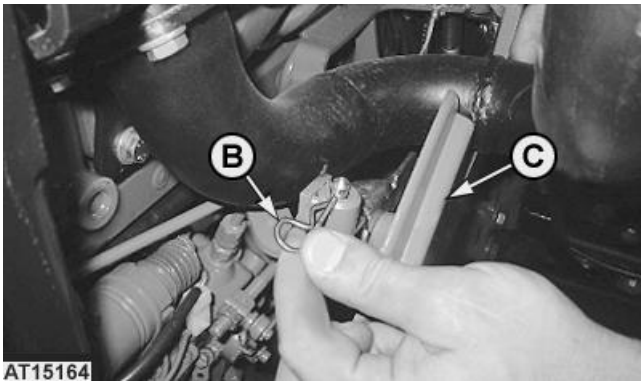
Group 05 - Component Location
Group 10 - Theory of Operation
Group 15 - Diagnostics, Tests and Adjustments
Section 260 - STEERING AND BRAKE SYSTEMS — OPERATION AND TESTS
Group 05 - Component Location
Group 10 - Theory of Operation
Group 15 - Diagnostics, Tests and Adjustments
Section 270 - HYDRAULIC SYSTEM — OPERATION AND TESTS
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Group 15 - Diagnostics
Group 20 - Tests
Group 25 - Adjustments
Group 30 - Hydraulic System Schematics
Section 280 - MISCELLANEOUS
Group 10 - Operational Checks
Section 290 - AIR-CONDITIONING SYSTEM — OPERATION AND TESTS
Group 05 - Component Location
Group 10 - Theory of Operation
Group 15 - Diagnostics, Tests and Adjustments
Section 299 - SPECIAL TOOLS
Group 05 - Special Tools (Dealer-Fabricated)
Group 10 - Special Tools and Test Equipment

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Left-hand side panel

[18] - Place left-hand side panel (C) and install pin (B).

[19] - Connect battery. (See “ Remove and Install Battery ” in Section 40, Group 05.)

[20] -

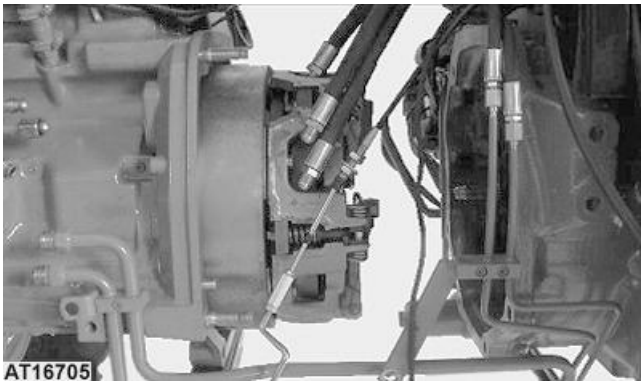
CAUTION:

Stay clear from moving components.

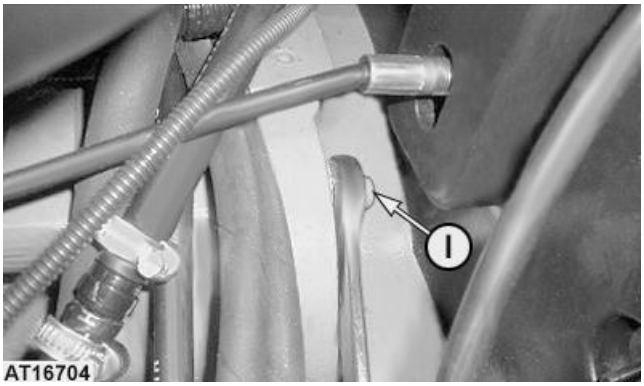
Start engine and allow it to reach proper operating temperature. Check radiator, hoses and connections for leaks. Adjust coolant level in recovery tank.

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Engine/clutch housing separation



Remove screw



Support stand

[3] - Clean mating surfaces of clutch housing and engine.

→NOTE:

Ensure that disconnected hydraulic lines do not entangle with engine components or electrical wiring during engine/clutch housing installation.

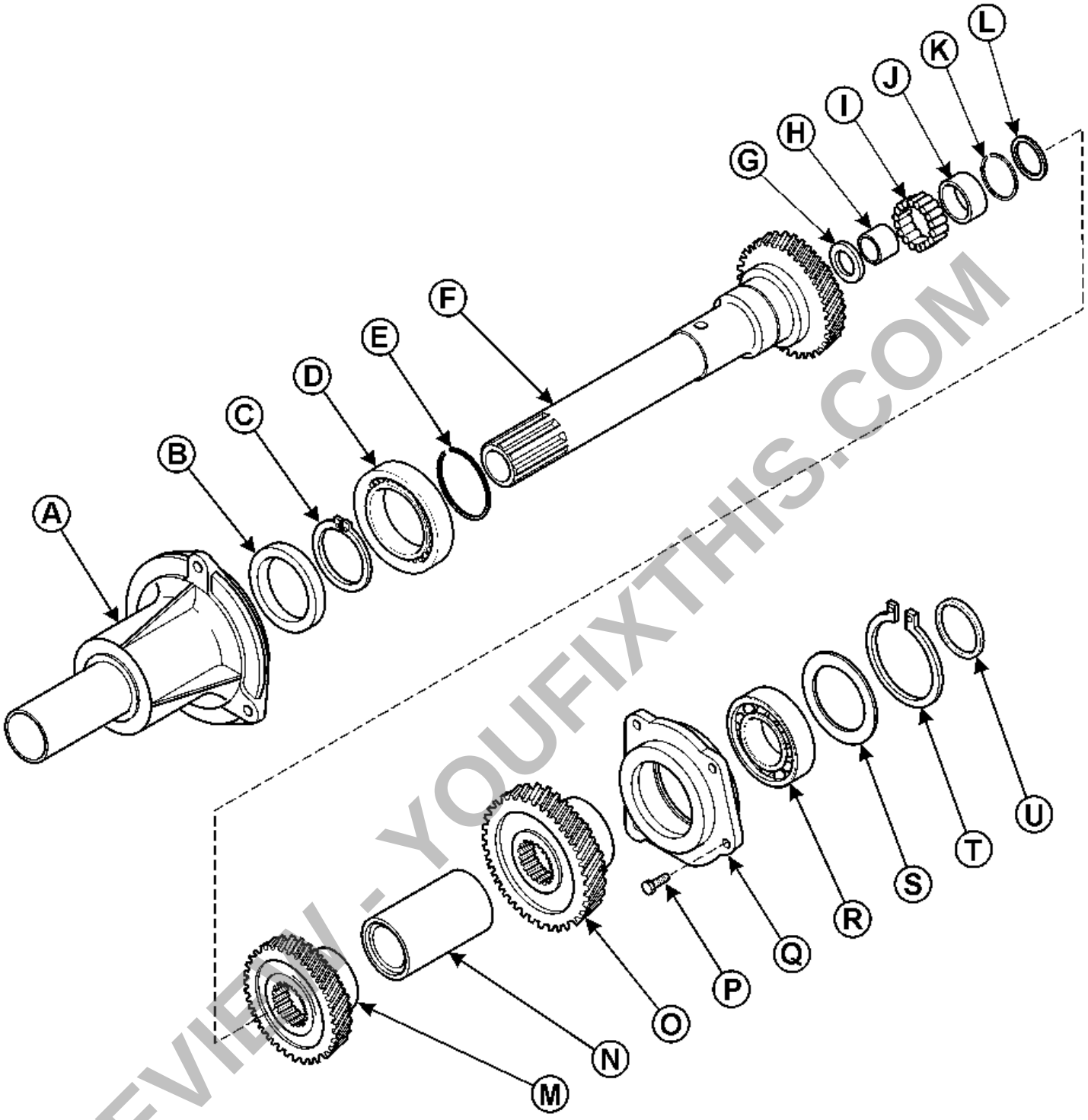
It may be necessary to rotate PTO shaft and/or engine flywheel so the clutch shafts mesh with the clutch discs. Rotate the PTO shaft by manually turning the PTO at rear of tractor.

