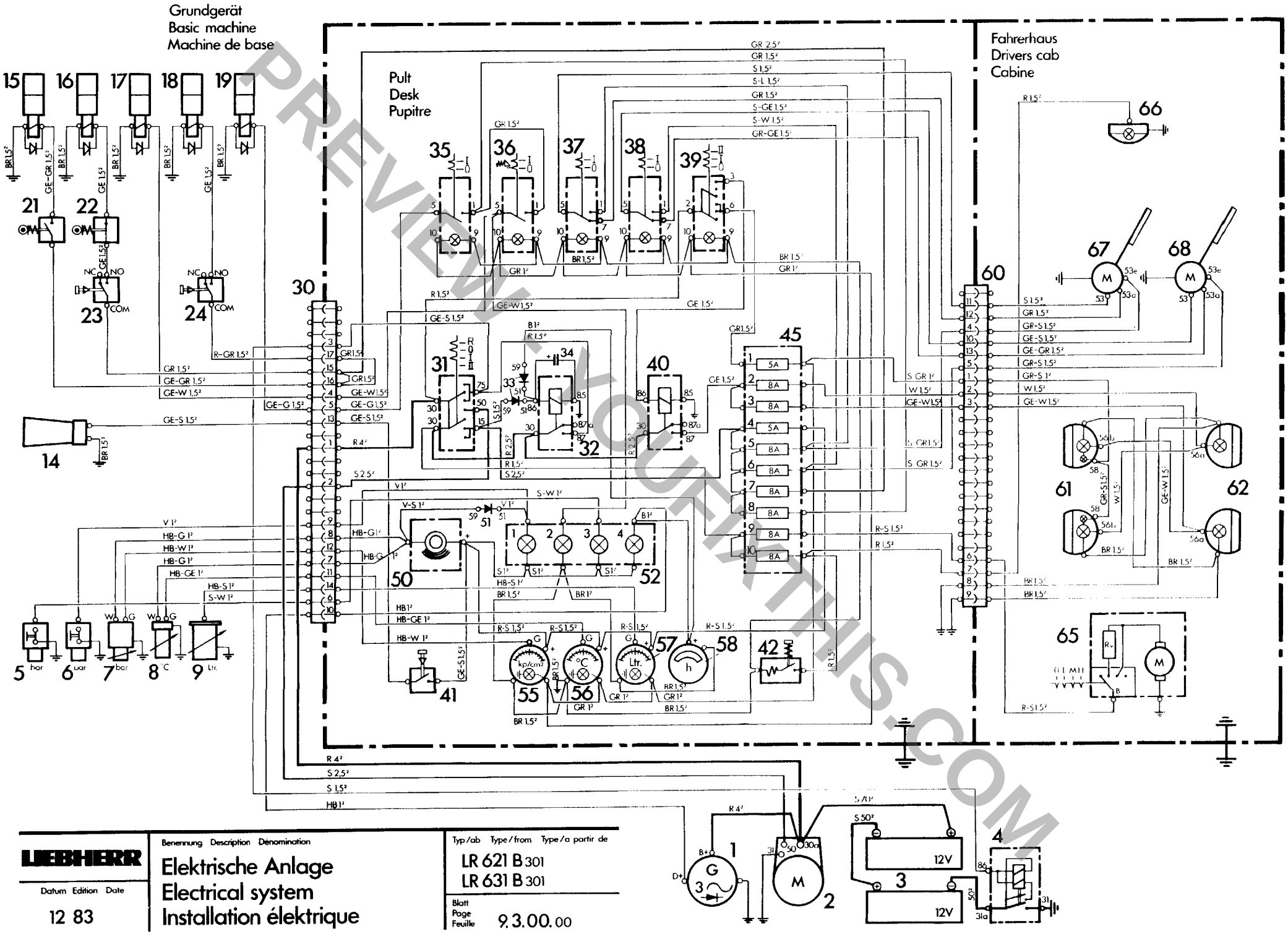


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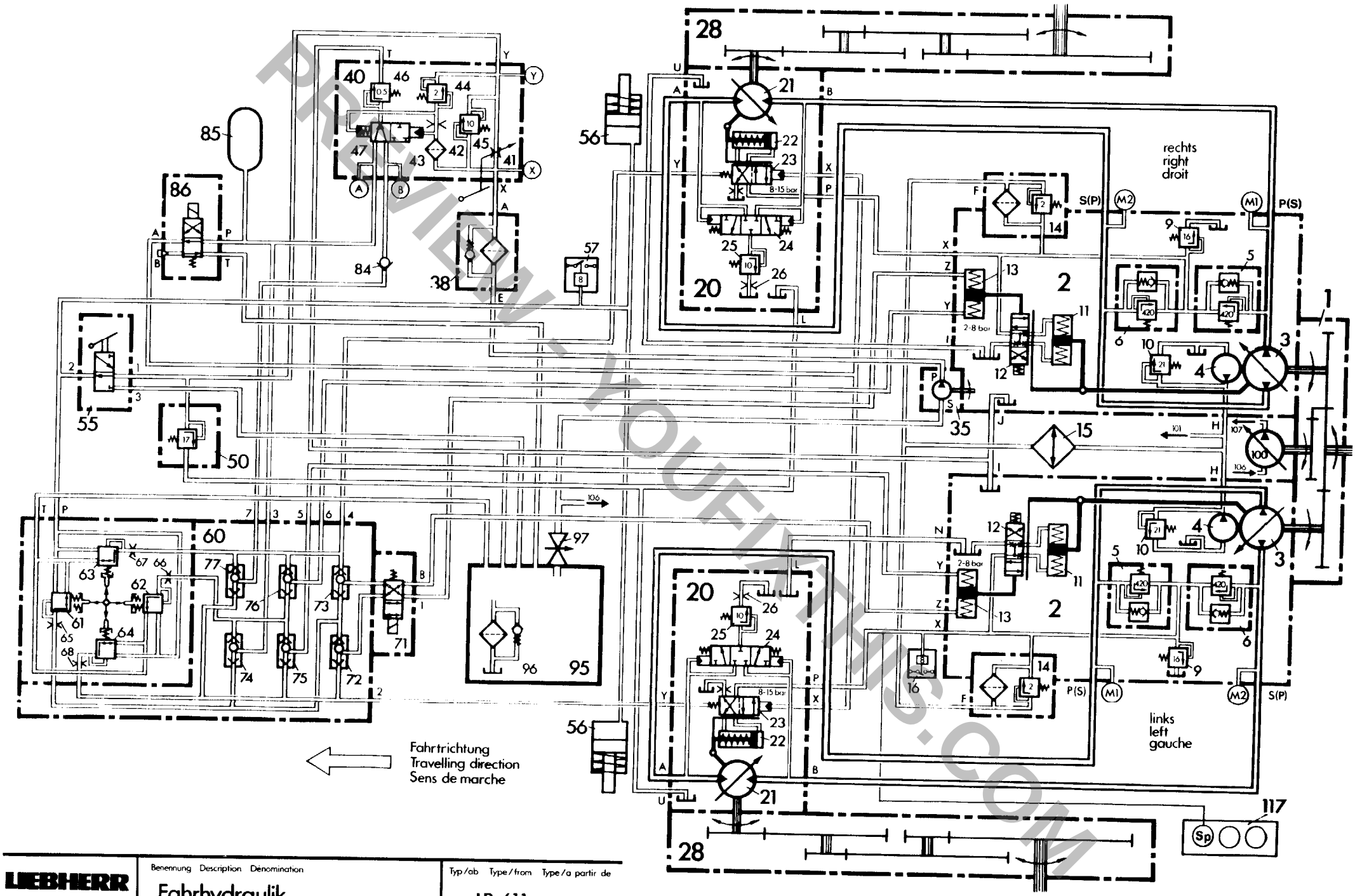
Datum Edition Date
12 83

Benennung Description Dénomination

Elektrische Anlage
Electrical system
Installation électrique

Typ/ab Type/from Type/a partir de
LR 621 B 301
LR 631 B 301

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Page
Feuille
9.3.00.00



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Datum Edition Date
02 85

Benennung Description Dénomination
Fahrhydraulik
Travel hydraulic
Hydraulique de translation

Typ/ab Type/from Type/a partir de
LR 611 102

Blatt
Page
Feuille
6.3.10.00

Installation preload F_M and tightening torques M_A per DIN 13 part 13, wrench sizes of hex head screws per ISO 4014, socket head screws per DIN 912.

