

# 2D LASER SCANNER **LMS-Q240i**

The **RIEGL LMS-Q240i** 2D - laser scanner makes use of the pulsed time-of-flight range measurement principle and beam scanning by means of an opto-mechanical scan mechanism, providing fully linear, unidirectional and parallel scan lines.



The instrument is extremely rugged, therefore ideally suited for the installation on board of an aircraft, and also compact and lightweight enough to be used under limited space conditions (e.g. in small single-engine planes, helicopters or other vehicles). The instrument needs only one power supply and provides the scan data via an integrated TCP/IP Ethernet interface. The binary data stream can easily be post-processed by the user's software using the available software library. The laser scanner LMS-Q240i offers a unique combination of wide scanning angle, high maximum range, high measurement accuracy, narrow laser beam; all within a compact and robust housing.

- **Maximum range 650 m @ 80 % target**
- **Ranging accuracy 20 mm**
- **Data rate 10 000 meas. / sec**
- **Scanning rates up to 80 scans / sec**
- **Scanning ranges up to 80°**
- **Perfectly linear scan**
- **Rugged IP64 housing**
- **Integrated TCP/IP Ethernet interface**
- **Input for GPS time synchronization**

### **Typical applications include**

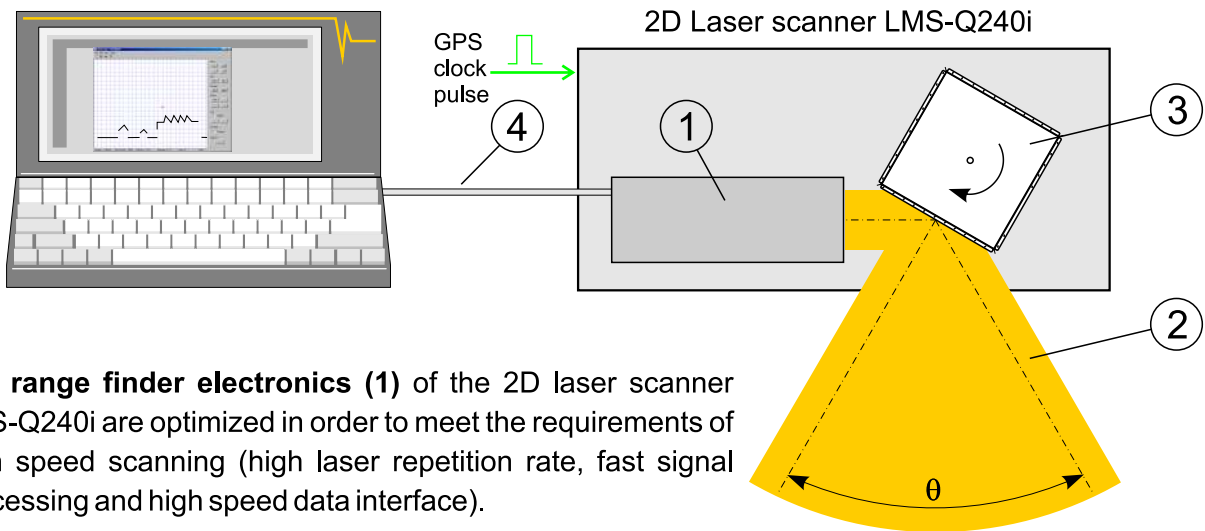
- **Airborne laser scanning**
- **Long-range guidance of autonomous vehicles**