Rotate the engine flywheel using flywheel turning tool JDE83 .

[4] - Install engine to clutch housing.

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AT3670

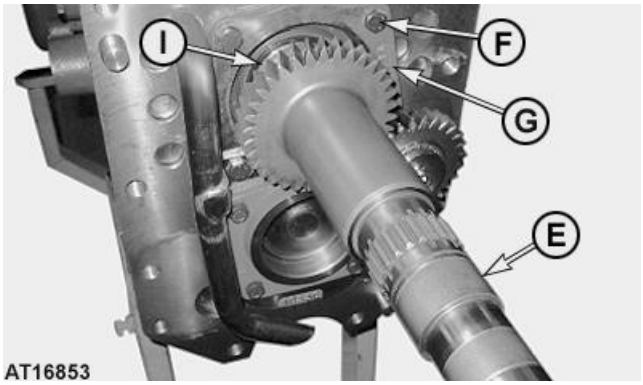
Hydraulic Hi-Lo drive shaft - exploded view

LEGEND:

A	Guide
B	Seal
C	Snap ring
D	Bearing
E	Locking ring
F	Transmission shaft
G	Seal ring
H	Bushing
I	Needle bearing
J	Spacer
K	Ring
L	Shim (as required)
M	Gear

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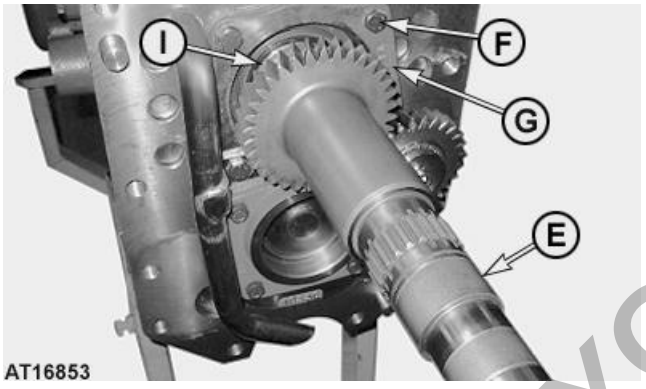


Shaft assembly

Place cover (G) and tighten bolts (F) to specified torque.

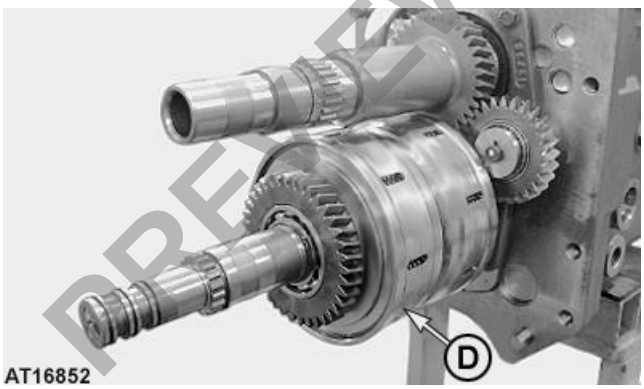
Item	Measurement	Specification
Bolts, Cover to Transmission Housing	Torque	35 N˙m 25.8 lb-ft

[13] - Install shaft (E).



Shaft assembly

[14] - Install the low/reverse clutch assembly (D).



Low/reverse clutch assembly

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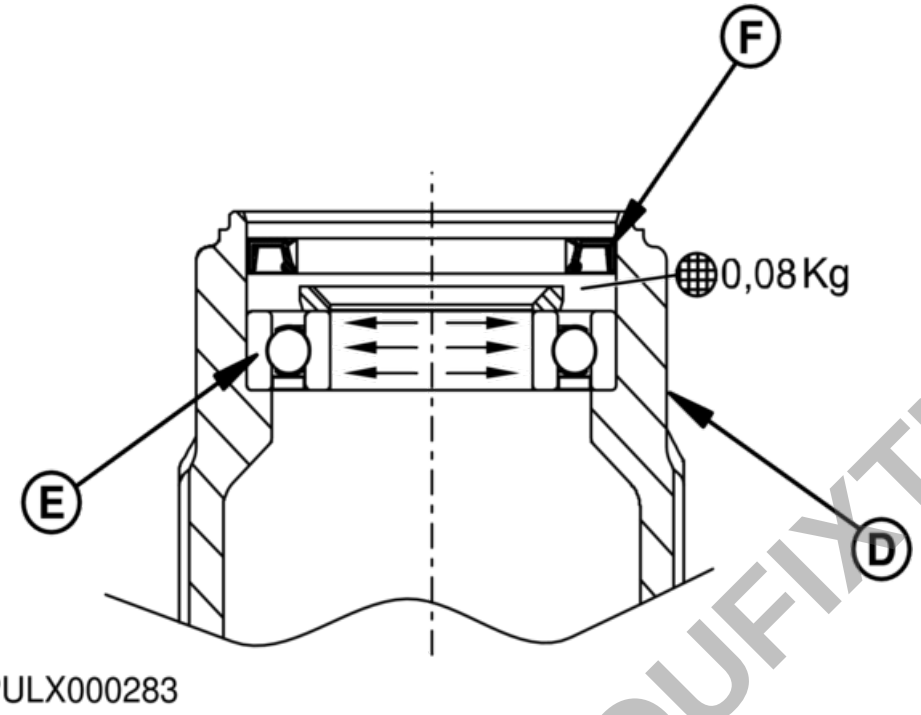
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[7] - Remove seal ring (F) from the final drive housing (D).

[8] - Remove ball bearing (E) from the final drive housing (D).

