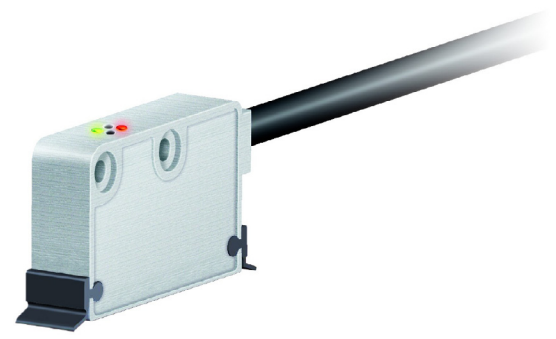


ENC-LKE51 Linear Magnetic Encoder

FEATURES

- Resolutions: 5, 10, 25, and 50µm
- Linear Travel Speed: Up to 16m/s
- Standard Sensor for Linear and Rotary Axis
- Gap Clearance up to 2mm
- Hi-Flex Sensor Cable
- Status LED for Clearance Error
- Push-Pull or Line Driver Circuit Output
- Quadrature TTL Squarewave Output
- Resistant to Dust, Debris, and Liquids
- Operating Temperature -25 °C to +85 °C
- Optional Reference Mark ENC-LKM51-1309



DESCRIPTION

The ENC-LKE51 with Index series is a non-contact encoder offering reliable operation with no maintenance required. This encoder can be easily added to any application requiring feedback control. The flexibility and versatility of the magnetic sensor and scale allows this linear encoder to be used for both linear and rotary applications. As the magnetic sensor travels along the magnetic scale or ring, it detects the displacement and outputs a TTL signal. The frequency of the output signal is proportional to the measuring speed and displacement of the sensor. Each encoder features a resolution between 5µm and 50µm, is IP67-protected, and is powered by a single +5 or +10-30 VDC power supply (model-dependent).

Linear Encoder Accessories including wipers and reference marks (with R Index option) are also available.

***Note: The magnetic sensor (ENC-LKE51) and scale (ENC-MT50) are sold separately.**

LKE51 ORDERING INFORMATION

ENC - LKE51 - L - 1 - 05 - I - 05 - B

Output Circuits		Power Supply		Resolution		Index		Cable Length	
L	Line Driver (AB, /AB)	1	+5VDC ± 5% Must be selected with Output Circuit option "L" (Line Driver)	05	5µm	N	No Index	02	2m
YC	Push-Pull (AB, /AB)	2	+10 - 30VDC Must be selected with Output Circuit option "Y" or "YC" (Push-Pull)	10	10µm	I	Every 5mm	03	3m
Y	Push-Pull (AB)			25	25µm	R	Unique Reference Signal	04	4m
				50	50µm			05	5m
								07	7m
								10	10m
								Available up to 50m	

*Note: Output Circuit option "L" must be matched with Power Supply option "1" (5VDC ±

*Note: Output Circuit options "Y" or "YC" must be matched with Power Supply option "2" (10 - 30VDC)

*Note: The magnetic scale is sold separately and not included with the magnetic sensor. The 'Scale Ordering Information' can be found on the next page.

Also, the cable length of the sensor can be requested at time of order but cannot exceed 50m.

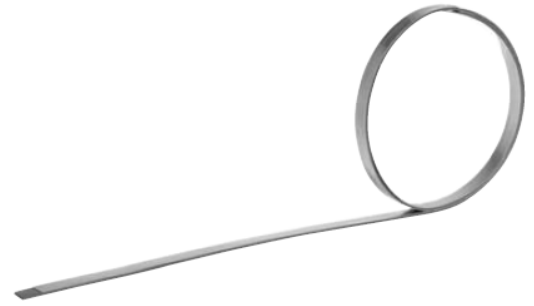
L011070

Max Counting Frequency (kHz)	
H	3,333
J	2,000
A	1,000
B	500
C	250

ENC-MT50 Magnetic Scale

FEATURES

- Accuracy Class of $\pm 8\mu\text{m}$, $\pm 35\mu\text{m}$, or $\pm 85\mu\text{m}$
- Flexible Magnetic Scale with Adhesive Tape
- Resistant to Debris, Liquids, and Oils
- Scale Length up to 100m
- Pole Pitch: 5mm
- Cover Strip



