Group HCU - HCU Diagnostic Trouble Codes

HCU 022- System Voltage not in Specification

24

Service code indicates that the system voltage is not in specification due to a inadequate battery charge, defective battery or alternator, slipping or broken alternator belt, the vehicle was jump started, defective cab wiring harness or a problem with the HCU diagnostic circuit, fuse (F115), HCU power and ground circuit (856 and 050), HCU CCD circuits (924 and 925).

This procedure provides supporting information to trouble shoot service code HCU 022.

Following test(s) are used to trouble shoot this service code. Refer to manual links for supporting information.

Check system voltage address 03 for HCU AL78061

Check system voltage address 18 for all other HCU's

To check HCU part number see address 80 and 81

HCU 027- Calibration not Successful

24

Service code indicates that the calibration is not valid. A sensor (or sensors) did not calibrate properly.

This procedure provides supporting information to trouble shoot service code HCU 027.

An additional code related to the defective sensor circuit will be stored.

Following test(s) are used to trouble shoot this service code. Refer to manual links for supporting information.

Check for additional service code and check the relevant component:

Recall Codes Procedure

Refer to the Service Code list .

Recalibrate:

Callibration procedure for HCU AL78061

Callibration procedure for all other HCU's

To check HCU part number see address 80 and 81

HCU 028- Calibration Memory Failure

24

Service code indicates that the calibration memory failed. This code occurs if previous calibration has not been saved or a new HCU not calibrated

Download full manual at youfixthis.com
PREVIEW - YOUFIXTHIS.COM

Group 10 - Engine Tests

Preliminary Engine Tests

Before tuning a tractor engine, determine whether a tune-up will restore operating efficiency. When there is doubt, the following preliminary tests will help to determine whether the engine can be tuned up. Perform the following tests:

After engine has been stopped for several hours, carefully loosen crankcase drain plug and watch for any water to seep out. A few drops could be due to condensation, but any more than this would indicate problems which require engine repairs rather than just a tune-up.

With engine stopped, inspect engine coolant for an oil film. With engine running, inspect coolant for air bubbles. Either condition would indicate problems which require engine repairs rather than just a tune-up.

Perform a dynamometer test as instructed below. Repeat dynamometer test after tune-up so that horsepower before and after tune-up can be compared.

Measure compression as described in the Technical Manual "Engines".

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Group 10 - System Diagnosis

Fuel System

Symptom	Problem	Solution
Fuel pump not working or performing poorly	Interruption to power supply	Check electrical circuit SE1 (see Section 240, Group 15)
	Screen plugged	Clean the screen
	Electric motor defective	Change fuel pump
	Pump gear defective	Change fuel pump
	Line defective or bent	Change the line
	Line incorrectly connected	See Group 20A
	Fuel filter contaminated	Change filter, see Operator's Manual
	Tank not venting properly	Change filler cap
Injection pump not working or performing poorly	Mechanical or electrical defect	See technical manual dealing with engines

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Group 05 - System Information

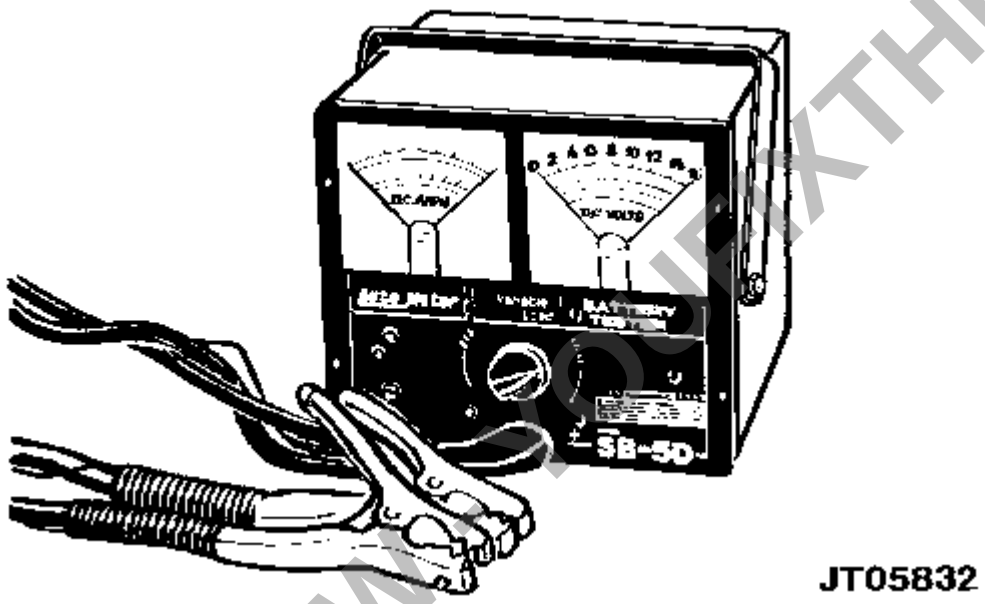
Special or Essential Tools

→NOTE:

Order tools according to information given in the U.S. SERVICE-GARD ™ Catalog or in the European Microfiche Tool Catalog (MTC).

Battery Load Tester

JT05832



JT05832

Battery, checking on

PREVIEW YOUFIXTHIS.COM

Download full manual at youfixthis.com

Group 05 - Operational Checks

Checking if Clutch Separates Properly

→NOTE:

Perform this test when oil is cold.

