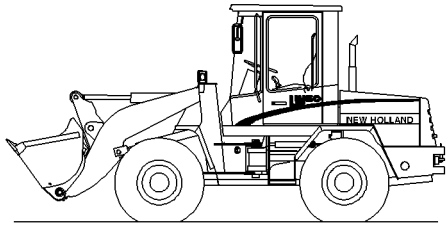
NEW HOLLAND CONSTRUCTION LW 50

TECHNICAL HANDBOOK



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05 Axles

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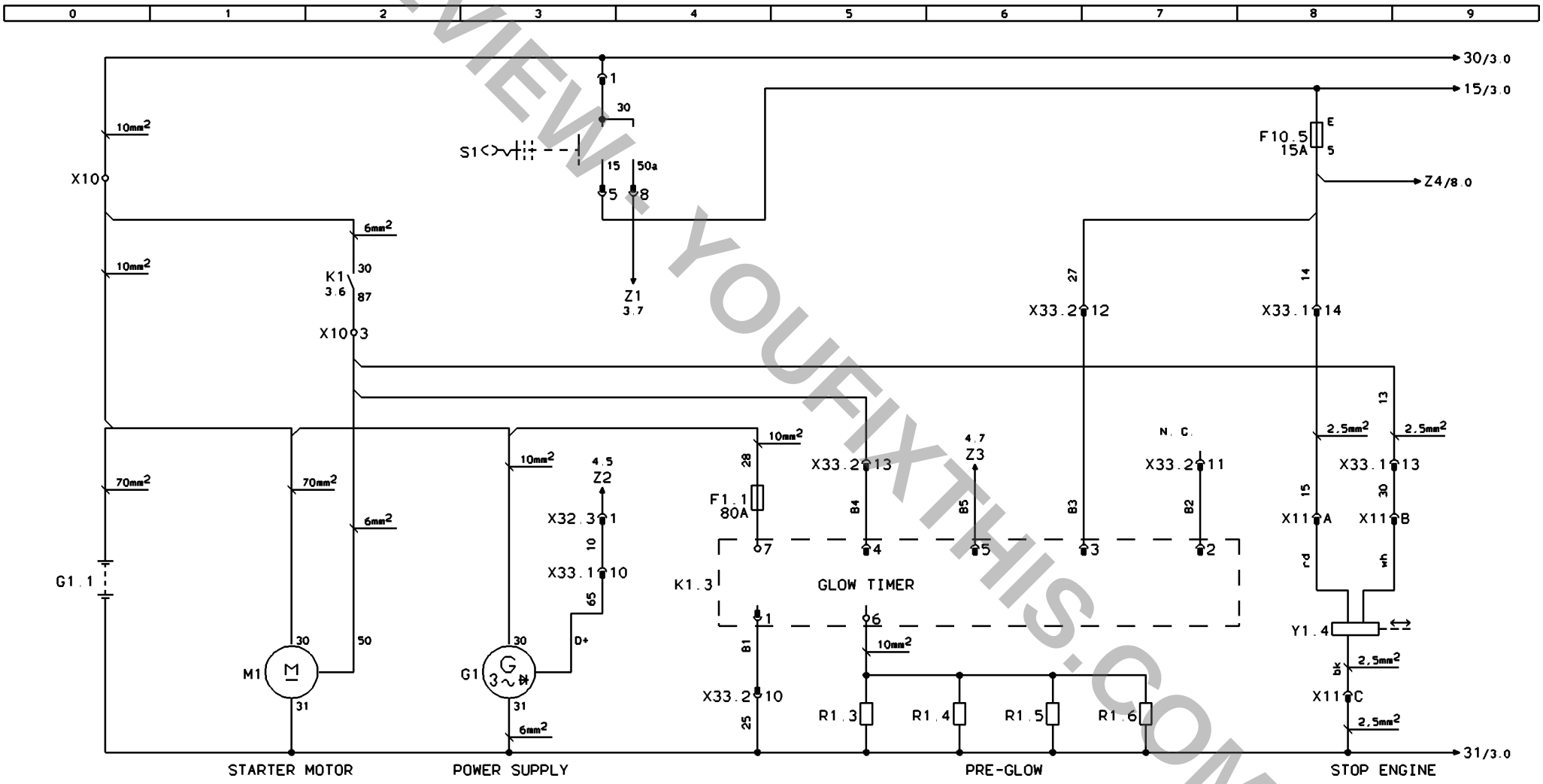
11 Fittings, pipes and hoses

12 Sealing, protective, checking and cleaning agents

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Hydraulic circuit diagram - travel drive

