

# Differential cylinder type LAS

## Product documentation



Operating pressure  $p_{\max}$ :  
Permissible stroke speed:

Up to 220 bar  
 $\leq 0.1 \text{ m/s}$



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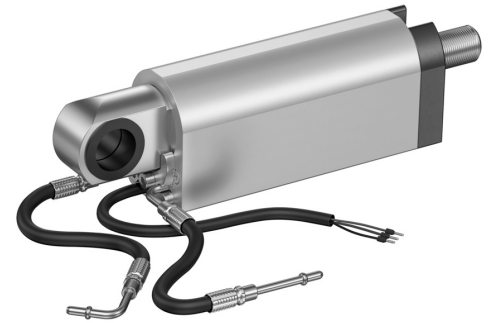
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**1****Overview of the differential cylinder type LAS**

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 LAS 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 67 000 double strokes (at maximum stroke 300 mm).

For special applications the differential cylinder type LAS 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.



*Differential cylinder type LAS*

**Features and advantages**

- Lower weight (aluminium design)
- Piston diameters 20, 25, 32 and 42 mm
- Stroke 50 to 300 mm, depending on size
- Internally and externally technically leak-proof for holding position over an extended period of time
- With or without displacement measuring system (HISENS)
- With variety of mechanical fasteners (optional)
- With corrosion protection
- With special wiper for marine growth (optional)

**Intended applications**

- Trim, steering and tilt drives for boats and jet skis in freshwater and seawater environments
- Trim-tabs drives for boats and jet skis in freshwater and seawater environments
- Drives for convenience functions on boats in freshwater and seawater environments
- Automotive applications: window lifters, ride height adjustment and aerodynamic improvements in HGVs
- Drives for adjusting aircraft seats
- Applications in commercial vehicles

## 2 Available versions

### Ordering example

LAS 32/16	-0050	-1	-1	-0	-3	-2
						2.6 "Fastener"
						2.5 "Maritime elements"
						2.4 "Hose port"
						Coating
						▪ 1 anodised
						▪ 2 black anodised (on request)
						2.3 "Displacement measuring system (HISENS)"
						2.2 "Stroke"
						2.1 "Basic type and size"

### **i** INFORMATION

Minimum order quantity: 20 pieces of each version

### 2.1 Basic type and size

Type	Piston Ø (mm)	Rod Ø (mm)	Piston area (cm <sup>2</sup> )	Ring area (cm <sup>2</sup> )	Max. force (N)		at pressure p <sub>max</sub> (bar)
					on extension	on retraction	
LAS 20/10	20	10	3,14	2,36	6360	4770	220
LAS 25/12	25	12	4,91	3,78	9940	7650	220
LAS 32/16	32	16	8,04	6,03	16 280	12 210	220
LAS 42/20	42	20	13,85	10,71	25 500	19 710	200

### 2.2 Stroke

Coding	Standard length (mm)
0050	50
0100	100
0150	150
0200	200
0250	250
0300	300

## 2.3 Displacement measuring system (HISENS)

Coding	Description
0	without displacement measuring system (HISENS)
1	with displacement measuring system (HISENS)

## 2.4 Hose port

Coding	Nominal width	For type
0	DN 2.7 mm	All
1	DN 6.5 mm	<ul style="list-style-type: none"> <li>▪ LAS 32/16</li> <li>▪ LAS 42/20</li> </ul>

## 2.5 Maritime elements

Coding	Description	For type
0	No maritime elements	All
1	Wiper/scraper	<ul style="list-style-type: none"> <li>▪ LAS 32/16</li> <li>▪ LAS 42/20</li> </ul>
2	Piston with check valve	
3	Wiper and piston with check valve	

## 2.6 Fastener

Coding	Description
0	without fastener
1	Swivel rod end
2	Fork rod end
3	Rod end, only possible without displacement measuring system (HISENS)

## 3 Parameters

### 3.1 General data

Design	Double-acting cylinder with single-ended piston rod
Material	Aluminium, piston rod stainless steel
Installation position	any
Line connection	Plug connection as per HAWE standard
piston seal	O-ring / slide ring
Rod seal	Lip seal / double wiper
Operating pressure	5 - 220 bar
permissible stroke speed	$\leq 0.1$ m/s
Hydraulic fluid	Hydraulic fluid, according to DIN 51524 Parts 1 to 3; ISO VG 10 to 68 according to DIN ISO 3448 Titanium CHF 11S, Viscosity range: 12 - 230 mm <sup>2</sup> /s
Cleanliness level	<b>ISO 4406</b> 19/16/13
Temperatures	Environment: approx. -25 to +80 °C, hydraulic fluid: -20 ... +80°C, ensure the correct viscosity range.
	Operating temperature: -20 to +80°C
	Storage temperature: -30 to +85°C
Buckling strength	<a href="#">see Chapter 3.3, "Characteristic lines"</a>

