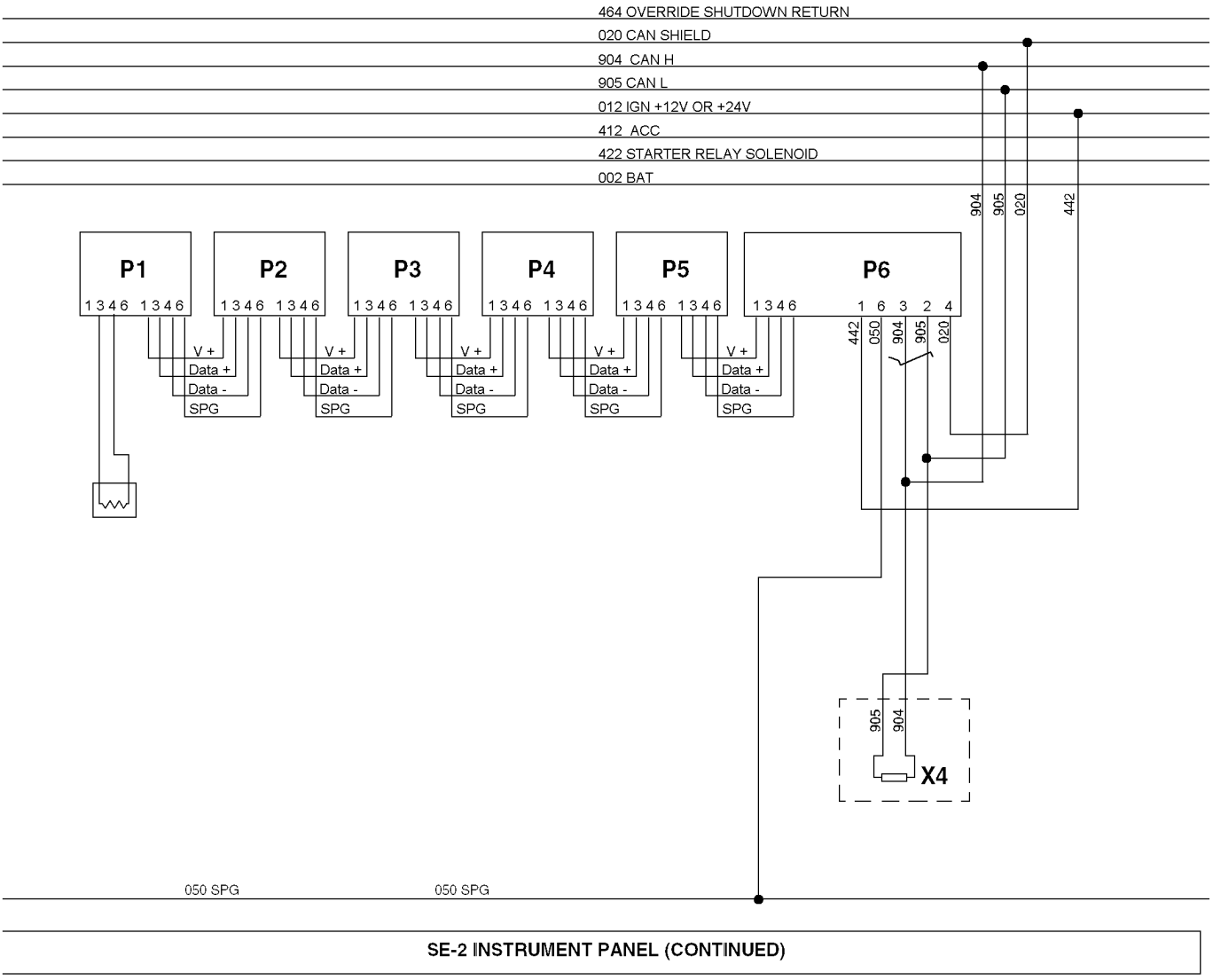
OEM Instrument Panel / Engine Start Components Electrical Wiring Diagram

RG12288 –19–23AUG02



B1—Analog Throttle Emulator
E1—Back Light Regulator (24V) or Plug (12V)
F1—Fuse (10 Amp)
F2—Fuse (5 Amp)
G1—Alternator
K1—Starter Relay
M1—Starter Motor
N1—Transient Voltage Protector
N2—Voltage Regulator (for 24V Operation)
P1—Optional Gauge
P2—Optional Gauge
P3—Oil Pressure Gauge
P4—Coolant Temperature Gauge
P5—Tachometer Display
P6—Hourmeter/Diagnostic Meter
S1—Ignition Key Switch
S2—Speed Select Switch (Momentary)
S3—Bump Enable Switch (Momentary
S4—Dual State Throttle Switch
S5—Override Shutdown Switch (Momentary)
S6—Dimmer Control or Jumper Plug
S7—Tri-state Throttle Switch
S8—Ramp Throttle Switch
V1—Diode
X1—Vehicle Harness Connector
X2—Alternator Harness Connector
X3—Single Point Ground
X4—CAN Terminator
X5—Analog Throttle Connector
X6—Remote On/Off Plug

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



OEM Instrument Panel Wiring Diagram

B1—Analog Throttle or Emulator
E1—Back Light Regulator (24V) or Plug (12V)
F1—Fuse (30 Amp)
F2—Fuse (5 amp)
G1—Alternator
K1—Starter Relay
M1—Starter Motor
N1—Transient Voltage Protector
N2—Voltage Regulator (for 24V Operation)
P1—Optional Gauge
P2—Optional Gauge
P3—Oil Pressure Gauge
P4—Coolant Temperature Gauge
P5—Tachometer Display
P6—Hourmeter/Diagnostic Meter
R1—Resistor
S1—Ignition Key Switch
S2—Speed Select Switch (Momentary)
S3—Bump Enable Switch (Momentary)
S4—High-Low Speed Switch
S5—Override Shutdown Switch (Momentary)
S6—Dimmer Control or Jumper Plug
X1—Vehicle Harness Connector
X2—Alternator Harness Connector
X3—Single Point Ground
X4—CAN Terminator
X5—Analog Throttle Connector

DN22556,0000466 –19–23MAY07–1/1

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Indx 1

F

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Indx 10