

Knob Potentiometer



FEATURES

- Test according to CECC 41000 or IEC 60393-1
- **P16F** - version for professional and industrial applications (cermet)
 - 1 W at 40 °C
- **PA16F** - version for professional audio applications (conductive plastic)
 - 0.5 W at 40 °C
- Compact (integrated)
- High dielectric strength: 5000 V_{AC}
- Fully sealed and panel sealed
- Metallic knob, special marking, or custom knob on request
- Custom knob and marking on request
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

LINKS TO ADDITIONAL RESOURCES



3D Models



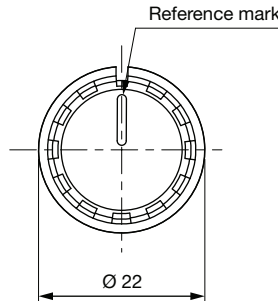
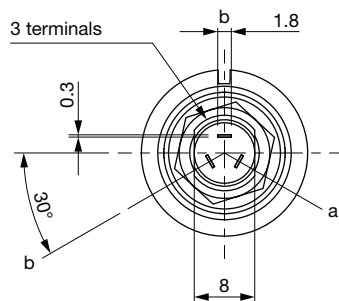
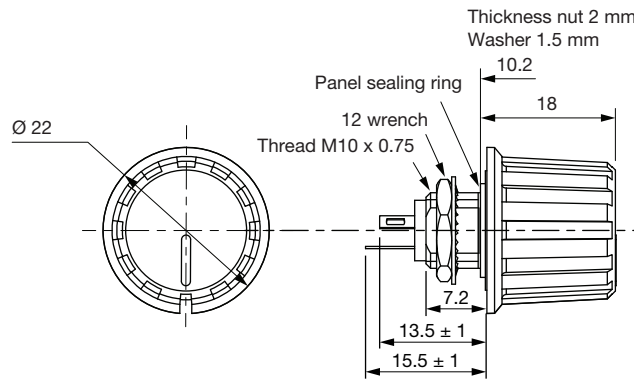
Capabilities and Custom Options

The P16F 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.

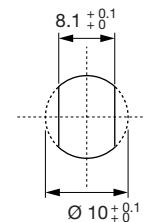
QUICK REFERENCE DATA

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), 50 cycles (track)

DIMENSIONS in millimeters (± 0.5 mm)



Panel Cutout



Panel thickness max.: 3 mm

ELECTRICAL SPECIFICATIONS		
	P16F	PA16F: VERSION FOR AUDIO PROFESSIONAL APPLICATION
Resistive element	Cermet	Conductive plastic
Electrical travel	$270^\circ \pm 10^\circ$	$270^\circ \pm 10^\circ$
Power rating chart		
Circuit diagram		
Taper		
Resistance range	Linear taper Logarithmic taper	22 Ω to 10 M Ω 100 Ω to 2.2 M Ω
Standard series E3		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
Tolerance	Standard On request	$\pm 20\%$ $\pm 10\%$
Power rating	Linear Logarithmic	1 W at +40 $^\circ\text{C}$ 0.5 W at +40 $^\circ\text{C}$
Power rating		0.5 W at +40 $^\circ\text{C}$ 0.25 W at +40 $^\circ\text{C}$
Temperature coefficient (typical)		± 150 ppm/ $^\circ\text{C}$
Temperature coefficient (typical)		± 500 ppm/ $^\circ\text{C}$
Dielectric strength (RMS)		5000 V _{AC}
Dielectric strength (RMS)		5000 V _{AC}
Limiting element voltage (linear law)		350 V
Limiting element voltage (linear law)		350 V
Contact resistance variation		3 % R _n or 3 Ω
Contact resistance variation		2 % R _n or 3 Ω
End resistance (typical)		1 Ω
End resistance (typical)		1 Ω
Insulation resistance (500 V _{DC})		10 ⁶ M Ω
Insulation resistance (500 V _{DC})		10 ⁶ M Ω



MECHANICAL SPECIFICATIONS	
Mechanical travel	300° ± 5°
Operating torque	3 Ncm typical
End stop torque	25 Ncm maximum
Max. tightening torque of mounting nut	180 Ncm maximum
Unit Weight	4.5 g typical

