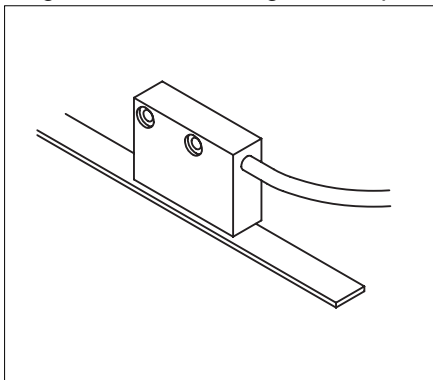


MSK200/1 + MB200

Magnetic sensor / Magnetic strip



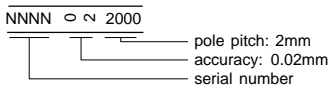
ENGLISH

1. Warranty information

- In order to carry out installation correctly, we strongly recommend this document is read very carefully. This will ensure your own safety and the operating reliability of the device.
- Your device has been quality controlled, tested and is ready for use. Please observe all warnings and information which are marked either directly on the device or specified in this document.
- Warranty can only be claimed for components supplied by SIKO GmbH. If the units are used together with other products, the warranty for the complete system is invalid.
- The guarantee period is 6 months starting with the date of invoice.
- Repairs should be carried out only at our works. If any information is missing or unclear, please contact the SIKO sales staff.

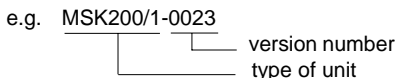
2. Identification

Magnetic strip: identification by printing on the strip.



Magnetic sensor: The particular type of unit and type number can be seen from the identification

plate. Type number and the corresponding version are indicated in the delivery documentation.



3. Installation

For mounting, the degree of protection specified must be observed. If necessary, protect the unit against environmental influences such as sprayed water, dust, knocks, extreme temperatures, solvents.

3.1 Mounting the magnetic strip

The mounting surface / measuring track must be flat. Buckles or bumps will lead to measuring inaccuracies.

For applications which do not allow properly glueing of the magnetic strip, it can be inserted into a **profile rail** (accessory) - eg. rail type **PS** or **PS1** thus forming a compact mounting unit.

For technical reasons the strip should be approx. 25 mm longer than the actual measuring distance.

Attention! To guarantee **optimal adhesion** oil, grease dust etc. must be removed by using cleansing agents which evaporate without leaving residues. Suitable cleansing agents are eg. ketones (acetone) or alcohols; Messrs. Loctite and 3M can both supply such cleansing liquid. Make sure that the surface to be glued is dry and apply the strip with maximum pressure. Glueing should preferably be undertaken at temperatures between 20 to 30° C and in dry atmosphere.



Advice! When applying long pieces of magnetic strip do not immediately remove the complete protective foil, but rather peel back a short part from the end sufficient to fix the strip. Now align the strip. As the protective strip is then peeled back and out press the tape firmly onto the mounting surface. A wall paper roller wheel could be used to assist in applying pressure onto the magnetic strip when fixing it in position.

Mounting steps (see fig. 1)

- Clean mounting surface (1) carefully.
- Remove protective foil (2) from the adhesive side of the magnetic strip (3).
- Stick down the magnetic strip (4).
- Clean surface of magnetic strip carefully.
- Remove protective foil (6) from adhesive tape on the cover strip (5).

- Fix cover strip (both ends should slightly overlap).
- Also fix cover strip's ends to avoid unintentional peeling.

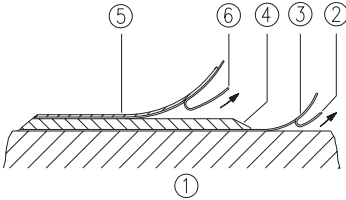


Fig. 1: Mounting of the magnetic strip



Attention! Do not expose the system to magnetic fields. Any direct contact of the magnetic strip with magnetic fields (eg. adhesive magnets or other permanent magnets) is to be avoided. Sensor movements during power loss are not captured by the follower electronics.

Mounting examples

Mounting with chamfered ends (fig. 2) is not recommended unless the strip is installed in a safe and protected place without environmental influences. In less protected mounting places the strip may peel. There we recommend mounting accord. to fig. 3 and 4.

Mounting in a groove (fig. 5) best protects the magnetic strip. The groove should be deep enough to totally embed the magnetic strip.

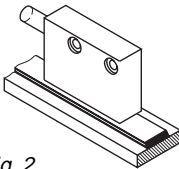


Fig. 2

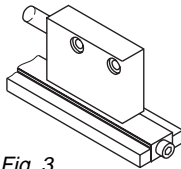


Fig. 3

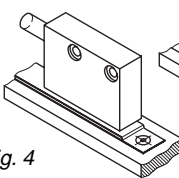


Fig. 4

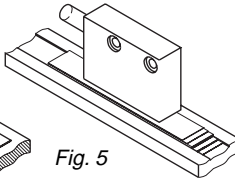


Fig. 5

3.2. Mounting of the magnetic sensor

The magnetic sensor can be fastened by using 2 bolts M3 over the Ø3.5mm through holes.

