



MLS LASER TRIANGULATION METERS



- **Laser Triangulation & CCD technique with digital signal processing.**
- **Non-Contact Measurement of Distance, Displacement, Thickness**
- **Work on most surfaces, materials or liquids.**
- **High temperature Models for targets of 1200°C or 1500°C**
- **Measurement ranges: 400 to 4000 mm. (1 6 " - 1 5 7 ")**
- **Resolution: 0.01 mm to 0.5 mm according to model.**
- **Measurement frequency of 1000 Hz, 2000Hz, 5000Hz or 10,000Hz**
- **Robust solid machined aluminum housing Design**
- **Serial , Analog and Ethernet Outputs available**
- **Synchronized thickness measurement with two sensors.**
- **Secondary Environmental Enclosure are available including Air Purged, Air Cooled and Water Cooled with Air Purging.**

Performance

Model	MLS500	MLS505	MLS700	MLS925	MLS1100	MLS1150	MLS1400	MLS1950	MLS3000
Measured range (mm)	400 - 600	450 - 550	600 - 800	600 - 1250	1000 - 1200	700 - 1600	700 - 2100	1500 - 2400	2000 - 4000
Center distance (mm)	500	500	700	925	1100	1150	1400	1950	3000
Resolution	<0.05 mm	0.01 mm	<0.05 mm	<0.1 mm	<0.05 mm	0.1 mm	<0.3 mm	0.2 mm	<0.5 mm
Reproducibility	±0.05mm	±0.01mm	±0.05mm	±0.1mm	±0.05mm	±0.1mm	±0.3mm	±0.2mm	±0.5mm
Linearity (of Full Scale)	±0.1mm	±0.05mm	±0.01mm	±0.3mm	±0.1mm	±0.4mm	±0.7mm	±0.5mm	±1.0mm
Laser Spot Size	Ø 2 mm	Ø 1 mm	Ø 2 mm	Ø 4 mm	Ø 3 mm	Ø 4 mm	Ø 5 mm	Ø 5 mm	Ø 5 mm

Typical Applications

- **Liquid Level Control**
- **Distance Measurement**
- **Thickness Measurement**
- **Weight/Volume Control**
- **Constant Tension Control**
- **Roll Diameter**
- **Profile Measurement**
- **Control of Vacuum in Containers**
- **Control of Surface Treatments**
- **Molten Metal Level**
- **Vibration Monitoring of a Rotating Object**
- **Measurements for Quality Control and Statistics**
- **Measurements for feedback in Production Lines**

General Description

The MLS Laser Triangulation Meter (LTM) is a compact unit 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 array. LED's indicate when the object is at the center or outside of the measuring range. Installation Windows software is provided for connection to a PC and to display measured values. Measurement of data is via RS232 or RS422 Serial Interface with analog output. Ethernet output is available.

The MLS Models are available with various measuring speeds and serial output update frequencies of up to 10,000 measurements per second. All MLS models have programming/select functionality. One useful feature is Group Mode as in this mode a running average is calculated over a user specified number of measuring points. 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 the analog signal.

When two similar LTM's are connected together they automatically provide change in thickness, width or difference values. The Standard MLS Models operate at a 1kHz measuring & update frequency and have a serial interface baud rate of 38400. The optional Models available operate at a 2kHz, 5kHz or 10kHz measuring frequency with 1kHz, 2kHz, 5kHz or 10kHz update frequency and serial interface baud rates of 38400, 115200 or 230400. The baud rate of 230400 requires R4 option RS422/RS485 serial Interface.

The MLS laser triangulation meters have a broad range of usage for measurement off surfaces where other devices fail. Ideal for measuring off wood, plastic, glass, rubber, paper, foam, textiles, food product, cold, hot or molten metals as well as various liquids. For molten metal level monitoring, according to the melted metal the more powerful AM, HM or MM Models are required.

MODULOC[®] Technology - Lasers for Precise Product Measurement

MODULOC[®] Control Systems Ltd.

