

## SPEETEC 1D

Measures length, speed and position. Without touching and without wear.

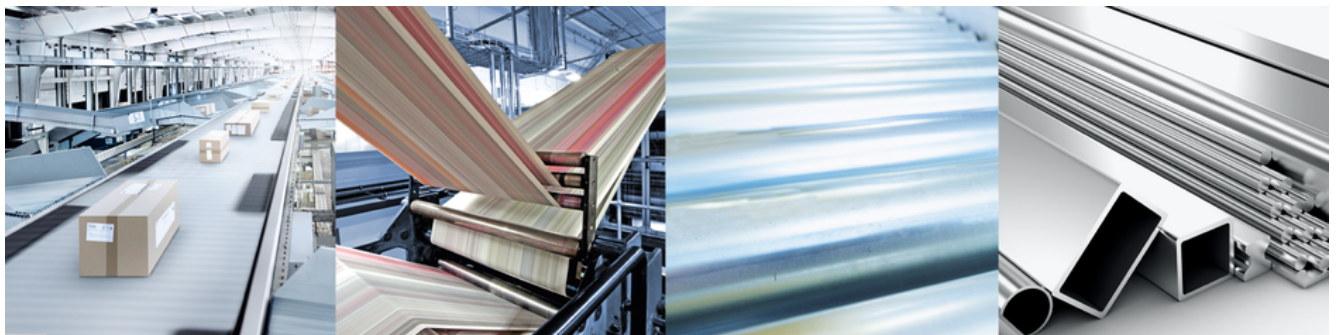
**SICK**  
Sensor Intelligence.

## Advantages



## Opening up new fields of application in motion monitoring

The SPEETEC 1D shows what's possible. Using the laser Doppler process, the sensor quickly and precisely measures the length, speed and position of piece goods as well as endless materials. Since it operates without contact during measurement, it enables new applications in automation: Where direct measurements on sensitive or soft surfaces were previously avoided because tactile sensors damaged them, the SPEETEC 1D now enables movement data to be recorded without making contact. Thanks to the compact dimensions and standardized TTL or HTL interface, it is also easy to integrate into new or existing plants and can be put into operation quickly.



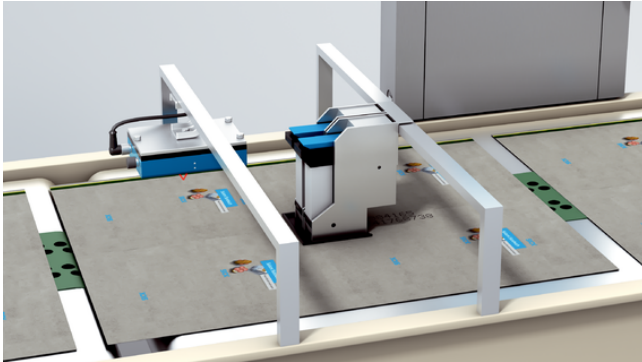
SPEETEC 1D can demonstrate its advantages in many applications. No matter whether it be the linear movements of conveyor belts, web materials, or thin or round objects, or the rotative movements of wheels and drums.



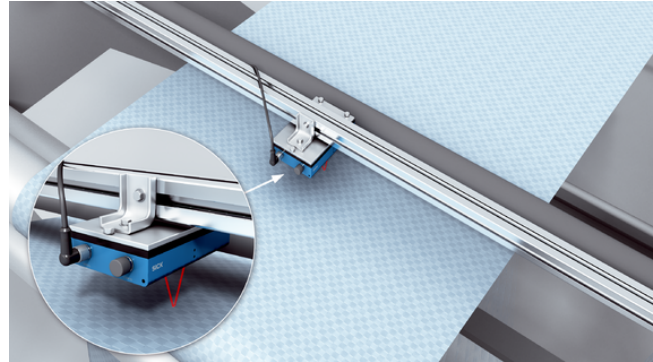
**Increases the measurement horizon: The SPEETEC 1D closes the gap between tactile measuring wheel systems and complex laser Doppler sensors – and is suitable for almost all surfaces and objects thanks to the non-contact measurement.**

## Problem-solver for previously unsolved and demanding measuring tasks

No measurement errors due to slip. Short response times and very high measurement accuracy in the first few centimeters: With its optical measurement principle, the SPEETEC 1D is setting new standards in speed measurement in dynamic and clocked processes.



