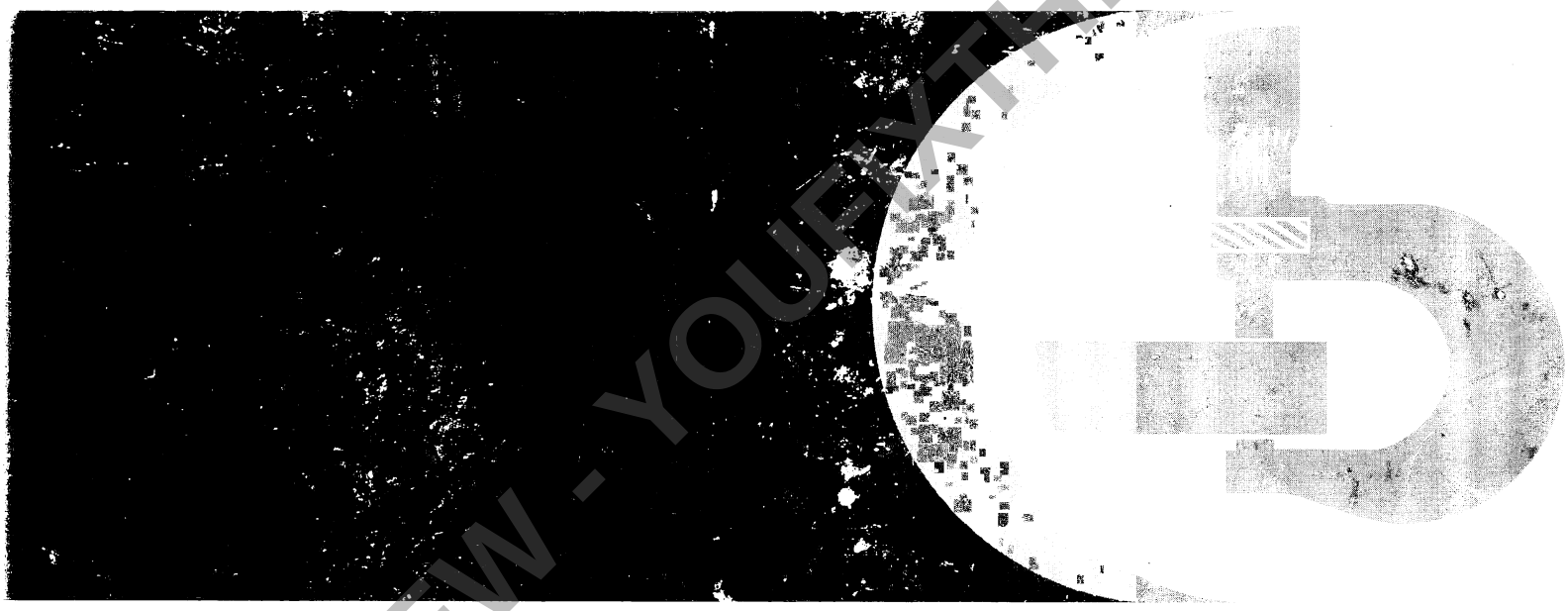
3200 and 3400 Telescopic Handlers



For complete service information also see:

POWERTECH 4.5 l and 6.8 l Diesel Engines CTM350

Alternator and Starting Motor CTM77

Drive Axles for 3200 and 3400 Telescopic Handlers CTM4655

John Deere Werke Zweibrücken

TM4626 (29JAN01)

Worldwide Edition

Printed in Germany

ENGLISCH

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Technical Information

		3200	3400
Engine power:	(According to ECE R24)	73.5 kW (100 hp)	73.5 kW (100 hp)
	Max. torque at 1/min	417 N•m (307 lb-ft) at 1400 1/min	417 N•m (307 lb-ft) at 1400 1/min
Engine:	Manufacturer	John Deere	John Deere
	Model	4045TZ250	4045TZ250
	Type	Four-stroke, in-line	Four-stroke, in-line
	Displacement	4.5 l (276 cu.in.)	4.5 l (276 cu.in.)
	Cylinder	4	4
	Bore	106.5 mm (4.19 in.)	106.5 mm (4.19 in.)
	Stroke	127.0 mm (5.00 in.)	127.0 mm (5.00 in.)
	Compression Ratio	17.2:1	17.2:1
	Slow idle range	775 – 800 1/min	775 – 800 1/min
	Fast idle range	2350 – 2400 1/min	2350 – 2400 1/min
	Rated engine speed	2200 1/min	2200 1/min
	Operating speed range	1200-2200 1/min	1200-2200 1/min
	Firing Order	1-3-4-2	1-3-4-2
	Intake valve clearance	0.35 mm (0.014 in.)	0.35 mm (0.014 in.)
	Exhaust valve clearance	0.45 mm (0.018 in.)	0.45 mm (0.018 in.)
	Combustion system	Direct injection	Direct injection
	Air intake system	Turbocharger	Turbocharger
Ground speeds:	1st Gear (Forwards/Reverse)	5 km/h (3 mph)	6 km/h (4 mph)
	2nd Gear (Forwards/Reverse)	10 km/h (6 mph)	11 km/h (7 mph)
	3rd Gear (Forwards/Reverse)	18 km/h (11 mph)	20 km/h (12 mph)
	4th Gear (Forwards/Reverse)[a]	31 km/h (19 mph)	35 km/h (22 mph)
Electrical System:	Type	12 V, negative ground	12 V, negative ground
	Alternator	65 A	65 A
	Starting motor	3.1 kW (4.1 hp)	3.1 kW (4.1 hp)
	Battery	110 Ah	110 Ah
Hydraulic system:	System pressure		
	– min. (stand-by)	1200 kPa (12 bar; 174 psi)	1200 kPa (12 bar; 174 psi)
	– max.	23500 kPa (235 bar; 3400 psi)	21000 kPa (210 bar; 3045 psi)
	Pump type	Gear pump	Gear pump
Weight:	Loading weight incl. 15 l (4 U.S. gal.)		
	Fuel	6540 kg (14418 lb.)	7040 kg (15520 lb.)
Capacities:	Fuel tank	200 l (53 U.S. gal.)	200 l (53 U.S. gal.)
	Cooling system (overall)	22.5 l (6 U.S. gal.)	22.5 l (6 U.S. gal.)
	– engine only	8.5 l (2.3 U.S. gal.)	8.5 l (2.3 U.S. gal.)
	– radiator only	8.2 l (2.2 U.S. gal.)	8.2 l (2.2 U.S. gal.)
	Engine crankcase		
	– initial filling with filter	13 l (3.4 U.S. gal.)	13 l (3.4 U.S. gal.)
	– oil change with filter change	13 l (3.4 U.S. gal.)	13 l (3.4 U.S. gal.)
	– oil change without filter change	12 l (3.2 U.S. gal.)	12 l (3.2 U.S. gal.)
	Transmission	18.5 l (5.1 U.S. gal.)	18.5 l (5.1 U.S. gal.)
	Hydraulic system	180 l (47 U.S. gal.)	180 l (47 U.S. gal.)
	Axles		
	– Front axle final drive	2 x 0.8 l (0.2 U.S. gal.)	2 x 0.8 l (0.2 U.S. gal.)
	– Front axle drive housing	7.1 l (1.9 U.S. gal.)	6.5 l (1.7 U.S. gal.)
	– Rear axle final drive	2 x 0.75 l (0.19 U.S. gal.)	2 x 0.8 l (0.2 U.S. gal.)
	– Rear axle drive housing	7.1 l (1.9 U.S. gal.)	7.1 l (1.9 U.S. gal.)

