en

Operating Manual

Wheel Loader

L506 - 776 from 12800

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Address

Address: LIEBHERR-WERK BISCHOFSHOFEN GMBH
Dr. Hans Liebherr – Straße 4
A – 5500 BISCHOFSHOFEN

Manufacturer

Name: LIEBHERR-WERK BISCHOFSHOFEN GMBH

Machine data:

Please enter the following details on receipt of your vehicle: *You will find these details on the vehicle type plate. They will be useful when ordering spare parts.

*** Serial no.**

VATZ . . . . ZZB . . . . . .

*** Year of manufacture**

. . . .

Initial start-up date

. . / . . / . .

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Foreword

This operating manual has been written for the **driver** and for the **maintenance personnel** of the machine.

It describes:
- Chapter 1 - Product description
- Chapter 2 - Safety regulations
- Chapter 3 - Operation and handling
- Chapter 4 - Malfunctions
- Chapter 5 - Maintenance

This operating manual must be carefully read before initial operation and should be read and used later at regular intervals by anyone responsible for working on the machine.

Working with or on the machine includes:
- **Operation** including equipping, troubleshooting during operation, removing production debris, maintenance, removing operating and auxiliary materials.
- **Servicing** including maintenance, inspection and repairs.
- **Transport** or loading the machine.

This manual helps the driver to become acquainted with the machine and prevents malfunctions due to incorrect operation.

Observation of the operating manual by maintenance staff:
- Increases reliability during operation
- Extends the service life of your machine
- Reduces repair costs and downtime

This manual must be kept with the machine. Make sure a copy is always kept in the glove compartment of the driver's cab.

In addition to the operating manual follow the instructions based on existing national accident prevention and environmental protection regulations.

In addition to the operating manual and applicable national and local legal accident prevention rules, observe the recognised technical regulations for safe and proper operation.

This operating manual contains all the information you need to operate and service your machine.

If you should, however, require more detailed explanations or information, our technical information and customer services departments will be happy to provide assistance.

You will understand that we cannot accept warranty claims for damage due to improper use, insufficient maintenance, use of non-approved consumables or failure to follow the safety instructions.

LIEBHERR will cancel without prior notice all obligations such as warranty agreements and service contracts entered into by **LIEBHERR** and/or its agents if spare parts other than genuine **LIEBHERR** parts or those purchased from **LIEBHERR** are used for maintenance and repairs.

In extreme conditions, maintenance may be required more often than stated in the inspection schedule.

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Modifications, conditions, copyright:

- We reserve the right to alter the technical details of the machine regardless of the specifications and illustrations in these documents.
- The warranty and liability terms contained in LIEBHERR's general conditions of trade are not affected by the information in the manual.
- The information and illustrations in this manual may not be reproduced, distributed or used for commercial purposes. All rights under copyright laws are expressly reserved.
- Machine data: our system sometimes records data which is relevant to the component. The manufacturer uses this data to continue improving functions and reliability.

Abbreviations used:

CAN = controller area network
CPU = central processing unit
Hydr. = hydraulic
LCD = liquid crystal display
LED = light emitting diode
LH-ECU = Liebherr electronic control unit
LFD = Liebherr ride control
LH = Liebherr
LKW = truck
MC = microcontroller
MV = solenoid valve
NLP = emergency steering pump
P-kinematics = kinematic version of the lift arms
PWM = pulse width modulated outputs (proportional solenoid)
REF = reference (comparison)
SKW = heavy lorry
SW = quick-change device
Ubat = battery power supply (terminal 30)
UEC = universal earth mover controller
Z-kinematics = kinematic version of the lift arms

Symbols and pictograms:


bsym0059
Direction of operation or movement


bsym0066
Stop movement


bsym0065
Do not do this


bsym0029
Air conditioning, winter, low temperatures


bsym0049
Visual inspection


bsym0061
Closed, locked


bsym0060
Open, unlocked

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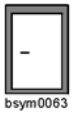
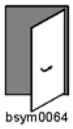
Audible signal, warning tone



Close



Open

Manual operation

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Ideas, comments (please state the page number):

Overall, how would you judge this document?

