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## GENERAL INFORMATION

### Characteristics of laser radiation

**L.A.S.E.R.** = Light Amplification by Stimulated Emission of Radiation

Laser light runs almost parallelly in one direction. By focussing the radiation lasers achieve a much higher power density than conventional light sources. Due to the minor divergence lasers can carry energy over long distances. The oscillations in a laser beam are almost in-phase (coherent) and have a big coherence length, i.e. there is no phase shifting for long periods. Due to polarising optical components in the resonator the entire radiation runs in one plane. The laser beam contains light of only one wave length.

### Advantages of laser sensors

The angle of beam and the big light spot of conventional light barriers often turn out to be disadvantageous in applications. These disadvantages can be eliminated using a laser diode. Pulsotronic offers different series of laser sensors, each one with a great variety of different types. Laser sensors are ideal for applications like precise positioning, drill fracture control, burst-out control, distance measurement, object measurement or the detection of very small parts. The light-spot geometry can be adjusted individually to each application. The customer chooses among a huge assortment of standard apertures with a diameter from 0,3mm up to a dimension of 30 mm x 2 mm.

The advantage of laser sensors is their ability to detect objects on each place between transmitter and receiver due to their parallel light beam. There is no need to make a focussing or an adjustment on the respective object. In order to compensate the influence of dirt accumulation some types are equipped with an intelligent contamination correction.

Laser sensors are very suitable for measurement tasks. Via an analog signal (0...10V DC or 4...20mA) all applications evaluating a variation of luminance or shadow dimension (e.g. edge correction, drill positioning) can be solved. For applications with little installation space miniatur sensors in different dimensions are available, e.g. mit 90°light exit. Switching frequencies of max. 500KHz guarantee a save detection of fast processes as well as of smallest parts.

### Laser classes

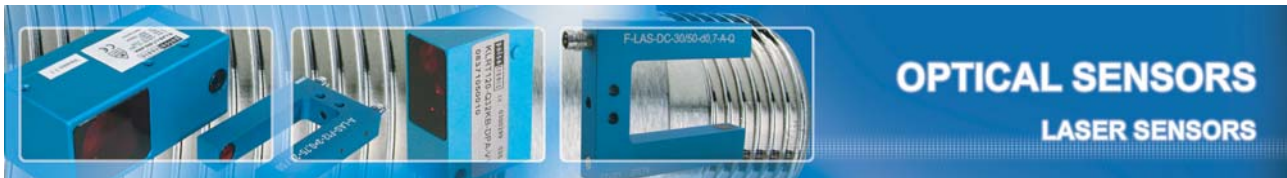
Except the M-LAS series all sensors given in this catalogue correspond to laser class 2. Sensors of the M-LAS series are conform with laser class 1.

#### Laser class 1

Lasers will a very low power, that have a wavelength in the visible light range and of which the radiated power does not go beyond 25µW. In correct use these lasers are very save. The limit of the accessible radiation of DIN EN 60825-1:2001-11 in wave lengths from 400nm up to 1400nm for the classification of a laser is equal between 100s and 30.000s. That is why disturbances cannot be ruled out in the case of long term exposure.

#### Laser classe 2

The accessible radiation lies in the visible spectral range (400nm to 700nm). It is nonhazardous in case of short term exposure (max. 0,25s). Other radiation parts beyond this radiation range come up to the regulations of laser class 1. Laser applications with laser class 2 do not pose a danger for the eye when this is exposed accidentally for a short term (i.e. exposure time max. 0,25s). For this reason laser applications with laser class 2 can be used without further safety precautions, when it is assured that neither an intentional look for more than 0,25s is necessary, nor a repeated look into the laser light respectively into reflected laser radiation is required. As a rule the user must not emanate from the eyelid closure reflex for the protection of the eye. For continuously radiating lasers of class 2 the limit value of the accessible radiation is at 1mW.



## A-LAS SERIES ANALOG LASER LIGHT BARRIERS

### Product information

Parallel laser light with homogeneous light distribution in round or rectangular cross-section is used for measuring, positioning and detecting objects starting from a size of 0.01 mm

- Visible laser beam (laser class 2)
- Apertures available from 0.2mm to 30mm
- High reproducibility starting from 0.5µm
- High analog band width (300kHz)
- Optics and optics cover made of glass
- Different control electronics available (parameterisable under Windows® via RS232)



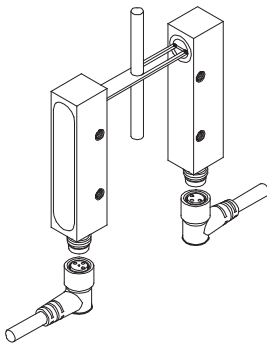
### Characteristics

#### Collimated laser beam

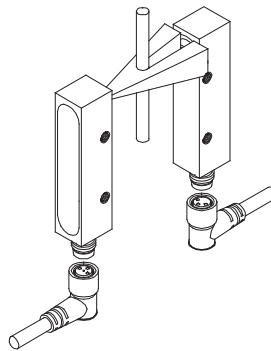
The laser light beam that is emitted by a high-precision optical unit (aspherical surface made of glass) allows the detection of smallest objects (e.g. threads) even in case of a large transmitter/receiver distance (distances up to 100m, depending on the aperture).

#### Advantages

- Telecentric design
- Exact shadow projection onto the receiver
- The distance of the measuring object from the transmitter or receiver has no influence on the measuring signal



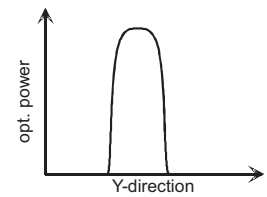
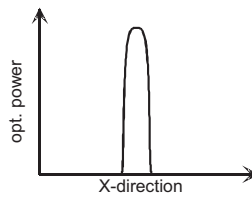
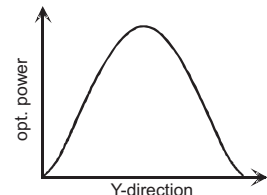
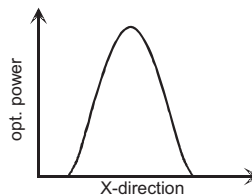
Light barrier A-LAS-Series



Conventional light barrier

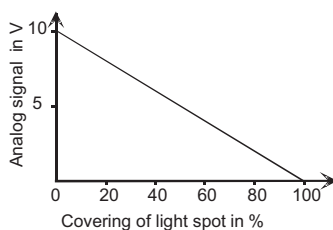
#### Homogeneous light distribution

The use of high-precision apertures in the transmitters ensures optimum adaptation to the respective application. Apart from a large variety of standard apertures special apertures can also be realised. The aperture guarantees a homogeneous light distribution on the beam and a sharp beam limitation.



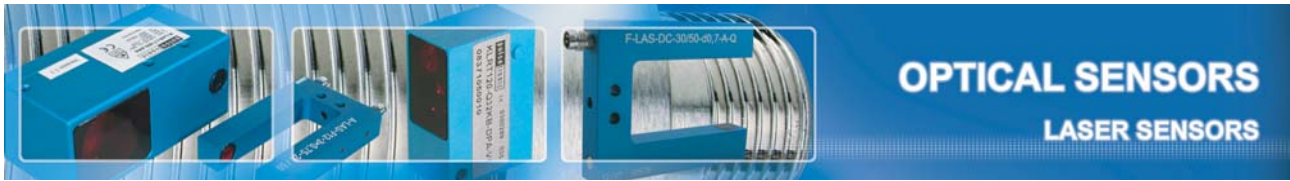
#### Measuring principle

Partial covering of the laser beam leads to a voltage at the analog output that is proportional to the degree of covering.



#### Compact and robust metal housing

With their robust metal housing and their high protection class the laser light barriers of series A-LAS are designed for demanding applications in machine construction. With respect to the housing size the A-LAS-90 sensor type with integrated laser driver and pre-amplifier electronics, for example, can be compared with conventional sensor types, and it can be installed and mounted without any problems.



## A-LAS SERIES ANALOG LASER LIGHT BARRIERS

### Selection chart sensors

Article number	Designation fork design A-LAS-F (Width)-(Aperture)-(Range/Depth)
083764000XX	A-LAS-F08-(Aperture)-10/50
083764001XX	A-LAS-F08-(Aperture)-20/50
083764002XX	A-LAS-F08-(Aperture)-20/60
083764003XX	A-LAS-F08-(Aperture)-20/80
083764004XX	A-LAS-F08-(Aperture)-30/50
083764005XX	A-LAS-F08-(Aperture)-30/60
083764006XX	A-LAS-F08-(Aperture)-30/80
083764015XX	A-LAS-F08-(Aperture)-40/50
083764007XX	A-LAS-F08-(Aperture)-40/60
083764008XX	A-LAS-F08-(Aperture)-40/80
083764009XX	A-LAS-F08-(Aperture)-50/50
083764010XX	A-LAS-F08-(Aperture)-50/60
083764011XX	A-LAS-F08-(Aperture)-50/80
083764012XX	A-LAS-F08-(Aperture)-100/50
083764013XX	A-LAS-F08-(Aperture)-100/80
083764020XX	A-LAS-F10-(Aperture)-10/50
083764021XX	A-LAS-F10-(Aperture)-20/50
083764022XX	A-LAS-F10-(Aperture)-20/60
083764023XX	A-LAS-F10-(Aperture)-20/80
083764024XX	A-LAS-F10-(Aperture)-30/50
083764025XX	A-LAS-F10-(Aperture)-30/60
083764026XX	A-LAS-F10-(Aperture)-30/80
083764035XX	A-LAS-F10-(Aperture)-40/50
083764027XX	A-LAS-F10-(Aperture)-40/60
083764028XX	A-LAS-F10-(Aperture)-40/80
083764029XX	A-LAS-F10-(Aperture)-50/50
083764030XX	A-LAS-F10-(Aperture)-50/60
083764031XX	A-LAS-F10-(Aperture)-50/80
083764032XX	A-LAS-F10-(Aperture)-100/50
083764033XX	A-LAS-F10-(Aperture)-100/80
083764040XX	A-LAS-F12-(Aperture)-10/50
083764041XX	A-LAS-F12-(Aperture)-20/50
083764042XX	A-LAS-F12-(Aperture)-20/60
083764043XX	A-LAS-F12-(Aperture)-20/80
083764044XX	A-LAS-F12-(Aperture)-30/50
083764045XX	A-LAS-F12-(Aperture)-30/60
083764046XX	A-LAS-F12-(Aperture)-30/80
083764039XX	A-LAS-F12-(Aperture)-40/50

Article number	Designation fork design A-LAS-F (Width)-(Aperture)-(Range/Depth)
083764047XX	A-LAS-F12-(Aperture)-40/60
083764048XX	A-LAS-F12-(Aperture)-40/80
083764049XX	A-LAS-F12-(Aperture)-50/50
083764050XX	A-LAS-F12-(Aperture)-50/60
083764051XX	A-LAS-F12-(Aperture)-50/80
083764052XX	A-LAS-F12-(Aperture)-100/50
083764053XX	A-LAS-F12-(Aperture)-100/80
083764060XX	A-LAS-F24-(Aperture)-20/60
083764061XX	A-LAS-F24-(Aperture)-30/60
083764062XX	A-LAS-F24-(Aperture)-40/60
083764063XX	A-LAS-F24-(Aperture)-50/60
083764064XX	A-LAS-F24-(Aperture)-100/60
083764065XX	A-LAS-F24-(Aperture)-100/80
083764066XX	A-LAS-F24-(Aperture)-100/100
083764070XX	A-LAS-F34-(Aperture)-50/80
083764071XX	A-LAS-F34-(Aperture)-100/80
083764072XX	A-LAS-F34-(Aperture)-150/80
083764073XX	A-LAS-F34-(Aperture)-200/80
083764074XX	A-LAS-F34-(Aperture)-250/80
083764075XX	A-LAS-F34-(Aperture)-300/80

Article number	Designation split design A-LAS-F (Range)-(Aperture)
083734073XX	A-LAS-08-(Aperture)
083734074XX	A-LAS-10-(Aperture)
083728472XX	A-LAS-90-(Aperture)
083728471XX	A-LAS-12/90-(Aperture)
083728477XX	A-LAS-24-(Aperture)
083728478XX	A-LAS-24/90-(Aperture)
083728460XX	A-LAS-34-(Aperture)-T
083728461XX	A-LAS-34-(Aperture)-R
083734034XX	A-LAS-34/90-(Aperture)-T
083734035XX	A-LAS-34/90-(Aperture)-R

Selection chart sensors in combination with selection chart apertures.  
Detailed information on [www.pulsotronic.de](http://www.pulsotronic.de).

### Control electronics

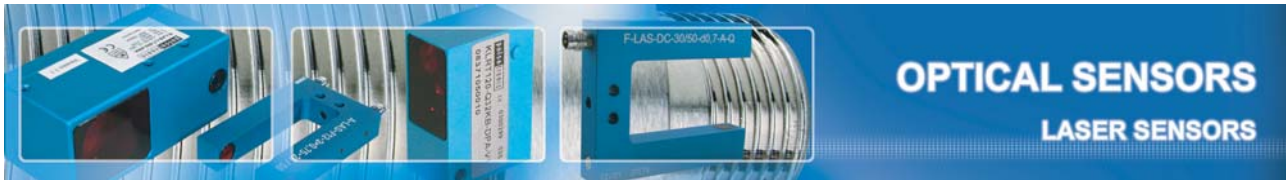
Article number	Designation	Dimensions in mm	Output signal	Operating voltage
08369401200	AGL3-2m	60 x 27 x 27	Analog (0-10V), digital (stat./ dyn.)	+12VDC...+32VDC
08369401202	AGL3-5m	60 x 27 x 27	Analog (0-10V), digital (stat./ dyn.)	+12VDC...+32VDC
08369401400	AGL4-Q	65 x 27 x 30	Analog (0-10V), digital (stat./ dyn.), PNP NO/NPN NC	+12VDC...+32VDC
08369401420	AGL4-Qinv	65 x 27 x 30	Analog (0-10V), digital (stat./ dyn.), NPN NO/PNP NC	+12VDC...+32VDC
08369401450	AGL4-Q-HS	65 x 27 x 30	Analog (0-10V), digital (stat./ dyn.), High Speed	+12VDC...+32VDC
08369401470	AGL4-Qinv-HS	65 x 27 x 30	Analog (0-10V), digital (stat./ dyn.), High Speed	+12VDC...+32VDC
08369401300	SI-CON4 (incl. software)	60 x 22 x 40	Analog (0-10V), digital (stat./ dyn.)	+24VDC...+32VDC
08369401510	SI-CON11-0/20	65 x 27 x 30	Analog (0-10V, 0-20mA)	+12VDC...+32VDC
08369401500	SI-CON11-4/20	65 x 27 x 30	Analog (0-10V, 4-20mA)	+12VDC...+32VDC
08369401520	SI-CON11-5/25	65 x 27 x 30	Analog (0-10V, 5-25mA)	+12VDC...+32VDC
08369401600	SI-CON34 (incl. software)	140 x 40 x 75	Digital (programmable)	+24VDC +/-10%
08369401800	SI-CON84 (incl. software)	135 x 31 x 135	Analog (0-5V/ 0-10V), digital (programmable)	+18VDC...+36VDC

#### Abbreviations

Q = PNP N.C. / NPN N.O.

Qinv = NPN N.C. / PNP N.O.

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## A-LAS SERIES ANALOG LASER LIGHT BARRIERS

### Apertures fork design A-LAS...

Last digits article number	..F08	...F10	...F12	...F24
01				0,5 x 16
02		1 x 0,3	1 x 0,3	
03		1 x 0,5	1 x 0,5	
04	1 x 1	1 x 1	1 x 1	
05				1 x 16
07	2 x 0,75	2 x 0,75	2 x 0,75	
08	2 x 1	2 x 1	2 x 1	
10				2 x 16
13	3 x 0,75	3 x 0,75	3 x 0,75	
14		4 x 1	4 x 1	
15			6 x 0,8	
16			6,5 x 0,5	
17			6,5 x 0,8	
18		3 x 1	3 x 1	
19		6,5 x 0,3	6,5 x 0,3	
20				16 x 0,5
21				16 x 1
22				16 x 2
23	d 0,3	d 0,3	d 0,3	0,2 x 9,5
24	d 0,5	d 0,5	d 0,5	0,3 x 10
26	d 0,7	d 0,7	d 0,7	
28	d 1,0	d 1,0	d 1,0	
31	d 2,0	d 2,0	d 2,0	1,5 x 9,5
33				9,5 x 0,2
34				9,5 x 1,5
36				10 x 0,3
42	1 x 0,3			
43	1 x 0,5			
45	3 x 0,1			
50	0,2 x 0,5	0,2 x 0,5	0,2 x 0,5	
51	0,2 x 1	0,2 x 1	0,2 x 1	
52	0,3 x 0,5	0,3 x 0,5	0,3 x 0,5	
53	0,3 x 0,8	0,3 x 0,8		
54	0,3 x 1	0,3 x 1	0,3 x 1	
55	0,3 x 1,5	0,3 x 1,5	0,3 x 1,5	
56		0,3 x 3	0,3 x 3	
57	0,5 x 0,2	0,5 x 0,2	0,5 x 0,2	
58	0,5 x 0,3	0,5 x 0,3	0,5 x 0,3	
59	0,5 x 1	0,5 x 1	0,5 x 1	
60	0,5 x 2			
61	0,5 x 3			
62		0,5 x 4	0,5 x 4	
63	0,75 x 2	0,75 x 2	0,75 x 2	
64	0,75 x 3	0,75 x 3	0,75 x 3	
65	0,8 x 0,3	0,8 x 0,3		
66	1 x 0,2	1 x 0,2	1 x 0,2	
67	1 x 2	1 x 2	1 x 2	
68	1 x 3			
69	1,5 x 0,3			
70	2 x 0,5			
71	3 x 0,5			
72	3 x 1			
73		1,2 x 2	1,2 x 2	
74		1,5 x 0,3	1,5 x 0,3	
75		2 x 1,2	2 x 1,2	
76		3 x 0,3	3 x 0,3	
77			0,5 x 6,5	
78			0,8 x 6	
79			0,8 x 6,5	
81		4 x 0,5	4 x 0,5	
90		1 x 4	1 x 4	

