

Absolute magnetic measurement system sensor head, magnetic

Limes LA10 / BA1

Measuring length max. 8 m Resolution min. 1 µm



The non-contact absolute magnetic linear measurement system Limes LA10 / BA1 - made up of the sensor head LA10 and of the magnetic band BA1 - reaches a resolution up to 1  $\mu$ m with a maximum distance of 0.2 mm between the sensor and the band (incl. masking tape).

The additional SinCos interface makes the measurement system LA10 / BA1 the optimal equipment for use in the linear drive technology.









Power supply



length



measuring tape















Temperature

Robust and versatile

- High resolution 1µm / measuring length max. 8 m.
- Non-contact magnetic absolute measuring technology therefore no wear - no referencing movement required.
- · Sturdy housing with IP64 protection.
- · For highly dynamic control.
- Optional SinCos signal (1 Vpp) for dynamic movement control with 1 mm pole pitch.
- · Masking tape protecting the magnetic band.

#### **Easy installation**

- · Simple glued assembly of the magnetic band.
- · Requires very little installation space.
- Robust measuring principle insensitive to dirt, smoke and humidity.

## Order code sensor head Limes LA10

8.LA10



Model

**b** baud rate

= standard

1 = IP64, standard

(CANopen, 250 k)

© Output circuit / Power supply

1 = SSI, 25 bit Gray-Code / 10 ... 30 V DC

2 = SSI, 25 bit Gray-Code, SinCos 1 Vpp / 10 ... 30 V DC

3 = CANopen, without bus terminating resistor / 10 ... 30 V DC 4 = CANopen, with bus terminating resistor / 10 ... 30 V DC

5 = CANopen, SinCos 1 Vpp, without bus terminating resistor / 10 ... 30 V DC

6 = CANopen, SinCos 1 Vpp, with bus terminating resistor / 10 ... 30 V DC

Type of connection

2 = standard, M12 connector, 12 pin

Stock types

8.LA10.1212 8.LA10.1232

8.LA10.1242

Scope of delivery sensor head + spacing template

## Order code magnetic band Limes BA1

0010 = 1 m

0020 = 2 m

0030 = 3 m

8.BA1 Туре

10



a Width 10 = 10 mm

**b** Length (measuring range = length - 0.1 m) 0005 = 0.5 m

0040 = 4 m0060 = 6 m

0080 = 8 m

Optional on request - other lengths

Stock types 8.BA11.10.010.0080



Absolute magnetic measurement system		Measuring length max. 8 m
sensor head, magnetic band	Limes LA10 / BA1	Resolution min. 1 µm

Accessories		Order no.
SSI display type 570 Position display, 6-digit	with 2 relay outputs and serial interface DC power supply	0.570.010.305
r oolion display, o digit	with 2 fast switch outputs AC/DC power supply	0.570.011.E00
	with scalable analog output AC/DC power supply	0.570.012.E90
	RS232 / RS485 interface AC/DC power supply	0.570.012.E05
Connection technology		Order no.
Connector, self-assembly (straight)	M12 female connector with coupling nut, 12 pin, A coded	8.0000.5162.0000
Cordset, pre-assembled	M12 female connector with coupling nut, 12 pin, $5 \text{ m} [16.4'] \text{ PUR cable } 6 \times 2 \times 0.14 \text{ mm}^2 [AWG 26]$	05.00.60B1.B211.005N
Unprepared cable, cut to length	6 x 2 x 0.14 mm <sup>2</sup> [AWG 26] PVC cable	8.0000.6900.XXXX <sup>1</sup>
	$6 \times 2 \times 0.14 \text{ mm}^2$ [AWG 26] PUR cable	8.0000.6Y00.XXXX
	5 x 2 x 0.14 mm <sup>2</sup> [AWG 26] PVC cable	8.0000.6Z00.XXXX

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	
Weight	approx. 0.1 kg [3.53 oz]
Working temperature	-10°C +70°C [+14°F +158°F] (non condensing)
Storage temperature	-25°C +85°C [-13°F +185°F]
Protection acc. to EN 60529	IP64
Housing	aluminum
Max. traverse speed	
SinCos reading	10 m/s
permanent absolute positions reading	1 m/s
Shock resistance acc. to EN 60068-2-27	5000 m/s², 1 ms
Vibration resistance acc. to EN 60068-2-6	300 m/s², 10 2000 Hz
Distance sensor head / magnetic band	0.01 0.2 mm incl. masking tape (recommended 0.2 mm)
Measuring length	max. 8 m
Type of connection (standard)	M12 connector, 12 pin

Electrical characteristics	
Power supply	10 30 V DC ±10%
Residual ripple	< 10 %
Current consumption	max. 150 mA
Reverse polarity protection	yes
Short circuit proof	yes
CE compliant acc. to	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU

Accuracy	
Measuring principle	absolute + incremental (option)
System accuracy at 20°C [+68°F]	max. $\pm$ (10 + 20 x L) $\mu$ m L = measuring length in meters
Repeat accuracy	±1 increment
Resolution	0.001 mm
LED, red	lights up when distance too large

