# Rotational Absolute Magnetic Kit Encoder Version 27 mm HP Position Sensor

## FEATURES

- Hall effect principle
- High precision (HP), high resolution
- Especially dedicated to harsh conditions (vibrations, shocks, CEM, ...)
- Not sensitive to external magnetic fields and temperature
- Not sensitive to moisture and pollution
- Plug and play
- Protected design, patent EP 2711663

| QUICK REFERENCE DATA | |
|---|---|
| Sensor type | ROTATIONAL, magnetic technology |
| Output type | Wires |
| Market appliance | Industrial |
| Dimensions | Diameter 27.3 mm |

| ELECTRICAL SPECIFICATIONS | |
|---|---|
| **PARAMETER** | |
| Voltage supply | 5 V ± 0.25 V |
| Current supply | ≤ 130 mA at 5 V |
| Output | SSI |
| Connection | Ultra-flex AWG32 wires (shielded cable and connector on request) |
| Useful electrical angle | 360° |
| Absolute accuracy at 25 °C | ± 0.03° > 13 bits |
| Absolute accuracy at -40 °C to +105 °C | ± 0.05° ~ 13 bits |
| Resolution | ≈ 0.0028° (17 bits, 131 072 points) over 360° |
| Startup time | ≤ 20 ms |
| Refresh time | ≤ 110 µs |
| Latency time | 100 µs ≤ latency time ≤ 200 µs |
| Sampling rate | 10 kHz ± 5 % |

| MECHANICAL SPECIFICATIONS | |
|---|---|
| **PARAMETER** | |
| Mechanical angle | 360° |
| Maximum speed rotation | 50 rpm (up to 1000 rpm with decreasing of accuracy, see “Maximum Speed vs. Accuracy” chart) |
| Weight | Rotor: 6.7 g ± 0.5 g; stator: 7 g ± 1 g |
| Coating | On the two sides of PCB |


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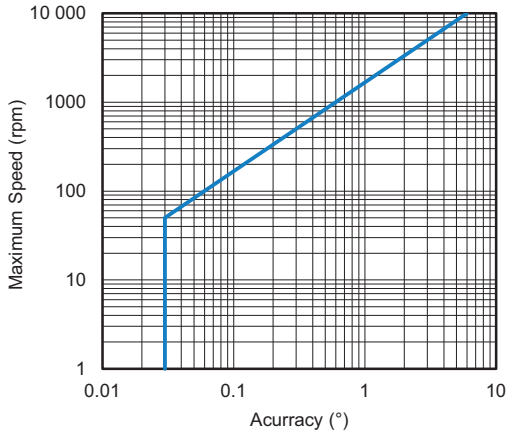
| SAP PART NUMBERING GUIDELINES | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| TYPE | MODEL | DESIGN | SIZE (mm) | TYPE | FUNCTION | ACCURACY (BITS) | RESOLUTION (BITS) | OUTPUT | PACKAGING | 3 DIGITS |
| R = rotational | AM | K = kit | 027 | M | 1 | 13 | 16 | U | B = box | To consult Vishay for dedicated 3 digits |

| PERFORMANCE | |
|---|---|
| PARAMETER | |
| Operating temperature range | -40 °C to +105 °C |
| Storage temperature range | -45 °C to +105 °C |
| Acceleration | 100 *g* for 1 s |
| Vibration | 0.05 $g^2$/Hz, 20 Hz to 2000 Hz for 1 h along the three major axis |
| Shock | 180 *g*, 14 ms, 1/2 sine |
| EMC | According to MIL-STD-461F:<br>- RE101: radiated emissions, magnetic field, 30 Hz to 100 kHz - limit for all navy applications to figure RE101-2<br>- RE102: radiated emissions, electric field, (10 kHz to 18 GHz) - curve for fixed wing external and helicopters at 2 MHz to 18 GHz, according to figure RE102-3 (1)<br>- RS101: radiated susceptibility, magnetic field, 30 Hz to 100 kHz - limit for all navy applications according to figure RS101-1<br>- RS103: radiated susceptibility, electric field, (2 MHz to 40 GHz) - 200 V/m, according to Table XI, aircraft external |
| Humidity | HR ≤ 88 % (non-condensing) operating 48 hours |

**Note**

(1) For the test setup, the RAMK027 metallic support for the stator is directly bonded with a braid to the ground plane and additional connection of the cable shielding to the ground plane

