en **Operator's manual**

Hydraulic excavator

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ORIGINAL OPERATOR'S MANUAL
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Manufacturer: Liebherr-France SAS
Type: R 926 Compact
Type no.: 1565, 1827
From Serial no.: 36183

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1.1.3 Undercarriage

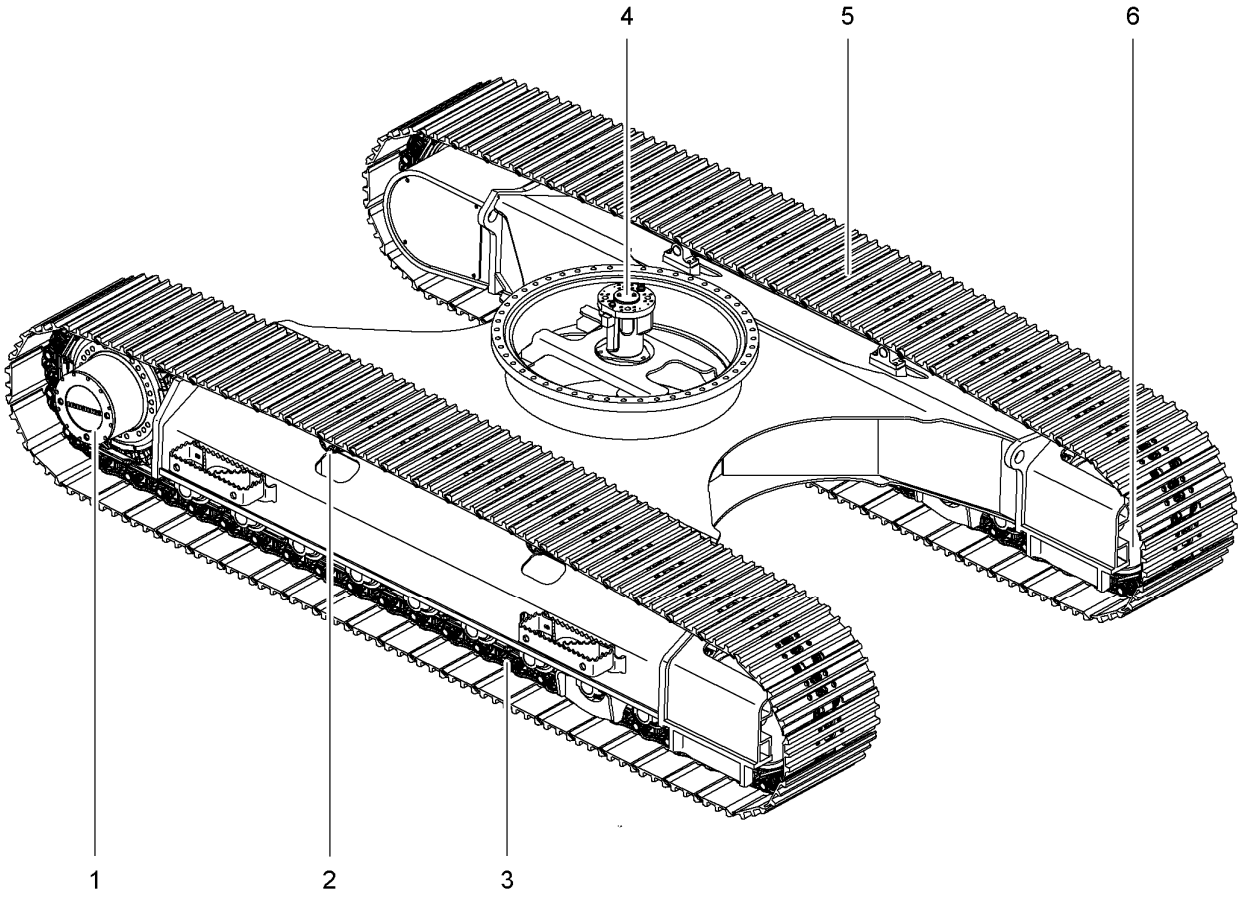

Fig. 4: Undercarriage

1	Travel gear mechanism and sprocket wheel	**3**	Track roller	**5**	Track
2	Carrier roller	**4**	Rotary connection	**6**	Idler

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High Productivity for Extraction and Loading

Boasting a rotation radius of 1.70 m at the rear and until 1.90 m at the front, the R 926 Compact is perfectly stable and suitable for the narrowest of worksites. The exceptional hydraulic performance of Liebherr excavators means shorter work cycles and higher productivity for extraction and loading.

A Wide Range of Attachments

The R 926 excavator is suitable for all types of works, thanks to a wide range of Liebherr tools. Different sticks can be combined with a variety of booms (monoblock, offset monoblock and luffing booms). Finally, an optional levelling blade completes the versatility of the machine. Then, to make tool-changing easier, Liebherr offers a SWA quick-change attachment and the LiKUFIX system as options.

The Liebherr System Tool-Management

The Tool-Management function makes it easy to change tools thanks to the tool recognition RFID system. The programmed pressure and flow values are available from the moment the hydraulic tool is changed. This increases productivity thanks to the shorter fitting times.

Cutting-Edge Technology for Top-Level Performance

The R 926 crawler excavator incorporates Liebherr's Positive Control hydraulic system. This system is controlled by Liebherr electronics, using strategically-positioned sensors. All of the machine's work is therefore faster, more accurate and fluid. What's more, as the two hydraulic pump circuits can operate either separately or in unison, this optimises the energy management of the R 926.

Intelligent Operating Modes

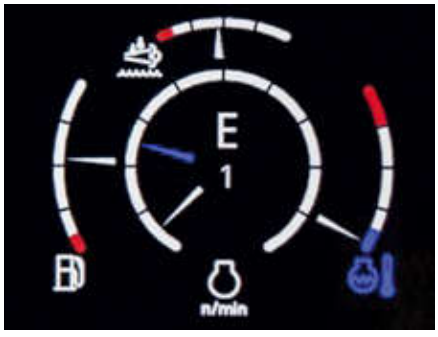
- Sensitive Mode: for accurate lifting work
- Economy mode: for an economic and ecological operation. Recommended for normal working conditions
- Power Mode: for powerful excavation capacities in difficult applications
- Full Power Mode: especially designed for higher power, ideal for extreme applications

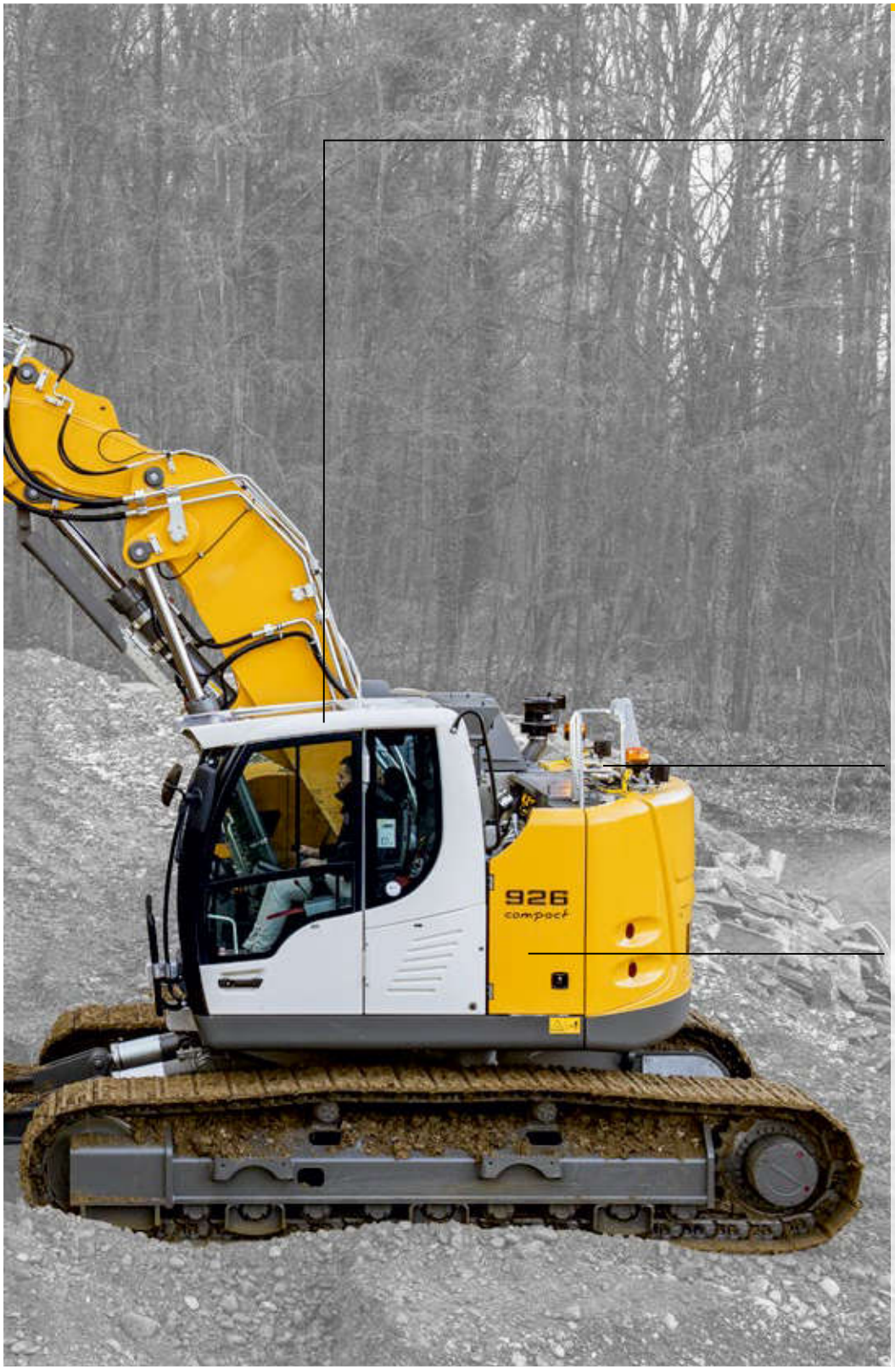
A D924 Liebherr Engine that is Even Cleaner and with Enhanced Performance

- New motor complies with the European Stage IV exhaust gas emission regulations thanks to its oxidation catalyst technology and SCR urea injection
- The most cutting-edge technology with the Common-Rail system without EGR valve and particle filter
- Automatic idling optimises energy efficiency

