

Magnetic rings RI20/ LI20



High rotational speed



High IP



Shock/vibration resistant



Reverse polarity protection

Robust

- **Increased ability to withstand vibrations and rough installation.** Eliminates machine downtime and repairs. High shock and vibration resistance, thanks to non-contact technology.
- **Stays sealed even when subjected to harsh everyday use. Offers security against failures in the field.** Potted housing with up to IP67 protection.

Compact

- Installation depth only 16 mm, width of magnetic ring 10 mm



- Large hollow shaft up to 30 mm
Can be used even where space is very tight

Simple installation

- **Fast start-up of the measuring system**
Easy fixing of the magnetic ring and the sensor head
- **Easy mounting with large tolerances possible**
Distance of sensor head to magnetic ring from 0.1-1.0 mm
- Tolerates lateral misalignment +1 mm
- Warning signal when magnetic field is too weak (LED)

Technical data magnetic sensor LI20:

Output circuit:	Push-Pull	RS422
Supply voltage:	4.8-30 VDC	4.8-26 VDC
Load/channel, max. cable length:	±20 mA, max. 30 m	120 Ohm, RS422 standard
Current consumption (without load):	typ. 25 mA, max. 60 mA	
Short-circuit proof outputs ¹⁾ :	yes	yes ²⁾
Min. Pulse interval:	1 µs (edge interval) corresp. to 4 µs/period (see signal figures at right)	
Output signal:	A, \bar{A} , B, \bar{B} , I, \bar{I}	
Reference signal:	Index periodical	
Accuracy:		
System accuracy:	typ. ±0.3° with shaft tolerance g6	
Repeat accuracy:	±1 increment	
Admissible alignment tolerance:	see draft "Mounting tolerances"	
Gap sensor / magnetic ring:	0.1-1.0 mm (recommended 0.4 mm)	
Offset:	max. ±1 mm	
Tilting:	max. 3°	
Torsion:	max. 3°	

Environmental conditions:

Working temperature:	-4 to +185°F (-20 to +80°C)
Shock resistance:	30 g (300 m/s ²), 10-2000 Hz
Protection class:	IP67 according to DIN 60 529 (housing)
Humidity:	100%, condensation possible
Housing:	Zinc die-cast

General data:

Cable:	2 m, PUR 8 x 0.14 mm ² , shielded, may be used in flexing cable installations
Status-LED:	Green: Pulse-index; Red: Error, revs too high or magnetic field too weak (for T8.LI20.XXXX.X020 and T8.LI20.XXXX.X050)
CE compliant acc. to:	EN 61 000-6-1, EN 61 000-6-4, EN 61 000-6-3, EN 61 000-4-8 (magnetic field)
RoHS compliant acc. to EU guideline 2002/95/EG	

¹⁾ With supply voltage correctly applied

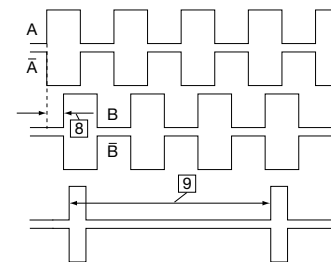
²⁾ A max. of one channel only may be short-circuited: (when +V = 5 V, a short-circuit to another channel, 0 V, or +V is permissible.) (when +V = 5-30 V, a short-circuit to another channel or to 0 V is permissible.)

Technical data magnetic ring RI20:

Pole gap:	2 mm from pole to pole
Temperature ranges:	Working temperature: -4 to +185°F (-20 to +80°C) Storage temperature: -4 to +185°F (-20 to +80°C)
Mounting:	Screwed on shaft typ. +0.3° (at 77°F (25°C)), Sensor/Magnetic ring distance 0.5 mm and drive shaft tolerance g6 in accordance with ISO 286-2
System accuracy:	

Signal figures

with rotation of the magnetic ring in the CW-direction (see draft "Mounting tolerances")



8 Min. Pulse interval: pay attention to the instructions in the technical data

9 periodic index signal (every 2mm) the logical assignment A, B and I-signal can change

Magnetic rings RI20/ LI20

Part number key: LI20

T8.LI20.11X1.2XXX

Model		Code*	005 016 020 050	* Annotations see table "selection guide", col 3
Design	1 = standard	Reference Signal	2 = index periodic	
Supply voltage	1 = standard	Type of connection	1 = cable (PUR), 2 m	
Interface and Supply voltage	1 = 4.8-26 VDC, RS422/4 2 = 4. 8-30 VDC, push-pull/4			

