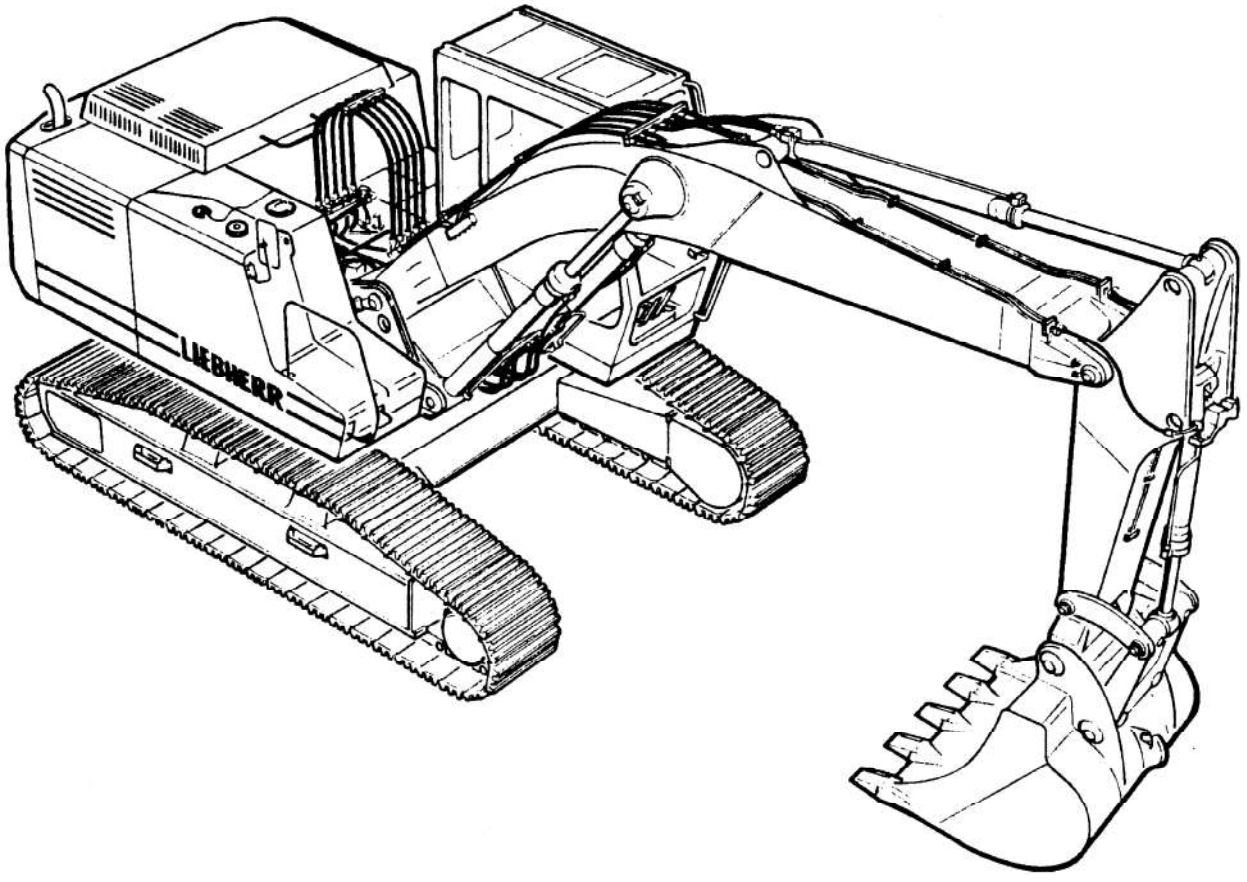
Operation and Maintenance Manual

R 912

Litronic



Engine

Liebherr diesel engine	
Rating per DIN/ISO 3046-1	96 kW/130 HP at 2000 RPM
Model	D 904 T
Type	4 cylinder in-line, water-cooled, direct injection, turbo-charged
Displacement	5,6 liters
Bore/Stroke	115 mm/135 mm
Air cleaner	dry-type air cleaner with pre-cleaner, primary and safety elements
Fuel tank	360 liters
Electrical system	
Voltage	24 V
Batteries	2 x 110 Ah/12 V
Alternator	24 V/35 amp
Option	sensor controlled engine idling

