

**LaserSpeed<sup>®</sup>**

Non-Contact  
Speed & Length Gauge



**BETA LaserMike**

## Non-Contact Speed & Length Gauge

A breakthrough in electro-optics design enables Beta LaserMike's LaserSpeed® Series gauges to produce highly accurate, non-contact speed and length measurements at a surprisingly low cost. To accomplish this, LaserSpeed gauges use Beta LaserMike's AI TraQ® signal processing engine, the most advanced, digital signal processing algorithm, coupled with new single-chip integrated circuit technology.

LaserSpeed gauges have no moving parts, use 100% solid-state digital technology, and are permanently calibrated—resulting in significant time and money savings. With accuracy up to  $\pm 0.02\%$ , LaserSpeed gauges are ideal replacements for contact encoders which are prone to measurement errors caused by slippage, dirt build-up, and day-to-day wear problems.



Smart, compact design provides  
**High Accuracy**  
at an affordable price

### Benefits

- High accuracy and repeatability ( $\pm 0.02\%$  to  $\pm 0.05\%$ )
- Permanently calibrated
- Direct replacement for encoders
- Non-contact length and speed measurement
  - No slippage
  - Non-marking
  - Unaffected by material surface or color
- No moving parts to wear out
- Low cost of ownership
- Compact, rugged industrial sensor operates on +24VDC
- "Smart" gauge—optics, electronics and I/O in the gauge

### Range of Applications

LaserSpeed gauges are well suited for a range of applications, including, but not limited to, measuring length and speed of:

- Paper and corrugated products
- Web products
- Non-woven products
- Plastic films and tapes
- Building materials
- Packaging
- Carpet
- Labeling
- Wire and cable
- Pipe and tube



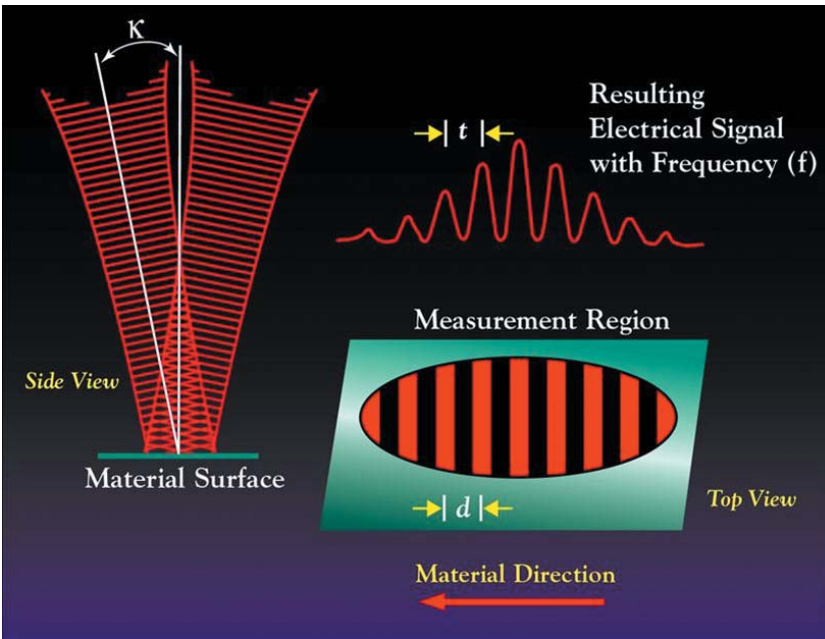
**LaserSpeed®**

## Contact Encoders vs. LaserSpeed

Contact encoders are typically used in manufacturing applications for length and speed measurement. However, there are a variety of problems with the use of contact length measurement that can be avoided by replacing encoders with LaserSpeed:

Normal Tachometer Problem:	LaserSpeed Solution:
<b>1.</b> Measurement errors and inaccuracy caused by: product slippage, dirt build-up, day-to-day wear problems	Non-contact measurement ensures high accuracy and repeatability
<b>2.</b> High cost of ownership due to the need to regularly replace parts and recalibrate	Use of 100% solid-state digital technology with no moving parts ensures permanent calibration and low cost of ownership
<b>3.</b> Contact measurement can mark or damage the product	Non-contact measurement ensures no marking or damage of the product

## Laser Doppler Velocimetry Principle



LaserSpeed uses dual-beam laser interferometer technology to measure product velocity (speed), which is integrated over time to measure length.

## Accessories

 <p><b>Airwipe and Quick-Change Window</b> Designed for a dirtier environment, the airwipe and quick change window help to ensure minimal downtime for cleaning.</p>	 <p><b>Environmental Housing</b> Provides heavy-duty, double-sealed protection against hot and humid environments.</p>
 <p><b>Zero-Speed/Directional Wheel</b> Provides input to the LaserSpeed for handling a stopped or reversing line. (LS4000 only)</p>	 <p><b>Accessory Case</b> A convenient case to hold the LaserSpeed and all accessories safe and secure.</p>
 <p><b>Breakout Box/Power Supply</b> Provides easy access to all gauge inputs and outputs. Also provides power to the LaserSpeed.</p>	

	<b>-301</b> (LS4000 only)	<b>-303</b>	<b>-306</b>	<b>-310</b>
<b>Standoff Distance</b>	100 mm (4 in.)	300 mm (12 in.)	600 mm (24 in.)	1000 mm (39.4 in.)
<b>Speed Range: LS4000/LS8000</b>	0.2 to 1700 m/min (0.7 to 5500 ft/min)	0.4 to 4000 m/min (1.3 to 13100 ft/min)	0.8 to 8000 m/min (2.6 to 26200 ft/min)	1.0 to 12000 m/min (3.2 to 39400 ft/min)
<b>Speed Range: LS9000</b>	-1700 to 1700 m/min (-5500 to 5500 ft/min)	-4000 to 4000 m/min (-13100 to 13100 ft/min)	-8000 to 8000 m/min (-26200 to 26200 ft/min)	-12000 to 12000 m/min (-39400 to 39400 ft/min)
<b>Measurement Depth of Field</b>	15 mm (0.6 in.)	35 mm (1.4 in.)	50 mm (2 in.)	75 mm (3.0 in.)

