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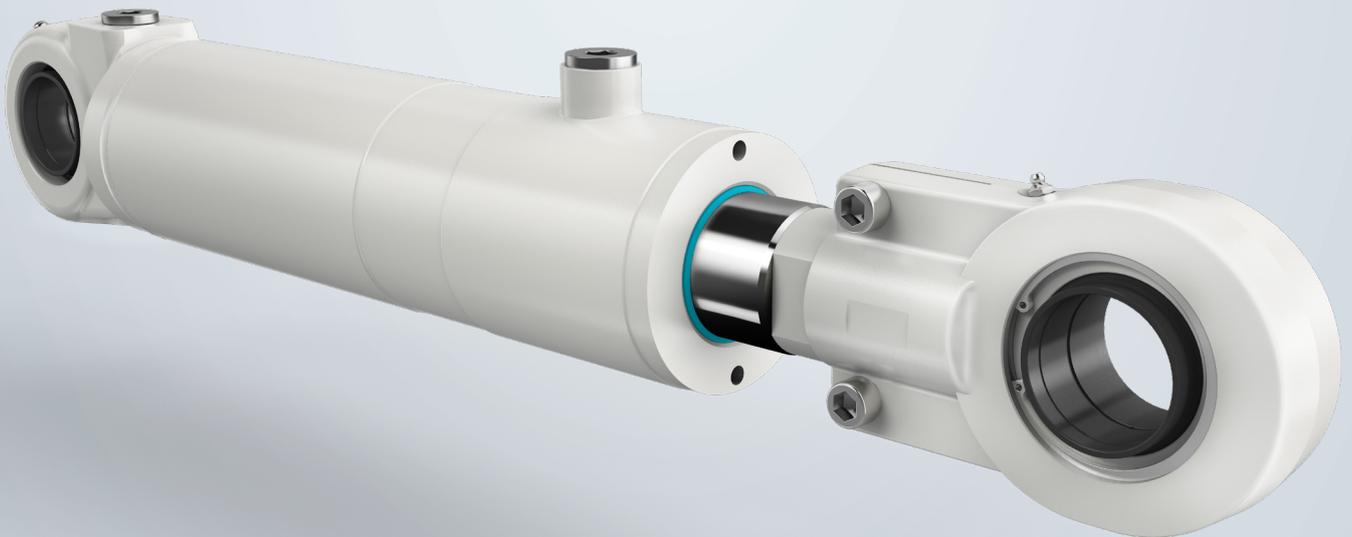
# Convertible

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Series-production  
range 260 bar

**LIEBHERR**

Components  
Hydraulic cylinders

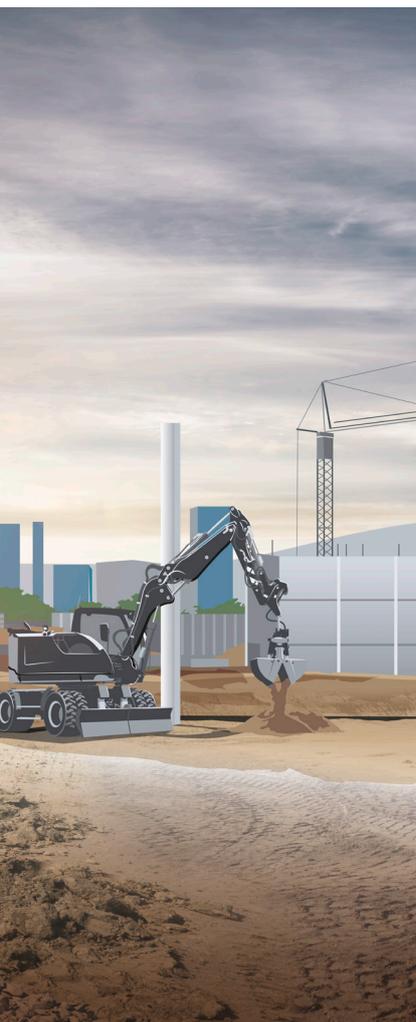




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# Mobile and stationary star

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With the 260 bar series-production range Liebherr offers its customers a range of hydraulic cylinders optimised to what is essential, which can still also be used in demanding conditions. With a broad selection of possible dimensions, mounting types, oil connections and piston rod coatings, the 260 bar series offers the necessary flexibility for a wide range of applications.

