



## **Knob Potentiometer With Switch**

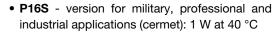


#### **LINKS TO ADDITIONAL RESOURCES**



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.

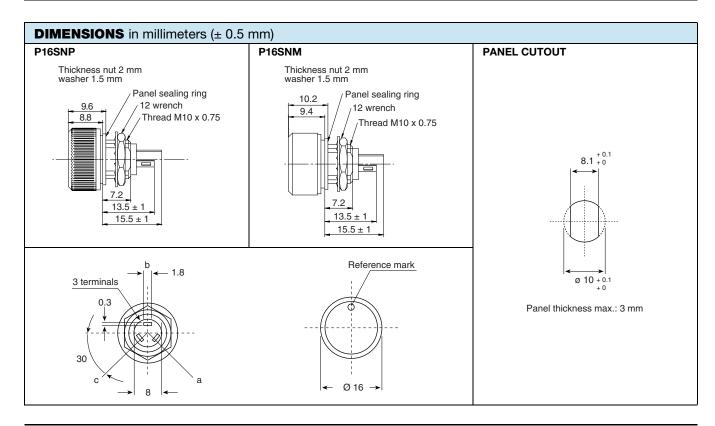
#### **FEATURES**





- 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 <a href="https://www.vishay.com/doc?99912">www.vishay.com/doc?99912</a>

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)





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		P16S	PA16S			
Resistive element		Cermet	Conductive plastic			
Electrical travel		220° ± 10°	220° ± 10°			
Power rating chart		PA16S LOG. TAPER 0 0 20 40 60				
Circuit diagram		a (1) b b → cw (3)				
Taper		20 0 10 20 40	60 80 100 E KNOB ROTATION			
Resistance range	linear law logarithmic laws	22 $\Omega$ to 10 M $\Omega$ 100 $\Omega$ to 2.2 M $\Omega$	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			
standard		± 20 %	± 20 %			
Tolerance	on request	± 10 %	± 10 % (1 kΩ to 100 kΩ)			
Power rating	linear 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	± 500 ppm			
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 <sup>6</sup> MΩ	10 <sup>6</sup> MΩ			

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MECHANICAL SPECIFICATIONS			
Mechanical travel	300° ± 5°		
Operating torque	2 Ncm typical		
End stop torque	25 Ncm maximum		
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			

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.		
Switching current	PA16S	1 mA max.		
Switch actuation torque	3 Ncm typical			
Switch actuation travel	30° ± 5°			
Dielectric strength terminal to terminal (RMS)	1000 V			
Insulation resistance between contacts	10 <sup>6</sup> 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

### **CONTROL KNOB**

Black metallic knob (NM). Black plastic knob (NP).

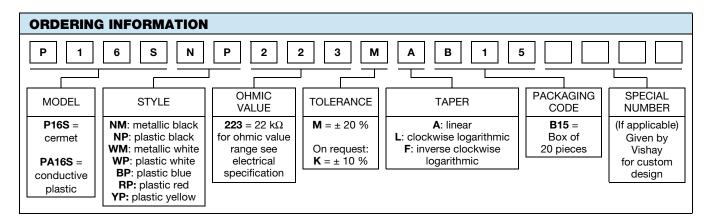
For white, blue, red, and yellow color see ordering information. Other dimensions, shape, marking, colors of control knobs are manufactured on request - please consult Vishay. Other reference marks (shapes, colors) and legends can be printed on plastic knob on request - please consult Vishay.

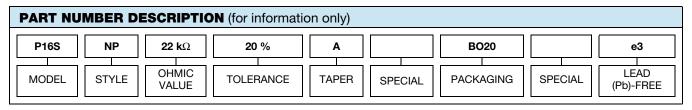
STANDA	STANDARD RESISTANCE ELEMENT DATA											
	P16S CERMET					PA16S CONDUCTIVE PLASTIC						
STANDARD	L	INEAR TAP	PER	LOG	ARITHMIC	TAPER	LINEAR TAPER			LOGARITHMIC TAPER		
RESISTANCE VALUES	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	MAX. 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	٧	mA	W	٧	mA	W	٧	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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PERFORMANCE						
TESTS	CONDITIONS	TYPICAL VALUES AND DRIFTS				
12313	OONDITIONS	∆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: > $10^4$ 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 %	-	$\Delta V_{1-2}/\Delta V_{1-3} \le \pm \ 0.5 \%$		





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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