



# Linear measuring technology

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

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

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

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

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

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

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

Option SinCos interface	
<b>Max. frequency -3dB</b>	400 kHz
<b>Signal level</b>	1 V <sub>pp</sub> (±10%)
<b>Short circuit proof</b>	yes
<b>Pulse rate</b>	1 SinCos per 1 mm pole

1) XXXX = cable length in meters (e.g. 10 m = 0010).

# Linear measuring technology

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

Magnetic band Limes BA1	
<b>Pole gap</b>	basic pole pitch 1 mm
<b>Dimensions</b>	width 10 mm
	thickness 1.97 mm incl. masking tape
<b>Relative linear expansion</b>	$\Delta L = L \times \alpha \times \Delta\delta$  L = measuring length in meters $\alpha = 16 \times 10^{-6} 1/K$ temperature coefficient $\Delta\delta$ = relative temperature change based on 20°C [+68°F] in °K

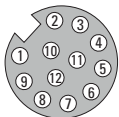
<b>Working temperature</b>	-20°C ... +70°C [-4°F ... +158°F] (in case of mounting with adhesive tape only)
<b>Storage temperature</b>	-20°C ... +80°C [-4°F ... +176°F]
<b>Mounting</b>	adhesive joint
<b>Additional length</b>	100 mm in order to obtain an optimal measuring result, the magnetic band should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

## Terminal assignment

Output circuit	Type of connection	M12 connector, 12 pin												
1	2	Signal:	0 V	+V	C+	C-	D+	D-	-	-	-	-	-	-
		Pin:	1	2	3	4	5	6	7	8	9	10	11	12
Output circuit	Type of connection	M12 connector, 12 pin												
2	2	Signal:	0 V	+V	C+	C-	D+	D-	A	$\bar{A}$	B	$\bar{B}$	-	-
		Pin:	1	2	3	4	5	6	7	8	9	10	11	12
Output circuit	Type of connection	M12 connector, 12 pin												
3, 4	2	Signal:	0 V	+V	CAN_L	CAN_H	-	-	-	-	-	-	-	-
		Pin:	1	2	3	4	5	6	7	8	9	10	11	12
Output circuit	Type of connection	M12 connector, 12 pin												
5, 6	2	Signal:	0 V	+V	CAN_L	CAN_H	-	-	A	$\bar{A}$	B	$\bar{B}$	-	-
		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,  $\bar{A}$ : Cosine signal
- B,  $\bar{B}$ : Sine signal

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



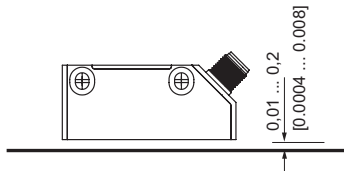
# Linear measuring technology

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

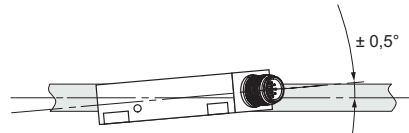
## Permissible mounting tolerances

Dimensions in mm [inch]

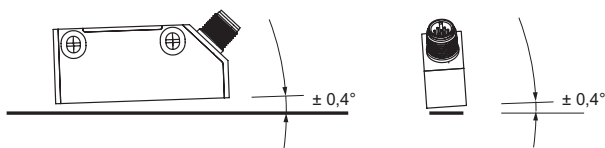
Distance sensor head / magnetic band (incl. masking tape)



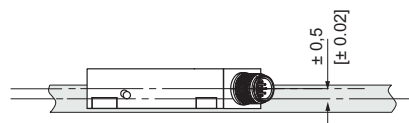
Torsion



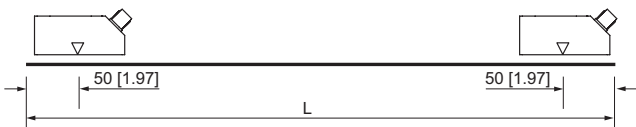
Tilting



Offset



Measuring range



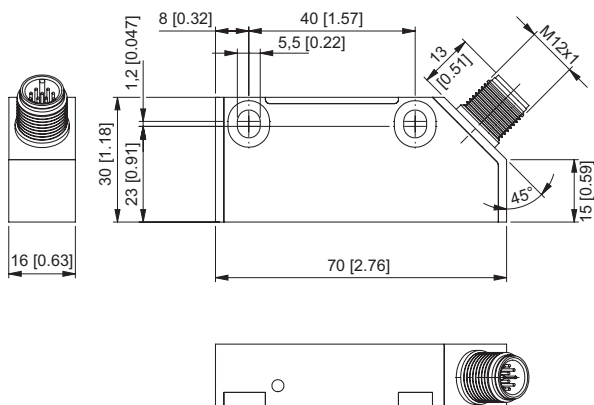
Observe mounting direction



## Dimensions

Dimensions in mm [inch]

**Sensor head Limes LA10**



**Magnetic band Limes BA1**

- 1 Length L, max. 8 m
- 2 Masking tape
- 3 Magnetic band

