en **Operator's manual**

Hydraulic excavator

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ORIGINAL OPERATOR'S MANUAL

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1.2.3 Specifications

The specifications for this machine are contained in the following technical description.

LFR/11341231/01/2018-02-22/en

Reliability

Liebherr-France SAS perpetuates the Liebherr Group's tradition of quality and innovation to offer a product that satisfies the needs of its clients throughout the world. This new R 924 excavator is recommended for completely reliable operation in all conditions.

The tradition of quality and robustness

Better stresses distribution

The R 924 crawler excavator is a product designed to withstand major stresses. The robustness of the undercarriage lengthens the service life of the machine. Molded steel parts strengthen the excavator at strategic points for difficult applications.

ROPS Structure

For complete peace-of-mind while working in even the most demanding terrains, the operator's cab is fitted with an integrated roll-over protection.

Automatic operation monitoring

The operator can concentrate fully on the task: the integrated on-board electronics ensure a constant readjustment to preset values. Any potential divergences from the operating parameters are displayed on the control screen.

Liebherr-Service

An excellent after-sales service

The after-sales services can be customised to suit and respond to your specific needs. Several programmes, such as ReMan, ReBuilt and Repair provide the perfect, economical solution, always including the manufacturer's quality and guarantee. A team of highly trained Service technicians has all the latest-generation diagnostic tools at its disposal, for a reduced machine downtime. By following your chosen maintenance programme, you will also obtain a higher resale price.

Spare parts

Spare parts available: a permanent stock of over 80,000 catalogue items, covering 98 % of needs, is available to you 24 hours a day using the online service portal, Liebherr-P@rts24, with an integrated ordering procedure reserved for Liebherr clients. A team is at your service to answer all your requests across the 5 continents.

LiDAT fleet management system

- A single point of contact for the complete management of the fleet
- Daily reports on the fleet of machines via the internet portal
- Accurate localisation of the machines
- Optimised security thanks to geographical limitations and established shut off times
- An updated transmission several times a day

Key components developed by Liebherr

- A perfect harmonisation of the machine's elements for worksite applications
- The main mechanically-welded structures, such as the undercarriage, attachment and uppercarriage are designed by Liebherr
- Engine, hydraulic pumps, transfer gearbox, transmission, rotating mechanism, crown wheel and electronic components manufactured by Liebherr

Lift Capacities

with Mono Boom 5.70 m

Stick 2.40 m

m	Undercarriage	3.0 m		4.5 m		6.0 m		7.5 m		9.0 m				m
10.5	NLC[1)]													
	SLC													
	LC													
	WLC													
9.0	NLC[1)]													
	SLC													
	LC													
	WLC													
7.5	NLC[1)]											3.6*	3.6*	5.9
	SLC											3.6*	3.6*	
	LC											3.6*	3.6*	
	WLC											3.6*	3.6*	
6.0	NLC[1)]					4.6	5.5*					3.4*	3.4*	7.1
	SLC					5.2	5.5*					3.4*	3.4*	
	LC					5.5*	5.5*					3.4*	3.4*	
	WLC					5.5*	5.5*					3.4*	3.4*	
4.5	NLC[1)]			6.8	7.1*	4.3	6.0*	3.0	4.8*			2.8	3.4*	7.8
	SLC			7.1*	7.1*	5.0	6.0*	3.4	4.8*			3.2	3.4*	
	LC			7.1*	7.1*	5.3	6.0*	3.7	4.8*			3.4*	3.4*	
	WLC			7.1*	7.1*	5.9	6.0*	4.1	4.8*			3.4*	3.4*	
3.0	NLC[1)]	10.8*	10.8*	6.2	8.8*	4.0	6.8*	2.9	5.4			2.5	3.6*	8.1
	SLC	10.8*	10.8*	7.1	8.8*	4.7	6.8*	3.3	5.5			2.9	3.6*	
	LC	10.8*	10.8*	7.6	8.8*	5.0	6.8*	3.5	5.5			3.1	3.6*	
	WLC	10.8*	10.8*	8.7	8.8*	5.6	6.8*	4.0	5.8*			3.5	3.6*	
1.5	NLC[1)]			5.6	10.4*	3.7	7.3	2.7	5.2			2.3	4.0*	8.2
	SLC			6.5	10.4*	4.4	7.5	3.1	5.3			2.7	4.0*	
	LC			7.0	10.4*	4.7	7.5	3.4	5.3			2.9	4.0*	
	WLC			8.0	10.4*	5.3	7.5*	3.8	5.9			3.3	4.0*	
0	NLC[1)]	8.4*	8.4*	5.3	11.0*	3.5	7.1	2.6	5.1			2.4	4.6*	8.0
	SLC	8.4*	8.4*	6.2	11.0*	4.1	7.2	3.0	5.2			2.8	4.6*	
	LC	8.4*	8.4*	6.7	11.0*	4.4	7.2	3.3	5.2			3.0	4.6*	
	WLC	8.4*	8.4*	7.7	11.0*	5.1	8.0*	3.7	5.7			3.4	4.6*	
-1.5	NLC[1)]	9.8	12.9*	5.2	10.7*	3.5	7.0					2.6	5.1	7.5
	SLC	11.8	12.9*	6.1	10.7*	4.1	7.1					3.0	5.1	
	LC	12.9	12.9*	6.6	10.7*	4.4	7.1					3.2	5.2	
	WLC	12.9*	12.9*	7.6	10.7*	5.0	7.9					3.7	5.7	
-3.0	NLC[1)]	10.0	13.3*	5.2	9.6*	3.5	7.1					3.1	6.1	6.6
	SLC	12.0	13.3*	6.2	9.6*	4.1	7.1*					3.6	6.2*	
	LC	13.1	13.3*	6.7	9.6*	4.4	7.1*					3.9	6.2*	
	WLC	13.3*	13.3*	7.7	9.6*	5.0	7.1*					4.4	6.2*	
-4.5	NLC[1)]	9.7*	9.7*	5.5	7.1*							4.6	6.1*	5.1
	SLC	9.7*	9.7*	6.5	7.1*							5.4	6.1*	
	LC	9.7*	9.7*	6.9	7.1*							5.8	6.1*	
	WLC	9.7*	9.7*	7.1*	7.1*							6.1*	6.1*	
-6.0	NLC[1)]													
	SLC													
	LC													
	WLC													

Stick 2.70 m

m	Undercarriage	3.0 m		4.5 m		6.0 m		7.5 m		9.0 m				m
10.5	NLC[1)]													
	SLC													
	LC													
	WLC													
9.0	NLC[1)]													
	SLC													
	LC													
	WLC													
7.5	NLC[1)]											3.1*	3.1*	6.3
	SLC											3.1*	3.1*	
	LC											3.1*	3.1*	
	WLC											3.1*	3.1*	
6.0	NLC[1)]					4.0*	4.0*					3.0*	3.0*	7.4
	SLC					4.0*	4.0*					3.0*	3.0*	
	LC					4.0*	4.0*					3.0*	3.0*	
	WLC					4.0*	4.0*					3.0*	3.0*	
4.5	NLC[1)]					4.6	5.2*					3.0*	3.0*	7.4
	SLC					5.2*	5.2*					3.0*	3.0*	
	LC					5.2*	5.2*					3.0*	3.0*	
	WLC					5.2*	5.2*					3.0*	3.0*	
3.0	NLC[1)]	11.3	13.6*	6.2	8.4*	4.4	5.7*	3.0	5.2*			2.6	3.0*	8.1
	SLC	13.5	13.6*	7.2	8.4*	5.0	5.7*	3.4	5.2*			3.0*	3.0*	
	LC	13.6*	13.6*	7.7	8.4*	5.3	5.7*	3.7	5.2*			3.0*	3.0*	
	WLC	13.6*	13.6*	8.4*	8.4*	5.7*	5.7*	4.1	5.2*			3.0*	3.0*	
1.5	NLC[1)]	6.6*	6.6*	5.6	10.1*	3.7	7.3*	2.7	5.2			2.2	3.4*	8.5
	SLC	6.6*	6.6*	6.6	10.1*	4.4	7.3*	3.1	5.3			2.6	3.4*	
	LC	6.6*	6.6*	7.0	10.1*	4.7	7.3*	3.3	5.3			2.8	3.4*	
	WLC	6.6*	6.6*	8.1	10.1*	5.3	7.3*	3.8	5.8			3.1	3.4*	
0	NLC[1)]	8.6*	8.6*	5.2	10.9*	3.5	7.1	2.6	5.1			2.2	3.9*	8.3
	SLC	8.6*	8.6*	6.2	10.9*	4.1	7.2	3.0	5.1			2.6	3.9*	
	LC	8.6*	8.6*	6.7	10.9*	4.4	7.2	3.2	5.2			2.8	3.9*	
	WLC	8.6*	8.6*	7.7	10.9*	5.1	7.9*	3.7	5.7			3.2	3.9*	
-1.5	NLC[1)]	9.6	12.3*	5.1	10.8*	3.4	6.9	2.5	5.0			2.4	4.7	7.8
	SLC	11.6	12.3*	6.0	10.8*	4.0	7.1	2.9	5.1			2.8	4.8	
	LC	12.3*	12.3*	6.5	10.8*	4.3	7.1	3.2	5.1			3.0	4.8	
	WLC	12.3*	12.3*	7.5	10.8*	4.9	7.9	3.6	5.6			3.4	4.9*	
-3.0	NLC[1)]	9.8	13.9*	5.2	9.8*	3.4	7.0					2.8	5.6	7.0
	SLC	11.8	13.9*	6.1	9.8*	4.0	7.1					3.3	5.7	
	LC	13.0	13.9*	6.6	9.8*	4.3	7.1					3.5	5.7	
	WLC	13.9*	13.9*	7.6	9.8*	5.0	7.3*					4.1	6.0*	
-4.5	NLC[1)]	10.2	10.6*	5.4	7.7*							4.0	6.0*	5.6
	SLC	10.6*	10.6*	6.3	7.7*							4.7	6.0*	
	LC	10.6*	10.6*	6.8	7.7*							5.0	6.0*	
	WLC	10.6*	10.6*	7.7*	7.7*							5.7	6.0*	
-6.0	NLC[1)]													
	SLC													
	LC													
	WLC													