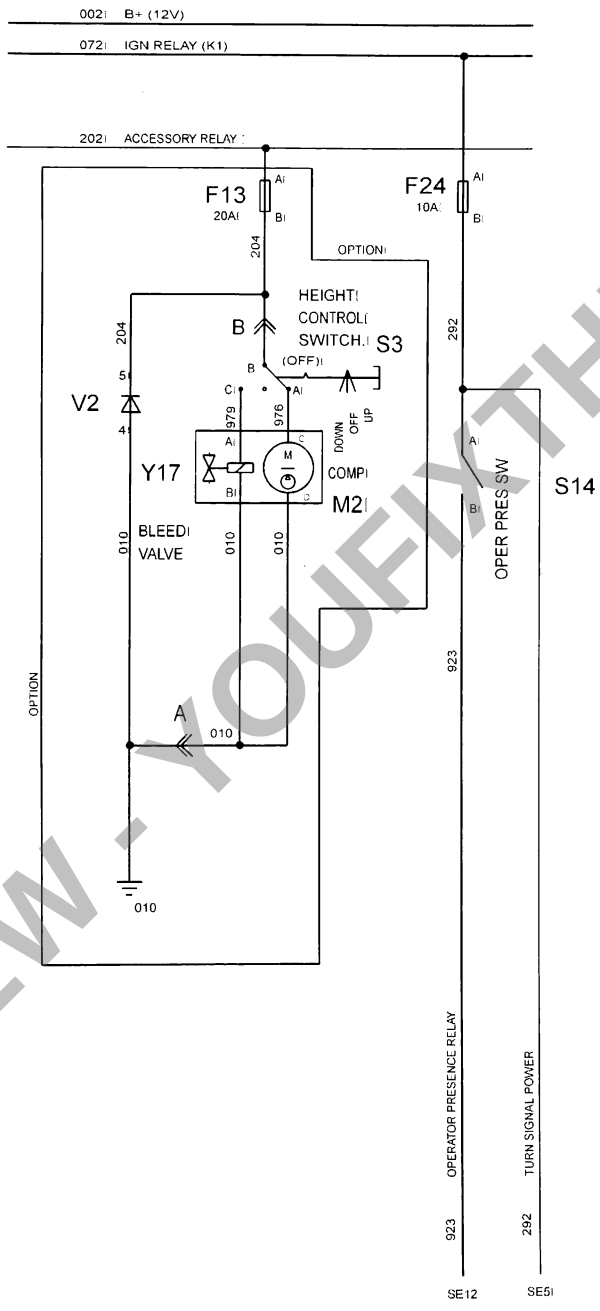
[a]optional in Germany

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Functional Schematic Section 2



SE2- SEAT CONTROL

ZX023808

ZX023808 -UN-29JAN01

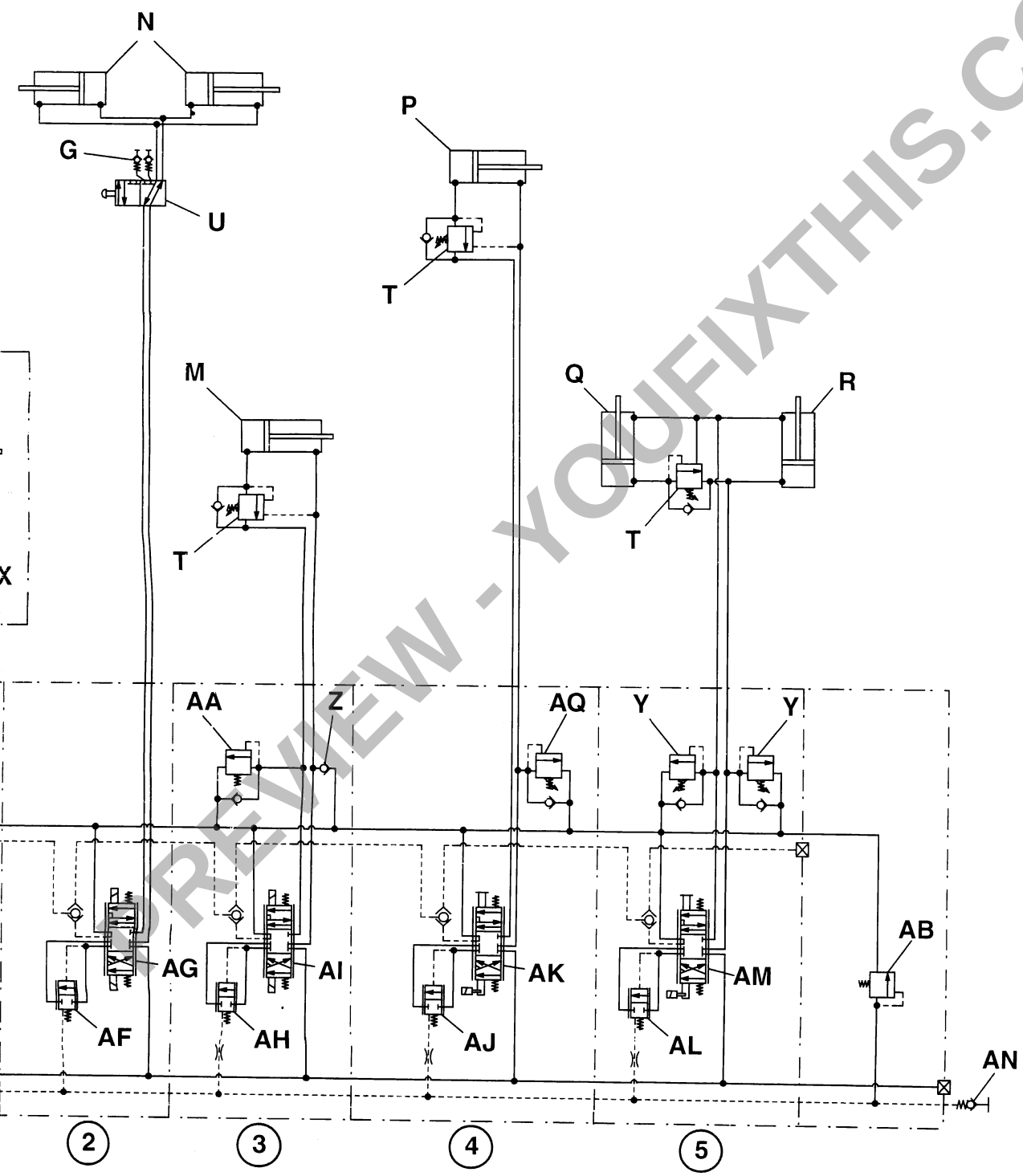
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Hydraulic System Circuit Diagram (3200)

