Incremental magnetic measurement system sensor head, magnetic band | Limes LI50 / B2 | Resolution min. 5 µm

The non-contact incremental magnetic linear measurement system Limes LI50 / B2 - made up of the sensor head LI50 and of the magnetic band B2 - reaches a resolution up to 5 µm with a maximum distance of 2 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 tape.
- Large mounting tolerances.
- Requires very little installation space.
- Warning signals via status LED if the magnetic field is too weak.

Order code sensor head Limes LI50

8.LI50	.	X	1	X	1	.	2	XXX
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)* [1]
050 = 25 µm
250 = 5 µm

Stock types
8.LI50.1111.2050
8.LI50.1111.2250
8.LI50.1121.2050
8.LI50.1121.2250

Order code magnetic band Limes B2

8.B2	.	10	.	010	.	XXXX
Type		a				b

a *Width*
10 = 10 mm

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

Optional on request
- other lengths up to 70 m

Stock types
8.B2.10.010.0020

1) With quadruple evaluation (only connected with magnetic band Limes B2)

Incremental magnetic measurement system sensor head, magnetic band | Limes LI50 / B2 | Resolution min. 5 µm

Accessories / display type 572		Order no.
Position display, 8-digit	with 4 fast switch outputs and serial interface	**6.572.0116.D05**
	with 4 fast switch outputs, serial interface and scalable analog output	**6.572.0116.D95**
Position display, 8-digit	with 4 fast switch outputs and serial interface	**6.572.0118.D05**
	with 4 fast switch outputs, serial interface and scalable analog output	**6.572.0118.D95**

Further accessories can be found in the accessories section or in the accessories area of our website at: 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.

Technical data

Mechanical characteristics sensor head LI50

Working temperature		-20°C ... +80°C [-4°F ... +176°F]
Storage temperature		-20°C ... +80°C [-4°F ... +176°F]
Shock resistance		5000 m/s², 1 ms
Vibration resistance		300 m/s², 10 ... 2000 Hz
Protection	model 1 model 2	IP67 acc. to EN 60529 IP68 / IP69k acc. to EN 60529 and humidity tested acc. to EN 60068-3-38, EN 60068-3-78
Housing		aluminum
Cable		2 m [6.56'] PUR 8 x 0.14 mm2 [AWG25] shielded, may be used in trailing cable installations
Status LED	green red	pulse-index error; speed too high or magnetic fields too weak (at 8.LI50.XXXX.X050 and 8.LI50.XXXX.X250)

Electrical characteristics sensor head LI50

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

Magnetic band Limes B2

Pole gap		5 mm from pole to pole
Dimensions	width thickness	10 mm 1,97 mm incl. masking tape
Temperature coefficient		16 x 10^{-6}/K
Working temperature		-20°C ... +80°C [-4°F ... +176°F] [4]
Mounting		adhesive joint
Measuring		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)
Bending radius		≥ 150 mm (when mounted solely with adhesive tape)
Material metal tape		precision steel strip 1.4310 acc. to EN 10088-3

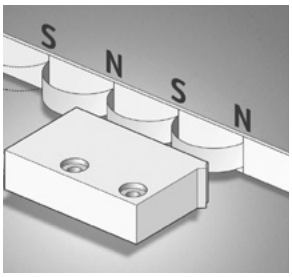
Accuracy

Magnetic band	± (0,025 + 0,02 x L) mm – L in [m], up to L_{max} = 70 m
Sensor head	± 0,025 mm interpolation error accuracy: at T = 20°C and gap sensor head/magnetic band 1 mm
Repeat accuracy	±1 increment
Resolution and speed [5]	25 µm (quadruple), max. 16,25 m/s 5 µm (quadruple), max. 3,25 m/s

Permissible alignment tolerance (see draft „mounting tolerances“)

Gap sensor head / magnetic band	0,1 ... 2,0 mm (recommended 1,0 mm)
Offset	max. ±1 mm
Tilting	max. 3°
Torsion	max. 3°

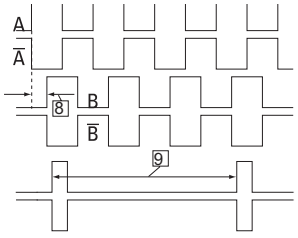
Function principle



Signal figures

[8] Pulse edge interval:
pay attention to the instructions in the technical data

[9] Periodic index signal
every 5 mm [0.20“];
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 equvalent.
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 then 250 kHz should be provided.

Incremental magnetic measurement system sensor head, magnetic band | Limes LI50 / B2 | Resolution min. 5 µm

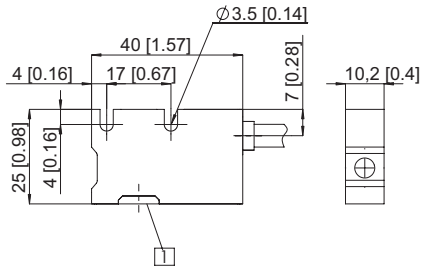
Terminal assignment

Output circuit	Type of connection	Cable									
1, 2	1	Signal:	0 V	+V	A	$\overline{A}$	B	$\overline{B}$	0	$\overline{0}$	⏚
		Core color:	WH	BN	GN	YE	GY	PK	BU	RD	shield [1]

Dimensions

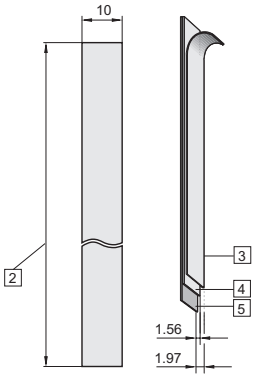
Dimensions in mm [inch]

Sensor head Limes LI50



1 Active measuring area

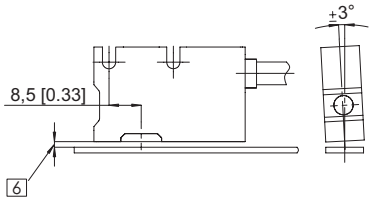
Magnetic band Limes B2



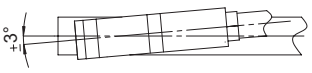
2 Length L, max. 70 m
3 Masking tape
4 Magnetic band
5 Carrier band

Permissible mounting tolerances

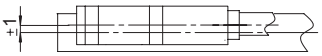
Tilting



Torsion



Offset



6 Distance sensor head / magnetic band:
0.1 ... 2.0 mm (recommended 1 mm)

1) PH = Shield is attached to connector housing.