[9] - Inspect all parts for wear or damage. Replace as necessary.

[10] -



PULX000283

.

Install ball bearing (E) using tool CA715825 into final drive housing (D).

[11] -

IMPORTANT:

Replace all seals. Damaged or used seals will leak.

Install seal ring (F) using tool CA119034 into final drive housing (D).

[12] - Install washer (G).

[13] - Install studs (I) on axle flange (H).

[14] - Warm the hatched area of the final drive housing (D) at 120 °C for 4/5 minutes to allow introduction of the axle flange (H).

[15] - Install axle flange (H).

[16] - Turn the final drive housing (D).

[17] - Install needle bearing (C) using tool CA715825 into final drive housing (D).

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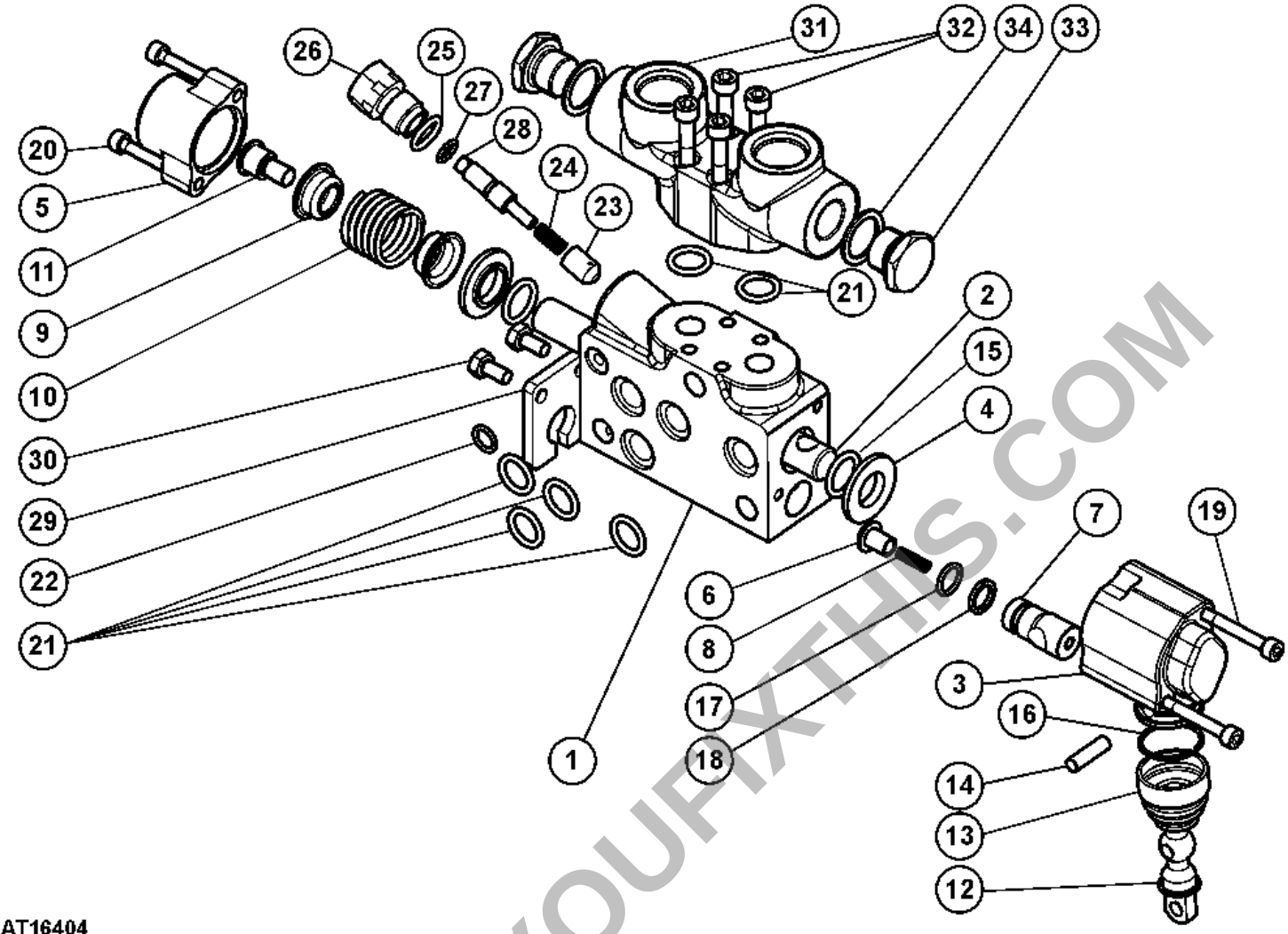
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LEGEND:

A	Elbow
B	Cap screw
C	Copper washer
D	Return line to sump
E	Bolt
F	Washer
G	Nut
H	Support
I	Fitting
J	Trailer brake valve
K	Brake pressure line r.h.
L	Coupler
M	Fitting
N	Outlet to rockshaft line
O	Pilot pressure line to trailer brake valve
P	Screw
Q	T-fitting
R	Valve
S	Brake pressure line l.h.
T	Inlet pressure line
U	Trailer brake coupler line

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Convertible double-acting SCV on single-acting SCV

LEGEND:

1	Housing
2	Spool
3	Cover
4	Washer
5	Cap
6	Valve
7	Valve seat
8	Spring
9	Spacer
10	Spring
11	Screw
12	Joint
13	Gasket
14	Pin
15	O-ring
16	Stop ring
17	O-ring
18	Parbak ring
19	Screw
20	Screw
21	O-ring
22	O-ring
23	Valve
24	Spring
25	O-ring
26	Plug
27	O-ring
28	Screw

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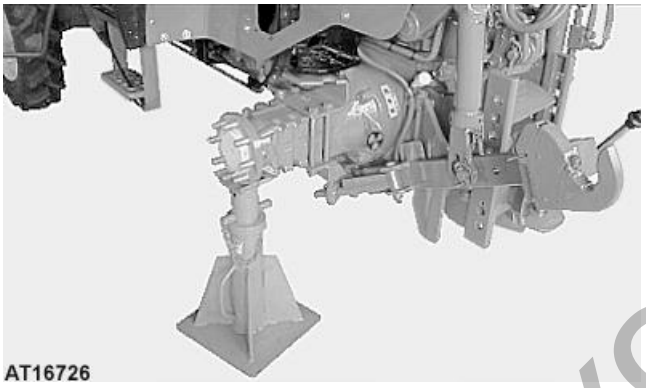
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Remove Open Operator´s Station

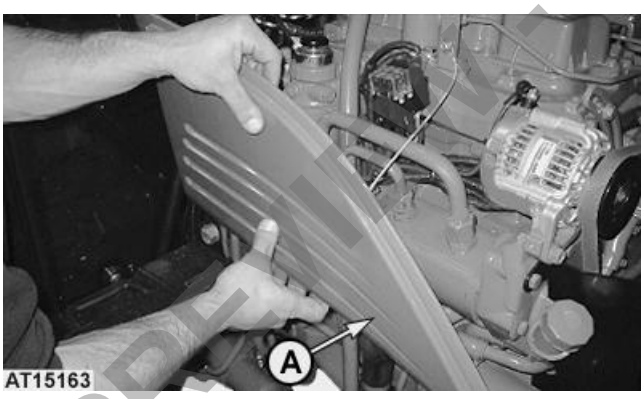
[1] - Remove battery, see " Remove and Install Battery " in Section 40, Group 05.