It includes 28 basic variants for the rated diameter combination of piston and piston rod. Four mounting types and two alternative oil connections are available for each of these basic variants. Depending on the environmental impacts, a single or double chrome coating can be selected. In order to be able to realise the most economical solution for the respective target application, no extended functions such as sensor technology or cushioning systems options are intended for this series.

## **Area of application**

The 260 bar series offers solutions for a wide range of applications that can be found both in mobile and stationary applications. For instance, on the one hand they are used in construction machines as well as in mobile work platforms and, on the other hand, in various industry applications such as presses. The hydraulic cylinders may also be exposed to static and dynamic loads.

# There is something for everyone here

## Robust – Series-production range 380 bar

The hydraulic cylinders of the series-production range 380 bar are mainly used in mobile applications. This also means that they can be used wherever durable and robust products are required in highly dynamic situations. The “eye-to-eye” mounting has been specially designed for connection to construction machinery to ensure optimum operation. The hybrid cylinder option is an added bonus. The use of carbon-fibre reinforced plastic saves on weight and increases machine efficiency.



## Intelligent – Series-production range according to ISO 6022

Designed specifically for industrial applications, the series-production range is designed and manufactured in accordance with the relevant ISO 6022 standards. The products are used in a wide variety of stationary applications, such as steel mills. A wide range of mounting options are available. In addition, the hydraulic cylinders can be fitted with a wide range of additional intelligent options as required (e.g. position transducer, end position cushioning or proximity switch).



## Series-production range 260 bar at a glance

Type	260 bar series-production range
Mounting types	Round flange at head, Basic variant, Fixed bushing eye at base, Spherical bearing eye at base, Swivel bearing mounting
Piston diameter	90-230 mm
Piston rod diameter	50-150 mm
Installation length	38-3,186 mm (depending on mounting type)
Stroke length	70-2,820 mm (depending on mounting type)
Piston rod coating	Single chrome coating NSS with 120 h Rating 9, Double chrome coating AASS with 96 h Rating 10 (hardened)
Piston rod connection	Threaded rod, Pre-assembled swivel head
Hydraulic port	Inch threaded connection acc. to 1179-1, Metric threaded connection acc. to ISO 9974-1
Vent Port	Without, VSTI screw plug rod side, VSTI screw plug piston side, VSTI screw plug on both sides
Paint	Primed white, Painted Liebherr grey (based on RAL7043)
Applications	Mobile machinery such as construction machines or work platforms, industry applications

# For use anywhere

1

## Adjusting cylinder

The hydraulic cylinders of the series-production range 260 bar can be used as adjusting cylinders in stationary applications such as recycling presses.

2

## Press cylinder

In a recycling press, the 260 bar hydraulic cylinder is used as a press cylinder. It compresses the recycling material.



The applications shown are examples of use.



3

**Hoist cylinder with pre-assembled swivel head**

The hoist cylinder can be configured with either a spherical bearing eye or a fixed bushing eye on the base, adding to its versatility for different applications.

4

**Rear ripper cylinder**

The hydraulic cylinder in the rear ripper makes it easier for bulldozers to work on the ground.

5

**Cylinder with swivel bearing mounting**

This type of attachment can also be configured as standard. It is responsible for lifting the shovel.

# Technical design

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## Hydraulic cylinder configuration

The hydraulic cylinders are calculated and designed using the latest technology. For example, the finite element method is used to help configure the designs. Accompanying impulse and endurance tests are also carried out to verify the calculation results.

The 260 bar series-production range is designed for dynamic and static applications. Also with this economical series Liebherr sets a reliable standard in terms of durability and resistance.

## Piston rod coating

A high quality single chrome plating with a thickness of 25 µm (±5 µm) is used as standard. For higher corrosion or impact protection requirements, a hardened piston rod with double chrome plating is available. This coating guarantees a minimum of 96 hours in the Acetic Acid Salt Spray (AASS) test to DIN EN ISO 9227 Rating 10. This version is available in piston rod diameters of 70 mm up to 125 mm.

## Seals

Seals are extremely important for the reliability of hydraulic cylinders. Liebherr uses a compact arrangement of seals and an innovative sealing system in the series-production range to meet the highest standards. This means that high quality, low friction seals are used as standard.