Stick 3.00 m

m	Undercarriage	3.0 m		4.5 m		6.0 m		7.5 m		9.0 m				m
10.5	NLC[1)]													
	SLC													
	LC													
	WLC													
9.0	NLC[1)]													
	SLC													
	LC													
	WLC													
7.5	NLC[1)]											2.8*	2.8*	6.7
	SLC											2.8*	2.8*	
	LC											2.8*	2.8*	
	WLC											2.8*	2.8*	
6.0	NLC[1)]							3.1	3.4*			2.6*	2.6*	7.7
	SLC							3.4*	3.4*			2.6*	2.6*	
	LC							3.4*	3.4*			2.6*	2.6*	
	WLC							3.4*	3.4*			2.6*	2.6*	
4.5	NLC[1)]					4.4	5.4*	3.0	5.0*			2.4	2.6*	8.4
	SLC					5.0	5.4*	3.4	5.0*			2.6*	2.6*	
	LC					5.3	5.4*	3.7	5.0*			2.6*	2.6*	
	WLC					5.4*	5.4*	4.1	5.0*			2.6*	2.6*	
3.0	NLC[1)]	11.7	12.4*	6.3	7.9*	4.1	6.2*	2.8	5.4*			2.2	2.7*	8.7
	SLC	12.4*	12.4*	7.3	7.9*	4.7	6.2*	3.3	5.4*			2.5	2.7*	
	LC	12.4*	12.4*	7.8	7.9*	5.0	6.2*	3.5	5.4*			2.7	2.7*	
	WLC	12.4*	12.4*	7.9*	7.9*	5.7	6.2*	4.0	5.4*			2.7*	2.7*	
1.5	NLC[1)]	8.3*	8.3*	5.6	9.7*	3.7	7.1*	2.7	5.2			2.1	3.0*	8.8
	SLC	8.3*	8.3*	6.6	9.7*	4.3	7.1*	3.1	5.3			2.4	3.0*	
	LC	8.3*	8.3*	7.1	9.7*	4.7	7.1*	3.3	5.3			2.6	3.0*	
	WLC	8.3*	8.3*	8.1	9.7*	5.3	7.1*	3.8	5.8*			3.0	3.0*	
0	NLC[1)]	8.8*	8.8*	5.2	10.7*	3.5	7.1	2.5	5.0			2.1	3.4*	8.6
	SLC	8.8*	8.8*	6.2	10.7*	4.1	7.2	3.0	5.1			2.4	3.4*	
	LC	8.8*	8.8*	6.6	10.7*	4.4	7.2	3.2	5.1			2.6	3.4*	
	WLC	8.8*	8.8*	7.7	10.7*	5.0	7.7*	3.6	5.7			3.0	3.4*	
-1.5	NLC[1)]	9.5	11.7*	5.0	10.8*	3.4	6.9	2.4	4.9			2.2	4.1*	8.1
	SLC	11.5	11.7*	6.0	10.8*	4.0	7.0	2.9	5.0			2.6	4.1*	
	LC	11.7*	11.7*	6.5	10.8*	4.3	7.0	3.1	5.0			2.8	4.1*	
	WLC	11.7*	11.7*	7.5	10.8*	4.9	7.8	3.6	5.6			3.2	4.1*	
-3.0	NLC[1)]	9.6	14.5*	5.1	10.0*	3.3	6.9					2.6	5.2	7.3
	SLC	11.6	14.5*	6.0	10.0*	3.9	7.0					3.0	5.3	
	LC	12.8	14.5*	6.5	10.0*	4.2	7.0					3.2	5.3	
	WLC	14.5*	14.5*	7.5	10.0*	4.9	7.4*					3.7	5.6*	
-4.5	NLC[1)]	9.9	11.5*	5.2	8.2*	3.5	5.8*					3.5	5.8*	6.0
	SLC	11.5*	11.5*	6.2	8.2*	4.1	5.8*					4.1	5.8*	
	LC	11.5*	11.5*	6.7	8.2*	4.4	5.8*					4.4	5.8*	
	WLC	11.5*	11.5*	7.7	8.2*	5.0	5.8*					5.0	5.8*	
-6.0	NLC[1)]													
	SLC													
	LC													
	WLC													

Stick 3.70 m

m	Undercarriage	3.0 m		4.5 m		6.0 m		7.5 m		9.0 m				m
10.5	NLC[1)]													
	SLC													
	LC													
	WLC													
9.0	NLC[1)]													
	SLC													
	LC													
	WLC													
7.5	NLC[1)]											2.1*	2.1*	7.4
	SLC											2.1*	2.1*	
	LC											2.1*	2.1*	
	WLC											2.1*	2.1*	
6.0	NLC[1)]							3.2	3.8*			2.0*	2.0*	8.4
	SLC							3.6	3.8*			2.0*	2.0*	
	LC							3.8*	3.8*			2.0*	2.0*	
	WLC							3.8*	3.8*			2.0*	2.0*	
4.5	NLC[1)]							3.1	4.4*			2.0*	2.0*	9.0
	SLC							3.5	4.4*			2.0*	2.0*	
	LC							3.7	4.4*			2.0*	2.0*	
	WLC							4.2	4.4*			2.0*	2.0*	
3.0	NLC[1)]			6.6	6.9*	4.2	5.6*	2.9	4.9*	2.1	3.1*	1.9	2.1*	9.3
	SLC			6.9*	6.9*	4.8	5.6*	3.3	4.9*	2.4	3.1*	2.1*	2.1*	
	LC			6.9*	6.9*	5.1	5.6*	3.6	4.9*	2.6	3.1*	2.1*	2.1*	
	WLC			6.9*	6.9*	5.6*	5.6*	4.0	4.9*	2.9	3.1*	2.1*	2.1*	
1.5	NLC[1)]	10.6	14.2*	5.9	8.8*	3.8	6.6*	2.7	5.2	2.0	3.7*	1.8	2.2*	9.4
	SLC	12.7	14.2*	6.8	8.8*	4.4	6.6*	3.1	5.3	2.3	3.7*	2.1	2.2*	
	LC	13.9	14.2*	7.3	8.8*	4.7	6.6*	3.4	5.3	2.5	3.7*	2.2*	2.2*	
	WLC	14.2*	14.2*	8.4	8.8*	5.4	6.6*	3.8	5.4*	2.8	3.7*	2.2*	2.2*	
0	NLC[1)]	9.6	9.9*	5.3	10.2*	3.5	7.1	2.5	5.0	1.9	3.5*	1.8	2.5*	9.2
	SLC	9.9*	9.9*	6.3	10.2*	4.1	7.2	3.0	5.1	2.2	3.5*	2.1	2.5*	
	LC	9.9*	9.9*	6.7	10.2*	4.4	7.2	3.2	5.1	2.4	3.5*	2.3	2.5*	
	WLC	9.9*	9.9*	7.8	10.2*	5.1	7.4*	3.6	5.7	2.7	3.5*	2.5*	2.5*	
-1.5	NLC[1)]	9.3	11.2*	5.0	10.7*	3.3	6.9	2.4	4.9			1.9	3.0*	8.8
	SLC	11.2*	11.2*	6.0	10.7*	3.9	7.0	2.8	5.0			2.2	3.0*	
	LC	11.2*	11.2*	6.4	10.7*	4.2	7.0	3.1	5.0			2.4	3.0*	
	WLC	11.2*	11.2*	7.5	10.7*	4.9	7.8*	3.5	5.5			2.8	3.0*	
-3.0	NLC[1)]	9.4	14.0*	4.9	10.4*	3.3	6.8	2.4	4.9			2.2	4.0*	8.0
	SLC	11.4	14.0*	5.9	10.4*	3.9	6.9	2.8	4.9			2.6	4.0*	
	LC	12.5	14.0*	6.4	10.4*	4.2	6.9	3.0	4.9			2.8	4.0*	
	WLC	14.0*	14.0*	7.4	10.4*	4.8	7.6*	3.5	5.5			3.2	4.0*	
-4.5	NLC[1)]	9.6	13.3*	5.0	9.2*	3.3	6.7*					2.8	5.5*	6.9
	SLC	11.7	13.3*	6.0	9.2*	3.9	6.7*					3.3	5.5*	
	LC	12.8	13.3*	6.5	9.2*	4.2	6.7*					3.5	5.5*	
	WLC	13.3*	13.3*	7.5	9.2*	4.9	6.7*					4.0	5.5*	
-6.0	NLC[1)]	9.1*	9.1*	5.3	6.4*							4.6	5.6*	5.0
	SLC	9.1*	9.1*	6.3	6.4*							5.4	5.6*	
	LC	9.1*	9.1*	6.4*	6.4*							5.6*	5.6*	
	WLC	9.1*	9.1*	6.4*	6.4*							5.6*	5.6*	

Height **Can be slewed through 360°** **In longitudinal position of undercarriage** **Max. reach** *** Limited by hydr. capacity**

The lift capacities on the load hook of the Liebherr quick coupler 48 without attachment are stated in metric tonnes (t), and can be lifted 360° on firm, level supporting surface. Adjacent values are valid for the undercarriage when in the longitudinal position. Capacities are valid for 600 mm wide triple-grouser pads. Indicated loads are based on ISO 10567 standard and do not exceed 75 % of tipping or 87 % of hydraulic capacity (indicated by *) or are limited through the allowed lift capacity of the load hook on the quick coupler (12 t). Without quick coupler the lift capacities will increase by 250 kg, without bucket cylinder, link and lever they increase by an additional 365 kg.

According to European Standard, EN 474-5: In the European Union excavators have to be equipped with an overload warning device, a load diagram and automatic check valves on the hoist cylinders, when they are used for lifting operations which require the use of lifting accessories.

[1)] Values are calculated with 500 mm wide triple-grouser pads for the NLC-Undercarriage

Lift Capacities

with Straight Mono Boom 6.00 m and Heavy Counterweight

Stick 2.40 m

m	Undercarriage	3.0 m		4.5 m		6.0 m		7.5 m		9.0 m				m
10.5	NLC[1)]													
	SLC													
	LC													
	WLC													
9.0	NLC[1)]											4.2*	4.2*	4.7
	SLC											4.2*	4.2*	
	LC											4.2*	4.2*	
	WLC											4.2*	4.2*	
7.5	NLC[1)]					5.1	5.3*					3.6*	3.6*	6.5
	SLC					5.3*	5.3*					3.6*	3.6*	
	LC					5.3*	5.3*					3.6*	3.6*	
	WLC					5.3*	5.3*					3.6*	3.6*	
6.0	NLC[1)]					5.0	6.2*	3.4	3.7*			3.4	3.4*	7.6
	SLC					5.7	6.2*	3.7*	3.7*			3.4*	3.4*	
	LC					6.0	6.2*	3.7*	3.7*			3.4*	3.4*	
	WLC					6.2*	6.2*	3.7*	3.7*			3.4*	3.4*	
4.5	NLC[1)]	12.1*	12.1*	7.4	8.4*	4.8	6.7*	3.3	5.8*			2.8	3.4*	8.2
	SLC	12.1*	12.1*	8.4*	8.4*	5.4	6.7*	3.8	5.8*			3.3	3.4*	
	LC	12.1*	12.1*	8.4*	8.4*	5.8	6.7*	4.0	5.8*			3.4*	3.4*	
	WLC	12.1*	12.1*	8.4*	8.4*	6.4	6.7*	4.5	5.8*			3.4*	3.4*	
3.0	NLC[1)]			6.7	9.9*	4.4	7.4*	3.2	5.9			2.6	3.5*	8.6
	SLC			7.7	9.9*	5.1	7.4*	3.7	5.9			3.0	3.5*	
	LC			8.2	9.9*	5.4	7.4*	3.9	6.0			3.2	3.5*	
	WLC			9.3	9.9*	6.1	7.4*	4.4	6.0*			3.5*	3.5*	
1.5	NLC[1)]			6.1	10.9*	4.2	7.9*	3.0	5.7			2.5	3.8*	8.6
	SLC			7.1	10.9*	4.8	7.9*	3.5	5.8			2.8	3.8*	
	LC			7.6	10.9*	5.1	7.9*	3.7	5.8			3.0	3.8*	
	WLC			8.7	10.9*	5.8	7.9*	4.2	6.2*			3.4	3.8*	
0	NLC[1)]			5.9	10.8*	4.0	7.7	2.9	5.6			2.5	4.3*	8.5
	SLC			6.9	10.8*	4.6	7.9	3.4	5.7			2.9	4.3*	
	LC			7.4	10.8*	4.9	7.9	3.6	5.7			3.1	4.3*	
	WLC			8.4	10.8*	5.6	7.9*	4.1	6.2*			3.5	4.3*	
-1.5	NLC[1)]	10.5*	10.5*	5.8	9.8*	3.9	7.5*	2.9	5.5			2.7	5.1	8.0
	SLC	10.5*	10.5*	6.8	9.8*	4.5	7.5*	3.4	5.6			3.1	5.1*	
	LC	10.5*	10.5*	7.3	9.8*	4.9	7.5*	3.6	5.6			3.3	5.1*	
	WLC	10.5*	10.5*	8.4	9.8*	5.5	7.5*	4.1	5.7*			3.8	5.1*	
-3.0	NLC[1)]	10.0*	10.0*	5.9	8.1*	4.0	6.2*					3.2	4.8*	7.1
	SLC	10.0*	10.0*	6.9	8.1*	4.6	6.2*					3.7	4.8*	
	LC	10.0*	10.0*	7.4	8.1*	4.9	6.2*					3.9	4.8*	
	WLC	10.0*	10.0*	8.1*	8.1*	5.6	6.2*					4.4	4.8*	
-4.5	NLC[1)]											4.1*	4.1*	5.6
	SLC											4.1*	4.1*	
	LC											4.1*	4.1*	
	WLC											4.1*	4.1*	
-6.0	NLC[1)]													
	SLC													
	LC													
	WLC													

