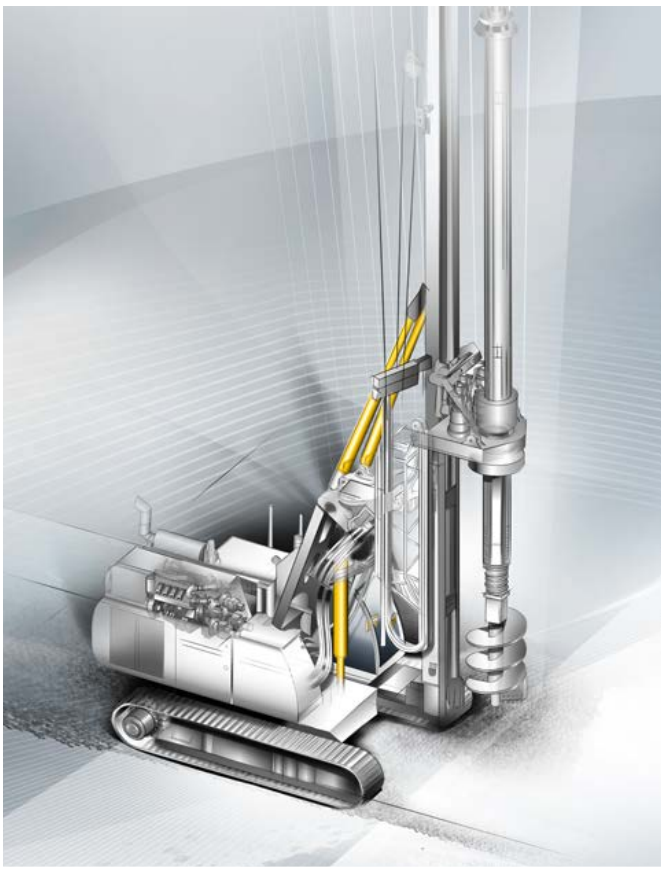
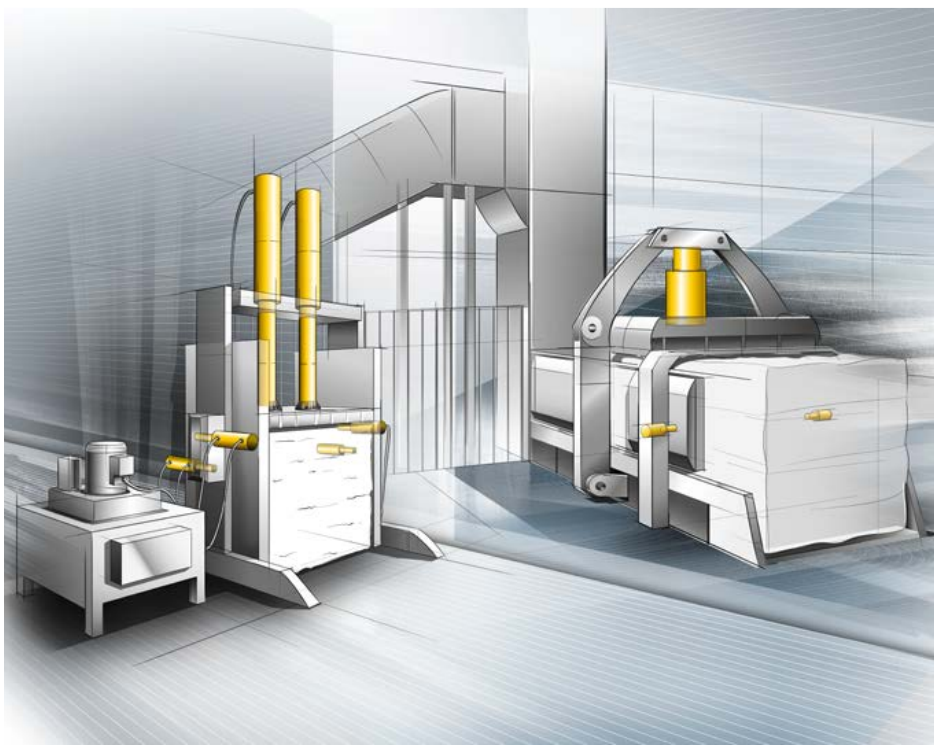
Hydraulic Cylinders by Liebherr

260 bar Series-Production Range

LIEBHERR

260 bar Series-Production Range





Economical solutions for the essentials

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.