Excellent	
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Your data: Machine / serial number:

Company:

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Thank you for your help.

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Notes:

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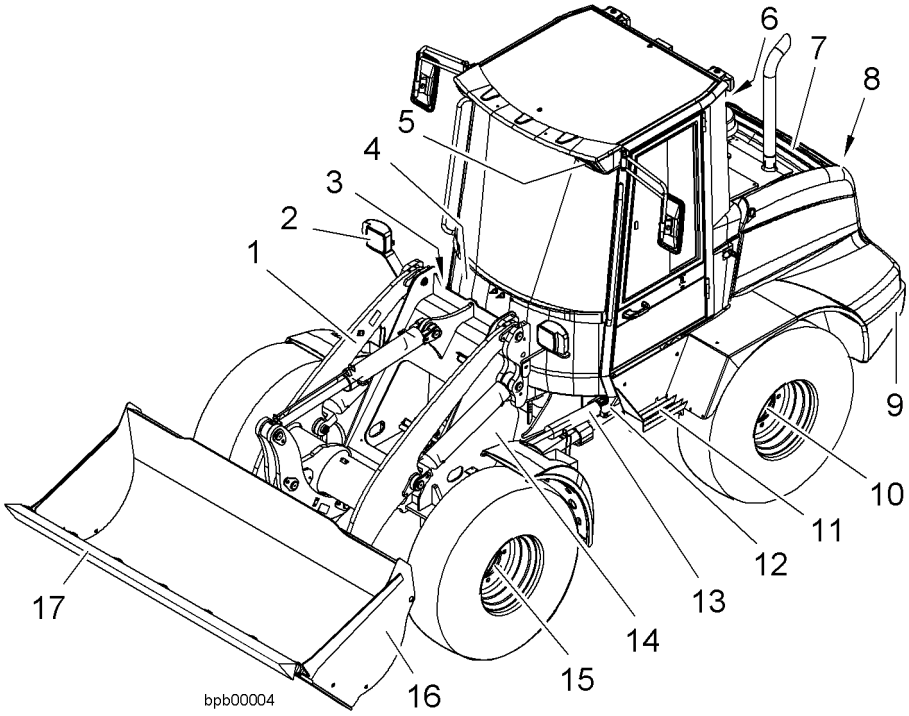
1 Product description

Equipment layout

Standard version

This section contains an overview of the machine and the names of the components shown.



Left view of machine

1 Lift arms
2 Lighting
3 Articulation lock
4 Driver's cab
5 Working floodlight
6 Battery compartment
7 Engine compartment hood
8 Towing device
9 Ballast weight
10 Rear axle
11 Cab access
12 Rear section
13 Steering cylinder
14 Front section
15 Front axle
16 Bucket
17 Tooth guard

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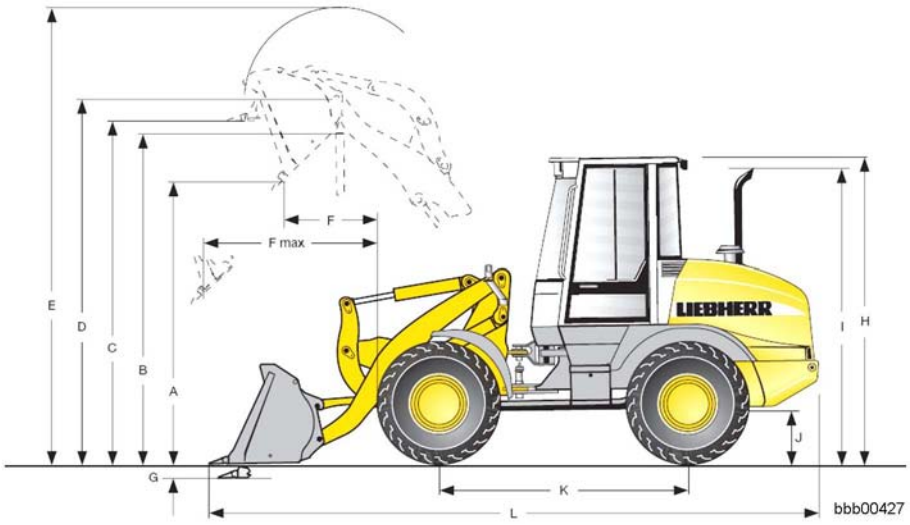
1.1 Technical data

