

LS...FA
LS...FA
LS121FA
LS122FA



DATA SHEET

since 1976

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LASER
MEASURING SYSTEMS

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1. General

The LS 11/12 FA is a laser range finder to measure distances from 0.2 m to more than 100 m with pinpoint accuracy.

A given target can be clearly identified with the help of a red laser sighting point. In terms of operating reach, the LS 11/12 FA performs depending on the reflectance, morphology and qualities of the target to be measured.

The range finder works based on comparative phase measurement. It emits modulated high-frequency light which is diffusely reflected back from the target with a certain shift in phase to be compared with a reference signal. From the amount of phase shift, a required distance can then be determined with millimetre accuracy.

A distance measuring cycle can be triggered in three different ways:

- By sending a command from the PC or another equivalent control unit
- By making appropriate prior parameter settings for the auto start command and applying supply voltage
- By external triggering (in remote-trigger mode).

For a more detailed description of these three trigger options, you should consult section 5. Operating Modes of this User Manual.

Special performance features are:

- Provides high accuracy and great reach under extreme outdoor temperatures.
- Works in a wide range of operating voltages from 10 V= to 30 V= from an on-board vehicle supply point, an industrial direct voltage supply net or a DC power pack.
- Features consistently low power consumption of <1.5 W (without
- Up to 30 m reach for distance measurement, with potential for more than 100 m reach if additional reflectors are mounted onto the target (depending on reflectance and environmental conditions).
- Visible laser beam for easier sighting.
- RS232 interface port for input of measuring functions and commands from, and output of measured values to, a PC or a laptop.
- Switching output and analogue output are separately programmed.
- Switching output with adjustable limit to indicate positive and negative excession of preselectable distance range window by sighting distance.
- Measured values can be displayed in meters, decimetres, centimetres, feet, inches due to.
- Option for remote triggering of a measurement from an external trigger device.

The LS 11/12 FA measuring module is shipped in a rugged cardboard box with adequate padding for safe transportation.

There are four models of LS

Model	Interface RS type	Sampling Frequency
LS121FA	RS232	50 Hz max.
LS122FA	RS422	50 Hz max.

3. Technical Data

3.1 Laser

Laser:	650 nm laser diode; red light
Laser class:	650 nm, visible, laser class 2, conforming to standard IEC825-1/EN60825, class II (FDA21 CFR)
Output power:	< 1mW
Laser divergence:	0.6 mrad
Beam diameter:	< 6 mm at 10 m distance < 30 mm at 50 m distance < 60 mm at 100 m distance

3.2 Measuring Performance

Measuring range ¹	0.2 m to 50 m with natural surfaces (for DT, DF or DM and ST =0), more than 100 m if target reflectance high enough	
Measuring accuracy:	± 3 mm (15 °C...35 °C), ± 2 mm for distance range from 0.1 m to 30 m under defined measuring conditions Max.: ± 5 mm (across full temp. range and for any type of surfaces)	
Measured value resolution:	Depends on scale factor (1 mm with SF = 1)	
Time to measure:	Typ.:	160 ms... 6s in standard mode measuring any type of surface
100 ms in "DW" measuring mode		
20 ms in "DX" measuring mode (only LS12FA)		
Max. target motion speed:	5 m/s in "DX" measuring mode (only LS12FA)	
Max. acceleration:	2.5 m/s ² in "DX" measuring mode (only LS12FA)	

¹ conditional on target reflectance, ambient light influences and atmospheric conditions