## MAXIMUM SPEED VS. ACCURACY CHART (latency time excluded)





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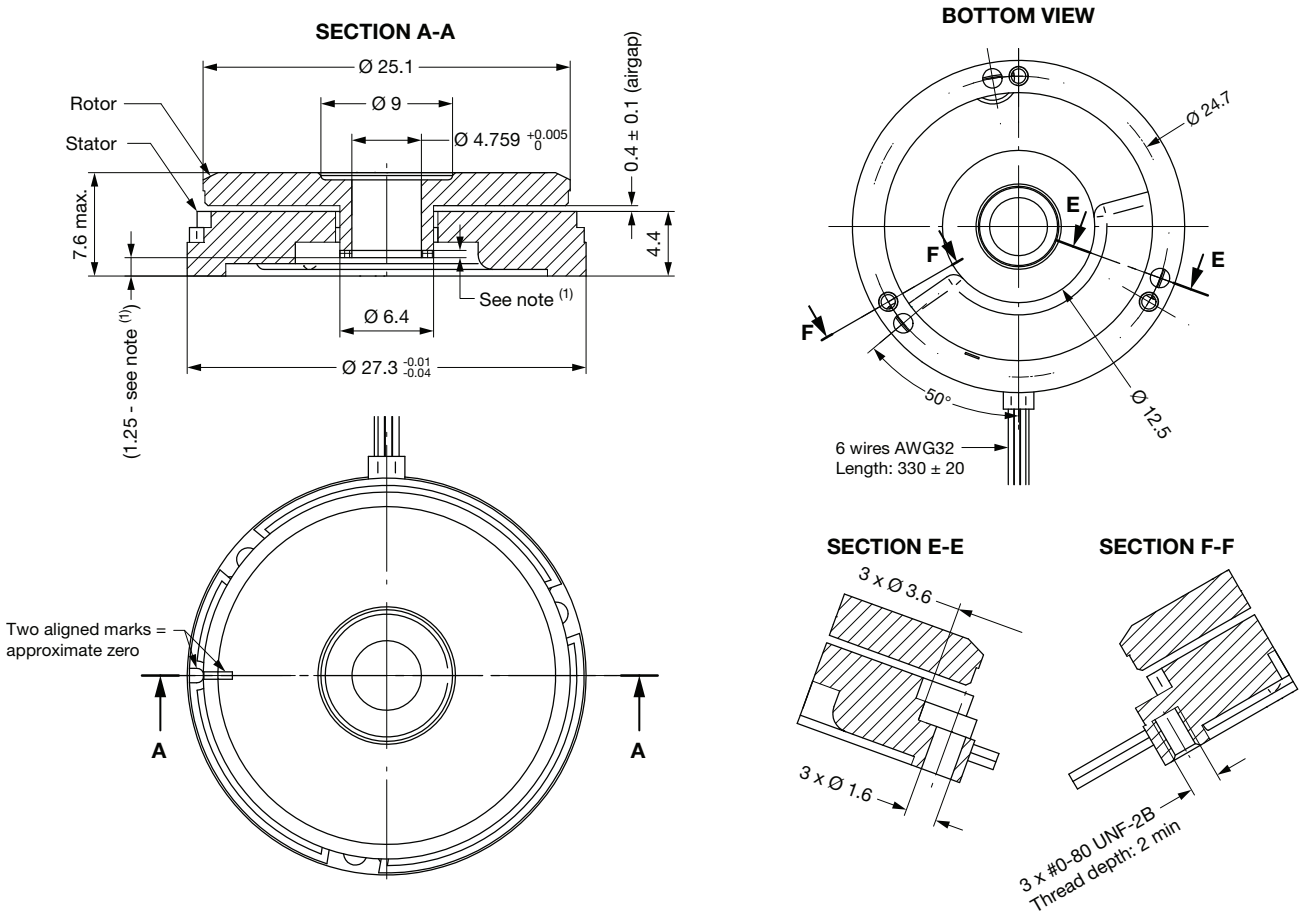
## **DIMENSIONS** in millimeters




**Note**

(1) The washer to set the airgap with respect to distance between stator and rotor reference of 1.25 is not the supplied. Only its thickness is supplied with the encoder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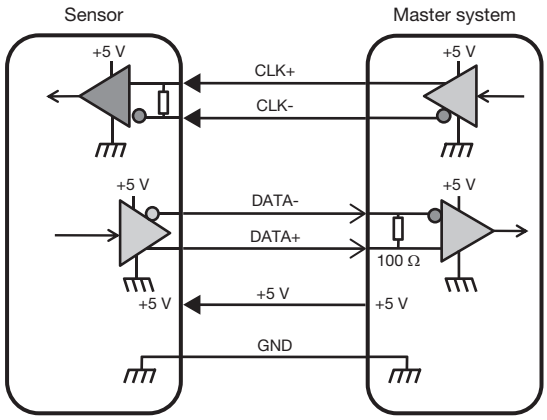
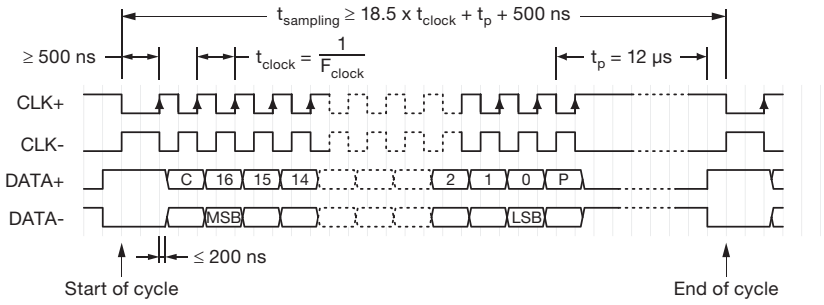
## ELECTRICAL INTERFACE DESCRIPTION - SSI INTERFACE

| 6 WIRES CONNECTIONS | |
|---|---|
| NAME | WIRE COLOR |
| GND | Black |
| +5 V | Red |
| CLK+ | White |
| CLK- | Clear |
| DATA+ | Yellow |
| DATA- | Green |




| SSI PARAMETERS | |
|---|---|
| Output code | Binary |
| Data differential interface | RS422 according to EIA-RS422 |
| CLK differential interface | RS422 according to EIA-RS422 |
| Minimum clock frequency | 300 kHz |
| Maximum clock frequency | 4 MHz |
| Data bit (n) | 19 bits |
| C: consistency of all internal magnetic cells outputs | Bit “C”: 0 → compliant / 1 → not compliant |
| 16-0: angle | Bit “16-0”: angle value |
| P: parity of this bits “C” to “16” | Bit “P”: 0 → pair sum / 1 → impair sum |

### Timing Diagram




## OPTIONS

- Other design on request (mechanical interfaces, electrical interfaces, ...)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