

MAGLINE<sup>MICRO</sup>  
MAGLINE<sup>BASIC</sup>  
**MAGLINE<sup>MACRO</sup>**  
MAGLINE<sup>ROTO</sup>



Magnetic Length Measuring Systems...  
**...track-true, fast  
and reliable!**



## MAGLINE<sup>MICRO</sup>

Especially suitable for precise and highly dynamic processes on linear guide systems and applications in the field of motive power engineering. MAGLINE<sup>MICRO</sup> is a magnetically sensing incremental system with programmable resolutions of up to 1  $\mu\text{m}$  and a measuring accuracy of up to 10  $\mu\text{m}$ . MAGLINE<sup>MICRO</sup> operates without wear, with measuring values captured contactlessly. This makes the system a robust and economic alternative to optical measuring systems.

## MAGLINE<sup>BASIC</sup>

This system combines all advantages of the contactless magnetic measuring technology and offers resolutions of up to 5  $\mu\text{m}$  and a measuring accuracy of up to 50  $\mu\text{m}$ . MAGLINE<sup>BASIC</sup> is available both as an incremental or absolute measuring system. MAGLINE<sup>BASIC</sup> measures incrementally as well as absolutely and either provides digital encoder signals or directly displays the values measured at the position the sensor is placed.

**The incremental measuring system:** the easy and economic solution for standard mechanical engineering applications.

**the absolute measuring system:** for all applications that must be able to detect movements even without operating voltage.

## MAGLINE<sup>MACRO</sup>

cm

Especially designed for very long measuring lengths. A system for measuring lengths of 160 meters and more – incrementally or absolutely. Digital signal outputs allow data transmission of the measured values via the standard interfaces with a resolution and accuracy of up to 1 mm to a display unit or a master control.

## MAGLINE<sup>ROTO</sup>

Primarily developed for direct angle and rotation recording with all the advantages of magnetic, contactless sensing. Appropriate sensors register the incremental segmentation of magnet rings at a maximum resolution of 40,000 pulses per revolution.

# Contents

MAGLINE<sup>MACRO</sup> – Magnetic Length Measuring System MAGLINE<sup>MACRO</sup>



4 MAGLINE<sup>MACRO</sup> – the product and its applications.

5 Use at customer. Typical applications.

6 The system and its components.

7 Magnetic band MB400 / MB2000

8 Magnetic sensor MSK400/1

9 Magnetic sensor MSK2000

**A** The incremental measuring system: a simple and economic solution for standard applications in machinery-building industry.

10 Magnetic band MBA1000

11 Magnetic sensor MSA1000

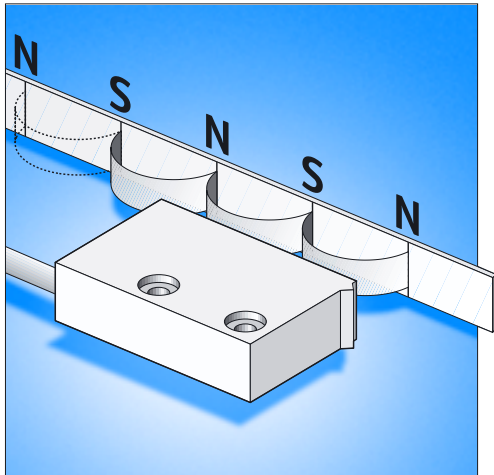
**B** The absolute system: for all applications where movements during power loss must be recognized.

12 Accessories

14 Appendix: Pin outs

# MAGLINE<sup>MACRO</sup> secure and wear-free

The magnetic linear system: insensitive to contamination.  
on measuring tracks of up to 160m.



4

MAGLINE<sup>MACRO</sup> works according to the principle of contactless sensing of magnetic graduations and converts measured values into digital or analog information.

Position registration belongs to the standard tasks of mechanical and systems engineering. The MAGLINE products of SIKO have already been in use for many years in modern and cost-effective solutions and have proved themselves superbly. The contactless measurement principle distinguishes itself from customary solutions, such as shaft encoders with gear mechanisms, cable-operated transducers or optical systems, by its extreme ruggedness even in the most difficult circumstances. Owing to its insensitivity to

almost any kind of contamination and wear the system is a cost-effective solution for many areas of application.