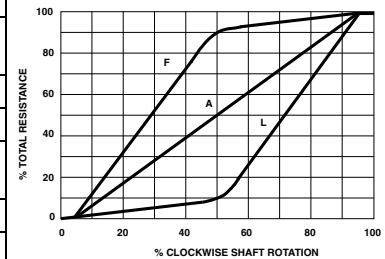
ENVIRONMENTAL SPECIFICATIONS		
	METALLIC KNOB (on request)	PLASTIC KNOB
Temperature range	-40 °C to +125 °C	-40 °C to +85 °C
Climatic category	40 / 100 / 56	40 / 85 / 56
Sealing	Sealed container and panel sealed	
Protection grades	IP67	

MARKING
<ul style="list-style-type: none"> Ohmic value code, tolerance code and taper Manufacturing date code

CONTROL KNOB
Black metallic knob (NM). On request, please consult Vishay. Black plastic knob (NP).

PACKAGING
<ul style="list-style-type: none"> 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.

SWITCH OPTION		
ON / OFF switch	Actuation in counter clockwise between terminal a and terminal b	
Switching current	P16F	100 mA max.
	P16AF, version for audio professional application	1 mA max.
Switching actuation torque	3 Ncm typical	
Switching 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	
Ordering information (special code)	RSD	



KNOB MARKING OPTIONS		
SPECIAL NUMBER	MARKING	EXAMPLE IMAGES
On request: several marking options on the top face of the knob		
F2	10 graduations	
F3	5 graduations	
F4	Gradient	
F5	Light	
F6	Fan	
F7	Temperature	
F8	Volume	
(Special code)	Other on demand	

P16F STANDARD RESISTANCE ELEMENT DATA						
STAN- DARD RESIS- TANCE VALUES	LINEAR TAPER			LOG TAPER		
	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER
	Ω	W	V	mA	W	V
22	1	4.69	213			
47	1	6.85	146			
100	1	10	100			
220	1	14.8	67.4	0.5	7.1	71
470	1	21.7	46.1	0.5	10.5	48
1K	1	31.6	31.6	0.5	15.3	32.6
2.2K	1	46.9	21.3	0.5	22.4	22.4
4.7K	1	68.5	14.6	0.5	33.2	15.1
10K	1	100	10	0.5	48.5	10.3
22K	1	148	6.74	0.5	70.7	7.07
47K	1	217	4.61	0.5	105	4.77
100K	1	316	3.16	0.5	153	3.26
220K	0.56	350	1.59	0.5	224	2.24
470K	0.26	350	0.75	0.5	332	1.51
1M	0.12	350	0.35	0.26	350	0.74
2.2M	0.05	350	0.16	0.12	350	0.35
4.7M	0.02	350	0.07	0.056	350	0.16
10M	0.01	350	0.012			

PA16F STANDARD RESISTANCE ELEMENT						
STAN- DARD RESIS- TANCE VALUES	LINEAR TAPER			LOG TAPER		
	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER	MAX. POWER AT 40 °C	MAX. VOLTAGE	MAX. CUR. THROUGH WIPER
	Ω	W	V	mA	W	V
470						
1K	0.5	22.4	22.4	0.25	10.8	23.1
2.2K	0.5	33.2	15.1	0.25	15.8	16
4.7K	0.5	48.5	10.3	0.25	23.5	11
10K	0.5	70.7	7.07	0.25	34.3	7
22K	0.5	105	4.77	0.25	50.0	5.0
47K	0.5	153	3.26	0.25	74	3.4
100K	0.5	224	2.24	0.25	108	2.3
220K	0.5	332	1.51	0.25	158	1.6
470K	0.26	350	0.74	0.25	235	1.1
1M	0.12	350	0.35	0.25	343	0.7

