

Vishay Sfernice

### **Knob Potentiometer**



### **LINKS TO ADDITIONAL RESOURCES**





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**

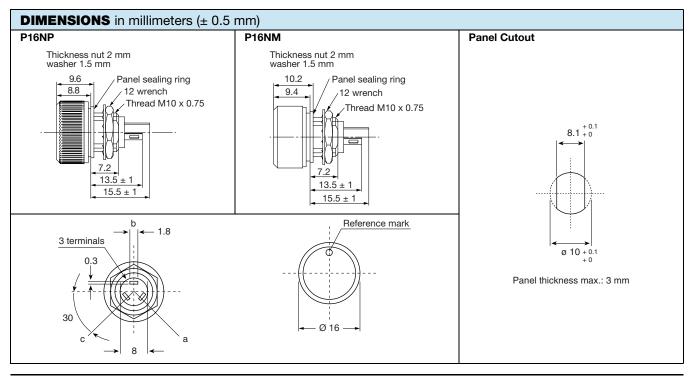
- Test according to CECC 41000 or IEC 60393-1
- P16 version for professional and industrial applications (cermet) 1 W at 40 °C



COMPLIANT

- PA16 version for professional audio applications (conductive plastic) 0.5 W at 40 °C
- Compact (integrated)
- High dielectric strength: 2500 V<sub>RMS</sub>
- Fully sealed and panel sealed
- · Blue, white, yellow, red, and black knob
- · Several marking: dot, line, gradient, 5 graduations, 10 graduations, fan, light, volume, temperature
- Metallic or plastic knob options
- · Custom knob and marking on request
- · Material categorization: for definitions of compliance please see www.vishav.com/doc?99912

QUICK REFERENCE DATA	
Multiple module	No
Switch module	Upgrade for switch version with P16S
Detent module	n/a
Special electrical laws	A: linear, L: logarithmic, F: reverse logarithmic
Sealing level	IP 67
Lifespan	50K cycles



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ELECTRICAL SPECIFICATIONS				
	P16	PA16		
Resistive element	Cermet	Conductive plastic		
Electrical travel	270° ± 10°	270° ± 10°		
Power rating chart	1.25 P16 LIN. TAPER "A"  0.75 P16 LOG. TAPER "L & F"  0.25 PA16 LIN. TAPER  0 0 0 0 0 0 120 140  AMBIENT TEMPERATURE IN °C			
Circuit diagram	$ \begin{array}{c} \stackrel{a}{\circ} \longrightarrow \stackrel{c}{\circ} \\ \stackrel{b}{\circ} \longrightarrow \stackrel{c}{\circ} \\ \stackrel{(3)}{\circ} $			
Taper		A L L 60 80 100 WISE SHAFT ROTATION		
Resistance range Linear taper Logarithmic taper	22 Ω to 10 MΩ 100 Ω to 2.2 MΩ	1 k $\Omega$ to 1 M $\Omega$ 470 $\Omega$ to 500 k $\Omega$		
Standard series E3	1 - 2.2 - 4.7 and on request 1 - 2 - 5	1 - 2.2 - 4.7		
Tolerance Standard On request	± 20 % ± 10 %	$\pm$ 20 % $\pm$ 10 % (1 k $\Omega$ to 100 k $\Omega$ )		
Power rating Logarithmic	1 W at +40 °C 0.5 W at +40 °C	0.5 W at +40 °C 0.25 W at +40 °C		
Temperature coefficient (typical)	± 150 ppm/°C	± 500 ppm/°C		
Dielectric strength (RMS)	2500 V	2500 V		
Limiting element voltage (linear law)	350 V	350 V		
Contact resistance variation	3 % Rn or 3 Ω	2 % Rn or 3 Ω		
End resistance (typical)	1 Ω	1 Ω		
Insulation resistance (500 V <sub>DC</sub> )	$10^6\mathrm{M}\Omega$	$10^6\mathrm{M}\Omega$		





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MECHANICAL SPECIFICATIONS				
Mechanical travel	300° ± 5°			
Operating torque	2 Ncm typical			
End stop torque	25 Ncm maximum			
Max. tightening torque of mounting nut	180 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**

- · Ohmic value code, tolerance code and taper
- Manufacturing date code

### **PACKAGING**

Carton box of 20 pieces

Hardware: nuts, washer, and O-ring are separately supplied (not mounted on the potentiometer), in a small bag placed in the packaging.

-	MTD	•	1/81	-

Black metallic knob (NM).

Black plastic knob (NP).

