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**SMAC** Moving Coil Actuators

# SRE-30 Series

## 2000 CPR Low Profile Rotary Kit Encoders



## Description

The SMAC SRE-30, High Resolution rotary encoder is similar in mounting to other industry standard enclosed rotary encoders. This model is a miniature non-contacting high-resolution incremental rotary encoder, which delivers two count channels in quadrature (called A and B) as output signals. The two output waveforms are 90 degrees out of phase and indicate both the position and the movement direction: when Channel A leads Channel B, for example, then the movement of the disc is clockwise. Otherwise, if B leads A, then the displacement is in the opposite direction. This encoder is available in 1000, 2000, 4000, 8000 and 16000 CPR resolution.
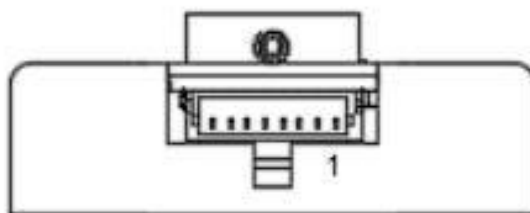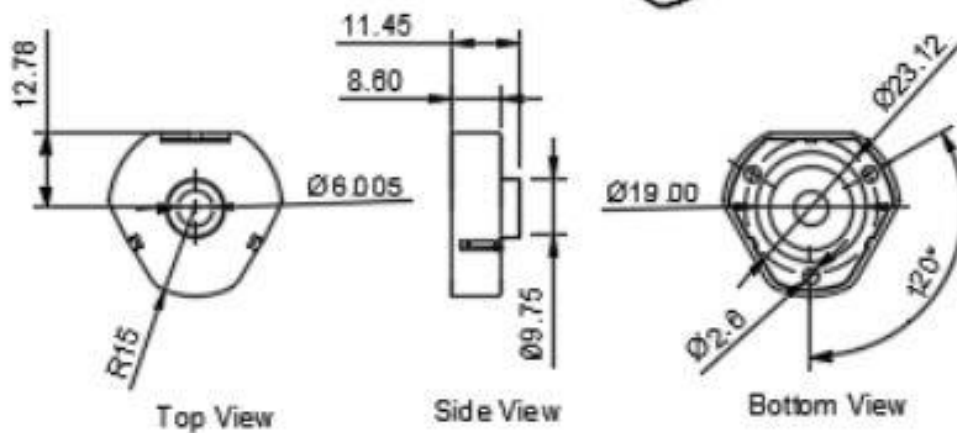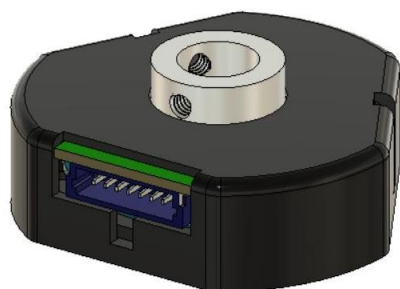
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## Features

- Light Source: Light Emitting Diode;
- Light Sensor: Optical Asic;
- Resolution: 1000, 2000, 4000, 8000 or 16000 CPR
- Output Format: Differential RS422 line driver output. Two count channels A and B in quadrature with an optional ZR output;
- Quadrature spec.: 90°, ±45° at maximum conditions;
- Rise and Fall Time: 1µm max. into 1000 pF load;
- 6mm standard shaft size

## Application Samples

- Data Storage Applications
- Motion Control
- Assembly Applications
- Electronic

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## Package Dimensions



Top View

Side View

Bottom View



| Pin | Function |
|-----|----------|
| 1 | GND |
| 2 | A+ |
| 3 | A- |
| 4 | +5V |
| 5 | B+ |
| 6 | B- |
| 7 | Z+ |
| 8 | Z- |

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## 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 |
| Termination | 120 ohm load across differential signals into a user's line receiver (recommend 26C30)     150 mA typical |
| Frequency Response | 25,000 RPM |

*Note: Absolute Maximum Ratings represent the limits that must not be overcome in order to guarantee a safe operation of the device. This does not mean that the device should be operated with such values.*

## Recommended Operating Conditions

| Parameter | Min. | Typical | Max. | Units |
|---|---|---|---|---|
| Supply Voltage | +4.75 | +5 | +5.25 | Vdc |
| Temperature | -25 | | +85 | °C |
| Output Frequency | | 400 | | kHz |

## Mechanical Characteristics

| Parameter | Dimension/Details | Tolerance | Units |
|---|---|---|---|
| Housing Material | PA6 Nylon | | |
| Disc Diameter | 26MM | | |
| Mounting Screw Size | M2.5 | | |
| Disc Material | Standard: Aluminum Mylar (optional Glass) | | |

## 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 SRE-30 is a reflective rotary encoder, which transforms the rotary motion of a code pattern on the disk into a digital output signal. The main components of the SMAC SRE-30 series are: a near UV, blue Light Emitting Diode (LED), a high-precision metal rotary scale, an IC photo-detector with a set of uniquely configured photodiode Interlaced Phased 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 and reflected back to the photodetectors 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 interpolated 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 | GND | Ground |
| Pin 2 | A+ | Digital Output |
| Pin 3 | A- | Digital Output |
| Pin 4 | +5v | Power |
| Pin 5 | B+ | Digital Output |
| Pin 6 | B- | Digital Output |
| Pin 7 | Z+ | ZR |
| Pin 8 | Z- | ZR |

### Order Code: SRE-30X-Y-Z

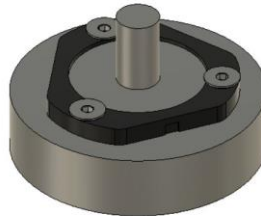| | | |
|---|---|---|
| X | Shaft Bore Diameter (mm) | 3 = 3/16"<br>4 = 4mm<br>5 = 1/4"<br>6 = 6mm |
| Y | Final CPR | 1 = 1000<br>2 = 2000<br>4 = 4000<br>8 = 8000<br>16 = 16000 |
| Z | Connection option | 1 = SHR-08V-S Female JST<br>2 = 0.5 meter cable w/ flying leads |

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## Installation Instructions

Step 1:

Place encoder base on 19mm pilot and affix with (3) M2.5 screws. Ensure the countersunk screw holes are facing away from the mounting surface.



Step 2:

Slide hub and code disk assembly onto the shaft, do not tighten the set screws in place yet. Press the PCB housing into position on the encoder base, when properly place housing will "click" into position and lock in place.
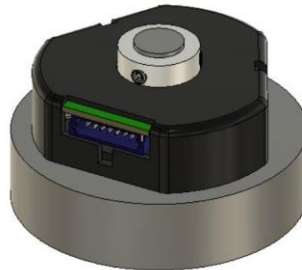


Step 3:

Insert Allen Wrench into one set screw on the hub and lower hub until the Allen Wrench is flush with the top surface of the PCB cover. Tighten both set screws, locking the hub in place on the shaft.