



LS113PS

Technical Datasheet



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LASER
MEASURING SYSTEMS

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1 General

The LS113PS is an opto-electronic distance measuring module for industrial applications.

Equipped with a Profibus® DP interface, the LS113PS can easily be integrated into any fieldbus-driven process controller.

The additional SSI interface provides another convenient option for controlled operation of the measuring module.

A compact and robust design shape combines with low power consumption, selectable switching outputs and the possibility to set specific application parameters to warrant flexibility in use.

You should not start using the LS113PS, unless you have read this User Manual and familiarized yourself with all safety notes contained in it. This is necessary to ensure that your opto-electronic distance measuring module can be used in the best possible way and damage will be prevented.



Safety Instructions

Basic Notes

These safety and operating instructions should be carefully read and followed during practical work with the LS113PS.

There is danger of laser radiation or electrical shock.

For necessary repair work, the LS113PS may not be opened by anyone other than Manufacturer personnel. Unauthorized intervention into the inner product space will void any warranty claims.



Compliance with all specified operating conditions is necessary.

Failure to observe advisory notes or information contained in this Manual or non-conforming product usage may cause physical injury to the user or material damage to the LS113PS. Cable connectors must not be plugged or unplugged, as long as voltage is supplied. Remember to turn voltage supply off before you begin working on cable connections.



Laser Classification

The LS11/12 is a class 2 laser product as stipulated in IEC825-1/DIN EN 60825-1:2001-11 and a class II product under FDA21 CFR. In the event of accidental, short-time laser exposure, the human eye is sufficiently protected by its own optico-facial winking reflex. This natural reflex may be impaired by medication, alcohol and drugs. Although the product can be operated without taking special safety precautions, one should refrain from directly looking into the laser beam. Do not direct the laser beam onto persons.

Caution:

There is class 2 laser radiation. Do not look into the beam!



Electric Supply

Use only 10 V to 30 V direct voltage for LS113PS operation. Use only the specially designated connector terminal for voltage supply. Specified signal levels must not be exceeded, in order to guarantee correct data communication.

Important Operating Advice

To make full use of the system's inherent performance capabilities and achieve a long service life, you should always follow these operating rules:

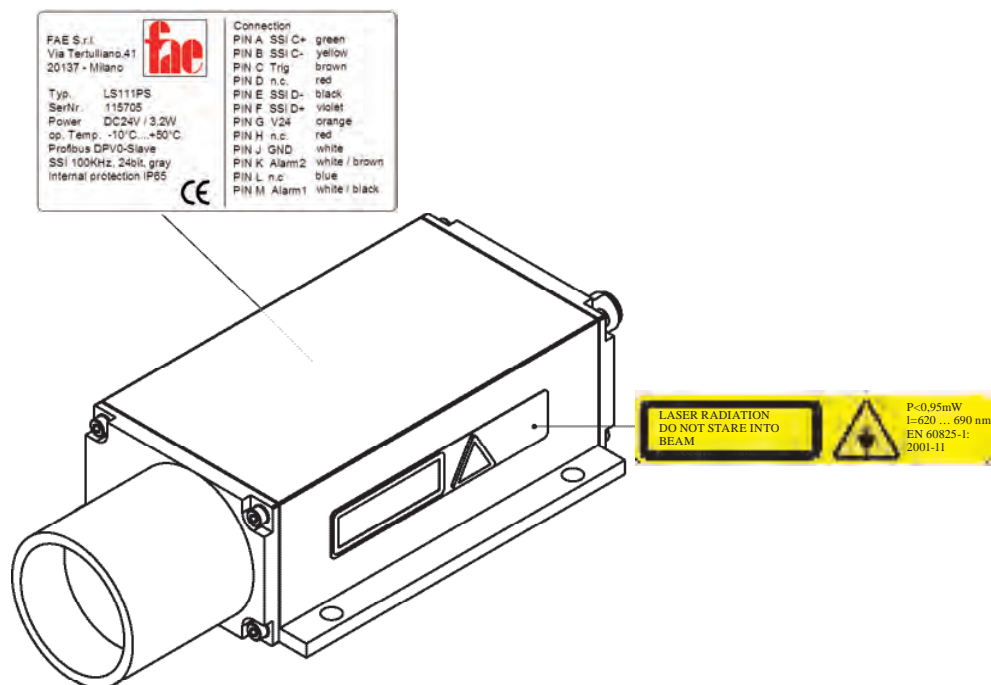
- Do not turn the LS113PS on if there is fogging or soiling on its optical parts!
- Do not touch any of the module's optical parts with bare hands!
- Proceed with care when removing dust or contamination from optical surfaces!
- Prevent exposure to shock impacts during transportation of the LS113PS!