An Accurate and Efficient Dozer Blade

- Radial fan blade
- Different blade lengths available
- Exemplary dozing accuracy and quality
- Only two lubrication points
- Integral protection of cylinder rods as standard
- Fitted tie-down rings





A Very Comfortable Operator's Workstation

- Spacious and air-conditioned work space for increased productivity
- Pneumatic seat with longitudinal and vertical pneumatic damping as standard
- 7" high resolution, easy-to-use, colour touch screen
- Fully retractable window screen

The Latest Technologies for Higher Performance

- New Stage IV engine technology with oxidation catalyst and SCR urea system without EGR valve and particle filter
- Automatic idling / engine speed increase
- Liebherr Positive Control hydraulic system for more accurate and fluid movements

Shorter Maintenance Time

- Completely new maintenance concept with elements within arm's reach, accessible from the ground
- Filters grouped together for shorter maintenance interventions
- Adequate lubrication guaranteed thanks to automatic centralised lubrication system, fitted as standard
- Motor oil level accessible from ground-level for checking and filling
- Shut-off valve at the outlet of the hydraulic tank

Lift Capacities

with Mono Boom Offset 5.70 m, Counterweight 5.7 t and Track Pads 600 mm

Stick 2.35 m

Under-carriage	m	3.0 m		4.5 m		6.0 m		7.5 m				m
LC	9.0	7.5*	7.5*							7.0*	7.0*	3.2
	7.5	8.0*	8.0*	6.9*	6.9*					5.7*	5.7*	5.5
	6.0	9.0*	9.0*	7.3*	7.3*	5.0	6.3*			4.1	5.5*	6.7
	4.5	12.3*	12.3*	7.5	8.3*	4.8	6.7*			3.4	5.5*	7.4
	3.0			6.7	9.6*	4.4	7.2*	3.2	5.6	3.0	5.3	7.8
	1.5			6.1	10.3*	4.1	7.6*	3.0	5.5	2.8	5.1	7.8
	0			5.8	10.0*	3.9	7.4	2.9	5.4	2.9	5.3	7.6
	−1.5	11.0*	11.0*	5.8	9.0*	3.9	6.9*			3.2	5.6*	7.0
	−3.0	8.6*	8.6*	6.0	7.1*	4.0	5.2*			4.0	5.2*	6.0
	−4.5									3.6*	3.6*	4.3
LC with blade	9.0	7.5*	7.5*							7.0*	7.0*	3.2
	7.5	8.0*	8.0*	6.9*	6.9*					5.7*	5.7*	5.5
	6.0	9.0*	9.0*	7.3*	7.3*	5.4	6.3*			4.4	5.5*	6.7
	4.5	12.3*	12.3*	8.0	8.3*	5.1	6.7*			3.6	5.5*	7.4
	3.0			7.2	9.6*	4.8	7.2*	3.4	5.8	3.2	5.4	7.8
	1.5			6.6	10.3*	4.5	7.6*	3.3	5.6	3.1	5.2	7.8
	0			6.4	10.0*	4.3	7.5*	3.2	5.5	3.2	5.4	7.6
	−1.5	11.0*	11.0*	6.4	9.0*	4.3	6.9*			3.5	5.6*	7.0
	−3.0	8.6*	8.6*	6.5	7.1*	4.4	5.2*			4.4	5.2*	6.0
	−4.5									3.6*	3.6*	4.3

Stick 2.65 m

Under-carriage	m	3.0 m		4.5 m		6.0 m		7.5 m				m
LC	9.0	7.1*	7.1*							5.9*	5.9*	3.8
	7.5			6.5*	6.5*					5.0*	5.0*	5.9
	6.0	7.4*	7.4*	6.9*	6.9*	5.1	6.1*			3.9	4.8*	7.0
	4.5	11.5*	11.5*	7.7	8.0*	4.8	6.5*	3.3	5.7*	3.2	4.8*	7.7
	3.0			6.8	9.4*	4.5	7.1*	3.2	5.7	2.8	5.1	8.0
	1.5			6.2	10.2*	4.2	7.5*	3.0	5.5	2.7	4.9	8.1
	0	5.5*	5.5*	5.8	10.1*	3.9	7.4	2.9	5.4	2.7	5.0	7.9
	−1.5	10.7*	10.7*	5.8	9.2*	3.9	7.0*			3.0	5.4*	7.3
	−3.0	9.5*	9.5*	5.9	7.6*	4.0	5.7*			3.7	5.1*	6.4
	−4.5	5.5*	5.5*	4.4*	4.4*					4.1*	4.1*	4.8
LC with blade	9.0	7.1*	7.1*							5.9*	5.9*	3.8
	7.5			6.5*	6.5*					5.0*	5.0*	5.9
	6.0	7.4*	7.4*	6.9*	6.9*	5.5	6.1*			4.2	4.8*	7.0
	4.5	11.5*	11.5*	8.0*	8.0*	5.2	6.5*	3.6	5.7*	3.4	4.8*	7.7
	3.0			7.3	9.4*	4.8	7.1*	3.5	5.8	3.1	5.1*	8.0
	1.5			6.7	10.2*	4.5	7.5*	3.3	5.6	2.9	5.0	8.1
	0	5.5*	5.5*	6.4	10.1*	4.3	7.5*	3.2	5.5	3.0	5.1	7.9
	−1.5	10.7*	10.7*	6.3	9.2*	4.2	7.0*			3.3	5.4*	7.3
	−3.0	9.5*	9.5*	6.4	7.6*	4.3	5.7*			4.0	5.1*	6.4
	−4.5	5.5*	5.5*	4.4*	4.4*					4.1*	4.1*	4.8

Stick 2.95 m

Under-carriage	m	3.0 m		4.5 m		6.0 m		7.5 m				m
LC	9.0									5.1*	5.1*	4.4
	7.5			6.1*	6.1*	5.0*	5.0*			4.4*	4.4*	6.2
	6.0	6.3*	6.3*	6.5*	6.5*	5.2	5.8*			3.6	4.2*	7.3
	4.5	10.6*	10.6*	7.6*	7.6*	4.9	6.3*	3.4	5.5*	3.0	4.3*	8.0
	3.0			7.0	9.1*	4.5	6.9*	3.2	5.7	2.7	4.5*	8.3
	1.5			6.2	10.1*	4.2	7.4*	3.0	5.5	2.6	4.6	8.4
	0	6.1*	6.1*	5.8	10.2*	3.9	7.4	2.9	5.3	2.6	4.7	8.1
	−1.5	10.2*	10.2*	5.7	9.5*	3.8	7.1*	2.9	5.3	2.8	5.2	7.6
	−3.0	10.4*	10.4*	5.8	8.0*	3.9	6.0*			3.4	5.1*	6.7
	−4.5	6.6*	6.6*	5.2*	5.2*					4.3*	4.3*	5.2
LC with blade	9.0									5.1*	5.1*	4.4
	7.5			6.1*	6.1*	5.0*	5.0*			4.4*	4.4*	6.2
	6.0	6.3*	6.3*	6.5*	6.5*	5.5	5.8*			3.9	4.2*	7.3
	4.5	10.6*	10.6*	7.6*	7.6*	5.3	6.3*	3.6	5.5*	3.3	4.3*	8.0
	3.0			7.5	9.1*	4.9	6.9*	3.5	5.7*	2.9	4.5*	8.3
	1.5			6.7	10.1*	4.5	7.4*	3.3	5.6	2.8	4.7	8.4
	0	6.1*	6.1*	6.4	10.2*	4.3	7.5*	3.2	5.5	2.8	4.8	8.1
	−1.5	10.2*	10.2*	6.3	9.5*	4.2	7.1*	3.1	5.4*	3.1	5.3*	7.6
	−3.0	10.4*	10.4*	6.4	8.0*	4.2	6.0*			3.7	5.1*	6.7
	−4.5	6.6*	6.6*	5.2*	5.2*					4.3*	4.3*	5.2

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

The load values are quoted in tons (t) at stick end (without bucket), and may be swung 360° on firm and even ground. Adjacent values are valid for the undercarriage when in the longitudinal position. Capacities are valid for 600 mm wide track pads. Indicated loads are based on ISO 10567 standard and do not exceed 75 % of tipping or 87 % of hydraulic capacity (indicated via *). Without bucket cylinder, link and lever the lift capacities will increase by 280 kg. Lifting capacity of the excavator is limited by machine stability and hydraulic capacity.

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 safety check valves on hoist cylinders and stick cylinder(s), when they are used for lifting operations which require the use of lifting accessories.

Multi-Purpose
The R 926 Compact is a multi-purpose machine that can be used for a great variety of purposes: its compact structure means it is perfect for worksites where space is restricted, such as town centres, roadworks or narrow forest tracks. What's more, it is capable of performing the traditional work of a standard crawler excavator, such as earth-moving, pipe-laying, demolition and material-handling works.

Compact Equipment
The kinematics of the attachments especially designed for the R 926 Compact allow for effective operations, even at heights, thanks to the boom joint being very close to the machine's centre of rotation. The total rotation radius can be equal to 1.90 m.

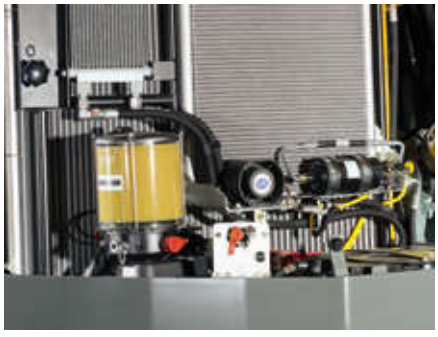
Easy Access
All the maintenance points have been designed for easy access and to shorten intervention times. The gull-wing hood openings allow all operations to be performed from the ground. The operations can be carried out in complete safety, whether they concern the air filter, the fuel filters, the engine oil filter and the radiators or the checking of engine oil levels.

Intelligent Energy Management
The integrated engineering of Liebherr's systems allows constant monitoring of the fuel consumption and the urea solution thanks to the effective management of the engine and hydraulics. The new diesel engine, the new DOC/SCR exhaust after-treatment system, automatic idling/engine speed increase, electronic engine speed sensing regulation and Regeneration Plus are just some of the elements that contribute towards better energy management. This consumption control greatly reduces the discharge of toxic gases into the atmosphere while minimizing operating costs.

