

# Rotational Absolute Magnetic Encoder Version 30 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
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



## LINKS TO ADDITIONAL RESOURCES



## QUICK REFERENCE DATA

Sensor type	ROTATIONAL, magnetic technology
Output type	Cable
Market appliance	Industrial
Dimensions	Diameter 30 mm

## ELECTRICAL SPECIFICATIONS

PARAMETER	
Voltage supply	5 V $\pm$ 0.25 V
Current supply	$\leq$ 130 mA at 5 V
Output	SSI
Connection	Shielded cable
Useful electrical angle	360°
Absolute accuracy at 25 °C	$\pm$ 0.03° > 13 bits
Absolute accuracy at -40 °C to +105 °C	$\pm$ 0.05° ~ 13 bits
Resolution	$\approx$ 0.0028° (17 bits, 131 072 points) over 360°
Startup time	$\leq$ 20 ms
Refresh time	$\leq$ 110 $\mu$ s
Latency time	100 $\mu$ s $\leq$ latency time $\leq$ 200 $\mu$ s
Sampling rate	10 kHz $\pm$ 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	51 g $\pm$ 5 g

**SAP PART NUMBERING GUIDELINES**

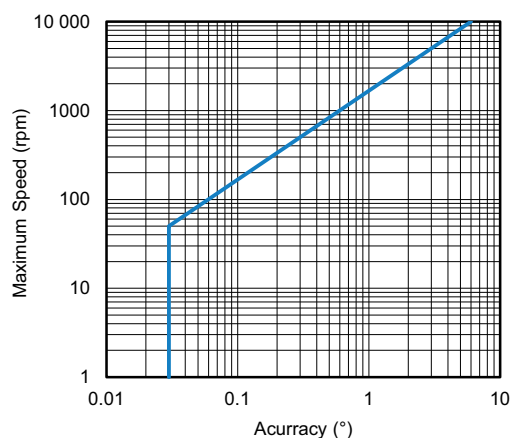
TYPE	MODEL	DESIGN	SIZE (mm)	TYPE	FUNCTION	ACCURACY (BITS)	RESOLUTION (BITS)	OUTPUT	PACKAGING
R = rotational	AM	E = encoder with housing	030	M	1	13	17	J = SSI CCW	B = box

**PERFORMANCE**

PARAMETER	
Operating temperature range	-40 °C to +105 °C
Storage temperature range	-45 °C to +105 °C
Acceleration <sup>(2)</sup>	100 g for 1 s
Vibration (three major axis) <sup>(2)</sup>	Vibration profile 1: 0.05 g <sup>2</sup> /Hz, 20 Hz to 2000 Hz for 1 h along Vibration profile 2: see figure 1 - tested according "Endurance" profile Vibration profile 3: see figure 2 - tested according "Endurance" profile Vibration profile 4: see figure 3 - tested according "Endurance" profile Vibration profile 5: see figure 4 - tested according "Endurance" profile
Shock <sup>(2)</sup>	180 g, 14 ms, 1/2 sine
EMC <sup>(2)</sup>	According to MIL-STD-461F: - RE101: radiated emissions, magnetic field, 30 Hz to 100 kHz - limit for all navy applications to figure RE101-2 - 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 <sup>(1)</sup> - RS101: radiated susceptibility, magnetic field, 30 Hz to 100 kHz - limit for all navy applications according to figure RS101-1 - RS103: radiated susceptibility, electric field, (2 MHz to 40 GHz) - 200 V/m, according to Table XI, aircraft external
Humidity <sup>(2)</sup>	HR ≤ 88 % (non-condensing) operating 48 hours

**Notes**

- <sup>(1)</sup> For the test setup, the metallic support of the electronic support is directly bonded with a braid to the ground plane and additional connection of the cable shielding to the ground plane
- <sup>(2)</sup> Tests have been performed on electronic board and magnet without the mechanical housing of the encoder

