



NMLC Laser Triangulation Meters



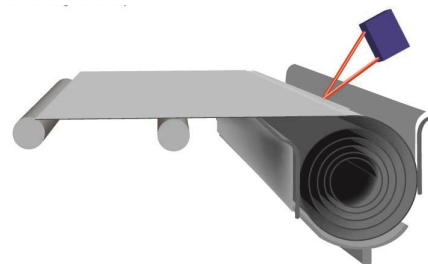
- Laser Triangulation & CCD array technique with digital signal processing
- Non-Contact Measurement of Distance, Displacement, Thickness & Difference
- Works on most surfaces, or materials and molten metal
- High temperature models for targets of 1000°C, 1300°C and at Very high temperature of 1,500°C and up to 2,200°C
- Measurement ranges: 180 - 1150 mm
- Resolution: 0.003 mm to 0.10 mm
- Serial/Digital, Analogue Outputs available with Updating frequency of 2kHz
- Ethernet is a serial Interface Option for Distance Measurement
- Synchronized thickness measurement with two sensors measuring at 1kHz frequency each
- Secondary Environmental Enclosure are available
- Air Purged, Air Cooled and Water Cooled with Air Purging

Performance

| Model | Short Stand Off | | | | | Long Stand off | | | | |
|--|----------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | NMLC-205 | NMLC-230 | NMLC-280 | NMLC-330 | NMLC-445 | NMLC-455 | NMLC-510 | NMLC-550 | NMLC-650 | NMLC-775 |
| Center distance | 205mm | 230mm | 280mm | 330mm | 450mm | 450mm | 500mm | 550mm | 650mm | 775mm |
| Measured range | 180-230mm | 180-280mm | 180 - 380mm | 180 - 480mm | 200 - 700mm | 400 - 500mm | 400 - 600mm | 400 - 700mm | 400 - 900mm | 400 - 1150mm |
| Resolution Minimum Range Maximum Range | 0.003 mm 0.006 mm | 0.01 mm 0.01 mm | 0.01 mm 0.02 mm | 0.01 mm 0.03 mm | 0.01 mm 0.07 mm | 0.01 mm 0.02 mm | 0.01 mm 0.02 mm | 0.01 mm 0.03 mm | 0.01 mm 0.04 mm | 0.01 mm 0.10 mm |
| Linearity (of Full Scale) | ±0.015mm | ±0.02mm | ±0.03mm | ±0.06mm | ±0.20mm | ±0.04mm | ±0.06mm | ±0.08mm | ±0.10mm | ±0.30mm |
| Laser Spot Size | Ø 0.5 mm | Ø 0.6 mm | Ø 0.7 mm | Ø 0.8 mm | Ø 0.5 mm | Ø 0.6 mm | Ø 0.7 mm | Ø 1.0 mm | Ø 1.5 mm | Ø 2.0 mm |

Typical Applications

- Distance Measurement
- Thickness Measurement
- Weight/Volume Control
- Constant Tension Control
- Roll Diameter
- Profile Measurement
- Molten Metal Level Control
- Width Measurement
- Vibration Monitoring of a Rotating object
- Quality Control and Statistics
- For feedback on Production Lines



General Description

These Laser Triangulation Meters are compact units with integrated optics and signal processor for precise measurement of distance or product thickness and width. A focused laser spot is illuminated on the object and the image distance determined by internal CCD Camera. LED's indicate when the object is at the center or outside of the measuring range. Installation Windows based software is provided for connection to a PC and to display measured values. Measurement of data is via RS232 or RS422 Serial Interface with two optional analog outputs. Ethernet output is available.

Various Models are available with varying measuring speeds and serial output update frequencies of up to 10,000 measurements per second. All Models have programming functionality. One useful feature is Group Mode as in this mode a running average is calculated over a user specified number of measuring points and the user can program the meter to disregard the quantity of any zero measurement results (if any), before calculating the average value. The average values are calculated at full measuring frequency and also used for converting to provide the analogue signal.

When two similar LTM's connected together they automatically provide change in thickness, width or difference values. The standard Model operates at a 2kHz measuring & update frequency with a serial interface baud rate of 38400. Optional Models available operating at 5kHz or 10kHz update measuring frequency where averaging filter not activated with serial interface baud rates of 38400 or 115200. The S5 model operate at a 5kHz measuring frequency with a 2kHz or 5 kHz update frequency and has a serial interface baud rate of 38400, 115200 or 230400. The baud rate of 230400 requires option R4 with RS422 serial interface.

These Laser Triangulation Meters have a broad range of usage for measurement off surfaces where other devices fail. Ideal for measuring off wood, plastic, rubber, paper, foam, textiles, food product, cold, hot or metal as well as molten metal. For molten metal level monitoring, according to the metal, the more powerful models listed overleaf are required.