Stick 2.70 m

m	Undercarriage	3.0 m		4.5 m		6.0 m		7.5 m		9.0 m				m
10.5	NLC[1)]													
	SLC													
	LC													
	WLC													
9.0	NLC[1)]											3.6*	3.6*	5.2
	SLC											3.6*	3.6*	
	LC											3.6*	3.6*	
	WLC											3.6*	3.6*	
7.5	NLC[1)]					5.1	5.4*					3.2*	3.2*	6.9
	SLC					5.4*	5.4*					3.2*	3.2*	
	LC					5.4*	5.4*					3.2*	3.2*	
	WLC					5.4*	5.4*					3.2*	3.2*	
6.0	NLC[1)]					5.0	6.0*	3.4	4.6*			3.0*	3.0*	7.9
	SLC					5.7	6.0*	3.9	4.6*			3.0*	3.0*	
	LC					6.0*	6.0*	4.2	4.6*			3.0*	3.0*	
	WLC					6.0*	6.0*	4.6*	4.6*			3.0*	3.0*	
4.5	NLC[1)]			7.5	8.0*	4.8	6.5*	3.3	5.6*			2.7	3.0*	8.5
	SLC			8.0*	8.0*	5.5	6.5*	3.8	5.6*			3.0*	3.0*	
	LC			8.0*	8.0*	5.8	6.5*	4.0	5.6*			3.0*	3.0*	
	WLC			8.0*	8.0*	6.5	6.5*	4.5	5.6*			3.0*	3.0*	
3.0	NLC[1)]			6.8	9.5*	4.5	7.2*	3.2	5.9			2.4	3.1*	8.9
	SLC			7.8	9.5*	5.1	7.2*	3.6	5.9*			2.8	3.1*	
	LC			8.3	9.5*	5.4	7.2*	3.9	5.9*			3.0	3.1*	
	WLC			9.4	9.5*	6.1	7.2*	4.4	5.9*			3.1*	3.1*	
1.5	NLC[1)]			6.1	10.7*	4.2	7.7*	3.0	5.7			2.3	3.3*	8.9
	SLC			7.1	10.7*	4.8	7.7*	3.5	5.8			2.7	3.3*	
	LC			7.7	10.7*	5.1	7.7*	3.7	5.8			2.9	3.3*	
	WLC			8.7	10.7*	5.8	7.7*	4.2	6.1*			3.2	3.3*	
0	NLC[1)]	6.0*	6.0*	5.8	10.8*	3.9	7.7	2.9	5.5			2.3	3.7*	8.7
	SLC	6.0*	6.0*	6.8	10.8*	4.6	7.8	3.4	5.6			2.7	3.7*	
	LC	6.0*	6.0*	7.3	10.8*	4.9	7.8	3.6	5.6			2.9	3.7*	
	WLC	6.0*	6.0*	8.4	10.8*	5.6	7.9*	4.1	6.2*			3.3	3.7*	
-1.5	NLC[1)]	9.9*	9.9*	5.8	10.0*	3.9	7.5*	2.8	5.5			2.5	4.4*	8.3
	SLC	9.9*	9.9*	6.8	10.0*	4.5	7.5*	3.3	5.6			2.9	4.4*	
	LC	9.9*	9.9*	7.3	10.0*	4.8	7.5*	3.5	5.6			3.1	4.4*	
	WLC	9.9*	9.9*	8.3	10.0*	5.5	7.5*	4.0	5.8*			3.5	4.4*	
-3.0	NLC[1)]	10.9*	10.9*	5.8	8.5*	3.9	6.5*					2.9	4.6*	7.5
	SLC	10.9*	10.9*	6.8	8.5*	4.5	6.5*					3.4	4.6*	
	LC	10.9*	10.9*	7.3	8.5*	4.8	6.5*					3.6	4.6*	
	WLC	10.9*	10.9*	8.4	8.5*	5.5	6.5*					4.1	4.6*	
-4.5	NLC[1)]			5.9*	5.9*	4.1	4.2*					3.9*	3.9*	6.2
	SLC			5.9*	5.9*	4.2*	4.2*					3.9*	3.9*	
	LC			5.9*	5.9*	4.2*	4.2*					3.9*	3.9*	
	WLC			5.9*	5.9*	4.2*	4.2*					3.9*	3.9*	
-6.0	NLC[1)]													
	SLC													
	LC													
	WLC													

Stick 3.00 m

m	Undercarriage	3.0 m		4.5 m		6.0 m		7.5 m		9.0 m				m
10.5	NLC[1)]													
	SLC													
	LC													
	WLC													
9.0	NLC[1)]											3.2*	3.2*	5.7
	SLC											3.2*	3.2*	
	LC											3.2*	3.2*	
	WLC											3.2*	3.2*	
7.5	NLC[1)]					5.2	5.3*					2.8*	2.8*	7.2
	SLC					5.3*	5.3*					2.8*	2.8*	
	LC					5.3*	5.3*					2.8*	2.8*	
	WLC					5.3*	5.3*					2.8*	2.8*	
6.0	NLC[1)]					5.1	5.7*	3.5	4.8*			2.6*	2.6*	8.2
	SLC					5.7*	5.7*	3.9	4.8*			2.6*	2.6*	
	LC					5.7*	5.7*	4.2	4.8*			2.6*	2.6*	
	WLC					5.7*	5.7*	4.7	4.8*			2.6*	2.6*	
4.5	NLC[1)]			7.6*	7.6*	4.8	6.2*	3.3	5.4*			2.5	2.6*	8.8
	SLC			7.6*	7.6*	5.5	6.2*	3.8	5.4*			2.6*	2.6*	
	LC			7.6*	7.6*	5.8	6.2*	4.0	5.4*			2.6*	2.6*	
	WLC			7.6*	7.6*	6.2*	6.2*	4.5	5.4*			2.6*	2.6*	
3.0	NLC[1)]	12.4	13.6*	6.8	9.2*	4.5	6.9*	3.2	5.7*	2.3	3.6*	2.3	2.7*	9.2
	SLC	13.6*	13.6*	7.9	9.2*	5.1	6.9*	3.6	5.7*	2.7	3.6*	2.6	2.7*	
	LC	13.6*	13.6*	8.4	9.2*	5.5	6.9*	3.9	5.7*	2.9	3.6*	2.7*	2.7*	
	WLC	13.6*	13.6*	9.2*	9.2*	6.1	6.9*	4.4	5.7*	3.2	3.6*	2.7*	2.7*	
1.5	NLC[1)]			6.2	10.4*	4.1	7.6*	3.0	5.7	2.2	4.2*	2.2	2.9*	9.2
	SLC			7.2	10.4*	4.8	7.6*	3.5	5.7	2.6	4.2*	2.5	2.9*	
	LC			7.7	10.4*	5.1	7.6*	3.7	5.7	2.8	4.2*	2.7	2.9*	
	WLC			8.8	10.4*	5.8	7.6*	4.2	6.0*	3.2	4.2*	2.9*	2.9*	
0	NLC[1)]	6.3*	6.3*	5.8	10.8*	3.9	7.7	2.9	5.5	2.2	3.5*	2.2	3.2*	9.0
	SLC	6.3*	6.3*	6.8	10.8*	4.5	7.8	3.3	5.6	2.6	3.5*	2.5	3.2*	
	LC	6.3*	6.3*	7.3	10.8*	4.9	7.8	3.5	5.6	2.7	3.5*	2.7	3.2*	
	WLC	6.3*	6.3*	8.4	10.8*	5.5	7.8*	4.0	6.1*	3.1	3.5*	3.1	3.2*	
-1.5	NLC[1)]	9.5*	9.5*	5.7	10.2*	3.8	7.5	2.8	5.4			2.3	3.7*	8.6
	SLC	9.5*	9.5*	6.7	10.2*	4.4	7.6*	3.2	5.5			2.7	3.7*	
	LC	9.5*	9.5*	7.2	10.2*	4.7	7.6*	3.5	5.5			2.9	3.7*	
	WLC	9.5*	9.5*	8.2	10.2*	5.4	7.6*	4.0	5.8*			3.3	3.7*	
-3.0	NLC[1)]	10.9	11.7*	5.7	8.8*	3.8	6.7*	2.8	4.9*			2.7	4.5*	7.8
	SLC	11.7*	11.7*	6.7	8.8*	4.4	6.7*	3.3	4.9*			3.1	4.5*	
	LC	11.7*	11.7*	7.2	8.8*	4.7	6.7*	3.5	4.9*			3.3	4.5*	
	WLC	11.7*	11.7*	8.3	8.8*	5.4	6.7*	4.0	4.9*			3.8	4.5*	
-4.5	NLC[1)]			5.9	6.5*	3.9	4.8*					3.5	3.9*	6.6
	SLC			6.5*	6.5*	4.6	4.8*					3.9*	3.9*	
	LC			6.5*	6.5*	4.8*	4.8*					3.9*	3.9*	
	WLC			6.5*	6.5*	4.8*	4.8*					3.9*	3.9*	
-6.0	NLC[1)]													
	SLC													
	LC													
	WLC													

