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HCU 029- Calibration Memory Failure

24

Service code occurs if calibration address 20 was selected for less than 30 seconds. Not necessarily a failure code. Anytime calibration (address 20) is activated for less than 30 seconds code will be generated.

Service Code Diagnosis

Additional References:

- "Testing with the Digital Display" , Section 245, Group 05.
- "Testing with the Performance Monitor" , Section 245, Group 05.
- "Calibration –– Quick Reference (for performance monitor)" , Section 270, Group 15.
- "Electrical Circuit Malfunctions" , Section 240, Group 05.

(1) Preliminary Checks

Action:

→NOTE:

Recall, record and clear codes before proceeding (See reference Recall Codes Procedure , Section 245, Group 05) to ensure that the service code which you are trouble shooting is an active code.

Check for additional stored Service Codes and troubleshoot each individual displayed Service Code.

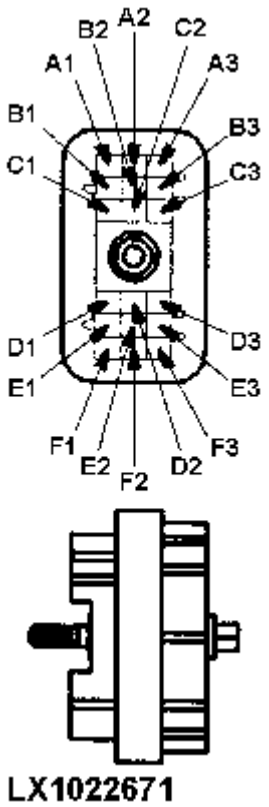
Result:

YES: Additional Service Codes stored, troubleshoot them first.

NO: No other Service Codes are stored. HCU interrupts calibration, GO TO 2 .

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LX1022671

Measure at connector X253 (SMD 1, marked with red PVC tape) with multimeter:

Item	Measurement	Specification
Identification Pin:	Voltage	12 Volt at Pin A3

Item	Measurement	Specification
Identification Pins:	Ground	at Pin A2; B3 and C3

For connector location and pin arrangement see W35; for Circuit Diagram see SE21C (for AutoPowr transmission see Circuit Diagram SE21A).

Result:

YES: Check SMD connector for bad, loose, widened or corroded contacts.

OK: Service Code PEC 201 was stored together with PEC 230 and check of circuit does not reveal any problems, change SMD1.

YES:• SMD2 - Check, GO TO 4 .• SMD3 - Check, GO TO 5 .

NO: Check Identification leads, GO TO 6 .

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SFA 073- Ground Speed Signal Interrupted While Tractor In Motion

39

Service Code indicates a problem with the EEPROM of the SFA Controller.

Service Code Diagnosis

(1) Check EEPROM of SFA Controller

Action:

→NOTE:

Recall, record and clear Service Codes before proceeding to ensure that the Service Code which you are trouble shooting is an active Service Code (See reference Recall Service Codes in 245-05)

If Service Code SFA 073 still persists, replace the EEPROM in the SFA Controller (Changes software number from 1.03 to 1.04 or higher):

A new EEPROM should be installed in the SFA Controller (Part Number: AL113367)

Install Conversion kit MPL10294.

Delete Service Codes.

For controller location see W34; for circuit diagram see SE20.

Result:

YES: After deleting Service Code SFA 073 does not appear. Diagnostic completed.

NO: After deleting Service Code SFA 073 still persists. Replace SFA Controller and calibrate new SFA Controller, see reference “Calibration” in 280-10.

SFA 075- Internal SFA Control Unit Failure

39

Service Code indicates an internal SFA controller failure.

Service Code Diagnosis

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(5) Checking the circuit of the sending unit of the filter by-pass valve (cold-weather starting)

Action:

See "Circuit Test for Filter By-Pass Valve (Cold-Weather Starting), Sending Unit (B87)" , Section 245, Group TCU.

Result:

YES: GO TO 6 .

NO: If required, carry out the repair and do a functional test.

