



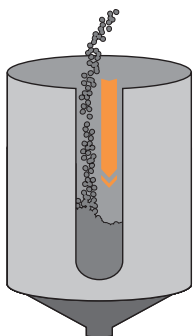
The NL-01 InoxLaser uses time-of-flight laser technology for continuous non-contact distance or level measurement.

Able to measure to any solid surface, at any angle, the NL-01 an ideal sensor for level, positioning and detection applications.

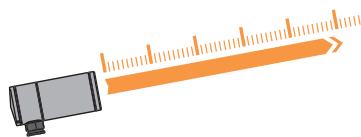
Features

- Non-contact measurement with laser technology
- Level, distance & position measurement of solids
- 303 Stainless steel housing
- Measurement range up to 50 m (164')
- Continuous measurement, 10 mm (0.39") resolution
- NAMUR compliant 4 ... 20 mA output
- 2 Normally open relay outputs
- Easy configuration via USB
- Optional Dust tube accessory (NL-01/DT) and Swivel mounting bracket (NL-01/SB)

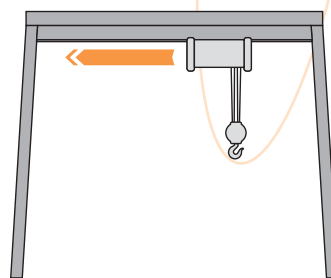
Applications



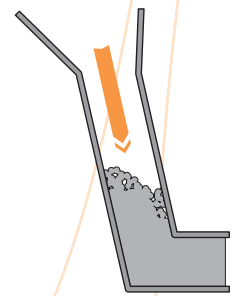
Level control



Distance measurement



Positioning



Blockage detection

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Disclaimer

Information found in this document is used entirely at the reader's own risk and whilst every effort has been made to ensure its validity neither LightWare Optoelectronics (Pty) Ltd nor its representatives make any warranties with respect the accuracy of the information contained herein.

1. Quick start guide

1. CAUTION - The NL-01 InoxLaser Sensor contains a laser and should never be aimed at a person or an animal. Do not look at the beam directly with optical instruments.
2. Download LightWare Terminal software from www.lightware.co.za > Info > Software onto your PC.
3. Open the LightWare Terminal package and follow the installation instructions. Everything needed for communicating with the NL-01 will automatically be installed.
4. Plug a USB cable into the USB A connector in the terminal compartment of the NL-01.
5. Plug the other end of the USB cable into a PC and the NL-01's LED indicators will light up.
6. Open Terminal software on the PC, a connection with the NL-01 will automatically be established using baud rate of 115200,8,n,1.
7. Click the "Connect" icon to open a communications port and the distance measured in meters, the milliamp output and the signal strength as a percentage. will begin to scroll in the Terminal window.
8. If an automatic connection is not created, click the "Laser" icon and select the appropriate USB port and 115200 baud rate.
9. To access the configuration settings menu of the NL-01, press the <SPACE> key on the keyboard:



Menu	Selection	Default	Description
<A> 4 ... 20 mA settings	 4 mA	25.00 m	Enter the distance corresponding to the 4 mA output value.
	<C> 20 mA	0.60 m	Enter the distance corresponding to the 20 mA output value.
	<D> Fail safe current	> 21.0 mA	Enter the failsafe condition of the 4...20 mA range for alarm indications.
	<E> Test	21.50 mA	Output test of the 4 ... 20 mA.
<F> Relay settings	<G> Relay A switch point 1	1.00 m	First distance at which Relay A activates.
	<H> Relay A switch point 2	2.00 m	Second distance at which Relay A activates.
	<I> Relay A mode	near => closed far => open	Select polarity of the relay
	<J> Relay B switch point 1	1.00 m	First distance at which Relay B activates.
	<K> Relay B switch point 2	2.00 m	Second distance at which Relay B activates.
	<L> Relay B mode	near => closed far => open	Select polarity of the relay
<N> System settings	<O> Measuring units	meters	Enter the required measuring units, either meters or feet.
	<P> Zero distance offset	0.00 m	Enter the distance corresponding to the zero datum trim.
	<Q> Lost signal timeout	4.0 sec	Enter the lost signal hold time delay in seconds.
	<R> Smoothing filter	ON	Turns the smoothing filter OFF (raw) or ON (filtered).
	<S> Filling rate filter	OFF	Turns the filling rate filter OFF (fast filling) or ON (slow filing).
	<U> Moving obstacle filter	ON	Turns the moving obstacle filter OFF (raw) or ON (reject obstacles).
	<V> Obstacle filter size	16 results	If the "Moving obstacle filter" is ON, this buffer allows for selection of the number of results used to reject obstacles.

