Compact Mobile Laser Scanning System

RIEGL VMX®-250

- *compact and lightweight design*
- *user-friendly mounting and installation, short setup time*
- *installed IMU allows the system to be delivered and operated practically worldwide*
- *2 RIEGL VQ-250 scanners smoothly integrated with INS/GNSS unit*
- *measurement rate up to 600 000 meas./sec*
- *scanning rate up to 200 lines/sec*
- *eyesafe operation (laser class 1)*
- *high penetration of obstructions (e.g. fences, vegetation) by means of echo digitization and online waveform processing*

The new *RIEGL* VMX Mobile Laser Scanning System is an extremely compact and user-friendly measurement unit. The roof-carrier mounted measuring head integrates two *RIEGL* VQ-250 scanners, inertial and satellite navigation hardware, and mounting points for digital cameras or video equipment.

Fast 3D data collection, featuring high accuracy and high resolution, provides a basis for a variety of applications like mapping of roadways and rail corridors (e.g. route inventory, noise protection, clearance gauge), waterways, ports, and harbors (e.g. river banks, jetties, cliffs) as well as extended urban and vacant areas.

Typical applications are

- ***Mapping of Transportation Infrastructure***
- ***City Modeling***
- ***Fast Mapping of Construction Sites***
- ***Surveying of Mining / Bulk Materials***
- ***Network Planning***

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RIEGL®
LASER MEASUREMENT SYSTEMS

The *RIEGL* VMX-250 comprises fully-integrated and calibrated laser scanners, INS/GNSS equipment, and the corresponding *RIEGL* software packages, reducing the complexity of installation and post-processing to a minimum. It allows thorough and seamless processing of the scan data from acquisition to system calibration and georeferencing. The output is a highly accurate survey-grade 3D point cloud in common coordinate systems for maps and surveying. The integrated INS/GNSS allows the system to be delivered and operated practically worldwide.[1)]

Thanks to the smart design, the *RIEGL* VMX-250 is easily mounted on the roof rack of a vehicle by means of a genuine mounting mechanism. System calibration is maintained even if the system is removed, e.g. during transport or for storage purposes.

Data acquisition and operator control is accomplished through the compact control unit box, optimized for easy transportation and powered directly from the vehicle's battery / alternator system.

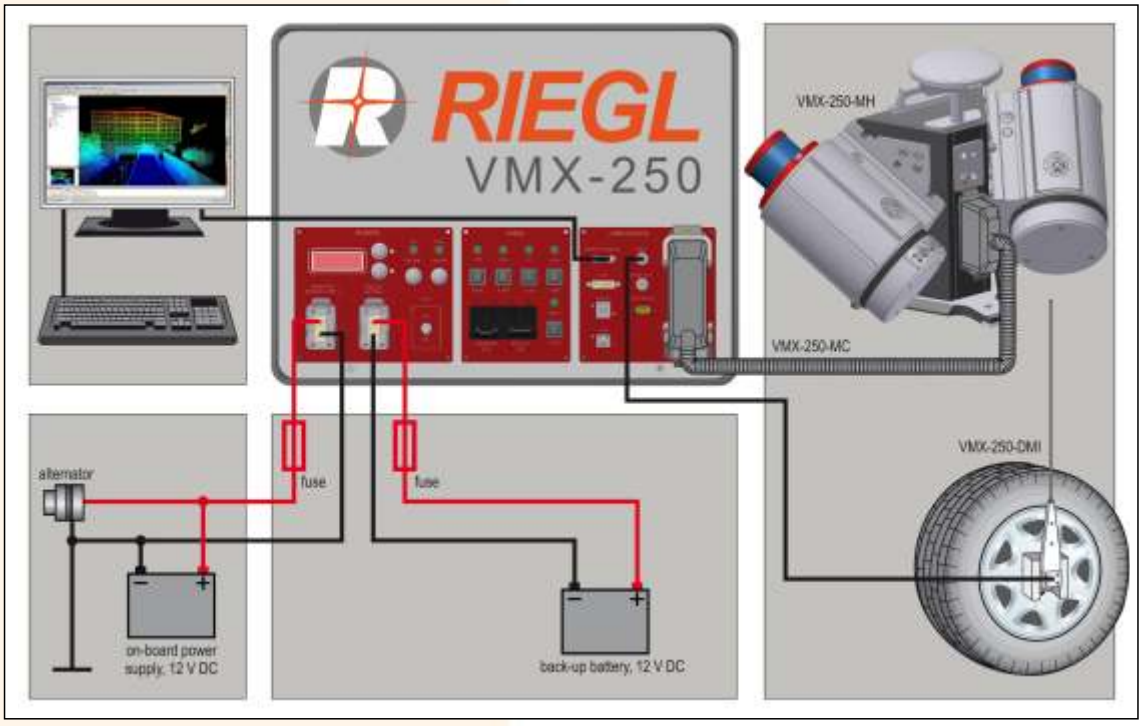
The extraordinary "Full Circle" V-Line® laser scanner *RIEGL* VQ-250, the key component of the *RIEGL* VMX-250, catches the eye with its extremely high measurement rate of 300,000 meas./sec and its scanning rate of up to 100 revolutions/sec, each, performing non-contact profile measurements by an invisible, infrared laser beam over 360 degrees without any gaps.

