LASER DISPLACEMENT SENSOR

Series LAV

Key-Features:

- *Measurement range 0.2 to 8 m or 0.2 to 50 m*
- *Linearity ±25 mm*
- *Repeatability <5 mm*
- *Response time 10 ms*
- *Analog output 4...20 mA and switching output*
- *IO-Link interface*
- *Protection class up to IP67*
- *Operating temperature -30 to 50 °C*
- *Individual parametrization by teach-in procedure*

Content:

21.01.21

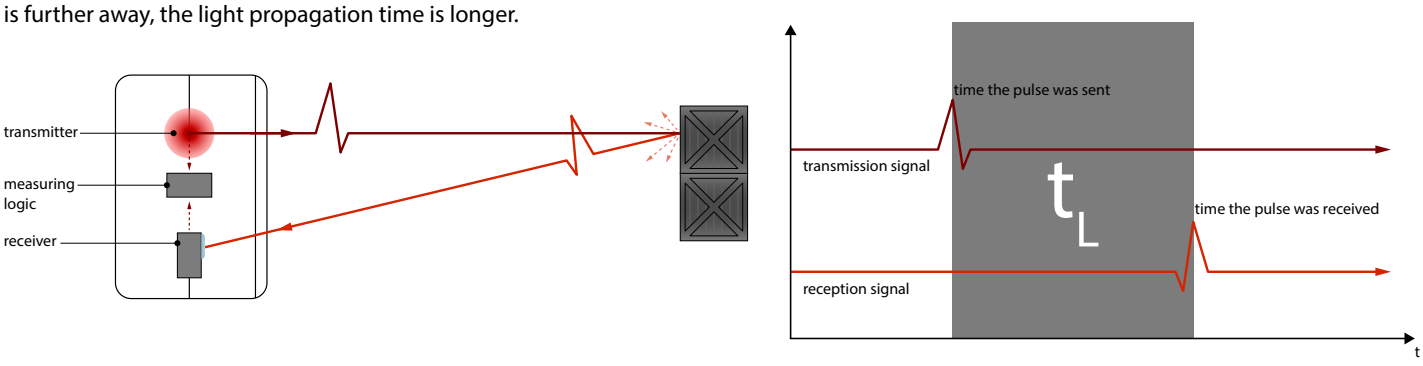
WayCon
Positionsmesstechnik

INTRODUCTION

Laser sensors of the LAV series cover measurement ranges from 0.2 to 50 m. The integrated micro-controller delivers an accurate output signal, which is proportional to the detected distance. External analysers to evaluate the signals are not required. Reliable operation, independent of colour or other influences of the surface, is ensured by sophisticated electronic elements integrated in the system. The small visible laser spot allows a simple and precise orientation of the sensor.

MEASUREMENT PRINCIPLE

A powerful light source emits short, high-energy pulses, which are reflected by the target object and then captured by a light-sensitive receiver. During this process, the emission and reception times are detected with a high degree of precision. From the values determined, the distance to the target object is calculated using the runtime of the light pulses. If the target object is close, the light propagation time is short. If the object is further away, the light propagation time is longer.



TEACH-IN FUNCTION

The desired range can conveniently be adapted within the maximum measurement range by means of the teach-in button. The analog output has its full stroke within the taught range. The default configuration uses the maximum measurement range. A description of the teach-in procedure can be found in the installation guide.

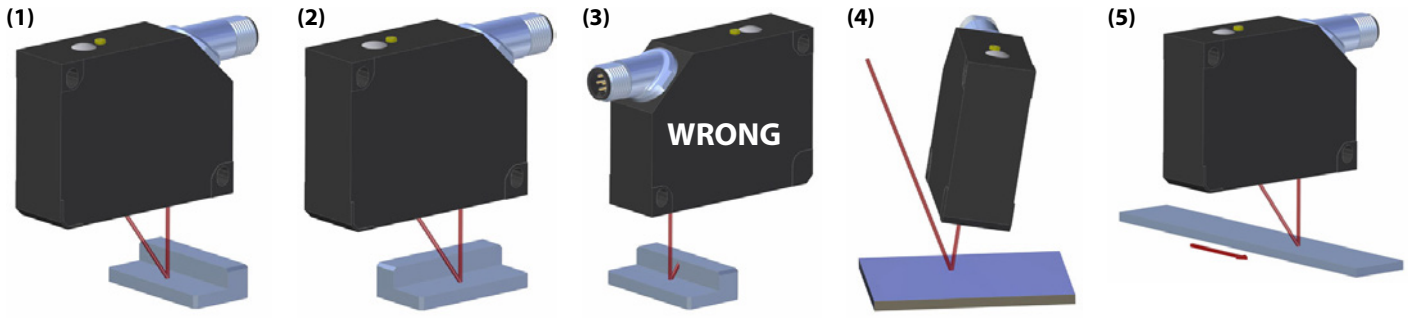
INSTALLATION AND MAINTENANCE

Installation

The first condition for a successful distance measurement is the absence of any obstruction in the light path, as shown in fig. 3. The receiver optics must be able to detect the light spot directly (fig. 1 and 2).