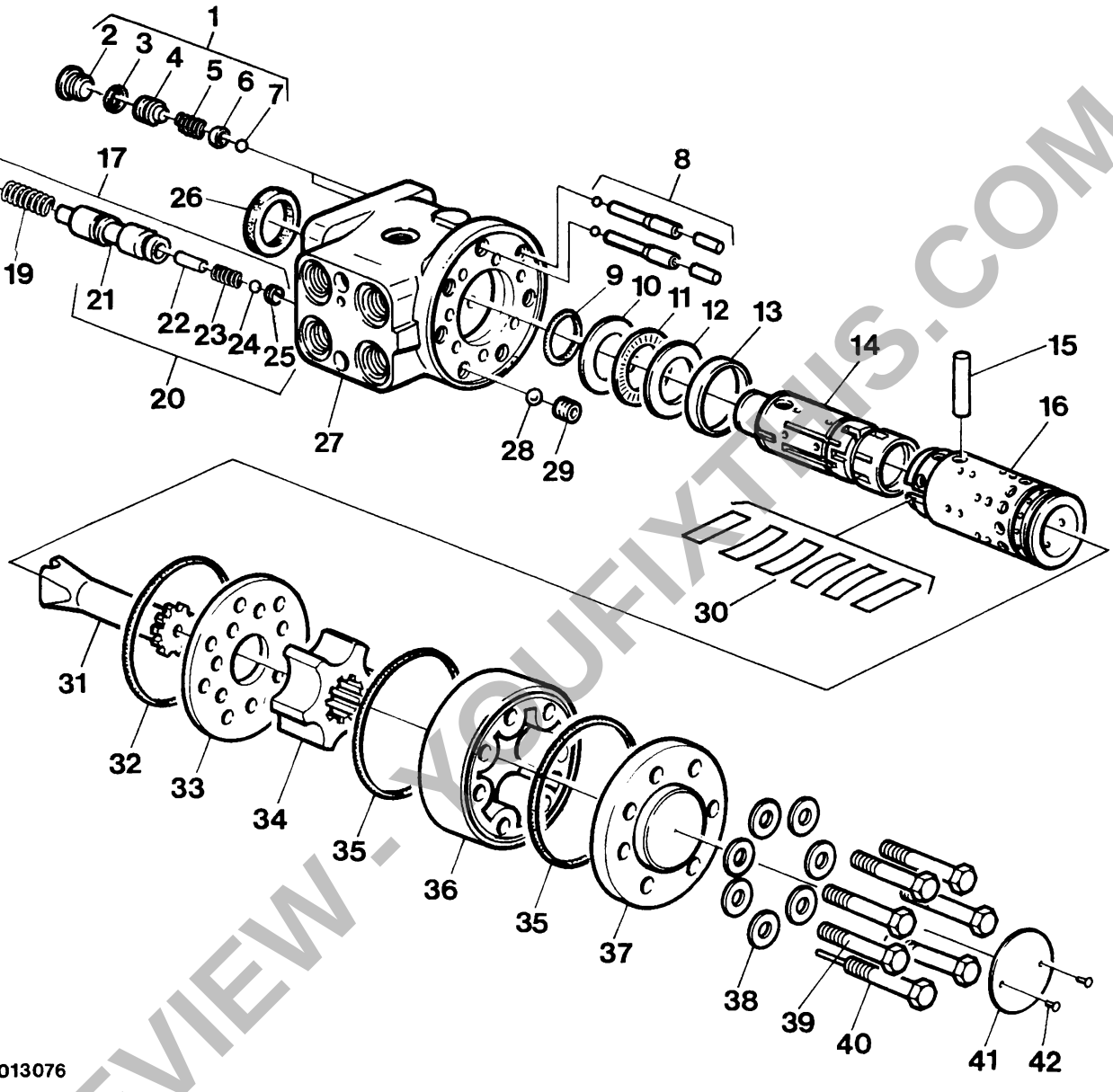
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Exploded View of Steering Unit



LX013076

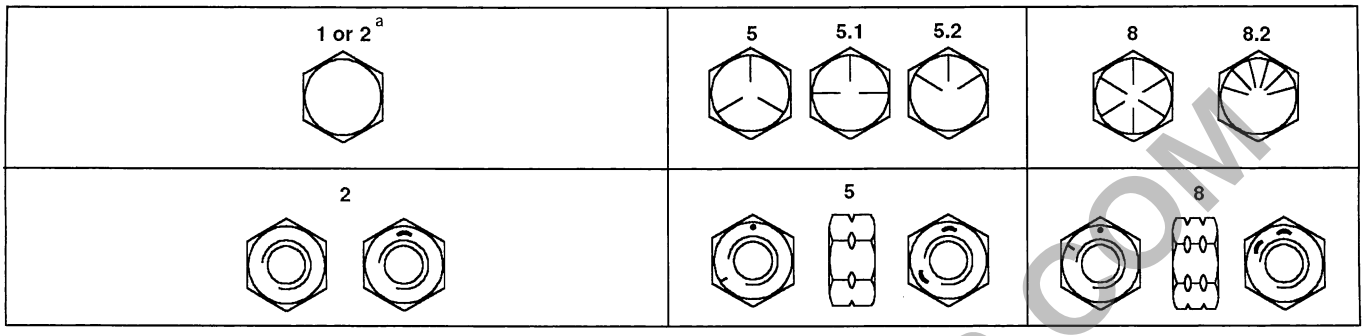
1—Shock valve (2 used)
2—Threaded plug (2 used)
3—Seal ring (2 used)
4—Adjusting screw (2 used)
5—Spring (2 used)
6—Spring guide (2 used)
7—Ball (2 used)
8—Suction valve assembly (2 used)
9—Seal ring assembly
10—Thrust washer
11—Thrust bearing
12—Thrust washer
13—Retaining ring
14—Valve spool
15—Cross pin
16—Valve sleeve
17—Control valve assembly
18—Threaded plug with O-ring
19—Spring
20—Control piston assembly
21—Control piston
22—Pin
23—Spring
24—Ball
25—Plug
26—Seal ring
27—Housing
28—Ball
29—Threaded bushing
30—Leaf springs
31—Rotor shaft
32—O-ring
33—Distributor plate
34—Rotor
35—O-ring
36—Stator
37—Cover Plate
38—Seal washers (7 used)
39—Cap screws (6 used)
40—Cap screw with spring pin
41—Serial number plate
42—Impact screws

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Unified Inch Bolt and Cap Screw Torque Values



TORQ1A –UN–27SEP99

Top, SAE Grade and Head Markings; Bottom, SAE Grade and Nut Markings

	Grade 1 (No Mark)		Grade 2[a] (No Mark)		Grade 5, 5.1 or 5.2		Grade 8 or 8.2	
Size	Lubricated[b] N•m (lb-ft)	Dry[c] N•m (lb-ft)	Lubricated[b] N•m (lb-ft)	Dry[c] N•m (lb-ft)	Lubricated[b] N•m (lb-ft)	Dry[c] N•m (lb-ft)	Lubricated[b] N•m (lb-ft)	Dry[c] N•m (lb-ft)
1/4	3.8 (2.8)	4.7 (3.5)	6 (4.4)	7.5 (5.5)	9.5 (7)	12 (9)	13.5 (10)	17 (12.5)
5/16	7.7 (5.7)	9.8 (7.2)	12 (9)	15.5 (11.5)	19.5 (14.5)	25 (18.5)	28 (20.5)	35 (26)
3/8	13.5 (10)	17.5 (13)	22 (16)	27.5 (20)	35 (26)	44 (32.5)	49 (36)	63 (46)
7/16	22 (16)	28 (20.5)	35 (26)	44 (32.5)	56 (41)	70 (52)	80 (59)	100 (74)
1/2	34 (25)	42 (31)	53 (39)	67 (49)	85 (63)	110 (80)	120 (88)	155 (115)
9/16	48 (35.5)	60 (45)	76 (56)	95 (70)	125 (92)	155 (115)	175 (130)	220 (165)
5/8	67 (49)	85 (63)	105 (77)	135 (100)	170 (125)	215 (160)	240 (175)	305 (225)
3/4	120 (88)	150 (110)	190 (140)	240 (175)	300 (220)	380 (280)	425 (315)	540 (400)
7/8	190 (140)	240 (175)	190 (140)	240 (175)	490 (360)	615 (455)	690 (510)	870 (640)
1	285 (210)	360 (265)	285 (210)	360 (265)	730 (540)	920 (680)	1030 (760)	1300 (960)
1-1/8	400 (300)	510 (375)	400 (300)	510 (375)	910 (670)	1150 (850)	1450 (1075)	1850 (1350)
1-1/4	570 (420)	725 (535)	570 (420)	725 (535)	1280 (945)	1630 (1200)	2050 (1500)	2600 (1920)
1-3/8	750 (550)	950 (700)	750 (550)	950 (700)	1700 (1250)	2140 (1580)	2700 (2000)	3400 (2500)
1-1/2	990 (730)	1250 (930)	990 (730)	1250 (930)	2250 (1650)	2850 (2100)	3600 (2650)	4550 (3350)

[a] *Grade 2 applies for hex cap screws (not hex bolts) up to 6 in. (152 mm) long. Grade 1 applies for hex cap screws over 6 in. (152 mm) long, and for all other types of bolts and screws of any length.*

[b] *"Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings.*

[c] *"Dry" means plain or zinc plated without any lubrication.*

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fastener threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