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



## VIBRATION PROFILES

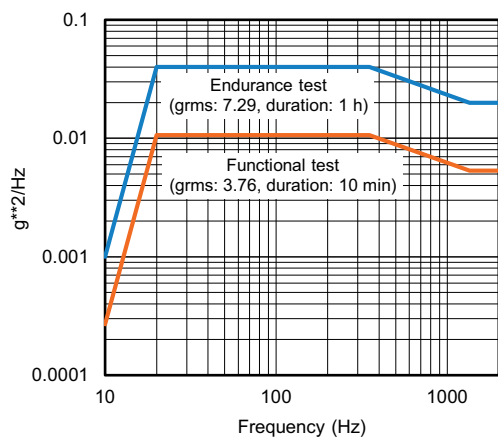


Fig. 1 - Vibration Profile 2

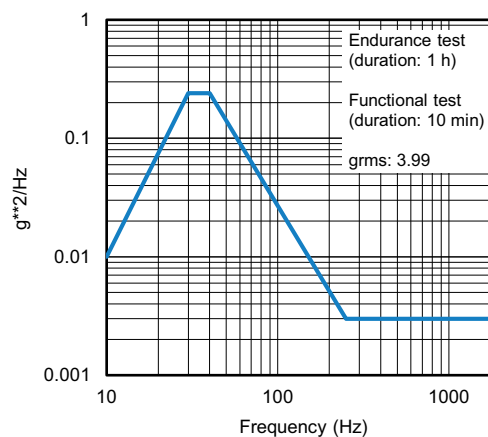


Fig. 3 - Vibration Profile 4

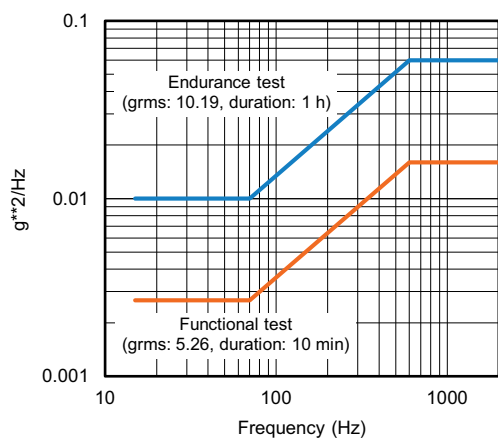


Fig. 2 - Vibration Profile 3

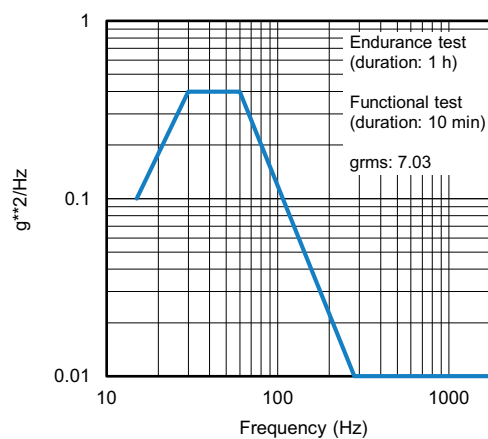
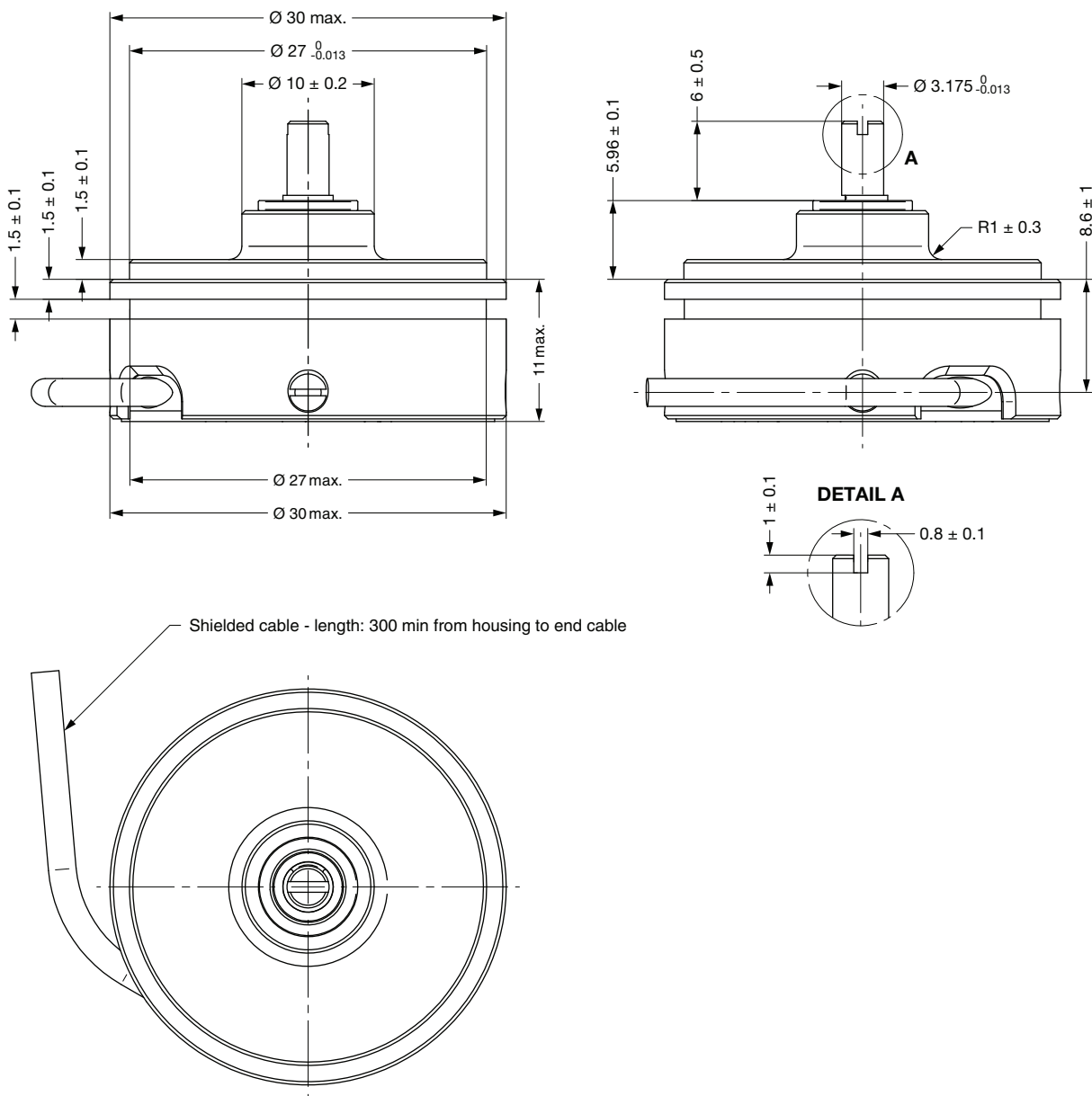