High-performance pulsed laser ranging, based on *RIEGL´*s unrivaled echo signal digitization technology with subsequent online waveform processing, results in excellent multiple target detection up to a maximum unambiguous measurement range of several hundred meters on natural targets even under adverse conditions.

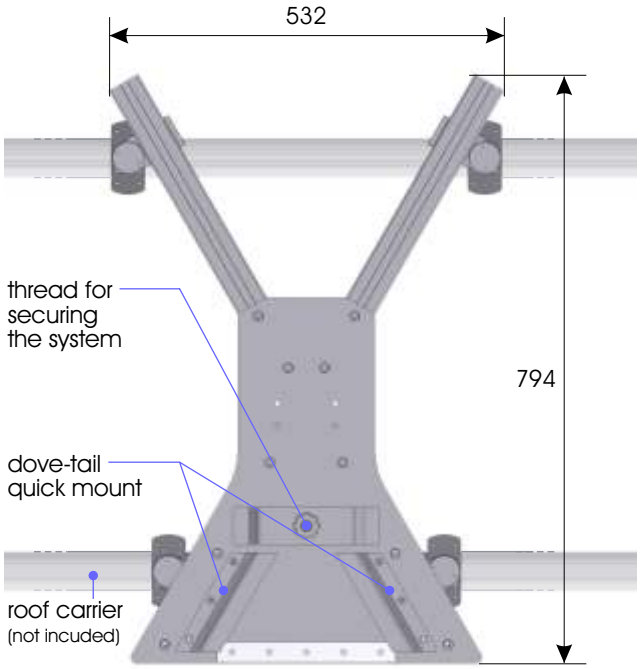
As a consequence: objects like buildings, infrastructure and others can be surveyed accurately, even if obscured by fences, trees, bushes or other obstructions.

1) The installed IMU is listed neither in the European Export Control List (i.e. Annex 1 of Council Regulation 428/2009) nor in the Canadian Export Control List. Detailed information on certain cases will be provided on request.