Automatic Centralised Lubrication System as Standard
- Fully automated centralised lubrication system as standard for rapid maintenance, less manual lubrication and shorter machine downtime
- Covers all the lubrication points of the uppercarriage and equipment, other than the connecting link (optional)
- Adequate lubrication of each joint guaranteed, for a longer service life of the moving parts
- Safety aspect: the lubrication can be performed without the operator having to leave the cab

LIKUFIX and Tool-Management
- Ideal for worksites requiring tool changes
- Mechanical and hydraulic coupling of tools possible without leaving the cab
- Optimised excavator operation with automatic tool change system
- Intelligent Tool-Management option, for automatic tool detection, pressure and corresponding flow adjustment

Liebherr Lubricants
- Complete range of lubricants and coolants for your Liebherr engines
- Special service with product specialists available to listen to and advise you



Operator's Cab

Cab	ROPS safety cab structure (roll-over protection system according to ISO 12117-2:2008) with windscreen, totally or partially retractable (only upper part), under cab roof, LED work headlights integrated in the ceiling, a door with a sliding window (can be opened on both sides), large storing box and several stowing possibilities, shock-absorbing suspension, laminated right hand side and roof windows, all windows tinted, separate extensible window shades for the sunroof window and windscreen, cigarette lighter and 24 V plug, 12 V plug, cup holder
Operator's seat	Liebherr-Comfort seat, airsprung with automatic weight adjustment, vertical and longitudinal seat damping including consoles and joysticks. Seat and armrests adjustable separately and in combination (adjustable in width, height and inclination), seat heating as standard
Arm consoles	Oscillating consoles with seat, tiltable console left
Operation and displays	Large high-resolution operating unit, intuitive, colour display with touchscreen, video-compatible, numerous setting, control and monitoring options, e.g. air conditioning control, fuel consumption, machine and attachment parameters
Air-conditioning	Automatic air-conditioning, recirculated air function, fast de-icing and demisting at the press of a button, air vents can be operated via a menu. Recirculated air and fresh air filters can be easily replaced and are accessible from the outside. Heating-cooling unit, designed for extreme outside temperatures, sensors for solar radiation, inside and outside temperatures The air conditioning system contains fluorinated greenhouse gases
Refrigerant	R134a
Global warming potential	1,430
Quantity at 25 °C*	1,220 g
CO_2 equivalent	1.75 t
Vibration emission**	
Hand/arm vibrations	< 2.5 m/s², according with ISO 5349-1:2001
Whole-body vibrations	< 0.5 m/s²
Measuring inaccuracy	According with standard EN 12096:1997
Noise emission	
ISO 6396	L_{pA} (inside cab) = 69 dB(A)
2000/14/EC	L_{WA} (surround noise) = 103 dB(A)

Undercarriage

LC	Gauge 2,380 mm
Drive	Liebherr swashplate motor with brake valves on both sides
Transmission	Liebherr compact planetary reduction gear
Maximum travel speed	Low range 3.3 km/h High range 5.5 km/h
Drawbar pull on crawler	226 kN
Track components	B60, maintenance-free
Track rollers/ Carrier rollers	9/2
Tracks	Sealed and greased
Track pads	Triple grouser
Holding brake	Wet multi-disc (spring applied, pressure released)
Brake valves	Integrated into travel motor
Lashing eyes	Integrated

Equipment

Hydraulic cylinders	Liebherr cylinders with seal and guidance systems
Bearings	Sealed, low maintenance
Lubrication	Liebherr central lubrication system

* Valid for standard machine without operator's cab elevation and without height adjustable cab
** For the risk assessment according to 2002/44/EC see ISO/TR 25398:2006

Lift Capacities

with Two-Piece Boom 6.00 m, Counterweight 5.7 t and Track Pads 600 mm

Stick 2.35 m

Under-carriage	m	3.0 m		4.5 m		6.0 m		7.5 m				m
LC	9.0	8.1*	8.1*							6.5*	6.5*	3.9
	7.5	8.1*	8.1*	7.7*	7.7*					5.4	5.5*	5.9
	6.0	9.4*	9.4*	8.1*	8.1*	5.4	6.8*			3.9	5.2*	7.0
	4.5	13.6*	13.6*	8.0	9.2*	5.4	7.2*	3.5	6.0	3.2	5.3*	7.7
	3.0	13.8*	13.8*	7.9	10.3*	5.3	7.6*	3.4	5.9	2.9	5.1	8.1
	1.5	14.1	15.2*	7.8	10.5*	5.0	7.8*	3.2	5.7	2.8	5.0	8.1
	0	13.4	16.6*	7.2	10.6*	4.6	7.8*	3.1	5.6	2.8	5.1	7.9
	−1.5	12.9	16.9*	6.8	10.9*	4.3	7.7*			3.1	4.9*	7.4
	−3.0	12.9	15.8*	6.5	9.5*	4.1	5.4*			3.8	4.2*	6.4
	−4.5	7.6*	7.6*	3.4*	3.4*					2.3*	2.3*	4.9
LC with blade	9.0	8.1*	8.1*							6.5*	6.5*	3.9
	7.5	8.1*	8.1*	7.7*	7.7*					5.5*	5.5*	5.9
	6.0	9.4*	9.4*	8.1*	8.1*	5.7	6.8*			4.2	5.2*	7.0
	4.5	13.6*	13.6*	8.4	9.2*	5.7	7.2*	3.7	6.0*	3.5	5.3*	7.7
	3.0	13.8*	13.8*	8.3	10.3*	5.6	7.6*	3.7	6.0	3.2	5.2	8.1
	1.5	14.7	15.2*	8.3	10.5*	5.3	7.8*	3.5	5.9	3.0	5.1	8.1
	0	14.4	16.6*	7.7	10.6*	5.0	7.8*	3.4	5.7	3.1	5.2	7.9
	−1.5	13.9	16.9*	7.4	10.9*	4.6	7.7*			3.3	4.9*	7.4
	−3.0	13.8	15.8*	7.0	9.5*	4.5	5.4*			4.1	4.2*	6.4
	−4.5	7.6*	7.6*	3.4*	3.4*					2.3*	2.3*	4.9

Stick 2.65 m

Under-carriage	m	3.0 m		4.5 m		6.0 m		7.5 m				m
LC	9.0	7.4*	7.4*							5.5*	5.5*	4.4
	7.5	7.0*	7.0*	7.1*	7.1*	5.3	5.6*			4.8*	4.8*	6.3
	6.0	7.7*	7.7*	7.8*	7.8*	5.5	6.6*			3.7	4.6*	7.4
	4.5	13.2*	13.2*	8.0	8.9*	5.4	7.0*	3.5	5.9*	3.1	4.6*	8.0
	3.0	13.8*	13.8*	7.9	10.1*	5.4	7.5*	3.5	5.9	2.8	4.8*	8.3
	1.5	14.0	14.9*	7.9	10.5*	5.1	7.7*	3.3	5.8	2.6	4.7	8.4
	0	13.5	16.4*	7.2	10.6*	4.7	7.8*	3.1	5.6	2.7	4.8	8.2
	−1.5	12.9	16.8*	6.8	10.8*	4.3	7.8*	3.0	5.2*	2.9	4.8*	7.7
	−3.0	12.8	16.2*	6.5	10.1*	4.1	6.2*			3.5	4.2*	6.8
	−4.5	9.8*	9.8*	5.1*	5.1*					2.8*	2.8*	5.3
LC with blade	9.0	7.4*	7.4*							5.5*	5.5*	4.4
	7.5	7.0*	7.0*	7.1*	7.1*	5.6*	5.6*			4.8*	4.8*	6.3
	6.0	7.7*	7.7*	7.8*	7.8*	5.8	6.6*			3.9	4.6*	7.4
	4.5	13.2*	13.2*	8.4	8.9*	5.7	7.0*	3.8	5.9*	3.3	4.6*	8.0
	3.0	13.8*	13.8*	8.3	10.1*	5.7	7.5*	3.7	6.0	3.0	4.8*	8.3
	1.5	14.7*	14.9*	8.2	10.5*	5.4	7.7*	3.6	5.9	2.9	4.8	8.4
	0	14.5	16.4*	7.8	10.6*	5.1	7.8*	3.4	5.7	2.9	4.9	8.2
	−1.5	13.9	16.8*	7.4	10.8*	4.7	7.8*	3.3	5.2*	3.1	4.8*	7.7
	−3.0	13.8	16.2*	7.0	10.1*	4.5	6.2*			3.8	4.2*	6.8
	−4.5	9.8*	9.8*	5.1*	5.1*					2.8*	2.8*	5.3

Stick 2.95 m

Under-carriage	m	3.0 m		4.5 m		6.0 m		7.5 m				m
LC	9.0			5.6*	5.6*					4.8*	4.8*	4.9
	7.5			6.4*	6.4*	5.4	5.6*			4.2*	4.2*	6.6
	6.0	6.4*	6.4*	7.0*	7.0*	5.5	6.4*	3.6	4.6*	3.4	4.0*	7.7
	4.5	12.4*	12.4*	8.1	8.6*	5.4	6.8*	3.6	5.8*	2.9	4.1*	8.3
	3.0	13.9*	13.9*	7.9	9.8*	5.4	7.3*	3.5	5.9	2.6	4.2*	8.6
	1.5	13.9*	14.7*	7.8	10.4*	5.1	7.7*	3.4	5.9	2.5	4.5	8.7
	0	13.7	16.1*	7.3	10.5*	4.8	7.7*	3.2	5.7	2.5	4.6	8.5
	−1.5	13.0	16.7*	6.9	10.7*	4.4	7.9*	3.0	5.5	2.7	4.7*	7.9
	−3.0	12.8	16.5*	6.5	10.5*	4.1	6.8*			3.2	4.2*	7.1
	−4.5	11.6*	11.6*	6.4	6.5*					3.1*	3.1*	5.7
LC with blade	9.0			5.6*	5.6*					4.8*	4.8*	4.9
	7.5			6.4*	6.4*	5.6*	5.6*			4.2*	4.2*	6.6
	6.0	6.4*	6.4*	7.0*	7.0*	5.8	6.4*	3.9	4.6*	3.7	4.0*	7.7
	4.5	12.4*	12.4*	8.5	8.6*	5.7	6.8*	3.9	5.8*	3.1	4.1*	8.3
	3.0	13.9*	13.9*	8.2	9.8*	5.6	7.3*	3.8	5.9	2.9	4.2*	8.6
	1.5	14.6	14.7*	8.2	10.4*	5.5	7.7*	3.6	5.9	2.7	4.6*	8.7
	0	14.7	16.1*	7.8	10.5*	5.1	7.7*	3.4	5.8	2.8	4.7	8.5
	−1.5	14.0	16.7*	7.4	10.7*	4.7	7.9*	3.3	5.6*	3.0	4.7*	7.9
	−3.0	13.7	16.5*	7.1	10.5*	4.5	6.8*			3.5	4.2*	7.1
	−4.5	11.6*	11.6*	6.5*	6.5*					3.1*	3.1*	5.7

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

The load values are quoted in tons (t) at stick end (without bucket), and may be swung 360° on firm and even ground. Adjacent values are valid for the undercarriage when in the longitudinal position. Capacities are valid for 600 mm wide track pads with adjusting cylinder in optimal position. Indicated loads are based on ISO 10567 standard and do not exceed 75 % of tipping or 87 % of hydraulic capacity (indicated via *). Without bucket cylinder, link and lever the lift capacities will increase by 280 kg. Lifting capacity of the excavator is limited by machine stability and hydraulic capacity.
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 safety check valves on hoist cylinders and stick cylinder(s), when they are used for lifting operations which require the use of lifting accessories.

