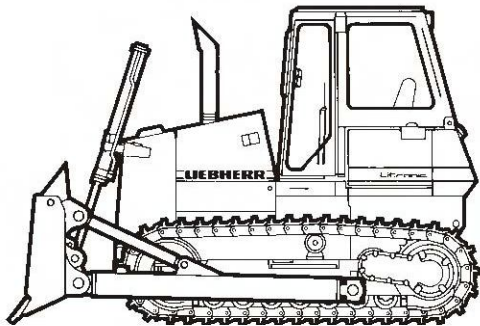


Service Manual

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Crawler Dozers
SERIES **2**
Litronic

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For your information


This manual contains technical data, descriptions of design and function, repair and adjustment guidelines as well as numerous drawings, functional views and illustrations

LIEBHERR - crawler dozers (PR), crawler loaders (LR) or pipelayers (RL).

This manual should simplify competent customer service of our products, does however, not replace expert and qualified training and an attendance of our factory schools.

Information which is in trade considered basic knowledge is not included. Operation and spare parts information can be found in separate manuals.

The manual will be updated as necessary when changes occur in series.

 This symbol is used in the manual for very important notes.

During the activities on the machine, accident prevention regulations and safety guidelines must be strictly observed.

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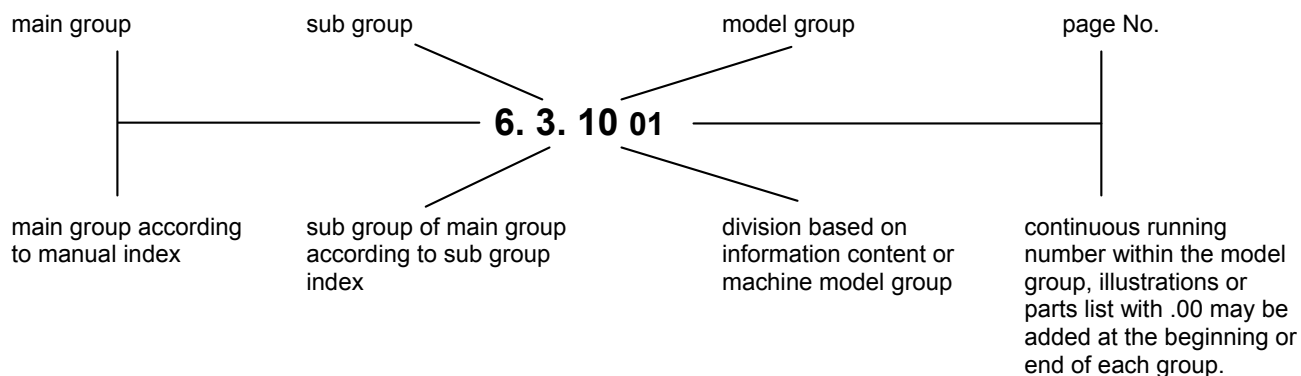
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We reserve the right to make changes of technical details on the machine in comparison to the information and drawings in this manual.

Printed and published by
LIEBHERR-Werk Telfs GmbH., Service -Training Department.

Explanation of structure (page numbers)

In order to find specific information and add supplements more easily, the following numbering system is being used:



Updated pages retain the same page number, but receive a more recent date when mailed. Supplements have a new number. If the page is only valid for a certain machine model group, it will so be indicated on the page.

We hope that with the enclosed information we have taken yet another step to improve the service on the LIEBHERR - crawler dozers, crawler loaders and pipelayers.

LIEBHERR-Werk Telfs GmbH.
Service-Training Dept.

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1. Prior and during the performance of tests, adjustments, and repairs, the following guidelines must be followed :

- Any type of work may only be performed by **qualified personnel** or under the supervision of such personnel.

Qualified personnel are persons who - based on specialized training and experience - have sufficient knowledge in the general area of earthmoving equipment and the specific technology of LIEBHERR machines. They must also have knowledge of all applicable laws and general work protection regulations, accident prevention regulations, guidelines and generally approved rules concerning technology, and be able to evaluate if earthmoving equipment is safe to operate and if the necessary work can be performed without endangering themselves or third persons.

