

DIGITAL LASER DISTANCE METERS

LD05-A20 and **LD05-A40**

The *RIEGL* LD05 is a **multi-purpose laser distance meter** based on precise time-of-flight laser range measurement. It uses state-of-the-art **digital signal processing** enabling precise distance measurement for complex multi-target situations even under bad visibility conditions. Digitizing the echo signal and subsequent analyzing allows multi-target distance measurements. Five target distances can be detected and provided for each laser shot.

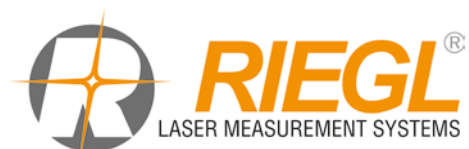


The LD05 can be configured for various application modes:

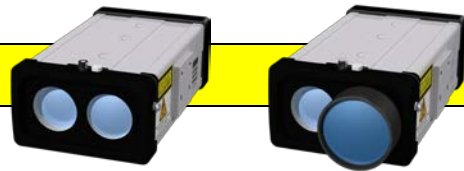
- **High Penetration and High Accuracy Mode** for complex target situations, based on a sequence of laser shots, self adapting (rather low) data update rate
Significant enhancement of the maximum range based on Pre-Detection-Averaging
- **Fast Mode** is between the High Speed and High Penetration Mode, very high data update rate
- **High Speed Mode** for simple target situations, extremely high data update rate

- Short infrared laser pulses providing **excellent interference immunity**
- Narrow measurement beam with low divergence for **excellent spatial resolution**
- **Measurement to almost any surface** regardless of the angle of incidence of the beam and the surface characteristics
- Lightweight, stable aluminium housing, ready **to be used in harsh industrial environments**.
- Different basic instrument types with pre-configured measurement modes, but also **individually programmable for customer specific applications**

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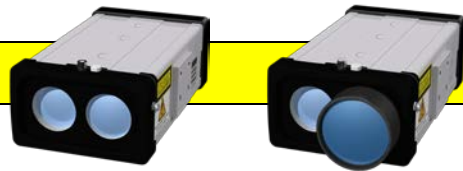
Technical Data LD05



Performance Examples

	LD05-A20	LD05-A40
High Penetration and High Accuracy Mode		
Measurement range ¹⁾ for natural targets, $\rho \geq 80\%$ for natural targets, $\rho \geq 10\%$ reflector foil ²⁾ & plastic cat's-eye reflector	up to 500 m up to 150 m up to 2200 m	up to 900 m up to 300 m up to 2400 m
Minimum range	2 m	2 m
Measurement accuracy ^{3) 4)}	typ. ± 12 mm	typ. ± 12 mm
Measurement rate ⁵⁾	typ. 100 Hz	typ. 100 Hz
Max. number of targets	5	5
Fast Mode		
Measurement range ¹⁾ for natural targets, $\rho \geq 80\%$ for natural targets, $\rho \geq 10\%$ reflector foil ²⁾ & plastic cat's-eye reflector	up to 250 m up to 80 m up to 1200 m	up to 470 m up to 160 m up to 2200 m
Minimum range	2 m	2 m
Measurement accuracy ^{3) 4)}	typ. ± 15 mm	typ. ± 15 mm
Measurement rate	2500 Hz	2500 Hz
Max. number of targets	5	5
High Speed Mode		
Measurement range ¹⁾ for natural targets, $\rho \geq 80\%$ for natural targets, $\rho \geq 10\%$ reflector foil ²⁾ & plastic cat's-eye reflector	up to 200 m up to 60 m up to 1000 m	up to 390 m up to 130 m up to 1900 m
Minimum range	2 m	2 m
Measurement accuracy ^{3) 4)}	typ. ± 20 mm	typ. ± 20 mm
Measurement rate	10000 Hz	10000 Hz
Max. number of targets	5	5

- 1) The following conditions are assumed
 - target is larger than footprint of laser beam, • perpendicular angle of incidence, • visibility 10 km
 - typical values for average ambient brightness conditions. In bright sunlight, the operational range is considerably shorter than under an overcast sky. At dawn or at night the range is even higher.
- 2) Reflecting foil 3M DG4090 or equivalent, dimensions $\geq 0.45 \times 0.45 \text{ m}^2$.
- 3) One sigma standard deviation @ 50 m range under RIEGL test conditions.
- 4) Plus distance depending error $\leq \pm 20$ ppm.
- 5) With self-adapting measurement time selected, the effective data update rate depends on the number of targets and their reflectivity and distance.

