Knob Potentiometer

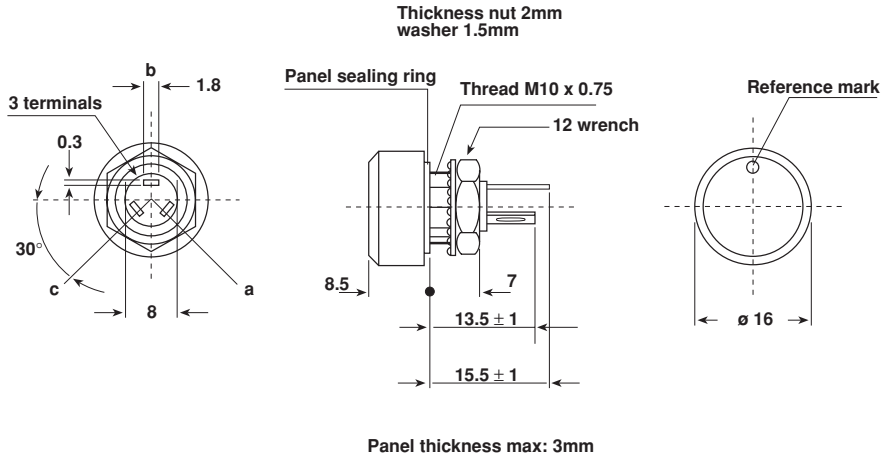
The P16 is a revolutionary concept in panel mounted potentiometers. This unique design consists of a knob driving and incorporating a cermet potentiometer. Only the mounting hardware and terminals are situated on the back side of the panel reducing to a minimum the required clearance

FEATURES

- 1 Watt at 40°C
- CECC 41300
- **P16 -** version for professional and industrial applications
- **PA16 -** version for professional audio applications
- Compact (integrated)
- Minimum clearance required
- Safety in use due to good insulation: > 10^4 MΩ 500V_{DC}
- High dielectric strength: 2500V_{RMS}
- Hermetically sealed and panel sealed
- Metallic or plastic knob options
- Cermet or conductive plastic

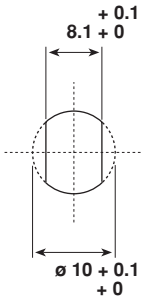
DIMENSIONS in millimeters

P16 - PA16

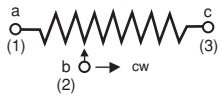


Panel thickness max: 3mm

PANEL CUTOUT



CIRCUIT DIAGRAM



ELECTRICAL SPECIFICATIONS		
Resistive Element		cermet
Electrical Travel		270° ± 10°
Resistance Range	**Linear Law**	22Ω to 10MΩ
	Logarithmic Laws	100Ω to 2.2MΩ
Standard series E3		1 - 2.2 - 4.7 and on request 1 - 2 - 5
Tolerance	**Standard**	± 20%
	On Request	± 10%
Power Rating	**Linear**	1W at + 40°C
	Logarithmic	0.5W at + 40°C
Temperature Coefficient		See Standard Resistance Element Data
Dielectric Strength (RMS)		2500V
Limiting Element Voltage (Linear Law)		350V
Insulation Resistance (500VDC)		≥ 10^4MΩ
Contact Resistance Variation		3% Rn or 3Ω
End Resistance (Typical)		1Ω
Insulation Resistance (500VDC)		10^6MΩ