Also interesting?

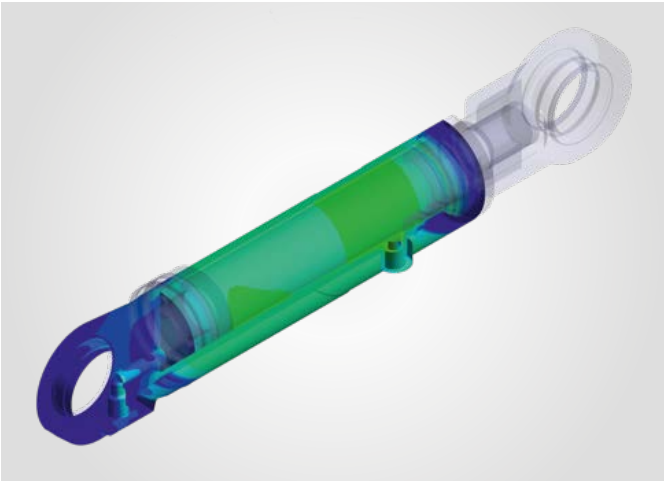
380 bar series-production range
The hydraulic cylinders in the 380 bar series are mainly used in mobile applications. They are used wherever durable and robust products are required in highly dynamic applications. The “eye-eye mounting" specially designed for connection in construction machines guarantees optimal operation.
A highlight is the optional equipment with Liebherr's own position transducer LiView®, which reliably records the linear movement during work.

Series-production range according to ISO 6022
The series developed specially for industry applications is designed and manufactured according to the applicable standards of ISO 6022. The products are used in various stationary applications such as steelworks, for example. There is a wide selection of mounting types available. Furthermore, the hydraulic cylinders can be equipped with a large portfolio of configurable additional optional equipment (e.g. position transducer, end of stroke cushioning, proximity switch or pressure sensor) as required.

Product range – overview

Type	Differential cylinder
Operating pressure	Max. 260 bar
Stroke lengths	Up to 3,100 mm (depending on application); longer lengths available on request
Piston diameter	90–230 mm
Piston rod diameter	50–150 mm
Mounting types	Bushing or spherical bearing eye at base, round flange at head, trunnion mounting
Piston rod connection	Rod thread; available with appropriate swivel head as option
Media connection	Threaded connection in inches; metric threaded connection at the customer's request
Consumables	Hydraulic oils acc. to ISO 4406: 20/18/15
Coating	Chrome coating with 25 µm (±5 µm); double chrome coating AASS with 96 h Rating 10 at the customer's request
Corrosion protection	Primed; painted at the customer's request
Operating temperature	-20 °C to +80 °C
Piston speed	Up to 1 m/s
Intended type of use	Dynamic, static
Applications	Mobile machinery such as construction machines or work platforms, industry applications

Technical Design



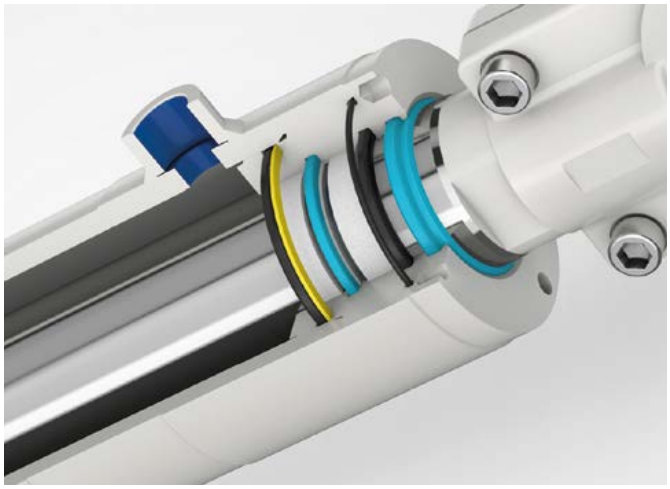
Hydraulic cylinder configuration

The hydraulic cylinders are computed and designed using state-of-the-art technology. Here, for example, the finite element method is used to help configure the designs. Supporting pulse 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 coating with a thickness of 25 µm (±5 µm) is used as standard. A hardened piston rod with a double chrome coating is available for higher corrosion or impact protection requirements. This coating guarantees at least 96 h in acetic acid-salt spray test (AASS) according to DIN EN ISO 9227 Rating 10.