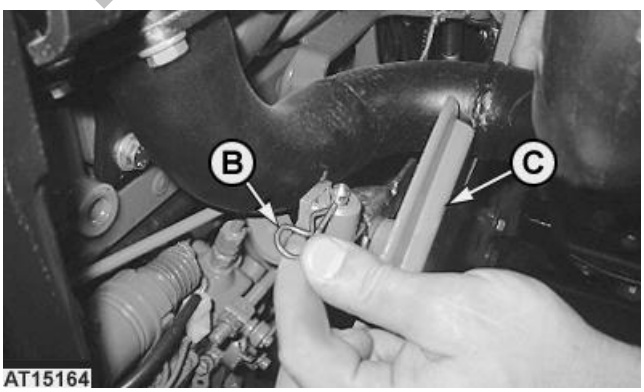
High-pressure fluids



Remove rear wheels



Right-hand side panel



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See the relevant references in this group:

- Fill with Refrigerant Oil
- Filling the System
- Leakage Test

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(3) Check continuity with lever connected

Action:

• Turn the tractor key switch**off** .

• Use a JT05791A multimeter to check the continuity.

• Disconnect the EHM control unit connector XA300/2 or EHM II control unit connector XA310 .

Item	Measurement	Specification
Check the continuity (EHM)		
Between brown cable (pin 9) and blue cable (pin 8) at connector XA300/2 (grey)	Continuity	Not present
Check the continuity (EHM II)		
Between brown cable (pin 19) and blue cable (pin 46) at connector XA310	Continuity	Not present

Result:

YES: Check the leads and the**EHM** control unit. Repair as needed. Carry out an operational test after repair and check EHM control unit for additional stored codes. See " EHM Control Unit - Procedure for Dealing with Diagnostic Trouble Codes " in Section 245, Group 05.

NO: Check the B64 - Reverse Drive Lever Switch (EHM or EHM II) . Repair the reverse drive lever as needed. Carry out an operational test and check EHM II control unit for additional diagnostic trouble codes.

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XH01 - 2/1-Pin Connectors for Horn H01 500
XH50 - 2-Pin Connector for Warning Light H50 (EHM or EHM II) 501
XK01 - 4-Pin Connector for Starter Relay K01 503
XK02 - 5-Pin Connector for Hi-Lo Relay (ON) 504
XK03 - 5-Pin Connector for Hi-Lo Relay (OFF) 505
XK04 - 5-Pin Connector for Differential Lock Relay (ON) 506
XK05 - 5-Pin Connector for Front-Wheel Drive Relay 507
XK06 - 5-Pin Connector for Differential Lock Relay (OFF) 508
XK07 - 5-Pin Connector for PTO Neutral Start Relay 509
XK08 - 6-Pin Connector for Turn/Warn Signal Relay K08 510
XK09 - 5-Pin Connector for Trailer Brake Relay K09 510
XK10 - 4-Pin Connector for Intake Air Heater Relay K10 512
XK11 - 5-Pin Connector for Relay of Fan Motor (Tractors with Cab) 512
XK12 - 5-Pin Connector for Rear Work Light Relay (Tractors with Cab) 513
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XK14 - 5-Pin Connector for Front-Wheel Drive Relay K14 (EHM or EHM II) 516
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XK16 - 5-Pin Connector for Neutral Start Relay K16 (EHM or EHM II) 520
XK17 - 4-Pin Connector for Relay K17 of Shut-Off System (EHM) 521
XK18 - 4/1-Pin Connectors for Relay K18 (EHS) 522
XK18 II - 4/1-Pin Connectors for Relay K18 II (EHS II) 523
XM01 - Connectors for Starter Motor M01 523
XM02 - 1-Pin Connector for Air-Conditioning Compressor Clutch M02 524
XM03 - 4-Pin Connector for Front Wiper Motor M03 526
XM04 - 2-Pin Connector for Rear Wiper Motor with Switch M04 526
XM05 - 2-Pin Connector for Pump of Washer System M05 527
XM06 - 2-Pin Connector for Air Suspension Seat Compressor Motor M06 528
XM07 - 3-Pin Connectors for Fan Motor M07 529
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XR15 - 1-Pin Connector for Intake Air Heater R15 (4-Cyl.) 530
XS01 - 6/1-Pin Connectors for Main Switch S01 531
XS08 - 3/1-Pin Connectors for Turn Signal Light Switch S08 531
XS09 - 6/1-Pin Connectors for Light and Horn Switch S09 532
XS11 - 10-Pin Connector for H4 Farm Headlight Switch S11 533
XS14 - 5/1-Pin Connectors for Fan Switch S14 535
XS15 - 10-Pin Connector for Switch S15 of Windshield Wiper and Pump of Washer System 536
XS20 - 2-Pin Connector for Calibration Switch S20 of Digital Instrument 538
XS21 - 2-Pin Connector for PTO Mode Switch S21 538
XS22 - 10-Pin Connector for Differential Lock Switch S22 539
XS23 - 10-Pin Connector for Reversal Switch for Allocation S23 (Flow Divider Valve) 540
XS36 - 10-Pin Connector for Beacon Light Switch S36 541
XS50 - 2-Pin Connector for Calibration Switch S50 (EHM or EHM II) 543
XS51 - 2-Pin Connector for Calibration Switch S51 of Digital Instrument (EHM or EHM II) 544
XS54 - 1-Pin Connector for Declutch Switch S54 (EHM or EHM II) 545
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XS63 - 10-Pin Connector for Front-Wheel Drive Switch S63 546
XS68 - 6-Pin Connector for Hitch Remote Control Switch S68 (EHS) 548
XS68 II - 6-Pin Connector for Hitch Remote Control Switch S68 II (EHS II) 549
XS72 - 4/1-Pin Connectors for Clutch Pedal Switch S72 (EHM or EHM II) 550
XS92/1 - 10-Pin Connector for Front Work Light Switch S92/1 552
XS92/2 - 10-Pin Connector for Rear Work Light Switch S92/2 554
XS93 - 2/1-Pin Connectors for Heating and Air-Conditioning Switch S93 556
XS106 - 7-Pin Connector for Hazard Warning Light Switch S106 556

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NO: Check continuity to ground of black wire.

