en **Operator's manual**

Material handling machine

Document ID

ORIGINAL OPERATOR'S MANUAL

Order number: 12213976
Issued: 2020-02-10
Version: 01
Author: LHB / Technical Documentation Department

Product ID

Manufacturer: Liebherr-Hydraulikbagger GmbH
Type: LH 35 M Litronic
Type no.: 1254 (USA / CAN)
From Serial no.: 89912

Contact

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Liebherrstraße 12
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LHB/12213976/01/2020-02-10/en

NOTICE
Malfunctions in diesel engine and exhaust treatment system!
High emission values.

- ▶ Adhere to error messages.
- ▶ Rectify malfunctions in diesel engine and exhaust treatment system immediately.

If malfunctions are not rectified:
- ▶ Take machine out of service.

NOTICE
Incorrect operation!
Damage to machine.

- ▶ Make sure that diesel engine and exhaust treatment system are operated and serviced exclusively according to operator's manual.

This CO_2 measurement results from testing over a fixed test cycle under laboratory conditions a(n) (parent) engine representative of the engine type (engine family) and shall not imply or express any guarantee of the performance of a particular engine.

Engine type	Nominal power	High idle rpm	Code	97/68/EC stage	CO_2 emissions during NRSC testing or RMC testing under standard laboratory conditions	CO_2 emissions during NRTC testing with warm start under standard laboratory conditions
D924 A7-04 SCRonly	129 kW	2200 rpm	F4HFE413G*B	IV	653.45 g/kWh	640.45 g/kWh
D924 A7-14 SCRT	129 kW	2200 rpm	F4HFE414G*B	IV	678.33 g/kWh	631.52 g/kWh
D934 A7-04	200 kW	1900 rpm	R04LQ7103	IV	682.18 g/kWh	726.85 g/kWh
D934 A7-14	140 kW	1900 rpm	R04LQ7102	IV	683.53 g/kWh	760.17 g/kWh
D934 A7-14	200 kW	1900 rpm	R04LU7101	IV	671.94 g/kWh	709.8 g/kWh
D936 A7-04	320 kW	1900 rpm	R06LQ7101	IV	650.74 g/kWh	694.6 g/kWh
D936 A7-14	320 kW	1900 rpm	R06LU7101	IV	664.06 g/kWh	673.06 g/kWh
D944 A7-04	200 kW	1900 rpm	R04KQ7102	IV	687.26 g/kWh	769.07 g/kWh
D944 A7-04	230 kW	1900 rpm	R04KQ7101	IV	682.36 g/kWh	750.86 g/kWh
D944 A7-14	200 kW	1900 rpm	R04KU7102	IV	686.43 g/kWh	731.46 g/kWh
D944 A7-14	230 kW	1900 rpm	R04KU7101	IV	681.03 g/kWh	713.34 g/kWh
D946 A7-04	330 kW	1900 rpm	R06KQ7102	IV	643.85 g/kWh	684.24 g/kWh
D946 A7-14	330 kW	1900 rpm	R06KU7101	IV	669.65 g/kWh	684.04 g/kWh
D9508 A7-04	455 kW	1900 rpm	V08MQ7102	IV	709.44 g/kWh	761.34 g/kWh
TCD 3.6 L4 DOConly / SCR	95 kW	2000 rpm	CFXI95BU	IV	713.39 g/kWh	730.75 g/kWh

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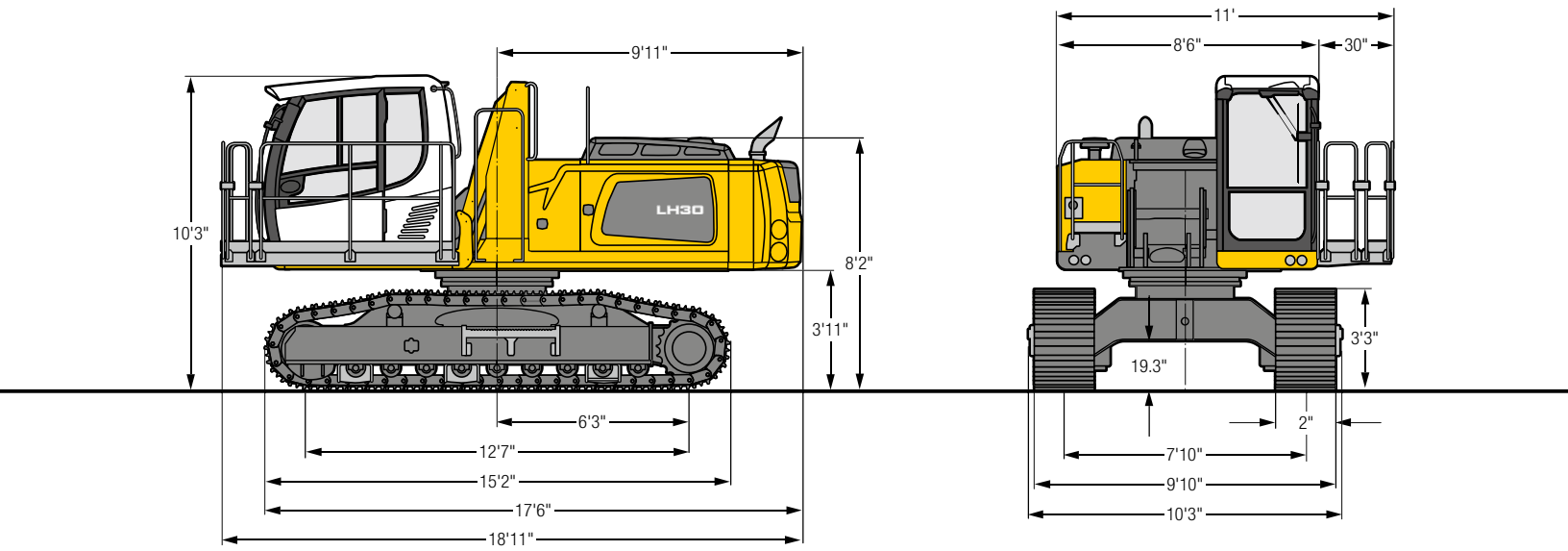
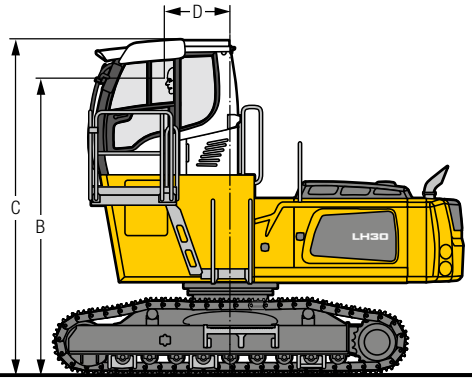
LH 30 C LC – Dimensions



LH 30 C LC – Choice of Cab Elevation

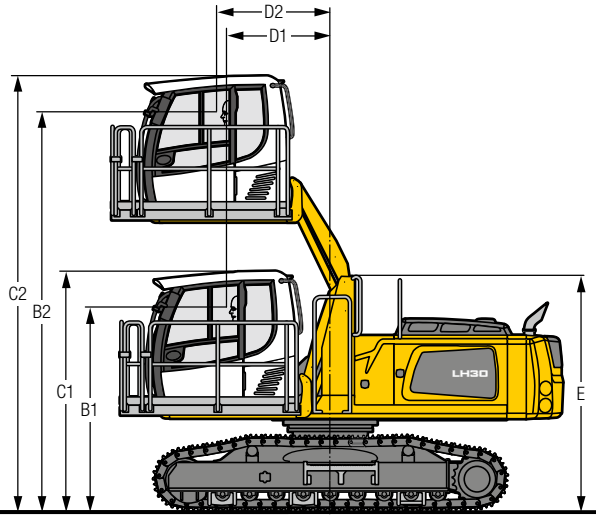
Cab Elevation LFC
(Rigid Elevation)



Increase type	LFC 120
Height	3'11"
B	12' 8"
C	14' 2"
D	2' 7"

A rigid cab elevation has a fixed eye level height. For a lower transport height, the shell of the cab can be removed and replaced by a transport device. The dimension C is in this machine design for all rigid cab elevations 11'3".

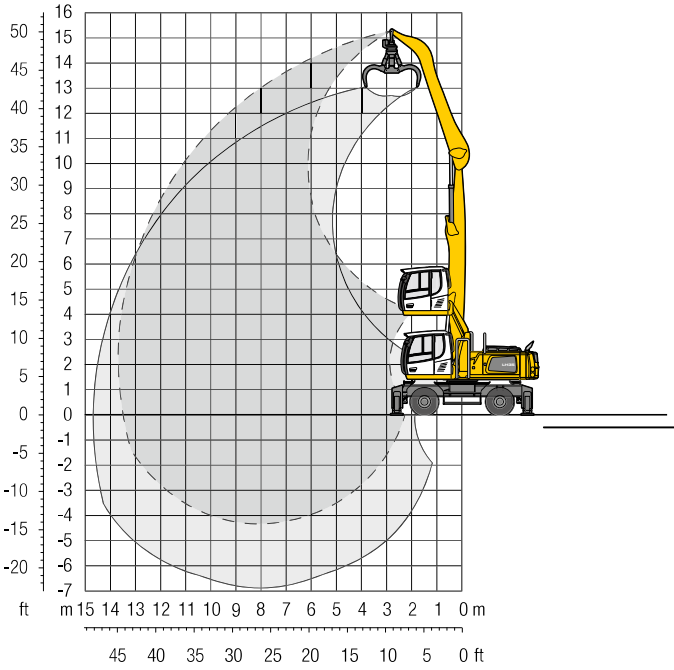
Cab Elevation LHC
(Hydraulic Elevation)



Increase type	LHC 255
B1	8' 8"
B2	17' 1"
C1	10' 3"
C2	18' 7"
D1	4' 5"
D2	4'10"
E	10'

The hydraulically adjustable cab allows the driver, that he can choose his field of view freely and at any time within the stroke.

LH 35 M – Equipment GA14

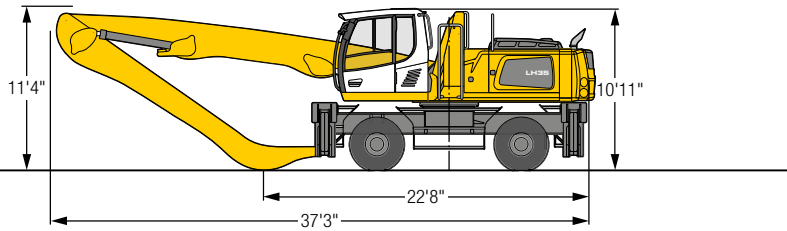


Operating Weight

The operating weight includes the basic machine with 4 point outriggers, hydr. cab elevation, 8 solid tires plus intermediate rings, straight boom 25'7", angled stick 19'8" and multi-tine grab GM 65/0.78 yd³ semi-closed tines.

