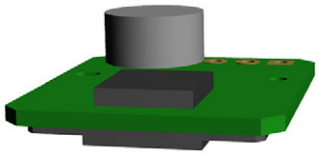
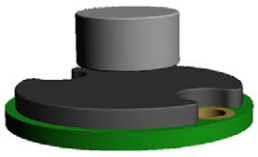
Rotational Absolute Magnetic Kit Encoder Version 16 mm Medium Precision Position Sensor





LINKS TO ADDITIONAL RESOURCES

3D Models | Infographics | Capabilities and Custom Options

FEATURES

- On-axis rotational absolute magnetic encoder
- Especially dedicated to motor drive, to robot's position and industrial motion control with accurate positioning
- Rotation speed up to 10 000 rpm
- High repeatability, high precision, single turn
- Hall effect technology
- Not sensitive to moisture and pollution
- Especially dedicated for harsh conditions (vibrations, shocks, …)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free RoHS COMPLIANT

QUICK REFERENCE DATA	
Sensor type	ROTATIONAL, magnetic technology
Output type	Pads
Market appliance	Industrial
Dimensions	Diameter 12 mm or size 16 mm x 14 mm

ELECTRICAL SPECIFICATIONS	
PARAMETER	
Voltage power supply (on sensor connector)	5 V_{DC} ± 0.5 V_{DC}
Supply current at 5 V_{DC}	≤ 100 mA (typical 75 mA at 25 °C)
Output format	SSI
Useful electrical angle	360°
Accuracy at 25 °C	≤ 0.5° (typical ± 0.35°)
Accuracy at 25°C over the range of mechanical tolerances mixing misalignment rotor / stator up to ± 0.5 mm and airgap 1 mm ± 0.5 mm	≤ 1.5°
Micro-linearity error	≤ + 4 / - 2 LSB
Output noise (at static position)	≤ 5 LSB
Resolution	Better than 16 384 points (14 bits, ≈ 0.022°)
Startup time	≤ 100 ms
Data latency time	≤ 200 µs
Maximum sampling rate	4.6 kHz (TBD)

MECHANICAL SPECIFICATIONS	
PARAMETER	
Mechanical angle	360°
Maximum rotation speed	10 000 rpm (more on request)
Rotor weight (magnet)	0.4 g
Stator weight (RAMK016)	0.63 g

For technical questions, contact: mcbprecisionpot@vishay.com

SAP PART NUMBERING GUIDELINES										
TYPE	MODEL	DESIGN	SIZE (mm)	TYPE	FUNCTION	ACCURACY (BITS)	RESOLUTION (BITS)	OUTPUT	PACKAGING	OPTION
R = rotational	AM	K = kit	012	I	1	10	14	F = SPI CCW	B = box	xxx = customized design
								J = SSI CCW		
								L = Biss-C		
								N = sine-cosine		
								Z = incremental		
			016					J = SSI CCW (1)		

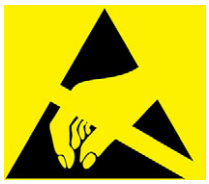
Note

(1) On request: SPI, BiSS-C, sine-cosine, or incremental output for RAMK016

PERFORMANCE	
PARAMETER	
Standard operating temperature range	-40 °C to +125 °C
Storage temperature range	-40 °C to +125 °C
Environmental protection	Coating on PCB components side (on request)

EMC PARAMETERS	
PARAMETER	
ESD susceptibility at all outputs	HBM, 100 pF discharged through 1.5 kΩ, 2 kV

