

LIEBHERR

HYDRAULIC EXCAVATOR

R 900 B / R 904
R 914 / R 924
R 934 / R 944
R 934 B / R 944 B

Litronic

Ident. / Nb : 8504335

Issue : March 2002

This issue contains all previous
complements
up to the nb. 02 of march 2002
one enclosed

SERVICE MANUAL

N^b

Owner:

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Volume 1
Volume 2

1 General Information

2 Tools

3 Technical Data / Maintenance Guidelines

4 Engine

5 Coupling / Splitterbox

6 Hydraulic System

7 Hydraulic Components

8 Electrical System

9 Swing Gear

10 Swing Ring

11 Travel Gear / Two Speed Gear Box

12 Track Components / Axles

13 Steering System

14 Oscillating Axle Stabilizer

15 Brake System

16 Special Attachments /
Additional Hydraulic Installations

17 Cab Heater / Air Conditioning System

18 Undercarriage / Uppercarriage Attachments

19 Arrangement of Tanks

SUBGROUP INDEX

- 1.01.** Chart / Coming into Effect of Modifications
- 1.10.** Safety Information
- 1.19.** Conversion Factors
- 1.20.** Tightening Torques
- 1.50.** Lubrication

Angaben über den Einlauf von Änderungen
Chart / Coming into Effect of Modifications
Entrée en vigueur des modifications

Änderungsmarke Modification mark Repère de modif.	Art der Änderung Kind of modification Nature de la modification	Änderungseinlauf Modified on machines Modifié à partir de
(a)	Thermostatgeregelte Ölkühlung Einlauf von Kühlvorspannventil Y53 Oil cooling with thermostatic regulation Added regulation solenoid valve Y53 Réfrigération d'huile hydraulique régulée thermostatiquement par électrovanne Y53	R 900B Li: 6093→ R 904 Li: 6278→ R 914 Li: 6676→ R 924 Li: 6282→
(b)	Geändertes Torque-Control Ventil Modified torque control valve Clapet contrôleur de couple modifié	R 900B Li: 6106→ R 904 Li: 6291→
(c)	Neuer Drehwerksmotor mit geänderten TC - Ventil 137, Steuerkolben 133, Neu swing-drive motor with modified TC valve 137 and piston valve 133, ... Nouveau moteur d'orientation avec contrôleur de couple 137, tiroir 133, modifiés	R 914 Li: 6676→ R 924 Li: 6282→
(d)	Neue Drehwerkspumpe (DWD Regelung ersetzt Torque -Control Regelung) Neu swing-pump (with DWD regulator instead of Torque Control) Nouvelle pompe d'orientation (régulateur de type DWD au lieu du contrôleur de couple)	R 934 Li: 5278→ R 944 Li: 5265→
(e)	Schalteinheit S2 geändert (Symbol S19, Schalter S85 statt S12,) Control unit S2 modified (symbol of S19 switch S85 instead of S12, ...) Unité de commande S2 modifiée (symbole de S19, touche S86 au lieu de S12, ...)	R 900B Li: 6135→ R 904 Li: 6370→ R 914 Li: 6852→ R 924 Li: 6400→ R 934 Li: 5345→ R 944 Li: 5329→
(f)	Neue Platine A1010 (Relais K5 geändert, alle Endstufen mit 3 fach LED, ...), Notplatine E52 neu (S73 aktiv, ...) New printplate A 1010 (modified relay K5, all output stages with 3 LEDs, ...) new safety circuit E52 (switch S73 active, ...) Nouvelle platine A 1010 (relais K5 modifié, toutes les sorties surveillées par 3 LED,), nouveau module E52 (S73 actif, ...)	R 900B Li: 6158→ R 904 Li: 6423→ R 914 Li: 6940→ R 924 Li: 6476→ R 934 Li: 5406→ R 944 Li: 5376→
(g)	Einbaulage der Kühldüse - Fahrmotor geändert Modified location of travel motor cooling orifice Emplacement du gicleur pour refroidiss. des moteurs de translation modifié	R 900B Li: 6072→ R 904 Li: 6400→ R 914 Li: 6930→ R 924 Li: 6460→ R 934 Li: 5418→ R 944 Li: 5385→

