

RIEGL VQ[®]-480

high-accuracy ranging based on echo digitization and online waveform processing
high laser repetition rate - fast data acquisition
multiple target capability - unlimited number of targets
perfectly linear scan lines
compact, rugged and lightweight design
electrical interfaces for GPS data string and Sync Pulse (1PPS)
mechanical interface for IMU mounting
integrated LAN-TCP/IP interface

The V-Line[®] Airborne Laser Scanner *RIEGL VQ-480* provides high speed, non-contact data acquisition using a narrow infrared laser beam and a fast line scanning mechanism. High-accuracy laser ranging is based on *RIEGL*'s unique echo digitization and online waveform processing, which allows achieving superior measurement results even under adverse atmospheric conditions, and the evaluation of multiple target echoes.

The scanning mechanism is based on a fast rotating multi-facet polygonal mirror, which provides fully linear, unidirectional and parallel scan lines.

The *RIEGL VQ-480* is a very compact and lightweight scanner, mountable in any orientation and even under limited space conditions on helicopters or UAVs. The instrument needs only one power supply and provides line scan data via the integrated LAN-TCP/IP interface. The binary data stream can easily be decoded by user-designed software making use of the available software library RIVLib.



Typical applications include
Corridor Mapping
Power Line Inspection
Cultural Heritage Mapping

visit our website www.riegl.com



RIEGL[®]
LASER MEASUREMENT SYSTEMS

Technical Data *RIEGL VQ*[®]-480

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.



Range Measurement Performance

Measuring Principle

time-of-flight measurement, echo signal digitization, online waveform processing

Laser Pulse Repetition Rate PRR ¹⁾	50 kHz	100 kHz	150 kHz	200 kHz	300 kHz
Effective Measurement Rate (meas./sec) ¹⁾²⁾	25 000	50 000	75 000	100 000	150 000
Max. Unambiguous Measuring Range ³⁾					
natural targets 20%	950 m	750 m	650 m	550 m	450 m
natural targets 60%	1500 m	1200 m	900 m ⁴⁾	700 m ⁴⁾	450 m ⁴⁾
Max. Operating Flight Altitude AGL ²⁾	750 m (2450 ft)	600 m (2000 ft)	550 m (1800 ft)	450 m (1500 ft)	350 m (1150 ft)
Max. Number of Targets per Pulse	practically unlimited (details on request)				

Minimum Range

Accuracy ⁵⁾⁷⁾

Precision ⁶⁾⁷⁾

Laser Pulse Repetition Rate PRR ¹⁾⁸⁾

Max. Effective Measurement Rate ¹⁾

Echo Signal Intensity

Laser Wavelength

Beam Divergence

Laser Beam Footprint (Gaussian Beam Definition)

10 m

25 mm

25 mm

up to 300 kHz

up to 150 000 meas./sec (@ 300 kHz PRR & 60° FOV)

for each echo signal, high-resolution 16 bit intensity information is provided

near infrared

0.3 mrad

31 mm @ 100 m, 75 mm @ 250 m, 150 mm @ 500 m

1) Rounded values.

2) Reflectivity 20%, ±30° FOV, additional roll angle ±5°.

3) The following conditions are assumed: target larger than the footprint of the laser beam, perpendicular angle of incidence, visibility 23 km, average ambient brightness.

4) Limited by maximum unambiguous range.

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

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

7) One sigma @ 150 m range under *RIEGL* test conditions.

8) User selectable.

Scanner Performance

Scanning Mechanism

Field of View (selectable)

Scan Speed (selectable)

Angular Step Width (selectable)
between consecutive laser shots

Angle Measurement Resolution

Internal Sync Timer

Scan Sync (optional)

rotating multi-facet mirror

60° (+30° / -30°)

10 - 100 scans/sec

0.006° 0.24°

0.001°

for real-time synchronized time stamping of scan data

scanner rotation synchronization

Data Interfaces

Configuration

Scan Data Output

GPS-System

LAN 10/100/1000 Mbit/sec

LAN 10/100/1000 Mbit/sec

Serial RS232 Interface for data string with GPS-time information,

TTL input for 1 PPS synchronization pulse

Mechanical Interfaces

Mounting of Laser Scanner

Mounting of IMU Sensor

mounting base block (with 8 x M8 thread inserts and 6 x mounting slots)

3 x M6 thread inserts in the bottom and the top plate

(rigidly coupled with the internal mechanical structure)