Beginning with grade 10.9, the use of lock washers does no longer provide safety.

For special screws, such as Durlock or Tensilock, the tightening torques of the manufacturer should be observed.

When using impact wrenches, care must be taken so that the torque values are not exceeded. (Tightness must be checked with a torque wrench).Nm x 0.7375 = ft. lbs.

Use always torque wrenches with correct measuring range (upper third of range should include the listed torque value).

Specific torques listed in drawings and or descriptions must be observed.

Tightening torques for screws with standard metric thread

⚠ **Surface of bolts**: "black" or "5 µm white zinc-plated A2E"

Screw size	Preload values F_M based on Grades in N			Tightening torques M_A based on Grades in Nm			Wrench size for Hex head-screw		Wrench size for Socket head-screw	
	8.8	10.9	12.9	8.8	10.9	12.9	mm	inch	mm	inch
M 4 × 0,7	3 900	5 700	6 700	3,1	4,5	5,3	7	9/32	3	---
M 5 × 0,8	6 400	9 300	10 900	6,1	8,9	10,4	8	5/16	4	5/32
M 6 × 1	9 000	13 200	15 400	10,4	15,5	18,0	10	---	5	---
M 7 × 1	13 100	19 300	22 600	17,0	25,0	30,0	11	---	---	---
M 8 × 1,25	16 500	24 200	28 500	25	37	43	13	1/2	6	---
M 10 × 1,5	26 000	38 500	45 000	51	75	87	(17) 16	(11/16)--	8	5/16
M 12 × 1,75	38 500	56 000	66 000	87	130	150	(19) 18	(3/4)--	10	---
M 14 × 2	53 000	77 000	90 000	140	205	240	(22) 21	(7/8)--	12	---
M 16 × 2	72 000	106 000	124 000	215	310	370	24	---	14	9/16
M 18 × 2,5	91 000	129 000	151 000	300	430	510	27	1-1/16	14	9/16
M 20 × 2,5	117 000	166 000	194 000	430	620	720	30	1-3/16	17	---
M 22 × 2,5	146 000	208 000	243 000	580	970	830	(32) 34	---	17	---
M 24 × 3	168 000	239 000	280 000	740	1 060	1 240	36	1-7/16	19	3/4
M 27 × 3	221 000	315 000	370 000	1 100	1 550	1 850	41	1-5/8	19	3/4
M 30 × 3,5	270 000	385 000	450 000	1 500	2 100	2 500	46	1-13/16	22	7/8
M 33 × 3,5	335 000	480 000	560 000	2 000	2 800	3 400	50	2	24	---
M 36 × 4	395 000	560 000	660 000	2 600	3 700	4 300	55	2-3/16	27	1-1/16
M 39 × 4	475 000	670 000	790 000	3 400	4 800	5 600	60	2-3/8	27	1-1/16

⚠ **Note:** Preload forces and tightening torques are based on lightly lubricated screws and nuts (corresponds to medium friction $\mu_G = 0,14$).
Wrench sizes (x) = former wrench size per DIN 931.

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Work to be done -At service meter hours (smh)	delivery	250	500	1000	maintenance intervals (normal) in smh
DAIMLER - BENZ ENGINE OM 352					
Check oil level	○	○	○	○	8 - 10
Change oil and filter as outlined in the D.B. Operating instruction booklet. Normal conditions.	○	10 to 30 smh			
		○	○	○	250
Retighten cylinder head bolts (100 - 110 Nm)	○	10 to 30 smh			
Adjust valves (intake 0,20 mm, exhaust 0,30 mm)	○	10 to 30 smh			
		○	○	○	500
Check coolant level (if necessary check anti-freeze protection)	○	○	○	○	8 - 10
Drain water from fuel filter/water separator (only USA) - clean filter as necessary		○	○	○	250
Change fuel filter			○	○	500
Drain water and sediment from fuel tank		○	○	○	250
Check crankcase breather				○	1000
Clean air precleaner		○	○	○	as necessary
Change air cleaner element (main and safety)				○	as necessary
Check and maintain linkage to injection pump	○	○	○	○	250
Check tension and condition of V-belts	○	○	○	○	250
Check starter and alternator (maintain as necessary)			○	○	500
Grease fly wheel ring gear				○	1000
Check engine and radiator for dirt		○	○	○	8 - 10
Check engine for - oil, air-intake, coolant, fuel leaks	○	○	○	○	8 - 10
Check all bolts and nuts - especially the engine mounts for tightness	○	○	○	○	250
Perform additional checks and maintenance as outlined in the D.B. Operating instruction booklet.				○	1000
HYDRAULIC SYSTEM					
Check oil level (hydraulic tank)	○	○	○	○	8 - 10
Change hydraulic oil (Add oil through return filter only) 161 ltr.					2000
Check splitter box oil level	○	○	○	○	250
Change splitter box oil 1,6 ltr SAE 90		○	○	○	500
Clean magnetic rod daily - (8 smh) for the first 250 smh	○	○	○	○	250
Change filter-element (hydraulic - tank)		○	○	○	500
Change travel pump filters (2 filters)		○	○	○	500
Change filter- element (servo-circuit)		○	○	○	500
Clean filter (screen) at hydraulic travel pumps and motors (4 filters)					2000
Drain condensat and sediment from hydraulic - tank (at least every six months)			○	○	500
Check oil cooler for dirt		○	○	○	250/ or as necessary
Check working and travel hydraulic system for leakage and correct function.	○	○	○	○	250
Check all hydraulic hoses for chafing	○	○	○	○	250

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Oil filter element

1. Removal

1.1 In the case of hanging or horizontal oil filters, unscrew the drain plug on the filter housing and drain the oil. Upright oil filters empty themselves when the engine is switched off.

1.2 Unscrew the oil filter housing and remove complete with filter element

1.3 Remove the full-flow filter element and O-ring seal. Check the filter element for abnormal deposits.



2. Assembly

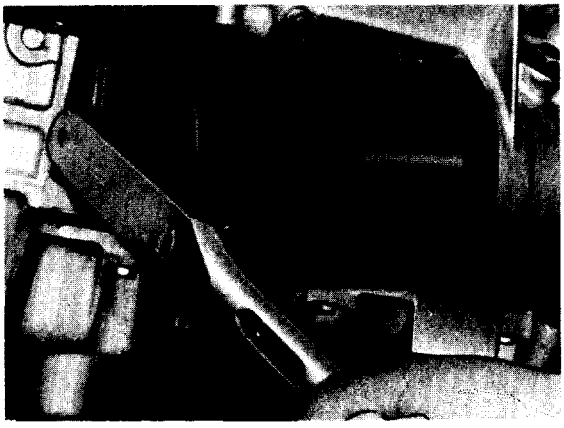
2.1 Place the new main filter element and O-ring seal in position

2.2 Centre the oil filter housing on the filter base. Tighten the centre bolt and the drain plug to 50 Nm. For horizontal filters the drain plug must be at the lowest point.