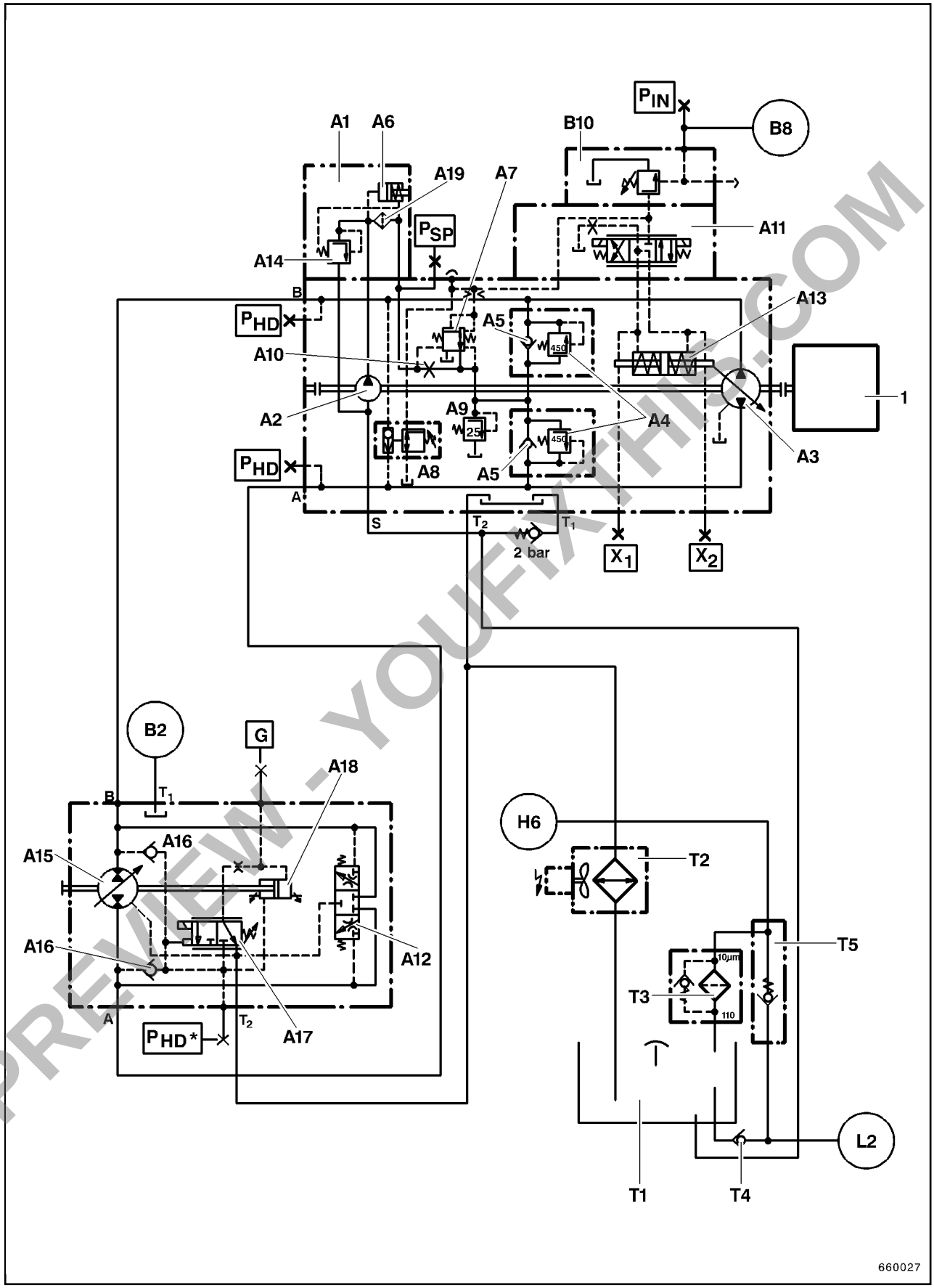


Fig. 2

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Axle Drive Assembly

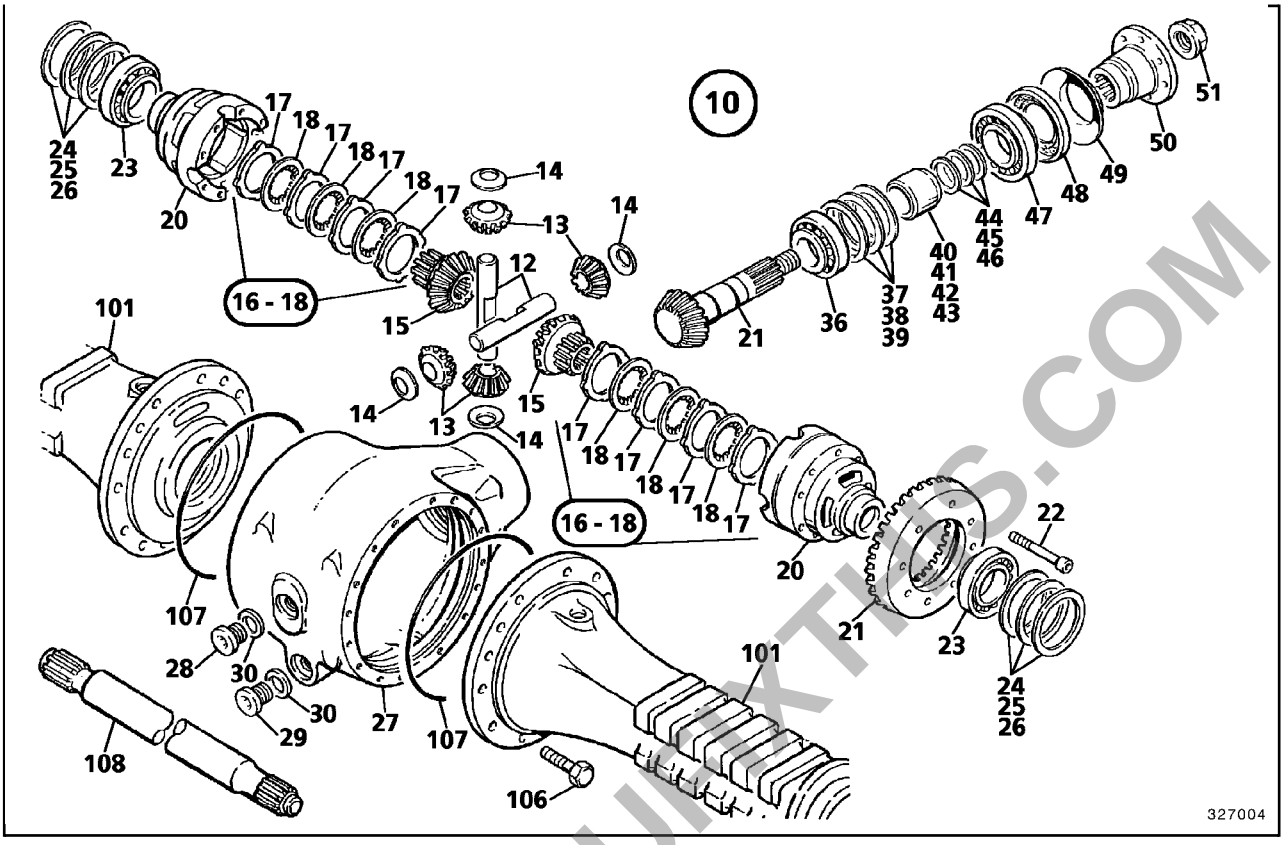


Fig. 2

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Schrauben mit Regelgewinde nach DIN 13 - 13
Bolts with standard thread DIN 13 - 13