General Technical Data

Power Supply Input Voltage

Power Consumption

Main Dimensions / Weight

Humidity

Protection Class

Max. Flight Altitude (operating)

Max. Flight Altitude (not operating)

Temperature Range

18 - 32 V DC

typ. 65 W

360.5 x 219 mm (length x width), approx. 13 kg

max. 80% non condensing @ +31°C

IP64, dust and splash-proof

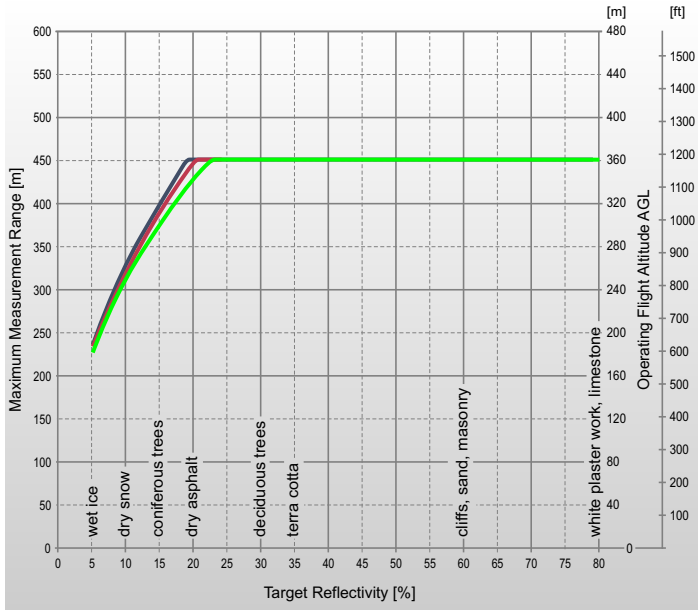
16 500 ft (5 000 m) above MSL

18 000 ft (5 500 m) above MSL

-10 °C to +40 °C (operation) / -20 °C to +50 °C (storage)

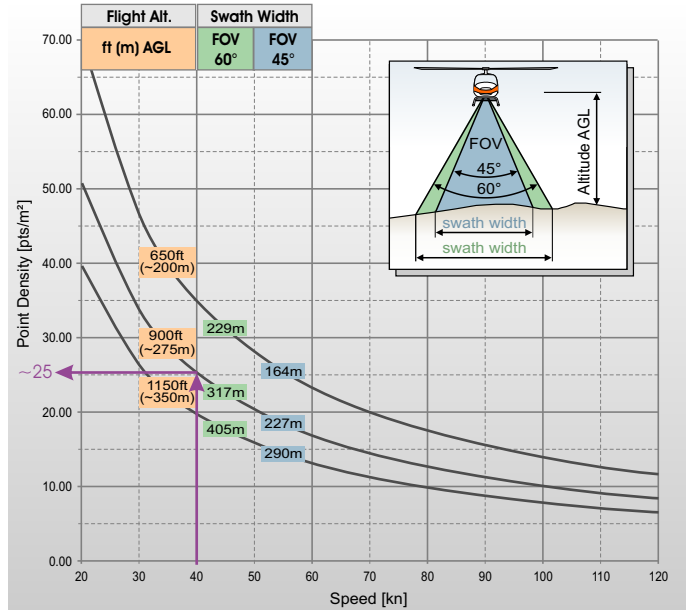
Maximum Measurement Range & Point Density for RIEGL VQ[®]-480