Weight	73,000 lb

Dimensions



ft	Undercarriage	10 ft		15 ft		20 ft		25 ft		30 ft		35 ft		40 ft		45 ft				ft in
50	Stabilizers raised	17,8*	17,8*															17,6*	17,6*	10' 1"
	4 pt. outriggers down	17,8*	17,8*															17,6*	17,6*	
45	Stabilizers raised					13,8*	13,8*											11,0*	11,0*	23'
	4 pt. outriggers down					13,8*	13,8*											11,0*	11,0*	
40	Stabilizers raised					15,8*	15,8*	12,4	13,6*									8,9	9,3*	29'11"
	4 pt. outriggers down					15,8*	15,8*	13,6*	13,6*									9,3*	9,3*	
35	Stabilizers raised							12,7	13,7*	9,3	11,7							6,9	8,4*	34'10"
	4 pt. outriggers down							13,7*	13,7*	12,2*	12,2*							8,4*	8,4*	
30	Stabilizers raised							12,6	13,7*	9,3	11,7	7,1	9,0					5,8	7,5	38' 4"
	4 pt. outriggers down							13,7*	13,7*	12,1*	12,1*	10,7*	10,7*					7,9*	7,9*	
25	Stabilizers raised					16,2*	16,2*	12,4	13,9*	9,2	11,6	7,0	8,9	5,4	7,0			5,1	6,7	41'
	4 pt. outriggers down					16,2*	16,2*	13,9*	13,9*	12,2*	12,2*	10,7*	10,7*	9,3*	9,3*			7,6*	7,6*	
20	Stabilizers raised					16,9	17,1*	11,9	14,4*	8,9	11,3	6,9	8,8	5,4	7,0			4,7	6,1	42'11"
	4 pt. outriggers down					17,1*	17,1*	14,4*	14,4*	12,4*	12,4*	10,8*	10,8*	9,3*	9,3*			7,5*	7,5*	
15	Stabilizers raised	15,4*	15,4*	22,3*	22,3*	15,8	18,3*	11,3	14,4	8,5	10,9	6,6	8,5	5,2	6,8			4,4	5,7	44' 1"
	4 pt. outriggers down	15,4*	15,4*	22,3*	22,3*	18,3*	18,3*	15,0*	15,0*	12,6*	12,6*	10,8*	10,8*	9,2*	9,2*			7,5*	7,5*	
10	Stabilizers raised	16,2*	16,2*	21,7	26,3*	14,5	18,8	10,5	13,6	8,0	10,4	6,3	8,2	5,1	6,7			4,2	5,5	44'10"
	4 pt. outriggers down	16,2*	16,2*	26,3*	26,3*	19,5*	19,5*	15,5*	15,5*	12,8*	12,8*	10,8*	10,8*	9,0*	9,0*			7,1*	7,1*	
5	Stabilizers raised	2,6*	2,6*	19,2	21,2*	13,2	17,4	9,8	12,8	7,6	9,9	6,0	7,9	4,9	6,5			4,1	5,5	44'10"
	4 pt. outriggers down	2,6*	2,6*	21,2*	21,2*	19,9*	19,9*	15,6*	15,6*	12,7*	12,7*	10,5*	10,5*	8,6*	8,6*			6,4*	6,4*	
0	Stabilizers raised	3,7*	3,7*	12,3*	12,3*	12,2	16,4	9,2	12,1	7,2	9,5	5,8	7,7	4,8	6,3			4,1	5,5	44' 4"
	4 pt. outriggers down	3,7*	3,7*	12,3*	12,3*	19,2*	19,2*	15,1*	15,1*	12,2*	12,2*	10,0*	10,0*	7,9*	7,9*			5,7*	5,7*	
– 5	Stabilizers raised	5,9*	5,9*	12,1*	12,1*	11,6	15,8	8,7	11,7	6,9	9,2	5,6	7,5	4,7	6,3			4,3	5,0*	42'11"
	4 pt. outriggers down	5,9*	5,9*	12,1*	12,1*	17,3*	17,3*	13,8*	13,8*	11,1*	11,1*	8,9*	8,9*	6,7*	6,7*			5,0*	5,0*	
–10	Stabilizers raised			13,8*	13,8*	11,4	14,3*	8,6	11,5	6,8	9,1	5,6	7,2*					5,0	5,7*	38' 5"
	4 pt. outriggers down			13,8*	13,8*	14,3*	14,3*	11,7*	11,7*	9,4*	9,4*	7,2*	7,2*					5,7*	5,7*	
–15	Stabilizers raised																			
	4 pt. outriggers down																			

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

The lift capacities on the stick end without attachment are stated in lb x 1,000 and are valid on a firm, level supporting surface with blocked oscillating axle. These capacities can be slewed through 360° with the undercarriage in the transverse position. Capacities in the longitudinal position of the undercarriage (+/– 15°) are specified over the steering axle with the stabilizers raised and over the rigid axle with the stabilizers down. Indicated loads based on the ISO 10567 standard and do not exceed 75 % of tipping or 87 % of hydraulic capacity. The lift capacity of the unit is limited by its stability, the lifting capability of the hydraulic elements, or the maximum permissible lifting capacity of the load hook.

Performance
Power plus speed –
Redefined performance

Economy
Good investment –
Savings for long-term

LH 30 M Industry Litronic

Operating Weight
58,400 – 64,200 lb*

Engine
188 HP / 140 kW (SAE J1349)
190 HP / 140 kW (ISO 9249)
Stage Tier 4f

LH 35 M Industry Litronic

Operating Weight
67,700 – 70,300 lb*

Engine
188 HP / 140 kW (SAE J1349)
190 HP / 140 kW (ISO 9249)
Stage Tier 4f

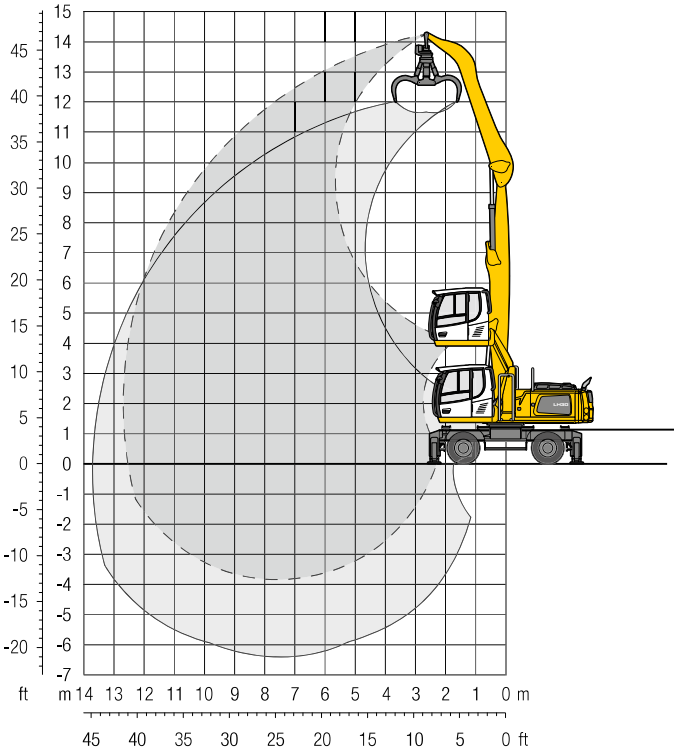
LH 30 C Industry Litronic

Operating Weight
59,700 – 66,600 lb*

Engine
188 HP / 140 kW (SAE J1349)
190 HP / 140 kW (ISO 9249)
Stage Tier 4f

* Without working tool

LH 30 M – Attachment GA13

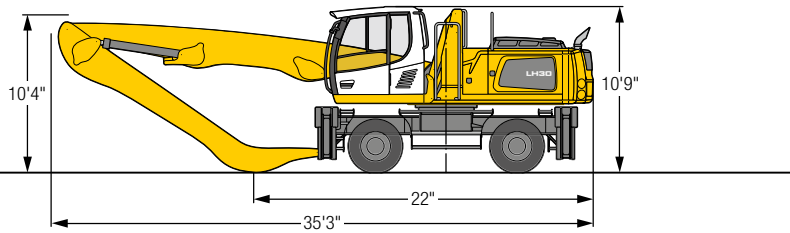


Operating Weight

The operating weight includes the basic machine with 4 point outriggers, hydr. cab elevation, 8 solid tires plus intermediate rings, straight boom 23'11", angled stick 18'1" and grab GM 65 / 0.78 yd³ semi-closed tines.