Fig. 4 - Vibration Profile 5

**DIMENSIONS** in millimeters


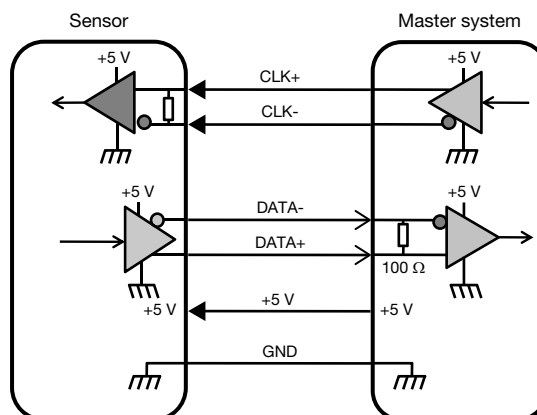
## ELECTRICAL INTERFACE DESCRIPTION - SSI INTERFACE

## 6 WIRES CONNECTION

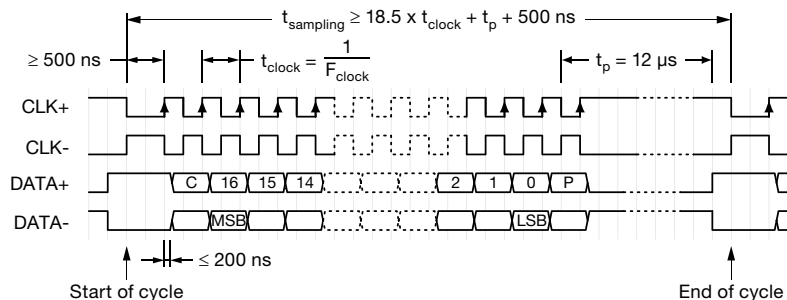
NAME	WIRE COLOR	WIRE SIZE
GND	Black	32 AWG
+5 V	Red	32 AWG
CLK+	White	32 AWG
CLK-	Blue	32 AWG
DATA+	Yellow	32 AWG
DATA-	Green	32 AWG