- Never operate a machine with a raised cab or canopy! The machine may only be operated with a lowered and secured cab or canopy.
- Always adhere to the LIEBHERR adjustment values when performing adjustment work.
- When performing a Delivery Inspection on a machine, the operator(s) must be trained using a current Operation and Maintenance Manual. The safety guidelines in that manual must be particularly observed and followed as listed.
- The same **safety guidelines must also be observed** when performing repair work. On the other hand, there are instances of specific repair and/or maintenance which, in the judgement of qualified personnel, require steps and procedures other than as specified in the safety guidelines. In such event, qualified personnel or individuals performing said work under the supervision of such personnel, should assure that additional safety precautions necessary to insure the safety of those involved in the repair are taken. Such items of repair and/or maintenance include, but are not limited to, the following :

- It may be necessary to open the side engine compartment doors while the engine is running for diagnostic and/or component adjustment reasons.

In such event, care should be taken to assure that the engine compartment doors are fully secured from unexpected and/or unintended closing during the diagnostic and/or adjustment work effort. Care should also be exercised to assure that there will be no inadvertent or unintended contact of any part of the body with any moving and/or heated parts of the engine. Along these lines, loose clothing, scarves, open jackets, ties and jewelry should be avoided.

- It may be necessary for purposes of performing repairs, adjustments and/or troubleshooting to start the engine of the machine and to actuate the travel drive with the cab or canopy tilted. Such should never be done unless the machine has been raised completely off the ground and supported properly and according to all applicable guidelines.

However, this procedure can only be performed by a factory certified service mechanic.

Following please find the **Safety Guidelines** as listed in the present Operation and Maintenance Manual. Liebherr reserves the right to update any Operation and Maintenance Manual, including but not limited to the revision or addition of safety guidelines. It is, therefore, strongly recommended to also **consult the latest Operation and Maintenance Manual** of the machine involved.

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12 94		1.2.01.01

2. SAFETY GUIDELINES

(Abstract of the Operator and Maintenance Manual Issue 10 / 94, printed later than 2/12/94)

Working with earthmoving machinery may be dangerous, it could result in injury or death if proper precautions were not taken by you, the operator and / or maintenance personnel. We urge you to read these safety notes repeatedly and carefully, and to observe them to prevent danger and accidents.

This is especially important for any personnel that only works on the machine occasionally, such as during set up and / or maintenance.

Careful adherence to the below listed safety information will insure safe operation and maintenance and potentially prevent personal injury to yourself and others and possible damage to your machine.

Important safety notes are used throughout the Operation and Maintenance Manual, such as DANGER, CAUTION and / or NOTE, to emphasize important or critical instructions.

In the Operation and Maintenance Manual, these safety notes are defined as follows:

DANGER

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

CAUTION

Denotes a reminder of safety practices or direct attention to unsafe practices if proper precaution are not taken, which could result in personal injury and / or damage or destruction of the machine.

NOTE

This symbol is used to describe operational and maintenance procedures which should be followed to keep your machine operational and insure long service life and / or to facilitate certain operating procedures.

In addition to these instructions, you must follow additional safety regulations applicable to your work environment and job site, any federal, state and local laws governing travel on public roads and highways, and any guidelines issued by trade and professional associations.

2.0.1 PROPER AND INTENDED USE

With the standard dozer attachment, the machine may only be used to loosen, move and dump dirt, gravel, broken rocks, or other similar material.

Other use for which this machine is not designed, such as breaking rocks, demolishing buildings, driving piles, transporting personnel, etc. are considered to be improper and unsafe use. Neither the manufacturer nor the dealer can be held responsible for any damage or accident resulting from such or any other unauthorized use of the machine. Any risk in improperly using this machine is the responsibility of the user.

Never use this machine in a special application unless it is equipped with the appropriate attachment and safeguards, and supplied with specific operating and safety guidelines and/or decals.

The proper and intended use also includes the strict adherence to the operating and maintenance guidelines issued in this Operation and Maintenance Manual and careful adherence to inspection and maintenance schedules and guidelines.

2.1 DECALS ON THE MACHINE

Several safety decals are attached to the machine. They must be strictly observed to prevent death or serious injury. The decals and the location of the decals on the machine are shown in the Operation and Maintenance Manuals. (Please use them for more information).

These safety decals must be checked regularly to ensure they are still complete and legible.

Missing or illegible safety decals must **always** be replaced immediately.

