# Rotational Absolute Magnetic Encoder High Precision Displacement Sensor

## FEATURES

- 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
- Hall effect principle

| QUICK REFERENCE DATA | |
|---|---|
| Sensor type | ROTATIONAL, magnetic technology |
| Output type | Wires, cables, or connector |
| Market appliance | Industrial |
| Dimensions | Diameter 44 mm and 58 mm |

| ELECTRICAL SPECIFICATIONS | |
|---|---|
| **PARAMETER** | |
| Voltage supply | 5 V ± 0.25 V (or 9 V to 35 V in option) |
| Current supply | ≤ 110 mA max. at 5 V |
| Output | SSI (SPI on request) |
| Connection | Ultra-flex AWG32 wires (shielded cable and connector on request) |
| Useful electrical angle | 360° (single turn) |
| Absolute accuracy at 25 °C | ± 0.03° |
| Absolute accuracy at -40 °C to +105 °C | ± 0.05° (13 bits) |
| Resolution | 0.0017° (> 17 bits, 212 992 points) |
| Startup time | ≤ 20 ms |
| Refresh 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 380 rpm with decreasing of accuracy, see “Maximum Speed vs. Accuracy” chart) |
| Axial charge | 10 N |
| Radial charge | 10 N |

**SAP PART NUMBERING GUIDELINES**

| TYPE | MODEL | DESIGN | SIZE (mm) | TYPE | FUNCTION | ACCURACY (BITS) | RESOLUTION (BITS) | OUTPUT | PACKAGING |
|---|---|---|---|---|---|---|---|---|---|
| R = rotational | AM | E = encoder with housing | 044<br>058 | I | 1 | 13 | 17 | J = SSI CCW | B = box |


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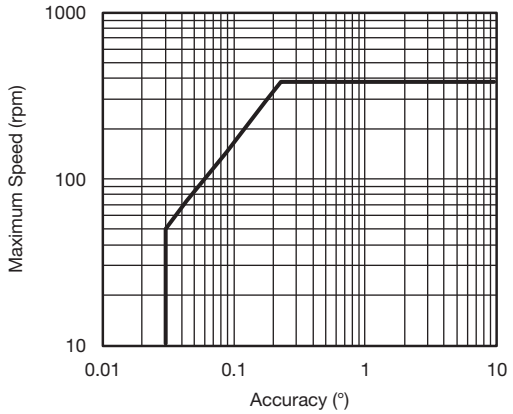
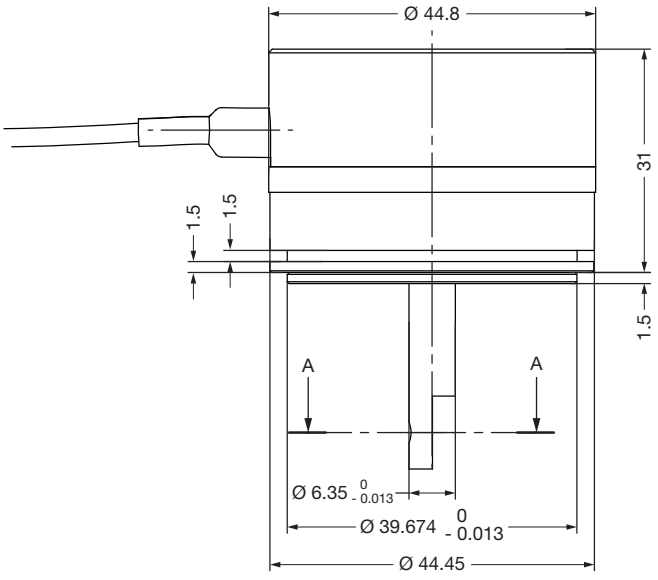
| PERFORMANCE | |
|---|---|
| **PARAMETER** | |
| Operating temperature range | -40 °C to +105 °C (-55 °C to +105 °C on request) |
| Storage temperature range | -45 °C to +105 °C (-55 °C to +105 °C on request) |
| Protection class | IP50 (IP67 on request) |
| Life | 50M cycles |
| Humidity | HR ≤ 80 % (non-condensing) |
| Acceleration | 70 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 | MIL-STD-461F<br>- CS114: conducted susceptibility, bulk cable injection,10 kHz to 200 MHz table VI army ground level common mode injection and differential mode on positive<br>- RS101: magnetic susceptibility, magnetic field, fig. RS101-2 from 30 Hz to 100 kHz<br>- RS103: radiated susceptibility, electric field, 2 MHz to 18 GHz (level: 50 V/m)<br>- RE102: radiated emissions, electric field, fig. RE102-4 - navy mobile and army - 10 kHz to 16 MHz |

