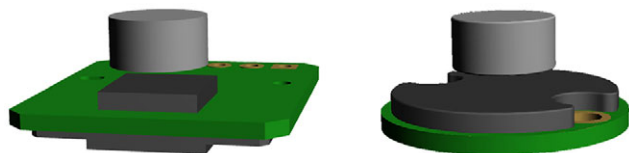


Rotational Absolute Magnetic Kit Encoder Version 12 mm and Version 16 mm Medium Precision Position Sensor



LINKS TO ADDITIONAL RESOURCES



3D Models



Infographics


Capabilities and
Custom Options

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

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


RoHS
COMPLIANT

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	≤ 125 ms
Data latency time	≤ 15 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

**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

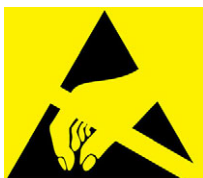
⁽¹⁾ On request: SPI, BiSS-C, sine-cosine, or incremental output for RAMK016

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!

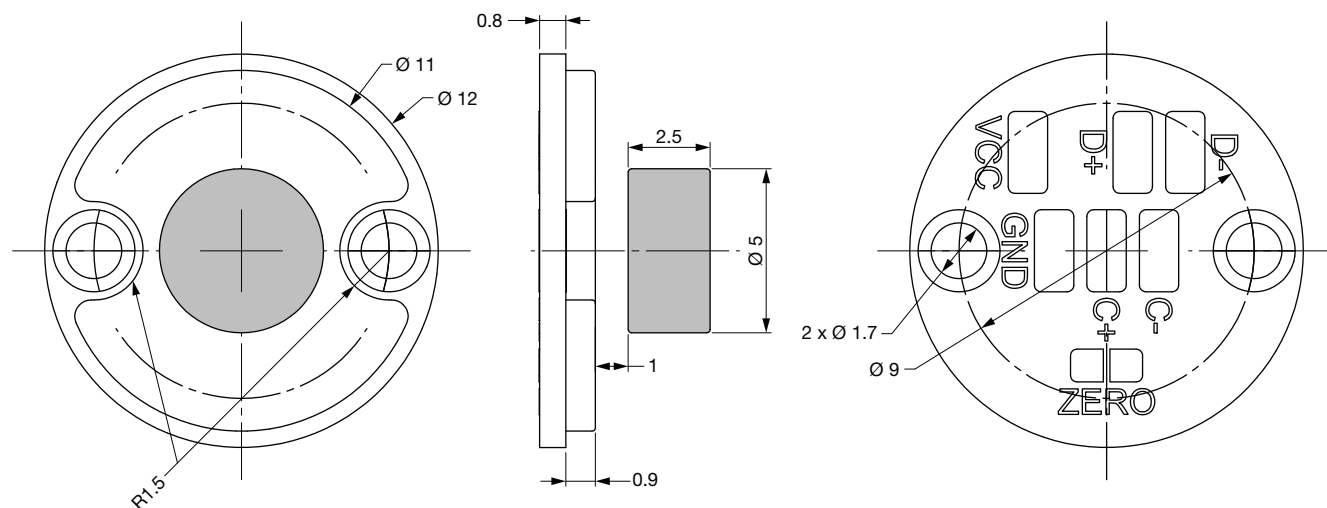


Warning: the rotor and the stator must have the same serial number!

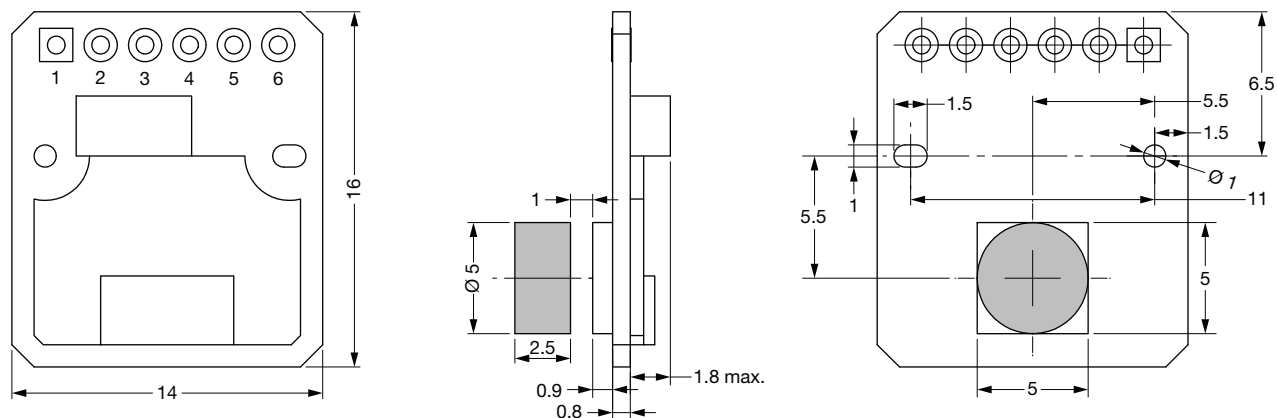
- The sensor is delivered in an ESD packaging. To ensure safe handling, remove the sensor from its ESD bag only in an Electrostatic Protected Area (EPA)
- Do not damage the rotor disk surface
- Do not use cleaning product or chemical product
- Environmental protection: conformal coating or potting on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



RAMK012 DIMENSIONS in millimeters



RAMK016 DIMENSIONS in millimeters



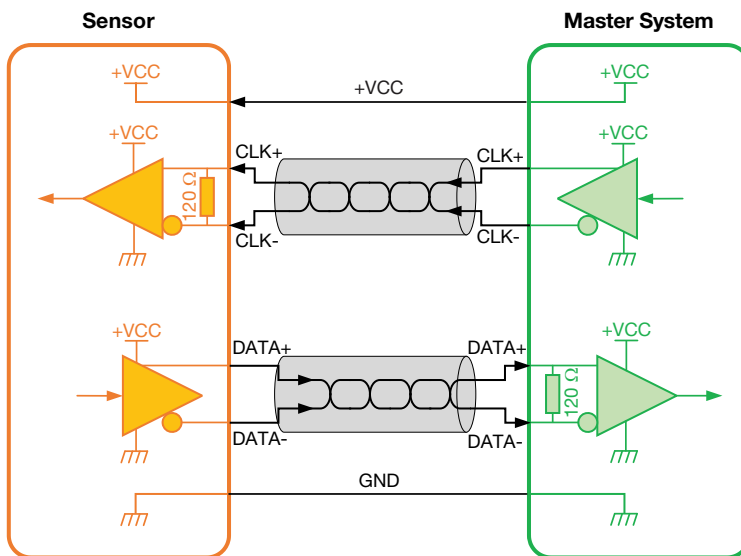
COMMUNICATION INTERFACE

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

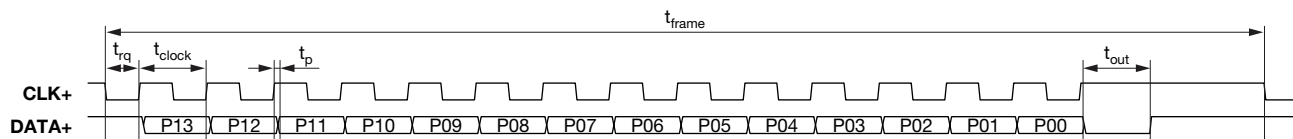


Fig. 1

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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