Hydraulic System

Hydraulic pump	Liebherr variable displacement, swash plate, in line double pump
Max. flow	2 x 200 l/min
Max. hydr. pressure	320 bar
Electronic engine speed sensing	over the entire RPM range
Pump control	electro-hydraulic with electronic engine speed sensing regulation over entire RPM range; pressure compensation; flow compensation; automatic oil flow optimizer
Hydraulic tank capacity	230 liters
Hydraulic system capacity	380 liters
Hydraulic oil filter	1 full flow filter in return line
Hydraulic oil cooler	combination engine radiator and hydraulic oil cooler, thermostatically controlled oil flow
ECO control	adjustment of machine performance to match application – "high" mode setting for highest performance in severe applications – "Econo" mode setting for general digging and loading – "fine control" mode for precision work and lifting

Hydraulic Controls

Power distribution	via control valves with integrated primary and secondary safety valves
Flow summation	to boom and stick
Servo circuit	
Attachment and swing	– proportional via joystick levers
Travel	– proportional via foot pedals or hand levers – for all travel functions
Additional functions	– via foot pedals or joystick toggle switch

Swing Drive

Drive	Liebherr swash plate motor with integrated brake valves
Transmission	Liebherr planetary reduction gear
Swing ring	Liebherr sealed single race ball bearing swing ring, internal teeth
Swing speed	0 – 8 RPM
Swing torque	66 kNm
Holding brake	wet discs (spring applied, pressure released)
Option	pedal controlled positioning brake

Operator's Cab

Cab	built from deep drawn components, resiliently mounted, sound insulated, tinted windows, front window stores overhead, door with sliding window
Operator's seat	fully adjustable, shock absorbing suspension, adjustable to operator's weight
Joysticks	integrated into adjustable seat consoles
Monitoring	by lights, sound and LCD display, machine malfunctions stored in memory for quick troubleshooting
Acoustical and optical signal	in case of low engine oil pressure or low coolant level
Optical signal	in case of engine overheating or low hydraulic oil level
Heating system	hot water heat exchanger, to provide heated fresh air, circulated air, or fresh cool air
Noise emission (86/662/EWG)	inside cab = 77 dB(A) surround noise = 106 dB(A)

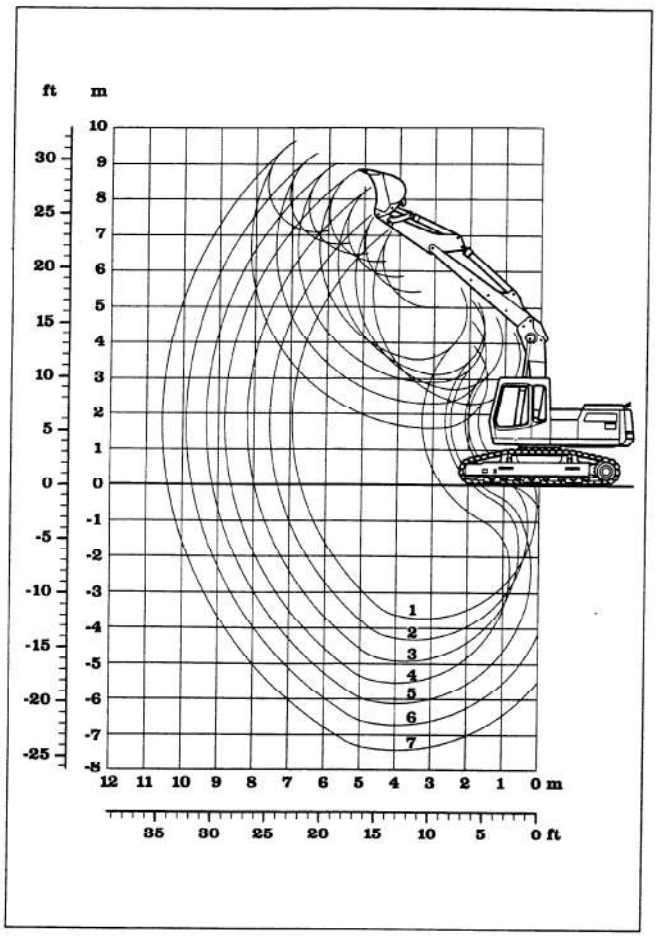
Undercarriage

Three undercarriage versions are available	
Std	standard
HD-S	heavy duty, narrow gauge
HD-SL	heavy duty, wide gauge
Drive	Liebherr variable flow swash plate motors with integrated brake valves
Transmission	Liebherr planetary reduction gears
Travel speed	Std and HD-SL undercarriage I Stage: – 3,1 km/h II Stage: – 5,2 km/h HD-S undercarriage I Stage: – 3,0 km/h
Drawbar pull	264 kN
Track components	Std and HD-SL undercarriage B 60, maintenance-free HD-S undercarriage D 6 C, maintenance-free
Track rollers/ carrier rollers	Std and HD-S undercarriage 7/2 HD-SL 8/2
Track pads	triple grouser
Digging locks	wet multi-disc (spring applied pressure released)
Brake valves	integrated into travel motor