## 3.2 Electrical data

### Displacement measuring system (HISENS)

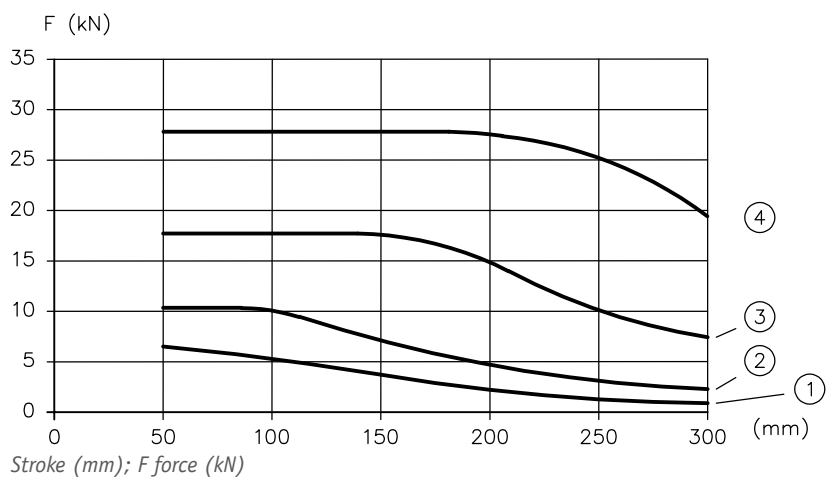
Operating voltage	5 V $\pm$ 0.5 V DC		
Analogue output signal	0.5 V to 4.5 V DC measured radiometrically		
Analogue resolution (depending on stroke)	12 bit (stroke [mm] / 4096) Example: at 200 stroke = 0.05 mm		
Linearity (depending on stroke)	$\pm$ 0.025 V (stroke [mm] / 4 V * 0.025 V) Example: at 200 stroke = $\pm$ 1.25 mm		
Cable definition	HELU OZ-500-PUR 3x 0.5 mm <sup>2</sup>		
Cable termination	Ferrules DIN 46228 Part 1 0.5 mm		
Usable cable length	1.5 m minus cylinder housing length l		
Sensor degree of protection when installed	min. IP 67		
Electromagnetic compatibility according to CISPR 25	<b>Conducted emitted interference:</b>		
	<b>Frequency range</b>	<b>0.15 - 0.3 MHz</b>	<b>0.53 - 1.8 MHz</b>
	PK (peak value)	Class 5	Class 5
	QP (quasi peak value)	Class 5	Class 4
	AV (average value)	Class 4	Class 3
Radiated emitted interference	Class 5 (at all frequencies for PK; QP; AV detector)		
Electrical connection	<b>Cable</b>		
	<b>Wire marking</b>	<b>Type</b>	
	1	Supply	
	2	Signal	
	3	Ground	