(6) Isolate the problem

Action:

Reasons for problems with the filter by-pass valve (cold-weather starting) (not related to electrical circuit):

- Faulty thermal element in the filter by-pass valve (cold-weather starting).
- Filter by-pass valve (cold-weather starting):
  - defective spring.
  - valve sticking closed.

Result:

NO: If required, carry out the repair and repeat the test.

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Item	Measurement	Specification
	CAN- (lead 935)	Pin 30
ECU (with VP44 Fuel Injection Pump) -- Connector X361 (W34)		
Power supply:	Voltage (lead 622)	12 Volt at Pin 19
	Voltage (lead 032)	12 Volt at Pin 23 and Pin 68
	Ground (lead 050)	at Pin 1
CAN BUS (29-Bit) circuit:	CAN+ (lead 934)	Pin 21
	CAN- (lead 935)	Pin 44
PEC -- Connector X221 (W34)		
Power supply:	Voltage (lead 562)	12 Volt at Pin 23
	Ground (lead 050)	at Pin 1
CAN BUS (29-Bit) circuit:	CAN+ (lead 934)	Pin 21
	CAN- (lead 935)	Pin 44
PEC (with VP44 Fuel Injection Pump) -- Connector X221 (W34)		
Power supply:	Voltage (lead 572)	12 Volt at Pin 23
	Ground (lead 050)	at Pin 1
CAN BUS (29-Bit) circuit:	CAN+ (lead 934)	Pin 21
	CAN- (lead 935)	Pin 44

For connector location and pin arrangement see W4 and W34; for Circuit Diagram see CCD BUS Diagnostic Schematic and CAN BUS Diagnostic Schematic.

Result:

YES:• BCU is not displayed: Check CCD circuit, GO TO 9 .• ECU and PEC are not displayed: Check 29-Bit CAN BUS circuit, GO TO 10 .

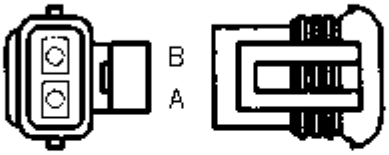
NO: Repair as needed, then call up controller.

(4) BIF Connector Check

Action:

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LX1017909

Terminal Number	Lead Number and Section	Wire Color	To Plug or Component
A	325CA-2.5	Dark Green	X03-A1
B	310CM-2.5	Black	XGND9, K01-2, X215-J, X306-B

X130 1-Pin Plug for Compressor Clutch



LX1017881

Terminal Number	Lead Number and Section	Wire Color	To Plug or Component
A	213C-1	Orange	X03-B5

X139 2-Pin Plug (Front Grille Worklight Connection Point; W14)

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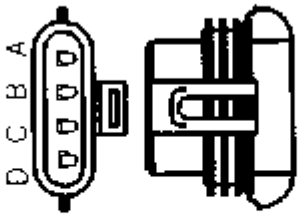
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Terminal Number	Lead Number and Section	Wire Color	To Plug or Component
F201A	622AB-1	Red	X222-E2, X247-11, X201-A
F201E	022AA-1.5	Red	S01-IGN, X03-F7, X03-B1, K105-86
F202A	672AB-1	Red	X222-L6, X201-C, X212-B, K212-30, X213-30, X193-A
F202E	072AH-1	Red	H25-3, K101-87, F215E, K106-86, X247-8, F111E, F112E, F113E, F115E, F116E, F117E, F211E
F203A	349AB-4	White	F204E, K203-87
F203E	255A-4	Dark Green	X232-E
F204A	260A-1	Black	X232-F
F204E	349AA-1	White	F203A, K203-87
F205A	032A-2.5	Red	X222-A2
F205E	012AI-2.5	Red	X03,1-1FA, F208E, F206E, F212E, K204-30, K203-30
F206A	162A-2.5	Red	K205-30
F206E	012AM-2.5	Red	X03,1-1FA, F205E, F208E, F212E, K204-30, K203-30
F207A	104AD-1	Yellow	X101M-D, F210E, F209E
F207E	135AD-1.5	Dark Green	K206-86, D122E, X25-21, K205-86, S09-H
F208A	132A-2.5	Red	K206-30
F208E	012AL-2.5	Red	X03,1-1FA, F205E, F206E, F212E, K204-30, K203-30
F209A	174A-1	Yellow	X07-18
F209E	104AC-1	Yellow	X101M-D, F210E, F207A
F210A	184AA-1	Yellow	X248-11, X07-19
F210E	104AB-1	Yellow	X101M-D, F209E, F207A