High measurement accuracy in start-stop operation and with short measurement lengths.



Slip-free measurements in dynamic processes increase the process quality and productivity of the plants.



## More convenient handling – safety with laser class 1 from the factory

The SPEETEC 1D is much more economic than other laser speed sensors: Thanks to laser class 1, no protective measures such as housing, eye protection and safety areas are required for integration of the device, and no specially trained staff is needed. Installation work is minimal: Simply mount and go. The laser Doppler process of the infrared laser delivers exact speed values of up to 10 m/s with very high repeatability. Whether endless materials or piece goods – the high resolution of the laser enables a maximum resolution of 4  $\mu\text{m}$  and, on a path of one meter, the sensor measures material lengths down to the last millimeter. It therefore offers maximum reliability for countless applications.

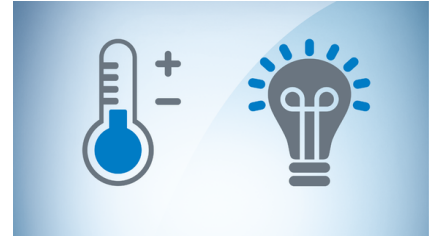
## Practical technology



A measuring distance of up to 100 mm makes it possible to take measurements on objects of different thicknesses and makes mounting easier.



Thanks to laser class 1, damage caused by laser beams is ruled out – even with direct eye contact.



The optical sensor of the SPEETEC 1D is insensitive to ambient light or temperature fluctuations and always delivers reliable measured values.



**High precision, reliability and very simple use: The SPEETEC 1D makes laser class 1 the new standard for non-contact speed measurement.**

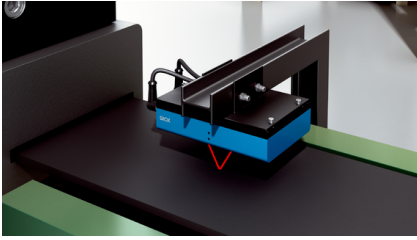


## A measurement system for challenging surfaces – gentle and economic measurement

The measurement system is specially suited for the measurement of particularly sensitive materials. Surfaces which get dented or damaged or undergo material changes due to the contact pressure of conventional measuring wheel systems can now be measured simply and reliably. This applies also to contaminated surfaces, which often lead to incorrect measurements in tactile measurement systems. The laser-based technology also prevents contamination on the material surface to be measured. In addition to movements of endless materials, the SPEETEC 1D also precisely detects movements of piece goods without a problem. In addition, the laser is wear-free, ensuring more process reliability with minimal maintenance costs.



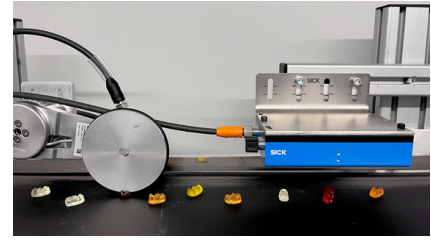
## Material-friendly, wear and maintenance free



The optical sensors prevent damage to especially sensitive materials such as thin film, soft rubber or insulating material.



The SPEETEC 1D measures without wear and delivers reliable and exact values after many thousands of hours of use.

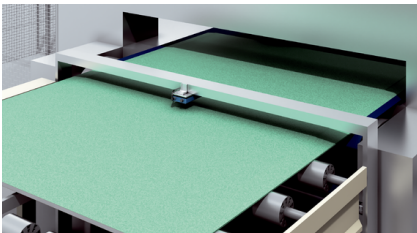


In contrast to tactile systems, contamination on the surface does not affect the measurement result. This reduces maintenance costs.



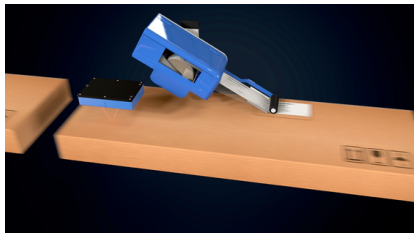
**Frictionless speed measurement: The SPEETEC 1D allows exact non-contact movement measurement on especially soft, sensitive as well as contaminated surfaces. This increases the quality and reduces maintenance costs.**

## Precise and non-contact length and position measurement on piece goods



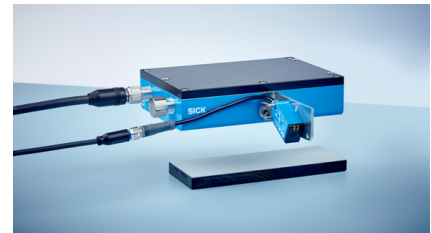
### Length measurement of piece goods

With precise length values of piece goods, the SPEETEC 1D delivers the foundation for automated statistical process control, optimal processes and cost-effective system control.



