

LIEBHERR

TELESCOPIC BOOM- MOBILE CRANE

TYPE LTM 1160/2

Load charts and notes for using the load charts

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| crane number | 0023224 |
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I. INFORMATION FOR USING THE LOAD CAPACITY TABLES

DANGER: The regulations specifications in the operating instructions for crane operations are decisive and final. If these are not observed, there is an extremely high risk of ACCIDENTS!

1. Explanations

- 1.1 The load capacity value in the load capacity tables are indicated in pounds [lbs].
- 1.2 The working radius is the horizontal distance indicated in feet [ft] between the center of gravity of the load from the slewing axis of the crane superstructure as measured from the ground. This also applies when the crane is subjected to loads; i.e., this includes boom flexure.
- 1.3 Crane operations are only permitted with the crane supported. Here, the sliding arms must always be extended to the dimensions specified in the respective load capacity table.
- 1.4 Boom positions other than those specified in the load capacity tables are prohibited.
- 1.5 The boom must only be moved in those ranges for which load capacity values are given, even without a load, as otherwise the crane can topple. In normal operations, this is prevented by the overload safety device. When "Assembly" is engaged, (with the assembly key-operated switch), the boom must only be luffed or lowered within the specified working radius ranges.
- 1.6 The given load capacities include the weight of the slinging tackle, hoisting and take-up tackle. The possible weight of the load to be hoisted is thus less than the weights above.
- 1.7 There are several levels of lifting capacity tables in the LICCON Overload Safety Device. In this booklet you will find all lifting capacity tables of all levels. In the table of contents (the first few pages of chapter II) the corresponding level-number (E0, E1, E2, E3) is indicated in the upper left corner of the working mode symbols.

2. Crane operating mode "Crane supported"

- 2.1 Before the crane is raised on its supports, the axle suspension must be blocked.
- 2.2 The sliding arms of the hydraulic support jack must be extended (simultaneously on both sides) to the precise dimension specified in the applicable load capacity table.
- 2.3 The sliding arms must be secured by pins.
- 2.4 It is necessary to place suitable underlay material under the support pads of the support jacks over a large surface area according to ground conditions.
- 2.5 All wheels must be raised clear of the ground.
- 2.6 The crane must be aligned horizontally with the aid of the level gauges. The horizontal crane position must be checked occasionally, and if necessary corrected, during crane operation.

3. There is a danger of overloading or toppling the crane if:

- 3.1 the crane is unsupported and the slewing platform is rotated out of the crane's longitudinal axis. Before slewing the superstructure, the crane must be supported;
- 3.2 the crane is not properly supported on all 4 hydraulic supports and aligned;
- 3.3 the sliding arms are not extended to the precise dimension specified in the correct load capacity table;
- 3.4 the sliding arms are not secured with pins;
- 3.5 the support pads are not provided with a suitable foundation of stable material in accordance with the relevant ground conditions;
- 3.6 the load and/or working radii specified in the load capacity tables are not strictly adhered to;
- 3.7 there is insufficient distance from trenches, cellars, and holes;
- 3.8 the load begins to swing due to improper control of crane movements;
- 3.9 loads are pulled at an angle. Pulling diagonally to the boom's longitudinal axis is the most dangerous movement, and must never be carried out. Pulling at an angle is prohibited.

4. Telescopic boom

- 4.1 The lifting capacity of the telescopic boom with its 5 extendable telescopic sections is limited. The loads stated in the load capacity tables must not be exceeded.
- 4.2 The specifications for the telescopic sections to be extended according to load and required boom length must be observed under all circumstances.
- 4.3 As a general rule, the boom should first be extended to the required length, and then loaded. However, it is possible to extend and retract the boom under partial load. The weight of this partial load is dependent on bearing pad lubrication and the available useable lengths of the telescopic sections.
- 4.4 Even without a load, the telescopic boom may only be moved within the working radius ranges for which values are listed in the load capacity table.

DANGER : Failure to observe this regulation may lead to accidents

5. Rope winches

- 5.1 Winch 1 (main hoisting gear)
Winch 1 is designed for a maximum rope tension of 113 kN. This rope tension must not be exceeded under any circumstances. Accordingly, the minimum number of hoisting rope lines (rope reeving) should be selected according to the weight of the load to be lifted (see Table "Hoisting rope reeving" in Chapter II).
- 5.2 Winch 2 (auxiliary hoisting gear)
The information given under point 5.1 applies here also.
- 5.3 Prevention of rope slack formation:
 - 5.3.1 When retracting the telescopic boom, the winch must be operated in the direction of lifting simultaneously, in order to prevent the hook block from descending to the ground and creating rope slack. The speed of the hoisting rope movement should be matched to that used for retraction.
 - 5.3.2 The rope guides on the winches must be supervised by a member of the workforce when additional equipment is being mounted.