Weight	63,300 lb

Dimensions

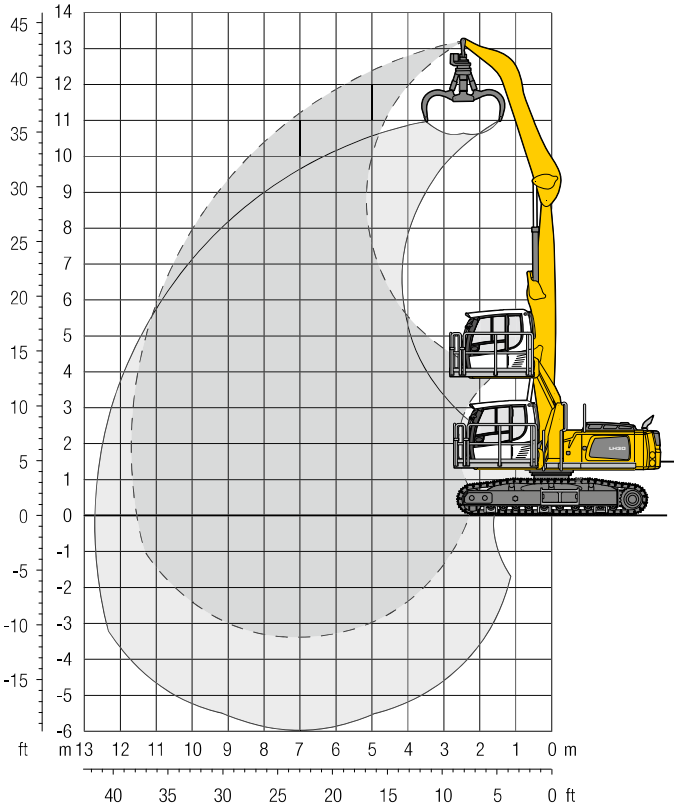


ft	Undercarriage	10 ft		15 ft		20 ft		25 ft		30 ft		35 ft		40 ft		45 ft				ft in
45	Stabilizers raised																	15,0*	15,0*	14'11"
	4 pt. outriggers down																	15,0*	15,0*	
40	Stabilizers raised					12,8	15,5*											8,9	11,1*	24' 5"
	4 pt. outriggers down					15,5*	15,5*											11,1*	11,1*	
35	Stabilizers raised					13,3	16,7*	9,1	11,9	6,3	8,5							6,2	8,4	30' 2"
	4 pt. outriggers down					16,7*	16,7*	14,6*	14,6*	10,0*	10,0*							9,6*	9,6*	
30	Stabilizers raised					13,4	16,5*	9,2	12,0	6,6	8,8							4,9	6,7	34' 4"
	4 pt. outriggers down					16,5*	16,5*	14,3*	14,3*	12,7*	12,7*							8,9*	8,9*	
25	Stabilizers raised					13,1	16,8*	9,0	11,9	6,5	8,7	4,8	6,6					4,1	5,7	37' 4"
	4 pt. outriggers down					16,8*	16,8*	14,5*	14,5*	12,7*	12,7*	9,9	11,2*					8,5*	8,5*	
20	Stabilizers raised					12,5	16,6	8,7	11,5	6,3	8,5	4,7	6,5					3,6	5,1	39' 5"
	4 pt. outriggers down					17,6*	17,6*	14,9*	14,9*	12,7	12,8*	9,8	11,2*					8,0	8,3*	
15	Stabilizers raised	18,0*	18,0*	18,2	24,1*	11,6	15,6	8,1	11,0	6,0	8,2	4,6	6,3	3,5	5,0			3,3	4,8	40'10"
	4 pt. outriggers down	18,0*	18,0*	24,1*	24,1*	18,8*	18,8*	15,4*	15,4*	12,3	13,0*	9,6	11,1*	7,7	9,3*			7,5	8,3*	
10	Stabilizers raised	28,7	32,0*	15,8	22,2	10,5	14,3	7,5	10,3	5,6	7,8	4,3	6,1	3,4	4,9			3,1	4,5	41' 6"
	4 pt. outriggers down	32,0*	32,0*	26,8*	26,8*	19,9*	19,9*	15,8	15,9*	11,9	13,2*	9,4	11,0*	7,6	9,0*			7,2	8,1*	
5	Stabilizers raised	3,9*	3,9*	13,6	19,7	9,3	13,1	6,9	9,6	5,2	7,4	4,1	5,8	3,3	4,7			3,1	4,5	41' 7"
	4 pt. outriggers down	3,9*	3,9*	27,9*	27,9*	20,4*	20,4*	15,0	16,0*	11,5	13,0*	9,1	10,7*	7,5	8,4*			7,1	7,4*	
0	Stabilizers raised	4,8*	4,8*	12,3	16,0*	8,5	12,2	6,3	9,1	4,9	7,0	3,9	5,7	3,2	4,7			3,1	4,5	41' 1"
	4 pt. outriggers down	4,8*	4,8*	16,0*	16,0*	19,8*	19,8*	14,4	15,5*	11,1	12,4*	8,9	10,0*	7,3*	7,3*			6,5*	6,5*	
– 5	Stabilizers raised			11,7	15,3*	8,0	11,7	6,0	8,7	4,7	6,8	3,8	5,5					3,3	4,7	39' 5"
	4 pt. outriggers down			15,3*	15,3*	17,7*	17,7*	14,0*	14,0*	10,9	11,2*	8,6*	8,6*					5,9*	5,9*	
–10	Stabilizers raised					7,9	11,6	5,9	8,6	4,6	6,7							3,9	5,7	34' 1"
	4 pt. outriggers down					14,3*	14,3*	11,6*	11,6*	9,0*	9,0*							6,9*	6,9*	

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

The lift capacities on the stick end without attachment are stated in lb x 1,000 and are valid on a firm, level supporting surface with blocked oscillating axle. These capacities can be slewed through 360° with the undercarriage in the transverse position. Capacities in the longitudinal position of the undercarriage (+/– 15°) are specified over the steering axle with the stabilizers raised and over the rigid axle with the stabilizers down. Indicated loads based on the ISO 10567 standard and do not exceed 75 % of tipping or 87 % of hydraulic capacity. The lift capacity of the unit is limited by its stability, the lifting capability of the hydraulic elements, or the maximum permissible lifting capacity of the load hook.

LH 30 C EW – Attachment GA12

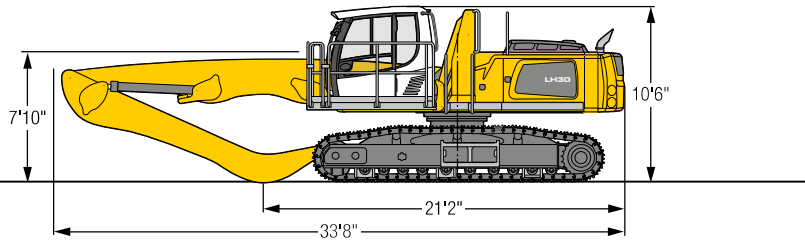


Operating Weight and Ground Pressure

The operating weight includes the basic machine with hydr. cab elevation, straight boom 22'4", angled stick 16'5" and grab GM 65/0.78 yd³ semi-closed tines.

Weight	67,500 lb
Pad width	24"
Ground pressure	on request

Dimensions



ft	Undercarriage	10 ft		15 ft		20 ft		25 ft		30 ft		35 ft		40 ft		45 ft				ft in
45	EW																			
40	EW			17,3*	17,3*													14,3*	14,3*	**17' 5"**
35	EW					17,2*	17,2*	11,5*	11,5*									11,4*	11,4*	**25' 1"**
30	EW					17,4*	17,4*	15,2*	15,2*									10,2*	10,2*	**30'**
25	EW					17,5*	17,5*	15,1*	15,1*	13,3*	13,3*							9,6*	9,6*	**33' 5"**
20	EW			21,7*	21,7*	18,1*	18,1*	15,4*	15,4*	13,4*	13,4*	11,0	11,4*					9,3*	9,3*	**35'10"**
15	EW	20,9*	20,9*	24,5*	24,5*	19,3*	19,3*	15,9*	15,9*	13,5*	13,5*	10,9	11,4*					9,3*	9,3*	**37' 5"**
10	EW	42,1*	42,1*	27,3*	27,3*	20,5*	20,5*	16,4*	16,4*	13,5	13,6*	10,7	11,2*					9,4	9,4*	**38' 2"**
5	EW	5,7*	5,7*	28,7*	28,7*	21,0*	21,0*	16,5*	16,5*	13,2	13,3*	10,5	10,7*					8,6*	8,6*	**38' 5"**
0	EW	6,2*	6,2*	21,7*	21,7*	20,3*	20,3*	15,8*	15,8*	12,6*	12,6*	9,7*	9,7*					7,5*	7,5*	**37'11"**
– 5	EW			19,8*	19,8*	18,1*	18,1*	14,2*	14,2*	11,0*	11,0*	7,8*	7,8*					7,0*	7,0*	**36'**
–10	EW					14,3*	14,3*	11,3*	11,3*									8,7*	8,7*	**29' 5"**

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

The lift capacities on the stick end without attachment are stated in lb x 1,000 and can be slewed through 360° on a firm, level supporting surface. Capacities are valid for 24" wide triple grouser pads. Indicated loads based on the ISO 10567 standard and do not exceed 75 % of tipping or 87 % of hydraulic capacity. The lift capacity of the unit is limited by its stability, the lifting capability of the hydraulic elements, or the maximum permissible lifting capacity of the load hook.

– Make sure there are no persons in area around machine.

Lightning strike

– Remain in operator's cab.
– Do not leave machine until all components are voltage-free.

Contact with high voltage cable

– Do not move machine and working attachment.
– Remain in operator's cab.
– Do not leave machine until all components are voltage-free.
– Make sure that all persons stay away from the machine and the high voltage cable.
– Have voltage switched off.

Damage

Incorrect operation in operating conditions deviating from intended use

– Equip machine according to operating conditions.

Following operating conditions deviate from intended use:
– Dust intensive applications
– Contaminated areas
– Lower or higher ambient temperatures

Incorrect operation in corrosive environment or with corrosive material

– Regularly clean machine to remove corrosive materials (for example salt, phosphate, fertiliser).
– Treat metallic surfaces with conservation wax if necessary.
– Derust, prime and repaint damaged and corroded steel parts.
– Make sure that piston rods of hydraulic cylinders are coated completely with an oil film.
– If piston rods are not coated completely with an oil film: Retract and extend piston rods along the entire stroke.
– If it is not possible to retract and extend the piston rods along the entire stroke: Clean and conserve piston rods.

2.2.5 Disposal

Danger to life

Unapproved disposal of gas containers and pressure vessels

– Before disposal, completely depressurise pressure vessel.
– Before disposal, professionally empty pressure vessel.
– Adhere to safety instructions of pressure vessel manufacturer.

Unapproved disposal of refrigerant

– Have refrigerant disposed of by refrigerant recycling point.
– Adhere to safety data sheet of refrigerant during disposal.

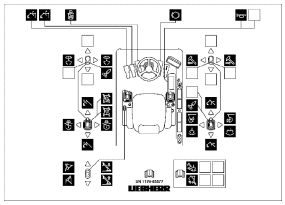
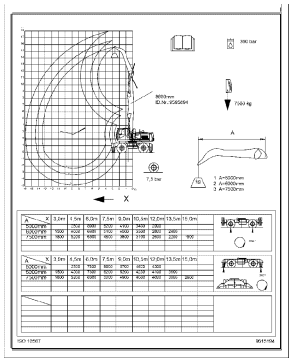
LHB/122139/76/01/2020-02-10/en

Sign	Description
	**Danger of collision during transport** Applies to machines with energy recuperation cylinder. Danger from unexpected movements of working attachment during transport.
	**Avoiding engine damage** Indicates maximum permitted sulphur content in fuel.

Tab. 8: Safety signs (USA)

2.4.2 Information signs

These signs contain information about:
- Machine operation
- Machine maintenance
- Machine characteristics

Sign	Description
	**Control description sticker** Indicates functions of unmarked control elements.
	**Control changeover** Indicates modified control elements by activating the “control changeover” option.
	**Load lift chart** Indicates approved load capacities at the end of the stick in dependence on the reach.

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– 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.

2.7.5 Machine danger zone

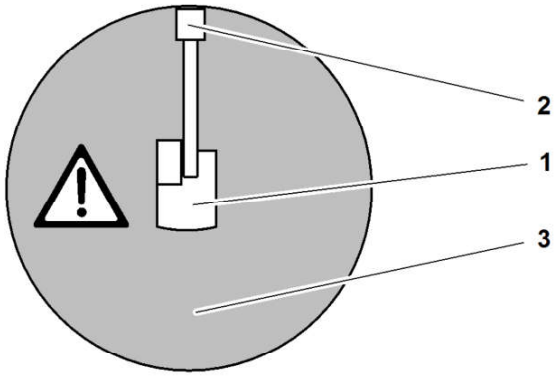

Fig. 58: Machine danger zone (view from above)

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.