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LASER MEASUREMENT SYSTEMS

## Principle of operation *RIEGL* LMS-Q240i

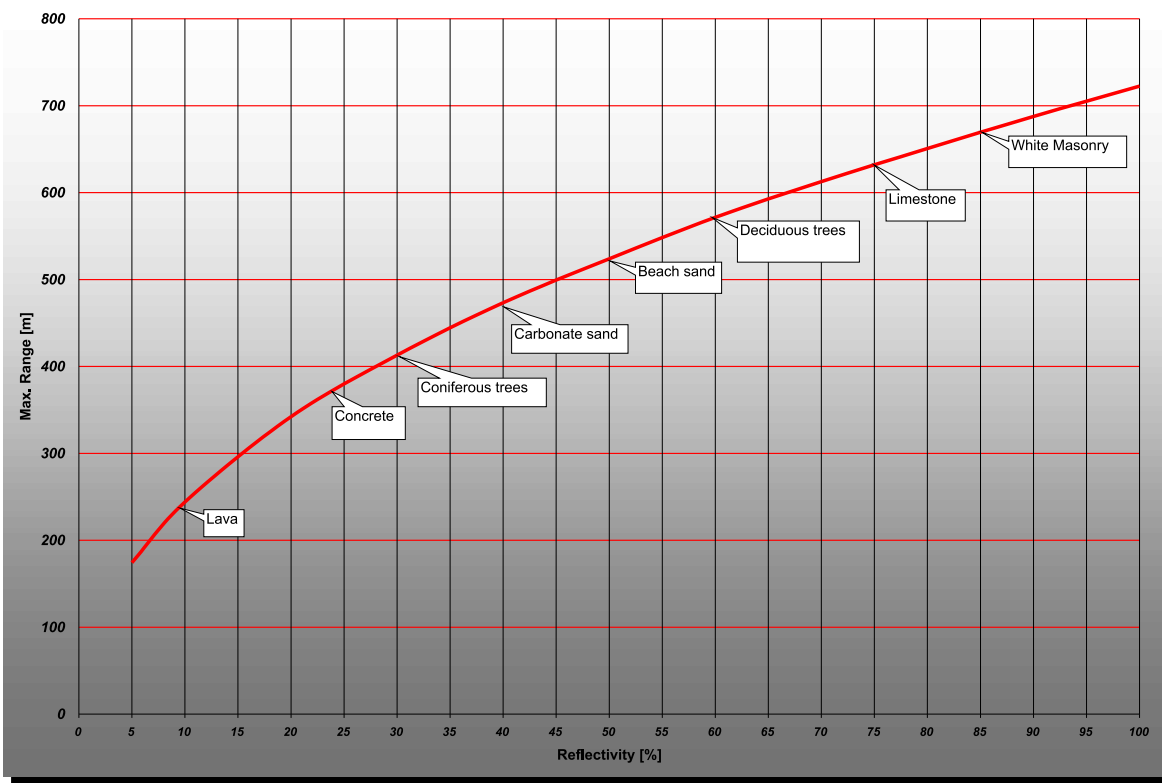


The **range finder electronics (1)** of the 2D laser scanner LMS-Q240i are optimized in order to meet the requirements of high speed scanning (high laser repetition rate, fast signal processing and high speed data interface).

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  $\theta = 60^\circ$  (LMS-Q240i-60) or  $\theta = 80^\circ$  (LMS-Q240i-80).

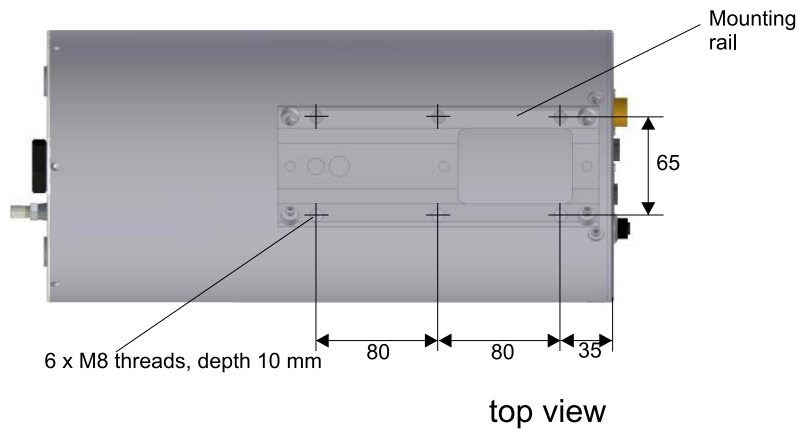
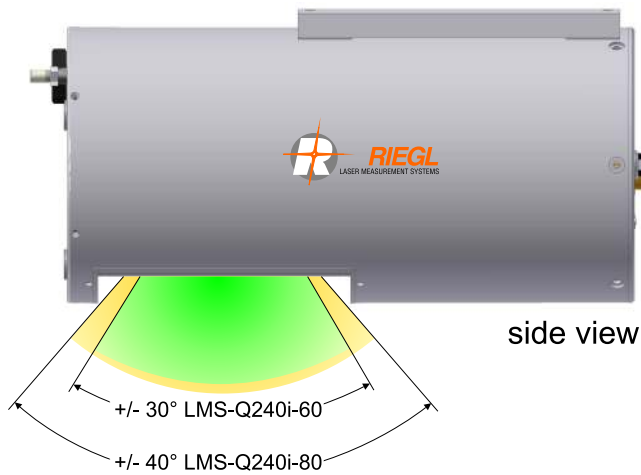
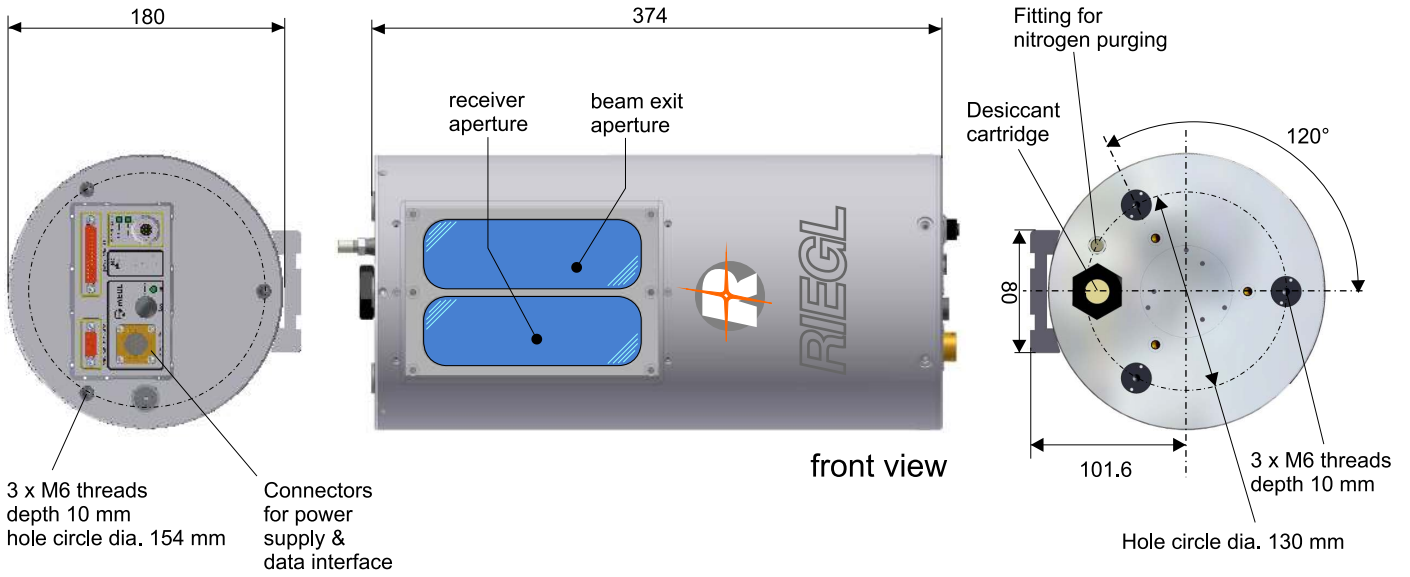
For every measurement **RANGE**, **SCAN ANGLE**, **SIGNAL AMPLITUDE**, and optionally a **TIMESTAMP** are provided via a **TCP/IP Ethernet interface (4)**. The LMS-Q240i is designed to accept a TTL-signal (i.e., 1 pulse per second) from, e.g., a GPS receiver, to reset an internal timer, which is used to timestamp every measurement.