OTHER INFORMATION

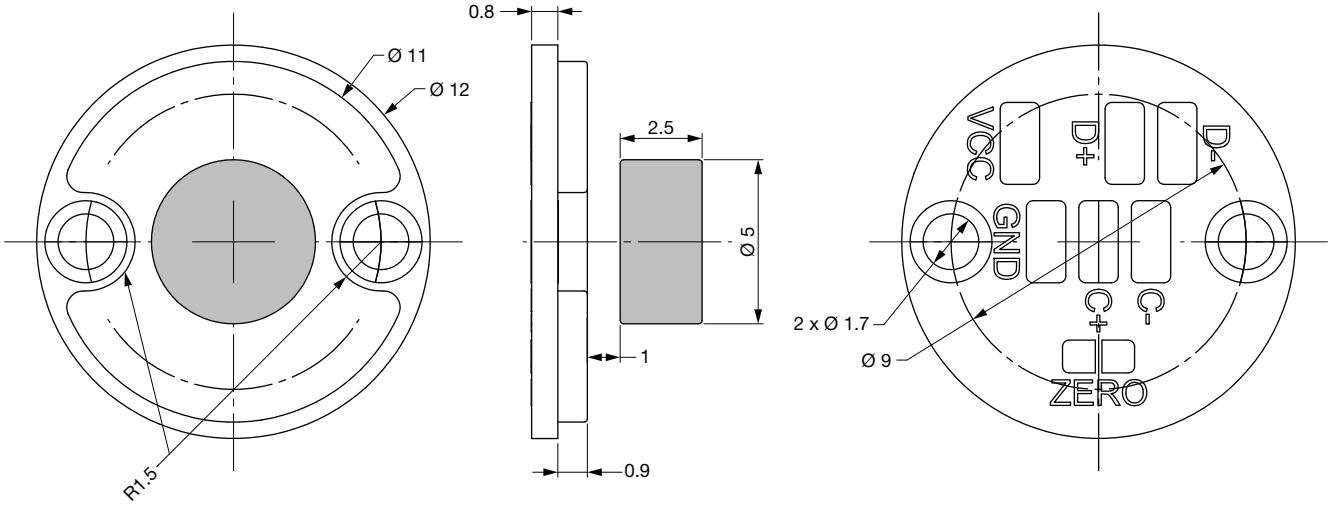


ATTENTION!
Observe Precautions for Handling Electrostatic Sensitive Devices!

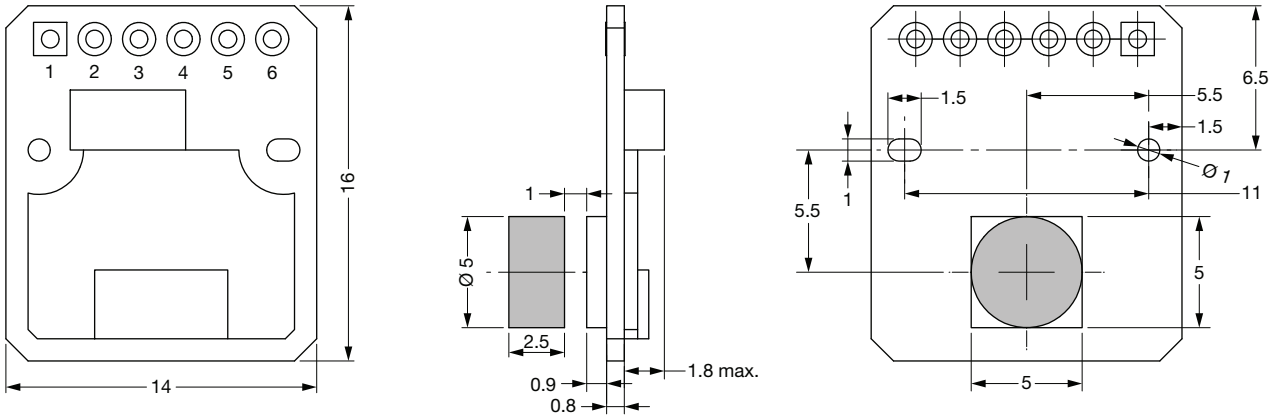
Warning: the rotor and the stator must have the same serial number!

- The sensor is delivered in an ESD packaging. To ensure safe handling, remove the sensor from its ESD bag only in an Electrostatic Protected Area (EPA)
- Do not damage the rotor disk surface
- Do not use cleaning product or chemical product
- Environmental protection: conformal coating or potting on request for use in heavy-duty environments (metallic particles, oils, greases, salt spray, moisture, corrosion...)