(16) Check voltage at grey wire terminal of right front work light E18/2R (outer)

Action:

Result must be same as battery voltage.

Result:

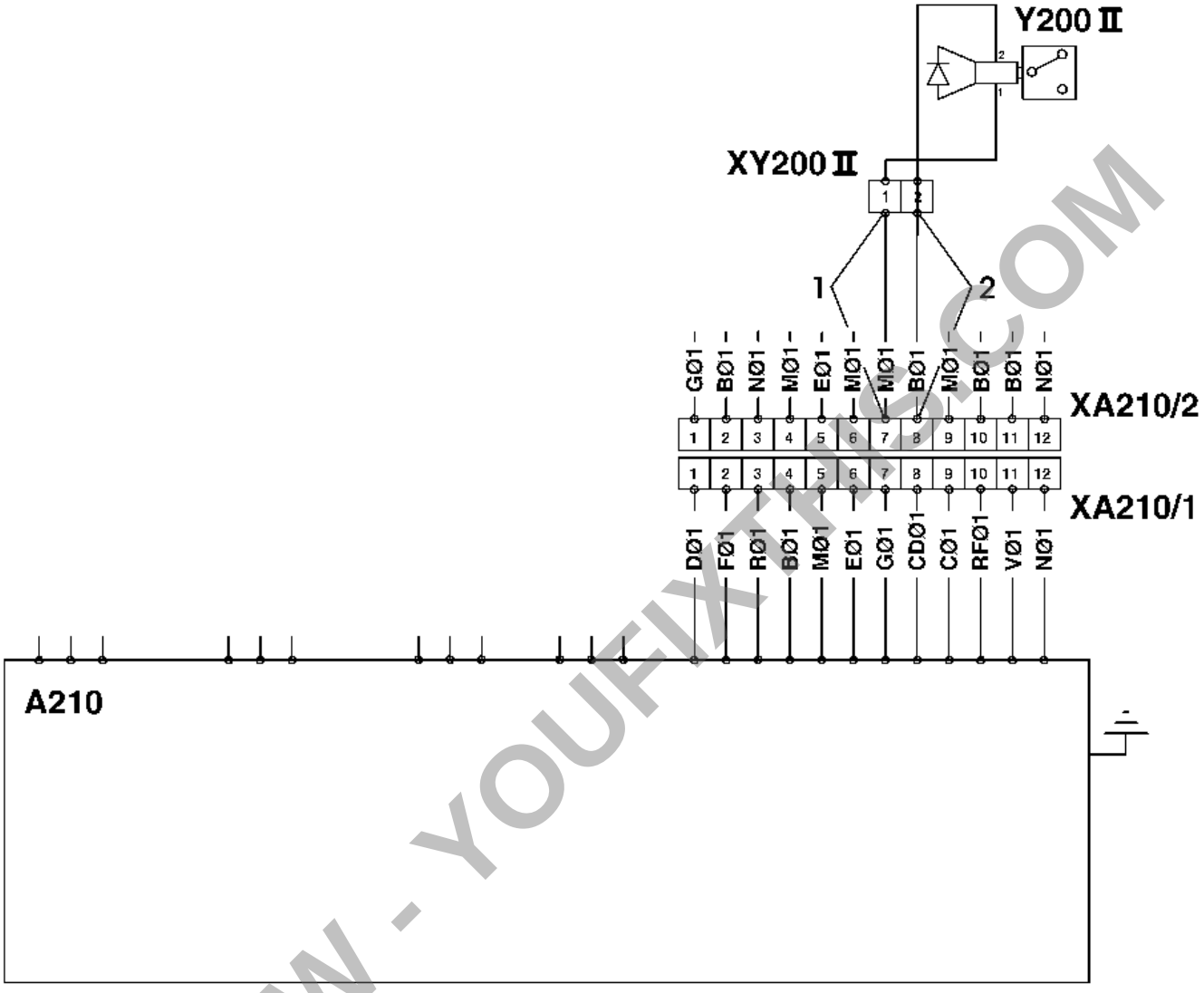
YES:END OF TEST

NO: Check for corroded connections or broken wire between front work light connector (outer) and right front work light.

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SE15B - Raise Solenoid Valve Y200 II (EHS II), Diagnostic Schematic and Circuit Test



AT17434

Schematic raise solenoid valve Y200 II (EHS II)

LEGEND:

A210	EHS II control panel
XA210	12-pin connector for EHS II control panel A210
XY200 II	4-pin connector for raise solenoid valve Y200 II (EHS II)
Y200 II	Raise solenoid valve (EHS II)

Meet following requirements:

- Multimeter JT05791A positive lead on numbered test points.
- Multimeter JT05791A negative lead on numbered test points.
- Multimeter JT05791A on continuity or on DC volts.

Raise Solenoid Valve Test

(1) Check continuity at brown wire between terminal 7 of XA210/2 and terminal 1 of XY200 II

Action:

Location: XA210 - 12-Pin Interconnection between EHS II Control Panel A210 and W11 II (EHS II) and XY200 II - 4-Pin Connector for Raise Solenoid Valve Y200 II (EHS II)

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(2) Check voltage at brown/yellow wire terminal of reverse drive lever switch B64

Action:

Put reverse drive lever in forward position.

Result must be same as battery voltage.

Result:

YES: GO TO 3

NO: Check " B64 - Reverse Drive Lever Switch (EHM or EHM II) " and replace if necessary. If switch is good, check for corroded or loose terminals.

(3) Check voltage at brown wire terminal of reverse drive lever switch B64

Action:

Put reverse drive lever in reverse position.

Result must be same as battery voltage.

Result:

YES: GO TO 4

NO: Check " B64 - Reverse Drive Lever Switch (EHM or EHM II) " and replace if necessary. If switch is good, check for corroded or loose terminals.

(4) Check voltage at brown/yellow wire terminal 2 of 3-pin connector X22

Action:

Location: X22 - 3-Pin Connector for Diodes

Put reverse drive lever in forward position.

Result must be same as battery voltage.

Result:

YES: GO TO 5

NO: Check for corroded connections or broken brown/yellow wire between reverse drive lever switch and X22.

(5) Check voltage at brown wire terminal 1 of 3-pin connector X22

Action:

Put reverse drive lever in reverse position.

Result must be same as battery voltage.

Result:

YES: GO TO 6

NO: Check for corroded connections or broken brown wire between reverse drive lever switch and X22.

(6) Check voltage at light blue wire terminal 3 of 3-pin connector X22

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Action:

Continuity must be present.

Result:

YES: Check " Y51 - Reverse Clutch Solenoid Valve (EHM or EHM II) " and replace if necessary. GO TO 4

NO: Check for corroded connections or broken pink/blue wire between connectors XA310 and XY51.

(4) Check continuity between pink/blue wire terminal 1 and pink/green wire terminal 2 of 2-pin connector XY51

Action:

Main switch in IGN position.

