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# Remove and Install Intake Manifold—3TNV80F

**→NOTE:**

**The intake manifold is integral with the rocker arm cover. (See Remove and Install Rocker Arm Cover—3TNV80F .)**

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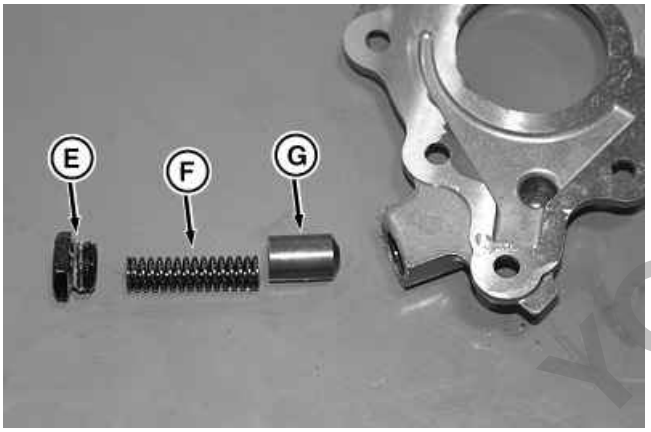
# Inspect Oil Pump—3TNV80F



***Oil Pump Cover***

**[1] -** Inspect inside of oil pump cover for grooves or deep scratches. Replace cover if worn or damaged.

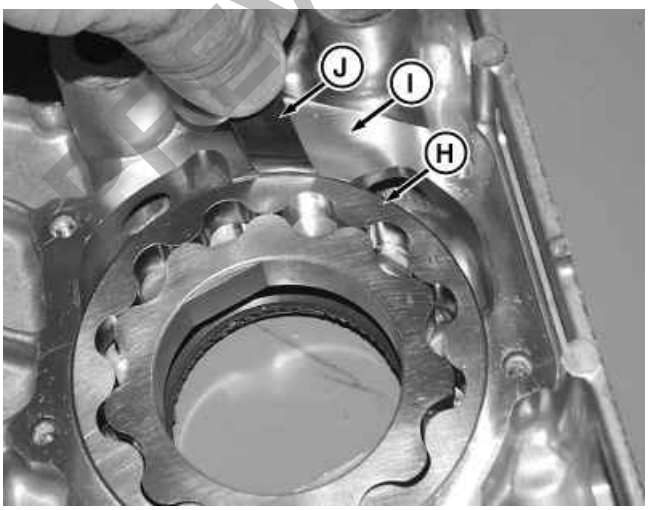
**[2] -**




***Relief Valve Parts***

Remove relief valve cap (E), spring (F), and valve (G). Inspect all parts for wear or damage. Replace any worn or damaged parts.

**[3] -**




***Outer Rotor to Timing Cover Clearance***

Measure clearance between outer rotor (H) and timing cover (I) with a feeler gauge (J). If clearance exceeds wear limit, replace

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# Remove and Install Camshaft Followers—3TNV82A, 3TNV88

## Special or Required Tools

- Magnetic Pick-Up Tool

## Removal and Installation

**[1] -** Remove the camshaft. (See Remove and Install Camshaft—3TNV82A, 3TNV88 .)

**[2] -** Remove the oil pan and strainer.

**[3] -**

***IMPORTANT:***

***Cam followers must be installed in the same bores from which they were removed.***

Put a mark on each cam follower and the cylinder block bore to aid in installation.

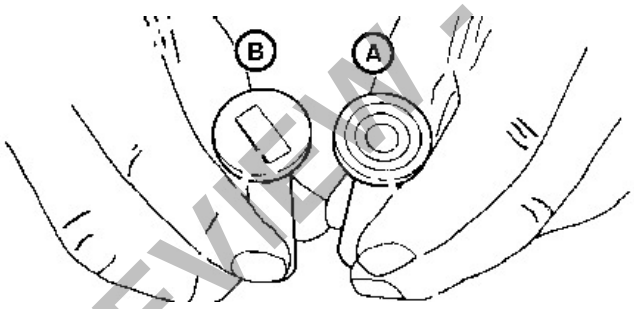
**[4] -** Remove the cam followers.

**[5] -** Inspect all parts for wear or damage.

**[6] -** Apply clean engine oil to all parts during installation.

- Installation is done in the reverse order of removal.

## Inspection



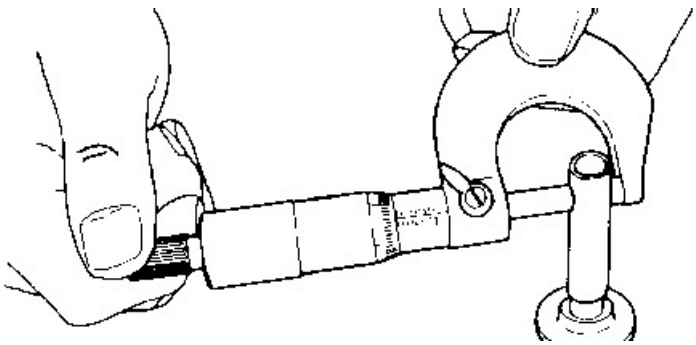

**LEGEND:**

| | |
|---|---|
| A | Normal Contact |
| B | Abnormal Wear |

***Inspect Cam Follower***

**[1] -** Inspect the cam follower contact surface for normal contact (A) or abnormal wear (B). Replace if necessary.

**[2] -**



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**Splice Table**

| Splice No. | Circuit No./Color |
|---|---|
| **Sp-11** | 103 Blk |
| | 150 Blk |
| | 145 Blk |
| | 126 Blk |
| | 127 Blk |
| | 142 Blk |
| **Sp-12** | 148 Blk |
| | 146 Blk |
| | 147 Blk |
| **Sp-13** | 514 Yel |
| | 513 Yel |
| | 599 Yel |
| **Sp-14** | 710 Pur |
| | 707 Pur |
| | 705 Pur |
| **Sp-15** | 225 Red |
| | 230 Red |
| | 201 Red |
| **Sp-16** | 503 Yel |
| | 590 Yel |
| | 560 Yel |
| | 561 Yel |
| | 562 Yel |
| **Sp-20** | 100 Blk |
| | 123 Blk |
| | 108 Blk |
| | 120 Blk |
| | 135 Blk |
| | 148 Blk |
| | 153 Blk |
| | 101 Blk |
| | 102 Blk |
| | 107 Blk |
| | 130 Blk |
| | 143 Blk |
| | 145 Blk |

