Absolute magnetic measurement system
Sensor head, magnetic band

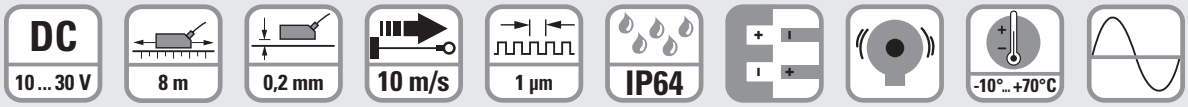
Limes LA10 / BA1

Measuring length max. 8 m
Resolution min. 1 µm

The non-contact absolute magnetic linear measurement system LA10 / BA1 - made up of the sensor head LA10 and of the magnetic band BA1 - reaches a resolution up to 1 µm 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.

RoHS SSI CANopen



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
- Interfaces: SSI, CANopen, BiSS-C on request
- 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 Magnetic sensor Limes LA10

8.LA10	.	1	2	X	2
Type		a	b	c	d

a *Model*
1 = IP64, Standard

b *baud rate*
2 = Standard (CANopen, 250 k)
other baud rates on request

c *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

d *Type of connection*
2 = Standard, M12 connector, 12 pin

Stock types
8.LA10.1212 8.LA10.1222
8.LA10.1232 8.LA10.1242

Scope of delivery
Sensor + spacing template

Order code Magnetic band Limes BA1

8.BA1	.	10	.	010	.	XXXX
Type		a				b

a *Width*
10 = 10 mm

b *Length (measuring range = length - 0.1 m)*
0005 = 0.5 m 0040 = 4 m
0010 = 1 m 0060 = 6 m
0020 = 2 m 0080 = 8 m
0030 = 3 m Other lengths on request

Stock types
8.BA1.10.010.0080

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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**
	with 2 fast switch outputs AC/DC power supply	**0.570.011.E00**
	with scalable analogue output AC/DC power supply	**0.570.012.E90**
	RS232 / RS485 interface AC/DC power supply	**0.570.012.E05**

Connection technology

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 m [16.4'] PUR cable 6 x 2 x 0.14 mm² [AWG 26]	**05.00.60B1.B211.005M**
Unprepared cable, cut to length	6 x 2 x 0.14 mm² [AWG 26] PVC cable	**8.0000.6900.00XX**
	6 x 2 x 0.14 mm² [AWG 26] PUR cable	**8.0000.6Y00.00XX**
	5 x 2 x 0.14 mm² [AWG 26] PVC cable	**8.0000.6Z00.00XX**

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	IP64 acc. to DIN 60529
Housing	aluminium
Max. traverse speed SinCos reading permanent absolute positions reading	 10 m/s 1 m/s
Shock resistance acc. to EN 60068-2-27	5000 m/s², 1 ms
Vibration strength acc. to EN 60068-2-6	300 m/s², 10 ... 2000 Hz
Distance sensor / 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 2004/108/EC
RoHS compliant acc. to	guideline 2011/65/EU

Accuracy

Measuring principle	absolute + incremental (option)
System accuracy at 20°C [+68°F]	max. ± (10 + 20 x L) µm L = measuring length in meters
Repeat accuracy	±1 µm
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 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/no via order code
Node address	1 ... 15 (default 1)
LSS protocol	CIA LSS protocol DS305 Global command support for node address and baud rate Selective commands via attributes of the identity object

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

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

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

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

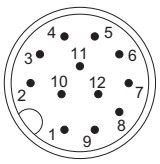
Output circuit	Type of connection	M12 connector, 12 pin											
2	2	Signal:	0 V	+V	C+	C-	D+	D-	A	$\overline{A}$	B	$\overline{B}$	–	–
		Pin:	1	2	3	4	5	6	7	8	9	10	11	12

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	$\overline{A}$	B	$\overline{B}$	–	–
		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, $\overline{A}$: Cosine signal
B, $\overline{B}$: Sine signal

Connection cable colour assignment	Connection cable with M12 connector, 12 pin (accessory)											
	Colour:	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



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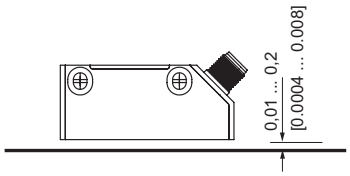
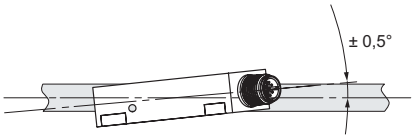
Permissible mounting tolerances

Dimensions in mm [inch]

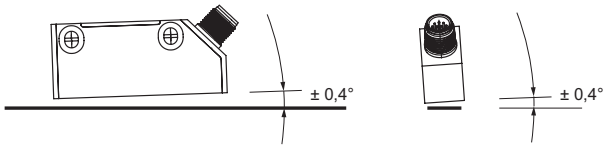
Distance sensor / magnetic band (incl. masking tape)



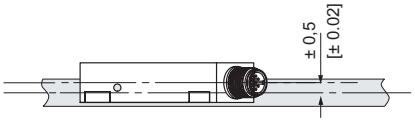
Torsion



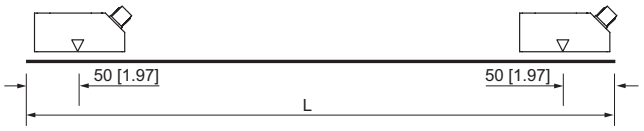
Tilting



Offset



Measuring range

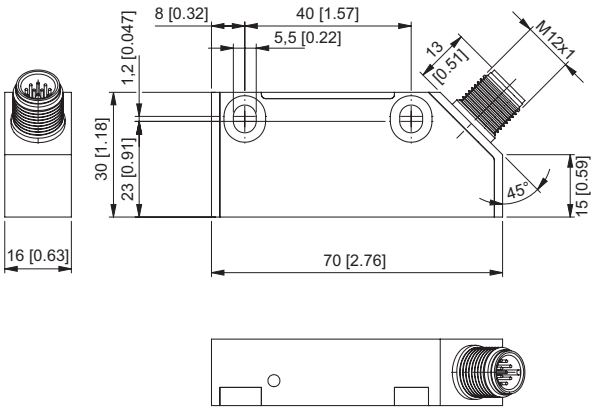


Observe mounting direction

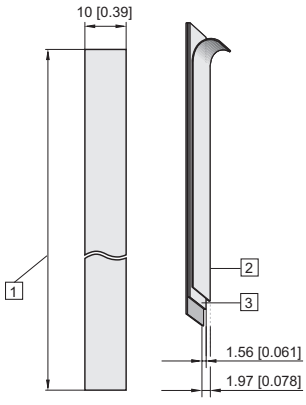
Dimensions

Dimensions in mm [inch]

Sensor head Limes LA10



Magnetic band Limes BA1



1 length L, max. 8 m
2 masking tape
3 magnetic band