- Cables should be layed in such a way that there is no danger of damaging. Provide tension relief and drag chain or casing, if necessary.
- **Observe the correct alignment with regard**

to the counting direction (Figs.6). This does not apply if the counting direction can be reversed in the electrical interpretation . e.g. with SIKO's magnetic-strip displays)

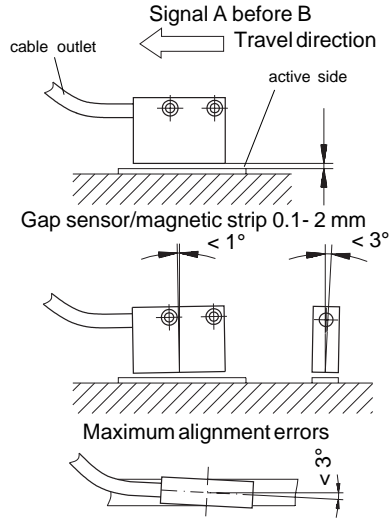


Fig. 6: Definition of the counting direction with magnetic strip **MB200** and assemblage of sensor / magnetic strip, gap measures, tolerances

4. Output signals

The integrated interpretation electronics **MSK200/1** converts the magnetic length information of the magnetic sensor into incremental output signals. The signal output is proportional to their velocity. Please note that pulses of e.g. 1µs (standard) may occur during standstill (due to the internal interpolation procedure). The maximum travel speed of the sensor depends on the factory-set pulse gap (see table. 1)

Attention! When diomensioning the follow-up electronics, care should be taken that it is designed for the set pulse width.



Maximum travel speed [m/s]

Pulse gap [in µs]	Resolution[in mm] 0.004	0.005	0.01
4µs	0.6	0.8	1.6
2µs	1.2	1.6	3.2
1µs	2.5	3.2	6.4
0,5µs	5.1	6.4	12.8
0,25µs	10.2	12.8	25

Table. 1: Max. travel speed as a function of the pulse gap.

Signal sequence

The reference signal 0 is emitted after every 2,0 mm independent of the resolution.

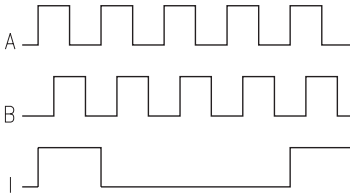


Fig. 7 : Output signals A and B with reference signal (1 increment)



Attention ! The logical allocation A, B with reference signal A, B, I may change.

5. Referencing

The integrated interpretation electronics **MSK200/1** is a component of an incremental measuring system, which must be referenced for absolute measurement at a defined position (reference point). For this, the reference signal must be connected with the signal of a reference Referenzwertgeber REF (e.g.: cam switch or proximity switch). If the follower electronics reacts flange-controlled, the reference point can be set with a repeat accuracy of ± 1 increment.

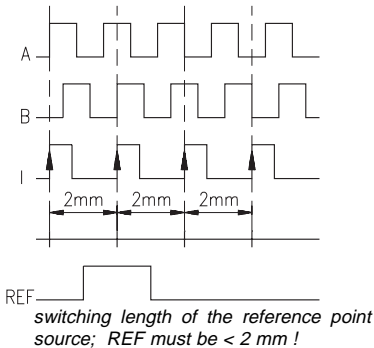


Fig. 8: Calibration principle

6. Electrical connection

- Wiring must only be carried out with power off!
- Check all lines and connections before switching on the equipment.

Interference and distortion

All connections are protected against the effects of interference. **The location should be selected to ensure that no capacitive or inductive**

interferences can affect the sensor or the connection lines! Interference can be caused by motors, switch gear, cyclic controls and contactors. Suitable wiring layout and choice of cable can minimise the effects of interference.

Necessary measures:

- Only screened cable should be used. Wire cross section is to be at least 0,14 mm², max. 0,5 mm².
- Wiring to the screen and ground (0V) must be secured to a good point. Ensure that the connection of the screen and earth is made to a large surface area with a sound connection to minimise impedance.
- The sensor should be positioned well away from cables with interference; if necessary a **protective screen or metal housing** must be provided. The running of wiring parallel to the mains supply should be avoided.
- Contactor coils must be linked with spark suppression.

Supply voltage

Operating voltage depends on execution and is indicated in the delivery documentation or on the identification plate.

Eg.: 24 VAC $\pm 20\%$

Attention ! Length of the connection cable between sensor and follower electronic must not exceed 20 m.



6.1 Connection methods

Connection type E1

Flying leads.

1. Remove cable coating.
2. Open screening and twist it.
3. Strip stranded wires to a length of 5 mm and twist them.
4. Pinch stranded wires.

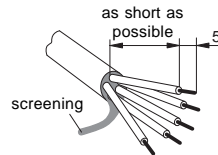


Fig.9: Connection type E1

Connection type E6

Connection with mit coupler plug and coupler socket. Plug mounting according to fig.11.