Part number key: magnetic ring RI20

Part number key/type	Outer diameter	Bore diameter
T8.RI20.031.0800.111	Ø 31 mm	8 mm
T8.RI20.031.1000.111	Ø 31 mm	10 mm
T8.RI20.031.1200.111	Ø 31 mm	12 mm
T8.RI20.031.1500.111	Ø 31 mm	15 mm
T8.RI20.031.1587.111	Ø 31 mm	15.875 mm (5/8")
T8.RI20.031.2000.111	Ø 31 mm	20 mm
T8.RI20.041.0800.111	Ø 41.2 mm	8 mm
T8.RI20.041.1500.111	Ø 41.2 mm	15 mm
T8.RI20.045.0800.111	Ø 45 mm	8 mm
T8.RI20.045.0925.111	Ø 45 mm	9.525 mm (3/8")
T8.RI20.045.1200.111	Ø 45 mm	12 mm
T8.RI20.045.1500.111	Ø 45 mm	15 mm
T8.RI20.045.1800.111	Ø 45 mm	18 mm
T8.RI20.045.2500.111	Ø 45 mm	25 mm
T8.RI20.045.2540.111	Ø 45 mm	25.4 mm (1")
T8.RI20.045.3000.111	Ø 45 mm	30 mm

Selection guide: magnetic sensor Li20/magnetic ring RI20

Pulses/ppr	Part number key for magnetic ring RI20	Part number key for magnetic sensor*	Max. rpm
250	T8.RI20.031.XXXX.111	T8.LI20.11X1.2005	12,000
1000	T8.RI20.031.XXXX.111	T8.LI20.11X1.2020	2,400
2500	T8.RI20.031.XXXX.111	T8.LI20.11X1.2020	3,900
1024	T8.RI20.041.XXXX.111	T8.LI20.11X1.2016	7,000
360	T8.RI20.045.XXXX.111	T8.LI20.11X1.2005	12,000
3600	T8.RI20.045.XXXX.111	T8.LI20.11X1.2050	2,700

*At the listed rotational speed the min. pulse interval is 1 µs, this corresponds to 250 kHz. For the maximum rotational speed range a counter with a count input frequency of not less than 250 kHz should be provided.

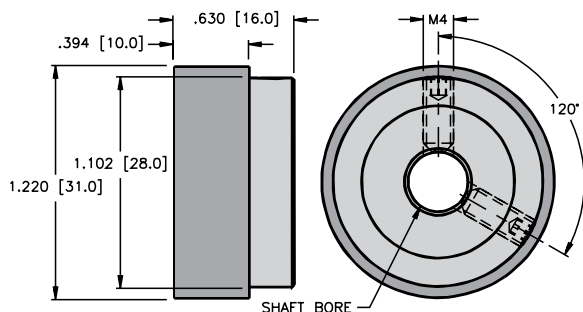
Pin assignment:

Signal:	0 V, GND	+V	A	\bar{A}	B	\bar{B}	I	\bar{I}
Color:	WH	BN	GN	YE	GY	PK	BU	RD

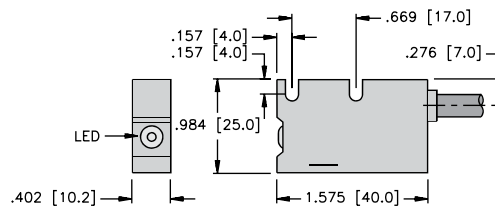
Shield is on the housing

Dimensions: RI20 magnetic ring

T8.RI20.031.XXXX.111, Ø 31 mm



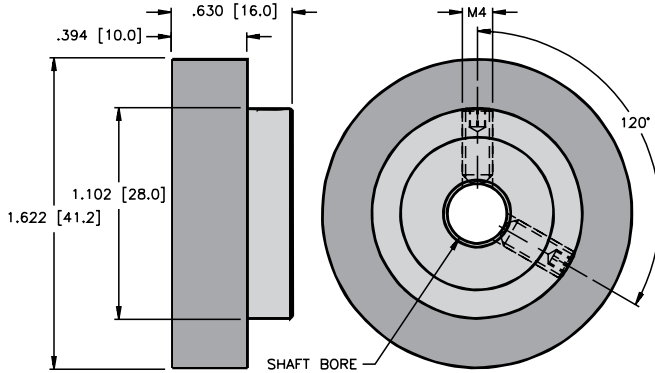
Dimensions: Magnetic sensor LI20



Magnetic rings RI20/ LI20

Dimensions: RI20 magnetic ring

T8.RI20.041.XXXX.111, Ø 41.2 mm



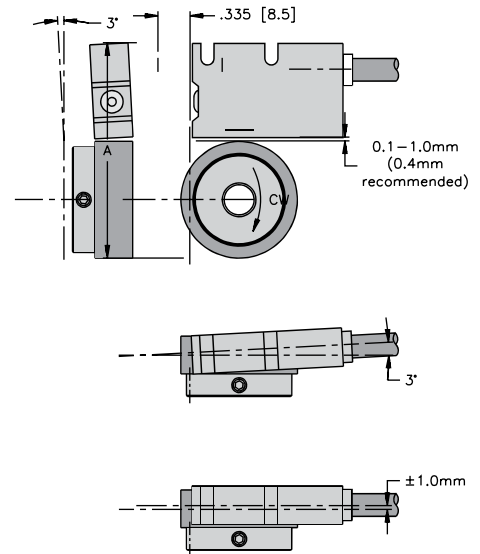
T8.RI20.045.XXXX.111, Ø 45 mm



Recommended tolerance of the drive shaft diameter: g6 in accordance with ISO 286-2

Permissible mounting tolerances:

RI20 and linear read head



Part Number	Dimension A
T8.RI20.031.XXXX.111	56.4 ¹⁾
T8.RI20.041.XXXX.111	66.6 ¹⁾
T8.RI20.051.XXXX.111	70.4 ¹⁾

¹⁾ With Distance Sensor / Magnetic ring = 0.4 mm

Display type 572 for LI20



Counter series for demanding applications, with two individually scalable encoder inputs. HTL or TTL in each case A, \bar{A} , B, \bar{B} for count frequencies up to 1 MHz per channel. Operating modes can be selected for position or event counter, total counter, difference counter, cut-to-length display, diameter calculator, batch counter and more.

- Two separate freely scalable count inputs - HTL or TTL; also with inverted inputs
- Max. input frequency 1 MHz/ channel
- Four freely programmable fast solid-state outputs, each with 350 mA output current
- Step or tracking preset
- AC and DC supply voltage
- Can be used as a counter or position display with limit values
- Monitoring function, where two values are monitored or calculated with respect to each other
- Four fast programmable inputs with various functions such as reset, gate, display memory, reference input or switching between the display values.
- Optional scalable analog output 0/4-20 mA, +/-10 V or 0-10 V

- Two auxiliary power supplies for sensors: 5.2 VDC and 24 VDC
- Standard interface RS232

Part number key specification:

Position display, 6 digits, with 4 fast switch outputs and serial interface: **6.572.0116.D05**

Position display, 6 digits, with 4 fast switch outputs and serial interface and scalable analog output: **6.572.0116.D95**

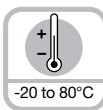
Position display, 8 digits, with 4 fast switch outputs and serial interface: **6.572.0118.D05**

Position display, 8 digits, with 4 fast switch outputs and serial interface and scalable analog output: **6.572.0118.D95**

Linear Magnetic Measurement System LI20/B1



High IP



Temperature



Shock/vibration resistant



Reverse polarity protection

Robust

- **Fully potted diecast metal housing.**
- **Increased ability to withstand vibrations and rough installation:** Eliminates machine downtime and repairs. Non-contact technology results in high shock and vibration resistance.
- **Stays sealed even when subjected to harsh everyday use.** Die cast metal housing with up to IP67 protection.



Compact

- **Installation depth only 10 mm, width of magnetic band 10 mm.**
- **Installation height only 28 mm.** May be used even where space is very tight.

Versatile

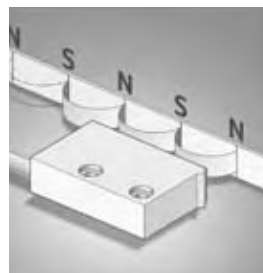
- **Fast start-up of the measuring system:** Easy attachment of the magnetic band and the sensor head.
- **Easy mounting with large tolerances possible:** Distance of sensor head to magnetic band from 0.1 to 1.0 mm; tolerates lateral misalignment + 1 mm; LED warning indicator when magnetic field is too weak.

