

Technical Data



Diesel Engine

Rating per SAE J1349/ISO 9249	402 HP (I) (300 kW) at 1,800 rpm
Model	Liebherr D946
Type	6 cylinder in-line
Bore/Stroke	5.1/5.9 in
Displacement	729 in ³
Engine operation	4-stroke diesel Common-Rail turbo-charged and after-cooled reduced emissions
Air cleaner	dry-type air cleaner with pre-cleaner, primary and safety elements
Engine idling	sensor controlled
Electrical system	
Voltage	24 V
Batteries	2 x 180 Ah/ 12 V
Alternator	three-phase current 28 V/ 140 A
Stage Tier 4f	
Harmful emissions values	in accordance with EPA/CARB-40CFR stage Tier 4f
Emission control	Liebherr-SCR technology
Fuel tank	357 gal
Urea tank	48 gal



Electric Motor

Rating	300 kW at 1,700 rpm
Model	Liebherr KGF1182/6
Type	three-phase squirrel cage motor
Secondary electric motor	
Electric motor auxiliary equipment (air-conditioning compressor, alternator 24 V)	15 kW
Electrical system energy supply	Liebherr drive components and control cabinets for uppercarriage and undercarriage Liebherr frequency converter fed drive system heavy-duty version
Manufacturer	Liebherr
Supply voltage	
Low voltage	380 – 690 V
High voltage	2.14 – 20 kV
Frequency	50/60 Hz
Engine idling	sensor controlled
Electrical system	battery-assisted control system, lighting, diagnostics system
Voltage	24 V
Batteries	2 x 180 Ah/ 12 V
Alternator	three-phase current 28 V/ 140 A



Cooling System

Diesel engine	water-cooled cooling system, consisting of a cooling unit for water and charge air and a 2 nd cooler for hydraulic oil, each with an infinitely variable, thermostatically controlled fan drive system
Electric motor	air-cooled cooling system for hydraulic oil with an infinitely variable, thermostatically controlled fan drive system frequency converter water-cooled



Hydraulic Controls

Power distribution	via control valves with integrated safety valves, simultaneous actuation of chassis and equipment. Swing drive in separate closed circuit
Servo circuit	
Equipment and swing	with electro-hydraulic pilot control and proportional joystick levers
Chassis	with electric proportionally functioning foot pedals or adjusted with plugable levers
Additional functions	via switch or electro-proportional foot pedals
Proportional control	proportionally acting transmitters on the joysticks for additional hydraulic functions



Hydraulic System

Hydraulic pump	
for equipment and travel drive	2 Liebherr axial piston variable displacement pumps (double construction)
Max. flow	2 x 122 gpm
Max. pressure	5,076 psi
for swing drive	reversible axial piston variable displacement pump, closed-loop circuit
Max. flow	94 gpm
Max. pressure	5,004 psi
Hydraulic pump regulation and control	2 circuit Liebherr-Synchron-Comfort-system (LSC) with electronic engine speed sensing regulation, pressure and flow compensation, automatic oil flow optimizer
Hydraulic tank	120 gal
Hydraulic system	310 gal
Hydraulic oil filter	2 main return filters with integrated partial micro filtration (5 µm)
MODE selection	adjustment of engine and hydraulic performance via a mode pre-selector to match application, e.g. for especially economical and environmentally friendly operation or for maximum material handling and heavy-duty jobs
S (Sensitive)	mode for precision work and lifting through very sensitive movements
E (Eco)	mode for especially economical and environmentally friendly operation
P (Power)	mode for high performance with low fuel consumption
P+ (Power-Plus)	mode for highest performance and for very heavy duty applications, suitable for continuous operation
Engine speed and performance setting	stepless alignment of engine output and hydraulic power via engine speed
Option	Tool Control: 20 pre-adjustable pump flows and pressures for add-on attachments



Swing Drive

Drive	Liebherr axial piston motor in a closed system, Liebherr planetary reduction gear
Swing ring	Liebherr, sealed race ball bearing swing ring, internal teeth
Swing speed	0 – 6.5 rpm stepless
Swing torque	147,512 lbf ft
Holding brake	wet multi-disc (spring applied, pressure released)
Option	slewing gear brake Comfort