1.1.1 Complete machine with bucket

bpik0039 

The values stated refer to the machine:
– In its standard version
– With 365/70R18 tyres
– Including all lubricants
– With a full tank
– With ROPS/FOPS cab and driver

Tyre sizes and additional attachments affect the operating weight and tipping load.



Dimensions

Name	Value	Units
Bucket capacity (ISO 7546) [1)]	0.8	m ^{3}
Bucket width	1900	mm
Specific material weight	1.8	t/m ^{3}
A - Dump height at maximum lifting height and 42° tilt-out angle	2550	mm
B - Dump height	2872	mm
C - Maximum bucket base height	3011	mm
D - Maximum bucket pivot point height	3211	mm
E - Maximum bucket top height	4040	mm
F - Reach at maximum lifting height and 42° tilt-out angle	818	mm
F max - Maximum reach at 42° tilt-out angle	1517	mm
G - Digging depth	80	mm

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Name	Value	Units
H - Height above the cab	2725	mm
I - Height above exhaust	2600	mm
J - Ground clearance	295	mm
K - Wheel base	2150	mm
L - Overall length	5295	mm
Loader width across tyres	1850	mm
Turning radius over bucket outer edge	3690	mm
Lifting force (SAE)	39	kN
Breakout force (SAE)	43	kN
Tipping load when straight	3540	kg
Articulated tipping load	3231	kg
Operating weight	5120	kg
Tractive force	45.9	kN

[1)]In practice, the bucket capacity can be around 10 % greater than as calculated using the ISO 7546 method. This depends on the type of material.

1.1.2 Engine

bpik0027 

Water-cooled Liebherr diesel engine with turbocharger.

The exhaust emissions are below the threshold levels in EU directive 97/68/EC – Tier II.

Name	Value	Units
Diesel engine	D404T-00	
Number of cylinders	4	Pc.
Combustion	Pump-jet	
Rated power according to ISO 9249 at 2800 min^{-1}	42	kW
Maximum torque at 1680 min^{-1}	209	Nm
Cylinder capacity	2.44	litres
Idle speed	min.850 $^{\pm 50}$ max.3040 $^{+80}$	min^{-1} min^{-1}
Longitudinal / traverse inclinability	30	°

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1.1.3 Electrical system

bpik0028 

Name	Value	Units
Battery voltage	12	V
Battery capacity	100	Ah
Number of batteries	1	Pc.
Operating voltage	12	V
Alternator	12/65	V/ A
Starter	12/2.2	V / kW

Battery fastening

Name	Value	Units
Tightening torque	10	Nm

1.1.4 Travel drive

bpik0029 

Continuously variable hydrostatic travel drive

Travel drive controlled by gas pedal and combined inch/brake pedal.

The inch pedal allows you to smoothly adapt the tractive and thrust force to the terrain and conditions.

Forward and reverse travel are selected using the Liebherr control lever

Speed data:
– For forward and reverse travel
– With standard tyres

Name	Value	Units
Travel range 1	0 – 6.0	km/h
Travel range 2	0 – 20.0	km/h

1.1.5 Axles

bpik0030 

Front axle Rigidly mounted planetary axle

Name	Value	Units
Width	1486	mm
Differential lock, automatic action	45	%

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Rear axle Oscillating planetary axle
Kingpin steering

Name	Value	Units
Width	1486	mm
Differential lock, automatic action	25	%
Angle of articulation to each side	5	°

1.1.6 Braking

bpik0031 

The braking system complies with the roadworthiness certification regulations.

Service brake Hydrostatic travel drive, wear-free, acting on all four wheels, with additional hydraulically operated drum brake.