Environmental pollution

Unapproved disposal of machine

- Make sure that the individual elements of the machine are disposed of correctly after the service life.
- Dispose of elements of machine in line with valid country-specific waste disposal guidelines and relevant valid laws.
- Remove fuels, operating fluids and lubricants from all components before disposal.
- 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

Staff meet the following requirements:
- The machine is operated, maintained and repaired exclusively by authorised and trained persons.
- All persons operating, maintaining or repairing the machine have the required minimum age.
- Staff training involves theoretical information (technology and safety) and practical training on the machine.

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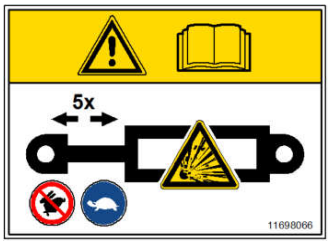
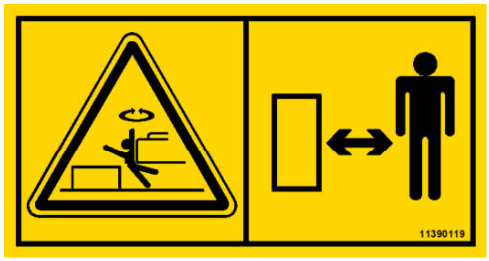
	Sign	Description
14		**Danger from diesel effect** Danger from diesel effect on hydraulic cylinders. For bleeding the hydraulic cylinders adhere to operator's manual.
15		**Risk of crushing** Risk of crushing during machine operation. Remaining in the working area of the machine is prohibited.
16		**Risk of crushing** Danger of crushing through movement of uppercarriage. Remaining in the working area of the machine is prohibited.

Tab. 9: Warning signs

2.4.3 Information signs

Information signs relate to operation, maintenance or properties of the machine.

Certain information signs are not present on all machines.

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.

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2.7.4 Access to machine

Injury

Incorrect entry and exit

- Uppercarriage and undercarriage are positioned so that steps and ladders are aligned with each other.
- Clean dirt, oil, ice and snow from steps, ladders, anti-slip mats, handrails and handles.
- Enter and exit carefully on muddy roads, ice, snow, traffic on access roads and in narrow conditions.
- Regularly check steps, ladders, anti-slip mats, handrails and handles and have them repaired if necessary.
- Before entering machine, clean mud, grease, ice and snow from shoes and climbing aids.
- Put on gloves for secure grip.
- Do not climb up or down using tyres, wheel hubs or rims.
- When exterior influences (for example wind) make opening and closing the door more difficult: Always guide door with your hand.
- Make sure that the opened or closed door has engaged properly.
- If the machine is still moving: Do not stand up from the operator's seat.
- Never jump off machine.
- Enter and leave the machine exclusively using the access system.
- Do not use control elements as handles.
- Keep your face towards machine during entry and exit.
- Make sure you always have two hands and a foot or two feet and one hand in contact with the access system.
- After entering the operator's cab, find out about emergency exit.

If the machine has a cab elevation:
- Climb until the door is reached.
- When you reach door handle with your free hand: Open door.
- Continue climbing.

Adhere to safety instructions on entry and exit in operator's manual of complete machine:
- If the uppercarriage is mounted on a support.
- If the machine is part of a system.
- If the uppercarriage is mounted on a pontoon or rail guide system.

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3.1.2 Control unit A

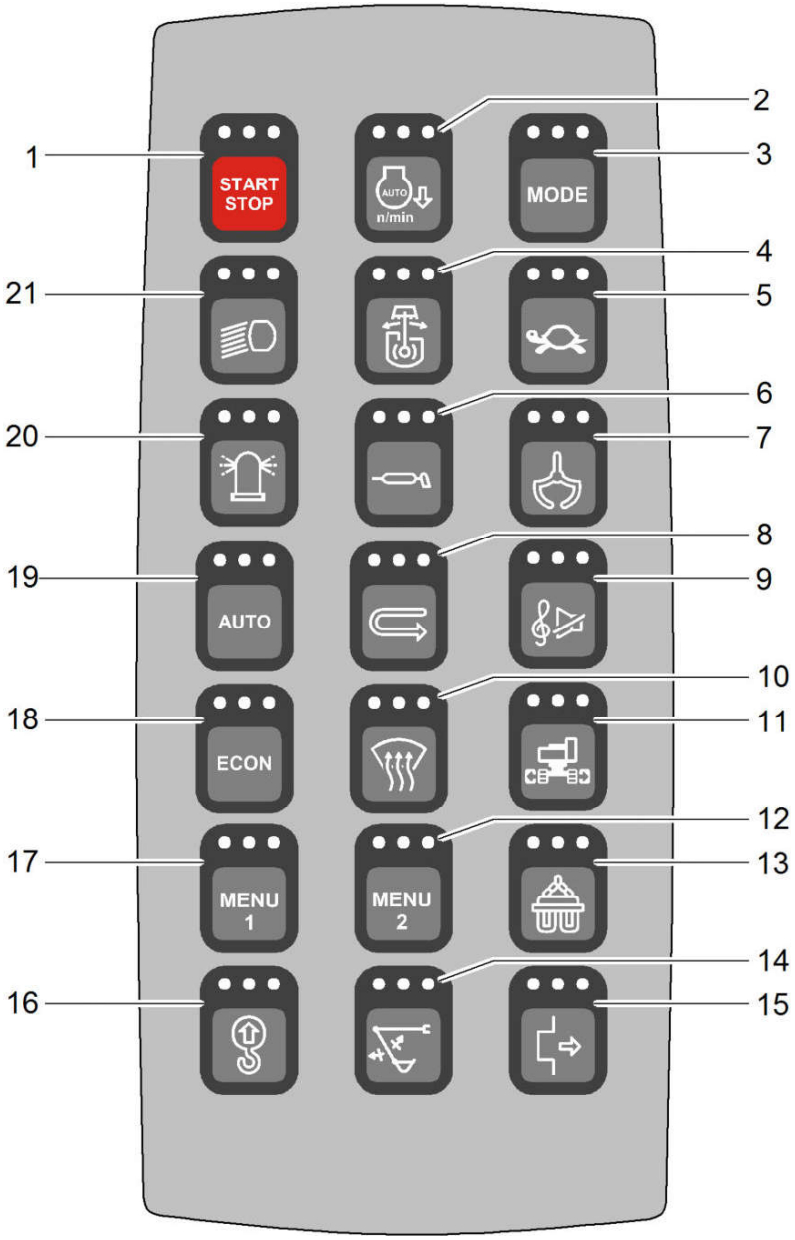

Fig. 53: Control unit A

1 *START STOP* key
2 *Sensor-controlled low idle automatic* key
3 *Operating mode* key
4 *Slewing brake* key
5 *Creeper gear* key
6 *Additional lubrication* key
7 *Grapple priority* key [3)]
12 *MENU 2* key
13 *Magnet system* key [3)]
14 Inactive key
15 *Quick coupler* key [3)]
16 *Overload warning system* key [3)]
17 *MENU 1* key
18 *ECON* key

See next page for continuation of the image legend

[3)] Option

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Symbol	Meaning
	Unlocking of quick coupler at boom end in progress
	Locking of quick coupler at boom end in progress
	Quick coupler at basic boom end unlocked
	No working attachment in locking position

Tab. 18: Status of quick coupler

3.2.3 *Start page* menu

Menu call: 

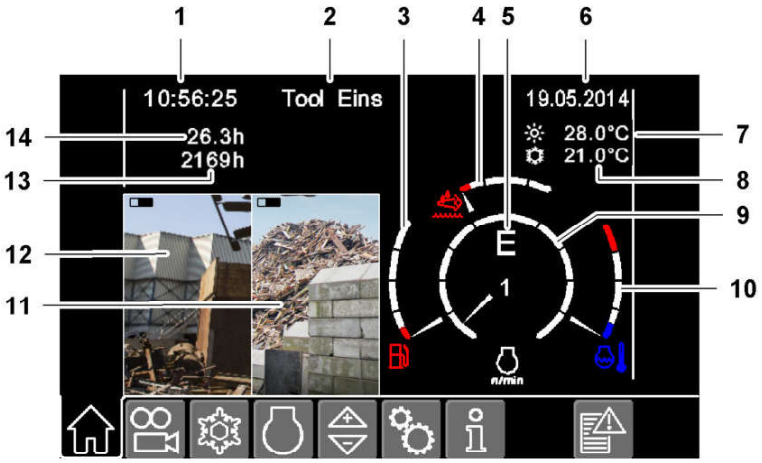

Fig. 137: Start page menu

1 Time
2 Selected working tool
3 Fill level in fuel tank
4 Fill level in diesel exhaust fluid tank[6)]
5 Operating mode
6 Date
7 Outside temperature
8 Selected cab temperature
9 Rev counter
10 Coolant temperature
11 Image of side area camera[6)]
12 Image of rear area camera
13 Total operating hours
14 Daily operating hours

6) Depending on machine configuration

3.2.13 *Radio remote control* submenu

Menu call:  > 

Note

▶ For more information on operating principle of radio: Adhere to manufacturer's operator's manual.