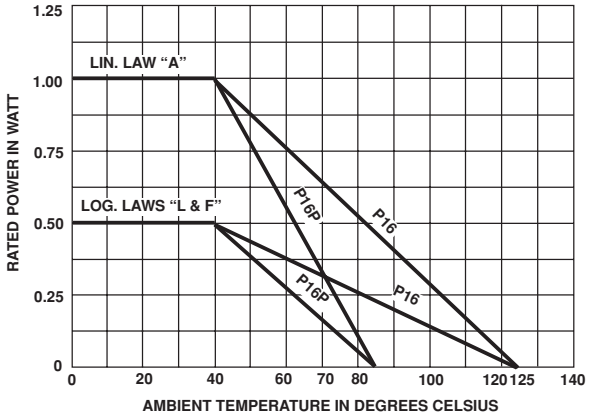
P16 CHARACTERISTICS
MECHANICAL SPECIFICATIONS

Mechanical Travel	300° ± 5°
Operating Torque (Ncm)	2 typical
End Stop Torque (max. Ncm)	25
Max Tightening Torque of Mounting Nut (max. Ncm)	250
Unit Weight	4.5 g typical

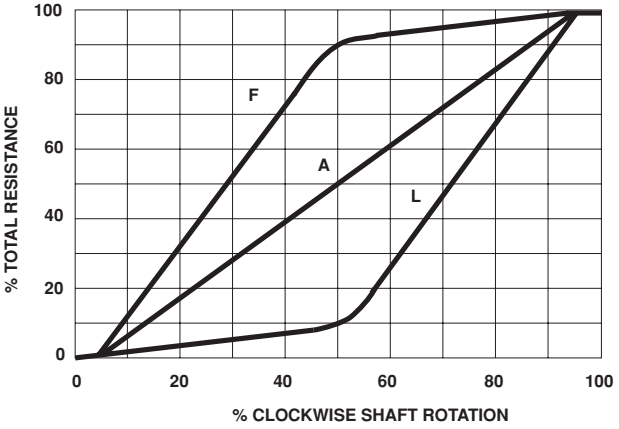
ENVIRONMENTAL SPECIFICATIONS

	METALLIC KNOB	PLASTIC KNOB
Temperature Range	– 55°C to + 125°C	– 55°C to + 85°C
Climatic Category	55 / 100 / 56	55 / 70 / 56
Sealing	sealed container and panel sealed	
Protection Grades	IP67	

POWER RATING CHART



RESISTANCE LAWS



PERFORMANCE			
TESTS	**CONDITIONS**	**TYPICAL VALUES AND DRIFTS**	
		$\frac{\Delta RT}{RT}$ (%)	$\frac{\Delta R_{1-2}}{R_{1-2}}$ (%)
Load Life	1000 hours Pn 90'/30' at 40°C	± 1% Contact res. variation: < 3% Rn	
Climatic Sequence	Phase A dry heat 85°C/125°C Phase B damp heat Phase C cold – 55°C Phase D damp heat 5 cycles	± 0.5%	± 1%
Humidity	56 days	± 0.5% Insulation resistance: > 10^4 MΩ	
Temperature Variations	5 cycles – 55°C at + 85°C/125°C	± 0.5%	
Shock	50 g at 11 ms 3 successive shocks in 3 directions	± 0.1%	± 0.2%
Vibration	10-55 Hz 0.75mm or 10 g during 6 hours	± 0.1%	± 0.2%
Rotational Life	25000 cycles	± 3% Contact res. variation: < 2% Rn	

STANDARD RESISTANCE ELEMENT DATA

STANDARD RESISTANCE VALUES	LINEAR LAW			LOG LAW			T.C. –40°C +85°C
	MAX. POWER AT 40°C	MAX. WORKING VOLTAGE	MAX. CUR. THROUGH ELEMENT	MAX. POWER AT 40°C	MAX. WORKING VOLTAGE	MAX. CUR. THROUGH ELEMENT	
Ω	P1 (W)	$Um = \sqrt{P1 \times Rn}$ or $350V_{DC}$	Im (mA)	P1 (W)	$Um = \sqrt{P1 \times Rn}$ or $350V_{DC}$	Im (mA)	10^6/°C
22	1	4.69	213.2				-50
47		6.85	145.8				+200
100		10	100				± 100
220		14.83	67.4				
470		21.67	46.1				
1k		31.62	31.6	0.5	22.4	22.4	
2.2k		46.90	21.32		33.2	15.1	
4.7k		68.55	14.58		48.5	10.3	
10k		100	10		70.7	7.07	
22k		148.32	6.74		105	4.77	
47k		216.7	4.61		153	3.26	
100k	1	316.23	3.16		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				
4.7M	0.02	350	0.07				
10M	0.01	350	0.012				