Seals

Seals are extremely important for the reliability of hydraulic cylinders. Liebherr also uses a compact arrangement of seals and an innovative sealing system in the series to satisfy the most exacting of standards. This means that high-quality and low-friction seals are already 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:

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

For the connection of the piston rod, its end is provided with a thread. An appropriate swivel head can also be pre-assembled as an option.

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").

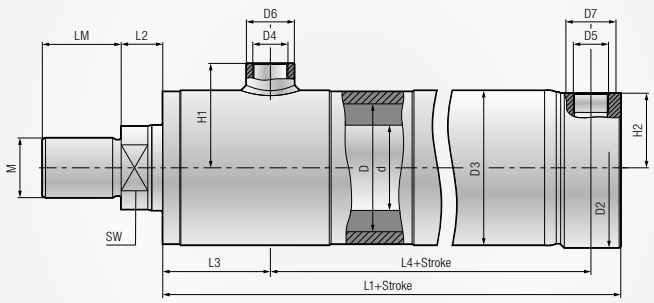
Corresponding 3D models can be supplied for each variant.

Basic dimensions						Oil connection at piston rod end				
D	**d**	**D2**	**D3 max.**	**L1**	**Stroke min.**	**L3**	**D4 Standard***	**Optional****	**D6**	**H1 max.**
90	50	116	112	185	230	76	G 3/4"	M27x2	38	75
90	60	116	112	185	230	76	G 3/4"	M27x2	38	75
100	60	127	124	199	220	81	G 1"	M33x2	45	85
100	65	127	124	199	220	81	G 1"	M33x2	45	85
110	60	136	134	203	220	83	G 1"	M33x2	45	90
110	70	136	134	203	220	83	G 1"	M33x2	45	90
120	70	148	148	222	200	88	G 1"	M33x2	45	95
120	80	148	148	222	200	88	G 1"	M33x2	45	95
130	75	157	158	224	200	89	G 1"	M33x2	45	103
130	85	157	158	224	200	89	G 1"	M33x2	45	103
140	80	168	169	240	190	92	G 1 1/4"	M42x2	60	108
140	90	168	169	240	190	92	G 1 1/4"	M42x2	60	108
150	85	178	180	242	190	97	G 1 1/4"	M42x2	60	113
150	95	178	180	242	190	97	G 1 1/4"	M42x2	60	113
160	95	193	191	266	170	110	G 1 1/4"	M42x2	60	120
160	100	193	191	266	170	110	G 1 1/4"	M42x2	60	120
170	100	203	203	282	150	110	G 1 1/4"	M42x2	60	125
170	105	203	203	282	150	110	G 1 1/4"	M42x2	60	125
180	100	214	215	282	150	115	G 1 1/4"	M42x2	60	130
180	115	214	215	282	150	115	G 1 1/4"	M42x2	60	130
190	105	226	226	299	150	120	G 1 1/2"	M48x2	70	140
190	120	226	226	299	150	120	G 1 1/2"	M48x2	70	140
200	115	237	238	311	130	120	G 1 1/2"	M48x2	70	148
200	125	237	238	311	130	120	G 1 1/2"	M48x2	70	148
210	120	247	249	321	120	130	G 1 1/2"	M48x2	70	153
210	140	247	249	321	120	130	G 1 1/2"	M48x2	70	153
220	140	268	271	328	120	133	G 1 1/2"	M48x2	70	158
230	150	280	283	328	120	133	G 1 1/2"	M48x2	70	165

