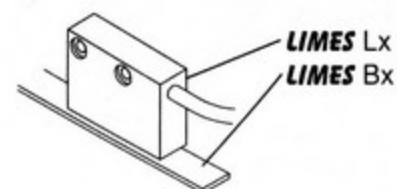


## User Information

Magnetic sensor **LIMES L1** and **LIMES L2**  
Magnetic strip **LIMES B1** and **LIMES B2**



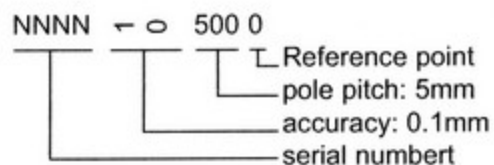
## 1. Warranty information

- 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 Kübler GmbH. If the system is used together with other products, there is no warranty for the complete system.
- Repairs should be carried out only at our works. If any information is missing or unclear, please contact the Kübler GmbH sales staff.

## 2. Identification

### Magnetic strip:

identification by printing on the strip.



## 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.

## 3.1 Mounting the magnetic strip

The mounting surface / measuring track must be flat. Buckles or bumps will lead to measuring inaccuracies. For technical reasons the strip should be approx. 100mm 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.

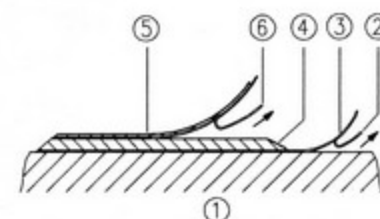


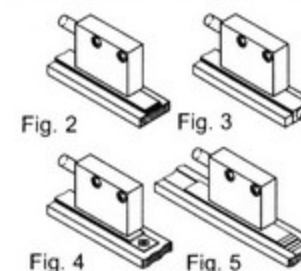
Fig. 1 mounting of the magnetic strip

### 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.



## 3.3 Mounting of the magnetic sensor

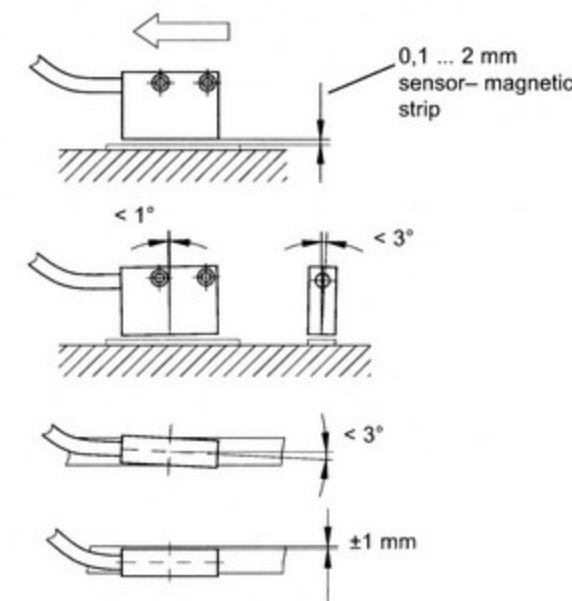
### LIMES L1 and L2

The magnetic sensors **LIMES L1** and **L2** can be fastened by using two bolts M3 over the  $\varnothing 3.5$  mm through holes.

Cables should be layed in such a way that there is no danger of damaging. Provide ten-sion relief and drag chain or casing, if neces-sary.

**Observe the correct alignment with regard to the counting direction (Figs.6).**

**Attention!** The tolerance and gap measures must be observed over the whole measuring length.



Mounting magnetic sensor/magnetic strip

## 4. 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!** Suitable wiring layout and choice of

cable can minimise the effects of interference (eg. interference caused by SMPS, motors, cyclic controls and contactors).

## Necessary measures:

Only screened cable should be used. Wire cross section is to be at least 0,14 mm<sup>2</sup>, max. 0,5 mm<sup>2</sup>.

- 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 system 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

The voltages depend on the sensor designs; they are to be taken from the delivery documentation and the identification plate.

e.g.: 24 VDC ±20%

**Attention!** When connecting sensor and follow electronics, please do not exceed the max. admissible cable length.

**Note:** In case of operating voltage 24 VDC, output circuit LD and index signal I / reference signal R we recommend use of terminal resistors 300 Ohm in order to avoid thermic overload.

## 4.1 Connection type

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

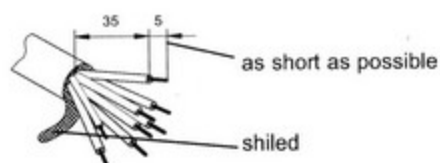


Fig. 7 connection

## 4.2 Pin outs

|     |        |
|-----|--------|
| A   | red    |
| B   | orange |
| I   | blue   |
| UB  | brown  |
| GND | black  |
| A̅  | yellow |
| B̅  | green  |
| I̅  | violet |

## 5. 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.

## 7. 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 4.2).
- 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).
- Sensor has not been aligned according to chapter 6.

