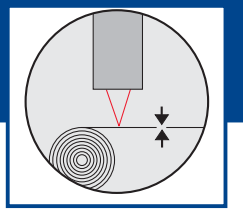
Cutting Control



Beta LaserMike's LaserSpeed Gauges are ideally suited for controlling cutting operations of continuous or semi-continuous processes. The technology used by the LaserSpeed Gauges makes use of Dual Beam Laser Interferometry to obtain speed measurements without contacting the product. The length measurement is obtained from the speed measurement using the following formula:

$$\textbf{Length} = \int \textbf{Vdt}$$

where V is the velocity or speed

The basic measurement of the LaserSpeed Gauge is speed, and length is obtained by integrating speed over time.

Historically, contact rollers and tachometers have been used to obtain speed and length measurements needed for cutting control. This method is an indirect measurement of the product. The tachometer is attached to the roller and measures the rotational speed of the roller. The slippage factor between the roller and product and the diameter of the roller needs must be precisely known to obtain the actual product speed. There are two major problems with speed and length measurements obtained from contact rollers and tachometers:

- Errors due to slippage between the roller and the strip
- Errors due to the change in roller diameter due to wear

LaserSpeed Gauges measure the speed of the product directly, thereby eliminating slippage and mechanical wear problems. LaserSpeed Gauges offer a accuracy of ±0.05% and have a high repeatability of ±0.02%.

LaserSpeed Gauges can be used to control a cutter for any type of material: small steel wire, steel strip, welded tubes, seamless pipes, and roll formed products. The product can be hot or cold.

LaserSpeed Gauges offer a variety of outputs to connect to almost any PLC. These include:

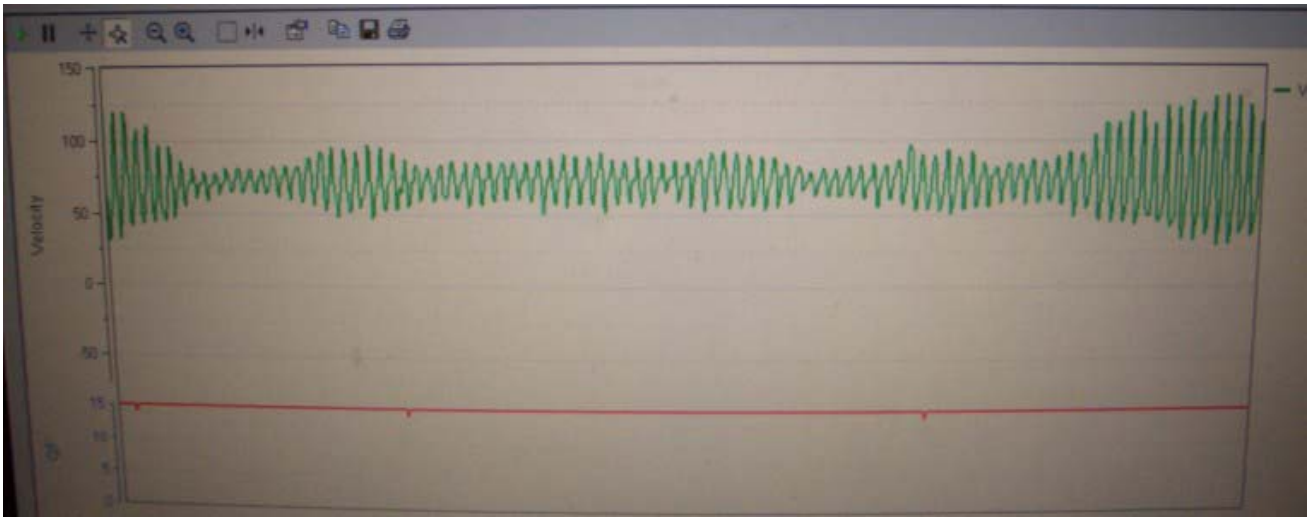
- Full quadrature pulse output, which is user-selectable and amplitude-scaleable
- Full quadrature pulse output, which is RS422-compatible
- RS232 serial output
- RS422 serial output
- Ethernet (optional)
- Profibus (optional)
- Analog

Recommended gauges for this application:

- LS8000-306
- LS9000-306
- LS8000-310E
- LS9000-310E

LaserSpeed®

In addition to controlling the torch cutter to improve the length of the cut cast, LaserSpeed gauges can also measure the speed influence of the mold oscillation on the cast, near the torch cutter. The picture below shows the mold oscillation's influence on the speed of the cast at the location near the torch cutter.



Strand speed near torch cutter

As shown above, the speed of the strand varies at the same oscillation rate as the mold oscillation rate. As the strand builds up more friction between the strand and the mold, the speed variations of the strand increase greatly. Shortly after this data was taken, the strand had a breakout and had to be shut down.