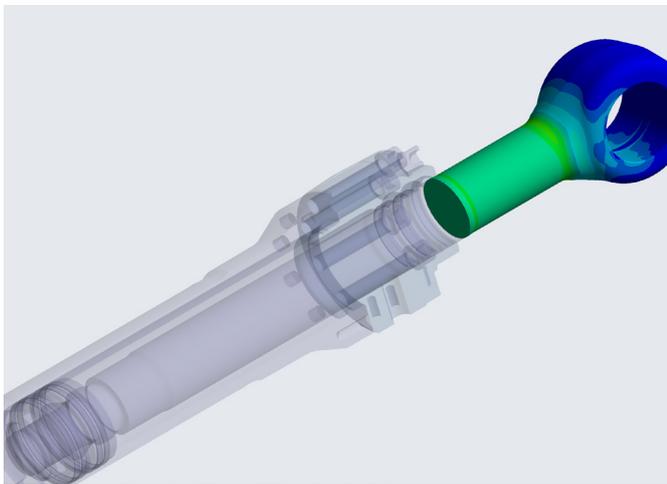
A proven tandem sealing system consisting of a primary and a secondary seal is used for the rod seal.

## Mounting types

In order to satisfy the diverse installation situations for hydraulic cylinders, the 260 bar series-production range has four possible mounting options:

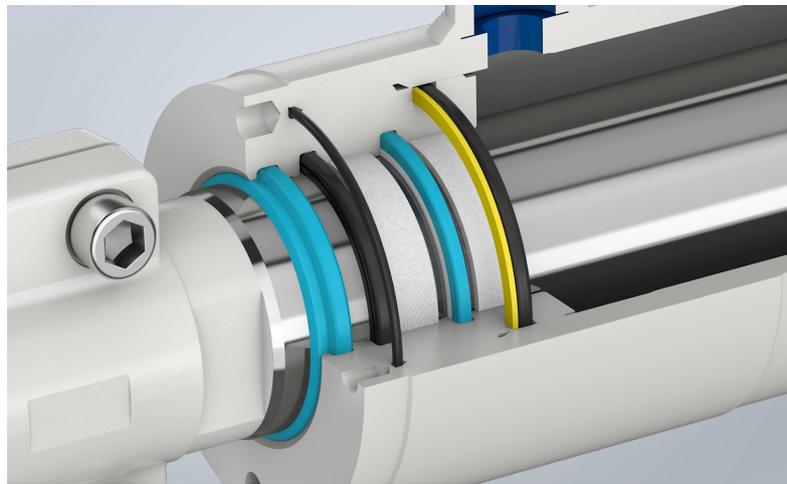
- Round flange at head (MF3)
- Bushing at base (MP3)
- Spherical bearing eye at base (MP5)
- Swivel bearing mounting (MT4)

The end of the piston rod is threaded for connection. An optional swivel head can also be pre-assembled.



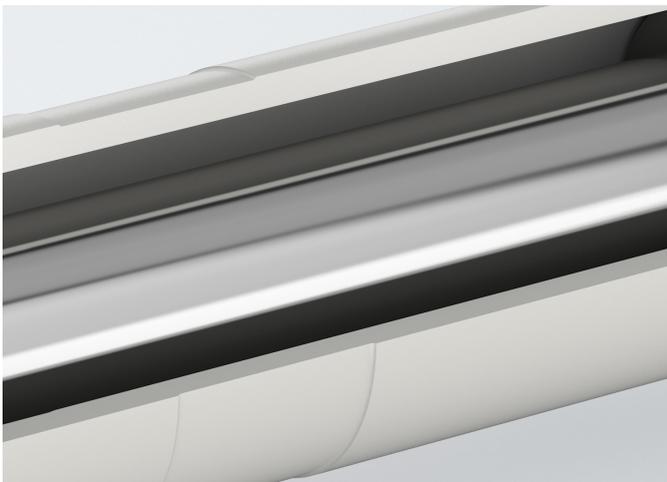
**Hydraulic cylinder configuration**

The hydraulic cylinders are designed according to the state of the art. This is supported by the use of the FEM method as well as pulse and endurance tests.



**Seals**

The seals are compactly arranged. A tandem sealing system is used.



**Piston rod coating**

The high quality coatings are adapted for use in hydraulic cylinders.



**Mounting types**

Five mounting types are available to suit a wide range of installation situations.

# Sizes and dimensions

The following table illustrates all relevant dimensions of the basic design. Any additional tolerance specifications are made available individually with the respective acceptance drawing. Each combination of piston and piston rod diameter defines a basic variant.

The following pages expand this version according to the respective mounting type. Depending on the mounting variant, there are further dimensions. They can be taken from the relevant tables.