DESCRIPTION

With its adhesive backing tape, the ENC-MT50 magnetic scale can be easily mounted to metals, ceramics, and other engineering materials. The magnetic scale consists of alternating north and south pole magnets and are placed at a fixed distance called the pole pitch. As the magnetic sensor travels along the magnetic scale or ring, it detects the displacement and outputs a TTL signal. The total length of the incremental magnetic tape ENC-MT50 should exceed the measuring length by at least 10mm (0.4") on each side. Also, the ENC-MT50 magnetic scale is resistant to oil, chemicals, and debris to ensure a more accurate reading from the magnetic sensor.

MT50 ORDERING INFORMATION

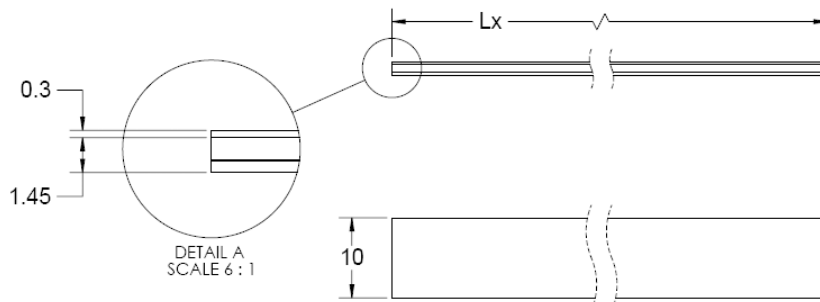
ENC - MT50 - 1000 - 010

Scale Length*				Accuracy Class	
0500	500mm	2500	2500mm	010	$\pm 8 \mu\text{m/m}$ (up to 10m)
1000	1000mm	3000	3000mm	050	$\pm 35 \mu\text{m/m}$ (up to 30m)
1500	1500mm	3500	3500mm	100	$\pm 85 \mu\text{m/m}$
2000	2000mm	4000	4000mm		

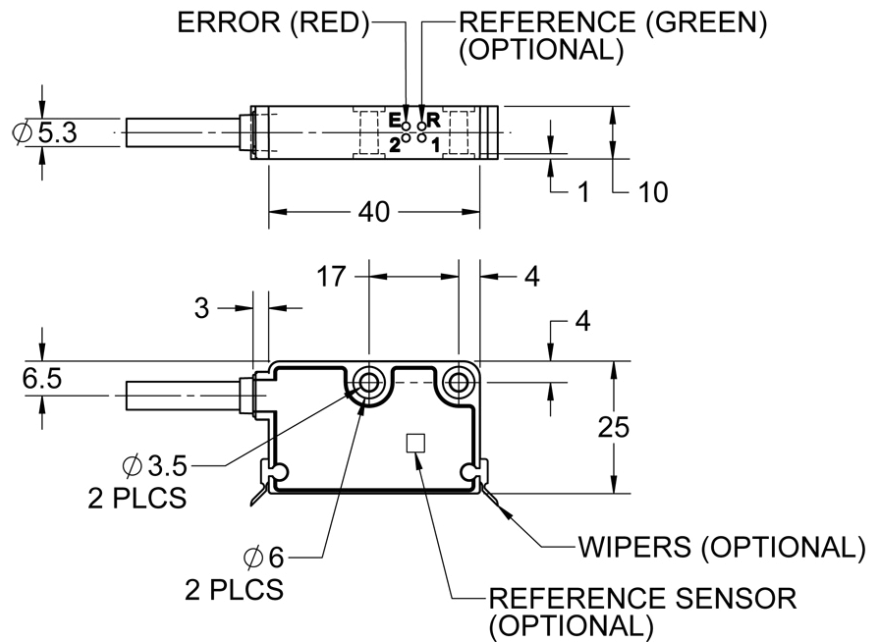
*Available up to 100m length

**Note: Longer lengths of MT50 can be purchased upon request (up to 100m). The total length of the magnetic tape MT50 should exceed the measuring length by 10mm (.4") on each side.*