Parking brake engaged.

Reverse drive lever in reverse position.

Result must be same as battery voltage.

Result:

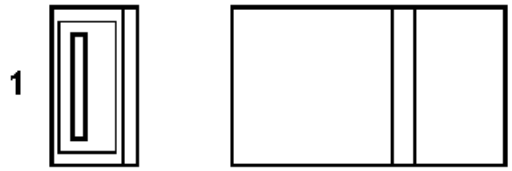
YES:END OF TEST

NO: Perform following tests:• SE26B - Hi-Lo Selection Switches (EHM II), Diagnostic Schematic and Circuit Test • SE26B - Reverse Drive Lever (EHM II), Diagnostic Schematic and Circuit Test

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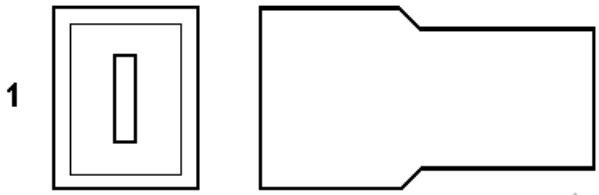
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X81 - 1-Pin Interconnection between Wiring Harnesses W02 and W03 II



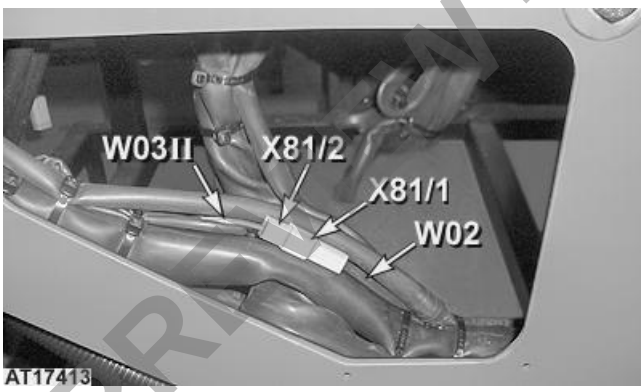
ATX811

1-pin connection on main wiring harness W02



ATX812

1-pin connector on EHM II wiring harness W03 II



1-pin interconnection between wiring harnesses W02 and W03 II

LEGEND:

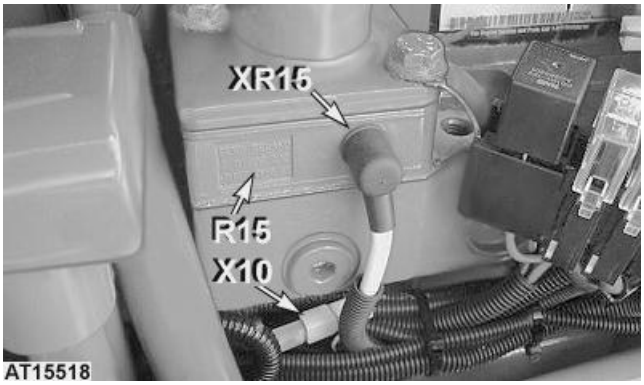
W02	Main wiring harness
W03 II	24/12-speed transmission wiring harness (EHM II)
X81/1	1-pin connection on main wiring harness W02
X81/2	1-pin connector on EHM II wiring harness W03 II

Component information

Component information	
Number of pins:	1

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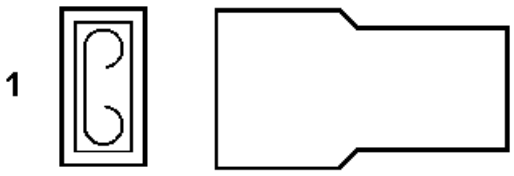


Intake air heater R15 (4-cyl.)

LEGEND:

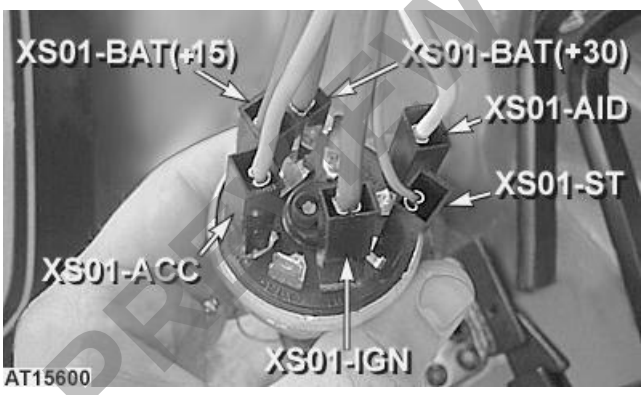
R15	Intake air heater (4-cyl.)
X10	1-pin interconnection between wiring harnesses W01 and W10
XR15	1-pin connector for intake air heater R15 (4-cyl.) (white lead)

XS01 - 6/1-Pin Connectors for Main Switch S01



ATXS01

1-pin connector for main switch S01



6/1-pin connectors for main switch S01

LEGEND:

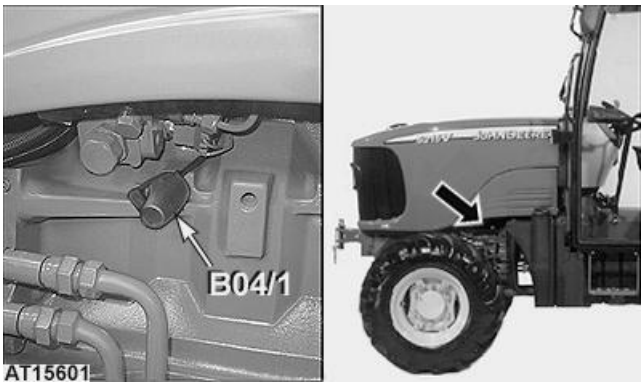
XS01-ACC	1-pin connector for main switch S01 (orange lead)
XS01-AID	1-pin connector for main switch S01 (white lead)
XS01-BAT(+15)	1-pin connector for main switch S01 (red lead)
XS01-BAT(+30)	1-pin connector for main switch S01 (red lead)
XS01-IGN	1-pin connector for main switch S01 (brown lead)
XS01-ST	1-pin connector for main switch S01 (blue/black lead)

XS08 - 3/1-Pin Connectors for Turn Signal Light Switch S08

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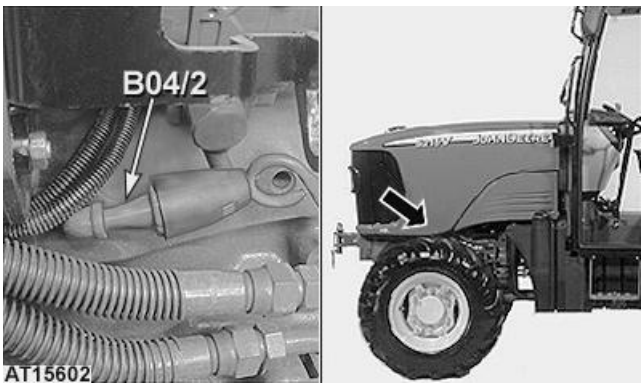
B04 - Engine Oil Pressure Switch



LEGEND:

B04/1	Engine oil pressure switch (3-cyl.)
B04/2	Engine oil pressure switch (4-cyl.)