Attachment

Hydraulic cylinders	Liebherr cylinders with special seal system. Shock absorption
Pivots	sealed, low maintenance
Lubrication	centralized in easily accessible locations
Hydraulic connections	pipes and hoses equipped with SAE split-flange connections
Bucket	standard equipped with 12 t safety hook for lifting

Technical Data



To order a complete machine you need the following:

		Id. No.
● Basic machine		see page 14
● Hoist cylinders		9350410
● Basic boom		9198685
● Main boom 4,00 m		9207161
● Stick	1,80 m	9756507
	2,40 m	9757189
	3,00 m	9757190
	3,70 m	9757191
● Bucket – size as needed		see below

Digging envelope

1 with stick 1,80 m main boom retracted 3 holes
2 with stick 1,80 m main boom retracted 2 holes
3 with stick 1,80 m main boom retracted 1 hole
4 with stick 1,80 m and bucket R 932 Litronic
5 with stick 2,40 m
6 with stick 3,00 m
7 with stick 3,70 m

Stick length	m	1,80	2,40	3,00	3,70
Max. digging depth	m	5,50	6,10	6,70	7,40
Max. reach at ground level	m	8,60	9,15	9,70	10,40
Max. dump height	m	6,25	6,45	6,75	7,05
Max. teeth height	m	8,80	9,00	9,30	9,65

Max. digging force: 138 kN (13,5 t)
Max. breakout force: 146 kN (14,9 t)

Buckets

Cutting width SAE		mm	370[1]	440[1]	490[1]	550	620[2]	650	850	1050	1250	1400	1400
Capacity SAE heaped		m³	0,30	0,35	0,40	0,35	0,30	0,40	0,60	0,80	1,00	1,20	1,40
Max. possible material weight	HD-S	t/m³	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,5	1,2
	HD-SL	t/m³	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,5	1,2
Weight with Liebherr teeth 13 C[3]		kg	–	–	–	490	–	530	625	620	690	845	850
Weight with Liebherr teeth 16 C[4]		kg	–	–	–	540	850	580	670	755	845	930	–
Weight with Bofors teeth		kg	370	390	410	–	–	–	–	–	–	–	–
Id. No. with Liebherr teeth 13 C			–	–	–	9350426	–	9350428	9353344	–	–	–	9350443
Id. No. with Liebherr teeth 16 C			–	–	–	9350427	9350444	9350429	9350432	9350435	9350438	9350441	–
Id. No. with Bofors teeth			9199104	9199097	9199092	–	–	–	–	–	–	–	–
Max. stick length for machine stability per ISO 10567:													
HD-SL Undercarriage			3,70	3,70	3,70	3,70	3,70	3,70	3,70	3,70	3,00	2,40	2,40
HD-S Undercarriage			3,70	3,70	3,70	3,70	3,70	3,70	3,70	3,00	2,40	1,80	1,80

[1] Bucket with ejector
[2] Ripper bucket with teeth size Z 16 P
[3] Liebherr Z 13 C teeth for standard digging applications (mounting not recommanded with stick 1,80 m)
[4] Liebherr Z 16 C teeth for heavy duty digging applications

Note:

When digging in highly abrasive materials, buckets must be protected by appropriate wear material.
Optional side cutters increase cutting width by approx. 120 mm.
– Weld-on set of adaptors (Id. No. 9352194)
– Set of bolt-on side cutters (Id. No. 9352195)

