

# Fully Sealed Container Cermet Potentiometers Military and Professional Grade


**P13V**

**P13T**

P13 potentiometers fully conform to CECC 41301-001 specification. Their excellent performances are due to the use of a cermet-track sealed in a large case.

P13 interchangeability with RV6, combined with the excellent stability of its rated characteristics make it fully acceptable for military and professional uses.

## FEATURES

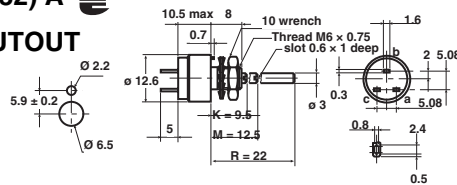
- High power rating 1.5 Watt at 70 °C
- CECC 41 301-001 (A, B, C)
- GAM T1
- Fully sealed case
- Tight temperature coefficient ( $\pm 75$  ppm/°C typical)
- Mechanical strength


**RoHS**  
COMPLIANT

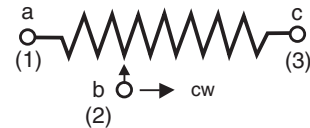
## DIMENSIONS in millimeters

### P13T - (PC32) A

#### PANEL CUTOUT

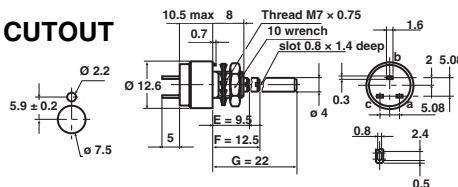


## CIRCUIT DIAGRAM

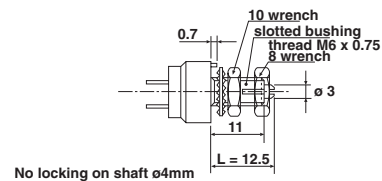


### P13Q - B

#### PANEL CUTOUT

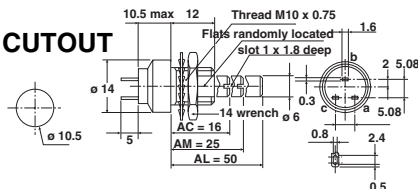


### P13H

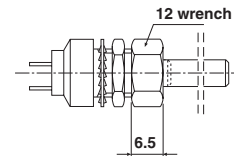


### P13V - (PC33) C

#### PANEL CUTOUT



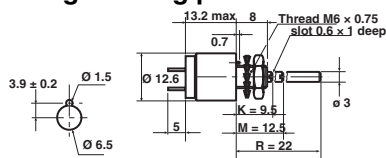
### P13V DBAN



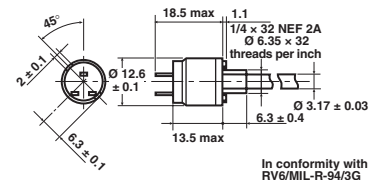
## Panel sealed version

### P13TP - P13TPE

#### TPE: Including locating ped



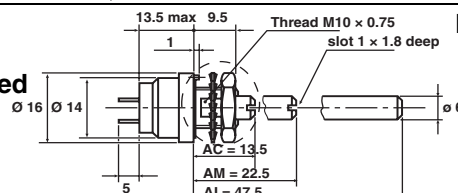
### P13T - F55


In conformity with  
RV6/MIL-R-94/3G

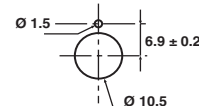
## Panel sealed version

### P13VP - P13VPE

#### VPE: Including locating ped



#### PANEL CUTOUT



Undergoes European Quality Insurance System

**ELECTRICAL SPECIFICATIONS**

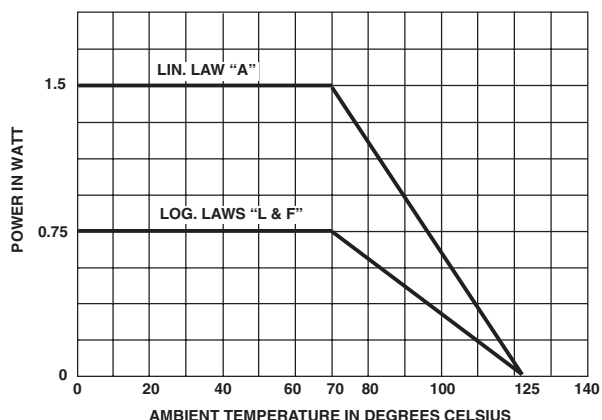
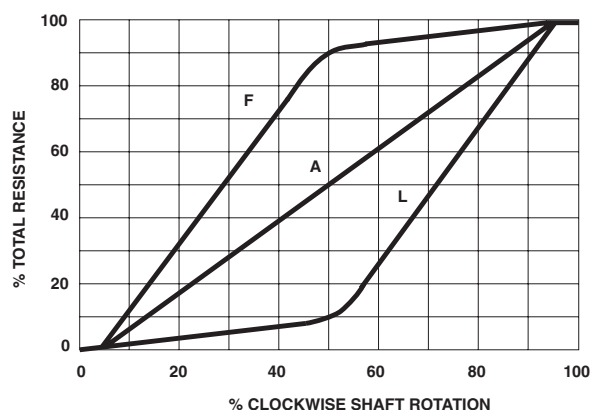
Resistive Element		cermet
Electrical Travel		270° ± 10°
Resistance Range	Linear Law	22 Ω to 10 MΩ
	Logarithmic Laws	100 Ω to 2.2 MΩ
Standard series E3		1 - 2.2 - 4.7 and on request 1 - 2 - 5
Tolerance	Standard	± 20 %
	On Request	± 10 % - ± 5 %
Power Rating	Linear	1.5 W at + 70 °C
	Logarithmic	0.75 W at + 70 °C
Temperature Coefficient		See Standard Resistance Element Data
