

LPM-321

- **range up to 6000 m @ Laser Class 1M**
- **echo digitization and online waveform analysis**
- **measurement accuracy typ. 25 mm**
- **measurement rate up to 1000 points/sec**
- **field of view up to 150° x 360°**

The Laser Profile Measuring System **RIEGL® LPM-321** provides unprecedented flexibility for long range 3D profiling. Hemispheric scanning, automated or manual operation, reflectorless ranging up to 6000 meters, high accuracy and a comprehensive 3D data acquisition software package operable from any standard laptop or PC are included.

Without the use of a retroreflector, the LPM-321 calculates the distance to the surface in question, based on the time-of-flight measurement of a short laser pulse.

The distance meter comprises state-of-the-art digital signal processing and echo waveform analysis, enabling precise distance measurements even under bad visibility conditions. In multi target situations, the distance meter can provide up to 3 target distances per measurement.

The point of impact of the measuring infrared laser beam can be observed through a telescope. The pan & tilt mount serves to automatically position the beam using the integrated stepper motors with an accuracy of 0.009 degrees. Handwheels for manual operation are provided too.

The optional combination with a calibrated and accurately orientated and mounted high resolution digital camera results in a hybrid sensor system. This system provides data which lends itself to automatic or semi-automatic processing of scan- and image data to generate products such as colored pointclouds, textured triangulated surfaces and high resolution panorama images as a basis for e.g. geotechnical analysis and mining assessment.

The LPM series provides the user with the sophistication of **RIEGL** laser measurement technology combined with a robust and easy to use design.