Backhoe Attachment with Two Piece Boom and HD-SL or HD-S Undercarriage

- Have blocks or wedges ready to block the machine, if necessary, to prevent the machine from rolling backwards.
- Retract the attachment as far as possible and lower the attachment as close as possible to the loading surface and carefully drive up the ramp and onto the flat bed trailer.
- When the excavator is on the trailer, release the uppercarriage lock pin, turn the uppercarriage back and lower the attachment.
  If the backhoe attachment is attached, tilt the stick and bucket in and relock the uppercarriage.
- Carefully secure the uppercarriage and other parts with chains, wedges and blocks to prevent slipping.
- Release the hydraulic pressure, remove the ignition key, raise the safety lever, close and lock the cab and close and secure all other doors and leave the machine.
- Carefully check out the transport route. Make sure that width, height and weight allowances are within the permitted limits.
- Check that there is enough clearance underneath all bridges, underpasses, utility lines, and in tunnels.
- During the unloading procedure, proceed with the same care and caution as during the loading procedure. Remove all chains and wedges. Start the engine as outlined in the Operation and Maintenance Manual. Carefully drive off the loading platform. Keep the attachment as close as possible to the ground level. Have another person guide and signal you.

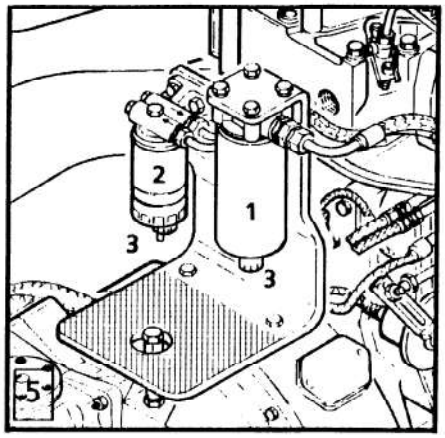
MACHINE TOWING SAFETY

- Observe the correct procedure: check the index in your Operation and Maintenance manual and refer to the appropriate section : "Towing the Excavator".
- Only tow the excavator if absolutely necessary, for example to remove it for repairs from a dangerous job site.
- Be sure all towing and pulling devices such as cables, hooks, and couplers are safe and adequate.
- Make sure that the cable or the towing rod are strong enough and are routed around the center of the undercarriage or to the towing hook on the undercarriage, which is designated for this purpose. Be aware that any damage to the machine caused by towing is never covered by the manufacturer's warranty.
- Never allow anyone to stand near the cable when pulling or towing the excavator.
- Keep the cable tight and free of kinks.
- Engage travel slowly, and do not jerk. With a slack cable, the sudden impact of the load being towed could snap and break.
- During the towing procedure, keep within the required transport position, permissible speed and distance.
- After the towing procedure is completed, return the machine to its previous state.
- Proceed as outlined in the Operation and Maintenance Manual when putting the excavator back in service.

MACHINE MAINTENANCE SAFETY

- The machine may not be made unsafe when performing maintenance work. Never attempt maintenance procedures or repairs you do not understand.
- Check the Operator's and Maintenance Manual for service and maintenance intervals. Make sure you use only appropriate tools for all maintenance work.
- Refer to your **Operator's and Maintenance Manual** to see, who is authorized to perform certain repairs. The operator should only perform the daily / weekly maintenance procedures.

  The remaining work may only be performed by especially trained personnel.
- Use only replacement parts corresponding to the technical requirements specified by the manufacturer. This is assured by using only original Liebherr replacement parts.
- Always wear proper work clothing when maintaining the excavator. Certain work may only be performed with a hard hat, safety shoes, safety glasses and gloves.
- During maintenance, do not allow unauthorized personnel to enter the maintenance area.
- Secure the maintenance area, as necessary.

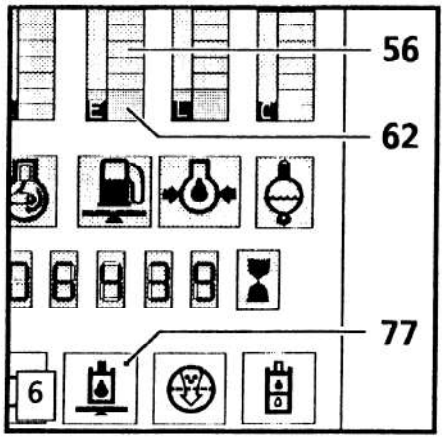


CHECK FUEL SYSTEM / FUEL LEVEL

⚠ DANGER

Do not store Diesel fuel on the machine or in glass containers. Do no smoke while refueling!