Blaupunkt radio (option)

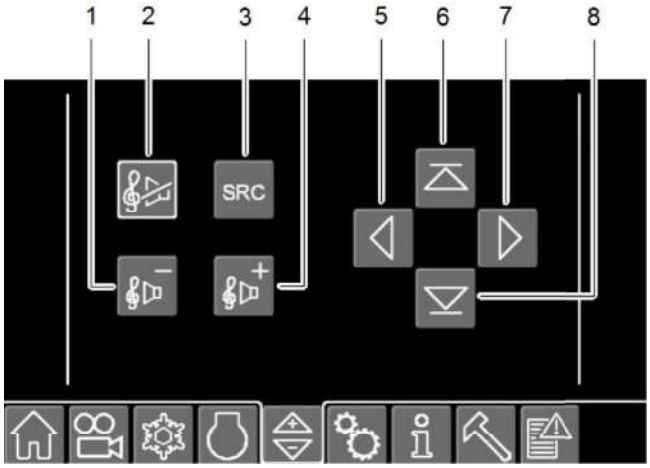

Fig. 166: Radio remote control submenu

1 *Reducing volume* button
2 *Mute* button
3 *Selecting audio source* button
4 *Increasing volume* button
5 *Reducing radio frequency* button
6 *Automatic station scanning forward* button
7 *Increasing radio frequency* button
8 *Automatic station scanning backwards* button

LFR/12222724/01/2020-01-07/en

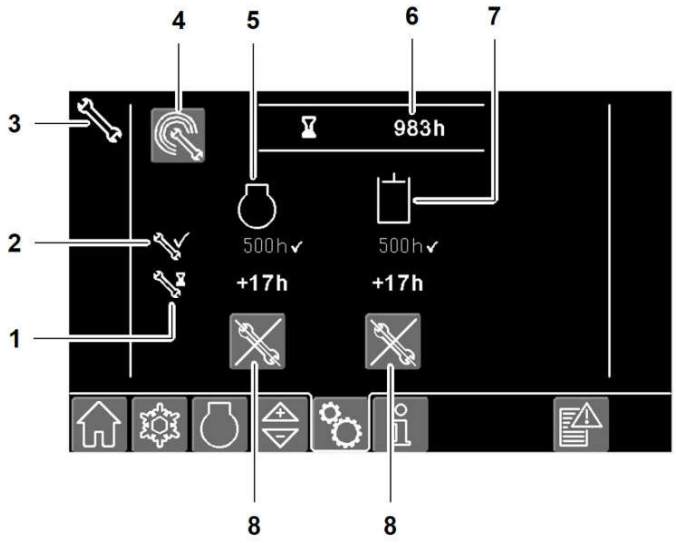

Fig. 198: Maintenance submenu

1	Remaining time to next maintenance	**5**	Maintenance of diesel engine
2	Operating hour meter at last maintenance	**6**	Total operating hours
3	*Maintenance due* status symbol	**7**	Hydraulic system maintenance
4	*Teleservice* button	**8**	*Confirmation of maintenance due message* button

Maintenance

If next maintenance is due in less than 100 hours or deadline has been exceeded by 100 hours, the following elements are displayed:
– *Maintenance due* status symbol **3**
– *Confirmation of maintenance due message* button **8**

▶ Hide *maintenance due* message: Press *confirmation of maintenance due message* button **8**.
▷ *Maintenance due* status symbol **3** disappears.

▶ Have maintenance performed at specified 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
Machine movements!
Danger to life.

▶ Make sure there are no persons in hazard zone.

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Multiple special working attachments can be programmed. For setting and saving parameters for special working attachments contact Liebherr customer service.

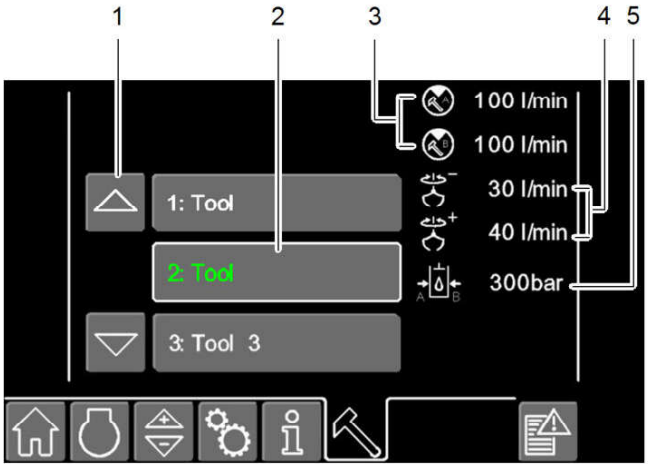

Fig. 228: Tool Control menu

1 *Scroll* button

2 *Selected special working attachment* button

3 Maximum flow rate in high pressure circuit of special working attachment during operation

4 Maximum flow rate in medium pressure circuit of special working attachment during operation

5 Maximum pressure of special working attachment in operation

NOTICE
Unsuitable parameters!
Damage to special working attachment.

- ▶ Select suitable parameters for special working attachment.
- ▶ Adhere to maximum permitted values for pressure and flow rate.

- ▶ Press *scroll* buttons **1** until desired *selected special working attachment* button **2** is outlined in white.
- ▶ Press required *selected special working attachment* button **2**.
  - ▷ Name of special working attachment is displayed in green.
  - ▷ Special working attachment is selected.
  - ▷ Parameters of special working attachment are activated.

3.2.39 Tool Control symbols

Symbol	Meaning
	Automatically forced selection of working tool
	Working tool in continuous mode

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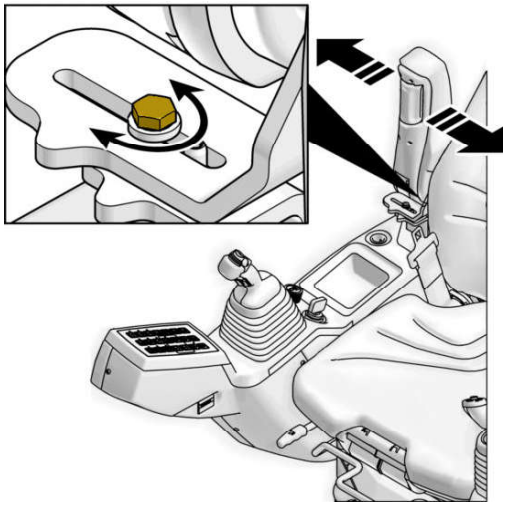

Fig. 257: Adjusting armrest laterally

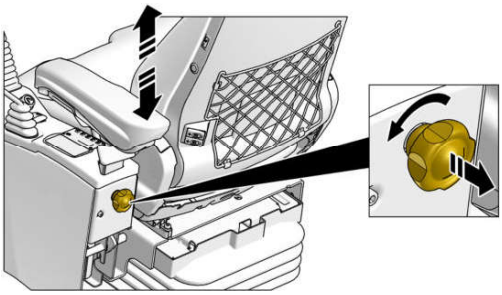

Fig. 258: Adjusting armrest height

▶ Make sure that armrest does not touch control unit of auxiliary heater.

Adjusting seat cushion

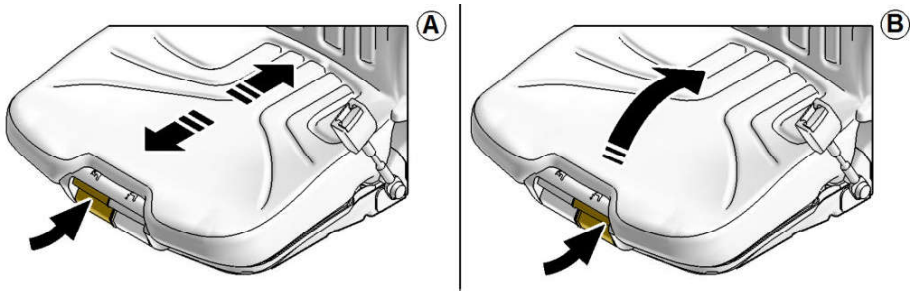

Fig. 259: Adjusting seat cushion

A Adjusting seat cushion depth

B Adjusting seat cushion angle

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Lower windscreen

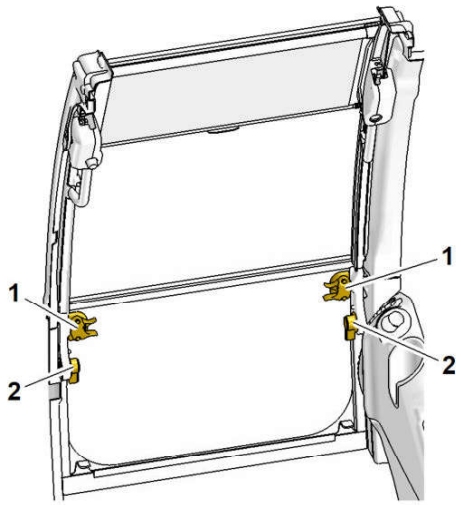

Fig. 287: Lower windscreen

1 Locking mechanism **2** Extender wheel

Opening lower windscreen

- ▶ Turn extender wheels **2** upwards simultaneously.
- ▶ Unlock lower windscreen: Press levers of locking mechanism **1** together simultaneously.
- ▶ Push lower windscreen upwards until it engages.

Closing lower windscreen

- ▶ Unlock lower windscreen: Press levers of locking mechanism **1** together simultaneously.
- ▶ Pull lower windscreen downwards until it engages.
- ▶ Simultaneously turn extender wheels **2** downwards.

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3.3.16 Cab lighting system

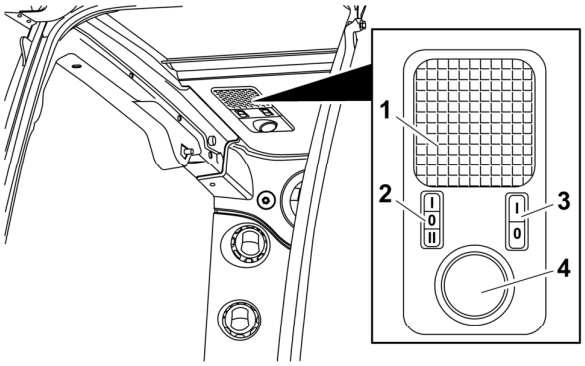

Fig. 306: Cab lighting system

1	Cab lighting system	**3**	Switch for reading lamp
2	Switch for cab lighting system	**4**	Reading lamp

Note
Discharged battery.

▶ Make sure that cab lighting system is switched off when exiting machine.

Cab lighting system

▶ Make sure that ignition key is set to 1.

