

2D LASER SCANNER **LMS-Q120i**

The *RIEGL* LMS-Q120i 2D - laser scanner provides accurate non-contact line scanning using a narrow infrared laser beam. The instrument makes use of the precise time-of-flight laser range measurement principle and fast line scanning by means of a high-speed opto-mechanical scan mechanism, providing fully linear, unidirectional and parallel scan lines.



The rugged overall system design makes the *RIEGL* LMS-Q120i exceptionally well suited for installation in harsh industrial environments, and the compactness of the housing allows installation under limited space conditions (e.g. in a robotic vehicle). The instrument needs only one power supply and provides line scan data via the integrated TCP/IP Ethernet interface. The binary data stream can easily be post-processed by any user-designed software using the available software library.

- **Maximum range 150 m @ only 10 % target**
- **Ranging accuracy 20 mm**
- **Data rate up to 10 000 meas. / sec**
- **Scanning rate up to 100 scans / sec**
- **Scanning range 80°**
- **Perfectly linear scan**
- **Rugged IP64 housing**
- **Integrated TCP/IP Ethernet interface**

Typical applications include

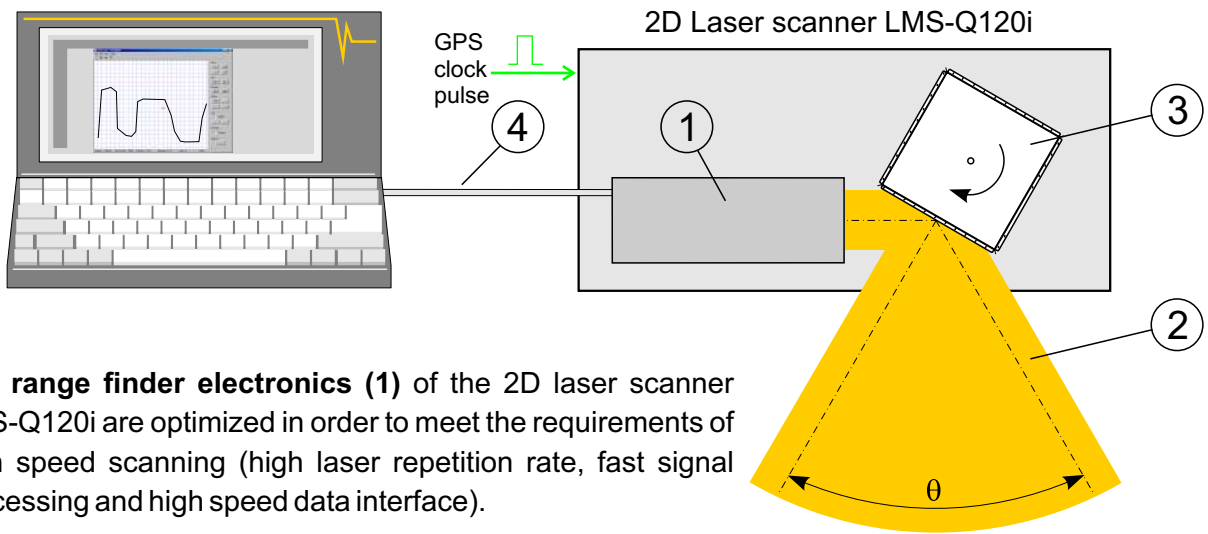
- ***Guidance of autonomous vehicles***
- ***Obstacle detection and collision avoidance***
- ***Industrial profile measurement***