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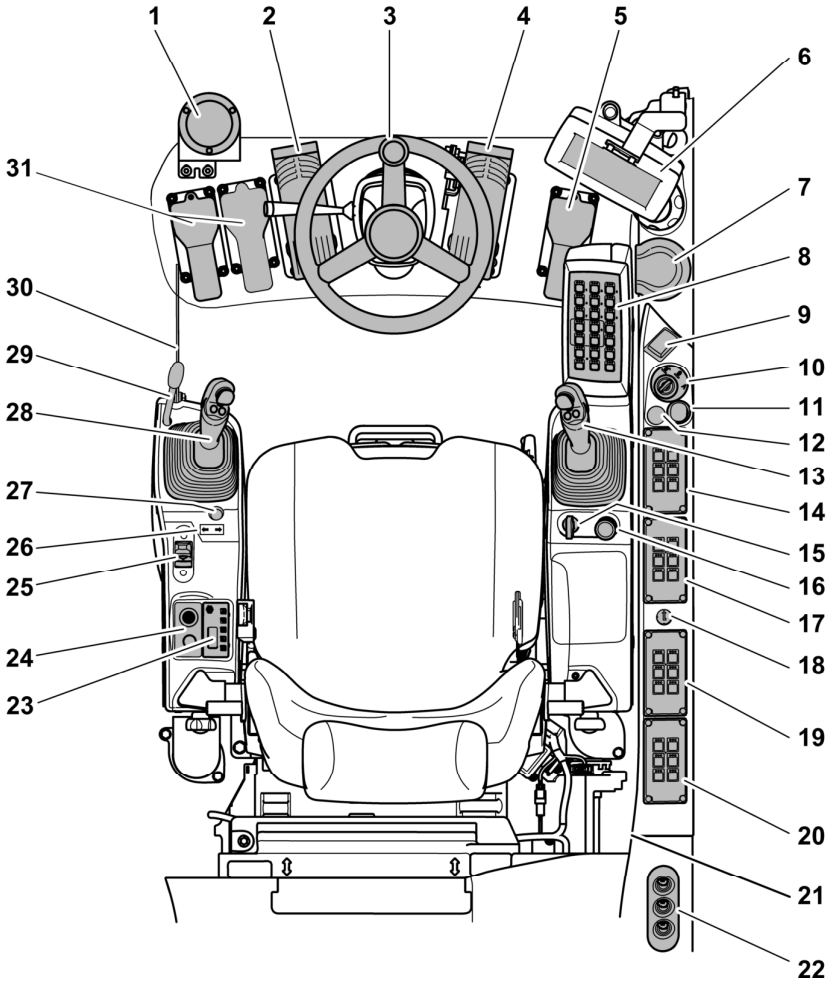

Fig. 59: Overview of operator's platform

1	Circular spirit level[1)]	**17**	Control unit C
2	Slewing brake[1)]	**18**	Confirmation button
3	Steering wheel[1)]	**19**	Control unit D
4	Service brake	**20**	Control unit E
5	Travelling pedal	**21**	Socket (12 V)
6	Display	**22**	Key switch[1)]
7	Drink holder	**23**	Control unit of auxiliary heater[1)]
8	Control unit A	**24**	Exterior mirror control[1)]
9	Adjusting lever for operator's cab (two-way adjustable cab)[1)]	**25**	Adjustment lever for operator's cab or support[1)]
10	Oscillating axle switch	**26**	Turn signal switch[1)]
11	Emergency cut-off switch or emergency stop button[1)]	**27**	Unlocking button for folding console
12	Control, magnetic crossbeam[1)]	**28**	Left joystick

See next page for continuation of the image legend

[1)] Option

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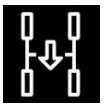
Symbol	Description	Symbol	Description
	Retracting side frames		Travelling right
	Travelling forward		Turning travel gear left on the spot
	Travelling forward and backward		Turning travel gear right on the spot
	Travelling backwards		

Tab. 18: Crawler excavator travel mode

Rail excavator travel mode

Symbol	Description	Symbol	Description
	Travelling forward		Travelling backwards

Tab. 19: Rail excavator travel mode

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Symbol	Meaning
	Backward Stability; shut-off initiated

Tab. 24: Status symbols of slewing gear

Height-adjustable cab

Symbol	Meaning
	Adjusting operator's cab blocked
	Lifting operator's cab blocked
	Lowering operator's cab blocked
	Automatic mode for upper park position
	Automatic mode for lower park position
	Operator's cab; neutral position required
	Boom line break safety open
	Hoist cylinder protection switched off
	Stick cylinder protection switched off
	Inclination cylinder protection switched off
	Adjusting cab inclination blocked

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▷ Air conditioning control settings are restored.

ECON mode

ECON mode is used to save fuel. The cooling function is switched off in ECON mode.

The cab temperature is exclusively controlled by heating or ventilation.

▶ Press *ECON* button.
▷ *ECON* button lights up green.

Operation using control unit

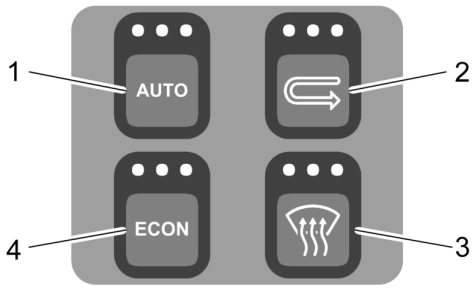

Fig. 387: Keys on control unit

1 *Automatic mode* button
2 *Recirculated air* button
3 *Defrosting and defogging* button
4 *ECON* button

When function is switched on, all LEDs on corresponding key light up.

▶ Switch on or switch off functions: Press *automatic mode* button **1**, *recirculated air* button **2**, *defrosting and defogging* button **3** or *ECON* button **4**.

Air conditioning in emergency mode

Malfunctions in the air conditioning control have the following results:
– Functions are not displayed.
– Temperature display is replaced with a bar chart display.
– Error messages are shown on the display.

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3.2.20 *Time zone* submenu

Menu call:  > >

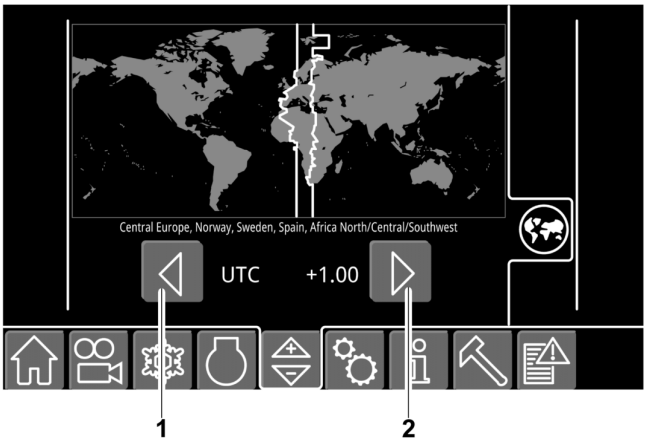

Fig. 420: Time zone submenu

1 *Moving time zone to west* button **2** *Moving time zone to east* button

3.2.21 *Time format and date format* submenu

Menu call:  > >

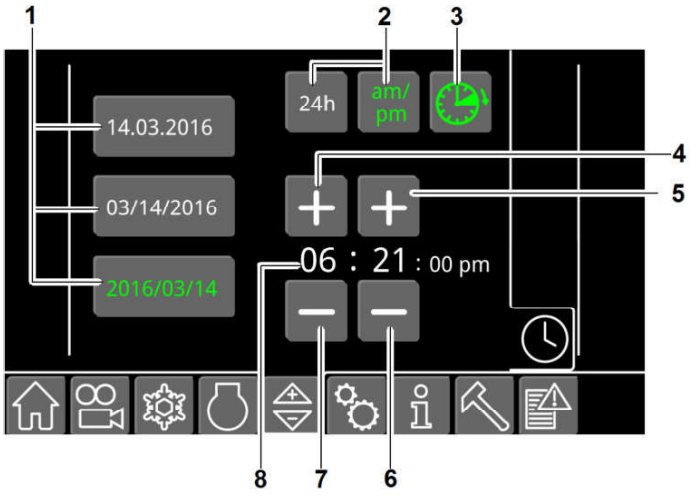

Fig. 421: Time format and date format submenu

1 *Date format* buttons
2 *Time format* buttons
3 *Summer time or winter time* button
4 *Setting hours forward* button
5 *Setting minutes forward* button
6 *Setting minutes backward* button
7 *Setting hours backward* button
8 Set time format

▶ Select time format and date format: Press corresponding buttons.
▷ Selected time format and date format are displayed in green.

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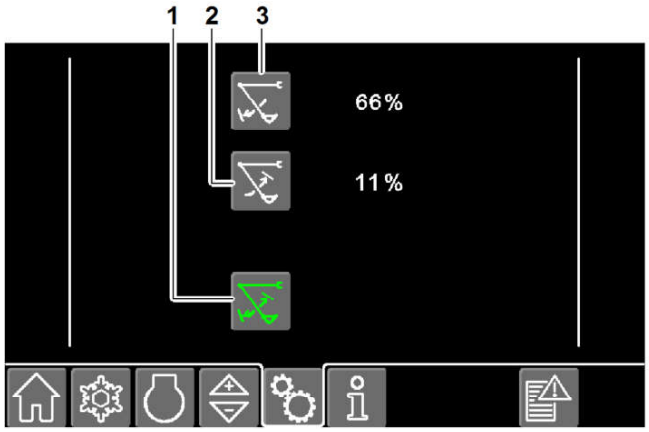

Fig. 458: Stick cylinder shut-off submenu

1 *Activating stick cylinder shut-off* button
2 *Upper shut-off point* button
3 *Lower shut-off point* button

In machines without *activating stick cylinder shut-off* button **1** the stick cylinder shut-off is always activated.

