

LDM 41/42 P

Laser Distance Measurement Sensor



Theory of Operation

The LDM 41/42 P Laser Distance Measurement Sensor with Profibus DP interface is designed for distance measurement applications in an industrial environment. The LDM 41/42 P works based on comparative phase measurement. To achieve this, it emits a visible Laser beam with different modulation frequencies. The target being measured returns diffusely reflected light that is subsequently compared with a reference signal. Finally, a microprocessor uses the recorded phase shift to calculate a required distance with mm accuracy.

The sensor LDM 41 P distinguishes itself through a high precision as well as a big independence of the surface of the measured object. The LDM 42 P is design for fast measurement on a white target. The red, well visible Laser beam allows a simple alignment.

Applications

- Supervision of crane and conveyors
- Distance and position measurement
- Level-measurement
- Supervision of security-relevant parts
- Supervision of lift systems / lift level measurement / elevator positioning
- Positioning control
- Diameter measurement of coils

Characteristics

- Millimeter precise measurement at various surfaces (LDM 42 P only for white surface)
- Long range reflector-less distance measurement, with additional reflectors¹ mounted onto target over 100 m
- High availability under outdoor temperature conditions with high precision
- Big supply voltage range 10 V until 30 V DC
- Safe use because of Laser Class 2
- Simple alignment with a visible Laser beam
- RS 232 data interface for programming
- Simple parameter setup with a PC or laptop
- Measured values are displayed in meters, decimetre, centimetre, feet, inch... and different resolutions due to free scaling
- Stable and easy to install enclosure with protection grade of IP 65
- Direct connection to Profibus DP
- Setup of measurement mode, inside temperature measurement, switch-off Laser (Stand-by) controlled by Profibus control byte

¹ e.g. 3M, self adhesive foil white non glossy or for longer distance reflection foil Type 3290

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Technical Data

Application	Distance-measurement of solid surfaces without reflector
Measuring range ²	0.1 m up to 30 m with natural surfaces, more than 100 m possible, depending on target reflectance
Measuring accuracy ³	± 3 mm (+15 °C up to +30 °C), ± 5 mm (-10 °C up to +50 °C) ± 2 mm under defined measuring conditions ⁴ ,
Resolution	max. 0.1 mm , user scalable
Repeatability	± 0.5 mm
Operating modes	Distance tracking DT, DW, DX only LDM 42 P, single measurement DM, trigger mode DF
Measuring time	0.16 up to 6 s adjustable or automatic in DT mode 0.1 s in DW mode at white surface 20 ms in DX mode at white surface (only LDM 42 P)
Laser Class	Laser Class 2 regarding DIN EN 60825-1:2001-11, ≤1 mW, 650 nm (visible red)
Laser divergence ⁵	0,6 mrad
Bus interface	Profibus DP <ul style="list-style-type: none">• Profibus DP Norm slave• Auto detect up to 12 MBit• ID-Number 0x2079 (8313)• 13 Byte IN, 1 Byte OUT
Data interface	RS232 or RS422 <ul style="list-style-type: none">• 9600 Baud, ASCII, 8N1• Programming with Windows terminal program (for example LDMTTool or HyperTerminal)• After connection to Profibus master RX line will be switched off
Supply voltage	10 up to 30 V DC
Power consumption	< 3,5 W for distance tracking and < 3 W Laser off (Stand-by)
Operating temperature	-10 °C up to +50 °C
Storage temperature	-40 °C up to +70 °C
Dimensions	approx. 212 x 96 x 50 (L x W x H) in mm
Mounting	100 x 85 in mm, 4 holes for M6 screws
Weight / protection class	Aluminum approx. 850 g / IP 65
EMC	EN 61000-6-2 and EN 55011
Shock resistance	10 g / 6 ms persistence shock DIN ISO 9022-3-31-01-1
Scope of delivery	Sensor with user manual
Options	Programming cable, connection plugs, Profibus terminator, software LDMTTool, reflector foils, filter and protection glass and others

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² depending on target reflectance, stray light influences and atmospheric conditions

³ statistic spread 95 %

⁴ for measurement at a planar white target surface in continues movement or in standstill, approx. 20 °C

⁵ at 10 m distance the beam diameter is 6 mm, at a distance of 50 m it is 3 cm and at a distance of 100 m it is 6 cm