### Position measurement of piece goods

The SPEETEC 1D detects positions on piece goods. As a result, it is possible to process or finish piece goods at the right position.



### Complete length measurement system

Mounting the trigger sensor directly on the housing of the SPEETEC 1D enables exact length measurement of piece goods.



## Flexibility and transparency with the optional parameterization and diagnostic interface

The SPEETEC 1D is also available with a parameterization and diagnostic interface on request.

This interface can be used to parameterize the default settings such as resolution, electrical interface and direction of movement. Logic functions for the evaluation of external input signals and resulting output signals can also be activated and set. The diagnostic functions provide an overview of the status data of the sensor and the current measurement results in the customer application.

### Logic functions, configuration, diagnostics



The PGT-14 programming unit allows access to all parameterization and diagnostic functions via SOPAS ET.



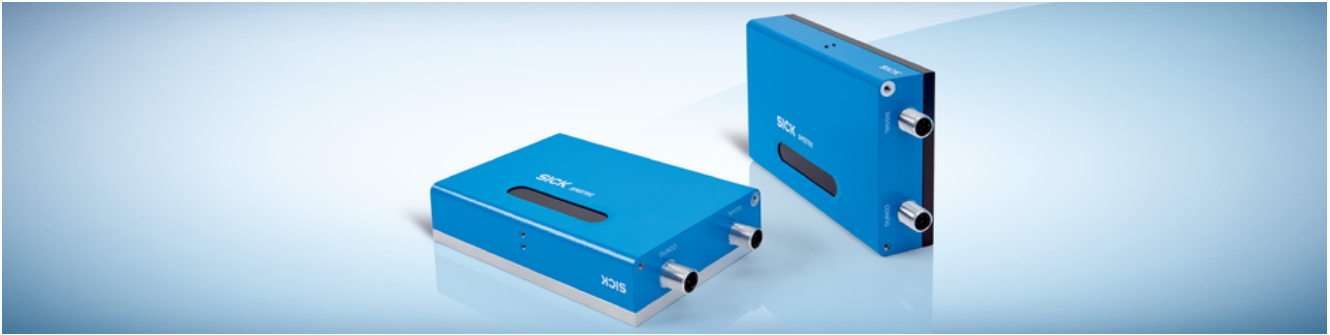
Extensive diagnostic values make it possible to get an idea of the sensor condition and the application and enable reliable process monitoring.



The integrated logic functions make it possible to measure the length of piece goods using an external probe. Actions can also be triggered on piece goods.



**Customized sensor adaptation, control-independent logic functions as well as transparency and monitoring of the sensor and the application. All of this is possible with a SPEETEC 1D with parameterization and diagnostic interface.**



## Two products variants for different customer needs

The SPEETEC 1D product family comprises two product variants: NCV50E and NCV50B. The key difference between the two variants is the construction of the laser sensing system. This results in differences in the specifications and behavior with regard to mounting tolerances, repeatability, and measurement accuracy.

Both types offer the outstanding advantages of a contactless sensor with a class 1 laser: Avoidance of damage to and contamination of the surface being measured, and slip-free measurement with a very high measurement accuracy and repeatability.

Both variants are factory calibrated and have an integrated temperature compensation. This enables both variants to deliver the best possible measurement results without regular calibration.

## Product variants



### NCV50B: Best performance and simple installation

NCV50B is the preferred choice for retrofitting and use in end-customer applications where easy mounting is important. NCV50B achieves a very high measurement accuracy with large mounting tolerances, which allows quick and easy mounting without a reference measurement or calibration. If a higher measurement accuracy is desired, this can be achieved with a reference measurement and a correction factor in the sensor or the controller.



### NCV50E: Good performance for large-scale production

NCV50E is the ideal solution for OEM customers who define the best mounting position for their application and can ensure precise mounting. The systematic errors of the application can be determined by performing a reference measurement after mounting. The required measurement accuracy can be achieved by using a correction factor in the sensor of the controller.