## MAXIMUM SPEED VS. ACCURACY CHART




## DIMENSIONS in millimeters

**RAME044 (STANDARD)**



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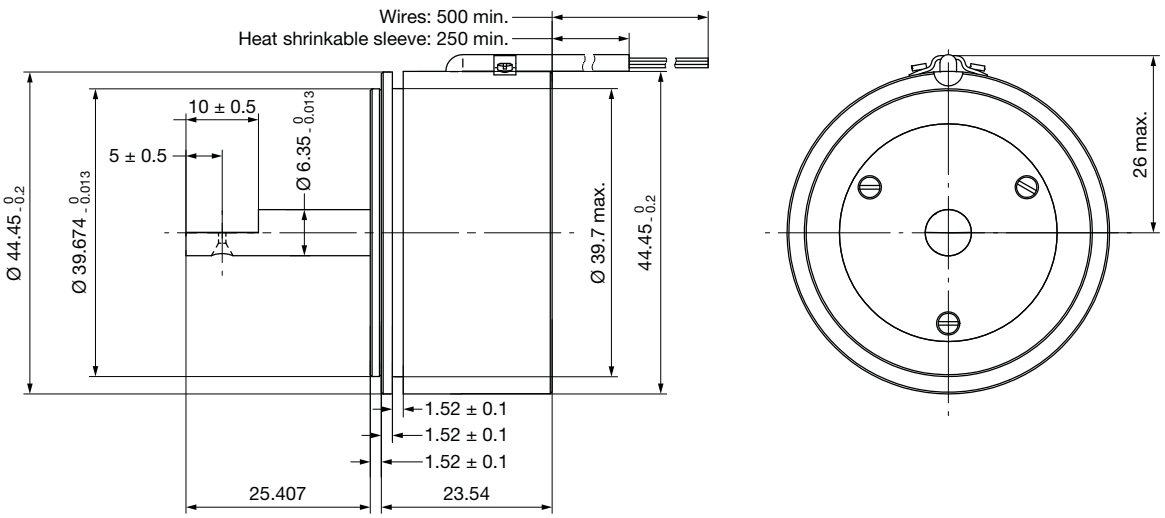
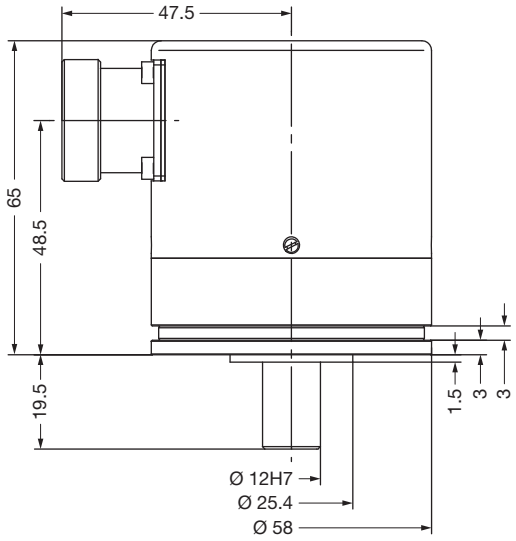
## DIMENSIONS in millimeters

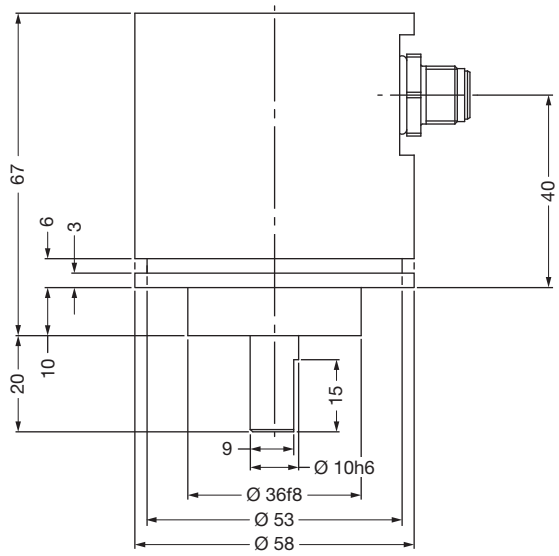
### RAME044 (ON REQUEST)