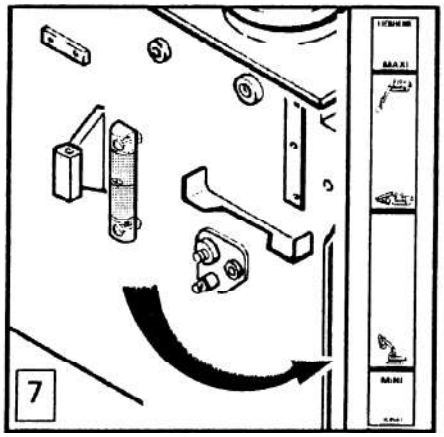
The condensation in the fuel system and fuel tank must be checked daily.
Turn the plug (fig. 5, pos. 3) on the water separator of the prefilter 1 and fine filter 2, drain the condensation until fuel drains off and retighten the plug.
Under ideal operating conditions, this interval may be extended to one week.



Check the fuel gauge on the instrument panel (Fig. 6, pos. 56) before starting to work.

If the red diode 62 of the indicator 56 lights up, only a little reserve of fuel remains in the tank.
For remaining quantity, see page 3.6.

Refill the tank, if fuel level is low.
Since a high fuel level in tank reduces condensation inside the tank, the refueling should be done preferably at the end of the working day.



HYDRAULIC OIL

When checking the oil level or adding oil,

- park the machine on level ground,
- rest the attachments on the ground,
- with stick and tilt cylinders fully extended
- turn the engine off.
  After engine shut down, wait for 3 minutes if the oil is cold, resp. for 1 minute if oil is at working temperature before checking the oil level.

Check oil level in the hydraulic tank

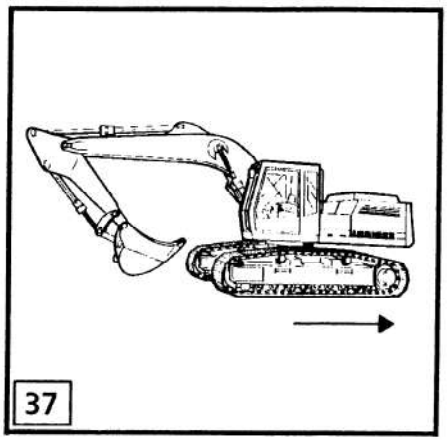
If, in this position, the oil level is below middle level on the sight gauge (fig. 7), oil has to be added through the return filter until the oil reaches middle level.

See page 5.10 for description of procedure for adding oil.

Level "MAXI" shows the maximum oil level when all cylinders are retracted.

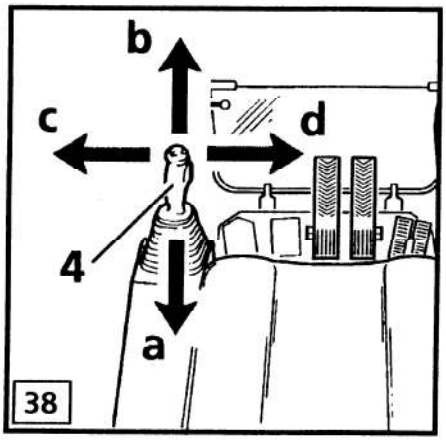
Level "MINI" shows the minimum oil level when all cylinders are extended.

If the oil level drops below the level "MINI" on the sight gauge, the indicator light 77 lights up.



WORKING POSITION

When working in a straight line using the backhoe attachment, the machine should move backwards and work over the idler (fig. 37).

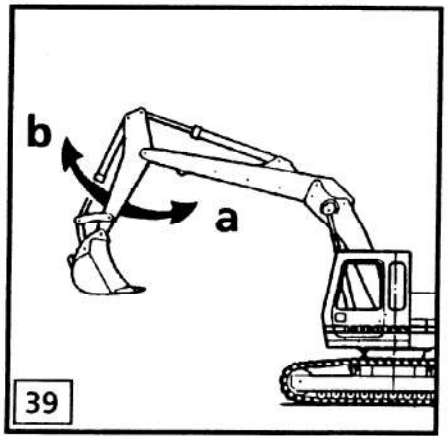


ATTACHMENT CONTROL

CONTROL OF THE STICK CYLINDER
(left joystick 4 - fig. 38)

Pull joystick 4 backwards (a) to move the stick in, (Fig. 39).

Push joystick 4 forward (b) to move the stick out.



REMOVAL AND INSTALLATION
OF
BACKHOE, DITCH CLEANING BUCKET, OR RIPPER

REMOVAL

Lower the attachment until the flat part of the bucket rests on the ground.

Remove plates 5 and 6 and drive out pins 3 and 4.