DX,TORQ1 –19–01OCT99–1/1

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PN=31

Load Indicator Error Messages

Symptom	Problem	Solution
No LED lights up	Power supply is interrupted	Remove the load indicator and check the connector's contacts; recalibrate load indicator (see "Load Indicator Calibration (Basic Procedure)" in this group)
	Internal protection device was activated	Replace and recalibrate the load indicator (see "Load Indicator Calibration (Basic Procedure)" in this group)
LEDs (4) and (5) lights up and LED (1) blinks fast	The signal received from the load sensor lies outside the load span calibrated	Adjust load sensor (see "Adjust Load Sensor" in component technical manual CTM4655, Section 10, Group 10)
LEDs (2) to (7) blink slowly (once per second)	Error in internal load indicator circuit	Replace and recalibrate the load indicator (see "Load Indicator Calibration (Basic Procedure)" in this group)
LEDs (2) to (11) blink slowly (once per second) and LED (1) blinks fast	Load sensor is not connected	Check the contacts of the load sensor connector
	Load sensor is defective	Replace load sensor and recalibrate the load indicator (see "Load Indicator Calibration (Basic Procedure)" in this group)

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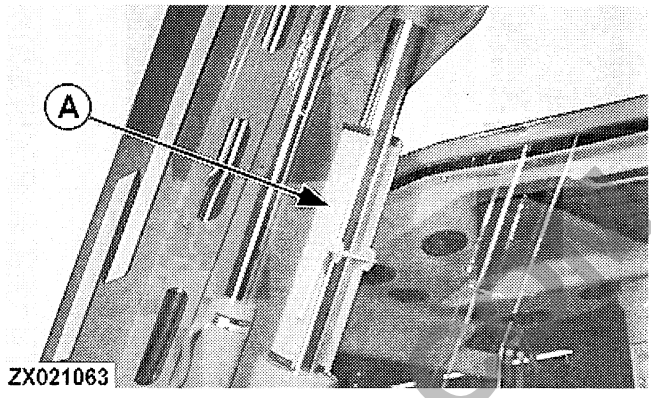
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Engine Removal and Installation

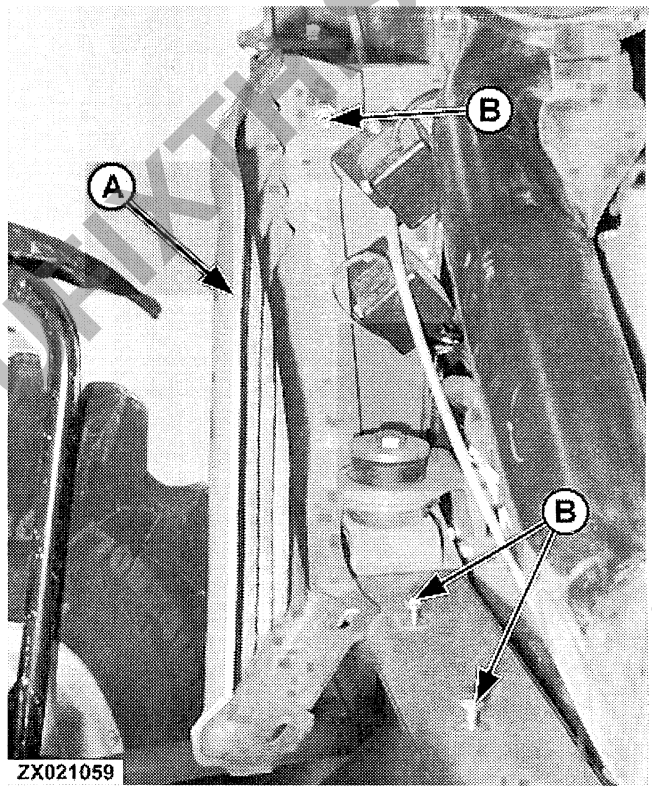
1. Raise boom and install safety channel (A) on boom lift cylinder.

2. Remove *radiator* (see "Radiator Removal and Installation" in Section 20, Group 10).



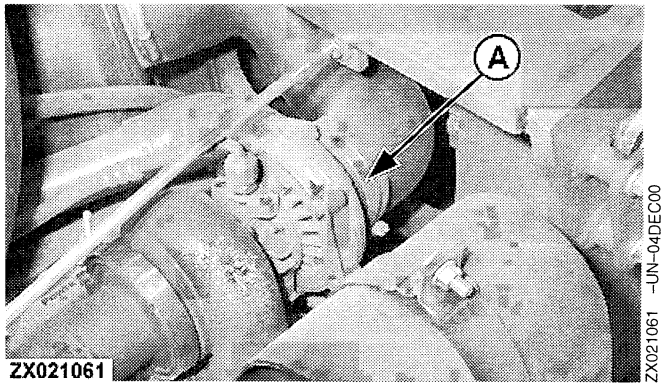
AG,ZX09161,822 –19–28AUG00–1/12

3. Remove screws (B) on l.h. engine side and remove guard (A).



AG,ZX09161,822 –19–28AUG00–2/12

4. Remove hose clamp (A) from turbocharger air intake hose and pull off hose.

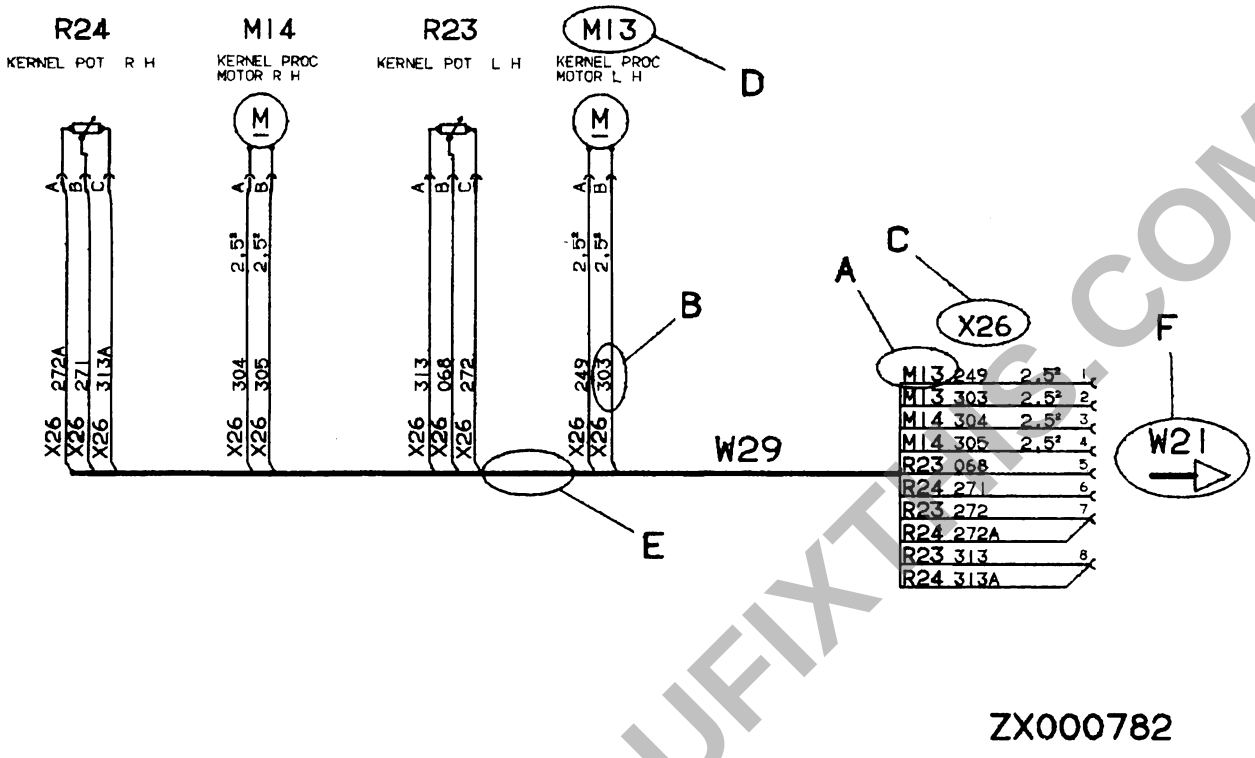


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How to Read a Wiring and Harness Diagram



ZX000782

ZX000782 –UN–28APR95

A—Component to which cable or wire is routed
B—Wiring number with color code
C—Pin number
D—Component identification
E—Wires arranged in a wiring harness
F—Identification where the harness is continued

Wiring and harness diagrams are divided into wiring harnesses. The individual harness connectors are also shown. Each wire and the wire color are identified by a number. If the wire cross section is not stated, the wire has a cross section of 1 mm². Before a cable or wire joins a wiring harness, information concerning the cable routing is given.