[1] - Run engine at a speed of 2000 1/min.

[2] - Depress clutch pedal and select a low gear.

The tractor must not move while the clutch pedal is depressed.

If it does move, check the clutch pedal valve and the pedal setting. See Group 15.

Checking Clutch for Slippage

CAUTION:

Always perform this test out of doors and ensure that no lives are put at risk.

[1] - Run the engine at a speed of 1500 1/min.

[2] - Depress clutch pedal and select a high gear.

[3] - Depress brake pedal and slowly release clutch pedal.

The engine must cut out.

If it does not cut out, check clutch pressure. See Group 15.

Checking Slip Phase of Clutch

CAUTION:

Always perform this test out of doors and ensure that no lives are put at risk.

[1] - Drive tractor onto an uphill slope and stop it there.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Group 05 - Operational Checks

Checking Rear PTO

With engine running, engage PTO.

PTO must engage smoothly. No unusual noise must occur.

Refer to Group 10 or 15 if malfunctions occur.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Group 05 - Operational Checks

Checking the Steering

CAUTION:

This test must be performed outdoors. Make sure there is no risk of injuring anybody.

[1] - Drive the tractor onto a level surface and stop it there.

[2] - Run the engine.

[3] - Turn the steering wheel several times in each direction.

It should be easy to turn the steering wheel smoothly in both directions. The steering lock position must be distinct.

[4] - Drive the tractor and turn the steering wheel several times in each direction.

There should be no need to correct the position of the steering wheel while the tractor is driving straight ahead.

If faults are evident, see Groups 10 and 15.

Checking the Brakes

[1] - Press both brake pedals together.

[2] - Press each brake pedal separately.

The brake pedals must not sink of their own accord.

If the brake pedals do sink excessively, turn to Group 15 to find the reason. Ignore Point 3 for the time being.

If the brake pedals behave normally, continue the check procedure from Point

[3] -

CAUTION:

This test must be performed outdoors. Make sure there is no risk of injuring anybody.

Drive the tractor and actuate the brakes several times.

The brakes should respond safely and in a normal fashion. The tractor must not pull to one side.

If the brakes should “rattle” in an unusual manner, check the hydraulic oil and change if

Download full manual at youfixthis.com
PREVIEW - YOUFIXTHIS.COM

Group 05 - Operational Checks

Operational Checks

Explanation of Operational Checks

CAUTION:

Whenever performing a diagnosis on the hydraulic system, always observe the safety precautions listed in this Group.

The checks listed here apply to troubleshooting without tools. Their purpose is to help locate faults in the hydraulic system and power train.

These tests must be carried out when hydraulic units fail to operate or operate too slowly, when the hydraulic oil overheats and whenever major repairs have been carried out on the hydraulic system or on the power train elements.

In every case, perform the checks in the sequence in which they are listed here.

In the **hydraulic system** , a distinction is drawn between faults in the **transmission circuit** and faults in the actual **hydraulic system** itself.

Faults in the **transmission circuit** affect the transmission pump, valves in the clutch housing, power train elements (vehicle clutch, PTO clutches, FWD, differential, PowrQuad transmission), the oil cooler and transmission lubrication.

Faults in the actual **hydraulic system** itself affect the charge pump, hydraulic pump, steering, inlet priority valve, rockshaft and selective control valves.

→NOTE:

Further operational checks on specific components can be found in the other Sections, under Group 05.

Safety Precautions

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Group 05 - Operational Checks

A/C System Operational Checks

Before You Start

Always begin with this group to identify a failure. The operational checks step-by-step procedures will provide a quick check of the system. No tools are required to perform these checks.

Always start with the first step and follow the sequence from left to right. Read each step completely before performing the check. Concentrate only on the check you are performing and disregard signals from unrelated components.

Complete all checks before making repairs, unless instructed otherwise in right column.

A/C System Operational Checks

(1) Engine Off Checks

Action:

Open cab door.

Turn A/C compressor switch ON.

Temperatur control knop must be CCW.

Turn key switch ON but do NOT start engine.

Operate blower motor switch from OFF to LOW several times while listening for a click indicating compressor clutch engagement.

Result:

YES: GO TO **(2)**

NO: GO TO **(7)**

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

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.

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.

Technical manuals are divided in two parts: repair and operation and tests. Repair sections tell how to repair the components. Operation and tests sections help you identify the majority of routine failures quickly.

Information is organized in groups for the various components requiring service instruction. At the beginning of each group are summary listings of all applicable essential tools, service equipment and tools, other materials needed to do the job, service parts kits, specifications, wear tolerances, and torque values.