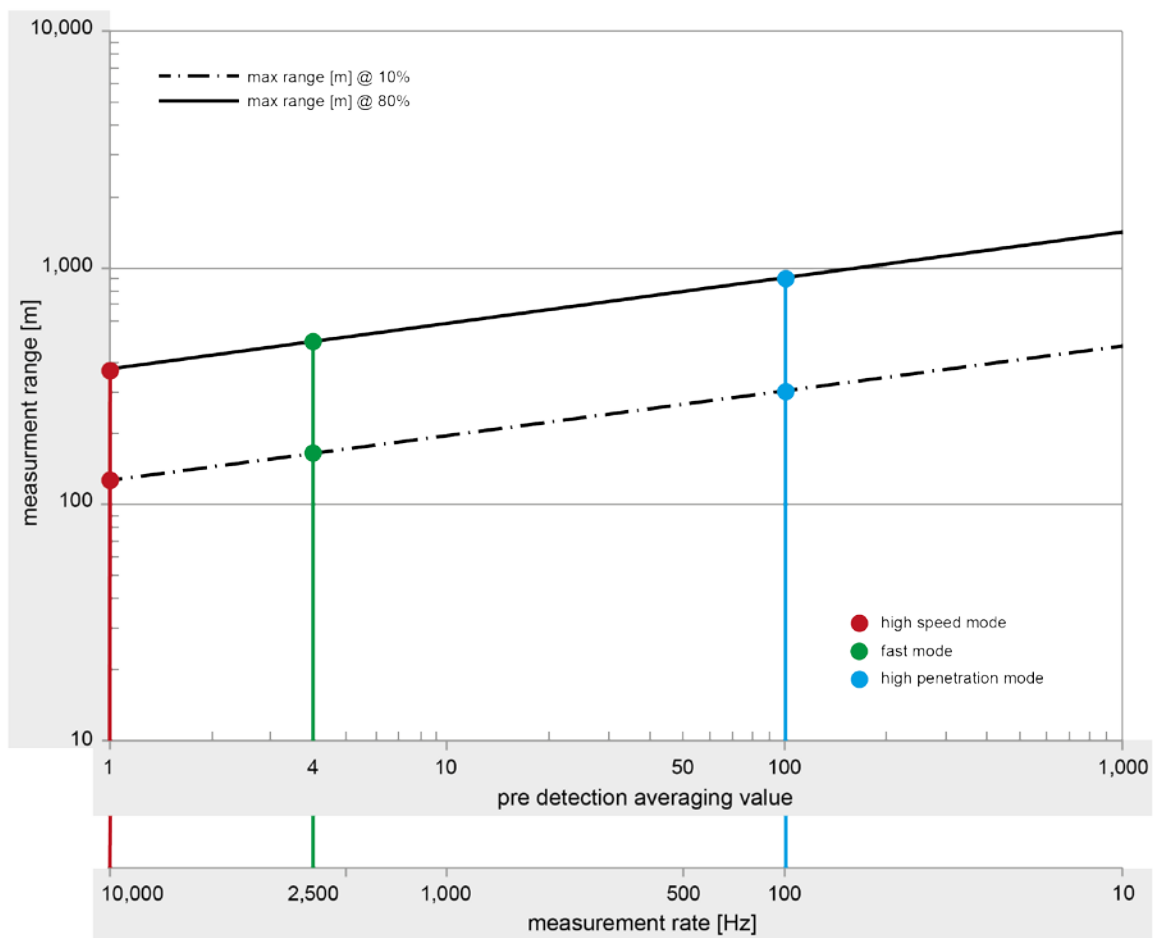


Increasing Measurement Range

The measurement range can be increased by summing echo signals of multiple laser shots (pre-detection averaging) ¹⁾. The position of the target must be stable while a measurement is executed.

The following diagram shows the maximum measurement range versus pre-detection averaging value without any atmospheric attenuation. Depending on atmospheric visibility, the resulting maximum range can be further reduced.