MT50 DIMENSIONS

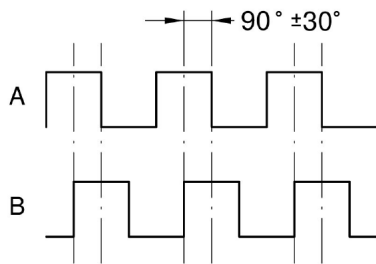


Dimensions are in mm

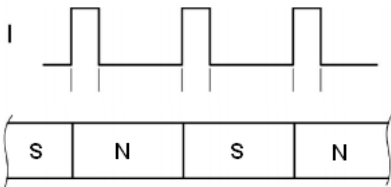


Dimensions are in mm

A and B Channel Output:



Index Output every 5mm (Pole Pitch):



*Note: When ordering the 'N' version, the output signal 'I' is not available.

Lead Wires	Color	Description
1	Black	0VDC
2	Red	+VDC*
3	Yellow	A
4	Blue	/A
5	Green	B
6	Orange	/B
7	White	I
8	Grey	/I

* See ENC-LKE51 Ordering Information

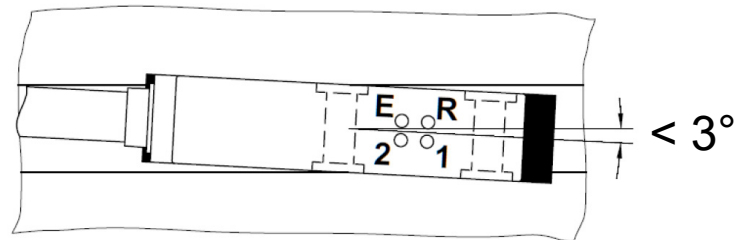
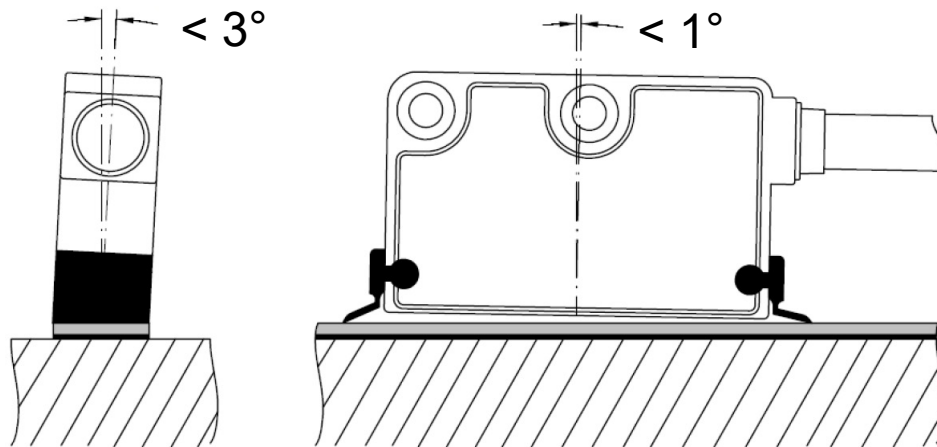
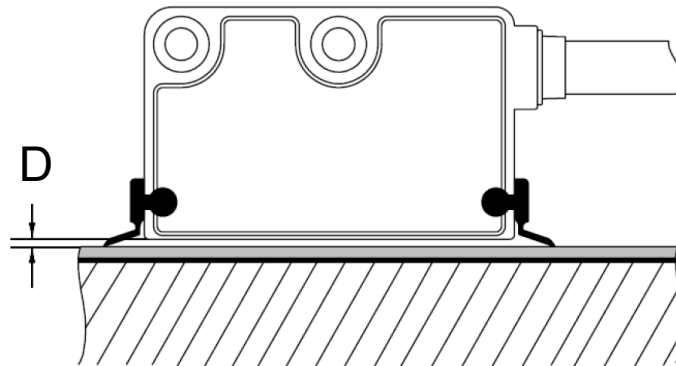
Example:
 ENC-LKE51-L-1-... +VDC = +5VDC ± 5%
 ENC-LKE51-Y-2-... +VDC = +10VDC, +30VDC