If necessary, lift the attachment slightly to remove pin 4.

INSTALLATION

Position the bucket so the flat part of the bucket rests on the ground.

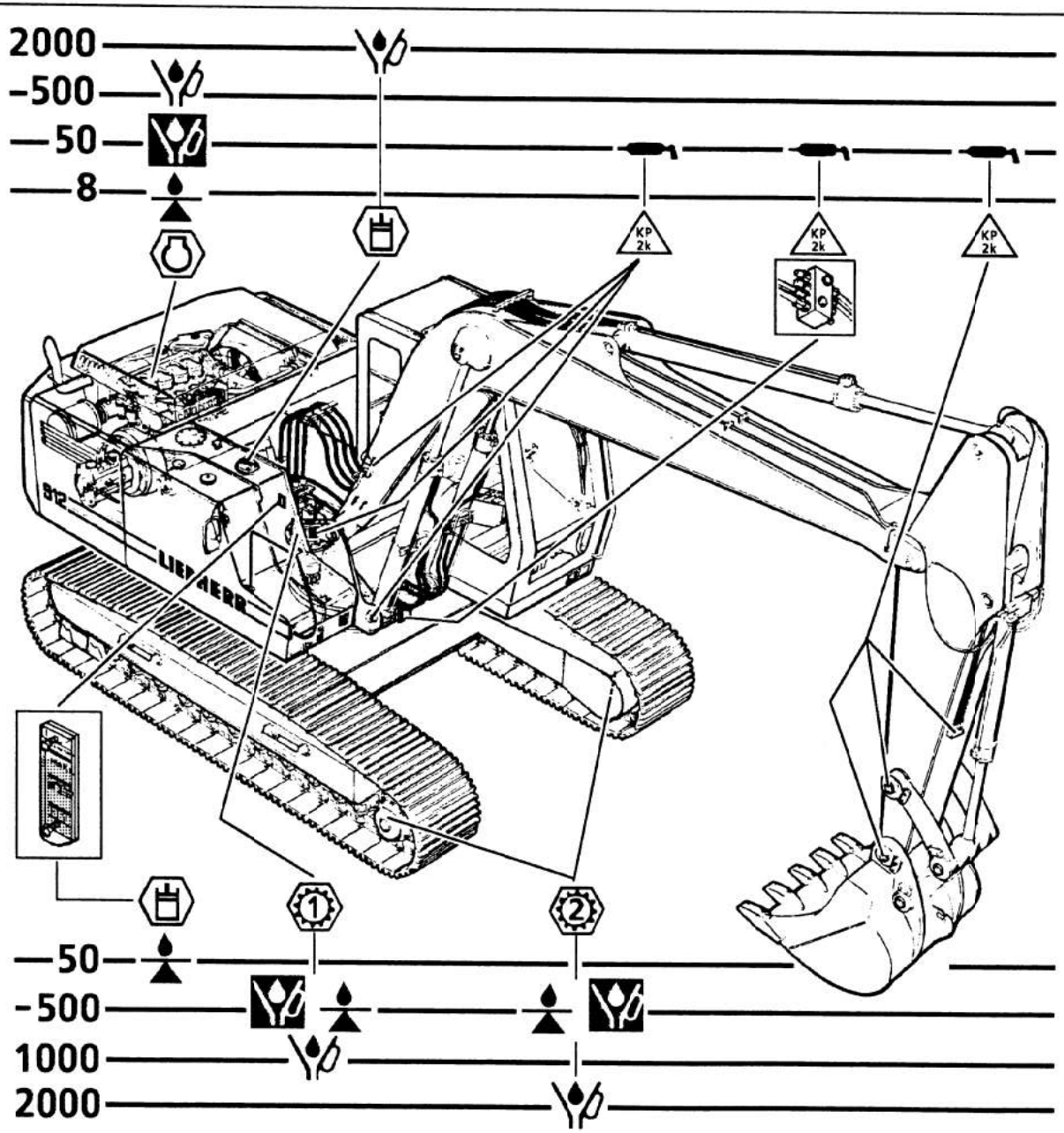
Start the engine and move the attachments until the stick and bucket bore holes 1 align.

Insert pin 4 and secure with plate 6.

Slowly extend the stick cylinder until the bore of the connector bracket 7 is exactly between bore holes 2.

Insert pin 3 and secure with plate 5.

Lubricate all bearings of pins 3 and 4 until clean grease emerges.