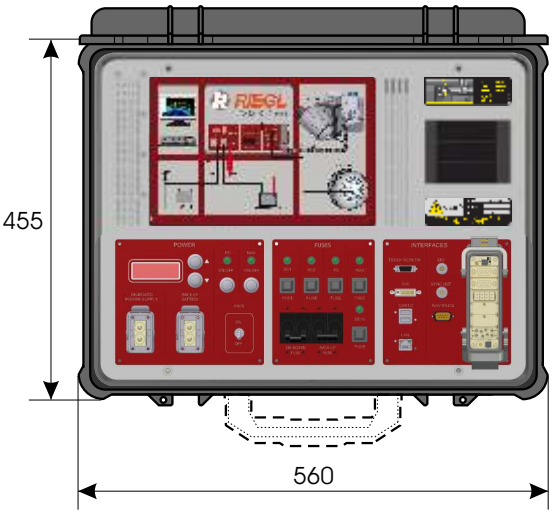
RIEGL VMX-250 System Components



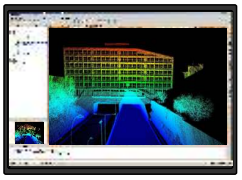
VMX-250-RM Roof Mount



VMX-250-CU Control Unit

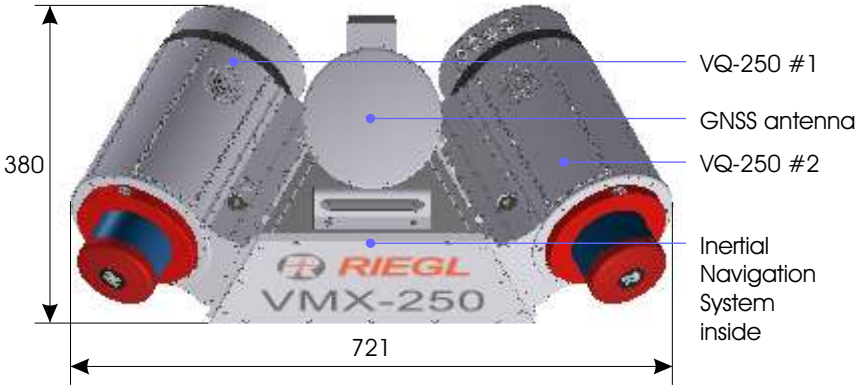


touch-screen



keyboard

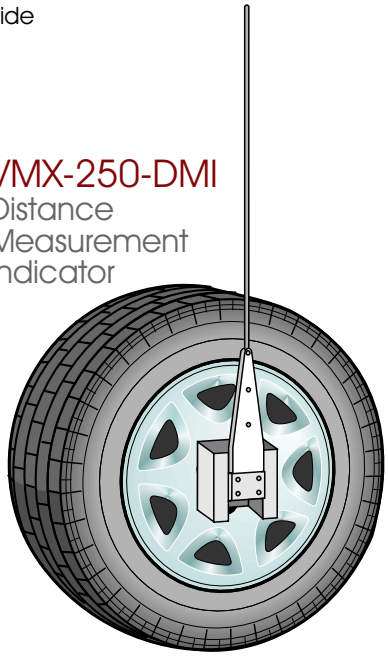
