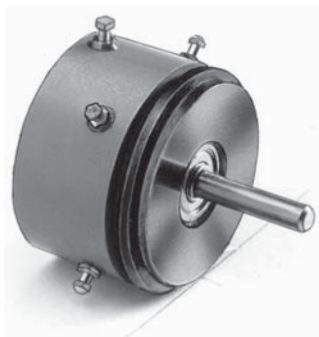


## Precision Rotative Transducers 360° Special Laws: Sine/Cosine



Rotational motion transducers with trigonometric laws for a full angle measurement: 360° (no dead band).

### QUICK REFERENCE DATA

Sensor type	ROTATIONAL, conductive plastic
Output type	Output by turrets
Market appliance	Professional
Dimensions	1 1/16" (27 mm)

### FEATURES

- Laws: sine and cosine
- Size 11
- Continuous measure on 360°
- Long life up to 25 10<sup>6</sup> cycles
- Conformity from ± 1 % down to ± 0.5 %
- Bushing or servo mounting
- Following MIL-R-39023 requirements
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

<b>SIZE</b>	<b>11</b>	
<b>MODEL</b>	116 SFZ	116 BFZ
<b>LAW</b>	Z: Sine and cosine	

### ELECTRICAL SPECIFICATIONS

Theoretical Electrical Angle (TEA) = 360°	Actual electrical angle (AEA) = TEA	
Conformity Peak to Peak	A ≤ ± 1 %	or B ≤ ± 0.5 %
Number of Cups	Up to 2	
Ohmic Values (R <sub>T</sub> per quadrant)	1 kΩ - 5 kΩ - 10 kΩ - on request other values	
Ohmic Value Tolerances at 20 °C	± 20 %	
Output Smoothness	≤ 0.05 %	
Maximum Power Rating at 70 °C	0.4 W	
Wiper Current	Recommended: a few μA - 1 mA max. (continuous)	
Ground Taps	On request	
Resistance Load on Wiper	Minimum 10 <sup>3</sup> x R <sub>T</sub>	
Resolution	Essentially infinite	
Insulation Resistance	≥ 1000 MΩ, 500 V <sub>DC</sub>	
Dielectric Strength	≥ 500 V <sub>RMS</sub> , 50 Hz	

### MECHANICAL SPECIFICATIONS

Mechanical Angle (MA)	360° continuous	
Mounting Type	Servo	Bushing
Shaft Guiding	Ball bearings	Sleeve bearings
Shaft	Stainless steel	
Housing	Plastic molding	
Termination	Turrets	
Wiper	Precious metal multi-finger contact	
Starting Torque (N.cm)	1 cup	≤ 0.3
	2 cups	≤ 0.5
Weight (g)	1 cup	≤ 0.5
	2 cups	≤ 0.8
30 ± 2 (1 cup) + 17 ± 2 (2 cups)		

**PERFORMANCE**

Life (10 <sup>6</sup> cycles)	≥ 25 (servo)	≥ 15 (bushing)
Temperature Range	-55 °C to +125 °C	
Climatic Category	55/125/04	
Speed Rotation (RPM)	600 (servo)	150 (bushing)
Sine Vibration on 3 Axes	1.5 mm or 20 g from 10 Hz to 2000 Hz	
Mechanical Shocks on 3 Axes	50 g - 11 ms - half sine	

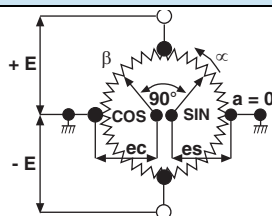
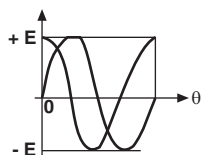
**Note**

- Nothing stated herein shall be construed as a guarantee of quality or durability.

**TRIGONOMETRIC FUNCTIONS**

SINE/COSINE  
OVER 360°

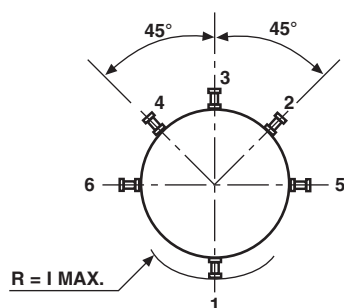
LAW Z



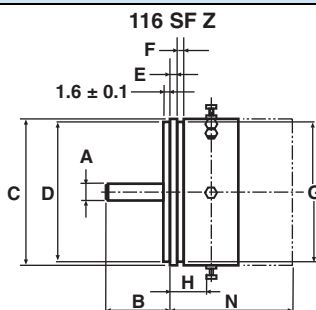
$$\frac{e_s}{E} = \sin \alpha \quad \frac{e_c}{E} = \cos \beta$$

$$0^\circ \leq \alpha \leq 360^\circ$$

$$\beta = \alpha + 90^\circ$$

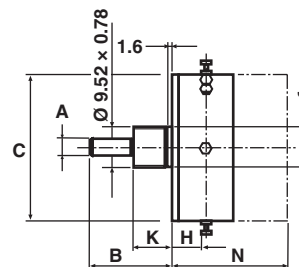
**DIMENSIONS** in millimeters, general tolerance  $\pm 0.5$  mm


- 1: POWER SUPPLY (+)
- 2: POWER SUPPLY (-)
- 3: WIPER (SINE)
- 4: WIPER (COSINE)
- 5: GROUND TAP (ON REQUEST)
- 6: GROUND TAP (ON REQUEST)



SIZE 11

116 BF Z



DIMENSIONS mm	A + 0 - 0.013	B max.	C max.	D + 0 - 0.013	E ± 0.1	F min.	G max.	H min.	I max.	J + 0 - 0.02	K max.	N max. (1 cup)	N max. (2 cups)
DESIGNATION													
116 SF Z	3.175	16.6	27.05	24.608	1.6	1.5	24.8	4.5	17.3	-	-	18.5	35
116 BF Z		20	27.05	-	-	-	-	3	-	10.3	9.6	16.5	33

**ORDERING INFORMATION/DESCRIPTION**

ROT	116	S	F	Z	1	A	502	e1
SERIES	MODEL	MOUNTING TYPE	CONDUCTOR	LAW	NUMBER OF CUPS	CONFORMITY	OHMIC VALUE	LEAD FINISH
		S: Servo B: Bushing	F: Plastic	Z: Sine/ cosine	2 max.	A: ± 1 % B: ± 0.5 %	First 2 digits are significant numbers 3rd digit indicates number of zeros	

**Note**

- Special characteristics and designs on request

**SAP PART NUMBERING GUIDELINES**

RO 116SFZ	1	B	103
MODEL	GANG NUMBER	CONFORMITY	OHMIC VALUE
	1 or 2	A or B	10 kΩ



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