10. Press the appropriate keyboard key to select a menu item, e.g. type <A> for "a: Hide 4-20 mA settings" to show or hide the 4-20 mA settings menu.
11. To restart measurements, press the <SPACE> keyboard key.
12. To save a copy of the current screen data, click the "Save" icon.
13. If you wish to start recording data, click the "Log" icon.
14. To clear the screen of measurement data, click the "Clear" icon.
15. Once you have configured the NL-01, click the "Disconnect" icon and disconnect the USB cable from the unit.
16. Connect the 24 V power supply, the 4 ... 20 mA output, and the relays, as necessary for your application.

2. Connections

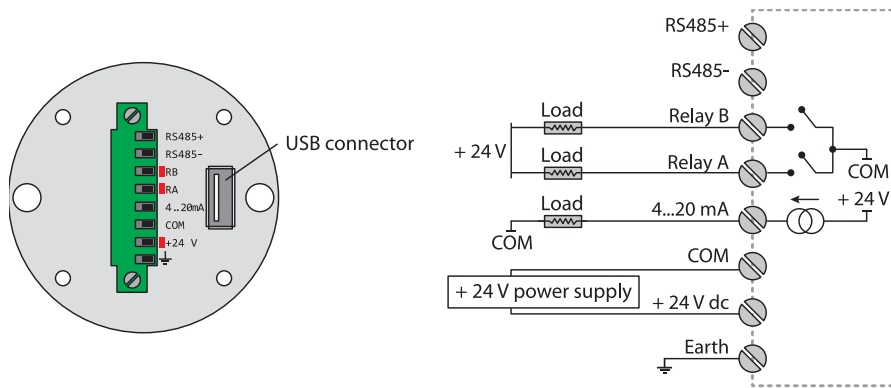


Figure 1 :: Connection diagram

NL-01

3. Instructions for safe use

The NL-01 is a laser rangefinder that emits ionizing laser radiation. The level of the laser emission is Class 1M which indicates that the laser beam is safe to look at with the unaided eye but must not be viewed using binoculars or other optical devices at a distance of less than 15 meters. Notwithstanding the safety rating, avoid looking into the beam and switch the unit off when working in the area.

CAUTION -- The use of optical instruments with this product will increase eye hazard.

The NL-01 should not be disassembled or modified in any way. The laser eye safety rating depends on the mechanical integrity of the optics and electronics so if these are damaged do not continue using the NL-01. There are no user serviceable parts and maintenance or repair must only be carried out by the manufacturer or a qualified service agent.

No regular maintenance is required for the NL-01 but if the lenses start to collect dust then they may be wiped with suitable lens cleaning materials. Make sure that the NL-01 is switched OFF before looking into the lenses.

The NL-01 should be mounted using the four holes provided in the circuit board. Do not hold or clamp the lens tubes as this may cause damage and adversely affect the laser safety rating.