F201 - F220 Fuses (Fuse Box 2) - Continued -

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LX1017887

Terminal Number	Lead Number and Section	Wire Color	To Plug or Component
A	859D-1	White	X03/4-J4
B	858D-1	Gray	X03/4-J5
C	855D-1	Dark Green	X03/4-J2
D	854D-1	Yellow	X03/4-J3

X93 2-Pin Plug for Neutral Start Switch



LX1017883

Terminal Number	Lead Number and Section	Wire Color	To Plug or Component
A	311D-1	Brown	X03/4-C1
B	506D-1	Light Blue	X03/4-C2

X94 2-Pin Plug for Rear PTO Speed Sender

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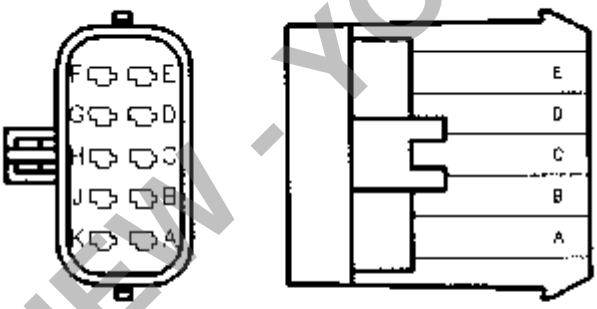
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LX1017948

Terminal Number	Wire Number and Cross-Section	Wire Color	To Plug or Component
A	111CA-1	brown	X288-C
B	310CD-1	black	XGND9

X288 10-Pin Plug (Connecting Point - Engine Wiring Harness; W04)