**Surface motion sensors: the complete product portfolio for measuring the speed and length of moving surfaces.**



**Are you looking for further solutions for measuring speed or length directly on the material being processed? Then take a look at Our entire portfolio for measuring moving surfaces.**

**Quality – You can count on it:**

**Reliability, signal strength, accuracy - Verified by us!**

Every SPEETEC is tested for adherence to its specifications before shipping. To this end, each device undergoes several tests during production and before shipping which the device must pass. And because we are confident in our product, we offer an up to 5-year guarantee on SPEETEC 1D on request.



## Reliability, signal strength, accuracy



### Safety

Thanks to the class 1 laser, there is no risk of damage by the laser beams – even with direct eye contact.

Every SPEETEC that leaves our manufacturing facility is tested for compliance with the permissible limit values for a class 1 laser using a special measuring device. This measuring device is checked for correct functioning on a regular basis by a certified test laboratory.



### Signal strength

Each sensor must achieve a defined signal strength on a very demanding reference material. This measurement is performed at different distances and speeds.



### accuracy

Every SPEETEC we produce is calibrated over a specific measuring distance and then, in final testing, checked for adherence to the specified measurement accuracy and reproducibility. Only if it achieves these values can it be shipped.



**Erroneous readings due to jitter or measurement step deviation, which are typical for encoders and measuring wheel systems, are not relevant for SPEETEC. Because they simply do not arise. Thanks to its measurement method and internal signal processing, SPEETEC is free from jitter and measurement step deviation and therefore delivers a clean square signal at the incremental output.**

## Smart design



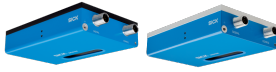
The long laser window and the rounded edges indicate the direction of movement.



High-quality plug connectors meet minimalistic and functional design.



The clear and elegant design of the SPEETEC 1D received the iF Design Award 2020



## Technical data overview

<b>Nominal measuring distance</b>	50 mm
<b>Direction of movement</b>	1D, x-direction
<b>Laser class</b>	1 (IEC 60825-1:2014)
<b>Wavelength/Type of light</b>	850 nm invisible infrared light
<b>Supply voltage</b>	12 V ... 30 V
<b>Communication interface</b>	TTL / RS-422 HTL / Push pull TTL / HTL
<b>Connection type</b>	Male connector, M12, 8-pin, A-coded Male connector, M12, 8-pin, A-coded <sup>1)</sup>
<b>Measuring increment (resolution in µm/pulse)</b>	4 ... 2,000 (depending on type)
<b>Programmable/configurable</b>	- / ✓ (depending on type)

<sup>1)</sup> Observe the maximum length of cable: e.g. 20 m at a resolution of 4µm and 1 m/s or 2 m at a resolution of 4µm and 5 m/s: The frequency is calculated differentially with 4-fold evaluation as follows: Frequency = (speed/resolution) / 4; Example: (5.0 m/s / 4µm) / 4 = 312.5 kHz; maximum frequency 625 hKz.

## Product description

The wear-and-tear and maintenance-free SPEETEC 1D laser surface motion sensor detects the movements of object surfaces without contacting them. This detection requires no scale or measuring elements. The laser Doppler effect based technology enables the SPEETEC 1D to measure the speed, length, movement direction and position of objects on almost any surfaces. The non-contact measurement method used by the sensor makes it particularly suitable for applications with soft or sensitive surfaces that would be damaged by tactile measurement. The SPEETEC 1D is also ideal for encoder applications with fast and dynamic processes that are unsuitable for encoders. The sensor can be monitored and logic functions configured via an interface.

## At a glance

- Non-contact measurement of speed, length and position without measuring elements
- Compatible with many materials, colors and surfaces
- Very high measurement accuracy and repeatability
- Laser class 1
- Rugged design, compact dimensions, low weight
- TTL or HTL interface
- Diagnostics and parameterization function

