LM Series



Compact Precision Laser Measurement Sensor

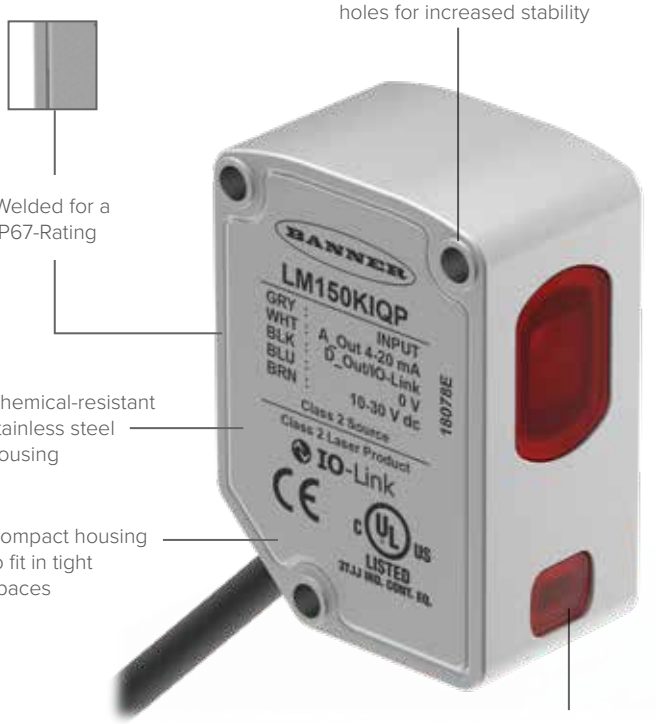
- Superior precision for real world applications
- Best in class thermal & mechanical stability
- Small housing design for the tightest spaces
- High response speed for fast moving targets
- Simplified set up, control and replacement with optional Remote Sensor Display (RSD)
- Supports Industry 4.0/IIoT with IO-Link®, discrete, and analog outputs in one model

BANNER®
more sensors, more solutions

ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

Precise Measurement. Problem Solver.

Durable sensor provides reliable measurements even in the most challenging applications





Three bright LED indicators provide ongoing indication of the status

Analog Output LED Indicator

Power LED Indicator

Discrete Output LED Indicator



High resolution distance measurements with RS-232 digital export via INT (see page 8 for more details)

IO-Link®

Program via IO Link, remote input wire or RSD (see page 7 for more info on RSD)



Challenging Targets



Shiny or Metal

Automatic gain adjustment reduces power for high reflectivity targets



Dark Surface

Automatic gain adjustment increases power for low reflectivity targets



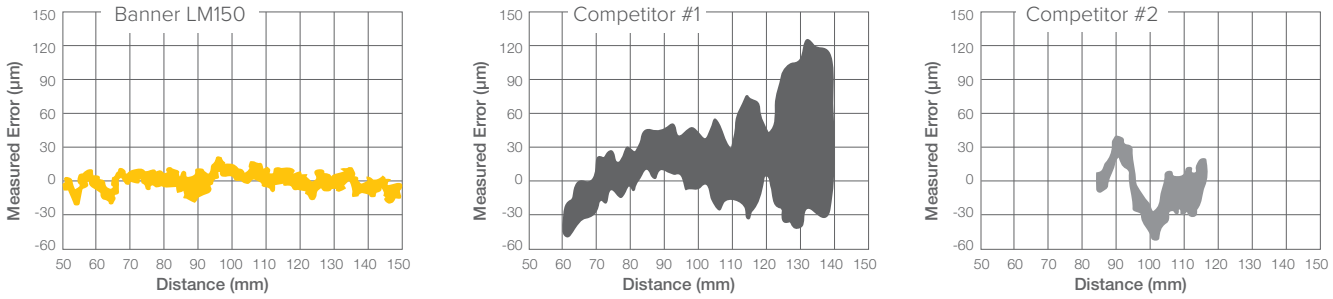
Multicolored

Small beam spot minimizes measurment variation across color transitions

Precision Measurement Regardless of Target or Environment

Linearity

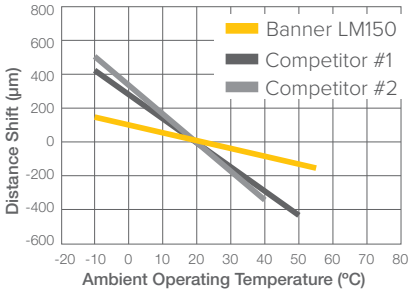
Linearity is the maximum deviation between an ideal straight line measurement and the actual measurement. The more linear a sensor is the more consistent and precise the sensing results. NOTE: Results shown in charts are based on LM150. Better performance will be acheived with the LM80.