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LASER MEASUREMENT SYSTEMS

Principle of operation RIEGL LMS-Q120i



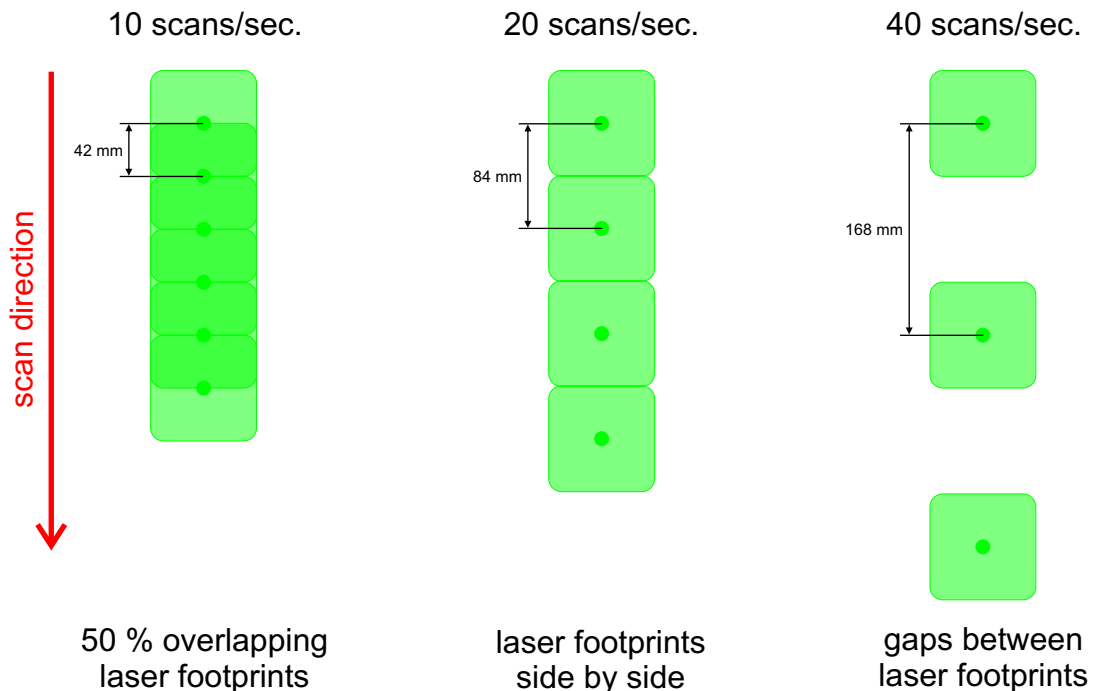
The **range finder electronics (1)** of the 2D laser scanner LMS-Q120i are optimized in order to meet the requirements of high speed scanning (high laser repetition rate, fast signal processing and high speed data interface).

The angular deflection of the **laser beam (2)** is realized by a **rotating polygon (3)** with a number of reflective surfaces. It continuously rotates at an adjustable speed to provide unidirectional scans within an angular range of $\theta = 80^\circ$.

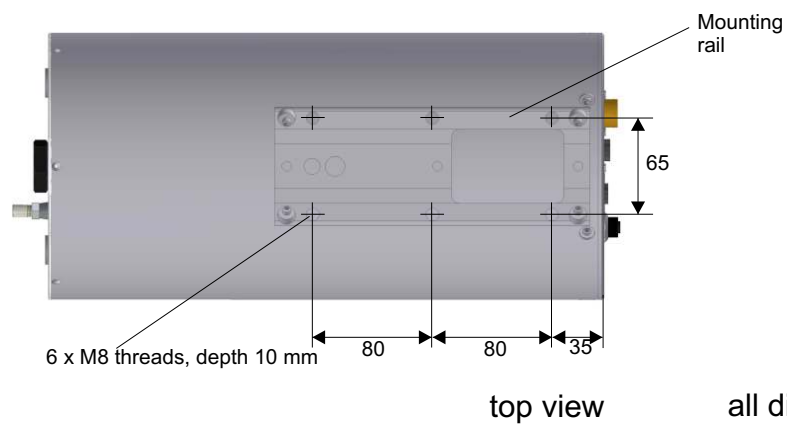
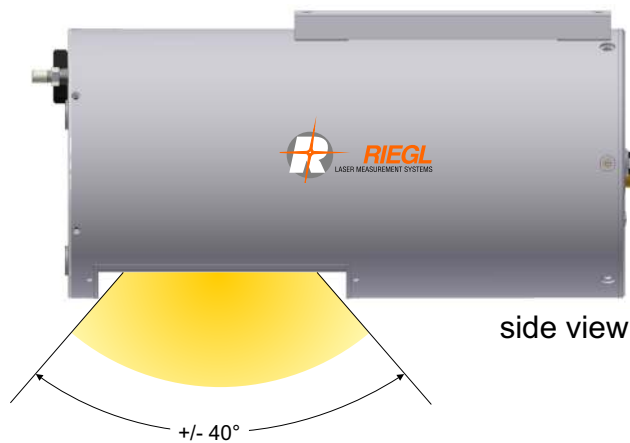
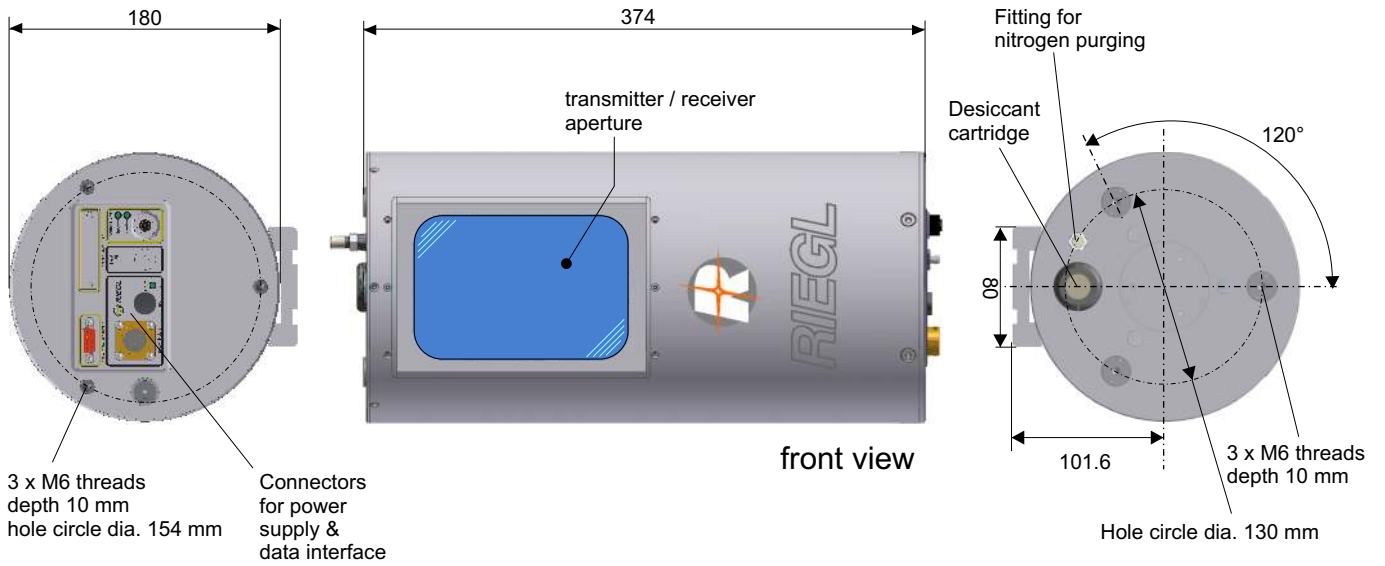
For every measurement RANGE, SCAN ANGLE, SIGNAL AMPLITUDE, and optionally a TIMESTAMP are provided via a **TCP/IP Ethernet interface (4)**. The LMS-Q120i is designed to accept a TTL-signal (i.e., 1 pulse per second) from, e.g., a GPS receiver, to reset an internal timer, which is used to timestamp every measurement.