- Prevent overheating of the LS113PS!
- Prevent major temperature variances during LS113PS operation
- In accordance with IP65 internal protection standards, the LS113PS is designed to be splashproof and dustproof.



Read these safety and operating instructions with due care and follow them in practical use.

Danger Signs & Specification Plates



Intended & Conforming Use

General Product Description

The LS113PS is a laser distance measuring module to determine distances from 0.1 m to 30 m, using natural surfaces, or to measure distances up to 150 m with a target reflector. Providing a red laser sighting point, the LS113PS allows you to unequivocally mark a particular target. Its effective operating range depends on the reflectance and surface qualities of the targets being sighted.

The module 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 millimeter accuracy.

A distance measurement cycle can be triggered:

- via the Profibus
- from an external trigger source (external trigger mode)
- via the SSI.

Special performance features are:

- Profibus interface
- Broad range of parameter setting options via Profibus
- SSI interface
- Two switching outputs, each with selectable parameter settings
- External trigger input, with selectable parameter settings
- Capable of operating at outdoor temperatures from +15°C to +30°C with ± 2 mm accuracy
- Up to 30 m reach for distance measurement, with potential for 150 m reach if additional reflectors are mounted onto the target
- Visible laser beam for easier sighting.

The LS113PS measuring module is shipped in a rugged cardboard box with adequate padding for safe transportation.

Conforming Use

- Measurement of distances and output of measured data to the Profibus.
- Special measuring functions.
- Compliance with prescribed temperatures for operation and storage.
- Operation at correct voltage level.
- Application of specified signal levels to the appropriate data lines.

Nonconforming Use

- Do not operate the LS113PS in any other way than described under “Intended & Conforming Use” above and only in a proper working condition.
- Safety devices must not be defeated or otherwise rendered ineffective.
- Information and warning signs must not be removed.
- Repair work on the LS113PS must not be carried out by anyone other than FAE S.r.l. personnel.
- Refrain from using the LS113PS in an explosive environment.
- Measurement with the LS113PS pointed at the sun or other strong light sources may produce faulty results.
- Measurement of targets with poor surface reflectance in a strongly reflecting environment may also result in faulty measurement values.
- Measurement of strongly reflecting surfaces may deliver faulty results.
- Measurement performed through transparent optical media, for example, glass, optical filters, plexiglass, etc. may equally produce incorrect results.
- Rapidly changing measuring conditions are likely to falsify the result of measurement.

Scope of Delivery

Description	Part number
LS113PS	012840-430-22
CD with Customer documentation	
Optional accessories	
Power chord, 2 m	012840-144-24
Power chord, 5 m	012840-145-24
Power chord, 10 m	012840-146-24
12-pole jack	28509
Profibus terminator, M12	94145
Profibus 5-pole jack	94136
Profibus 5-pin plug	94133
Profibus-in-out cable, 5m	012840-170-24
Profibus-in cable jack, 5m	012840-165-24
Profibus-in cable jack, 10m	012840-166-24
Profibus-out cable plug, 5m	012840-160-24
Profibus-out cable plug, 10m	012840-161-24
Screw cap for Profibus jack	94363
Screw cap for Profibus plug	94366
Set of Customer documentation (hardcopy)	