PRR = 300 kHz



— @ visibility 23 km
 — @ visibility 15 km
 — @ visibility 8 km

PRR = 300 kHz

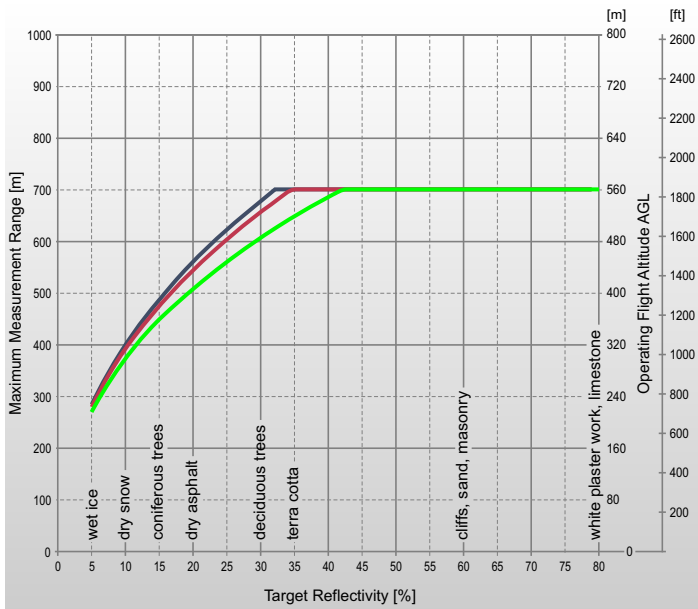


Example: VQ-480 at 300,000 pulses/second
 Altitude = 900ft AGL, Speed = 40 kn
 Resulting Point Density ~ 25 pts/m²

For the Operating Flight Altitude AGL, the following conditions are assumed

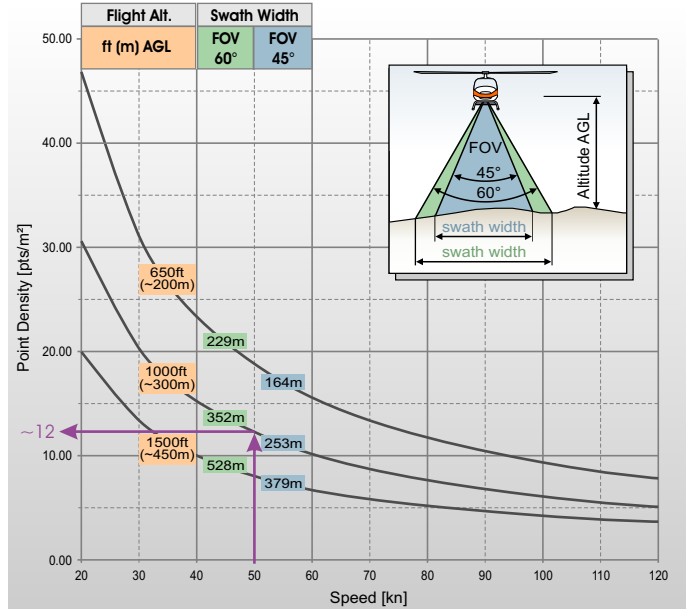
- target size laser footprint
- average ambient brightness
- scan angle 60°
- roll angle +/- 6°

PRR = 200 kHz



— @ visibility 23 km
 — @ visibility 15 km
 — @ visibility 8 km

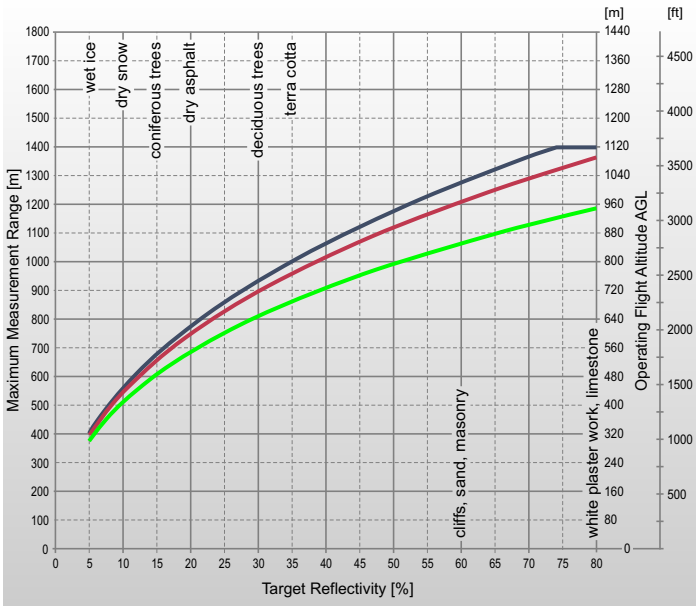
PRR = 200 kHz



Example: VQ-480 at 200,000 pulses/second
 Altitude = 1000ft AGL, Speed = 50 kn
 Resulting Point Density ~ 12 pts/m²

