

# Rotational Absolute Magnetic Encoder Version 12 mm HP Position Sensor



## LINKS TO ADDITIONAL RESOURCES



## 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
- Plug and play
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



## QUICK REFERENCE DATA

Sensor type	ROTATIONAL, magnetic technology
Output type	Wires
Market appliance	Industrial
Dimensions	Diameter 12.7 mm

## ELECTRICAL SPECIFICATIONS

PARAMETER	
Voltage supply	5 V $\pm$ 0.25 V
Current supply	$\leq$ 100 mA at 5 V
Output	SSI
Connection	Twisted wires AWG 28
Useful electrical angle	360°
Absolute accuracy at 25 °C	$\pm$ 0.15° (11.23 bits)
Absolute accuracy at -40 °C to +105 °C	$\pm$ 0.30° (10.23 bits)
Resolution	$\approx$ 0.022° (14 bits, 16 384 points)
Startup time	$\leq$ 20 ms
Refresh time	$\leq$ 100 $\mu$ s
Latency time	$\leq$ 200 $\mu$ s
Sampling rate	2.5 kHz $\pm$ 10 %

## MECHANICAL SPECIFICATIONS

PARAMETER	
Mechanical angle	360°
Maximum speed rotation	See "Speed vs. Accuracy" chart
Weight	About 11 g without wires
Endurance life	50 x 10 <sup>6</sup> rotations
Starting / running torque	$\leq$ 10 cNcm
Axial and radial play	$\leq$ 50 $\mu$ m under $\pm$ 2.5 N on shaft
Axial and radial customer load at the end of the shaft	< 5 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	012	M	1	11	14	J = SSI CCW	B = box

**PERFORMANCE**

PARAMETER	
Operating temperature range	-40 °C to +105 °C
Storage temperature range	-45 °C to +125 °C
Acceleration	Constant acceleration: Axis X: 6.3 g (2 min in each direction) Axis Y: 2.65 g (2 min in each direction) Axis Z: 2.65 g (2 min in each direction)
Vibration (three major axis)	<b>Vibration 1:</b> Frequency range: 5 Hz to 500 Hz Axis X: 0.95 $g_{RMS}$ , specific PSD <sup>(1)</sup> , 75 min at each axis Axis Y: 2.32 $g_{RMS}$ , specific PSD <sup>(1)</sup> , 75 min at each axis Axis Z: 2.32 $g_{RMS}$ , specific PSD <sup>(1)</sup> , 75 min at each axis
	<b>Vibration 2:</b> Frequency range: 5 Hz to 2000 Hz Axis X: 3.01 $g_{RMS}$ , specific PSD <sup>(1)</sup> , 1 min at each axis Axis Y: 2.50 $g_{RMS}$ , specific PSD <sup>(1)</sup> , 1 min at each axis Axis Z: 2.50 $g_{RMS}$ , specific PSD <sup>(1)</sup> , 1 min at each axis
Mechanical shock	Non-functional test conditions: half sine pulse: 20 $g_{peak}$ x 5 ms, 3 shocks in every direction
Humidity	95 % HR, 20 days, temperature cycling (total time at 60 °C: 120 h and at 30 °C: 160 h)