COLOR CODE

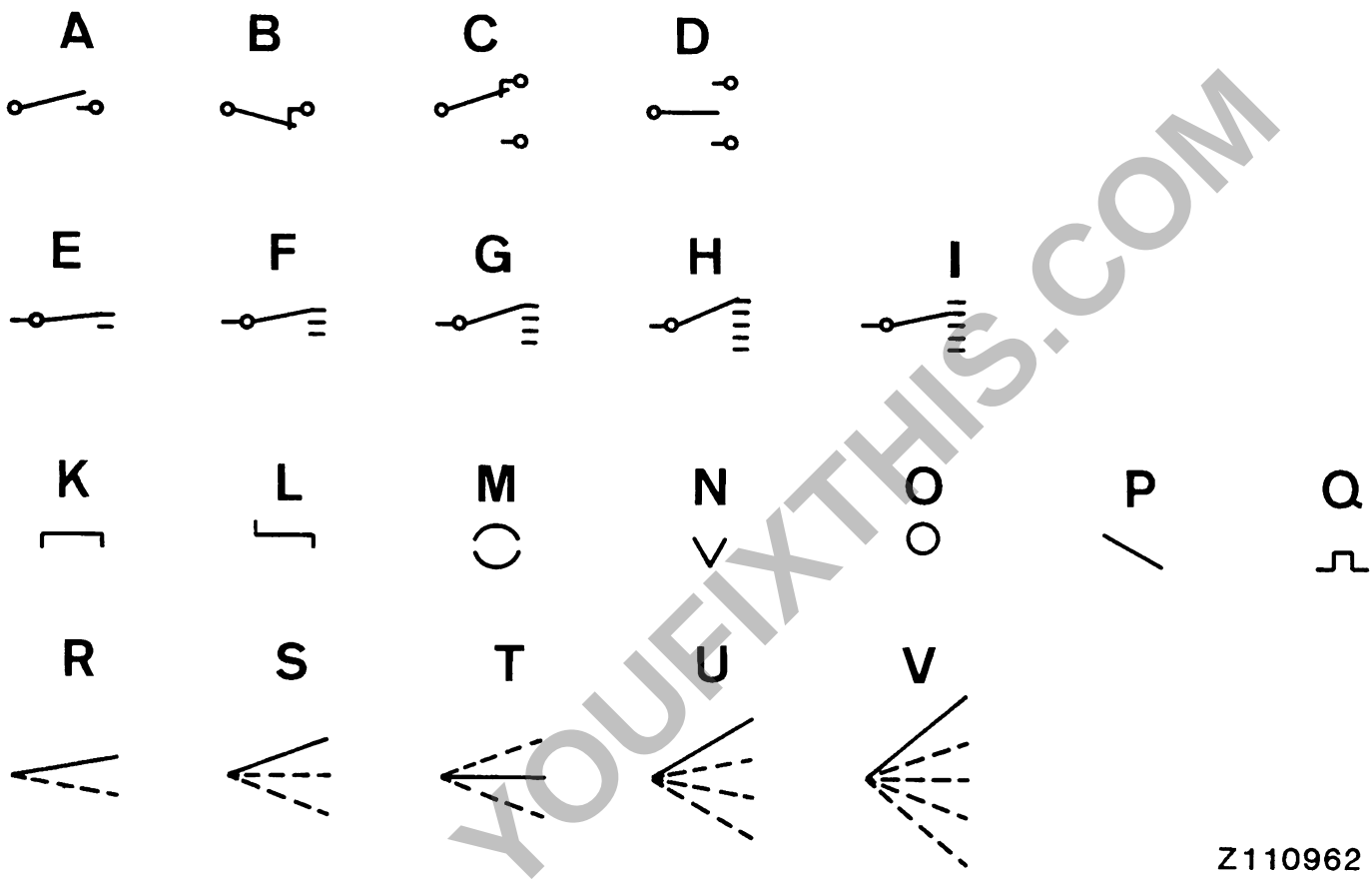
The last digit of the wire number is the color:

XX0	BLACK
XX1	BROWN
XX2	RED
XX3	ORANGE
XX4	GELB
XX5	GREEN
XX6	BLUE
XX7	VIOLET
XX8	GREY
XX9	WHITE

ZX09161,0000882 –19–22JUL91–1/1

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Symbols in System Diagrams



A—Circuit closing switch
B—Circuit opening switch
C—Change-over switch
D—Two-way closing switch with center position
E—Two-way switch
F—Three-way switch
G—Four-way switch
H—Five-way switch (basic position I)
I—Five-way switch (basic position II)
K—Push-pull switch
L—Rotary switch
M—Key switch
N—Detent
O—End switch
P—Foot-operated switch
Q—Actuator
R—2 switch positions
S—3 switch positions (basic position I)
T—3 switch positions (basic position II)
U—4 switch positions
V—5 switch positions

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Z110962 –UN–02MAY95

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Hydraulic System Diagnosis

Symptom	Problem	Solution
Machine does not move	Transmission oil level low or no oil	Check transmission oil level and adjust, if necessary
	Low or no transmission oil pump pressure	Check pump pressure (see "Transmission Oil Pump Pressure Test" in Section 250, Group 10 and "Transmission Oil Pressure Too Low" in the diagnostics
	Main pressure regulating valve defective	Check clutch system oil pressure (see "Clutch Response Pressure Test" in Section 250, Group 10) and replace valve, if necessary
	Direction control valve or solenoid switch defective	Operate valve spool by hand and note the engaging action, replace solenoid switch or valve; if necessary
	Clogging in connections restricts oil flow	Check transmission oil pump displacement (see "Transmission Oil Pump Displacement Test" in Section 250, Group 10) and remove foreign material
	Drive shaft seal rings worn or damaged	Remove drive shaft and check seal rings (see "Disassemble Drive Shaft" in Section 50, Group 10) and replace as necessary
	Mechanical malfunction in transmission or torque converter unit	Refer to "Mechanical System Diagnosis" in this group

Continued on next page

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Load Indicator Calibration Mode

The calibration of the load indicator is carried out by retracting the boom without load and defining this as **zero load point**. Now lift a known load and define as **100% calibration point (SPAN)**.

The zero and 100% calibration points are set by using the push buttons on the unit.

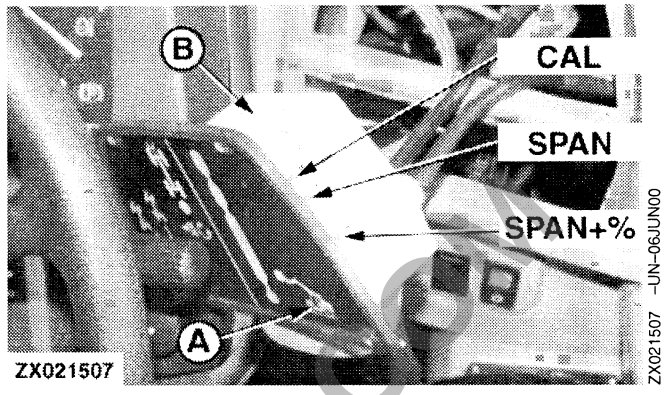
- The **TEST** button (A) is used for setting the zero load point.
- The three buttons concealed on the right-hand side of the case (B) are used for setting calibration mode and 100% calibration point.

