

P16, PA16

RoHS

COMPLIANT

**Vishay Sfernice** 

# **Knob Potentiometer**



### LINKS TO ADDITIONAL RESOURCES

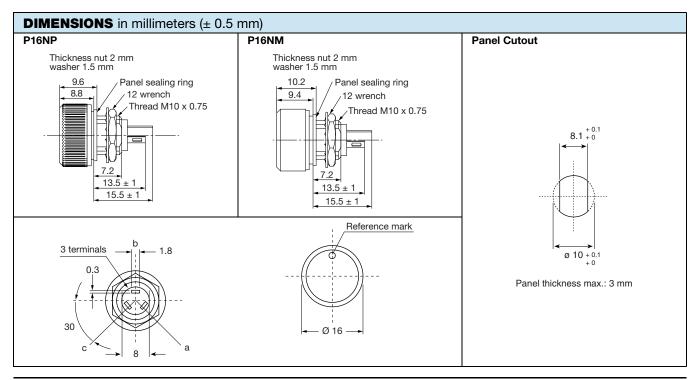


The P16 is a revolutionary concept in panel mounted potentiometers. This unique design consists of a knob driving and incorporating a cermet potentiometer. Only the mounting hardware and terminals are situated on the back side of the panel reducing to a minimum the required clearance.

#### **FEATURES**

- Test according to CECC 41000 or IEC 60393-1
- P16 version for professional and industrial applications (cermet) 1 W at 40 °C
- 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.vishay.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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For technical questions, contact: sferpottrimmers@vishay.com

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# P16, PA16

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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" 0.50 A PA16 LIN. TAPER TE WERTURE IN °C			
Circuit diagram		cw cw		
Taper		A L L L L L L L L L L L L L L L L L L L		
Resistance range Linear taper Logarithmic taper	22 Ω to 10 MΩ 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 %	$\pm 20\%$		
On request	± 10 % 1 W at +40 °C	± 10 % (1 kΩ to 100 kΩ) 0.5 W at +40 °C		
Power rating Logarithmic	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)	2500 V 350 V	2500 V 350 V		
Contact resistance variation	350 V 3 % Rn or 3 Ω	2 % Rn or 3 Ω		
End resistance (typical)	3 % Rh or 3 Ω 1 Ω	2 % Rh or 3 Ω 1 Ω		
Insulation resistance (500 V <sub>DC</sub> )	10 <sup>6</sup> MΩ	10 <sup>6</sup> MΩ		
Insulation resistance (SOU VDC)	10 <sup>-</sup> IVI22	10° IVIS2		

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MECHANICAL SPECIFICATIONS					
Mechanical travel $300^{\circ} \pm 5^{\circ}$					
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

#### **CONTROL KNOB**

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 \$	P16 STANDARD RESISTANCE ELEMENT DATA								
STAN-	TAN- LINEAR TAPER LOG			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	v	mA	w	v	mA			
22 47 100 220 470 1K 2.2K 4.7K 10K 22K 47K 100K 220K 470K 1M 2.2M	1 1 1 1 1 1 1 1 1 0.56 0.26 0.26 0.05	4.69 6.85 10 14.8 21.7 31.6 46.9 68.5 100 148 217 316 350 350 350	213 146 100 67.4 46.1 31.6 21.3 14.6 10 6.74 4.61 3.16 1.59 0.75 0.75 0.35 0.16	0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	7.1 10.5 15.3 22.4 33.2 48.5 70.7 105 153 224 332 350 350	71 48 32.6 22.4 15.1 10.3 7.07 4.77 3.26 2.24 1.51 0.74 0.35			
4.7M 10M	0.02 0.01	350 350	0.07 0.012	0.056	350	0.16			

#### 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.

#### **DETENT OPTION**

On request: The detent mechanism is housed in the P16 One detent at CCW position Mechanical endurance: 10 000 cycles Ordering information (special code): CV1D: one detent at CCW position (on request)

<b>PA16</b>	PA16 STANDARD RESISTANCE ELEMENT DATA								
STAN-	LI	NEAR TA		LOG TAPI	ER				
DARD RESIS- TANCE VALUES	MAX. POWER AT 40 °C	MAX. VOLTAGE		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 0.7			

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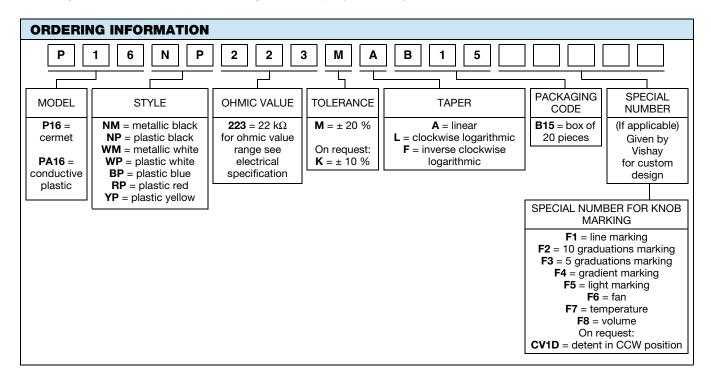
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PERFORMANCE								
TESTS	CONDITIONS		TYPICAL VALUES AND DRIFTS					
12010	CONDITIONS	∆ <b>R<sub>T</sub>/R<sub>T</sub> (%)</b>	∆ <b>R<sub>1-2</sub>/R<sub>1-2</sub> (%)</b>	OTHER				
Electrical endurance	1000 h at rated power 90'/30' cycle at +40 °C	±5%	-	Insulation resistance: > $10^4 M\Omega$ Contact res. variation: < 2 % Rn				
Damp heat, steady state	56 days 40 °C, 93 % HR	±2%	±1%	Insulation resistance: > $10^4 M\Omega$				
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 %	-	$\Delta V_{1\text{-}2}/\Delta V_{1\text{-}3} \leq \pm 0.5 \%$				

Note

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



KNOB STYLES					
STYLE	EXAMPLE	IMAGES			
NP = black plastic					
WP = white plastic					

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KNOB STYLES						
STYLE	EXAMPLI	E IMAGES				
BP = blue plastic						
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	EXAMP	PLE IMAGES	AVAILABILITY FOR PLASTIC KNOB	AVAILABILITY FOR METALLIC KNOB
-	Dot (standard)			Yes	Yes
F1	Line			Yes	Yes
F2	10 graduations			Yes	Yes
F3	5 graduations	1 0 0 0		Yes	Yes
F4	Gradient			Yes	Yes

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SPECIAL NUMBER	MARKING	EXAMP	LE IMAGES	AVAILABILITY FOR PLASTIC KNOB	AVAILABILITY FOR METALLIC KNOB
F5	Light	· 淡	-**	Yes	Yes
F6	Fan	-55		Yes	Yes
F7	Temperature			Yes	Yes
F8	Volume			Yes	Yes
(Special code)	Other on demand	VISHAY		On request	On request

PART NUMBER DESCRIPTION (for information only)								
P16	NP	22 kΩ 20 % Α		во		e3		
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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