Parking brake Mechanically operated drum brake.

1.1.7 Steering

bpik0033 

“Stereo steering”, central articulation joint with absorbers in combination with kingpin steering on the rear axle.

Name	Value	Units
Angle of articulation to each side	30	°
Angle of articulation of articulated joint to each side	5	°
Maximum operating pressure	180	bar

1.1.8 Working hydraulics

bpik0034 

Single lever control with Liebherr control lever, hydraulic pilot control.

Design:
– Gear pump and pressure cut-off

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Name	Value	Units
Maximum flow	65	l/min
Maximum operating pressure	210	bar

1.1.9 Working attachment

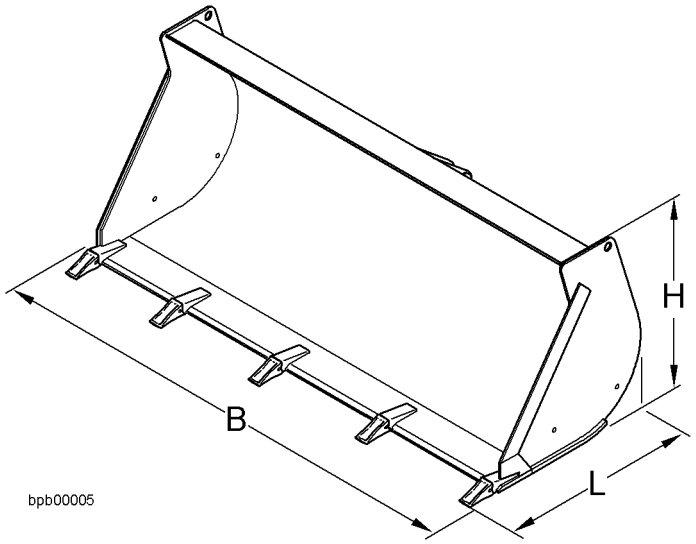

bpik0035

Lift arms

Bearing points – lathed, thick-walled bushings with lubricating grooves

Z kinematics:
– Standard version
– With standard hydraulic quick-change device

Bucket



bpb00005

Dimensions

Name	Value	Units
Bucket capacity (ISO 7546)	0.8	m³
Specific material weight	1.8	t/m³
B – bucket width	1900	mm
H – height	863	mm
L – length with teeth	936	mm
Weight	307	kg
Teeth – UNI-Z-2000	7	Pc.

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1.1.10 Driver's cab

bpik0036 

On elastic bearing on rear section, soundproof ROPS/FOPS cab.

Design:
- 2 detachable doors
- The right door is the emergency exit.
- Left door with sliding window
- Tinted windows made of hardened single-glazed safety glass
- ROPS rollover protection in accordance with DIN/ISO 13510/ EN 474-3.
- FOPS stone impact protection in accordance with DIN/ISO 13627/ EN 474-1.

Driver's seat

Alternative versions:
- Driver's seat with mechanical suspension
- Driver's seat with pneumatic suspension.
  This equipment is optional.

1.1.11 Heating and ventilation

bpik0043 

Driver's cab with defroster, fresh air filter, circulated air filter and warm water heating.

Name	Value	Units
Number of blower levels	3	
Heating power	11.3	kW

1.1.12 Sound emission

bpik0037 

Sound pressure

Name	Value	Units
ISO 6396 – L_{pA}(in driver's cab)	70	dB(A)

Sound output

You can read the level on the decal on the machine.
See the section on decals on the machine in chapter 2.

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1.1.13 Towing device

bpik0041 

The towing device is attached to the back of the machine.

Purpose:
– For towing the machine out of a danger area, see section 3 on emergency operation.
– For lifting the machine by crane, see section 3 on transporting the machine.

Note
It may not be used for attaching a trailer. The manufacturer/supplier will not be held liable for damage resulting from this.
! See the instructions on proper use and safely towing the machine in chapter 2.

1.1.14 Tyres

bpik0032 

The driving performance of the machine depends, among other things, on the tyres.