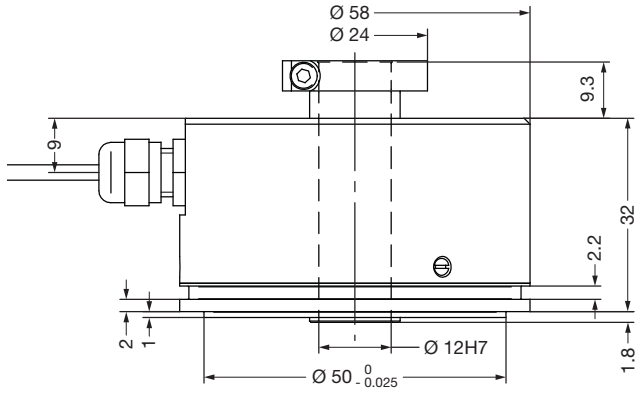

### RAME058 - SHAFT VERSION 1 (STANDARD)




### RAME058 - SHAFT VERSION 2 (ON REQUEST)



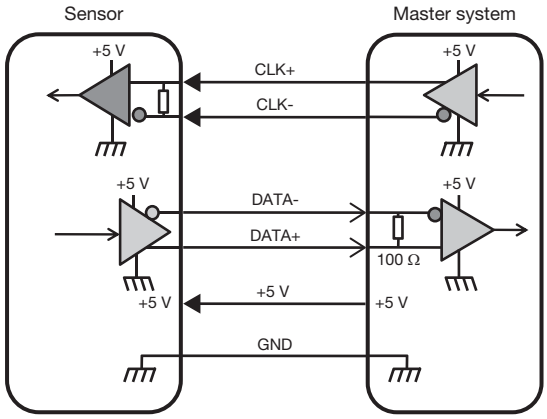

### RAME058 - HOLLOW SHAFT (ON REQUEST)



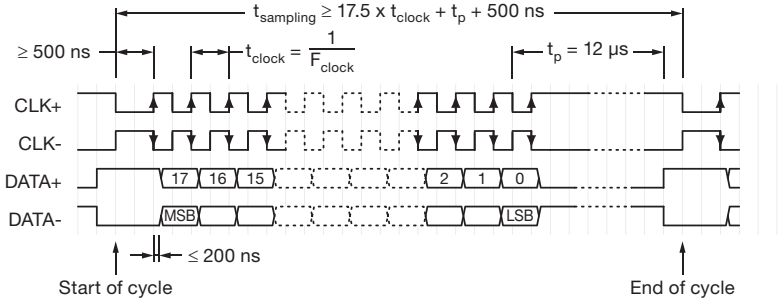
## ELECTRICAL INTERFACE DESCRIPTION - SSI INTERFACE

| 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) | 18 bits |



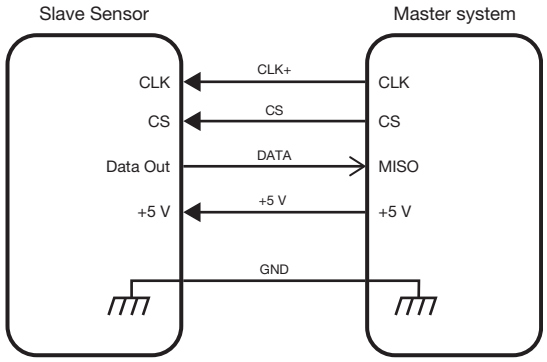

### Timing Diagram



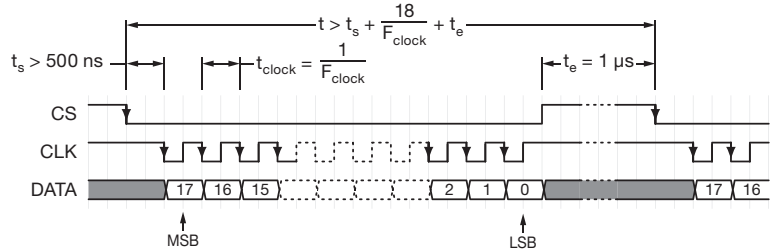

## ELECTRICAL INTERFACE DESCRIPTION - SPI INTERFACE (on request)

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

| SPI PARAMETERS | |
|---|---|
| Output code | Binary |
| Minimum clock frequency | 300 kHz |
| Maximum clock frequency | 4 MHz |
| Data bit (n) | 18 bits |




### Timing Diagram




## OPTIONS

- Other design on request including waterproofness, mechanical interfaces, electrical interfaces, ...
- Better accuracy (on request)

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