

VLM 250 Series

Velocity and length sensor



Functional description

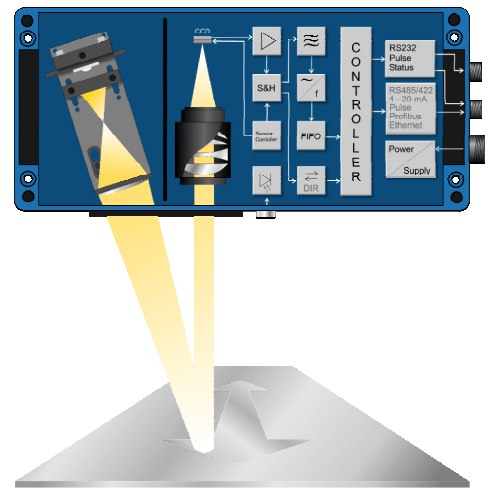
The VLM 250 operates optically without contact, and implements the principle of the spatial filter by means of the use of a CCD sensor. Spatial filter is the generic term used to describe a measuring principle for the non-contact determination of the velocity and length of moving materials. The spatial filter is based on the filtering effect of grid-like structures (grid modulation).

The function of the VLM 250 can be described as follows:

The object to be measured is reproduced through the objective onto the CCD sensor. The CCD sensor is operated as an optical grid (no image pickup). The object to be measured is illuminated by an integrated light source (LED). External light disruptions are effectively suppressed with this method.

When the object is moved, a signal frequency is generated due to grid modulation. This frequency is proportional to the velocity at which the object is moving. The device measures the signal frequency and converts it to a velocity value.

There are several control circuits that enable automatic adjustment to the most varied of materials (material surface structure and brightness).



Applications

- Suitable for nearly all materials, such as metal, paper, textiles, plastics, rubber, ceramics and timber
- Ideal for the measurement of a wide range of products, including tapes, rails, plates, foils, tubes, profiles, cables, wires, ropes, etc.
- Caters for various processes such as cutting, positioning, regulation, inspection, quality control
- Examples: Length and speed measurement at winders, length cutting units, coating and inspection lines; velocity measurement in paper machines for example at pulb, web and paper; inspection of cut length of pipes and profiles; provision of velocity signals for testing purposes, velocity regulation and cutting control for extruders

Advantages

- The semiconductor chip (CCD) is used as a reference: greatest proven long-term stability in the market (in conventional systems, the wave length of a laser source that is subject to ageing is used as the reference), excellent short-term stability (no mode jumps that are typical for laser light)
- Measurements can be taken on virtually all surfaces, from high-gloss to matte black, as the device adjusts itself automatically to the task. Even surfaces that could not be accurately assessed with optical measuring equipment can now be measured!
- Accurate measurements, even if the window is dirty, as the reference is well protected inside the device (the laser reproduces a reference grid; the beams thereby exit through the window, so that dirt could potentially affect the measurements)
- Compact design, excellent flexibility as regards interfaces, including all conventional solutions from analog output to Profibus; high-accuracy pulse output as standard, input for change to standby mode
- Modular design: easy maintenance, new assemblies can be used to repair or upgrade older units; light sources and interface boards can be replaced by the customer
- High interference immunity thanks to 100% potential isolation and sophisticated ESD and EMC protection
- Long service life, making the VLM 250 excellent value for money
- High quality standard, made in Germany; with 36-months warranty
- Safety (Light source LED)
- Update/upgrade of the firmware via PC (flash and bootloader)
- Light source monitoring (error code and switch output) and temperature monitoring (command for display and error code)