Example linearity on 90% white card

Temperature Effect

A sensor with minimal temperature effect is critical for precise sensing applications since the induced error from just a few degrees of temperature shift can greatly impact sensors results.

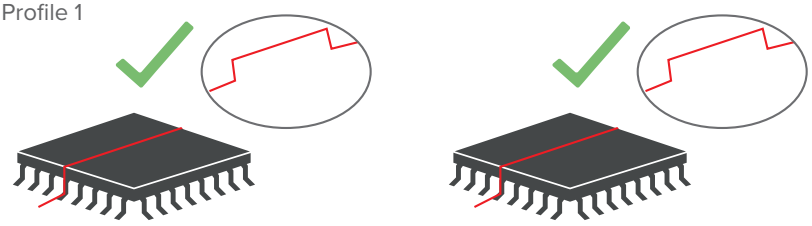


Example temperature effect at max range

Spot Size

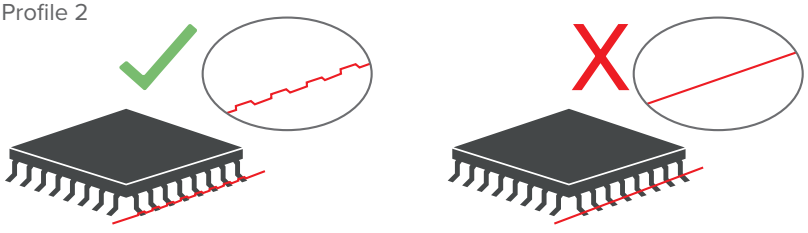
Small spot plus algorithems allows the Banner LM sensor to measure objects smaller than the spot size providing a more accurate profile of an object.

