3D Measurement Made Easy

LineScan3D – Calibrated GigE Vision 3D Sensor

Industrial Cameras | 3D Sensors | Made in Germany

VRmagic

LineScan3D

High-Performance 3D Measurements for Industrial Image Processing

The laser line is captured by the built-in image sensor and directly processed on the sensor's FPGA.

Calibrated 3D Sensor

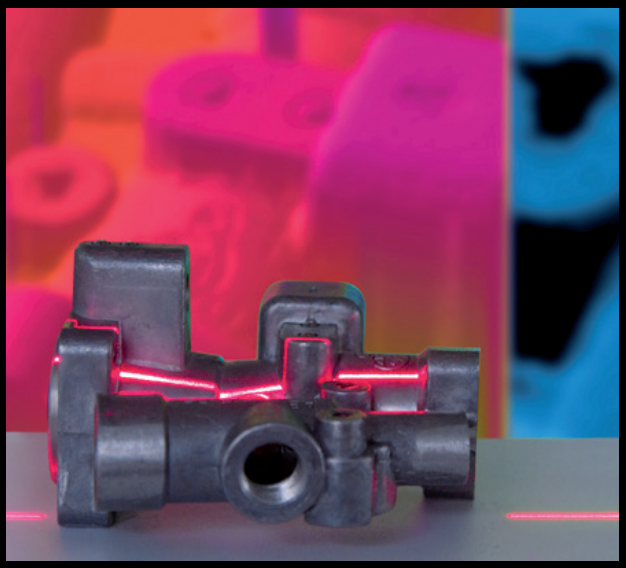
The LineScan3D by VRmagic Imaging is a ready-to-use, calibrated 3D sensor with integrated laser, optics and protective circuitry. The calibration is available in two types: the industrial calibration, sufficient for most measuring purposes, and the metrological calibration, offering a certified linearity for higher precision. An uncalibrated version is also available.

Real-Time Profile Extraction

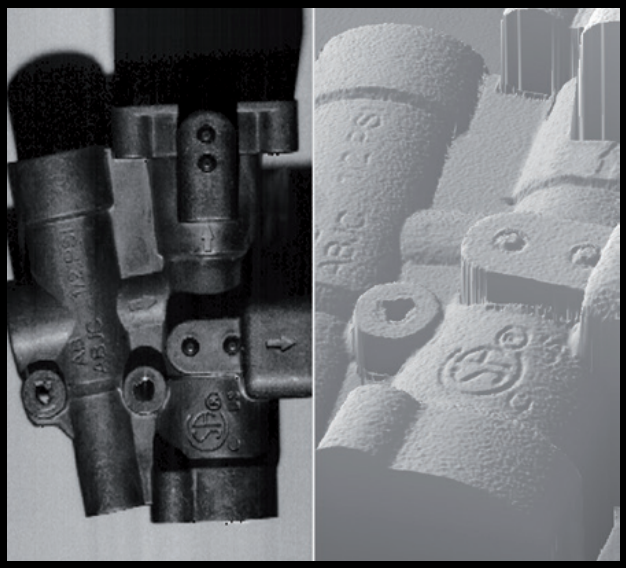
Real-time extraction of the laser line is carried out in the FPGA of the sensor with up to 1000 Hz and 2048 points per profile. The profile speed can even be increased with an optional sensor readout boost at a reduced Z resolution. A high dynamic range (HDR) mode may be activated to further enhance the laser line extraction for materials with varying surface reflectivity characteristics.

3D and 2D Data in One Measurement

In addition to the 16 bit profile coordinates, the sensor also supplies the brightness values of the laser line. This so-called intensity image enables 2D image processing in parallel to the 3D measurement, e.g. for surface inspection or bar code reading. The 3D and 2D data is recorded at the same time from exactly the same perspective – optimum preconditions for combined evaluation.



Object scanned by the LineScan3D



Resulting intensity image and 3D range map

Seamless Integration and High Accuracy

GigE Vision and Industrial Connectors

Integration into an existing vision infrastructure is easily accomplished via the GigE-Vision interface and standard M12 connectors. The sensor has a 24 V power supply and an isolated RS485 interface for ABZ rotary encoder input and trigger. The dedicated redundant laser interlock circuit provides protection from accidental exposure to the laser.