Technical data magnetic sensor LI20:

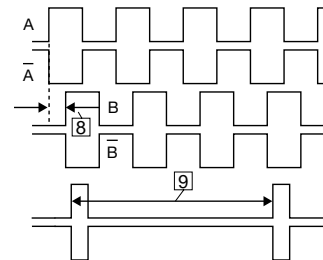
Output circuit:	Push-Pull	RS422
Supply voltage:	4.8 to 30 VDC	4.8 to 26 VDC
Load/channel, max cable length:	±20 mA, max. 30 m	120 Ohm, RS422 standard
Current consumption (without load):	typ. 25 mA, max. 60 mA	
Short circuit proof outputs: ¹⁾	yes	yes ²⁾
Min. Pulse interval:	1 µs (edge interval) corresponds to 4 µs/cycle (see signal figures below)	
Output signal:	A, \bar{A} , B, \bar{B} , I, \bar{I}	
Reference signal:	Index periodical	
System Accuracy:	typ. 0.2 mm, max. ± (0.04 + 0.04 x L) mm, (L in [m], up to L = 50 m, at T = 20°C)	
Repeat accuracy:	±1 increment	
Resolution and speed: ³⁾	0.1 mm (quadruple), max. 25 m/s 0.025 mm (quadruple), max. 4 m/s 0.01 mm (quadruple), max. 6.5 m/s	
Permissible alignment tolerance:	see draft "Mounting tolerances"	
Gap sensor / magnetic band:	0.1-1.0 mm (0.4 mm recommended)	
Offset:	max. ±1 mm	
Tilting:	max. 3°	
Torsion:	max. 3°	
Working temperature:	-4 to +176°F (-20 to +80°C)	
Shock resistance:	500 g / 1 ms	
Vibration strength:	30 g / 10-2,000 Hz	
Protection class:	IP67 according to DIN 60 529 (housing)	
Humidity:	100%, condensation possible	
Housing:	Zinc die-cast	
Cable:	2 m, PUR 8 x 0.14 mm ² , shielded, may be used in trailing cable installations	
Status-LED:	Green: Pulse-index; Red: Error Speed too high or magnetic fields too weak (for sensors T8.LI20.XXXX.X020 and T8.LI20.XXXX.X050)	

CE-compliant according to EN 61 000-6-1, EN 61 000-6-4, EN 61 000-6-3, EN 61 000-4-8 (magnetic field)
RoHS compliant acc. to EU guideline 2002/95/EG

Function principle:



Signal figures



- 9) periodic index signal (every 2 mm)
The logical assignment A, B and I-Signal can change
8) Min. Pulse interval: pay attention to the instructions in the technical data

¹⁾ With supply voltage correctly applied
²⁾ A max. of one channel only may be short-circuited: (when +V = 5 V, a short circuit to another channel, 0 V, or +V is permissible.) (when +V = 5-30 V, a short circuit to another channel or to 0 V is permissible.)
³⁾ At the listed rotational speed the min. pulse interval is 1µs, 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 Magnetic Measurement System LI20/B1

Technical data magnetic band B1:

Pole gap:	2 mm from pole to pole
Dimensions:	Width: 10 mm, Thickness: 1.7 mm incl. masking tape
Temperature coefficient:	$(11 \pm 1) \times 10^{-6} / K$
Temperature ranges:	working temperature: -4 to +176°F (-20 to +80°C) storage temperature: -40 to +176°F (-40 to +80°C)
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:	≤ 50 mm

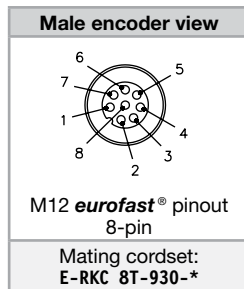


Pin configuration:

Pin	Signal	Color
1	0 V	WH
2	+V	BN
3	A	GN
4	\bar{A}	YE
5	B	GY
6	\bar{B}	PK
7	Z	BU
8	\bar{Z}	RD

Shield is on the housing

Wiring Diagram:



* Length in meters.

Part number key: Magnetic sensor LI20

T8.LI20.11X1.2XXX-XM-E-RSS 8T

Options for molded connection only.

