

Магнитные системы измерения длины Limes LI20/B1, Limes LI50/B2, Limes LA10/BA1, Limes LA50/BA5

Технические характеристики

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Linear measuring technology

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 . X1XX . 2XXX
Type a b c d e i

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 / supply voltage

- 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
- A = cable, special length PUR *)

*) Available special lengths ¹⁾ (connection type A):
3, 5, 8, 10, 15, 20 m [9.84, 16.40, 26.25, 32.80, 49.21, 65.62']
order code expansion .XXXX = length in dm
ex.: 8.LI50.111A.2050.0030 (for cable length 3 m)

e Reference signal

- 2 = index periodic

i Code (resolution)²⁾

- 050 = 25 µm
- 250 = 5 µm

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

1) Cable lengths >10 m only possible with supply voltage >10 V.

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

Linear measuring technology

Incremental magnetic measurement system sensor head, magnetic band		Limes LI50 / B2	Resolution min. 5 µm
Accessories / Displays		Order no.	
Codix 560, preset counter 6-digit 	- Counter, tachometer, time counter and position display in one device - Scalable display - Readable via RS232/485 interface or configurable via MODBUS or CR/LF protocol	6.560.010.XXX Details s. datasheet >	
571T touch, multifunction preset counters 8-digit 	- Measuring function for RPM, speed, speed from elapsed time, machine cycle time, throughput time (reciprocal rotary speed), as well as numerous count functions such as position display - Fast counting input (250 kHz/HTL, 1 MHz/RS422) - 4 switching outputs as limit values (response time < 1 ms) - Scalable analog output (response time < 150 ms), resolution 16 bit - Serial interface RS232 or RS485 for reading in and out the data	6.571T.01X.XXX Details s. datasheet >	

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/s ² , 1 ms	
Vibration resistance	300 m/s ² , 10 ... 2000 Hz	
Protection	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
Housing	aluminum	
Cable	2 m [6.56'] PUR 8 x 0.14 mm ² [AWG25] shielded, may be used in trailing cable installations	
Status LED	green	pulse-index
	red	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
Supply voltage	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, $\bar{A}$, B, $\bar{B}$, 0, $\bar{0}$	
Reference signal	index periodical ³⁾	

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°

Magnetic band Limes B2	
Pole gap	5 mm from pole to pole
Dimensions	width 10 mm thickness 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

Approvals	
CE compliant in accordance with	
EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU

- 1) If supply voltage 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.

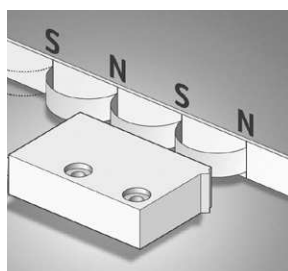
Linear measuring technology

Incremental magnetic measurement system sensor head, magnetic band

Limes LI50 / B2

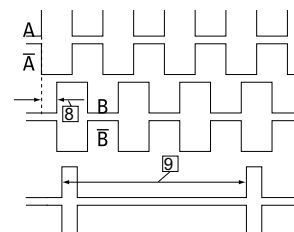
Resolution min. 5 µm

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



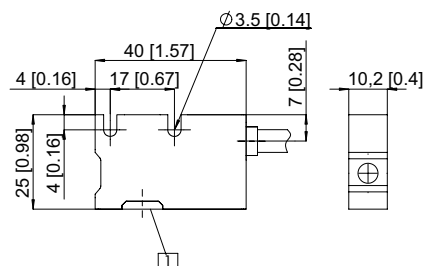
Terminal assignment

Output circuit	Type of connection	Cable									
1, 2	1, A	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 ¹⁾

Dimensions

Dimensions in mm [inch]

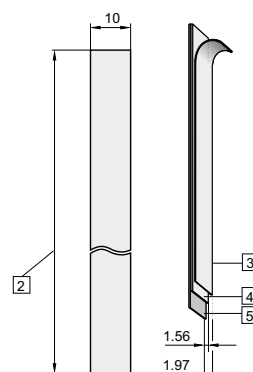
Sensor head Limes LI50



1 Active measuring area

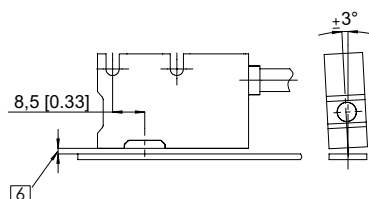
Magnetic band Limes B2

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

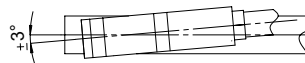


Permissible mounting tolerances

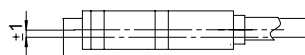
Tilting



Torsion



Offset



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

1) PH = Shield is attached to connector housing.