Operator's Cab

Cab	safety cab structure with fixed built-in front and roof window made from impact-resistant laminated safety glass, work headlights integrated in the ceiling, a door with a sliding window (can be opened on both sides), large stowing and depositing possibilities, shock-absorbing suspension, sound damping insulating, tinted laminated safety glass, separate shades for the sunroof window and windscreen
High Rise/Gantry	deviating from standard: safety cab structure with fixed built-in front and roof window made from impact-resistant laminated safety glass
Operator's seat Comfort	air cushioned operator's seat with 3D-adjustable armrests, headrest, lap belt, seat heater, adjustable seat cushion inclination and length, lockable horizontal suspension, automatic weight adjustment, adjustable suspension stiffness, pneumatic lumbar vertebrae support and passive seat climatisation with active coal
Operator's seat Premium (Option)	in addition to operator's seat comfort: active electronic weight adjustment (automatic re-adjustment), pneumatic low frequency suspension and active seat climatisation with active coal and ventilator
Control system	joysticks with control consoles and swivel seat, folding left control console
Operation and displays	large high-resolution operating unit, self-explanatory, color display with touchscreen, video-compatible, numerous settings, control and monitoring options, e.g. air conditioning control, fuel consumption respectively energy consumption, machine and attachment parameters
Air-conditioning	
Diesel engine	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
Electric motor	in addition to diesel engine: stationary air conditioning function with external climate condenser – controlled by a weekly timer



Undercarriage

Mobile	
Versions	Standard, High Rise
Drive	one driven axle with transmission with Liebherr axial piston motor and functional brake valve on both sides
Travel speed	
Joystick steering	0 – 3.1 mph stepless (creeper speed) 0 – 5.0 mph stepless
Driving operation	automotive driving using accelerator pedal, cruise control function: storage of variable accelerator pedal positions
Axles	198,400 lb drive axles; manual or automatic hydraulically controlled front axle oscillation lock
Service brake	two circuit travel brake system with accumulator; wet and backlash-free disc brake
Holding brake	wet multi-disc (spring applied, pressure released)
Stabilization	4 point outriggers
Crawler	
Versions	SW, High Rise, Gantry
Drive	Liebherr compact planetary reduction gear with Liebherr axial piston motor per side of undercarriage
Travel speed	0 – 1.6 mph stepless (creeper speed) 0 – 2.5 mph stepless
Brake	functional brake valves on both sides
Holding brake	wet multi-disc (spring applied, pressure released)
Track pads	flat
Tracks	sealed and greased



Equipment

Type	high-strength steel plates at highly-stressed points for the toughest requirements. Complex and stable mountings of equipment and cylinders
Hydraulic cylinders	Liebherr cylinders with special sealing and guide system and, depending on cylinder type, shock absorption
Energy recovering cylinder	Liebherr gas cylinder with special sealing and control system
Bearings	sealed, low maintenance

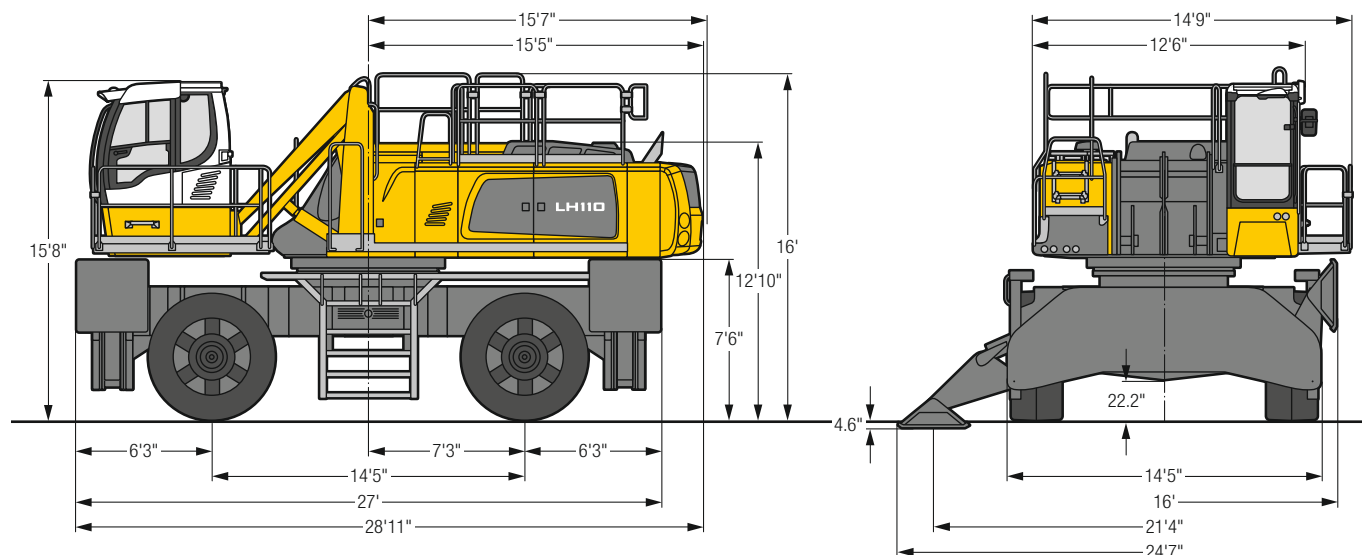


Complete Machine

Lubrication	Liebherr central lubrication system for upper-carriage and equipment, automatically
Mobile (Option)	Liebherr central lubrication system for undercarriage, automatically
Steps system	safe and durable access system with anti-slip steps; main components hot-galvanized
Noise emission	
ISO 6396	L _{PA} (inside cab) = 70 dB(A)
2000/14/EC	L _{WA} (surround noise) = 107 dB(A)
ISO 6396	L _{PA} (inside cab) = not specified (Electric)
2000/14/EC	L _{WA} (surround noise) = not specified (Electric)