2.3 Turn the engine on the starter until the oil pressure indicator responds. The engine must not be started. The throwout must be disengaged.

2.4 Start the engine and check the oil filter for leaks.



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1 Housing

2 Input shaft
3 Shaft seal
4 Grooved ball bearing
5 Grooved ball bearing
6 Bearing flange
7 Snap ring
8 Dowel pin
9 O-ring
10 Ring

15 Spur gear
16 Grooved ball bearing
17 Grooved ball bearing
18 Deflector shield
19 Bearing flange
21 Snap ring
22 Roll pin
23 O-ring

25 Stud
26 Hex nut
27 Washer

30 Spur gear
31 Grooved ball bearing
32 Grooved ball bearing
33 Deflector shield
34 O-ring
35 Snap ring
36 Roll pin
37 Bearing flange

38 Stud
39 Hex nut
40 Washer

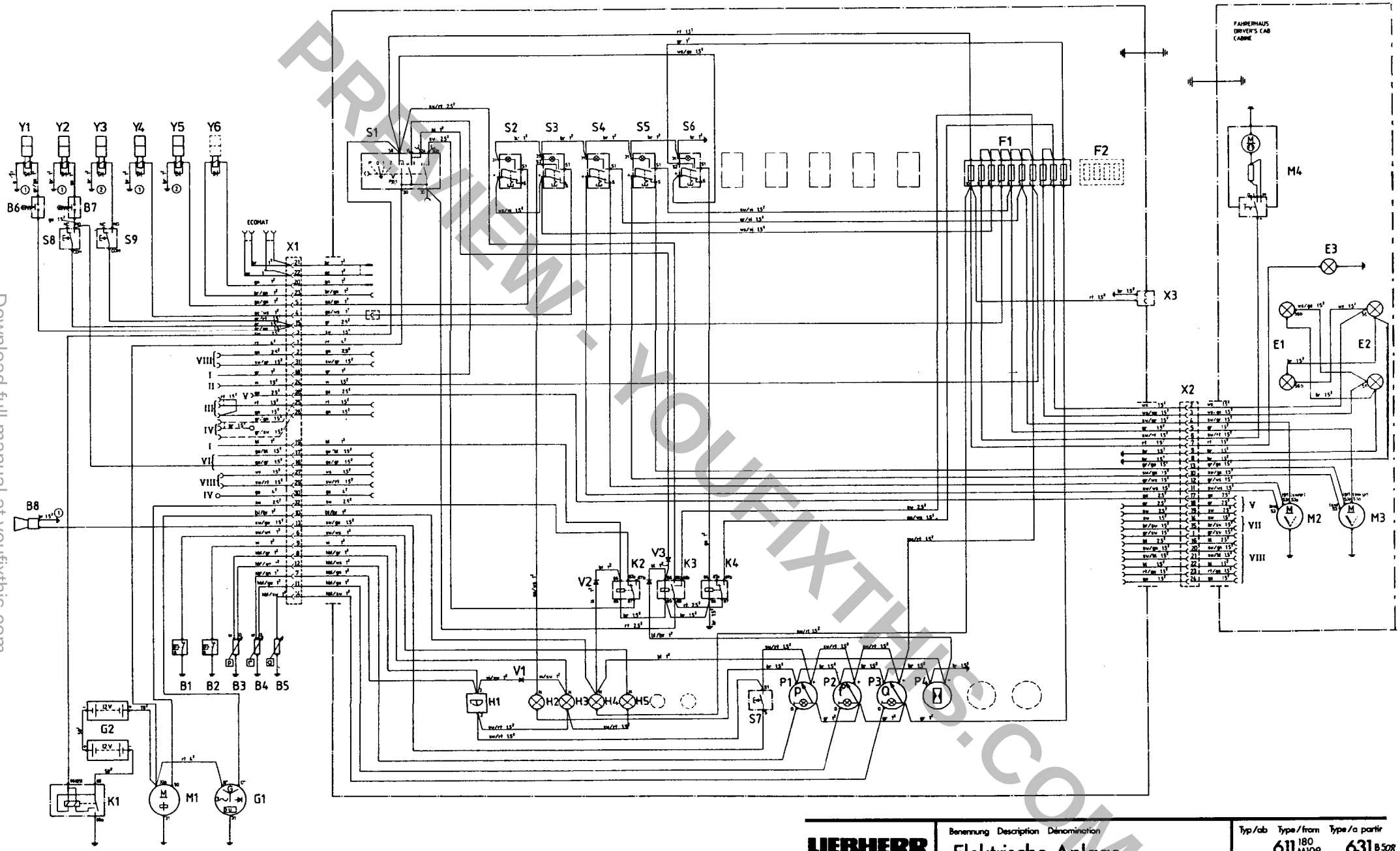
42 Intermediate flange
43 O-ring

45 Drain valve
46 Seal ring

50 Oil dipstick complete
52 Plug with seal ring

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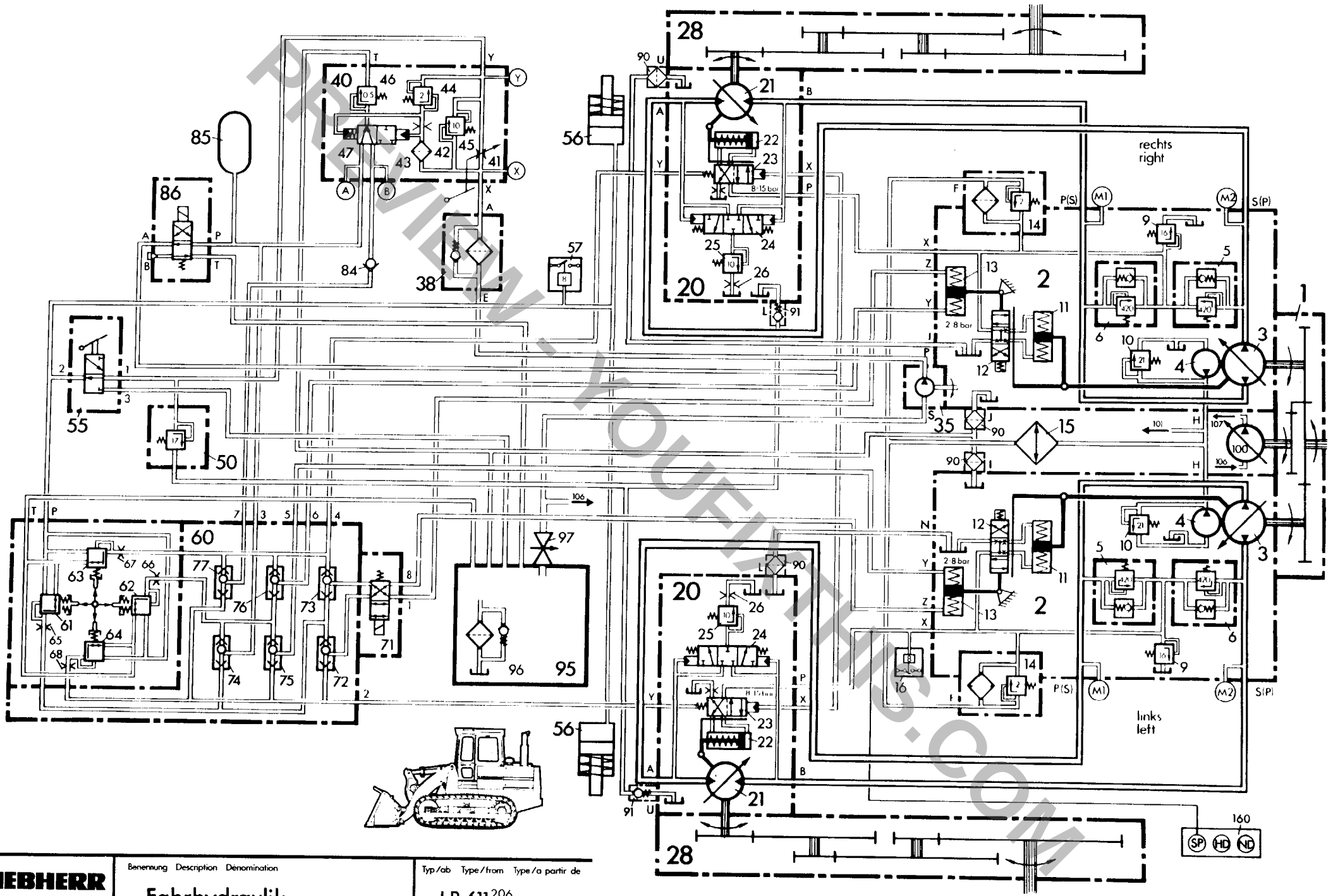
LIEBHERR

