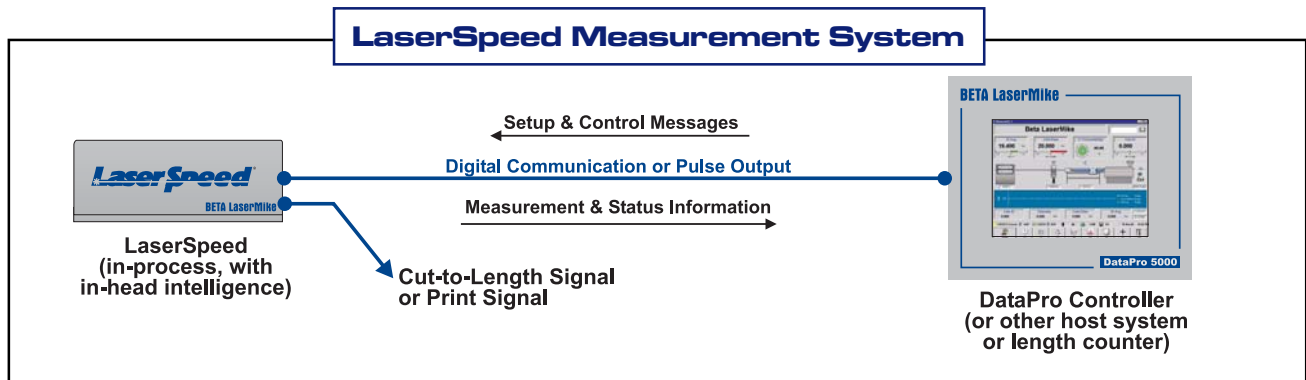


Length & Speed Measurement Systems

With the ability to measure length and speed with accuracy better than $\pm 0.05\%$, LaserSpeed is the ideal gauge for replacing contact tachometers that are prone to a variety of measurement errors and high maintenance costs. LaserSpeed uses the non-contact laser doppler velocimetry (LDV) technique with all signal processing and intelligence built directly into the gauge, allowing it to integrate with a variety of other systems from simple length counters to advanced control systems.



Contact Tachometers vs. LaserSpeed

Contact tachometers are typically used in extrusion 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 tachometers with LaserSpeed:

Normal Tachometer Problem:	LaserSpeed Solution:
1. Measurement errors and inaccuracy caused by: product slippage, dirt build-up, day-to-day wear problems	▶▶▶ Non-contact measurement ensures high accuracy and repeatability
2. 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
3. Contact measurement can mark or damage the product	▶▶▶ Non-contact measurement ensures no marking or damage of the product

The LaserSpeed Advantage

- Non-contact length and speed measurement, unaffected by:
 - Product diameter
 - Material texture or color
 - Product diameter
 - Ramp up & ramp down cycles
 - Surface shape
 - Ambient temperature over operating range
 - Speed—even speeds over 39000 ft/min (11887 m/min)
- Low cost of ownership due to permanent calibration and no moving parts
- Easy integration to other devices due to in-head intelligence
- "Cut-to-length" application
- Index pulse output to printing device



Laser Doppler Velocimetry Principle

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

Fringe distance is a function of laser wavelength and beam angle:

$$d = \frac{\lambda}{2 \sin \kappa}$$

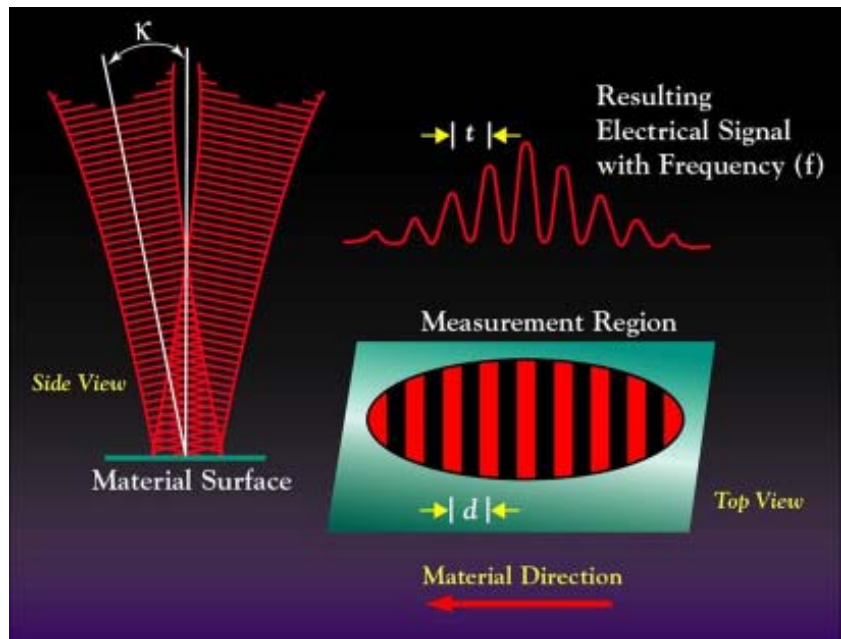
Velocity is distance over time:

$$v = \frac{d}{t}$$

Period is the inverse of frequency:

$$t = \frac{1}{f}$$

Velocity is integrated to find length:

$$L = \int_0^T v dt$$


LaserSpeed Models

LS4000			
Model	Speed Range	Standoff Distance	Depth of Field
LS4000-301	0.2 – 1,700 m/min (0.7 – 5,500 ft/min)	100 mm (4 in.)	15 mm (0.6 in.)
LS4000-303	0.4 – 4,000 m/min (1.3 – 13,100 ft/min)	300 mm (12 in.)	35 mm (1.4 in.)
LS4000-306	0.8 – 8,000 m/min (2.6 – 26,200 ft/min)	600 mm (24 in.)	50 mm (2.0 in.)
LS4000-310	1.0 – 12,000 m/min (3.2 – 39,400 ft/min)	1000 mm (39.4 in.)	75 mm (3.0 in.)
NEW! LS9000 With Zero Speed & Automatic Direction Detection!			
Model	Speed Range	Standoff Distance	Depth of Field
LS9000-303	0..±4000 m/min (0..±13100 ft/min)	300 mm (12 in.)	35 mm (1.4 in.)
LS9000-306	0..±8000 m/min (0..±26200 ft/min)	600 mm (24 in.)	50 mm (2.0 in.)
LS9000-310	0..±12000 m/min (0..±39400 ft/min)	1000 mm (39.4 in.)	100 mm (3.0 in.)

Each model has the same high accuracy (<±0.05%) and repeatability (<±0.02%) and comes in an IP 67 rated industrial enclosure

The following I/O is included as standard with each model:

- **Speed output:** RS-232
0 – 2 volts (user selectable full scale)
- **Length output:** Isolated quadrature pulse output (user selectable resolution)
Isolated quadrature pulse output (fixed at 1000 pulses/ft)
Index pulse output for printer or cutter (selectable pulse rate per unit of measure)
- **Status output:** RS-232 or analog voltage (0 – 1V)
- **Inputs:** Direction, Measurement Hold, Shutter Control, Laser Interlock

Options

- Height Stand
- Air Wipe
- Quick Change Window
- Analog Output Converter:
Converts 0 – 2V speed output to other voltage or current ranges