### Apertures split design A-LAS...

Last digits article number	...08	...10	...90 ...12/90	...24 ...24/90	...34 ...34/90 ...F34
02	1 x 0,3	1 x 0,3	1 x 0,3	2 x 16	
03	1 x 0,5	1 x 0,5	1 x 0,5		
04	1 x 1	1 x 1	1 x 1		
06					
07	2 x 0,75	2 x 0,75	2 x 0,75		
08	2 x 1	2 x 1	2 x 1		
11					
12				16 x 2	
13	3 x 0,75	3 x 0,75	3 x 0,75		
14	4 x 1	4 x 1	4 x 1		
15			6 x 0,8		
16			6,5 x 0,5		
17			6,5 x 0,8		
18			4 x 0,5		
23	d 0,3	d 0,3	d 0,3	0,2 x 9,5	
24	d 0,5	d 0,5	d 0,5	0,3 x 10	
26	d 0,7	d 0,7	d 0,7	0,5 x 16	
28	d 1,0	d 1,0	d 1,0	1 x 16	
31	d 2,0	d 2,0	d 2,0	1,5 x 9,5	
33			d 3,0	9,5 x 0,2	
34				9,5 x 1,5	
36				10 x 0,3	
38				16 x 0,5	
41				16 x 1	
43					
50	0,2 x 0,5	0,2 x 0,5	0,2 x 0,5		
51	0,2 x 1	0,2 x 1	0,2 x 1		
52		0,3 x 0,5	0,3 x 0,5		
53	0,3 x 0,8		0,3 x 0,8		
54			0,3 x 1		
55	0,3 x 1,5	0,3 x 1,5	0,3 x 1,5		
56	0,3 x 3	0,3 x 3	0,3 x 3		
57			0,5 x 0,2		
58			0,5 x 0,3		
59			0,5 x 1		
62		0,5 x 4	0,5 x 4		
63			0,75 x 2		
64			0,75 x 3		
65			0,8 x 0,3		
66			1 x 0,2		
67			1 x 2		
74			1,5 x 0,3		
75	2 x 1,2	2 x 1,2			
76			3 x 0,3		
80		2 x 3			
81			4 x 0,5		
83					10 x 0,3
84					10 x 2
85					20 x 0,3
86					20 x 2
87					25 x 2
88					25 x 0,3
89					30 x 0,5
90			1 x 4		30 x 2
91			5 x 1		
92					5 x 2
93					5 x 0,3



## A-LAS SERIES ANALOG LASER LIGHT BARRIERS

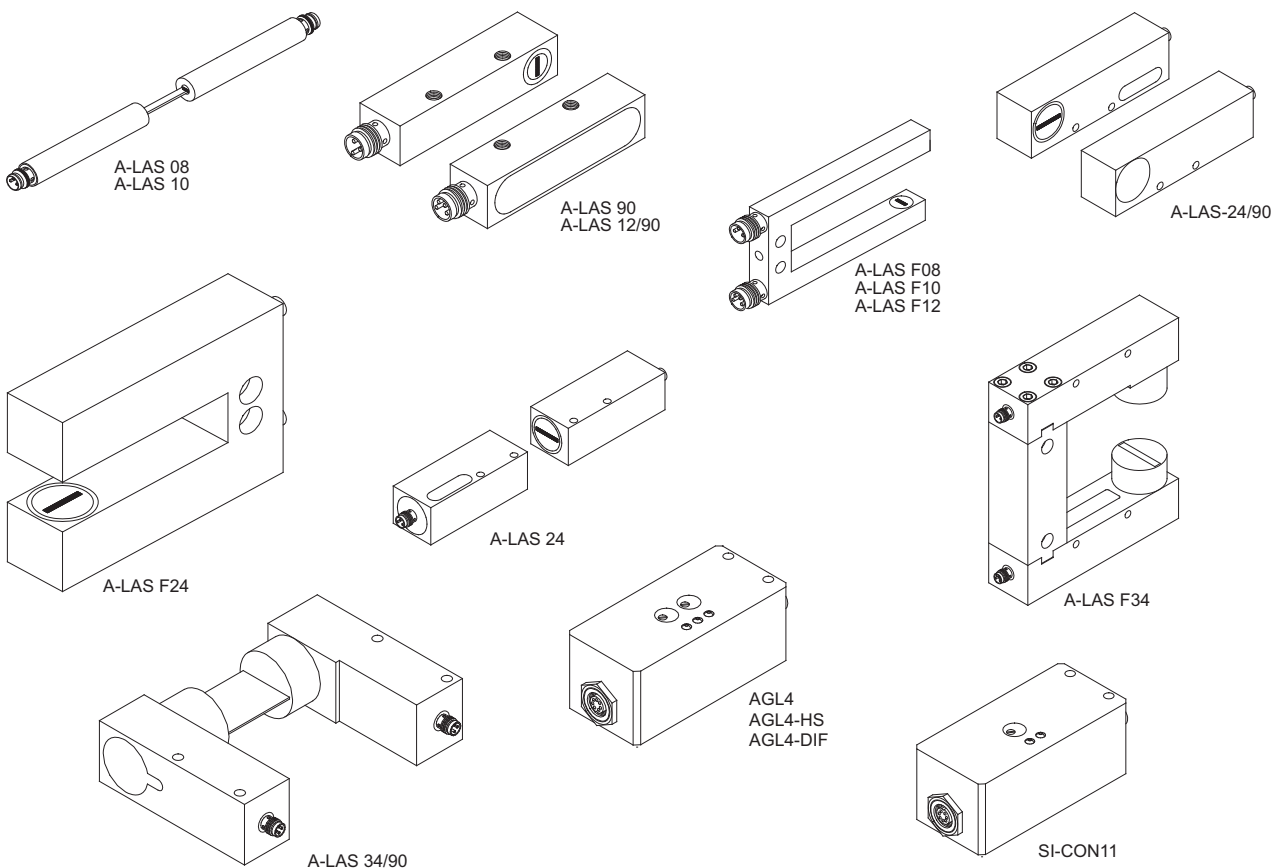
### Accessories

Article number	Designation	Application
08379481100	MOUNT-LS90/1	mounting device (straight) for A-LAS-90-...
08379480700	MOUNT-LS90/2	mounting device (angled) for A-LAS-90-...
08379480300	MOUNT-LS08	mounting device for A-LAS-08-...
08379480200	MOUNT-LS10	mounting device for A-LAS-10-...
08369401130	ZS-8	target for A-LAS-08
08369401120	ZS-10	target for A-LAS-10

### Cables

Article number	Designation	Application
08379450800	cab-las-agl7 (l=2m)	connection AGL3 with PLC and voltage supply
08379450400	cab-las3-2 (l=2m)	connection A-LAS-transmitter with control electronics SI-CON4
08379450300	cab-las4-2 (l=2m)	connection A-LAS-receiver with control electronics SI-CON4
08379450100	cab-las5/PC (l=2m)	connection SI-CON4/ SI-CON34 with PC
08379452600	cab-las8/702-fem (l=2m)	connection SI-CON11/ AGL4 with PLC and voltage supply
08379451600	cab-las8/SPS (l=2m)	connection SI-CON34 with PLC and voltage supply
44505451100	cab-M8/4-g-2 (l=2m)	connection SI-CON4 with PLC and voltage supply
08379452500	cab-las-y-2m (l=2m)	connection A-LAS with control electronics SI-CON4/ SI-CON11/ SI-CON34
08379453000	cab-las9/PC (l=2m)	connection SI-CON84 with PC
08379453100	cab-power25-i/o (l=2m)	connection SI-CON84 with PLC and voltage supply
08379453200	cab-sens9 (l=2m, open)	connection SI-CON84 with external sensors
08379453300	cab-code9 (l=2m, open)	connection SI-CON84 with incremental encoder
08379453400	cab-las-y-con84	connection A-LAS with control electronics SI-CON84

### Type overview

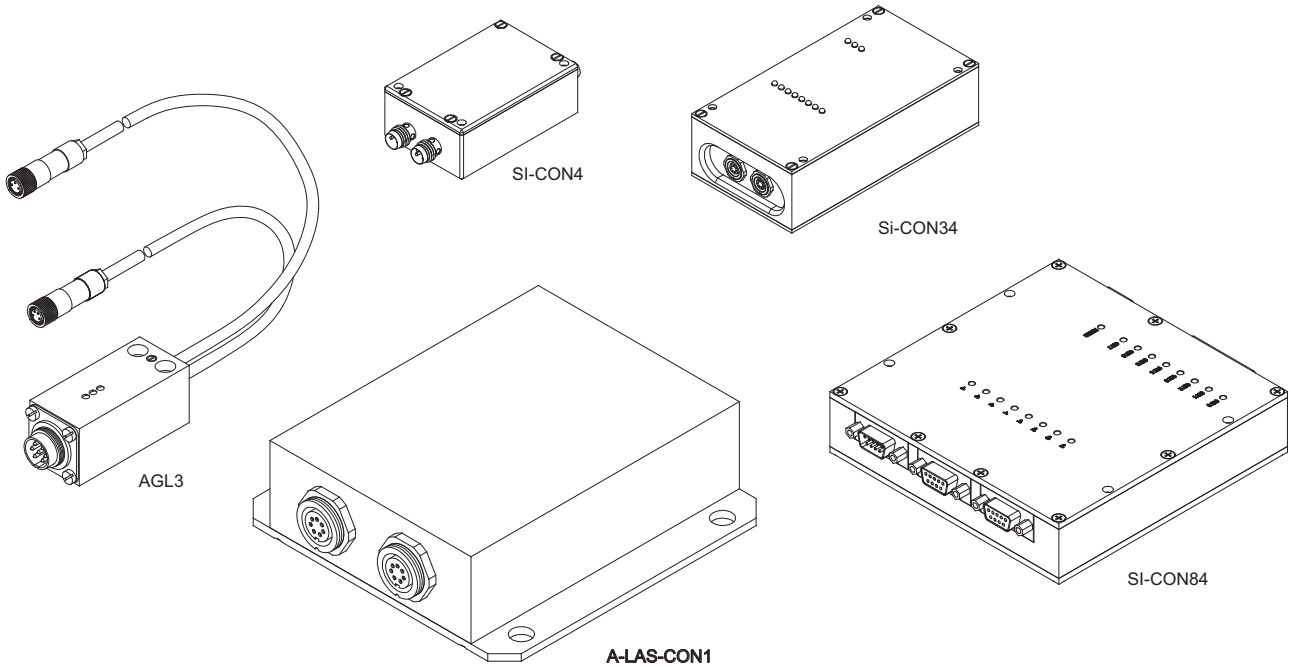


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# A-LAS SERIES ANALOG LASER LIGHT BARRIERS

## Type overview





## D-LAS SERIES DIGITAL LASER LIGHT BARRIERS

### Product information

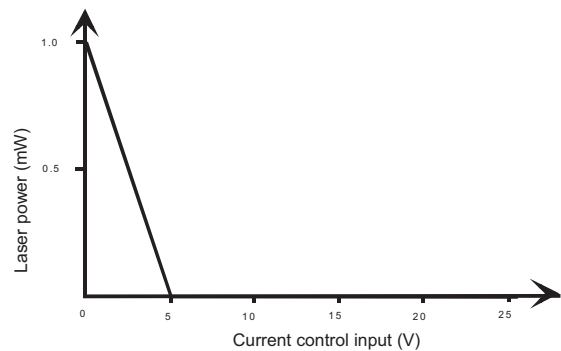
The laser digital light barriers of D-LAS Series work with visible parallel laser light. The use of round or rectangular apertures ensures a homogeneous light distribution in the laser beam. Smallest objects are detected even in case of a large transmitter/receiver distance. Dynamic correction of the switching threshold compensates the effect of dirt accumulation (with D-LAS1, D-LAS2, D-LAS34, D-LAS-34/90). These light barriers are ideal for positioning tasks.



### Characteristics

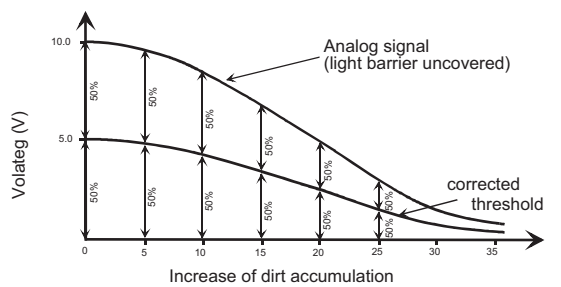
#### Adjustable laser power

The adjustment of the laser power of transmitters type D-LAS1, D-LAS2 and D-LAS90 is realised via the current control input (I-Control). This input can also be used as a test input for switching the laser light barrier ON or OFF.



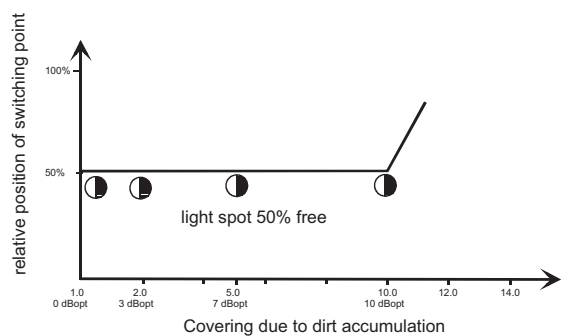
#### Dynamic threshold

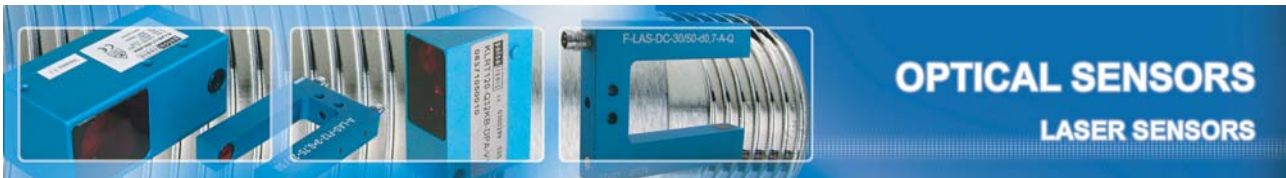
By way of continuous monitoring of the maximum value at the receiver a dynamic correction of the switching threshold compensates the effect of dirt accumulation. This means that increased dirt accumulation does not lead to a shift of the switching point.



#### Example:

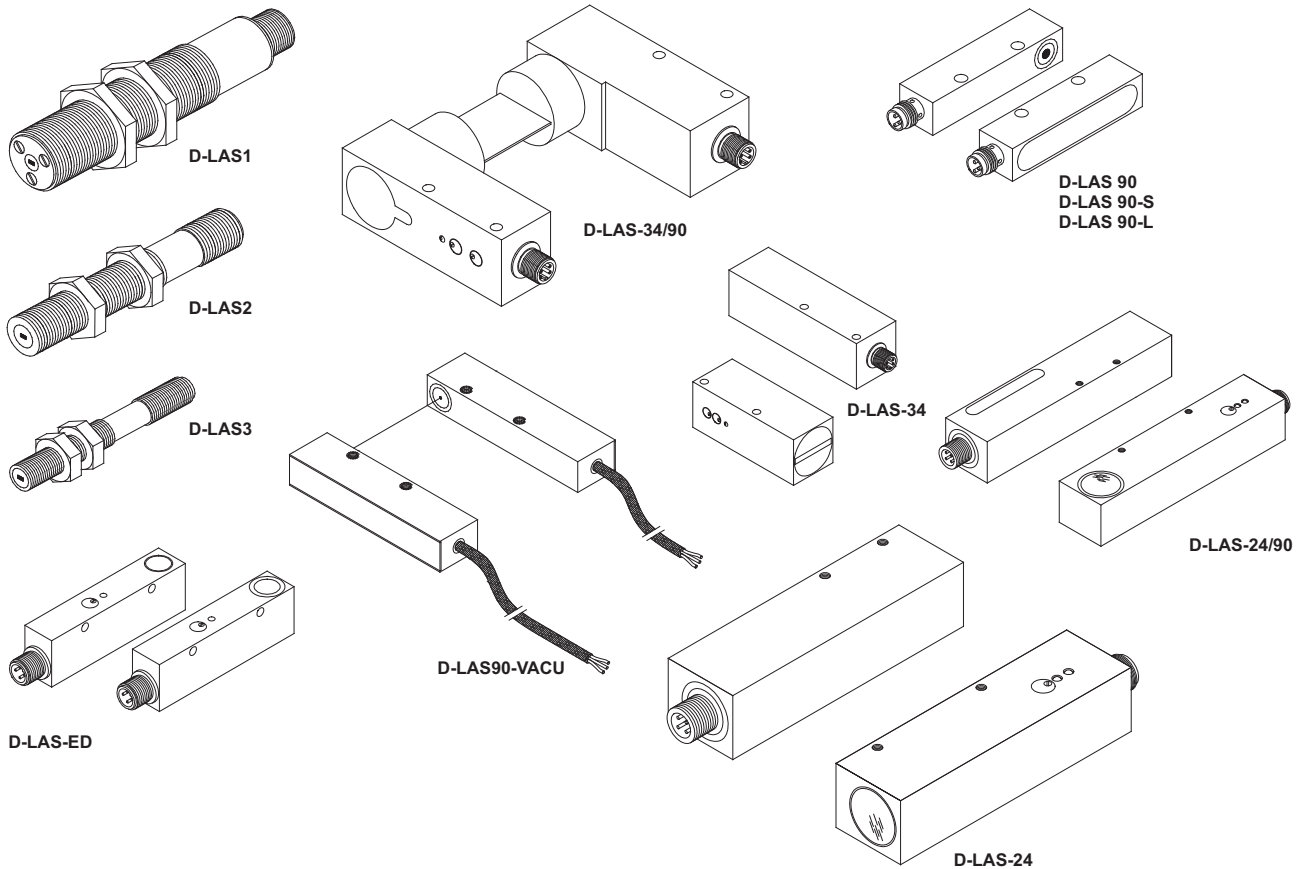
In clean condition the laser light barriers of D-LAS Series indicates a value of 10 V at the analog output, the switching threshold adjusts itself to 50% of the analog signal, i.e. the switching state changes at 50% covering of the light spot. In case of increasing dirt accumulation the value of the analog signal decreases, but the 50% distance to the switching threshold is maintained.





## D-LAS SERIES DIGITAL LASER LIGHT BARRIERS

### Type overview



#### Monitor signal

In addition to the switching signal the laser light barriers D-LAS1 and D-LAS2, D-LAS 24, D-LAS 24/90 as well as D-LAS 34 also provide an analog signal. This "monitoring" of the analog voltage allows improved evaluation of the switching signal. The output also is suitable for measuring tasks.

#### Dynamic measurement

When a measuring object passes through the laser light beam of a D-LAS1-D light barrier it triggers a voltage pulse. The pulse duration of the voltage impulse is independent of the time the measuring object stays in the laser beam. The pulse duration is set to a fixed value of 10 ms.

#### Pulsating light operation

If intensive external light sources must be expected in a laser light barrier application, it is recommendable for safety reasons to use a pulsed system (D-LAS1, D-LAS3, D-LAS90, D-LAS90-VACU). Due to the use of narrow-band electronic filters only the modulated light of the transmitter is detected. Even pulsed light sources such as fluorescent lamps have no influence on the switching reliability.