Datum Edition Date
11 86

Benennung Description Dénomination
Elektrische Anlage
Electrical system
Installation électrique

Typ/ab	Type/from	Type/a partir
LR	611 180 M109	631 B 508
	621 B465 BM301	641 102

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LIEBHERR	Benennung Description Dénomination: Fahrhydraulik / Travel Hydraulics	Typ/ab Type/from Type/a partir de: LR 611 206/M119
Datum Edition Date: 02 87		Blatt Page Feuille: 6.3.11 .00

Tightening torques for screws with fine metric thread

Screw Size	Preload values F_M based on Grades in N			Tightening torques M_A based on Grades in Nm			Wrench size for Hex head-screw		Wrench size for Socket head-screw	
	8.8	10.9	12.9	8.8	10.9	12.9	mm	inch	mm	inch
M 8 × 1	18 100	26 500	31 000	27	40	47	13	1/2	6	---
M 9 × 1	23 800	35 000	41 000	40	58	68	---	---	---	---
M 10 × 1	30 500	44 500	52 000	57	84	98	17	11/16	8	5/16
M 10 × 1,25	28 500	41 500	48 500	54	79	93	17	11/16	8	5/16
M 12 × 1,25	43 000	64 000	74 000	96	140	165	19	3/4	10	---
M 12 × 1,5	40 500	60 000	70 000	92	135	155	19	3/4	10	---
M 14 × 1,5	58 000	86 000	100 000	150	220	260	22	7/8	12	---
M 16 × 1,5	79 000	116 000	136 000	230	340	390	24	---	14	9/16
M 18 × 1,5	106 000	152 000	177 000	350	490	580	27	1-1/16	14	9/16
M 18 × 2	98 000	140 000	164 000	330	460	540	27	1-1/16	14	9/16
M 20 × 1,5	134 000	191 000	224 000	480	690	800	30	1-3/16	17	---
M 22 × 1,5	166 000	236 000	275 000	640	920	1 070	32	---	17	---
M 24 × 1,5	200 000	285 000	333 000	830	1 180	1 380	36	1-7/16	19	3/4
M 24 × 2	189 000	270 000	315 000	810	1 160	1 350	36	1-7/16	19	3/4
M 27 × 1,5	258 000	367 000	430 000	1 200	1 710	2 000	41	1-5/8	19	3/4
M 27 × 2	245 000	350 000	410 000	1 190	1 700	2 000	41	1-5/8	19	3/4
M 30 × 1,5	323 000	460 000	538 000	1 670	2 370	2 780	46	1-13/16	22	7/8
M 30 × 2	309 000	440 000	515 000	1 610	2 300	2 690	46	1-13/16	22	7/8
M 33 × 1,5	396 000	563 000	659 000	2 220	3 170	3 710	50	2	24	---
M 33 × 2	380 000	540 000	630 000	2 250	3 200	3 700	50	2	24	---
M 36 × 1,5	475 000	677 000	792 000	2 910	4 140	4 850	55	2-3/16	27	1-1/16
M 36 × 3	425 000	610 000	710 000	2 800	3 900	4 600	55	2-3/16	27	1-1/16
M 39 × 1,5	562 000	801 000	937 000	3 720	5 300	6 200	60	2-3/8	27	1-1/16
M 39 × 3	510 000	720 000	850 000	3 600	5 100	5 900	60	2-3/8	27	1-1/16

Note: Preload forces and tightening torques are based on lightly lubricated screws and nuts (corresponds to medium friction $\mu_G = 0{,}14$).

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	LR 611 Work to be done -At service meter hours (smh)	delivery	250	500	1000	maintenance intervals (normal) in smh
	Check all hydraulic pressures	○	○	○	○	500
	Check all bolts and nuts for tightness	○	○	○	○	500
ELECTR. SYSTEM	Check battery electrolite level - clean connections. Check battery condition and charge.	○	○	○	○	250
	Check system and instruments for correct function	○	○	○	○	8 - 10
HEATER FRESH AIR	Check system for function and leakage.	○	○	○	○	250
	Check cab filters					as necessary
TRAVEL GEAR	Check oil level	○	○	○	○	250
	Change gear - oil 2 x 18 ltr. SAE 90			○		2000
	Check bolts and nuts for tightness	○	○	○	○	250
	Check brake for correct function	○	○	○	○	500
TRACK COMPONENTS	Clean undercarriage					as necessary
	Check bolts and nuts for tightness. (First check at 50 smh)	○	○	○	○	250
	Check carrier rollers, track rollers and front idlers for leakage.	○	○	○	○	250
	Check track tension - 2 cm slack between carrier roller and idler.	○	○	○	○	as necessary
	Check idler guides.		○	○	○	250
	Check wear of undercarriage.		○	○	○	250
ATTACHMENTS	Check all bearings for clearance and maintenance - lubricate.	○	○	○	○	8 - 10
	Check hoist limiter bucket return and stops.		○	○	○	250
	Check all bolts and nuts for tightness.	○	○	○	○	250
	Check wear of cutting edges, end bits and ripper teeth.		○	○	○	8 - 10
	Check attachment for wear and damage.		○	○	○	250
GENERAL	Check machine for condition and proper maintenance.	○	○	○	○	
	Explain proper use maintenance to operator.	○	○	○	○	
	Advice Owner/Operator to use only original LIEBHERR replacement parts, Example: Filters, Seals, Hoses and other wear and tear items.	○	○	○	○	

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Fuel filter element

1. Removal and assembly

1.1 Unscrew the filter housing, take out the filter element and clean the housing with fuel.

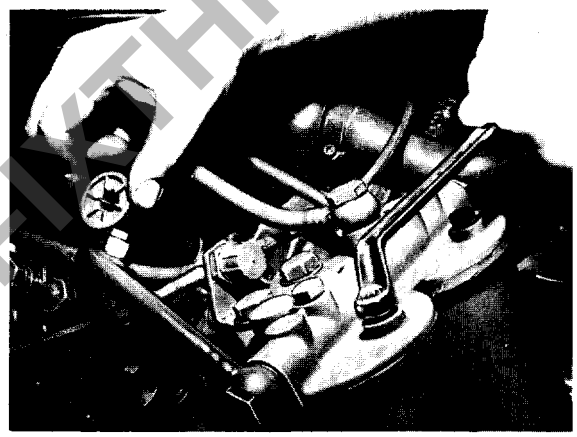
1.2 Remove seal ring and install a new one.