* according to ISO 1179-1

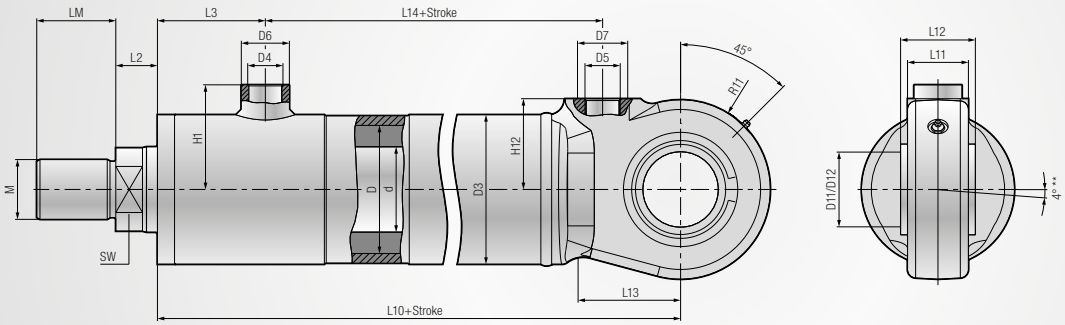
** according to ISO 9974-1

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



Oil connection at base					Piston rod end			
L4	**D5 Standard***	**Optional****	**D7**	**H2**	**L2 min.**	**M**	**LM**	**SW**
87	G 3/4"	M27x2	42	54	24	M42x2	56	40
87	G 3/4"	M27x2	42	54	24	M42x2	56	50
93	G 1"	M33x2	47	59	24	M48x2	63	50
93	G 1"	M33x2	47	59	24	M48x2	63	50
95	G 1"	M33x2	47	64	27	M48x2	63	50
95	G 1"	M33x2	47	64	27	M48x2	63	60
109	G 1"	M33x2	47	70	27	M56x2	74	60
109	G 1"	M33x2	47	70	27	M56x2	74	65
110	G 1"	M33x2	47	75	31	M64x3	85	65
110	G 1"	M33x2	47	75	31	M64x3	85	70
118	G 1 1/4"	M42x2	58	79	33	M64x3	85	65
118	G 1 1/4"	M42x2	58	79	33	M64x3	85	75
115	G 1 1/4"	M42x2	58	84	33	M72x3	90	70
115	G 1 1/4"	M42x2	58	84	33	M72x3	90	80
126	G 1 1/4"	M42x2	58	92	35	M80x3	95	80
126	G 1 1/4"	M42x2	58	92	35	M80x3	95	85
142	G 1 1/4"	M42x2	58	97	35	M80x3	95	85
142	G 1 1/4"	M42x2	58	97	35	M80x3	95	90
137	G 1 1/4"	M42x2	58	103	35	M90x3	105	85
137	G 1 1/4"	M42x2	58	103	35	M90x3	105	100
144	G 1 1/2"	M48x2	65	108	40	M90x3	105	90
144	G 1 1/2"	M48x2	65	108	40	M90x3	105	105
156	G 1 1/2"	M48x2	65	114	40	M100x3	112	100
156	G 1 1/2"	M48x2	65	114	40	M100x3	112	110
156	G 1 1/2"	M48x2	65	119	40	M100x3	112	105
156	G 1 1/2"	M48x2	65	119	40	M100x3	112	120
160	G 1 1/2"	M48x2	65	130	42	M125x4	125	120
160	G 1 1/2"	M48x2	65	136	42	M125x4	125	130

Bushing or Spherical Bearing Eye (MP3/MP5)