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Technical data

	VLM 250 A	VLM 250 D	VLM 250 L	VLM 250 V
Measuring distance	185 ± 7.5 mm	240 ± 15 mm	170 ± 7.5 mm	170 ± 7.5 mm
Extended measuring distance	185 ± 15 mm	240 ± 30 mm	170 ± 10 mm	170 ± 10 mm
Measuring range	0.07 ... 6.7 m/s	0.03 ... 6.7 m/s	0.008 ... 3.0 m/s	0.004 ... 0.5 m/s
Extended measuring range	0.14 ... 13.3 m/s	0.07 ... 13.3 m/s	0.016 ... 6.0 m/s	0.008 ... 1.0 m/s
	VLM 250 FA	VLM 250 FD	VLM 250 FL	VLM 250 FV
Measuring distance	185 ± 7.5 mm	240 ± 15 mm	170 ± 7.5 mm	170 ± 7.5 mm
Extended measuring distance	185 ± 15 mm	240 ± 30 mm	170 ± 10 mm	170 ± 10 mm
Measuring range	0.07... 25 m/s	0.03 ... 15 m/s	0.008 ... 3.0 m/s	0.004 ... 0.5 m/s
Extended measuring range	0.14 ... 50 m/s	0.07 ... 30 m/s	0.016 ... 6.0 m/s	0.008 ... 1.0 m/s
Measuring uncertainty ¹⁾	better than 0.1 % (0.2 % in extended range)			
Reproducibility ¹⁾	better than 0.05 %			
Averaging time	from 8 ms; for F and S series from 2 ms; with single, double or eight-fold floating averaging function			
Length measuring range	internal measuring range up to 200 km (devices of the F and S series are not equipped with an internal length measuring system; length can however be measured by means of external pulse counting)			
Detector / principle	CCD sensor / spatial filter with semiconductor grid as reference			
Illumination ²⁾	White light, LED (recommended maintenance interval: 24 months, expected life span: 70% brightness after 50.000 hours of operation)			
Programming interface ³⁾	RS 232, opto-isolated (for parameterisation, data output and firmware update)			
Opto-isolated outputs ³⁾	OUT0, OUT1, OUT2, OUT3			
Function	OUT0: VLM OK OUT1, OUT2: Pulse output with 2 phase shaft encoder emulation (A and B) OUT3: Signal status			
Frequency for pulse output	0.4 Hz - 25 kHz (2 phases, resolution 20 ns) (2 optional high resolution pulse outputs available, see below)			
Type / max. output current	npn open emitter / 40 mA with AB3, optional with AB4 active push/pull			
Opto-isolated inputs ³⁾	IN0, IN1, IN2			
Function	IN0: Standby IN2: External directional signal IN3: Trigger signal (for signals 0/24 V, 0/20 mA or ±20 mA, Ri approx. 1 kOhm)			
Voltage level	> 8 V for HIGH (switchable to > 3 V)			
Input current	approx. 20 mA at 24 V			
Power supply	230 V / 50 Hz , optional 115 V / 60 Hz or 24 V / DC			
Power consumption	< 50 W			
Temperature range	0 to 50 °C			
Protection class	IP 65			
Weight ²⁾	Approx. 5.8 kg			
EMC ⁴⁾	Industrial standard in compliance with CE			
Housing dimensions ²⁾	360 mm x 160 mm x 90 mm			
Options				
Analog output IF1 4 to 20 mA or 0 to 20 mA (16-bit, opto-isolated); various digital interfaces IF1 (RS485/RS422, RS232, opto-isolated); high-resolution pulse output IF2 0.4 Hz to 25 kHz and IF2F to 500 kHz (2 x 2 phases, resolution 20 ns); interface cards for Ethernet or Profibus DP; direction detection (not with F/S series), real time clock, light barriers, various counters and displays, installation accessories, linear units, protecting cases, free blowing unit				
¹⁾ DIN 1319 / ISO 3534, of measured length, test conditions: measuring length 10 m, with active tracking			³⁾ AB3 connections are short-circuit proof, max. voltage 50 V/DC, 36V/AC	
²⁾ Standard model without connections; L and V series without objective window; other models available on request			⁴⁾ Tested by accredited institute	

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