At the customer's request each hydraulic cylinder in the series can also have a vent hole (G ¼"). Corresponding 3D models can be supplied for each variant.

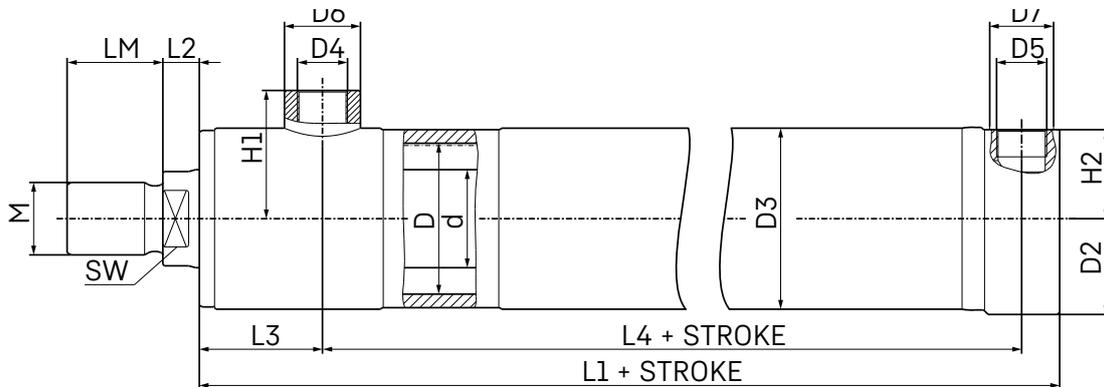
## Basic dimensions

D	d	M	LM	SW	L2 min.	D2	L4
90	50	M42x2	56	41	24	116	87
90	60	M42x2	56	50	24	116	87
100	60	M48x2	63	50	24	127	93
100	65	M48x2	63	50	24	127	93
110	60	M48x2	63	50	27	136	95
110	70	M48x2	63	60	27	136	95
120	70	M56x2	74	60	27	148	109
120	80	M56x2	74	65	27	148	109
130	75	M64x3	85	65	31	157	110
130	85	M64x3	85	70	31	157	110
140	80	M64x3	85	65	33	168	118
140	90	M64x3	85	75	33	168	118
150	85	M72x3	90	70	33	177	117
150	95	M72x3	90	80	33	177	117
160	95	M80x3	95	80	35	193	126
160	100	M80x3	95	85	35	193	126
170	100	M80x3	95	85	35	203	142
170	105	M80x3	95	90	35	203	142
180	100	M90x3	105	85	35	214	137
180	115	M90x3	105	100	35	214	137
190	105	M90x3	105	90	40	226	144
190	120	M90x3	105	105	40	226	144
200	115	M100x3	112	100	40	237	156
200	125	M100x3	112	110	40	237	156
210	120	M100x3	112	105	40	247	156
210	140	M100x3	112	120	40	247	156
220	140	M125x4	125	120	42	266	160
230	150	M125x4	125	130	42	274	160

\* according to ISO 1179-1

\*\* according to ISO 9974-1

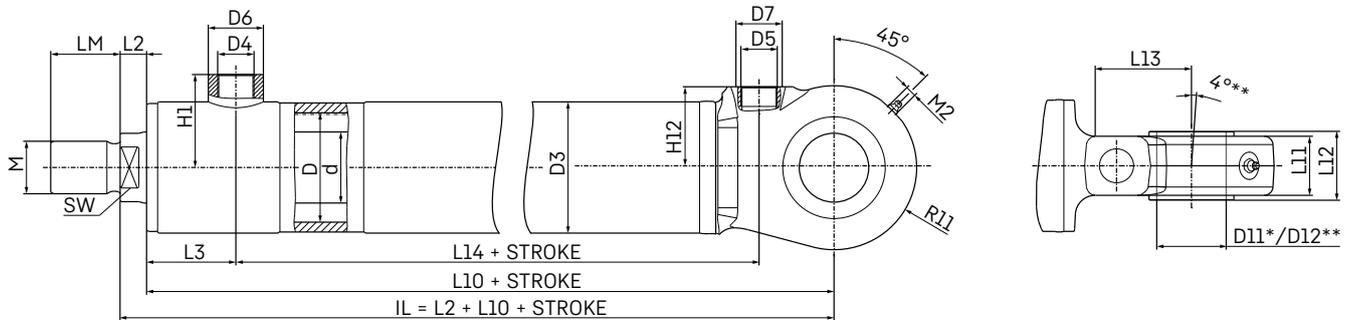
Note: If not otherwise indicated, all information are provided in millimetres.