1.3 Put the filter housing with the new filter element on the filter base and tighten to 20 Nm.

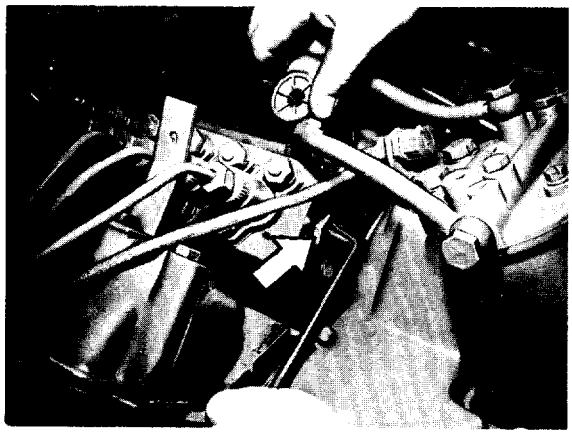


2. Ventilation

2.1 Loosen the vent bolt at the fuel filter for two turns. Operate the hand pump until fuel leaks out bubble-free at the vent bolt. Tighten vent bolt. Venilate step filters separately (if step filters are present).



2.2 Loosen the vent bolts at the injection pump and repeat the ventilation process.



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1 Housing

2 Input shaft
3 Shaft seal
4 Roller bearing
5 Roller bearing
6 Bearing flange
7 Ring
8 O-ring
9 Socket head screw

15 Spur gear
16 Roller bearing
17 Bearing flange
18 Countersunk screw
19 Stop
20 O-ring

25 Stud (stickled)
26 Hex nut
27 Washer

30 Spur gear
31 Roller bearing
32 Bearing flange
33 Countersunk screw
34 Stop

40 Intermediate flange
41 O-ring
42 O-ring

45 Stud (stickled)
46 Hex nut
47 Washer

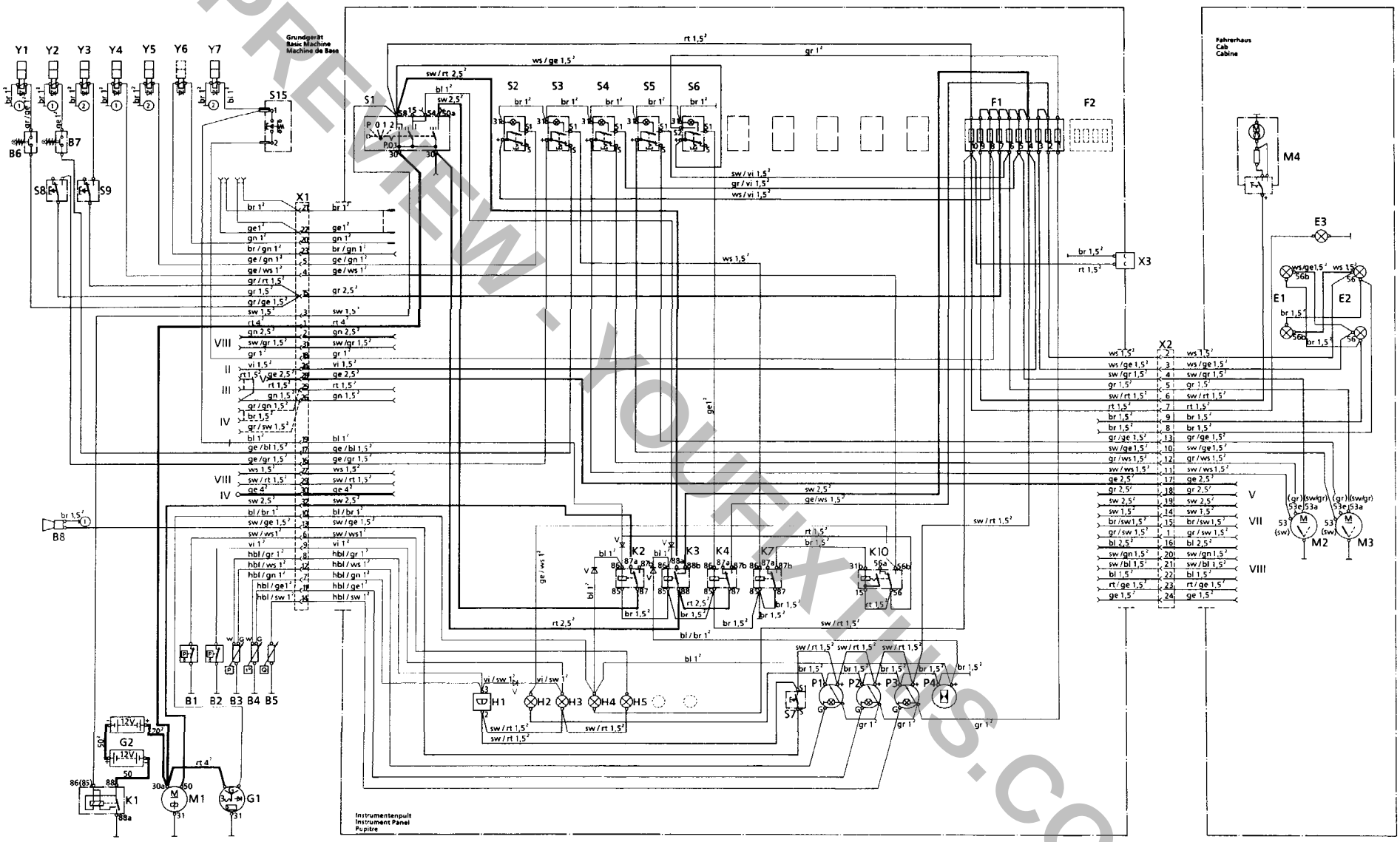
50 Stud
51 Hex nut
52 Washer

55 Drain valve
56 Seal ring

60 Connecting piece
61 Oil dipstick complete

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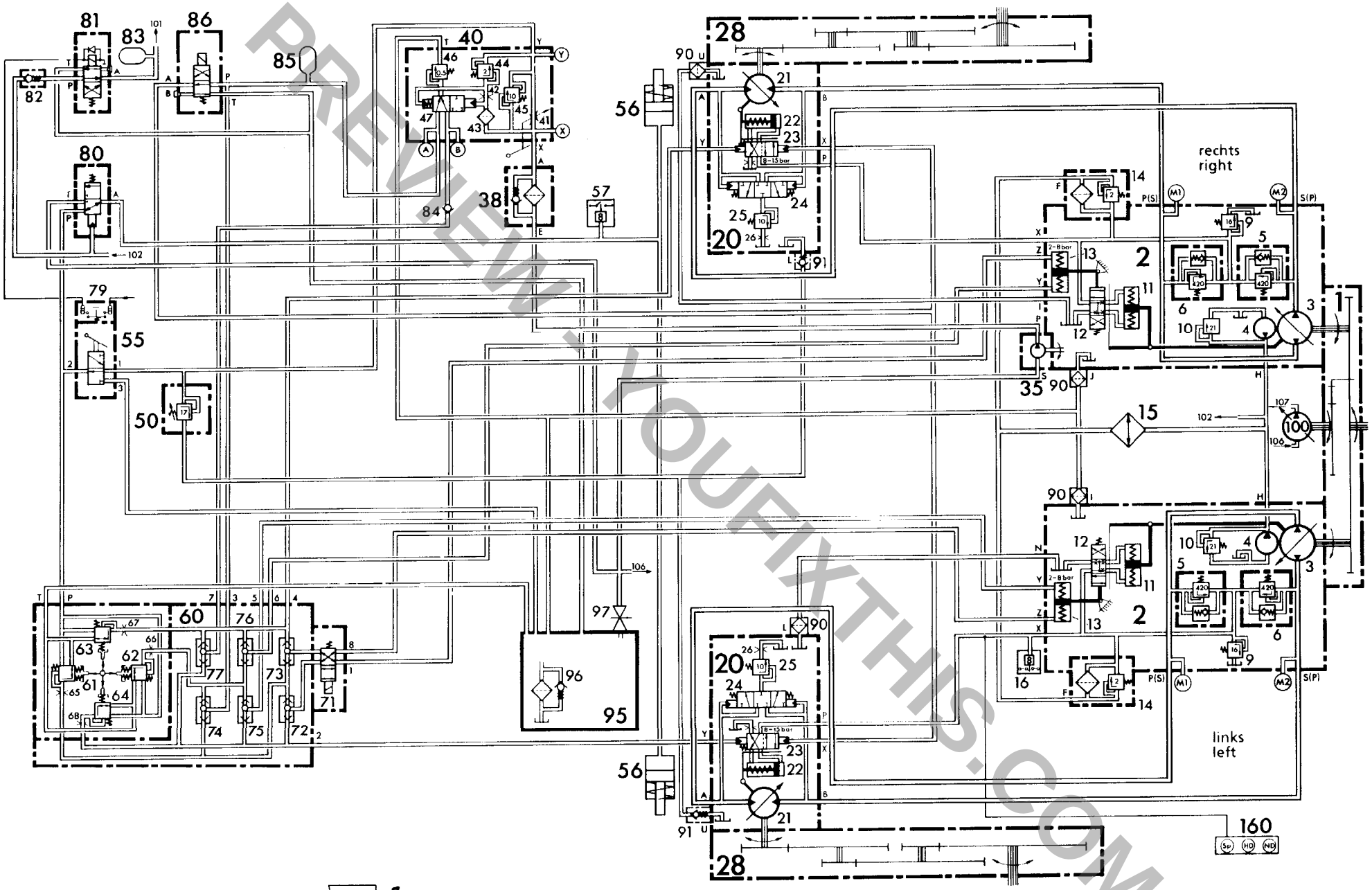
Benennung Description Dénomination

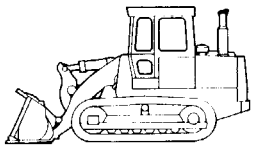
Elektrische Anlage
Electrical Equipment

Typ/ab Type/from Type/a partir de

LR 611 268 M 127 631 B 679
LR 621 B 581 BM 309 641 161

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Datum Edition Date
06 88

Benennung Description Dénomination

Fahrhydraulik

Travel Hydraulics

Typ/ab Type/from Type/a partir de

LR 611 268, M 127

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Installation preload F_M and tightening torques M_A per DIN 13 part 13, wrench sizes of hex head screws per ISO 4014, socket head screws per DIN 912.

Beginning with grade 10.9, the use of lock washers does no longer provide safety.

For special screws, such as Durlock or Tensilock, the tightening torques of the manufacturer should be observed.

When using impact wrenches, care must be taken so that the torque values are not exceeded. (Tightness must be checked with a torque wrench).Nm x 0.7375 = ft. lbs.

Use always torque wrenches with correct measuring range (upper third of range should include the listed torque value).

Specific torques listed in drawings and or descriptions must be observed.

Tightening torques for screws with standard metric thread

Surface of bolts: "8 µm zinc-plated, yellow sensitize chromed A3C"

Screw size	Preload values F_M based on Grades in N			Tightening torques M_A based on Grades in Nm			Wrench size for Hex head-screw		Wrench size for Socket head-screw	
	8.8	10.9	12.9	8.8	10.9	12.9	mm	inch	mm	inch
M 4 × 0,7							7	9/32	3	---
M 5 × 0,8	6 900	9 700		4,9	7,0		8	---	4	5/32
M 6 × 1	9 750	13 700		8,0	12,0		10	---	5	---
M 7 × 1							11	---	---	---
M 8 × 1,25	17 900	25 100		20	28		13	1/2	6	---
M 10 × 1,5	28 400	40 000		40	56		(17) 16	(11/16)--	8	5/16
M 12 × 1,75	41 500	58 500		69	98		(19) 18	(3/4)--	10	---
M 14 × 2	56 500	80 000		110	155		(22) 21	(7/8)--	12	---
M 16 × 2	78 500	110 000		170	240		24	---	14	9/16
M 18 × 2,5							27	1-1/16	14	9/16
M 20 × 2,5	122 000	172 000		330	465		30	1-3/16	17	---