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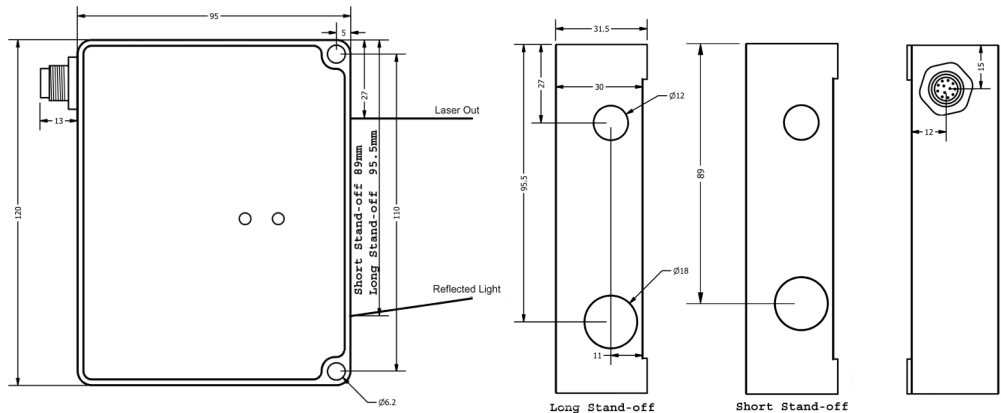


NMLC Laser Triangulation Meters

Dimensions

Housing: Steel/Aluminum/Glass
Housing Rating: IEC IP65
Weight w/o Cable: 0.5 Kg
Cable Length: 2.5 M

Dimensions: 120 x 95.5 x 31.5mm



General Specifications

| | | | |
|-----------------------------|--|---------------------------|---|
| Serial Output | RS232 Standard | Supply Voltage | 24VDC $\pm 10\%$ |
| Serial Output | RS422 (optional) | Power Consumption | 4.5 Watt |
| Digital Output | Digital output 1/10 values of full range | Humidity | Max 90% RH (non condensing) |
| Analog Output ²⁾ | 1-9VDC & 4-20mA ²⁾ | Operating Temperature | 0°C (32°F) to +45°C (113°F) |
| Measuring Frequency | 2000 Hz | Storage Temperature | -20°C (-4°F) to +70°C (158°F) |
| Temperature Deviation | $\pm 0.03\%$ of F.S./°C | Product Temp. Limit | Maximum 2,200°C (3,992°F) |
| Light Source | Visible 655/670 nm Laser | Laser Class ⁴⁾ | Class II, IEC 2 Class 3R and 3B Options |

1) Analog Output is pre-set at the factory and can be configured, at an additional cost, to suit specific requirements. Analog output frequency is always at 2 kHz frequency.

2) Laser class 3R may be needed with HT/VHT versions.

3) Laser Class 3B needed with VVHT Versions

We reserve the right to alter specifications without prior notice. Specifications without tolerances are typical values.

Option AN : Provided with 4 – 20mA analogue output in place of the standard 0-9 VDC output

Option EN : Provided with Ethernet interface in place of the standard RS232 serial interface. Note: Cannot be connected as a pair for Master/Slave synchronized measurement.

Option R4: LTM with a RS422 serial interface in place of the standard RS232 serial interface

Option HT and VHT: For Product upto 1000°C or 1300°C
 HT Model option designed for target surface temperatures upto 1000°C. VHT Model Option designed for target surface temperatures upto 1300°C with Class 3R Laser. The HT/VHT option can also be required when there is a high risk of external bright light as is the case with bright sunlight, both direct and reflected. Operates via safe Class 2 Red Laser beam.

Option VVHT: For Product at 1500°C upto 2200°C

This Model option is designed for target surface temperatures upto 2200°C. Sensors that are supplied with this option are specifically designed for measurement of molten metals that are greater than 1500°C and upto temperatures of 2200°C. For these higher temperature surfaces the LTMs utilise Class 3B Blue Laser.

Secondary Enclosures

The maximum ambient temperature for all Models is 45°C. Optional water or air cooled secondary environmental enclosures with air wipe/purging are available to keep them below this temperature as well as to keep the viewing glass or field of view clear of contamination.

Thickness Measurement

All LTM's when connected to an identical model will automatically transform into the Master or the Slave of a synchronized Thickness Measurement System.

The Master LTM reads the digital distance data sent from the Slave LTM over the RS232 serial interface, and after taking its own distance information into account, will output the calculated change in thickness to the serial interface as well as to the analogue output.

Thus two LTM's will measure thickness, width or difference without an additional processing or calibration from the factory. This is a unique characteristic of these Laser Triangulation Meters.

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