▶ Switch on cab lighting system: Set switch for cab lighting system **2** to I.

▶ Switch off cab lighting system: Set switch for cab lighting system **2** to 0.

Cab lighting system for entry and exit

The cab lighting system for entry and exit is independent of the position of the ignition key.

▶ Switch on cab lighting system: Set switch for cab lighting system **2** to II.
  ▷ Cab lighting system switches on automatically when cab door is opened.
  ▷ Cab lighting system switches off automatically when cab door is closed.

▶ Switch off cab lighting system: Set switch for cab lighting system **2** to 0.

Reading lamp

▶ Make sure that ignition key is set to 1.

▶ Switch on reading lamp: Set switch for reading lamp **3** to I.

▶ Switch off reading lamp: Set switch for reading lamp **3** to 0.

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- ▶ Equip machine with bypass filters.
- ▶ Equip machine with attachment for “flow reversal for radiator cleaning”.

3.4.7 Preparing machine for use in biologically sensitive areas

The machine can be operated with biodegradable Liebherr hydraulic oils or biodegradable hydraulic oils from other manufacturers. (For more information see: 5.3.6 Hydraulic oils, page 256)

If biodegradable hydraulic oil is used:
- ▶ Use bypass filter.

During an oil change, residues of old hydraulic oil remain in the hydraulic system and mix with the new hydraulic oil.

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

3.4.8 Starting diesel engine

Starting

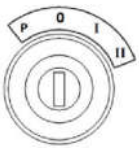
NOTICE
Starting diesel engine at altitude above 2000 m!
Damage to diesel engine.

- ▶ 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 up diesel engine at medium load and medium speed.

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



- ▶ Warn bystanders before starting machine: Activate horn. (For more information see: 3.3.9 Horn, page 119)
- ▶ Set ignition key to **I**.
  - ▷ Autocheck begins.
  - ▷ All LEDs briefly light up.
- ▶ During autocheck, check that the LEDs are functioning correctly.

If LEDs are defective:
- ▶ Have LEDs replaced.

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Travelling sensitively

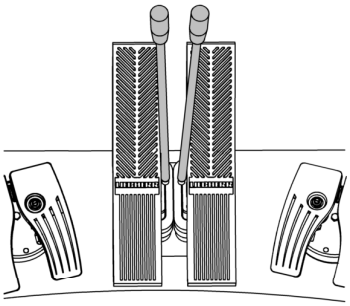


Fig. 346: Driving lever

When sensitive travel is required:

▶ Insert driving levers in accelerator pedals.

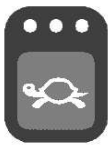
At the end of work:

▶ 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. 33: 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.

Selecting automatic protection mode

This protection applies to machines with *Tool Control* and with selected working tool that does not require automatic protection.

The adjacent symbol indicates on the *Tool Control* display menu that the selected working tool is parametrised with automatic protection.

Key	Status of LEDs	Meaning
	○ ○ ☀	Automatic mode: Hoist cylinder protection is activated automatically as soon as working tool with automatic protection is selected on the display in *Tool Control* menu.

Tab. 37: Protection modes for working tool with automatic protection

Combining protection modes

A manual protection mode can be combined with an automatic protection mode. In this case the selected manual mode is used.

Key	Status of LEDs	Meaning
	○ ☀ ☀	Automatic mode combined with manual mode: Hoist cylinder protection is active as long as **a** button is pressed. (For more information see: Manually activating protection, page 160)
	☀ ○ ☀	Automatic mode combined with continuous mode: Hoist cylinder protection is permanently active.

Tab. 38: Combined protection modes

Make sure the following preconditions are met:

❑ Automatic mode is selected. (For more information see: Selecting automatic protection mode, page 161)

▶ Combine automatic mode with required manual mode: Press and hold *hoist cylinder protection* key until required mode combination is reached.

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.

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3.4.27 Changing over control of right mini-joystick (option)

Special working attachment can be controlled either with the right mini-joystick **1** or with the right joystick **2**.

Key label depends on serial number of machine.

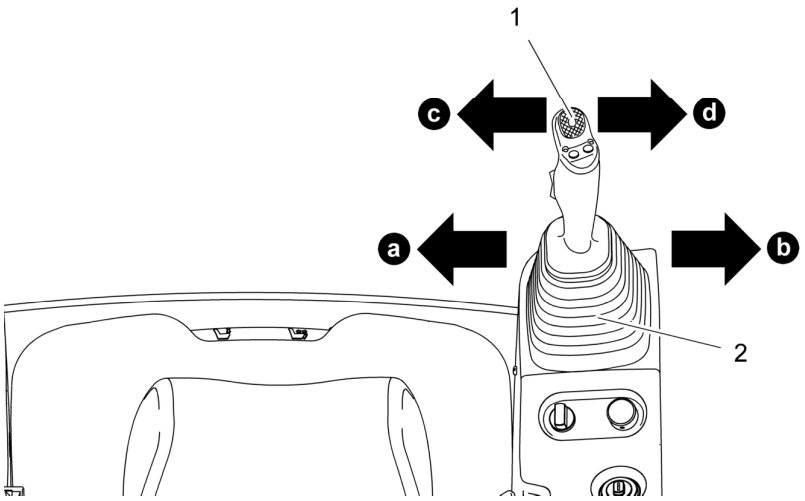
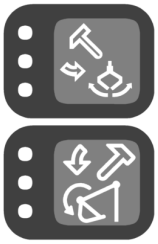


Fig. 399:

1 Right mini-joystick **2** Right joystick

Key	Status of LEDs	Changeover	Operation	Control element
	○ ○ ○	Deactivated	Bucket or grapple	Right joystick **2**
			Special working attachment	Right mini-joystick **1**
	☀ ☀ ☀	Activated	Bucket or grapple	Right mini-joystick **1**
			Special working attachment	Right joystick **2**

Tab. 40: Changing over control of right mini-joystick

DANGER
Use of incorrect control!
Danger to life.

▶ Before working with machine, check function of controls.

Make sure the following preconditions are met:
❑ Right mini-joystick **1** is not activated.
❑ Right joystick **2** is not activated.

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Working with activated overload warning system

Note
Earth-moving operations create increased pressure on the machine.
When the overload warning system is activated, it can trigger repeatedly.

▶ Deactivate overload warning system for earth-moving operations.

If overload warning system triggers:
▶ Reduce reach.
or

Lower load to the ground without increasing reach.

Deactivating overload warning system

▶ Press *overload warning system* key.
▷ *Confirmation required* status symbol appears on the display.
▷ LEDs in *overload warning system* key flash.

▶ Press confirmation button within 5 seconds.
▷ *Confirmation required* status symbol is hidden.
▷ LEDs in *overload warning system* key go out.

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- ▶ Make sure that handle is not vertical when working.
- ▶ Make sure that hydraulic cylinder does not retract or extend to the stop when working.
- ▶ Operate hydraulic hammer.

If material to be broken does not break after 15 seconds maximum:

- ▶ Change purchase.

3.6.9 Working with the grapple

DANGER
Danger of fatal injury due to a swinging grapple!
The grapple can damage the operator's cab and injure the machine operator. The grapple can injure people standing in the vicinity. The stability of the machine can be endangered.

- ▶ Never allow anyone to remain within the danger zone.
- ▶ Make sure that the grapple does not swing too close to the operator's cab.
- ▶ Position the stick so that the grapple cannot swing against the operator's cab during movement or braking.
- ▶ Prevent the grapple from swinging: move the joystick carefully and slowly.
- ▶ Do not raise heavy loads with the boom and stick moved too far out.
- ▶ Note the load lift chart[14)] .

3.6.10 Working with clamshell

WARNING
Collision of clamshell and operator's cab!
Danger to life.

- ▶ Perform slow and steady movements.
- ▶ Make sure that clamshell does not swing close to operator's cab.

Make sure the following preconditions are met:

- ❑ Machine is in working position. (For more information see: 3.6.2 Putting machine in working position, page 184)

[14)] The load lift chart states the permissible loads that can be lifted at the end of the stick, depending on the reach.

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Installing bucket with special seal

NOTICE
Incorrectly set throttle check valves!
Damage to working attachment.

▶ Adapt throttle check valves to bucket size: Have throttle check valves adjusted by Liebherr customer service or authorised specialist staff.

Make sure the following preconditions are met:
❑ Grease used is approved. (For more information see: 5.3.8 Greases, page 258)

▶ Position working attachment so that bearings of stick **7** are aligned with bearings (stick side) **A** of bucket **1**.

▶ Insert pin **6** and sealing rings in bearing (stick side) **A** of bucket **1**.

▶ Insert O-rings **5** and covers **4**.

▶ Position working attachment so that hole of link **2** is aligned with bearings (link side) **B** of bucket **1**.

▶ Insert pin **6** in bearing (link side) **B**: Use same procedure as for inserting pin **6** in bearing (stick side) **A**.

▶ Lubricate pins **6** via grease fitting until clear grease emerges from bearings.

If stopcocks **9** are available:
▶ Set stopcocks **9** to **0**.

Removing bucket with special seal

▶ Remove covers **4** and O-rings **5**.

▶ Pull pins **6** out of bearings. Raise working attachment slightly if necessary.

3.7.4 Using quick coupler

WARNING
Pressurised hydraulic lines!
Injuries.

▶ Before installing and removing depressurise hydraulic system.

▶ Follow operator's manual of the quick coupler manufacturer.

3.7.5 Installing and removing grapple on the stick

Two people are required for installing and removing a grapple.

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❑ Machine is fully configured: Counterweight and working attachment have been installed on machine.

Preparatory work

If machine is equipped with undercarriage with adjustable width:
▶ Contact Liebherr customer service.

If the machine is equipped with Multi-User attachment or slope equipment:
▶ Contact Liebherr customer service.

If machine is not fully configured:
▶ Contact Liebherr customer service.

▶ Adhere to *lifting points and tie-down points* information sign in operator's cab of machine.

▶ Find *lifting points* information signs on machine.

