

Vishay Sfernice

Knob Potentiometer With Switch



The P16S 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.

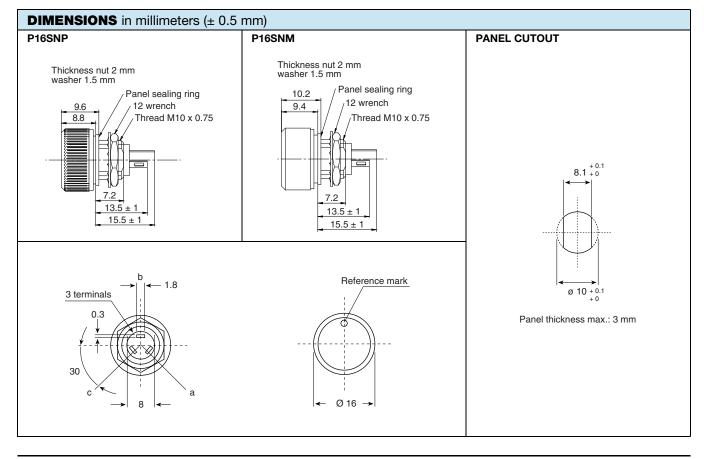
QUICK REFERENCE DATA						
Multiple module No						
Switch module	Yes					
Detent module Yes						
Special electrical laws	A: linear, L: logarithmic, F: reverse logarithmic					
Sealing level	IP 67					
Lifespan 10K cycles (switch), 50K cycles (track						

FEATURES

 P16S - version for military, professional and industrial applications (cermet): 1 W at 40 °C



- **PA16S** version for professional audio applications (conductive plastic): 0.5 W at 40 °C
- Compact (integrated)
- Detent and electric cut off at beginning of travel
- Fully sealed and panel sealed
- Metallic or plastic knob options
- Custom knob on request
- Test according to CECC 41000 or IEC 60393-1
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>



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P16S, PA16S

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ELECTRICAL SPECIFICATIONS P16S **PA16S Resistive element** Cermet Conductive plastic $220^{\circ} \pm 10^{\circ}$ 220° ± 10° Electrical travel 1.25 P16S LIN. TAPER "A 1.00 RETED POWER IN W 0.75 P16S LOG. TAPER "L & F Power rating chart N 0.50 & PA16S 3 LIN. TAPER 0.25 PA16S LOG. TAPER 0 20 40 60 100 120 140 0 80 AMBIENT TEMPERATURE IN °C a 0-(1) Circuit diagram (2)Switch on-off 100 80 F % TOTAL RESISTANCE 60 Δ Taper L 40 20 0 0 10 20 40 60 80 100 % CLOCKWISE KNOB ROTATION linear law 22 Ω to 10 $M\Omega$ 1 k Ω to 1 M Ω Resistance range logarithmic laws 100 Ω to 2.2 $M\Omega$ 470 Ω to 500 k Ω 1 - 2.2 - 4.7 and on request 1 - 2 - 5 Standard series e3 1 - 2.2 - 4.7 standard ± 20 % ± 20 % Tolerance on request ± 10 % \pm 10 % (1 k Ω to 100 k Ω) 1 W at +40 °C 0.5 W at +40 °C linear Power rating logarithmic 0.5 W at +40 °C 0.25 W at +40 °C Temperature coefficient (typical) ± 150 ppm ± 500 ppm 2500 V Dielectric strength (RMS) 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) 1Ω 1Ω $10^6 M\Omega$ $10^6 M\Omega$ Insulation resistance (500 V_{DC})

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MECHANICAL SPECIFICATIONS							
Mechanical travel	300°	± 5°					
Operating torque	2 Ncm	typical					
End stop torque	25 Ncm 1	maximum					
Tightening torque of mounting nut	180 Ncm	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					
Protection grades	IP67					

