

New Technologies RAIK045 and RAIE027 Customized Position Sensor Variants Dedicated to Aviation Applications Available with DO Quality Standards Compatibility

Vishay offers a variety of encoders based on magnetic or inductive technology, including a complete range of RAME / RAMK and RAIE / RAIK series position sensors. Based on the company's know-how and extensive experience in aviation applications, we've introduced new design variants built on inductive technology dedicated to the functions of position and actuator motor control for commercial, regional, and eVTOL aircraft, in addition to drones.

Compared to solutions based on standard magnetic technology, the RAIK045 and RAIE027 designs are completely insensitive to the magnetic environment, allowing them to be used close to electrical motors. Lighter and thinner than magnetic encoders, the devices offer lower inertia without hysteresis.



RAIK045



RAIE027 Single

RAIE027 Redundant

The RAIK045 achieves > 13-bit accuracy (0.044°), 18-bit resolution, and \geq 17-bit repeatability. Offering an off-axis design for hollow shaft mounting, the position sensor features a useful electrical angle of 360° and a wide temperature range of -40 °C to +105 °C. The device has a 45 mm outside diameter, a 5 mm inner diameter, a thickness of 7.4 mm, and is designed with variant SSI output signals.

The RAIE027 achieves ~ 12-bit accuracy (0.1°), 18-bit resolution, and \geq 15-bit repeatability. Offering a body design with a shaft interface, the position sensor features a useful electrical angle of 360° and a wide temperature range of -40 °C to +105 °C. The device has a 27 mm outside diameter, with a height of 21.3 mm for single function, and 27 mm for redundant functions. It is designed with variant SSI output and variant analog ratiometric signals. With its ratiometric analog output and 27 mm housing diameter, the RAIE27 is an excellent candidate to replace potentiometer designs.

The both models maintain robustness against external magnetic fields, moisture, airborne pollution, vibration, mechanical shock, and changes in temperature. They integrate EMC protection and SEU immunity.

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Because the standard DO requires a specific process from the beginning of development regardless of requirements,, Vishay R&D is ready to study all specifications in a close partnership with customers to adapt the design.

Key Advantages

- Dual functions for safe operations on RAIK045: one function full performances + second function for safe function.
- Single or Redundant functions on RAIE027: full redundance for redundant variant.
- ✓ Architecture: designed to be compatible with quality standard DO160/254, choice of components adapted to SEU environment, built-in self-monitoring (supplying voltage survey, temperature survey, correct operations survey)
- ✓ **Inductive technology:** completely insensitive to the magnetic environment, no hysteresis, very low inertia versus magnetic technology, lighter and thinner than magnetic encoders.
- ✓ Interfacing: RAIE027 variant with analog ratiometric output (analog variant can replace potentiometer technology pin to pin), RAIE027 and RAIK045 variant with digital output is adapted to new digital actuators.
- Customizable profile: in kit design, the dimensions can be adapted upon customer request
- Redundant technology (on request): in RAIE027 model, one cup could be designed with magnetic technology with providing of similar performances (accuracy & resolution).

	RAIK045	RAIE027
Design	Kit (rotor + stator)	Body
Angle	360°	
Accuracy over the range temperature	13 bits (0.05°)	12 bits (0.1°)
Resolution	18 bits (262 144 points)	
Repeatability	≥ 17 bits	≥ 15 bits
Latency time	< 12 µs	< 10 µs
Maximum sampling rate	23 kHz	
Maximum rotation speed	10 000 rpm	5 000 rpm
Output format	SSI	SSI
		or analog ratiometric
Voltage power supply	5 V _{DC} ±0.25 V _{DC}	5 V _{DC} ±0.25 V _{DC} for digital output
		from 5 V to 30 V±5% for analog output
Operational temperature range	-40 °C to +105 °C	
Storage temperature range	-55°C to +125°C	
EMC / SEU	EMC Protection / SEU Immunity	
Dimensions	Outer Diameter 45 mm	Outer Diameter 27 mm
	Inner Diameter 5 mm	
Weight	35,5 g	34 g (for single function)
Part Number	RAIK045 A	RAIE027 A

Main Features

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Fast Facts



✓ To read and evaluate the RAIK045 and RAIE027: USB Encoder Interface

Useful Links

- RAIK045A / RAIK045I product page
- RAIE027A / RAIE027I product page

Contact Information

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