

Final length inspection for quality control



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100% online length inspection in
continuous production

Application note

Speed and length measurements using laser surface velocimetry

A non-contact LSV Laser Surface Velocimeter in combination with a DAQ (Data Acquisition System) provides 100% part length inspection. Because the LSV is non-contact, it is not susceptible to slippage, mechanical wear and frequent calibration associated with contact encoder wheels, thus providing more accurate and reliable measurements, with long term consistency and little to no maintenance.

Before bundling and shipping to customers, many processes require 100% verification and validation of cut length in order to maintain and improve production efficiency, quality control and customer satisfaction. One hundred percent, online length inspection not only addresses customer requirements, but also enables operations to track quality rates, reveal and address real time drifts in production control and analyze long term data for process improvements and predictive maintenance purposes.

Current measurement techniques

Many operations inspect length manually, with a tape measure. This can be time consuming and is susceptible to human error, often resulting in miscalculations. Still others attempt to utilize contact wheels. However, contact devices are susceptible to slippage, wear and require frequent calibration. In addition, contact methods can be problematic due to the continuous up and down motion they make to avoid the leading and tail end of the part. In short, the mechanical considerations involved in using contact wheels can generate many maintenance challenges and result in significant production downtime.

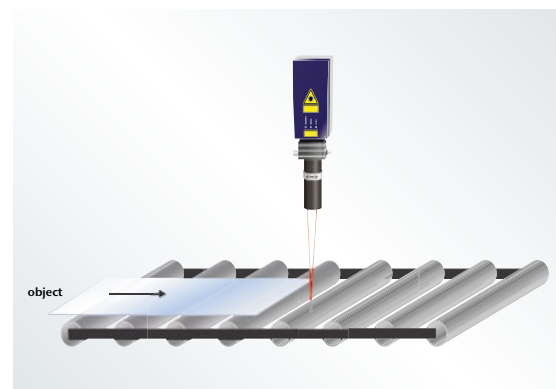
The Polytec optical solution

LSV Laser Surface Velocimeters installed to verify length of pre-cut pieces have proven successful. This technique eliminates the typical mechanical issues associated with contact wheels that cause measurement errors and long term drift while preventing production downtime associated with damaged contact wheels. It enables greater accuracy, repeatability and reliability, with little to no maintenance.

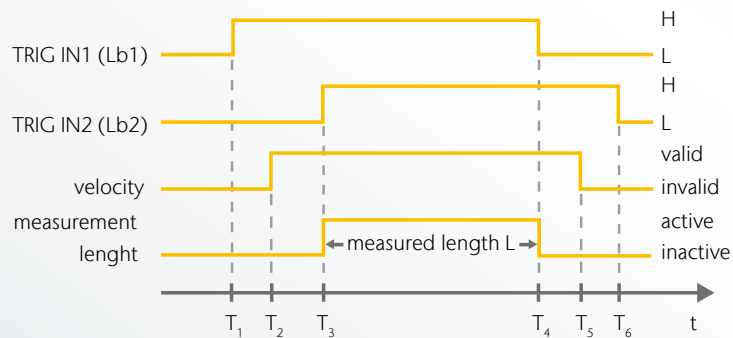
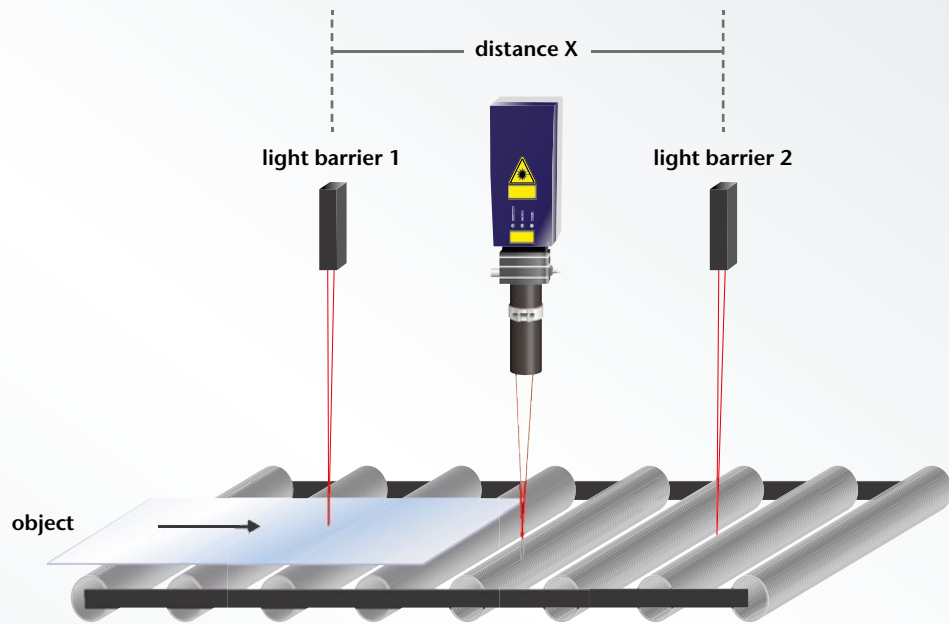
There are two LSV installation methods to consider: a standalone LSV system that utilizes the internal material detect function and a LSV system in conjunction with external light barriers. Determining which method is best will depend upon the specific application requirements and parameters.