MARKING

Printed:
– VISHAY trademark
– ohmic value
– tolerance (in %)
– resistance law
– manufacturing date

CONTROL KNOB

Black metallic knob (N).
Black plastic knob (NP).
For white and blue color see ordering information.
Other dimensions, shapes, colors of control knobs are manufactured on request - please consult VISHAY.
Other reference marks (shapes, colours) and legends can be printed on plastic knob on request - please consult VISHAY.

PACKAGING

Carton box of 20 pieces

PROFESSIONAL AUDIO APPLICATIONS PA16

The industrial cermet track is replaced by a **conductive plastic** track especially selected for its performance characteristics in relation to audio functions.

PA16 SPECIFICATIONS

ELECTRICAL SPECIFICATIONS		
Resistive Element		conductive plastic
Resistance Range PA16		A laws 1kΩ to 1MΩ L,F laws 470Ω to 500kΩ
Tolerance	**Standard**	± 20%
	On Request	± 10% (1kΩ to 100kΩ)
Power Rating		0.5W at + 40°C
Temperature Coefficient		± 1000 ppm/°C
Contact Resistance Variation Law A		2% Rn
Limiting Element Voltage		350V

MECHANICAL SPECIFICATIONS

Rotational Life 50000 cycles

ENVIRONMENTAL SPECIFICATIONS

Temperature Range – 25°C to + 85°C

Climatic Category 25 / 85 / 56

Sealing sealed container and panel sealed IP67

PA16 PARTICULAR CHARACTERISTICS

NOMINAL RESISTANCE	LAWS A, L, F			T.C. –25°C +100°C
	MAX. DISSIPATION AT 40°C	MAX. VOLTAGE	MAX. CUR. THROUGH THE WIPER	
Ω	W	V	mA	ppm/°C
1k	0.5	22.4	22.4	
2.2k		33.2	15.1	
4.7k		48.5	10.3	
10k		79.7	7.07	
22k		105	4.77	± 1000
47k		153	3.26	
100k		224	2.24	
220k	0.5	332	1.51	
470k	0.26	350	0.74	

PERFORMANCE

TESTS	CONDITIONS	TYPICAL VALUES AND DRIFTS
		$\frac{\Delta Rac}{Rac}$ (%) / $\frac{\Delta Rac}{Rac}$ (%)
Load Life	1000 hours at Pn 90'/30' cycle at + 40°C	± 5% Insulation resistance: > 10^4 MW Contact res. variatio: < 2% Rn
Long Term Damp Heat	56 days	± 2% Insulation resistance: > 10^4 MΩ / ± 1%
Shock	50 g at 11 ms 3 successive shocks in 3 axes	± 0.2% / ± 0.5%
Vibration	10-55 Hz 0.75mm or 10 g during 6 hours	± 0.2% / $\frac{\Delta V_{ab}}{V_{ac}}$ ≤ ± 0.5%
Rotational Life	50000 cycles	± 5% Contact res. variation: < 2% Rn

ORDERING INFORMATION

PA, PA16	NP	22 kΩ	20%	A	BO20
SERIES	CONTROL KNOB DESIGNATION	OHMIC VALUE	TOLERANCE	LAW	PACKAGING

N : metallic black color
NP : plastic black color
W : metallic white color
WP : plastic white color
BP : plastic blue color

A : linear
L : clockwise logarithmic
F : inverse clockwise logarithmic

SAP PART NUMBERING GUIDELINES

P	1	6	N	P	2	2	3	M	B	1	5						
MODEL			STYLE		OHMIC VALUE			TOL	PACKAGING CODE			SPECIAL (IF APPLICABLE)					

See the end of this data book for conversion tables

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