

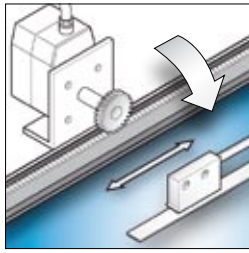
MagLine | Magnetic Length and Angle Measurement Systems



Product Overview

- MagLine Micro
- MagLine Basic
- MagLine Macro
- MagLine Roto

Contactless measurement technology replaces susceptible mechanical systems.



From the idea to the solution

The MagLine product series is based on the idea of replacing mechanical measurement systems consisting of rotary encoders, rack and pinion with a contact-free system operating on a magnetic principle.

At present, there are four groups of MagLine products covering the entire spectrum of industrial measurement tasks. The main differentiating factors are system accuracy, resolution and band reading distance. SIKO's magnetic technology is first choice when it comes to precision, reproducibility and, above all, robust measurement processes.

Key areas of use are measurement of linear and radial positions, angle values and rotational speed.

The magnetic measuring principle

The key element of magnetic linear measurement is a firmly mounted magnetic band (also known as a measuring scale). This band is scanned contactlessly by a magnetic sensor attached to the moving part of the machine. The sensor interprets the measured values into digital or analog signals via the integrated electronics. These signals are optionally available for a translation module, upstream controls (PLC) or measurement displays mounted directly at the site.

The actual magnetic measurement results from the change in resistance caused by a magnetic influence. The magnetic bands are encoded at SIKO in specially developed processes. The resulting band codings enable incremental or absolute measuring processes of variously high resolutions.

Benefits:

- Completely wear-free technology
- Insensitive to dust, shavings, humidity, oil, fat, etc.
- Very robust with shock and vibration
- No measurement errors caused by gear ratios or gear backlash
- High system accuracy and reproducibility
- Easy handling and mounting
- Virtually maintenance-free



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Successful use of MagLine – the measurement system's magnetic sensor and measuring band are perfectly integrated in the following applications: [1] Monitoring rotation and position of tire balance units [2] Precise tracking of sun reflectors [3] Cutting flagstones [4] Highly dynamic linear motors.



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Magnetic measurement technology in a customer-specific solution: [5] Self-sufficient electronic length stop on circular saws.

FELDERKCC, Austria

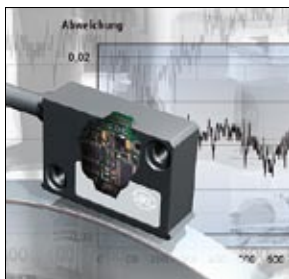


Incremental Systems

In incremental systems the magnetic band is magnetized at regular intervals with north and south poles, and the pole length also determines the maximum resolution and system accuracy. If the sensor is moved over the band, the periods generate the path information that is processed in the form of square-wave signals (counting pulses) or analog sine/cosine signals. Counting of the pulses provides information on the traveled path.

In an incremental system, at least one absolute reference is necessary – the reference point. This point serves for re-orientation of the system and can be stored on the magnetic band as additional information. This reference point is also of importance due to the fact that the actual position value is generally lost in an incremental system if the power supply is interrupted (e.g., if the system is switched on and off) and if the sensor position has been changed in the meantime. A new referencing operation is then necessary.

Reference operation is needed in a system without a buffer battery. Battery-buffered systems operate as quasi-absolute systems.

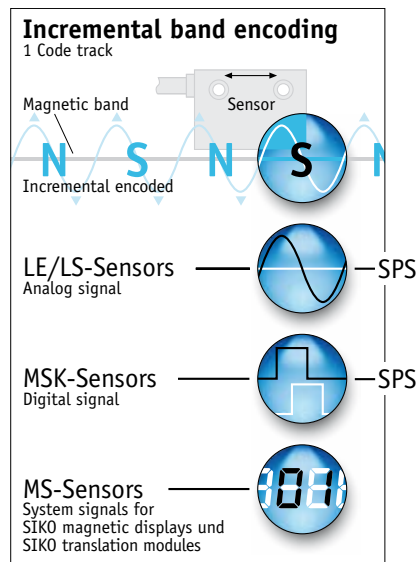


Absolute Systems

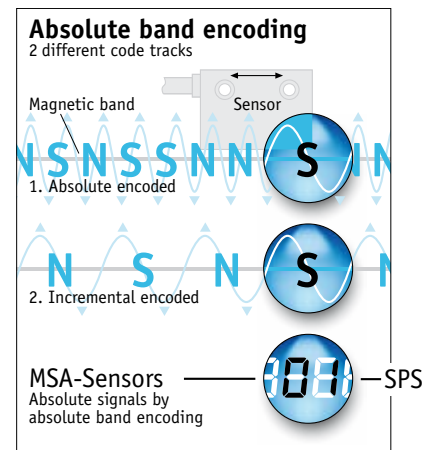
Reference operations are not necessary for linear measurement with absolute encoded magnetic bands. The flexible plastic band is magnetized with a special absolute code.