### 3.3 Characteristic lines

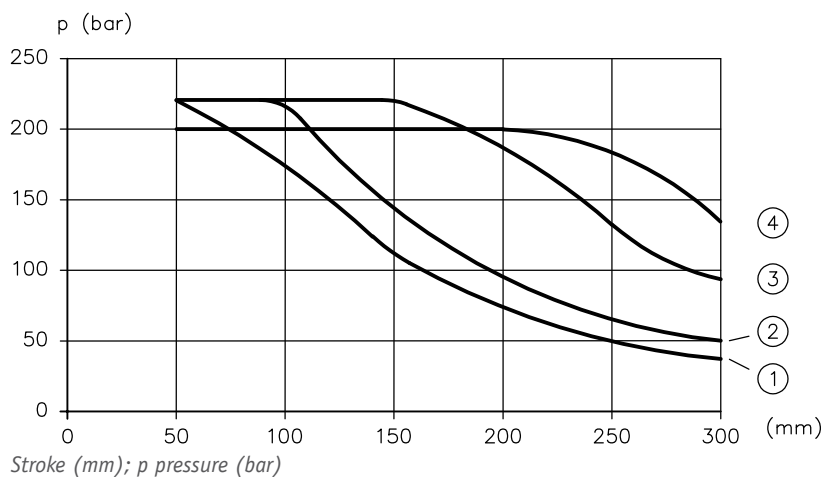
#### Buckling resistance of piston rods

##### Force over stroke



- 1 20/10 cylinders
- 2 25/12 cylinders
- 3 32/16 cylinders
- 4 42/20 cylinders

##### Pressure over stroke



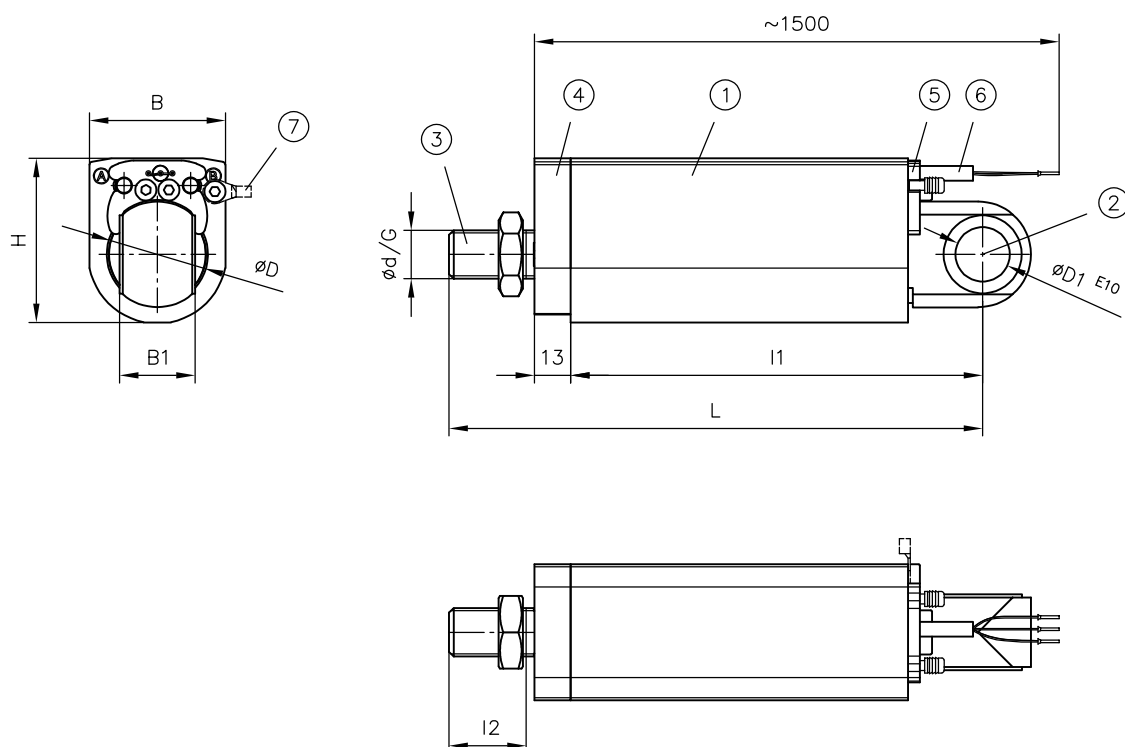
- 1 20/10 cylinders
- 2 25/12 cylinders
- 3 32/16 cylinders
- 4 42/20 cylinders

## 4 Dimensions

All dimensions in mm, subject to change.

### 4.1 Differential cylinder

LAS..



- 1 Housing
- 2 Base
- 3 piston rod with lock nut (dimensions see [Chapter 4.2](#))
- 4 Sensor or cover
- 5 Retaining plate for connections
- 6 Sensor cable
- 7 Possible connection for ground cable

Type	B	B1	H	L + stroke	ØD	ØD1	l1 + stroke	l2	Ød	G
LAS 20/10	33	19	35	123	23	10	85.2	23	10	M10x1.25
LAS 25/12	40	21	47	130	27	12	91.7	24	12	M12x1.25
LAS 32/16	45	25	54.3	136.4	35	18	96.2	26	16	M16x1.5
LAS 42/20	58	36	63.5	143	45	20	98.8	33	20	M20x1.5