Specific dimensions regarding mounting type

D4/D5 Standard Optional	D7	H2	L3	D6	H1 max.
G 3/4"/M27x2	42	54	76	42	75
G 3/4"/M27x2	42	54	76	42	75
G 1"/M33x2	47	59	81	50	85
G 1"/M33x2	47	59	81	50	85
G 1"/M33x2	47	64	83	50	90
G 1"/M33x2	47	64	83	50	90
G 1"/M33x2	47	70	88	50	95
G 1"/M33x2	47	70	88	50	95
G 1"/M33x2	47	75	89	50	103
G 1"/M33x2	47	75	89	50	103
G 1 1/4"/M42x2	58	79	92	60	108
G 1 1/4"/M42x2	58	79	92	60	108
G 1 1/4"/M42x2	58	84	95	60	113
G 1 1/4"/M42x3	58	84	95	60	113
G 1 1/4"/M42x2	58	92	110	60	120
G 1 1/4"/M42x2	58	92	110	60	120
G 1 1/4"/M42x2	58	97	110	60	125
G 1 1/4"/M42x2	58	97	110	60	125
G 1 1/4"/M42x2	58	103	115	60	130
G 1 1/4"/M42x2	58	103	115	60	130
G 1 1/2"/M48x2	65	108	120	70	140
G 1 1/2"/M48x2	65	108	120	70	140
G 1 1/2"/M48x2	65	114	120	70	148
G 1 1/2"/M48x2	65	114	120	70	148
G 1 1/2"/M48x2	65	119	130	70	153
G 1 1/2"/M48x2	65	119	130	70	153
G 1 1/2"/M48x2	65	128	133	70	158
G 1 1/2"/M48x2	65	133	133	70	165