**Splice Table**

| Splice No. | Circuit No./Color |
|---|---|
| **S-CAN3** | F201 Yel |
| | F203 Yel |
| | F204 Yel |
| **S-CAN4** | F101 Grn |
| | F103 Grn |
| | F104 Grn |
| **S-CAN5** | F204 Yel |
| | F205 Yel |

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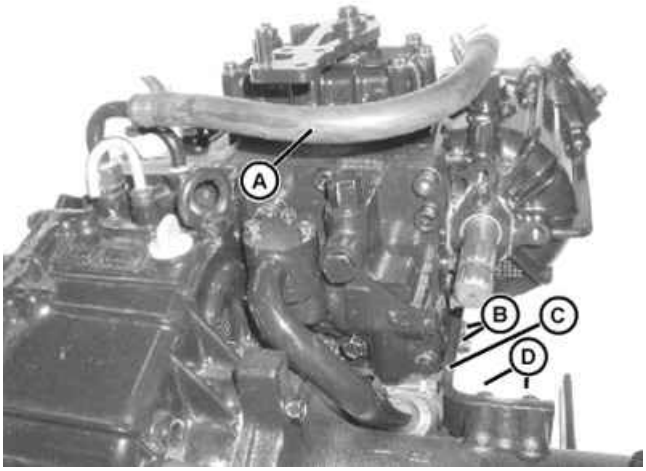
# Separate and Install Hydrostatic and Differential Assemblies

***IMPORTANT:***

***Absolute cleanliness is essential when working on hydraulic components. Contamination can result in serious damage or inadequate operation. Clean all lines and fittings prior to opening hydraulic system.***

**[1] -** Remove transaxle. (See Remove and Install Transaxle .)

**[2] -**




**LEGEND:**

| | |
|---|---|
| A | Return Hose |
| B | Cap Screws |
| C | L-Bracket |
| D | Cap Screws |

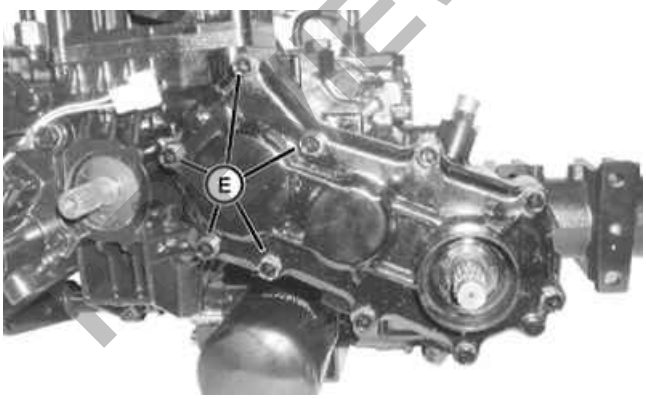
***Transaxle With Return Hose***

Disconnect return hose (A).

**[3] -** Remove two cap screws (B), two cap screws (D), and L-bracket (C).

**[4] -** Remove charge pump. (See Disassemble, Inspect, and Assemble Charge Pump .)

**[5] -**




**LEGEND:**

| | |
|---|---|
| E | Cap Screws |

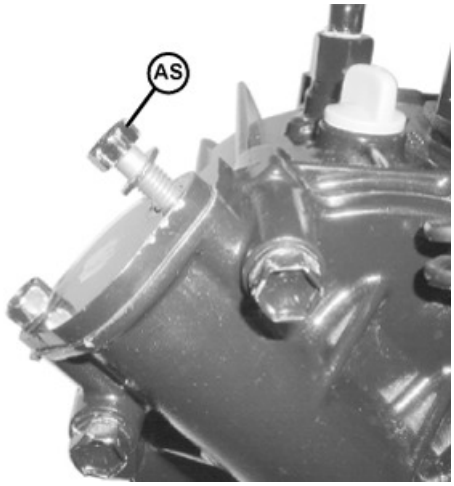
***4WD Gearbox Shown***

Remove five cap screws (E) and cover plate, or 4WD gearbox, if equipped.

**[6] -**

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**LEGEND:**

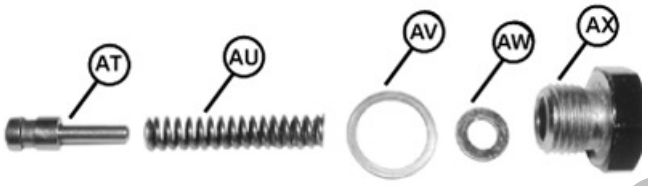
| | |
|---|---|
| AS | Cap Screw |

***Replace Cap Screws***

Remove one M8 x 30 cap screw (AS) and replace it with an original cover cap screw. Tighten cap screw.

**[31] -** Repeat for other M8 x 30 cap screw.

**[32] -**




***Install Relief Valve Components***




**LEGEND:**

| | |
|---|---|
| AT | PTO Relief Piston |
| AU | Spring |
| AV | Seal |
| AW | Shims |
| AX | Relief Cap |

***Install Relief Cap***

Install PTO relief piston (AT) and then spring (AU) into PTO cover.

**[33] -** Install shims (AW) and new seal (AV) into relief cap (AX).

**[34] -** Carefully install cap into PTO cover, taking care not to drop shims out of cap.

**[35] -**

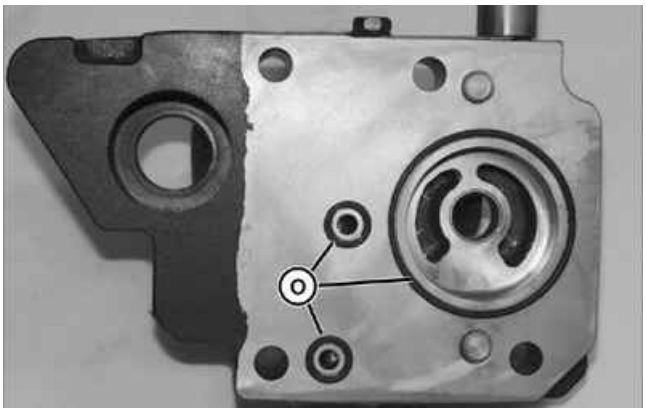
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***Shaft with Identification Dimple in Position Shown***

Install the inner gear on the pin and pump shaft with the identification dimple (M) facing out. Install the outer gear over the inner, with the identification dimple (N) in the position shown.

