

# Differential cylinder type LVM

## Product documentation



Operating pressure  $p_{\max}$ : 160 bar  
permissible stroke speed:  $\leq 0.1$  m/s



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## 1 Overview of the differential cylinder type LVM

Differential cylinders are double-acting cylinders with a single-ended piston rod. They thus have effective areas of two different sizes: The larger piston area is for extension and a smaller ring area is for retraction. If the cylinder is to generate tensile forces, the largest available ring area is selected.

The differential cylinder type LVM is designed for a traversing speed up to 0.1 m/s, and thanks to its high-quality seal system can remain in position for extended periods. When operated correctly it is capable of performing at least 100,000 double strokes.

For special applications the differential cylinder type LVM can be equipped with customer-specific sealing elements and manufactured in customer-specific stroke lengths. Thanks to its short and compact design, it is ideally suited to mini-hydraulic solutions from the HAWE Hydraulik product range.

### Features and benefits

- suitable for high loadings (made of steel)
- The compressed design enables free positioning of the hydraulic connections over 360 degrees and is cost-efficient
- Piston diameters 20, 25, 32 and 40 mm
- Stroke 15 to 400 mm, depending on the size
- leak-tight internal and external technical seals for positioning maintained over an extended period of time
- short and compact design

### Intended applications

- Airline seats
- Operating tables
- Window lifters
- Rescue stretchers



*Differential cylinder type LVM size 2010*



*Differential cylinder type LVM size 2516*



*Differential cylinder type LVM size 4024*

## 2 Available versions

### Ordering example

LVM2010	-0015	-3
LVM3220	-0400	-1

2.2 "Cylinder foot"

**Stroke** Standard strokes available. Special strokes available on request.

### 2.1 "Basic type and size"

#### **i** NOTE

Minimum order quantity: 20 pieces of each version

### 2.1 Basic type and size

Type	Piston diameter (mm)	Piston area (cm <sup>2</sup> )	Ring area (cm <sup>2</sup> )	max. force (N) at 160 bar	
				on extension	on retraction
LVM 2010	20	3,14	2,35	5000	3700
LVM 2512	25	4,91	3,77	7800	6000
LVM 2516	25	4,91	2,90	7800	4600
LVM 3220	32	8,04	4,90	12 800	7800
LVM 4024	40	12,56	8,03	20 000	12 800

### 2.2 Cylinder foot

Coding	for size	Description
-1	2516 3220 4024	<ul style="list-style-type: none"> <li>with internal thread</li> </ul>
-3	2010 2512	<ul style="list-style-type: none"> <li>with pivot eye</li> </ul>

Attachment parts see Chapter 6.1, "Accessories, spare and individual parts"