Stick 3.70 m

m	Undercarriage	3.0 m		4.5 m		6.0 m		7.5 m		9.0 m				m
10.5	NLC[1)]													
	SLC													
	LC													
	WLC													
9.0	NLC[1)]											2.3*	2.3*	6.7
	SLC											2.3*	2.3*	
	LC											2.3*	2.3*	
	WLC											2.3*	2.3*	
7.5	NLC[1)]							3.3*	3.3*			2.1*	2.1*	8.0
	SLC							3.3*	3.3*			2.1*	2.1*	
	LC							3.3*	3.3*			2.1*	2.1*	
	WLC							3.3*	3.3*			2.1*	2.1*	
6.0	NLC[1)]							3.5	4.4*			2.0*	2.0*	8.9
	SLC							4.0	4.4*			2.0*	2.0*	
	LC							4.3	4.4*			2.0*	2.0*	
	WLC							4.4*	4.4*			2.0*	2.0*	
4.5	NLC[1)]					5.0	5.6*	3.4	5.0*	2.4	3.4*	2.0*	2.0*	9.5
	SLC					5.6	5.6*	3.9	5.0*	2.8	3.4*	2.0*	2.0*	
	LC					5.6*	5.6*	4.1	5.0*	3.0	3.4*	2.0*	2.0*	
	WLC					5.6*	5.6*	4.6	5.0*	3.4	3.4*	2.0*	2.0*	
3.0	NLC[1)]	12.5*	12.5*	7.1	8.3*	4.6	6.4*	3.2	5.4*	2.3	4.4*	2.0	2.0*	9.8
	SLC	12.5*	12.5*	8.2	8.3*	5.2	6.4*	3.7	5.4*	2.7	4.4*	2.0*	2.0*	
	LC	12.5*	12.5*	8.3*	8.3*	5.6	6.4*	3.9	5.4*	2.9	4.4*	2.0*	2.0*	
	WLC	12.5*	12.5*	8.3*	8.3*	6.3	6.4*	4.4	5.4*	3.3	4.4*	2.0*	2.0*	
1.5	NLC[1)]	8.5*	8.5*	6.4	9.8*	4.2	7.2*	3.0	5.7	2.2	4.3	1.9	2.2*	9.8
	SLC	8.5*	8.5*	7.4	9.8*	4.9	7.2*	3.5	5.8*	2.6	4.3	2.2*	2.2*	
	LC	8.5*	8.5*	7.9	9.8*	5.2	7.2*	3.7	5.8*	2.8	4.3	2.2*	2.2*	
	WLC	8.5*	8.5*	9.0	9.8*	5.9	7.2*	4.2	5.8*	3.2	4.8	2.2*	2.2*	
0	NLC[1)]	7.3*	7.3*	5.9	10.6*	3.9	7.7*	2.8	5.5	2.1	4.2	1.9	2.4*	9.7
	SLC	7.3*	7.3*	6.9	10.6*	4.6	7.7*	3.3	5.6	2.5	4.2	2.2	2.4*	
	LC	7.3*	7.3*	7.4	10.6*	4.9	7.7*	3.5	5.6	2.7	4.2	2.4	2.4*	
	WLC	7.3*	7.3*	8.5	10.6*	5.5	7.7*	4.0	6.0*	3.1	4.7	2.4*	2.4*	
-1.5	NLC[1)]	9.1*	9.1*	5.6	10.5*	3.8	7.5	2.7	5.4	2.1	4.1	2.0	2.8*	9.3
	SLC	9.1*	9.1*	6.6	10.5*	4.4	7.6	3.2	5.5	2.5	4.2	2.4	2.8*	
	LC	9.1*	9.1*	7.1	10.5*	4.7	7.6	3.4	5.5	2.6	4.2	2.5	2.8*	
	WLC	9.1*	9.1*	8.2	10.5*	5.4	7.7*	3.9	5.9*	3.0	4.3*	2.8*	2.8*	
-3.0	NLC[1)]	10.6	12.0*	5.6	9.6*	3.7	7.1*	2.7	5.3			2.3	3.5*	8.6
	SLC	12.0*	12.0*	6.6	9.6*	4.3	7.1*	3.2	5.4*			2.7	3.5*	
	LC	12.0*	12.0*	7.1	9.6*	4.7	7.1*	3.4	5.4*			2.8	3.5*	
	WLC	12.0*	12.0*	8.2	9.6*	5.3	7.1*	3.9	5.4*			3.2	3.5*	
-4.5	NLC[1)]	10.4*	10.4*	5.7	7.7*	3.8	5.8*					2.8	4.0*	7.5
	SLC	10.4*	10.4*	6.7	7.7*	4.4	5.8*					3.3	4.0*	
	LC	10.4*	10.4*	7.2	7.7*	4.7	5.8*					3.5	4.0*	
	WLC	10.4*	10.4*	7.7*	7.7*	5.4	5.8*					4.0*	4.0*	
-6.0	NLC[1)]													
	SLC													
	LC													
	WLC													

Height | Can be slewed through 360° | In longitudinal position of undercarriage | Max. reach | * Limited by hydr. capacity

The lift capacities on the load hook of the Liebherr quick coupler 48 without attachment are stated in metric tonnes (t), and can be lifted 360° on firm, level supporting surface. Adjacent values are valid for the undercarriage when in the longitudinal position. Capacities are valid for 600 mm wide triple-grouser pads. Indicated loads are based on ISO 10567 standard and do not exceed 75 % of tipping or 87 % of hydraulic capacity (indicated by *) or are limited through the allowed lift capacity of the load hook on the quick coupler (12 t). Without quick coupler the lift capacities will increase by 250 kg, without bucket cylinder, link and lever they increase by an additional 365 kg.

According to European Standard, EN 474-5: In the European Union excavators have to be equipped with an overload warning device, a load diagram and automatic check valves on the hoist cylinders, when they are used for lifting operations which require the use of lifting accessories.

[1)] Values are calculated with 500 mm wide triple-grouser pads for the NLC-Undercarriage

- Collect and store fuels, operating fluids and lubricants in suitable containers before disposal.
- Adhere to instructions of relevant manufacturer when disposing of fuels, operating fluids and lubricants.
- Have fuels, operating fluids and lubricants disposed of by old oil recycling point.
- Have metal parts disposed of by metal recycling point.
- Have plastic parts disposed of by plastic recycling point.
- Have rubber parts disposed of by rubber recycling point.
- Have electronic components disposed of by electronics recycling point.

2.3 Description of staff

2.3.1 Personal protective equipment

Operators, assistants and maintenance staff are responsible for the following:
- Wearing personal protective equipment
- Regular cleaning and care of protective equipment
- Immediate replacement of damaged parts of protective equipment

The protective equipment consists of following elements:
- Protective helmet
- Safety glasses
- Hearing protection
- Breathing equipment
- Protective gloves
- Warning clothing (reflective, in signal colour)
- Safety boots
- Special protective clothing
  - To prevent burns
  - To prevent freezing
  - To prevent acid burns
  - To prevent stabbing and cutting injuries

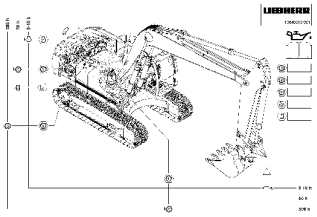
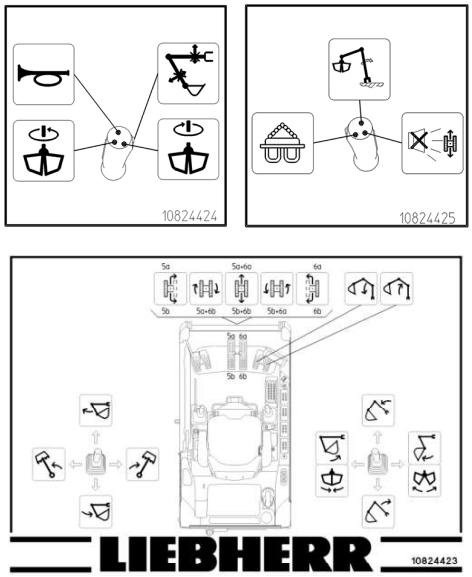
2.3.2 Requirements for staff

- Make sure that exclusively authorised and trained persons operate, maintain or repair the machine.
- Make sure that all persons operating, maintaining or repairing the machine have the specified minimum age.
- Make sure that staff training involves theoretical information (technology and safety) and practical training on the machine.
- Make sure that the staff have read and understood the operator's manual and supplied documentation.
- Make sure that staff undergoing training, education, instruction, or a general apprenticeship exclusively work on the machine under constant supervision by an experienced person.
- Regularly check safety-aware and danger-aware working of staff.
- Clearly specify staff responsibility for operation, set-up, maintenance and repair work.

LFR/11341231/01/2018-02-22/en

DANGER
Failure to adhere to information signs!
Danger to life.

- ▶ Regularly check condition of information signs.
- ▶ Immediately replace any incomplete, illegible or missing information signs.
- ▶ Adhere to information signs.

	Sign	Description
30		**Lubrication chart** Shows lubrication tasks.
31		**Engine lubrication chart** Shows maintenance tasks on the diesel engine.
32		**Description of the control elements** Describes pedal and joystick function.

2.7.5 Machine danger zone

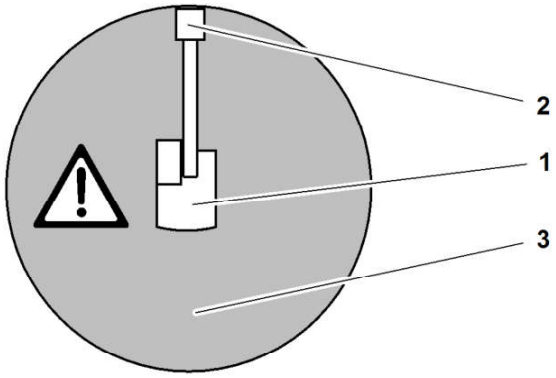


Fig. 56: Machine danger zone (view from above)

1 Machine
2 Reach of working attachment
3 Danger zone

Danger to life

Unapproved presence in danger zone

– Make sure there are no persons in danger zone.

2.7.6 Visibility

Danger to life

Insufficient visibility

– Make sure that persons approach machine from the front and within operator's field of vision.
– Make sure that persons contact the operator before approaching the machine.
– Make sure that no obstacles impair visibility in the working area.
– Use viewing devices to observe environment of machine if necessary.
– Use viewing devices if necessary to observe areas around the machine that cannot be seen directly.
– Exclusively perform rotary motions if visibility is sufficient.
– Position working attachment so that sufficient visibility is ensured.
– Avoid travelling in reverse whenever possible.
– Work with spotter if visibility is restricted.
– Agree on which hand signs to use.
– If necessary communicate via radio.
– Make sure that spotter is outside danger zone.
– In conditions of poor visibility use illumination in accordance with the applicable regulations.
– Exclusively use sun visors if field of vision is not restricted.

Incorrect operation

– Comply with national regulations regarding sufficient visibility in the operator's cab.

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4a Joystick
4b Joystick with mini-joystick [1)]
5 Left double pedal [1)]
6 Travelling pedals
7 Travel lever
8 Right double pedal [1)]
9 Display
14 Engine speed controller
15 Control unit C [1)]
16 Starting switch
17 Emergency stop button [1)]
18 Control unit D [1)]
19 Control unit E [1)]

[1)] Option

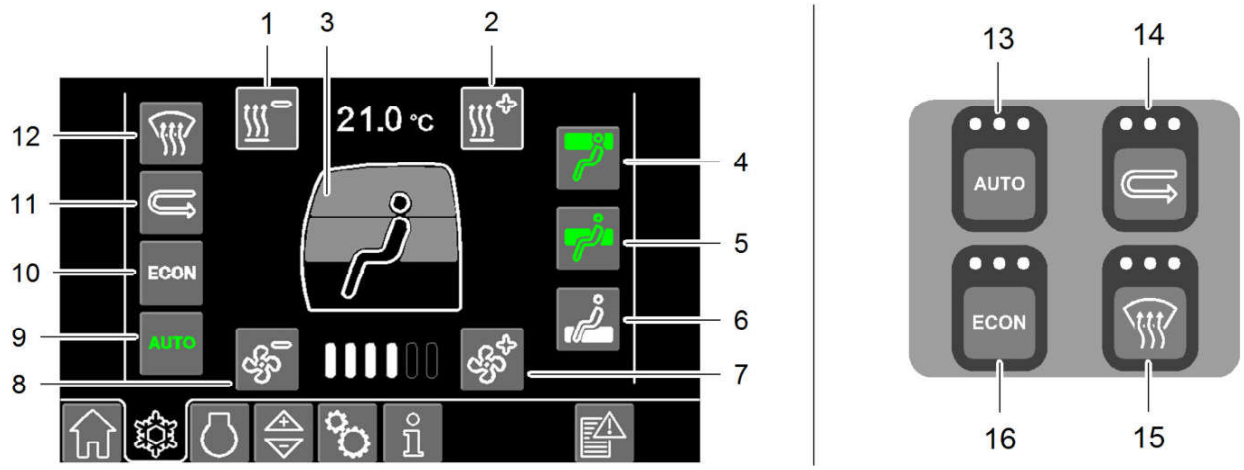

Fig. 116: Air conditioning unit menu and buttons of control unit A

1 *Reducing temperature* button
2 *Increasing temperature* button
3 Condition of air discharges
4 *Head area air supply* button
5 *Torso area air supply* button
6 *Foot area air supply* button
7 *Increasing blower power* button
8 *Reducing blower power* button
9 *AUTO* button
10 *ECON* button
11 *Recirculated air* button
12 *Defrosting* button
13 *AUTO* key
14 *Recirculated air* key
15 *Defrosting* key
16 *ECON* key

Note
Settings are saved when the engine is switched off.