**[6] -**



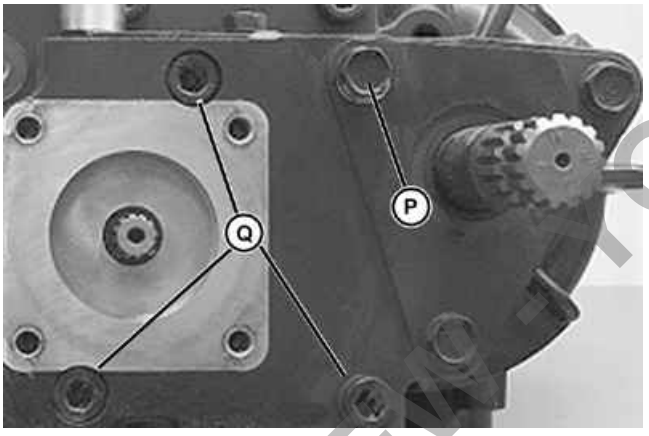

**LEGEND:**

| | |
|---|---|
| O | O-Rings |

***O-Rings in the Face of the Hydrostatic Sub Plate to be Replaced***

Replace the O-rings (O) in the face of the hydrostatic sub plate.

**[7] -**




**LEGEND:**

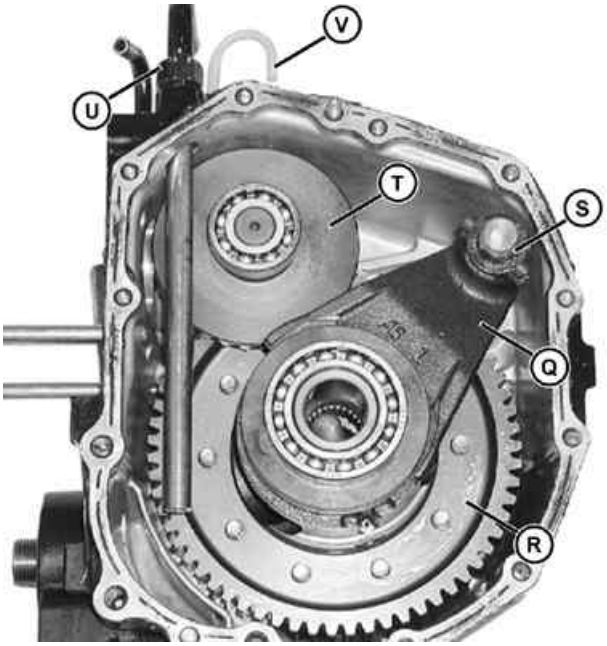
| | |
|---|---|
| P | Cap Screw |
| Q | Hex Socket Head Screws (3 used) |

***Install Hydrostatic sub Plate on Hydrostatic Center Plate with Cap Screw and Hex Socket Head Screws***

Install hydrostatic sub plate on hydrostatic center plate with one cap screw (P) and three hex socket head screws (Q).

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**LEGEND:**

| | |
|---|---|
| Q | Differential Lock Shaft |
| R | Differential Assembly |
| S | Washer |
| T | Idler Shaft Assembly |
| U | Oil Return Tube |
| V | Dipstick |

***Component Locations Shown Inside Differential Housing***

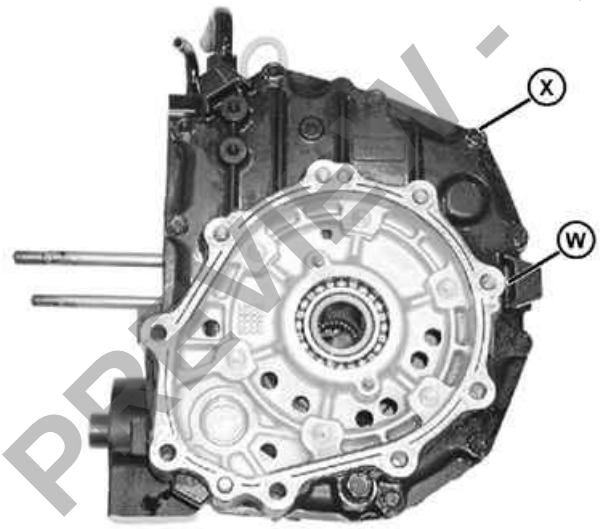
Install differential lock shaft (Q) and differential assembly (R) into case as an assembly.

**[11] -** Install washer (S) on differential lock shaft.

**[12] -** Install idler shaft assembly (T).

**[13] -** Install oil return tube (U) and dipstick (V).

**[14] -**




**LEGEND:**

| | |
|---|---|
| W | Differential Side Cover |
| X | M8 x 35 Cap Screws |

***Install Differential Side Cover and Tighten Hardware to Specification***

Apply PM38655 John Deere ™ Form-In-Place Gasket on side cover (W) and differential housing mating surfaces.

| Number | Name | Use |
|---|---|---|
| • PM38655 (U.S.) Loctite ™ 515/ PM38625 (Canada) (us) | John Deere ™ Flexible Form-in-Place Gasket | Apply to differential cover and housing mating surfaces before assembly. |

**[15] -** Install side cover and nine M8 x 35 cap screws (X). Tighten cap screws to specification.

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Disconnect hydraulic hose connections (A-E). Close all openings using caps and plugs. Wipe up any spills immediately.