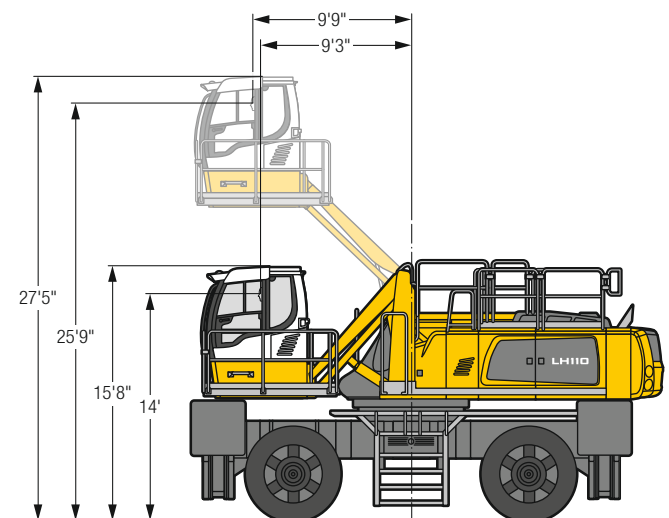
LH 110 M – Dimensions

Industry



LH 110 M – Cab Elevation

Cab Elevation LHC (Hydraulic Elevation)

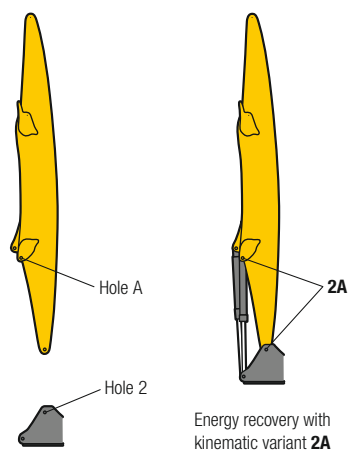


Increase type **LHC 360-50**

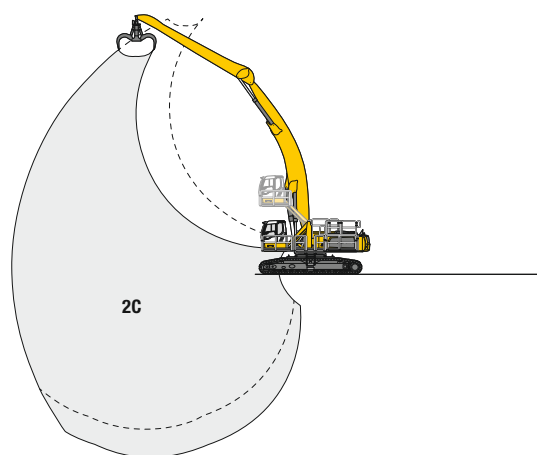
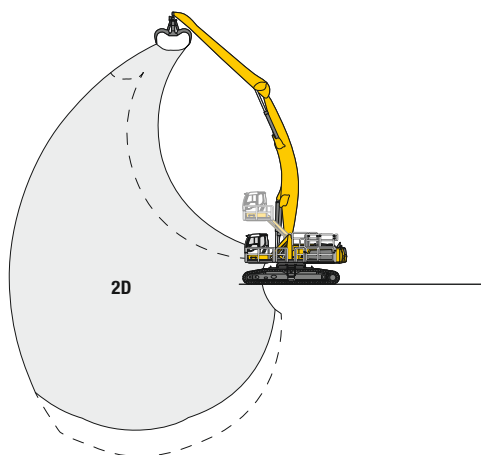
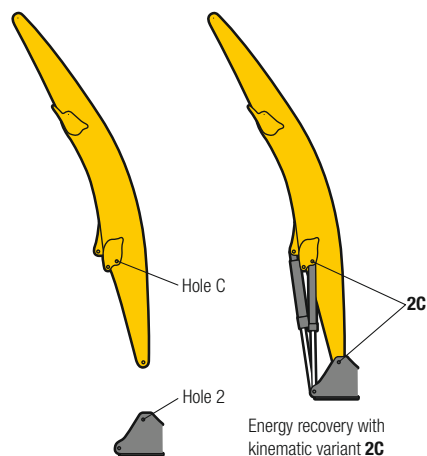
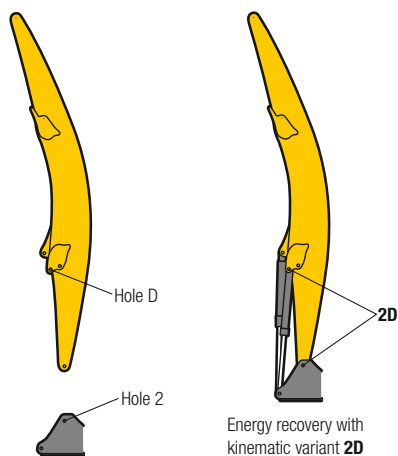
The hydraulically adjustable cab allows the driver, that he can choose his field of view freely and at any time within the stroke.