▶ Pay attention to total weight of machine and most unfavourable position of machine's centre of gravity. (For more information see: 2.4.4 Identification plates, page 45)

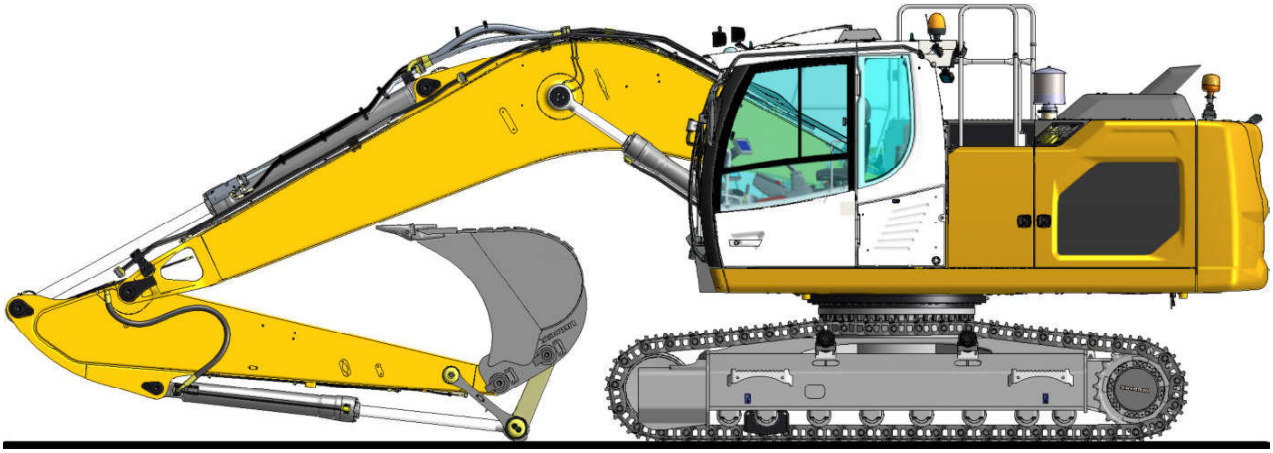


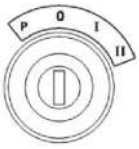
Fig. 470: Lifting position

▶ Place machine on level and firm ground.

▶ Retract stick to the stop.

▶ Tilt in bucket to the stop.

▶ Lower working attachment to the ground.



▶ Depressurise hydraulic hoses. (For more information see: 5.10.1 Depressurising hydraulic system, page 308)

▶ Set ignition key to **0**.

▶ Pull out ignition key.

▶ Move safety lever or folding console up.

▶ Close and lock all doors, covers and hoods on the machine.

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Lowering operator's cab from uppercarriage in an emergency

The emergency lowering stopcock on the uppercarriage is behind the operator's cab.

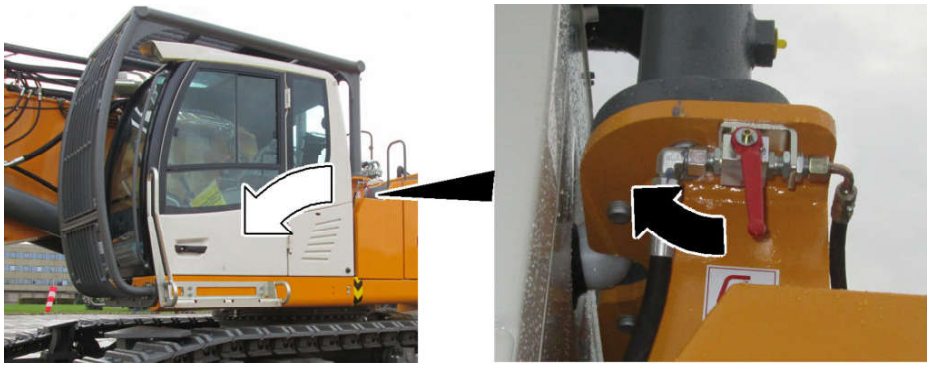

Fig. 489: Emergency lowering stopcock on uppercarriage

▶ Put emergency lowering stopcock in horizontal position.
▷ Operator's cab is lowered.

When operator's cab is lowered:
▶ Put emergency lowering stopcock in vertical position again.
▷ Operator's cab can be tilted.

3.10.5 Central lubrication system

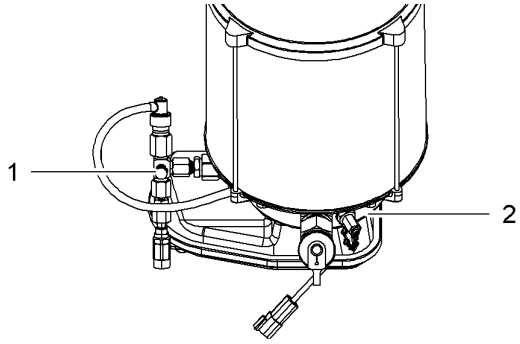

Fig. 490: Central lubrication system

1 Grease fitting **2** Lubricating pump

▶ Lubricate all bearings if lubricating pump **2** fails: Once a day or once per shift, fill around 200 cm^3 of grease into grease fitting **1**.

3.10.6 Towing

Towing machine

If diesel engine does not start or hydraulic system is defective:
▶ Do not tow machine.

▶ Contact Liebherr customer service.

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
F31	20	Air conditioning
F32	10	Roof glass panel windscreen wiper
F33	10	Front windscreen wiper
F34	10	Front windscreen wiper, lower windscreen
F35	15	Radio
Switch fuses on terminal 58 (KL58)		
F23	10	Control unit B
F24	10	Control unit C
F25	10	Control unit D
F26	10	Control unit E
F27	10	Master
Relay		
K01	40	Condenser fan
K02	40	Front roof light
K03		Rear roof light
K04	15	Front windscreen wiper
K05	15	Roof glass panel windscreen wiper
K06	15	Front windscreen wiper, lower windscreen
K07		Rear windscreen wiper
K08	15	KL58
K09	15	Radio
K10		Emergency mode
K11		Warning sound in emergency mode on malfunction of engine
K1_1	15	Option
K1_2	15	Option
K1_3	15	Option
K2_1	15	Option
K2_2	15	Option
K2_3	15	Option
K3_1	15	Option
K3_2	15	Option
K3_3	15	Option

Tab. 50: Fuses and relays of main circuit board

Main fuses

The main fuses are under a protective plate behind the front right side door.

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Symbol	Meaning
	Hydraulic system
	Check oil level of the hydraulic tank
	Diesel engine
	Check oil level of the diesel engine
	Gearbox
	Check oil level of the gearbox
	Lubricating points
	Lubrication
h	Operating hours
	Adhere to instructions in the operator's manual

Tab. 55: Meaning of the symbols on the lubrication chart

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Locking access points

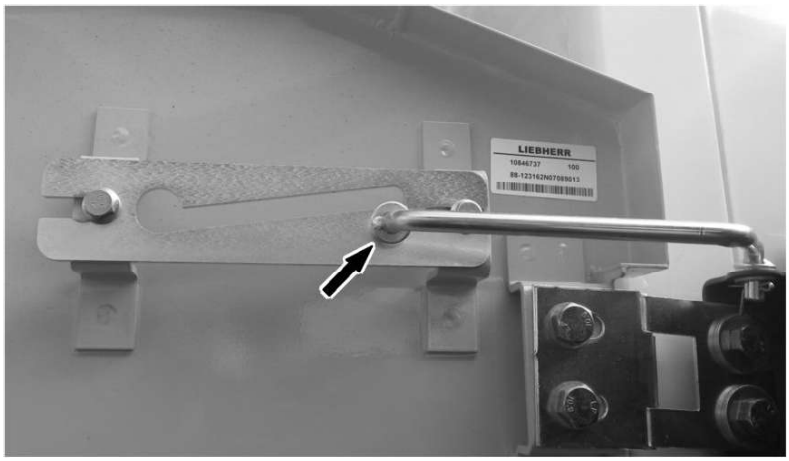

Fig. 569: Locking mechanism

- ▶ Completely open access point.
- ▶ Click locking mechanism into place.

5.4.2 Access points under the uppercarriage

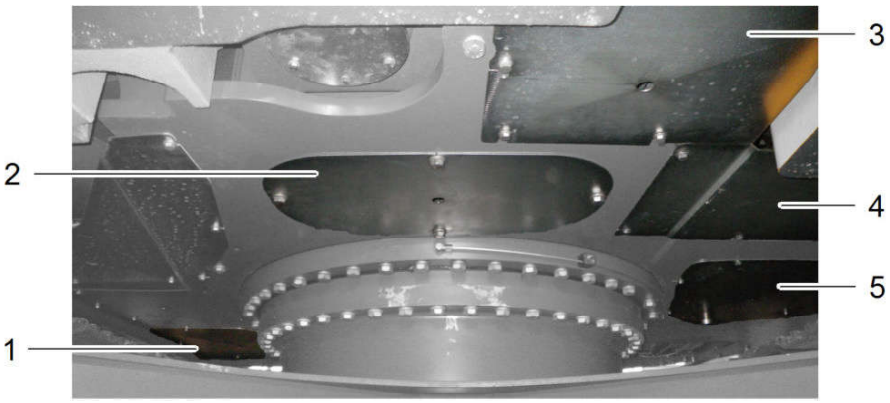

Fig. 570: Access points under the uppercarriage

No.	Access to
1	Hydraulic hoses in operator's cab
2	Control valve block
3	Hydraulic tank drain valves
4	Hydraulic pumps
5	Diesel engine drain valve

Tab. 83: Access points under the uppercarriage

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- ▶ After shutting down the machine, clean the severely soiled parts of the travel gear.
- ▶ Clean the sliding surfaces of the track tensioners.
- ▶ Park the machine on boards at temperatures below zero to prevent it freezing to the ground.

5.6.6 Cleaning fan and radiator

With reversible fan drive

- ▶ If available, activate reversible fan drive. (For more information see: Manually activating reversible fan drive, page 176)

Without reversible fan drive

WARNING
Moving parts!
Injuries.

- ▶ Shut off diesel engine.
- ▶ Wait until all parts have stopped before starting work.

WARNING
Hot diesel engine!
Burns.

- ▶ Wait until diesel engine has cooled down before starting work.

- ▶ Clean fins of radiator and fan wheel: Blow compressed air from inside of machine to outside.
- ▶ If necessary, wait 10 minutes and repeat radiator cleaning.

5.6.7 Corrosion protection

Item code: 11212565

Version: 002

Scope and purpose

This chapter on corrosion protection is aimed at all users of machines for earth-moving operations, material handling, mining and excavating work in rivers and in the offshore area. The complete machine must be inspected regularly in order to ensure maintenance of the corrosion protection. To ensure the service life of the components, this protection must be renewed regularly. In addition, depending on the type of corrosion protection of the machine, the environment (for example offshore area, industrial etc.) and specific applications (e.g. handling of fertiliser, salt etc.) the treatments must be performed more frequently and more consistently.