Profile 1

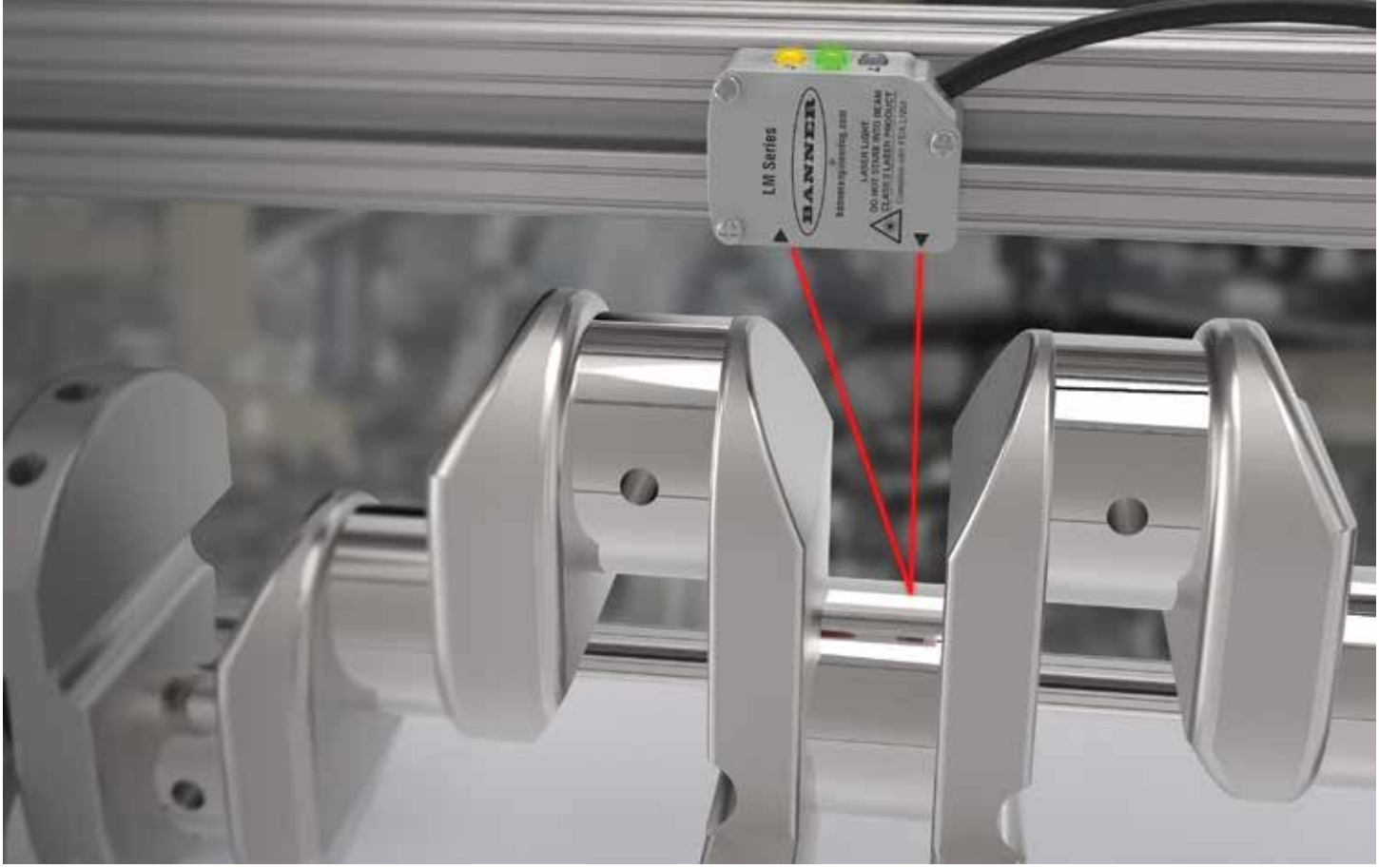


Banner LM | Competitor

Profile 2



Banner LM | Competitor



Crankshaft Runout Measurement

Crankshaft runout is measured to make sure it is within the manufacturer's tolerance. If the crankshaft is out of tolerance, it can lead to mechanical failures and damage to the engine.

Challenge

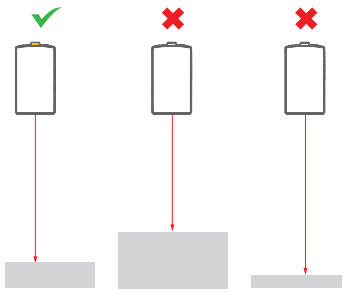
A crankshaft can be a challenging target for any optical sensor, because the shiny metal generates specular reflections while oil residue can present a much