

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





P16 - version for professional and industrial applications (cermet)

RoHS COMPLIANT

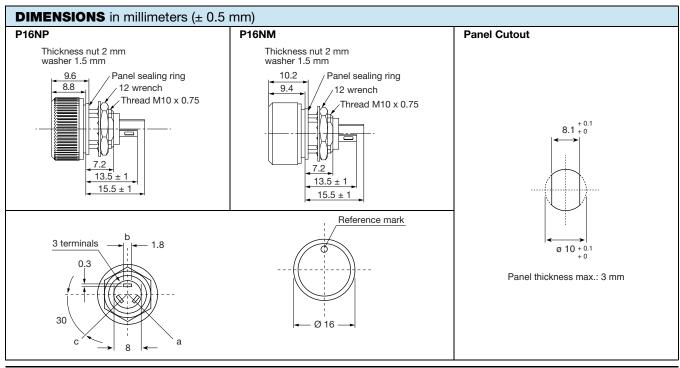
1 W at 40 °C

 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
- Detent option on request (haptic technology)
- 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		



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ELECTRICAL SPECIFICATIO	NS				
		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 LIN. TAPER 0.25 PA16 LOG. TAPER 0 0 20 40 60 80 100 120 140 AMBIENT TEMPERATURE IN °C			
Circuit diagram			V CW (3)		
Taper			A L L GO 80 100 CWISE SHAFT ROTATION		
Resistance range	near taper imic taper	22 Ω to 10 M Ω 100 Ω to 2.2 M Ω	1 k Ω to 1 M Ω 470 Ω to 500 k Ω		
Standard series E3	-	1 - 2.2 - 4.7 and on request 1 - 2 - 5	1 - 2.2 - 4.7		
Tolerance	Standard on request	± 20 % ± 10 %	\pm 20 % \pm 10 % (1 kΩ to 100 kΩ)		
Power rating 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/°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})		$10^6\mathrm{M}\Omega$	$10^6{ m M}\Omega$		





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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).

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 (haptic technology)

Detent option is a positive tactile feedback.

On request:

the detent mechanism is housed in the P16

Mechanical endurance: 10 000 cycles

One detent in CCW position (CV1D) One detent in CW position (CV1F)

One detent in CW position and CCW position (CVDF)

Ordering information (special code):

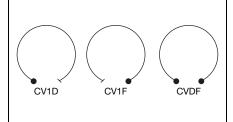
CV1D

One detent in CCW position CV1F

Detent in CW position

CVDF

Detent in CW position and CCW position







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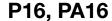
P16 S	P16 STANDARD RESISTANCE ELEMENT DATA							
STAN-	LINEAR TAPER			NEAR TAPER LOG TAPE		R		
DARD RESIS- TANCE VALUES	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER		
Ω	W	٧	mA	W	V	mA		
22	1	4.69	213					
47	1	6.85	146					
100	1	10	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-	LINEAR TAPER				LOG TAP	ER		
DARD RESIS- TANCE VALUES		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 %	-	$\Delta V_{1-2}/\Delta V_{1-3} \le \pm \ 0.5 \%$		

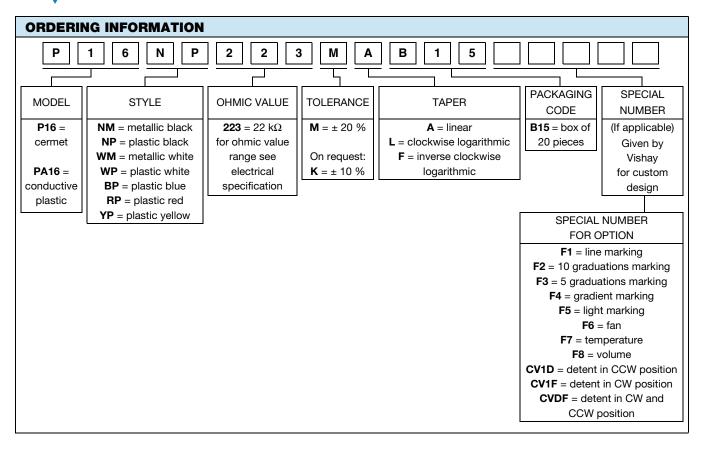
Note

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





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KNOB STYLES						
STYLE	EXAMPLI	E IMAGES				
NP = black plastic						
WP = white plastic						
BP = blue plastic						
RP = red plastic						
YP = yellow plastic						





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KNOB STYLES						
STYLE	EXAMPLI	EIMAGES				
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	01 01 02 02 12 4 5		Yes	Yes
F3	5 graduations	3 8.		Yes	Yes
F4	Gradient			Yes	Yes
F5	Light	· ※	*	Yes	Yes
F6	Fan	.\$	4	Yes	Yes
F7	Temperature			Yes	Yes



P16, PA16

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SPECIAL NUMBER	MARKING	EXAMPLE IMAGES		AVAILABILITY FOR PLASTIC KNOB	AVAILABILITY FOR METALLIC KNOB
F8	Volume			Yes	Yes
(Special code)	Other on demand	VISHAY		On request	On request

P16 NP 22 kΩ 20 % A BO e3 MODEL STYLE VALUE TOLERANCE TAPER SPECIAL PACKAGING SPECIAL LEAD (Pb)-FREE (Pb)-FREE	PART NUMBER DESCRIPTION (for information only)																		
II MODEL II STVIE II VALLE ILIOLEBANCEII TADED II SDECTAL ILDACKACINICII SDECTAL II	P16		NP		22 k Ω		20 %		Α				во				e3		
	MOD	DEL	ST	YLE	VAI	UE	TOLEF	RANCE	TAI	PER	SPE	SPECIAL		PACKAGING		SPECIAL		l II	

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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