Note
Use the same tyre size for all four wheels.
When changing the tyres or if there is increasing wear on the tyres, make sure that the difference in diameter between the tyres on the front and rear axles is no more than 3%.
! Otherwise the travel drive system may be damaged.

The correct tyre pressure is crucial for:
– Reliable behaviour of the machine in use
– Long tyre lifetime

You will find the following specifications in the table below:
– Recommended tyre sizes
– Tyre tread
– Tyre pressure

Abbreviations:
– **p – Max.** = maximum permissible air pressure
– **VA** = front axle
– **HA** = rear axle

The air pressure specifications refer to:
– Basic air pressure recommendations - as set when delivered from the factory
– Cold tyres
– Machine ready for operation - basic machine with standard equipment and permissible load

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Note
For special uses such as industrial timber handling or other uses where heavier loads may be expected, we recommend a higher tyre pressure, depending on the specific load.
However, the tyre pressure may not be greater than the maximum permitted by the tyre manufacturer's specifications.
! Check and adjust the tyre pressure, see the maintenance tasks in chapter 5.

Dunlop tyres Air pressure table for the standard machine

Tyre size	Tyre tread	Air pressure bar		
		VA	HA	p – Max.
365/70R18EM [1)]	SPT9-TL	3.75	2.00	3.75
405/70R18EM	SPT9-TL	3.00	1.75	3.75
335/80R20EM	SPT9-TL	3.50	2.00	3.75
365/80R20EM	SPT9-TL	3.00	1.75	3.75
405/70R20EM	SPT9-TL	2.75	1.75	3.75

[1)]Standard tyres

Michelin tyres Air pressure table for the standard machine

Tyre size	Tyre tread	Air pressure bar		
		VA	HA	p – Max.
375/75R20EM	XZSL-TL	2.25	1.60	3.80
375/75R20EM	XM27-TL	2.25	1.60	3.80
400/70R20EM	XMCL-TL	2.50	1.60	4.00
405/70R20EM	XZSL-TL	2.25	1.60	3.80

Goodyear tyres Air pressure table for the standard machine

Tyre size	Tyre tread	Air pressure bar		
		VA	HA	p – Max.
400/70R18EM	IT 520-TL	3.00	1.75	4.00

Bridgestone tyres Air pressure table for the standard machine

Tyre size	Tyre tread	Air pressure bar		
		VA	HA	p – Max.
365/80R20EM	VUT-TL	3.30	2.80	3.75
405/70R20EM	VUT-TL	3.10	2.70	3.75

Mitas tyres Air pressure table for the standard machine

Tyre size	Tyre tread	Air pressure bar		
		VA	HA	p – Max.
365/70R18	EM-01-TL	4.50	2.80	4.50

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Special tyres

Air pressure table for machines with special tyres:

Tyre size	Tyre tread	Air pressure bar		
		VA	HA	p – Max.
1)				
2)				
2)				

The specifications should be entered in the tables as follows:

1) By the manufacturer, if the machine is delivered ex-works with special tyres.

2) By the machine operator, if the machine is retrofitted by the machine operator.

Tyres for machines with optional accessories

Table 1 is for the type of optional accessory

Air pressure table 2 is for machines with optional accessories

Specifications	Type of optional accessory
1)	
2)	
2)	

Table 1

Tyre size	Tyre tread	Air pressure bar		
		VA	HA	p – Max.
1)				
2)				
2)				

Air pressure table 2

The specifications should be entered in the tables as follows:

1) By the manufacturer, if the machine is delivered ex-works with optional accessories.

2) By the machine operator, if the machine is retrofitted by the machine operator.

1.1.15 Air conditioning system

This equipment is optional.

Name	Value	Units
Refrigerant	R134a	
Cooling power	6.4	kW

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1.1.16 Snow chains or guard chains

bpik0044 

This equipment is optional.

When snow chains or guard chains are used, they must be attached to all four wheels.

Note

Failure to do this can damage the drive system.

! See the section on attachments and accessories in chapter 2.

