

## SLE-LL SERIES

Miniature, Small Cross-section Linear Encoder



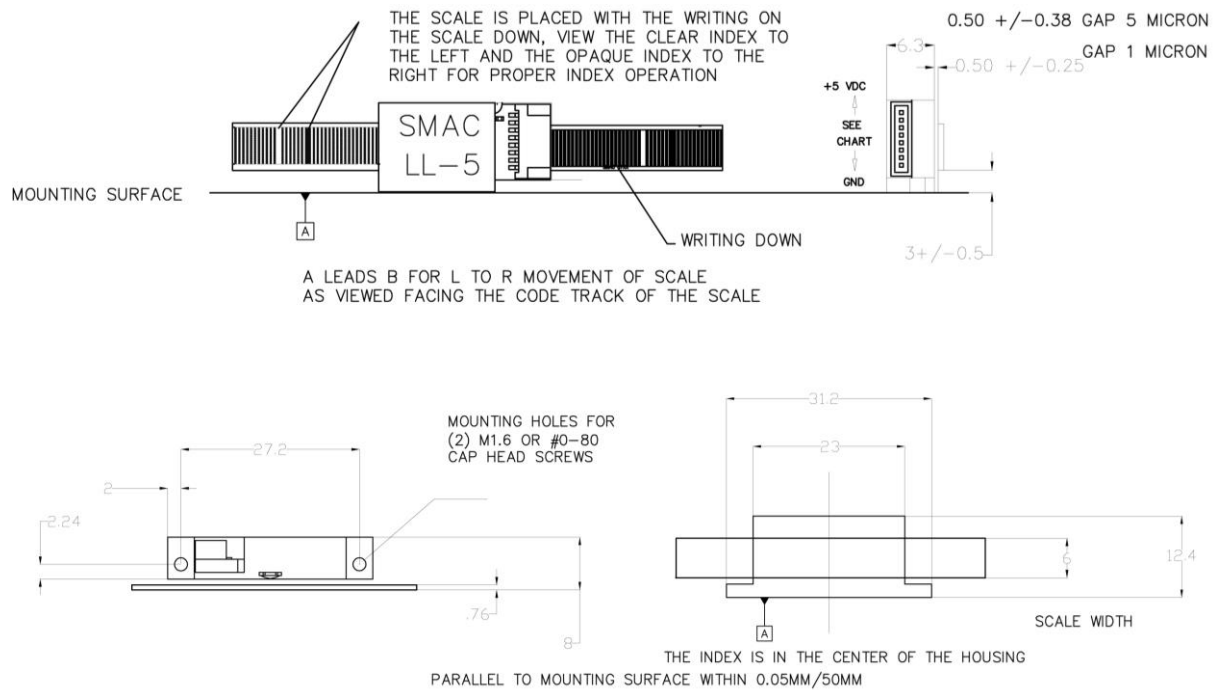
### Description

The SMAC SLE-LL Series linear encoder is a miniature non-contacting high-resolution incremental linear encoder, which delivers two count channels in quadrature RS422 output signals. This series is available in 1 and 5 micron resolution.

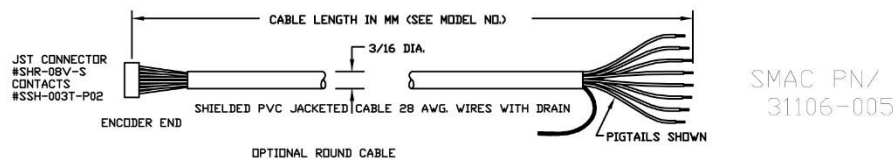
### Features

- Light Source: Light Emitting Diode;
- Light Sensor: Optical ASIC
- Resolution after quadrature: 5 and 1 micron
- Output Format: Differential RS422 line driver output. Two count channels A and B in quadrature with an optional ZR output;
- Quadrature spec.:  $90^\circ \pm 45^\circ$  at maximum conditions;
- Rise and Fall Time: 1  $\mu$ s max., with 1000 pF load;

## Package Dimensions



## OPTIONAL CABLE



50cm cable is included as standard.

### Ordering Code:

**SLE-LL-YY-ZZ-M**

#### Resolution:

05 = 5 micron

01 = 1 micron

#### Cable Termination:

00 = Flying Lead

09 = 9 pin D-sub

15 = 15 pin D-sub

#### Cable Jacket Material (optional)

0 = PVC (Standard)

1 = mPPE (Low Off-Gassing)

## Absolute Maximum Ratings

Storage Temperature Range	-25 °C to 85 °C
Operating Temperature Range	0 °C to 85 °C
Supply Voltage	+ 5V DC $\pm$ .25V
Output Current per channel	50 mA
Frequency Response	4.8 Meters per Second (5 Micron) 3 Meter per Second (1 Micron)

## Recommended Operating Conditions

Parameter	Min.	Typical	Max.	Units
Supply Voltage	4.75	5	5.25	V
Temperature	0	25	85	°C
Output Frequency		240		kHz

## Mechanical characteristics

Parameter	Dimension/Details	Units
Housing Material	Aluminum	
Mounting Screw Size	M1.6	

## Compatible Scales

The SLE-LL series of encoders is compatible with all scale part numbers ending in a -A designator.  
For lengths not listed please consult with the factory.

## Mechanical and Environmental Tests

Parameter	Reference	Conditions
Shock	IEC 68-2-27	10 G at 11 ms
Humidity	IEC 68-2-3	98 % RH (non-condensing)

## Theory of Operation

The SMAC SLE-LL, Reflective linear encoder, transforms the linear motion of a linear scale into a digital output signal. The main components of the SMAC SLE-LL series are: an IR Light Emitting Diode (LED), a focusing lens, a high-precision linear scale, an IC photo-detector with a set of uniquely configured photodiode Interlaced Array, an IC interpolator, and an IC line driver.

The light source is emitted by the LED and is reflected off the code pattern of the scale to produce a set of analog signals, by means of the modulation from the optical ASIC detector producing proper compensation and interpolation factors, the analog signals are used to produce the digital A and B signals. Therefore, these digital signals feed the IC line driver in order to obtain the differential outputs for channels A, B and I and their complements.

## Pin Assignment

Pin	Signal	Description
Pin 1	+5	Input Voltage
Pin 2	Z-	ZR Output
Pin 3	Z+	ZR Output
Pin 4	B-	Digital Output
Pin 5	B+	Digital Output
Pin 6	A-	Digital Output
Pin 7	A+	Digital Output
Pin 8	GND	Ground

### SMAC Moving Coil Actuators

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The information contained in this document may change without prior notice due to product improvements.

SLS-**WWW**-**XXXX**-**Y**-**Z**

W		Material Details
	1WW	Glass
		160 0.75±0.01mm Thick, 6mm width
		162 3.0mm Thick, 6mm width
	2WW	Mylar
		260 0.3mm Thick, 6mm width

Scale can be cut to a desired length.

X		Scale Length in mm
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Y		Scale Pitch
	A	80mm Pitch
	B	20mm Pitch

Z		Backing
	A	No Adhesive Backing
	B	Peel and Stick Adhesive Backing

Scale Part Number SLS- <b>WWW</b> - <b>XXXX</b> - <b>Y</b> - <b>Z</b>	Scale Length [mm]	Encoder Models						
		SLE-LI-01	SLE-LI-10	SLE-LI-15	SLE-LL-1	SLE-LL-5	SLE-35-10	SLE-35-25
SLS-160-0164-A	164	X	X	X	X	X	X	
SLS-160-0128-B	128							X
SLS-162-0314-B	314							X
SLS-260-0600-A	600	X			X	X		