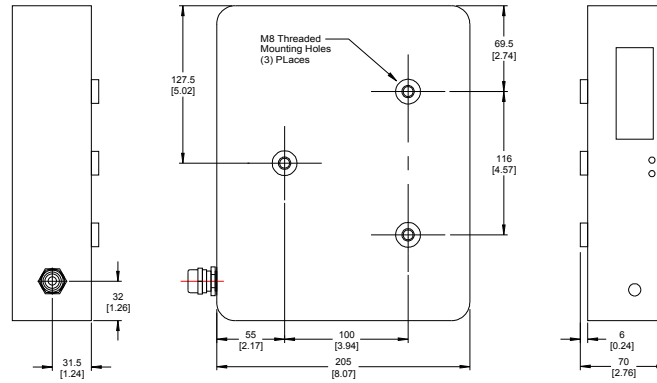
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Dimensions

Housing: Solid machined aluminum
Housing Rating: IEC IP65
Weight w/o Cable: 4.5 Kg (8.8lbs)
Cable Length: 2.5 M



General Specifications

Serial Output	RS232 Standard - up to 38400 baud	Supply Voltage	24VDC ±10%
Serial Output	RS422/485 (optional) up to 2300400 baud	Power Consumption	4.5 Watt Max.
Digital Output	Digital output 1/10 values of full range	Humidity	Max 90% RH (non condensing)
Analog Output	1-9VDC/4-20mA ¹⁾	Operating Temperature	0°C to +45°C (32°F to 113°F)
Measuring Frequency	1000 Hz (2000 Hz, 5000 Hz & 10,000Hz Options)	Storage Temperature	-20°C to +70°C (-4°F to 158°F)
Temperature Deviation	±0.03% of F.S./°C	Product Temp. Limit	Standard 450°C (842°F) MM & -HM Models Higher
Light Source	Visible 655/670 nm Laser	Laser Class ²⁾	Class II, IEC2 ²⁾

- 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 the same as the measuring frequency.
 2) =Laser Class IIIR (3R) is supplied with combination of options HM & S2. Laser Class IIIB (3B) is supplied with combination of options HM & S5, and all VHM versions.

Option S2: Increased performance compared to standard model as operates at 2kHz measuring frequency with 1 kHz or 2 kHz update. Frequency and has a serial interface baud rate of 38400 or 115200.

Options S5 & S10: Increased measuring performance operating at 5kHz or 10 Hz measuring frequency with 1 kHz, 2½kHz, 5 kHz or 10kHz update frequency. Serial interface baud rates of 38400,115200 or 2300400. The baud rate of 230400 requires option R4 with RS422/RS485 serial interface.

Option R4: Provides a RS422/RS485 serial interface in place of the standard RS232 serial interface.

Option AM: Molten Aluminum

The AM option is specifically designed for measuring off molten aluminum as a target.. Typically used in Cast Houses for this purpose. They operate via safe Class II red Laser beam.

Option: - HM High Temperature 1200°C (2190°F)

The HM option is designed for target surfaces of up to 1200°C such as hot rolled steel and glass. The HM option an also be required when there is a high risk of harmful false light as is the case with bright sunlight, both direct and reflected. They operate via safe Class II red Laser beam.

Option MM: High Temperature surfaces of 1500°C (2730°F)

The MM option is designed for target surfaces of up to 1500°C Sensors that are supplied with this option are specifically designed for measurement of molten metals that are greater than 1200°C and up to temperatures of 1500°C. For these higher temperature surfaces the LTM's would utilize Class IIIB Laser in Red or blue.

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.

Update Rates

All the AM, HM or MM Models can be supplied in either 1kHz, 2kHz, 5kHz or 10kHz versions. The laser class changes to a IIIR when the HM or LHM option is supplied with the 2kHz or faster options. It should be noted that the laser Class changes to a IIIB when these options are supplied with the 5kHz or faster option.

Thickness Measurement

All MLS LTM's when connected to an identical³⁾ MLS 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 analog output.

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

³⁾ = MLS500, MLS700 & MLS1100 have the unique capability of connecting to any other MLS model to form a Master - Slave Thickness Measuring System.

MODULOC[®] Technology - The Total Laser Solution

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Your Local Sales Representative:

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



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