All interfaces customarily used in industry for connection to control, regulation or bus systems are available. A multitude of possible variants and system combinations, as well as an extensive range of accessories and special solutions round out the range and offer a suitable solution for almost any measurement task. The innovative sensing procedure of MAGLINE Macro offers a simple, robust and cost-effective technique for long measurement stretches, even of more than 160 meters with relatively modest requirements of precision.

A flexible steel band with Ferro-magnetic film is the essential component of the Macro series. The incremental design requires a band magnetized with north and south polarity at equal intervals. The absolute measurement method makes use of a special band with an

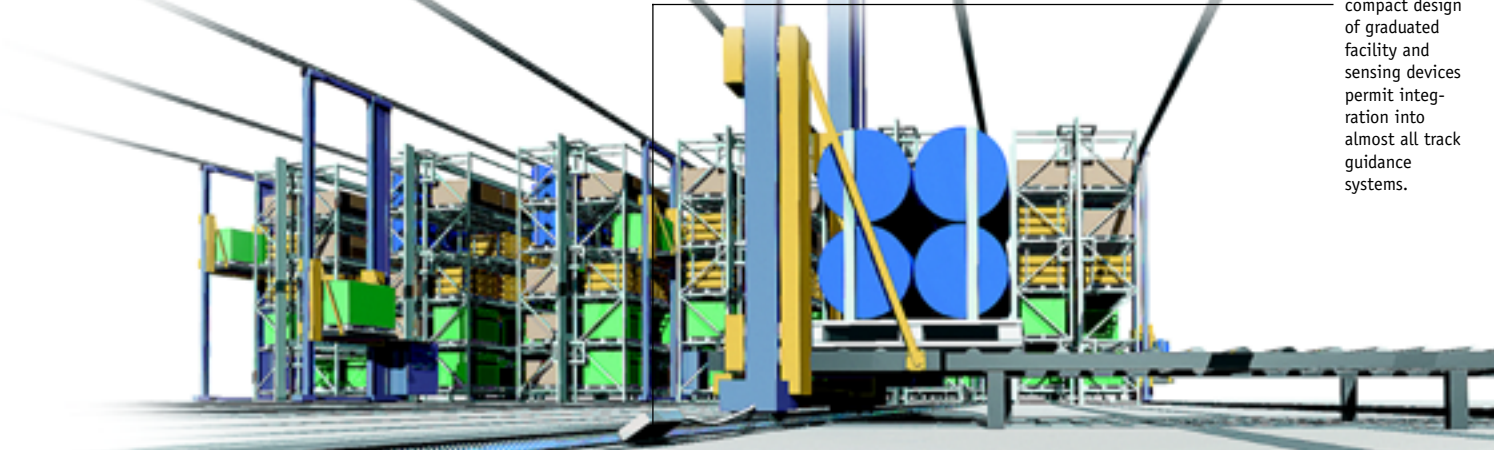
absolute code. This system will maintain calibration even if adjustments are made while power is off.

The band is fastened by simple adhesive mounting or by drawing into a groove and, if necessary, is additionally protected physically by a stainless steel covering band.

A sensor is traversed along the measuring band for the measuring and position registration and in this way the path information is scanned completely contactless and thus wear-free. In this approach intervals and tolerances of up to 4 mm are possible.

By means of a specially developed conversion procedure the position information and the movement direction are derived from the measurement signals. These are either displayed directly on site (with magnetic display) or are relayed via the customary interfaces to the control and regulation systems for further processing. The bus systems which are available enable connection to virtually all industrial control systems. The absolute measuring method makes use of a special band with an absolute code.