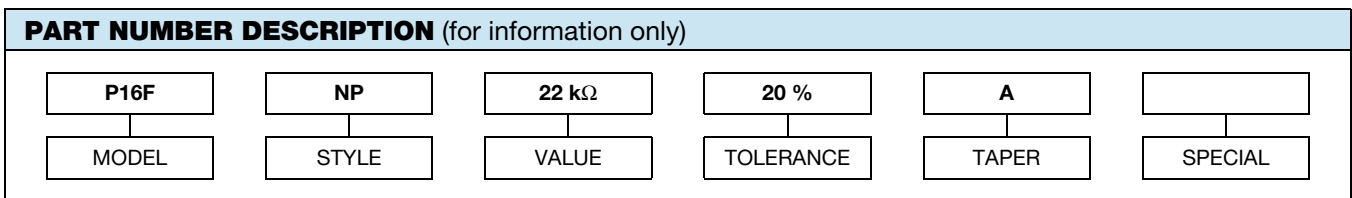
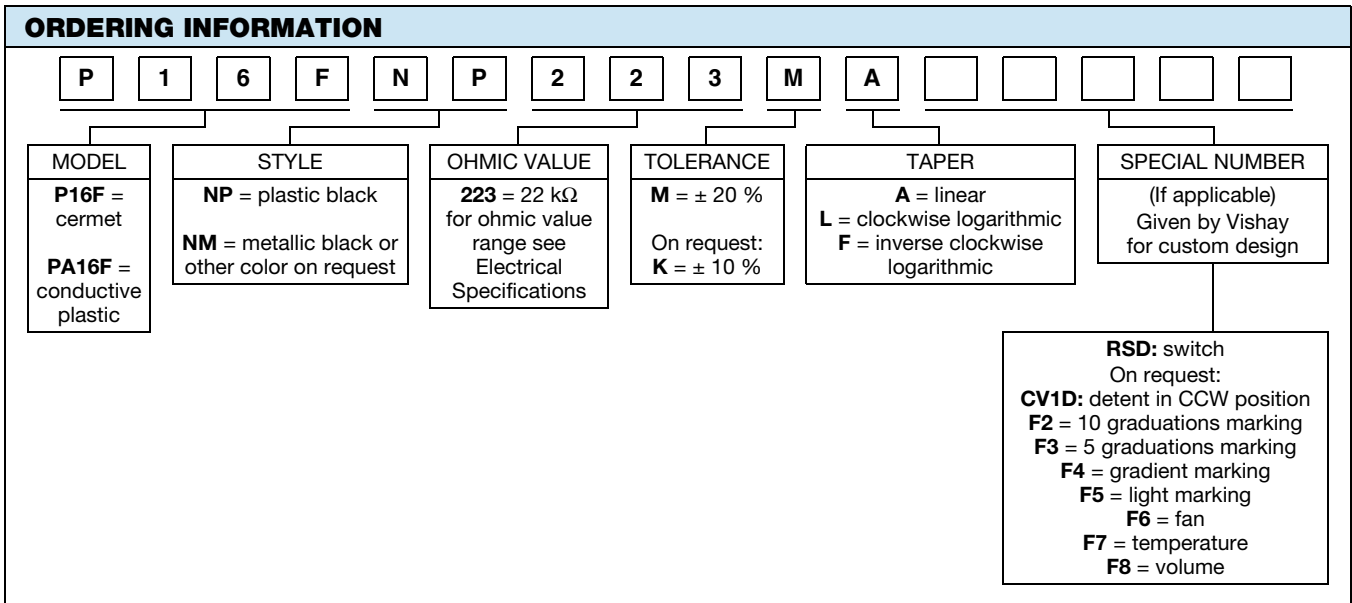
DETENT OPTION
On request: The detent mechanism is housed in the P16 One detent at CCW position Mechanical endurance: 10 000 cycles Ordering information (special code): CV1D: one detent at CCW position (on request)



PERFORMANCE				
TESTS	CONDITIONS	TYPICAL VALUES AND DRIFTS		
		$\Delta R_T/R_T$ (%)	$\Delta R_{1-2}/R_{1-2}$ (%)	OTHER
Electrical endurance	1000 h at rated power 90°/30° cycle at +40 °C	± 5 %	-	Insulation resistance: > 10 ⁴ MΩ Contact res. variation: < 2 % Rn
Damp heat, steady state	56 days 40 °C, 93 % HR	± 2 %	± 1 %	Insulation resistance: > 10 ⁴ MΩ
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 g's during 6 h	± 0.2 %	-	$\Delta V_{1-2}/\Delta V_{1-3} \leq \pm 0.5$ %

Note

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



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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