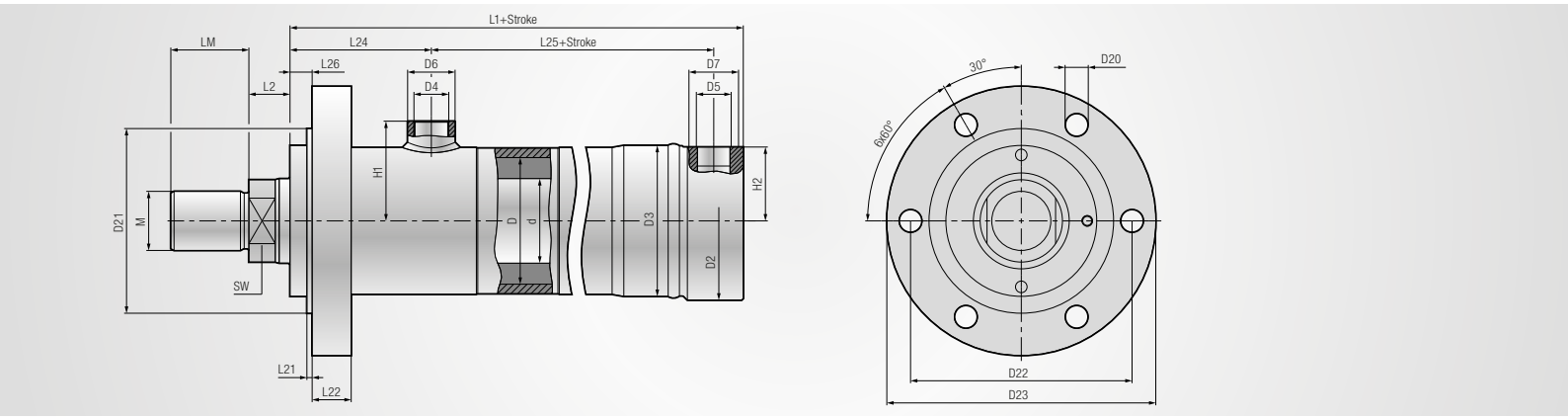
Basic dimensions			Oil connection at base		Specific dimensions regarding mounting type				
D	**d**	**L10**	**L14**	**H12**	**L11**	**L12**	**D11* (H9) / D12** (H7)**	**L13**	**R11**
90	50	230	99	62	42	50	50	68	62
90	60	230	99	62	42	50	50	68	62
100	60	259	110	74	54	63	63	87	75
100	65	259	110	74	54	63	63	87	75
110	60	263	112	74	54	63	63	87	75
110	70	263	112	74	54	63	63	87	75
120	70	284	126	82	57	70	70	80	82
120	80	284	126	82	57	70	70	80	82
130	75	306	135	92	67	80	80	101	94
130	85	306	135	92	67	80	80	101	94
140	80	312	138	92	67	80	80	100	94
140	90	312	138	92	67	80	80	100	94
150	85	319	134	102	72	90	90	99	103
150	95	319	134	102	72	90	90	99	103
160	95	373	168	114	85	100	100	120	114
160	100	373	168	114	85	100	100	120	114
170	100	389	183	114	85	100	100	120	114
170	105	389	183	114	85	100	100	120	114
180	100	409	189	130	88	110	110	137	131
180	115	409	189	130	88	110	110	137	131
190	105	414	189	130	88	110	110	137	131
190	120	414	189	130	88	110	110	137	131
200	115	441	206	142	103	125	125	141	142
200	125	441	206	142	103	125	125	141	142
210	120	451	206	142	103	125	125	141	142
210	140	451	206	142	103	125	125	141	142
220	140	483	218	164	130	160	160	165	167
230	150	483	218	164	130	160	160	165	167

* with bushing

** with spherical bearing

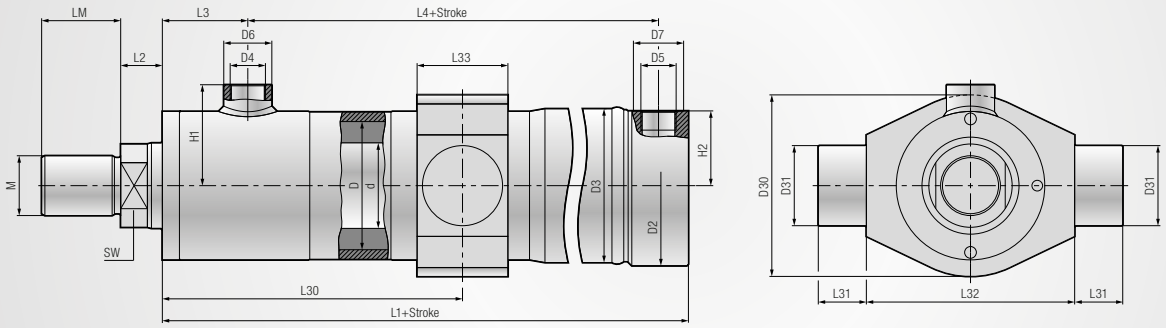
Note: Both bushing and spherical bearing eye are equipped with a screw thread M10x1 as well as a concial grease nipple according to DIN 71412 form A.