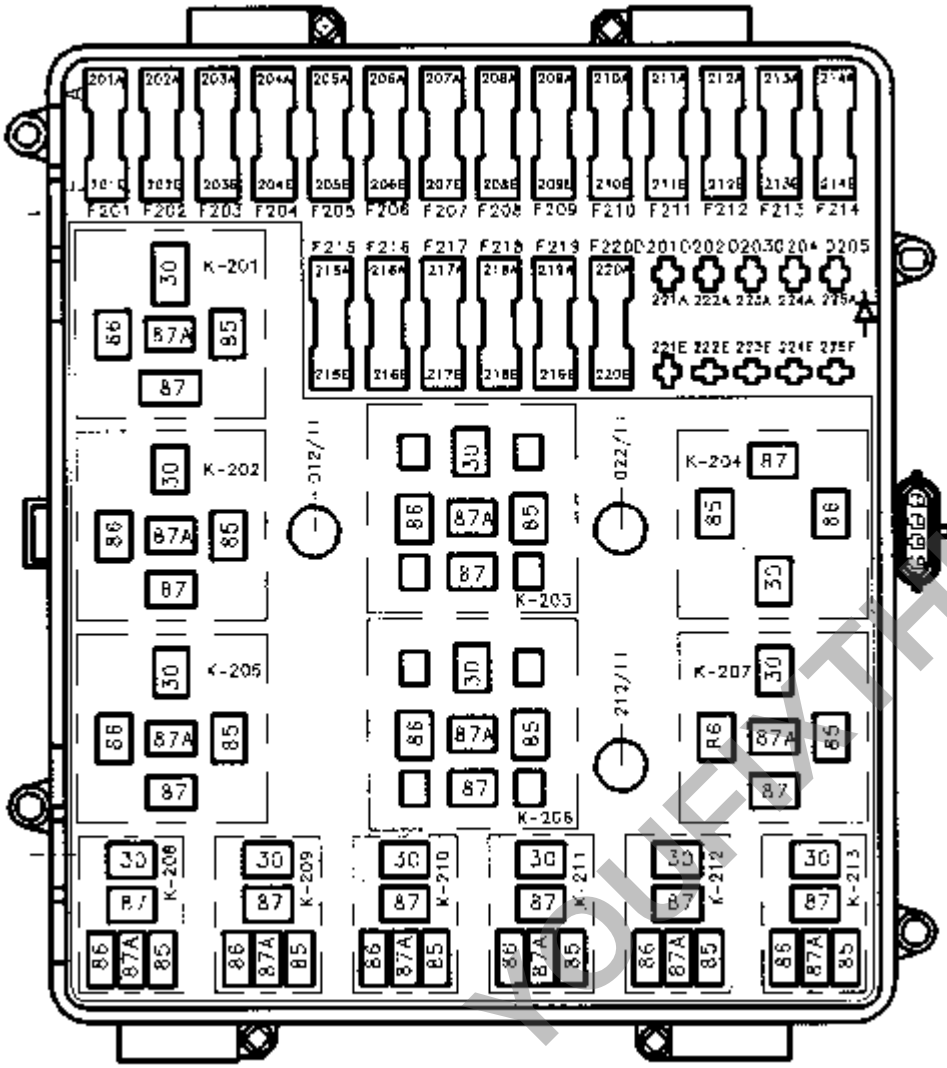


LX1017897

Terminal Number	Wire Number and Cross-Section	Wire Color	To Plug or Component
A	325C-1	dark green	X76-A
B	114C-1	yellow	X67-B
C	111CA-1	brown	X139-A
D	310CJ-1	black	XGND9, X76-B, X79/2
E	329C-1	white	X77-A
F	347C-1	pale purple	X78-A
G	351C-1	brown	X70/2-A
H	306C-1	light blue	G2-D+
J	903C-1	orange	X66/1
K	124C-1	yellow	X68-B

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SE3-Horn

General Information

The horn is located at the front, just behind the front grille. The horn button is part of the multifunction unit. The horn circuit is closed by pushing in the turn signal switch.

Operation

Current flows from activated relay (K102) pins 30 and 87 via fuse (F103) to the horn button (S04). Pressing the button causes current to flow to the horn (H01).

Possible Horn Circuit Problems	
Malfunction	**Possible cause**
Horn does not produce any noise	Fuse F103 defective Faulty horn button Faulty horn Power leads broken or shorted Poor ground connection
Horn produces a noise continuously	Faulty horn button Power leads shorted
Horn not loud enough	Faulty horn Power leads damaged or corroded Horn/ground connections are loose or corroded

SE3-Functional Schematic

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SE5-Front PTO and Handbrake Monitoring System

General Information

Front PTO

The front PTO switch is located on the shift console. If, with PTO engaged, the engine is shut off and started again, a built-in safety circuit prevents the PTO from revolving again. The PTO must be disengaged and then reengaged.

Handbrake monitoring system

The handbrake lever is located on the left-hand side near the operator's seat. With the engine running and the handbrake applied, handbrake indicator light glows.

Operation

Front PTO

With the ignition on, the engine running and the front PTO switched off:

Current flows from terminal ACC of key switch (S01) SE1 via fuse (F027) and switch (S06) to terminals 86 and 87 of relay (K021) and to terminal 86 of relay (K022). These two relays activate terminals 30 and 87. The supply of current is cut off to indicator light (H19) and solenoid valve (Y01).

With ignition on, engine running and front PTO switched on:

Switch (S06) is activated. Relays (K021) and (K022) remain activated and supply current to indicator light (H19) and solenoid valve (Y01).

→NOTE:

Relays (K021) and (K022) are kept in the activated position by means of terminals 30, 86 and 87.