Model

Design
1 = standard

Pulse interval
1 = standard

Interface and supply voltage
1 = 4.8-26, VDC RS422
2 = 4.8-30 VDC, push-pull

Type of connection
1 = cable (PUR), 2 m

Connection (optional)
E-RSS 8T = 8-pin M12 **eurofast**®

Mold on Length
Overall length in meters.
0.2M = 0.2 meters

Code (Resolution*)
005 = 100 μm
020 = 25 μm
050 = 10 μm
(only connected with magnetic band B1)

Reference signal
2 = index periodic

* with quadruple evaluation

Part number key: Magnetic band B1

T8.B1.10.010.XXXX

Model

Width
10 = 10 mm

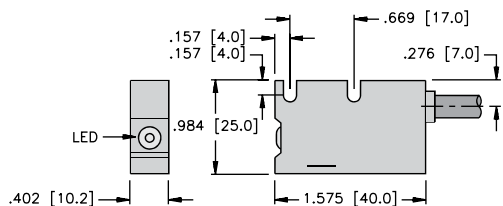
Length
0010 = 1 m
0050 = 5 m
0100 = 10 m
Other lengths up to 90 m on request

Accessories:

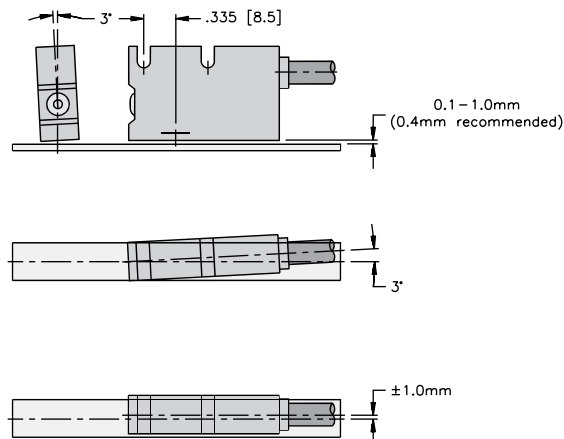
- See page J1, Connectivity, for cables and connectors

Linear Magnetic Measurement System LI20/B1

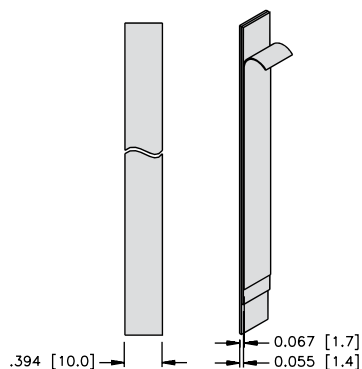
Dimensions: Magnetic sensor LI20



Permissible Mounting tolerances:



Dimensions: Magnetic band B1



Display Type 572 for LI20



Counter series with two individually scalable encoder inputs: HTL or TTL. In each case A \bar{A} , B \bar{B} , for count frequencies up to 1 MHz per channel. Operating modes may be selected for position or event counter, total counter, difference counter, cut-to-length display, diameter calculator, batch counter and more.

- Two separate freely scalable count inputs – HTL or TTL – also with inverted inputs.
- Max. input frequency 1 MHz/ channel.
- Four freely programmable solid-state outputs, each with 350 mA output current.
- Step or tracking preset.
- AC and DC supply voltage.
- May be used as a counter or position display with limit values.
- Monitoring function, where two values are monitored or calculated with respect to each other.
- Four programmable inputs with various functions, such as reset, gate, display memory, reference input or switching between the display values.
- Optional scalable analog output 0/4 to 20 mA, +/-10 V or 0 to10 V.
- Two auxiliary power supplies for sensors: 5.2 VDC and 24 VDC.
- Standard interface RS 232.

Part number key specification
Position display, 6 digits, with 4 fast switch outputs and serial interface: **6.572.0116.D05**

Position display, 6 digits, with 4 fast switch outputs and serial interface and scalable analog output: **6.572.0116.D95**

Position display, 8 digits, with 4 fast switch outputs and serial interface: **6.572.0118.D05**

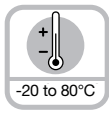
Position display, 8 digits, with 4 fast switch outputs and serial interface and scalable analog output: **6.572.0118.D95**

For detailed product specifications, see page E15.

Linear Magnetic Measurement System LI50/B2



High IP



Temperature
-20 to 80°C



Shock/vibration resistant



Reverse polarity protection

Robust

- **Fully potted diecast metal housing.**
- **Increased ability to withstand vibrations and rough installation:** Eliminates machine downtime and repairs. Non-contact technology results in high shock and vibration resistance.
- **Stays sealed even when subjected to harsh everyday use.** Die cast metal housing with up to IP67 protection.