#### Constant light operation

In case of high switching frequency requirements a non-pulsed system can be used. Here external light suppression is ensured by means of narrowband optical filtering. Therefore constant-light light barriers are suitable for fast processes or for measuring objects moving at high speed. With the help of the analog output constant-light light barriers of series D-LAS2, D-LAS-34, D-LAS-34/90, D-LAS-GD1 can also be used for measuring tasks.



# OPTICAL SENSORS

## LASER SENSORS

## D-LAS SERIES DIGITAL LASER LIGHT BARRIERS

### Selection chart sensors

Article number	Designation square housing	Connection
083724210XX	D-LAS90-Q-(Aperture)	M8, 3 pole
083724211XX	D-LAS90-Qinv-(Aperture)	M8, 3 pole
08378421550	D-LAS90-S-T (Type "short": Apert. 0.7mm)	M8, 3 pole
08378421500	D-LAS90-S-Q-R	M8, 3 pole
08378421600	D-LAS90-S-Qinv-R	M8, 3 pole
08378422550	D-LAS90-L-T (Type "long": Apert. 3.0mm)	M8, 3 pole
08378422500	D-LAS90-L-Q-R	M8, 3 pole
08378422600	D-LAS90-L-Qinv-R	M8, 3 pole
083734203XX	D-LAS90-VACU-T-2m	Capton-cable
083734204XX	D-LAS90-VACU-R-2m	Capton-cable
083724220XX	D-LAS24-Q-(Aperture)	M12, 4 pole
083724221XX	D-LAS24-Qinv-(Aperture)	M12, 4 pole
083724230XX	D-LAS24/90-Q-(Aperture)	M12, 4 pole
083724231XX	D-LAS24/90-Qinv-(Aperture)	M12, 4 pole
083734205XX	D-LAS34-(Aperture)-T	M12, 4 pole
083734206XX	D-LAS34-Q-(Aperture)-R	M12, 4 pole
083734207XX	D-LAS34-Qinv-(Aperture)-R	M12, 4 pole
083734226XX	D-LAS34-TC-Q-(Aperture)-R	M12, 4 pole
083734227XX	D-LAS34-TC-Qinv-(Aperture)-R	M12, 4 pole
083734235XX	D-LAS-34/90-(Aperture)-T	M12, 4 pole
083734236XX	D-LAS-34/90-Q-(Aperture)-R	M12, 4 pole
083734237XX	D-LAS-34/90-Qinv-(Aperture)-R	M12, 4 pole
083734246XX	D-LAS-34/90-TC-Q-(Aperture)-R	M12, 4 pole
083734247XX	D-LAS-34/90-TC-Qinv-(Aperture)-R	M12, 4 pole
08378420100	D-LAS-ED1-T (Glass detection)	M12, 4 pole
08378420200	D-LAS-ED1-R (Glass detection)	M12, 5 pole
08373000063	CD-LAS-63 (CD height measurement)	cable, 4 pole

Article number	Designation cylinder housing 1=M18, 2=M12, 3=M8	Connection
083734100XX	D-LAS1-Q-(Aperture)	M12, 4 pole
083734101XX	D-LAS1-Qinv-(Aperture)	M12, 4 pole
083734102XX	D-LAS1-TC-Q-(Aperture)	M12, 4 pole
083734103XX	D-LAS1-TC-Qinv-(Aperture)	M12, 4 pole
083734104XX	D-LAS1-D-Q-(Aperture)	M12, 4 pole
083734105XX	D-LAS1-D-Qinv-(Aperture)	M12, 4 pole
083734106XX	D-LAS1-DTC-Q-(Aperture)	M12, 4 pole
083734107XX	D-LAS1-DTC-Qinv-(Aperture)	M12, 4 pole
083734108XX	D-LAS1-P-Q-(Aperture)	M12, 4 pole
083734109XX	D-LAS1-P-Qinv-(Aperture)	M12, 4 pole
083734110XX	D-LAS1-PTC-Q-(Aperture)	M12, 4 pole
083734111XX	D-LAS1-PTC-Qinv-(Aperture)	M12, 4 pole
083734112XX	D-LAS1-PD-Q-(Aperture)	M12, 4 pole
083734113XX	D-LAS1-PD-Qinv-(Aperture)	M12, 4 pole
083734114XX	D-LAS1-PDTC-Q-(Aperture)	M12, 4 pole
083734115XX	D-LAS1-PDTC-Qinv-(Aperture)	M12, 4 pole
08373418000	D-LAS1-LC-Q	M12, 4 pole
08373418100	D-LAS1-LC-Qinv	M12, 4 pole
083714200XX	D-LAS2-Q-(Aperture)	M12, 4 pole
083714201XX	D-LAS2-Qinv-(Aperture)	M12, 4 pole
083714202XX	D-LAS2-TC-Q-(Aperture)	M12, 4 pole
083714203XX	D-LAS2-TC-Qinv-(Aperture)	M12, 4 pole
08371428028	D-LAS2-LC-Q	M12, 4 pole
08371428128	D-LAS2-LC-Qinv	M12, 4 pole
083714230XX	D-LAS3-Q-(Aperture)	M8, 3 pole
083714231XX	D-LAS3-Qinv-(Aperture)	M8, 3 pole

Selection chart sensors in combination with selection chart apertures.  
Detailed information on [www.pulsotronic.de](http://www.pulsotronic.de).

### Mounting devices

Article number	Designation
08379480800	FL-18 (mounting flange flat, f. D-LAS1)
08379480900	FL-12 (mounting flange flat, f. D-LAS2)
08379481000	FL-8 (mounting flange flat, f. D-LAS3)
08379481100	FL-90 (mounting flange flat, f. D-LAS90)
08379480400	WFL-18 (mounting flange angled / D-LAS1)
08379480500	WFL-12 (mounting flange angled / D-LAS2)
08379480600	WFL-8 (mounting flange angled / D-LAS3)
08379480700	WFL-90 (mounting flange angled / D-LAS90)

### Accessories

Article number	Designation
08369174700	EO-18 (Attachment optics receiver D-LAS1)
08369401000	SF-12 (Ray trap)
08369401100	ZS-18 (Target, f. D-LAS1 receiver)
08369401115	ZS-12 (Target, f. D-LAS2 receiver)
08369401130	ZS-8 (Target, f. D-LAS3 receiver)

### Abbreviations

D = Dynamic output  
ED = Glass detection  
EO = Attachment optics  
FL = Flange

Article number	Designation high temperature through beam S=0,3Hz, M=20Hz, L=1kHz	Connection
08373411698	D-LAS-CERO-T	M12, 4 pole
08373411650	D-LAS-CERO-Q-S-R	M12, 4 pole
08373411660	D-LAS-CERO-Q-M-R	M12, 4 pole
08373411670	D-LAS-CERO-Q-L-R	M12, 4 pole
08373411610	D-LAS-CERO-Qinv-S-R	M12, 4 pole
08373411620	D-LAS-CERO-Qinv-M-R	M12, 4 pole
08373411630	D-LAS-CERO-Qinv-L-R	M12, 4 pole
08373411950	D-LAS-CERO90-Q-S-R	M8, 3-pole
08373411960	D-LAS-CERO90-Q-M-R	M8, 3-pole
08373411970	D-LAS-CERO90-Q-L-R	M8, 3-pole
08373411750	D-LAS-CERO90-Qinv-S-R	M8, 3-pole
08373411760	D-LAS-CERO90-Qinv-M-R	M8, 3-pole
08373411770	D-LAS-CERO90-Qinv-L-R	M8, 3-pole

### Abbreviations

Q = PNP N.C. / NPN N.O.  
L = Type long, Aperture d 0,3  
LC = Low cost (plastic optics)  
P = Potentiometer  
R = Receiver  
Qinv = PNP N.O / NPN N.C.  
S = Type short, Aperture d 0,7  
SF = Ray trap  
T = Transmitter  
TC = Threshold Correction  
VACU = Application in vacuum possible  
WFL= Angled flange  
ZS = Target



## D-LAS SERIES ANALOG LASER LIGHT BARRIERS

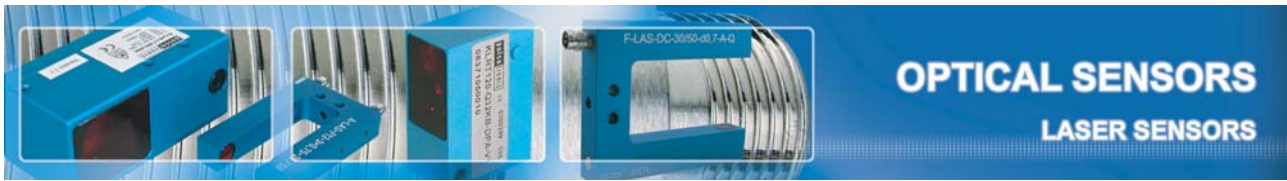
### Selection chart apertures

Last digits article number	D-LAS1	D-LAS2	D-LAS3	D-LAS 90 D-LAS 12/90	D-LAS 24 D-LAS 24/90	D-LAS 34 D-LAS 34/90
02				1 x 0,3	2 x 16	
03	1 x 0,3	1 x 0,3	1 x 0,3	1 x 0,5		
07	2 x 0,75	2 x 0,75	2 x 0,75	2 x 0,75		
08	2 x 1	2 x 1	2 x 1	2 x 1		
12				3 x 0,5	16 x 2	
13	3 x 0,75	3 x 0,75	3 x 0,75	3 x 0,75		
14	4 x 1			4 x 1		
18				4 x 0,5		
23	d 0,3	d 0,3	d 0,3	d 0,3		
24	d 0,5	d 0,5	d 0,5	d 0,5	2 (0,3) x 10	
26	d 0,7	d 0,7	d 0,7	d 0,7		
28	d 1,0	d 1,0	d 1,0	d 1,0	1 (0,5) x 16	
31	d 2,0	d 3,0	d 2,0	d 2,0	1,5 (0,2) x 9,5	
34	d 3,0	d 2,0			9,5 x 1,5 (0,2)	
36					10 x 2 (0,3)	
41					16 x 1 (0,5)	
43	1 x 0,5	1 x 0,5	1 x 0,5			
54				0,3 x 1		
55	0,3 x 1,5	0,3 x 1,5	0,3 x 1,5	0,3 x 1,5		
56	0,3 x 3	0,3 x 3	0,3 x 3	0,3 x 3		
59				0,5 x 1		
62	0,5 x 4	0,5 x 4		0,5 x 4		
63				0,75 x 2		
64				0,75 x 3		
74				1,5 x 0,3		
76				3 x 0,3		10 x 0,3
83						10 x 2
84						20 x 0,3
85						20 x 2
86						25 x 2
87						25 x 0,3
88						30 x 0,5
89						30 x 2
90						5 x 2
92						5 x 0,3
93						
99	7 x 3					

At rectangular apertures (A x B) the measure "A" stands for the side of the aperture, that is parallel to the longest side of the sensor.

### Cables

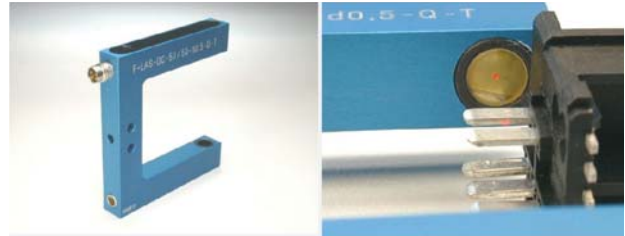
Article number	Designation	Application
44505123810	V1-3/P/2m	cab-M8/3-g-2 (straight, l=2m)
44505123812	V1-3/P/5m	cab-M8/3-g-5 (straight, l=5m)
44505125610	V1-3/W/P/2m	cab-M8/3-w-2 (angled, l=2m)
44505125612	V1-3/W/P/5m	cab-M8/3-w-5 (angled, l=5m)
44505125910	V1-3/W/P/PNP/2L/2m	cab-M8/3-w-pnp-2 (angled, LED, l=2m)
44505125912	V1-3/W/P/PNP/2L/5m	cab-M8/3-w-pnp-5 (angled, LED, l=5m)
44505126010	V1-3/W/P/NPN/2L/2m	cab-M8/3-w-npn-2 (angled, LED, l=2m)
44505126012	V1-3/W/P/NPN/2L/5m	cab-M8/3-w-npn-5 (angled, LED, l=5m)
44505170210	V1-4/P/2m	cab-M8/4-g-2
44503833544	V1-4/P/5m	cab-M8/4-g-5
44505125310	V2-4/P/2m	cab-M12/4-g-2 (straight, l=2m)
44505125312	V2-4/P/5m	cab-M12/4-g-5 (straight, l=5m)
44505123910	V2-4/W/P/2m	cab-M12/4-w-2 (l=2m)
44505123912	V2-4/W/P/5m	cab-M12/4-w-5 (angled, l=5m)
08379452800	cab-M12/4-g-2-shd (straight, l=2m, screened)	cab-M12/4-g-2-shd (straight, l=2m, screened)
08379452802	cab-M12/4-g-5-shd (straight, l=5m, screened)	cab-M12/4-g-5-shd (straight, l=5m, screened)
44505125410	V2-4/W/P/PNP/2L/2m	cab-M12/4-w-pnp-2 (angled, LED, l=2m)
44505125412	V2-4/W/P/PNP/2L/5m	cab-M12/4-w-pnp-5 (angled, LED, l=5m)
44505124010	V2-4/W/P/NPN/2L/2m	cab-M12/4-w-npn-2 (angled, LED, l=2m)
44505124012	V2-4/W/P/NPN/2L/5m	cab-M12/4-w-npn-5 (angled, LED, l=5m)
44505129000	V2-5/P/2m	cab-M12/5-g-2 (straight, l=2m)



## F-LAS SERIES LASER FORK LIGHT BARRIERS

### Product information

Parallel laser light with homogeneous light distribution in round or rectangular cross-section detects smallest objects. The sensitivity is set by means of a potentiometer. These laser light barriers are ideal for positioning tasks.



### Characteristics

#### Collimated laser beam

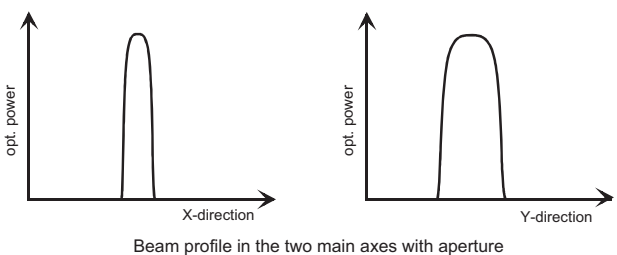
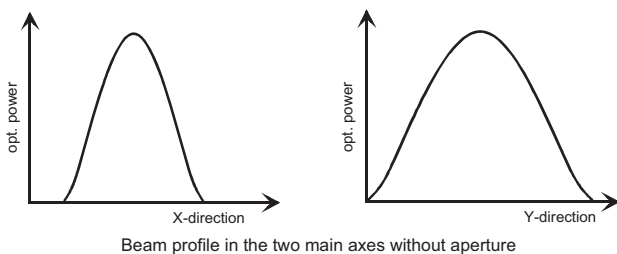
The laser light beam that is emitted by a high-precision optical unit allows a very precise detection of smallest objects. The low divergence of the light beam almost completely reduces the measuring error that is caused by moving the measuring object from the transmitter in the direction of the receiver.

#### Advantages:

- Visible light beam
- Telecentric design
- Exact shadow projection onto the receiver
- The distance of measuring object from the transmitter or receiver has no influence on the measuring signal in a wide range

#### Homogenous light distribution

The use of high-precision apertures in the transmitter ensures optimum adaptation to the application. Apart from a large variety of standard apertures special apertures can be realised. The aperture ensures an homogeneous light distribution in the beam and a sharp beam limitation.

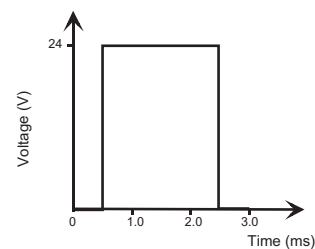
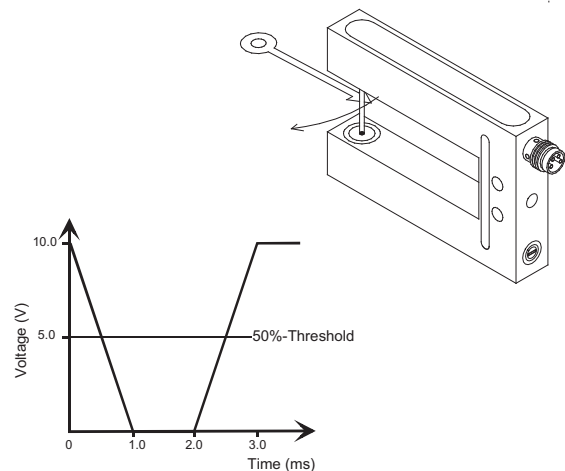


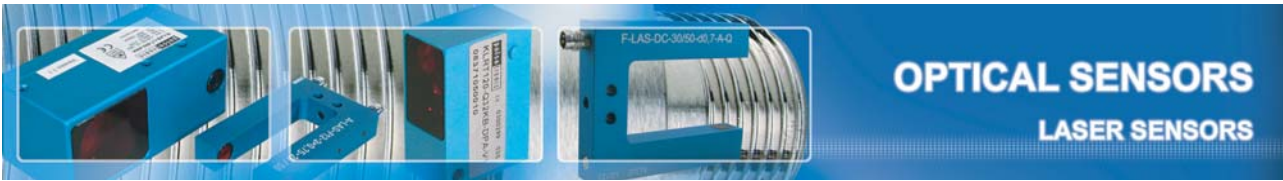
#### Monitor signal

In addition to the switching signal the fork light barriers of the F-LAS series also provide an analog signal. Monitoring the analog voltage allows a better evaluation of the switching signal. The output can also be used for measuring tasks.

#### Functional principle

The signal at the analog output decreases proportionally with increasing laser beam covering.





## F-LAS SERIES LASER FORK LIGHT BARRIERS

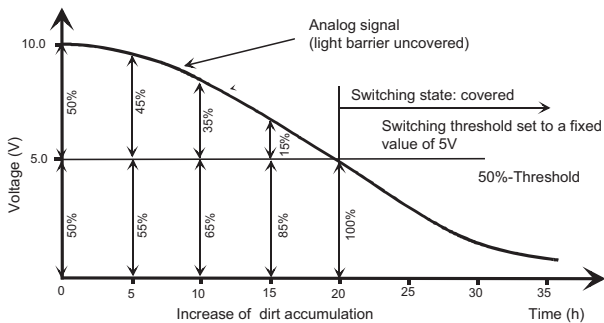
### Characteristics

#### Adjustable switching threshold (Version T)

The comparator threshold is adjusted via the integrated potentiometer. The switching state is indicated by an integrated LED.