Gewinde-Nenn Ø Thread nominal Ø	Festigkeits-klasse Material quality	Anziehdrehmomente M_A in Nm Tightening torques M_A in Nm		
		gesamt total 0,10[1]	gesamt total 0,12[2]	gesamt total 0,16 (L)[3]
M 5	8.8 10.9 12.9	4,9 7,3 8,5	5,5 8,1 9,5	6,5 9,5 11,2
M 6	8.8 10.9 12.9	8,5 12,5 14,5	9,5 14 16,5	11,2 16,5 19,5
M 8	8.8 10.9 12.9	20,5 30 35	23 34 40	27 40 47
M 10	8.8 10.9 12.9	41 60 71	46 68 79	55 80 94
M 12	8.8 10.9 12.9	71 104 195	79 117 215	94 140 260
M 16	8.8 10.9 12.9	170 250 300	195 280 330	230 340 400
M 20	8.8 10.9 12.9	350 490 580	390 560 650	470 670 780
M 24	8.8 10.9 12.9	600 850 1000	670 960 1120	800 1140 1350
M 30	8.8 10.9 12.9	1190 1700 2000	1350 1900 2250	1600 2300 2700
M 36	8.8 10.9 12.9	2100 3000 3500	2350 3300 3900	2800 4000 4700

[1] Schraube und/oder Mutter galvanisch verzinkt (A3B).
Screw and/or nut electro-galvanized.

[2] Schraube schwarz vergütet oder phosphatiert, Gewinde geölt.
Screw black-plated or phosphatized, thread oiled.

[3] Schrauben mit flüssiger Schraubensicherung z.B. Loctite 242, 243.
Screws with liquid screw fixer, e.g. Loctite 242, 243.

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Troubleshooting

Trouble	Cause	Remedy
1. Acid level too low	Overcharging, evaporation (particularly during the summer months)	Top up with distilled or demineralized water (when the battery is charged)
2. Acid leaks out of the vent plug	1. Charging voltage too high	Check and adjust voltage regulator or have it replaced
	2. Acid level too high	Draw off excessive acid with the hydrometer
3. Acid density too low	1. Battery discharged	Charge the battery
	2. Alternator malfunction	Have alternator checked
	3. Short-circuit in wiring	Have electrical system checked
	4. Too much water in acid due to incorrect servicing	Have acid density re-adjusted
4. Acid density too high	Too much acid	Have acid density adjusted
5. Battery output power insufficient. Heavy voltage drop	1. Battery discharged	Recharge battery
	2. Charging voltage too low	Re-adjust or replace voltage regulator
	3. Connection terminals loose or corroded	Clean terminals and apply a thin layer of acid-protection grease Ft 40 v 1 on the underside; tighten terminal screws
	4. Battery capacity insufficient (too many consumers)	Use greater battery. If required, install also stronger alternator; consult specialized workshops
	5. Excessive self-discharge of the batteries due to impurities in the battery acid	Replace the battery
	6. Battery "sulphated" (grey-white layer on the positive and negative plates)	Charge battery with low current to induce decomposition of the layer. If the output is still insufficient after repeated charging and discharging, replace the battery
	7. Battery used up, plate substance no longer active	Replace the battery
	8. Acid level below upper edge of plates	Top up with distilled or de-mineralized water to the prescribed level

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Service fluids

	LW 50 No. 506 101 -		
	Approx. quantity litres (gal)	**Operating hours between changes**	**Grade[2)]**
Engine (including filter)	8,5[1)] (2.25)	500[2)]	CD SE 15W-40
Fuel tank	90 (23.85)	See Engine Oper. Instruction	
Cooling system	15.5 (4.10)	2000[7)]	See Engine Oper. Instruction
Hydraulic system	55[1)] (14.57)	3000[3)]	Multigrade Hydraulic-Oil
Transfer box gearing	1,0[1)] (0.3)	1000[4)]	LS 5-90
Front axle	3,7[1)] (1.0)	1000[4)]	LS 5-90
Rear axle	3,7[1)] (1.0)	1000[4)]	LS 5-90
Axle-planetary gears	4 x 0,6[1)] (4 x 0.16)	1000[4)]	LS 5-90
Lubricating points	2 x for all lube points[6)]	weekly	NLGI-Nr.2[5)]

1) Filling quantities are valid for oil changes and **not** for first filling

2) See Operating Instructions

3) After 3 years at the latest

4) After 1 year at the latest

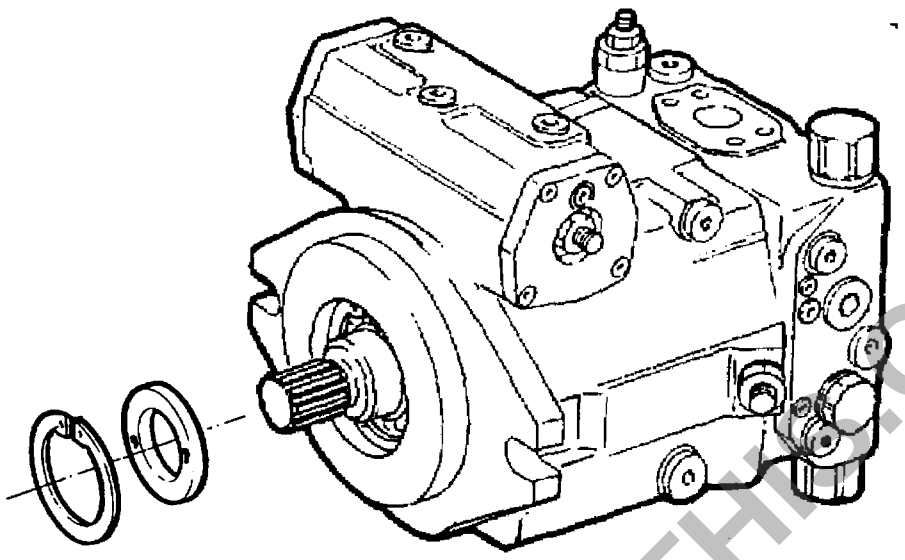
5) At ambient temperatures below 0˚C (32˚F) use grease NLGI-No. 1 or 0.