VMX-250-MH Measuring Head



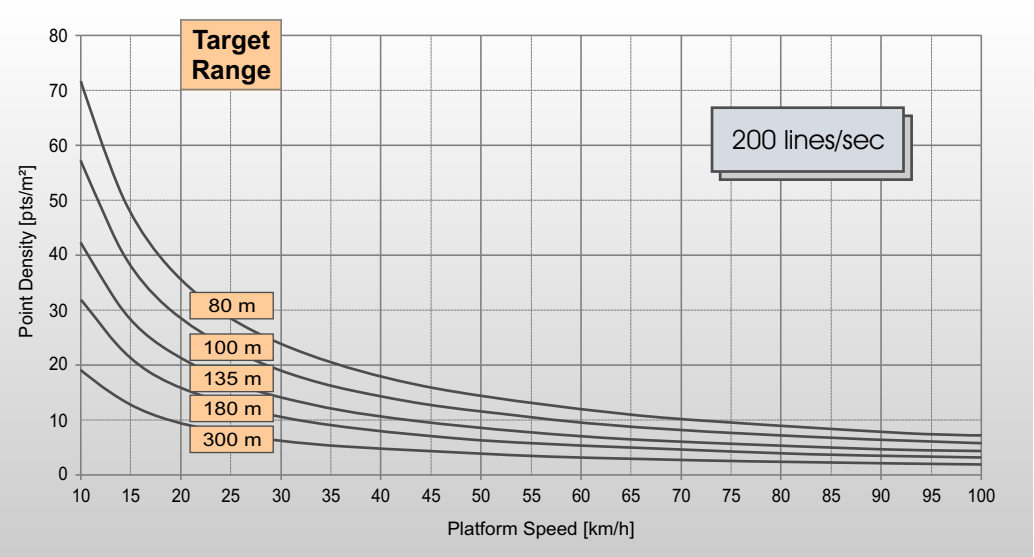
RIEGL MLS-Software

VMX-250-MC Main Cable

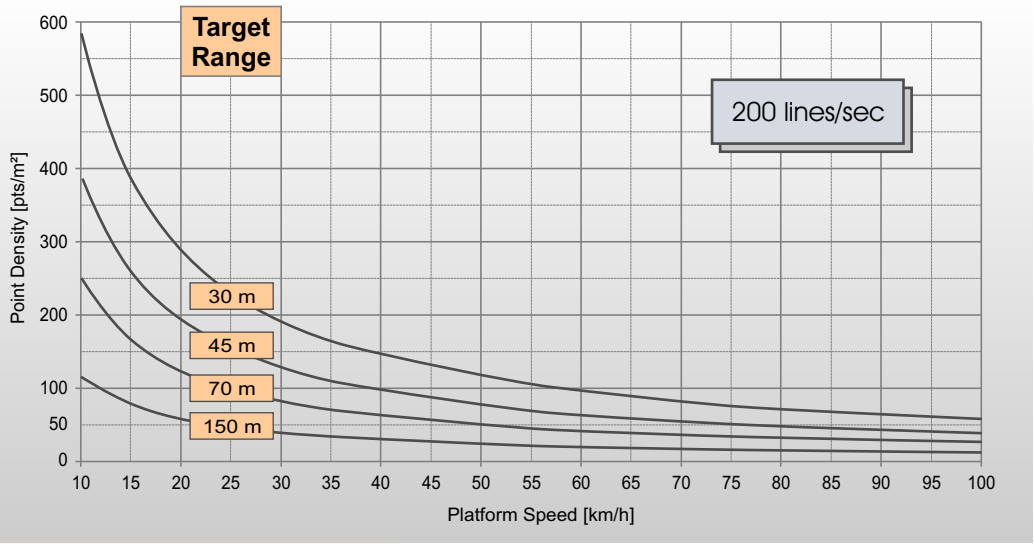
VMX-250-DMI Distance Measurement Indicator



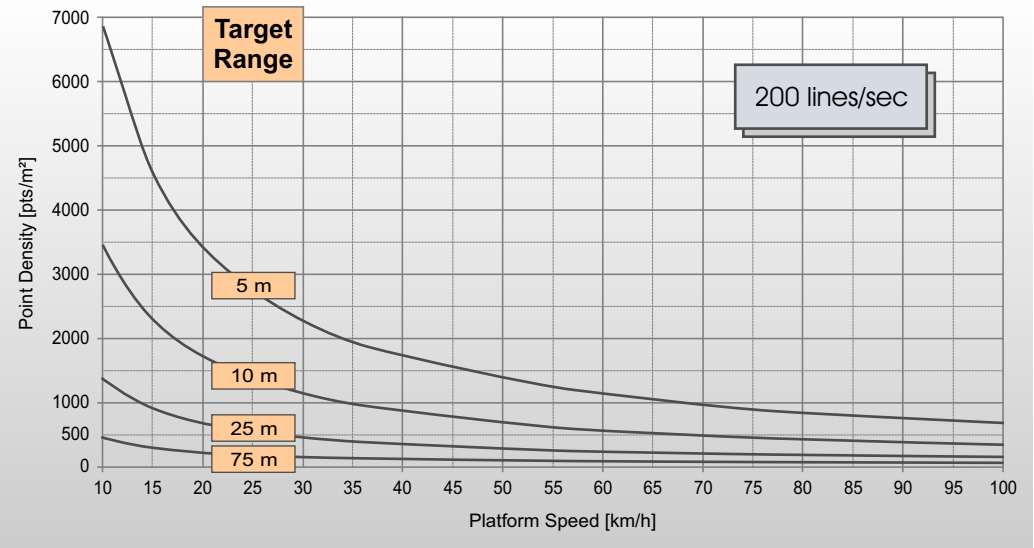
PRR = 100 kHz: for long range applications



