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ELOVIS
Electronics • Optics • Solutions
GERMANY

µSPEED

Non-Contact Speed & Length Gauges bi-directional, precise, zero speed measurement

µSPEED systems are capable of measuring speed and length without contact to the moving material surface. The systems replace tactile measurement solutions as e.g. contact wheels, which tend to measurement errors caused by slippage, chatter, dirt build-up and day to day wear problems. The maintenance free and long term calibrated µSPEED systems measure nearly all surfaces without parameter setting.

µSPEED-SMART/-ECO/-PRO

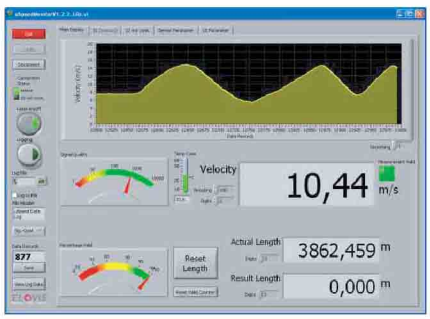
BENEFITS

Compared To Tactile Measurement Systems :

- Self-Monitoring
- Non-contact, no slippage
- Maintenance free and permanently calibrated
- Measurement independent form material structur, thickness, elasticity
- Can not damage material surface
- High accuracy, high repeatability

Compared to other Non-Contact devices:

- The most compact in class
- The most easy to handle in class (plug & play)
- Non-contact direction detection
- Non-contact zero speed measurement
- No parametration necessary
- Permanently calibrated
- Long laser lifetime
- Optimum price performance ratio
- MID 2014/32/EU standard (proofed by German PTB)
- Made in Germany

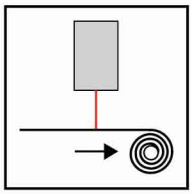


PC-SOFTWARE

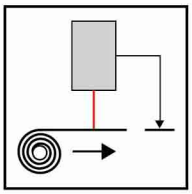
INDICATOR

APPLICATIONS

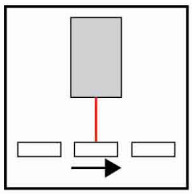
SPOOL LENGTH



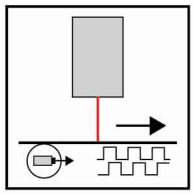
CUT-TO-LENGTH CONTROL



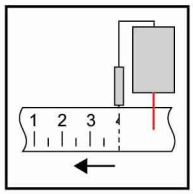
PART LENGTH



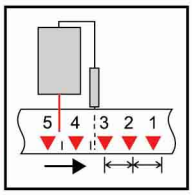
ENCODER CALIBRATION



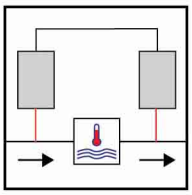
PRINT CONTROL



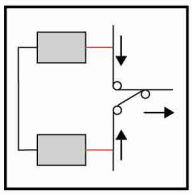
REPEAT PATTERN



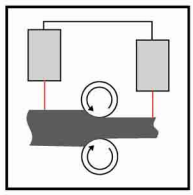
DIFFERENCE SPEED



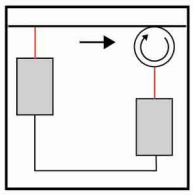
SPEED BALANCING



ELONGATION RATIO



SLIPPAGE DETECTION



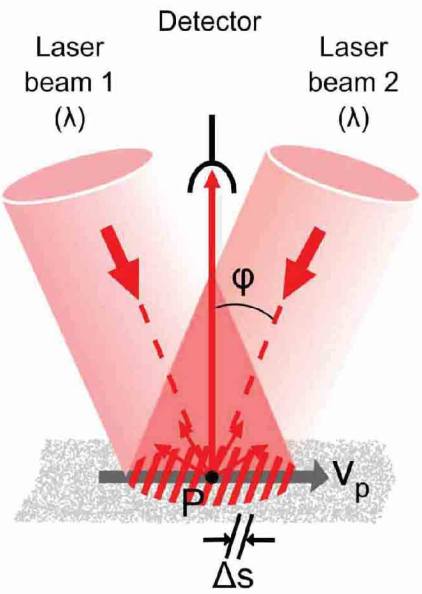
MEASUREMENT PRINCIPLE

µSPEED sensors operate according to the differential doppler method. Here two laser beams, which occur at an angle φ to the optical axis, superimpose on the surface of the measurement object. For a point P which moves with the velocity v through the point of intersection of the two laser beams, the frequencies of the two laser beams are doppler shifted. The two laser beams are superimposed in the measurement volume, producing an interference pattern of light and dark stripes. The stripe spacing Δs is a constant which depends on the laser wavelength λ and the angle between the measurement beams 2φ:

$$\Delta s = \lambda/(2 \sin \varphi)$$

If a particle moves through the stripe pattern, the back-scattered light from the particle is modulated in its intensity. A photodetector in the sensor produces a signal whose frequency fD is directly proportional to the speed component of the surface in the measuring direction vp and:

$$fD = vp/\Delta s = (2v/\lambda) \sin \varphi$$



fD = Doppler frequency
vp = Velocity vector in measuring direction
Δs = Stipe spacing in the measurement volume
The value of λ/sinφ is the measuring scale for speed and length measurement.

TECHNICAL SPECIFICATIONS:

MODEL		µSPEED-PRO	µSPEED-SMART	µSPEED SMART-ECO
Parameter	**Unit**			
Direction Detection		YES Non-Contact	YES via external direction signal	YES via external direction signal
Zero Speed Measurement		YES Non-Contact	No	No
Material Presence Detection		YES Non-Contact	YES Optional Non-Contact	YES Optional Non-Contact
Accuracy (typical) (2σ;L>10m/3σ;L>20m)	%	± 0.05	SMART ± 0.05	SMART-ECO ± 0.3
Repeatability	%	± 0.02	± 0.02	
Speed Range in different Models	m/min	0 to 180 60 / 100 / 200	60 / 300 / 600 / 1200 / 2400 / 4800	60 / 300 / 600 / 1200 / 2400 / 4800
Stand-Off Distances (Tolerances)	mm	115±5 (±20)	120±5 (±20) 240±10 (±40)	120±5 (±20) 240±10 (±40)
I/Os	pls/m	Quadrature output 1 to 100.000 (dependent on max speed) Input: Start, Gate, Direction, Laser Interlock Output: Status	Quadrature output 1 to 100.000 (dependent on max speed) Input: Start, Gate, Direction, Laser Interlock Output: Status	Quadrature output 1 to 100.000 (dependent on max speed) Input: Start, Gate, Direction, Laser Interlock Output: Status
Dimensions (LxWxH)	mm	Sensor Head: 154 x 94 x 39 Controller unit:	Sensor Head: 154 x 94 x 39 Controller unit	Sensor Head: 154 x 94 x 39 Controller unit
Gauge Weight	kg	Sensor Head: 1 kg	Sensor Head: 1 kg	Sensor Head: 1 kg