

LNS

Laser Nano Sensor

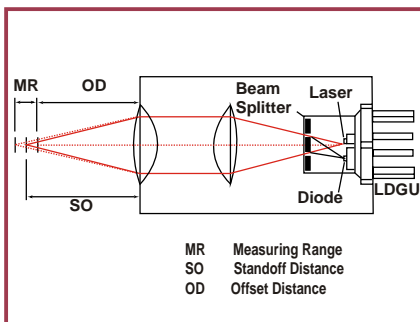


Laser Autofocus Principle Provides Nanometer Resolution

A laser beam is projected onto a reflecting surface via a system of two high-grade lenses from a special miniature Laser Diode Grating Unit (LDGU). The reflected light from the target returns through the same system of lenses and is split by a holographic optical grating or beam splitter. Two separate light spots from the beam splitter are focused on a four-part photodiode.

When the object to be measured is precisely at the focal point of the laser beam, the spots are projected onto the center of the photodiode couples. When the object moves toward or away from the sensor, it moves out of the focal point causing the light spots to move inward or outward on the photodiode couples. The object movement with respect to the focal point of the laser is calculated in the electronics by summing the outputs from the exterior and interior diodes, and then using the normalized values.

The LNS must be used on highly reflective surfaces (polished like a mirror or glass) perpendicular to the laser beam path.



- Resolution to 0.7 nm
- Spot Size to 1 micron

Technical Specification

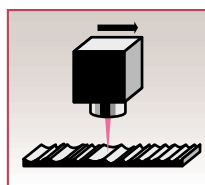
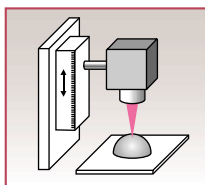
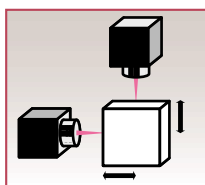
Model Number	Measurement Range (MR)	Measurement Range (MR) Maximum	Stand * Off (SO)	Offset * Distance (OD)	Resolution	Spot Size at SO	
	Note 1	Note 2			Note 3		
LNS 2.3/4 Type 1	mm	0.004	2.3	2.3	0.00000070	0.001	
	in	0.00016	0.09	0.09	0.00000028	0.00004	
LNS 9/13 Type 2	mm	0.013	0.02	9	9	0.0000022	0.002
	in	0.0005	0.0008	0.35	0.35	0.00000087	0.00008
LNS 18/40 Type 3	mm	0.040	0.060	18	18	0.0000068	0.004
	in	0.0016	0.0024	0.71	0.71	0.00000027	0.00016
LNS 26/130 Type 4	mm	0.130	0.20	26	26	0.0000221	0.006
	in	0.005	0.0079	1.02	1.02	0.00000087	0.00024

* SO and OD are approximate

Note 1: LNS output is non-linear. The ± 5 VDC output is range closest to linear.

Note 2: Max range is non-linear (± 10 VDC output)

Note 3: RMS noise 0.017% of range



Options & Accessories

- High Speed Analog Output up to 200 kHz Response

Technical Specifications

LNS Laser Nano Sensor

LASER SOURCE

Laser type	AlGaInP
Laser class	3R
Laser source power	mW 4.5
Wavelength	nm 650
Lifetime expectancy	hr 100 000

ENVIRONMENTAL

Enclosure	NA
Temperature	°C 0 - 50
	°F 32 - 122
Temp. Fluctuation	% of MR / °C 0.01
Relative Humidity	% <95 non-condensing

ELECTRICAL

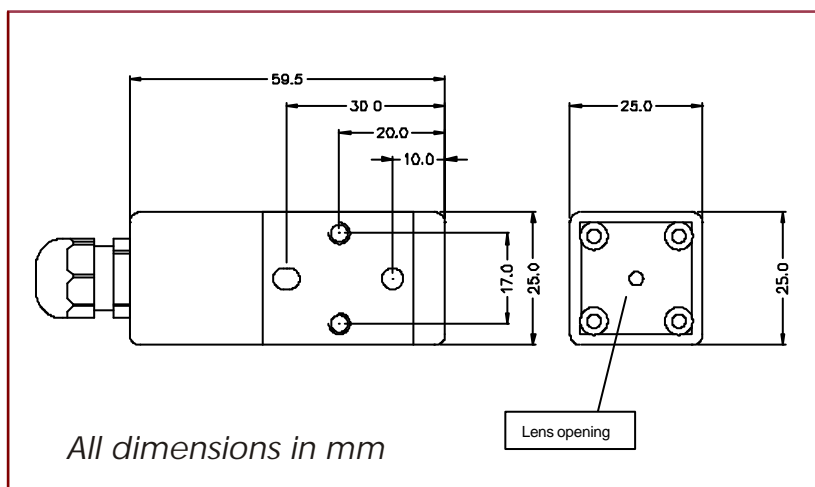
Power supply voltage	VDC -15/+15 ± 5%
Current draw	mA < 200
Analog voltage output	VDC Guaranteed MR ± 5 VDC *
Frequency response	Hz 30 000 (Optional up to 200,000**)
Detector type	LDGU

PHYSICAL

Dimensions	mm 25 x 25 x 59.5
	in 0.98 x 0.98 x 2.34
Weight (sensor head)	kg 0.1
	lbs 0.22
Weight (amplifier enclosure)	kg 0.50
	lbs 1.1
Cable Length (30 kHz response)	m 0.5
	ft 1.6

* LNS output is non-linear. MR ± 5VDC as stated in the MR in page 1. Maximum range ± 10VDC

** With 200 kHz option, cable length reduced to 0.3 m



CONNECTION WIRING

Brown	Power (+15 VDC)
Green/Blue	Ground
White	Power (-15 VDC)
Yellow	Analog output
Gray	Intensity out
Pink	Invalid 4.7 V
	Valid -0.7 V

Red = Laser on
Purple = Optocoupler Collector
Black = Optocoupler Emitter

Additional Comparator with optocoupler switch on distance signal X
Optocoupler: NPN; Maximum collector emitter voltage 35 Volts;
maximum current 40 mA

LMI can provide a comparator output, but must drill a hole in case to access the potentiometers.

1. Distance output. Comparator is active when the output signal drops below preset value. Tunable between ±10VDC. Opto-coupler is NPN Max 40mA, maximum collector emitter voltage 35 Volts
2. Invalid output. Comparator shuts the analog output off to ±13Volts (selectable) when intensity drops below preset value of nominal 50mVolts

1 - YEAR LIMITED WARRANTY

The company will replace or, at the company's option, repair any system or parts of a system which are found defective in material or workmanship within one year from the date of shipment. Our obligation with respect to such system or parts shall be limited to repair and replacement, F.O.B: our facilities, and in no event shall the company be liable for incidental, consequential or special damages, or for transportation, installation, adjustment or other expenses which may arise in connection with such system or parts. This warranty is expressly made in lieu of any and all other warranties, expressed or implied, including warranties of merchantability and fitness. No waiver, alteration, or modification of the foregoing warranty shall be valid unless made in writing and signed by an executive of the company.

LMI vision sensors are manufactured under one or more of the following U.S. patents: 4,305,661; 4,373,804; 4,375,921; 4,394,683; 4,576,482; 4,667,231; 4,875,776; 5,056,922; 5,114,230; 5,164,579; 5,362,970; 5,510,625; 5,670,787; 5,684,292; 5,691,545; 5,734,172; 5,811,827; 5,854,491; 5,877,491; 5,880,459; 5,940,302; 5,981,965. Other US and foreign patents pending.

www.lmint.com

Complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 50, dated July 26, 2001.



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