1.1.17 Diesel particle filter

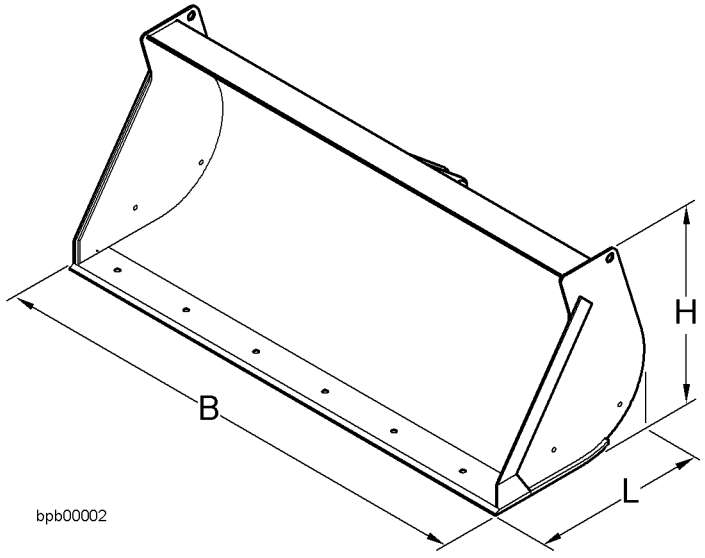
This equipment is optional.

Name	Value	Units
Filter medium	Ceramic block made from cordierite with catalytic coating	
Maximum exhaust gas counterpressure	0.2	bar

1.1.18 Light material bucket with undercut blade

bpik0039 

This equipment is optional.



bpb00002

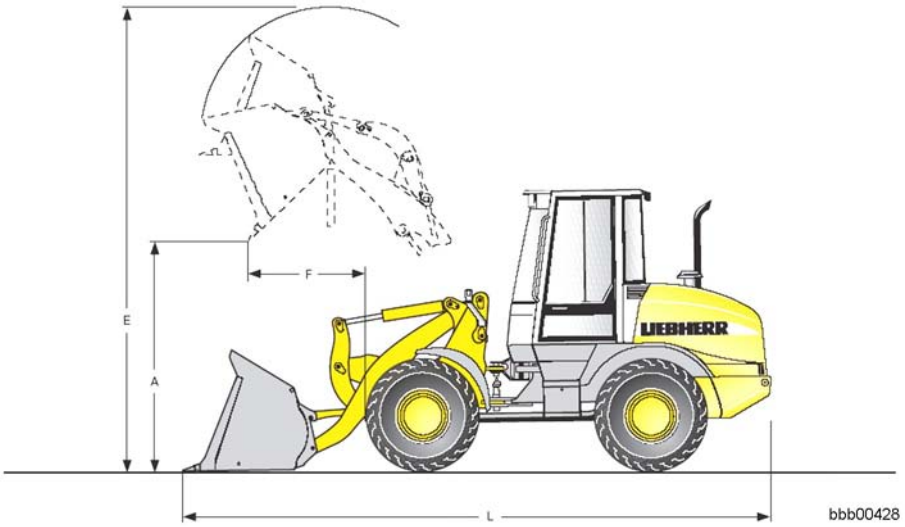
Dimensions

	Description	Unit	Value	
	Bucket capacity as per ISO 7546	m^3	1.1	1.6
	Specific material weight	t/m^3	1.3	0.9
B	Bucket width	mm	2220	2400
H	Height	mm	935	1050
L	Length	mm	913	1000
	Weight	kg	432	500

Complete machine with light material bucket

The values stated refer to the machine:
- With 365/70R18 tyres
- Including all lubricants
- With a full tank
- With ROPS/FOPS cab and driver

Tyre sizes and additional attachments affect the operating weight and tipping load.