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(h)	<p>Umschaltchieber statt Wechselventil in den Bremsventilen der Fahrmotoren Commutation spool instead of shuttle valve in the brake valves of the travel motors. Tiroir de commutation au lieu de clapet navette dans clapets de freinage des moteurs de transl.</p>	<p>R 900B Li: → R 904 Li: 9518→ R 914 Li: 9490→ R 924 Li: 9494→ R 934 Li: 9528→ R 944 Li: 9537→</p>
(i)	<p>Thermostatgesteuerte Lüfterdrehzahl über Regelmagnetventil Y347 Thermostatic regulation of cooler fan RPM via regulating solenoid valve Y347 Electrovanne Y347 pour régulation thermostat. du régime du ventilateur des réfrigérants</p>	<p>R 934 B Li: 9995→ R 944 B Li: 9872→</p>
(j)	<p>Verbesserung der Feinsteuerbarkeit - Fahren (Verbindungsleitung mit Ausgleichsdrosseln 90/91 zwischen den Vorsteuergeräten 82 / 83) Improvement of fine control for travel (connection line with compenstion orifices 90 / 91 between the both travel pedals 82 / 83) Amélioration du pilotage fin en translation (liaison avec orifices d'équilibrage entre les deux pédales de translation 82 / 83)</p>	<p>R 914 Li: 6932→ R 944 Li: 6461→</p>

Working with an excavator can be dangerous, it could result in injury or death if proper precautions are not taken! **WE URGE YOU TO READ THIS MANUAL CAREFULLY!** This safety information is provided to operators and maintenance mechanics to ensure the safe operation and maintenance of the excavator. It is essential that you read and familiarize yourself with this information, which explains safety requirements and precautions and specific hazards of which you should be aware. This also applies to any personnel which might be working on the machine only occasionally, such as during set up or maintenance.

- Careful adherence to these safety guidelines will permit safe operation and maintenance and potentially prevent personal injury to yourself and others, and possible damage to the excavator.
- Important safety notes such as **DANGER**, **CAUTION** or **NOTE** are used throughout this manual to emphasize important or critical instructions.

In this manual, **DANGER**, **CAUTION** or **NOTE** are defined as follows :



Denotes an extreme intrinsic hazard which could result in a high probability of death or serious injury if proper precautions are not taken.



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NOTE:

NOTE describes operation and maintenance procedures which should be followed to keep your excavator operation and to insure long machine life and/ or to facilitate certain procedures.

In addition to these instructions you must follow the safety regulations applicable to your work environment and job site and any federal, state and local safety requirements (A model excavators must also follow local and federal highway regulations)

For EC countries, guidelines 89 / 655 / EWG contain the minimum safety guidelines for users.

DESTINED USE

- The excavator with the standard backhoe, grapple or bucket attachment may only be used to loosen, pick up, move, load and dump soil, gravel, rock, or other material and to load trucks, barges, conveyor belts, or rock crushing systems.
- Special guidelines are applicable for machines used for lifting applications and special safety devices must be installed.
- Any other use above and beyond the applications described above, such as breaking out rock or demolishing buildings, pounding in posts etc. requires special attachments and safety devices.
- If the machine is exposed to the risk of falling down objects during operation, the cab of the machine must be fitted with a safety device according to the FOPS prescriptions.
- Transporting personnel or loads etc. is not considered destined use and is therefore prohibited. The manufacturer / dealer is not responsible for any resulting damage. Any risk must be carried by the user himself.
- Destined use is considered part of observing and adhering to all regulations and inspection and maintenance guidelines given in this Operation and Maintenance Manual.

GENERAL SAFETY INFORMATION

- Study the **Operation and Maintenance Manual** before operating or working on the excavator.

Make sure that you have additional information for special attachments of your machine, read it and understand it!