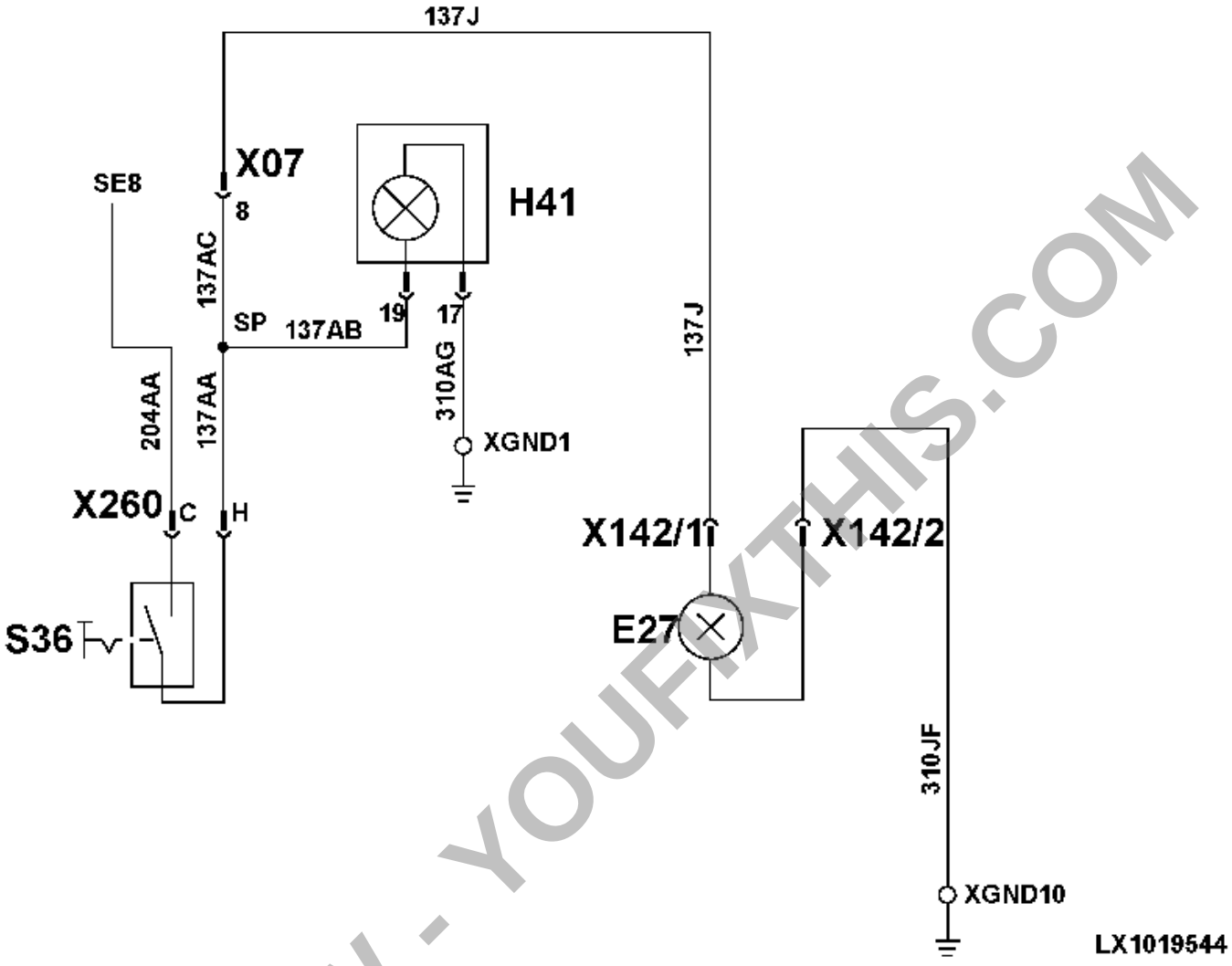
With the ignition on, start the engine (front PTO switched on):

When starting, terminal ACC of key switch (S01) SE1 receives no current, causing relays (K021) and (K022) to drop off and connect terminal 30 with terminal 87a; the supply of current to solenoid valve (Y01) is cut off. The caution light receives ground current from solenoid valve (Y01) via terminals 30 and 87a of relay (K022), causing it to light up.

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SE13-Diagnostic Schematic



LEGEND:

E27	Beacon light (W11)
H41	Beacon indicator light (W4)
S36	Beacon light switch (W4)
X07	20-pin plug (cab roof connection point; W4, W11)
X27	26-pin plug (monitor unit connection point, rear; W4)
X142/1	1-pin plug (beacon connection point; W11)
X142/2	1-pin plug (beacon connection point; W11)
X260	10-pin plug (headlight switch connection point; W4)

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IMPORTANT:

Connect multimeter with IGNITION--OFF.