2.2 GENERAL SAFETY GUIDELINES

- Study the Operation and Maintenance Manual before operating or working on the machine.
 - Make certain that you have additional information for the special attachments of your machine, read it and make sure you understand it.
- Only trained and authorized personnel may operate, maintain, service or repair this machine.
 - Make sure you are aware of the permissible minimum operator age, as stated by law.
- Utilize only trained or specially trained personnel, make sure that everybody is aware of the person / persons responsible for the operation, installation of attachments, maintenance and repair of the machine.
- Determine the responsibility of the operator, (to include adherence to traffic regulations) and permit him to refuse to carry out unsafe instructions or practices given by a third person.
- Do not allow any personnel, either still to be trained or already in training, to work on the machine unless that person is under the constant supervision of an experienced instructor or operator.
- Periodically, check to see if all persons observe all safety guidelines and work cautiously, as noted in the Operation and Maintenance Manual.
- Always wear proper clothing when operating or working on the machine.
 - Avoid wearing rings, watches, bracelets, ties, scarves, open jackets, loose clothing such as unbuttoned or unzipped jackets, etc. they are dangerous, could get caught in the machinery and could cause serious injury!
 - Wear the proper safety equipment for certain work, such as safety glasses, safety shoes, hard hats, gloves, reflective vests, ear protection.
- Consult your employer or supervisor for specific safety equipment requirements and safety regulations applicable to the job site.
- Never use the safety lever, control levers or joysticks as handholds. This could trigger inadvertent movement of the machine and cause serious accidents.
- Never jump off the machine! Climb on and off the machine only by using the steps, rails and handles provided. When climbing on or off the machine, use both hands for support and face the machine.
- Keep operator's cab, catwalks, steps, handrails and handles clean and free from oil, grease, mud, snow and ice. These precautions will minimize the danger of slipping, stumbling or falling.
- Familiarize yourself with the emergency exit route through the right cab door.
- If no other instructions were given, proceed as follows for maintenance and repairs:
 - Park the machine on firm and level ground and lower the attachment to the ground.
 - Bring all operating and control levers into neutral position.

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- Turn the engine off and leave the ignition key in contact position.
 - Actuate the operating lever / joystick several times to relieve pressure in the hydraulic lines.
 - Bring all operating and control levers into neutral position.
 - Place the safety lever in the full down position before leaving the machine.
 - Remove the ignition key.
- Before any work on the hydraulic circuit, you must also - with the ignition key in contact position - actuate all servo controls (joysticks and foot pedals) in both directions to relieve pressure in the servo and hydraulic system. Then relieve the hydraulic tank pressure.
 - The safety lever must always be placed in the full down position before leaving the cab.
 - Secure all loose parts on the machine properly.
 - Never operate a machine until you have performed a complete walk around inspection. Also, check if all warning decals are on the machine and if all of them are legible.
 - Check and follow all instructions given on the warning and safety decals.
 - This machine can only be utilized in the special applications if equipped with the appropriate attachment and safeguards, and if supplied with specific operating and safety guidelines and/or decals.
 - Never change, add or modify anything on the machine which could influence the safety of the machine without explicit written permission from the manufacturer. This also applies to the installation and adjustment of safety devices and valves as well as for any welding on load carrying machine parts or sections.
 - Never install any attachments or parts without LIEBHERR's permission.

2.3 CRUSHING AND BURN PREVENTION

- Never work underneath the attachment unless it is safely placed on the ground or properly blocked and supported.
- Never use damaged or insufficient load carrying devices, such as chains, ropes, ... Always wear gloves when handling wire ropes.
- When working on the attachment, never align bores with your fingers, always use proper alignment tools when installing, changing or servicing attachments.
- When the engine is running, make sure that no objects touch the radiator fan. Rotating fans will swirl and throw out objects which can become very dangerous and, in addition to damaging the fan, they can cause severe injury to yourself and others.
- Avoid contact with components containing coolant. At or near operating temperature, the engine coolant is hot and under pressure and could cause severe burns.
- Check 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. Make sure there are no sparks and open flames in the vicinity.
- Never permit anyone to hand-guide the attachment to its proper position.
- Secure the engine compartment doors in open position to avoid unwanted closing.
- Insure that all engine and battery compartment doors are closed and locked before operating the machine.

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