

# Linear measuring technology

**Incremental magnetic measurement system  
sensor head, magnetic band**

**Limes LI20 / B1**

**Resolution min. 10 µm**



The non-contact incremental magnetic linear measurement system Limes LI20 / B1 - made up of the sensor head LI20 and of the magnetic band B1 - reaches a resolution up to 10 µm with a maximum distance of 1 mm between the sensor and the band.

For outdoor use with extremely sturdy aluminum housing and stainless-steel cover, wide temperature range as well as a UV-resistant cable. IP68 / IP69k protection, special encapsulation technology and tested resistance to cyclic humidity and damp heat offer the highest levels of reliability, even in exposed outdoor use.



Temperature range



High protection level



Shock / vibration resistant



Reverse polarity protection

## Robust

- Sturdy housing with IP67 protection.  
Option: special housing for maximum resistance against condensation (IP68 / IP69k, resistance to cyclic humidity acc. to EN 60068-3-38 as well as damp heat acc. to EN 60068-3-78).
- Non-contact measuring system – free from wear.
- Masking tape protecting the magnetic band.

## Easy installation

- Simple glued assembly of the magnetic band.
- Large mounting tolerances.
- Requires very little installation space.
- Warning signals via LED if the magnetic field is too weak.

## Order code sensor head Limes LI20

**8.LI20.X1X1.2XXX**  
Type      a      b      c      d      e      f

### a Model

- 1 = IP67, standard
- 2 = IP68 / IP69k and humidity tested acc. to EN 60068-3-38, EN 60068-3-78

### b Pulse edge interval

- 1 = standard

### c Output circuit / power supply

- 1 = RS422 / 4.8 ... 26 V DC
- 2 = Push-pull / 4.8 ... 30 V DC

### d Type of connection

- 1 = cable, 2 m [6.56'] PUR

### e Reference signal

- 2 = index periodic

### f Code (resolution)<sup>1)</sup>

- 005 = 100 µm
- 020 = 25 µm
- 050 = 10 µm

### Stock types

- 8.LI20.1111.2005
- 8.LI20.1111.2020
- 8.LI20.1111.2050
- 8.LI20.1121.2005
- 8.LI20.1121.2020
- 8.LI20.1121.2050

## Order code magnetic band Limes B1

**8.B1.10.010.XXXX**  
Type      a      b

### a Width

- 10 = 10 mm

### b Length

- 0010 = 1 m      0060 = 6 m
- 0020 = 2 m      0100 = 10 m
- 0040 = 4 m      0200 = 20 m
- 0050 = 5 m

### Optional on request

- other lengths up to 70 m

### Stock types

- 8.B1.10.010.0010

<sup>1)</sup> With quadruple evaluation (only connected with magnetic band Limes B1)

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<b>Incremental magnetic measurement system sensor head, magnetic band</b>		<b>Limes LI20 / B1</b>	<b>Resolution min. 10 µm</b>
<b>Accessories / display type 572</b>			Order no.
<b>Position display, 8-digit</b>	with 4 fast switch outputs and serial interface		<b>6.572.0116.D05</b>
	with 4 fast switch outputs, serial interface and scalable analog output		<b>6.572.0116.D95</b>
<b>Position display, 8-digit</b>	with 4 fast switch outputs and serial interface		<b>6.572.0118.D05</b>
	with 4 fast switch outputs, serial interface and scalable analog output		<b>6.572.0118.D95</b>

Further accessories can be found in the accessories section or in the accessories area of our website at: [www.kuebler.com/accessories](http://www.kuebler.com/accessories).  
Additional connectors can be found in the connection technology section or in the connection technology area of our website at: [www.kuebler.com/connection\\_technology](http://www.kuebler.com/connection_technology).

## Technical data

Mechanical characteristics sensor head LI20		
<b>Working temperature</b>	-20°C ... +80°C [-4°F ... +176°F]	
<b>Storage temperature</b>	-20°C ... +80°C [-4°F ... +176°F]	
<b>Shock resistance</b>	5000 m/s <sup>2</sup> , 1 ms	
<b>Vibration resistance</b>	300 m/s <sup>2</sup> , 10 ... 2000 Hz	
<b>Protection</b>	model 1	IP67 acc. to EN 60529
	model 2	IP68 / IP69k acc. to EN 60529 and humidity tested acc. to EN 60068-3-38, EN 60068-3-78
<b>Housing</b>	aluminum	
<b>Cable</b>	2 m [6.56'] PUR 8 x 0.14 mm <sup>2</sup> [AWG25] shielded, may be used in trailing cable installations	
<b>Status LED</b>	green	pulse-index
	red	error; speed too high or magnetic fields too weak (at 8.LI20.XXXX.X020 and 8.LI20.XXXX.X050)

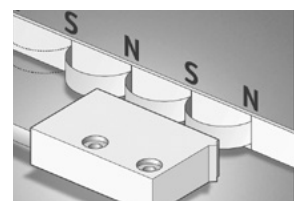
Electrical characteristics sensor head LI20		
<b>Output circuit</b>	Push-pull	RS422
<b>Power supply</b>	4,8 ... 30 V DC	4,8 ... 26 V DC
<b>Permissible load / channel</b>	±20 mA	120 Ω
<b>Max. cable length</b>	max. 30 m [98.43']	RS422 standard
<b>Power consumption (no load)</b>	typ. 25 mA, max. 60 mA	
<b>Short circuit proof</b> <sup>1)</sup>	yes	yes <sup>2)</sup>
<b>Min. pulse edge interval</b>	1 µs (corresponds to 4 µs/cycle see signal figures below)	
<b>Output signal</b>	A, $\bar{A}$ , B, $\bar{B}$ , 0, $\bar{0}$	
<b>Reference signal</b>	index periodical <sup>3)</sup>	
<b>CE compliant acc. to</b>	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU	