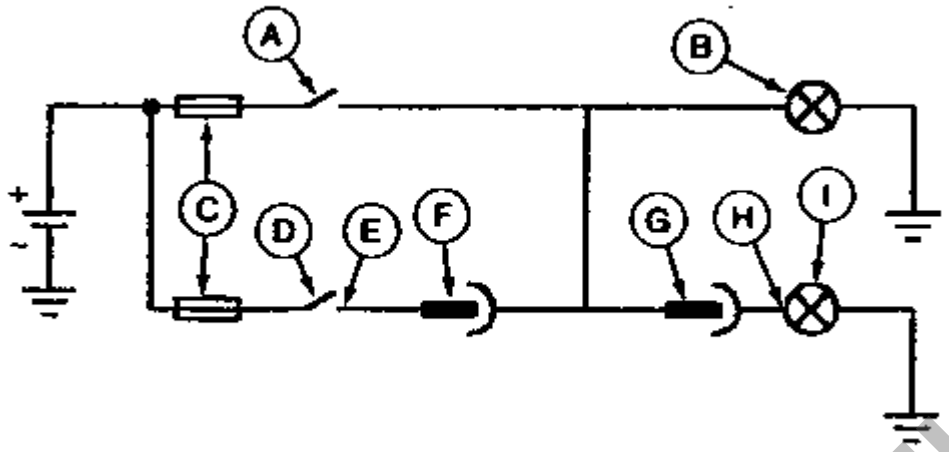
Technical Manuals are concise guides for specific machines. They are on-the-job guides containing only the vital information needed for diagnosis, analysis, testing, and repair.

Fundamental service information is available from other sources covering basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic type of failures and their causes.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Shorted Circuit



LEGEND:

A	Switch
B	Lamp
C	Fuse
D	Switch
E	Component Terminal
F	Circuit Connector
G	Circuit Connector
H	Component Terminal
I	Lamp

A shorted circuit usually results in two components operating when one of two switches is turned on (ex: improper wire-to-wire contact). Components can also become shorted. However, shorted components will usually open the circuit protection device.

To isolate the location of a shorted circuit:

[1] - Turn Switch (A) ON for correct lamp (B) to operate.

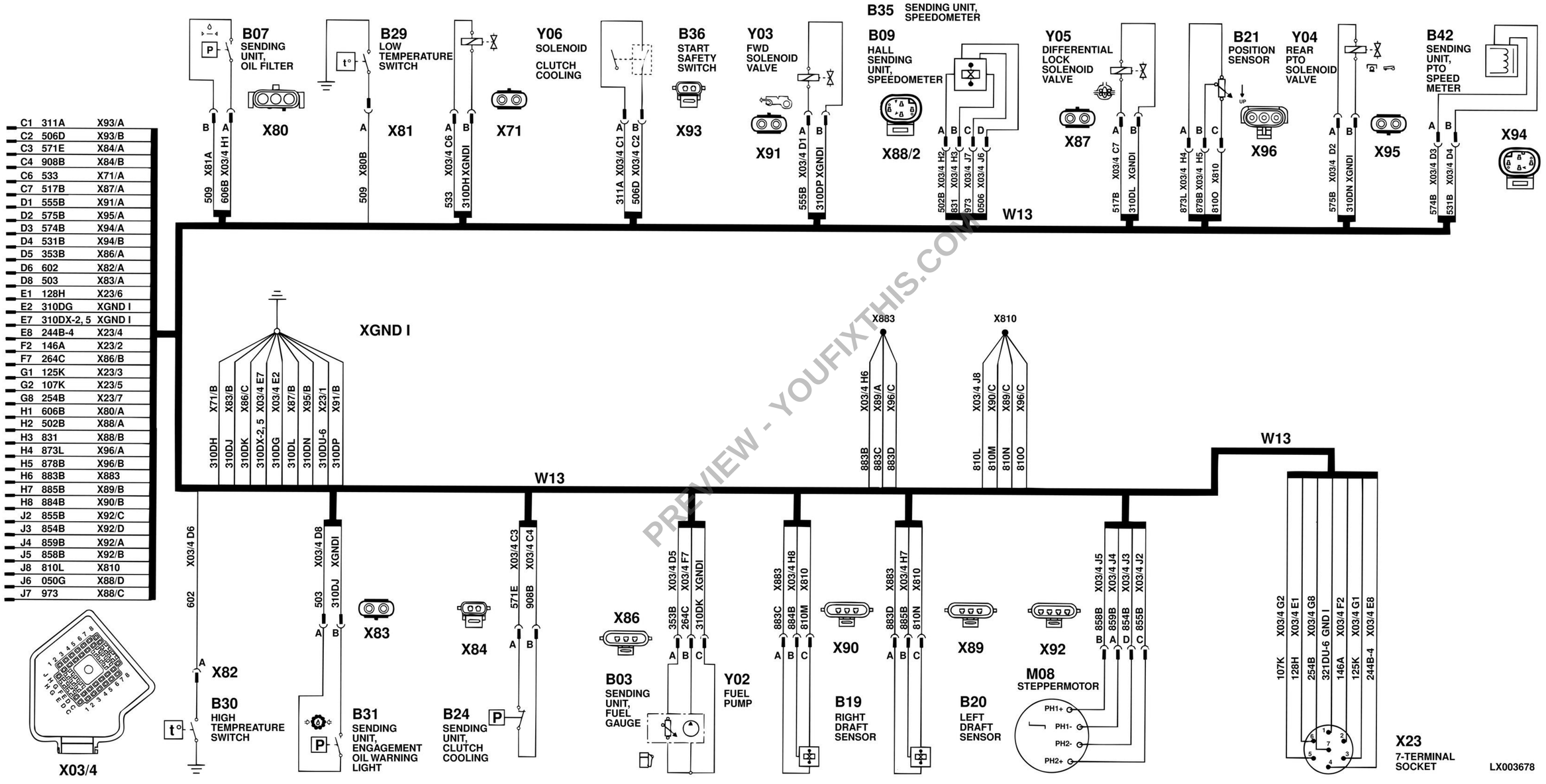
[2] - Start at controlling switch (D) of lamp (I) that should not be operating and disconnect the wire at terminal (E).

