



Knob Potentiometer With Switch



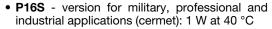
LINKS TO ADDITIONAL RESOURCES





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

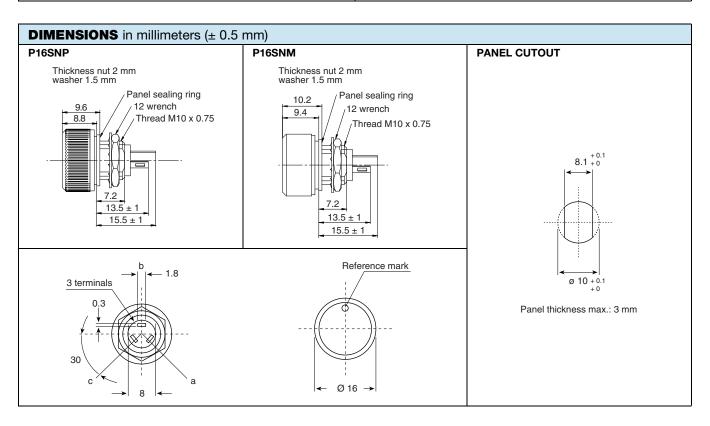




 PA16S - version for professional audio applications (conductive plastic): 0.5 W at 40 °C

- 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 <u>www.vishay.com/doc?99912</u>

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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ELECTRICAL SPECIFICATIONS						
		P16S	PA16S			
Resistive element		Cermet	Conductive plastic			
Electrical travel		220° ± 10° 220° ± 10°				
Power rating chart		0 20 40 60	80 100 120 140 PERATURE IN °C			
Circuit diagram		$ \begin{array}{c} \stackrel{a}{\circ} \longrightarrow \longrightarrow \stackrel{c}{\circ} \\ \stackrel{b}{\circ} \longrightarrow \longrightarrow \stackrel{c}{\circ} \\ \stackrel{(2)}{\circ} \end{array} $				
Taper		Switch on-off 80 80 F A L 100 Switch on-off F 0 0 10 20 40 60 80 100 % CLOCKWISE KNOB ROTATION				
Resistance range	Resistance range linear law logarithmic laws		1 k Ω to 1 M Ω 470 Ω to 500 k Ω			
Standard series e3		100 Ω to 2.2 M Ω 1 - 2.2 - 4.7 and on request 1 - 2 - 5	1 - 2.2 - 4.7			
	standard	± 20 %	± 20 %			
Tolerance	on request	± 10 %	\pm 10 % (1 k Ω to 100 k Ω)			
	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)	<u> </u>	± 150 ppm	± 500 ppm			
Dielectric strength (RMS)		2500 V	2500 V			
Limiting element voltage (linear law)		350 V	350 V			
		3 % Rn or 3 O	2 % Rn or 3 O			
Contact resistance variation End resistance (typical)		3 % Rn or 3 Ω 1 Ω	2 % Rn or 3 Ω 1 Ω			

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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 co	unter clockwise position (between terminal a and terminal b)			
Switching ourrent	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 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

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.

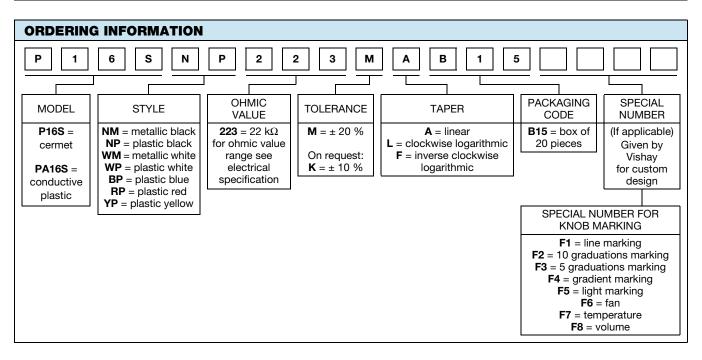
STANDA	STANDARD RESISTANCE ELEMENT DATA											
	P16S CERMET				PA16S CONDUCTIVE PLASTIC							
STANDARD	ı	LINEAR TAP	PER	LOG	ARITHMIC	TAPER	I	LINEAR TAP	PER	LOG	ARITHMIC	TAPER
RESISTANCE VALUES	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH 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	W	٧	mA	W	V	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	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 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							

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	\$ \$ \$		Yes	Yes
F4	Gradient			On request	Yes
F5	Light	*	*	On request	Yes
F6	Fan	*	4	On request	Yes



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SPECIAL NUMBER	MARKING	EXAMP	PLE IMAGES	AVAILABILITY FOR PLASTIC KNOB	AVAILABILITY FOR METALLIC KNOB
F7	Temperature	İ		On request	Yes
F8	Volume	- 🖘		On request	Yes
(Special code)	Other on demand	VISHAY		On request	On request

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
Capabilities and Custom Options	www.vishay.com/doc?48493



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