

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

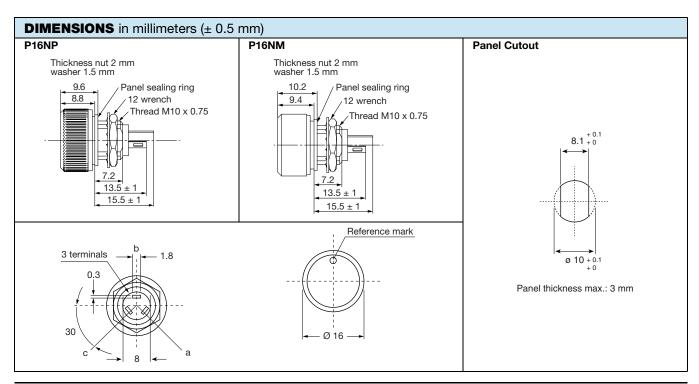
- Test according to CECC 41000 or IEC 60393-1
- P16 version for professional and industrial applications (cermet)



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_{RMS}
- 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 <u>www.vishay.com/doc?99912</u>

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



Revision: 03-Jun-2024 1 Document Number: 51036





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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" 1.00 P16 LOG. TAPER "L & F" PA16 LOG. TAPER O O O O O O O O O O O O O					
Circuit diagram	a (1) b b (2)	V C C (3) (3)				
Taper	100 80 F 40 0 0 20 40 % CLOCK	A L L GO 80 100 WISE SHAFT ROTATION				
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 %	± 20 %				
On request	± 10 %	± 10 % (1 kΩ to 100 kΩ)				
Power rating Linear	1 W at +40 °C	0.5 W at +40 °C				
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)	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 _{DC})	$10^6\mathrm{M}\Omega$	$10^6\mathrm{M}\Omega$				





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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.

CONTROL KNOB

Black metallic knob (NM).

Black plastic knob (NP).

position (CVDF)

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.

DETENT OPTION		
On request:	Ordering information (special code):	
the detent mechanism is housed in the P16	CV1D One detent in CCW position	
Mechanical endurance: 10 000 cycles	CV1F	
One detent in CCW position (CV1D)	Detent in CW position	
One detent in CW position (CV1F)	CVDF Detent in CW position and CCW position	
One detent in CW position and CCW	Deterit in Ovv position and Oovv position	CV1D CV1F CVDF





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P16 S	P16 STANDARD RESISTANCE ELEMENT DATA						
STAN-	LINEAR TAPER			L	OG TAPE	R	
DARD RESIS- TANCE VALUES	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	
Ω	W	٧	mA	W	V	mA	
22	1	4.69	213				
47	1	6.85	146				
100	1	10	100	0.5	7.1	71	
220	1	14.8	67.4	0.5	10.5	48	
470	1	21.7	46.1	0.5	15.3	32.6	
1K	1	31.6	31.6	0.5	22.4	22.4	
2.2K	1	46.9	21.3	0.5	33.2	15.1	
4.7K	1	68.5	14.6	0.5	48.5	10.3	
10K	1	100	10	0.5	70.7	7.07	
22K	1	148	6.74	0.5	105	4.77	
47K	1	217	4.61	0.5	153	3.26	
100K	1	316	3.16	0.5	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	PA16 STANDARD RESISTANCE ELEMENT DATA							
STAN-	LI	NEAR TA	PER	LOG TAPER				
DARD MAX. RESIS- TANCE AT VALUES 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		
470				0.25	10.8	23.1		
1K	0.5	22.4	22.4	0.25	15.8	16		
2.2K	0.5	33.2	15.1	0.25	23.5	11		
4.7K	0.5	48.5	10.3	0.25	34.3	7		
10K	0.5	70.7	7.07	0.25	50.0	5.0		
22K	0.5	105	4.77	0.25	74	3.4		
47K	0.5	153	3.26	0.25	108	2.3		
100K	0.5	224	2.24	0.25	158	1.6		
220K	0.5	332	1.51	0.25	235	1.1		
470K	0.26	350	0.74	0.25	343	0.7		
1M	0.12	350	0.35					

PERFORMANCE						
TESTS	CONDITIONS	TYPICAL VALUES AND DRIFTS				
12313	CONDITIONS	∆R _T /R _T (%)	$\Delta R_{1-2}/R_{1-2}$ (%)	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% 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 %	-	$\Delta V_{1-2}/\Delta V_{1-3} \le \pm \ 0.5 \%$		

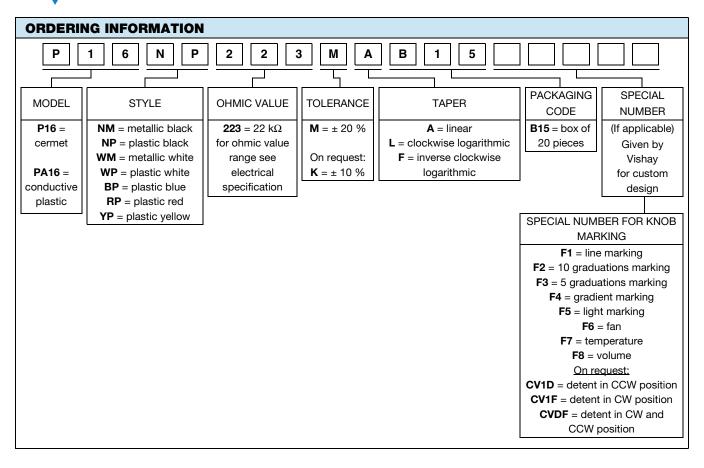
Note

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





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KNOB STYLES					
STYLE	EXAMPLI	EIMAGES			
NP = black plastic					
WP = white plastic					
BP = blue plastic					
RP = red plastic					





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KNOB STYLES					
STYLE	EXAMPLI	IMAGES			
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	EXAMF	PLE 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	3 2 2 3		Yes	Yes
F4	Gradient			Yes	Yes
F5	Light	*	*	Yes	Yes
F6	Fan	**	4	Yes	Yes



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SPECIAL NUMBER	MARKING	EXAMPLE IMAGES		AVAILABILITY FOR PLASTIC KNOB	AVAILABILITY FOR METALLIC KNOB
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	22 k Ω	20 %	Α		во		e3
MODEL	STYLE	VALUE	TOLERANCE	TAPER	SPECIAL	PACKAGING	SPECIAL	LEAD (Pb)-FREE

ACCESSORIES				
Additional Accessories (to order separately)	www.vishay.com/doc?51051			

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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