▶ Activate stick cylinder shut-off: (For more information see: 3.5.1 Stick cylinder shut-off (option), page 193)

3.2.31 *Hoist cylinder shut-off* submenu (option)

Menu call: >

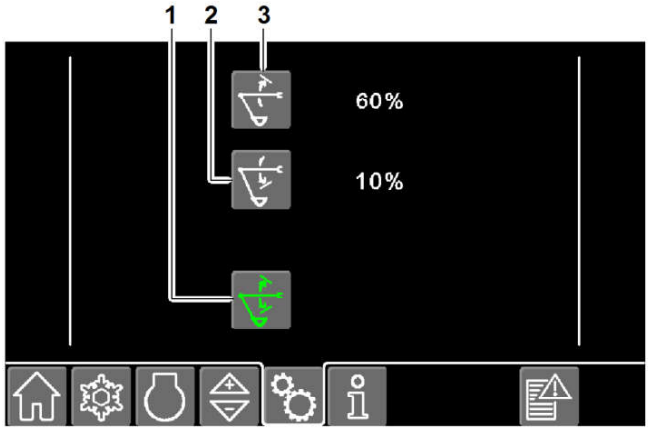

Fig. 459: Hoist cylinder shut-off submenu

1 *Activating hoist cylinder shut-off* button
2 *Lower shut-off point* button
3 *Upper shut-off point* button

▶ Activate hoist cylinder shut-off: (For more information see: 3.5.2 Hoist cylinder shut-off (option), page 196)

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3.3 Control

3.3.1 Battery main switch

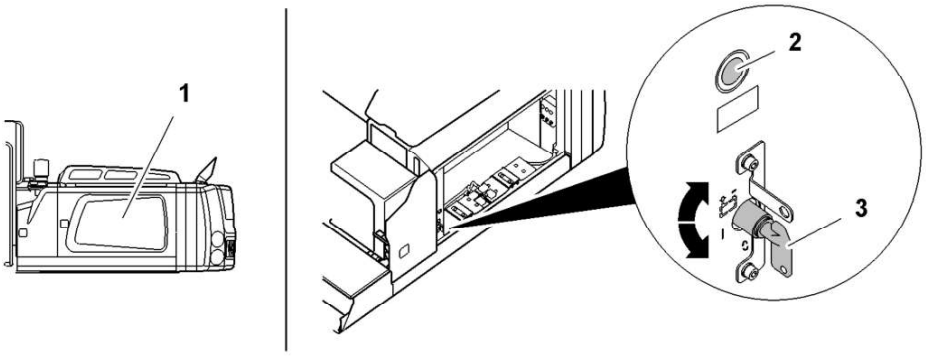

Fig. 482: Battery main switch

1 Service hatch
2 Indicator light of SCR system
3 Battery main switch

Symbol	Switch position	Function
	0	Off
	I	On

Tab. 41: Battery main switch

Switching on power supply

▶ Open service hatch **1**.

▶ Turn battery main switch **3** to I.
▷ Machine's electrical system is supplied with voltage.

▶ Close service hatch **1**.

Switching off power supply

NOTICE
Unapproved switch-off of power supply!
Damage to machine.

▶ Make sure that preconditions for switching off power supply are met.

Make sure that following preconditions are met before switching off power supply:
❑ 1 minute waiting time after diesel engine shut-off is adhered to.
❑ Auxiliary heater is not active.
❑ Indicator light of SCR system **2** is off.

▶ Open service hatch **1**.

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Mechanically adjustable operator's seat (option)

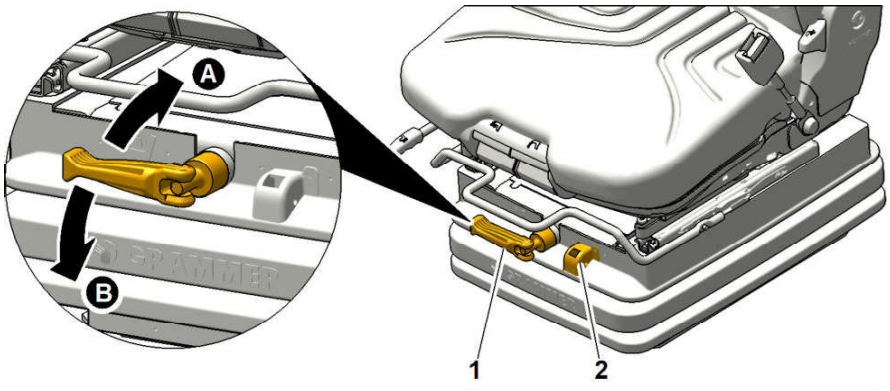

Fig. 504: Mechanically adjustable operator's seat

A Increase
B Reduce
1 Adjustment lever
2 Display

▶ Sit on operator's seat.

▶ Adjust with adjustment lever **1** until display **2** is green.

Automatically adjusting operator's seat

Operator's seat with mechanical adjustment (option)

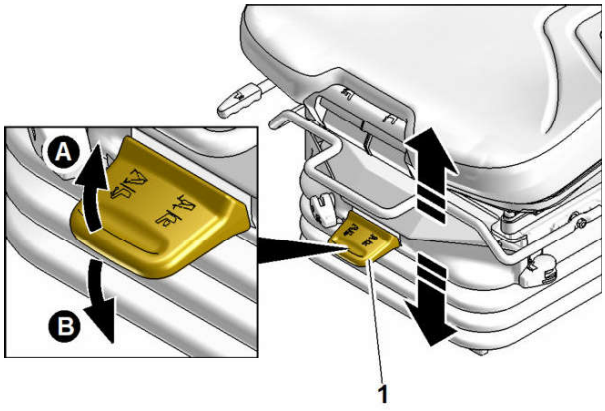

Fig. 505: Operator's seat with mechanical adjustment

A Increase
B Reduce
1 Adjustment lever

▶ Sit on operator's seat.

▶ Turn ignition key to **I**. (For more information see: 3.3.10 Ignition key, page 134)
▷ Operator's seat adjust automatically.

▶ Ensure that automatic adjustment is completed.

▶ If necessary, adjust operator's seat with adjustment lever **1**.

▶ If operator changes, adjust operator's seat with adjustment lever **1**.

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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.

Upper windscreen

NOTICE
Windscreen collides with steering wheel!
Damage to windscreen.

▶ Make sure that steering column is swivelled away from windscreen during opening and closing.

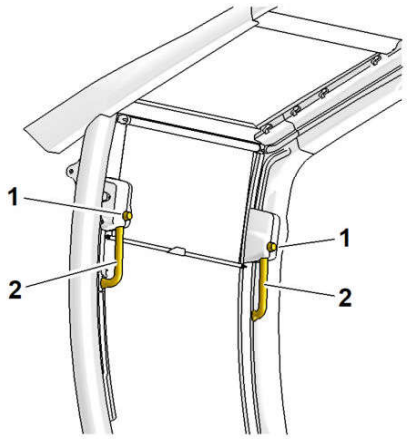

Fig. 531: Upper windscreen

1 Knob **2** Handle

Opening upper windscreen

Make sure the following preconditions are met:
❑ Steering column is swivelled away from windscreen.

▶ Unlock upper windscreen: Press knobs **1** simultaneously.

▶ Push upper windscreen upwards with handles **2** and pull back until it engages in roof of operator's cab.

▶ Swivel steering column into working position.

Closing upper windscreen

Make sure the following preconditions are met:
❑ Steering column is swivelled away from windscreen.

▶ Unlock upper windscreen: Press knobs **1** simultaneously.

▶ Pull upper windscreen forwards and downwards with handles **2** until it engages in front in operator's cab.

▶ Swivel steering column into working position.

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3.4.2 Refuelling

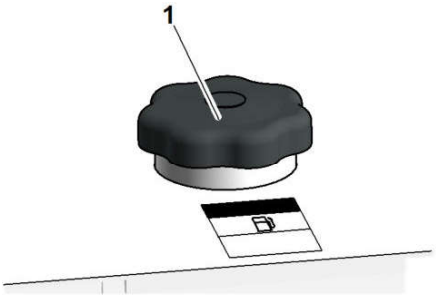

Fig. 570: Fuel tank

1 Tank lid

DANGER
Explosion of highly flammable fuel!
Danger to life.

- ▶ Avoid naked flames.
- ▶ Do not smoke.

Note
Sulphur content of fuel affects change interval of engine oil and oil filter.

- ▶ Adhere to sulphur content of fuel and change intervals of engine oil. (For more information see: Difficulty factors, page 291)

If sulphur content of fuel is not known:

- ▶ Determine sulphur content with oil analysis set.

3.4.3 Refuelling with electric refuelling pump (option)

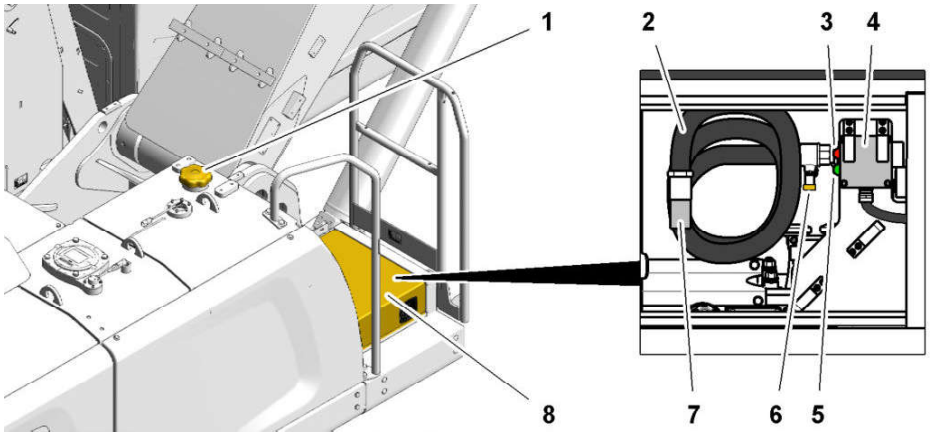

Fig. 571: Electric refuelling pump

1 Tank lid
2 Suction hose
3 *Switching off refuelling pump* button
4 Remote control
5 *Switching on refuelling pump* button
6 Stop cock
7 Protective cap
8 Hatch

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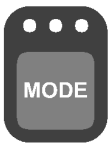
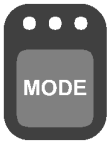
Operating mode			Application
Key	Status of LEDs	Mode	
	☀ ○ ○	S (SENSITIVE)	For especially precise work or lifting loads.
	○ ☀ ○	E (ECO)	For particularly economical and environmentally friendly work.
	○ ○ ☀	P (POWER)	For high transfer loading performance and heavy-duty applications.
	☀ ☀ ☀	P+ (POWER PLUS)	For maximum load handling performance and heavy-duty applications.

Tab. 49: Operating modes

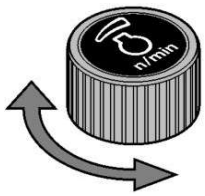
Operating mode S, E and P

Selecting operating mode with *MODE* key



▶ Press *MODE* key until required operating mode is active.
  ▷ Control selects speed step for selected operating mode.
  ▷ Operating mode appears on the display.
  ▷ LEDs in *MODE* key display selected operating mode.