The following diagram shows the measurement range values for the LD05-A40:



1) The following conditions are assumed

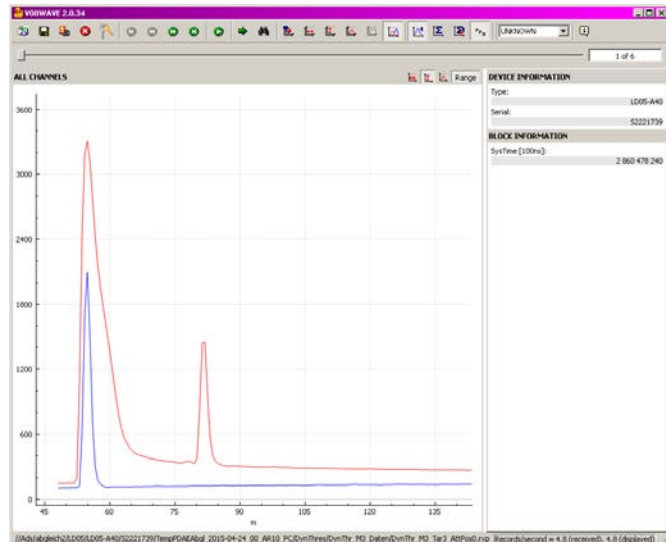
- target is larger than footprint of laser beam, • perpendicular angle of incidence, • visibility 10 km
- typical values for average ambient brightness conditions. In bright sunlight, the operational range is considerably shorter than under an overcast sky. At dawn or at night the range is even higher.

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Optional Full Waveform Mode

The digitized waveform data can be logged to either an internal memory card or to a TCP/IP data port. Subsequent offline full waveform analysis allows detailed investigation of the target situation, especially with complex target situations.

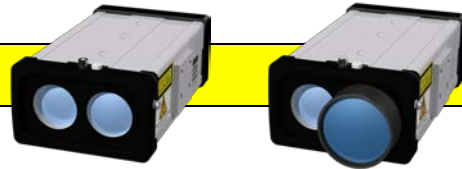


Laser Specifications

	LD05-A20	LD05-A40
Wavelength	near infrared	near infrared
Beam divergence ¹⁾	0.9 x 0.2 mrad	1.2 x 1.8 mrad
Laser product classification according to IEC 60825-1:2007 The following clause applies for instruments delivered into the United States: Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.	Laser Class 1M  Viewing the laser output with certain optical instruments designed for use at a distance (for example telescopes and binoculars) may pose an eye hazard.	Laser Class 1M  Viewing the laser output with certain optical instruments designed for use at a distance (for example telescopes and binoculars) may pose an eye hazard.

1) Measured at the 1/e² points. 1mrad corresponds to 10 cm beam width per 100 m distance.

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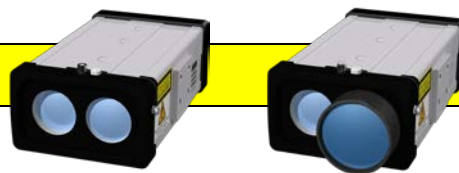


General Technical Data

	LD05-A20	LD05-A40
Data interfaces	TCP/IP, 10/100/1000 MBit port or RS232/RS422 TCP/IP, 10/100/1000 MBit port or RS232/RS422 TCP/IP	
Data port Configuration port WEB interface		
Power supply	11 – 28 V DC, 24 VDC nominal	
Power consumption	18 W	
Main dimensions (L x W x H) mm	230x133x84	259x133x84
Weight	approx. 2.1 kg	approx. 2.9 kg
Protection class	IP64	IP64
Temperature range	-10°C up to +50°C ¹⁾ -20°C up to +60°C ¹⁾	
Operation Storage		
Mounting	Flanges on both sides	
Analog Output	4 – 20 mA ²⁾ , not galvanically isolated, resolution 16 Bit, linearity 1 ‰ of full scale	
Switching Output	2 x PNP transistor driver ³⁾ , built-in thermal and short-circuit protection, switching current 200 mA max., switching voltage = supply voltage	