6) 0.4 kg (0.9 lb) - cartridge

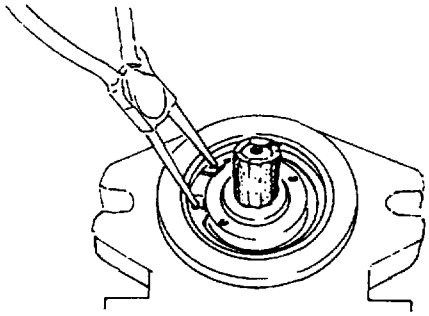
7) After 2 years at the latest

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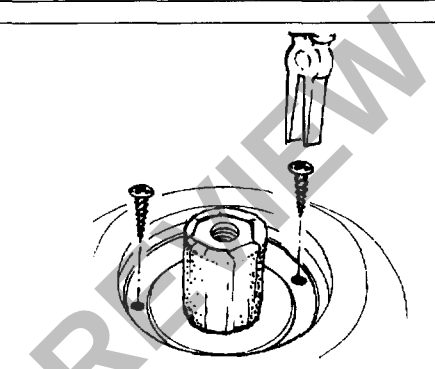


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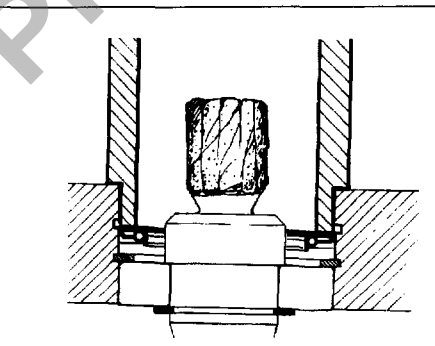
12 Triebwelle abkleben.
Sicherungsring ausbauen.

Protecting the drive shaft.
Remove retaining ring.



13 Blechschraube in die mit Gummi gefüllten Löcher eindrehen.
Mit Zange WDR herausziehen.

Screw in sheet metal screw into the holes fitted with rubber.
Pull out shaft seal with pliers.



14 Wellendichtring mit Buchse auf Anschlag einpressen.

Press-in shaft seal with bush to stop.

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Axle Drive Assembly

Item	Quantity	Description
10	1	Axle drive assembly
12	2	Differential pin
13	4	Bevel gear
14	4	Washer
15	2	Bevel gear
16	2	Disk set
17	10	Outer disk
18	8	Inner disk
20	1	Differential housing
21	1	Bevel gear set
22	12	Fillister-head screw, M 12 - 10.9 M_A = 129 Nm (95 lbft), LOCTITE 243
23	2	Tapered roller bearing
24		Spacing washer, 0.1 mm
25		Spacing washer, 0.3 mm
26		Spacing washer, 0.5 mm
27	1	Housing
28	1	Cap screw
29	1	Cap screw
30	2	Packing ring
36	1	Tapered roller bearing
37		Spacing washer, 0.1 mm
38		Spacing washer, 0.3 mm
39		Spacing washer, 0.5 mm
40	1	Liner
41	1	Liner
42	1	Liner
43	1	Liner
44		Spacing washer, 0.1 mm
45		Spacing washer, 0.3 mm
46		Spacing washer, 0.5 mm
47	1	Tapered roller bearing
48	1	Shaft ring
49	1	Cap
50	1	Flange
51	1	Collar unit M_A = 200 Nm (148 lbft), LOCTITE 243

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FOREWORD

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This **Technical Handbook (THB)** has been written with **the servicing mechanic** in mind and contains important information required to carry out repair and servicing procedures.

Read through the **Technical Handbook**, but also the **Operating Instructions** for the **NEW HOLLAND CONSTRUCTION Wheel Loader** before commencing any servicing or repair work. The **Technical Handbook**, as well as the **Operating Instructions** and **Spare Parts List** should be used as a source of reference and assistance - even when the user is well acquainted with the range of NEW HOLLAND CONSTRUCTION Wheel Loaders.

Using the Technical Handbook allows the experienced mechanic to carry out repair work in a correct manner.

Using the Technical Handbook

The Technical Handbook is divided into main and sub-groups that deal with the machine as actually delivered. Any auxiliary attachments or optional upgrading introduced later are not described.

The main table of contents allows to find the required information quickly.

For the sake of clarity, the illustrations have been simplified and can therefore differ slightly from the actual appearance of the machine.

Servicing and repair

Servicing and repair work should be carried out as soon as possible. This keeps overall servicing & repair costs to a minimum and increases the availabilily of the NEW HOLLAND CONSTRUCTION Wheel Loader.

During servicing and repair work, always follow the instructions contained in the Technical Handbook and Operating instructions.

The **NEW HOLLAND CONSTRUCTION After Sales Service** is always available for assistance and advice.

□

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Umrechnungstabelle für Einheiten der mechanischen Spannung (Festigkeit)
Conversion table for units of mechanical stress (strength)

mit 1 Pa = 1 N/m^2 = $\frac{1}{9{,}81}$ kp/m^2 = 0,102 kp/m^2

	Pa	N/mm^2	daN/cm^2	daN/mm^2	kp/cm ^{2}	kp/mm^2
1 Pa (= 1 N/m^2) =	1	10^{-6}	10^{-5}	10^{-7}	0,102 x 10^{-4}	0,102 x 10^{-6}
1 N/mm^2 (=1 M Pa) =	1 000 000	1	10	0,1	10,2	0,102
1 daN/cm^2 (= 1 bar) =	100 000	0,1	1	0,01	1,02	0,0102
1 daN/mm^2 (= 1 hbar) =	10 000 000	10	100	1	102	1,02
1 kp/cm^2 (= 1 at) =	98 100	0,0981	0,981	0,00981	1	0,01
1 kp/mm^2 =	9 810 000	9,81	98,1	0,981	100	1