# Fixed bushing eye and spherical bearing eye at base (MP3/MP5)

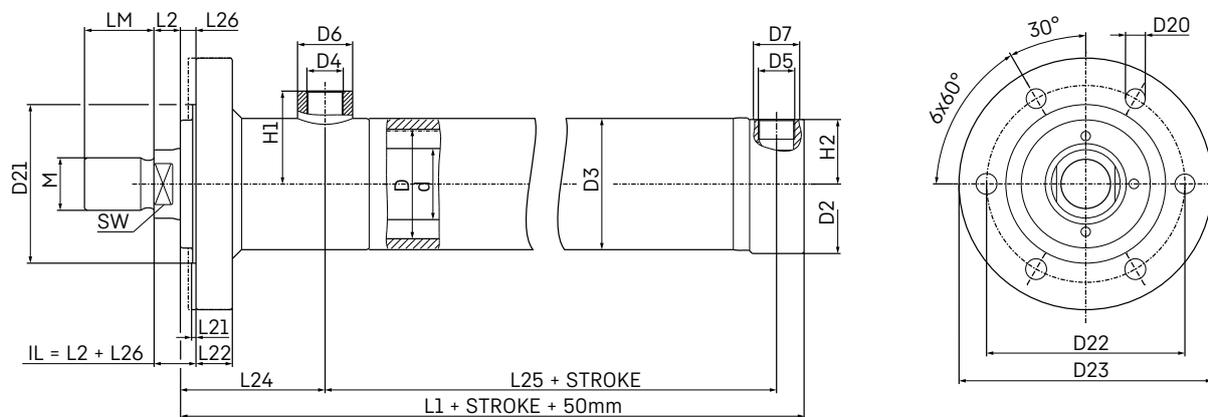


Basic dimensions		Specific dimensions regarding mounting type								
D	d	L10	L14	D11* / D12**	L12	L11	R11	H12	M2	L13
90	50	230	99	50	50	42	62	62	M10x1	68
90	60	230	99	50	50	42	62	62	M10x1	68
100	60	259	110	63	63	54	75	74	M10x1	87
100	65	259	110	63	63	54	75	74	M10x1	87
110	60	263	112	63	63	54	75	74	M10x1	87
110	70	263	112	63	63	54	75	74	M10x1	87
120	70	284	126	70	70	57	82	82	M10x1	80
120	80	284	126	70	70	57	82	82	M10x1	80
130	75	306	135	80	80	67	94	92	M10x1	100
130	85	306	135	80	80	67	94	92	M10x1	100
140	80	312	138	80	80	67	94	92	M10x1	100
140	90	312	138	80	80	67	94	92	M10x1	100
150	85	319	136	90	90	72	103	102	M10x1	99
150	95	319	136	90	90	72	103	102	M10x1	99
160	95	373	168	100	100	85	114	114	M10x1	120
160	100	373	168	100	100	85	114	114	M10x1	120
170	100	389	184	100	100	85	114	114	M10x1	120
170	105	389	184	100	100	85	114	114	M10x1	120
180	100	409	189	110	110	88	131	130	M10x1	137
180	115	409	189	110	110	88	131	130	M10x1	137
190	105	414	189	110	110	88	131	130	M10x1	137
190	120	414	189	110	110	88	131	130	M10x1	137
200	115	441	206	125	125	103	142	142	M10x1	141
200	125	441	206	125	125	103	142	142	M10x1	141
210	120	451	206	125	125	103	142	142	M10x1	141
210	140	451	206	125	125	103	142	142	M10x1	141
220	140	483	218	160	160	130	167	164	M10x1	165
230	150	483	218	160	160	130	167	164	M10x1	165

\* with bushing \*\* with spherical bearing

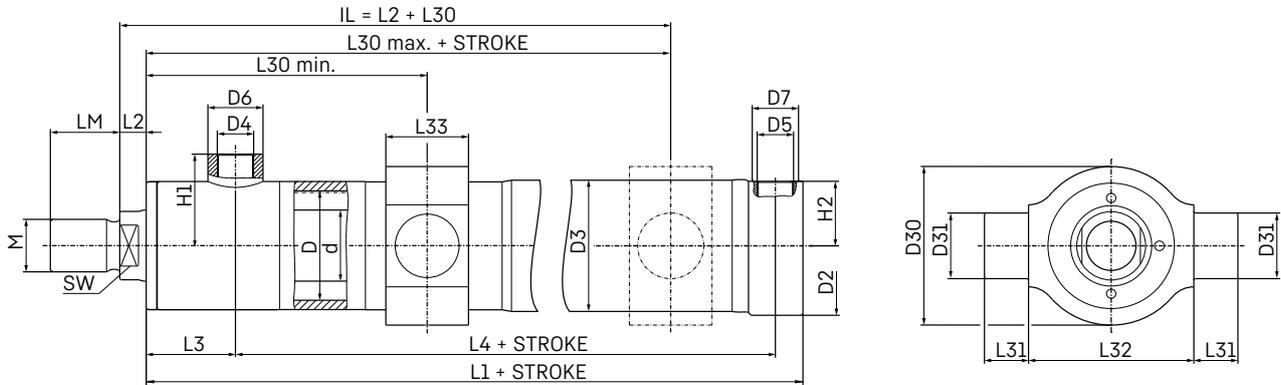
Note: Both bushing and spherical bearing eye are equipped with a screw thread M10x1 as well as a conical grease nipple according to DIN 71412 form A.

# Round flange at head (MF3)



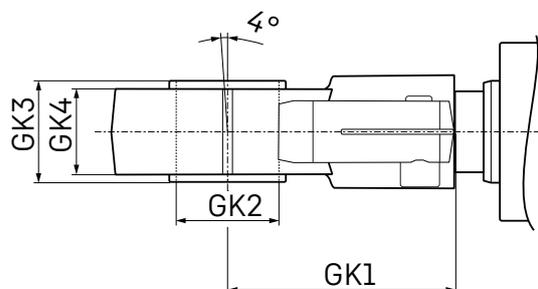
Basic dimensions		Specific dimensions regarding mounting types								
D	d	L24	L25	L26	L22	D23	D21	L21	D22	D20
90	50	126	87	14	28	210	135	4	165	17,5
90	60	126	87	14	28	210	135	4	165	17,5
100	60	131	93	14	33	230	145	4	180	17,5
100	65	131	93	14	33	230	145	4	180	17,5
110	60	133	95	16	33	245	160	4	195	22
110	70	133	95	16	33	245	160	4	195	22
120	70	138	109	17	37	255	175	5	210	22
120	80	138	109	17	37	255	175	5	210	22
130	75	139	110	17	37	275	190	5	230	22
130	85	139	110	17	37	275	190	5	230	22
140	80	142	118	15	42	290	205	5	245	22
140	90	142	118	15	42	290	205	5	245	22
150	85	145	117	15	42	315	220	5	260	26
150	95	145	117	15	42	315	220	5	260	26
160	95	160	126	15	47	330	230	5	275	26
160	100	160	126	15	47	330	230	5	275	26
170	100	160	142	15	47	350	245	5	295	26
170	105	160	142	15	47	350	245	5	295	26
180	100	165	137	15	52	370	260	5	315	26
180	115	165	137	15	52	370	260	5	315	26
190	105	170	144	15	52	385	275	5	330	26
190	120	170	144	15	52	385	275	5	330	26
200	115	170	156	18	54	425	290	8	355	33
200	125	170	156	18	54	425	290	8	355	33
210	120	180	156	18	54	440	305	8	370	33
210	140	180	156	18	54	440	305	8	370	33
220	140	183	160	18	59	460	320	8	390	33
230	150	183	160	18	59	470	335	8	400	33