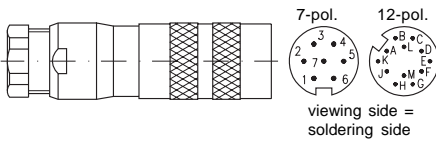


Fig. 10: Coupling socket E6

1. Slip parts 6 to 10 over outer cable.
2. Strip cable.
3. Turn down screening.
4. Push part 5 onto ferrules.
5. Solder wires to part 3 (according connection diagram).
6. Open spacer (part 4) and put it over ferrules, squeeze and push it onto part 3. Slot and keyway of parts 3 and 4 must align.
7. Press parts 6 and 5 together; cut protruding screening.
8. Push parts 2 and 7 together and screw part 11 using appropriate tool.
9. Push part 8 into part 9 and slide both parts into part 7.
10. Screw parts 10 and 7 together.
11. Push part 1 into part 2.

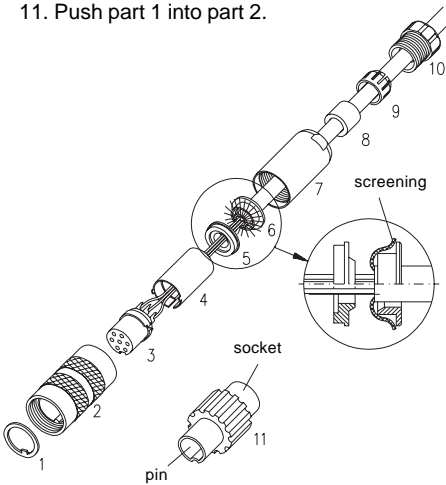


Fig. 11 : Mounting connection type E6

E8: Connection with 9-pole D-SUB plug

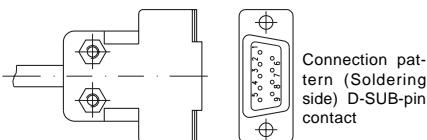


Fig. 12 : Connection type E8 / D-SUB

6.2 Pin-outs

Signal inverted

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

Signal inverted with reference signal

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

With the coupler plug (socket) E6 the PIN-designation is numerical up to pole 8 and alphabetical from pole 12 onwards. See PIN indication in brackets.

Attention! Unused PINs are not listed.



7. Joining magnetic strips together

For some applications it may be necessary to extend the magnetic strip. The magnetic strip can be cut and rejoined using standard tools.

But however carefully this is done the accuracy of the strip at the join will be impaired (error of at least 0,1 ... 0,2 mm).

The following tools / accessories are required:

- magnet magnifier, magnetic foil or metal dust
- rule or suitable tool
- compass needle

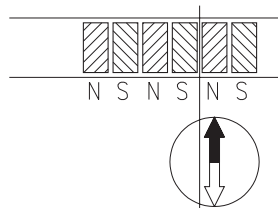


Fig. 13: Determination of the pole position.

Cutting the magnetic strip

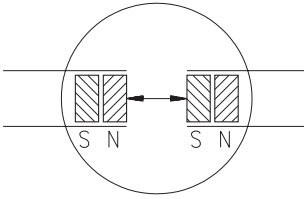


Fig. 14: Determination of the pole position. Joining the magnetic strip

Steps

- If there is a cover strip, this is to be removed first.
- To determine the pole division either use metal dust, a magnet magnifier or magnetic foil.
- If necessary, use a compass needle to determine the location of the poles on the magnetic strip (fig. 13).
- Use a rule and a sharp knife to cut the magnetic strip at a right angle. Then also cut the carrier strip accordingly.
- Previous steps are to be repeated with the other part of strip.
- Check polarity before joining the two parts. Both ends must attract each other (if necessary, use compass needle). In case both ends have the same polarity, shorten one end by a half pole division (fig. 14).
- Join the two ends closely together and add the cover strip.

8. Maintenance

We recommend cleaning the magnetic strip's surface from time to time with a soft rag. This avoids dirt (dust, chips, humidity ...) sticking to the strip.

9. Trouble shooting

Below are some typical errors which may occur during installation and operation:

- Magnetic strip incorrectly mounted (active surface must be mounted towards the sensor) (see chapter 3.1)
- Use of foreign protective strip. Must always be non-magnetic.
- Sensor not or incorrectly connected (pin connection, see chapter 6.2).
- Tolerance for the gap between magnetic sensor and magnetic strip not observed over the

total travel distance. Sensor touches strip (see fig. 6)

- Cable squeezed / interrupted / cut by sharp edges.
- Sensor's active side not mounted towards the magnetic strip (see fig. 6). The active side is marked by the label "scale side".
- Sensor has not been aligned according to chapter 6.

SIKO GmbH
DR.-ING. G. WANDRES

Postanschrift / Postal address:
Postfach 1106
D-79195 Kirchzarten

Werk / Factory:
Weihermattenweg 2
D-79256 Buchenbach

Telefon / Phone 0 76 61 / 3 94 - 0
Telefax / Fax 0 76 61 / 3 94 - 388
Internet www.siko.de