PRR = 300 kHz: for medium range applications



PRR = 600 kHz: for high resolution mobile laser scanning in urban areas



RiACQUIRE

- Project-oriented scandata acquisition and scanner control
- Online visualization of geo-referenced monitoring data during acquisition
- Quality assurance with detailed history of events, system parameters and operator´s interactions
- Status feedback for fast recognition by the operator

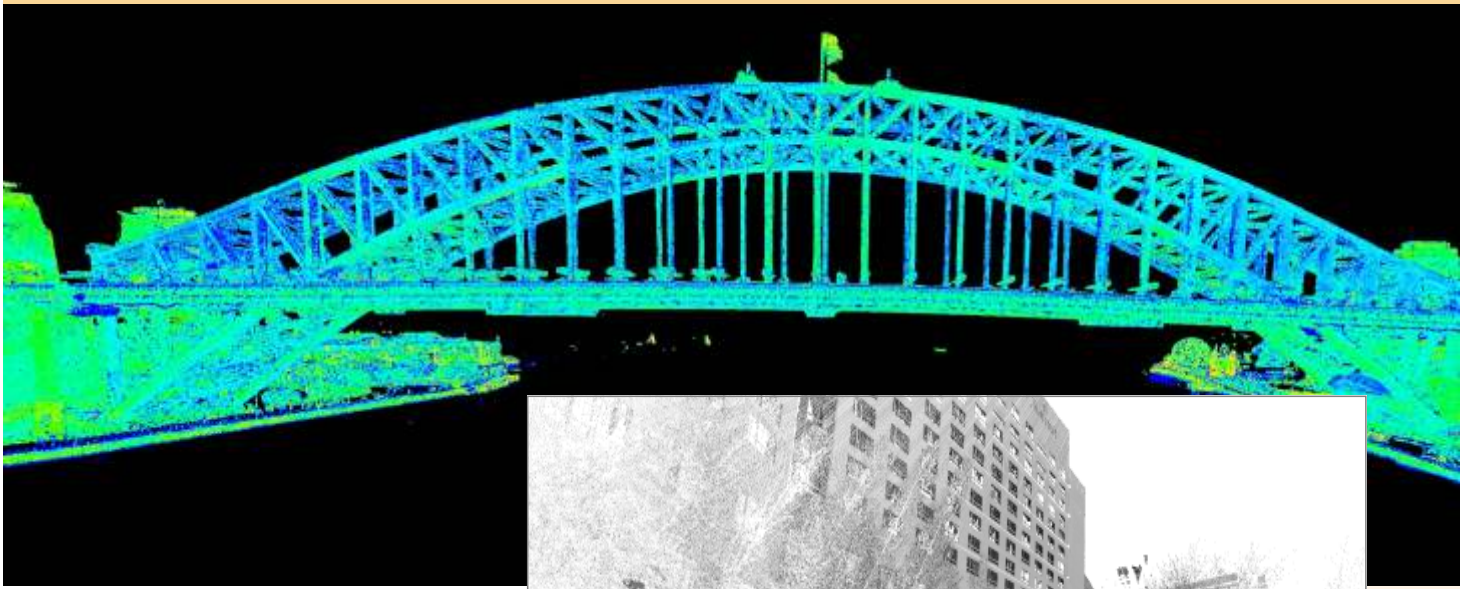
RiPROCESS

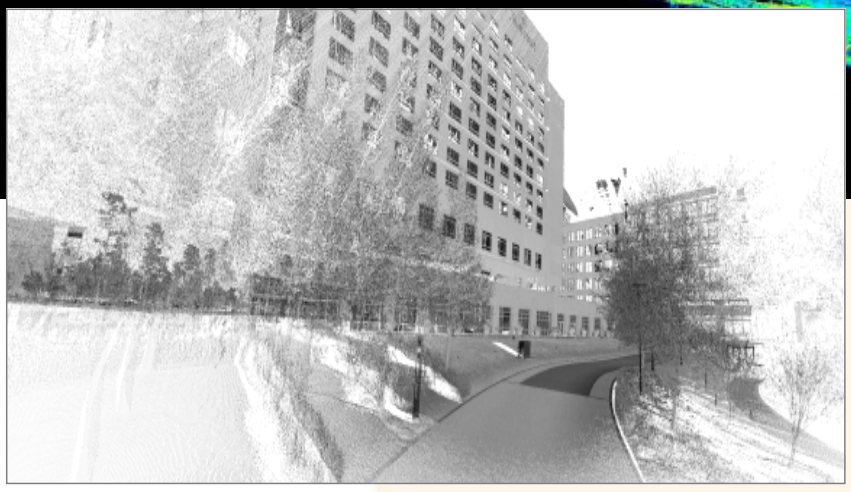
- Project-oriented managing and processing software for *RIEGL* mobile scan data
- Operation in a multiple-workstation environment - parallel task processing
- Fast access to data for inspection in different visualization formats
- System calibration and scandata adjustment
- Statistical analysis of referencing, matching quality
- Interfacing to third party software packages