#### High positioning accuracy

In conventional light barriers the switching threshold, which depends on a fixed voltage (absolute value), is set by a potentiometer. As a consequence the switching point shifts with increasing dirt accumulation.



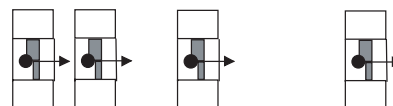
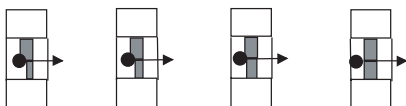
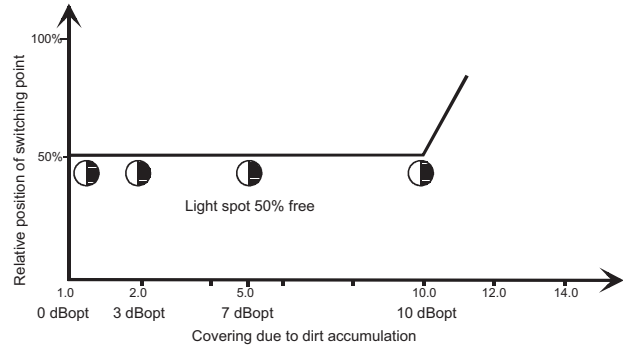
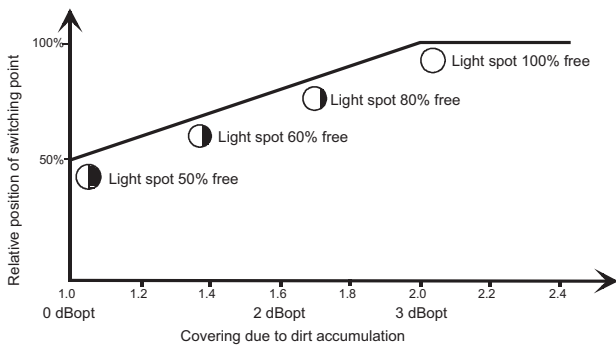
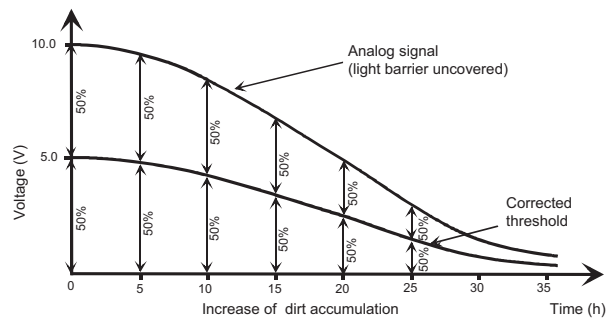
#### Constant light operation (F-LAS-DC)

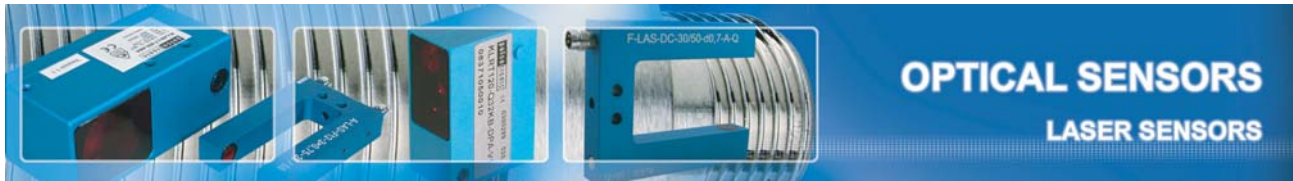
In case of high switching frequency requirements a non-pulsed system can be used. Here external light suppression is ensured by means of narrow-band optical filtering. Therefore constant-light light barriers are suitable for fast processes or for measuring objects moving at high speed. The analog output can also be used for measuring tasks.

#### Adjustable amplification (Version A)

With version A the amplification factor can be adjusted via the integrated potentiometer. The switching threshold is fixed.

A dynamic correction of the switching threshold compensates the effect of dirt accumulation by continuous monitoring of the maximum value at the receiver. Thus increased dirt accumulation does not lead to a shift of the switching point.





## F-LAS SERIES LASER FORK LIGHT BARRIERS

### Selection chart sensors

Article number	Designation 12mm housing Constant light operation F-LAS-DC-(Width/depth)-(Aperture)
083764200XX	F-LAS-DC-10/50-(Aperture)-A-Q
083764210XX	F-LAS-DC-10/50-(Aperture)-A-Qinv
083764240XX	F-LAS-DC-10/50-(Aperture)-T-Q
083764250XX	F-LAS-DC-10/50-(Aperture)-T-Qinv
083764280XX	F-LAS-DC-10/50-(Aperture)-A-Q-TC
083764270XX	F-LAS-DC-10/50-(Aperture)-A-Qinv-TC
083764220XX	F-LAS-DC-10/50-(Aperture)-T-Q-TC
083764230XX	F-LAS-DC-10/50-(Aperture)-T-Qinv-TC
083764201XX	F-LAS-DC-20/50-(Aperture)-A-Q
083764211XX	F-LAS-DC-20/50-(Aperture)-A-Qinv
083764241XX	F-LAS-DC-20/50-(Aperture)-T-Q
083764251XX	F-LAS-DC-20/50-(Aperture)-T-Qinv
083764281XX	F-LAS-DC-20/50-(Aperture)-A-Q-TC
083764271XX	F-LAS-DC-20/50-(Aperture)-A-Qinv-TC
083764221XX	F-LAS-DC-20/50-(Aperture)-T-Q-TC
083764231XX	F-LAS-DC-20/50-(Aperture)-T-Qinv-TC
083764202XX	F-LAS-DC-30/50-(Aperture)-A-Q
083764212XX	F-LAS-DC-30/50-(Aperture)-A-Qinv
083764242XX	F-LAS-DC-30/50-(Aperture)-T-Q
083764252XX	F-LAS-DC-30/50-(Aperture)-T-Qinv
083764282XX	F-LAS-DC-30/50-(Aperture)-A-Q-TC
083764272XX	F-LAS-DC-30/50-(Aperture)-A-Qinv-TC
083764222XX	F-LAS-DC-30/50-(Aperture)-T-Q-TC
083764232XX	F-LAS-DC-30/50-(Aperture)-T-Qinv-TC
083764203XX	F-LAS-DC-40/50-(Aperture)-A-Q
083764213XX	F-LAS-DC-40/50-(Aperture)-A-Qinv
083764243XX	F-LAS-DC-40/50-(Aperture)-T-Q
083764253XX	F-LAS-DC-40/50-(Aperture)-T-Qinv
083764283XX	F-LAS-DC-40/50-(Aperture)-A-Q-TC
083764273XX	F-LAS-DC-40/50-(Aperture)-A-Qinv-TC
083764223XX	F-LAS-DC-40/50-(Aperture)-T-Q-TC
083764233XX	F-LAS-DC-40/50-(Aperture)-T-Qinv-TC
083764204XX	F-LAS-DC-50/50-(Aperture)-A-Q
083764214XX	F-LAS-DC-50/50-(Aperture)-A-Qinv
083764244XX	F-LAS-DC-50/50-(Aperture)-T-Q
083764254XX	F-LAS-DC-50/50-(Aperture)-T-Qinv
083764284XX	F-LAS-DC-50/50-(Aperture)-A-Q-TC
083764274XX	F-LAS-DC-50/50-(Aperture)-A-Qinv-TC
083764224XX	F-LAS-DC-50/50-(Aperture)-T-Q-TC
083764234XX	F-LAS-DC-50/50-(Aperture)-T-Qinv-TC
083764205XX	F-LAS-DC-100/50-(Aperture)-A-Q
083764215XX	F-LAS-DC-100/50-(Aperture)-A-Qinv
083764245XX	F-LAS-DC-100/50-(Aperture)-T-Q
083764255XX	F-LAS-DC-100/50-(Aperture)-T-Qinv
083764285XX	F-LAS-DC-100/50-(Aperture)-A-Q-TC
083764275XX	F-LAS-DC-100/50-(Aperture)-A-Qinv-TC
083764225XX	F-LAS-DC-100/50-(Aperture)-T-Q-TC
083764235XX	F-LAS-DC-100/50-(Aperture)-T-Qinv-TC
083764207XX	F-LAS-DC-100/100-(Aperture)-A-Q
083764217XX	F-LAS-DC-100/100-(Aperture)-A-Qinv
083764247XX	F-LAS-DC-100/100-(Aperture)-T-Q
083764257XX	F-LAS-DC-100/100-(Aperture)-T-Qinv
083764287XX	F-LAS-DC-100/100-(Aperture)-A-Q-TC
083764277XX	F-LAS-DC-100/100-(Aperture)-A-Qinv-TC
083764227XX	F-LAS-DC-100/100-(Aperture)-T-Q-TC
083764237XX	F-LAS-DC-100/100-(Aperture)-T-Qinv-TC

Connection 12mm housing: connector M8 4-pole

Article number	Designation 16mm housing Pulsating light operation
083764258XX	F-LAS-16-AC-80/40-(Aperture)-A-Q
083764278XX	F-LAS-16-AC-80/40-(Aperture)-A-Qinv
083764268XX	F-LAS-16-AC-80/40-(Aperture)-T-Q
083764288XX	F-LAS-16-AC-80/40-(Aperture)-T-Qinv
083764218XX	F-LAS-16-AC-80/65-(Aperture)-A-Q
083764238XX	F-LAS-16-AC-80/65-(Aperture)-A-Qinv
083764228XX	F-LAS-16-AC-80/65-(Aperture)-T-Q
083764248XX	F-LAS-16-AC-80/65-(Aperture)-T-Qinv

Article number	Designation 16mm housing Constant light operation
083764209XX	F-LAS-16-DC-80/40-(Aperture)-A-Q
083764219XX	F-LAS-16-DC-80/40-(Aperture)-A-Qinv
083764249XX	F-LAS-16-DC-80/40-(Aperture)-T-Q
083764259XX	F-LAS-16-DC-80/40-(Aperture)-T-Qinv
083764289XX	F-LAS-16-DC-80/65-(Aperture)-A-Q
083764279XX	F-LAS-16-DC-80/65-(Aperture)-A-Qinv
083764229XX	F-LAS-16-DC-80/65-(Aperture)-T-Q
083764239XX	F-LAS-16-DC-80/65-(Aperture)-T-Qinv

Connection 16mm housing: connector M12 4-pole

Article number	Designation Laser fork light barriers for label detection
0837342600X	F-LAS-LBL-(Aperture)-Q
0837342601X	F-LAS-LBL-(Aperture)-Qinv
0837342604X	F-LAS-LBL-(Aperture)-Q-HAMP
0837342605X	F-LAS-LBL-(Aperture)-Qinv-HAMP

Connection label detection: connector M12 4-pole

Selection chart sensors in combination with selection chart apertures.  
Detailed information on [www.pulsotronic.de](http://www.pulsotronic.de).

#### Abbreviations

A = Potentiometer for adjustment of amplification  
AC = Pulsating light operation  
DC = Constant light operation  
HAMP = High amplification  
Q = NPN N.O. / PNP N.C.  
Qinv = PNP N.O. / NPN N.C.  
T = Potentiometer for adjustment of comparator threshold  
TC = Threshold Correction



# OPTICAL SENSORS

## LASER SENSORS

### F-LAS SERIES LASER FORK LIGHT BARRIERS

#### Selection chart apertures

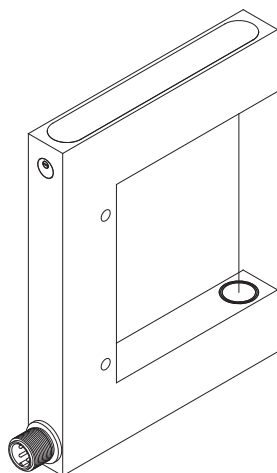
Last digits article number	F-LAS	F-LAS-LBL
02	1 x 0,3	
03	1 x 0,5	
07	2 x 0,75	
08	2 x 1	
09	3 x 0,75	
23	d 0,3	
25	d 0,5	
27	d 0,7	
28	d 1,0	
29	d 2,0	
30	0,8 x 9,5	
33	9,5 x 0,2	
34	9,5 x 0,3	
35	9,5 x 0,8	
36	9,5 x 1,5	
37	9,5 x 4	
49	0,2 x 2	
50	0,2 x 5	
51	0,2 x 9,5	
54	0,3 x 1	
55	0,3 x 1,5	
56	0,3 x 3	
57	0,3 x 9,5	
59	0,5 x 1	
61	0,5 x 3	
63	0,75 x 2	
64	0,75 x 3	
67	1 x 2	
73	1,5 x 9,5	
74	1,5 x 0,3	
75	1,5 x 5	
76	3 x 0,3	
77	3 x 0,5	
80	4 x 9,5	
85	5 x 0,2	
86	5 x 1,5	
X0		d 0,5
X1		d 1,0
X2		3 x 0,3
X8		3 x 0,5
X9		3 x 0,75

#### Cables

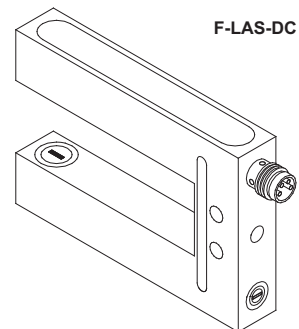
Article number	Designation	Application
44505123810	V1-3/P/2m	cab M8/3-g-2 (straight, l = 2m)
44505123812	V1-3/P/5m	cab M8/3-g-5 (straight, l = 5m)
44505125610	V1-3/W/P/2m	cab M8/3-w-2 (angled, l = 2m)
44505125612	V1-3/W/P/5m	cab M8/3-w-5 (angled, l = 5m)
44505451100	cab M8/4-g-2 (straight, l = 2m)	
08379125512	cab M8/4-g-5 (straight, l = 2m)	
44505451150	V1-4/W/P/2m	cab M8/4-w-2 (angled, l = 2m)

#### Type overview

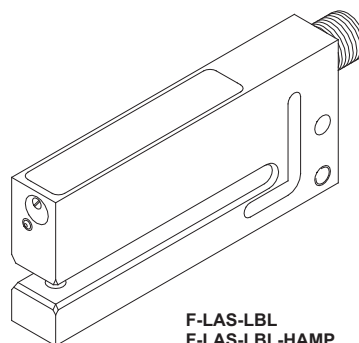
F-LAS-AC-16-80/65  
F-LAS-DC-16-80/65



F-LAS-DC



F-LAS-LBL  
F-LAS-LBL-HAMP



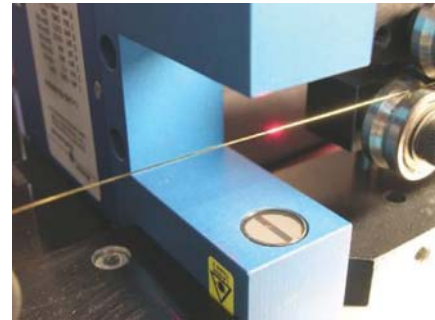


## L-LAS SERIES LASER LINE SENSORS

### Product information

Line sensors are applied where precise positioning is required or where the dimensions of an object have to be determined with high accuracy, e.g. the diameter of a wire.

The laser line sensors of L-LAS series offer various operating widths with a resolution of maximum 1024 pixels. An analog output (voltage or current output) informs about the position and the dimensions of an object. The digital output switches when the adjustable threshold values are exceeded or gone below. The serial interface RS232 allows communication via PC (or PLC + RS232 module).



### Characteristics

#### Functional principle of the sensor

L-LAS-TB laser line sensors are one-way light barriers. A laser collimator that generates a gap-shaped laser light curtain is used as a transmitter, that means parallel laser light is available. The object is positioned between the transmitter and receiver unit of the sensor system. When the laser light curtain impinges on the object, this creates a shadow of this object. Subsequently the laser light curtain (incl. shadow) impinges on the optical receiver and is projected on a line sensor.

The L-LAS-LT laser line sensors operate according to the principle of triangulation, laser transmitter and receiver are arranged in a certain angle to each other. In the so-called reference distance the two optical axes of transmitter and receiver meet. A part of the laser light that is reflected from the measuring object is projected from the receiver optics onto the line detector. The integrated controller calculates the distance between measuring object and sensor.

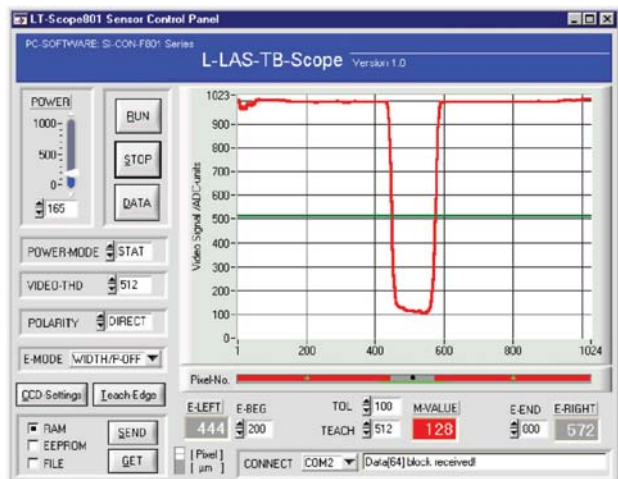
- Telecentric beam path
- Various models available (in fork shape or split shape)
- Various operating widths available
- Resolution up to 1024 pixels
- Insensitive to outside light due to interference filter, polarisation filter and mechanical covers
- External Teach-function
- Sturdy metal housing
- Parameterisable under Windows®, RS232 interface (USB adaptor available)
- Laser class 2 (visible laser light, 670 nm)
- Thickness measurement of objects respectively measurement of the distance between two objects
- Object counting in the lens coverage

#### Parametrisation under Windows® with Software

**L-LAS-TB Scope, L-LAS-LT-Scope, L-LAS-MS-Scope, L-LAS-GD-Scope, LINE-Scope**

The sensors can easily be set with the help of a Windows® user interface in which the sensor signals are displayed in numerical and graphical form.