R 912 Litronic

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Dieselmotor : Engine : Moteur thermique :	18,5 l. 4.9 US gal.
Hydraulikanlage : Hydraulic system : Circuit hydraulique :	280 l. 74 gal.
Drehwerksgetriebe : Swing gear : Réducteur d'orientation :	5,5 l. 1.5 gal.
Fahrgetriebe : Travel gear : Réducteur de translation :	2 × 5 l. 2 × 1.3 gal.

KP 2k — Allgemeine Schmierstellen
General lubrication points
Points de graissage

Ölstand prüfen
Oil level check
Vérifier le niveau

Ölwechsel
Oil change
Vidange

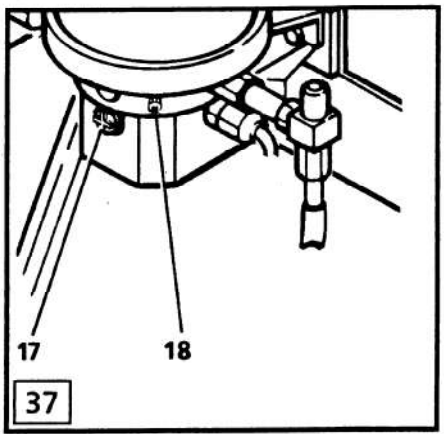
Erster Ölwechsel
First oil change
Première vidange

Schmieren
Lubrication
Graissage

Die angegebenen Füllmengen sind nur Richtwerte.
Nach jedem Ölwechsel oder Nachfüllung den Ölstand prüfen.

Les capacités ne sont données qu'à titre indicatif.
Vérifiez le niveau après chaque vidange ou appoint.

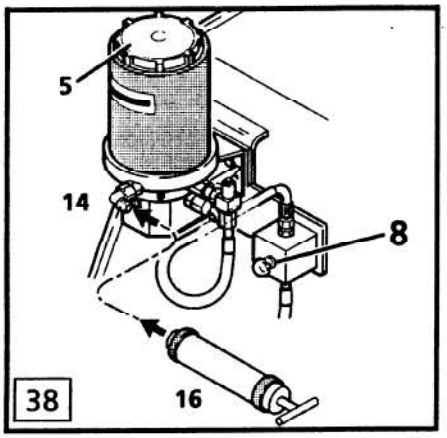
The capacities are only given for your guidance.
Always check the level after replacing oil or topping up.



An additional lubricating procedure can be started any time by depressing the push button 102 (fig. 36) for about 2 seconds.

In case the lubrication pump does not work, all lubrication points connected to the centralized system may be lubricated via the lube fitting 8 (fig. 38).
Connect a lubrication gun and press about 150 to 200 cm^3 of grease into this fitting, once a day or, if applying, once a working shift.

The frequency of the lubricating procedures can be adjusted, after removal of the protection cover 17 and by turning the selector TS or moving the bridge HM (see fig. 40), so to obtain the desired "pause time" PT shown in following shedule.



Bridge HM → M PT (minutes)	3.7	7.5	11	15	19	22	26	30	34	38	41	45	49	52	56
Time Selector TS Position	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Bridge HM → H PT (hours)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

TO REFILL THE GREASE CONTAINER

The grease level in the container of the pump must be checked weekly, and if necessary, the container refilled.

See the lubricant chart for grease specification.

The refilling of the grease tank should only be done via the special fitting (fig. 38, pos. 14).

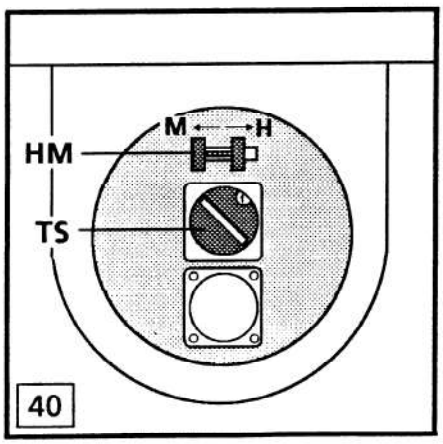
Insert a grease cartridge in the special filling pump 16 (Id. No. 5608704), connect the pump to the fitting 14 and push the grease into the container (fig. 38) .

Avoid refilling via the upper tank cover 5, since it could create an air pocket in the container and cause the pump to run dry.