- Allow only authorized personnel informed about the safety rules to operate, service or repair the excavator. Make sure to observe any minimum applicable age requirement.
 - Allow only properly trained personnel to operate or work on the excavator, make sure to clearly specify the person who is responsible for set up, maintenance and repairs.
 - Make sure the operator knows his responsibility regarding the observance of traffic regulations and permit him to refuse any unsafe instructions given by a third person.
 - Any persons still in training should only operate or work on the machine under the supervision and guidance of an experienced person.
 - Check and observe any person working or operating the excavator periodically and regularly, if they observe safety instructions and guidelines given in the Operation and Maintenance Manual.
 - Wear proper work clothing when operating or working on the excavator. Rings, watches, bracelets and loose clothing such as ties, scarves, unbuttoned or unzipped shirts and jackets are dangerous and could cause injury! Wear proper safety equipment, such as safety glasses, safety shoes, hard hats, work gloves, reflector vests and ear protection.
 - Consult your employer or supervisor for specific safety equipment requirements and safety regulations on the job site.
 - Always tilt up the safety lever before leaving the operator's seat.
 - Do not carry tools, replacement parts or other supplies while climbing on or off the excavator. Never use the steering column, control levers or joysticks as handholds.
 - Never jump off the excavator, climb on and off the excavator using only the steps, rails and handles provided.
When climbing on or off the excavator, use both hands for support and face the machine.
 - If needed, use the front window as an escape hatch.
- If no other guidelines are given, perform maintenance and repairs utilizing the following precautions :
 - Park excavator on firm and level ground. Rest the attachment on the ground.
 - Place all control in neutral position and raise the safety lever.
 - Turn the engine off and remove the ignition key.
 - Before working on the hydraulic circuit, move all joysticks and pedals with the ignition key in contact position and the safety lever tilted down to relieve the servo pressure and the remaining pressures in the different main circuits. In addition, relieve the pressure in the hydraulic tank as described in the Operation and Maintenance Manual.
 - Secure all loose parts on the excavator.
 - Never operate the excavator without a complete walk around inspection. Check if all warning decals are on the machine and if they are all legible.
 - Observe all danger and safety guidelines.
 - For certain special applications, the excavator must be equipped with specific safety equipment. Use the excavator only, if they are installed and functioning properly.
 - Never perform any changes, additions or modifications on the machine, which could influence the safety, without obtaining the written permission from the manufacturer. This also applies to the installation and adjustment of safety devices and safety valves as well as to any welding on load carrying parts.
 - Do not install any equipment or attachments made by other manufacturers or any which are not specifically authorized by LIEBHERR for installation without first obtaining the written permission from LIEBHERR. LIEBHERR will issue any required technical documentation for approved installations.
 - Should the electrical circuit be modified or additional components be installed, so the modification must be performed according to the national standards and safety regulations (such as OSHA per the USA). The installation must be certificated by an approved organization and a copy of the certification has to be sent to the LIEBHERR company.
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- Never work underneath the excavator unless it is safely resting on the ground and / or is properly blocked and supported.
- Never use damaged or insufficient wire ropes, slings or chains.
Always wear gloves when handling wire ropes.
- Never reach into bores during attachment installation or removal. Never align bores with your fingers or hands. Use proper alignment tools when installing, changing or servicing attachments by qualified mechanics
- Keep objects away from the radiator fan. Rotating fans will swirl and throw out objects, which can become very dangerous and cause severe injury to yourself and others.
- Avoid contact with any components containing coolant. At or near operating temperature, the engine coolant is hot and under pressure and could cause severe burns.
- Check the coolant level only after the radiator cap is cool enough to touch. Remove the radiator cap slowly to relieve pressure .
- 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 wear safety glasses and protective gloves when handling batteries. Keep sparks or open flames away!
- Never permit anyone to hand guide the bucket or grapple into position.
- When working in the engine area, make sure the top covers and side doors are properly secured or closed with the appropriate supports.
- Never work underneath or on the excavator unless it is properly blocked and supported.
- Check the electrical system regularly and frequently.
All defects, such as loose connections, burnt out fuses and bulbs, burnt or damaged cables must be repaired immediately by a licensed electrician or specially trained personnel.
- Never store flammable fluids on the machine except in storage tanks intended for the excavator's operation.
- Inspect all components, lines, tubes and hoses for oil and fuel leaks and / or damage.
Replace or repair any damaged components immediately.
Any oil, which escapes from leaks, can easily cause a fire.
- Be certain that all clamps, guards and heat shields are installed. These components prevent vibration, rubbing, chafing and heat build-up. Install tie wraps to fasten hoses and wires, as required.
- Cold start ether is extremely flammable. Do not use together with preheat. Use ether only in ventilated areas and as directed. Never use it near heat sources or open flames, do not permit anybody to smoke.
- Know the location of the excavator's fire extinguisher and be familiar with its operation. Make sure you know your local fire regulations and fire reporting procedures.
- A fire extinguisher can be attached inside the operator's cab, using the four threaded holes provided in the rear left support of the cab.