Limiting Element Voltage (Linear Law)		350 V
Contact Resistance Variation		3 % Rn or 3 Ω
End Resistance (Typical)		1 Ω
Dielectric Strength (RMS)		2000 V
Insulation Resistance (500 VDC)		10 <sup>6</sup> MΩ

**MECHANICAL SPECIFICATIONS**

Mechanical Travel	$300^\circ \pm 5^\circ$
Operating Torque (max. Ncm)	2 typical
End Stop Torque (max. Ncm)	style T.Q.: 35 - V : 80
Tightening Torque (max. Ncm)	T.Q.: 150 - V: 250
Unit Weight (max. g)	6 to 18

**ENVIRONMENTAL SPECIFICATIONS**

Temperature Range	$-55^\circ \text{C}$ to $+125^\circ \text{C}$
Climatic Category	55/100/56
Sealing	fully sealed container IP67

**POWER RATING CHART****RESISTANCE LAWS****TEMPERATURE COEFFICIENT**

For values  $\geq 100 \text{ ohms}$  and in the temperature range  $+20^\circ \text{C}$  to  $+70^\circ \text{C}$ , the typical temperature coefficient is  $\pm 75 \text{ ppm}/^\circ \text{C}$ .



PERFORMANCE					
NF C 83-253				TYPICAL VALUES AND DRIFTS	
TESTS	CONDITIONS	$\frac{\Delta RT}{RT}$ (%)	REQUIREMENTS	$\frac{\Delta R_{1-2}}{R_{1-2}}$ (%)	$\frac{\Delta RT}{RT}$ (%) $\frac{\Delta R_{1-2}}{R_{1-2}}$ (%)
Climatic Sequence	Phase A dry heat 125 °C Phase B damp heat Phase C cold - 55 °C Phase D damp heat 5 cycles	± 10 %		± 10 %	± 0.5 %    ± 1 %
Long Term Damp Heat	56 days 40 °C    93 % RH	± 10 %		± 10 % Dielectric strength: 250 V Insulation resistance: > 100 MΩ	± 0.5 %    ± 1 % Dielectric strength: 1000 V Insulation resistance: > 10 <sup>4</sup> MΩ
Rotational Life	25 000 cycles	± 10 %		Contact res. variation: < 7 % R <sub>n</sub>	± 3 % Contact res. variation: < 2 % R <sub>n</sub>
Load Life	1000 h at rated power 90°/30° - ambient temp. 70 °C	± 10 %		Contact res. variation: < 7 % R <sub>n</sub>	± 1 % Contact res. variation: < 3 % R <sub>n</sub>
Rapid Temperature Change	5 cycles - 55 °C at + 125 °C	± 3 %			± 0.5 %
Shocks	50 g at 11 ms 3 successive shocks in 3 directions	± 2 %			± 0.1 %    ± 0.2 %
Vibrations	10 - 55 Hz 0.75 mm or 10 g during 6 hours	± 2 %			± 0.1 % $\frac{\Delta V_{1-2}}{V_{1-3}} < \pm 0.2 \%$

