Revision: 22-Jul-2021

1 For technical questions, contact: <u>mcbprecisionpot@vishay.com</u>

Rotational Absolute Magnetic Encoder Version 12 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
- Plug and play
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

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 ± 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	± 0.15° (11.23 bits)	
Absolute accuracy at -40 °C to +105 °C	± 0.30° (10.23 bits)	
Resolution	≈ 0.022° (14 bits, 16 384 points)	
Startup time	≤ 20 ms	
Refresh time	≤ 100 μs	
Latency time	≤ 200 μs	
Sampling rate	2.5 kHz ± 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 ⁶ rotations		
Starting / running torque	≤ 10 cNcm		
Axial and radial play	\leq 50 μm under ± 2.5 N on shaft		
Axial and radial customer load at the end of the shaft	< 5 N		



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LINKS TO ADDITIONAL RESOURCES



ISHA



RAME012

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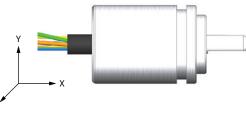
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SAP PART NUMBERING GUIDELINES									
ТҮРЕ	MODEL	DESIGN	SIZE (mm)	TYPE	FUNCTION	ACCURACY (BITS)	RESOLUTION (BITS)	OUTPUT	PACKAGING
R = rotational	AM	E = encoder with housing	012	М	1	11	14	J = SSI CCW	B = box

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)	<u>Vibration 1:</u> Frequency range: 5 Hz to 500 Hz Axis X: 0.95 g _{RMS} , specific PSD ⁽¹⁾ , 75 min at each axis Axis Y: 2.32 g _{RMS} , specific PSD ⁽¹⁾ , 75 min at each axis Axis Z: 2.32 g _{RMS} , specific PSD ⁽¹⁾ , 75 min at each axis		
	$\begin{tabular}{lllllllllllllllllllllllllllllllllll$		
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

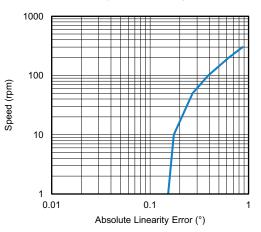
⁽¹⁾ To contact Vishay for details





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

Ζ



Note

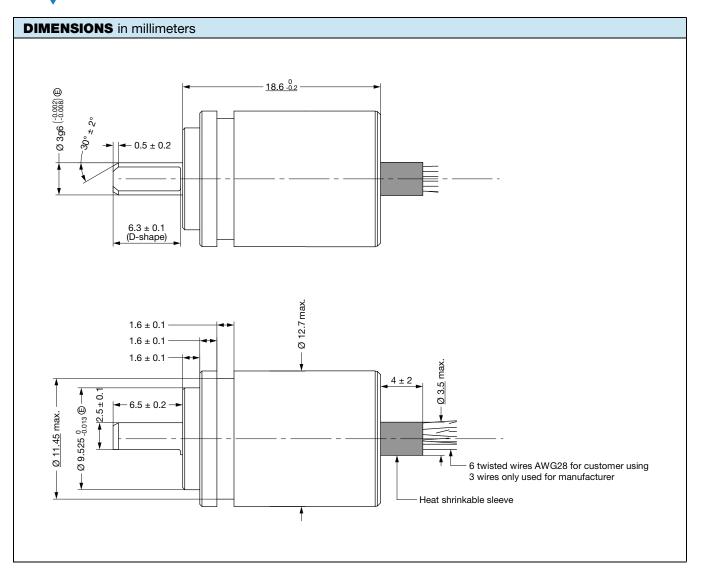
• Latency time excluded



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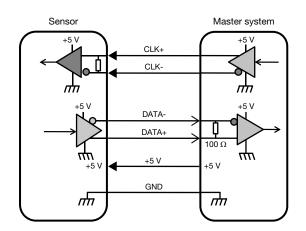
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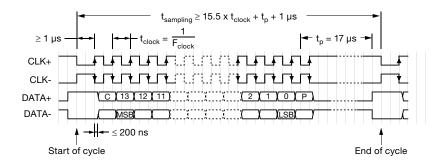
ELECTRICAL INTERFACE DESCRIPTION - SSI INTERFACE

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": $0 \rightarrow \text{compliant} / 1 \rightarrow \text{not compliant}$		
13-0: angle	Bit "13-0": angle value		
P: parity of this bits "C" to "0"	Bit "P": $0 \rightarrow \text{pair sum } / 1 \rightarrow \text{impair sum}$		



Timing Diagram



OTHER INFORMATION



OPTIONS

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



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