- Threshold (video threshold)
- Laser power
- Averaging
- Polarity of output signal
- Display in mm, inch or pixel
- Exposure time of laser line
- Evaluation algorithm (thickness measurement, „gap-size“ measurement, edge detection, etc.)
- Laser power correction
- (Video-) Threshold correction





# OPTICAL SENSORS

## LASER SENSORS

### L-LAS SERIES LASER LINE SENSORS

#### Selection chart sensors

Article number	Designation Through beam version, split
08377063600	L-LAS-TB-12-T
08377063601	L-LAS-TB-12-R (incl. software)
08378000020	L-LAS-TB-25-T
08378000021	L-LAS-TB-25-R (incl. software)
08377063500	L-LAS-TB-35-T
08377063501	L-LAS-TB-35-R (incl. software)
08377063800	L-LAS-TB-50-T
08377063801	L-LAS-TB-50-R (incl. software)
08377063810	L-LAS-TB-75-T
08377063811	L-LAS-TB-75-R (incl. software)
08377063820	L-LAS-TB-100-T
08377063821	L-LAS-TB-100-R (incl. software)

Article number	Designation Through beam version, split with separate control electronics
08377064002	L-LAS-TB-8-CON1 (incl. software)
08377064000	L-LAS-TB/90-8x1-T
08377064001	L-LAS-TB/90-8x1-R
08377064003	L-LAS-TB/90-1x8-T
08377064004	L-LAS-TB/90-1x8-R

08377064012	L-LAS-TB-12-CON1 (incl. software)
08377064010	L-LAS-TB/90-12x1-T
08377064011	L-LAS-TB/90-12x1-R
08377064013	L-LAS-TB/90-1x12-T
08377064014	L-LAS-TB/90-1x12-R

08377064002	L-LAS-TB-8-CON2 (incl. software)
08377064100	L-LAS-TB-T08
08377064101	L-LAS-TB-R18

08377064002	L-LAS-TB-8-CON-MS (incl. software)
08377064000	L-LAS-TB/90-8x1-T
08377064001	L-LAS-TB/90-8x1-R
08377064003	L-LAS-TB/90-1x8-T
08377064004	L-LAS-TB/90-1x8-R

Article number	Designation Through beam version Master/Slave-Systems
08377064400	L-LAS-TB-F-8x1-40/40-MA (incl. software)
08377064450	L-LAS-TB-F-8x1-40/40-SL
08377064403	L-LAS-TB-F-1x8-40/40-MA (incl. software)
08377064453	L-LAS-TB-F-1x8-40/40-SL

08377064500	L-LAS-TB-F-16x1-40/40-MA (incl. software)
08377064550	L-LAS-TB-F-16x1-40/40-SL
08377064503	L-LAS-TB-F-1x16-40/40-MA (incl. software)
08377064553	L-LAS-TB-F-1x16-40/40-SL

08377064600	L-LAS-TB-F-8x1-200/40-MA-BL (incl. software)
08377064650	L-LAS-TB-F-8x1-200/40-SL-BL
08377064603	L-LAS-TB-F-1x8-200/40-MA-BL (incl. software)
08377064653	L-LAS-TB-F-1x8-200/40-SL-BL

08377064610	L-LAS-TB-F-8x1-200/65-MA-BL
08377064660	L-LAS-TB-F-8x1-200/65-SL-BL
08377064613	L-LAS-TB-F-1x8-200/65-MA-BL
08377064663	L-LAS-TB-F-1x8-200/65-SL-BL

08377064310	L-LAS-TB-F-8x1-200/65-MA-BL
08377064360	L-LAS-TB-F-8x1-200/65-SL-BL
08377064313	L-LAS-TB-F-1x8-200/65-MA-BL
08377064363	L-LAS-TB-F-1x8-200/65-SL-BL

Article number	Designation Principle of triangulation
08377065037	L-LAS-LT-37 (incl. software)
08377065055	L-LAS-LT-55 (incl. software)
08377065058	L-LAS-LT-55-HS (incl. software)
08377065080	L-LAS-LT-80 (incl. software)
08377065110	L-LAS-LT-110 (incl. software)
08377065135	L-LAS-LT-135 (incl. software)
08377065160	L-LAS-LT-160 (incl. software)
08377065200	L-LAS-LT-200 (incl. software)
08377065275	L-LAS-LT-275 (incl. software)
08377065450	L-LAS-LT-450 (incl. Software)
08377065038	L-LAS-LT-37-MA (incl. software)
08377065039	L-LAS-LT-37-SL

Article number	Designation Reflex light Electronics and frontend in separate housings
08377065900	L-LAS-RL-15-FE (frontend)
08377065901	L-LAS-RL-CON1 (incl. software)

Electronics and frontend in one housing	
08377065930	L-LAS-RL-150-UV-256 (incl. software)
08377065931	L-LAS-RL-150-UV-256-SL (incl. software)
08377065932	L-LAS-RL-150-UV-512 (incl. software)
08377065933	L-LAS-RL-150-UV-512-SL (incl. software)
08377065934	L-LAS-RL-150-UV-1024 (incl. software)
08377065935	L-LAS-RL-150-UV-1024-SL (incl. software)

08377065960	L-LAS-RL-150-VIS-256 (incl. software)
08377065961	L-LAS-RL-150-VIS-256-SL (incl. software)
08377065962	L-LAS-RL-150-VIS-512 (incl. software)
08377065963	L-LAS-RL-150-VIS-512-SL (incl. software)
08377065964	L-LAS-RL-150-VIS-1024 (incl. software)
08377065965	L-LAS-RL-150-VIS-1024-SL (incl. software)

08377065980	L-LAS-RL-150-IR-256 (incl. software)
08377065981	L-LAS-RL-150-IR-256-SL (incl. software)
08377065982	L-LAS-RL-150-IR-512 (incl. software)
08377065983	L-LAS-RL-150-IR-512-SL (incl. software)
08377065984	L-LAS-RL-150-IR-1024 (incl. software)
08377065985	L-LAS-RL-150-IR-1024-SL (incl. software)

Article number	Designation Special versions
08377065000	L-LAS-GD10 (incl. software)
08377065001	L-LAS-GTM-256/16 (incl. software)

Detailed information on [www.pulsotronic.de](http://www.pulsotronic.de).

#### Abbreviations

ED = Edge detection  
 GD = Gloss detection  
 GTM = Glass thickness measuring  
 IR = Infrared  
 LT = Laser Triangulation  
 MA = Master  
 R = Receiver  
 RL = Reflex laser  
 SL = Slave  
 T = Transmitter  
 TB = Through beam  
 UV = Ultraviolet  
 VIS = Visible

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www.pulsotronic.de

subject to  
modifications!



# OPTICAL SENSORS

## LASER SENSORS

### L-LAS SERIES LASER LINE SENSORS

#### Accessories

Article number	Designation blast air attachment
08378000027	ABL-12-T (for L-LAS-TB-12-T)
08378000028	ABL-12-R (for L-LAS-TB-12-R)
08378000024	ABL-25-T (for L-LAS-TB-25-T)
08378000025	ABL-25-R (for L-LAS-TB-25-R)
08378000050	ABL-50-T (for L-LAS-TB-50-T)
08378000051	ABL-50-R (for L-LAS-TB-50-R)
08378000053	ABL-75-T (for L-LAS-TB-75-T)
08378000054	ABL-75-R (for L-LAS-TB-75-R)
08378000056	ABL-100-T (for L-LAS-TB-100-T)
08378000057	ABL-100-R (for L-LAS-TB-100-R)

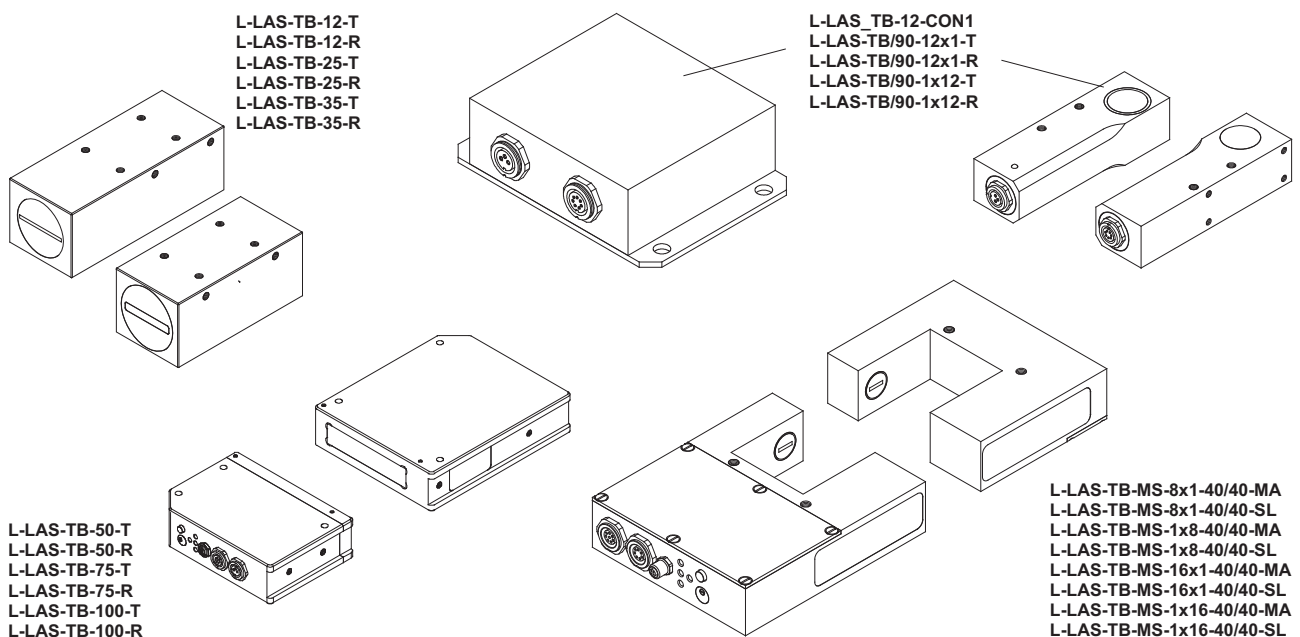
Article number	Designation fastening rail
08379063002	TRA-L-LAS-TB-25-100 (for L-LAS-TB-25)
08379063003	TRA-L-LAS-TB-35-200 (for L-LAS-TB-35)
08379063010	TRA-L-LAS-TB-L100 (for L-LAS-TB-50, -75, -100)
08379063020	TRA-L-LAS-TB-L200 (for L-LAS-TB-50, -75, -100)
08379063030	TRA-L-LAS-TB-L300 (for L-LAS-TB-50, -75, -100)
08379063040	TRA-L-LAS-TB-L400 (for L-LAS-TB-50, -75, -100)
08379063050	TRA-L-LAS-TB-L500 (for L-LAS-TB-50, -75, -100)
08379063100	TRA-L-LAS-TB-L1000 (for L-LAS-TB-50, -75, -100)
08379063150	TRA-L-LAS-TB-L1500 (for L-LAS-TB-50, -75, -100)

Article number	Designation mounting devices
08378000026	MOUNT-L-LAS-TB/90-12 (mounting plate for L-LAS-TB-12 T + R)

#### Cables

Article number	Designation	Connection	with
08379450050	cab-las4/PC (l = 2m)	PC	L-LAS-CON, L-LAS-R, L-LAS-F, L-LAS-MA, L-LAS-LT, L-LAS-ED, L-LAS-GTM
08379451600	cab-las8/SPS (l = 2m)	SPS	L-LAS-CON, L-LAS-R, L-LAS-F, L-LAS-MA, L-LAS-LT, L-LAS-ED, L-LAS-GTM
08379450450	cab-las3-male-2m (l = 2m)	L-LAS-T	L-LAS-CON1, L-LAS-R
08379450460	cab-las7-male-2m (l = 2m)	L-LAS-R	L-LAS-CON1
		L-LAS-MA	L-LAS-SL
08379450470	cab-las3-m/f	L-LAS-T	L-LAS-CON2
08379455000	ca-col5	L-LAS-R	L-LAS-CON2

#### Type overview





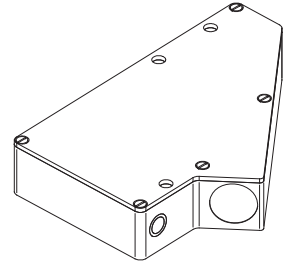
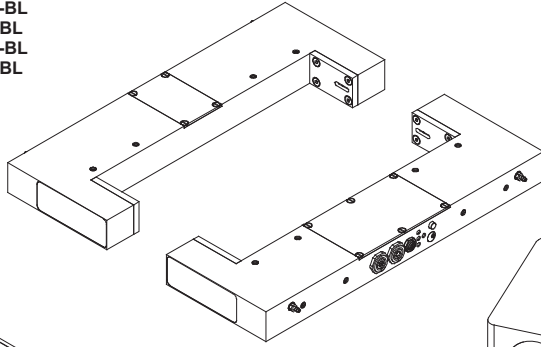
# OPTICAL SENSORS

## LASER SENSORS

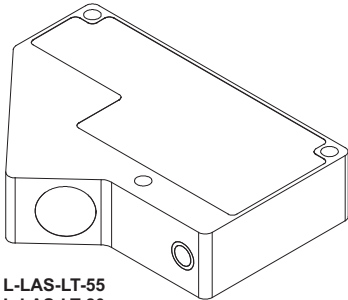
### L-LAS SERIES LASER LINE SENSORS

#### Type overview

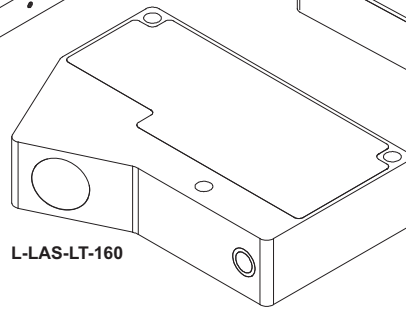
- L-LAS-TB-MS-8x1-200/40-MA-BL
- L-LAS-TB-MS-8x1-200/40-SL-BL
- L-LAS-TB-MS-1x8-200/40-MA-BL
- L-LAS-TB-MS-1x8-200/40-SL-BL
- L-LAS-TB-MS-8x1-200/40-MA
- L-LAS-TB-MS-8x1-200/40-SL
- L-LAS-TB-MS-1x8-200/40-MA
- L-LAS-TB-MS-1x8-200/40-SL



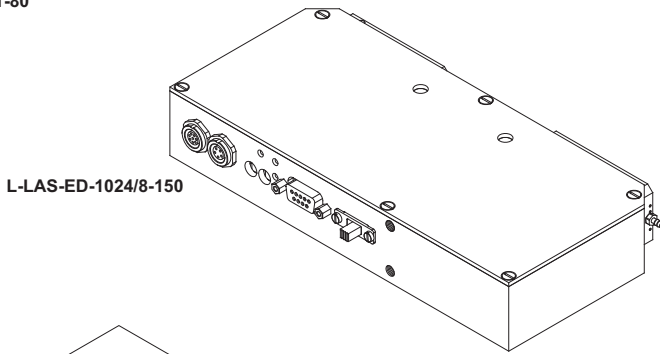
L-LAS-LT-37



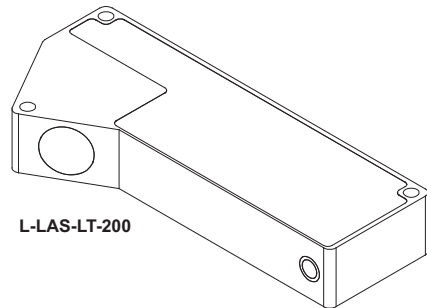
L-LAS-LT-55  
L-LAS-LT-80



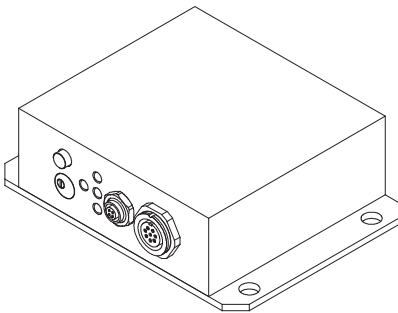
L-LAS-LT-160



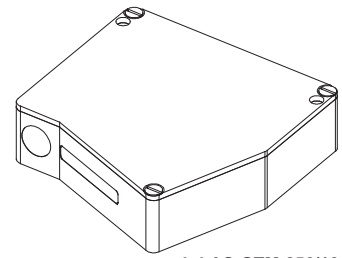
L-LAS-ED-1024/8-150



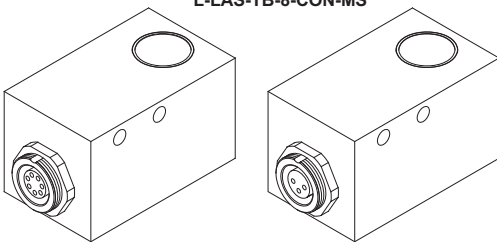
L-LAS-LT-200



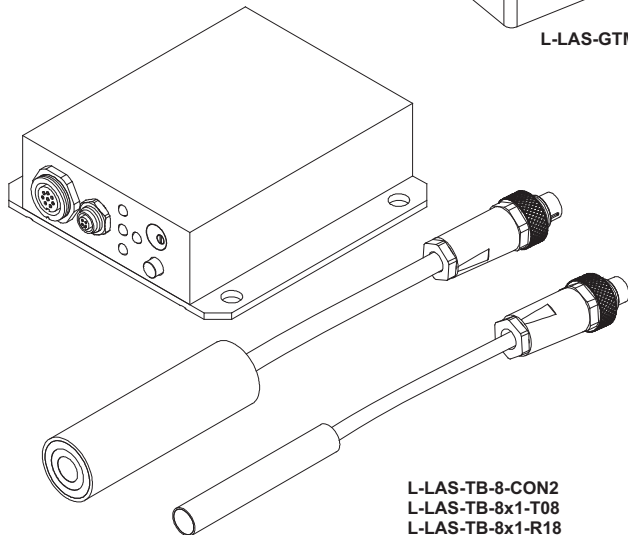
L-LAS-TB-8-CON-MS

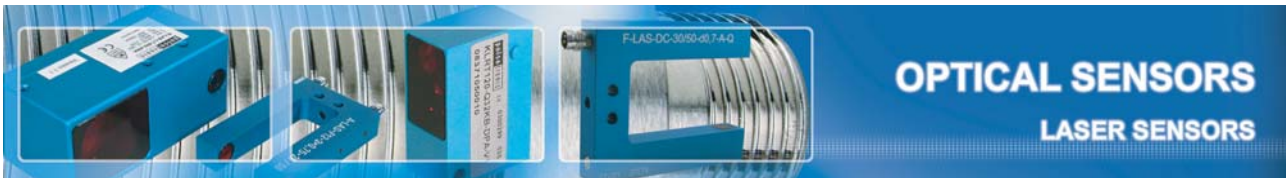


L-LAS-GTM-256/16



L-LAS-TB-8-CON2  
L-LAS-TB-8x1-T08  
L-LAS-TB-8x1-R18





# OPTICAL SENSORS LASER SENSORS

## LCC SERIES LASER COPY COUNTERS

### Product information

LCC laser copy counters primarily are designed for detecting and counting magazines or single sheets in imbricated arrangement. In the optimal operating range they detect sheet edges of a thickness of typ. 50 µm. The sensors of LCC Series are characterised by their reliable function, their ease of operation and their sturdy mechanical construction. The LCC series provides high scanning frequencies of max. 1,5kHz and is able to adapt to bright and dark, slow and fast moving parts.