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 . X1XX . 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 / supply voltage

- 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
- A = cable, special length PUR *)

*) Available special lengths ¹⁾ (connection type A):
3, 5, 8, 10, 15, 20 m [9.84, 16.40, 26.25, 32.80, 49.21, 65.62']
order code expansion .XXXX = length in dm
ex.: 8.LI20.111A.2005.0030 (for cable length 3 m)

e Reference signal

- 2 = index periodic

f Code (resolution) ²⁾

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

Order code magnetic band Limes B1

8.B1 . 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

1) Cable lengths >10 m only possible with supply voltage >10 V.

2) With quadruple evaluation (only connected with magnetic band Limes B1).

Linear measuring technology

Incremental magnetic measurement system sensor head, magnetic band		Limes LI20 / B1	Resolution min. 10 µm
Accessories / Displays		Order no.	
Codix 560, preset counter 6-digit 	- Counter, tachometer, time counter and position display in one device - Scalable display - Readable via RS232/485 interface or configurable via MODBUS or CR/LF protocol	6.560.010.XXX Details s. datasheet >	
571T touch, multifunction preset counters 8-digit 	- Measuring function for RPM, speed, speed from elapsed time, machine cycle time, throughput time (reciprocal rotary speed), as well as numerous count functions such as position display - Fast counting input (250 kHz/HTL, 1 MHz/RS422) - 4 switching outputs as limit values (response time < 1 ms) - Scalable analog output (response time < 150 ms), resolution 16 bit - Serial interface RS232 or RS485 for reading in and out the data	6.571T.01X.XXX Details s. datasheet >	

Technical data

Mechanical characteristics sensor head LI20		
Working temperature	-20 °C ... +80 °C [-4 °F ... +176 °F]	
Storage temperature	-20 °C ... +80 °C [-4 °F ... +176 °F]	
Shock resistance	5000 m/s ² , 1 ms	
Vibration resistance	300 m/s ² , 10 ... 2000 Hz	
Protection	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
Housing	aluminum	
Cable	2 m [6.56'] PUR 8 x 0.14 mm ² [AWG25] shielded, may be used in trailing cable installations	
Status LED	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		
Output circuit	Push-pull	RS422
Supply voltage	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, $\bar{A}$, B, $\bar{B}$, 0, $\bar{0}$	
Reference signal	index periodical ³⁾	

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

Magnetic band Limes B1	
Pole gap	2 mm from pole to pole
Dimensions	width 10 mm thickness 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	± 0,01 mm interpolation error accuracy: at T = 20 °C and gap sensor head/magnetic band 0,4 mm
Repeat accuracy	±1 increment
Resolution and speed ⁵⁾	100 µm (quadruple), max. 25 m/s 25 µm (quadruple), max. 4 m/s 10 µm (quadruple), max. 6,5 m/s

Approvals	
CE compliant in accordance with	
EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU

- 1) If supply voltage 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.

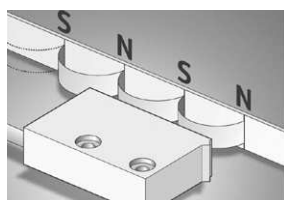
Linear measuring technology

Incremental magnetic measurement system sensor head, magnetic band

Limes LI20 / B1

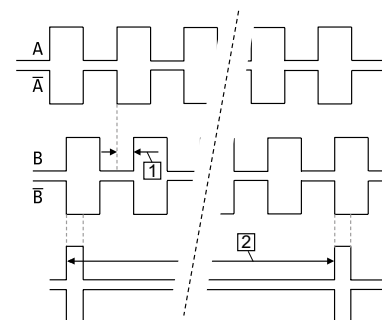
Resolution min. 10 µm

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



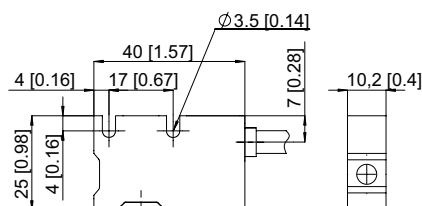
Terminal assignment

Output circuit	Type of connection	Cable									
1, 2	1, A	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 ¹⁾