MACHINE START UP SAFETY

- Before excavator start up, perform a thorough walk around inspection.
- Visually inspect the excavator, look for loose bolts, cracks, wear, any leaks and any evidence of vandalism.
- Never start or operate an unsafe excavator.
- Report all defects to your foreman or supervisor and make sure they are corrected immediately.
- Make sure all covers and doors are closed and locked and all warning decals are on the machine.
- Make sure all windows, as well as inside and outside mirrors are clean, and secure all doors and windows to prevent any unintentional movement.

FIRE AND EXPLOSION PREVENTION

- Always turn off the engine while refueling the excavator.
- Never smoke or allow an open flame in refueling areas or where batteries are being charged, or where batteries or flammable materials are stored.
- Never leave machine unattended while fueling. During this operation, no one but the employee in charge of refueling is allowed to stay on the excavator.
- Always start the engine as described in the Operation and Maintenance Manual.

- Be certain that the area surrounding the excavator is free of other personnel, and that no one is working on or under the excavator before starting the engine.
- After entering the cab, adjust the operator's seat and controls, the inside and outside mirror, the armrests and fasten and adjust the seat belt. Be certain that all controls can be reached comfortably.
- All noise protection devices on the machine must be functional during operation.

ENGINE START UP AND OPERATING SAFETY

- Before start up, check if all indicator lights and instruments are functioning properly, place all controls in neutral position and tilt the safety lever up.
- Before starting the engine, alert any nearby personnel that the excavator is being started by sounding the horn.
- Start the machine only when seated in the operator's seat, and with the seat belt fastened (if installed).
- If you have no other instructions, start the engine as outlined in the **Operation and Maintenance Manual**.
- Tilt the safety lever down and check all indicators, gauges, warning devices and controls for their proper indication.
- Start and operate the engine only in a well ventilated area. If necessary, open doors and windows.
Warm up the engine and hydraulic system to operating temperatures. Low engine and hydraulic oil temperatures can cause the excavator to be unresponsive.
- Check that all attachment functions are operating properly.
- Move the excavator slowly into an open area and check all travel functions for their proper operation, check travel and swing brakes, the steering function as well as the turn signals and lights.

MACHINE OPERATING SAFETY

- Familiarize yourself with job site rules. Be informed about traffic and hand signals and safety signs. Ask who is responsible for signaling.
Check your surrounding for any obstacles in the working and movement range, check the load carrying capacity of the terrain, and

secure the job site to shield it from any public highway traffic. Rope off the working area of the machine and install the necessary signs to forbid any non authorized person entering the area.

- Always keep a safe distance from overhangs, walls, drop offs, and unstable ground.
- Be alert of changing weather conditions, bad or insufficient visibility and of changing ground conditions.
- Be alert for utility lines, check the location of underground cables, gas and water lines, and work especially careful in that vicinity. If necessary and/ or if required, call local authorities to mark the location, and take precaution against contact with underground utilities.
- Keep sufficient distance to electrical lines. When working in the vicinity of high voltage electrical lines, keep proper distance to assure that the attachment does not come close to the lines.
DANGER! You must inform yourself about safe distances.
Preferably have the electrical lines de-energized (and lockout / tagged out according to the regulations applicable on the job-site) each time it is possible, and in any case if the closeness of the working area make it necessary.
- In case you do touch a high voltage line by accident, proceed as follows:
 - do not leave the machine,
 - move the machine, if possible, from the danger zone until you obtain sufficient distance,
 - warn any personnel in the vicinity not to come close to the excavator and not to touch it,
 - instruct or initiate that someone turns off the voltage.
 - Do not leave the machine until you are absolutely sure that voltage in the line, which had been touched or damaged, has been turned off!
- Before moving the machine, make sure that the attachments and equipment is secured properly to avoid accidents.
- When traveling on public roads, make sure to observe traffic regulations, and make sure that the machine meets federal and local public highway standards.
- Always turn on the lights if visibility is bad or if you are still working during dusk.



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aservicemanualpdf@yahoo.com