Tires 26.5-66

Kinematic Variant 2A



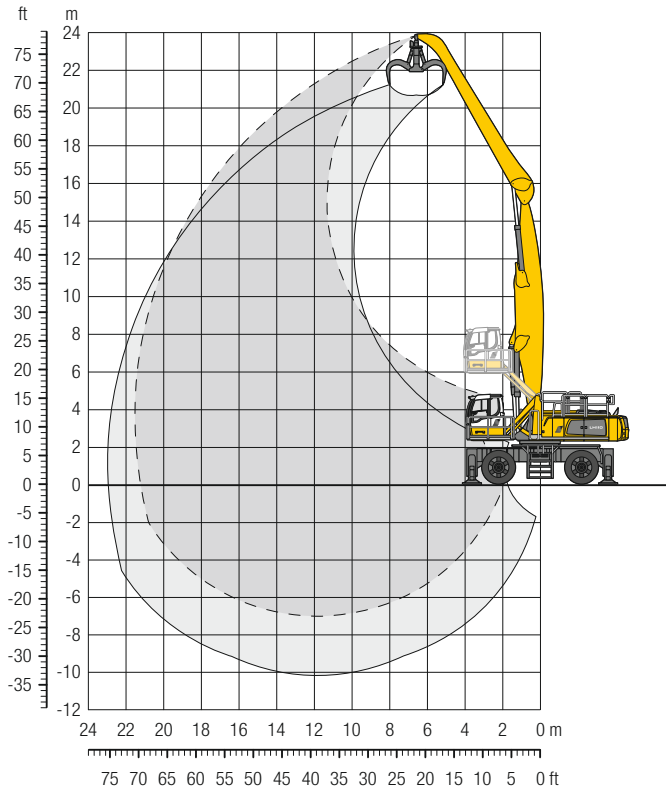
Kinematic Variant 2D/2C



Altered range curve with additional reach depth, e.g. for unloading from ships

LH 110 M – Equipment GA22

Industry – Kinematic 2A

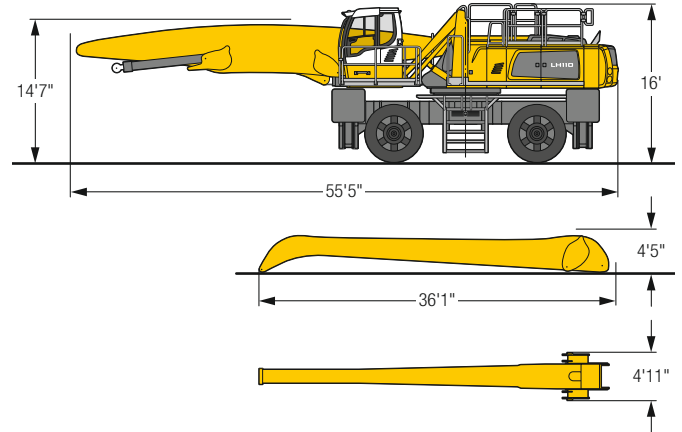


Operating Weight

The operating weight includes the basic machine with 4 point outriggers, hydr. cab elevation, 4 solid tires, straight boom 37'9", angled stick 34'5" and multi-tine grab GMM 120-5/2.62 yd³ semi-closed tines.