M 22 × 2,5							(32) 34	---	17	---
M 24 × 3	176 000	248 000		570	800		36	1-7/16	19	3/4
M 27 × 3							41	1-5/8	19	3/4
M 30 × 3,5	282 000	397 000		1 150	1 600		46	1-13/16	22	7/8
M 33 × 3,5							50	2	24	---
M 36 × 4							55	2-3/16	27	1-1/16
M 39 × 4							60	2-3/8	27	1-1/16

Note: Preload forces and tightening torques are based on lightly lubricated screws and nuts (corresponds to medium friction $\mu_G = 0,10$).
Wrench sizes (x) = former wrench size per DIN 931.

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Customer: ..... Machine Type ..... S/N ..... Hours: ..... Date .....

Maintenance/Inspection by operating hours

at delivery	every 8 - 10 h	at 10 - 50 h	every 250 h	every 500 h	every 1000 h	every 2000 h	WORK TO BE CARRIED OUT	Reference	Remarks
							DIESEL ENGINE		
○	○		○	○	○	○	Check engine oil level and oil pressure	OM	①
○	○		○	○	○	○	Check coolant level	OM	①
				○	○	○	Check radiator cap and fan - check corrosion inhibitor / antifreeze protection	OM / SM	②
			○	○	○	○	Check fuel filter water separator/drain, as necessary	OM	
				○	○	○	Check fuel prefilter - clean if necessary	OM	
		□	○	○	○	○	Change engine oil	OM	①②
		□		○	○	○	Change lube oil filter	OM / SM	
				○	○	○	Check condition and tension of V-belt	OM / SM	
				○	○	○	Check engine and radiator for dirt - clean if necessary	OM	
○				○	○	○	Check oil, cooling and fuel system for leaks and condition	OM / SM	
○				○	○	○	Check air intake and exhaust system for tightness and leaks	OM / SM	
				○	○	○	Check all screws and nuts - especially, oil pan and engine mounts for condition and tightness	OM / SM	
				○	○	○	Check / adjust valve clearance - when engine is cold for LR 611 - 500 hrs. =□ , every 1000 hrs. =○	SM	③
				□	○	○	Check engine RPM, adjust if necessary	SM	③
				○	○	○	Check and service injection pump linkage	OM /SM	
					○	○	Change fuel filter element - stage 1	OM	
					○	○	Drain fuel tank condensation and sediments	OM	
					○	○	Grease flywheel teeth	SM	
					○	○	Check preheater system (before cold season)	SM	
						○	Change fuel filter element - stage 2	OM	
							Replace air filter elements - if necessary or at least once a year	OM	
							Replace crankcase breather - every 2 years	OM / SM	
							Change coolant with antifreeze - every 2 years	OM / SM	①②
							Check / service fuel injectors - as necessary	SM	③
							Clean dust collector - as necessary	OM	
							Check coolant pump -every 2 years/3000 hours	SM	③
							HYDRAULIC SYSTEM		
○	○		○	○	○	○	Check oil level in hydraulic tank	OM	①
○	□		□	○	○	○	Clean magnetic rod - daily during the first 250 hrs	OM / SM	
				○	○	○	Change hydraulic oil filter	OM	
				○	○	○	Change pressure filter - repl. oil	OM	
				○	○	○	Replace filter insert - servo	OM	
○				○	○	○	Check working and travel hydraulic system for function and leaks Check hoses for scrapes	OM / SM	
				○	○	○	Drain condensation and sediments from hydraulic tank - at least every 6 months	OM	
				○	○	○	Check hydr. oil cooler for dirt - clean as necessary	OM	
				○	○	○	Check all hydraulic pressures / adjust as necessary	SM	③
				○	○	○	Check all screws, nuts, connections for tightness	OM / SM	
						○	Change hydraulic oil (refill via tank filter)	OM	①②