[3] - Follow circuit and disconnect wire at connectors (F, G or H) until the extra lamp (I) stops operating.

[4] - The short or improper connection will be between the last two locations where the wire was disconnected. In our example, it is between (F and G).

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com



C1	311A	X93/A
C2	506D	X93/B
C3	571E	X84/A
C4	908B	X84/B
C6	533	X71/A
C7	517B	X87/A
D1	555B	X91/A
D2	575B	X95/A
D3	574B	X94/A
D4	531B	X94/B
D5	353B	X86/A
D6	602	X82/A
D8	503	X83/A
E1	128H	X23/6
E2	310DG	XGND I
E7	310DX-2, 5	XGND I
E8	244B-4	X23/4
F2	146A	X23/2
F7	264C	X86/B
G1	125K	X23/3
G2	107K	X23/5
G8	254B	X23/7
H1	606B	X80/A
H2	502B	X88/A
H3	831	X88/B
H4	873L	X96/A
H5	878B	X96/B
H6	883B	X883
H7	885B	X89/B
H8	884B	X90/B
J2	855B	X92/C
J3	854B	X92/D
J4	859B	X92/A
J5	858B	X92/B
J8	810L	X810
J6	050G	X88/D
J7	973	X88/C

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com



LX013189

Terminal No.	Wire No. and Gauge	Wire Color	To Plug or Component
A	147A-1.5	pale purple	X07
B	310DK-1.5	black	XGND10

XGND10 Ground Connection

Terminal No.	Wire No. and Gauge	Wire Color	To Plug or Component
(-)	310AB-1	black	X160
(-)	310AJ-1	black	X161
(-)	310AX-1	black	XGND14
(-)	310DC-1	black	X162/1
(-)	310DK-1.5	black	X165
(-)	310DM-1	black	X162/2

XGND11 Ground Connection

Terminal No.	Wire No. and Gauge	Wire Color	To Plug or Component
(-)	310AC-1	black	X112/1
(-)	310AG-1	black	X107

XGND12 Ground Connection

Terminal No.	Wire No. and Gauge	Wire Color	To Plug or Component
(-)	310AA-1	black	M05
(-)	310AY-1	black	X106
(-)	310AZ-1	black	X112/2