Weight 217,200 lb

Dimensions



		20 ft	25 ft	30 ft	35 ft	40 ft	45 ft	50 ft	55 ft	60 ft	65 ft	70 ft	75 ft	80 ft	
ft	Undercarriage														ft in
90	4 pt. outriggers down														
85	4 pt. outriggers down														
80	4 pt. outriggers down														
75	4 pt. outriggers down														
70	4 pt. outriggers down				28.4"	28.4"									27.5"
65	4 pt. outriggers down				32.4"	32.4"	28.2"	28.2"	21.8"	21.8"					23.1"
60	4 pt. outriggers down						30.1"	30.1"	27.5"	27.5"	21.1"	21.1"			20.7"
55	4 pt. outriggers down						29.5"	29.5"	27.3"	27.3"	25.6"	25.6"	19.1"	19.1"	18.2"
50	4 pt. outriggers down						29.3"	29.3"	27.1"	27.1"	25.3"	25.3"	23.9"	23.9"	17.5"
45	4 pt. outriggers down						29.3"	29.3"	27.1"	27.1"	25.2"	25.2"	23.7"	23.7"	17.0"
40	4 pt. outriggers down						29.6"	29.6"	27.3"	27.3"	25.3"	25.3"	23.7"	23.7"	16.6"
35	4 pt. outriggers down						33.1"	33.1"	30.1"	30.1"	27.6"	27.6"	25.6"	25.6"	16.4"
30	4 pt. outriggers down						34.1"	34.1"	30.8"	30.8"	28.1"	28.1"	25.9"	25.9"	16.4"
25	4 pt. outriggers down														
20	4 pt. outriggers down														
15	4 pt. outriggers down	66.1"	66.1"	53.0"	53.0"	44.4"	44.4"	38.4"	38.4"	33.8"	33.8"	30.3"	30.3"	27.5"	27.5"
10	4 pt. outriggers down	71.9"	71.9"	56.5"	56.5"	46.7"	46.7"	39.9"	39.9"	34.9"	34.9"	31.0"	31.0"	28.0"	28.0"
5	4 pt. outriggers down	49.4"	49.4"	59.4"	59.4"	48.7"	48.7"	41.3"	41.3"	35.8"	35.8"	31.7"	31.7"	28.4"	28.4"
0	4 pt. outriggers down	29.9"	29.9"	61.3"	61.3"	50.0"	50.0"	42.2"	42.2"	36.5"	36.5"	32.1"	32.1"	28.6"	28.6"
-5	4 pt. outriggers down	26.2"	26.2"	50.0"	50.0"	50.5"	50.5"	42.6"	42.6"	36.7"	36.7"	32.2"	32.2"	28.5"	28.5"
-10	4 pt. outriggers down	26.2"	26.2"	43.5"	43.5"	49.8"	49.8"	42.1"	42.1"	36.3"	36.3"	31.7"	31.7"	27.9"	27.9"
-15	4 pt. outriggers down	27.5"	27.5"	41.9"	41.9"	47.6"	47.6"	40.5"	40.5"	34.9"	34.9"	30.4"	30.4"	26.5"	26.5"
-20	4 pt. outriggers down			42.7"	42.7"	43.4"	43.4"	37.4"	37.4"	32.3"	32.3"	27.9"	27.9"	23.9"	23.9"

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

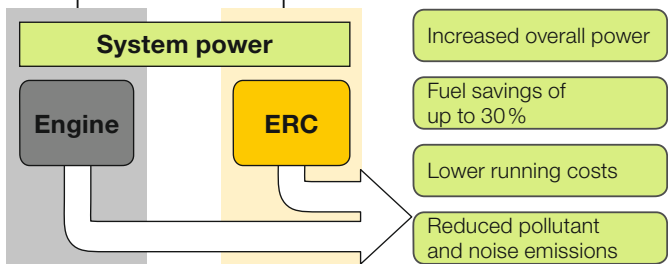
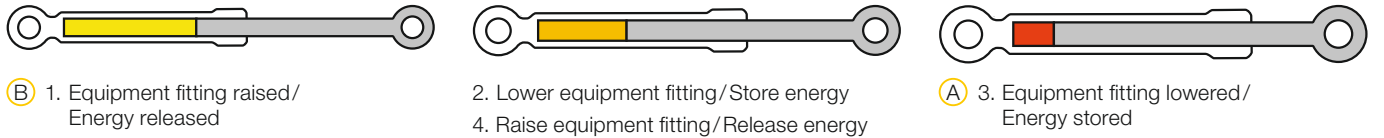
The lift capacities on the stick end without attachment are stated in lb x 1,000 and are valid on a firm, level supporting surface with blocked oscillating axle. These capacities can be slewed through 360° with the undercarriage in the transverse position. Capacities in the longitudinal position of the undercarriage (+/- 15°) are specified over the 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 values indicated are attained at the corresponding operating temperature. This operating temperature is ensured by continuous movement of the boom. Weights of fitted attachments (grabs, load hooks, etc.) and load accommodation attachment are to be deducted from the lift capacity values. 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.

Liebherr ERC-System

ERC System – More Performance, Less Consumption

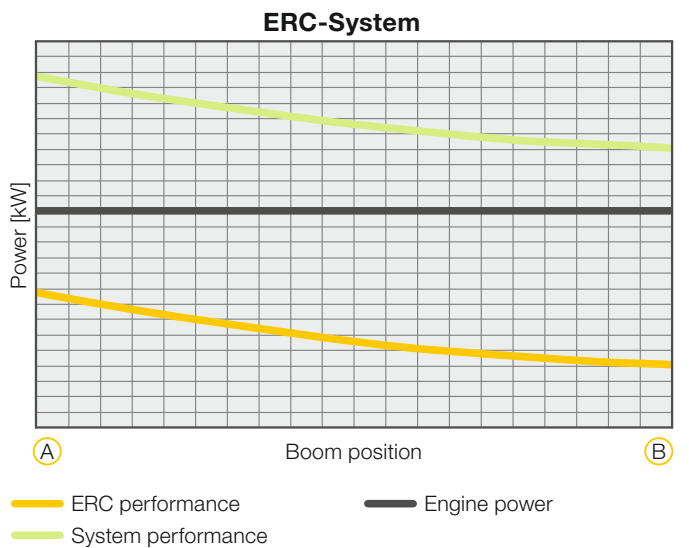
Lowering the equipment stores energy in the ERC system. This stored energy is then made available to the machine to provide additional engine power. When the equipment is raised the stored energy is released and is reflected in

powerful, homogeneous operating cycles. The result is a clear saving on fuel – and, at the same time, even greater performance.