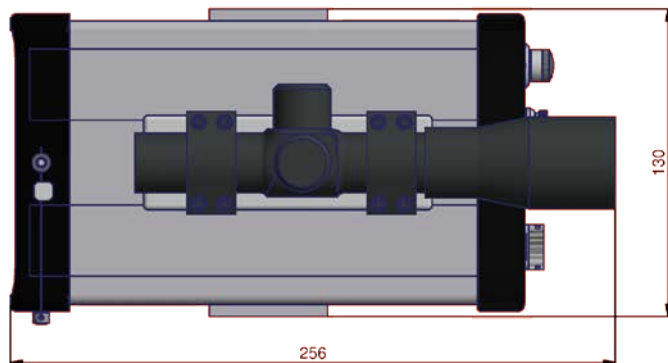
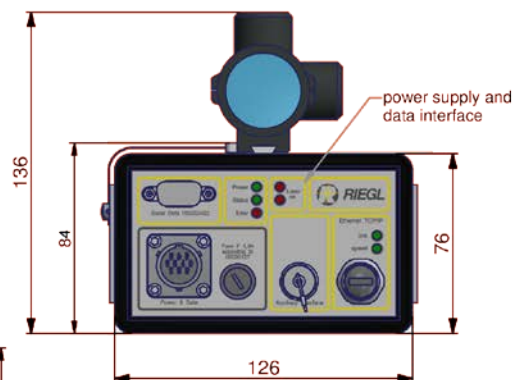
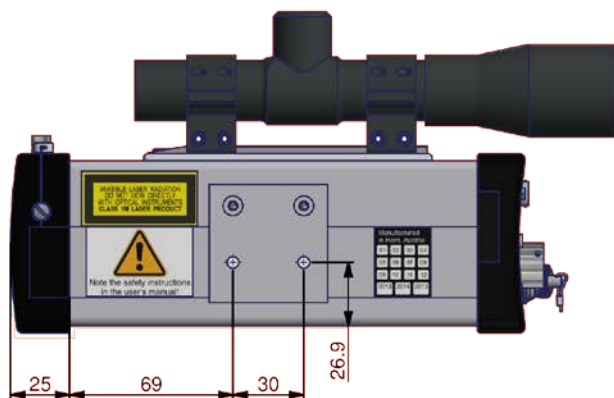
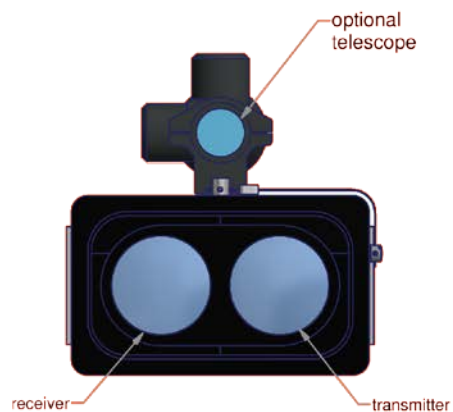
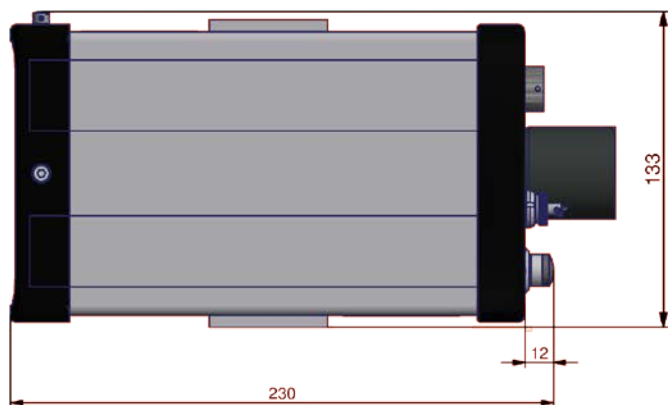
- 1) The life expectancy (MTBF) of the instrument is reduced in case of operation and/or storage at high temperatures.
 2) Operating range selectable via TCP/IP port or serial interface.
 3) Switching points adjustable via TCP/IP port or serial interface.

