

VLM 320 Series

Velocity and length sensor



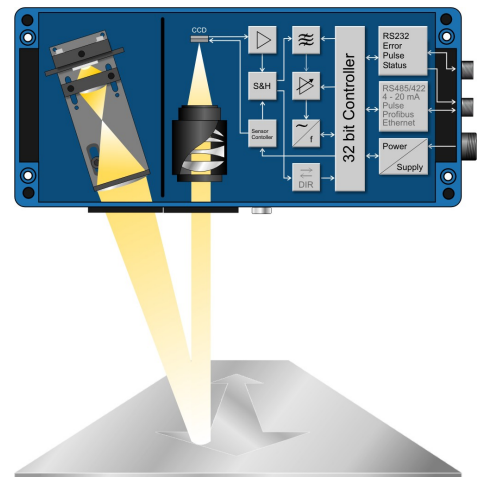
Functional Description

The VLM 320 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 320 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
- Suitable for a wide range of products, including strips, 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, slitting lines, coating and inspection lines; velocity measurement in paper machines for example at paper pulp, web and paper; tube and profile length inspection and 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, excellent short-term stability
- 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 measured reliably with any optical measuring equipment can now be measured!
- Accurate measurements, even if the window is dusty, as the reference is well protected inside the device
- Compact design, best interface flexibility in the market, including all conventional solutions from analog output to Profibus; high-accuracy pulse output with 5 ns resolution as standard
- Input for change to standby mode
- Output for hardware error and standstill/status
- Safe operation (white LED light source)
- Easy firmware update/upgrade via PC
- Modular design: easy maintenance, new assemblies can be used for repair or upgrade older units; light sources and interface boards can be replaced by the customer itself
- Hardware, lighting and temperature self-diagnosis (error codes and output)
- All gauges have internal length calculation, sliding average, synchronous-, clock- and date functionality
- Direct connection of two light barriers possible
- High interference immunity thanks to 100% potential isolation and sophisticated ESD and EMC protection
- Replacing of the LED and interface cards is easy for the customer
- Long service life, making the VLM 320 excellent value for money
- High quality standard, made in Germany; with 36-months warranty

ASTECH Angewandte Sensortechnik GmbH

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Technical Data

	VLM 320 A	VLM 320 D	VLM 320 L	VLM 320 V
Working distance and range	185 ± 7,5 mm	240 ± 15 mm	170 ± 7,5 mm	170 ± 7,5 mm
Extended working range	185 ± 15 mm	240 ± 30 mm	170 ± 10 mm	170 ± 10 mm
Measuring range	0.01 ... 25 m/s	0.008 ... 15 m/s	0.004 ... 3,0 m/s	0.001 ... 1,5 m/s
in extended working range	0.02 ... 50 m/s	0.016 ... 30 m/s	0.008 ... 6,0 m/s	0.002 ... 3,0 m/s
Max. Acceleration = $K_i \cdot v^2$ ⁵⁾	$K_i = 200 \text{ m}^{-1}$	$K_i = 290 \text{ m}^{-1}$	$K_i = 450 \text{ m}^{-1}$	$K_i = 900 \text{ m}^{-1}$
Measuring uncertainty ¹⁾	< 0,025 % at nominal working distance (< 0.05 % in distance range and 0.2 % in extended working range)			
Reproducibility ¹⁾	< 0.025 %			
Averaging-/Update-Time	from 0,2 ms with additional 1 - 32 times sliding averaging			
Length measuring range	internal length range up to 400 km			
Detector / principle	CCD sensor / spatial filter with semiconductor grid as reference			
Illumination	white light LED (recommended maintenance interval ⁶⁾ : 24 months, expected life span: 70% brightness after 50.000 hours of operation)			
Programming interface ³⁾	RS 232, opto-isolated (for parameter setting, data output and firmware update)			
Opto-isolated outputs ³⁾	OUT0, OUT1, OUT2, OUT3			
Function	OUT0: VLM Error (Hardware Error) OUT1, OUT2: Pulse output with 2 phase pulse encoder emulation (A and B) OUT3: Standstill or signal status			
Frequency for pulse output	0.2 Hz - 25 kHz (A/B 2 phases 90°, resolution 5 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 for IN1 and IN2)			
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	< 20 W			
Temperature range	0 up 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	Additional 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, bus-compatible, usable like programming interface); 2 additional pulse outputs up to 25 kHz: IF3 (passive) and IF3-PP (active); 2 high-resolution pulse outputs: IF3-5V (0,2 Hz up to 2 MHz); interface board for Ethernet or Profibus DP; automatic direction detection, light barriers, various counter and displays, mounting accessories, linear moving units, air purge nozzles, protection cases, etc.			
¹⁾ DIN 1319 / ISO 3534, of measured length, test conditions: measuring length 10 m, with active tracking				⁴⁾ Tested by accredited institute
²⁾ Standard model without connections; L and V series without objective window; other models available on request				⁵⁾ v is the current speed in m/s
³⁾ AB3 connections are short circuit proof, max. voltage 50 V/DC, 36V/AC				⁶⁾ Simple replacement by the user possible

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