## MAGLINE<sup>MACRO</sup>



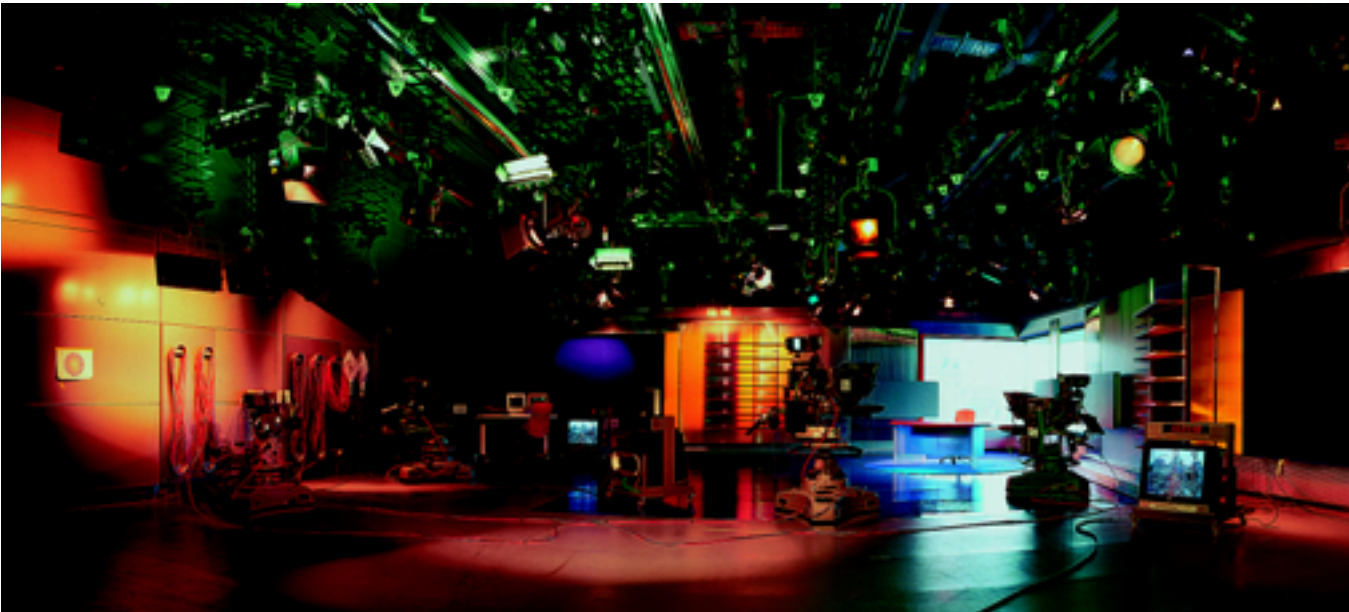
The small, compact design of graduated facility and sensing devices permit integration into almost all track guidance systems.

MAGLINE<sup>MACRO</sup> is a length measuring system which permits either incremental or absolute position registration. It is also designed for use in very long stretches such as in the warehousing and materials-handling fields. The large permissible tolerances of fitting offer high reliability in daily use. New areas of application, such as theatre stage and studio lighting, utilize millimeter precision. The customary interfaces enable easy integration

into control systems. The completely encapsulated sensor unit, without internal moving parts, gives the system high resistance to shock and vibration. Extreme areas of application, such as stone-working, take advantage of the high protection type IP67 and the insensitivity to even the strongest contamination.