## Technical data magnetic sensor LINES LT:

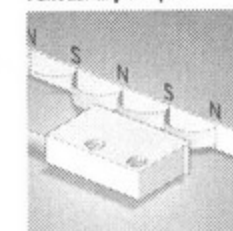
|                                |   |
|--------------------------------|---|
| Supply voltage:                | 24 V DC ±20 % or 5 V DC ±5 %  |
| Connection / cable length:     | flying leads/2 m cable  |
| Output circuit:                | push pull or line-driver*   |
| Output signal:                 | inverted  |
| Reference signal:              | index periodical  |
| Resolution:                    | 0.025 mm on quadruple evaluation  |
| Power consumption:             | max. 70 mA  |
| Output signals:                | A, B, A̅, B̅, I, I̅   |
| Gap sensor / magnetic band:    | 0.1 ... 1.0 mm  |
| Adjusting tolerance:           | lateral offset: ± 1 mm; angle offset ± 3°                                       |
| System accuracy:               | ± (0.05 + 0.01 × L) mm, L: length in [m] at T = 20 °C                           |
| Repeat accuracy:               | ± 1 increment   |
| Jitter:                        | < 15% for sensor/magnetic band gap 0,5 mm                                       |
| Travel speed:                  | max. 25 m/s   |
| Interference protection class: | 3, to IEC 801   |
| Humidity:                      | 100 % rF, condensation permissible  |
| Temperature ranges:            | working temperature: -10 ... +70 °C<br>storage temperature: -30 ... +80 °C      |
| Shock resistance:              | 200 g/8 ms  |
| Vibration resistance:          | 10 g/50 Hz  |
| Protection class:              | IP67 according to DIN 40050 (housing)   |
| Housing:                       | Plastic, green  |
| Cable:                         | PUR 8x0,1 mm <sup>2</sup> shielded, may be used in trailing cable installations |

\* For line driver (LD) output, terminal resistance are to be used > 470 Ohm to prevent thermal stress

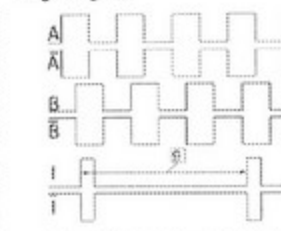
## Technical data magnetic band LINES B1:

|                          |   |
|--------------------------|---|
| Pole gap:                | 2 mm from pole to pole  |
| Dimensions:              | Width: 10 mm; Thickness: 1.7 mm with masking tape   |
| Temperature coefficient: | (11±1)×10 <sup>-6</sup> /K  |
| Temperature ranges:      | working temperature: -20 ... +70 °C<br>storage temperature: -40 ... +70 °C  |
| Mounting:                | adhesive joint  |
| Measuring:               | 0.1 m (to get optimal measuring results the magnetic band should be about 0.1 m longer than the desired measuring length) |

## Functional principle:



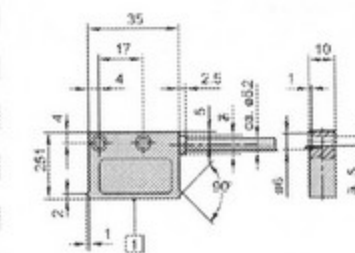
## Signal figures



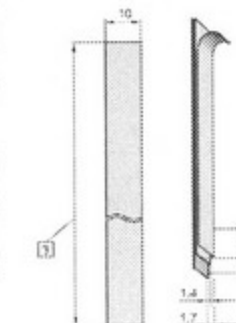
## Connection:



[9] periodical index signal (all 2 mm) the logical allocation A, B and I-signal can change



[1] active measuring



[3] length L, max. 90 m

[4] masking tape

[5] magnetic band

[6] carrier band

## Inverted signal with index signal

| Signal | Colour |
|--------|--------|
| GND    | black  |
| UB     | brown  |
| A      | red    |
| B      | orange |
| A̅     | yellow |
| B̅     | green  |
| I      | blue   |
| I̅     | violet |

## Anschluss / Connection

|      |           |        |
|------|-----------|--------|
| GND  | - schwarz | black  |
| UB   | - braun   | brown  |
| A    | - rot     | red    |
| B    | - orange  | orange |
| /A   | - gelb    | yellow |
| /B   | - grün    | green  |
| Idx  | - blau    | blue   |
| /Idx | - violett | violet |