Dimensions

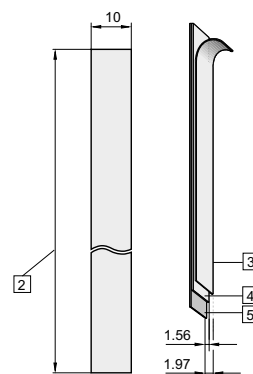
Dimensions in mm [inch]

Sensor head Limes LI20



1 Active measuring area

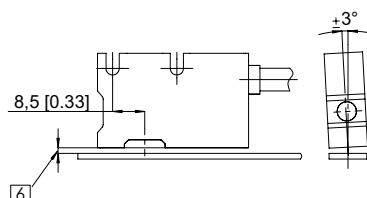
Magnetic band Limes B1



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

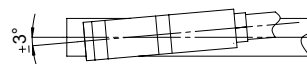
Permissible mounting tolerances

Tilting

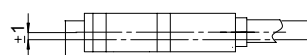


- 6 Distance sensor head / magnetic band:
0.1 ... 1.0 mm (recommended 0.4 mm)

Torsion



Offset



1) Shield is attached to connector housing

Linear measuring technology

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

Limes LA50 / BA5

**Measuring length max. 20 m
Resolution min. 10 µm**



The non-contact absolute magnetic linear measurement system Limes LA50 / BA5 - made up of the sensor head LA50 and of the magnetic band BA5 - reaches a resolution up to 10 µm with a maximum distance of 1.5 mm between the sensor and the band.



DC 10 ... 30 V	 20 m	 1,5 mm	 4 m/s	 0,01 mm	 IP40	 Reverse polarity protection	 Shock / vibration resistant	 -10°...+70°C	 Magnetic sensor
Supply voltage	Max. measuring length	Max. distance to measuring tape	Max. speed	High resolution	Protection	Reverse polarity protection	Shock / vibration resistant	Temperature range	Magnetic sensor

Robust and versatile

- Resolution 0.01 mm / measuring lengths max. 20 m.
- Rugged die-cast zinc housing.
- Positions changes are also detected when de-energized no referencing movement required – no wear.
- Automatic distance detection in case of too high distance between the sensor and the magnetic band.
- Masking tape protecting the magnetic band.
- Address, baud rate, bus termination can be modified via microswitches.
- Interfaces: SSI, CANopen.

Easy installation

- Simple glued assembly of the magnetic band.
- Large mounting tolerances.
- Requires very little installation space.
- LED warning signals in case of too weak magnetic field.

**Order code
sensor head Limes LA50**

8.LA50 . 1 2 X 1
Type a b c d

- | | | |
|---|---|---|
| a Model
1 = IP40, standard | c Output circuit / supply voltage
1 = SSI 25 bit / 10 ... 30 V DC
3 = CANopen / 10 ... 30 V DC | d Type of connection
1 = cable, 1.5 m PUR |
| b baud rate
2 = standard (CANopen, 250 k) | | |

**Order code
magnetic band Limes BA5**

8.BA5 . 20 . 010 . XXXX
Type a b

- | | |
|------------------------------|--|
| a Width
20 = 20 mm | b Length (measuring range = length - 0.1 m)
0010 = 1 m 0060 = 6 m
0020 = 2 m 0100 = 10 m
0040 = 4 m 0200 = 20 m
0050 = 5 m |
|------------------------------|--|

Linear measuring technology

Absolute magnetic measurement system sensor head, magnetic band	Limes LA50 / BA5	Measuring length max. 20 m Resolution min. 10 µm
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Accessories		Order no.
SSI display type 570T	with 2 relay outputs and serial interface DC supply voltage	6.570T.010.300
Position display, 8-digit	with 4 fast switch outputs and serial interface AC/DC supply voltage	6.570T.012.E01
	with 4 fast switch outputs, serial interface and scalable analog output AC/DC supply voltage	6.570T.012.E02
	with 4 fast switch outputs and RS485 interface AC/DC supply voltage	6.570T.012.E03