Easy Multi-Sensor Setups

Multi-sensor setups of up to 32 LineScan3D devices can be realized without additional hardware. Simply connect several devices by cable to achieve a daisy chain setup.

IP65/67 Housing for Harsh Environments

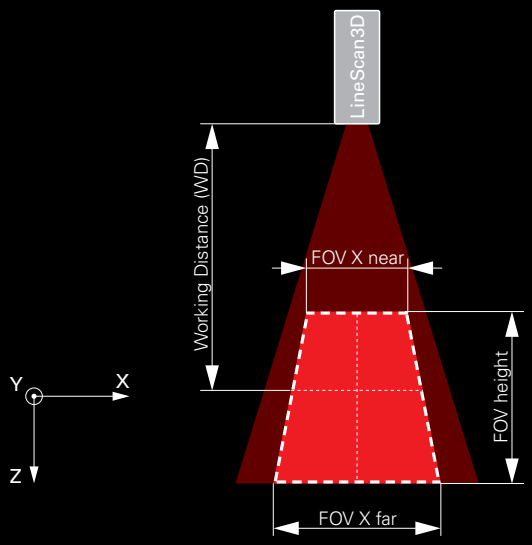
The LineScan3D was designed for industrial environments, and its compact IP65/67 aluminum enclosure is made to last. All components are dust tight, protected against water jets, and water immersion resistant.

Image Processing Software

Any GigE Vision compatible software such as Common Vision Blox, Halcon, Matrox Imaging Library, and Eye Vision Technology (EVT) may be used with the LineScan3D. VRmagic Imaging offers EyeVision 3 bundles for measurement of height, angle, diameter, gap, or seal inspection, as well as applications for bin picking or pin inspection. The EyeVision 3 software makes it possible to solve image processing tasks with an intuitive graphical user interface.

Laser Profiles in 1/64 Sub-Pixel Accuracy

The LineScan3D uses laser triangulation to generate 3D data from a laser line projected onto an object. The sensor ensures a robust laser line extraction with the COG-based, configurable VRmLineExtraction algorithm. As the sensor scans the laser lines, 16 bit coordinates of the line profiles are calculated in real-time and with 1/64 sub-pixel resolution using the camera's FPGA, thereby making the measured data quickly available for further processing.



Product Highlights

- GigE Vision compatible, calibrated 3D sensor
- 1000 Hz@360 lines scan rate, 2,048 points per profile
- Multi-sensor setups with up to 32 LineScan3D devices without additional hardware
- Optional intensity image and HDR mode
- On-board FPGA-based laser line extraction
- 24 V power supply, Gigabit Ethernet and RS485 IOs on industry-standard M12 connectors
- Rugged IP65/67 aluminum housing
- Dedicated redundant laser interlock circuit

Technical Data

Measuring Fields	VRmLS1-74	VRmLS1-128
FOV X near ... far [mm]	74 ... 97	128 ... 215
FOV height [mm]	84	213
Working distance [mm]	220	320
Z resolution with 1/64 subpixel calculation near ... far [µm]	0.9 ... 1.6	1.8 ... 5.1
Metrological calibration, certified Z linearity [µm]	±10	±20
Dimensions [mm]	240 x 120 x 51	240 x 120 x 51

Interfaces	
Ethernet	1000 Mbit Ethernet
IO	RS485 2 ABZ encoder inputs 1 gate/trigger input
	Daisy chain multi-sensor setup (up to 32 sensors)
Power	24 V DC, +/- 10% Typical power consumption 11 W

3D Measurement	
Profile speed	1000 Hz@360 lines 338 Hz@1088 lines (full AOI)
Profile resolution	2,048 points per profile
Output format	16 bit profile coordinates 16 bit intensity image (optional)
Line extraction	Integrated, robust, configurable profile algorithm, HDR mode option, 1/64 sub-pixel resolution

Physical	
Connectors	Power/laser interlock: M12, 8-pin A-coded male
	Ethernet: M12, 8pin X-coded female
	Trigger In: M12, 12pin A-coded male
	Trigger Out for daisy chain: M12 12pin A-coded female
Certification	CE, FCC
IP Rating	IP65/IP67

Laser	
Wavelength	660 nm
Laser class	2M, 3R option available
Laser dimmable	yes
Interlock	Dedicated redundant laser interlock circuit