Commissioning is performed by one-time calibration of the system. Due to the absolute encoding of the band, no buffer battery is necessary and the current position value is immediately available when the system is switched on.

Even a change in position in a non-powered condition does not affect the



accuracy of the displayed measured value, as the position is stored at each point on the encoded magnetic band. A reference operation is also unnecessary, for example, if the sensor is lifted from the magnetic band for maintenance purposes.



Incremental and absolute encoding processes enable position detection with various options for processing feedback (see graphic).

MagLine is of particular benefit ...

... in branches of industry requiring high repeat accuracy of linear or rotative measurement processes under harsh environmental conditions including ...

- Wood, metal and plastic processing
- Stone processing
- Medical equipment engineering
- Direct drives
- Storage technology
- Stage and studio technology
- Speed recording
- Window construction
- ...

MagLine Micro

Accuracy class 10 μm , typical resolution 1 μm

Profile

MagLine Micro's high-resolution feedback system is designed for precise, highly dynamic processes with special measurement requirements in the μm range.

Features:

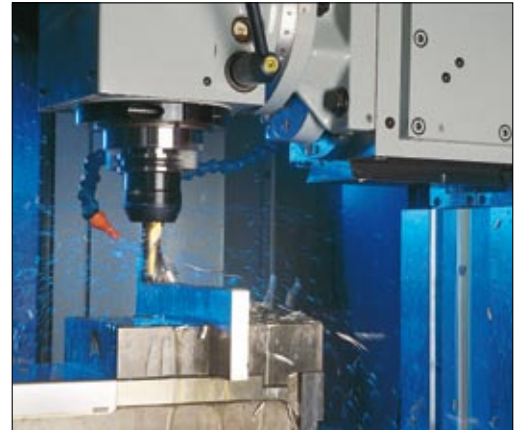
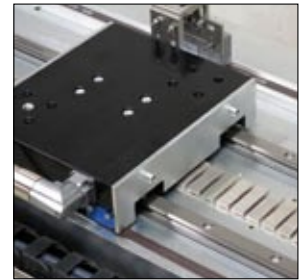
- Measuring lengths up to 90 m
- Parameters can be freely selected
- Sensors with or without integrated translation module
- System for incremental or absolute measured value acquisition
- Primary areas of application are in linear and rotative guide and drive engineering

MagLine Micro specifications

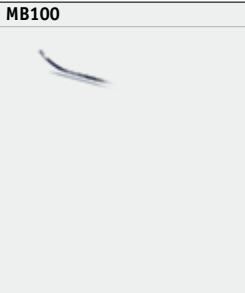










Resolution 0.2 ... 5 μm
System accuracy $\pm 10 \mu\text{m}$
Repeat accuracy $\pm 1 \mu\text{m}$
Sensor/band gap up to 0.4 mm



Micro systems detect measurement value and position data with optimum precision and reliability even in very adverse environmental conditions.

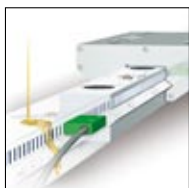


Combinations

Measurement method	Scale	Magnetic sensor	Interface	Downstream electronics unit
incremental		LE100/1 	analog 	governor/controller*
		MSK1000 	digital 	PLC, counter*
		MS100/1 	direct connection 	MA100/1 
absolute	MBA111 	MSA111C 	SSI, analog 	governor/controller*

* Customer-provided downstream electronics unit

MagLine Micro



Examples of use



Benefits

- Very high resolution
- Incremental/absolute
- Economical
- Small and compact

Pick-and-place linear drives with dowel drilling systems, parquet manufacture, tubular film packaging

MagLine Basic

Accuracy class 50 μm , typical resolution 10 μm

Profile

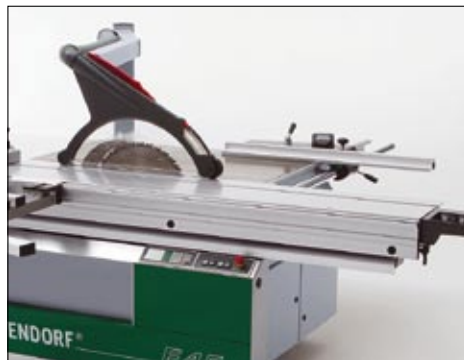
The application-proven, cleverly-devised Basic product series offers a particularly wide spectrum of matching components. These enable efficient solutions for a variety of individual applications, which fulfill all standard requirements of measurement precision.

Features:

- Infinite measurement lengths
- Sensors with or without integrated translation module
- System for incremental/absolute measured value acquisition
- Complete systems with sensor and connected display

MagLine Basic specifications

Resolution 1 ... 100 μm
System accuracy $\pm 25 \mu\text{m}$
Repeat accuracy $\pm 5 \mu\text{m}$
Sensor/band gap up to 2.5 mm



Motifs: Saw, angle stop: Wilhelm-Allendorf GmbH & Co. KG



In use: Incremental and absolute position measurement with Basic systems. Combination with compatible electronics enables connection to controls or direct on-site display.