LSV solution with internal material detection

This method utilizes the internal material detect function of the LSV, which triggers the LSV to start and stop an internal length measurement based on the detection of the leading and trailing edge of the part. It delivers good accuracy without the need for additional light barriers and is easy to install. The LSV reports the final part length to the DAQ through the Serial or Ethernet outputs.



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Illustrates the installation method



Length of the part = measured length L + distance X

L = length as measured by LSV; X = distance between light barriers

LSV solution with light barriers

To optimize the measurement for highest accuracy and repeatability, a technique utilizing light barriers (photo-eyes, laser light barriers, hot/cold metal detectors, etc) to detect the leading and trailing edges of the part is used. The light barriers can be integrated with the LSV to start and stop the length measurement.

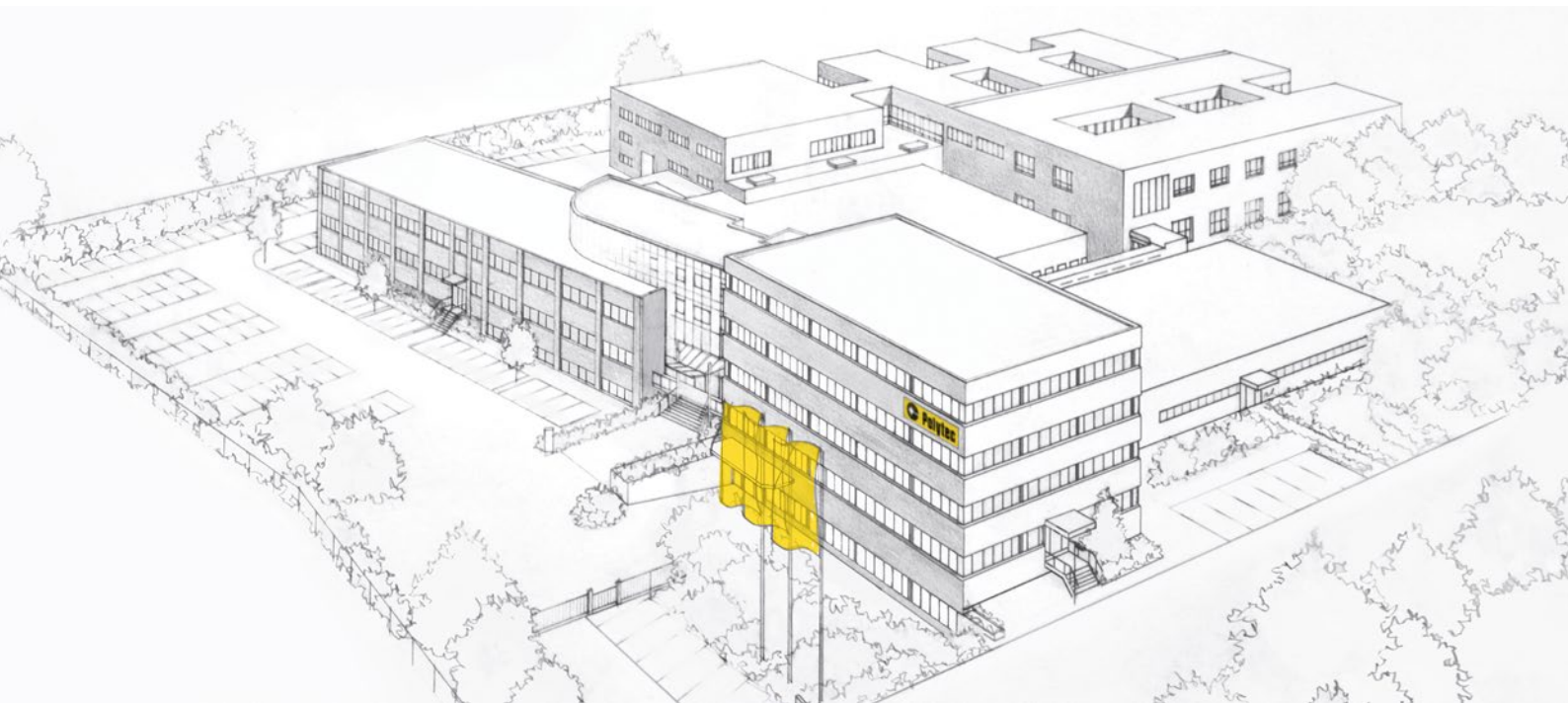
By placing one light barrier before and one after the sensor, a simple control logic can be set up directly in the LSV that starts the length measurement while both light barriers are active and stops the measurement when the entry light barrier is deactivated. The final part length is the length, as measured by the LSV, plus the fixed distance between the two light barriers. The fixed offset can be added to the final length in the internal LSV calculation or separately in the DAQ.

The LSV line of length and speed sensors incorporate rugged construction, a sophisticated optical configuration and advanced signal conditioning to deliver exceptional performance and reliability. With their flexible interface concept LSV are ready for the industrial digitalization.

Contact our PolyXperts for support and demonstrations.

For more information: www.polytec.com/lsv

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Illustrates the timing for this installation method



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