Laser radiation information and labels

Specification	Value / AEL	Notes
Laser wavelength	905 nm	
Pulse width	< 20 ns	
Pulse frequency	< 36 kHz	
Peak power	< 10 W	50 millimeter aperture at 2 meters
Average power	< 0.6 mW	7 millimeter aperture
Average energy per pulse	< 300 nj	
NOHD	15 m	Distance beyond which binoculars with may be used safely

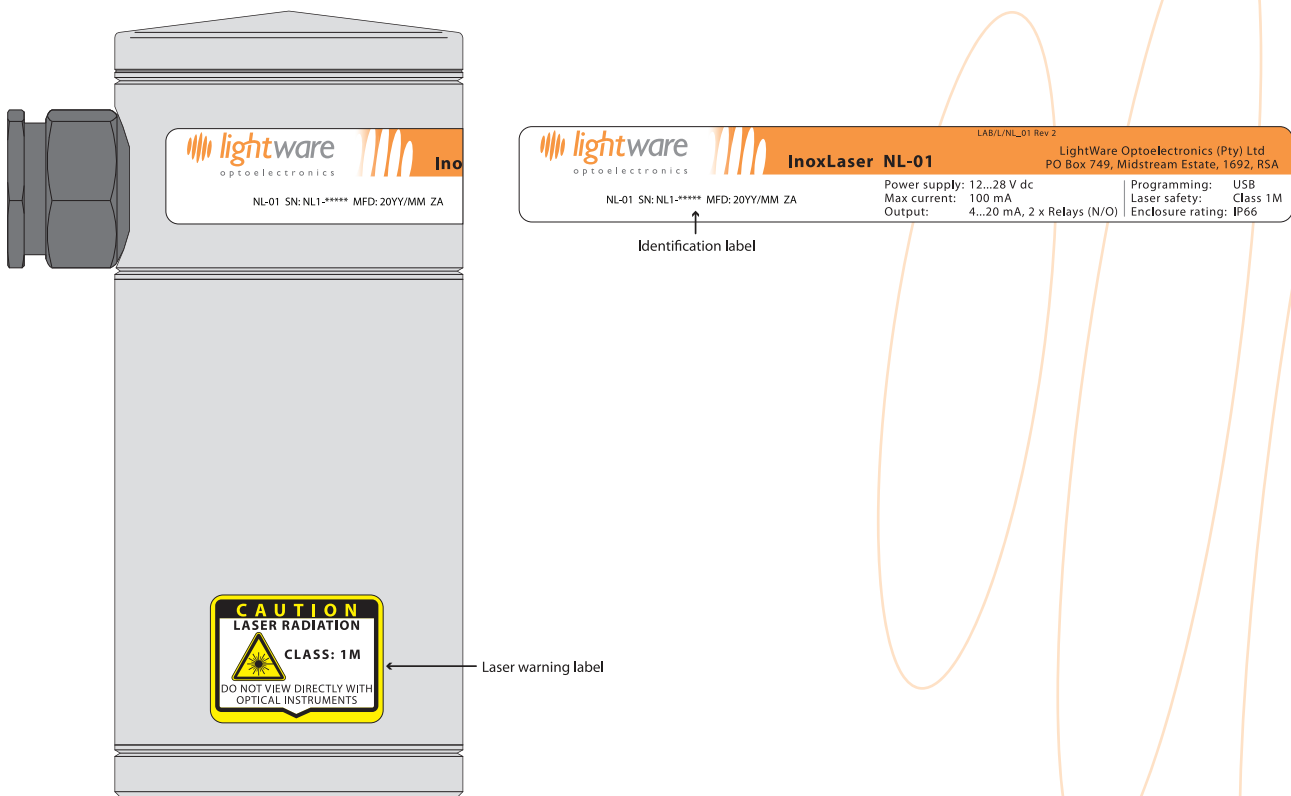


Figure 2 :: Labelling on the NL-01

Appendix A :: Specifications

Performance data	
Sensing range	0.3 ... 50 m (0.98' ... 164')
Resolution	10 mm (0.39")
Accuracy	<0.1% of full range at 20 °C
Update rate	5 readings per second
Technical data	
Power supply	24 V dc nominal (12 ... 28 V dc)
Current consumption	100 mA nominal
Output	
Analog	4 ... 20 mA NAMUR compliant self-powered & non-isolated. 2 x Relays (N/O), 42 V dc at 1.3 A.
Communication	USB at 115200 baud 8-N-1
Mechanical data	
Diameter	NL-01: 63.5 mm (2.36") NL-01/DT: 110 mm (4.33")
Length	NL-01: 144 mm (5.51") NL-01/DT: 200 mm (7.87")
Weight	NL-01: 1.25 kg (2.76 lb) NL-01/DT: 0.83 kg (1.83 lb)
Connection	Flange accessory (NL-01/DT) with 4 Ø 8.5 mm holes on 120 PCD
Housing material	303 Stainless steel Powder coated stainless steel
Optical data	