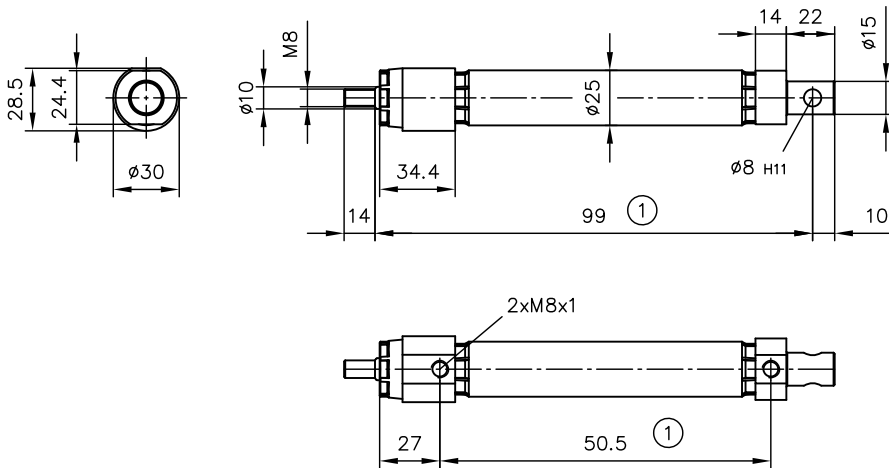
**3.1 General data**

<b>Design</b>	Double-acting cylinder with single-ended piston rod
<b>Material</b>	steel
<b>Installation position</b>	any
<b>Line connection</b>	M8x1
<b>piston seal</b>	O-ring / slide ring
<b>Rod seal</b>	Lip seal / double wiper
<b>Operating pressure</b>	5 - 160 bar
<b>permissible stroke speed</b>	≤ 0.1 m/s
<b>Hydraulic fluid</b>	Hydraulic fluid, according to DIN 51 524 Parts 1 to 3; ISO VG 10 to 68 according to DIN ISO 3448 Viscosity range: 12 - 230 mm <sup>2</sup> /s
<b>Cleanliness level</b>	<b>ISO 4406</b> <u>19/17/14</u>
<b>Temperatures</b>	Environment: approx. -25 ... +80 °C, hydraulic fluid: -10 ... +80 °C, ensure the correct viscosity range.

## 4 Dimensions

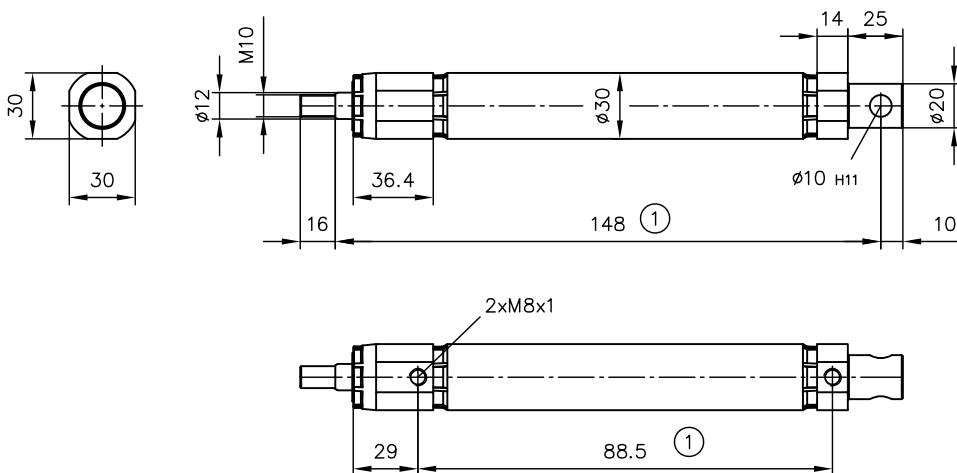
All dimensions in mm, subject to change.

### LVM 2010



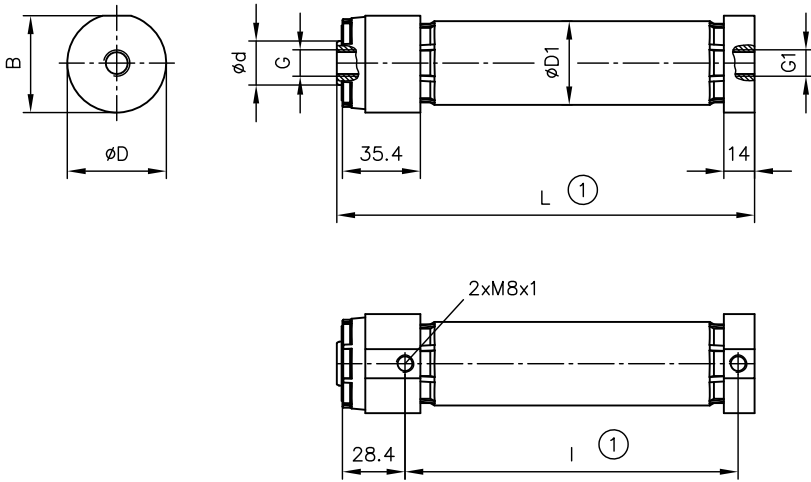
1 + stroke (cylinder retracted)

### LVM 2512



1 + stroke (cylinder retracted)

LVM 2516  
LVM 3220  
LVM 4024



1 + stroke (cylinder retracted)

Type	B	$\varnothing d$	$\varnothing D$	$\varnothing D1$	G	G1	l	L
LVM 2516	38.5	16	40	30	M10, 15 deep	M10, 17 deep	48	86
LVM 3220	44	20	45	38	M12, 22 deep	M12, 17 deep	51,5	90
LVM 4024	47	24	48	48	M16, 25 deep	M16, 17 deep	51,5	90



## 5 Installation, operation and maintenance information

Observe the document B 5488 "General operating instructions for assembly, commissioning, and maintenance."