☐ First and only maintenance interval
○ Repeat maintenance interval
▨ by maintenance personnel
▨ by authorized trained personnel
OM- Operation / Maintenance Manual
SM- Service Manual

① For corrrect oil level, use dipstick marks - for procedure and quantities, see OM
② For quality and viscosity guidelines see "Service Fluids",SM - section 1.3
③ For adjustment values, see data page entries in SM

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1. Working

The low pressure in the crankcase is controlled by a spring-loaded membrane in the oil separator.

When damaged, e.g. by dents in the cover or tears in the membrane, the engine can draw in unfiltered air. That causes increased engine wear.

A damaged oil separator should therefore be replaced. Also, oil vapour released from the vent is a sign that the oil separator needs replacing.

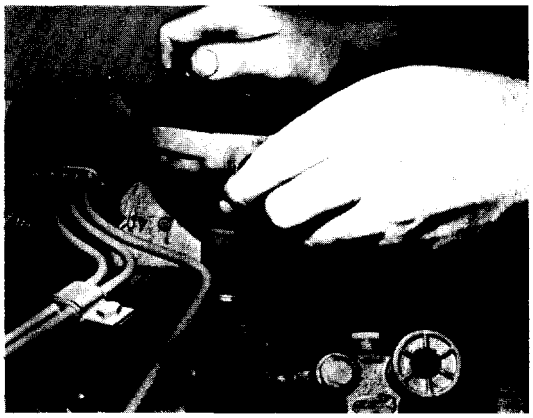
2. Removal and assembly

2.1 Release clamps. Pull the hose off the oil separator and remove the oil separator from the crankcase.



2.2 Place a new O-Ring seal in the new oil separator.

2.3 Place the oil separator over the connecting sleeve on the crankcase and tighten to 8 Nm. Fasten the hose to the oil separator with the clamp.



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1 Housing

2 Input shaft
3 Shaft seal
4 Grooved ball bearing
5 Grooved ball bearing
6 Bearing flange
7 Snap ring
8 Dowel pin
9 O-ring
10 Ring

15 Spur gear
16 Grooved ball bearing
17 Grooved ball bearing
18 Deflector shield
19 Bearing flange
21 Snap ring
22 Roll pin
23 O-ring

25 Stud
26 Hex nut
27 Washer

30 Spur gear
31 Grooved ball bearing
32 Grooved ball bearing
33 Deflector shield
34 O-ring
35 Snap ring
36 Roll pin
37 Bearing flange

38 Stud
39 Hex nut
40 Washer

42 Intermediate flange
43 O-ring

45 Drain valve
46 Seal ring

50 Oil dipstick complete
52 Plug with seal ring

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LIEBHERR

0	Unfallverhütung	Accident Prevention	Prévention des accidents
1	Allgemeine Richtlinien	General Information	Généralités
2	Werkzeuge und Arbeitshinweise	Tools and Repair Instructions	Outillage et indication de travail
3	Gerätedaten und Wartungsrichtlinien	Specifications and Maintenance Guidelines	Caractéristiques techniques et plans d'inspection
4	Motoranordnung	Engine Arrangement	Ensemble moteur
5	Verteilergetriebe	Splitter Box	Mécanisme de distribution
6	Fahrhydraulik	Travel Hydraulic	Hydraulique de translation
7	Arbeitshydraulik	Working Hydraulic	Hydraulique de travail
8	Tankanordnung	Tank Arrangement	Disposition du réservoir hydraulique
9	Elektrische Anlage	Electrical System	Installation électrique
10			
11	Fahrgetriebe	Travel Gear	Mécanisme de translation
12	Laufwerksanordnung	Undercarriage	Ensemble train de chenilles
13	Hauptrahmen - Anbauteile	Attachments - Main Frame	Châssis principal - accessoires
14	Arbeitsausrüstung - frontseitig	Working Attachment - Front	Equipement de travail - avant
15	Arbeitsausrüstung - heckseitig	Working Attachment - Rear	Equipement de travail - arrière
16	Kabine und Heizung	Accessories for Cap/Canopy	Cabine et chauffage
17	Sonstige Informationen	Miscellaneous Informations	Informations complémentaires

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1. Scope

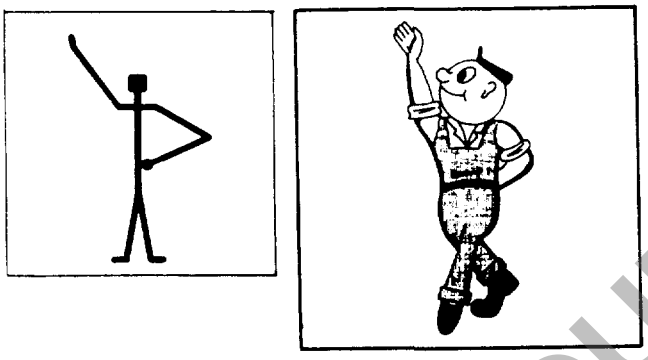
This standard applies to hand-given directions for the drivers of earthmoving machinery with a restricted field of vision in the working area or direction of travel. The standard does not apply where other signals have been agreed or are mandatory.

2. Purpose

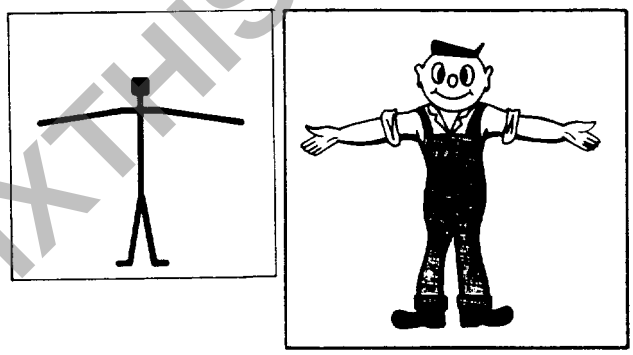
This standard lays down clear hand signals which can be used systematically to avoid misunderstandings with the driver.

3. Hand signals

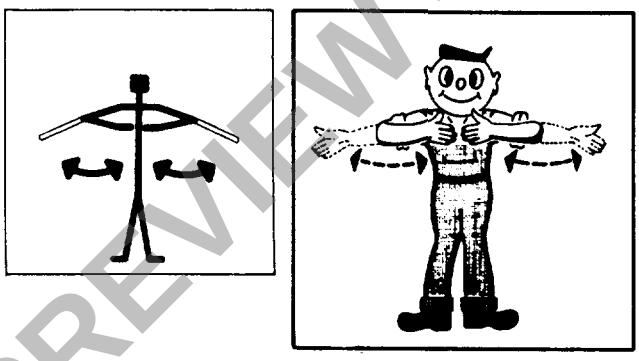
3.1 General hand signals



Attention! Careful!
Raise one arm with palm outwards.