RiWORLD

- Transformation of laser scandata into the coordinate system of the INS
- Use of geometrical system description and calibration information (e.g. lever arms)
- Supports different formats of position and orientation data
- Interfacing to third party software packages
- Smoothly integrated into RiPROCESS task management

Screenshots of Example Data





Data acquired with the RIEGL VMX-250 Mobile Laser Scanning System is visualized as point clouds in different view types, e.g., color coded reflectance (above) or grey scale coded reflectance (right).

Technical Data Mobile Laser Scanning System *RIEGL* VMX®-250

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.

2 x VQ-250 Measurement Performance

Effective Measurement Rate[1]	100 kHz	200 kHz	300 kHz	400 kHz	**600 kHz**
Max. Unambiguous Measuring Range[2]					
natural targets ρ ≥ 10%	180 m	130 m	110 m	100 m	**75 m**
natural targets ρ ≥ 80%	500 m	380 m	340 m	300 m	**200 m**
Max. Number of Targets per Pulse	practically unlimited (details on request)				

Minimum Range	1.5 m
Accuracy [3) 5)]	10 mm
Precision [4) 5)]	5 mm
Max. Effective Measurement Rate [1)]	600 000 meas./sec (2 x 300 000 meas./sec)
Line Scan Speed (selectable)	up to 200 lines/sec (2 x 100 lines/sec)

1) Rounded values, based on 2 *RIEGL* VQ-250 laser scanners.
2) The following conditions are assumed: target larger than the footprint of the laser beam, perpendicular angle of incidence, visibility 23 km, average ambient brightness.
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 @ 150 m range under *RIEGL* test conditions.

INS/GNSS Performance[6)]

Position (absolute)	typ. 20 - 50 mm
Position (relative)[7)]	typ. 10 mm
Roll & Pitch	0.005°
Heading	0.015°

6) One sigma values, no GNSS outages, with DMI option, post-processed.
7) With a control point spacing < 300 m.

Physical Data

	Main Dimensions (L x W x H)	*Weight*
VMX-250-MH Measuring Head including GNSS antenna	721 x 380 x 462 mm	approx. 38 kg
VMX-250-CU Control Unit	560 x 455 x 265 mm	approx. 18 kg
VMX-250-RM Roof Mount including mounting brackets	794 x 532 x approx. 200 mm	approx. 13 kg
VMX-250-MC Main Cable	approx. 3 m (length)	approx. 5 kg

Electrical Data / Interfaces

Power Supply Input Voltage	11 - 15 V DC
Power Consumption	typ. 230 W (max. 500 W)
Interfaces	LAN, 10/100/1000 MBit/sec USB 2.0 DVI SYNC OUT (synchronization output NMEA+PPS) NAV RS232 (COM of INS/GNSS system) removable hard disks for project data transfer

Environmental Data

Temperature Range	
VMX-250-MH Measuring Head	-10°C to +40°C (operation) / -20°C to +50°C (storage)
VMX-250-CU Control Unit	0°C to +50°C (operation) / -40°C to +70°C (storage)
Humidity	max. 80% non condensing @ +31°C
Protection Class	
VMX-250-MH Measuring Head	IP64, dust and splash-proof
VMX-250-CU Control Unit	IP64 (closed lid), IP30 (open lid)

RIEGL®
LASER MEASUREMENT SYSTEMS

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