Laser Range Scanner

Sensor for Real-Time Object Scanning

The continuously rotating scanhead measures the distance to the objects surface by the principle of laser triangulation. In combination with the rotational angle of the scanhead, a plain cut of the environment can be sensorized. An additional translatory movement of the scanner along the scanheads rotational axis, can be used to stack the slices, in order to get a three-dimensional world model.
Integrated in the scanhead are a miniaturized laser diode module, a receiver optics including achromat and position-sensitive-device (PSD) and the electronics for computing and transmitting the data.

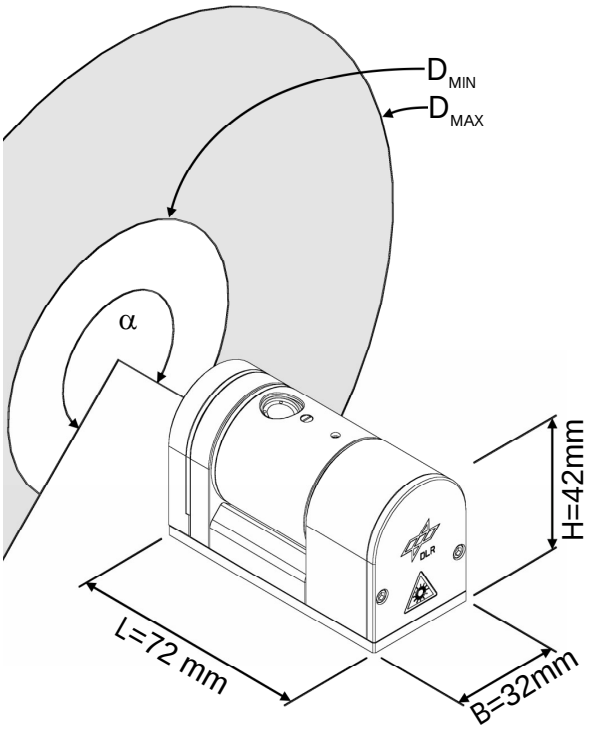
The laser module's dimensions are Ø9 x 11.5 mm and it emits a laser beam at 670 nm of Ø1.2 mm with a divergence of 2 mrad. The laser diode is electrically isolated but thermally well coupled inside the housing. The surface of the scanhead is therefore used as a heat sink to ensure cool operation of the laser.

The diffus reflection on the objects surface is received and transformed by an achromat and the PSD to a value proportional to the scanning distance.
For the bi-directional data transmission between the rotating scanhead and the chassis of the Laser Range Scanner, opto-electronic emitter-receiver modules are used. With the realized configuration a data transfer rate of 1 Mbit/s can be achieved. Additionally, the power supply of the rotating scanhead is realized without slip rings. Two transformer coils embedded in ferrite cores are integrated vis-a-vis in the scanhead, the scanners chassis respectively.

With the contact-free power supply and data transmission a wear-free and rugged operation with high data transmission quality is achieved.
An optical index system delivers an impulse with each completed rotation of the scanhead. This impulse is referenced with the incremental rotation angle of the motor control. In a separate black-box the raw data and the rotational angle are correlated and transmitted via the CAN-Bus under Device-Net, a standard protocol for robot control units.

With an additional input socket, the scan frequency can be synchronized with an external video signal in order to use the scanner in multi-sensory systems.

Dimensions s. Figure			
Weight	G	=	180 g
Maximal Scan Angle	α	=	270°
Scan Angle Resolution	$\Delta\alpha$	=	0,9°
Minimal Scanning Distance	D_{MIN}	=	53 mm
Maximal Scanning Distance	D_{MAX}	=	300 mm
Sampling Rate	F	=	10 kHz
Resolution Distance / Light Intensity			12/4 Bit
Power Supply			24V
Interface			CAN-Bus under DeviceNet



DLR - Laser Range Scanner

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