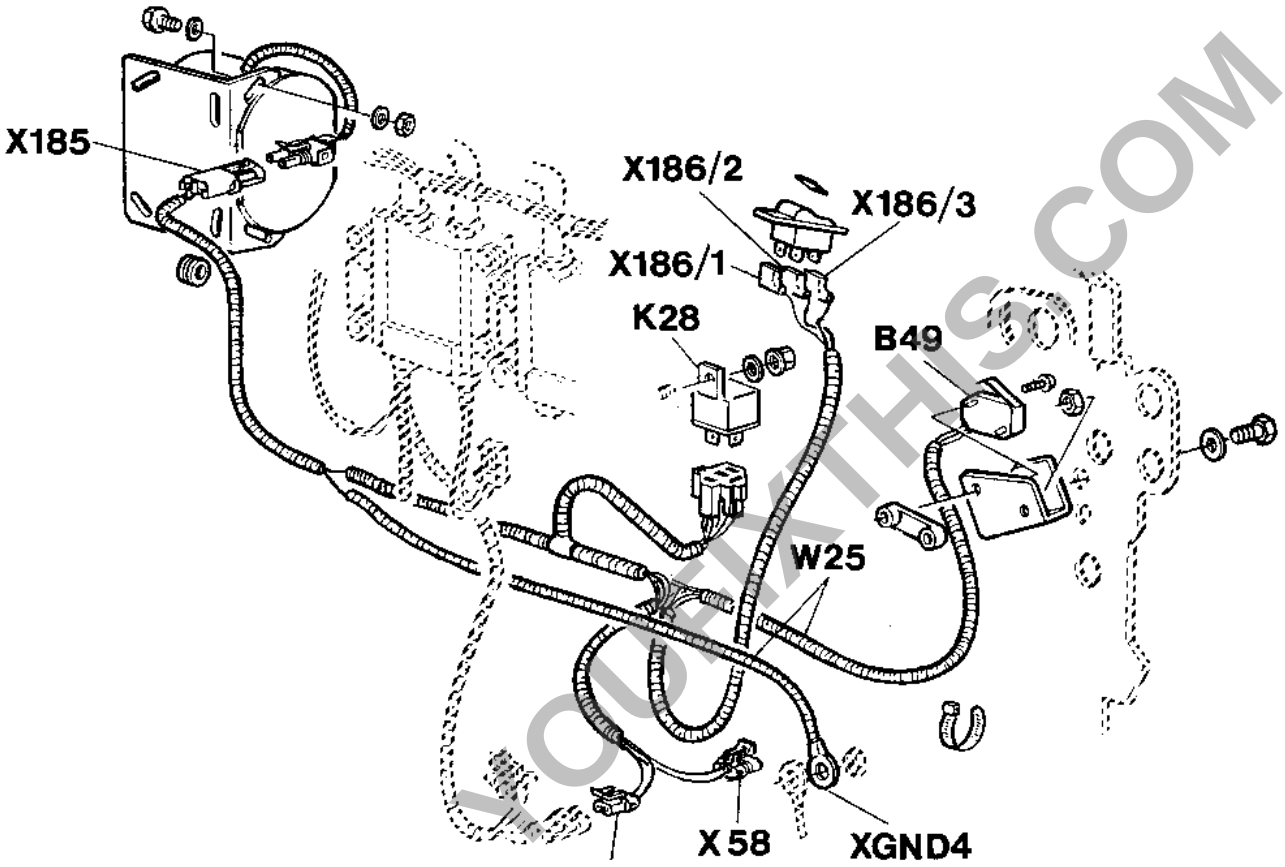
XGND13 Ground Connection

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

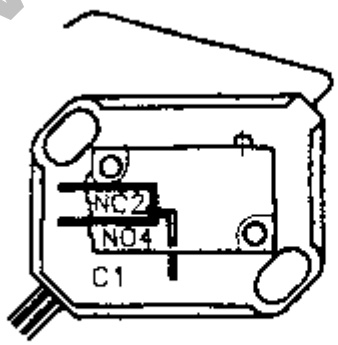
Back-Up Alarm Wiring Harness (AL81580; W25) (ROPS)

SyncroPlus transmission



LX1016499

B49 Back-Up Alarm Switch



LX1016175

PREVIEW - YOUFIXTHIS.COM

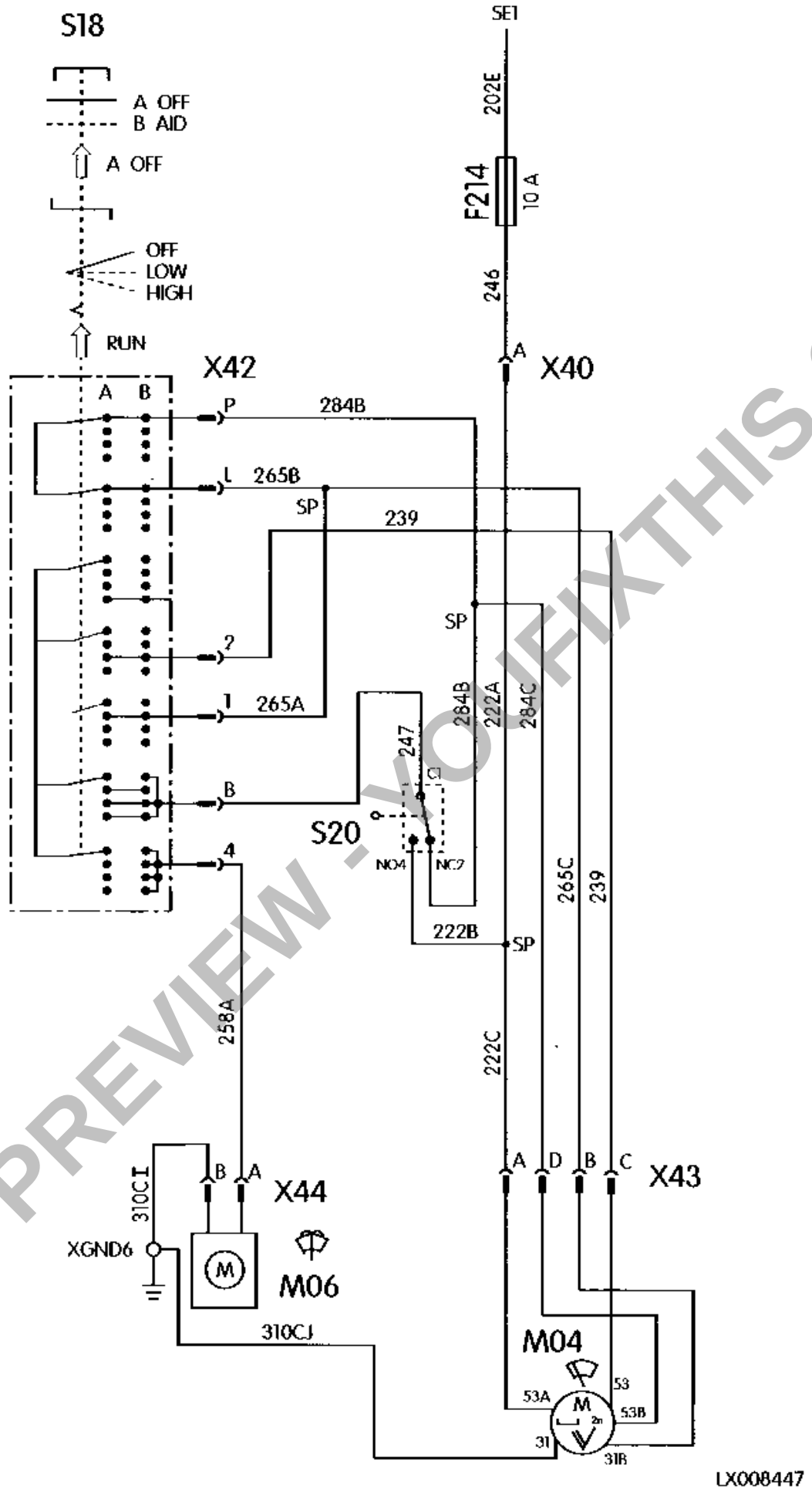
Download full manual at youfixthis.com

LEGEND:

E05	Cigarette lighter
F201	Fuse
M09	Compressor
X58	2-pin plug (connecting point - operator’s seat)
X128/1	2-pin plug (connecting point - cigarette lighter)

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com



PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

(3) Oil Filter Warning Light Sending Unit (B07)

Action:

→NOTE:

The oil filter warning light sending unit must be electrically removed from its circuit before performing resistance or continuity checks.