Technical Data

Measuring Performance	
Measuring principle	Comparative phase measurement
Measuring parameter	Distances
Measuring range ^{*1}	0.1 m ... 30 m for natural, diffusely reflecting surfaces, and up to 150 m with a target board
Measuring accuracy	± 2 mm for white surfaces, (+15 °C ... +30 °C) ± 3 mm for natural surfaces, (+15 °C ... +30 °C) ± 5 mm (-10 °C ... +50 °C)
Target surface	Of natural, diffusely reflecting type
Target board required	From 30 m to 150 m
Measured value resolution	0.1 mm
Reproducibility	±0.5 mm
Measuring time	0.16 sec ... 6 sec on white target board (10 Hz mode) 20 msec on white target board (50 Hz mode)
Max. carrier motion speed	4 m p. sec in "DX" operating mode
^{*1} conditional on target reflectance, ambient light influences and atmospheric conditions	
Laser	
Laser class	Laser class 2, ≤ 1 mW conforming to standard IEC 825-1 / EN 60829
Laser beam divergence	0.6 mrad
Wavelength	650 nm (red, visible)

Electric Power Requirements	
Supply voltage	10 V ... 30 V DC
Max. power consumption	3.2 W at 24 V
Interface	
Data interface	Profibus RS485 Ident. no. 0x09CB Profibus DP-V0 slave under IEC 61158 / IEC 61784 External termination resistor
Baud rate	9.6 / 19.2 / 93.75 / 187.5 / 500 kbaud 1.5 / 3 / 6 / 12 Mbaud Automatic baud rate detection
GSD file	LDM409CB.GSD PNO Profile Encoder Class 1/2 Configuration of measuring parameters Output of measured values and error messages Parameters and PB-address are stored in NVRAM
SSI interface	Transfer rate: 50 kHz ... 1 MHz, 200 µs break Signal input to signal output differential signal (RS422), 24bit, gray-encoded, Slave Electrical isolation to 500 V for signal input
Operation modes	Continuous measurement external triggering
Switching output	Two outputs with HIGH signal level VCC -2 V and LOW signal level < 2 V; max. load carrying capacity 0.5 A, short-circuit-proof; switching threshold and hysteresis selectable
Trigger input	One input with HIGH signal level > 11 V and LOW signal level < 6.5 V 2.5 mA input current at 24 V Trigger edge and delay selectable Trigger pulse of max. 24 V
Environment & Ambient Conditions	
Operating temperature	-10 °C ... +50 °C with automatic laser diode shut down on excession of temperature limits
Temperature measurement	Internal
Storage temperature	-20 °C ... +70 °C
Humidity	< 65%
Dimensions (L x W x H)	210 mm x 96 mm x 50 mm
Weight	770 g
Protection type	IP 65
EMC	EN 61000-6-2, EN 55011

Mechanical Mounting Conditions

The casing consists of a rugged, corrosion-resistant extruded aluminum profile with

front-side and rear-side covers also in corrosion-resistant design. Four mounting holes are provided in the baseplate for mechanical attachment of the LS113PS. (® Fig. 2 Dimensional drawing).