□

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Depressurizing the hydraulic system

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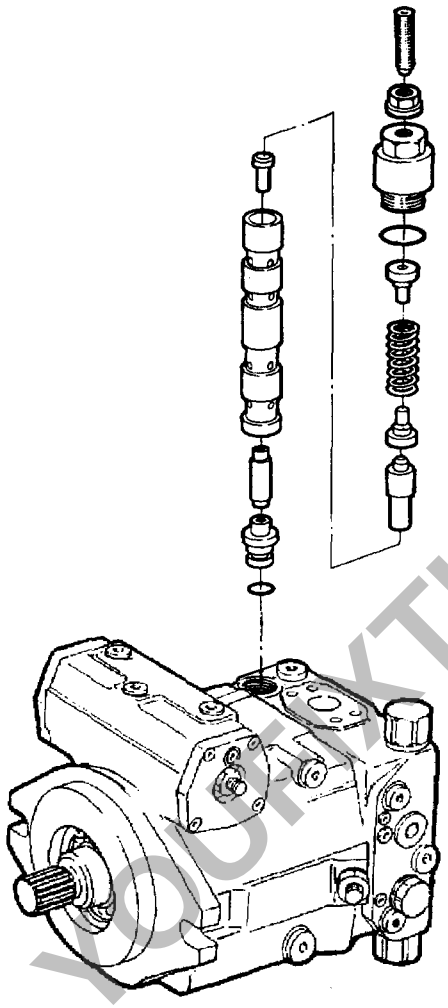
Before starting work, depressurize the hydraulic system:

- Secure the machine as described under "Securing the machine".
- Move control lever for operating equipment and 3rd function in all directions until the operating equipment makes no further movement.

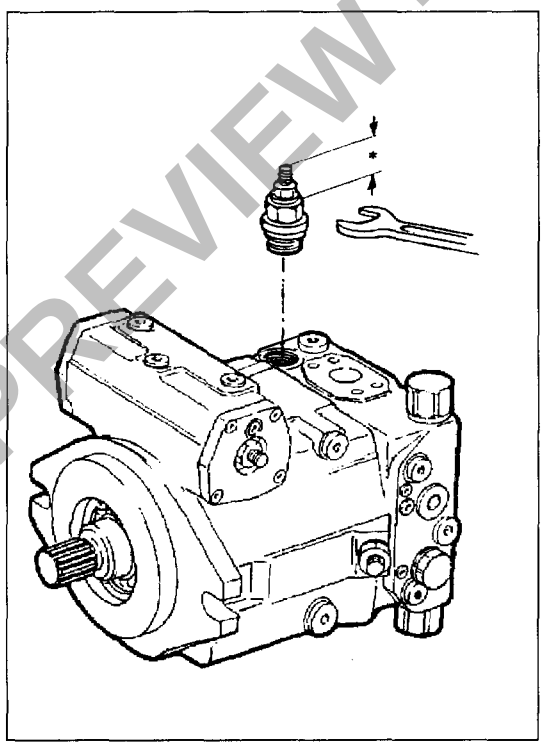
The residual pressure in the operating equipment is then discharged. □

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31



33 Wechsel der Dichtmutter.
Einstellmaß festhalten (*).

Change of the sealing nut.
Note setting measure (*).

Achtung!
Nach Einbau "Ventileinstellung" überprüfen.

Attention!
After assembly check "valve setting".

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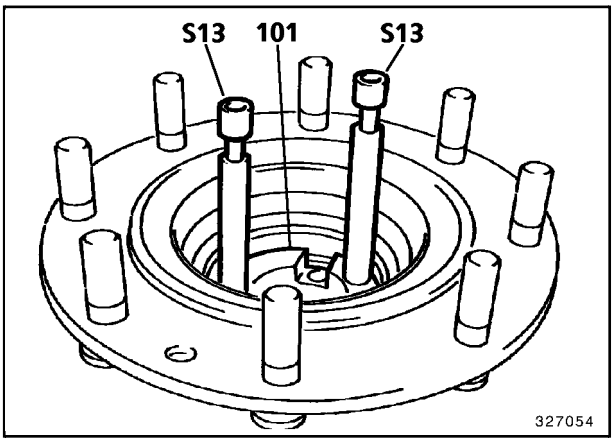


Fig. 12

Screw two pins of mounting fixture (S13) into axle tube (101).

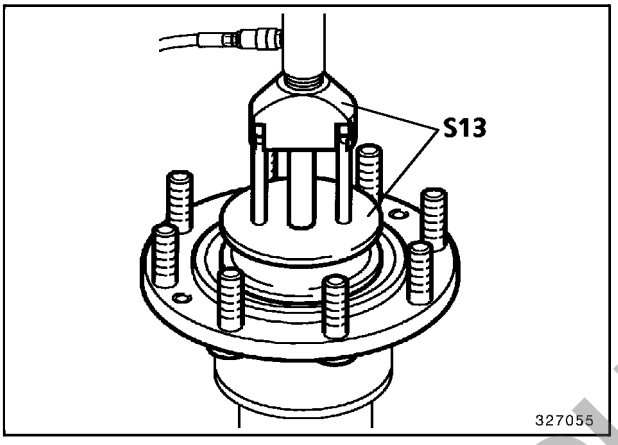


Fig. 13

Apply mounting fixture (S13) with screwed-in cylinder for conventional hydraulic presses (Lukas).

Fully press hub onto axle tube.