SWITCH ELECTRICAL AND MECHANICAL SPECIFICATIONS

ON / OFF switch	Actuation in counter clockwise position (between terminal a and terminal b)				
Switching current	P16S	100 mA max.			
	PA16S	1 mA max.			
Switch actuation torque	3 Ncm typical				
Switch actuation travel	$30^{\circ} \pm 5^{\circ}$				
Dielectric strength terminal to terminal (RMS)	1000 V				
Insulation resistance between contacts	10 ⁶ MΩ				
Switch mechanical endurance	10 000 cycles				
1 cycle	ON-OFF-ON				

Note

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

MARKING

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

PACKAGING

• Carton box of 20 pieces

STANDARD RESISTANCE ELEMENT DATA

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.

	P16S CERMET						PA16S CONDUCTIVE PLASTIC					
STANDARD	I	LINEAR TAPER LOGARITHMIC TAPER				LINEAR TAPER LOGARITHMIC TAP				TAPER		
RESISTANCE VALUES	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER		MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER
Ω	W	V	mA	W	V	mA	W	V	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				0.25	10.8	23.1
1K	1	31.6	31.6	0.5	22.4	22.4	0.5	22.4	22.4	0.25	15.8	16
2.2K	1	46.9	21.3	0.5	33.2	15.1	0.5	33.2	15.1	0.25	23.5	11
4.7K	1	68.5	14.6	0.5	48.5	10.3	0.5	48.5	10.3	0.25	34.3	7
10K	1	100	10	0.5	70.7	7.07	0.5	70.7	7.07	0.25	50	5
22K	1	148	6.74	0.5	105	4.77	0.5	105	4.77	0.25	74	3.4
47K	1	217	4.61	0.5	153	3.26	0.5	153	3.26	0.25	108	2.3
100K	1	316	3.16	0.5	224	2.24	0.5	224	2.24	0.25	158	1.6
220K	0.56	350	1.59	0.5	332	1.51	0.5	332	1.51	0.25	235	1.1
470K	0.26	350	0.75	0.26	350	0.74	0.26	350	0.74	0.25	343	0.7
1M	0.12	350	0.35	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									

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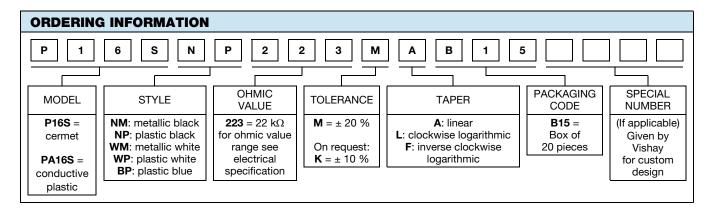
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PERFORMANCE							
TESTS	CONDITIONS	TYPICAL VALUES AND DRIFTS					
12313	CONDITIONS	∆ R_T/R_T (%)	∆ R₁₋₂/R₁₋₂ (%)	OTHER			
Electrical endurance	1000 h at rated power 90'/30' cycle at +40 °C	± 5 %	-	Insulation resistance: > $10^4 M\Omega$ Contact res. variation: < 2 % Rn			
Damp heat, steady state	56 days 40 °C, 93 % HR	± 2 %	± 1 %	Insulation resistance: > $10^4 \text{ M}\Omega$			
Mechanical endurance	50 000 cycles	± 5 %	-	Contact res. variation: < 2 % Rn			
Shock	50 g's at 11 ms 3 successive shocks in 3 dimensions	± 0.2 %	± 0.5 %	-			
Vibration	10 Hz to 55 Hz 0.75 mm or 10 <i>g</i> 's during 6 h	± 0.2 %	-	$\Delta V_{1\text{-}2} / \Delta V_{1\text{-}3} \leq \pm \text{ 0.5 \%}$			



PART NUMBER DESCRIPTION (for information only)								
P16S	NP	22 k Ω	20 %	Α		BO20		e3
MODEL	STYLE	OHMIC 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



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