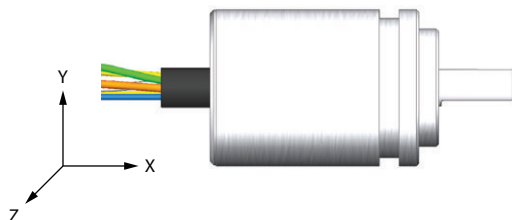
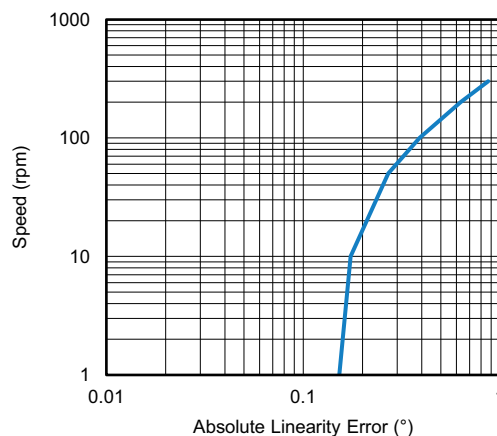
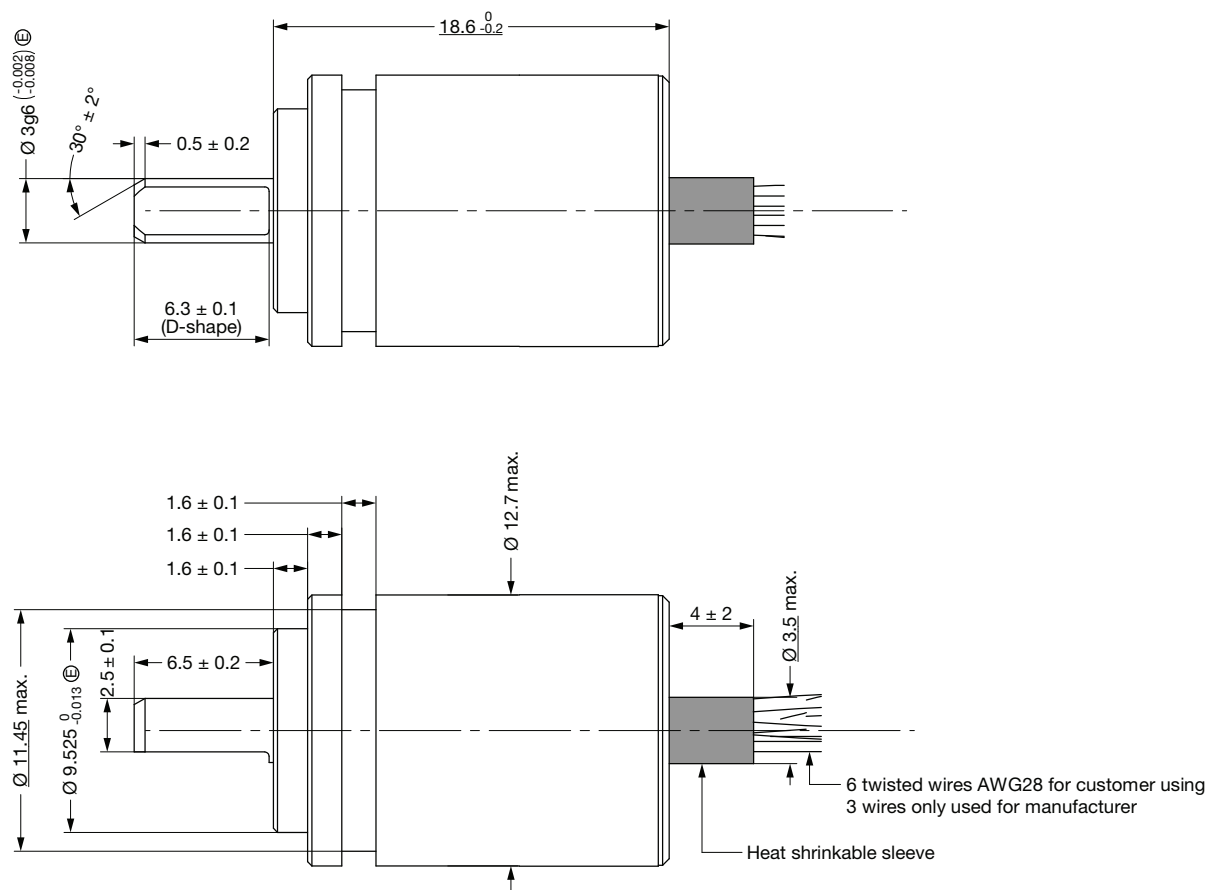
**Note**
<sup>(1)</sup> To contact Vishay for details


Fig. 1 - Encoder Axis System

**SPEED VS. ABSOLUTE LINEARITY ERROR (at 2500 sample/s at room temperature)**

**Note**

- Latency time excluded

**DIMENSIONS** in millimeters


## ELECTRICAL INTERFACE DESCRIPTION - SSI INTERFACE

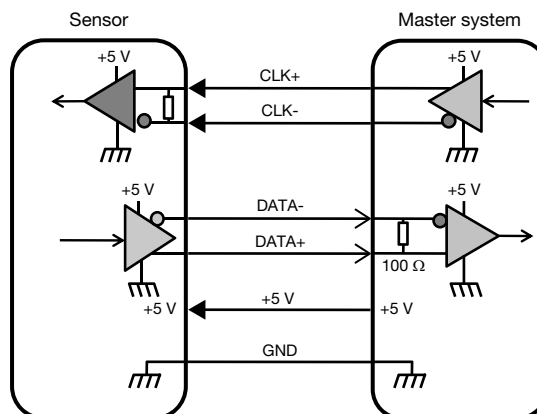
### 6 WIRES CONNECTION

(according to MIL-22759/32)

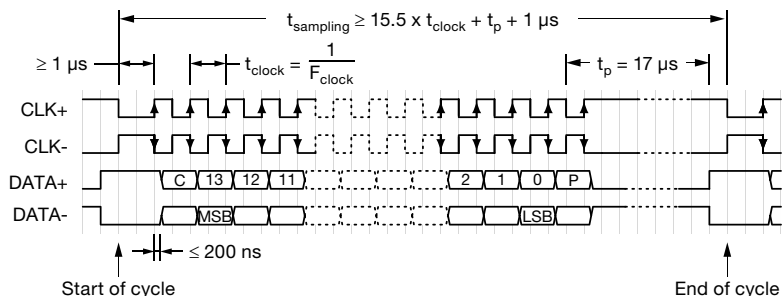
NAME	WIRE COLOR	WIRE SIZE
GND	Black	28 AWG
+5 V	Red	28 AWG
CLK-	Orange	28 AWG
CLK+	White	28 AWG
DATA+	Yellow	28 AWG
DATA-	Green	28 AWG

### SSI PARAMETERS

Output code	Binary
Data differential interface	RS422 according to EIA-RS422
CLK differential interface	RS422 according to EIA-RS422
Minimum clock frequency	100 kHz
Maximum clock frequency	4 MHz
Data bit (n)	16 bits
C: consistency of magnetic cell output	Bit "C": 0 → compliant / 1 → not compliant
13-0: angle	Bit "13-0": angle value
P: parity of this bits "C" to "0"	Bit "P": 0 → pair sum / 1 → impair sum



### Timing Diagram



### OTHER INFORMATION



### OPTIONS

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



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