## Maximum range vs. target reflectivity of *RIEGL* LMS-Q240i



Target larger than foot print of laser beam, perpendicular angle of incidence, visibility 10 km, average ambient brightness

# Dimensional drawings of RIEGL LMS-Q240i



all dimensions in mm

# Technical data of RIEGL LMS-Q240i

Laser Product Classification

Class 1 Laser Product 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.



## Rangefinder Performance

	LMS-Q240i-60	LMS-Q240i-80
max. Measurement Range <sup>1)</sup> for natural target $\rho \geq 20\%$ for natural target $\rho \geq 80\%$	320 m 650 m	320 m 650 m
max. Operating Flight Altitude AGL <sup>2)</sup>	260 m 850 ft	230 m 750 ft

1) The following conditions are assumed: • target is larger than the footprint of the laser beam • average ambient brightness  
• perpendicular angle of incidence of the laser beam • visibility 10 km  
2) Reflectivity  $\rho \geq 20\%$ , max. scan angle, additional roll angle +/- 5°

Minimum range	2 m
Accuracy <sup>3) 5)</sup>	20 mm
Precision <sup>4) 5)</sup>	15 mm
Laser PRR	30 000 Hz
Effective measurement rate	10 000 Hz
Laser wavelength	near infrared
Beam divergence <sup>6)</sup>	2.7 mrad
Target detection modes <sup>7)</sup>	First target, last target <sup>8)</sup> , or alternating

3) Accuracy is the degree of conformity of a measured quantity to its actual (true) value.

4) Precision, also called reproducibility or repeatability, is the degree to which further measurements show the same result.

5) One sigma @ 50 m range under RIEGL test conditions.

6) Foot print of laser beam: 26.5 cm at 100 m, 52.5 cm at 200 m, 105 cm at 400 m, 157 cm at 600 m

7) Only one target distance can be provided per measurement.

8) For last target measurement, the last echo of up to 4 echoes is provided.

For n echoes with  $n > 4$ , always echo number 4 is supplied as last pulse target distance.

## Scanner performance

	LMS-Q240i-60	LMS-Q240i-80
Scan angle range <sup>9)</sup>	$\pm 30^\circ = 60^\circ$ total	$\pm 40^\circ = 80^\circ$ total
Scanning mechanism	Rotating polygon mirror	
Scan speed	6 to 80 scans/sec	5 to 60 scans/sec
Angular step width $\Delta \vartheta$ <sup>9)</sup> between consecutive laser shots	$\Delta \vartheta \geq 0.04^\circ$	
Angle measurement resolution	0.005°	
Internal Sync Timer	Option for real-time synchronized time stamping of scan data	
Scan Sync	Option for synchronizing scan lines to external timing signal	

9) Scanning parameters can be set via RS232 or TCP/IP configuration interface.

## General technical data

Interface:	for configuration & data output	TCP/IP Ethernet, 10/100 MBit/sec
	for configuration	RS 232, 19.2 kBd
	for data output	ECP standard (enhanced capability port) parallel
Input voltage range	18 - 32 V DC	
Current consumption	approx. 1.8 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, dust and splash-proof	
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-Q240i, 14/07/2010



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