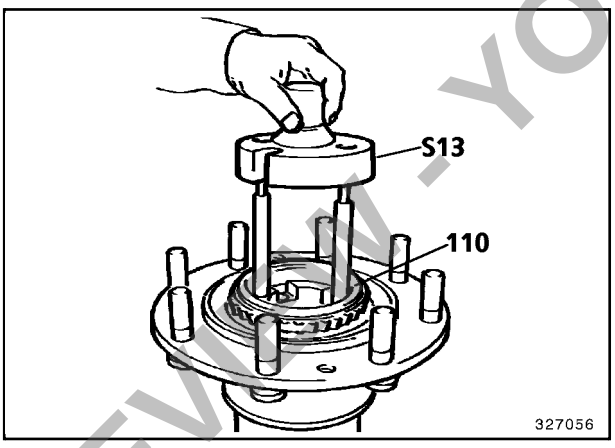


Fig. 14

Insert tapered roller bearing (110).

Apply new die of mounting fixture (S13) to bearing ring.

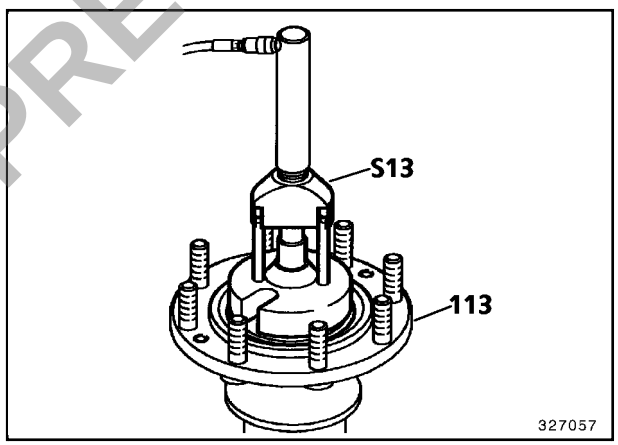


Fig. 15

Increase pressure of hydraulic press to approx. 200 bar (2903 psi). Give hub a few taps with plastic mallet for settling.

Reduce pressure to 50 bar (726 psi) and turn hub (113) by hand. This value yields the axial prestress of 0.05 - 0.15 mm required for new tapered roller bearings (110).

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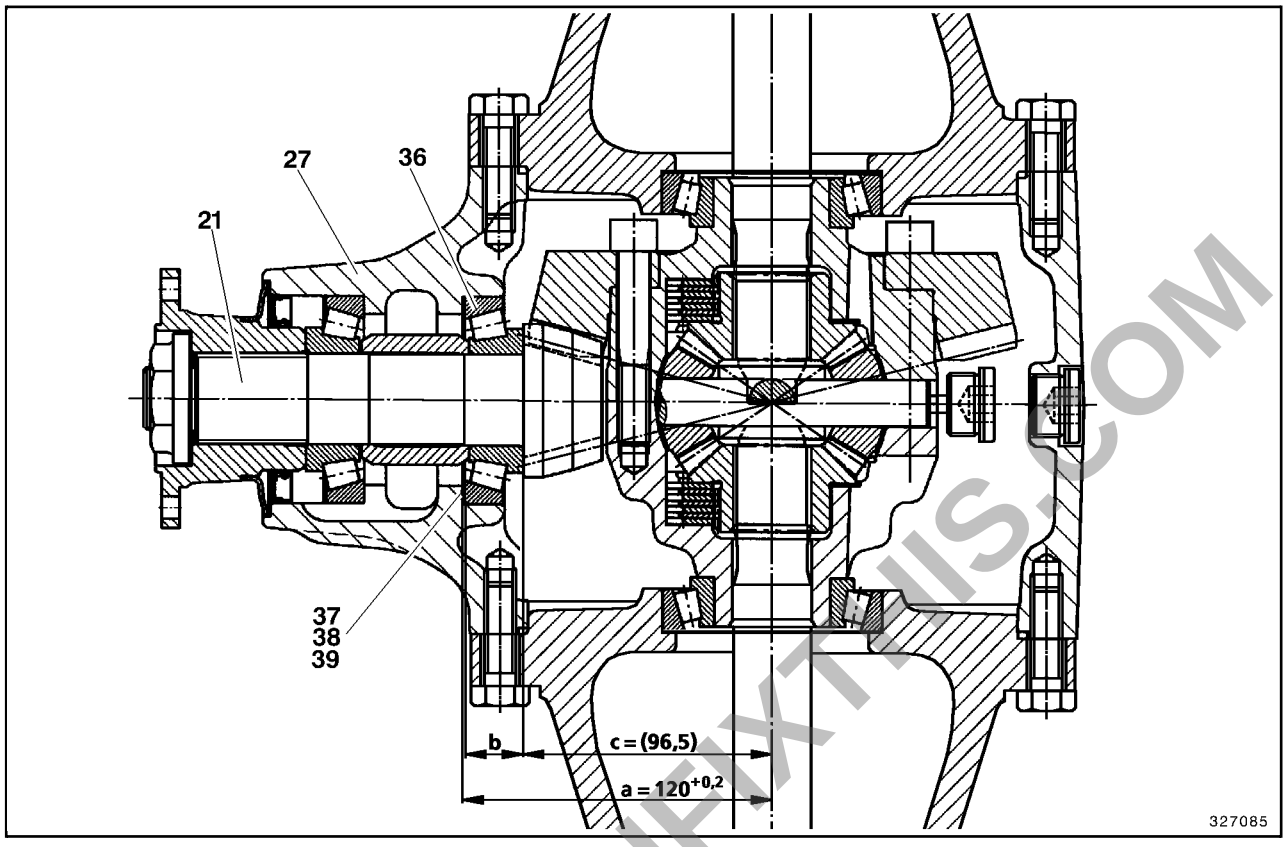


Fig. 7

Calculating Spacing Washers (37-39)

Original Dimensions (Fig. 23):

a : Bearing seat nominal dimensions = 120 $^{+02}$ mm

a1 : For deviation to be read off housing (27), refer to Fig. 20.

b : Measure width of tapered roller bearing (36).

c : Pinion shaft nominal dimension = (96.5 mm)

c1 : Read deviation (+ or -) off pinion shaft (21). Refer to Fig. 21.