## Use at customer

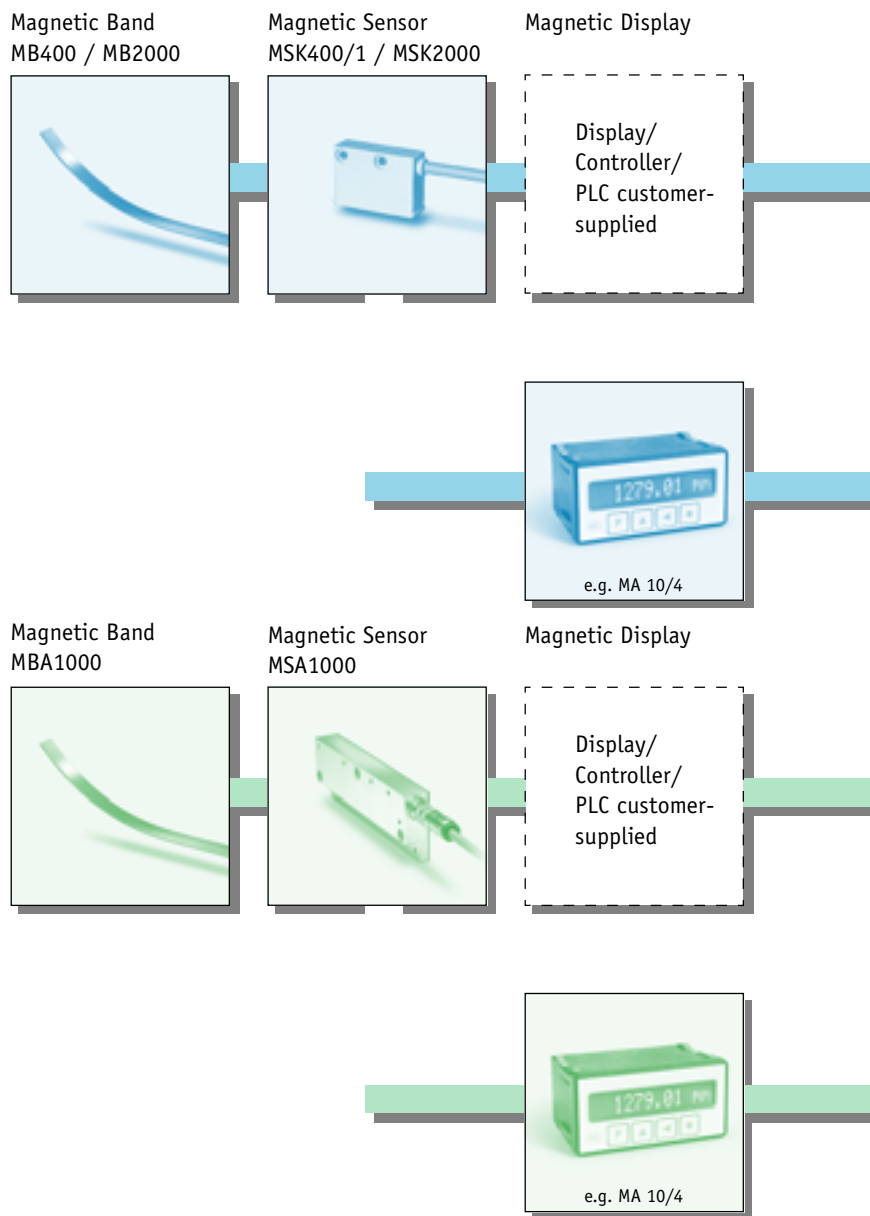
Typical applications



broadcast-service Hagen; AIO - Hauptstadt Sudio Berlin / MAN Logistik; Hochregallager / Mannesmann Dematic; Fabriktechnik

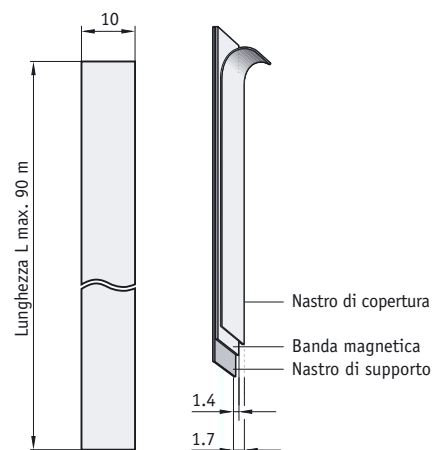
# Product Survey

MAGLINE<sup>MACRO</sup> and its components



# Banda magnetica MB400 / MB2000

La banda magnetica è costituita da uno speciale nastro magnetizzato, a passi regolari, saldamente unito al nastro di supporto. Per l'installazione è già premontato un adesivo speciale. Viene inoltre sempre fornito un nastro di copertura in acciaio inossidabile.



**Caratteristiche:**

- semplice montaggio adesivo
- stabile all'umidità, ai liquidi ed agli olii
- immune alla polvere, trucioli, olii ecc.

**Attenzione!** Per l'impiego corretto la lunghezza della banda magnetica deve essere maggiore di quella della corsa da misurare di circa 100 mm (MB400) / 200mm (MB2000).