Compact

- **Installation depth only 10 mm, width of magnetic band 10 mm.**
- **Installation height only 28 mm.** May be used even where space is very tight.

Simple installation

- **Fast start-up of the measuring system:** Easy attachment of the magnetic band and the sensor head.
- **Easy mounting with large tolerances possible:** Distance of sensor head to magnetic band from 0.1 to 2.0 mm; tolerates lateral misalignment +1 mm; LED warning indicator when magnetic field is too weak.

Technical data magnetic sensor LI50:

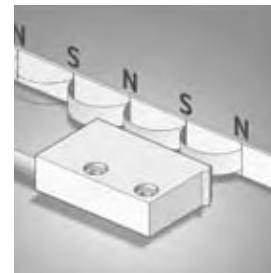
Output circuit:	Push-Pull	RS422
Supply voltage:	4.8 to 30 VDC	4.8 to 26 VDC
Load/channel, max cable length:	±20 mA, max. 30 m	120 Ohm, RS422 standard
Current consumption (without load):	typ. 25 mA, max. 60 mA	
Short circuit proof outputs: ¹⁾	yes	yes ²⁾
Min. Pulse interval:	1 μs (edge interval) corresponds to 4 μs/cycle (see signal figures below)	
Output signal:	A, \bar{A} , B, \bar{B} , I, \bar{I}	
Reference signal:	Index periodical	
System Accuracy:	typ. 0.2 mm, max. ± (0.06 + 0.04 × L) mm, (L in [m], up to L = 50 m, at T = 20°C)	
Repeat accuracy:	±1 increment	
Resolution and speed: ³⁾	0.025 mm (quadruple), max. 16.25 m/s 0.005 mm (quadruple), max. 3.25 m/s	
Permissible alignment tolerance:	see draft "Mounting tolerances"	
Gap sensor / magnetic band:	0.1-2.0 mm (1.0 mm recommended)	
Offset:	max. ±1 mm	
Tilting:	max. 3°	
Torsion:	max. 3°	
Working temperature:	-4 to +176°F (-20 to +80°C)	
Shock resistance:	500g/1 ms	
Vibration strength:	30 g/10-2000 Hz	
Protection class:	IP67 according to DIN 60 529 (housing)	
Humidity:	100%, condensation possible	
Housing:	Zinc die-cast	
Cable:	2 m, PUR 8 × 0.14 mm ² , shielded, may be used in trailing cable installations	

Status-LED:

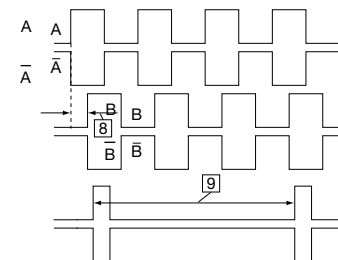
Green: Pulse-index; Red: Error
Speed too high or magnetic fields too weak
(for sensors T8.LI50.XXXX.X050 and T8.LI50.XXXX.X250)

CE-compliant according to EN 61 000-6-1, EN 61 000-6-4, EN 61 000-6-3, EN 61 000-4-8 (magnetic field)
RoHS compliant acc. to EU guideline 2002/95/EG

Function principle:



Signal figures



- 9] periodic index signal (every 2 mm)
8] Min. Pulse interval: pay attention to the instructions in the technical data

¹⁾ With supply voltage correctly applied
²⁾ A max. of one channel only may be short-circuited: (when +V = 5 V, a short circuit to another channel, 0 V, or +V is permissible.) (when +V = 5-30 V, a short circuit to another channel or to 0 V is permissible.)
³⁾ At the listed rotational speed the min. pulse interval is 1μs, 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 Magnetic Measurement System LI50/B2

Technical data magnetic band B2:

Pole gap:	5 mm from pole to pole
Dimensions:	Width: 10 mm, Thickness: 1.7 mm incl. masking tape
Temperature coefficient:	$(11 \pm 1) \times 10^{-6}/K$
Temperature ranges:	working temperature: -4 to +176°F (-20 to +80°C) storage temperature: -40 to +176°F (-40 to +80°C)
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:	≤ 50 mm

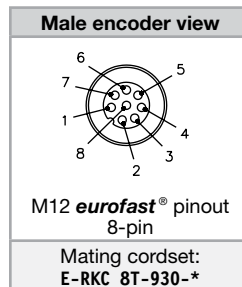


Pin configuration:

Pin	Signal	Color
1	0 V	WH
2	+V	BN
3	A	GN
4	\bar{A}	YE
5	B	GY
6	\bar{B}	PK
7	Z	BU
8	\bar{Z}	RD

Shield is on the housing

Wiring Diagram:



* Length in meters.