The oil filter warning light sending unit is normally open and should close when pressure reaches 650-750 kPa (6.5-7.5 bar) (95-110 psi) on increasing pressure.

Item	Measurement	Specification
Oil Filter Warning Light Sending Unit	Closes at (increasing pressure)	650-750 kPa (6.5-7.5 bar; 95-110 psi)

The sending unit should open when pressure reaches 450-750 kPa (4.5-7.5 bar) (65-110 psi) on decreasing pressure.

Item	Measurement	Specification
Oil Filter Warning Light Sending Unit	Opens at (decreasing pressure)	450-750 kPa (4.5-7.5 bar; 65-110 psi)

Result:

YES: Oil filter warning light sending unit is good. Check harness if necessary.

NO: Replace sending unit.

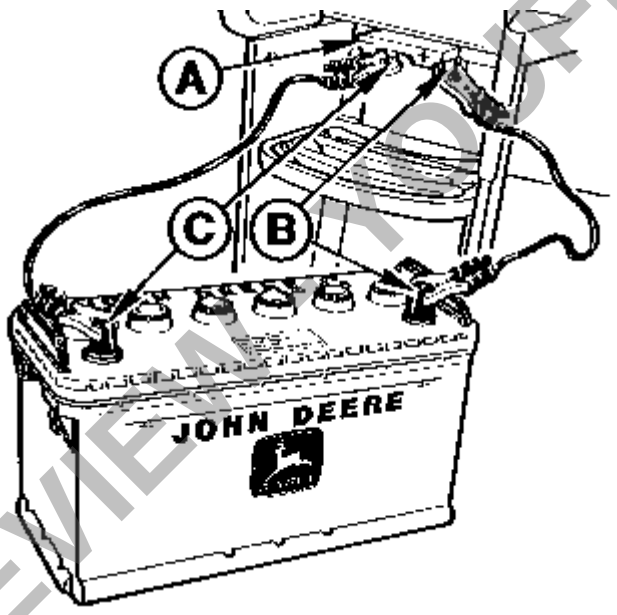
PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Diagnose Battery Malfunctions

Symptom	Problem	Solution
Battery Uses Too Much Water	Shorted battery cell	Check battery state of charge.
	High ambient temperature	Add distilled water.
	Cracked battery case	Replace battery. Replace battery hold-down clamps.
	Alternator regulator	Test alternator charging circuit. See Charging Circuit Diagnosis.
Cracked Battery Case	Battery hold-down clamps too tight, too loose or missing	Install new battery. Install hold-down clamps correctly.
	Frozen battery	Keep electrolyte at proper level and battery fully charged.
Low Battery Output	Low water level	See Battery Using Too Much Water, and Cracked Battery Case Symptoms.
	Dirty or wet battery top, causing discharge	Clean battery top. Charge battery.
	Corroded or loose battery cable ends	Clean and tighten cable end clamps. Charge battery.
	Broken or loose battery posts	Wiggle posts by hand. If posts are loose or will turn, replace battery.
	Loose fan/alternator belt or worn pulleys	Inspect belt or pulley. Adjust or replace as necessary.