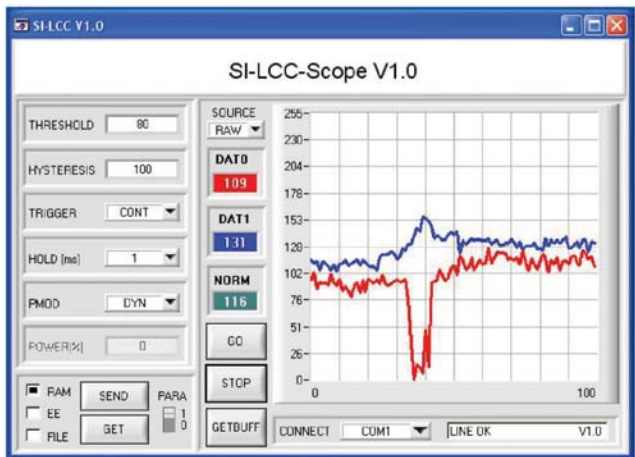
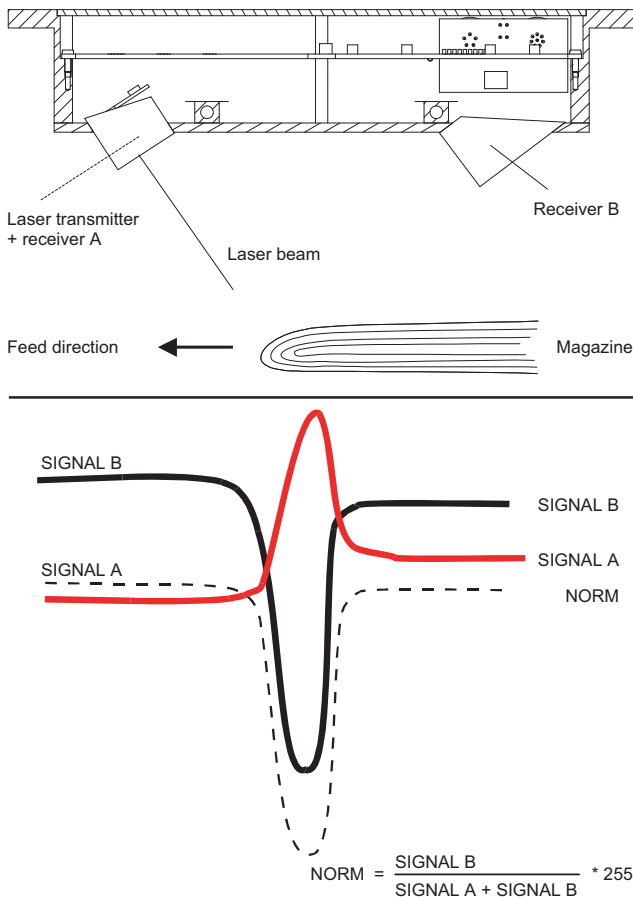
### Characteristics

#### Functional principle of the sensor

The LCC laser copy counters comprehend a laser transmitter (laser diode, λ=670nm) and two receivers. The laser beam is focussed at an angle onto the magazine or sheet opposite to the direction of feed. When an edge arrives, it blocks the beam path to receiver 2, whereas the signal at receiver 1 slightly increases due to the more favourable angle of impingement. The standardised (NORM) value of SIGNALS A and B is used as the starting signal for all further algorithms of the laser copy counter.

#### Parametrisation under Windows® with Software SI-LCC-Scope V1.0 resp. SI-LCC-MA-Scope V1.0

The sensors can easily be set with the help of a Windows® user interface in which the sensor signals are displayed in numerical and graphical form. The user interface also provides various software algorithms and setting parameters. With software version SI-LCC-MA V1.0 several parameters can also be set via DIP and HEX switches.



Parameters such as

- Threshold (sensitivity)
- Hysteresis
- Laser power mode (static or dynamic)
- Output pulse lengthening
- Dead time (static or dynamic)

can be adjusted via software resp. via HEX- and DIP-switches on LCC-...-MA types.



## LCC SERIES LASER COPY COUNTERS

### Selection chart sensors

Article number	Designation
<b>LCC-Sensing range</b>	
08398409150	LCC-30 (incl. SI-LCC V1.0 software*)
08398409140	LCC-40 (incl. SI-LCC V1.0 software*)
08398409170	LCC-60 (incl. SI-LCC V1.0 software*)
08398409180	LCC-80 (incl. SI-LCC V1.0 software*)
08398409190	LCC-90 (incl. SI-LCC V1.0 software*)
08398409160	LCC-130 (incl. SI-LCC V1.0 software*)
<b>LCC-MA</b>	
08398409152	LCC-30-MA (incl. SI-LCC-MA V1.0 software*)
08398409101	LCC-40-MA (incl. SI-LCC-MA V1.0 software*)
08398409171	LCC-60-MA (incl. SI-LCC-MA V1.0 software*)
08398409181	LCC-80-MA (incl. SI-LCC-MA V1.0 software*)
08398409191	LCC-90-MA (incl. SI-LCC-MA V1.0 software*)
08398409161	LCC-130-MA (incl. SI-LCC-MA V1.0 software*)
<b>LCC-CON</b>	
08398409300	LCC-CON1 (incl. SI-LCC V1.0 software*)
08398409320	LCC-FE-TR (transmitter and receiver unit)
08398409301	LCC-FE-R (receiver unit)
<b>LCC-CYL</b>	
08398409142	LCC-40-CYL (incl. SI-LCC V1.0 software*)
08398409182	LCC-80-CYL (incl. SI-LCC V1.0 software*)
<b>LCC-LT</b>	
08398409195	LCC-LT-110 (incl. SI-LCC V1.0 software*)

#### Abbreviations

CON = Control electronics  
 CYL = Cylinder optics  
 FE = Frontend  
 LCC = Laser Copy Counter  
 LT = Laser Triangulation  
 MA = Master  
 R = Receiver  
 TB = Through beam

Detailed information on [www.pulsotronic.de](http://www.pulsotronic.de).

### Accessories

Article number	Designation
08398409151	LCC-TB-30 attachment optics
08398409184	LCC-TB-80 attachment optics
08379451630	counting adaptor

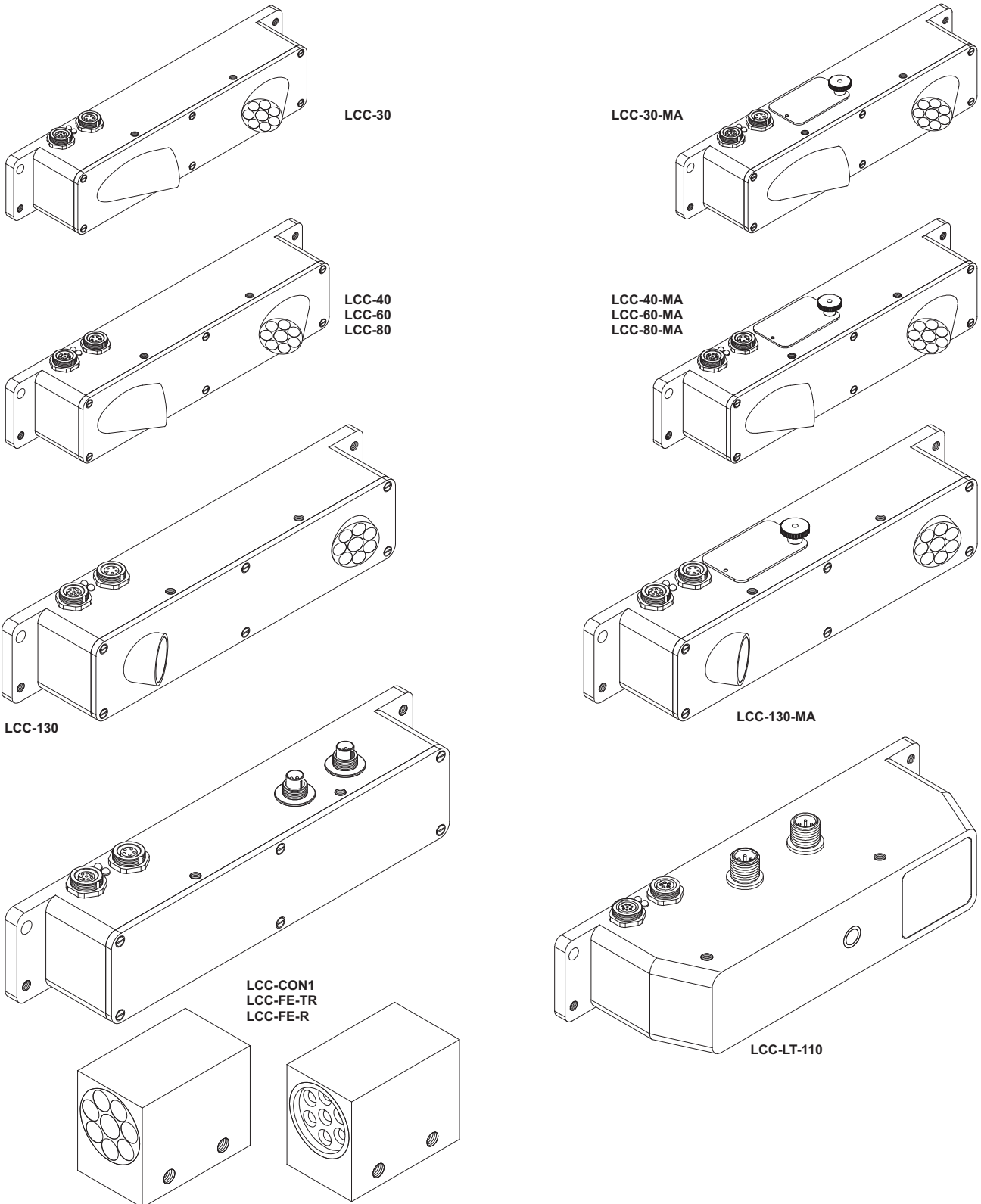
### Cables

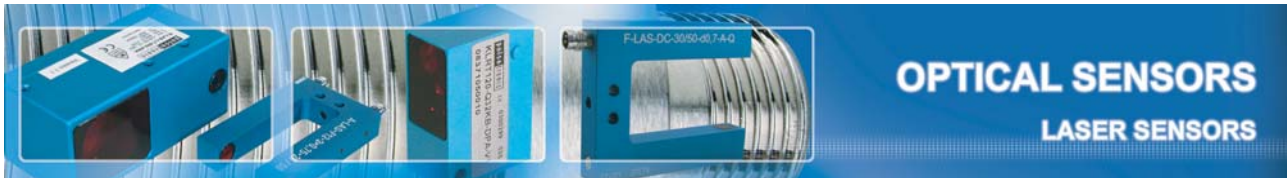
Article number	Designation	Application
08379450100	cab-las5/PC (l = 2m)	connection LCC - PC
08379451600	cab-las8/SPS (l = 2m)	connection LCC - SPS
08405163100	cab-lcc-5 (l = 2m)	connection LCC-CON1 - LCC-R
08405163103	cab-lcc-5 (l = 6m)	connection LCC-CON1 - LCC-R
08405163000	cab-lcc-8 (l = 2m)	connection LCC-CON1 - LCC-TR
08405163003	cab-lcc-8 (l = 6m)	connection LCC-CON1 - LCC-TR



# LCC SERIES LASER COPY COUNTERS

## Type overview





## M-LAS SERIES MINIATURE LASER SENSORS

### Product information

With an external diameter starting from 3mm or thread M4 these laser light barriers are among the smallest throughout the world. Due to their compact design sensors of the M-LAS series are used for applications with little installation space and applications that require a small light spot (parallel or focused). Various control units are available:

- RS232 version, parametrisable under Windows®
- Analog version with 4...20 mA output
- Digital version with automatically corrected switching threshold

Sensors of the M-LAS Series are ideal for detecting extremely small parts and for positioning objects.



### Characteristics

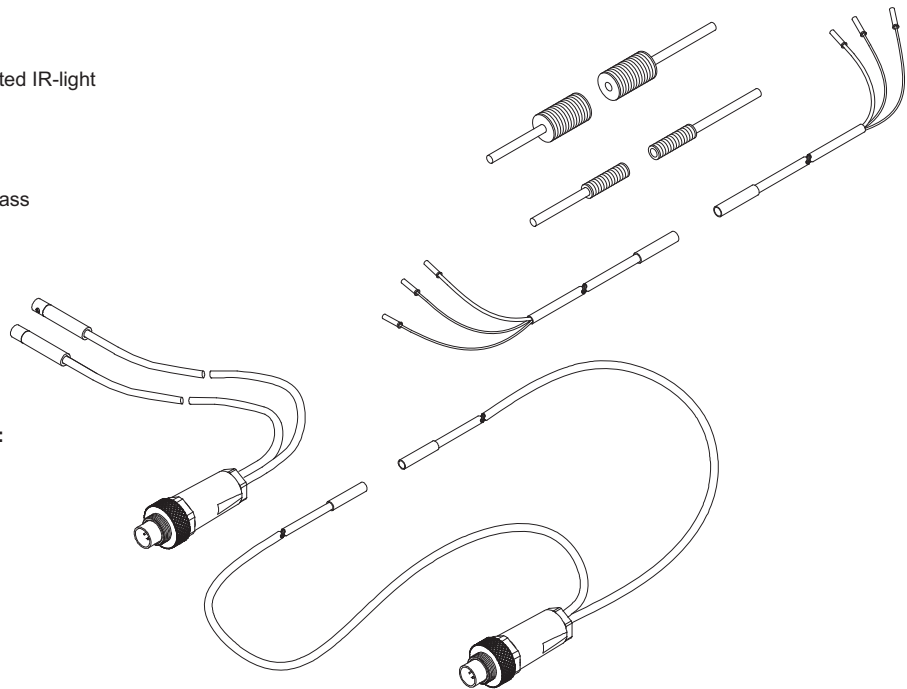
- Big transmitter/receiver distance
- Low beam divergency
- Insensitive to outside light due to modulated IR-light
- Laser class 1 (PO < 0,4 mW)
- High switching frequency
- Sturdy metal housing
- Scratch-resistant optics cover made of glass

#### Versions without connector:

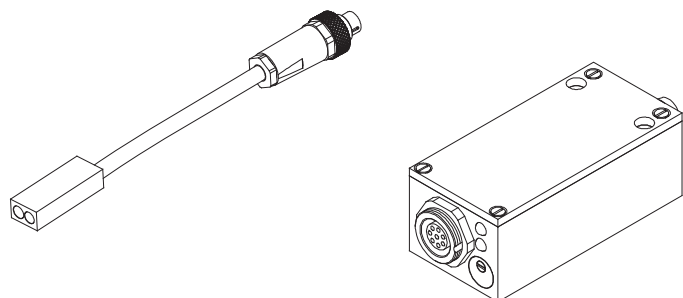
M-LAS-3  
M-LAS-M4  
M-LAS-M8

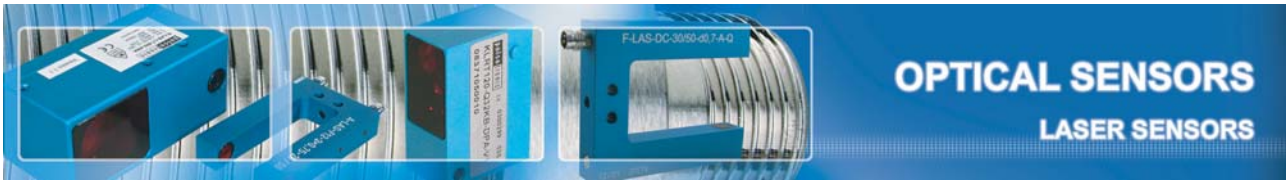
#### Versions with 8-pole circular connector:

M-LAS-3-P  
M-LAS-M4-P  
M-LAS-M8-P  
M-LAS-4/90-P  
M-LAS-Q5/90-P  
M-LAS-F05-30130  
M-LAS-F05-80/50  
M-LAS-10-RFX-IR  
M-LAS-10-RFX-VIS



Depending on the users' requirements, the M-LAS laser light barriers can be combined with different control units.





## M-LAS SERIES MINIATURE LASER SENSORS

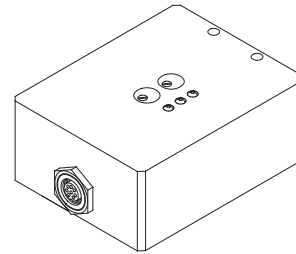
### Selection chart sensors

Article number	Designation
08363604230	M-LAS-M4-P (connector 712 8-pole)
08363604330	M-LAS-M8-P (connector 712 8-pole)
08363604430	M-LAS-M8-VIS-P (connector 712 8-pole)
08363604239	M-LAS-4/90-P (connector 712 8-pole)
08363604539	M-LAS-Q5/90-P (connector 712 8-pole)
08363604530	M-LAS-F05-30/30 (cable length 1m)
08363604580	M-LAS-F05-80/50 (cable length 3m)

### Control electronics

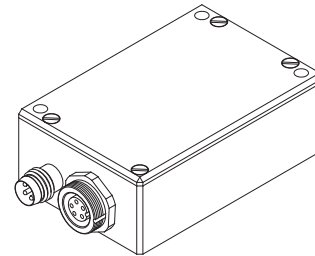
Article number	Designation
08369402010	M-CON2-0/20
08369402020	M-CON2-4/20

- Digital signals static and dynamic
- Analog voltage output (0 ... 10V)
- Analog current output (4 ... 20mA)
- Amplification factor and sensitivity adjustable via potentiometer



Article number	Designation
08369402030	M-CON3 (incl. software LR-Scope)

- Windows®-Parametrisation
- Analog signal (0 ... 10V) and digital signal (0V/+24V)



Continuation on the following page

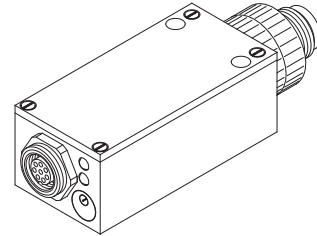


## M-LAS SERIES MINIATURE LASER SENSORS

### Control electronics

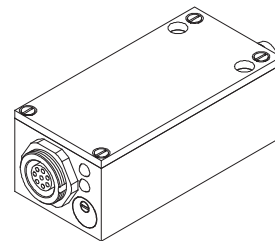
Article number	Designation
08369402050	M-CON4 Kontrollelektronik

- Connector M12 4-pole
- Two switching signals (static Q, Qinv)
- Adjustment of sensitivity via potentiometer



Article number	Designation
08369402060	M-CON8

- Two digital signals (static Q, Qinv)
- Connector M8 4-pole
- Adjustment of sensitivity via potentiometer



### Reflex light barriers with special control electronics

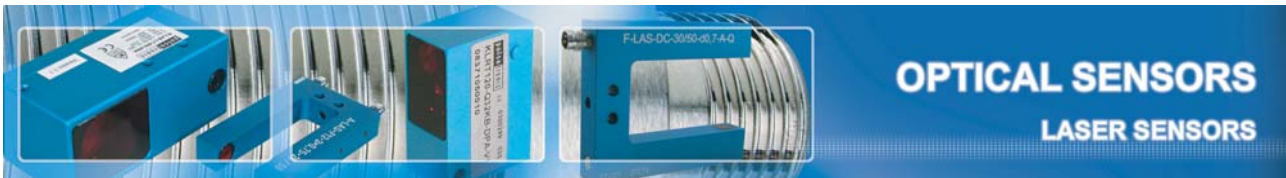
Article number	Designation light barrier
08363604500	M-LAS-10-RFX-IR (1m cable)
08363604600	M-LAS-10-RFX-VIS (1m cable)

Article number	Designation control electronics
08369402090	M-CON4-10-RFX-IR
08369402080	M-CON4-10-RFX-VIS

Detailed information on [www.pulsotronic.de](http://www.pulsotronic.de).