Combinations

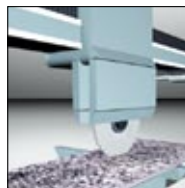
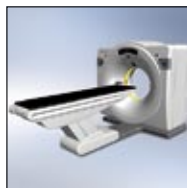
Measurement method	Scale	Magnetic sensor	Interface	Downstream electronics unit	
incremental	MB320		digital	PLC, counter*	
	MB500		digital	PLC, counter*	
		MS500		direct connection	MA503/1 (MagScale)
absolute	MBA		SSI	PLC, controller*	
		MSA		direct connection	MA505

* Customer-provided downstream electronics unit

MagLine Basic



Examples of use



CT patient tables, sliding table saws, stone cutting ...

Benefits

- Versatile system
- Easily definable
- Ideal in serial use
- Uncomplicated retrofitting

MagLine Macro

Accuracy class 1 mm, typical resolution 0.25 mm

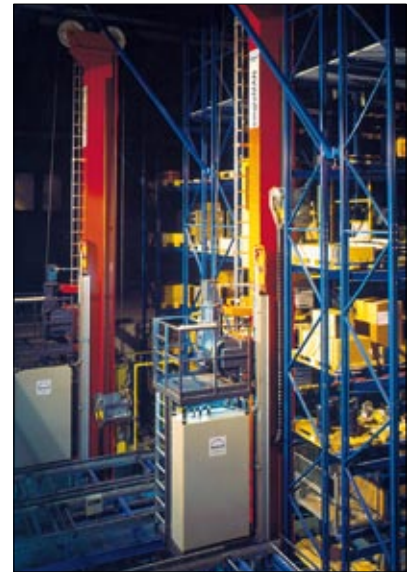
Profile

Specially designed for very long measurement distances with large tolerances, MagLine Macro enables safe position detection with millimeter accuracy and interplay of many flexible units.



Features:

- Infinite measurement lengths
- A reading distance of up to 20 mm forgives height impacts in the measuring distance
- System for incremental or absolute measured value acquisition
- Especially suitable for long measurement lengths, it finds its main use in storage and conveyance technology



MagLine Macro specification

Resolution 0.25 ... 2 mm

System accuracy ±1 mm

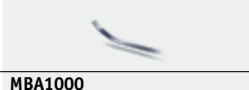

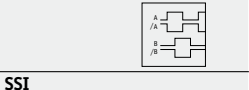


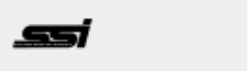
Repeat accuracy ±1 mm

Sensor/band gap up to 20 mm

The compact design of the scale and corresponding sensors permit simple and inconspicuous integration into almost any guide unit.



Combinations

Measurement method	Scale	Magnetic sensor	Interface	Downstream electronics unit
incremental	MB2000, MB4000 	MSK2000, MSK4000 	digital 	PLC, counter*
absolute	MBA1000 	MSA1000 	SSI 	PLC, controller*

* Customer-provided downstream electronics unit

MagLine Macro



Examples of use



Stone cutting, forklifts, waste and scrap presses ...

Benefits

- High resolution with very long measurement ranges
- High protection class (IP67)
- Large installation tolerances permitted

MagLine Roto

Accuracy class 0.05°, typical resolution 200 000 pulses

Profile

The open system of the Roto series is the ideal alternative to conventional optical encoder systems, especially for exact rotation or angle measurement under extreme conditions.



Extremely robust and designed for direct angle and rotation measurement – the contactless, magnetic measurement principle brings versatile benefits to typical MagLine Roto applications.



Features:

- Sensing of measured values under difficult environmental conditions
- Particularly long service life since strong mechanical loads are not transmitted to the measurement system
- Typical application areas are rotation or angle measurement e. g., at rotary tables

MagLine Roto specifications

Resolution 100 ... 200.000 pulses/revolution

















System accuracy ±0.05°

Repeat accuracy ±1 increment

Sensor/band gap up to 2 mm



Combinations

Measurement method	Scale	Magnetic sensor	Interface	Downstream electronics unit
incremental	MR	MSK320	digital	PLC, counter*
				
absolute	MBR	MSK210	digital	PLC, counter*
				
absolute	MBR500, MR500	ASA510H	SSI, analog, digital	PLC, controller*
			  	
absolute	MRA110	ASA110H	SSI, analog, digital	PLC, controller*
			  	

* Customer-provided downstream electronics unit

MagLine Roto



Examples of use



Wind energy plants, elevator technology, tube bending technology ...

Benefits

- High operational safety
- Long service life
- High protection class (IP67)
- Flexible, customer-specific ring solutions



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