Example 1:

a	120.00 mm
a1	+ 0.10 mm
	120.10 mm
b	- 23.00 mm
c	- 96.50 mm
	0.60 mm
c1 = + 0.10 ->	- 0.10 mm
	0.50 mm

1 no. of spacing washer 0.5 mm

Example 2:

a	120.00 mm
a1	+ 0.10 mm
	120.10 mm
b	- 23.00 mm
c	- 96.50 mm
	0.60 mm
c1 = - 0.10 ->	+ 0.10 mm
	0.70 mm

2 nos. of spacing washers 0.3 mm
1 no. of spacing washer 0.1 mm

Spacing washers (37 - 39): 0.1 - 0.3 - 0.5 mm thick.
If possible, keep number of inserted spacing washers small.

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Steering valve (L2)

2800935

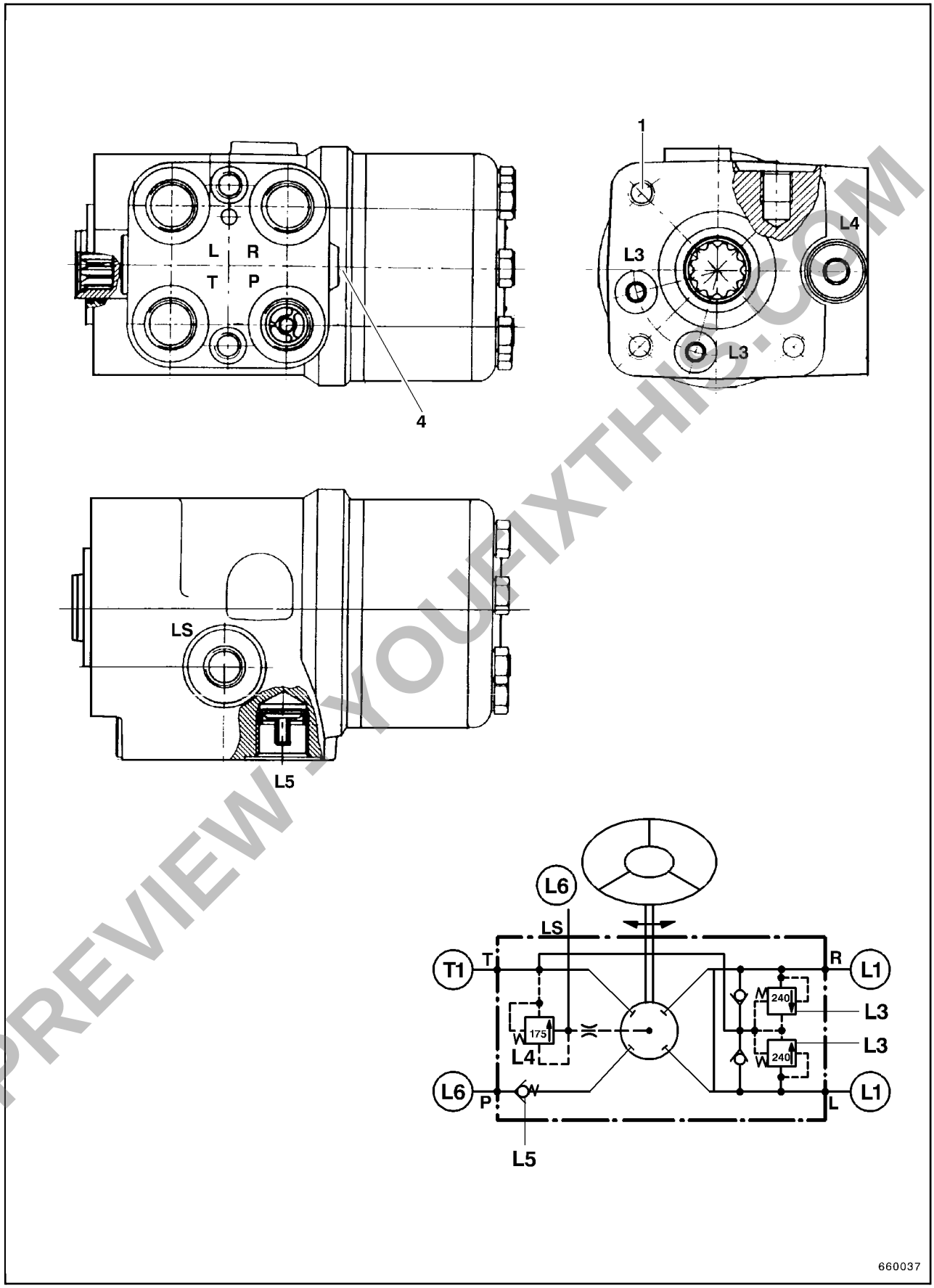


Fig. 7

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Control block (H6)

Parts Fig. 2

H6 - Control block
H7 - Secondary valve, rearward tilting
H8 - Secondary valve, dumping
H9 - Primary valve
H10 - Replenishing valve
H11 - Pressure-maintaining valve, lifting / lowering
H12 - Pressure-maintaining valve, rearward tilting / dumping
H13 - Pressure-maintaining valve, 3rd function
H14 - Control piston, lifting / lowering
H15 - Control piston, rearward tilting / dumping
H16 - Control piston, 3rd function

Connection designations

Designation at block	Use	Thread
A	Oil to operating equipment / cylinder	M 18 x 1.5
B	Oil to operating equipment / cylinder	M 18 x 1.5
P	Pressure oil from priority valve	M 22 x 1.5
T	Tank reflow via distributor (part T5)	M 26 x 1.5

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Low-maintenance batteries

The electrolyte level of low-maintenance batteries should be checked at least once a year. If the electrolyte level drops below the "min" mark, the cells must be topped up with distilled water.

If the battery is disconnected from the vehicle electrical system for recharging, it must be charged with a current corresponding to 1/10 of the nominal capacity of the battery.

Important:
During the charging process, batteries give off highly explosive gases. Batteries must only be charged in well ventilated rooms provided for this purpose. Fire, unshielded light and smoking are prohibited.
The safety regulations pertaining to battery handling must always be observed.