System Power

The energy recovery cylinder is a storage system which is independent of the diesel engine. The system performance of material handling machines fitted with the ERC system is composed of the installed engine power and the energy recovery cylinder. When the equipment is raised, energy from the ERC system is supplied in addition to the power from the diesel engine.



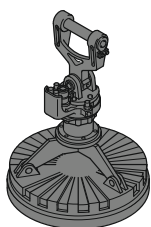
Attachments



Multi-Tine Grab

Multi-Time Grab		open				semi-closed				closed			
Grab model GMM 80-4 (4 tines)													
Capacity	yd ³	1.44	1.83	2.22		1.44	1.83	2.22			1.83*		
Weight	lb	4,180	4,265	4,400		4,610	4,740	4,870			5,355		
Grab model GMM 80-5 (5 tines)													
Capacity	yd ³	1.44	1.83	2.22		1.44	1.83	2.22		1.44*	1.83*	2.22*	
Weight	lb	4,785	4,895	5,050		5,270	5,435	5,600		5,380	5,690	6,040	
Grab model GMM 120-4 (4 tines)													
Capacity	yd ³	2.22	2.62	3.27	3.92	2.22	2.62	3.27	3.92				
Weight	lb	4,750	4,850	4,970	5,080	5,325	5,445	5,645	5,855				
Grab model GMM 120-5 (5 tines)													
Capacity	yd ³	2.22	2.62	3.27	3.92	2.22	2.62	3.27	3.92	2.22	2.62	3.27	3.92
Weight	lb	5,480	5,600	5,755	5,895	6,140	6,285	6,535	6,800				

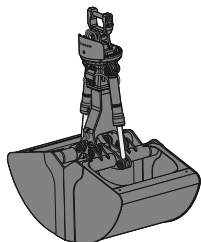
* heart-shaped



Magnet Devices / Lifting Magnets

Generator	kW	30	30
Electromagnet with suspension			
Power	kW	17.8	22
Diameter of magnet	ft in	5'7"	6'3"
Weight	lb	7,230*	11,220*

* only magnet plate



Grab for Loose Material

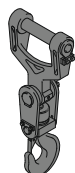
Shells for loose material with cutting edge (without teeth)

Grab model GMZ 80							
Width of shells	ft in	4'3"	4'11"	5'9"	6'7"	7'3"	8'6"
Capacity	yd ³	3.92	4.58	5.23	5.88	6.54	7.85
Weight	lb	5,535	5,785	6,105	6,480	6,690	7,200
Grab model GMZ 120							
Width of shells	ft in	5'11"	6'7"	7'3"	7'10"	9'2"	10'6"
Capacity	yd ³	5.88	6.54	7.19	7.85	9.15	10.46
Weight	lb	7,055	7,350	7,550	7,960	8,435	9,170



Wood Grab

Grab model GMH 80 Rundform (complete overlapping, vertical cylinders)				
Size	yd ²	1.91	2.27	2.63
Cutting width	ft in	2'10"	2'10"	2'10"
Height of grab, closed	ft in	9'6"	9'9"	10'1"
Weight	lb	4,980	5,080	5,160
Grab model GMH 120 Rundform (complete overlapping, vertical cylinders)				
Size	yd ²	3.35	3.83	
Cutting width	ft in	2'10"	2'10"	
Height of grab, closed	ft in	11'9"	12'1"	
Weight	lb	6,105	6,175	



Load Hook

Max. load	lb	55,115
Weight	lb	562

Equipment



Undercarriage

	110 M	110 C	110 M HR	110 C HR	110 C Gantry
Track pads, variants		+		+	+
Individual control outriggers	+		•		
Three-piece chain guide		•		•	•
Shuttle axle lock, automatic	•		•		
Outrigger monitoring system	+		+		
Tires, variants	+		+		
Trailing cable ²⁾		•		•	•
Protection for piston rods, outriggers	+		+		
Two lockable storage compartments	•				
Cable reel system ²⁾		+		+	+



Upperchassis

	110 M	110 C	110 M HR	110 C HR	110 C Gantry
Upperchassis right side light, 1 piece, LED	•	•	•	•	•
Upperchassis rear light, 2 pieces, LED	+	+			
Upperchassis underneath rear light, 1 piece, LED			+	+	+
Refuelling system with filling pump ¹⁾	+	+	+	+	+
Railing on upperchassis	•	•	•	•	•
Generator	+	+	+	+	+
Main battery switch for electrical system	•	•	•	•	•
Amber beacon, at upperchassis, LED double flash	+	+	+	+	+
Protection for headlights	+	+			
Tool equipment, extended	•	•	•	•	•