Scan pattern at a target distance of 30 m

laser footprint 90x90mm



Dimensional drawings of RIEGL LMS-Q120i



Technical data of *RIEGL* LMS-Q120i

Rangefinder performance ¹⁾

Laser product classification according to IEC60825-1:2007

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.



Maximum measurement range for wire targets, diameter 6 mm ²⁾ for natural targets, reflectivity 10 % ³⁾	up to 45 m up to 150 m
Minimum range	2 m
Accuracy ^{4) 6)}	20 mm
Precision ^{5) 6)}	15 mm
Laser Pulse Repetition Rate	30 000 Hz
Effective measurement rate	10 000 measurements/sec.
Laser wavelength	near infrared
Laser beam divergence ⁷⁾	2.7 mrad

- 1) First or last target mode selectable. Maximum measurement range and accuracy is defined below for a visibility >1km, overcast sky or night.
- 2) Diameter of wire in excess of 6 mm. Diffuse reflectivity of wire surface in excess of 15%. Beam incidence perpendicular to wire. The maximum measurement range to the specified target drops to 30 m in case of an angle of incidence of 45 deg, provided that the surface of the wire is reflecting strictly diffusely.
- 3) Diffuse reflectivity in excess of 10%. Beam incidence perpendicular to target. Size in excess of laser beam diameter. Maximum measurement range for an extended flat target of 10 % reflectivity will drop to 100 m for an angle of incidence of 45 deg.
- 4) Accuracy is the degree of conformity of a measured quantity to its actual (true) value.
- 5) Precision, also called reproducibility or repeatability, is the degree to which further measurements show the same result.
- 6) One sigma @ 50 m range under *RIEGL* test conditions.
- 7) 2.7 mrad correspond to 27 cm increase of beam width per 100 m of range.

Scanner performance

Scan angle range ⁸⁾	± 40° = 80° total
Scanning mechanism	rotating polygon mirror
Scan speed	5 to 100 scans / sec
Angular step width ⁸⁾ between consecutive laser shots	0.04°
Angle measurement resolution	0.01°
Internal Sync Timer	Option for real-time synchronized time stamping of scan data
Scan Sync	Option for synchronizing scan lines to external timing signal

- 8) Scanning parameters can be set via TCP/IP configuration interface.

General technical data

Data interface	TCP/IP Ethernet, 10/100 MBit/sec
Input voltage range	18 - 32 V DC, 24 V DC nominal
Current consumption	approx. 2 A @ 24 V DC
Main dimensions	180 x 374 mm (diameter x length)
Weight	approx. 7 kg
Temperature range	-10°C up to +50°C (operation) -20°C up to +60°C (storage)
Protection class	IP64
Mounting	M6 and M8 steel thread inserts

Information contained herein is believed to be accurate and reliable. However, no responsibility is assumed by *RIEGL* for its use. Technical data are subject to change without notice. Data sheet, LMS-Q120i, 20/04/2010



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