Without the special filling pump or grease cartridges, the tank has to be refilled through the grease fitting on the tank (fig. 37, pos. 18), using a grease pump.

At every stroke of a working piston in a metering device, 0.2 cm^3 of lubricant are delivered.

Depending on the combination of the metering devices and lubrication lines, 12 up to 20 cm^3 grease are necessary for each complete lubrication cycle, this corresponding to a consumption of about 1 Kg (2.2 lbs) for 100 to 200 working hours.



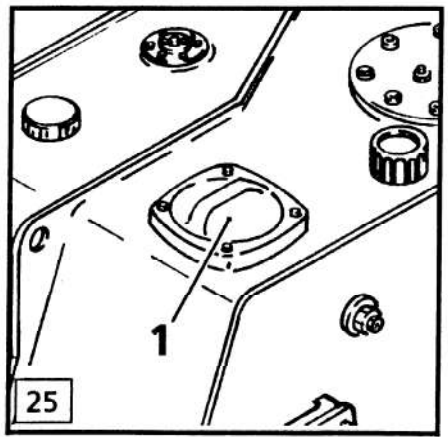
CHANGES IN THE LUBRICATION CIRCUIT

Before you make any changes to the lubrication system (for example when changing the attachment configuration), always check with a LIEBHERR mechanic first.

Never close off a line, which is not being used.

Only plug a line after the line has been removed on the outlet of the metering device. Only use plug (Id. No. 7011340) and seals (Id. No. 7011344)!

Do not close off the outlets 1 and 2 of a metering device, or the whole lubrication system would be blocked.



THE HYDRAULIC SYSTEM

Maintenance of the hydraulic system is limited to the hydraulic tank.

None of the other components in the hydraulic system require special maintenance.

However, hydraulic lines and hoses must be regularly checked for leaks.

Cleanliness in the hydraulic system is especially important.

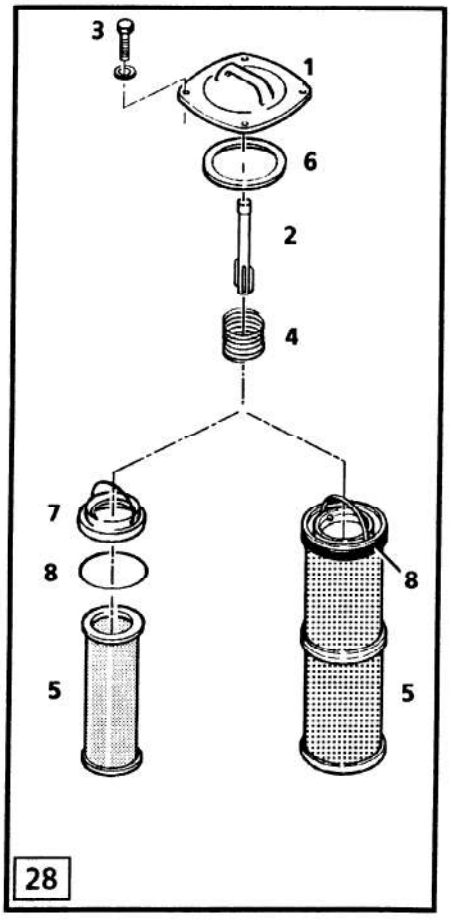
For this reason, the given maintenance intervals to replace the return filter, to clean the oil cooler, and to change the oil need to be strictly observed.

⚠ DANGER

DO NOT ALLOW YOUR SKIN TO COME INTO CONTACT WITH HOT OIL OR COMPONENTS CONTAINING HOT OIL.
At or near operating temperature, engine and hydraulic oil is hot and can be under pressure.

Always relieve the hydraulic pressure before working on the hydraulic system.

Apply both joysticks (with ignition key in contact position) and then unscrew breather filter (Fig. 29, pos 4) several turns to depressurize the hydraulic tank.



OIL COOLER

A clean oil cooler is necessary to achieve optimum hydraulic oil cooling.
Clean the cooling circuit with air or steam at the intervals specified in maintenance schedule, and more often if the working conditions make it necessary.

RETURN FILTER

The magnetic rod in the return filter (Fig. 28, pos. 2) should be cleaned daily during the first 300 operating hours, then every week.

Change filter element 5 the first times after the 50 and 500 first operating hours.
Then change these elements
- every 500 hours,
- and after each major repair in the hydraulic system.

Notice : When working under very dusty conditions observe the special recommandations concerning the element change on page 5.5.