Technical data

Mechanical characteristics	
Weight	ca. 0.19 kg [6.70 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	IP40
Housing	zinc die-cast
Max. traverse speed permanent absolute positions reading	4 m/s
Shock resistance acc. to EN 60068-2-27	5000 m/s ² , 1 ms
Vibration resistance acc. to EN 60068-2-6	300 m/s ² , 10 ... 2000 Hz
Distance sensor head / magnetic band	0.1 ... 1.5 mm incl. masking tape (recommended 0.5 mm)
Measuring length	max. 20 m
Type of connection (standard)	cable, 1.5 m PUR, open cable ends

Electrical characteristics	
Supply voltage	10 ... 30 V DC ±10%
Residual ripple	< 10 %
Current consumption	max. 150 mA
Reverse polarity protection	yes
Short circuit proof	yes

Accuracy	
Measuring principle	absolute
System accuracy at 20 °C [+68 °F]	max. ± (150 + 20 × L) µm L = measuring length in meters
Repeat accuracy	±1 increment
Resolution	0.01 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 typ. 3.8 V LOW at I _{Load} = 20 mA typ. 1.3 V
Clock rate	25 bit (24 + 1 failurebit for distance)
Code	binary / gray (default) switchable
SSI clock rate	80 kHz ... 0.25 MHz
Monoflop time	≤ 40 µs
Data refresh rate	≤ 1 ms

CANopen interface	
Interface	CAN High-Speed acc. to ISO 11898, Basic and Full CAN, CAN specification 2.0 B
Protocol	CANopen
Baud rate	125 ... 1000 kbit/s adjustable with a rotary switch
Termination	yes/no with a rotary switch
Node address	1 ... 15 configurable (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

Approvals	
CE compliant in accordance with	
EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU

Linear measuring technology

Absolute magnetic measurement system sensor head, magnetic band	Limes LA50 / BA5	Measuring length max. 20 m Resolution min. 10 µm
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Magnetic band Limes BA5	
Pole gap	basic pole pitch 5 mm
Dimensions	width 20 mm
	thickness 1.8 mm incl. masking tape
Relative linear expansion	$\Delta L = L \times \alpha \times \Delta \delta$ L = measuring length in meters α = $16 \times 10^{-6} 1/K$ temperature coefficient $\Delta \delta$ = relative temperature change based on 20 °C [+68 °F] in °K

Working temperature	-20 °C ... +80 °C [-4 °F ... +176 °F] ¹⁾
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

<i>Output circuit</i>	Type of connection	Cable									
1 (SSI)	1	Signal:	0 V	+V	D+	D-	C+	C-	–	–	⏏
		Core color:	WH	BN	YE	OR	GN	VT	GY	BK	shield ²⁾

<i>Output circuit</i>	Type of connection	Cable									
3 (CANopen)	1	Signal:	0 V	+V	CAN_H	CAN_L	–	–	–	–	⏏
		Core color:	WH	BN	YE	OR	GN	VT	GY	BK	shield ²⁾

+V: Supply voltage encoder +V DC
 0 V: Supply voltage encoder ground GND (0V)
 C+, C-: Clock signal
 D+, D-: Data signal

1) Magnetic band (ends) attached by screwing, clamping or equivalent.
 2) Connect shielding only machine side

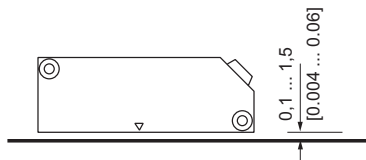
Linear measuring technology

Absolute magnetic measurement system Sensor head, magnetic band	Limes LA50 / BA5	Measuring length max. 20 m Resolution min. 10 µm
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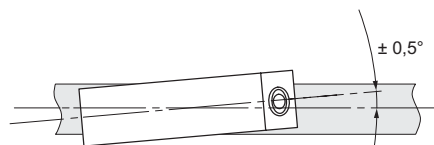
Permissible mounting tolerances

Dimensions in mm [inch]

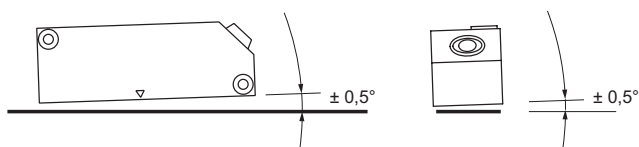
Distance sensor head / magnetic band (incl. masking tape)