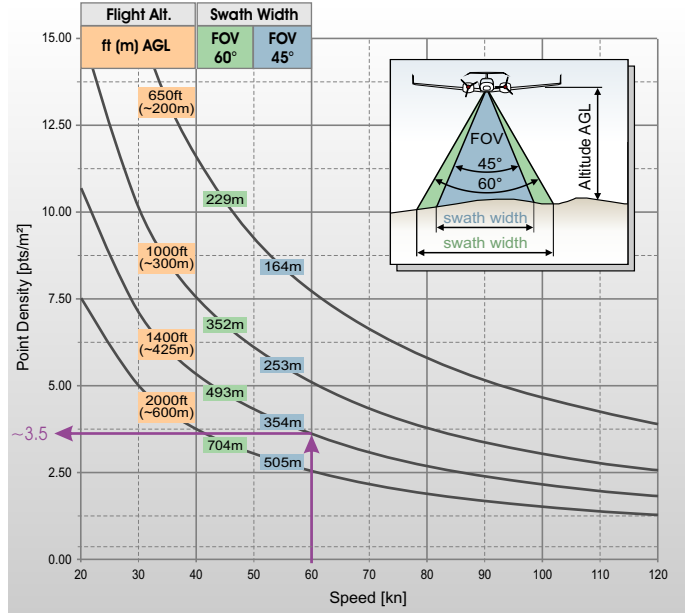
Maximum Measurement Range & Point Density for RIEGL VQ[®]-480

PRR = 100 kHz



— @ visibility 23 km
 — @ visibility 15 km
 — @ visibility 8 km

PRR = 100 kHz

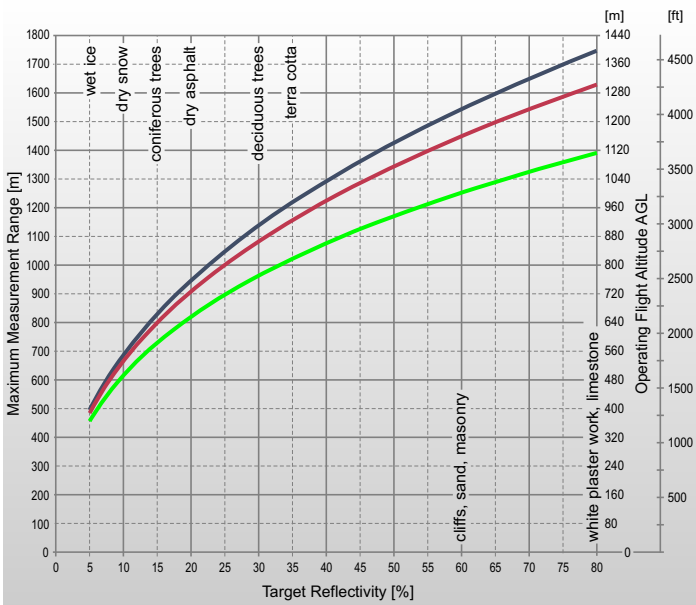


Example: VQ-480 at 100,000 pulses/second
 Altitude = 1400ft AGL, Speed = 60 kn
 Resulting Point Density ~ 3.5 pts/m²

For the Operating Flight Altitude AGL, the following conditions are assumed

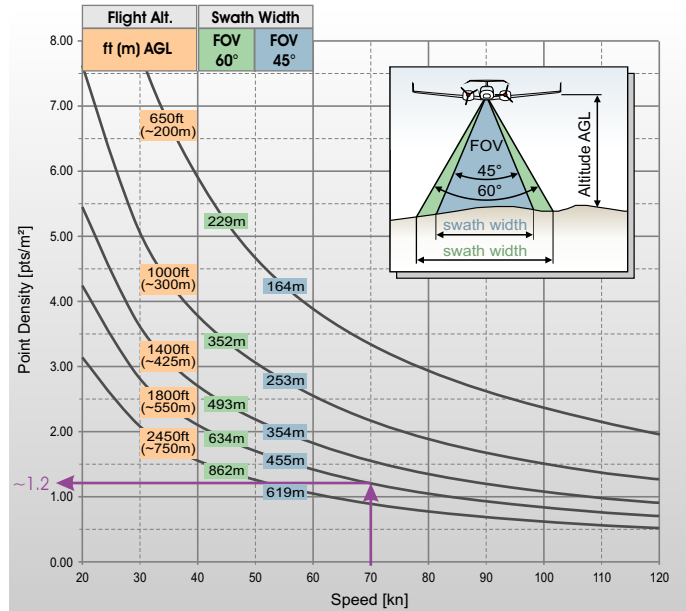
- target size laser footprint
- average ambient brightness
- scan angle 60°
- roll angle +/- 6°