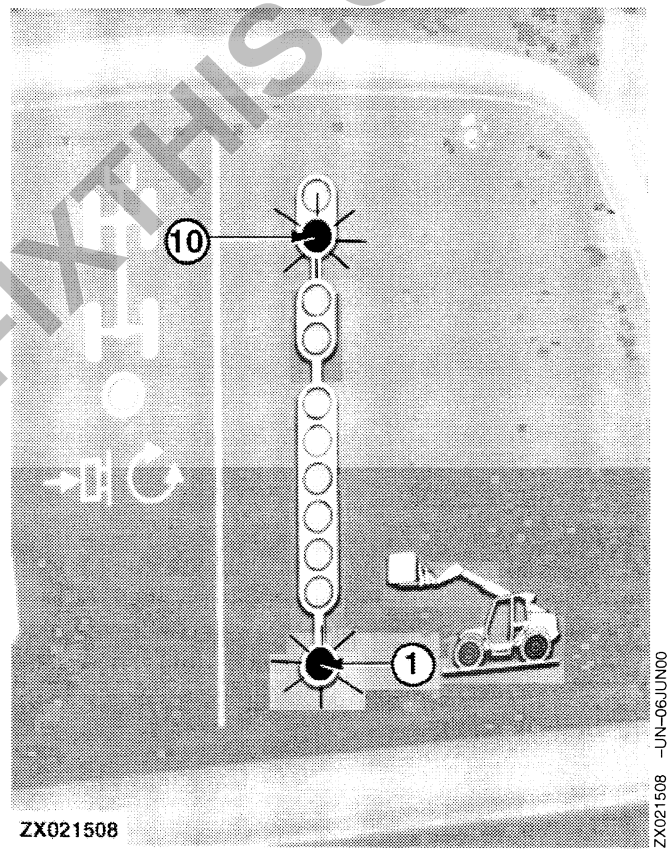
The buttons on the side are labeled "**CAL**", "**SPAN**" and "**SPAN+%**".

Momentarily pressing the **CAL** button puts the unit into **calibration mode**. Calibration mode is indicated by LEDs 1 to 10 being illuminated briefly and then flashing quickly.

NOTE: Pressing CAL button when in calibration mode will return the unit to normal operation.

When in calibration mode, the following functions are available:





Continued on next page

ZX09161,0000903 –19–18DEC00–1/4

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Repair Specifications

Item	Measurement	Specification
Engine	Chopping speed	2000 to 2200 rpm
Transmission oil pump	Pressure	1200 - 1400 kPa (12 - 14 bar; 174 - 203 psi)
Torque converter circuit	Pressure	300 - 400 kPa (3 - 4 bar; 44 - 58 psi)
Direction control valve	Opening pressure (forward and backward)	1200 - 1400 kPa (12 - 14 bar; 174 - 203 psi)
Transmission oil pump	Displacement	28 - 32 l/min (7.3 - 8.3 gpm)

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Transmission and Torque Converter Inspection

IMPORTANT: Ensure that oil is at operational temperature when tests are executed.

If a malfunction of the transmission or torque converter is indicated, a systematic pressure checking procedure should be followed. These checks should be carried out while the transmission and converter drive unit are still in the vehicle so that true operating conditions are created. Pressure checks are essential since a failure in the hydraulic system may not be easily traceable when the assemblies are stripped down on a bench.

When performing pressure tests the forward/neutral/reverse (FNR) lever must be set to neutral and the engine speed must be between 2000 and 2200 rpm. As a safety precaution the machine's handbrake should be applied.

	Specification
Engine—Speed	2000 to 2200 rpm

CAUTION: The handbrake must be activated to prevent the telescopic handler from rolling.

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05
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Practice Safe Maintenance

Understand service procedure before doing work. Keep area clean and dry.

Never lubricate, service, or adjust machine while it is moving. Keep hands, feet, and clothing from power-driven parts. Disengage all power and operate controls to relieve pressure. Lower equipment to the ground. Stop the engine. Remove the key. Allow machine to cool.

Securely support any machine elements that must be raised for service work.

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.

On self-propelled equipment, disconnect battery ground cable (—) before making adjustments on electrical systems or welding on machine.

On towed implements, disconnect wiring harnesses from tractor before servicing electrical system components or welding on machine.



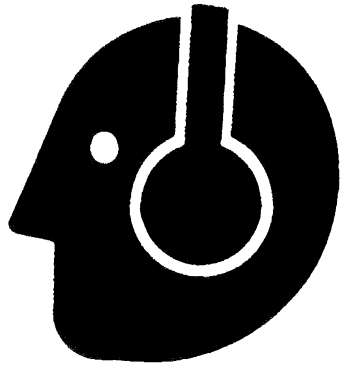
TS218 –UN–23AUG88

DX,SERV –19–17FEB99–1/1

Protect Against Noise

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

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



TS207 –UN–23AUG88

DX,NOISE –19–03MAR93–1/1

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A—Torque converter housing with transmission oil pump
B—Transmission
C—Strainer
D—Torque Converter Unit
E—Full flow oil filter
F—Main pressure regulating valve
G—Torque converter relief valve
H—Clutch circuit
J—Direction control valve
K—Forward travel clutch
L—Reverse travel clutch
M—Oil cooler
N—Torque converter
O—Filter bypass valve

AG,ZX09161,762 –19–14JUL00–2/2

Power Train — Theory of Operation

Clutch Circuit

From the transmission oil pump (A) oil flows from transmission sump (B) via a hose through strainer (C) to the torque converter unit (D pump).

Forced by the pump pressure the oil flows through the full flow oil filter (E) with by-pass valve (O) and via hoses back to the torque converter unit.

The oil then flows through the main pressure regulating valve (F). This valve keeps the clutch circuit pressure constantly at approx. 1400 kPa (14 bar; 203 psi). From this valve circuit oil also enters the torque converter circuit.

Via a hydraulic hose the pressure oil from the torque converter unit flows to the clutch circuit (H) of the transmission. The solenoid valve actuated direction control valve (J) at the transmission causes oil to flow from the clutch circuit to the forward/reverse travel piston. This piston operates the forward (K) or reverse (L) travel clutch. When in neutral the valve shuts off the oil supply and allows oil from the clutch pistons to return to the transmission sump.

A hydraulic hose or balance pipe returns any excess oil from the converter unit to the transmission sump.

Torque Converter Circuit

Oil enters the converter circuit from the main pressure regulator valve circuit. It flows through passages in the transmission oil pump housing and into the torque converter (N).

Pressure is controlled by the converter relief valve (G) which prevents the pressure within the torque converter from exceeding the design limits. The marginal value is 1000 kPa (10 bar; 145 psi). Excess oil flows back to the transmission oil pump sump.

Cooling and Lubrication Circuit

Hot oil flows from the torque converter via the inside of the pump stator tube, through the center of the transmission oil pump and out of the converter unit via connecting hoses.