**[3] -** Remove cotter pin and pin from valve control (F).

**[4] -** Remove bolts and flange nuts (G).

**[5] -** Remove auxiliary hydraulic valve (H) from mounting bracket (I).

## Install

- Lubricate and install new O-rings on fittings and adapters.
- Apply thread lock and sealer to threads of all screws and plugs.
- Tighten all plugs and screws to specifications.
- Install auxiliary lift valve onto mounting bracket.
- Connect all hoses and tighten fittings.
- Connect lift lever link(s).
- Connect battery negative (—) cable.
- Bleed hydraulic system. (See Hydraulic System Bleeding Procedure .)
- Check hydraulic oil level. Add oil if necessary.

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***IMPORTANT:***

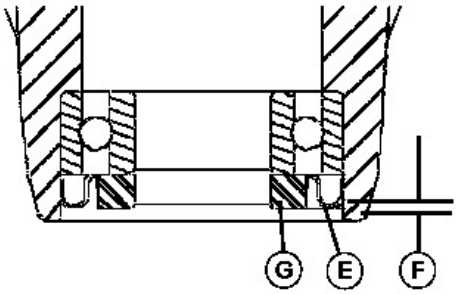
***Using disk drivers, support both the inner and outer races of the upper and lower bearings when installing the upper bearing. Do not support the housing by allowing it to rest on its end.***

Using a press and disk driver, install upper bearing (D) until it rests against the bottom of the housing shoulder.

**[5] -**

**→NOTE:**

**The inner diameter chamfer of the seal ring is away from the bearing.**




**LEGEND:**

| | |
|---|---|
| E | Lower Seal |
| F | Height |
| G | Lower Seal Ring |

***Install Lower Seal***

Using a press and disk, install lower seal (E) with open side toward bearing until the face of the seal is at the specified height (F) from the lower end of the housing.

| Item | Measurement | Specification |
|---|---|---|
| Seal Face Distance from Lower End of Housing | Distance | 2.57 mm (0.10 in.) |

**[6] -** Install lower seal ring (G) with the outer diameter chamfered edge toward bearing.

**[7] -**

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# Remove and Install Right Side Panel

**[1] -** Park machine safely.

**[2] -**




**LEGEND:**

| | |
|---|---|
| A | Wing Nut |
| B | Cover |

***Battery Cover***

Remove wing nuts (A) on front and back of battery cover (B) and remove cover.

**[3] -** Disconnect — negative battery cable.

**[4] -** Loosen clamp and disconnect air cleaner hose from side cover.

**[5] -**




**LEGEND:**

| | |
|---|---|
| C | Bolt |

***Bolt***

Remove bolt (C) from front of side panel.

**[6] -**

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# Test Fuel Injection System—3TNV80F

***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. Information may be obtained in the United States and Canada only by calling 1-800-822-8262.***

## Reason

To stop fuel flow to the cylinders (one at a time), while engine is running, to determine what effect that cylinder has on overall engine performance.

## Special or Required Tools

- 17-mm Open End Wrench (2 used)

## Procedure

**[1] -** Park machine on level surface with park brake on and transmission in neutral.

**[2] -**

***CAUTION:***

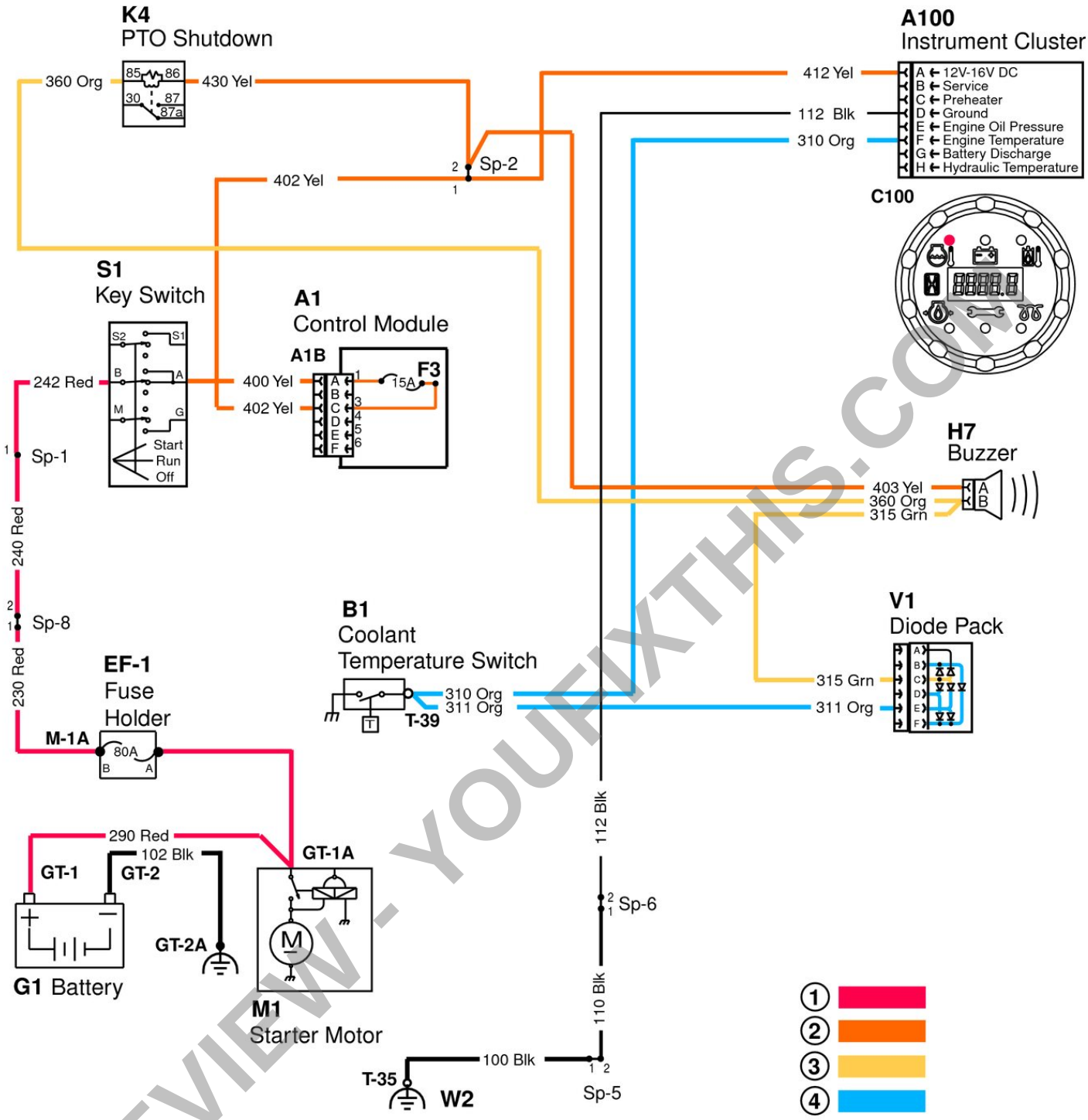
***This test will cause diesel fuel to be released from fuel system. Injection pump is capable of producing extremely high pressure. Eye protection must be worn. Do not open fuel injector connectors more than 1/8 of a turn. Do not place hands near fuel injectors during test. Do not allow any debris to enter intake manifold during test. Do not smoke.***