Order Code	Edge Distance (μs)	Max Counting Frequency (kHz)	Resolution (μm) vs Max Possible Speed (m/s)*			
			5	10	25	50
H	0.3	3,333	16.0	16.0	16.0	16.0
J	0.5	2,000	10.0	16.0	16.0	16.0
A	1.0	1,000	5.0	10.0	16.0	16.0
B	2.0	500	2.5	5.0	12.5	16.0
C	4.0	250	1.3	2.5	6.3	12.5

*Theoretical speed between sensor and tape/ring. Please check travelling speed limitation on product specs.

Mounting Instructions

This section describes how to mount the ENC-LKE51 magnetic encoder sensor to your application. The ENC-LKE51 sensor can be fixed by using two M3 screws inserted in the provided holes. In order to obtain the most accurate of readings, it is necessary to ensure the gap between the sensor and the scale are within their respective tolerances. The figures below help illustrate the tolerances along the measuring length of the sensor and scale. It is important to note to avoid contact between the parts. You can check planarity and parallelism between the magnetic sensor and magnetic scale using a feeler gauge.



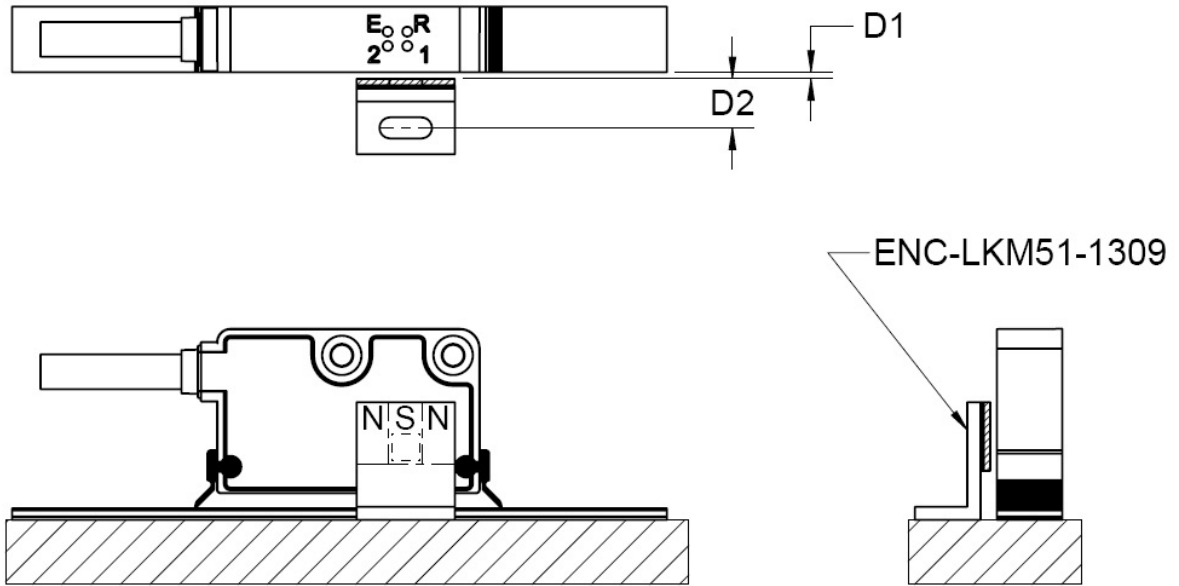
MOUNTING INSTRUCTIONS

Magnetic Sensor	Gap Sensor / Magnetic Scale (D)	Gap Sensor / Cover Strip (D)
ENC-LKE51	0.1 - 2.0mm	0.1 - 1.7mm