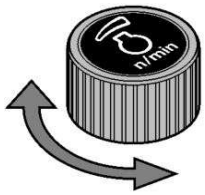
Selecting operating mode with engine speed controller



▶ Turn engine speed controller to right or left.
  ▷ Control selects operating mode for selected speed step.
  ▷ Operating mode appears on the display.
  ▷ LEDs in *MODE* key display selected operating mode.

Operating mode P+

Operating mode P+ corresponds to speed step 10+. Operating mode P+ can exclusively be selected with engine speed controller.



▶ Select operating mode P+: Turn engine speed controller to right.
  ▷ Operating mode appears on the display.
  ▷ LEDs in *MODE* key display selected operating mode.

▶ Exit operating mode P: Press *MODE* key.
  or

  Turn engine speed controller to left.

Engine speed and operating mode after starting machine

After starting the machine speed step 1 is preset.

In *Mode* key LEDs for the most recently activated operating mode flash.

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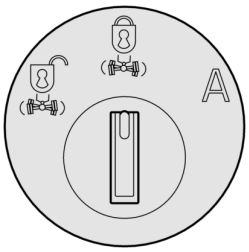
▶ Push *switching off travel alarm* switch.
or

Press *deactivating travel alarm* button.
▷ Warning sound stops after 10 s.

3.4.21 Locking and unlocking oscillating axle

Setting operating mode

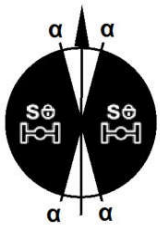
Switch position		Operating mode
		Oscillating axle is unlocked.
		Oscillating axle is locked.
		Oscillating axle support automatic, locking mechanism of service brake automatically locks oscillating axle.

Tab. 58: Oscillating axle switch switch position

▶ Set operating mode according to driving situation. (For more information see: 3.6.3 Travelling at operating location, page 223) (For more information see: 3.6.4 Travelling with load at operating location, page 224)
or

Set operating mode according to working situation. (For more information see: Putting machine with wheeled undercarriage with two axles in working position, page 222)

Locking and unlocking oscillating axle according to angle of rotation



The behaviour of the oscillating axle corresponds to the operating mode selected on the oscillating axle switch within the white slewing area (±α).

Within the black area the oscillating axle is locked.

Oscillating axle switch and service brake		Angle of rotation of uppercarriage	Effect on oscillating axle	Symbol on the display
Unlocked		α < 15°	Oscillating axle is unlocked.	-
		α > 15°	Oscillating axle is locked by angle-controlled oscillating axle locking.	

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▶ Release left joystick.

▶ Press *slewing brake* switch **1** to position **A**.

If two LEDs in *slewing brake* key flash:

▶ Wait until LEDs in *slewing brake* key light up.
  ▷ Uppercarriage is locked.

Deactivating locking mechanism

Deactivating locking mechanism with joystick

▶ Move left joystick to left or to right.

Deactivating locking mechanism with switch

▶ Press *slewing brake* switch **1** to position **A**.
  ▷ LEDs in *slewing brake* key go out.
  ▷ Uppercarriage can be turned.

Locking uppercarriage automatically

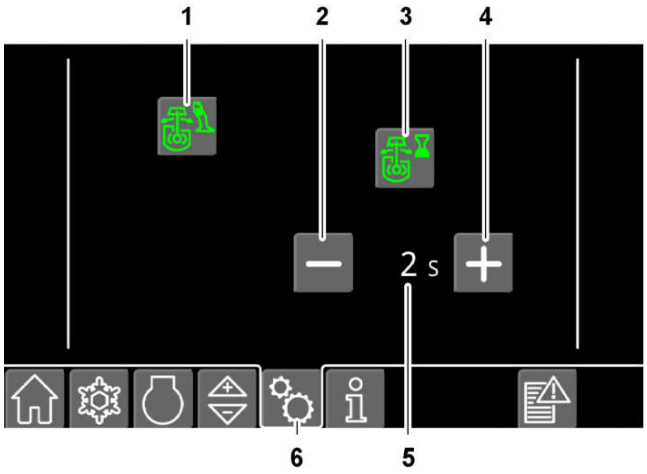

Fig. 672: Comfort slewing brake menu: Automatic mode

1	*Semi-automatic* button	**4**	*Increasing locking time* button
2	*Reducing locking time* button	**5**	Locking time
3	*Automatic* button	**6**	*Function settings* menu button

After the locking time has elapsed the comfort slewing gear locks the stationary uppercarriage.

Note
Different machine configuration!

▶ Observe control description sticker.

Switching on automatic

▶ Press *function settings* menu button **6**.

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▷ Holding force of magnet increases.

▶ Wait until magnet has reached required holding force and lift load.

▶ Release *magnet* button **2**.
▷ Magnet has maximum holding force.

▶ Carefully move working attachment.

▶ Put down load.

Deactivating magnet with sorting function (option)

▶ Press and hold *magnet* button **2**.
▷ Holding force of magnet drops.

▶ Wait until magnet has reached required holding force.

▶ Release *magnet* button **2**.
▷ Magnet has maximum holding force.

▶ Press *magnet* button **2** again.

Switching off magnet system

▶ Press *magnet system* key on control unit A. (For more information see: 3.1.2 Control unit A, page 61)
▷ LEDs in *magnet system* key go out.
▷ Magnet system is switched off.

3.4.36 Reversible fan drive for radiator cleaning (option)

NOTICE
Incorrect use of reversible fan drive for radiator cleaning!
Damage to machine.

▶ Check air intake area before starting work and remove stubborn contamination.

Status symbol	Meaning
	Reversible fan drive blocked: Time distance for repeated switching on is too short.
	Reversible fan drive blocked: Coolant temperature is too high.

Tab. 70: Reversible fan drive blocked status symbol

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3.5.3 Stick cylinder shut-off for heavy working tool (option)

Stick cylinder shut-off for heavy working tool has the following advantages:
– Limits the movement of the working attachment.
– Machine stability is increased.

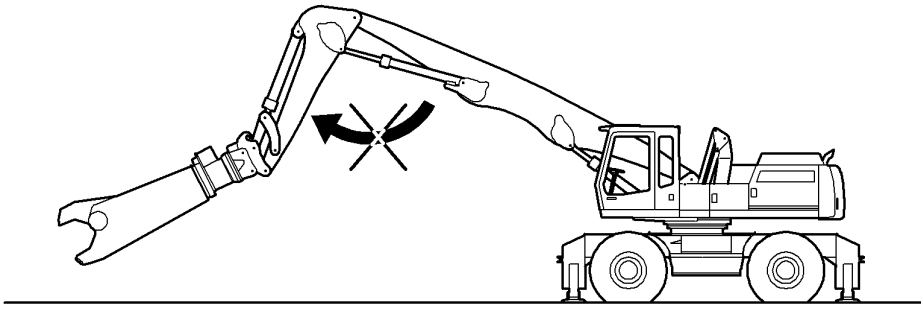

Fig. 753: Stick cylinder shut-off for heavy working tool

Automatic activation of stick cylinder shut-off for heavy working tool

The stick cylinder shut-off for heavy working tool is activated automatically when one of the following actions is performed:
– Turn ignition key to position 1.
– Activate safety lever.
– Activate quick coupler.

Display

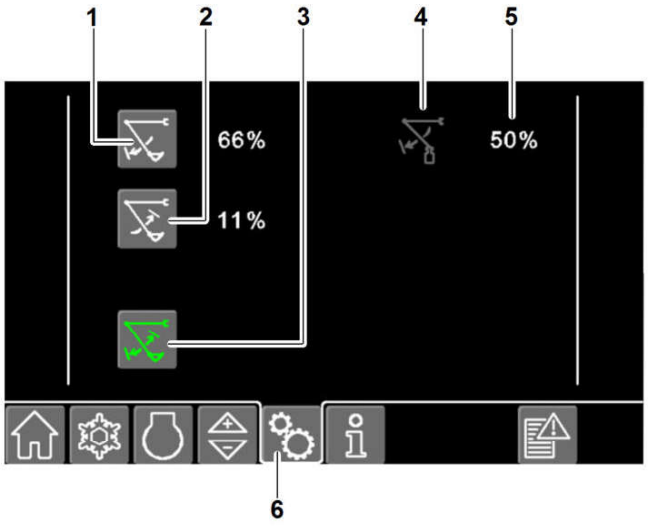

Fig. 754: Stick cylinder shut-off menu

1 Shut-off point for extending stick

2 Shut-off point for retracting stick

4 *Stick cylinder shut-off for heavy working tool* symbol

5 Value to stick cylinder shut-off for heavy working tool

See next page for continuation of the image legend

Note
Moving contour stops the movement of working attachment!

▶ Enable stick movement: Lower working attachment.

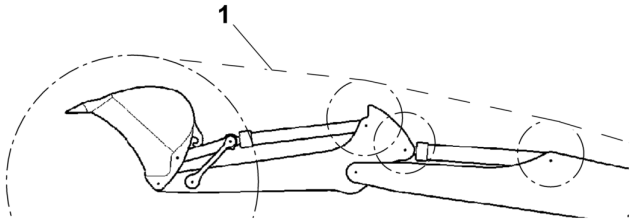

Fig. 782: Moving contour

1 Moving contour

The moving contour considers the arrangement of the working attachment:
- Hydraulic lines
- Electrical cables
- Hydraulic cylinders
- Line break safeties
- Movement radii of working attachment
- Movement radius 5‘ 9“ ft-in of largest Liebherr bucket

Note

If change to movement radius is necessary:
▶ Contact Liebherr customer service.

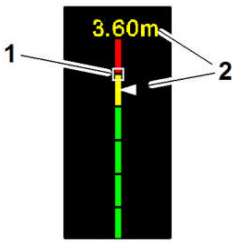

Fig. 783: Scale in height limitation menu

1 Set limit value

2 Current height of working attachment

Scale	Status symbol	Meaning
Font colour of current height of working attachment **2** is green. Arrow is in green area of scale.		Working attachment is moving in safe area.
Font colour of current height of working attachment **2** is yellow. Arrow is in yellow area of scale.		Working attachment is moving close to set limit value. Speed of movement of working attachment is reduced.

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▷ Load moment limitation is bypassed for 10 seconds.
▷ Intermittent warning sound sounds.

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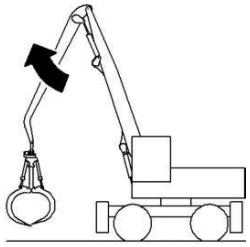
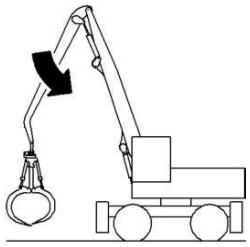
Extending stick

Hand gesture	Banksman	Machine
Extend forearm forward. Close fingers. Extend thumb sideways, away from body.		