## 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

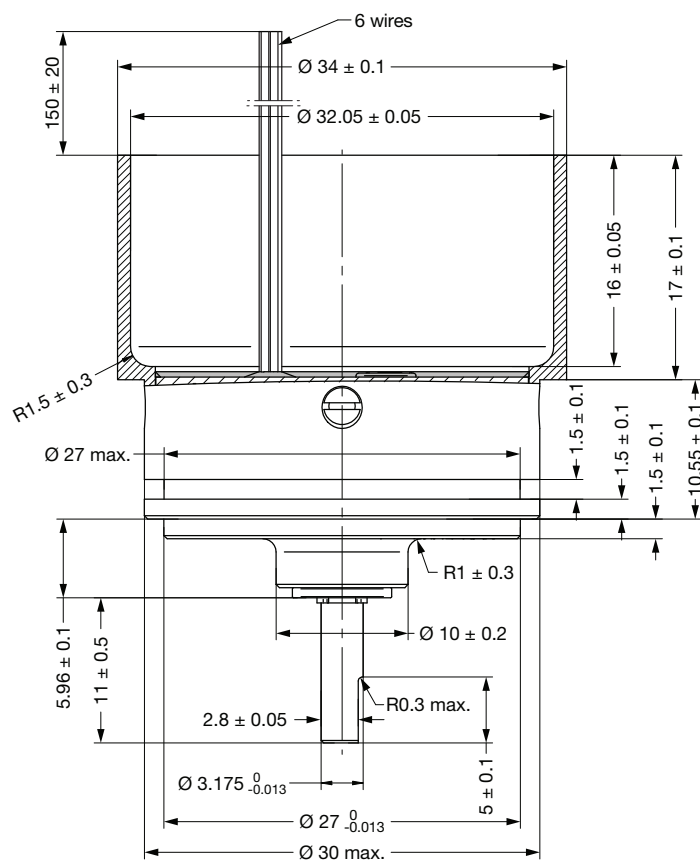
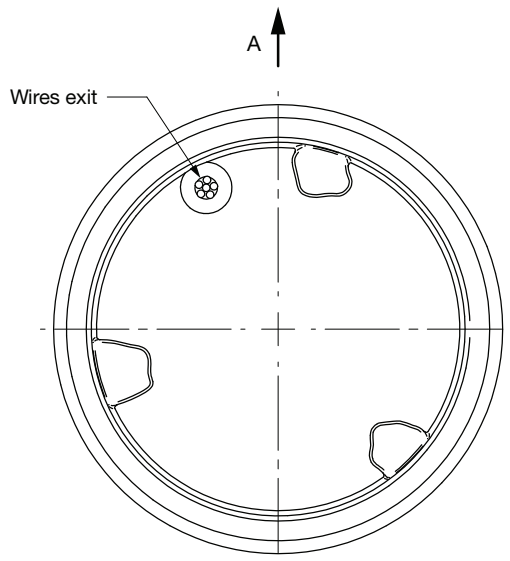
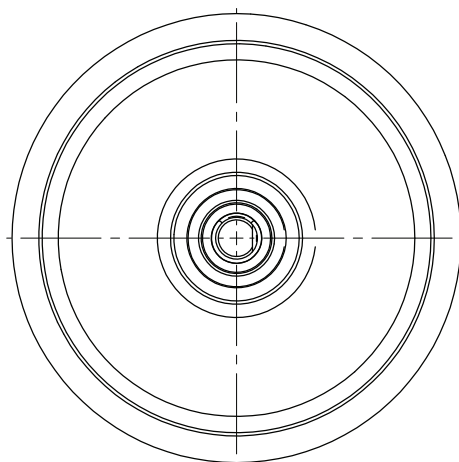


## Timing Diagram



## OPTIONS

- Other design on request (mechanical interfaces, electrical interfaces, ...)
- On request: axial output wires (see upcoming Dimensions table for details)

**DIMENSIONS** in millimeters

**View A**




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