

LASER DISPLACEMENT SENSOR

Links to further documents for this series:

[Installation guide](#)

[Catalogue](#)



LAV SERIES

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

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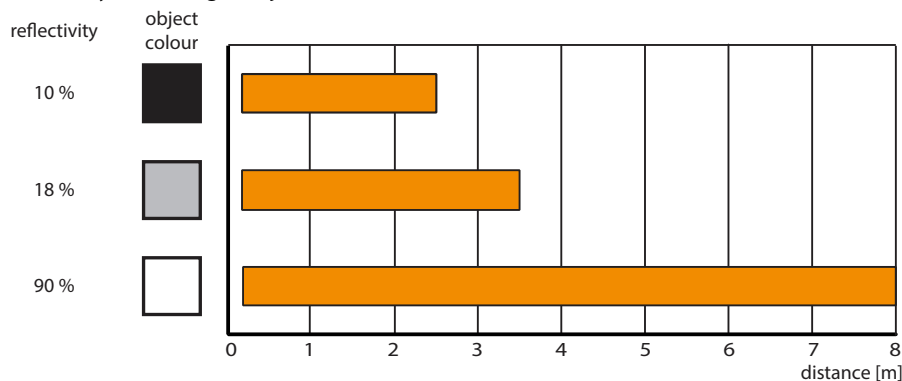
TECHNICAL DATA

| | | 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, typ. service life 85000 h at Ta = +25 °C | |
| Light type | | modulated visible red light | |
| 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, short-circuit/overload protected | |
| 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 | |
| Laser safety | | IEC 60825-1:2007 | |
| Product standard | | EN 60947-5-2 | |
| 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, optical face: PMMA | |
| Weight | [g] | | 90 |

MEASUREMENT RANGE INFLUENCED BY TARGET

LAV-8-420-IO

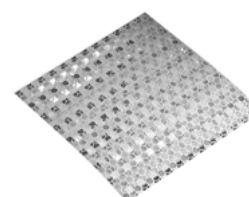
The following figure shows the how the measurement range changes depending on the reflectivity of the target object:



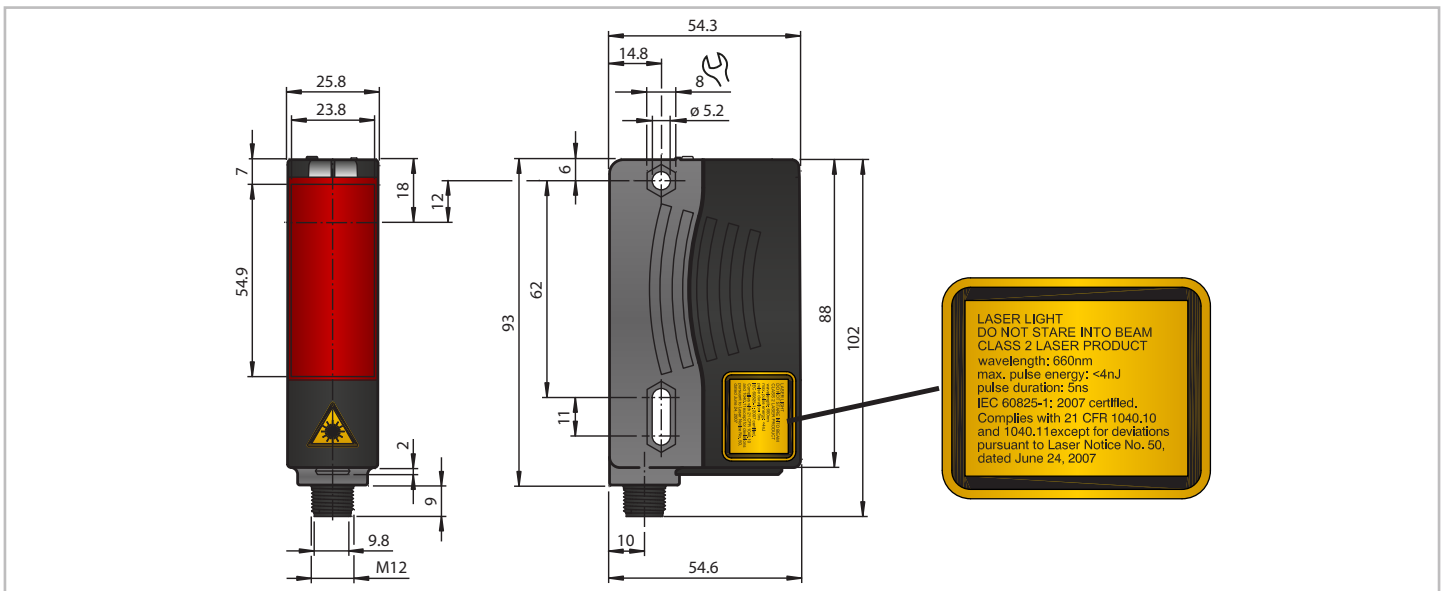
LAV-50-420-IO

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

| | |
|---|------|
| 1 | +UB |
| 2 | Q2 |
| 3 | 0 V |
| 4 | C/Q1 |

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

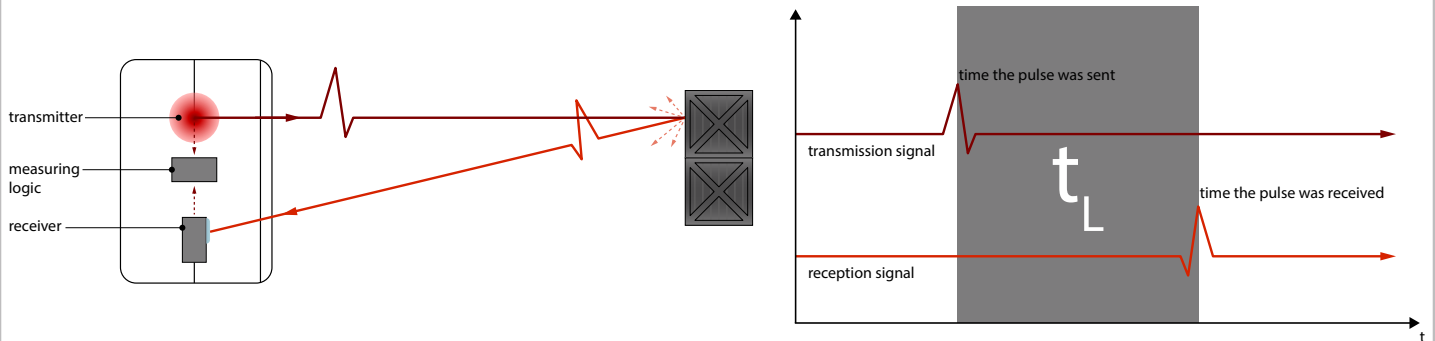
Q2: Analog output 4...20 mA
 setting of the min. and max. values A and B

C: data line IO-Link

○ = Light on
 ● = Dark on

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.



The first condition for a successful distance measurement is the absence of any obstruction in the light path: The receiver optics must be able to detect the light spot directly: 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.



For laser-based technologies, please apply to the corresponding laser safety regulations.

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-AC | touch screen, supply: 115...230 VAC |

For more information and options please refer to the [WAY-AX data sheet](#).

Subject to change without prior notice.

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