#### Abbreviations

- IR = Infrared
- P = Potentiometer
- Q = PNP N.C. / NPN N.O.
- Qinv = PNP N.O. / NPN N.C.
- R = Receiver
- RFX = Reflex light barrier
- T = Transmitter
- VIS = Visible



## R-LAS SERIES LASER REFLEX SENSORS

### Product information

The laser reflection light barriers of the R-LAS-LR series operate according to the principle of auto-collimation. An integrated polarisation filter ensures protection against spurious triggering caused by reflecting objects. The laser power adjusts itself to the respective reflector and the reflector distance. Parametrisable under Windows® with the software LR-SCOPE.

The laser light sensors of the R-LAS-LT series operate according to the principle of triangulation with background suppression. The measuring object is measured independently of the surface quality, color and background. Standardised evaluation and automatic power correction ensure a very dynamic range. The sensors are parametrisable under Windows® with the software RT-SCOPE or LT-SCOPE.



### Characteristics

#### Parametrisation under Windows®

Sensor parameters such as tolerance, laser power, switching hysteresis, bright/dark-switching, automatic laser power correction on/off, averaging, intensity/distance selection can be set via the RS232 interface. With sensors of type R-LAS-LT the two analog signals or the standardised signal can be displayed on the PC.

The laser light sensors of type R-LAS-LT are characterised by their high positioning accuracy. The extremely small laser spot (40 µm diameter at reference distance) allows the measurement of very small objects, such as for example IC pins or threads. Various types with different reference distances are available: 45 mm, 80 mm, 110 mm, 170 mm, 300 mm, 500 mm, 900 mm. The reflection light barriers of type R-LAS-LR are excellently suited for the detection of small objects due to the very small laser beam diameter (approx. 2mm). With the R-LAS-LR-R type a triple mirror serves as a reflector, whereas with the R-LAS-LR-O version the object itself acts as a reflector.

#### Distance check by tolerance setting

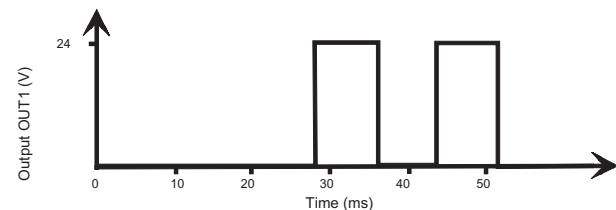
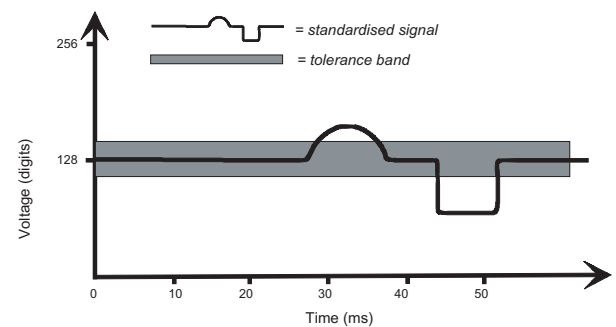
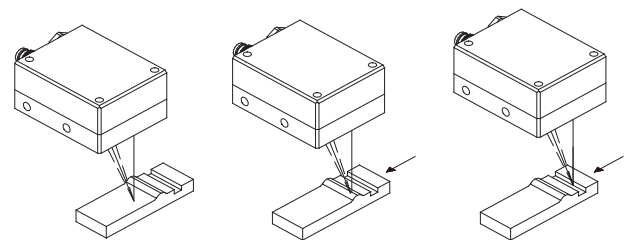
Apart from high-accuracy positioning tasks the R-LAS-LT types can also be used for distance monitoring tasks. Under Windows® the tolerance band is set symmetrically around the reference distance.

#### High switching frequency

Scanning of small objects or of objects moving at high speed requires a high switching frequency. With a switching frequency of 6 kHz with the R-LAS-LR types and 3 kHz with the R-LAS-LT types the R-LAS Series is well suited for high speed processes.

#### Adjustable time delay

Under Windows® a time delay (pulse lengthening) can be set in steps from 0 ms to max. 200 ms.



If the standardised signal (distance signal) leaves the tolerance band, an error is indicated at the tolerance switching output.



## R-LAS SERIES LASER REFLEX SENSORS

### Characteristics

#### Position check

Due to the very small laser spot the sensor type R-LAS-LT is ideally suited for positioning tasks. As the sensor operates according to the triangulation principle, the background can easily be suppressed.

#### Polarisation filter

The polarisation filter that is integrated in the R-LAS-LR-R types suppresses spurious triggering caused by reflections at the measuring object. Even parts with very good reflection behaviour, such as nickelplated or chromium-plated objects, can safely be measured.

#### Auto-collimation principle

The light barriers of type R-LAS-LR operate according to the auto-collimation principle, i.e. transmitter and receiver are set to the same optical axis. This allows safe detection of measuring objects starting from a distance of approx. 1mm from the face of the sensor housing.

#### Automatic laser power correction

The laser light ratio of R-LAS-LT sensors, that is directed into the optical receiver by the measuring object, is kept constant. Thus the degree of absorption and the surface properties of the measuring object have no influence on the measuring accuracy to a large extent. Automatic laser power correction with the R-LAS-LR types operates in a similar way. With the R-LAS-LR-R the laser power adjusts itself to the respective reflector and to the reflector distance so that the laser power arriving at the receiver is kept constant. The R-LAS-LR-O corrects the laser power and adjusts itself to the respective background with a certain time constant.

#### Background suppression

The laser sensors of R-LAS-LT type operate according to the triangulation principle. A modulated laser beam is focussed on the measuring object and dispersed diffusely on its' surface. A part of the divergent light dispersed in the half space is concentrated by the receiver optics of the R-LAS sensor and projected as light-spot on a position-sensitive, optical receiver element (e.g. Differential Foto Diode DFD, see illustration 1). Each position of the light-spot on the DFD corresponds to a certain distance X of the measuring object from the reference distance.

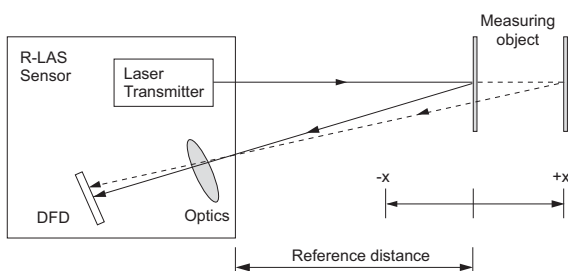


Illustration 1: Triangulation-principle

#### Pulsating light operation

In addition to optical filtering the insensitivity to outside light of the R-LAS sensors and light barriers is further increased by pulsating operation. The R-LAS-LT types are pulse-operated with approx. 200 kHz, and the R-LAS-LR types with approx. 50 kHz.

#### Compact and sturdy metal housing

With their sturdy metal housing and protection class IP67 the laser sensors and light barriers of R-LAS Series are designed for demanding applications in machine construction.

#### Optics and optics cover made of glass

Scratch resistant filter glass guarantees reliable long time operation also in rough industrial applications.

#### Visible laser spot

The visible red light beam considerably facilitates correct alignment of the sensors and light barriers of R-LAS Series to the measuring object or to the reflector.

#### Modular design - repairable

In case of damaging of mechanical or electronic components during operation individual components can be replaced due to the modular design of the R-LAS Series (sensor top part can be unscrewed). Thus costly replacement can be avoided in most cases.

#### Analog output

Alternatively to the digital outputs (tolerance and reference) the option -ANA provides an analog output (0V ... +10V) available for measuring purposes.

#### Insensitive to outside light

The influence of outside light is considerably reduced by means of a red light filter and an additional interference filter. With the R-LAS-LR-R the time (ms) integrated polarisation filter also reduces the effect of outside light.



## R-LAS SERIES LASER REFLEX SENSORS

### Selection chart sensors

Article number	Designation laser reflex sensor triangulation
08378440000	R-LAS-LT-45 (incl. software RT-Scope*)
08378440010	R-LAS-LT-45-XL (incl. software RT-Scope*)
08378440700	R-LAS-LT-45-ANA (incl. software RT-Scope*)
08378440710	R-LAS-LT-45-ANA-XL (incl. software RT-Scope*)
08378440100	R-LAS-LT-80 (incl. software RT-Scope*)
08378440800	R-LAS-LT-80-ANA (incl. software RT-Scope*)
08371449000	R-LAS-LT-80-WA (incl. software RT-Scope*)
08371449020	R-LAS-LT-80-WA-PLL (incl. software RT-Scope*)
08371449010	R-LAS-LT-80-WA-XL (incl. software RT-Scope*)
08371449030	R-LAS-LT-80-WA-XL-PLL (incl. software RT-Scope*)
08371449200	R-LAS-LT-80-WA-ANA (incl. software RT-Scope*)
08371449240	R-LAS-LT-80-WA-ANA-0/20 (incl. software RT-Scope*)
08371449250	R-LAS-LT-80-WA-ANA-4/20 (incl. software RT-Scope*)
08371449210	R-LAS-LT-80-WA-ANA-XL (incl. software RT-Scope*)
08371449260	R-LAS-LT-80-WA-ANA-XL-0/20 (incl. software RT-Scope*)
08371449230	R-LAS-LT-80-WA-ANA-XL-4/20 (incl. software RT-Scope*)
08378440500	R-LAS-LT-170 (incl. software RT-Scope*)
08378440510	R-LAS-LT-170-XL (incl. software RT-Scope*)
08378441200	R-LAS-LT-170-ANA (incl. software RT-Scope*)
08378441210	R-LAS-LT-170-ANA-XL (incl. software RT-Scope*)
08378440600	R-LAS-LT-300 (incl. software RT-Scope*)
08378440650	R-LAS-LT-300-XL (incl. software RT-Scope*)
08378441300	R-LAS-LT-300-ANA (incl. software RT-Scope*)
08378441350	R-LAS-LT-300-ANA-XL (incl. software RT-Scope*)
08378442000	R-LAS-LT-500 (incl. software LT-Scope*)
08378442010	R-LAS-LT-500-XL (incl. software LT-Scope*)
08378442300	R-LAS-LT-500-ANA (incl. software LT-Scope*)
08378442310	R-LAS-LT-500-ANA-XL (incl. software LT-Scope*)
08378442600	R-LAS-LT-110-HD2 (incl. software LT-Scope*)
08378442700	R-LAS-LT-110-HD2-ANA-4/20 (incl. software LT-Scope*)
08378441600	R-LAS-LT-45-WR
08378441700	R-LAS-LT-45-HR
08378441800	R-LAS-LT-120-WR
08378441900	R-LAS-LT-120-HR

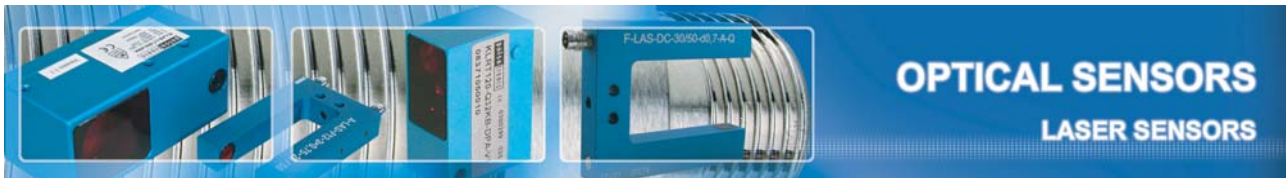
Article number	Designation laser reflex light barrier
08378440200	R-LAS-LR-R (incl. software LR-Scope*)
08378440210	R-LAS-LR-R-CYL (incl. software LR-Scope*)
08378440300	R-LAS-LR-O (incl. software LR-Scope*)
08379441400	R-LAS-LR-RP
08379441500	R-LAS-LR-OP
08379441550	R-LAS-LR-OP-CYL
08379441560	R-LAS-LR-OBC

Article number	Designation laser reflex light barrier
08376420010	R-LAS-LR-O-LWL (incl. software LR-Scope*)
08376420020	R-LAS-LR-O-LWL-RA (incl. software LR-Scope*)
08376420030	R-LAS-LR-O-LWL -TE-HAMP (incl. software LR-Scope*)
08378442230	R-LAS-GD1 (incl. software RT-Scope*)
08378442231	R-LAS-GD1-FOC (focussing, incl. software RLAS-GD-Scope*)
08378442232	R-LAS-GD1-TE (incl. software RLAS-GD-TE-Scope*)
08378442200	R-LAS-GD2 (incl. software RT-Scope*)
08378442201	R-LAS-GD2-TE (incl. software RLAS-GD-TE-Scope*)
08378442210	R-LAS-GD3 (incl. software RLAS-GD-Scope*)
08378442211	R-LAS-GD3-TE (incl. software RLAS-GD-TE-Scope*)
08378442220	R-LAS-GD4 (incl. software RLAS-GD-Scope*)
08378442221	R-LAS-GD4-TE (incl. software RLAS-GD-TE-Scope*)

Detailed information on [www.pulsotronic.de](http://www.pulsotronic.de).

#### Abbreviations

ANA = Analog  
 CYL = Cylinder optics  
 FOC = Focussing  
 GD = Glass detection  
 HAMP = High Amplification  
 HD = Hohe Dynamic  
 HR = High Resolution  
 LR = Laser reflex sensor  
 LT = Laser-Triangulation  
 O = Objekt detection  
 OBC » Drill fracture control  
 OP = Object detection with potentiometer  
 PLL = Parallel laser light  
 RA = Reduced Amplification  
 RP = Reflex barrier with potentiometer  
 TE = Teach-input  
 WA = Wide Angle  
 WR = Wide Range  
 XL = Large control range



## R-LAS SERIES LASER REFLEX SENSORS

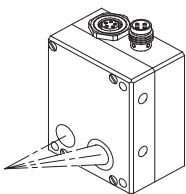
### Accessories

Article number	Designation reflectors
08369430100	reflector D=7mm
08369175100	reflector D=22mm
08369127500	reflector D=40mm
08369430103	reflector D=50mm
08369127600	reflector D=80mm
08369175200	reflector 42,5mm x 34,5mm
08369430123	reflector 47mm x 47mm
08369175500	reflector 90mm x 40mm
08369430182	reflector 18mm x 120mm
08369175600	reflector foil 100mm x 100mm

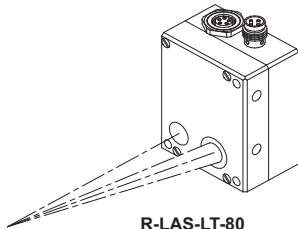
### Cables

Article number	Designation
44505451100	cab-M8/4-g-2
08379125512	cab-M8/4-g-5
08379450100	cab-las5/PC

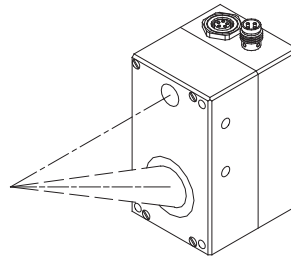
### Type overview



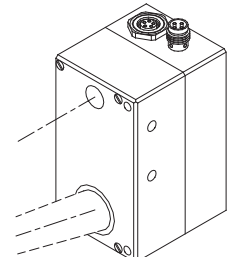
R-LAS-LT-45



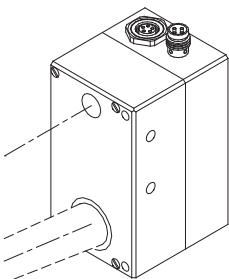
R-LAS-LT-80



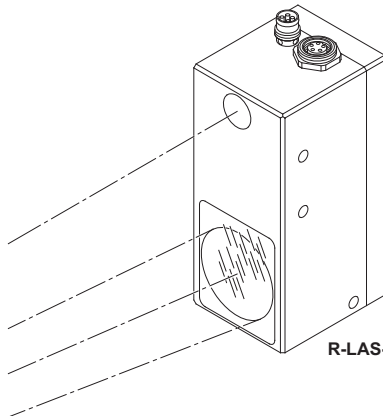
R-LAS-LT-80-WA



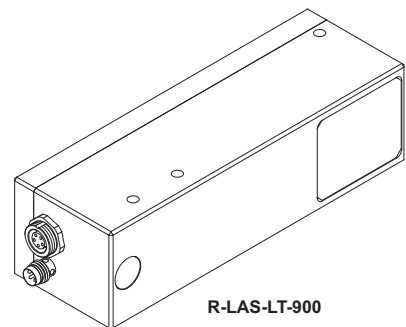
R-LAS-LT-170



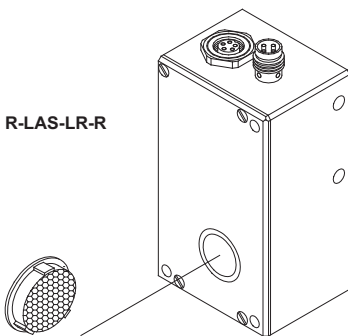
R-LAS-LT-300



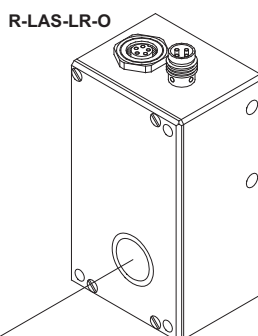
R-LAS-LT-500



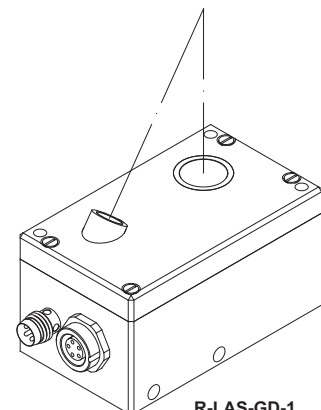
R-LAS-LT-900



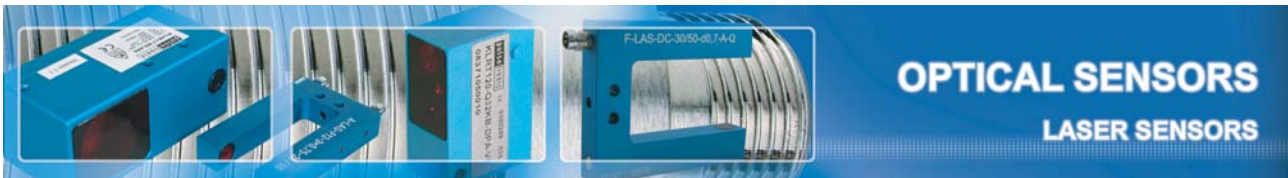
R-LAS-LR-R



R-LAS-LR-O



R-LAS-GD-1

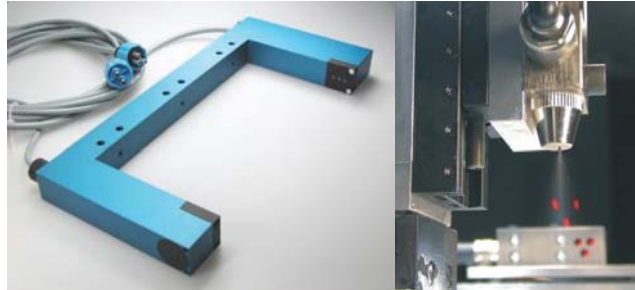


# OPTICAL SENSORS LASER SENSORS

## SI-JET SERIES LASER SPRAY JET CONTROL SYSTEMS

### Product information

Using three laser light barriers integrated in a transmitter and receiver unit the SI-JET laser sprayjet control system checks the density, symmetry and the cone angle of the spray jet. Thus choked or incorrectly set nozzles are detected in time. The system can be parametrised via the software. A dirt accumulation of the optics can be avoided by a compressed air flushing.