6. Hoisting rope reeving

- 6.1 The hoisting rope must be reeved in between boom head and hook block in accordance with the maximum rope tension of the winch and the weight of the load to be lifted.
- 6.2 If several hoisting rope lines are reeved in, the efficiency of the hook block is reduced due to pulley friction and rope flexure.
In consequence, with a rope tension of e.g. 113 kN, only 232100 lbs can be pulled with a 10-fold line reeving, instead of 249000 lbs.
- 6.3 Consult the table "Hoisting rope reeving" in Chapter II of this manual for the maximum loads in dependence on the number of hoisting rope lines.
- 6.4 The number of hoisting rope lines reeved must be set on the control and display unit of the LICCON overload safety device according to the current hoisting rope reeving total.

7. Changing between material handling and installation operation

7.1 Load carrying capacity of the crane

The load carrying members of the crane have been designed according to the load criteria for installation /set up operations (load collective classification = "light" = Q1 or L1). Stress collective S₁ according to DIN 15018 Part 3 and stress margin range N1 according to DIN 15018 Part 1 or ISO 4301, group A₁.
If an installation / set up crane is used material handling, the stress margin range increases. Therefore the loads must be reduced since a higher stress group now be applicable. This is especially true if the calculated loads are limited by strength values.

CAUTION: For crane value calculation, it has been assumed that the crane will be utilized as an installation crane (load collective classification = "light" = Q1 or L1). If the crane is also used in material handling application, premature wear of all crane sections must be expected, and cracks may occur in load carrying steel members. We therefore strongly recommend, that if the crane is utilized in material handling application, the load values are reduced by 50 %, as compared to the data given in the corresponding load carrying capacity chart.

For details, have material handling done reduced and then contact your Liebherr Service Dept.

The size of the cables as well as the sections of hoist gears are configured according to the load collectives applicable for installation operation (load collective classification = "light" = Q1 or L1):

ISO 4301/2 or 4308/2

Group A₁

Hoist gears M3

Intake gears M2

If an installation / set up crane is used material handling (load collective classification = "light" = Q1 or L1), the stress margin range increases, the rope runs must therefore be reduced. If this is not assured, then the hoist rope wear out rate will be reached much earlier, and / or the hoist gear must be rebuilt / serviced much earlier.

Please refer to the information regarding wear out criteria for ropes according to DIN 15020, part 2 or ISO 4309 in chapter 8.01 "Repeat crane inspections" in the crane's Operating Instructions.

NOTE: In order to keep wear out rate of hoist ropes as low as possible during material handling operation (load collective classification = "medium" or higher), we recommend the use of a special length rope, so that during material handling operation the rope is rolled onto drum of the hoist winch in only one rope layer

If several layers are on the rope drum, the wear rate increases. In addition, the winch drive will run cooler, if the crane is operated with only one rope layer.

8. LICCON Overload safety device and Limit switch

If the permissible load moment is exceeded, the electronic LICCON overload safety device shuts down the hoisting, boom topping and boom extension movements. It is possible to decrease the load by means of movements in the opposite direction. The LICCON overload safety device must be checked for correct operation on each occasion before operating the crane.

- 8.1 The LICCON overload safety device must be set to the current equipment mode of the crane by means of function keys or by entering the corresponding 3-digit code (see separate operating instructions "LICCON Overload Safety Device for Liebherr Mobile Cranes").
- 8.2 The LICCON overload limit switch is a safety device and must not be used as a shutdown device for operating purposes. The crane operator must assure himself of the weight of a load before attempting to lift it. The fact that the crane is equipped with the LICCON overload safety device does not free the operator from responsibility with regard to operating safety.
- 8.3 The control and display unit of the LICCON overload safety device indicates among other things the working radius, boom length, pulley height, load and degree of crane load utilization. This provides the operator with a constant overview of the working range and crane utilization.
- 8.4 Hoisting limit switches at the head of the telescopic boom and folding jibs prevent the hook block from running up against the boom head. The hoisting limit switches must be checked for correct operation on each occasion before the crane is operated.
- 8.5 Gear cam limit switches on the cable winches ensure that 3 safety turns remain on the rope drums. When the final cable layer is reached, a visual check is also necessary to ensure that the 3 safety turns are available. If the hoisting gears have been overturned in the lifting direction, or if the hoisting cable has been changed, then the corresponding limit switch must be reset before resuming operation.
- 8.6 The crane operator must check correct operation of the LICCON overload safety device on each occasion before operating the crane. The crane manufacturer will accept no liability for damage to the crane and consequential damage resulting from non-function or disactivation of the LICCON overload safety device.

9. Working platform

- 9.1 If the crane is equipped with a working platform, refer to Chapter II for working radius tables for operation with a working platform. Never exceed or overshoot the working range specified in the working radius tables.
- 9.2 The maximum permissible load and number of persons which the working platform can carry is stated on the identification plate of the platform. These limits must be observed under all circumstances.

10. Hook block and load hooks

| Load | | Own weight | | Number of rope pulleys |
|------|---------|-------------|------------|------------------------|
| [t] | [lbs] | [t] | [lbs] | |
| 160 | 352,500 | 2.40 | 5,300 | 9 |
| 136 | 302,000 | 1.47 | 3,240 | 7 |
| 102 | 220,500 | 1.25 | 2,760 | 5 |
| 67 | 150,000 | 0.43 / 0.90 | 940 / 1980 | 3 |
| 30 | 66,100 | 0.76 | 1680 | 1 |
| 10 | 22,000 | 0.39 | 860 | -- |

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