Checking the battery

1) Acid density is the most important indicator of battery charge. The degree to which a battery is charged can therefore be determined by measuring the acid density. The acid density is measured with a hydrometer. The density can be read on the scale of this hydrometer.

Density values of diluted sulphuric acid

Charge condition	Type of battery	Acid density kg/l[1])	Freezing point °C
charged	normal type	1.28	- 68
	tropicalized type	1.23	- 40
half charged	normal type	1.16 / 1.20	- 17 ... - 27
	tropicalized type	1.13 / 1.16	- 13 ... - 17
discharged	normal type	1.04 / 1.12	- 3 ... - 11
	tropicalized type	1.03 / 1.08	- 2 ... - 8

2) Starting test
Starting tests are carried out by measuring the battery voltage under load conditions with a battery tester.

For batteries of the one-piece cover type, battery testers for 12 volts are used. The battery tester measures the voltage by applying a load resistor across the battery terminals, so that a current of 300 A flows for abt. 5 seconds through this resistor. The voltage is an approximate measure of the battery's starting capability. The admissible minimum voltage limit is fixed at 8 V = 1.33 V/cell. When the voltage is measured with the battery tester, it is important that the measuring probes and the terminal posts are in good contact.

3) Measuring results
If the acid density is insufficient, but if the starting test is satisfactory, the battery will in most cases only need recharging.
If the acid density and the starting test are unsatisfactory, the battery must only be charged with a low current of 6 A.
If the acid density is sufficient (e.g. after successful charging), but if the starting test is unsatisfactory, the battery is in most cases no longer useful.
If the acid densities of the cells or the battery voltages during the starting test differ considerably when the batteries are charged, or if they are even unsatisfactory, it is recommended to discard the battery.

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Symbols for directions of motion



Linear motion, e.g. to the right



Linear motion, in both directions



Rotary motion, e.g. to the left



Rotary motion, in both directions

3280891

□

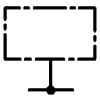
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Miscellaneous

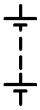

1-pole automotive plug


Assembly, unit


Shielded assembly with connection to ground


Cigarette lighter

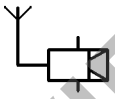

Fuse


Battery


Thermocouple (temperature probe)


Light beam


Heating element (f.ex. glow plug)


Radio / receiver


Speaker


Capacitor


Capacitor, polarized


Engine speed transducer with digital output signal (pick-up)

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Frame, Safety Instructions 2801917

DANGER

Read and observe the operating instruction: "Inspection and Servicing, Safety Instructions".

Secure the machine as described in the operating instruction: "Securing the machine".

□

Repairing the loader frame 2801061

Exchanging the main pivot parts

The articulated joint links the front frame with the rear frame of the chassis.

It consists of:

- pin (8)
- joint bearings (9)
- tapered split rings (3)
- rings (4)
- lids (2) and screws (1)

Dismantling

Note: For replacing the pivot pin parts separate the front frame section from the rear frame section.

- Place loader on solid and level ground. Relieve bucket from load burden.
- Separate both steering cylinders from front frame section by removing the pins. Remove hose holding brackets.

  Remove universal shaft from gear-box.
- Block up with wood under booth sides of oscillating axle.
- Block up under front frame section. Place mobile jack under rear frame section near the main pivot and take rear frame section at lift with a mobile crane and remove rear frame section.

  Attention: Before removing the pivot parts secure front and rear frame against tilting, articulating and rolling away.
- Remove screws (1, Fig. 2) and take off lids (2).
- Give the bottom of pin (8) a blow with a hammer to detach split rings (3).
  Remove lower split rings (3) and ring (4).
- Drive out pin (8) from the bottom using a hydraulic device fo this work.
- **Attention:** When pressing pivot pin out or in release rear section in the main pivot from load burden or center the main pivot.

  Make sure the front and rear frames do not jam when pressing the pin in or out. The pin bores must be in alignment.

  Note: Use pivot secure when the loader is transported by loading or shipping or in case of maintenance or resp. repairs.
- Separate front and rear frame and secure against inadvertent movements.
- Remove screws (5) and take off lid (6) and disk (7).
- Take a sleeve or a piece of pipe and hold against the outer ring of lower joint bearing (9). Drive bearing upwards with caution until an extractor can be applied between upper joint bearing (9) and sleeve (10).

  Note: Do not drive lower joint bearing out of its seat. The bearing can then no longer be removed from the frame.
- Withdraw upper joint bearing (9).
- Withdraw lower joint bearing and remove sleeve (10).

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Double-hex bolts (Fig. 3)

When limited space is available, and therefore whenever SAE flange couplings are being used, double-hexagon bolts are used. They have metric threads (DIN 13), material quality 10.9 (DIN 267) and surface protection A3B (DIN 267).

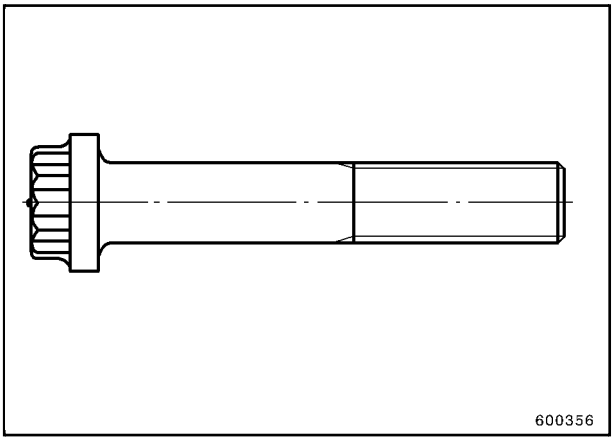


Fig. 3

Double-hex bolts bring the following advantages:

- high rust resistance - bolts are galvanized
- small wrench sizes, e.g. M 10 requires only wrench size 11 (the same size of hex. bolt requires size 17)
- tidy, positive tightening using standard ring spanners and socket spanners
- no danger of head becoming clogged, as with hexagon sockets
- easier positioning of wrench, due to twelve-sided head

Sizes of bolts available can be found in Table 2 (Appendix).

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