RAMK012 DIMENSIONS in millimeters



RAMK016 DIMENSIONS in millimeters



COMMUNICATION INTERFACE

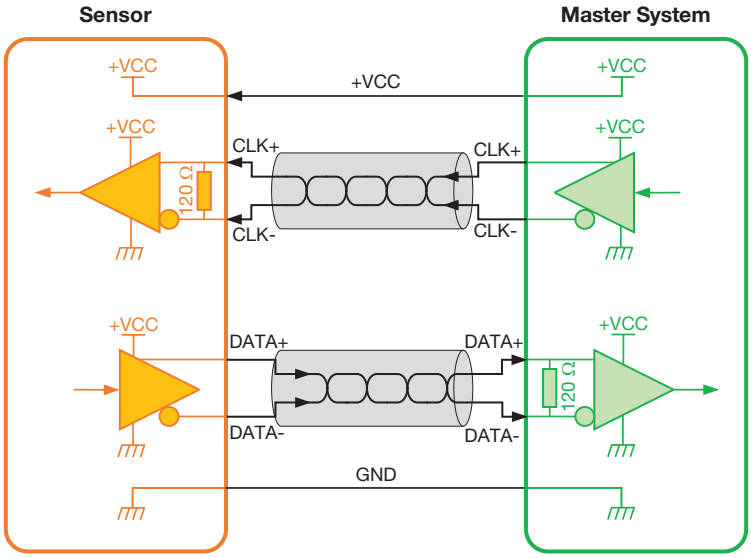
The SSI signals comply with the RS-422 electrical standard, using differential signaling for both the CLOCK and DATA lines.

To ensure robust EMC immunity, the use of twisted-pair wiring is strongly recommended:

- SSI signals: CLK+ twisted with CLK-, and DATA+ twisted with DATA-
- Power supply: twisting is not required

The typical characteristic impedance of the signal lines is 120 Ω.

COMMUNICATION DIAGRAM



PINOUT			
PIN NUMBER	**PAD NAME**	**SIGNAL NAME**	**DESCRIPTION**
1	VCC	VCC	Positive power supply
2	GND	GND	Negative power supply
3	D+	DATA+	Positive output data signal
4	D-	DATA-	Negative output data signal
5	C+	CLOCK+	Positive clock signal
6	C-	CLOCK-	Negative clock signal
7 to 8	ZERO	ZEROING PADS	Zeroing setting switch

SSI OUTPUT FORMAT

SSI Frame Timing Diagram

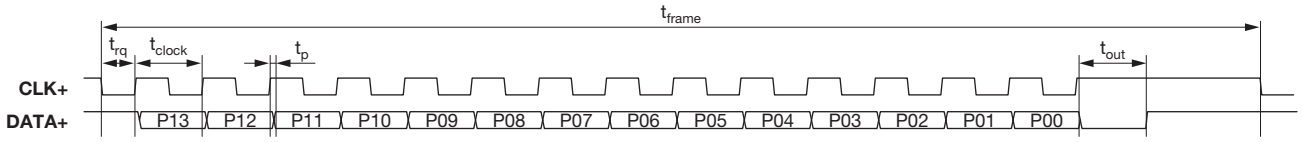


Fig. 1

SSI PARAMETERS			
PARAMETER	INFORMATION		
	MIN.	TYP.	MAX.
SSI configuration	SLAVE mode only		
Clock and data interface	RS422 according to the EIA-RS422		
Position data (P13 to P00)	14 bits, binary code, MSB first (0 to 16 383)		
t_{clock}	6667 ns	-	250 ns
f_{clock}	0.15 MHz	-	4 MHz
t_{out}	12.5 ns	14 ns to 2000 ns	2400 ns
t_{rq}	30 ns	-	-
t_p	-	-	70 ns
Total number of bits	14 bits		

ACCESSORIES AND OPTION ON REQUEST

- For the mechanical interface: mechanical parts could be added on the magnet and / or on the PCB to fasten the design (rotor and stator) to the customer equipment
- For the electrical interface some customizations are feasible:
  - Output by wires
  - Output by cable
  - Output by cable and connector
  - Shielded sleeve
- Soldering with lead available (= variant not RoHS)

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