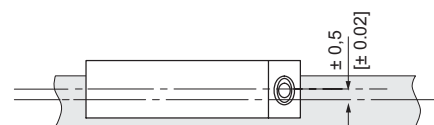
Torsion



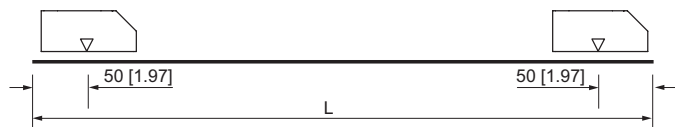
Tilting



Offset



Measuring range



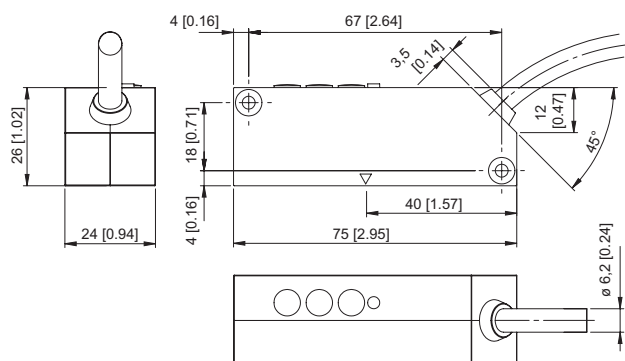
Observe mounting direction



Dimensions

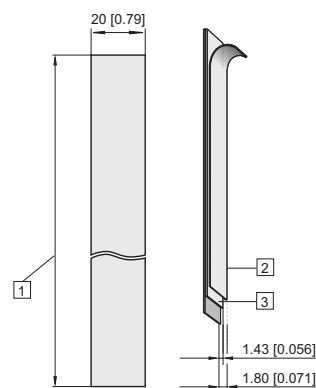
Dimensions in mm [inch]

Sensor head Limes LA50



Magnetic band Limes BA5

- 1 Length L, max. 20 m
- 2 Masking tape
- 3 Magnetic band



Linear measuring technology

**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 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.



DC 10 ... 30 V	8 m Max. measuring length	0,2 mm Max. distance to measuring tape	10 m/s Max. speed	1 µm High resolution	IP64 Protection	Reverse polarity protection	Shock / vibration resistant	-10°...+70°C Temperature range	SinCos
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Robust and versatile

- High resolution - 1 µm / 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 . **12X2**
Type a b c d

- | | |
|--|--|
| <p>a Model
1 = IP64, standard</p> <p>b baud rate
2 = standard
(CANopen, 250 k)</p> | <p>c Output circuit / Supply voltage
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</p> <p>d Type of connection
2 = standard, M12 connector, 12 pin</p> |
|--|--|

Scope of delivery
sensor head + spacing template

Optional on request
- other baud rate

Order code magnetic band Limes BA1

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

- | | |
|--------------------------------------|---|
| <p>a Width
10 = 10 mm</p> | <p>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</p> |
|--------------------------------------|---|

Optional on request
- other lengths

Linear measuring technology

Absolute magnetic measurement system sensor head, magnetic band		Limes LA10 / BA1	Measuring length max. 8 m Resolution min. 1 µm
Accessories			Order no.
SSI display type 570T Position display, 8-digit	with 2 relay outputs and serial interface DC supply voltage		6.570T.010.300
	with 4 fast switch outputs and serial interface AC/DC supply voltage		6.570T.012.E01
	with 4 fast switch outputs, serial interface and scalable analog output AC/DC supply voltage		6.570T.012.E02
	with 4 fast switch outputs and RS485 interface AC/DC supply voltage		6.570T.012.E03
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 m [16.4'] PUR cable 6 x 2 x 0.14 mm ² [AWG 26]		05.00.60B1.B211.005M
Unprepared cable, cut to length	6 x 2 x 0.14 mm ² [AWG 26] PVC cable		8.0000.6900.XXXX ¹⁾
	6 x 2 x 0.14 mm ² [AWG 26] PUR cable		8.0000.6Y00.XXXX ¹⁾
	5 x 2 x 0.14 mm ² [AWG 26] PVC cable		8.0000.6Z00.XXXX ¹⁾