## Your benefits

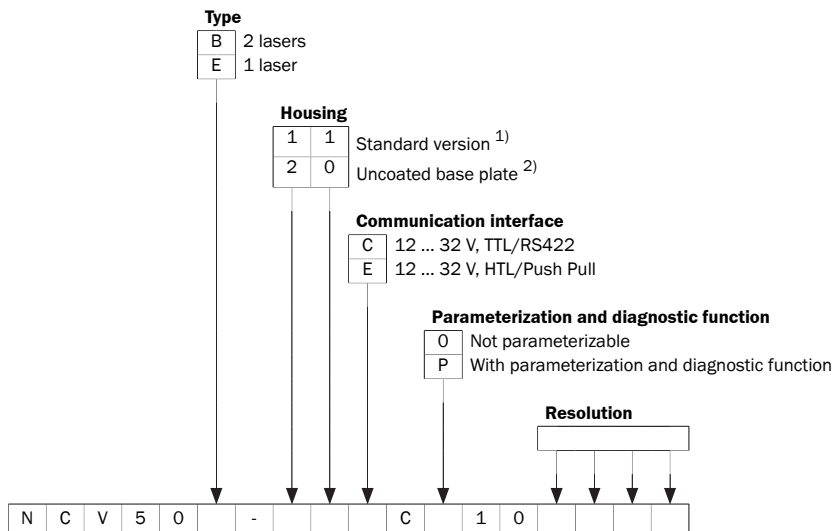
- Opens up new possibilities for measuring sensitive, soft or smooth objects
- Optical sensors avoid damage to, and contamination of the surfaces being measured and ensure a high product quality
- Slip-free measurement increases the measurement accuracy thereby optimizing productivity and process quality
- Thanks to the use of class 1 lasers, no expensive laser protection measures and no specially trained personnel are required
- High measurement accuracy, including in start-stop operation and at short measurement lengths
- Configuration interface allows application and sensor diagnostics as well as parameterization
- Easy to retrofit, wear and maintenance free

## Fields of application

- Consumer goods industry, e.g., packaging, digital printing
- Mechanical engineering, e.g., extrusion, metal processing, surface treatment
- Tire manufacturing, e.g., tire building
- Construction materials industry, e.g., insulating materials, dry construction
- Quality control
- Cutting processes

## Type code

Other models and accessories → [www.sick.com/SPEETEC\\_1D](http://www.sick.com/SPEETEC_1D)



<sup>1)</sup> Only in combination with type b.

<sup>2)</sup> Only in combination with type e.

## Preferred resolutions

Designation in the type code	Resolution/Measurement step (90° electrical)	Resolution/Measurement step (360° electrical)
0004	4 µm	16 µm
0020	20 µm	80 µm
0100	100 µm	400 µm
0200	200 µm	800 µm
1000	1000 µm	4000 µm

Other resolutions are available on request - please contact us. With the parameterizable type, you can select from all the technically possible resolutions yourself.

## Permissible lengths of cable

Speed (m/s)	Resolution/Measurement step (90° electrical)	Frequency	Permissible lengths of cable for TTL	Permissible lengths of cable for HTL
0.1	4 µm	6.25 kHz	350 m	100 m
1	4 µm	62.5 kHz	350 m	20 m
4	4 µm	250 kHz	350 m	5 m
5	4 µm	312.5 kHz	250 m	2 m
10	4 µm	625 kHz	250 m	-

For four-fold evaluation, differential, the frequency is calculated as follows:  

$$\text{Frequency} = (\text{speed}/\text{resolution}) / 4$$
 Example:  

$$(5.0 \text{ m/s} / 4 \text{ µm}) / 4 = 312.5 \text{ kHz}$$

## Functions of the parameterization and diagnostic interface

Notes:

To use the parameterization and diagnostic function, you need the PGT-14 programming device, see accessories.

To use the logic functions, you need the YM2A28-C20S01MYAAX signal distribution cable as well as a suitable trigger sensor with PNP switching output and M8 male connector, 4-pin.

Variants with the parameterization and diagnostic interface offer the following functions:

#### Parameterization

- the electrical interface TTL or HTL
- the length of the measurement step
- the direction of movement: forward or backward
- the functionality of the digital inputs and outputs
  - the "Deactivate incremental signal" logic function
  - the "Digital trigger output active after defined length" logic function
- a customer correction factor to compensate for assembly tolerances

#### Diagnostics

- the operating hours counter
- the internal sensor temperature
  - the current speed value
  - the current signal-to-noise ratio
- indicators for measurement errors due to reflections
  - the status of the digital inputs and outputs

Note: The interface is not designed as a permanent connection. The cable of the programming device must not be extended.

## Ordering information

Other models and accessories → [www.sick.com/SPEETEC\\_1D](http://www.sick.com/SPEETEC_1D)

## SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is “Sensor Intelligence.”

## WORLDWIDE PRESENCE:

Contacts and other locations –[www.sick.com](http://www.sick.com)