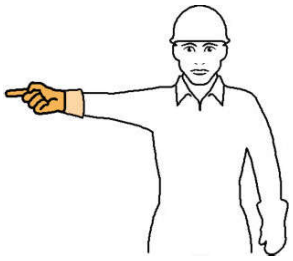
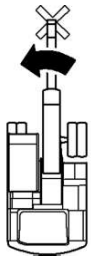
Tab. 87: Extending stick

Retracting stick

Hand gesture	Banksman	Machine
Extend forearm forward. Close fingers. Extend thumb sideways, towards body.		

Tab. 88: Retracting stick

Turning uppercarriage to the left

Hand gesture	Banksman	Machine
Extend arm sideways, in direction of rotation. Close fingers. Extend index finger.		

Tab. 89: Turning uppercarriage to the left

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3.9 Transport

3.9.1 Preparatory work

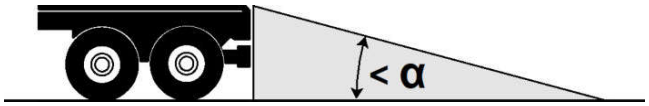

Fig. 851: Loading ramp

Make sure the following preconditions are met:
- ❑ Loading ramp is designed for required load capacity.
- ❑ Inclination angle α of loading ramp is smaller than 10°.
- ❑ Loading ramp is clean, free from snow and free from ice.
- ❑ Loading surface of low-loader is clean, free from snow and free from ice.

▶ Make sure that machine is clean, free from snow and free from ice.

▶ Make sure that machine is free from loose objects.

If machine exceeds permitted dimensions for transport:

▶ Contact Liebherr customer service.

▶ Place non-slip mats as per EN 12195-1 on loading surface of low-loader.

▶ Observe national regulations on transport.

Note

If it is not clear whether machine is suitable for transport:

▶ Contact Liebherr customer service.

3.9.2 Driving machine onto low-loader

Make sure the following precondition is met:
- ❑ Low-loader is suitable for transport and approved.

Note

Different machine configuration!

▶ Adhere to control description sticker in operator's cab. (For more information see: 3.1.5 Symbols on control description sticker, page 63)

DANGER

Machine tipping over!
Danger to life.

▶ Work with spotter.

▶ Adhere to swapped steering directions.

If working attachment is too large for transport:

▶ Have working attachment removed by Liebherr customer service. (For more information see: 3.7.3 Installing and removing boom, page 238)

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NOTICE
Not approved load!
Damage to transmission.

- ▶ Do not switch gears in uncoupled state.
- ▶ Do not operate travelling pedal in uncoupled state.

- ▶ Mount adapter **4** on grease gun **5**.
- ▶ Connect adapter **4** to emergency release connection **3**.
- ▶ Inject grease until grease emerges from the pressure relief valve **1**.
  ▷ Transmission is uncoupled.

Connecting transmission

- ▶ Loosen drain plug **2** with wrench and unscrew until grease emerges.
- ▶ Start diesel engine.
- ▶ Operate service brake (pedal).
- ▶ Press *parking brake* key.

- ▶ Press *gear step* key several times.
  ▷ Grease emerges from drain plug **2**.

- ▶ Observe drain plug **2**.

If no more grease emerges:
- ▶ Shut off diesel engine.
- ▶ Tighten drain plug **2**.
  ▷ Transmission is coupled.

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Malfunction / error	Cause	Remedy
Coolant temperature is too high.	There is too little coolant.	Fill with coolant.
	Radiator is soiled on the outside.	Clean radiator.
	Radiator is contaminated from inside or calcified.	Contact Liebherr customer service.
	Thermostat is defective.	Check thermostat. If thermostat is defective, contact Liebherr customer service.
	Transducer of coolant temperature is defective.	Check transducer. If transducer is defective, contact Liebherr customer service.
	Fan speed too low (hydrostatic fan drive).	Check fan drive. If fan drive is defective, contact Liebherr customer service.
Diesel engine does not reach full speed.	Engine speed is not set to maximum value.	Select higher speed step or different operating mode.
	Injection system is not set correctly.	Contact Liebherr customer service.
	Air filter is contaminated.	Clean or replace air filter.
	Fuel supply is too low.	Clean or replace fuel fine filter. Check fuel lines.
	There is water in the fuel.	Drain water from the fuel tank.
Charge indicator symbol is displayed when the diesel engine is running.	Tension of ribbed V-belt is inadequate.	Check tension of ribbed V-belt. Tension ribbed V-belt if necessary.
	Cable connections are loose.	Attach cables.
	Cable connections are disconnected.	Connect or replace cables.
	Generator, rectifier or controller is defective.	Contact Liebherr customer service.
Engine oil pressure is too low.	Oil level is too low.	Shut off diesel engine immediately and fill in engine oil.
	Oil pressure switch is defective.	Shut off diesel engine immediately and contact Liebherr customer service.
Diesel engine is losing oil.	Diesel engine has a leak.	Contact Liebherr customer service.
Diesel engine oil consumption is too great.	Compression is inadequate.	Contact Liebherr customer service.
Smoke development: Exhaust is grey or black.	Air filter is contaminated.	Clean or replace air filter.
	Injection nozzles are defective.	Contact Liebherr customer service.
	Turbocharger is defective.	Contact Liebherr customer service.
Smoke development: Exhaust gases are white (water vapour).	Water is entering the combustion chamber.	Contact Liebherr customer service.
	Injection system is not set correctly.	Contact Liebherr customer service.
	Pre-heat system is defective.	Contact Liebherr customer service.

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Relay	Consumer
K13	Beacon rotary stage
K14	Right headlight
K15	Diesel engine sensors power supply
K16	Auxiliary heater
K17	Magnet system ON
K18	Power supply auxiliary heater
K19	Not used
K20	Not used
K21	Not used
K22	Switchable socket
K23	Brake light
K24	Not used
K30	Main relay, terminal 15
K31	Heater flange

Tab. 107: Electric cabinet A214

4.3.2 Operator's platform fuses and relays

DANGER
Components under voltage!
Danger to life.

▶ Before working on electrical system, switch off power supply.

DANGER
Bypassed fuses!
Danger to life.

▶ Replace defective fuses.

▶ Exclusively use genuine fuses.

▶ Do not bypass defective fuses.

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Inspection and maintenance schedule

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
						❄		Coolant: Check the concentration (at least once a year).		
						❍6000 h		Cooling system: Change coolant Liebherr Antifreeze OS (at least every four years).		
Working hydraulics										
		●	❍	❍	❍	✦		Hydraulic tank: Check oil level.		344
			❍	❍	❍	✦		Hydraulic tank: Drain water and sediments (after stationary time of over 6 months).		347
						✧		Hydraulic tank: Perform oil analysis. (at least once a year (For more information see: Oil analysis, page 294)).		
						✧		Hydraulic tank: Change oil. (For more information see: Oil change, page 295)		
					❍			Hydraulic tank: Replace breather filter. (additionally at every hydraulic oil change (For more information see: Filter replacement, page 294))		
		■	❍	❍	❍			Return filter: Check and clean magnetic rod. (once a week for the first 300 operating hours)		349
			☐	❍	❍	✧		Return filter: Replace filter cartridge. (additionally at every hydraulic oil change (For more information see: Filter replacement, page 294))		
		●	❍	❍	❍			Bypass filter (option): Check degree of contamination of filter cartridge.		350
						✧		Bypass filter (option): Replace filter cartridge. (For more information see: Filter replacement, page 294)		
						✧		Bypass filter (option) integrated in return filter: Replace filter cartridge. (For more information see: Filter replacement, page 294)		
			❍	❍	❍			Control oil unit: Replace filter cartridge.		
			❍	❍	❍			Supply pump: Replace filter cartridge.		
						❍3000 h		High-pressure filter: Replace filter cartridge.		
						✧		Replace hydraulic hoses.		
Steering system										
☐				❍	❍			Steering: Check function and tightness.		
				❍	❍			Steering: Check condition and mounting.		
Brake system										
			❍	❍	❍			Service brake and parking brake: Check function and effect.		

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5.3.4 Engine oils

Liebherr recommendation for stage IV / Tier 4f and stage V diesel engines

Description
Liebherr Motoroil 5W-30
Liebherr Motoroil 5W-30 low ash [27)]

Tab. 120: Liebherr recommendation

Other approved engine oils[28)]

Description
Liebherr Motoroil 10W-40
Liebherr Motoroil 10W-40 low ash [27)]

Tab. 121: Other approved engine oils

Minimum quality requirements

Specification
LH-00–ENG3A LA[27)]
ACEA E6, ACEA E9, API CJ-4

Tab. 122: Minimum quality requirements

If engine oils from a third party manufacturer are used, information on change intervals must be obtained from respective manufacturer or supplier.

Liebherr recommendation for other emission stages

Diesel engine power	Performance category
To 129 KW	Power band I as per Regulation ECE-R.96 (stage 3A, TIER III, CHINA III equivalent)
From 130 KW	Power band H as per Regulation ECE-R.96 (stage 3A, TIER III, CHINA III equivalent)

Tab. 123: Liebherr recommendation for other emission stages

Description
Liebherr Motoroil 10W-40

Tab. 124: Liebherr recommendation

[27)] For machines with diesel particulate filter use low ash engine oil.
[28)] Adhere to change interval.