# Swivel bearing mounting (MT4)



Basic dimensions		Specific dimensions regarding mounting type							
D	d	L30 min.	L30 max.	D3 max.	L33	D31	L31	L32	D30
90	50	240	48	110	65	50	35	140	130
90	60	240	48	110	65	50	35	140	130
100	60	255	52	120	75	60	40	150	146
100	65	255	52	120	75	60	40	150	146
110	60	260	53	135	80	65	40	170	156
110	70	260	53	135	80	65	40	170	156
120	70	270	67	145	85	70	45	195	170
120	80	270	67	145	85	70	45	195	170
130	75	275	64	155	95	80	50	205	186
130	85	275	64	155	95	80	50	205	186
140	80	290	64	170	105	90	60	225	196
140	90	290	64	170	105	90	60	225	196
150	85	295	66	180	105	90	60	230	210
150	95	295	66	180	105	90	60	230	210
160	95	320	83	190	120	100	60	240	226
160	100	320	83	190	120	100	60	240	226
170	100	320	99	200	120	100	60	250	240
170	105	320	99	200	120	100	60	250	240
180	100	330	94	215	130	110	70	260	256
180	115	330	94	215	130	110	70	260	256
190	105	340	99	225	130	110	70	270	266
190	120	340	99	225	130	110	70	270	266
200	115	345	106	235	140	120	80	300	280
200	125	345	106	235	140	120	80	300	280
210	120	360	111	245	150	130	80	320	296
210	140	360	111	245	150	130	80	320	296
220	140	363	118	260	150	130	80	340	306
230	150	368	113	270	160	140	90	360	320

# Swivel head and tolerances



Tolerance for swivel head acc. to ISO 8132

D	GK1	GK2	GK3	GK4
90	120	50	50	42
100	140	63	63	53,5
110	140	63	63	53,5
120	160	70	70	57
130	180	80	80	68
140	180	80	80	68
150	195	90	90	72
160	210	100	100	85,5
170	210	100	100	85,5
180	235	110	110	88
190	235	110	110	88
200	260	125	125	105
210	260	125	125	105
220	310	160	160	133
230	310	160	160	133

Tolerances for series-production range 260 bar

	Basic variant	Fixed bushing eye/spherical bearing eye at base	Round flange at head	Swivel bearing mounting	
Dimensions	E1 (ZJ)*	E4 (XC)*	E2 (WC)	E5 (XV)*	
Design	Grund	MP3	MF3	MT4	Stroke tolerance***
Stroke length					
≤ 1250	± 1,5	± 1,5	± 1,5	± 1,5	± 1
> 1250 ≤ 3150	± 3	± 3	± 3	± 3	± 2,5

\* Incl. stroke length

\*\* Not standardized

\*\*\* Stroke tolerances must not be added to the tolerances listed in this table.



# General information

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The maximum operating pressures must be less than or equal to the rated pressure of 260 bar. With increased loads such as pressure peaks or a high running frequency, the hydraulic cylinder design needs to be checked.

For the installation, commissioning, safe use, as well as the maintenance of the hydraulic cylinders of the 260 bar series, the relevant instruction and maintenance manual in its most up-to-date version must be observed.

Service and repair work on Liebherr products must only be carried out by specially trained personnel.

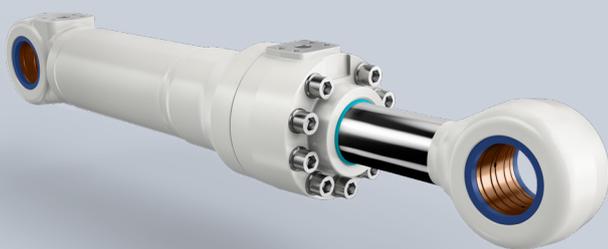
The selected seals of the hydraulic cylinders are suitable for the operation with mineral oils. The usability of the requested oil need to be verified by Liebherr in detail.