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Two-component top coats, supplied with hardener

Tab. 94: Repair system for maritime applications

Product name	Item code	Container	Colour
Epoxy primer for maritime applications	8504364	10 l	Light grey
Catalyser for epoxy primer, maritime applications	8504365	10 l	-
Two-component primer, can be diluted with polyurethane thinner, item code: 8504366 - 5 l.			
Top coats for maritime applications	10008569	16 l	Liebherr yellow
	10008570	16 l	Liebherr grey
	10008571	16 l	RAL 9002
	10008572	16 l	Special colour (to be specified)
Paint hardener for maritime applications	10008573	4 l	-
Two-component paints; can be diluted with thinner, item code: 10008574 - 5 l.			

Tab. 95: Spraying system for maritime applications

Product name	Item code	Container	Colour
Zinc repair spray	11491512	Aerosol 400 ml	Zinc
Zinc pigments (90 %) bound with resin; product is applied immediately to previously degreased and brushed metal.			

Tab. 96: Reworking system for zinc-plated parts (steps, ladders, railings, walkways etc.)

Product name	Item code	Container	Colour
Aluminium chrome spray	11491502	Aerosol 400 ml	Metallised aluminium
Aluminium pigments bound with resin; product is applied immediately to previously degreased and brushed metal.			

Tab. 97: Repair system for zinc-coated passivated parts (pipes, consoles, plates etc.)

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Checking oil level on dipstick

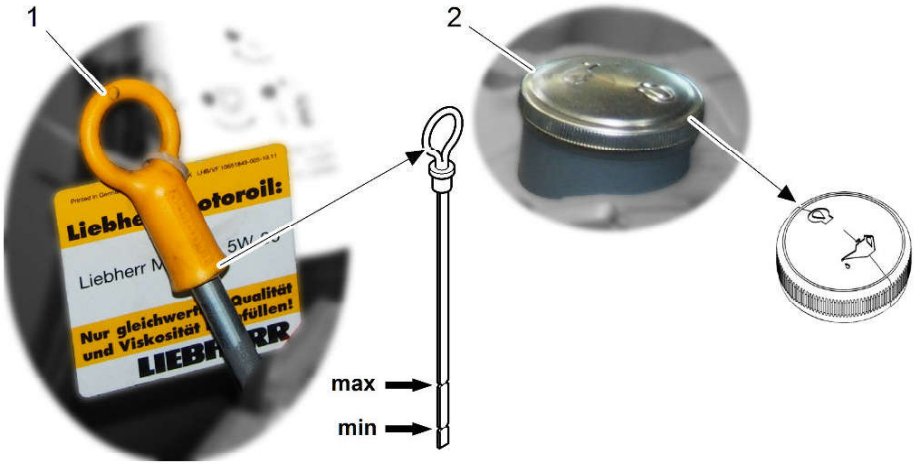

Fig. 591: Checking oil level on dipstick

1 Dipstick **2** Oil filling hole

Dipstick **1** and oil filling hole **2** are arranged differently according to diesel engine type.

WARNING
Hot engine oil!
Burns.

- ▶ Put on protective gloves.
- ▶ Avoid skin contact with hot engine oil and hot parts carrying oil.

Make sure the following preconditions are met:
- ❑ Diesel engine is in maintenance position. (For more information see: 5.8.1 Diesel engine: Putting in maintenance position, page 290)

- ▶ Pull out dipstick **1** and clean with clean lint-free cloth.
- ▶ Insert dipstick **1** fully.
- ▶ Pull out dipstick **1** again and check that oil level is between **MIN** mark and **MAX** mark.

If oil level is below **MIN** mark:
- ▶ Fill with oil. (For more information see: Filling with oil, page 291)
- ▶ Put in dipstick **1**.

Filling with oil

WARNING
Hot engine oil!
Burns.

- ▶ Put on protective gloves.
- ▶ Avoid skin contact with hot engine oil and hot parts carrying oil.

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Blocking regeneration selectively

▶ Select *diesel particulate filter* menu.

▶ Press *selective blocking of regeneration* button.
- ▷ *Selective blocking of regeneration* button appears in green.
- ▷ *Manual activation of regeneration* button is inactive.
- ▷ *Regeneration of diesel particulate filter blocked* status symbol appears on the display.

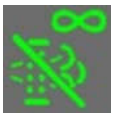
▶ Release blocking of regeneration: Press *selective blocking of regeneration* button.
- ▷ *Selective blocking of regeneration* button appears in white.
- ▷ *Manual activation of regeneration* button is active.
- ▷ *Regeneration of diesel particulate filter blocked* status symbol disappears.

▶ Blocking of selective regeneration is automatically removed during shut-off.

Blocking regeneration permanently[24)]

▶ Select *diesel particulate filter* menu.

▶ Press *permanent blocking of regeneration* button.
- ▷ *Permanent blocking of regeneration* button appears in green.
- ▷ *Manual activation of regeneration* button is inactive.
- ▷ *Permanent blocking of regeneration* button is inactive.
- ▷ *Regeneration of diesel particulate filter blocked* status symbol appears on the display.



▶ Release blocking of regeneration: Press *permanent blocking of regeneration* button.
- ▷ *Permanent blocking of regeneration* button appears in white.
- ▷ *Manual activation of regeneration* button is active.
- ▷ *Permanent blocking of regeneration* button is active.
- ▷ *Regeneration of diesel particulate filter blocked* status symbol disappears.

24) Option

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5.10.3 Hydraulic tank: Draining water and sediments

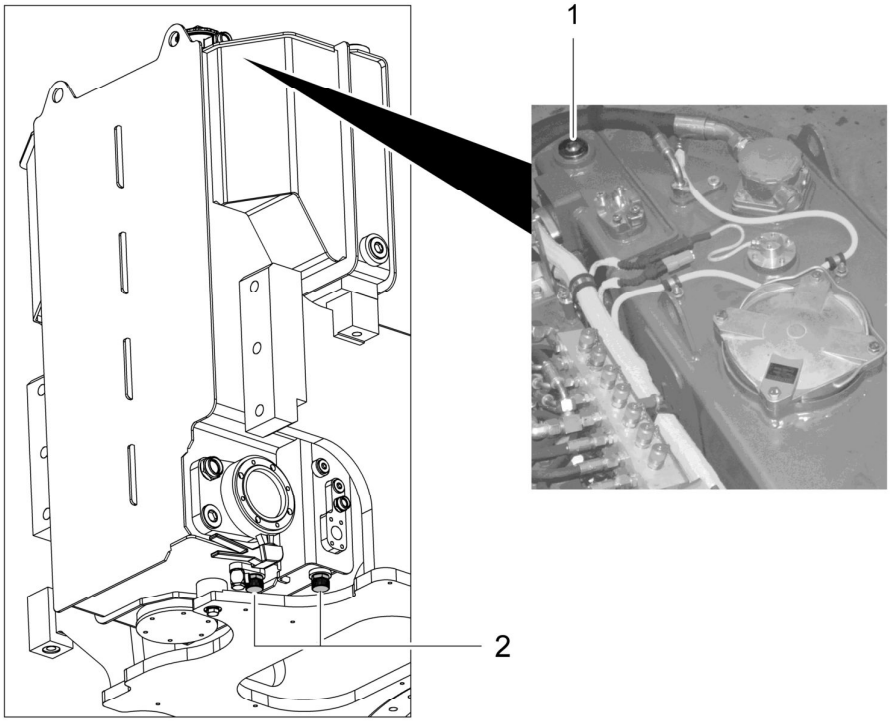

Fig. 624: Hydraulic tank

1 Collecting pipe **2** Drain valve

Note

If biodegradable hydraulic oil is used:

▶ After every diesel engine downtime exceeding 24 hours, drain water and sediment from hydraulic tank.

▶ Depressurise hydraulic system.

▶ Place suitable receptacle under hydraulic tank.

▶ Unscrew plug of collecting pipe **1**.

▶ Unscrew plugs of drain valves **2**.

▶ Attach drain hoses supplied with machine to drain valves **2** under hydraulic tank.

▶ Drain water and sediments until clean hydraulic oil emerges.

▶ Remove drain hoses.

▶ Screw in plugs of drain valves **2**.

▶ Screw in plug of collecting pipe **1**.

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If there are cracks or hairline cracks:

- ▶ Do not put machine into service.
- ▶ Have machine checked and repaired performed by Liebherr customer service.

5.13.5 Checking pin bearings for wear

- ▶ Check bearings of complete working attachment for proper condition.
- ▶ Check play between pin and bearing: Operate working attachment quickly and stop it suddenly.
- ▶ Inform operating company of defects affecting safety.
- ▶ Repair identified defects. See service manual for procedure.

If service manual cannot be accessed:

- ▶ Have repairs performed by Liebherr customer service.

5.13.6 Changing bucket teeth with Z system

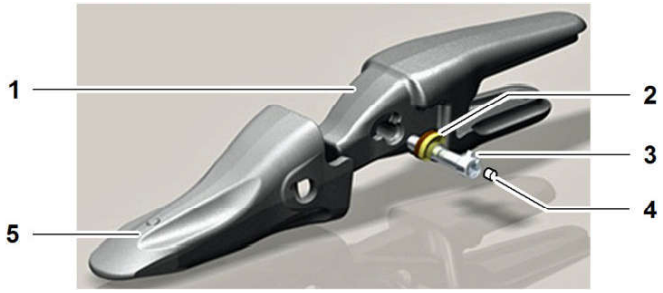

Fig. 633: Changing bucket teeth with Z system

1	Tooth adapter	**4**	Protection plug
2	Pin retention	**5**	Tooth
3	Securing pin		

NOTICE
Missing or very worn teeth!
Damage to tooth adapters.

- ▶ Before working with bucket, make sure that every tooth adapter is equipped with tooth.
- ▶ Before working, check wear of teeth.

Removing tooth

- ▶ Clean tooth **5** and mounting system.
- ▶ Remove protection plug **4**.
- ▶ Turn securing pin **3** with a square wrench approximately 30° towards tooth **5**.
  ▷ Nose of securing pin **3** slips out of pin retention **2**.
- ▶ Use the hammer and punch to knock out securing pin **3**.
- ▶ Remove tooth **5**.
- ▶ Remove pin retention **2**.

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