▶ Functions are reactivated when the engine is switched on again.

Operating modes

AUTO operating mode

The temperature in the operator's cab is controlled according to the set nominal temperature, the outside temperature and amount of sunshine.

Air distribution, blower power, cooling power and heating power are adjusted automatically.

Note
The temperature in the operator's cab can be controlled by means of the sun sensor. The sun sensor is located on back of display.

▶ Do not cover sun sensor.

ECON operating mode

Air conditioning unit is deactivated.

Machine consumes less fuel.

Recirculated air mode

When working in enclosed spaces operator is exposed to less exhaust fumes.

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3.2.14 *Display brightness and display volume* submenu

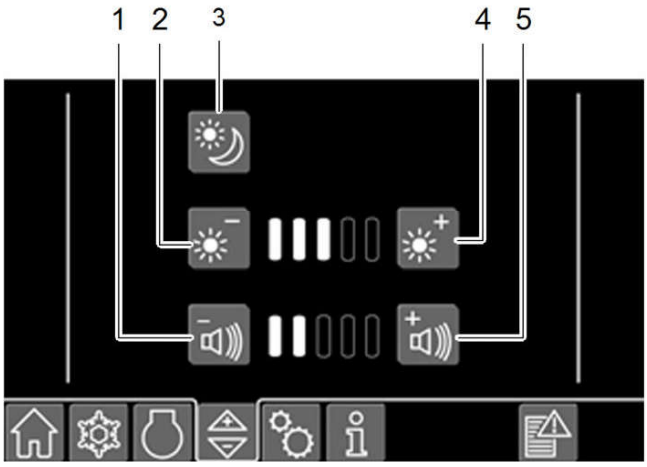

Fig. 143: Display brightness and display volume submenu

1 *Reducing display volume* button [9)]
2 *Reducing display brightness* button
3 *Day/night mode* button [9)]
4 *Increasing display brightness* button
5 *Increasing display volume* button [9)]

3.2.15 *Camera* submenu

Contrast submenu

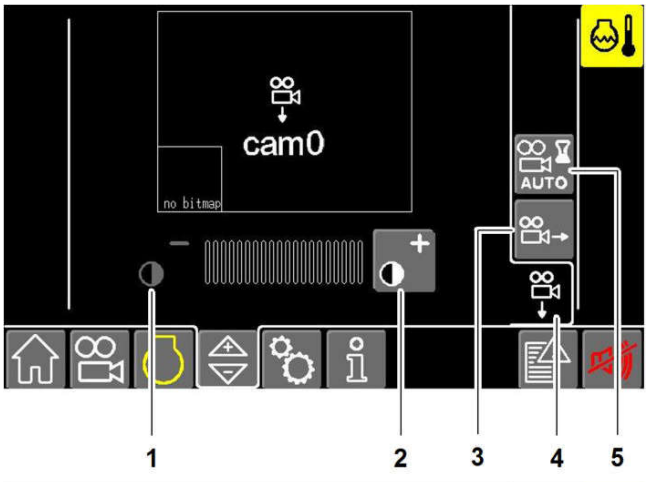

Fig. 144: Contrast submenu

1 *Reducing camera image contrast* button
2 *Increasing camera image contrast* button
3 *Side area camera* menu button
4 *Rear area camera* menu button
5 *Return time* menu button

[9)] Available depending on machine type

– *Confirmation of maintenance due message* button **9**

▶ Hide *maintenance due* message: Press *confirmation of maintenance due message* button **9**.
▷ *Maintenance due* status symbol **7** disappears.

▶ Have maintenance carried out at set time: Contact Liebherr customer service.

Teleservice

Via Teleservice Liebherr customer service reads and modifies parameters of machine control online if necessary.

Activating write access

DANGER
Unexpected machine movement!
Danger to life.

▶ Make sure there are no persons in working area of machine.

Note
Malfunctions in machine control!

▶ Do not operate machine during write access by Liebherr customer service.

▶ Press *teleservice* button **8** when prompted by Liebherr customer service.
▷ *Teleservice* button **8** is displayed in green:

▷ *Teleservice active* symbol is displayed:

▷ Online connection is enabled.
▷ Liebherr customer service has write access to machine control parameters.

Deactivating write access

Liebherr customer service deactivates write access.

Read access

Read access is always possible for Liebherr customer service. It is not necessary that the operator enables the online connection.

3.2.26 *SF* submenu

In the *SF* submenu the sensitivity of the joysticks for controlling following working attachments can be adjusted:
– Grapple
– Laterally adjustable boom
– Height adjustable boom
– Dozer blade

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Menu buttons	Designation
	Fuel consumption (For more information see: 3.2.33 *Fuel consumption* submenu, page 100)

Tab. 16: Information menu

Depending on machine configuration, additional submenus can be displayed by simultaneous pressing of *MENU 1* and *MENU 2* buttons on control unit A:

Menu buttons	Designation
	Electrical outputs (For more information see: 3.2.21 *Electrical outputs* submenu, page 83)
	Electrical inputs (For more information see: 3.2.22 *Electrical inputs* submenu, page 84)
	CodingKey (For more information see: 3.2.34 *CodingKey* submenu, page 101)

Tab. 17: Information menu

3.2.32 *Operating hours* submenu

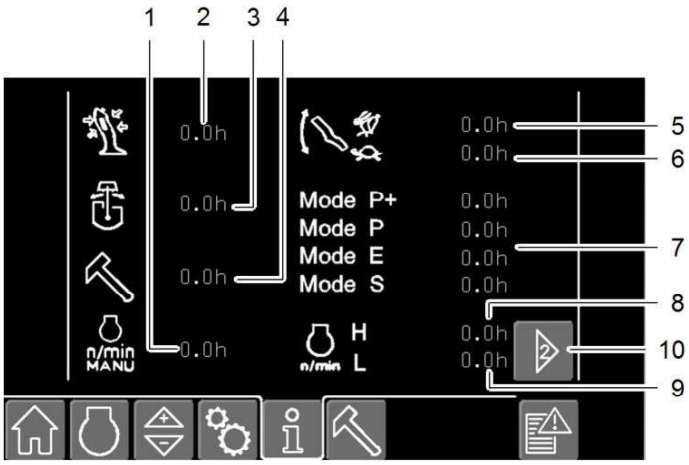

Fig. 194: Operating hours submenu

1 Emergency mode
2 Joysticks
3 Rotation
4 Option pedals
5 Driving in high gear
6 Driving in creeper gear
7 Operating modes P+/P/E/S
8 Maximum engine speed
9 Idling engine speed
10 *Operating hours of working tools* menu button

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3.3.7 Operator's seat

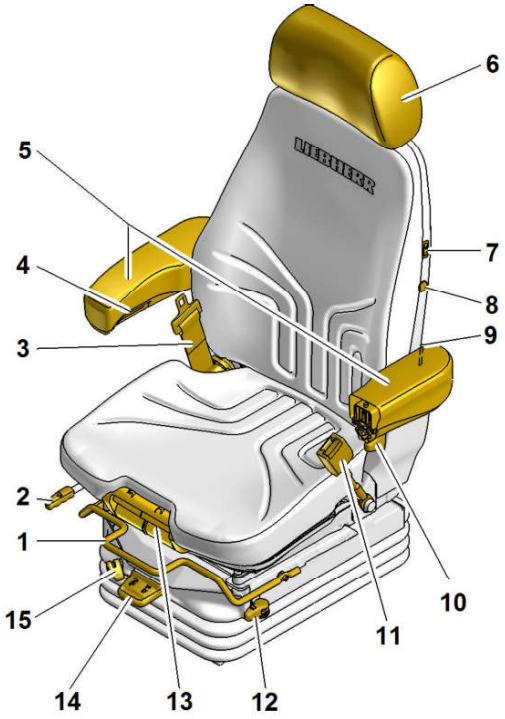

Fig. 212: Operator's seat

1	Adjusting seat position with armrests	**9**	Adjusting armrest height
2	Adjusting seat position	**10**	Adjusting backrest
3	Safety belt	**11**	Belt buckle
4	Adjusting armrest angle	**12**	Horizontal suspension[11)]
5	Armrest	**13**	Adjusting seat cushion
6	Head restraint	**14**	Adjusting seat height[11)]
7	Seat heating, seat air conditioning[11)]	**15**	Shock absorption
8	Lumbar support[11)]		

DANGER
Unexpected machine movement!
Danger to life.

▶ Exclusively adjust operator's seat when safety lever or folding console is in upper position.

[11)] Option

Upper windscreen

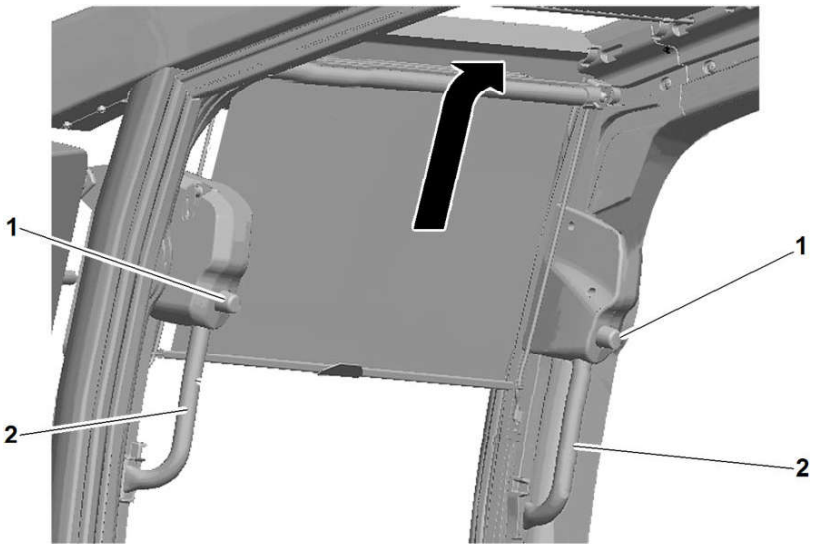

Fig. 230: Upper windscreen

1 Knob **2** Handle

Opening upper windscreen

- ▶ Unlock upper windscreen: Press buttons **1** simultaneously.
- ▶ Push upper windscreen upwards with handles **2** and pull back until it engages in roof of operator's cab.