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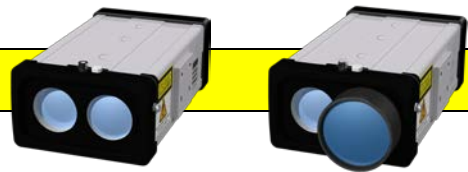


Dimensional Drawings LD05-A20

All dimensions in mm

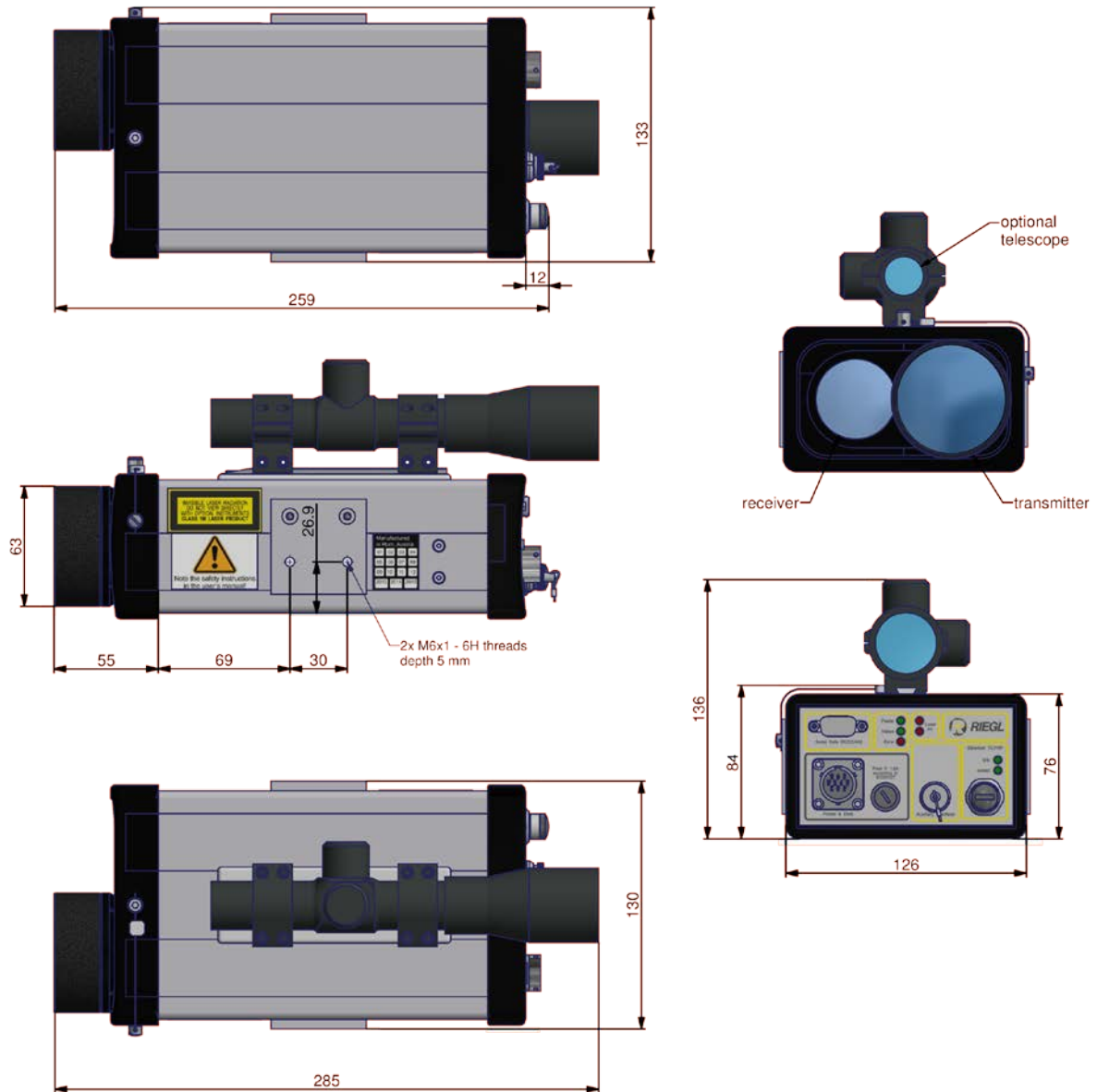


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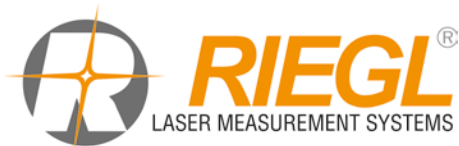


Dimensional Drawings LD05-A40

All dimensions in mm



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