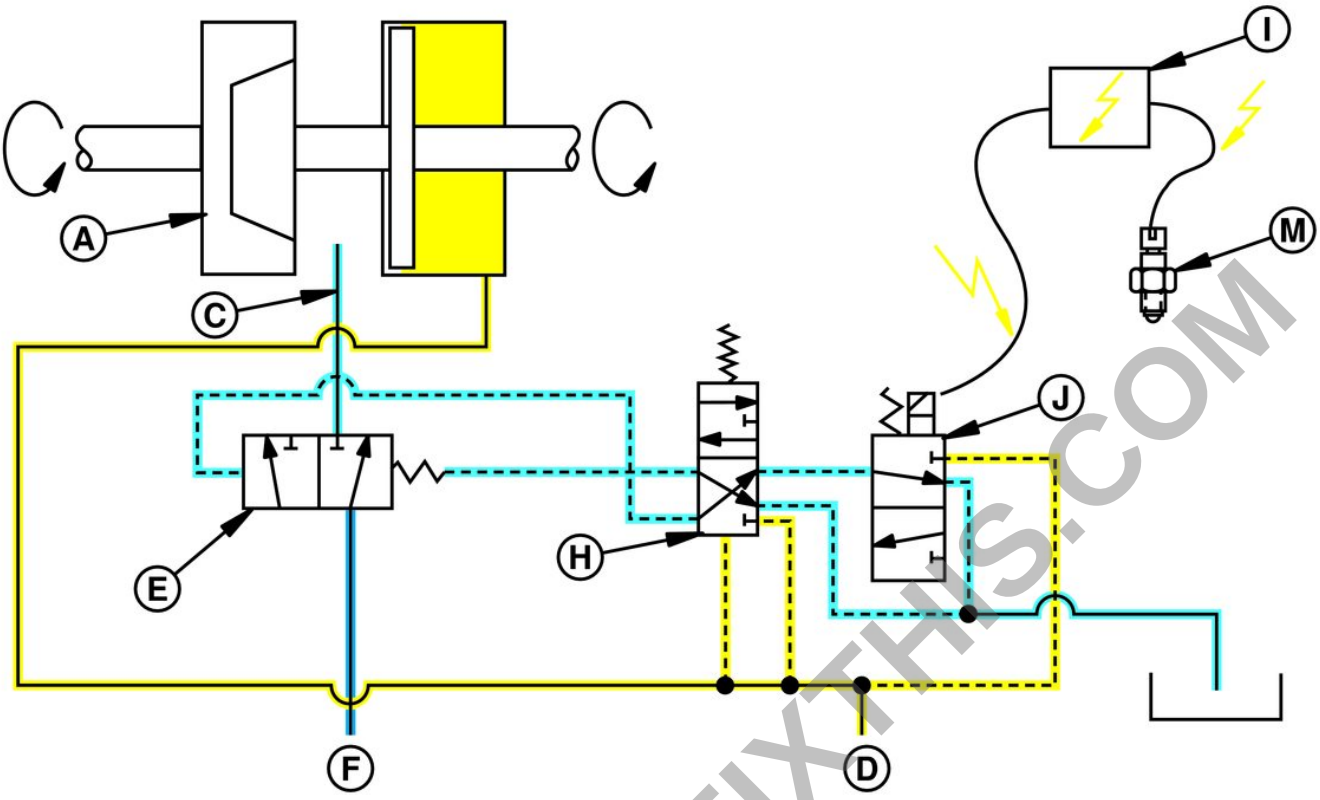
Starting With a Booster Battery



LX 000399

PREVIEW ONLY FIXTHIS.COM

Download full manual at youfixthis.com



LEGEND:

A	Clutch
B	Clutch pedal valve
C	Cooling oil passage
D	From clutch pedal valve
E	Clutch cooling valve
F	From transmission lubrication
G	Lever
H	Clutch cooling pilot valve
I	Clutch cooling relay [up to tractor serial no. 109779]
J	Solenoid valve [up to tractor serial no. 109779]
K	Spool for solenoid valve [up to tractor serial no. 109779]
L	Cam [up to tractor serial no. 109779]
M	Sending unit [up to tractor serial no. 109779]
N	Pilot oil
O	Pressure-free oil
P	Cooling and lube oil

Full operating pressure is present in the pressure passage, and the cooling system is not activated.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

- Cycle all hydraulic control levers, pedals and switches with engine running at slow idle.

Possible causes:

- Broken lines, hoses or loose connections
- Leaking O-rings or seals
- Cracked housing

Check tractor for unusual noises:

Drive tractor in various gears and with engine at various speeds. Operate brakes, differential lock, MFWD and PTO, if possible.

Be alert for conditions that could isolate a problem or cause further damage.

Check differential lock:

Drive tractor straight ahead in B2 at 1000 rpm. Engage differential lock. Differential lock indicator light should come on.

Turn steering wheel sharply to the left or right. The tractor should show noticeable resistance to turning as long as the differential lock is engaged. Lightly tap brake pedals to disengage the differential lock. The differential lock indicator light should go out and the tractor should now make a normal turn.

Check MFWD operation:

Drive tractor straight ahead in B2 at 1000 rpm. Press MFWD switch to engage MFWD. MFWD indicator light should come on.

Completely depress clutch pedal to stop the tractor.

Disengage MFWD. Observe front of tractor for slight side movement when MFWD is disengaged. MFWD indicator light should go out.

Check PTO operation:

Stop the tractor. With PTO disengaged, run engine at all speeds. PTO indicator light should be “OFF”.

IMPORTANT:

The PTO should not be rotating.

Lift PTO switch and rotate clockwise approximately 5 degrees until switch clicks. PTO should be rotating and PTO indicator light should come on.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

EOV Circuit (With Mechanical Reverser Control)

The operation of the engagement override valve is controlled by operation of the fwd-rev control valve.

- Operation if start-up occurs while in neutral. System 1 oil overcomes spring pressure at 400 kPa (4 bar; 58 psi) to provide passage for clutch pressure to fwd-rev valve.
- Operation if start-up occurs in gear. System 1 oil flows through the fwd-rev Valve and EOV to assist EOV spring. This spring shuts off clutch pressure at the EOV and opens a pathway from the element through the fwd-rev valve and EOV to high sump.

Stage 1	Closed	Path from fwd-rev valve to spring end of EOV Path from fwd-rev valve to high sump
Stage 2	400 kPa 4 bar 58 psi	Path from clutch pressure to fwd-rev valve Path from spring side of EOV to high sump

→NOTE:

The term high sump is used because the dumping to sump is physically located in a high position. This allows the elements and lines to stay nearly full of oil so the element fill time is considerably shorter. The two trigger valves dump to regular sump. The C_4 element dumps to sump through the clutch oil manifold at a point whose height is between regular and high sump. Thus, the term intermediate sump. This allows some oil to stay in the line but protects from self-engagement of C_4. All other valving is considered to be high sump.