Closing upper windscreen

- ▶ Unlock upper windscreen: Press buttons **1** simultaneously.
- ▶ Pull upper windscreen forwards and downwards with handles **2** until it engages in front in operator's cab.

Complete windscreen

Opening complete windscreen

- ▶ Open lower windscreen.
- ▶ Open upper windscreen.

Closing complete windscreen

- ▶ Close upper windscreen.
- ▶ Close lower windscreen.

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Adjusting rear area camera

▶ Contact Liebherr customer service.

3.3.15 Lighting

Key	Function
	Working attachment headlights
	Front roof lights and uppercarriage headlights[12)]
	Rear roof light[12)]
	Beacon[12)]

Tab. 20: Key functions

Switching on lighting

▶ Press corresponding key. (see: tab. 20, page 129)
▷ LEDs in key light up.

Switching off lighting

▶ Press corresponding key. (see: tab. 20, page 129)
▷ LEDs in key go out.

[12)] Option

- ▶ Have oil analysis performed by authorised specialist staff.
- ▶ Repeat hydraulic oil change if necessary.

3.4.7 Starting diesel engine

Starting

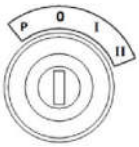
NOTICE
Starting diesel engine at altitude above 6561‘ 8“ ft-in!
Damage to diesel engine.

- ▶ Contact Liebherr customer service before starting the diesel engine.

NOTICE
Incorrect cold start of the diesel engine!
Damage to diesel engine.

- ▶ Start diesel engine.
- ▶ Let diesel engine run at idle speed for 15 seconds.
- ▶ Slowly warm diesel engine up by running it at medium load and medium speed.

Make sure the following preconditions are met:
- ❑ Fuel tank is full.
- ❑ Battery main switch is in the *ON* position.
- ❑ Safety lever is up.
- ❑ Joysticks and pedals are in neutral position.
- ❑ Nobody is in danger zone of machine.



- ▶ Warn bystanders before starting the machine: Activate horn. (For more information see: 3.3.9 Horn, page 116)
- ▶ Turn ignition key to position *I*.
  - ▷ Autocheck begins.
  - ▷ All LEDs briefly light up.
- ▶ During autocheck, check that the LEDs are functioning correctly.

If LEDs are defective:
- ▶ Have LEDs replaced.

- ▶ Press *engine start/stop* key for about half a second.
  - ▷ LEDs in *engine start/stop* key flash while diesel engine is starting.
  - ▷ LEDs in *engine start/stop* key light up as soon as diesel engine has started.

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Travelling sensitively

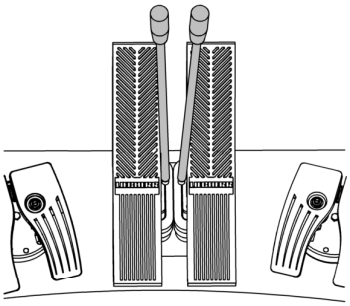


Fig. 291: Driving lever

When sensitive travel is required:

▶ Insert driving levers in accelerator pedals.

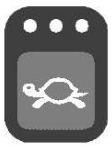
At the end of work:

▶ Pull out driving levers and stow in operator's cab.

Travelling in creeper gear and in automatic travel mode

The creeper gear permits sensitive travelling and improves travelling behaviour on difficult ground.

In automatic travel mode, the travel speed is adjusted to the ground conditions.

Key	Status of LEDs	Travelling	Travel speed
	○ ○ ○	Manual	Fast
	✳ ✳ ✳		Slow
	✳ ✳ ○	Automatic	Slow
	✳ ○ ○		Fast

Tab. 24: Travel modes

▶ Select travel mode: Press *creeper gear* key.

Braking

DANGER
Machine tipping over!
Danger to life.

▶ Release accelerator pedals slowly.

▶ Release accelerator pedals.
- ▷ Accelerator pedals return to neutral position.
- ▷ Machine is braked hydraulically.
- ▷ Mechanical brake blocks relevant gearbox after a few seconds.
- ▷ Machine stops.

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Activating manual protection

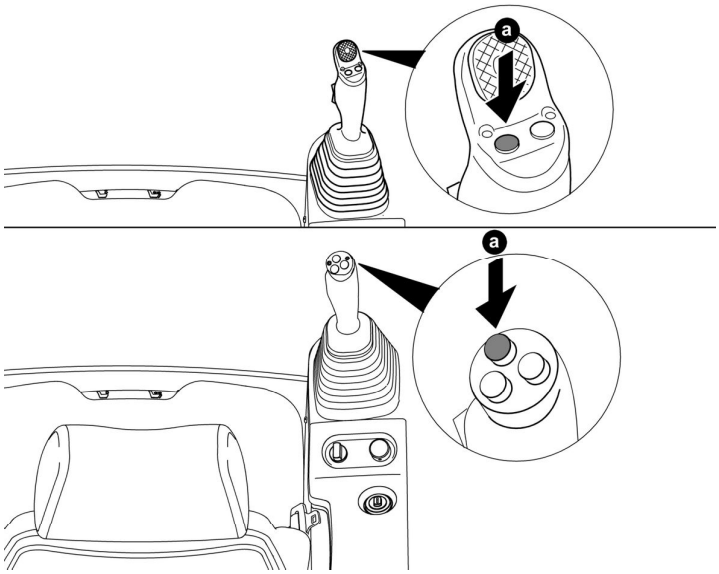

Fig. 323: Activating manual protection

- ▶ Select manual protection. (For more information see: Selecting protection mode, page 158)
- ▶ Press and hold button **a**.

3.4.22 Stick cylinder protection

Stick cylinder protection interrupts the extending of the stick cylinder before it hits the mechanical stop.

The interruption position cannot be set by the operator.

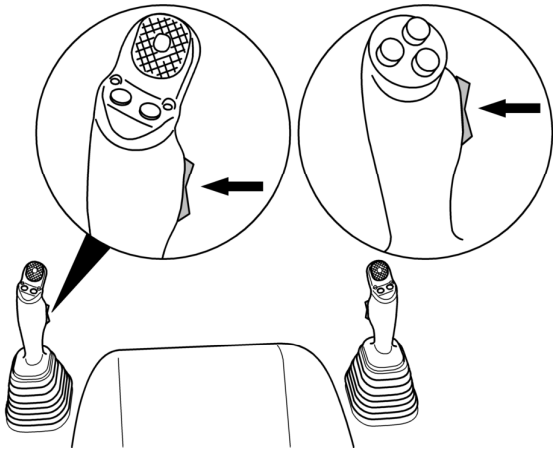

Fig. 324: Switch on the left joystick

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▷ LEDs in key light up.

Deactivating control changeover to right mini-joystick

▶ Press *control changeover to right mini-joystick* key.
▷ LEDs in key go out.

3.4.28 Changing over control of left double pedal (option)

Special working attachment can be operated with either the left double pedal **1** or with the right mini-joystick **2**.

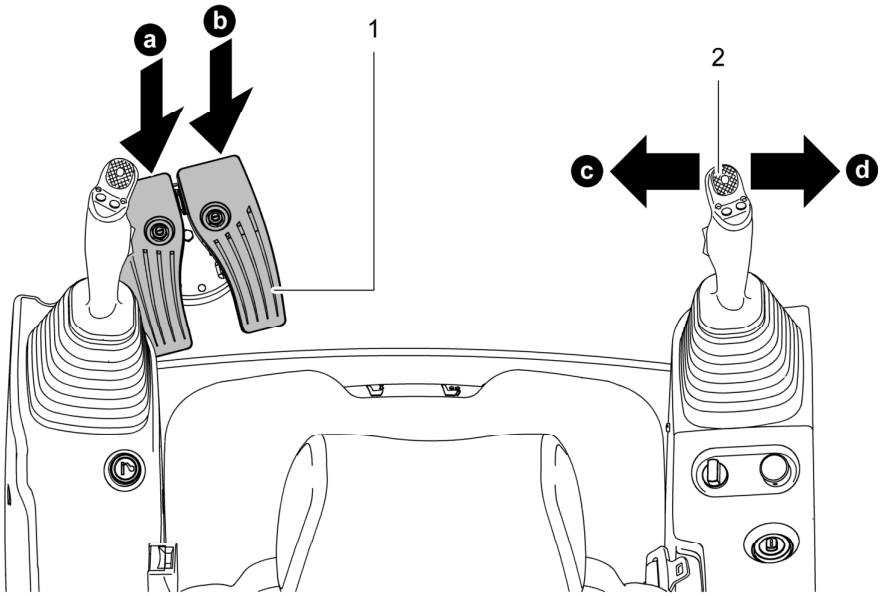

Fig. 342: Control changeover

1 Left double pedal **2** Right mini-joystick

Key	Status of LEDs	Changeover	Operation	Control element
	○ ○ ○	Deactivated	—	Left double pedal **1**
			Special working attachment	Right mini-joystick **2**
	☀ ☀ ☀	Activated	—	Right mini-joystick **2**
			Special working attachment	Left double pedal **1**

Tab. 31: Control changeover

DANGER
Use of incorrect control!
Danger to life.

▶ Before working with machine, check function of controls.

Make sure the following preconditions are met:
❑ Left double pedal **1** is not activated.

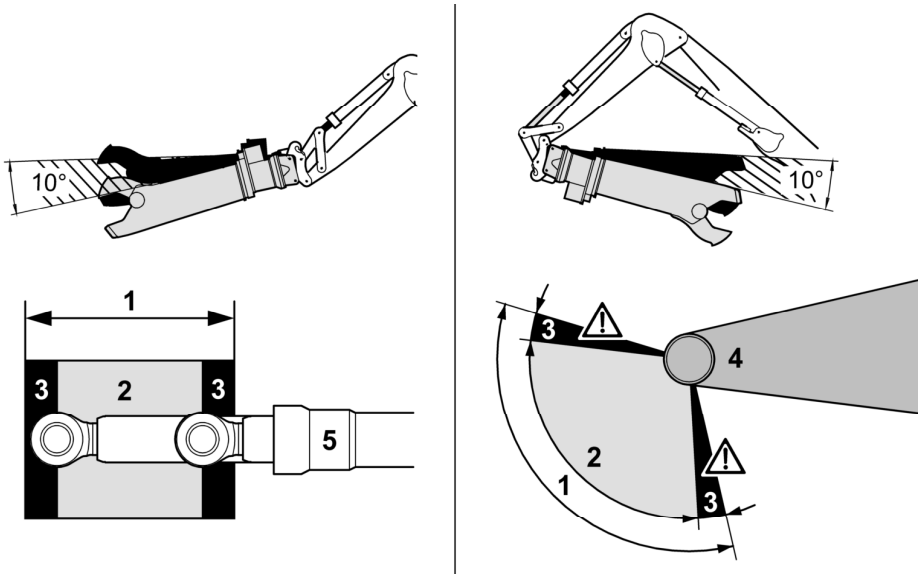

Fig. 375: Movement range of hydraulic cylinders

1 Possible movement range
2 Permitted movement range with safety angle of 10° to end position
3 Prohibited movement range
4 Boom or stick
5 Hydraulic cylinder

- ▶ Do not fully retract or extend hydraulic cylinders of stick.
- ▶ Adhere to permitted movement range with safety angle of 10° to end position **2**.
- ▶ Slowly retract and extend hydraulic cylinders near end stops.