Dimensions

	Description	Unit	Value	
	Bucket capacity as per ISO 7546	m^3	1.1	1.6
	Bucket width	mm	2200	2400
	Specific material weight	t/m^3	1.3	0.9
A	Dump height at maximum lifting height	mm	2511	2420
E	Maximum height above bucket top	mm	4123	4196
F	Reach at maximum lifting height	mm	866	890
L	Overall length	mm	5355	5410
	Tipping load when straight	kg	3437	3329
	Articulated tipping load	kg	3137	3039
	Operating weight	kg	5221	5311

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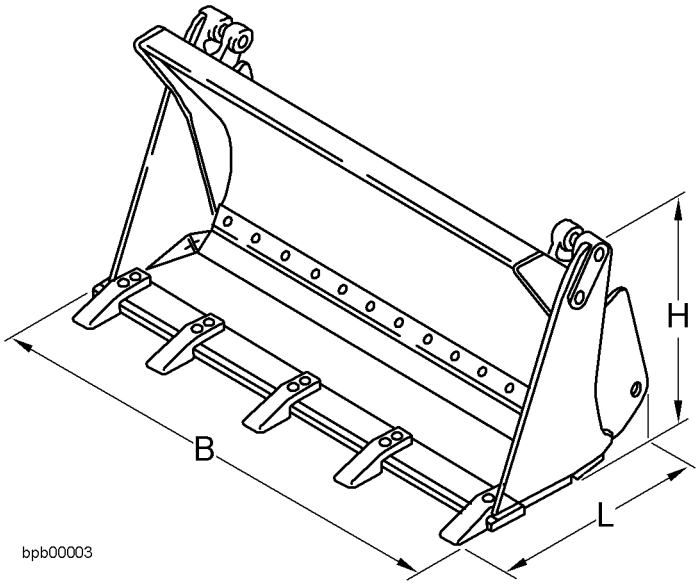
1.1.19 4 in 1 bucket

bpik0039 

This equipment is optional.



Dimensions

Name	Value	Units
Bucket capacity (ISO 7546)	0.7	m³
Specific material weight	1.8	t/m³
B – bucket width	2100	mm
H – height	930	mm
L – length with teeth	1020	mm
Weight	560	kg
Teeth – UNI-Z-2000	7	Pc.
Maximum hydraulic operating pressure	250	bar

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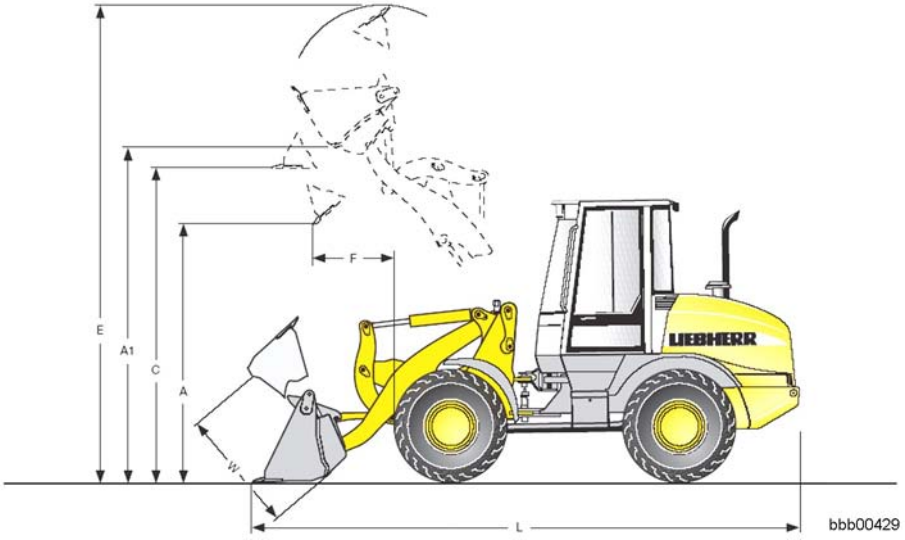
Complete machine with 4-in-1 bucket

The values stated refer to the machine:
– With 365/70R18 tyres
– Including all lubricants
– With a full tank
– With ROPS/FOPS cab and driver

Tyre sizes and additional attachments affect the operating weight and tipping load.