### Measuring principle

Special light sources emit modulated light (LED or laser). Due to the aperture technics three light beams quit the transmitter branch of the transmitter. On the receiver side they are projected through the receiver optics by three apertures on three receiver-elements.

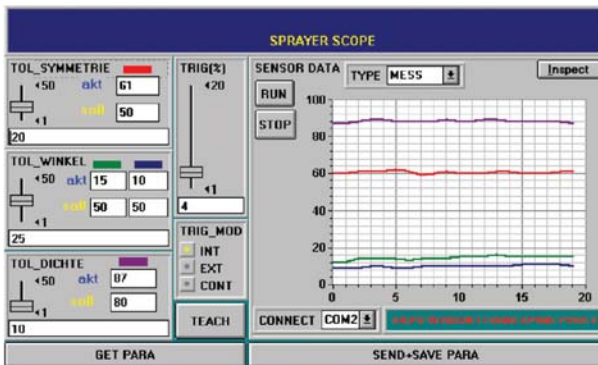
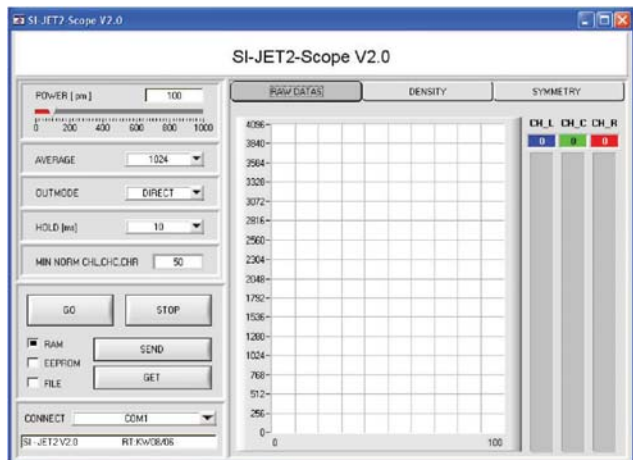
The receiver detectors convert and digitalise the three light signals in three electronic signals. When a spray jet crosses the three light beams, the droplets in the spray jet cause a light absorption resp. a light deflection. This leads to an attenuation of the respective light beam. The degree of attenuation of the respective signal is a measure for the droplet contraction at the place of the light beam.

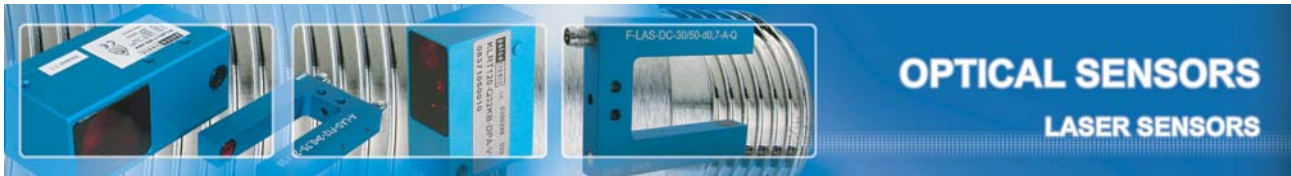
#### Parametrisation under Windows®

The software SPRAYER-Scope or SI-JET2-Scope which is included in the package serves for displaying the analog values provided by the laser light barriers in numerical and graphical form. Via the software the user adjusts the parameters and thresholds that are necessary for the operation of the spray jet system.

#### Parametrisation under Windows®

After switching on the sensor or changing the spray program the sensor has to be taught-in again. If during operation the characteristic values deviate more than the adjusted tolerance threshold allows, the output signal changes.





## SI-JET SERIES LASER SPRAY JET CONTROL SYSTEMS

### Selection chart SI-JET2 systems with fibre optics sensors

Article number	Designation sensor frontends for SI-JET2-CON2 (incl. fibre optics)
08374112100	SI-JET2-FK-200/100-H (length ca. 2m)
08374112200	SI-JET2-FK-200/100-V (length ca. 2m)
08374112300	SI-JET2-FK-400/400 (length ca. 5m)

Article number	Designation control electronics
08374112000	SI-JET2-CON2 (incl. software SI-JET2-Scope*)
08374113000	SI-JET2-CON3

Article number	Designation fibre optics frontends for SI-JET2-CON3
08374113100	R3-M-A1.1-(1.5)-5000-67°-3X (length ca. 5m)
08374113200	R3-M-A2.0-(2.5)-5000-67°-3X (length ca. 5m)

### Selection chart SI-JET3 systems (LED)

Article number	Designation sensor frontends for SI-JET3-CON5
08374114100	SI-JET3-FK-200/100-H

Article number	Designation control electronics
08374114000	SI-JET3-CON5 (incl. software SI-JET2-Scope*)

### Cables

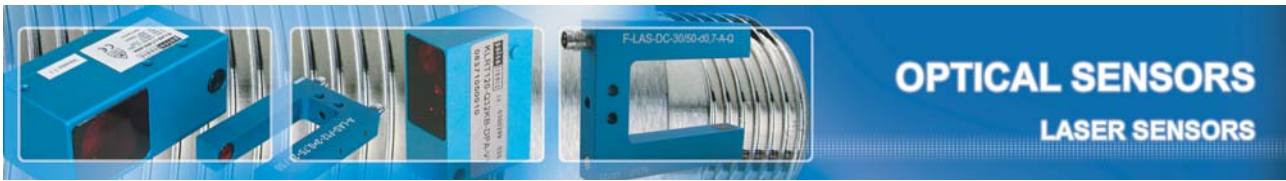
Article number	Designation
08379454000	cab-las7/POWER
08379450100	cab-las5/PC
08379454800	cab-jet8
08379454500	cab-jet5
08379451600	cab-las8/SPS
08379454300	cab-las3/FE-1m
08379454700	cab-las7/FE-1m

#### Abbreviations

\* Windows®-software

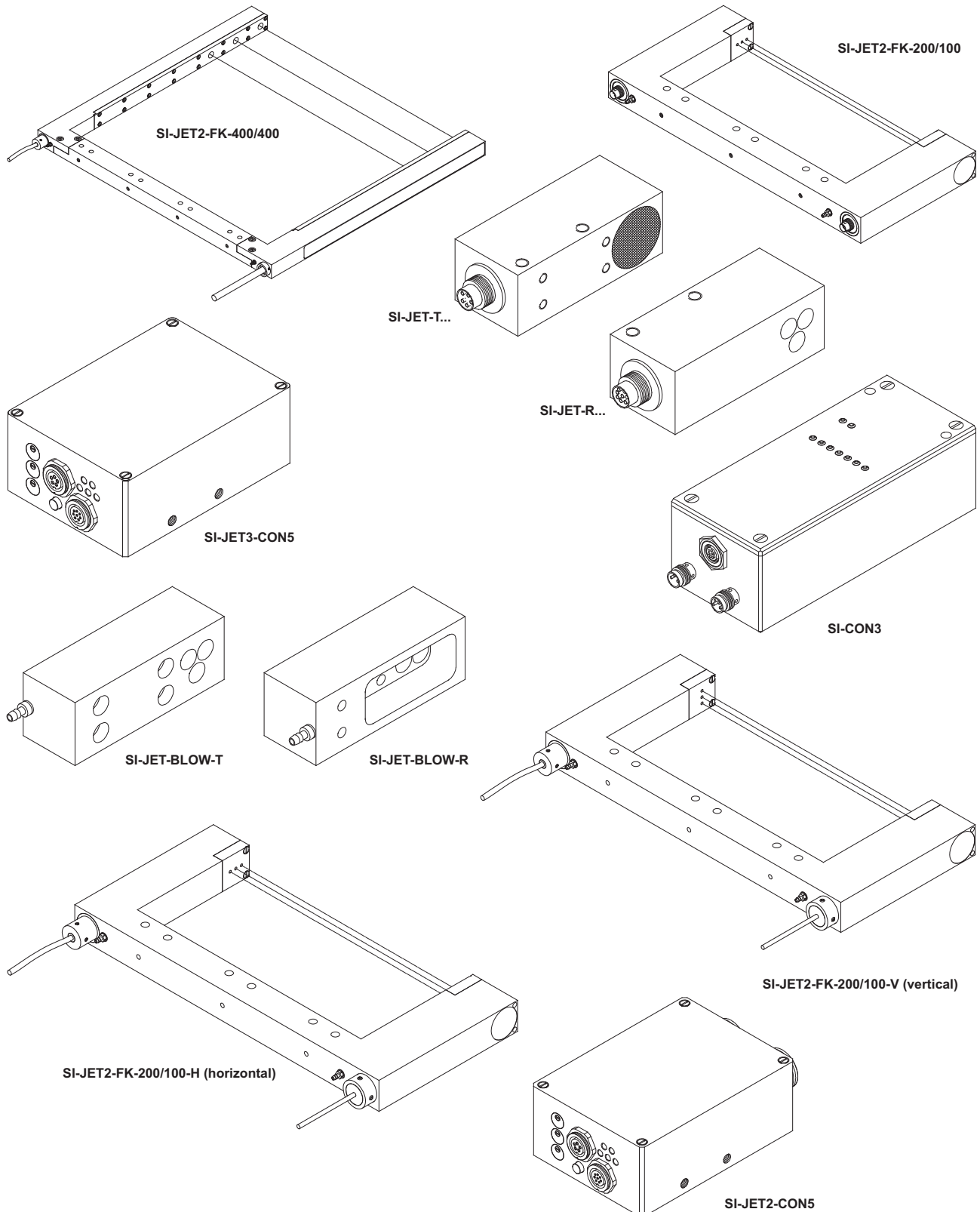
FK = Fork design  
 H = Horizontal  
 R = Receiver  
 T = Transmitter  
 V = Vertical

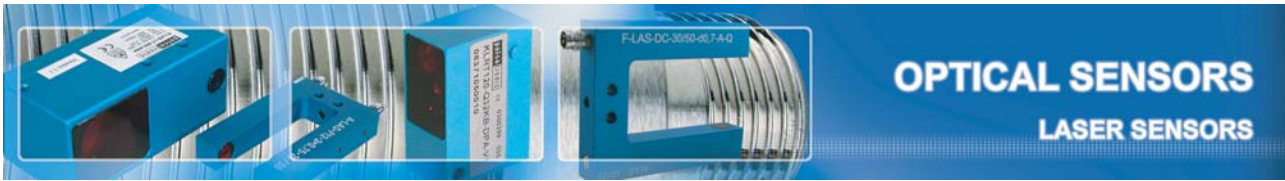
Detailed information on [www.pulsotronic.de](http://www.pulsotronic.de).



# SI-JET SERIES LASER SPRAY JET CONTROL SYSTEMs

## Type overview

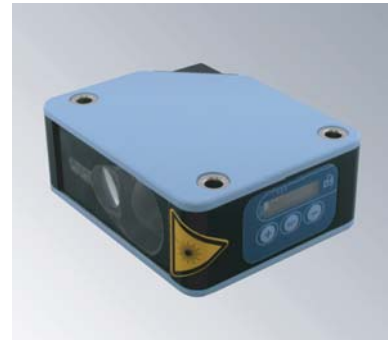




## KLDS SERIES LASER DISTANCE SENSORS

### Product information

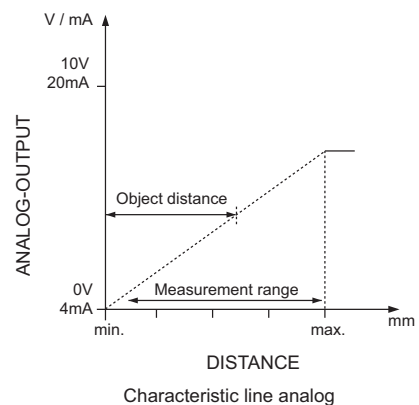
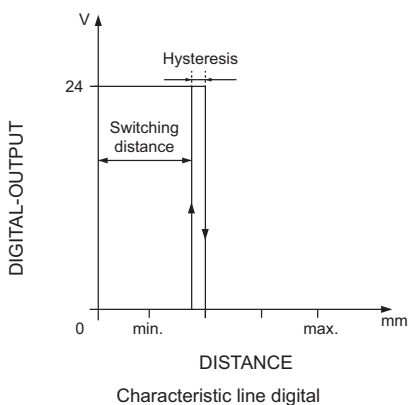
With laser distance sensors of the KLDS series the user realises precise measuring on large distances. The functional principle of the sensors is based on the detection of the time of flight. For distances of up to 7m the reflection characteristics of natural surfaces are sufficient. Using special reflectors the user realises distances of max. 100m. Additionally to two separately adjustable switching outputs analog or alarm outputs and serial interfaces are available.

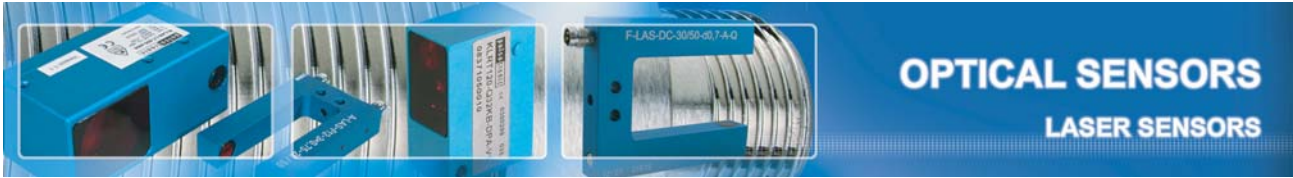


### Characteristics

Distance sensors with time of flight measurement are appropriate for applications demanding a constant performance on the entire measurement range. The maximum measurement and detection error mainly depends on the application and the factors given in the following. The linearity is of great importance. It indicates the maximum deviation of the analog output compared to the ideal value which is proportional to the distance. The linearity is indicated as percental value of the full scale value. The temperature drift indicates the maximum deviation of the measurement value in comparison to a thermal fluctuation of the sensor. It is given in mm/°C. The repeat accuracy is a measure for measuring variations on a target in the same distance in different measuring times.

### Output signal





## KLDS SERIES LASER DISTANCE SENSORS

### Selection chart sensors

Article number	Designation
08371000040	KLDS4-Q53KB-DNSS-V2
08371000041	KLDS4-Q53KB-DPSS-V2
08371000042	KLDS4-Q53KB-DNSS-ANU-V2
08371000043	KLDS4-Q53KB-DPSS-ANU-V2
08371000010	KLDS4-Q90AB-DNSS-ANI-V2
08371000011	KLDS4-Q90AB-DPSS-ANI-V2
08371000015	KLDS7-Q90KB-DNSS-ANI-V2
08371000016	KLDS7-Q90KB-DPSS-ANI-V2
08371000020	KLDS20-Q90KB-DNSS-ANI-V2
08371000021	KLDS20-Q90KB-DPSS-ANI-V2
08371000030	KLDS100-Q90KB-DNSS-ANI-V2
08371000031	KLDS100-Q90KB-DPSS-ANI-V2

### Accessories

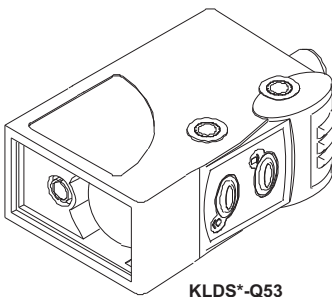
Article number	Designation
08379000001	ST-5037 Fastening angle for KLDS*-Q90...
08379000002	RFL-340/200 reflector

### Cables

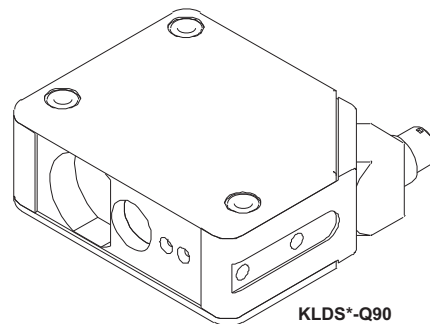
Article number	Designation
44500001910	V2-8/P/2m
44500001912	V2-8/P/5m
44500001917	V2-8/P/10m
44505129000	V2-5/P/2m
44500033556	V2-5/P/5m

Detailed information on [www.pulsotronic.de](http://www.pulsotronic.de).

### Type overview



KLDS\*-Q53



KLDS\*-Q90