Engine oil pressure switch (3-cyl.)



Engine oil pressure switch (4-cyl.)

Component Information

Component Information	
Type:	Pressure switch
Location:	L.h. side of engine under the injection pump
Connector:	XB04 - 1-Pin Connector for Engine Oil Pressure Switch B04
Harness:	W01 - Engine Wiring Harness
Specifications and Details:	See component check below:
Function:	Measures the engine oil pressure

Component Check

(1) B04 - Engine Oil Pressure Switch

Action:

→NOTE:

Unplug the engine oil pressure switch from the wiring harness.

Use a JT05791A multimeter to measure continuity between pin A and ground (housing) of the switch:

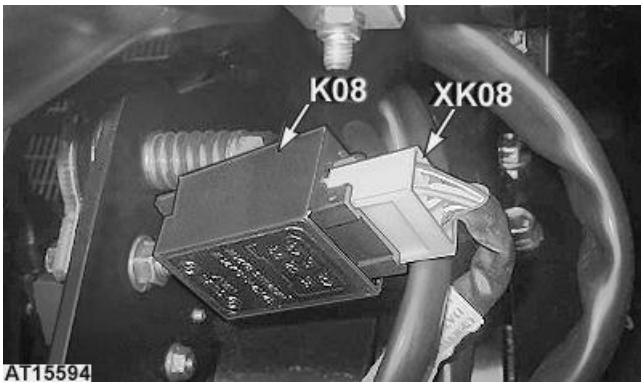
When pressure-free, the switch is open. It is forced to close while the engine is running.

Item	Measurement	Specification
B04 - Engine oil pressure switch		
Switch open:	Pressure	below 70 kPa (0.7 bar) (10.15 psi)
Switch closed:	Pressure	0-40 kPa (0.00-0,40 bar) (0.0-5.8 psi)

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K08 - Turn/Warn Signal Relay



LEGEND:
K08 Turn/warn signal relay
XK08 6-pin connector for turn/warn signal relay K08

Turn/warn signal relay

Component Information

Component Information	
Type:	Turn/warn signal relay
Location:	Below the instrument panel
Connector:	XK08 - 6-Pin Connector for Turn/Warn Signal Relay K08
Harness:	W02 - Main Wiring Harness
Specifications and Details:	See component check below:
Components:	XK08 - 6-Pin Connector for Turn/Warn Signal Relay K08

Component check

(1) Relay

Action:

Remove the relay.

Use a JT05791A multimeter to measure resistance at the relay between pins 85 (2) and 86 (1):

Item	Measurement	Specification
Relay		
Relay coil:	Resistance	approx. 75 - 90 ohms
Relay coil de-energized:	Continuity	30 (3) and 87 (5) open
	Continuity	30 (3) and 87A (4) closed
Relay coil energized:	Continuity	30 (3) and 87 (5) closed
	Continuity	30 (3) and 87A (4) open

There should never be any continuity between pins 87 (5) and 87A (4).

For extended checks, see also SE16A - Turn Signal Lights, Diagnostic Schematic and Circuit Test in this Section.

Result:

YES: The relay is in good condition.

NO: Replace the relay.

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- X81 - 1-Pin Interconnection between Wiring Harnesses W02 and W03 II
- X82 - 2-Pin Interconnections between Wiring Harnesses W02 and W03 II
- XFT01 - 1-Pin Connector for Fuse Box (3-Pin Power Outlet)
- Y03 - Front-Wheel Drive Solenoid Valve
- Y05 - Differential Lock Solenoid Valve
- Y23 - Flow Divider Solenoid Valve
- Y50 - Electro-Hydraulic Hi-Lo Solenoid Valve (24/24-Speed Transmission only)

For further information, see Wiring Color Chart in this group.

The following wiring harnesses are connected directly or indirectly to the main wiring harness ”A”. See in this group:

(B) - Wiring Diagram ”B” - Fuse Box Wiring Harness

(B II) - W16 - Fuse and Relay Box II Wiring Harness

(C) - Wiring Diagram ”C” - Trailer Brake Valve Wiring Harness

(D) - Wiring Diagram ”D” - 24/12-Speed Transmission Wiring Harness (EHM)

(D II) - Wiring Diagram ”D II” - 24/12-Speed Transmission Wiring Harness (EHM II)

(E) - Wiring Diagram ”E” - H4 Farm Headlight Wiring Harness

(F) -Wiring Diagram ”F” - Engine Wiring Harness

(G) - Wiring Diagram ”G” - Fuel Pre-Heater and Intake Air Heater Wiring Harness

(H) - Wiring Diagram ”H” - Engine/Cab Wiring Harness

(I) - Wiring Diagram ”I” - Hood Wiring Harness

(L) -Wiring Diagram ”L” - Cab Wiring Harness

(M) - Wiring Diagram ”M” - Shut-Off System Wiring Harness (EHM)