Hydraulic System

	110 M	110 C	110 M HR	110 C HR	110 C Gantry
Electronic pump regulation	•	•	•	•	•
Liebherr hydraulic oil from -4 °F to +104 °F	•	•	•	•	•
Liebherr hydraulic oil, biologically degradable	+	+	+	+	+
Liebherr hydraulic oil, specially for warm or cold regions	+	+	+	+	+
Magnetic rod in hydraulic tank	•	•	•	•	•
Bypass filter	+	+	+	+	+
Preheating hydraulic oil	+	+	+	+	+



Engine

	110 M	110 C	110 M HR	110 C HR	110 C Gantry
Fuel anti-theft device ¹⁾	+	+	+	+	+
Air pre-filter with dust discharge	+	+	+	+	+
Automatic engine shut-down (time adjustable)	+	+	+	+	+
Preheating fuel ¹⁾	+	+	+	+	+
Preheating coolant*	+	+	+	+	+
Preheating engine oil* ¹⁾	+	+	+	+	+



Cooling System

	110 M	110 C	110 M HR	110 C HR	110 C Gantry
Reversible fan drive, fully automatic	+	+	+	+	+
Protective grid in front of cooler intake	•	•	•	•	•

 Operator's Cab	110 M	110 C	110 M HR	110 C HR	110 C Gantry
Stabilizer, control lever, left console	+		+		
Stabilizer, proportional control on left joystick	•		•		
Cab lights rear, LED	+	+	+	+	+
Cab lights front, LED	+	+	+	+	+
Cab lights front, LED (under rain cover)	•	•	•	•	•
Armrest adjustable	•	•	•	•	•
Circular bubble level	•	•	•	•	•
Slewing gear brake Comfort, button on the left or right joystick	+	+	+	+	+
Driver profile, personalized (max. 5 drivers)	+	+	+	+	+
Operator's seat Comfort	•	•	•	•	•
Operator's seat Premium	+	+	+	+	+
Driving alarm (acoustic signal is emitted during travel, can be switched ON / OFF)	+	+	+	+	+
Fire extinguisher	+	+	+	+	+
Footrest	+	+	+	+	+
Horn, button on left joystick	•	•	•	•	•
Joystick steering	•		•		
Cab elevation, hydraulic (LHC)	•	•	•	•	•
Cab elevation, hydraulic with double parallelogram (LHC-D)	+	+	+	+	+
Cab elevation, rigid (LFC)	+	+	+	+	+
Automatic air conditioning	•	•	•	•	•
Wheel steering (slim version)	+		+		
LiDAT, vehicle fleet management	•	•	•	•	•
Engine shut-down (emergency stop) cab ²⁾		•		•	•
Proportional control	•	•	•	•	•
Radio Comfort, control via display with handsfree set	+	+	+	+	+
Preparation for radio installation	•	•	•	•	•
Back-up alarm (acoustic signal is emitted traveling backward, can not be switched off)	+		+		
Amber beacon, on cabin, LED double flash	+	+	+	+	+
Windows made from impact-resistant laminated safety glass	•	•	•	•	•
Windscreen wiper, roof	+	+	+	+	+
Windshield wiper, entire windscreen	•	•	•	•	•
Top guard	+	+	+	+	+
Front guard, adjustable	+	+	+	+	+
Sun visor	+	+	+	+	+
Stationary air-conditioning ²⁾		•		•	•
Left control console, folding	•	•	•	•	•

 Equipment	110 M	110 C	110 M HR	110 C HR	110 C Gantry
Boom lights, 2 pieces, LED	•	•	•	•	•
Stick lights, 4 pieces, LED	•	•	•	•	•
Boom shutoff (retract/extend), electronically	+	+	+	+	+
Equipment with electro-hydraulic end position control	•	•	•	•	•
AutoLift	+	+	+	+	+
Pressure warning mechanism hoist cylinder	•	•	•	•	•
ERC system	•	•	•	•	•
Filter system for attachment	+	+	+	+	+
Boom cylinder cushioning	•	•	•	•	•
Stick camera (with separate monitor), bottom side, with protection	+	+	+	+	+
Load torque limitation	+	+	+	+	+
Liebherr multi coupling system	+	+	+	+	+
Pipe fracture safety valves hoist cylinders	•	•	•	•	•
Pipe fracture safety valves stick cylinders	•	•	•	•	•
Quick coupling system MH 110B	+	+	+	+	+
Protection for piston rod, energy recovering cylinder	+	+	+	+	+
Protection for piston rods, hoist cylinder	+	+	+	+	+
Stick shutoff (retract), electronically	•	•	•	•	•
Stick shutoff (retract/extend), electronically	+	+	+	+	+
Retract stick without pressure	•	•	•	•	•
Sticks with quick coupling	+	+	+	+	+
Overload warning device	+	+	+	+	+