	<b>LS4000-3 (Uni-directional)</b>	<b>LS8000-3 (Discrete Parts)</b>	<b>LS9000-3 (Zero Speed &amp; Bi-directional)</b>
<b>Measurement Rate</b>	20000/s	50,000/s	100,000/s
<b>Starting/ Ending Length Correction</b>	- No	- Yes	- Yes
<b>Serial I/O Data Available</b>	- RS-232 - Speed, Length - Quality Factor, Status	- RS-232/RS-422 - Speed, Length - Quality Factor, Status	- RS-232 / RS-422 - Speed, Length - Quality Factor, Status
<b>Baud Rate</b>	- 115K, 230K, 19.2K, 38.4K, 57.6K 9.6K, 4.8K	- 115K, 230K, 19.2K, 38.4K, 57.6K 9.6K, 4.8K	- 115K, 230K, 19.2K, 38.4K, 57.6K 9.6K, 4.8K
<b>Status via Serial I/O or Optional Ethernet</b>	- Laser at Temperature - Laser On - Shutter Open - Gauge Temperature	- Laser at Temperature - Laser Interlock - Shutter Position - Valid Measurements - Material Present - System Ready	- Laser at Temperature - Laser Interlock - Shutter Position - Valid Measurements - Material Present - System Ready
<b>Quadrature Pulse Output 1</b>	- Opto isolated - Scaleable pulse amplitude (5-24V) - Fixed at 1000 pulses/unit - 250 KHz max pulse rate	- Opto isolated - Scaleable pulse amplitude (5-24V) - Selectable pulses/unit - 250 KHz max pulse rate	- Opto isolated - Scaleable pulse amplitude (5-24V) - Selectable pulses/unit - 250 KHz max pulse rate
<b>Output 2</b>	- Scaleable pulse amplitude (5-24V) - Selectable pulses/unit - 250 KHz max pulse rate	- RS-422 Drivers - Selectable pulses/unit - 5 MHz max pulse rate	- RS-422 Drivers - Selectable pulses/unit - 5 MHz max pulse rate
<b>Index pulse output</b>	- Yes/programmable	- Yes/programmable	- Yes/programmable
<b>Gauge Power</b>	- 24VDC (+/-4 VDC) @ 1 Amp - 50 mV ripple max	- 24VDC (+/-4 VDC) @ 1.5 Amp - 50 mV ripple max	- 24VDC (+/-4 VDC) @ 2.0 Amp - 50 mV ripple max
<b>Gauge Size</b>	203 x 159 x 81mm (8.0 x 6.3 x 3.2in.)	203 x 159 x 81mm (8.0 x 6.3 x 3.2in.)	203 x 159 x 95.2mm (8.0 x 6.3 x 3.75in.)
<b>Gauge Weight</b>	2.55 kg (5.6 lbs)	3.13 kg (6.9 lbs)	3.4 kg (7.5 lbs)
<b>Temperature Range</b>	-5 to 45°C (21 to 113°F)	-5 to 45°C (21 to 113°F)	-5 to 45°C (21 to 113°F)
<b>Output Rate</b>	2 to 32 ms in 2 ms increments	1 to 2000 ms in 1 ms increments	1 to 2000 ms in 1 ms increments
<b>Spot Size</b>	- 3 x 5 mm - 1.75 x 5 mm L Version	- 3 x 5 mm (-310: 3 x 7) - 1.75 x 5 mm L Version	- 3 x 5 mm (-310: 3 x 7)

### All LaserSpeed Gauges

<b>Acceleration Rate</b>	>500 m/s <sup>2</sup>	<b>Cooling*</b>	<b>Air</b>	- Pressure: Less than 70 kPa (< 10 PSI)
<b>Repeatability</b>	+/-0.02%			- Flow Rate: 50 l/min (2 SCFM) Typical
<b>Accuracy</b>	<+/-0.05% of reading	<b>Water</b>	- Pressure: Less than 207 kPa (< 30 PSI)	
<b>User Isolated Voltage</b>	5 to 24 VDC (300mA)		- Flow Rate: 1.0 to 3.8 l/min (0.26 to 1 gpm) 1.5 l/m (0.4 gpm) Typical - Coolant Temp: 5 to 45°C (41 to 113°F)	
<b>Relative Humidity</b>	Non-condensing	<b>Ethernet -Optional</b>	- 10/100, UDP, TCP, Telnet	
<b>Units of measure</b>	Selectable		- Speed, Length, Quality Factor, Status	
<b>Speed</b>	m/min, m/s, ft/min, ft/s, in/min, mm/sec, yards/in, yards/sec	<b>Degree of Protection</b>	IP67	
<b>Length</b>	m, ft, in, yards	<b>Temperature Range</b>	-5 to 45°C (21 to 113°F)	
<b>Analog Output</b>	- 0-2V - Velocity or quality factor			

\*For ambient temperatures beyond gauge specification.

This unit is a class 3B laser product and Complies with EN60825-1:2001. Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated July 26, 2001.



The following safety features required to comply with the Bureau of Radiological Health Class IIIB laser requirements are included:

- Key-operated power switch on optional controller
- Laser indicator light on supply and laser
- Delayed laser startup-laser indicator light on prior to laser radiation
- Laser beam blocking device
- Interlock capability for remote shut-off

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