For white, blue, red, and yellow color see ordering information. Other dimensions, shape, marking, 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 S	P16 STANDARD RESISTANCE ELEMENT DATA							
STAN-	LIN	EAR TAP	PER	L	OG TAPE	R		
DARD RESIS- TANCE VALUES		MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER		
Ω	W	٧	mA	W	٧	mA		
22 47 100 220 470 1K 2.2K 4.7K 10K 22K 47K 100K 220K 470K 1M 2.2M 4.7M	1 1 1 1 1 1 1 1 1 1 0.56 0.26 0.12 0.05 0.02	4.69 6.85 10 14.8 21.7 31.6 46.9 68.5 100 148 217 316 350 350 350 350 350	213 146 100 67.4 46.1 31.6 21.3 14.6 10 6.74 4.61 3.16 1.59 0.75 0.35 0.16 0.07	0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.26 0.12 0.056	7.1 10.5 15.3 22.4 33.2 48.5 70.7 105 153 224 332 350 350 350	71 48 32.6 22.4 15.1 10.3 7.07 4.77 3.26 2.24 1.51 0.74 0.35 0.16		

PA16 STANDARD RESISTANCE ELEMENT DATA						
STAN-	LI	NEAR TA	PER		LOG TAP	ER
DARD RESIS- TANCE VALUES			MAX. CUR. THROUGH WIPER	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER
Ω	W	V	mA	W	V	mA
470 1K 2.2K 4.7K 10K 22K 47K 100K 220K 470K 1M	0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.26 0.12	22.4 33.2 48.5 70.7 105 153 224 332 350 350	22.4 15.1 10.3 7.07 4.77 3.26 2.24 1.51 0.74 0.35	0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25	10.8 15.8 23.5 34.3 50.0 74 108 158 235 343	23.1 16 11 7 5.0 3.4 2.3 1.6 1.1



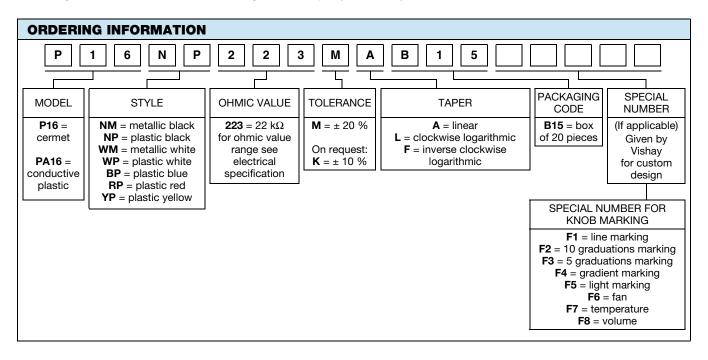


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PERFORMANCE							
TESTS	CONDITIONS	TYPICAL VALUES AND DRIFTS					
12313	CONDITIONS	∆R <sub>T</sub> /R <sub>T</sub> (%)	$\Delta R_{1-2}/R_{1-2}$ (%)	OTHER			
Electrical endurance	1000 h at rated power 90'/30' cycle at +40 °C	± 5 %	-	Insulation resistance: $> 10^4 \text{ M}\Omega$ Contact res. variation: $< 2 \% \text{ Rn}$			
Damp heat, steady state	56 days 40 °C, 93 % HR	± 2 %	± 1 %	Insulation resistance: $> 10^4 \text{ M}\Omega$			
Mechanical endurance	50 000 cycles	± 5 %	-	Contact res. variation: < 2 % Rn			
Shock	50 g's at 11 ms 3 successive shocks in 3 directions	± 0.2 %	± 0.5 %	-			
Vibration	10 Hz to 55 Hz 0.75 mm or 10 <i>g</i> 's during 6 h	± 0.2 %	-	$\Delta V_{1-2}/\Delta V_{1-3} \le \pm \ 0.5 \%$			

#### Note

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



KNOB STYLES		
STYLE	EXAMPLE	E IMAGES
NP = black plastic		
WP = white plastic		
BP = blue plastic		





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KNOB STYLES					
STYLE	EXAMPLI	IMAGES			
RP = red plastic					
YP = yellow plastic					
NM = black metal					
WM = white metal					

### **KNOB MARKING OPTIONS**

Several marking options on the top face of the knob are available.

SPECIAL NUMBER	MARKING	EXAMPLE IMAGES		AVAILABILITY FOR PLASTIC KNOB	AVAILABILITY FOR METALLIC KNOB
-	Dot (standard)			Yes	Yes
F1	Line			Yes	Yes
F2	10 graduations	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		Yes	Yes
F3	5 graduations	\$ '8'. 77.25		Yes	Yes
F4	Gradient			Yes	Yes
F5	Light	**	*	Yes	Yes





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SPECIAL NUMBER	MARKING	EXAME	PLE IMAGES	AVAILABILITY FOR PLASTIC KNOB	AVAILABILITY FOR METALLIC KNOB
F6	Fan	S	4	Yes	Yes
F7	Temperature	İ		Yes	Yes
F8	Volume			Yes	Yes
(Special code)	Other on demand	VISHAY		On request	On request

PART NUMBER DESCRIPTION (for information only)									
P16	NP	<b>22 k</b> Ω	20 %	Α		во		e3	
			<u> </u>			,			
MODEL	STYLE	VALUE	TOLERANCE	TAPER	SPECIAL	PACKAGING	SPECIAL	LEAD (Pb)-FREE	

RELATED DOCUMENTS						
APPLICATION NOTES						
Potentiometers and Trimmers	www.vishay.com/doc?51001					
Guidelines for Vishay Sfernice Resistive and Inductive Components	www.vishay.com/doc?52029					
Capabilities and Custom Options	www.vishay.com/doc?48493					



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