Lifting machine

- ▶ Do not lift machine using working attachment.

In case of unintentional lifting:

- ▶ Do not use working attachment to brace falling movement.
- ▶ Slowly lower machine to the ground.

Diesel engine

- ▶ Do not let diesel engine run at idle speed for long periods.
- ▶ Shut off diesel engine when machine is not in use.

Travel gear

- ▶ Position sprocket wheel in rear area of machine in the following cases:
  - – Travelling over longer distances
  - – Pipe-laying work
- ▶ If moving earth in longitudinal direction, for example when excavating a ditch, position working attachment above idler-wheels to travel backwards.

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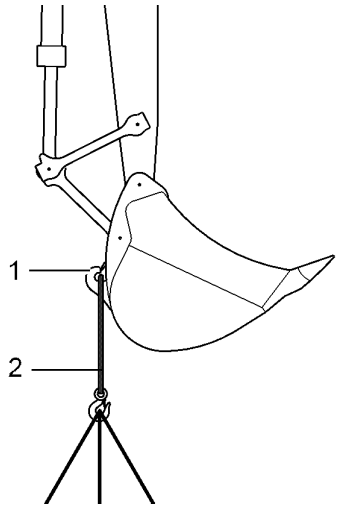

Fig. 384: Load-lifting work with load lift hook

1 Load lift hook **2** Lifting accessories

DANGER
Incorrectly lifted load!
Fatal or serious injuries. Lifted loads falling.

- ▶ Make sure no-one is in the danger zone.
- ▶ Only personnel who have been trained in lifting loads are allowed to perform this work.
- ▶ Do not use pick-lift hooks or safety flaps for lifting loads.
- ▶ Only attach lifting accessories to the load lift hook.
- ▶ Comply with the notes in the “Lifting loads” chapter. (For more information see: 3.6.11 Lifting loads, page 186)

- ▶ Comply with the load lift chart in the operator's cab and the maximum load lift of the load lift hook.
- ▶ Tilt in the backhoe bucket until the lifting accessory can be securely attached to the load lift hook.
- ▶ Attach lifting accessories specifically as shown in the illustration.
- ▶ Make sure that the lifting accessory hangs downwards freely and does not slide or swing over the body of the backhoe bucket.

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3.8.2 Parking machine on a slope

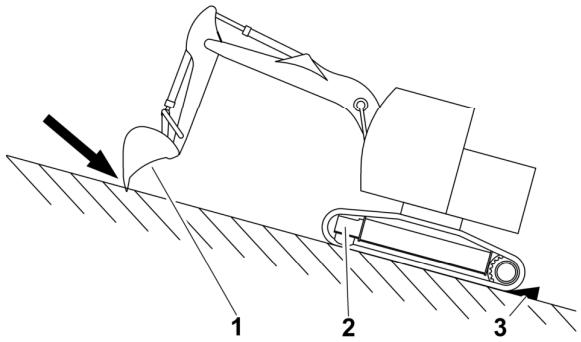

Fig. 389: Parking machine on a slope

1 Bucket teeth
2 Idler-wheels
3 Chocks

If ambient temperature is below 32 °F:

- ▶ Avoid freezing onto the ground: Park machine on boards.
- ▶ Position machine with idler-wheels **2** uphill.
- ▶ Turn operator's cab over idler-wheels.
- ▶ Align uppercarriage parallel to undercarriage.
- ▶ Lock slewing brake.
- ▶ Position stick at right angle to ground.

If machine is a tunnelling machine:

- ▶ Put swivel bearing in horizontal position.
- ▶ Align bucket teeth **1** in direction of ground.
- ▶ Lower working attachment until bucket teeth **1** are on the ground.
- ▶ Shut off diesel engine.
- ▶ Make sure that ignition key is set to **I**.
- ▶ Make sure that safety lever or folding console is moved down.
- ▶ Depressurise hydraulic system: Operate joysticks and pedals carefully in all directions.
- ▶ Move safety lever or folding console up.
- ▶ Pull out ignition key.
- ▶ Lock all doors and flaps and remove key.

If machine will not be used for a long time:

- ▶ Set battery main switch to **0**.
- ▶ Secure machine with chocks **3**.

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3.10.3 Lowering working attachment when engine is shut off

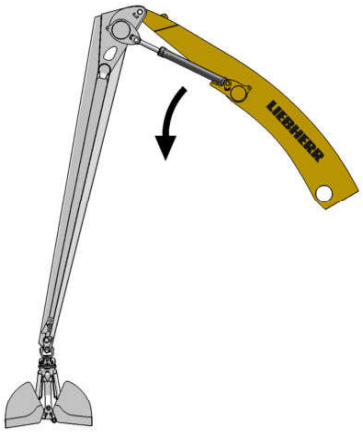
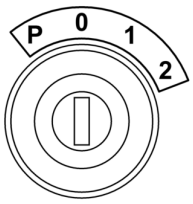


Fig. 408: Lowering working attachment when engine is shut off

Note
Limited pressure reserve!

- ▶ When engine is shut off, move joysticks exclusively to lower working attachment.
- ▶ When engine is shut off, press pedals exclusively to lower working attachment.



- ▶ Set ignition key to 1.
- ▶ Move safety lever down.
- ▶ Lower working attachment: Move joystick or press pedal.

3.10.4 Lowering operator's cab in an emergency (option)

In an emergency, hydraulically height adjustable cab can be lowered to bottom position from following locations:
– Operator's cab
– Uppercarriage

DANGER
Unapproved presence in danger zone!
Danger to life.

- ▶ Make sure there are no persons in the danger zone under the operator's cab.
- ▶ Keep your distance from moving parts when the operator's cab is moving down.

Lowering operator's cab from operator's cab in an emergency

The emergency lowering stopcock in the operator's cab is on the ground to the right of the operator's seat.

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Malfunction / error	Cause	Remedy
Diesel engine becomes too hot (according to coolant temperature display).	Too little coolant	Fill with coolant.
	Radiator contaminated from inside or calcified; radiator contaminated on outside	Clean or de-lime radiator.
	Thermostat defective	Check thermostat and replace if necessary. Contact Liebherr customer service.
	Coolant temperature sensor defective	Check sensor and replace if necessary. Contact Liebherr customer service.
	Fan speed too low (exclusively hydrostatic fan drive)	Check fan drive and replace if necessary. Contact Liebherr customer service.
Battery charge problem symbol lights up while diesel engine is running.	Inadequate belt tension	Check belt tension. Replace belt tensioner if necessary.
	Belt cracked	Replace belt.
	Cable connections loose or separated	Secure or replace cables.
	Generator, rectifier or controller defective	Contact Liebherr customer service.
Black smoke coming from diesel engine.	Exhaust treatment system defective	Contact Liebherr customer service.
Exhaust gas is blue.	Oil level in diesel engine too high	Correct oil level.
	Penetration and combustion of engine oil in combustion chamber	Contact Liebherr customer service.
	Leak at turbocharger compressor	Contact Liebherr customer service.
	Crankcase breather filter defective	Check crankcase breather filter and replace if necessary.
Exhaust gases are white.	Start of injection too late	Contact Liebherr customer service.
	Heating flange defective (at cold temperatures)	Have heater flange checked and replaced if necessary.
Diesel engine is pinging.	Combustion cycle is malfunctioning	Contact Liebherr customer service.
Diesel engine rattles.	Excessive valve clearance	Adjust valve play.
	Injection nozzles damaged or contaminated by carbon deposits	Contact Liebherr customer service.
	Bearing damage	Contact Liebherr customer service.
	Piston rings worn or broken; pistons seized	Contact Liebherr customer service.
Unusual noises	Leaks at suction hoses and exhaust hoses generate whistling noises	Eliminate leaks and replace seals if necessary.
	Turbine wheel or compressor wheel rubs against housing; foreign particles in compressor or turbine; bearings of rotating parts seized	Contact Liebherr customer service.

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	Current value [A]	Function
F14	10	Air-sprung operator's seat
F15	15	Control of air conditioning
F16	15	Control unit A
F17	10	Safety lever
F18	15	Sensors of module A165
F19	15	Power supply for modules A164/A165
F20	5	Sensors of module A164
F21	5	Display
F22	10	Master
F23	10	Control unit B
F24	10	Control unit C
F25	10	Control unit D
F26	10	Control unit E
F28		Power supply 1/option circuit board
F29		Power supply 2/option circuit board
Switch fuses on terminal 30 (KL30)		
F1_1	15	Control units B, C, D, E
F1_2	15	Option
F1_3	15	Option
F2_1	15	Option
F2_2	15	Option
F2_3	15	Option
F3_1	5	Camera power supply
F3_2	15	Option
F3_3	15	Option
F4	10	Cigarette lighter
F5	5	Interior lighting
F6	5	Interior lighting
F7	10	Power supply 3/option circuit board
F8	30	Condenser fan
F9	30	Front roof light
F10	10	Rear windscreen wiper
F11	15	Relay KL58
F12	30	Rear roof light
F28		Power supply 1/option circuit board
F29		Power supply 2/option circuit board
F30	15	Starting switch

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Customer:.....Machine type:.....Serial no.:.....Operating hours:.....Date:.....

Maintenance / inspection after service hours								Tasks to be performed		
On handover	All 8-10 h	All 50 h	All 500 h	All 1000 h	All 2000 h	Other intervals	Additional labelling	**By maintenance staff** ■ Once-only activity ● Repeat interval ✦ If necessary ❄ Annually before the winter **By authorised specialist staff** ☐ Once-only activity ❍ Repeat interval ✧ If necessary **Additional labelling** Assistance required Have this task carried out exclusively by a certified electrician	Confirm tasks	See page
				❍	❍			Slewing gearbox: Take oil sample for oil analysis. (For more information see: 5.3.2 Oil analysis, page 243) .		
			☐	❍	❍			Slewing gearbox: Change oil.		
				❍	❍			Slewing gear brake: Check function.		
				❍	❍			Slewing ring: Checking meshing of slewing gear pinion.		

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Machine with pump distributor gear oil cooler

Liebherr recommendation

Ambient temperature	Description
41 to 122 °F	Liebherr Hypoid 85W-140 EP
23 to 122 °F	Liebherr Gear Basic 90 LS
23 to 122 °F	Liebherr Gear Hypoid 90 EP
-4 to 122 °F	Liebherr Syntogear Plus 75W-90

Tab. 61: Liebherr recommendation

Minimum quality requirements

Specification
API: GL-5
MIL-L: 2105 D or E, PRF-2105 D or E

Tab. 62: Minimum quality requirements

Make sure the following preconditions are met:
– Oil viscosity is approved for hydraulic oil cooler

If gear oils from other manufacturers are used, information on change intervals must be obtained from respective manufacturer or supplier.

5.3.10 Greases

Liebherr recommendation

Ambient temperature	Description
From -4 °F	Liebherr Universalfett 9900
From -67 °F	Liebherr Universalfett Arctic

Tab. 63: Liebherr recommendation

Minimum quality requirements

Thickener	Shelf life	Specification
Soap-based (lithium complex)	At least 3 years	Pumpable according to KP 2 K (DIN 51502)
		VKA welding force: ≥ 2300 N (DIN 51350/4, ASTM D 2596)

Tab. 64: Minimum quality requirements

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NOTICE
Incorrect cleaning with high pressure water or steam cleaning!
Damage to paint.