Reverse-Tractor Started in Neutral

System 1 oil acts on the head end of the EOV forcing the valve upward against spring pressure. System 1 oil also flows (only when in forward or reverse) to and through the fwd-rev valve to the spring end of the EOV. Since the EOV has been moved upward, oil cannot act on the spring end of the valve. A path is now open for clutch oil to flow through the EOV to the fwd-rev valve and on to the reverse brake piston.

Theory Of Operation - Electrical Reverser Control

The electrical reverser control consists of the forward drive lever, electronic reverser control unit (RCU) and various switches, relays and solenoid valves.

The reverser control unit (RCU) is responsible for controlling the direction of travel. Various signals and commands are sent to the control unit. These signals and commands are checked and processed by the control unit.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

→NOTE:

To test leaf springs, turn steering wheel in both directions with engine shut off.

In case of malfunctions, repair steering valve. Refer to "Repair" Technical Manual (Section 60, Group 05).

Checking Steering System for External Leakage

Check steering valve, hydraulic lines, fittings and steering cylinder for external leakage.

If leakages are detected, repair parts as necessary.

If there is no external leakage, check steering system for internal leakage.

Checking Steering System for Internal Leakage

Start engine and turn steering wheel to full lock position. Then, using a force of 10 N·m (7.5 lb-ft), turn steering wheel beyond full lock for one minute.

During this period, the wheel must not turn more than:

OSPC 100 LS dyn.: 4.5 times
OSPC 125 LS dyn.

[See type plate on steering valve]
: 4.5 times
OSPC 160 LS dyn.
[See type plate on steering valve]
: 4 times

If more turns are needed, check steering valve to find the cause of leakage.

Checking Steering Unit

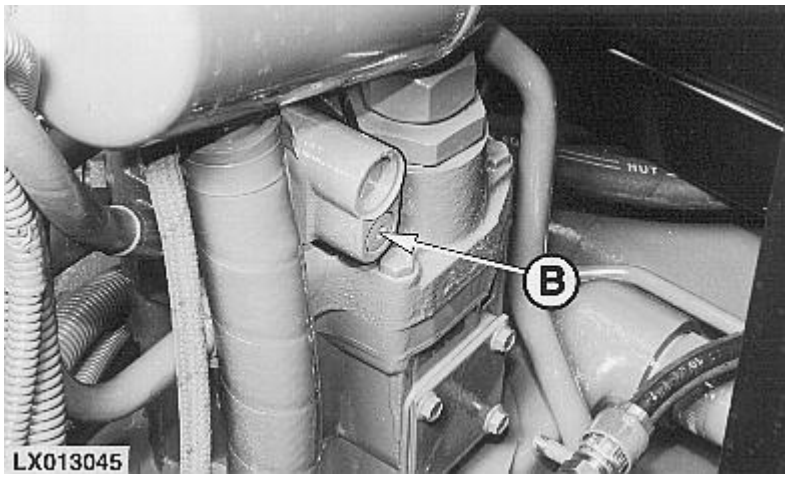
[1] - Disconnect hydraulic hoses at steering cylinder.

[2] - Plug hoses securely.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Adjusting the Load Sense Valve on the Hydraulic Pump



Adjusting min. system pressure

[1] - Ascertain **min. system pressure** . See “Checking And Adjusting System Pressure Of Hydraulic Pump”.

[2] - Remove hex. socket plug (B) from Load Sense valve on hydraulic pump cover.

[3] - Using a 1/4 in. hexagon socket wrench, tighten inner adjusting screw to increase pressure or slacken it to reduce pressure.

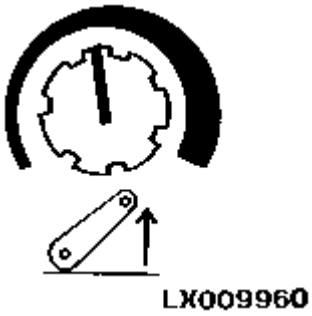
→NOTE:

1/8 of a turn changes the LS pressure signal by 300 kPa (3 bar; 44 psi).

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Action:



7d) . Turn raise limit control fully left, and then fully right again.

Rockshaft: rises approx. 1/3 of its travel, but does not reach end position.

Display: 20:XXX

XXX= 001 to 008

Result:

YES: GO TO **(8)**

NO: Faults as in 7b.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Metering check valve (H) is adjustable on-the-go from full flow to a minimum of 6 L/minute flow.This valve is closed by spring force and requires 400 kPa (4 bar) (58 psi) pressure at land (R) to raise valve against adjusting screw. The back pressure is needed at neutral safety piston when priority flow required for steering momentarily reduces secondary pressure. In addition, orifice (I) slows flow of oil to prevent loss of pressure to neutral safety piston.

The metering valve (H) also prevents reverse flow during conditions when the extend or retract port is at high pressure and the secondary pressure passage is momentarily at a lower pressure. Valve tip provides a pressure sensing point down stream of the metering valve notch and is required to fully open inlet check valve (H).

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

PREVIEW ONLY

You're viewing 25 of 1532 pages

The full manual includes:

- All 1532 pages, complete
- Searchable PDF (find any keyword)
- No watermarks
- Instant download
- Print-ready quality

GET FULL MANUAL NOW

John Deere 6200, 6200L, 6300, 6300L, 6400, 6400L, 6500, 6500L Operation and Tests Manual



Scan or click anywhere
youfixthis.com

Click anywhere on this page to get the full manual