darker target. In production environments, crankshafts are often rotated quickly to minimize the time spent on inspection and increase throughput.

Key Features

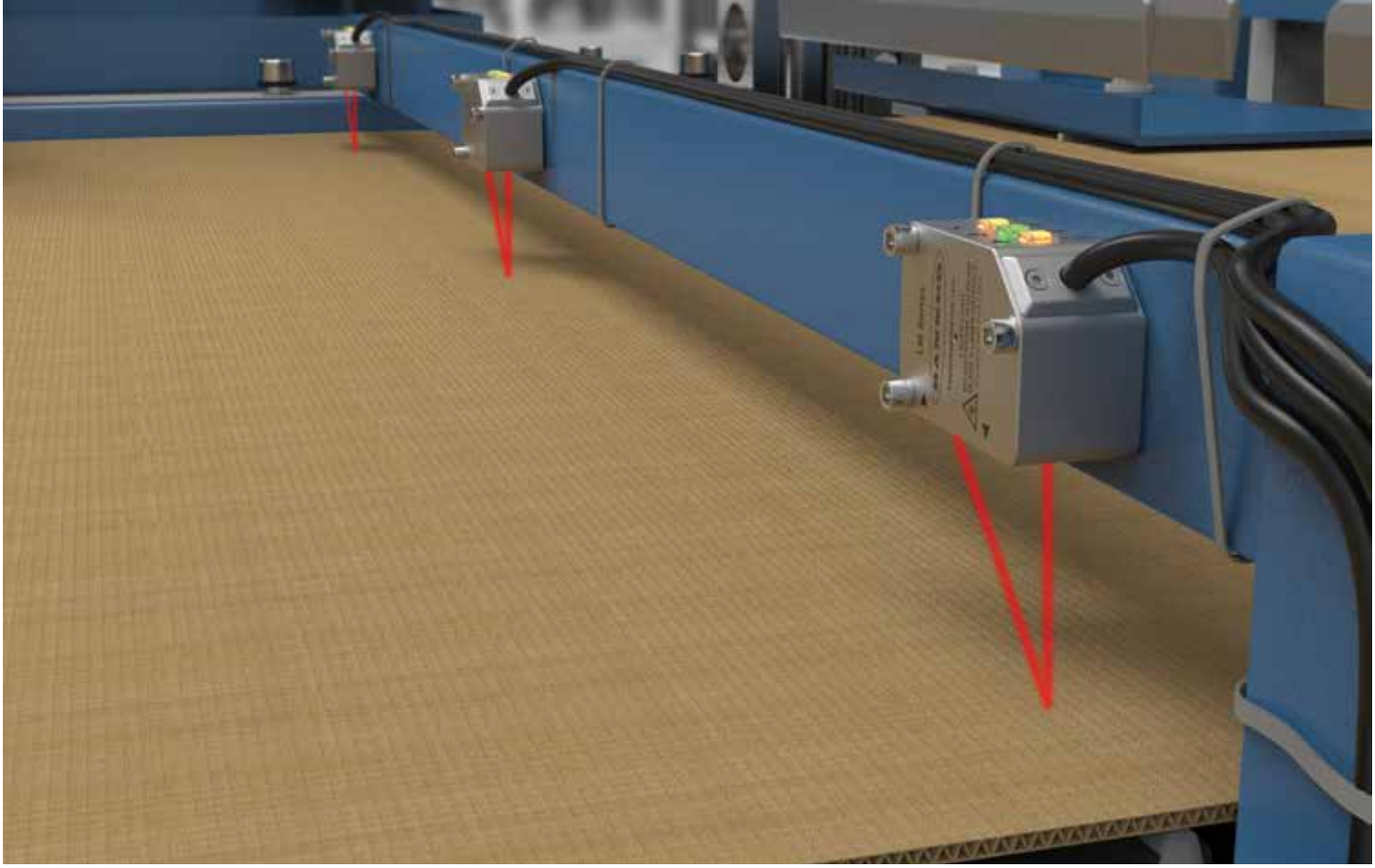
The LM150 has been designed with dynamic power adjustment for precision measurement across shiny and dark targets providing less measurement variation and a more reliable inspection. The LM150 is capable of a 4khz measurement rate, a best in class measuring speed, for more precise tracking of geometry changes and more robust inspections.