Dimensions

Name	Value	Units
A - Dump height at maximum lifting height and 42° tilt-out angle	2577	mm
A1 - Maximum dump height with bucket flap open	3203	mm
C - Maximum bucket base height	2946	mm
E - Maximum bucket top height	4215	mm
F - Reach at maximum lifting height and 42° tilt-out angle	824	mm
L - Overall length	5310	mm
W - Flap opening	1008	mm
Turning radius over bucket outer edge	3870	mm
Tipping load when straight	3145	kg
Articulated tipping load	2871	kg
Operating weight	5373	kg

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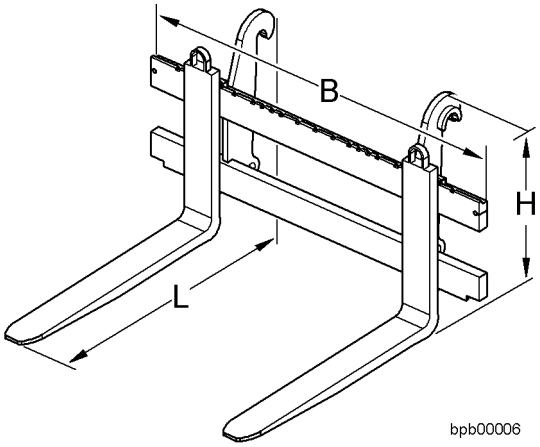
1.1.20 Forklift

bpik0040 

This equipment is optional.



Dimensions

Name	Value	Units
Fork carrier prong size	FEM II	
Prong length	1200	mm
L – Length (fork carrier + prongs)	1585	mm
B – Fork carrier width	1245	mm
H – Height (fork carrier + prongs)	860	mm
Weight (fork carrier + prongs)	255	kg

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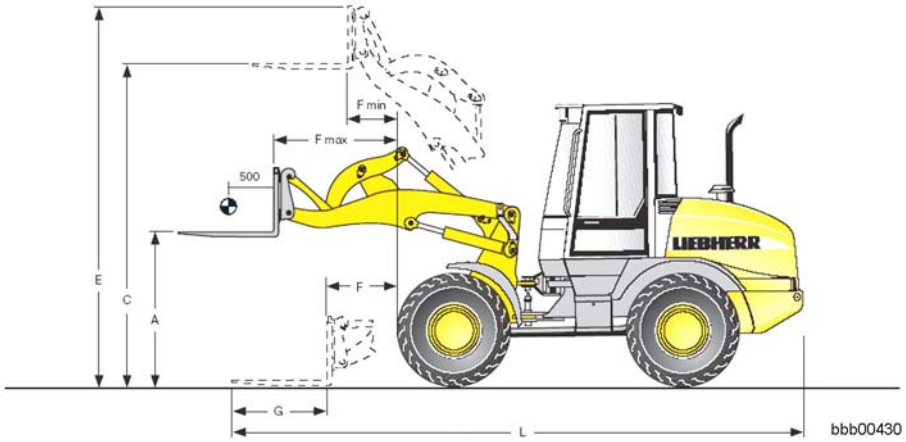
Complete machine with forks

The values stated refer to the machine:

- With 365/70R18 tyres
- With FEM II forks
- Including all lubricants
- With a full tank
- With ROPS/FOPS cab and driver
- In accordance with EN 474-3 and ISO 8313.

Tyre sizes and additional attachments affect the operating weight and tipping load.



Dimensions

Name	Value	Units
A - Lifting height at maximum reach	1452	mm
C - Maximum lifting height	3039	mm
E - Maximum height above fork carrier	3714	mm
F - Reach in loading position	741	mm
F max - Maximum reach	1258	mm
F min - Reach at maximum lifting height	550	mm
G - Fork prong length	1200	mm
L - Overall length of basic machine	5805	mm
Tipping load when straight	2629	kg
Articulated tipping load	2400	kg
Maximum payload on uneven terrain = 60 % of the static tipping load articulated	1440	kg
Maximum payload on even terrain = 80 % of the static tipping load articulated	1920	kg
Operating weight	5074	kg

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