29-BIT CAN BUS - check at service connector X519		
CAN-Voltage Check		
Measure voltage between Pins		Voltage
D (lead 934)	F (lead 050)	2.0 - 3.0 volts (normal range of operation: approx. 2.5 volts)
E (lead 935)	F (lead 050)	2.0 - 3.0 volts (normal range of operation: approx. 2.5 volts)
Check continuity between Pins		Normal Condition
D (lead 934)	E (lead 935)	No continuity
D (lead 934)	all occupied pins at X519	No continuity
E (lead 935)	all occupied pins at X519	No continuity
CAN-SHIELD WIRE check		
Measure voltage between Pins		Voltage
F (lead -050)	A (lead +622)	approx. 12 volts

(1) Communication lines -- voltage check (934/935)

Action:

IMPORTANT:

Connect multimeter with IGNITION--OFF.

IMPORTANT:

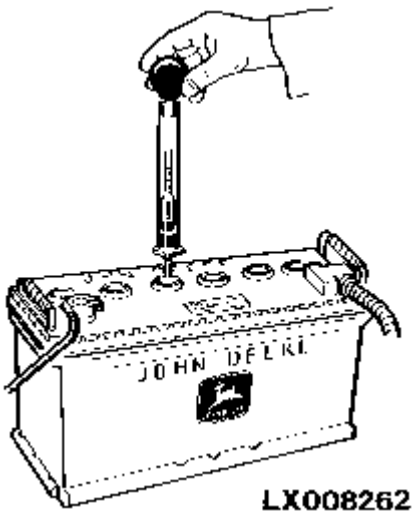
Carry out voltage measurement with IGNITION-- ON

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(3) Check Specific Gravity of Each Cell

Action:



→NOTE:

If any cell is at or above 1.175 points, see result column. If all cells are below 1.175 points, GO TO 5

Result:

YES:ALL cells 1.225 or above and less than 50 points variation between cells, GO TO 8

NO:ANY cell below 1.225 and less than 50 points variation between cells, GO TO 4

NO: More than 50 points variation between cells: Replace battery and then GO TO 1

(4) Check Battery Voltage

Action:

Surface charge must be removed before checking voltage of the battery.

To remove surface charge, ground battery negative terminal and turn light switch to position “4” (headlights and work lights) for one minute. Then turn light switch OFF, wait one minute and check battery voltage.

Result:

YES: If battery = 12.4 volts or more, GO TO 8

NO: If battery = less than 12.4 volts, GO TO 5

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(2) General Harness and Connector Test

Action:

Most of the harness problems are related to connector problems and/or bad ground connections. Check all relevant connectors for bad and loose contacts.

Following connectors are suspect (Output Lead 359):

1. X238 and X222 (W4; SE23)
2. X222 and X218 (W34; SE23)

For connector location and pin arrangement see W4 and W34; for circuit diagram see SE23 .

Result:

YES: Check output lead 359 for continuity. GO TO 3 .

NO: Repair as needed. Test completed.

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(7) Axis 2 Paddle Switch -- Output Lead 577

Action:

Check Output Lead 577:

1. for continuity.
2. for a short to ground.

→NOTE:

Lead 577 is connected to ground via the paddle switch with the Multi-Function Lever in NEUTRAL or moved over noticeable resistance to RIGHT or LEFT position.

Wiring Connections:

Circuit 577 (Paddle Switch 2 Output Circuit)		
Circuit	**Wiring Harness W34**	
(SE21B)	**from**	**to**
Lead 577	X220 - Pin F (Connection to Multi-Function Unit)	X221 - Pin 37 (PEC)

For circuit diagram see SE21B (for AutoPowr transmission see SE21).

Result:

YES: Check ground lead 541, GO TO 9 .

NO: Repair as needed and repeat this test.

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Circuit Test for Oil Temperature Sending Unit

General Information

The oil temperature sending unit is part of the internal transmission wiring harness and is located in the clutch control block.

Instructions for Diagnosis

• For component location and pin arrangement see: "Cab Wiring Harness W4" , Section 240, Group 10C.