PRR = 50 kHz



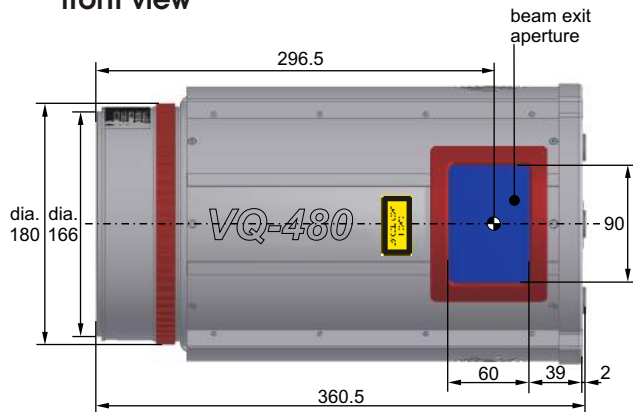
— @ visibility 23 km
 — @ visibility 15 km
 — @ visibility 8 km

PRR = 50 kHz

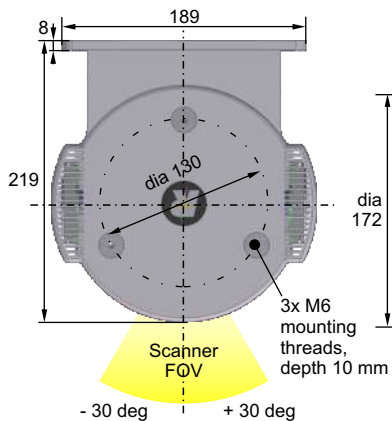


Example: VQ-480 at 50,000 pulses/second
 Altitude = 1800ft AGL, Speed = 70 kn
 Resulting Point Density ~ 1.2 pts/m²

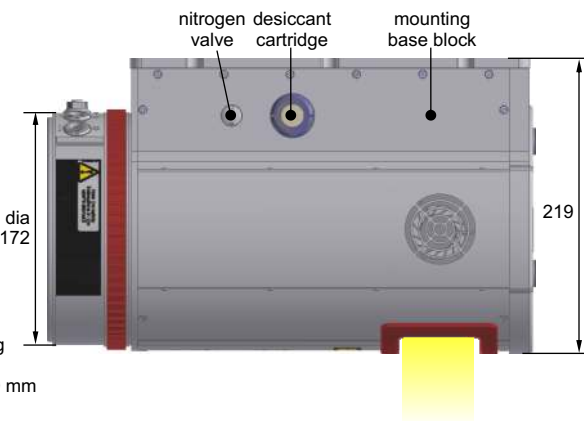
front view



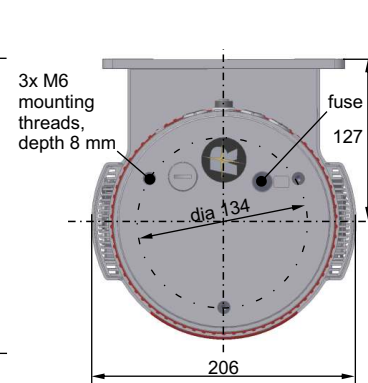
top view



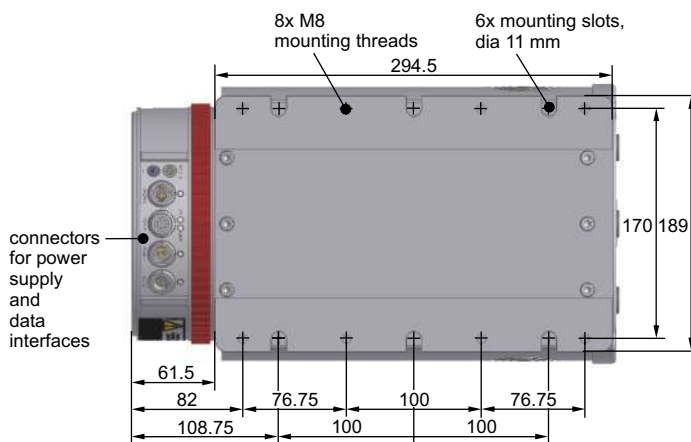
side view



bottom view



rear view



all dimensions in mm



RIEGL®
LASER MEASUREMENT SYSTEMS

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