- **Monitoring**
- **Topography & Mining**
- **Archaeology**

visit our webpage www.riegl.com



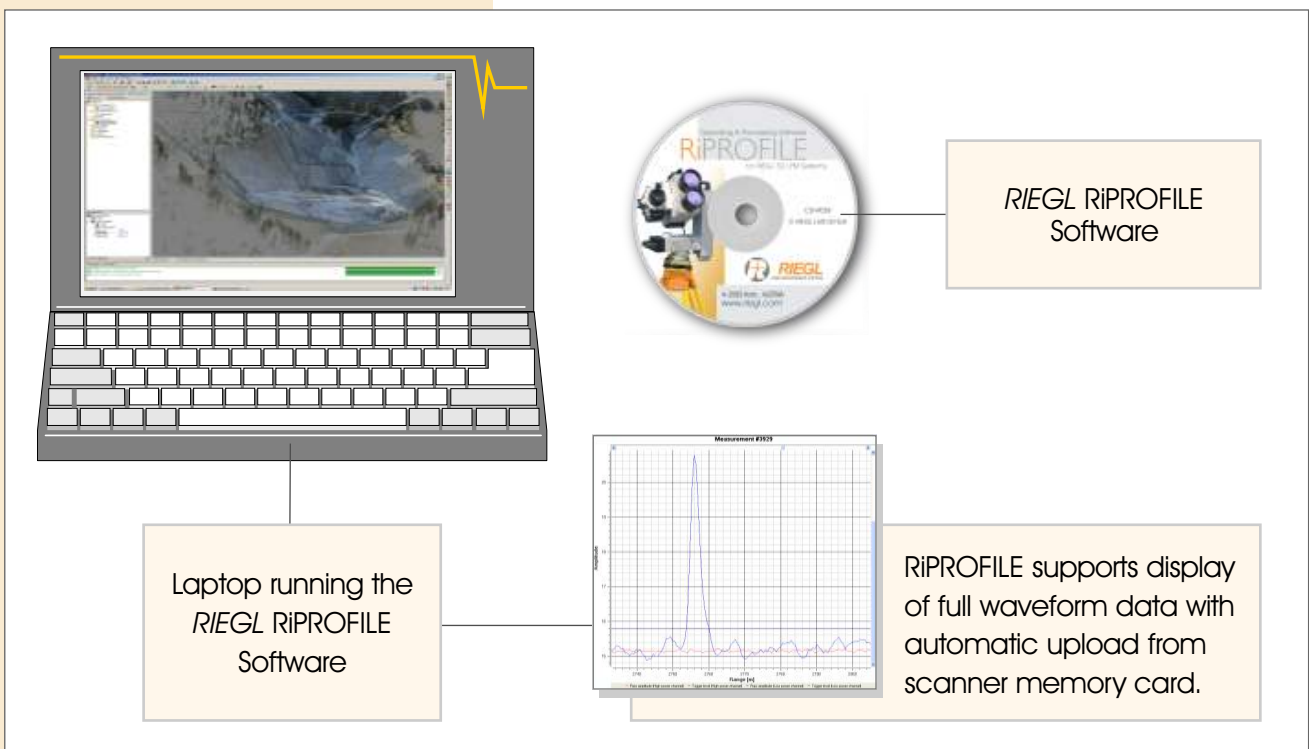
RIEGL®
LASER MEASUREMENT SYSTEMS

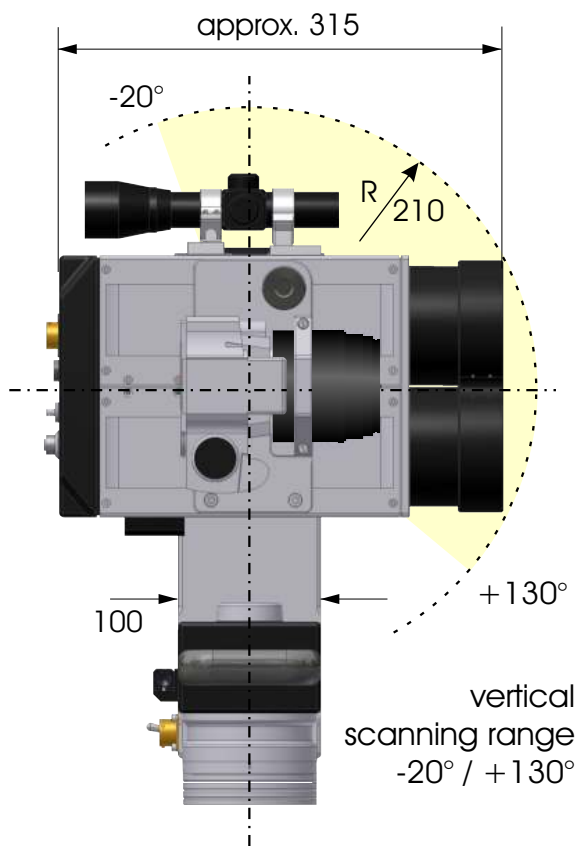
Functional Elements



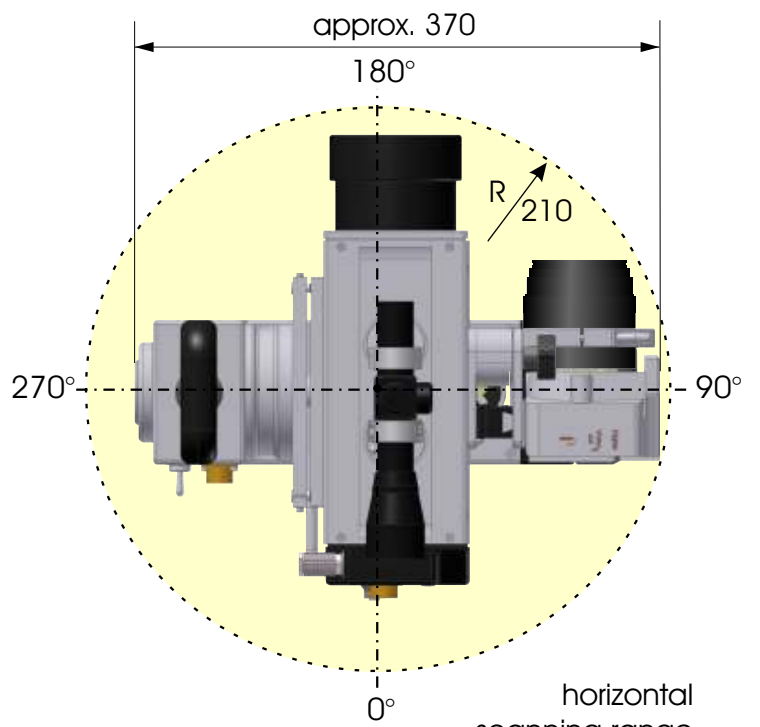
- 1) Laser distance meter LD321-LR
- 2) Digital camera (calibrated)
- 3) Handwheel for horizontal positioning
- 4) Carrying handle
- 5) Bubble level
- 6) 10-pole socket for power supply and data interface
- 7) 7-pole socket for optional joystick
- 8) 8-pole socket for ethernet interface
- 9) ON/OFF switch
- 10) Pan & tilt mount *RIEGL* PTM
- 11) Handwheel for vertical positioning
- 12) Telescope 3 x 20