- ▶ Do not clean machine with a high pressure cleaner for two months after first putting it into service (or after respraying).
- ▶ Observe instructions of high pressure cleaner manufacturer.

Cleaning outside of machine

Before cleaning

Before cleaning with water or a high-pressure cleaner, perform following activities in order to avoid water penetration.

- ▶ Turn ignition button to position **0**.
- ▶ Lubricate all bearings, pin connections and slewing ring, using central lubrication system, if available.
- ▶ Clean away oil, fuel or care products off connections and fittings.

If sensitive parts behind openings have to be protected from penetrating water:
- ▶ Cover or mask off openings.

Parts particularly at risk are:
- Electric motors
- Electric components
- Switch cabinets
- Plug connections
- Transmitters
- Air filters

Cleaning

- ▶ Use lint-free cleaning cloths.
- ▶ Do not clean machine with aggressive cleaning agents or flammable liquids.
- ▶ Soften up dirt with water.
- ▶ Rinse off softened dirt with water.

If fire warning and extinguishing system is fitted:
- ▶ Make sure that there is no possibility of the temperature sensors coming into contact with hot liquids during cleaning of the engine compartment.

After cleaning

- ▶ Check all fuel lines, engine oil lines and hydraulic lines (leaks, loose connections, chafe marks and damage).
- ▶ Immediately rectify any defects that are detected.
- ▶ Remove water that has penetrated: Lubricate all bearings, pin connections and slewing ring again.
- ▶ If necessary, refresh corrosion protection (inhibitor) on components or surfaces.

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5.8.10 Pump distributor gear: Checking oil level

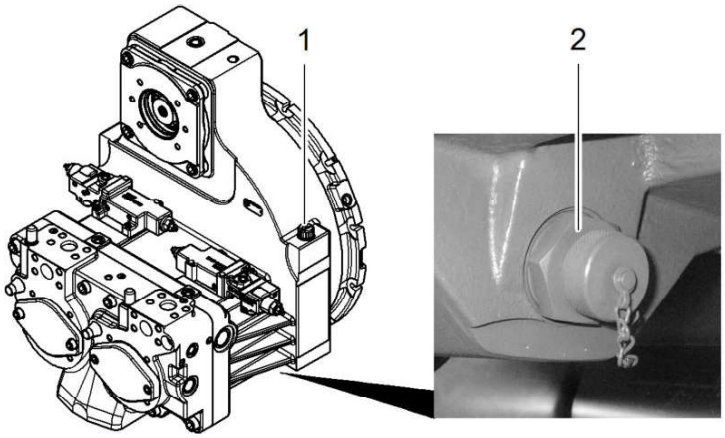

Fig. 474: Pump distributor gear: Checking oil level

1 Dipstick **2** Drain valve

Make sure the following preconditions are met:
❑ Diesel engine is shut off.

Checking oil level

▶ Unscrew and pull out dipstick **1**.
▶ Clean dipstick **1** with lint-free cloth.
▶ Insert and fully screw on dipstick **1**.
▶ Unscrew and pull out dipstick **1**.
▶ Check oil level.
▶ Fill with oil if necessary. (For more information see: Filling with oil, page 269)
▶ Insert and fully screw on dipstick **1**.

Filling with oil

Make sure the following preconditions are met:
❑ Approved oil is used. (For more information see: 5.3.8 Gear oils, page 247)
▶ Fill with oil through opening of dipstick **1**.
▶ Start diesel engine.
▶ Wait until oil has reached operating temperature.
▶ Shut off diesel engine.
▶ Check oil level. (For more information see: Checking oil level, page 269)

5.8.11 Diesel particulate filter: Activating and deactivating regeneration

The diesel particulate filter reduces the amount of pollution particles output with the exhaust gases. During regeneration, the particles retained in the diesel particulate filter are combusted.

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5.10.2 Hydraulic tank: Checking oil level

Checking hydraulic oil level

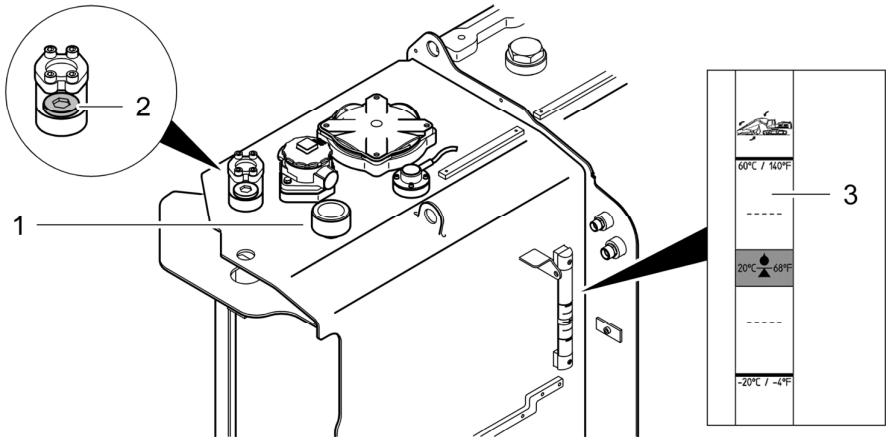
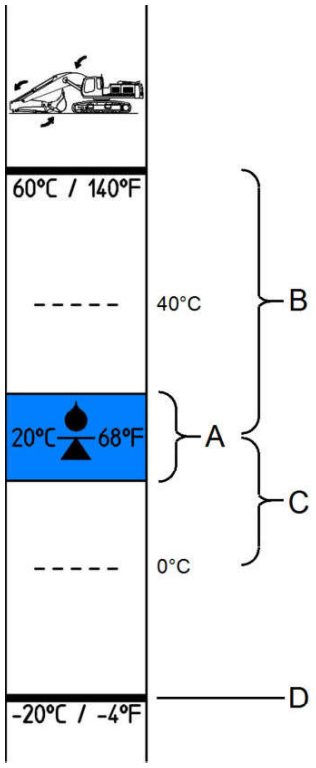


Fig. 499: Hydraulic tank

1 Breather filter
2 Collecting pipe
3 Oil sight glass

Oil sight glass	Hydraulic oil temperature	Required hydraulic oil level
	Approximately 68 °F	In blue area A
	Between 68 and 140 °F	In area B
	Between 32 and 68 °F	In area C
	Below 32 °F	Above D

Tab. 71: Required hydraulic oil level

Make sure the following preconditions are met:
❑ Machine is in maintenance position.

Checking mounting of sprocket wheels

NOTICE
Unsuitable mounting!
Damage.

- ▶ Do not retighten mounting bolts of sprocket wheels.
- ▶ Replace mounting bolts of sprocket wheels.

- ▶ Check **test torque** of all mounting bolts of sprocket wheels **2**.

If **test torque** is not correct:

- ▶ Replace mounting bolts of sprocket wheels **2**.
- ▶ Tighten new mounting bolts of sprocket wheels **2** with **pre-tightening torque and turning angle**.

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6 Appendix

If your machine has special attachments, you can find relevant information on the subsequent pages.

6.1 Pre-tightening torque and turning angle

The mounting bolts of the following components are tightened with a precisely defined turning angle:
- Track pads of the travel gear
- Sprocket wheels
- Travel gearboxes
- Travel motors

6.1.1 Procedure

The values of the pre-tightening torque and the turning angle are specified in the operator's manual.

▶ Tighten mounting bolt with the specified pre-tightening torque.

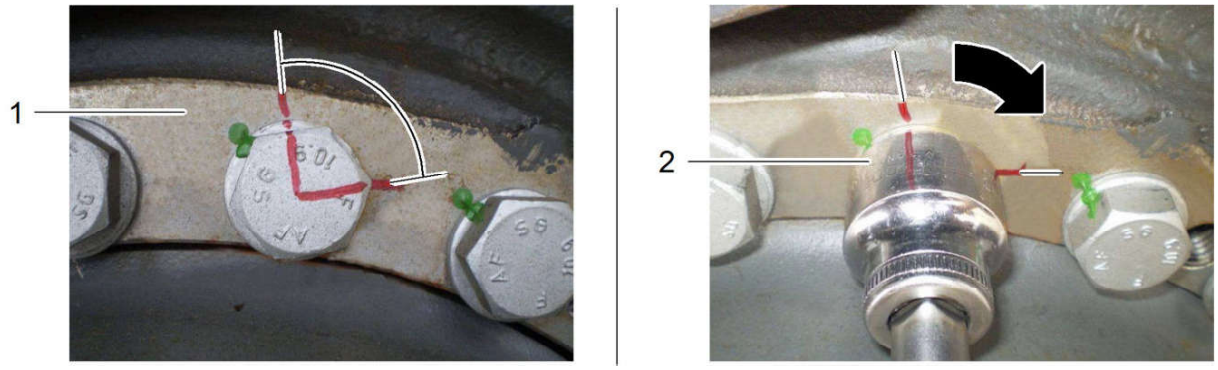

Fig. 515: Turning angle

1 Component

2 Socket key of the torque wrench

▶ Mark the specified turning angle on the screw head and on the component **1**. One edge of screw corresponds to 60°.

▶ On the socket key of the torque wrench **2**, mark the initial position with a line that is aligned with the line on the component **1**.

▶ Use the torque wrench to tighten in clockwise direction until the line of the initial position is aligned with the second line on the component **1**.

▶ Repeat process for the other screws. Tighten screws crosswise.

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Polyurethane top coats	10017051	Kit, 1.06 liq qt	Liebherr yellow
	10027496	Aerosol 13.53 oz	
	10017049	Kit, 1.06 liq qt	Liebherr grey
	10027498	Aerosol 13.53 oz	
	10017050	Kit, 1.06 liq qt	RAL 9002
	10027499	Aerosol 13.53 oz	
Two-component top coats, supplied with hardener			

Tab. 80: Standard repair system

Product name	Item code	Container	Colour
Polyurethane primer for repairs	11088445	3.17 gal	Beige
Polyurethane hardener	11088491	1.06 gal	-
Two-component primer; can be diluted with polyurethane thinner, item code: 8504530 - 1.32 gal.			
Polyurethane top coats	11088499	3.17 gal	Liebherr yellow
	11088498	3.17 gal	Liebherr grey
	11088454	3.17 gal	RAL 9002
Polyurethane hardener	11088491	1.06 gal	-
Two-component paints; can be diluted with polyurethane thinner, item code: 8504530 - 1.32 gal.			

Tab. 81: Standard spraying systems

Product name	Item code	Container	Colour
Epoxy primer for maritime applications	8504453	Kit, 1.32 liq qt	Light grey
	11346802	Aerosol 13.53 oz	
Two-component primer, supplied with catalyser			
Top coats for maritime applications	11118178	Kit, 1.06 gal	All colours (to be specified)
Two-component top coats, supplied with hardener			

Tab. 82: Repair system for maritime applications

Product name	Item code	Container	Colour
Epoxy primer for maritime applications	8504364	2.64 gal	Beige
Catalyser for epoxy primer, maritime applications	8504365	2.64 gal	-
Two-component primer, can be diluted with polyurethane thinner, item code: 8504366 - 1.32 gal.			
Top coats for maritime applications	10008569	4.23 gal	Liebherr yellow
	10008570	4.23 gal	Liebherr grey
	10008571	4.23 gal	RAL 9002
	10008572	4.23 gal	Special colour (to be specified)
Paint hardener for maritime applications	10008573	1.06 gal	-

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