Round Flange at Head (MF3)



Basic dimensions		Oil connection at piston rod end	Oil connection at base	Specific dimensions regarding mounting type						
D	**d**	**L24**	**L25**	**D20**	**L21**	**D21 (f8)**	**L22**	**D22 (js13)**	**D23**	**L26**
90	50	126	87	18	4	135	28	165	210	14
90	60	126	87	18	4	135	28	165	210	14
100	60	131	93	18	4	145	33	180	230	14
100	65	131	93	18	4	145	33	180	230	14
110	60	133	95	22	4	160	33	195	245	16
110	70	133	95	22	4	160	33	195	245	16
120	70	138	109	22	5	175	37	210	255	17
120	80	138	109	22	5	175	37	210	255	17
130	75	139	110	22	5	190	37	230	275	17
130	85	139	110	22	5	190	37	230	275	17
140	80	142	118	22	5	205	42	245	290	15
140	90	142	118	22	5	205	42	245	290	15
150	85	147	115	26	5	220	42	260	315	15
150	95	147	115	26	5	220	42	260	315	15
160	95	160	126	26	5	230	47	275	330	15
160	100	160	126	26	5	230	47	275	330	15
170	100	160	142	26	5	245	47	295	350	15
170	105	160	142	26	5	245	47	295	350	15
180	100	165	137	26	5	260	52	315	370	15
180	115	165	137	26	5	260	52	315	370	15
190	105	170	144	26	5	275	52	330	385	15
190	120	170	144	26	5	275	52	330	385	15
200	115	170	156	33	8	290	54	355	425	18
200	125	170	156	33	8	290	54	355	425	18
210	120	180	156	33	8	305	54	370	440	18
210	140	180	156	33	8	305	54	370	440	18
220	140	183	160	33	8	320	59	390	460	18
230	150	183	160	33	8	335	59	400	470	18

Trunnion Mounting (MT4)