3.3 Interface

Type of connection:	12-pole M18 flange-mount connector (Binder series 723)
Supply voltage (DC 10 V...30 V
Max. power consumption (in no-load state):	< 1,5 W
Data interface: (Please specify on ordering sheet!)	RS232 LS121FA RS422 LS122FA
Baud rate:	9,6 kBaud (2,4/4,8/19,2/ 38,4 kBaud selectable)
Data bits:	8
Parity:	none
Stop bit:	1
Handshake:	none
Protocol:	ASCII
Digital switching output:	HIGH = $U_V - 2\text{ V}$, LOW < 2 V, rated for loads up to 0.5 A, switching threshold and hysteresis selectable, can be inverted
Analogue output:	4 mA...20 mA, distance range limits can be set, behaviour on error report can be preselected Load resistance: <T 500 Ohm against GND Accuracy: $\pm 0.15\%$ Max. temperature drift: 50 ppm/K
Trigger input:	Trigger voltage 3 V ... 24 V Trigger threshold + 1.5 V, Trigger flank to start of measurement preset at 5 ms + delay time Trigger pulse length >1ms Delay time (trigger delay) selectable from 0 ms to 9999 ms Trigger flank selectable
Max. input voltages:	$U_V = 30\text{ V}$ (protected against polarity reversal)
RxD = $\pm 25\text{ V}$	
RX+, RX- = $\pm 14\text{ V}$	
TRIG = - 25 V	
Output voltages:	TxD „d 5 V
TX+/- 2 V, 2 x 50 W load differential	
ALARM $U_V - 2$	

3.4 Environment & Ambient Conditions

Operating temperature:	- 10 °C bis + 60 °C
Storage temperature:	- 20 °C bis + 70 °C
Protection type:	IP65

3.5 Mechanical Mounting Conditions

Casing:	Extruded aluminum profile with powder-coat paint finish, front-side & rear-side cover and tube anodized
Dimensions (L x W x H):	182 mm x 96 mm x 50 mm
Weight:	850 g

The casing consists of a rugged, corrosion-resistant extruded aluminium profile with front-side and rear-side covers also in corrosion-resistant design. Four mounting holes are provided in the base plate for mechanical attachment of the LS 11/12 FA (Figure 1 Dimensional drawing).

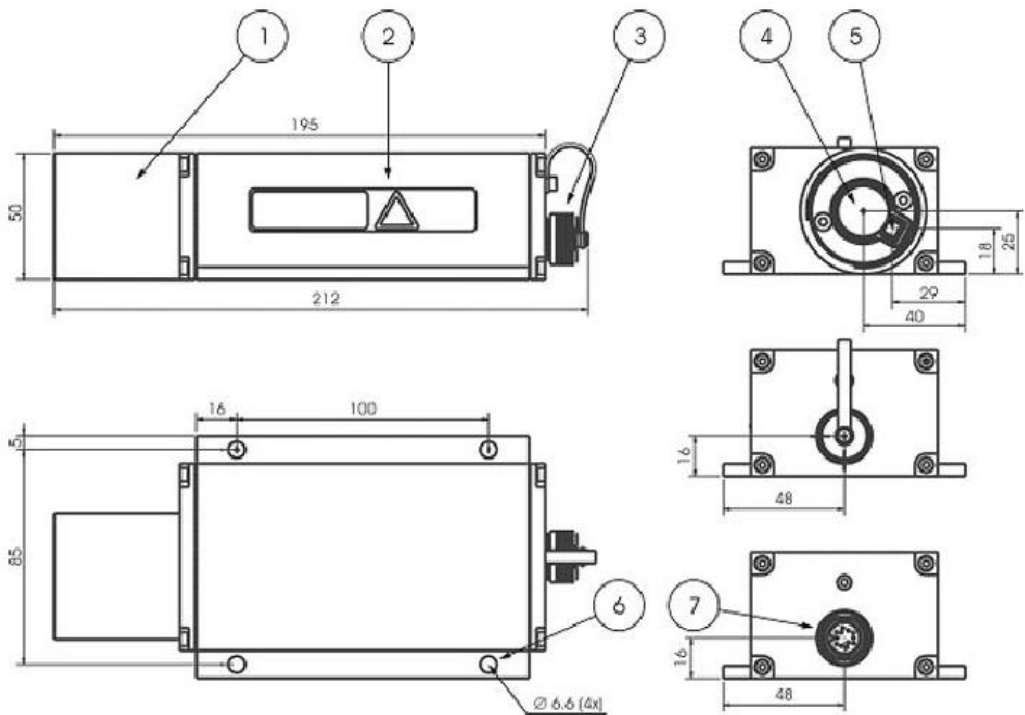


Figure 1 Dimensional drawing

- 1 Equalizer tube at front cover
- 2 Casing
- 3 Protective cap for flange-mount connector
- 4 Receiver optics
- 5 Sender optics
- 6 Mechanical mounting holes (four)
- 7 12-pole M18 flange-mount connector (Binder series 723)