Interfacing and Data Processing



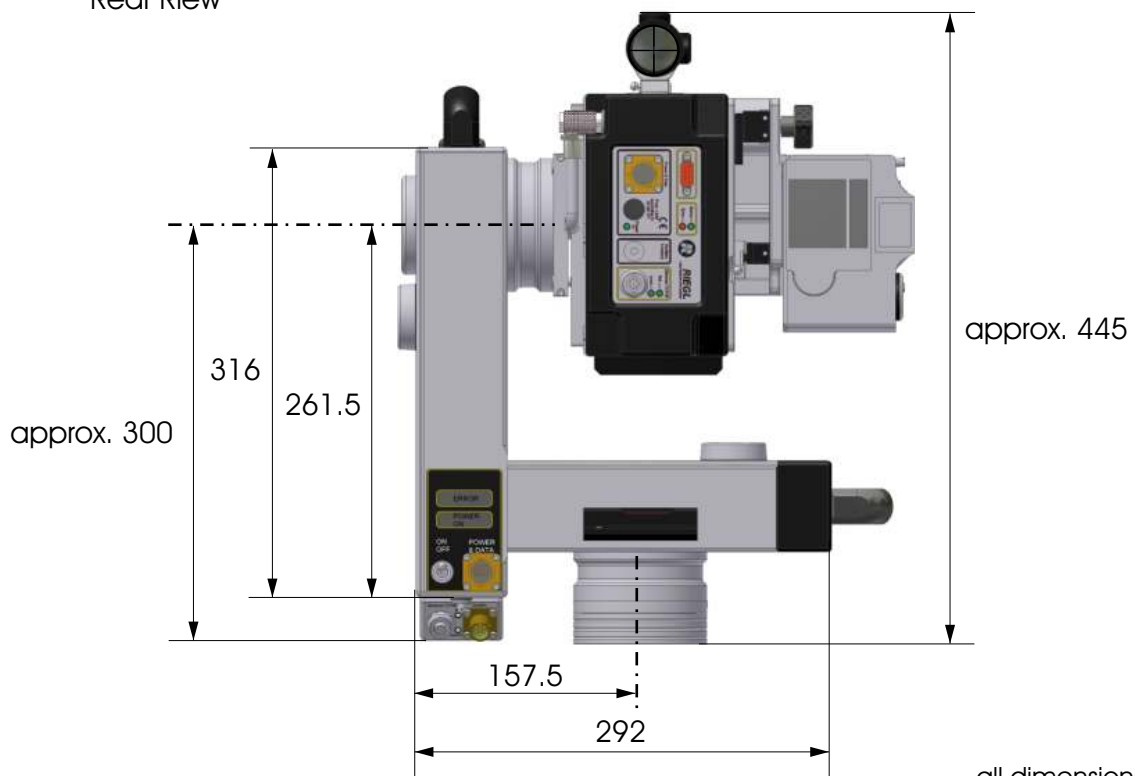


Side View



Top View

Rear View



all dimensions in mm

Technical Data RIEGL LPM-321

Laser Product Classification

Class 1M Laser Product according to IEC60825-1:2007

Viewing the laser output with certain optical instruments designed for use at a distance (for example, telescopes and binoculars) may pose an eye hazard.

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.



Distance Meter Performance

Max. Measurement Range ^{1) 2)}

@ measurement rate		1000 Hz	100 Hz	10 Hz
for natural targets, 80 % ³⁾		1500 m	2500 m	6000 m
for natural targets, 10 % ³⁾		500 m	850 m	1500 m

Minimum Measurement Range

10 m

Measurement Accuracy ^{2) 4) 5) 6)}

25 mm

Precision ⁷⁾

15 mm

System Measurement Rate ⁸⁾

10 to 1000 points/sec

Full Waveform Mode

for up to 2 000 000 measurements

(logging to internal 2GB memory card)

Laser Beam Divergence ⁹⁾

typ. 0.8 mrad

Laser Wavelength

near infrared

Telescope

magnification 3 x 20

- 1) Typical values under average conditions. Maximum range is specified for flat targets with size in excess of the laser beam diameter and near to perpendicular angle of incidence of the laser beam. In bright sunlight, the operational range is considerably shorter than under an overcast sky.
- 2) Not specified for retroreflectors.
- 3) For extended targets larger than laser footprint size.
- 4) One sigma standard deviation @ 50 m range under RIEGL test conditions.

- 5) Plus distance-dependant error ± 20 ppm.
- 6) Accuracy is the degree of conformity of a measured quantity to its actual (true) value.
- 7) Precision, also called reproducibility or repeatability, is the degree to which further measurements show the same result.
- 8) The system measurement rate depends on the selected distance measurement program and is additionally limited by the data transfer rate from distance meter to PTM and by the maximum speed of the line scan mechanism.
- 9) 0.8 mrad correspond to 80 mm beam width per 100 m distance.

Pan & Tilt Mount Performance

Scan Angle Range ¹⁰⁾ vertically horizontally

-20° +130°
0 360°

Angular Step Width
between consecutive measurements

0.018° (0.02 gon)

Angular Step Width
between consecutive scan lines

0.018° (0.02 gon)

Angle Measurement Resolution

0.009° (0.01 gon)

Scan Speed vertically horizontally

max. 81° (90 gon) / sec
max. 36° (40 gon) / sec

10) See dimensional drawings.

Physical Data

Data Interfaces

- Ethernet TCP/IP interface, 10/100 MBit/sec
- RS422, adjustable baud rate up to 460.8 kBd, typically 115.2 kBd

Power Supply Voltage Range

12 - 28 V DC

Power Consumption

approx. 23 W (standby)
approx. 60 W (both motors in operation)

Main Dimensions (LxWxH)

approx. 315 mm x approx. 370 mm x approx. 445 mm

Weight

approx. 16 kg

Protection Class

IP64, dust and splash-proof

Temperature Range

0°C to +45°C (operation), -20°C to +70°C (storage)



RIEGL[®]
LASER MEASUREMENT SYSTEMS

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