• For circuit diagram, see: "SE26 - Transmission Control Unit (TCU)" , Section 240, Group 15C.

Circuit Test

Most of the harness problems in the field are related to connector problems (loose, poor or widened contacts) and/or poor ground connections. **Before checking the electrical circuit in detail** and **if the problem with the electrical circuit is intermittent (loose contacts)** , check all the components of the circuit affected (see procedure for "Preliminary Check on TCU Electrical Circuit" , Section 245, Group TCU).

→NOTE:

None of the plugs/components on the internal transmission wiring harness can be reached without dismantling the transmission components. Before checking these plugs and components, make sure that the external sub-assemblies are all operating correctly.

Circuit for oil temperature sending unit (connectors and components):

1. **Plugs X332 (TCU) and X333 (connecting point for internal transmission harness) at cab wiring harness W4.**
2. **X333 (connecting point for W4) and oil temperature sending unit at internal transmission harness.**

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(G), housing cover (E) and return springs (F).

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(12) Select PCU Addresses 58 and 59 (Calibrating the Transmission Pulses per Axle Revolution).

Action:

→NOTE:

This value is used to calculate wheel speed, distance traveled and area worked.

The transmission pulse/axle revolution value consists of six digits and must be stored at two different addresses (58 and 59). Three digits of the six-digit code are entered in each address; the first three in address 58 and the last three in address 59.

First enter the value “001” at address 58. When the three digits are entered in address 58 the display automatically changes to address 59.

Input, address 58: 007

Input, address 59: 866

Result:

YES: Store the value. GO TO 13.

NO: Key in relevant value. GO TO 13.

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Metri-Pack Connector Tap Out Lead

JDG774

[Dealer Fabricated Tools-See Section 299]

Voltage check in circuits (e.g. clutch cooling solenoid).

Other Material

Number	Name	Use
• AR94522 (us)	ISO coupler	Adapt flow meter hoses to selective control valve.

Observe Safety Precautions

CAUTION:

The following safety precautions MUST be followed to prevent personal injury:

[1] - Keep hands away from moving parts. Shut engine off before checking lines near moving parts.

[2] - Use ONLY 14 mm adapters or plugs in 14 mm ports. Fittings of incorrect size may fit, but could be blown out under pressure.

[3] - Before checking transmission control circuits, place transmission right range lever at neutral.

[4] - When servicing front-wheel drive equipped tractor with rear wheels supported off ground, always support front wheels in a similar manner before rotating wheels by engine power. Loss of electrical power or transmission-hydraulic system pressure will engage front driving wheels, pulling rear wheels off support if front wheels are not raised.

Under these conditions, note that the front drive wheels can engage even with switch in disengaged position.

Legal Requirements

Certain countries, including Japan, Italy and Spain, have a legal requirement for a reverse lockout. In these countries, the following ranges cannot be used in reverse:

Transmission version	Ranges locked out in reverse travel
16-speed transm.	Range D
20-speed transm.	Range E