Start engine and run at slow idle.

**[3] -**

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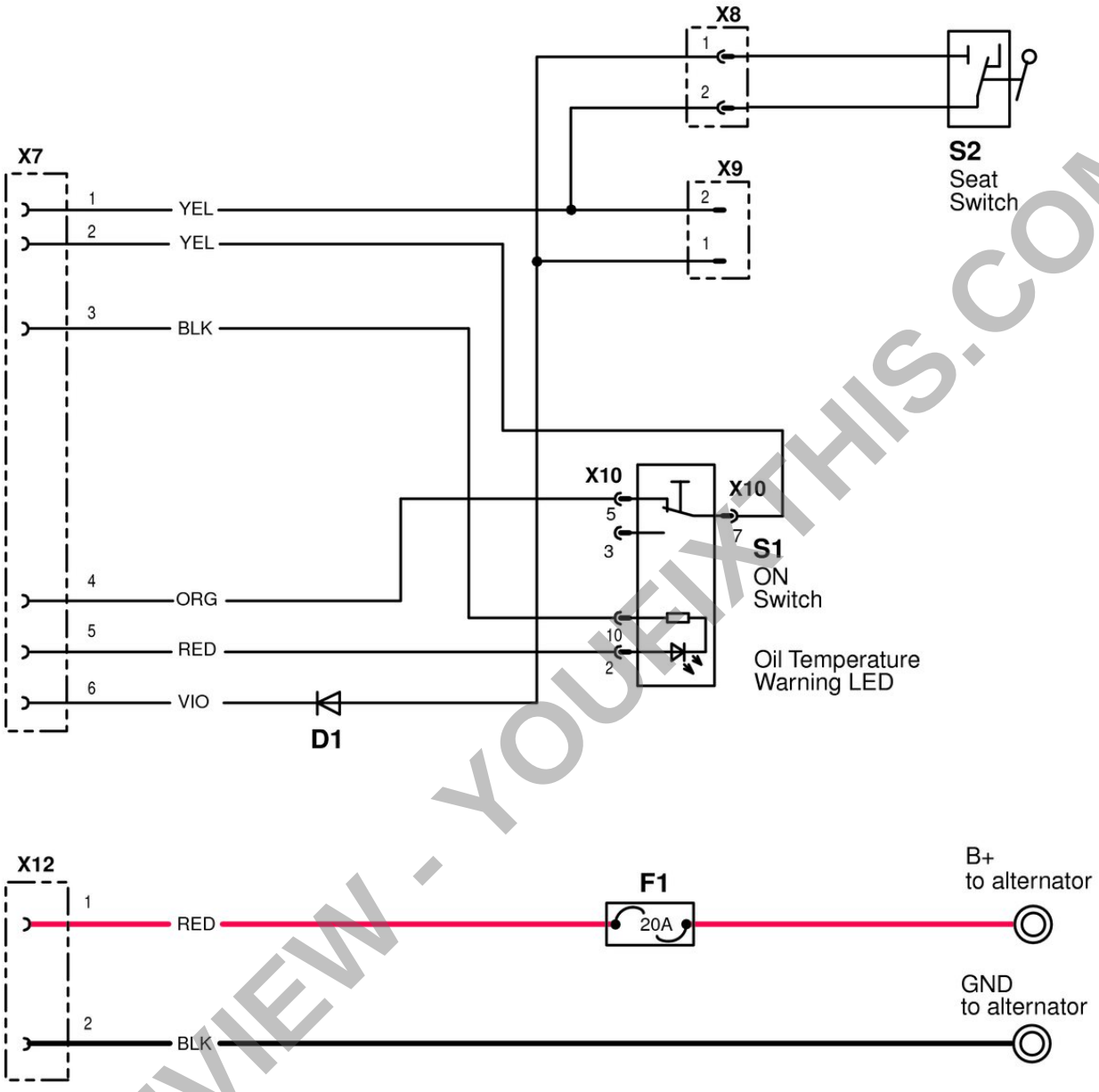
***Engine Coolant Circuit Schematic***

**LEGEND:**

| | |
|---|---|
| A100 | Instrument Cluster |
| B1 | Coolant Temperature Switch |
| H7 | Buzzer |
| K4 | PTO Shutdown Relay |
| S1 | Key Switch |
| V1 | Diode Pack |
| 1 | Unswitched Power Circuit |
| 2 | Switched Power Circuit |
| 3 | PTO Shutdown Circuit |
| 4 | Engine Coolant Temperature Circuit |


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## GLC Schematic




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*GLC System (2 of 2)*

**LEGEND:**

| | |
|---|---|
| D1 | Diode, Mini 1.5 A |
| F1 | Fuse, 20A |
| S1 | GLC ON Switch |
| S2 | Seat Switch |
| X8 | Seat Switch Connector |
| X9 | Seat Switch Connector |
| X10 | ON switch Connector |


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| | |
|---|---|
| 78 | — |
| 79 | 405 |
| 80 | 486 |
| 81 | 485 |
| 82-84 | — |
| 85 | 402 |
| 86 | 129 |
| 87 | — |
| 88 | 513 |
| 89-94 | — |