Key Benefits

The accuracy of the LM150 sensor can assure parts meet tight tolerances with fewer missed defects and false failures. High measurement speeds allow the LM150 to better identify a problem on fast moving parts while reducing time required for inspections.



Precise measurement regardless of reflectivity of target



Material Thickness

Many times, product quality is verified at the end of the line. Material that is too thin or too thick must be scrapped. When running long rolls of product, it is preferable to continuously monitor the cardboard sheeting thickness, preventing large quantities of product from being out of specification and reduces scrapped material.

Challenge

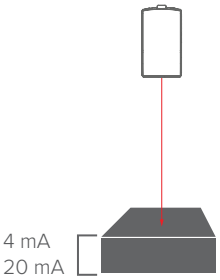
Cardboard material is run in wide sheets and the thickness can vary from side to side and as well as along the entire length. The temperature in the plant can fluctuate several degrees throughout the day, introducing measurement error in most sensors.

Key Features

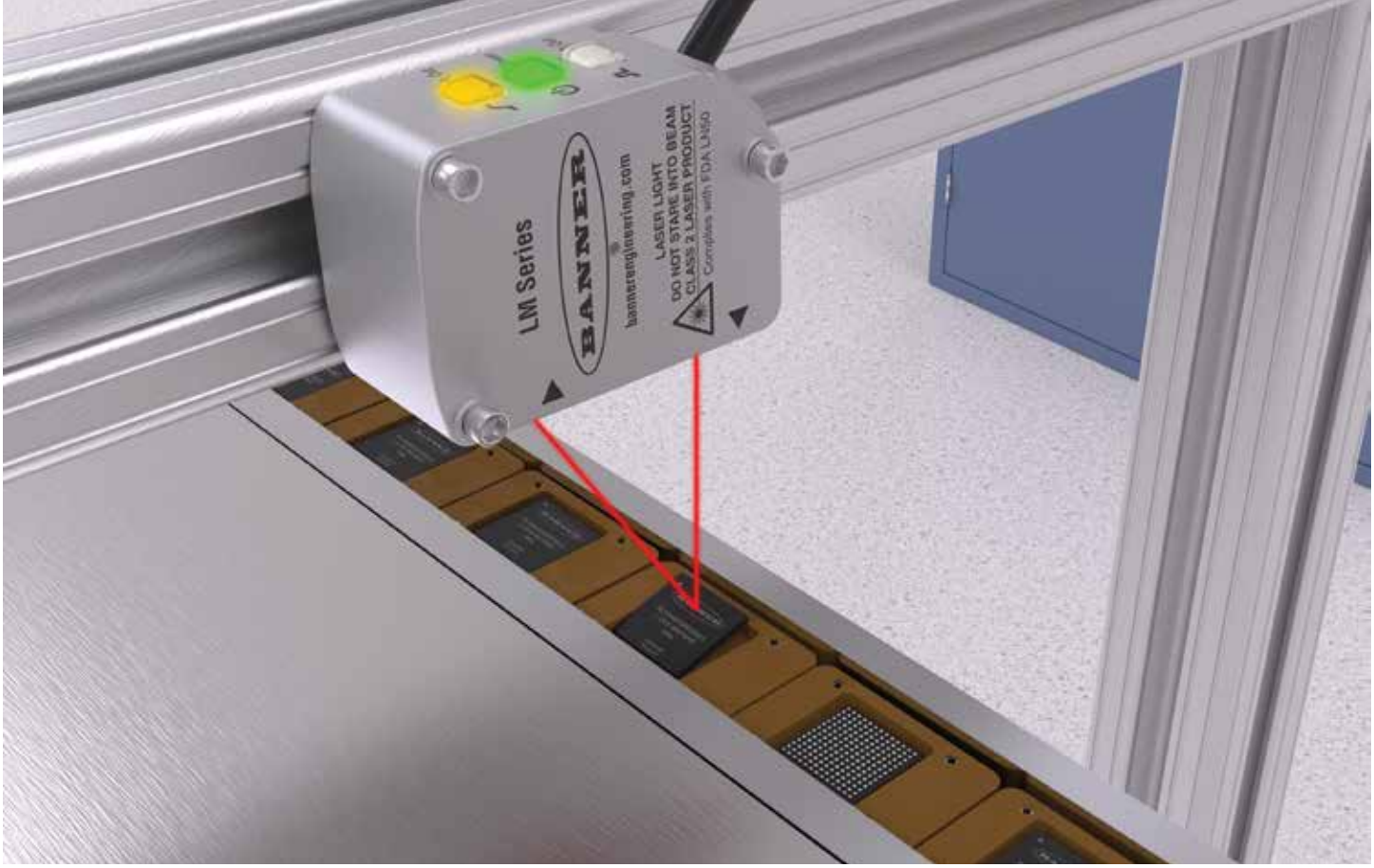
Three LM150s placed across the span of material monitor real-time changes in material thickness. The 0.004 mm resolution can detect very small changes in thickness. The extremely linear output of the LM150 is imperative when measuring long rolls of product. The LM150's stainless steel design makes it more stable across temperature changes in this environment.

Key Benefits

The thermal stability and precision of the LM150 help detect very small measurement changes in real-time and signal the PLC to speed up or slow down the process, reducing waste.



Extremely linear analog output for precise measurement over a large span of material



Correct Orientation/Alignment

In semiconductor manufacturing, integrated circuit chips are tested one at a time for functionality and performance. The IC chips are placed in a tray, or nest, to be delivered to the test station. The chips must be completely seated and right side up in the nests for presentation to the testing cell otherwise the test process cannot be completed properly.

Challenge

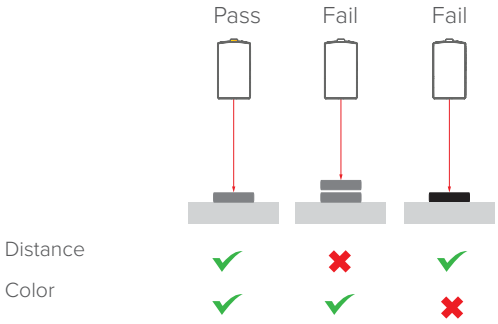
IC chips can be slightly tilted in the nests – which creates a small distance change that is difficult to detect. They can also be seated in the nests, but placed upside down. Test stations have space limitations and do not have room for large vision systems or sensors.

Key Features

Resolution of the LM80 is able to detect 0.002 mm of height variation, even on black targets. With the small spot(0.37 x 0.21 mm at 80 mm), the LM80 is able to take more measurements across the IC chip and provide more reliable measurements to detect slight tilt variations. The LM's Dual Teach mode, which measures distance and intensity, makes it able to distinguish contrast differences.

Key Benefits

The LM's precision allows it to catch if the chips are not seated completely in the nest, while the Dual Teach Mode can verify that the chip is right side up, providing a more reliable inspection and limiting false failures. The compact size of the LM80 is easy to integrate into the test fixture.