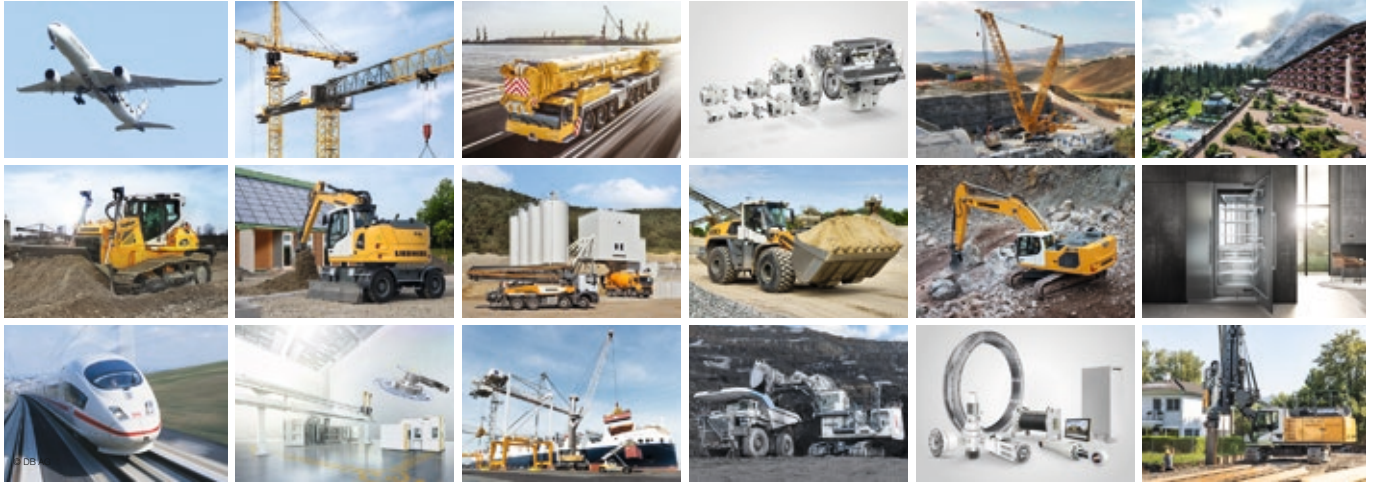
 Complete Machine	110 M	110 C	110 M HR	110 C HR	110 C Gantry
Lubrication					
Lubrication undercarriage, manually – centralized (one grease point)	•		•		
Central lubrication system for uppercarriage and equipment, automatically	•	•	•	•	•
Central lubrication system for undercarriage, automatically	+		+		
Central lubrication system, extension for attachment	+	+	+	+	+
Special coating					
Special coating, variants	+	+	+	+	+
Monitoring					
Rear view monitoring with camera	•	•	•	•	•
Side view monitoring with camera	•	•	•	•	•

• = Standard, + = Option

* = country-dependent, ¹⁾ not with electric drive, ²⁾ only with electric drive

Options and/or special equipments, supplied by vendors other than Liebherr, are only to be installed with the knowledge and approval of Liebherr in order to retain warranty.

The Liebherr Group of Companies



Diverse Product Range

The Liebherr Group is one of the largest construction equipment manufacturers in the world. Liebherr's quality products and services hold a high reputation in many industries. The wide range includes domestic appliances, aerospace and transportation systems, machine tools and maritime cranes.

Exceptional Customer Benefit

Every product line provides a complete range of models in many different versions. With both their technical excellence and superior quality, Liebherr products offer customers the highest benefits in practical applications.

State-of-the-art Technology

Liebherr attributes great importance to the product areas of core technology and components, in order to achieve its consistent, top-quality products. Important modules and components are developed and manufactured in-house, for instance, the entire drive and control technology for the construction equipment and mining trucks.

Worldwide and Family-Owned

Hans Liebherr founded the Liebherr family company in 1949. Since that time, the enterprise has steadily grown to a group of more than 130 companies with more than 48,000 employees located on all continents. The corporate headquarters of the Group is Liebherr-International AG in Bulle, Switzerland. The Liebherr family is the sole owner of the company.

www.liebherr.us

WARNING

This product can expose you to chemicals including lead and lead compounds, which are known to the State of California to cause cancer and birth defects or other reproductive harm.
For more information go to www.P65warnings.ca.gov.

WARNING

Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- ▶ Always start and operate the engine in a well-ventilated area.
- ▶ If in an enclosed area, vent the exhaust to the outside.
- ▶ Do not modify or tamper with exhaust system.
- ▶ Do not idle the engine except as necessary.

For more information go to www.P65warnings.ca.gov/diesel.