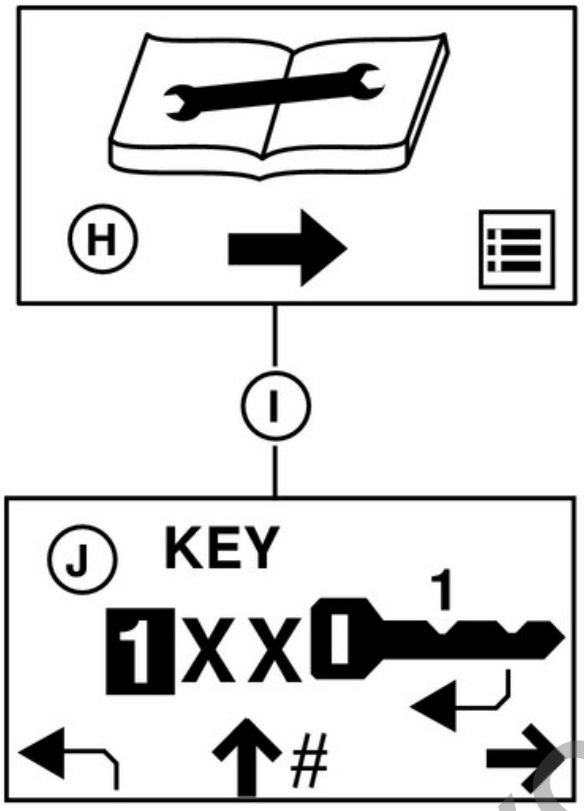
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**LEGEND:**

| | |
|---|---|
| F | Active Regeneration ON |
| G | Active Regeneration OFF |

This screen allows you to turn active DPF regeneration on or off.




**LEGEND:**

| | |
|---|---|
| H | Service Mode |
| I | Right press to enter pass code for Service Mode |
| J | Pass Code Entry |

***Entering Service Mode***

A center press takes you back to the hour meter screen.

The operator pass code is required to enter the service mode menus. See Pass Codes and Machine Start Pass Code Entry .

**→NOTE:**

**A left press returns you to the Service Mode screen (H).**

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**→NOTE:**

**Common conditions to cause code.**

- **Low system voltage**
- **Switched power shorted to ground**

# Procedure

**( 1 ) Alternator**

## Action:

Test alternator output and system voltage. (See Regulated Voltage Output Test .) Is voltage OK?

## Result:

**YES:**End of tests.

**NO:**Repair or replace alternator.

***VCU 000168.16- Supply Voltage (VBAT) Fault***
*328*

**Code Caused By:**

Battery voltage (VBAT) High (16> and <18 VDC for 0.5 sec when not in start mode)

**Alarm Level:**

Warning alert - no audible alarm

**SAE Lamp:**

Amber

**Alarm Frequency:**

Continuous

**Control Unit Response:**

Limited functionality

**Snapshot Recorded:**

Yes

**Required Tools:**

Multimeter and Service ADVISOR™

**Preliminary Checks:**

Check alternator output. See Regulated Voltage Output Test .

**Diagnosis:**

- Recall, record (Snapshot test under Interactive Tests), and clear codes. Service ADVISOR ™ : This procedure can be performed by making a connection to the machine and using the ”Diagnostics” tab to view and clear codes. Use Snapshot Test under Interactive Test tab for specific control unit to record fault.
- Clear codes using Diagnostic tab
- Recall codes again and check for return of this code.
- Recreate operating conditions that caused code.

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### *ECU 000102.13- Manifold Air Pressure Signal Calibration Fault*

*404 7E7DF514-4F79-445C-8743-555BB7C043B8*

*The manifold air pressure signal is lower than the sensor low voltage specification.*

## Diagnostic Procedure

**Troubleshooting Sequence: 522591.12**
**000102.03**

**000102.04**

**000102.07**

**When DTC is Displayed:** When the ignition is on, and the fault is active.

**Related Information:**

At ignition on, engine off, the ECU performs a comparison of multiple pressure sensors on the engine.

The manifold air pressure sensor signal voltage to the ECU is higher or lower than the other sensors being compared at ignition on, engine off.

**Alarm Level:** Stop

**Control Unit Response:**

The ECU derates the engine.
The ECU will command an engine stop after 15 minutes of continuous operation with the fault active.

**Additional references:**

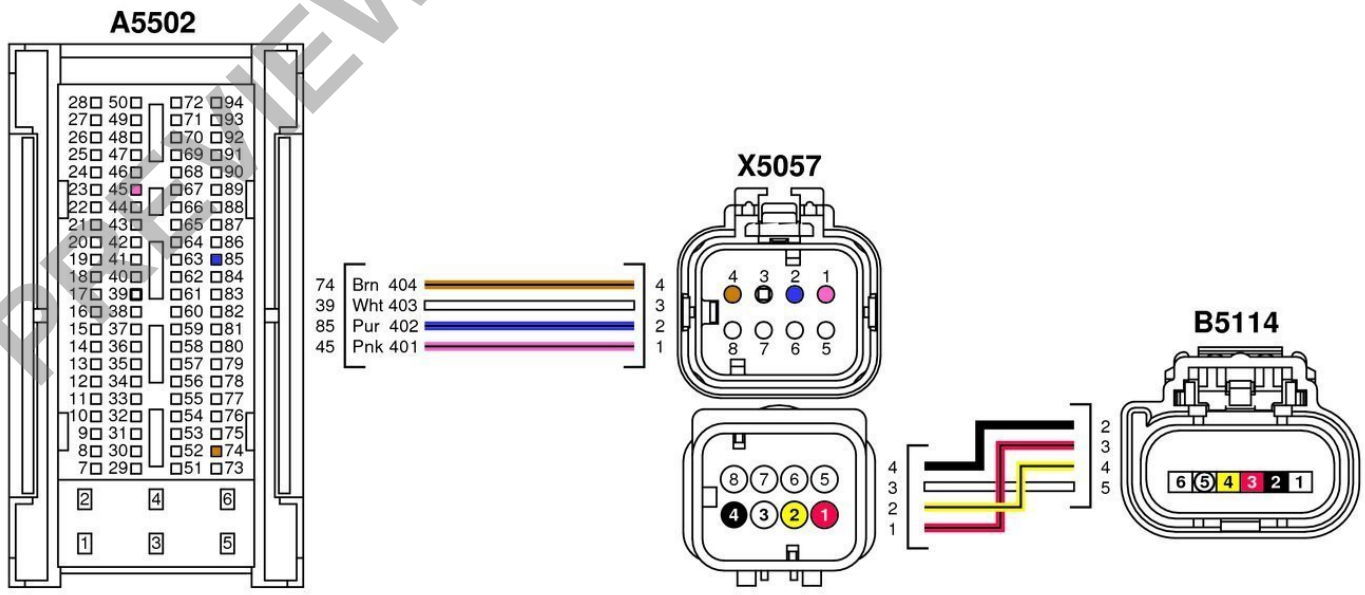
For sensor location, more pressure sensor information, and information on how to use Diagnostic Test Box, see CTM120419.