Part number key: Magnetic sensor LI50

T8.LI50.11X1.2XXX-XM-E-RSS 8T

Options for molded connection only.

Model		Connection (optional)	E-RSS 8T = 8-pin M12 eurofast ®
Design	1 = standard	Mold on Length	Overall length in meters. 0.2M = 0.2 meters
Pulse interval	1 = standard	Code (Resolution*)	050 = 25 μ m 250 = 5 μ m (only connected with magnetic band B2)
Interface and supply voltage	1 = 4.8-26 VDC, RS422 2 = 4.8-30 VDC, push-pull	Reference signal	2 = index periodic
Type of connection	1 = cable (PUR), 2 m		

* with quadruple evaluation

Part number key: Magnetic band B2

T8.B2.10.010.XXXX

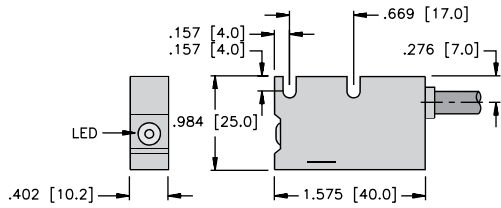
Model		Length	0010 = 1 m 0050 = 5 m 0100 = 10 m Other lengths up to 90 m on request
Width	10 = 10 mm		

Accessories:

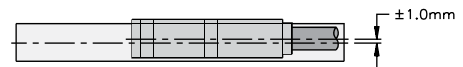
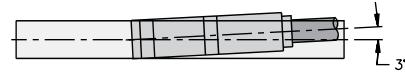
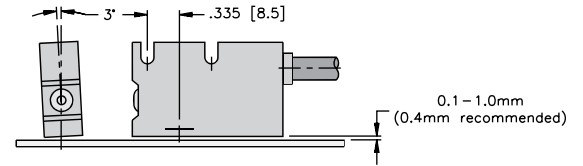
- See page J1, Connectivity, for cables and connectors

Linear Magnetic Measurement System LI50/B2

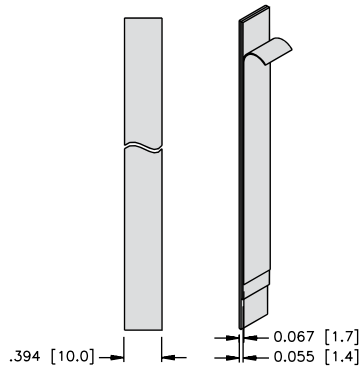
Dimensions: Magnetic sensor LI50



Permissible Mounting tolerances:



Dimensions: Magnetic band B2



Display Type 572 for LIXX



Counter series with two individually scalable encoder inputs: HTL or TTL. In each case, A \bar{A} , B \bar{B} for count frequencies up to 1 MHz per channel. Operating modes may be selected for position or event counter, total counter, difference counter, cut-to-length display, diameter calculator, batch counter and more.

- Two, separate freely scalable count inputs – HTL or TTL – also with inverted inputs.
- Max. input frequency 1 MHz/ channel.
- Four freely programmable solid-state outputs, each with 350 mA output current.
- Step or tracking preset.
- AC and DC supply voltage.
- May be used as a counter or position display with limit values.
- Monitoring function, where two values are monitored or calculated with respect to each other.
- Four programmable inputs with various functions, such as reset, gate, display memory, reference input or switching between the display values.
- Optional scalable analog output 0/4 to 20 mA, +/-10 V or 0 to 10 V.
- Two auxiliary power supplies for sensors: 5.2 VDC and 24 VDC.
- Standard interface RS 232.

Part number key specification:

Position display, 6 digits, with 4 fast switch outputs and serial interface: **6.572.0116.D05**

Position display, 6 digits, with 4 fast switch outputs and serial interface and scalable analog output: **6.572.0116.D95**

Position display, 8 digits, with 4 fast switch outputs and serial interface: **6.572.0118.D05**

Position display, 8 digits, with 4 fast switch outputs and serial interface and scalable analog output: **6.572.0118.D95**

For detailed product specifications, see page E15.