

## 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 reflectors<sup>1</sup> 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

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

# LDM 41/42 P

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### Technical Data

<b>Application</b>	<b>Distance-measurement of solid surfaces without reflector</b>
<b>Measuring range</b> <sup>2</sup>	<b>0.1 m up to 30 m</b> with natural surfaces, more than 100 m possible, depending on target reflectance
<b>Measuring accuracy</b> <sup>3</sup>	<b>± 3 mm</b> (+15 °C up to +30 °C), <b>± 5 mm</b> (-10 °C up to +50 °C) <b>± 2 mm</b> under defined measuring conditions <sup>4</sup> ,
<b>Resolution</b>	<b>max. 0.1 mm</b> , user scalable
<b>Repeatability</b>	<b>± 0.5 mm</b>
<b>Operating modes</b>	Distance tracking DT, DW, DS, DX only LDM 42 P, single measurement DM, trigger mode DF
<b>Measuring time</b>	<b>0.24 up to 6 s</b> adjustable or automatic in DT mode <b>0.1 s</b> in DW mode at white surface <b>20 ms</b> in DX mode at white surface (only <b>LDM 42 P</b> )
<b>Laser Class</b>	<b>Laser Class 2</b> regarding DIN EN 60825-1:2001-11, ≤1 mW, <b>650 nm (visible red)</b>
<b>Laser divergence</b> <sup>5</sup>	0,6 mrad
<b>Bus interface</b>	<b>Profibus DP</b> <ul style="list-style-type: none"><li>• Profibus DP Norm slave</li><li>• Auto detect up to 12 MBit</li><li>• ID-Number <b>0x2079</b> (8313)</li><li>• <b>13 Byte IN, 1 Byte OUT</b></li></ul>
<b>Data interface</b>	<b>RS232 or RS422</b> <ul style="list-style-type: none"><li>• 9600 Baud, ASCII, 8N1</li><li>• Programming with Windows terminal program (for example LDMTTool or HyperTerminal)</li><li>• After connection to Profibus master RX line will be switched off</li></ul>
<b>Supply voltage</b>	<b>10 up to 30 V DC</b>
<b>Power consumption</b>	< 3,5 W for distance tracking and < 3 W Laser off (Stand-by)
<b>Operating temperature</b>	<b>-10 °C up to +50 °C</b>
<b>Storage temperature</b>	-40 °C up to +70 °C
<b>Dimensions</b>	approx. <b>212 x 96 x 50</b> (L x W x H) in mm
<b>Mounting</b>	100 x 85 in mm, 4 holes for M6 screws
<b>Weight / protection class</b>	Aluminum approx. <b>850 g / IP 65</b>
<b>EMC</b>	EN 61000-6-2 and EN 55011
<b>Shock resistance</b>	10 g / 6 ms persistence shock DIN ISO 9022-3-31-01-1
<b>Scope of delivery</b>	Sensor with power cable 5 m and user manual
<b>Options</b>	Programming cable, connection plugs, Profibus terminator, software LDMTTool, reflector foils, filter and protection glass and others

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<sup>2</sup> depending on target reflectance, stray light influences and atmospheric conditions

<sup>3</sup> statistic spread 95 %

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

<sup>5</sup> 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

### **ASTECH Angewandte Sensortechnik GmbH**

No-contact measurement techniques for length, width, distance, position, velocity; laser; CCD-cameras  
Schonenfaherstr. 5, D-18057 Rostock, Germany

Phone +49 381 / 44073-0 FAX 0381 / 44073-20 e-mail info@astech.de Internet www.astech.de