Caratteristica	Dati d'ord.		Dati tecnici	Ulteriori informazioni
Tipo di banda magnetica	MB400	MB2000		
Larghezza	10	10	larghezza banda in mm	<b>standard</b>
	5	20	larghezza banda in mm	
Lunghezza	...	...	dati in m	(max. 90m)
Nastro adesivo	TM	TM	con	<b>standard</b>
	TO	TO	senza	
Nastro di copertura	AM	AM	con	<b>standard</b>
	AO	AO	senza	
Coefficiente di temperatura			$(11 \pm 1) \times 10^{-6} / K$	
Materiale nastro di copertura			acciaio inossidabile	
Temperatura di lavoro			-20°C ... + 70 °C	
Temperatura di stoccaggio			-40°C ... + 70 °C	
Tipo di montaggio			incollato	
Marchio di qualità			CE	

Il vostro ordine:  -  -  -  -





# Magnetic Band MBA1000

The magnetic band consists of a magnetic tape magnetized at regular distances and firmly joined with a carrier strip made of steel. A special adhesive tape is pre-applied for easy mounting. An additional stainless steel cover strip is also included as standard.



## Features:

- easy mounting by adhesive strip
- insensitive to humidity, liquids and oil
- insensitive to dust, shavings ...

**Attention!** Magnetic band length should exceed the actual measuring range by approximately 200 mm.

Feature	Ordering data	Technical data	Additional information
Width	10 A	10 mm	standard
Length	... B	length in m	(163 m, max.)
Carrier strip	St VA C	steel stainless steel	standard
Adhesive tape	1 0 D	with adhesive tape without adhesive tape	standard
Cover strip	with without E	with cover strip without cover strip	standard
Width		10 mm	
Thickness		1.5 mm	
Pole pitch		absolute encoding	
Temperature coefficient		$(11 \pm 1) \times 10^{-6} / K$	
Cover strip material		stainless steel	
Working temperature		-20 ... + 70 °C	
Storage temperature		-40 ... + 70 °C	

Your ordering: MBA1000 -  -  -

# Magnetic Sensor MSA1000

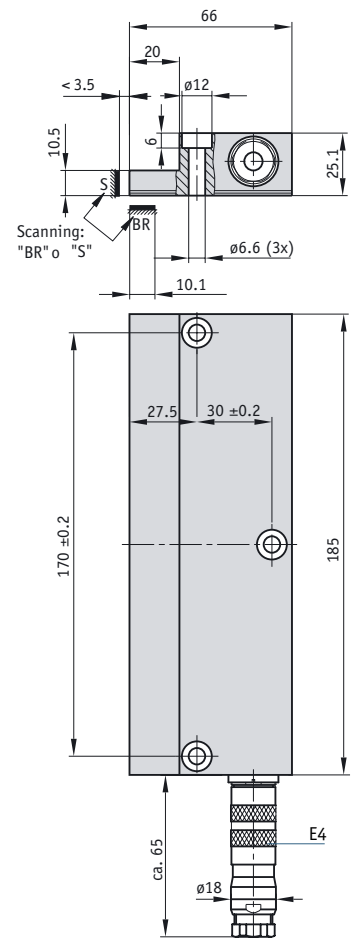
A completely innovative sensor for absolute position registration of especially long tracks.  
It works contactlessly and without wear.  
After switching on, the current position value is available without repeated referencing.

## Features:

- simple fitting and handling
- insensitive to dust, shavings, humidity
- resolution / repeat accuracy  $\pm 1$  mm
- via interface module connection to Interbus / Can-Bus / Profibus systems
- customer-specific integrated sensor electronics

## Note:

- Programming via RS485 with "demo1000.exe" or terminal program (see Appendix).



Feature	Ordering data	Technical data	Additional information
Measuring surface	S	narrow side	standard
	BR	broad side	
Connection /	EX	without plug	standard
	E3	angle plug, without cable	
	E4	circular plug, without cable	
cable length	OK	without cable	standard at 200 m max. baud rate SSI 125 kHz (10 x 0.25 mm <sup>2</sup> )
	...	max. 200 m	
Sealed electronics	SV	not sealed	for outdoor applications
	EV	completely sealed	
Power supply		24 VDC $\pm$ 20% with polarity protection	power consumption < 10 VA
Interfaces		SSI	position value output (24Bit)
		RS485 SIKO standard protocol*	position value output (ASCII, binary)
		RS485 SIKONETZ3 protocol**	position value output (binary), for bus operation
Measuring length		$\leq 163$ m	
Resolution		1 mm	
Real-time reaction		up to $v = 0.5$ m/s	
Max. travel speed:		5 m/s	
Gap band / sensor		0.1 ... 3,5 mm	
Radius for cornering		inner radius minimum 1.3 m	outer radius minimum 1.0 m
System accuracy		$\pm (2.5 + 0.03 \times L)$ mm [L in m]	at $T_U = 20^\circ$ C
Repeat accuracy		$\pm 1$ mm	
Temperature ranges		working temperature $-20^\circ$ C ... $+55^\circ$ C	storage temperature $-20^\circ$ C ... $+85^\circ$ C
Interference protection class		3	accord. to DIN EN 50081-2 and DIN EN 50082-2
Protection type		IP65	
Housing		aluminium	