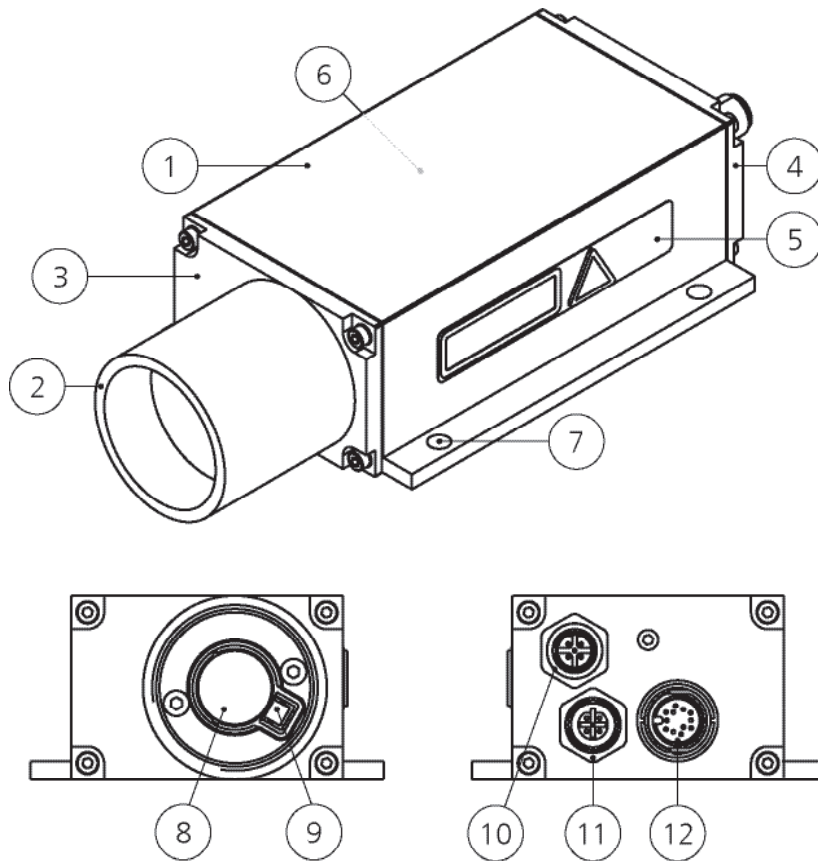


Fig. 1: LS113PS

Captions

1	Housing (extruded aluminum profile, powder-coated)	7	Mechanical mounting holes (4x, Ø = 6,6 mm)
2	Equalizer tube (anodized)	8	Receiver optics
3	Front cover (anodized)	9	Sender optics
4	Back cover (anodized)	10	Profibus-IN (M12)
5	Laser warning sign	11	Profibus-OUT (M12)
6	Specification plate	12	Power inlet

To protect the range finder's optical surfaces from dust, physical contact, mechanical impacts, etc., the casing has a special equalizer tube attached to it. Please note that measurement cannot be guaranteed to function correctly if the equalizer tube is removed by unqualified action!

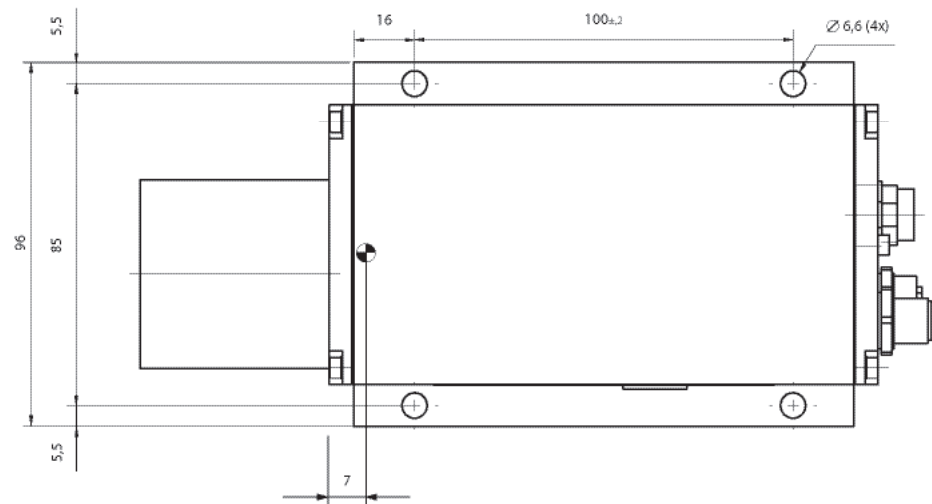


Figure 2 Offset against zero-edge (Dimensions in mm)

The LS113PS's zero-point is located 7 mm behind the outer surface of the front cover or 137 mm before the back cover outside face respectively. This zero-point has been introduced for constructional design reasons.