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5.4 Access points for maintenance work

5.4.1 Access points on uppercarriage

General overview

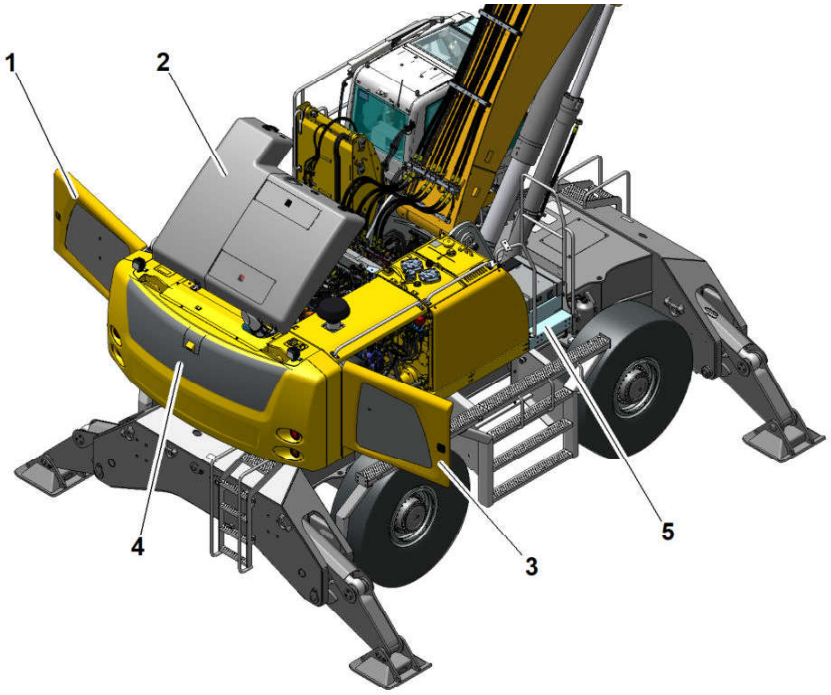

Fig. 951: Access points on uppercarriage

No.	Access point	Access to
1	Left side door	Battery main switch, batteries, fuse box, electric cabinet, radiator, condenser
2	Engine bonnet	Diesel engine, coolant container, fuel pre-filter, fuel fine filter, oil filter
3	Right side door	Hydraulic pumps, servo control unit, air filter
4	Cover plate	Exhaust muffler, diesel particulate filter, SCR module
5	Cab access	Fuel tank, diesel exhaust fluid tank, cab access, hydraulic tank, grease container, engine bonnet

Tab. 150: Access points on uppercarriage

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5.6.4 Cleaning fan and radiator

DANGER
Explosion of highly flammable gases!
Danger to life.

- ▶ Make sure that degassing hoses are laid correctly.
- ▶ Do not clean battery area with compressed air.
- ▶ Avoid naked flames.
- ▶ Do not smoke.

WARNING
Hot parts!
Burns.

- ▶ Make sure that diesel engine has cooled down before starting work.

WARNING
Moving parts!
Injuries.

- ▶ Make sure that all parts have stopped moving before starting work.

- ▶ Shut off diesel engine.
- ▶ Clean radiator fins and fan wheel with compressed air.
- ▶ Blow from the inside of the machine to the outside.

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Reason	Definition	Additional task
Damage	Damage has occurred in a component.	Enter nature of damage.
Other reason	None of the above reasons apply.	Enter reason.

Tab. 158: Reason for analysis

Sampling

▶ Enter date of sampling.

Last oil change

▶ Enter date of last oil change.

Top-up volume

If oil has been topped up since last oil change:
▶ Enter topped-up volume in litres.

Oil service life

▶ Tick specification (see: tab. 159, page 320) .

▶ Enter oil service life.

▶ Enter machine operating time.

Definition	Stated in
Fuel or operating fluid sample taken from drive train component	Hours
Fuel or operating fluid sample taken from machine after long downtime	Months and years

Tab. 159: Oil service life

Oil changed

If oil is changed after fuel or operating fluid sample has been taken:
▶ Tick yes.

If oil is not changed after fuel or operating fluid sample has been taken:
▶ Tick no.

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5.8.6 Air filter: Replacing main filter cartridge

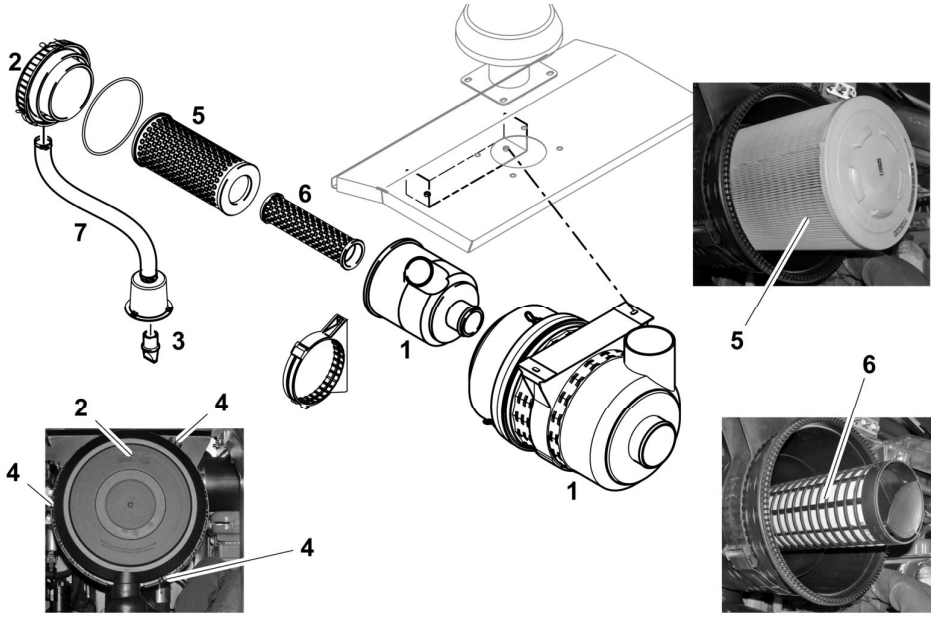

Fig. 974: Air filter: Replacing main filter cartridge

1	Filter housing	**5**	Main filter cartridge
2	Bowl with prefilter	**6**	Safety filter cartridge
3	Dust dump valve	**7**	Air hose
4	Clamp		

- ▶ Shut off diesel engine.
- ▶ Switch off battery main switch.
- ▶ Loosen clamps **4** (3 pieces) on bowl **2**.
- ▶ Remove bowl.
- ▶ Remove contaminated main filter cartridge **5**.
- ▶ Clean or replace main filter cartridge **5** depending on degree of contamination.

NOTICE
Incorrect cleaning!
Damage to the main filter cartridge.

- ▶ Clean main filter cartridge exclusively with dry air from the inside outward.
- ▶ Do not beat main filter cartridge.

NOTICE
Dirt entering open engine intake!
Damage to diesel engine.

- ▶ When cleaning filter housing leave safety filter cartridge in the filter housing.

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Fuel used	Maximum service life
ASTM D975 1D S15	12 months
ASTM D975 2D S15	
EN 590	

Tab. 165: Filter regeneration after longer downtime

When maximum service life is reached:

▶ Activate filter regeneration. (For more information see: Activating filter regeneration, page 336)

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5.10.5 Bypass filter (option): Checking degree of contamination of filter cartridge

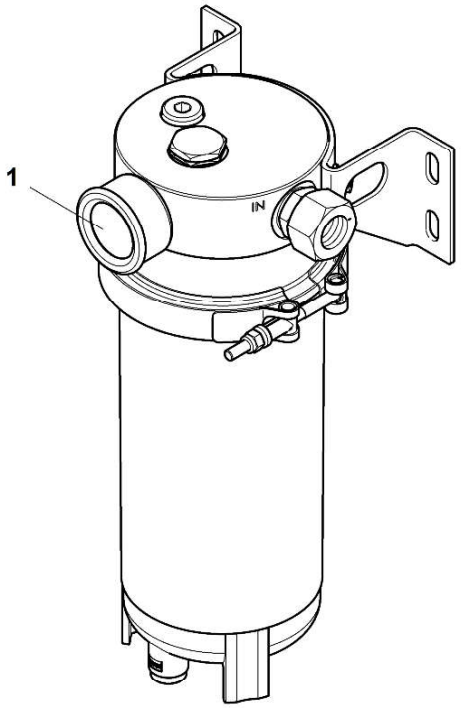

Fig. 1013: Bypass filter

1 Pressure gauge

Make sure the following preconditions are met:
- ❑ Diesel engine or electric motor is idling.
- ❑ Hydraulic oil is at operating temperature.

▶ Check pressure on pressure gauge **1** of bypass filter.

If displayed value exceeds 36.26 psi:
▶ Have filter cartridge of bypass filter replaced by Liebherr customer service.

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5.14.5 Checking condenser for contamination and cleaning if necessary

NOTICE
Incorrect cleaning!
Damage to condenser fins.

- ▶ Never clean condenser fins mechanically or by steam cleaning.
- ▶ Clean condenser fins exclusively with compressed air.

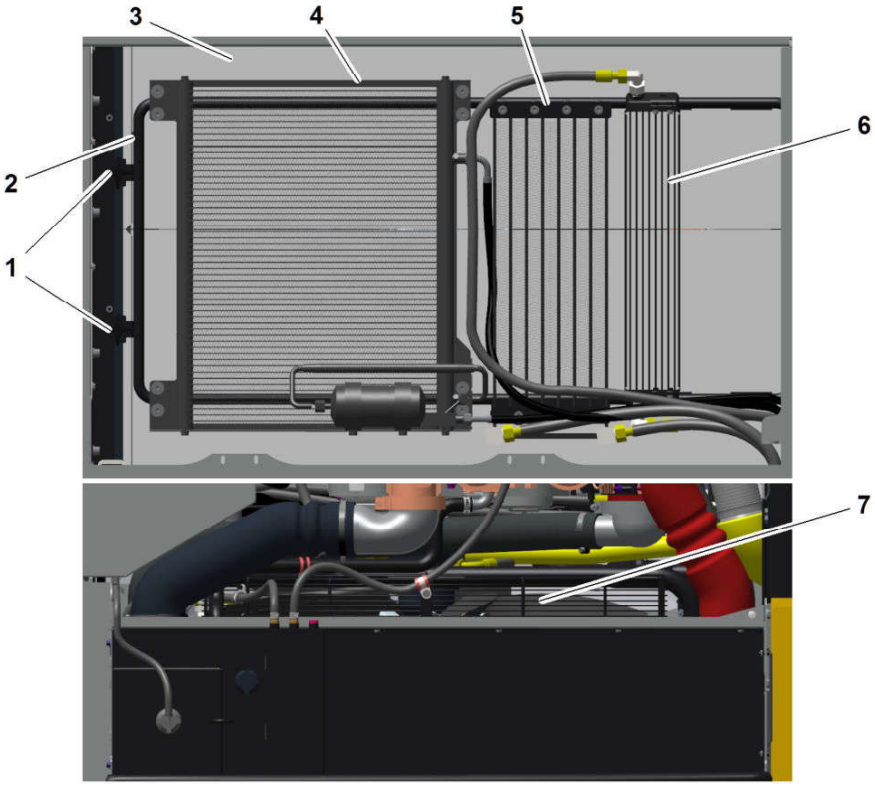

Fig. 1025: Checking condenser for contamination and cleaning if necessary

1	Star knob screw	**5**	Fuel cooler
2	Swivel frame	**6**	Gear oil cooler
3	Combination cooling unit	**7**	Radiator fan
4	Air conditioning condenser		

The combination cooling unit consists of the following coolers:
– Engine cooling
– Hydraulic oil cooler
– Intercooler

The machine is equipped with the following additional cooling units:
– Air conditioning condenser
– Fuel cooler
– Gear oil cooler

For optimal cooling, cooling units must be kept clean.

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

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