STANDARD RESISTANCE ELEMENT DATA							
STANDARD RESISTANCE VALUES	LINEAR LAW			LOGS LAW			TCR - 55 °C + 125 °C
	MAX. POWER AT 70 °C	MAX. WORKING VOLTAGE	MAX. WIPER CUR.	MAX. POWER AT 70 °C	MAX. WORKING VOLTAGE	MAX. WIPER CUR.	
Ω	W	V	mA	W	V	mA	ppm/°C
22	1.5	5.74	261				0
47		8.4	177				+ 200
100		12.2	122				
220		18.2	82.6				
470		26.5	56.5				
1k		38.7	38.7	0.75	27	27	
2.2k		57.5	26.1		40	18	
4.7k		84	17.9		59	12	
10k		122.5	12.2		87	8.7	
22k		182	8.26		128	5.8	
47k	1.5	265	5.65		187	3.9	
100k	1.22	350	3.5	0.75	273	2.7	± 100
220k	0.56	350	1.6	0.56	350	1.6	
470k	0.26	350	0.74	0.26	350	0.74	
1M	0.12	350	0.35	0.12	350	0.35	
2.2M	0.05	350	0.16	0.05	350	0.16	
4.7M	0.026	350	0.074				
10M	0.012	350	0.035				

## MARKING

Printed:

- VISHAY trademark
- series
- style
- ohmic value (in Ω, kΩ or MΩ)
- tolerance (in %)
- resistance law
- manufacturing date
- marking of terminals a

## SPECIAL FEATURES PANEL SEALING

Potentiometers P13T and P13V can be fitted with a device providing sealing between the threaded bushing and the front panel. Their designation is P13TP and P13VP respectively or with a locating peg P13TPE and P13VPE.

## SHAFT

Shaft lengths are measured from the mounting surface to the free end of the potentiometer. Special shafts are available, provided customer supplies a drawing.

The shaft slot is aligned to the wiper within ± 10°.

## SHAFT LOCKING

On potentiometers equipped with a 3 mm ø shaft, shaft locking can be obtained:

- either by a taper nut tightening a slotted bushing. Ask for P13H type. These devices are normally equipped with an L type shaft (12.5 mm with a slot),
  - or by a tightening nut locked by a screw. Ask for ES1 type.
- On potentiometers equipped with a Ø 6 mm shaft, locking can be obtained by a taper nut applying pressure on a slotted notched washer. This device is supplied in a box as an accessory. Ask for DBAN.

These devices are ordered separately. Please consult VISHAY SFERNICE.

## ORDERING INFORMATION

P13	T	P OR PE	M	22 k $\Omega$	$\pm 20\%$	A	XX	BO
SERIES	STYLE	PANEL SEALING	SHAFT	OHMIC VALUE	TOLERANCE	LAW	SPECIAL FEATURES	PACKAGING
	T 6 mm dia, 3 mm dia. shaft		K 9.5 mm, slotted M 12.5 mm, slotted R 22 mm, plain		$\pm 20\%$ standard $\pm 10\%$ on request	A Linear L clockwise logarithmic F inverse clockwise logarithmic	F55 DBAN F32 (PCB style)	
	Q 7 mm dia, 4 mm dia. shaft		E 9.5 mm, slotted F 12.5 mm, slotted G 22 mm, plain					
	V 10 mm dia, 6 mm dia. shaft		AC 16 mm, slotted AM 25 mm, slotted AL 50 mm, plain					
	locking H 6 mm dia, 3 mm dia. shaft		L 12.5 mm, slotted AP special shafts					
	VP 9.5 mm dia, 6 mm dia. shaft		AC 13 mm, slotted AM 22 mm, slotted AL 47 mm, plain					

## SAP PART NUMBERING GUIDELINES

P	1	3	T	A	B	2	2	3	M	A	B	1	7				
MODEL			BUSHING		SHAFT		OHMIC VALUE			TOL	LAW	PACKAGING		SPECIAL (IF APPLICABLE)			

See the end of this data book for conversion tables



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