All graphic representations serve as an example and do not necessarily correspond to the configured product.

# Configure series- production ranges



Configure  
your hydraulic  
cylinder now



## 380 bar

### Highly dynamic and mobile applications of earth movement

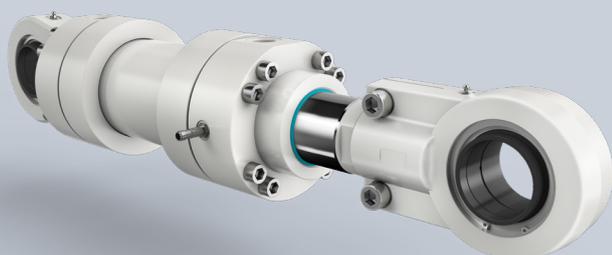
The hydraulic cylinders of the series-production range 380 bar come in handy mainly in mobile applications. This also means that they can be used wherever durable and robust products are required in highly dynamic situations. The “eye-eye mounting” was specially designed for connection to construction machinery and thus ensures optimal operation. The hybrid cylinder option is an added bonus. The use of carbon-fibre reinforced plastic saves on weight and increases machine efficiency.



## 260 bar

### Mobile and stationary applications

The hydraulic cylinders of the 260 bar series-production range can be used under demanding conditions of static and dynamic loads. A wide range of mounting types are available, including alternative oil connections and piston rod designs. The hydraulic cylinder adapts to fit your application.



## ISO 6022

### Mechanical and plant engineering

The hydraulic cylinders according to ISO 6022 come in handy in stationary applications, in which they can withstand equally with static and dynamic loads. The hydraulic cylinders can be equipped with a large portfolio of additional intelligent options (e.g. position transducer, end position cushioning or proximity switch) as required.

# Ready, set, configure

For the first time, Liebherr has made it possible to individually and easily configure all hydraulic cylinder series-production ranges via an online-based configurator on the company's website. Depending on the application and requirements, the configurator offers all kinds of variations: from the 380 bar series for mobile applications, the ISO 6022 series for industrial use all the way to the 260 bar series as a link between mobile and stationary applications.

***"When it comes to selecting and assembling the right product, the configurator offers assistance through stored logic and targeted user guidance."*** explains Jan Winter, product manager at Liebherr-Components Kirchdorf GmbH.



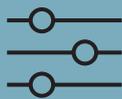
Available at any time on all devices, location-independent



CRP-hybrid cylinders configurable for 380 bar



Offer received within one business day



Wide range wavailable for many applications



Product key: Recall and saving is possible at any time



3D models and technical data for download



**Request your individually suitable offer now.**

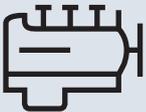
# Components

From A to Z – the components division of the Liebherr Group offers a broad range of solutions in the area of mechanical, hydraulic, electric and electronic drive system and control technology. The efficient components and systems are produced at a total of ten production sites around the world to the highest standards of quality. Central contact persons for all product lines are available to our customers at

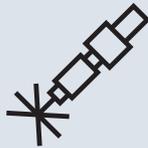
Liebherr-Components AG and the regional sales and distribution branches.

Liebherr is your partner for joint success: from the product idea to development, manufacture and commissioning right through to customer service solutions like remanufacturing.

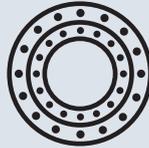
[components.liebherr.com](http://components.liebherr.com)



Engines



Fuel injection systems



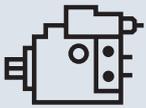
Slewing bearings



Gearboxes



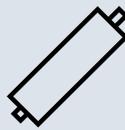
Winches



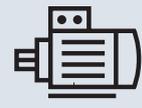
Hydraulic pumps and motors



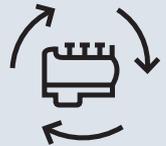
Hydraulic cylinders



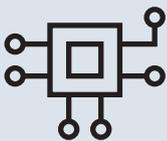
Piston accumulators



Electric machines



Remanufacturing



Industrial electronics



Electrical drive and control technology



Drive systems



Aerospace electronics



Fibre composite

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