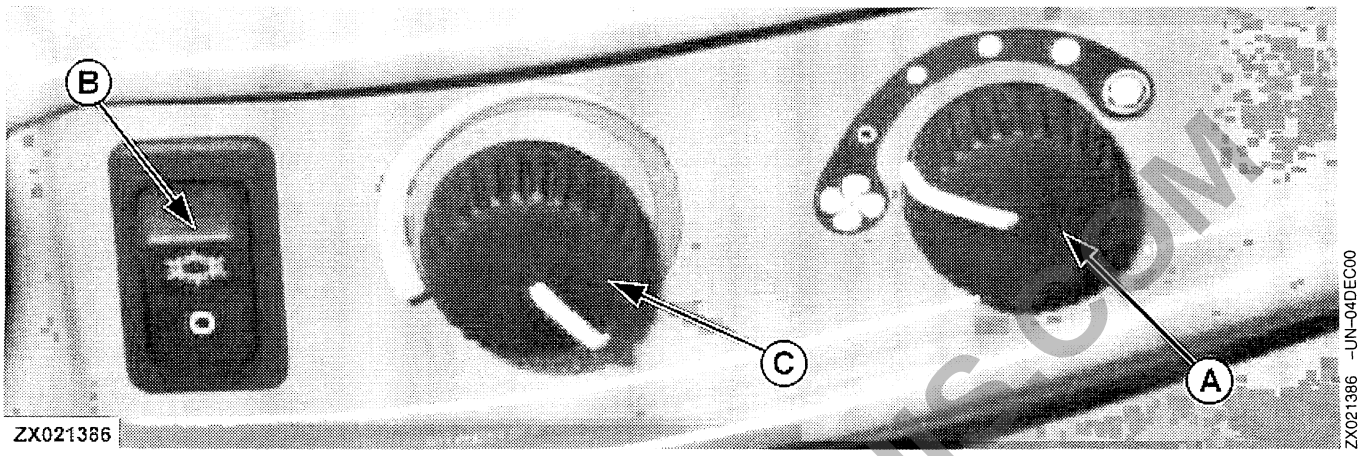
Afterwards it flows through an external oil cooler (M) and back to the transmission. There it is cooling the clutches and lubricating the drive shaft bearings; eventually it flows back to the sump.

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Operational Information



A—Circulator blower rotary switch

B—Air conditioning system switch

C—Temperature control rotary switch

With main switch in position I or II, blower may be switched on by means of rotary switch (A).

Blower can be adjusted to four speeds.

The heating temperature can be set via rotary switch (C).

With blower running, the air conditioning system can be turned on with switch (B) and the desired temperature can be adjusted by means of rotary switch (C).

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Operation

With main switch in position (I), the blower switch (S6) is supplied with voltage via fuse (F3) and relay (K4). Blower (M8) can be adjusted to four speeds by means of resistor (R2).

From position (I) of blower switch (S6) the air conditioning switch (S7) is supplied with voltage.

When the air conditioning system is switched on via switch (S7), electromagnetic *clutch* (Y1) is activated via deicing switch (B1) and high/low-pressure switch (B2).

The temperature is selected mechanically.

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Assemble Torque Converter Unit

IMPORTANT: All screws with nylon washers can be reused five or six times if they are tightened to 21 - 25 N•m (15 - 18 lb-ft).

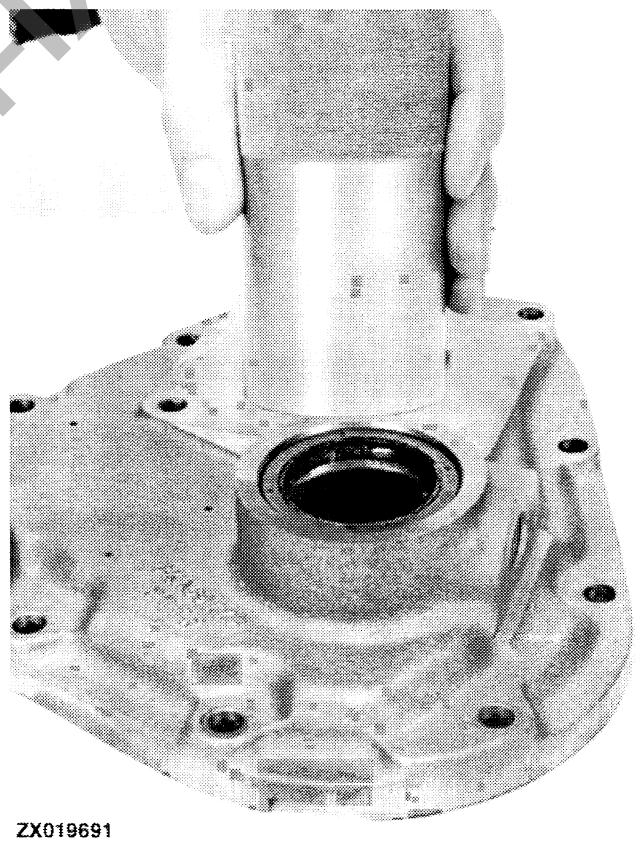
All shafts and bearings should be lubricated with transmission fluid prior to assembly.

To prevent possible contamination of hydraulic parts, lint *or* cotton rags should not be used.

Item	Measurement	Specification
Screws with nylon washers	Torque	21 - 25 N•m (15 - 18 lb-ft)

AG,ZX09161,810 –19–24AUG00–1/16

1. Using a suitably sized drift fit a new oil seal to the rear cover.



ZX019691

ZX019691 –UN–13APR00

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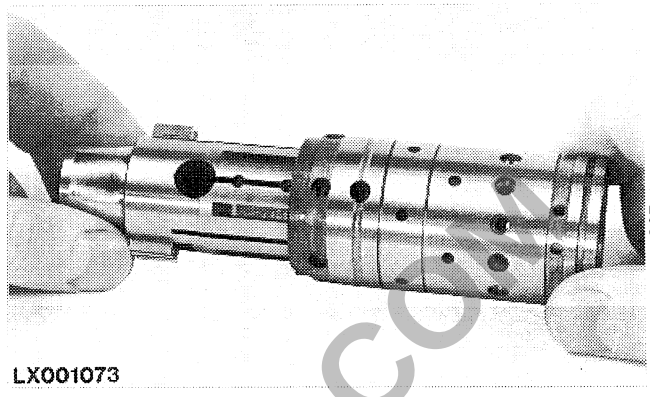
AG,ZX09161,810 –19–24AUG00–2/16

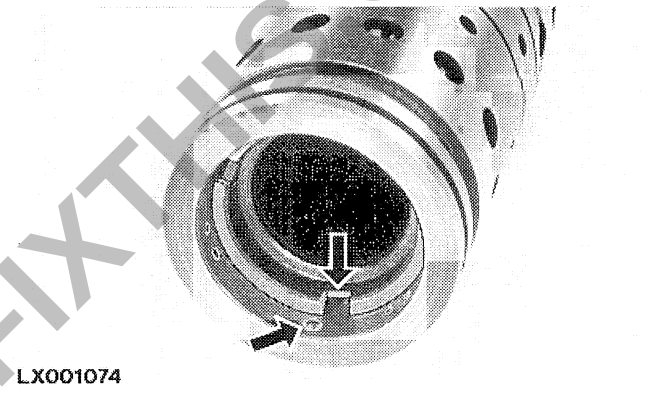
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6. Assemble spool and sleeve.

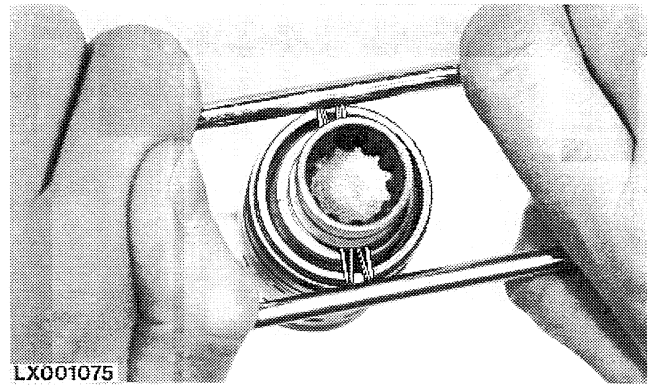
IMPORTANT: The slots in the spool must face the holes in the sleeve (see arrows).





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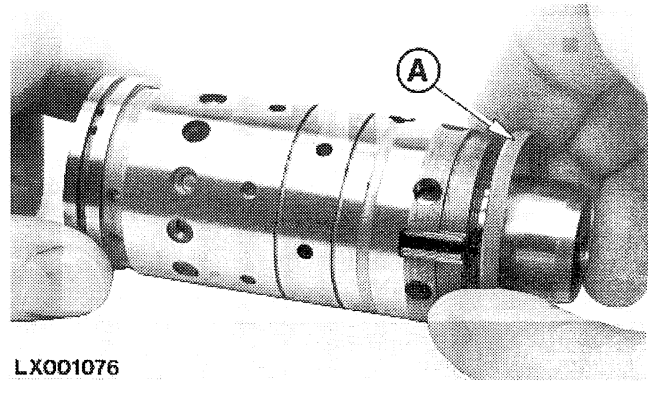
7. Align and center the leaf springs.