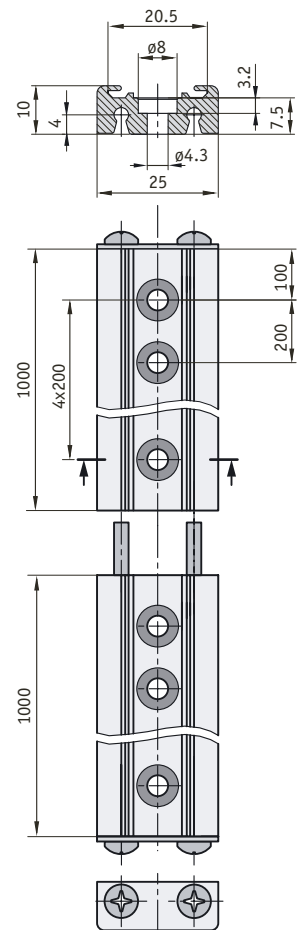
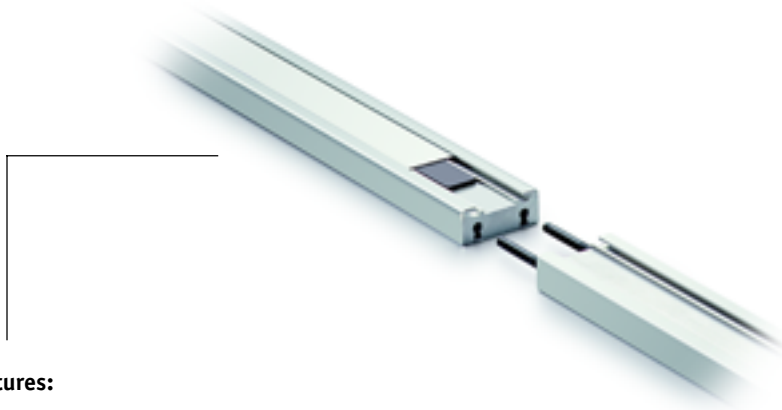
\* parameterization (origin/calibration/offset value; counting direction; output code SSI)

\*\* parameterization (origin/calibration/offset value; counting direction)

Your ordering: MSA1000 -  -  -  -

# Profile Rail PS, Protective Strip SB

Complete and robust mounting unit for 10 mm wide magnetic bands. For extremely commanding applications the pushed-in protective strip gives additional protection.



**Features:**

- easy mounting
- no adhesive connections
- ideal to insert magnetic band
- plug-in modules to allow easy extension

Feature	Ordering data	Technical data	Additional information
<b>Profile rail</b>	<b>PS</b>		coupling pins and closing panel included in scope of supply
Length	1.0 ...	<b>A</b> 1.0 m length in meters	<b>standard</b> 0.3 ... 10 m (in 0.1 m steps)
Width x height		25 x 10 mm	
Material		aluminium	
<b>Protective strip SB</b>	<b>20</b>	<b>A</b> width 20 mm	optional width 5 / 9 / 10
Length	1.0 ...	<b>B</b> 1.0 m length in meters	<b>standard</b> required length = profile rail + 36 mm
Adhesive tape	<b>without</b> <b>with</b>	<b>C</b>	adhesive tape not required in connection with PS
Material		stainless steel	

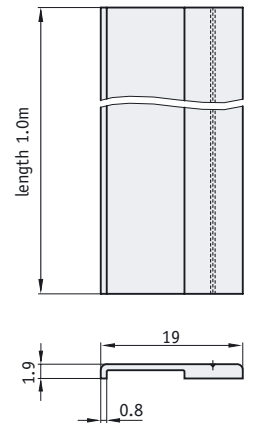
Your ordering:  -

Your ordering:  -  -  -

Accessory

# Profile Rail PS1

Continuous cast profile to safely cover magnetic bands with a width of up to 10 mm.