Reference Marker Mounting Instructions

MOUNTING REFERENCE MARKER INSTRUCTIONS

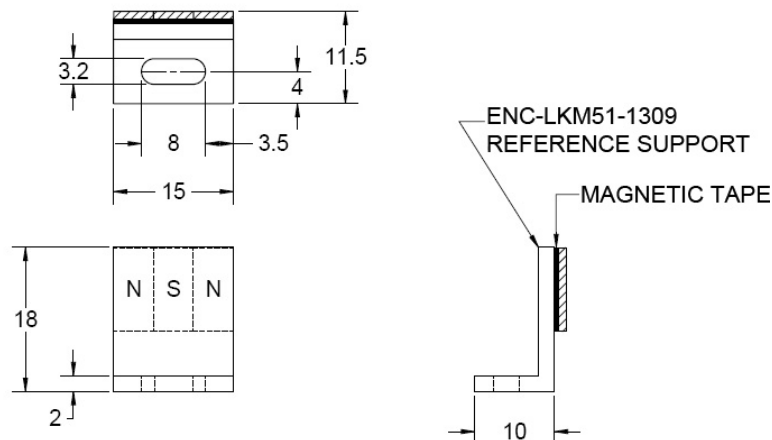
This section describes how to mount the ENC-LKM51-1309 reference marker. The R LED ON indicates that the zero signal is enabled (distance between sensor and reference marker is correct). If the zero signal is not present on the output when the LED is ON, move the reference marker about half a pole length to align it with the scale while keeping the same distance from the sensor.



D1: Gap distance between the ENC-LKE51 sensor and the ENC-LKM51-1309 Reference Marker.

D2: Gap distance between the center fixing hole to the edge of the ENC-LKM51-1309 Reference Marker.

Reference Marker	D1	D2
ENC-LKM51-1309	0.5 - 1.0mm	7.5mm



LKE51 Mechanical Specifications

Dimensions:	See Dimension Drawing
Housing:	Die Cast Aluminum, UNI EN AC-46100
Connection:	Hi-Flex Cable M8, 2.0m
Gap Sensor-Magnetic Tape: (Without Cover Strip)	0.1 to 2.0mm
Travel Speed:	max 16 m/s (Mechanical)
Resolution:	5,10, 25, or 50µm
System Accuracy:	±15µm Max
Repeatability:	±1 Increment
Vibration:	30g (50-2,000Hz)
Shock:	30g (11ms)

LKE51 Electrical Specifications

Power Supply:	+5VDC ±5%, +10-30VDC
Output Circuits:	Line Driver, Push-Pull
Output Signals:	ABI, /ABI
Counting Frequency:	Acc. to Edge Distance Setting
Output Current (Per Channel):	40 mA Max
Input Current:	70 mA Max

*Note Protection against inversion of channel polarity (except for 5VDC) and short-circuit.

LKE51 Environmental Specs	Min	Max	Units
Operating Temperature	-25	85	°C
Storage Temperature	-40	100	°C
Protection Level		IP67	

MT50 Environmental Specs	Min	Max	Units
Operating Temperature	-40	120	°C
Storage Temperature	-40	120	°C
Protection Level		IP67	

MT50 Mechanical Specifications

Dimensions:	See Dimension Drawing
Material:	Plastic and Steel
Accuracy Class:	±8 / ±35 / ±85 µm/m
Temperature Coefficient:	11±1 µm/K
Length:	Maximum 100m
Pole Pitch:	5.0mm