Magnetic band Limes B1	
<b>Pole gap</b>	2 mm from pole to pole
<b>Dimensions</b>	width 10 mm thickness 1,97 mm incl. masking tape
<b>Temperature coefficient</b>	16 x 10 <sup>-6</sup> /K
<b>Working temperature</b>	-20°C ... +80°C [-4°F ... +176°F] <sup>4)</sup>
<b>Mounting</b>	adhesive joint
<b>Measuring</b>	0.1 m (to receive an optimal result of measurement, the magnetic band should be ca. 0.1 m longer than the desired measuring length)
<b>Bending radius</b>	≥ 150 mm (when mounted solely with adhesive tape)
<b>Material metal tape</b>	precision steel strip 1.4310 acc. to EN 10088-3

Accuracy	
<b>Magnetic band</b>	± (0,025 + 0,02 x L) mm – L in [m], up to L <sub>max</sub> = 70 m
<b>Sensor head</b>	± 0,01 mm interpolation error accuracy: at T = 20°C and gap sensor head/magnetic band 0,4 mm
<b>Repeat accuracy</b>	±1 increment
<b>Resolution and speed</b> <sup>5)</sup>	100 µm (quadruple), max. 25 m/s 25 µm (quadruple), max. 4 m/s 10 µm (quadruple), max. 6,5 m/s

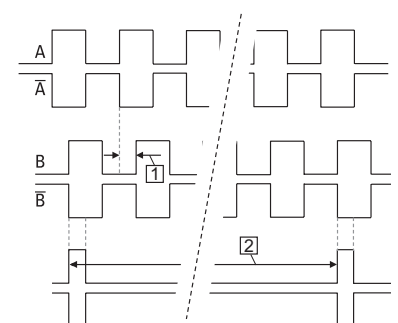
Permissible alignment tolerance (see draft „mounting tolerances“)	
<b>Gap sensor head / magnetic band</b>	0,1 ... 1,0 mm (recommended 0,4 mm)
<b>Offset</b>	max. ±1 mm
<b>Tilting</b>	max. 3°
<b>Torsion</b>	max. 3°

### Function principle



### Signal figures

- 1) Pulse edge interval:  
Pay attention to the instructions in the technical data
- 2) Periodic index signal every 2 mm [0.08"]; the logical assignment A, B and 0-signal can change



- 1) If power supply correctly applied.
- 2) Only one channel allowed to be shorted-out.  
If +V = 5 V, short-circuit to channel, 0 V, or +V is permitted.  
If +V = 5 ... 30 V, short-circuit to channel or 0 V is permitted.
- 3) At every pole change. The signal is generated by the sensor.
- 4) Magnetic band (ends) attached by screwing, clamping or equivalent.
- 5) At the listed rotational speed the min. pulse edge interval is 1 µs, this corresponds to 250 kHz. For the max. rotational speed range a counter with a count input frequency of not less than 250 kHz should be provided.

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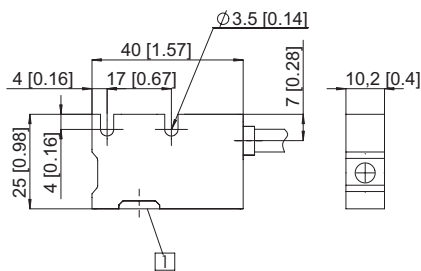
### Terminal assignment

Output circuit	Type of connection	Cable									
1, 2	1	Signal:	0 V	+V	A	$\bar{A}$	B	$\bar{B}$	0	$\bar{0}$	$\perp$
		Core color:	WH	BN	GN	YE	GY	PK	BU	RD	shield <sup>1)</sup>

### Dimensions

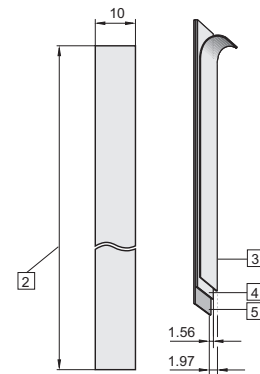
Dimensions in mm [inch]

#### Sensor head Limes LI20



1 Active measuring area

#### Magnetic band Limes B1



2 Length L, max. 70 m

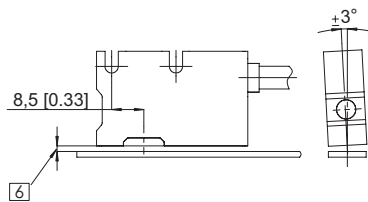
3 Masking tape

4 Magnetic band

5 Carrier band

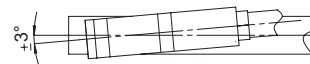
### Permissible mounting tolerances

#### Tilting

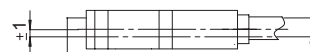


6 Distance sensor head / magnetic band:  
0.1 ... 1.0 mm (recommended 0.4 mm)

#### Torsion



#### Offset



1) Shield is attached to connector housing