Stop!
Extend both arms horizontally.



Stop! Danger!
Extend both arms horizontally
and flap with the forearms.

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Sub Group Index

Hand signals for earthworks	0.1.00
Safety Guidelines	0.2.00

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Technical Data, Wear Limits, Torques		OM 401
Engine output - per DIN 6270 b	kW / HP	103
Max. torque Nm at RPM		536 / 1300
Nominal (Rated) RPM	1/min	2100
Cylinder		6 - V 90°
Cylinder bore	mm / inch	125 / 4.9212
Piston Stroke	mm / inch	130 / 5.1181
Displacement	cm3 / cu inch	9570 / 583.96
Fuel consumption at rated RPM	g / kWh	230
Lube oil consumption - comp. to fuel cons.		1 %
Direction of rotation - flywheel		left
Firing order - beg. at the fan		1-4-2-5-3-6
Overlap		5-3-6-1-4-2
Firing sequence	°kW	90 - 150
Injection pump timing (B.T.D.C)	°KW	15° v. OT
Compression ratio		17.5 : 1
Compression pressure min. / max.	bar (PSI)	20/28 (289.5 / 405,3)
Deviation between cylinders	bar / PSI	4 / 57,9
Eng. oil pressure - low idle - min.	bar / PSI	0.6 / 8.68
Eng. oil pressure - high idle - min.	bar / PSI	2.4 / 34.74
Cooling system pressure	bar / PSI	0.6 / 8.68
Thermostat setting	°C / °F	71 / 160
Thermostat stroke	mm / inch	8 / 0.3149
Injectors - opening pressure - new	bar / PSI	175 + 10 / 2533 + 14,7
Injectors - opening pressure - used	bar / PSI	165 / 2388.6
Cylinder head min.	mm / inch	113.4 / 4.645
Injector protrusion	mm / inch	1.6 - 2.4 / 0.06299 - 0.0945
Valve clearance - inl. / ex.	mm (inch)	0.25 / 0.35 (0.0098 / 0.0137)
Valve seat angle inl. / ex.	°	30 / 45
Valve seat wear	mm / inch	0.7 - 1.1 / 0.0275 - 0.0433
Cyl. head screws - torque	Nm / f. lbs	see instructions
Injector tip to injector housing	Nm / ft. lbs	75 / 55.3
Retainer nut - Injector	Nm / ft. lbs	70 / 51.6
Valve lift at °0° clearance	mm / inch	12.5 / 0.4921
Cam height above Basic cam diameter	mm / inch	7.9 / 0.3110
Piston ring - ring gap max. - 1. ring	mm / inch	1.0 / 0.0393
- 2. ring	mm / inch	1.0 / 0.0393
- 2. ring	mm / inch	0.8 / 0.0315

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Notes

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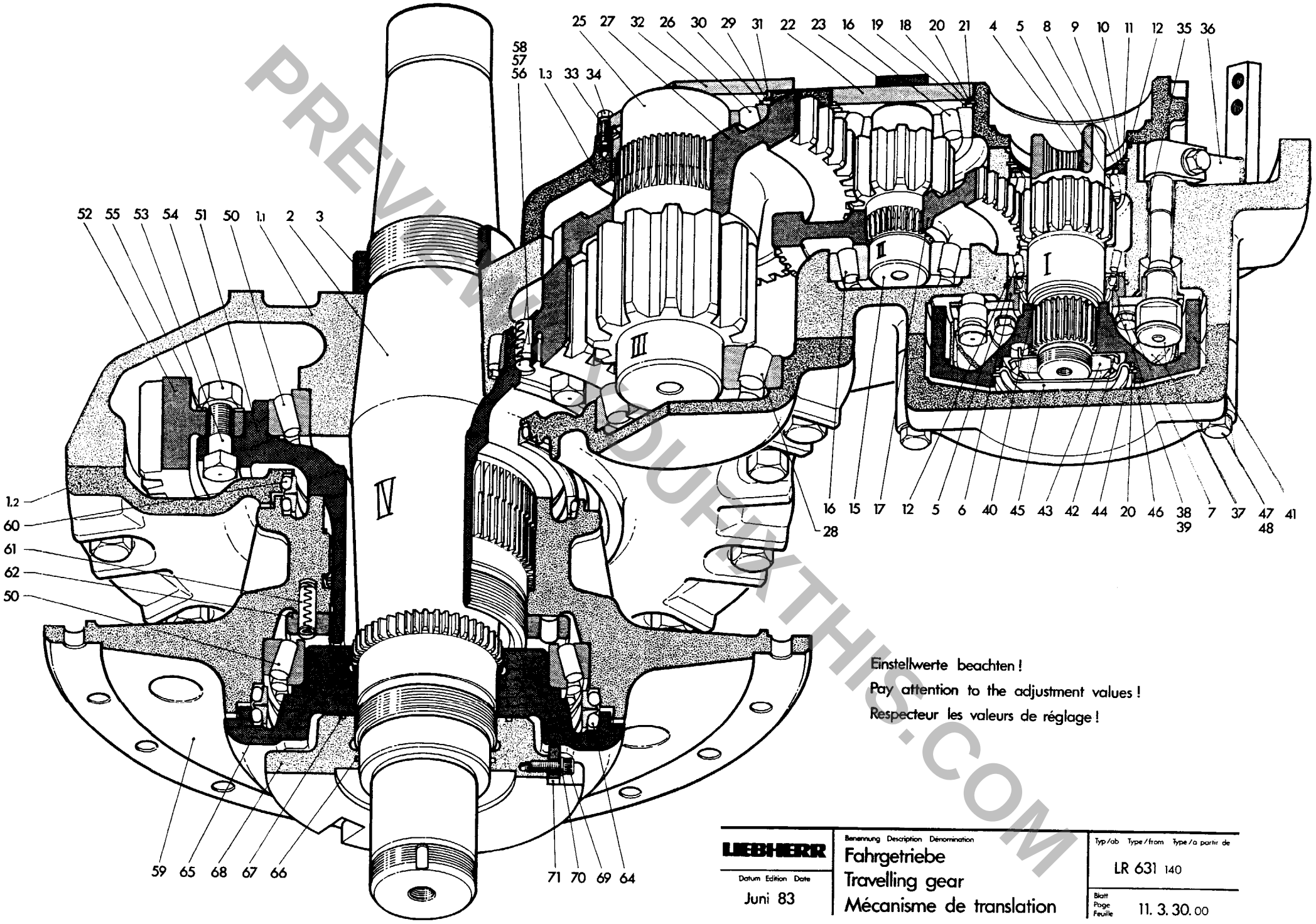
Notes

B1	Reaction point	8	bar	+/-	0,5 bar
B2	Reaction point	8	bar	+/-	0,5 bar
B3	Reaction point	0,5	bar	+/-	0,1 bar
B4	Reaction point	95°	C	+/-	3° C

rt	= rot	= red
bl	= blau	= blue
br	= braun	= brown
gr	= grau	= grey
gn	= grün	= green
ws	= weiß	= white
ge	= gelb	= yellow
sw	= schwarz	= black
be	= beige	= beige
vi	= violett	= violet
hbl	= hellblau	= lightblue

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Einstellwerte beachten !
Pay attention to the adjustment values !
Respecteur les valeurs de réglage !

LIEBHERR	Benennung Description Dénomination Fahrgetriebe Travelling gear Mécanisme de translation	Typ/ab Type/from Type/a partir de LR 631 140
Datum Edition Date Juni 83		Blatt Page Feuille 11. 3. 30. 00

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