

## Knob Potentiometer



The P16 is a revolutionary concept in panel mounted potentiometers. This unique design consists of a knob driving and incorporating a cermet potentiometer. Only the mounting hardware and terminals are situated on the back side of the panel reducing to a minimum the required clearance.

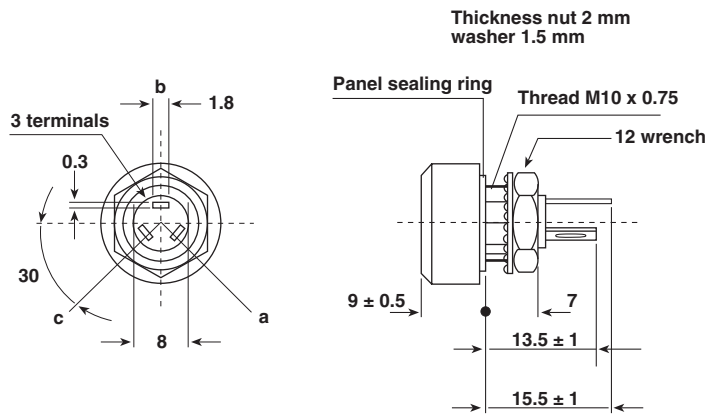
### FEATURES

- 1 W at 40 °C
- Test according to CECC 41300
- **P16** - Version for professional and industrial applications (cermet)
- **PA16** - Version for professional audio applications (conductive plastic)
- Compact (integrated)
- Safety in use due to good insulation:  $> 10^4 \text{ M}\Omega$  500 V<sub>DC</sub>
- High dielectric strength: 2500 V<sub>RMS</sub>
- Fully sealed and panel sealed
- Metallic or plastic knob options
- Custom knob on request
- Compliant to RoHS directive 2002/95/EC

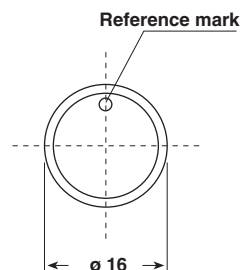


### DIMENSIONS in millimeters ( $\pm 0.5 \text{ mm}$ )

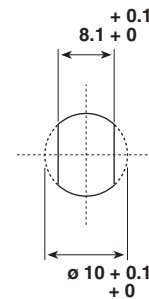
P16, PA16



Panel thickness max.: 3 mm



PANEL CUTOUT



ELECTRICAL SPECIFICATIONS		
	P16	PA16
Resistive Element	Cermet	Conductive plastic
Electrical Travel	270° ± 10°	270° ± 10°
Power Rating Chart		
Circuit Diagram		
Resistance Laws		
Resistance Range	linear law 22 Ω to 10 MΩ logarithmic laws 100 Ω to 2.2 MΩ	1 kΩ to 1 MΩ 470 Ω to 500 kΩ
Standard Series E3	1 - 2.2 - 4.7 and on request 1 - 2 - 5	1 - 2.2 - 4.7
Tolerance	standard ± 20 % on request ± 10 %	± 20 % ± 10 % (1 kΩ to 100 kΩ)
Power Rating	linear 1 W at + 40 °C logarithmic 0.5 W at + 40 °C	0.5 W at + 40 °C 0.25 W at + 40 °C
Temperature Coefficient (Typical)	± 150 ppm/°C	± 1000 ppm/°C
Dielectric Strength (RMS)	2500 V	2500 V
Limiting Element Voltage (Linear Law)	350 V	350 V
Insulation Resistance (500 V <sub>DC</sub> )	≥ 10 <sup>4</sup> MΩ	≥ 10 <sup>4</sup> MΩ
Contact Resistance Variation	3 % R <sub>n</sub> or 3 Ω	2 % R <sub>n</sub> or 3 Ω
End Resistance (Typical)	1 Ω	1 Ω
Insulation Resistance (500 V <sub>DC</sub> )	10 <sup>6</sup> MΩ	10 <sup>6</sup> MΩ

MECHANICAL SPECIFICATIONS	
Mechanical Travel	300° ± 5°
Operating Torque	2 Ncm typical
End Stop Torque	25 Ncm maximum
Max. Tightening Torque of Mounting Nut	250 Ncm maximum
Unit Weight	4.5 g typical

ENVIRONMENTAL SPECIFICATIONS		
	Metallic Knob	Plastic Knob
Temperature Range	- 40 °C to 125 °C	- 40 °C to 85 °C
Climatic Category	40/100/56	40/85/56
Sealing	Sealed container and panel sealed	
Protection Grades	IP67	

MARKING
<ul style="list-style-type: none"> <li>Ohmic value, tolerance, resistance law</li> <li>Manufacturing date</li> </ul>

PACKAGING
<ul style="list-style-type: none"> <li>Carton box of 20 pieces</li> </ul>

CONTROL KNOB
Black metallic knob (NM).
Black plastic knob (NP).
For white and blue color see ordering information.
Other dimensions, shapes, colors of control knobs are manufactured on request - please consult Vishay.
Other reference marks (shapes, colors) and legends can be printed on plastic knob on request - please consult Vishay.