Optical aperture	60 mm (2.36")
Beam divergence	< 1° to half power points
Lens material	Impact resistant acrylic
Laser safety classification	Class 1M CAUTION: Do not view laser directly with optical instruments
Environmental data	
Operating temperature	-20 °C ... +60 °C
Pressure	Atmospheric
Enclosure rating	IP66

Appendix B :: Dimension drawings

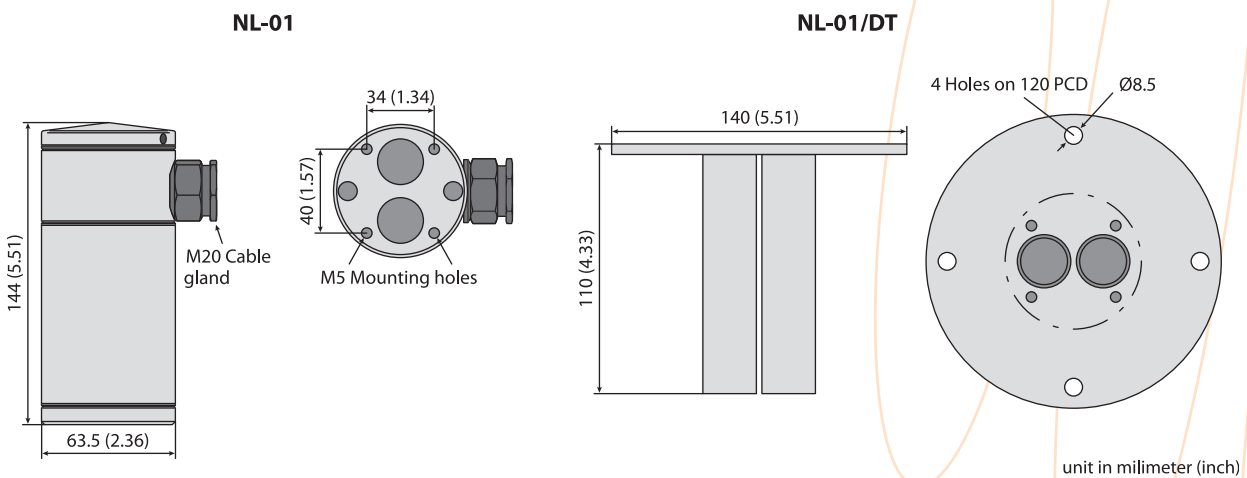


Figure 3 :: Dimension drawings of the NL-01

Revision history

Version	Date	Authors	Comments
Rev 3	2016/06/29	TLP	Update “1. Quick start guide” to reflect updated software menu structure (page 3). Update the “Appendix A :: Specifications” Relay output to “42 V DC at 1.3 A” (page 6). Update “Appendix A :: Specifications” dimensions of the dust tube to “NL-01/DT: 110 mm (4.33”)” (page 6) and related “Figure 3 :: Dimension drawings of the NL-01” (page 6).
Rev 2	2016/03/10	TLP	Update cm units to mm in “Appendix A :: Specifications” (page 6).
Rev 1	2016/02/23	TLP	Increased weight specification of the NL-01 to 1.25 kg (2.76 lb) (page 6). Increased weight specification of the NL-01/DT to 0.83 kg (1.83 lb) (page 6). Increased NL-01/DT length to 20 cm (7.87”) (page 6.)
Rev 0	2016/02/09	TLP	First edition