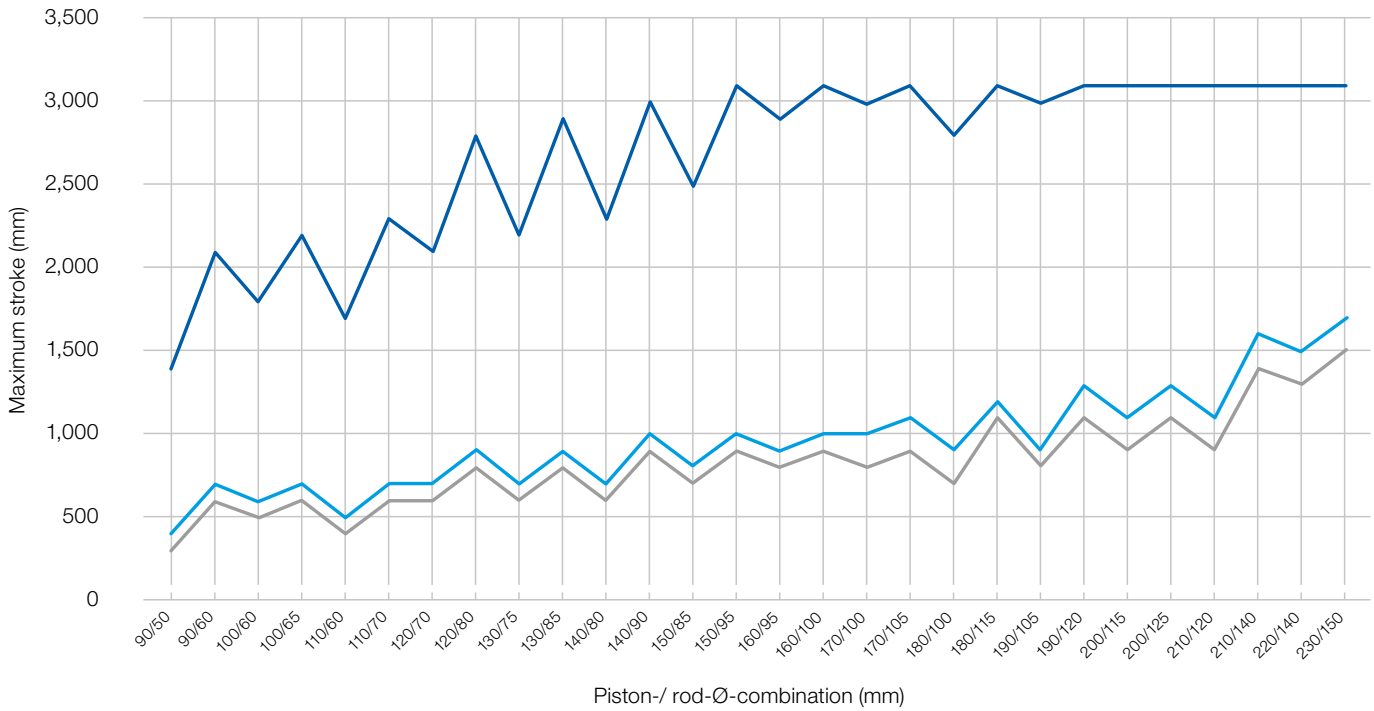


Basic dimensions		Specific dimensions regarding mounting type						
D	**d**	**L30 min.**	**L30 max.***	**D30**	**L31**	**D31 (f8)**	**L32 (h12)**	**L33**
90	50	240	48	130	35	50	140	65
90	60	240	48	130	35	50	140	65
100	60	255	52	145	40	60	150	75
100	65	255	52	145	40	60	150	75
110	60	260	53	155	40	65	170	80
110	70	260	53	155	40	65	170	80
120	70	270	67	170	45	70	195	85
120	80	270	67	170	45	70	195	85
130	75	275	64	185	50	80	205	95
130	85	275	64	185	50	80	205	95
140	80	290	64	195	60	90	225	105
140	90	290	64	195	60	90	225	105
150	85	295	66	210	60	90	230	105
150	95	295	66	210	60	90	230	105
160	95	320	83	225	60	100	240	120
160	100	320	83	225	60	100	240	120
170	100	320	99	240	60	100	250	120
170	105	320	99	240	60	100	250	120
180	100	330	94	255	70	110	260	130
180	115	330	94	255	70	110	260	130
190	105	340	99	265	70	110	270	130
190	120	340	99	265	70	110	270	130
200	115	345	106	280	80	120	300	140
200	125	345	106	280	80	120	300	140
210	120	360	111	295	80	130	320	150
210	140	360	111	295	80	130	320	150
220	140	363	118	305	80	130	340	150
230	150	368	113	320	90	140	360	160

* additional selected stroke

Buckling Resistance and General Information

In order to ensure safe operation of a hydraulic cylinder, the buckling resistance must be checked with the respective configuration. The following graphic shows the maximum possible stroke in relation to the respective piston/rod diameter basic variant with an assumed buckling resistance of 3.0. Depending on the selected mounting type, with a swivel head assembled at the piston rod there is the respective Euler case and the resulting maximum stroke.
Depending on the application, selected mounting type and buckling resistance required, an individual determination of the possible stroke is required.



Round flange at head (MF3) – Case 3
Bushing or spherical bearing eye (MP3/MP5) – Case 2
Trunnion mounting (MT4) – Case 2

Buckling according Euler cases with buckling resistance of 3.0 and swivel head at an operation pressure of 260 bar

General information

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.

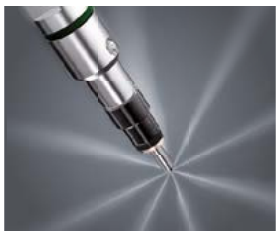
The selected seals of the hydraulic cylinders are suitable for the operation with mineral oils. The usability of the requested oil need to be verified by Liebherr in detail.

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

Liebherr Components

Gas engines

Diesel engines



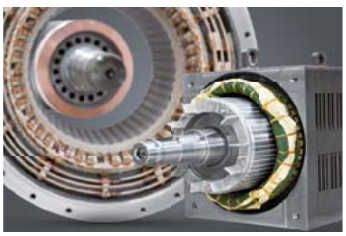
Fuel injection systems

Axial piston hydraulics

Hydraulic cylinders

Slewing bearings

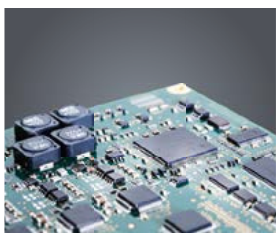
Gearboxes and winches



Electric machines

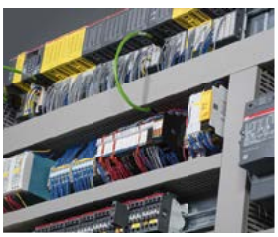
Remanufacturing

Human-machine interfaces and gateways



Control electronics and sensor technology

Power electronics



Control cabinets

Software

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.

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