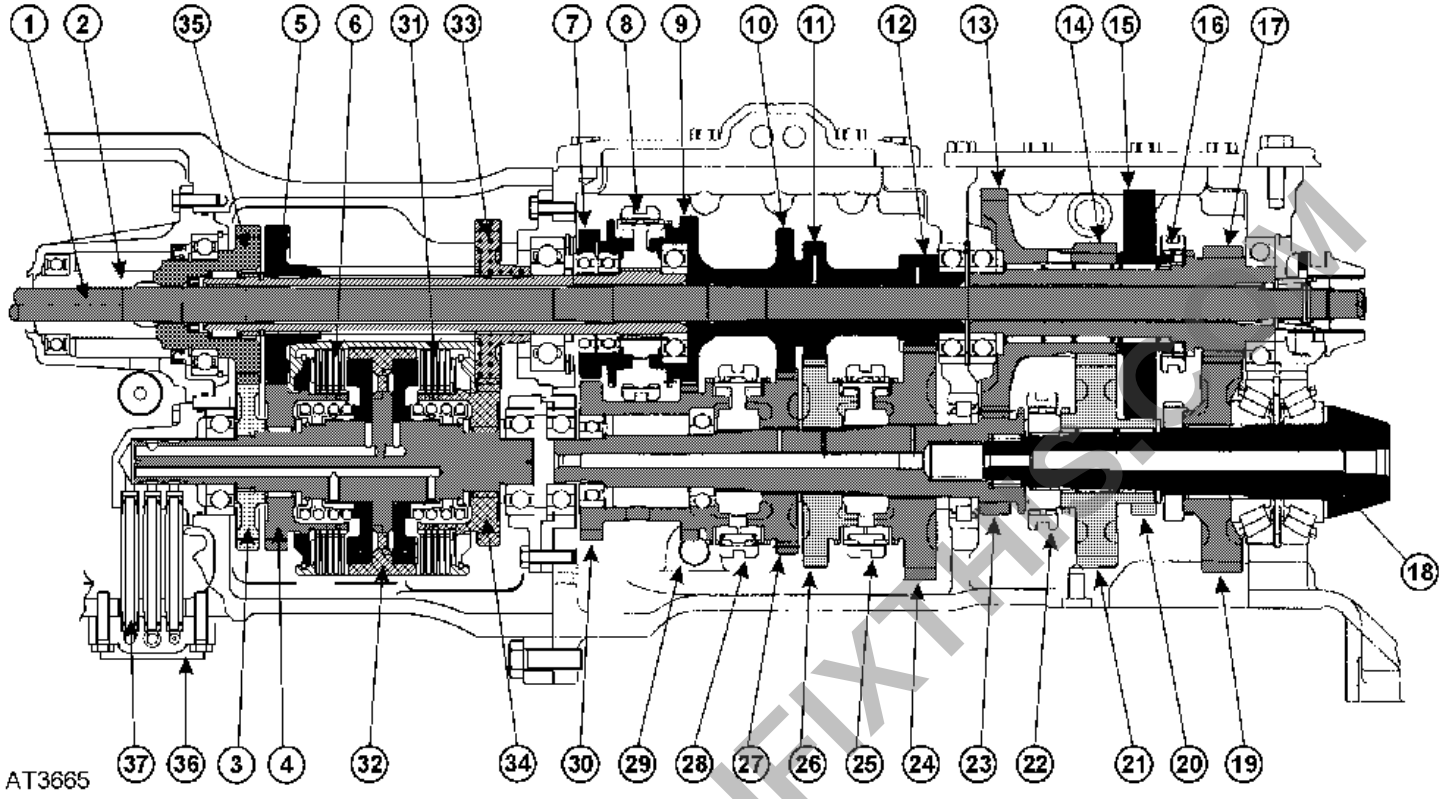
(N) - Wiring Diagram ”N” - Electronic Hitch Sensing Wiring Harness (EHS)

(N II) - Wiring Diagram ”N II” - Electronic Hitch Sensing Wiring Harness (EHS II)

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Transmission Components — 24/24-Speed Transmission (Hydraulic Hi-Lo Version)



24/24-speed transmission (hydraulic Hi-Lo version)

LEGEND:

1	PTO shaft
2	Traction clutch shaft
3	Driven gear
4	Drive gear (low range)
5	Driven gear (low range)
6	Clutch drive plate assembly (low range)
7	Reverse drive gear
8	Forward and reverse gear synchronizer
9	4th speed drive gear
10	3rd speed drive gear
11	2nd speed drive gear
12	1st speed drive gear
13	Range reduction drive gear
14	2nd range drive gear
15	1st range shift collar
16	1st range reduction driven gear
17	1st range drive gear
18	Differential drive shaft
19	1st range drive gear
20	1st range reduction drive gear
21	2nd range driven gear
22	2nd and 3rd range shift collar
23	Range reduction drive gear
24	1st speed driven gear
25	1st and 2nd gear synchronizer
26	2nd speed driven gear
27	3rd speed driven gear
28	3rd and 4th gear synchronizer
29	4th speed driven gear
30	Reverse driven gear
31	Clutch drive plate assembly (high range)
32	Hi-Lo clutch assembly

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Result:

YES: GO TO 6

NO: SeeCalibration Procedure for Electro-Hydraulic Management (EHM), Section 245, Group EHM.See 24/12-Speed Transmission - Oil Pressure Tests .

(6) Checking forward/reverse modulation

Action:

[1] - Engage 1st gear and low range.

[2] - Move the reverse drive lever from ”forward” to ”reverse” (clutch pedal NOT depressed).

• Modulated movement from ”forward” to ”reverse” should not take longer than 2 seconds and not be excessively aggressive.

Result:

YES: GO TO 7

NO: SeeCalibration Procedure for Electro-Hydraulic Management (EHM), Section 245, Group EHM.See 24/12-Speed Transmission - Oil Pressure Tests .

(7) Checking the Hi-Lo shifting

Action:

Drive the tractor forward in 1st gear and low range, engine at 1500 rpm.

Switch several times from Hi to Lo and reverse.

The tractor should increase and decrease the speed without any noises or vibrations.

Result:

YES: GO TO 8

NO: Check EHM for diagnostic trouble codes, see EHM Trouble Codes - Summary of References .SeeCalibration Procedure for Electro-Hydraulic Management (EHM), Section 245, Group EHM.See Group 240-105, X23 - 3-Pin Connector for Declutch Switch and Hi-Lo Switch .See 24/12-Speed Transmission - Oil Pressure Tests .

(8) Transmission (test drive)

Action:

Test drive the tractor, selecting each gear in turn in each of the ranges, at different engine speeds and both in forward and reverse.

• All gears and ranges should engage smoothly.

• None of the gears or ranges should ”jump” out.

• The shift levers must neither catch nor touch the shifting gate.

• No unusual noises should occur. To make it easier to identify the noise of the gears meshing, simulate a load on the gears by lightly applying the brake.

Deliberately engage and disengage all tractor components including the steering, brakes, rockshaft, control units, differential lock,

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MAJOR COMPONENTS:

- Oil cooler
- Check valve (24/12-speed transmission only)
- Pump, steering system
- Valve block

THEORY OF OPERATION:

The oil cooler system consists of supply line (G) from valve block to oil cooler (F) and return line (E) to transmission case.

Hydraulic oil moves through return line (E) to check valve (D). Check valve (D) prevents oil from returning to the sump until a pressure of 500 kPa (5 bar; 73 psi) has been reached. This ensures that there is always enough pressure in the system even in low idle conditions. Once the pressure of 500 kPa (5 bar; 73 psi) is exceeded, the check valve opens directing oil to the sump.

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Excessive Pump Noise During Operation

CONDITIONS:

- Machine parked on level surface.
- Main switch in off position.
- Hydraulic tests and adjustments in this Section.

Excessive pump noise

Test Location	Normal	If Not Normal
1. Hydraulic oil dipstick.	Oil level between marks. Oil of the proper type.	Add oil as needed. Drain and refill with correct oil.
2. Pump section line.	No kinks and free of air leaks.	Repair or replace line as needed.
3. Relief valve.	Pressure within specifications.	Adjust. Replace if necessary.
4. SCV.	Free to return to neutral position.	Operate SCV levers. Repair or replace valve.
5. Rockshaft valve.	Neutral position.	Perform rockshaft leakage test.

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