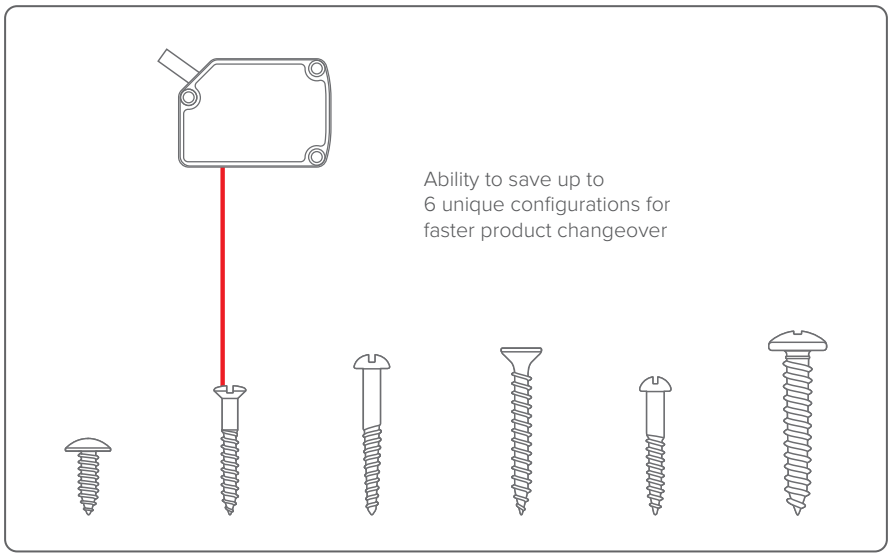
Inspections use distance to verify parts presence and position, and intensity to verify correct color or part orientation

RSD – Remote Sensor Display

The RSD remote display is designed to provide easy sensor configuration and monitoring. It can be used for initial setup by equipment manufacturers with the ability to copy settings across many sensors.

- Allows for configuration of remote sensor heads
- Easy to set up and use with a 2-line, 8-character display
- Display live distance measurement for remote monitoring
- Ability to save up to 6 unique configurations
- Not required for continuous operation of configured sensor(s)





LM Series Sensor

Series	Range (mm)	Output	Connector	
LM	**150**	**KI**	**QP**	**-X232**
	150 = 50–150 **80** = 40–80	**KI** = Discrete with IO-Link and 4 to 20 mA analog **KU** = Discrete with IO-Link and 0-10 V analog **IRSD** = 4-20 mA analog and communications	**QP** = PVC M12 Euro Pigtail QD	**-X232** = RS-232 Serial Communication*



* RS-232 Communication Cable INT-BBB-X232Q5 required for Serial Communication

Specifications

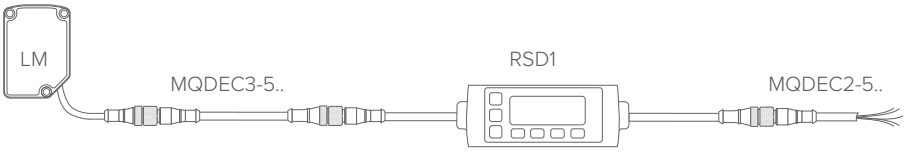


Resolution (mm)	LM150: 0.004 LM80: 0.002
Linearity (mm)	LM150: 50 to 120: ± 0.06 120 to 150: ± 0.07 LM80: 40 to 70: ± 0.02 70 to 80: ± 0.03
Spot Size (mm)	LM150: 0.77 x 0.31 LM80: 0.37 x 0.21
Response Speed	As fast as 0.5 ms depending on base measurement and averaging settings
Operating Conditions	-10 to +55 °C (+14 to +131 °F)
Environmental Rating	IP67
Construction	Housing: 316L stainless steel Window: PMMA acrylic
Temperature Effect	LM150: +/- 0.008 mm/°C LM80: +/- 0.006 mm/°C
Laser Classification	LM150: Class 2 LM80: Class 1
Certifications	c UL us CE IO-Link®

Accessories



SMBLML1 **SMBLML2**





Double-Ended
M12 with Shield
(Male/Female)

5-pin

MQDEC3-503SS
0.91 m (3')
MQDEC3-506SS
2 m (6.5')
MQDEC3-515SS
5 m (15')
MQDEC3-530SS
9 m (30')



M12 with Shield
Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDEC2-506RA**)

5-pin

MQDEC2-506
2 m (6.5')
MQDEC2-515
5 m (15')
MQDEC2-530
9 m (30')
MQDEC2-550
15 m (50')

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