



## **Knob Potentiometer With Switch**



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

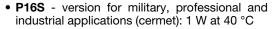






The P16S is a revolutionary concept in panel mounted potentiometers. This unique design consists of a knob driving and incorporating a cermet potentiometer. Only the mounting hardware and terminals are situated on the back side of the panel reducing to a minimum the required clearance.

#### **FEATURES**

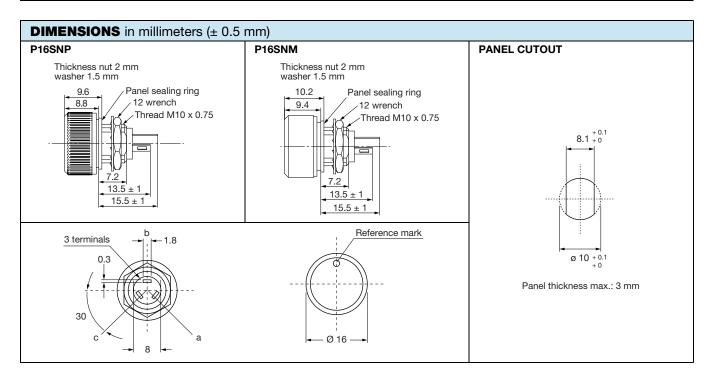




 PA16S - version for professional audio applications (conductive plastic): 0.5 W at 40 °C

- Compact (integrated)
- Detent and electric cut off at beginning of travel
- Fully sealed and panel sealed
- 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 knobs and marking 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"><u>www.vishay.com/doc?99912</u></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°			
Liectrical travel		1.25	220 ± 10			
Power rating chart	Power rating chart  1.00    P16S					
Circuit diagram		$ \begin{array}{c} \overset{a}{\circ} \longrightarrow & \overset{c}{\circ} \\ \overset{b}{\circ} \longrightarrow & \overset{c}{\circ} \\ \overset{(2)}{\circ} \end{array} $				
Taper		100 Switch on-off  80				
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				
	standard	± 20 %	± 20 %			
Tolerance	on request	± 10 %	± 10 % (1 kΩ to 100 kΩ)			
_	linear	1 W at +40 °C	0.5 W at +40 °C			
Power rating	logarithmic	0.5 W at +40 °C	0.25 W at +40 °C			
Temperature coefficient (typical)	<del></del>	± 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			

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 cou	nter clockwise position (between terminal a and terminal b)			
Civitahina ayyent	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 other reference marks (shapes, colors) and legends can be printed on plastic knob on request - please consult Vishay.

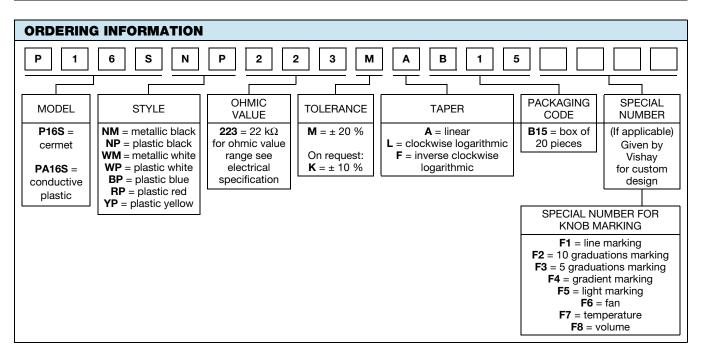
			P16S C	ERMET			PA16S CONDUCTIVE PLASTIC					
STANDARD		INEAR TAP	PER	LOG	ARITHMIC	TAPER	I	LINEAR TAP	PER	LOG	ARITHMIC	TAPER
RESISTANCE VALUES	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER
Ω	W	٧	mA									
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	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: $> 10^4  M\Omega$ 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 %	-	$\Delta V_{1-2}/\Delta V_{1-3} \le \pm \ 0.5 \ \%$		



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



KNOB STYLES								
STYLE	EXAMPLI	EIMAGES						
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	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 22		Yes	Yes
F4	Gradient			Yes	Yes
F5	Light	澿	*	Yes	Yes



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SPECIAL NUMBER	MARKING	EXAME	PLE IMAGES	AVAILABILITY FOR PLASTIC KNOB	AVAILABILITY FOR METALLIC KNOB
F6	Fan	*	4	Yes	Yes
F7	Temperature			Yes	Yes
F8	Volume	- (6)		Yes	Yes
(Special code)	Other on demand	VISHAY		On request	On request

PART NU	PART NUMBER DESCRIPTION (for information only)									
P16S	P16S NP 22 kΩ 20 % A BO20 e3									
MODEL	STYLE	OHMIC 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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