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/s ² , 1 ms
Vibration resistance acc. to EN 60068-2-6	300 m/s ² , 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	
Supply voltage	10 ... 30 V DC ±10%
Residual ripple	< 10 %
Current consumption	max. 150 mA
Reverse polarity protection	yes
Short circuit proof	yes
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 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 typ. 3.8 V LOW at I _{Load} = 20 mA 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	standard 250 kbit/s on request other baud rate (125 ... 1000 kbit/s)
Termination	selectable via order code
Node address	1 (standard); others on request
Option SinCos interface	
Max. frequency -3dB	400 kHz
Signal level	1 V _{pp} (±10%)
Short circuit proof	yes
Pulse rate	1 SinCos per 1 mm pole
Approvals	
CE compliant in accordance with	
EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU

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

Linear measuring technology

Absolute magnetic measurement system sensor head, magnetic band	Limes LA10 / BA1	Measuring length max. 8 m Resolution min. 1 µm
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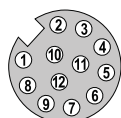
Magnetic band Limes BA1	
Pole gap	basic pole pitch 1 mm
Dimensions	width 10 mm
	thickness 1.97 mm incl. masking tape
Relative linear expansion	$\Delta L = L \times \alpha \times \Delta \delta$ L = measuring length in meters α = $16 \times 10^{-6} 1/K$ temperature coefficient $\Delta \delta$ = relative temperature change based on 20 °C [+68 °F] in °K
Working temperature	-20 °C ... +80 °C [-4 °F ... +176 °F] ¹⁾
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

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: Supply voltage encoder +V DC
 0 V: Supply voltage encoder 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												
	Core 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



1) Magnetic band (ends) attached by screwing, clamping or equivalent.

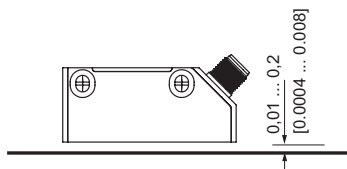
Linear measuring technology

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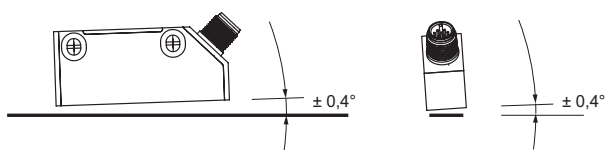
Permissible mounting tolerances

Dimensions in mm [inch]

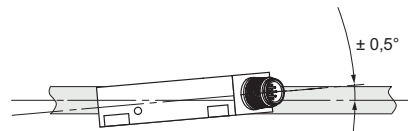
Distance sensor head / magnetic band (incl. masking tape)



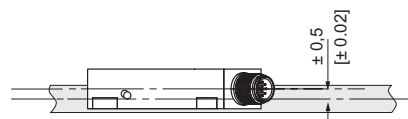
Tilting



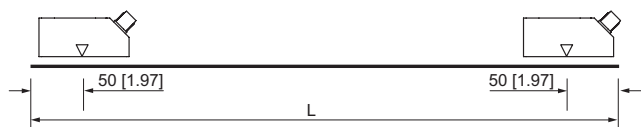
Torsion



Offset



Measuring range



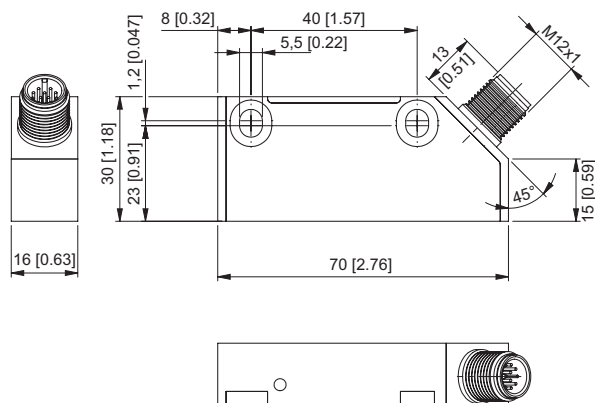
Observe mounting direction



Dimensions

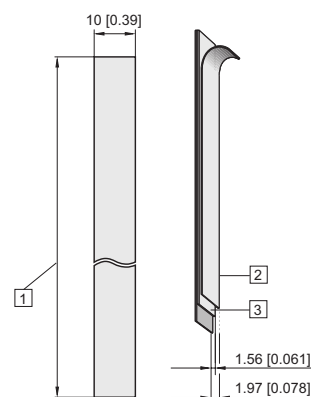
Dimensions in mm [inch]

Sensor head Limes LA10



Magnetic band Limes BA1

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





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