Accessories

ENC-MT50:	Magnetic Tape
*ENC-LKM51-1309:	Reference Pole Support
ENC-KT51	Wipers for ENC-LKE51 (10pcs)

*Note: The ENC-LKM51-1309 should only be used when using the R-Option for the index

E RED LED (error status)	Description
<p style="text-align: center;">ON Red</p>	<p>It warns of the presence of an error.</p> <ul style="list-style-type: none"> • Distance error: the specified mounting tolerances between sensor and tape (or ring) are not met; please refer to the “Mechanical installation” section on page 9. • Speed error: overspeed detected, the sensor exceeded the frequency limit and the zero may be lost; the rotational speed of the ring is too high and the sensor may have lost the zero; switch off and then on the power supply. For more information please refer to the technical datasheet. • Internal error of the conversion electronic (interpolator). • The presence of external noise may cause malfunctioning or a decrease in the quality of the signals.
<p style="text-align: center;">OFF</p>	<p>No error is active currently.</p>

Maintenance and Troubleshooting

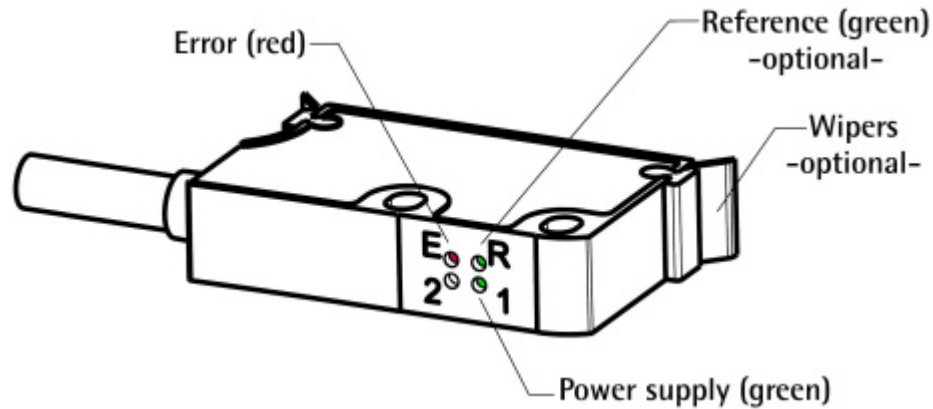
The magnetic measurement system does not need any particular maintenance; please always consider it is a delicate electronic equipment and therefore it must be handled with care. From time to time we recommend the following operations:

- Check the mounting tolerances between the sensor and the magnetic scale / magnetic ring all along the measuring length. Wear of the machine may increase the tolerances.
- The surface of the magnetic scale / magnetic ring should be cleaned periodically using a soft cloth to remove dust, chips, moisture etc.

The following list shows some typical faults and errors that may occur during installation and operation of the magnetic measurement system. Refer also to the Diagnostic LEDs:

Diagnostic LEDs

Three LEDs located in the upper face of the encoder enclosure are intended to show visually the work status of the device as explained in the following table. The LED 2 is not used.



Diagnostic LEDs and optional cleaning wipers

Fault:

The system does not work (no pulse output).

Possible cause:

- The scale or the sensor has been mounted incorrectly (the active part of the scale does not match the active side of the sensor).
- A magnetic piece or an inappropriate strip is in between the sensor and the scale / ring. Only non-magnetic materials are allowed between the sensor and the scale / ring.
- The sensor touches the scale / ring: the mounting tolerances are not met. Check if the active side of the sensor is damaged.
- The sensor has been damaged by a short circuit or a wrong connection.
- An internal error of the conversion electronics has occurred (interpolator).

Fault:

The measured values are inaccurate.

Possible cause:

- The mounting tolerances between the sensor and the scale / ring are not met all along the whole measurement length.
- The connection cable runs near to high voltage cable or shield is not connected correctly.
- The presence of external noise may cause malfunctioning or a decrease in the quality of the signals.
- The max. counting frequency of your receiving device is too low.