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8. Install retaining ring (A).

IMPORTANT: The retaining ring must be able to turn freely without interference from the leaf springs.



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Longitudinal Horizontal Spring Assembly Removal and Installation

1. Remove the seat upholstery.
2. Remove baseplate hex. nuts (1).

CAUTION: The baseplate hex. nuts are tightened to 25 N•m (18 lb-ft).

3. Remove washers (2).
4. Lift upper seat (3) off horizontal spring assembly.
5. Remove locking unit (4).
6. Remove horizontal spring assembly rail hex. nuts (5).

CAUTION: The horizontal spring assembly rail hex. nuts are tightened to 25 N•m (18 lb-ft).

Specification

Horizontal spring assembly rail hex. nuts—Torque	25 N•m (18 lb-ft)

7. Remove horizontal spring assembly rail (6, 7).
8. Slide the fore-and-aft mechanism forward.
9. Unscrew console hex. nuts (9).

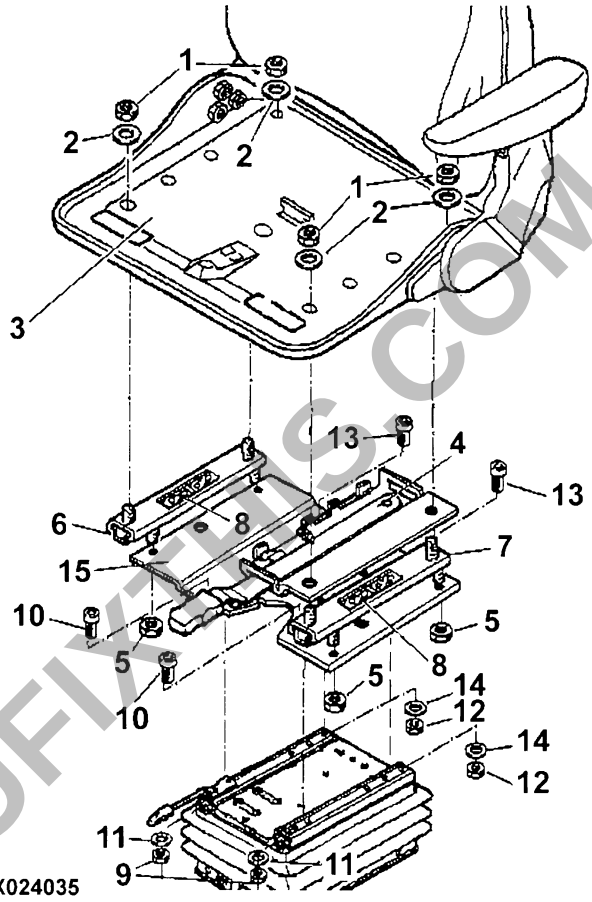
CAUTION: The console hex. nuts are tightened to 25 N•m (18 lb-ft).

10. Remove fillister-head screws (10) and washers (11).
11. Slide the fore-and-aft mechanism backward.
12. Unscrew console hex. nuts (12).

CAUTION: The console hex. nuts are tightened to 25 N•m (18 lb-ft).

13. Remove fillister-head screws (13) and washers (14).
14. Lift console (15) off longitudinal adjustment rails.
15. For installation, reverse the removal procedure.

CAUTION: When inserting horizontal spring assembly rail, ensure that the longer rubber spring (8) faces forward.



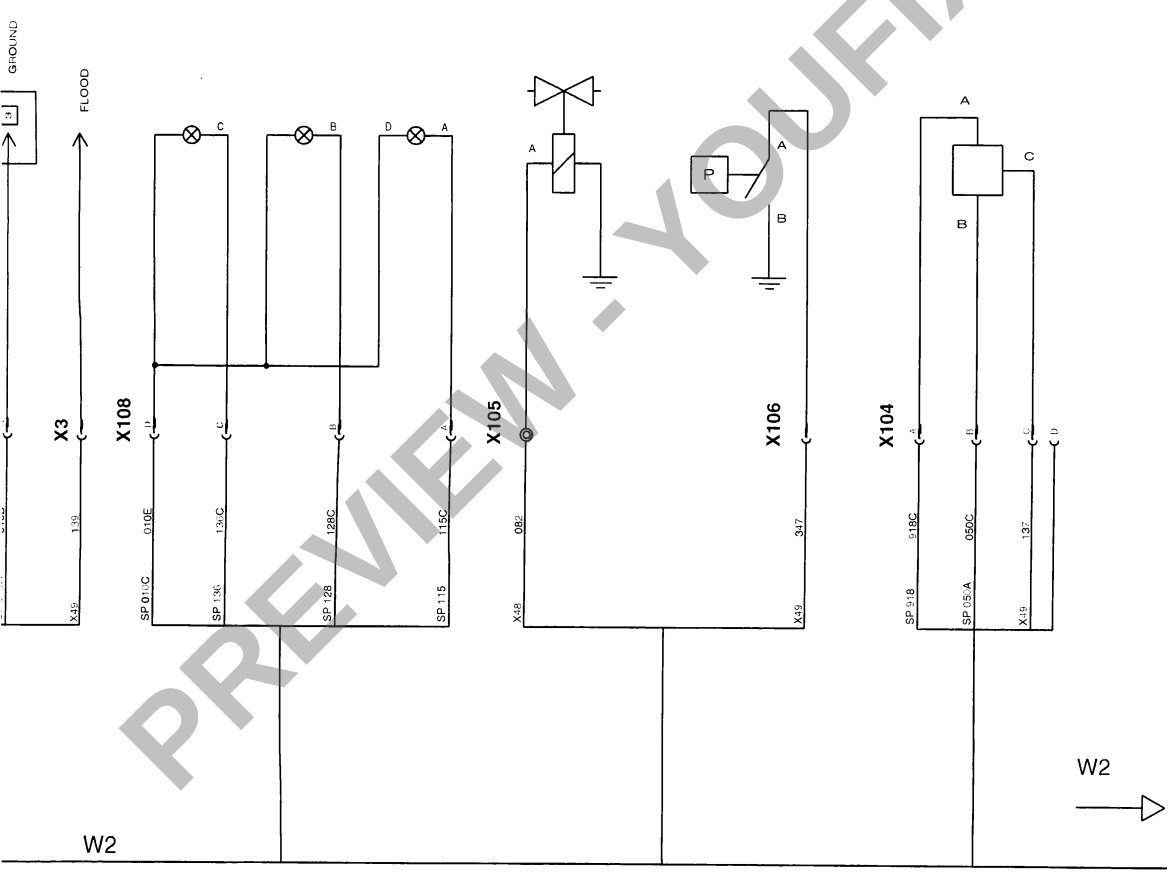
1—Baseplate hex. nuts
2—Washers
3—Upper seat
4—Locking unit
5—Horizontal spring assembly rail hex. nuts
6—Horizontal spring assembly rail
7—Horizontal spring assembly rail
8—Rubber spring
9—Console hex. nuts
10—Fillister-head screws
11—Washers
12—Console hex. nuts
13—Fillister-head screws
14—Washers
15—Console

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H1	E6	H3	Y2	B3	B12
BRAKE LAMPS	RIGHT TAIL LAMP	REAR RIGHT TURN	FUEL SHUT-OFF SOLENOID	ENG OIL PRESS SW	REAR AXLE SENSOR



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Load Indicator *Field* Calibration Procedure

Whenever it is necessary to recalibrate in the field where no calibration weight is available, then carry out the calibration procedure as follows:

CAUTION: The following procedure should be carried out only if the "Load Indicator Calibration Basic Procedure" cannot be carried out. Pay extreme attention while lifting the weight to tip the handler.

1. Apply the parking brake. Keep engine running.
2. Place the handler on level ground.

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