SSI interface	
Output driver	RS485 transceiver type
Permissible load / channel	max. ±20 mA
Signal level HIGH LOW at $I_{Load} = 20 \text{ mA}$	typ. 3.8 V typ. 1.3 V
Clock rate	25 bit (24 + 1 failurebit for distance)
Code	Gray
SSI clock rate	80 kHz 0.4 MHz
Monoflop time	≤ 40 µs
Data refresh rate	≤ 250 µs

CANopen interface	
Interface	CAN High-Speed acc. to ISO 11898, Basic and Full CAN, CAN specification 2.0 B
Protocol	CANopen
Baud rate	250 kbit/s; 125 1000 kbit/s configurable
Termination	yes via order code
Node address	1 (optional on request)

Option SinCos interface	
Max. frequency -3dB	400 kHz
Signal level	1 Vpp (±10%)
Short circuit proof	yes
Pulse rate	1 SinCos per 1 mm pole

<sup>1)</sup> XXXX = cable length in meters (e.g. 10 m = 0010).



# Absolute magnetic measurement system sensor head, magnetic band

# Limes LA10 / BA1

# Measuring length max. 8 m Resolution min. 1 μm

Magnetic band Limes B	A1	
Pole gap		basic pole pitch 1 mm
Dimensions	width thickness	10 mm 1.97 mm incl. masking tape
Relative linear expansion		$\begin{array}{lll} \Delta L &=& L  x  \alpha  x  \Delta \delta \\ \\ L &=& \text{measuring length in meters} \\ \alpha &=& 16  x  10^{-6}  1/K \\ & \text{temperature coefficient} \\ \Delta \delta &=& \text{relative temperature change} \\ & \text{based on 20°C [+68°F] in °K} \\ \end{array}$

Working temperature	-20°C +70°C [-4°F +158°F] (in case of mounting with adhesive tape only)
Storage temperature	-20°C +80°C [-4°F +176°F]
Mounting	adhesive joint
Additional length	100 mm in order to obtain an optimal measuring result, the magnetic band should be about 0.1 m longer than the required measuring length
Min. bending radius for storage	≥ 150 mm
Material metal tape	precision steel strip 1.4404 acc. to EN 10088-3

### **Terminal assignment**

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Output circuit	Type of connection	M12 connector, 12 pi	V12 connector, 12 pin											
1	2	Signal:	0 V	+V	C+	C-	D+	D-	-	-	_	_	-	-
I	2	Pin:	1	2	3	4	5	6	7	8	9	10	11	12
Output circuit	Type of connection	Type of connection M12 connector, 12 pin												
2	2	Signal:	0 V	+V	C+	C-	D+	D-	Α	Ā	В	B	-	_
2	2	Pin:	1	2	3	4	5	6	7	8	9	10	11	12
		1												
Output circuit	Type of connection	M12 connector, 12 pi	n											
2.4	2	Signal:	0 V	+V	CAN_L	CAN_H	-	_	_	-	-	-	-	_
3, 4	2	Pin:	1	2	3	4	5	6	7	8	9	10	11	12
		1												
Output circuit	Type of connection	M12 connector, 12 pi	n											
E C	2	Signal:	0 V	+V	CAN_L	CAN_H	-	-	Α	Ā	В	B	-	_
5, 6	2	Pin:	1	2	3	4	5	6	7	8	9	10	11	12

+V: Encoder power supply +V DC

0 V: Encoder power supply ground GND (0 V)

C+, C-: Clock signal D+, D-: Data signal A,  $\overline{A}$ : Cosine signal B,  $\overline{B}$ : Sine signal

Connection cable Connection cable with M12 connector, 12 pin (accessory) – for example 05.00.60B1.B211.005M													
color assignment	Color:	WH	BN	GN	YE	GY	PK	BU	RD	ВК	VT	GY/PK	RD/BU
with M12 female connector	Pin:	1	2	3	4	5	6	7	8	9	10	11	12





Absolute magnetic measurement system sensor head, magnetic band

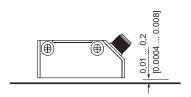
Limes LA10 / BA1

Measuring length max. 8 m Resolution min. 1 µm

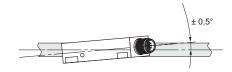
#### Permissible mounting tolerances

Dimensions in mm [inch]

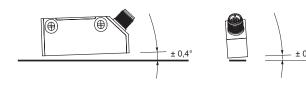
Distance sensor head / magnetic band (incl. masking tape)



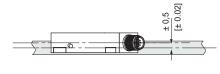
Torsion



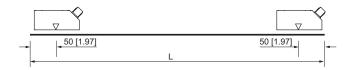
Tilting







#### Measuring range



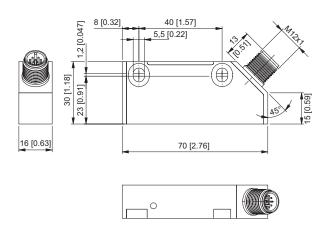
Observe mounting direction



#### **Dimensions**

Dimensions in mm [inch]

#### Sensor head Limes LA10



## Magnetic band Limes BA1