For complete wiring information:

- see Main Schematic, T4

- see Engine Connector X5057 Schematic

located in Section 230, Group 20.




***Manifold Air and Exhaust Pressure Sensor Wiring Diagram***

**LEGEND:**

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### *ECU 000633.03- Suction Control Valve Circuit Out of Range High*

404 7E7DF514-4F79-445C-8743-555BB7C043B8

*The ECU has detected the suction control valve drive voltage is greater than the specified value.*

## Diagnostic Procedure

**Troubleshooting Sequence:**

**000633.03**

**When DTC is Displayed:** When the ignition is on, and the fault is active.

**Related Information:**

The ECU has detected the voltage to the suction control valve is greater than expected.

**Alarm Level:**

Stop

**Control Unit Response:**

The ECU derates the engine.

The ECU commands the EGR Valve fully closed.

**Additional references:**

For component location, more suction control information, and information on how to use Diagnostic Test Box, see CTM120419.

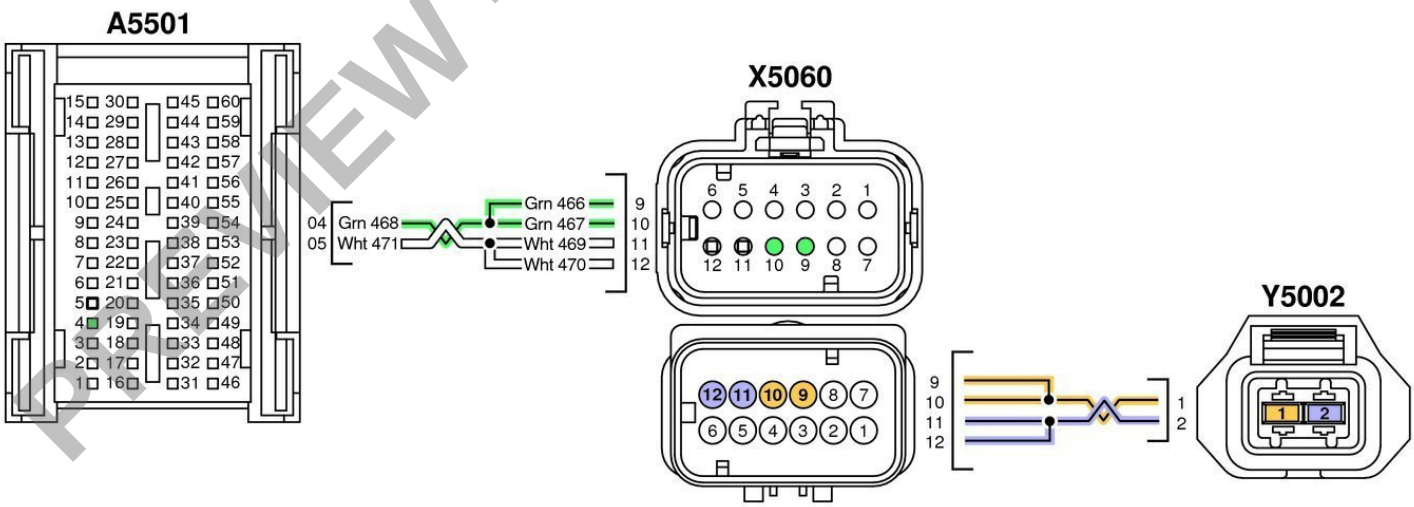
For complete wiring information:

- see Main Schematic, T4

- see Engine Connector X5060 Schematic

located in Section 230, Group 20.

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***Suction Control Valve Wiring Diagram***

**LEGEND:**

| | |
|---|---|
| A5501—5 | Drive - |
| A5501—4 | Drive + |

**( 1 ) Read DTCs and Store Snapshot Information**



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***Air Throttle Actuator Wiring Diagram***

**LEGEND:**

| | |
|---|---|
| A5501—19 | Drive (+) |
| A5501—20 | Drive (-) |
| A5502—20 | Signal |
| A5502—23 | Supply |
| A5502—52 | Return |

# Diagnostic Procedure

**( 1 ) Read DTCs and Store Snapshot Information**

## Action:

**[1] -** Connect Service ADVISOR.

**→NOTE:**

**When DTCs are cleared Snapshot information for ALL DTCs is cleared.**

**[2] -** Ignition ON, Engine OFF.

**[3] -** If any DTCs have snapshot capture or snapshot recording information, save the information.

Is DTC 002950.05.05 active?

## Result:

**YES:**Go to next step.

**NO:**Perform Verification Procedure .

**( 2 ) Terminal Check**

## Action:

**[1] -** Ignition OFF, Engine OFF.

**[2] -** Disconnect Air Throttle Actuator connector Y5401.

**[3] -** Perform Terminal Test on Air Throttle Actuator and Y5401 connector.

Were any problems found?

## Result:

**YES:**Repair problem. Perform Verification Procedure .

**NO:**Go to next step.

**( 3 ) Terminal Check**

## Action:

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Stop

**Control Unit Response:**

The ECU derates the engine.

The PDU flashes an Ash Cleaning Required icon each second.

**Additional References:**

For more DPF ash information, see “Exhaust Filter Operation” in CTM12041, in Section 03, Group 137.