For highly polished or mirror-like objects it is important to keep the direct reflection away from the detector. In these cases, it is recommended to slightly tilt the sensor (fig. 4).

Optimum results are obtained by transverse installation of the sensor with respect to the target movement (fig. 5).



Electromagnetic compatibility: The sensor must correctly be grounded; a shielded cable is recommended.

Cleaning of the laser window

- dry cleaning with a soft brush
- cleaning with a dry, soft, antistatic cloth
- wet cleaning with clear water, approx. 30 °C, if necessary, with a little mild soap.

Do **NOT** use window cleaner!!

TECHNICAL DATA

		LAV-8-420-IO	LAV-50-420-IO
Measurement range	[m]	0.2...8 [1]	0.2...50 [2]
Linearity	[mm]	±25	
Repeatability	[mm]	<5	
Angle deviation max.		±2°	
Temperature drift typ.	[mm/K]	≤0.25	
Light source		laser diode, red	
Laser class		class 2	class 1
Beam diameter		<10 mm (at a distance of 8 m at 20 °C)	<50 mm (at a distance of 50 m at 20 °C)
Wavelength	[nm]	660	
Beam divergence	[mrad]	1	<1.5
Pulse length	[ns]	5	approx. 4
Repetition rate laser	[kHz]	250	
Measurement output		4...20 mA	
Switching frequency	[Hz]	50	
Response time output	[ms]	10	
Interface		IO-Link (V1.0)	
Signal output		push-pull output	
Switching voltage max.	[VDC]	30	
Switching current max.	[mA]	100	
Power supply	[VDC]	10...30 (IO-Link: 18...30)	
Ripple		10 % (within the supply tolerance)	
No-load supply current		≤70 mA / 24 VDC	
Time delay before availability	[s]	1.5	
Protection class		IP65	IP67
Operating temperature	[°C]	-30...+50	-30...+55
Storage temperature	[°C]	-30...+70	
Ambient illuminance max.	[lx]	50.000	
EMC directive		2014/30/EU	
UL approval		cULus Listed, Class 2 Power Source, Type 1 enclosure	
Connection		connector output M12, 4 pins	
$MTTF_D$	[a]	200	
Mission time (T_M)	[a]	10	
Housing		plastics ABS	
Weight	[g]	90	

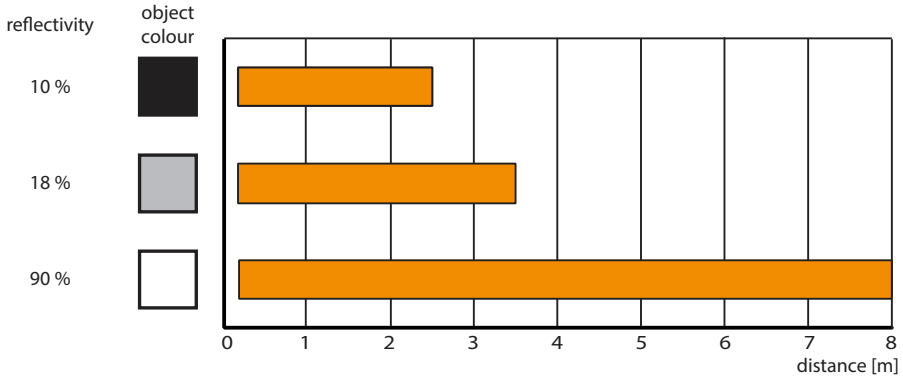
[1] for measurements on reference target (Kodak white, reflectivity 90 %)

[2] for measurement on reflective tape (see accessories)

MEASUREMENT RANGE INFLUENCED BY TARGET

LAV-8-420-IO

The following figure shows the how the measurement range changes depending on the reflectivity of the target object:

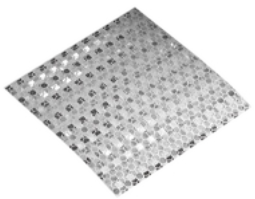


LAV-50-420-IO

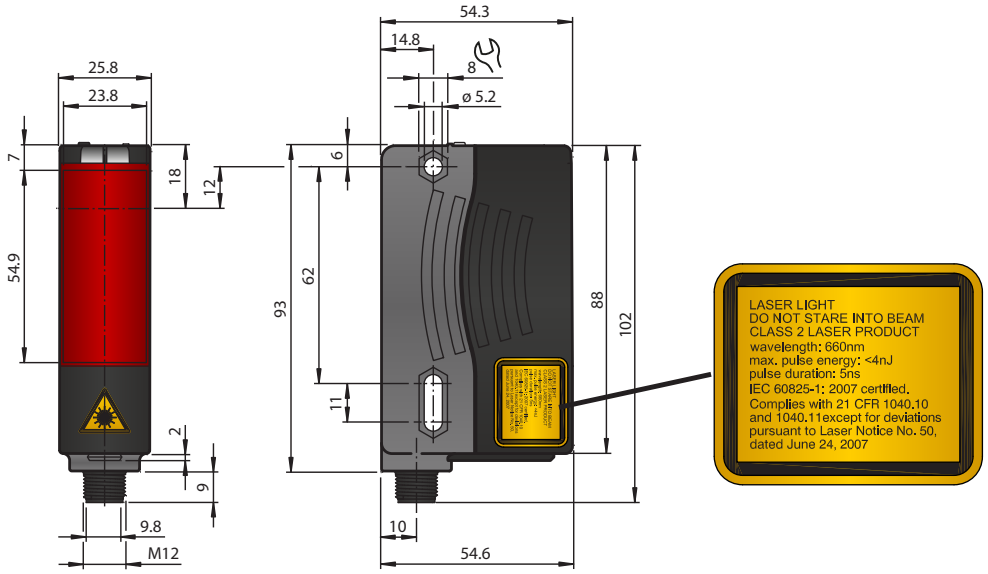
Measurements must always be made on the ZT100 reflective tape (see accessories).

Dimensions: 100 x 100 mm

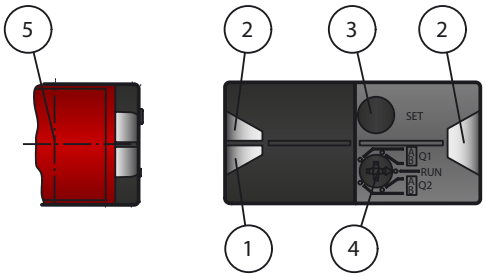
Temperature range: -35...60 °C



TECHNICAL DRAWING



OPERATING ELEMENTS



1	operating indicator (green)
2	signal indicator (yellow)
3	teach-in button
4	mode rotary switch
5	laser output

Details rotary switch

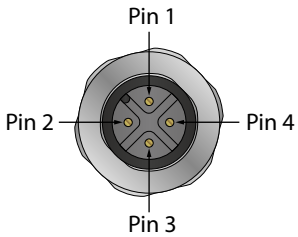
Q1: switching output (push-pull)
setting of the switching thresholds A and B

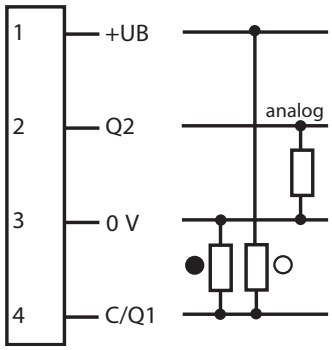
Q2: analog output 4...20 mA
setting of the min. and max. values A and B

For more information please refer to the installation guide.

ELECTRICAL CONNECTION

Connector M12, male, 4 pins





○ = Light on
● = Dark on

Q1:
switching output (push-pull)
setting of the switching threshold A and B
Light on: switches to 0 V
Dark on: switches to +UB

Q2:
Analog output 4...20 mA
setting of the min. and max. values A and B

C:
data line IO-Link

ORDER CODE

LAV — ☐ — 420-IO

Measurement range [m]	
0.2...8	8
0.2...50	50

ACCESSORIES

Cable with connector (female) M12, 4 poles, shielded	
K4P2M-S-M12	2 m, straight connector
K4P5M-S-M12	5 m, straight connector
K4P10M-S-M12	10 m, straight connector
K4P2M-SW-M12	2 m, angular connector
K4P5M-SW-M12	5 m, angular connector
K4P10M-SW-M12	10 m, angular connector

Mating connector (female) M12, 4 poles, shielded	
D4-G-M12-S	straight, for self assembly
D4-W-M12-S	angular, for self assembly

Reflective tape for LAV-50-420-IO	
ZT100	Reflective tape, necessary for measurement

Digital displays for sensors with analog output, 2 channel	
WAY-AX-S	touch screen, supply: 18...30 VDC
WAY-AX-S-AC	touch screen, supply: 115...230 VAC

For more information and options please refer to the WAY-AX data sheet.

GENERAL SAFETY INSTRUCTIONS

- Attention radiation laser.
- Do not stare into beam.
- Do not point the laser beam towards someone's eye.
- It is recommended to stop the beam by a matte object or matte metal shield.
- Laser regulations require the power to the sensor be switched off when turning off the whole system this sensor is part off.

Subject to change without prior notice.

WayCon Positionsmesstechnik GmbH
email: info@waycon.de
internet: www.waycon.biz

Head Office
Mehlbeerenstr. 4
82024 Taufkirchen
Tel. +49 (0)89 67 97 13-0
Fax +49 (0)89 67 97 13-250

Office Köln
Auf der Pehle 1
50321 Brühl
Tel. +49 (0)2232 56 79 44
Fax +49 (0)2232 56 79 45