P16 STANDARD RESISTANCE ELEMENT DATA							
STANDARD RESISTANCE VALUES	LINEAR LAW			LOG LAW			TYP. TCR - 40 °C + 85 °C
	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	
Ω	W	V	mA	W	V	mA	10 <sup>-6</sup> /°C
22	1	4.69	213				
47		6.85	146				
100		10	100	0.5	7.1	71	
220		14.8	67.4		10.5	48	
470		21.7	46.1		15.3	32.6	
1K		31.6	31.6		22.4	22.4	
2.2K		46.9	21.3		33.2	15.1	
4.7K		68.5	14.6		48.5	10.3	
10K		100	10		70.7	7.07	
22K		148	6.74		105	4.77	
47K		217	4.61		153	3.26	
100K	1	316	3.16		224	2.24	
220K	0.56	350	1.59	0.5	332	1.51	
470K	0.26	350	0.75	0.26	350	0.74	
1M	0.12	350	0.35	0.12	350	0.35	
2.2M	0.05	350	0.16	0.056	350	0.16	
4.7M	0.02	350	0.07				
10M	0.01	350	0.012				

PA16 STANDARD RESISTANCE ELEMENT DATA							
STANDARD RESISTANCE VALUES	LINEAR LAW			LOG LAW			TYP. TCR - 55 °C + 125 °C
	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	MAX. POWER AT 70 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	
Ω	W	V	mA	W	V	mA	ppm/°C
470							
1K							
2.2K	0.5	22.4	22.4	0.25	10.8	23.1	
4.7K		33.2	15.1		15.8	16	
10K		48.5	10.3		23.5	11	
22K		79.7	7.07		34.3	7	
47K		105	4.77		50.0	5.0	
100K		153	3.26		74	3.4	
220K		224	2.24		108	2.3	
470K		332	1.51		158	1.6	
1M		485	1.03		235	1.1	
2.2M	0.5	350	0.74	0.25	343	0.7	
4.7M	0.26	350	0.35				
10M	0.12	350	0.35				



<b>PERFORMANCE</b>			
TESTS	CONDITIONS	TYPICAL VALUES AND DRIFTS	
		$\Delta R_T/R_T$ (%)	$\Delta R_{1-2}/R_{1-2}$ (%)
Load Life	1000 h at Pn 90°/30° cycle at + 40 °C	± 5 % Insulation resistance: > 10 <sup>4</sup> MΩ Contact res. variation: < 2 % Rn	-
Long Term Damp Heat	56 days 40 °C, 93 % HR	± 2 % Insulation resistance: > 10 <sup>4</sup> MΩ	± 1 %
Shock	50 g at 11 ms 3 successive shocks in 3 axes	± 0.2 %	± 0.5 %
Vibration	10 Hz to 55 Hz 0.75 mm or 10 g during 6 h	± 0.2 %	$\Delta V_{1-2}/\Delta V_{1-3} \leq \pm 0.5 \%$
Rotational Life	50 000 cycles	± 5 % Contact res. variation: < 2 % Rn	-

<b>ORDERING INFORMATION</b>																		
P	1	6	N	P	2	2	3	M	A	B	1	5						
MODEL	STYLE			OHMIC VALUE			TOLERANCE	TAPER			PACKAGING CODE	SPECIAL NUMBER						
<b>P16</b> = Cermet <b>PA16</b> = Conductive plastic	<b>NM</b> : Metallic black <b>NP</b> : Plastic black <b>WM</b> : Metallic white <b>WP</b> : Plastic white <b>BP</b> : Plastic blue			<b>223</b> = 22 kΩ for ohmic value range see ELECTRICAL SPECIFICATION			<b>M</b> = ± 20 % On request <b>K</b> = ± 10 %	<b>A</b> : Linear <b>L</b> : Clockwise logarithmic <b>F</b> : Inverse clockwise logarithmic			<b>B15</b> = Box of 20 pieces	(If applicable) Given by Vishay for custom design						

<b>PART NUMBER DESCRIPTION</b> (for information only)								
P16	NP	22 kΩ	20 %	A		BO		e3
MODEL	STYLE	VALUE	TOLERANCE	TAPER	SPECIAL	PACKAGING	SPECIAL	LEAD (Pb)-FREE



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