## Diagnostic Procedure

**( 1 ) Read DTCs**

### Action:

**[1] -** Connect to Service ADVISOR.

**[2] -** Ignition ON, Engine OFF.

**[3] -** Refresh codes.

Are any of the DTCs in the Troubleshooting Sequence active or stored?

### Result:

**YES:**Work stored codes in order of Troubleshooting Sequence.

**NO:**Replace DPF. Perform Verification Procedure .

***ECU 003720.16- Calculated Ash Level Moderately High***

*404 7E7DF514-4F79-445C-8743-555BB7C043B8*

*The calculated ash level is moderately higher than expected.*

**Troubleshooting Sequence:**

**003251.04**
**003251.03**
**003251.00**
**003720.00**
**003720.16**

**When DTC is Displayed:**

When the ignition is ON, the engine is running, and the fault is active.

**Related Information:**

The calculated ash level is moderately high. This is the first notification to the operator that the DPF ash load is getting too high.

**Alarm Level:**

Warning

**Control Unit Response:**

The ECU derates the engine.

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**Preliminary Checks:**

**Diagnosis:**

- Recall, record (Snapshot test under Interactive Tests) and clear codes. Service ADVISOR ™ : This procedure can be performed by making a connection to the machine and using the ”Diagnostics” tab to view and clear codes. Use Snapshot Test under Interactive Test tab for specific controller to record fault.
- Clear codes using Diagnostic tab
- Recall codes again and check for return of this code.
- Recreate operating conditions that caused code.
- End of tests if code does not return.

Key switch is in on position and ECU did not receive any messages from other on board controllers.

Common tests:

- CAN Bus physical wiring, connections and splices.
- CAN Bus terminator(s). (See CAN Bus Terminator Test ).
- Electromagnetic interference. (See Erroneous Diagnostic Trouble Codes ).
- Communication faults. (See CAN Communication Fault Checks ).

***ECU 522609.09- Vehicle Controller CAN Communication Error #4***
*404*

**Code Caused By:**

CAN bus communication abnormal update rate.

**Alarm Level:**

Service alert - amber warning lamp

**To Clear Display:**

**Alarm Frequency:**

**Control Unit Response:**

**Snapshot Recorded:**

Yes

**Required Tools:**

Multimeter

**Preliminary Checks:**

**Diagnosis:**

- Recall, record (Snapshot test under Interactive Tests) and clear codes. Service ADVISOR ™ : This procedure can be performed by making a connection to the machine and using the ”Diagnostics” tab to view and clear codes. Use Snapshot Test under Interactive Test tab for specific controller to record fault.
- Clear codes using Diagnostic tab
- Recall codes again and check for return of this code.
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Key switch is in on position and ECU did not receive any messages from other on board controllers.

Common tests:

- CAN Bus physical wiring, connections and splices.
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- Electromagnetic interference. (See Erroneous Diagnostic Trouble Codes ).

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# Group 30 - Diagnosis

***System: Lift System***

*73*

***Lift System Diagnostic Tests***

*73*

*Lift System Tests*

**→NOTE:**

**In order to properly diagnose the hydraulic system, it is important to verify that the hydraulic components and control function inputs and outputs related to the hydraulic system are working properly before diagnosing hydraulic components.**

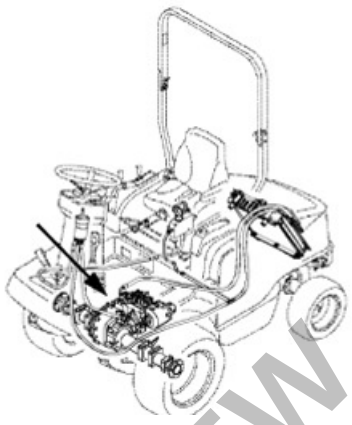
**In many cases, the combination and sequence of activation of controls are critical to successful lift system activation. Follow the sequence listed in the test conditions to ensure correct activation.**

**( 1 ) Test Procedure A**

## Action:

**Test Conditions**

- Machine parked safely.
- Key switch to OFF position.
- Park brake locked.



***Location for Checking Hydraulic Oil Level***

Check hydraulic oil level in transaxle. Normal oil level?

## Result:

**YES:**Go to next step.

**NO:**Fill transaxle to normal level with clean oil of correct specification.

**( 2 ) continued**

## Action:

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***System: 7-Iron V-Flex Deck***

*66*

***Test Procedure A: Mower Deck Linkage***

*396*

*7-Iron V-Flex Deck*

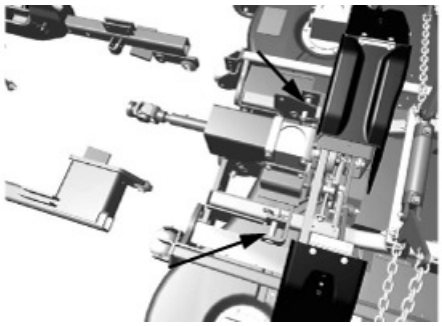
**( 1 ) Step 1**

## Action:

## Test Conditions

**Test Conditions**

- Machine parked safely.
- PTO disengaged.



***Deck Mounting Hardware***

Is the mounting hardware in place and secure?

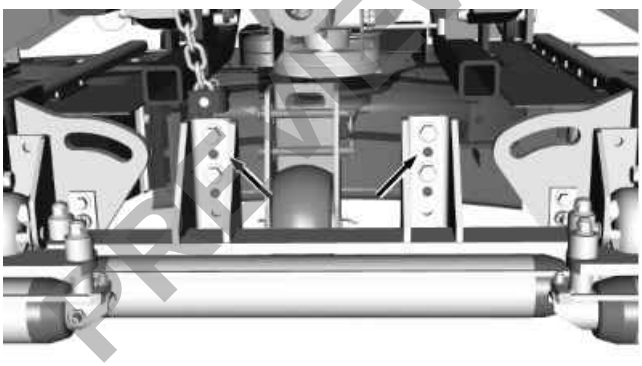
## Result:

**NO:**Tighten or replace hardware.

# Mower Deck Level

**( 1 ) Step 1**

## Action:



***Uneven Mower Deck Level***

Is there uneven cut?

## Result:

**YES:**Go to next step.

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