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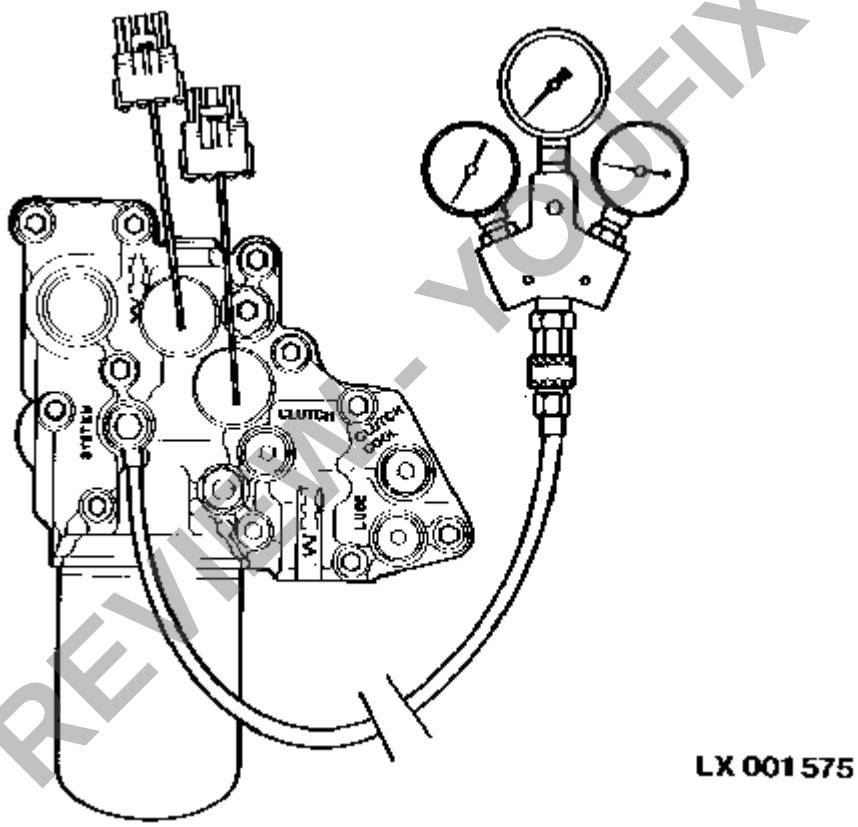
[5] - Measure the pressure with the PTO engaged.

→NOTE:

There should be no pressure shown when the PTO is engaged.

- Check the associated circuit if there is a pressure reading with the PTO engaged or no pressure reading with the PTO disengaged. See "SE16E-Basic Control Unit (BCU) (Rear PTO)" , Section 240, Group 15.
- If there is no electrical fault, the spool is jammed in the solenoid valve. See "Repairing the Solenoid Valve" in the relevant Repair manual, Section 56, Group 30.
- If the pressure reading is acceptable with the PTO disengaged but the PTO brake is not operating correctly, repair the PTO brake. See "Replacing the PTO Brake" in the relevant Repair manual, Section 56, Group 30.
- If the pressure is low when the PTO is disengaged, check the system pressure of the transmission.

Checking Transmission System Pressure



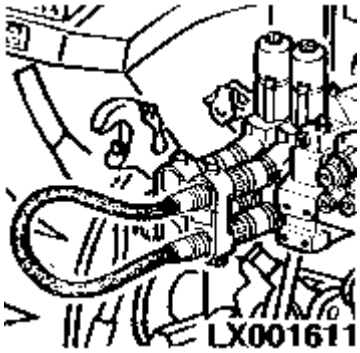
SyncroPlus pressure test shown

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(2) Cavitation test (check delivery rate of charge pump)

Action:



Connect tester to oil filter head.

Connect jumper hose at SCV unit and set flow-regulating valve to max. flow.

Run engine at max. speed.

Actuate SCVs.

Observe oil pressure.

Inlet pressure: approx. 100 kPa (1 bar; 14.5 psi)

There must be no noise of cavitation.

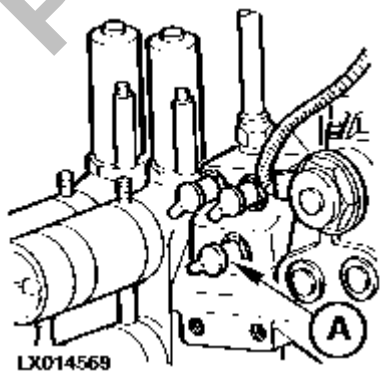
Result:

YES: Pressure OK: GO TO: **(3)**

NO: Pressure too low: GO TO: **1.1**

(3) System pressure check

Action:



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6810 and 6910 Tractors

LEGEND:

A	Lift cylinder
B	Rockshaft valve
C	Stepper motor
D	Draft force pin or load control shaft
E	Position sensor

The tractor has two external lift cylinders (A) designed to raise and lower the three-point hitch and implement.

The lift cylinders are extended or retracted by the rockshaft valve (B). The rockshaft valve is actuated by a stepper motor.

The HCU controls the rockshaft electronically.

→NOTE:

On 6810 and 6910 tractors from serial no. 260142, position sensor (E) is identical to that used on the 6010-6610 tractors. See “Position Sensor” in this Group.

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