### 5.1 Intended use

This product is intended exclusively for hydraulic applications (fluid technology).

The user must observe the safety measures and warnings in this document.

#### Essential requirements for the product to function correctly and safely:

- ▶ All information in this documentation must be observed. This applies in particular to all safety measures and warnings.
- ▶ The product must only be assembled and put into operation by specialist personnel.
- ▶ The product must only be operated within the specified technical parameters described in detail in this document.
- ▶ All components must be suitable for the operating conditions when using an assembly.
- ▶ The operating instructions for the components, assemblies and the specific complete system must also always be observed.

#### If the product can no longer be operated safely:

1. Remove the product from operation and mark it accordingly.
  - ✓ It is then not permitted to continue using or operating the product.

### 5.2 Assembly information

The product must only be installed in the complete system with standard and compliant connection components (screw fittings, hoses, pipes, fixtures etc.).

The product must be shut down correctly prior to disassembly (in particular in combination with hydraulic accumulators).



#### DANGER

##### Sudden movement of the hydraulic drives when disassembled incorrectly

Risk of serious injury or death

- ▶ Depressurise the hydraulic system.
- ▶ Perform safety measures in preparation for maintenance.

### 5.3 Operating instructions

Observe product configuration and pressure/flow rate.

The statements and technical parameters in this document must be strictly observed.

The instructions for the complete technical system must also always be followed.



#### DAMAGE

- ▶ Read the documentation carefully before usage.
- ▶ The documentation must be accessible to the operating and maintenance staff at all times.
- ▶ Keep documentation up to date after every addition or update.



#### CAUTION

##### Overloading components due to incorrect pressure settings.

Risk of minor injury.

- Pay attention to the maximum operating pressure of the pump and the valves.
- Always monitor the pressure gauge when setting and changing the pressure.

### Purity and filtering of the hydraulic fluid

Fine contamination can significantly impair the function of the product. Contamination can cause irreparable damage.

#### Examples of fine contamination include:

- Swarf
- Rubber particles from hoses and seals
- Dirt due to assembly and maintenance
- Mechanical debris
- Chemical ageing of the hydraulic fluid

#### **!** DAMAGE

**New hydraulic fluid from the manufacturer may not have the required purity.**

Damage to the product is possible.

- ▶ Filter new hydraulic fluid to a high quality when filling.
- ▶ Do not mix hydraulic fluids. Always use hydraulic fluid that is from the same manufacturer, of the same type, and with the same viscosity properties.

For smooth operation, pay attention to the cleanliness level of the hydraulic fluid (cleanliness level [see Chapter 3, "Parameters"](#)).

Additionally applicable document: [D 5488/1](#) Oil recommendations

## 5.4 Maintenance information

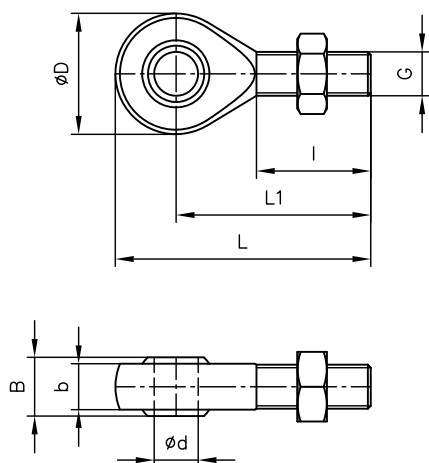
Check regularly (at least once a year) by visual inspection whether the hydraulic connections are damaged. If external leakages are found, shut down and repair the system.

Clean the surface of the device regularly (at least once a year) (dust deposits and dirt).

## 6 Other information

### 6.1 Accessories, spare and individual parts

#### Rod end



For type	b	B	$\varnothing d$	$\varnothing D$	G	l	L	L1	Order number	
									Rod end (DIN ISO 12240-4 form M, series K)	Nut (DIN 439-B)
LVM 2516	10,5	14	10 <sup>+0.015</sup>	28	M10	28	62	48	ZL10GSA	KNM.0431
LVM 3220	12.5	16	12 <sup>+0.018</sup>	33	M12	31,2	69,7	53,2	085-0009-0	KNM.0428
LVM 4024	15,5	21	16 <sup>+0.018</sup>	43	M16	38	87,5	66	085-0010-0	KNM.0430

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