**Features:**

- easy mounting
- for strong protection of magnetic bands

Feature	Ordering data	Technical data	Additional information
Length	1.0 ...	1.0 m length in meters	standard
Material		aluminium	
Mounting type		screwed	with slot for easy boring

Your ordering:  -

# Appendix / Pin outs

## MSK400/1, MSK2000

Connection type **E1**



Connection type **E6**



**E1**                      **E6**

MSK400/1

Colour	PIN	Signal
black	1	GND
red	2	A
orange	3	B
	4	N.C.
brown	5	+UB
	6	N.C.
	7	N.C.
white		Schirm

MSK2000 without inverted signals

Colour	PIN	Signal
black	1	GND
brown	2	+UB
red	3	A
orange	4	B

MSK2000 with inverted signals

Colour	PIN	Signal
red	1	A
orange	2	B
blue	3	N.C.
brown	4	+UB
black	5	GND
yellow	6	A/
green	7	B/

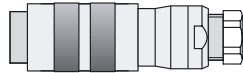
MSK2000 with inverted signals and reference signal

Colour	PIN	Signal
red	1 (A)	A
orange	2 (B)	B
blue	3 (C)	I
brown	4 (D)	+UB
black	5 (E)	GND
yellow	6 (F)	A/
green	7 (G)	B/
violet	8 (H)	I/

# Appendix / Pin outs

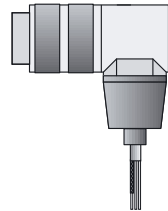
## MSA1000

Connection type E4



## MSA1000

Connection type E3



MSA1000

Colour	PIN	Signal
pink	A	SSI-Daten -
blue	B	SSI-Daten +
red	C	SSI-Takt -
black	D	SSI-Takt +
brown	E	+24 V
white	F	RS485 GND
yellow	G	RS485 DÚA
green	H	RS485 DÚB
gray	J	GND
-	K	GND
violet	L	configuration
-	M	-

Attention! Signals GND and RS485GND are not identical must not be interconnected!

### Programming note

The RS485 interface is integrated as the standard. On the customer's site the MSA1000 can be programmed non-volatilely with some specific parameters (origin / calibration / offset value; counting direction; SSI output code) and these can be changed again at any time. For this it is merely necessary to use a level transducer (e.g. Spectra type i-7520) in order to make the link between the serial RS232 interface of a PC and that of the RS485 interface of the sensor. For this purpose the SIKO terminal program "sikoterm.exe" is suitable or, with even more features, the programming tool "demo1000.exe" (DOS/Win95/Win98/WinME).

The "sikoterm.exe" and "demo1000.exe" programs can be obtained from SIKO or can be downloaded from Internet in their latest versions at the address: <http://www.siko.de> -> Download -> programmes



**SIKO GmbH**

Dr.-Ing. G. Wandres

Weihermattenweg 2  
79256 Buchenbach  
Germany

**Telefono**

+49 (0) 76 61 / 394 - 0

**Telefax**

+49 (0) 76 61 / 394 - 388

**eMail**

info@siko.de

**Internet**

www.siko.de

Looking for a dealer  
near to you?

You can find the complete  
addresses of all SIKO product  
representants in the support  
section on our website:

www.siko.de

**SIKO Ltd.**

Unit 6, Dalton Lane  
Codbeck Estate, Dalton  
Thirsk, North Yorkshire  
YO7 3HR  
United Kingdom

**Telefono**

+44 1845 / 57 88 45

**Telefax**

+44 1845 / 57 77 81

**eMail:**

sales@siko-uk.com

**Internet:**

www.siko-uk.com

**SIKO Italia S.r.l.**

Via Borromeo, 4  
I-20017 Rho MI  
Italy

**Telefono**

+39 02 93 90 63 29

**Telefax**

+39 02 93 46 95 32

**eMail**

info@siko-italia.com

**Internet**

www.siko-italia.com

**Rappresentante per il TRIVENETO**

TODESCATO  
Via A. Palladio, 13/e  
36040 SAREGO - VICENZA

**Telefono**

+39 340-8102809

**Telefax**

+39 0444 820426

**eMail**

info@todescato.com

**Internet**

www.todescato.com