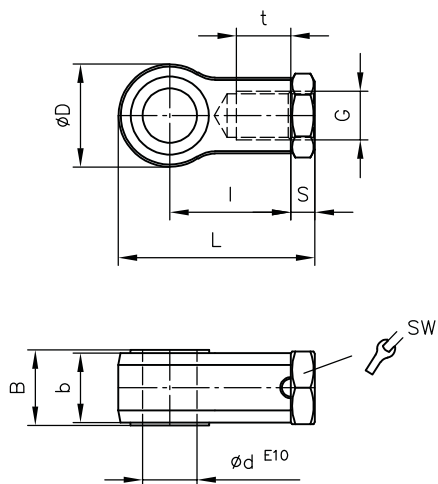
## Differential cylinder with head



Type	L2 + stroke		
	Swivel rod end	Fork rod end	Rod end
LAS 20/10	140	146	149
LAS 25/12	150	161	165
LAS 32/16	160	184	184
LAS 42/20	180	209	106

## 4.2 Fasteners

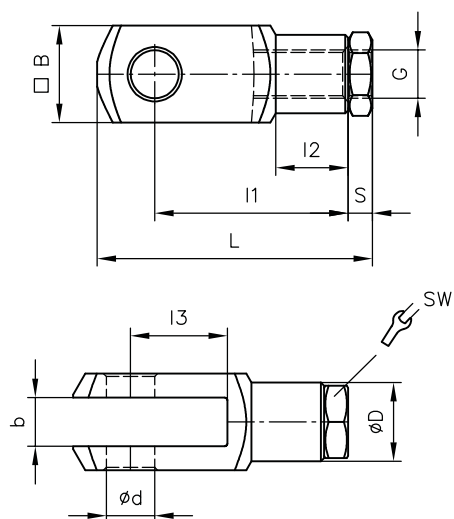
### Swivel rod end with lock nut



SW = Width across flats

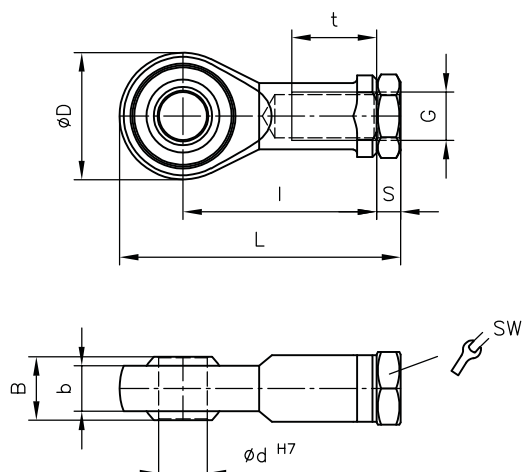
Type	B	L	ØD	b	l	Ød	G	t	S	SW
LAS 20/10	19	51	24	17	34	10	M10x1.25	18	5	16
LAS 25/12	21	57	28	19	37	12	M12x1.25	17	6	18
LAS 32/16	25	65	34	23	40	18	M16x1.5	18	8	24
LAS 42/20	36	80.5	39	33	51	20	M20x1.5	24	10	30

### Fork rod end with lock nut



SW = Width across flats

Type	B	L	ØD	b	l1	l2	l3	Ød	G	S	SW
LAS 20/10	20	57	18	10	40	15	20	10	M10x1.25	5	16
LAS 25/12	24	68	20	12	48	18	24	12	M12x1.25	6	18
LAS 32/16	32	91	26	16	64	24	32	16	M16x1.5	8	24
LAS 42/20	40	115	34	20	80	30	40	20	M20x1.5	10	30

**Rod end with lock nut**


SW = Width across flats

Type	B	L	ØD	b	l	Ød	G	t	S	SW
LAS 20/10	14	62	28	10.5	43	10	M10x1.25	20	5	16
LAS 25/12	16	72	32	12	50	12	M12x1.25	22	6	18
LAS 32/16	21	93	42	15	64	16	M16x1.5	28	8	24
LAS 42/20	25	112	50	18	77	20	M20x1.5	33	10	30

**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.

**NOTICE**

- ▶ 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. Parts may burst or fly off, and uncontrolled leakage of hydraulic fluid.

- Pay attention to the maximum operating pressure of the pump, valves and fittings.
- 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

#### NOTICE

**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).

## References

### Additional versions

- Differential cylinder type LVM: D 6053

