

P13

Vishay Sfernice

Fully Sealed Container Cermet Potentiometer Professional Grade



DESIGN SUPPORT TOOLS AVAILABLE



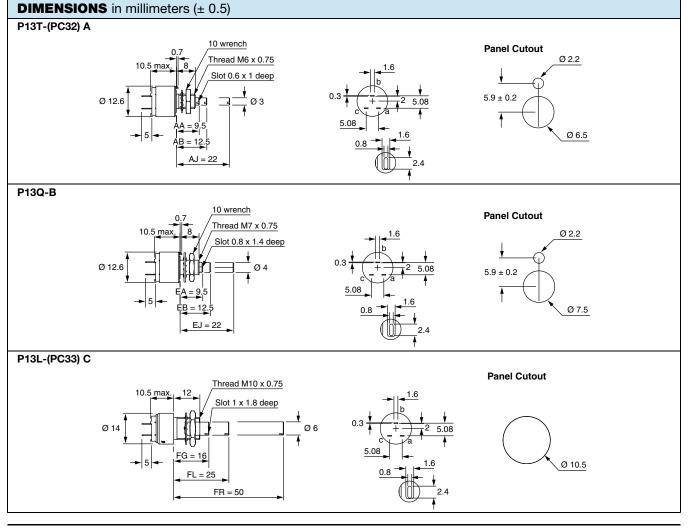
Their excellent performances are due to the use of a cermet-track sealed in a large case.

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 W at 70 °C
- Product qualification: According to CECC 41 301-001 (A, B, C)
- Test according to CECC 41000 or IEC 60393-1
- GAM T1
- Cermet element
- · Fully sealed case
- Tight temperature coefficient (± 75 ppm/°C typical)
- Mechanical strength
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

QUICK REFERENCE DATA									
Multiple module	No								
Switch module	n/a								
Detent module	n/a								
Special electrical laws	A: linear, L: logarithmic, F: reverse logarithmic								
Sealing level	IP 67								
Lifespan	25K cycles								



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1 For technical questions, contact: <u>sferpottrimmers@vishay.com</u> Document Number: 51034

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RoHS

COMPLIANT

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ELECTRICAL SPECIFICATIONS					
Resistive element	Cermet				
Electrical travel	270° ± 10°				
linear taper	22 Ω to 10 MΩ				
Resistance range logarithmic taper	1 k Ω to 2.2 M Ω				
Standard series e3	1, 2.2, 4.7 and on request 1, 2, 5				
standard	± 20 %				
Tolerance on request	± 10 % to ± 5 %				
Taper	BUD STATES STATE				
Circuit diagram	$ \begin{array}{c} a \\ \circ \\ (1) \\ b \\ \circ \\ \end{pmatrix} \begin{array}{c} c \\ \circ \\ (3) \\ (3) \\ (2) \end{array} $				
Power rating	Linear 1.5 W at 70 °C Logarithmic 0.75 W at 70 °C Amplent temperature in °C				
	AMBIENT TEMPERATURE IN °C				
Temperature coefficient (typical)	± 150 ppm/°C For values ≥ 100 Ω and in temperature range +20 °C to +70 °C, the typical temperature coefficient is ± 75 ppm/°C				
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 (300 V _{DC})	10 ⁶ ΜΩ				
Independent linearity (typical)	± 5 %				

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STANDARD	STANDARD RESISTANCE ELEMENT DATA									
STANDARD		LINEAR TAPER			LOG. TAPER					
RESISTANCE	MAX. POWER AT 70 °C	MAX. WORKING VOLTAGE	MAX. CUR. THROUGH WIPER	MAX. POWER AT 70 °C	MAX. WORKING VOLTAGE	MAX. CUR. THROUGH WIPER	TCR -55 °C +125 °C			
Ω	w	v	mA	w	v	mA	ppm/°C			
22	1.5	5.74	261							
47	1.5	8.4	177							
100	1.5	12.2	122							
220	1.5	18.2	82.6							
470	1.5	26.5	56.5							
1K	1.5	38.7	38.7	0.75	27	27				
2.2K	1.5	57.5	26.1	0.75	40	18				
4.7K	1.5	84	17.9	0.75	59	12				
10K	1.5	122.5	12.2	0.75	87	8.7	± 150			
22K	1.5	182	8.26	0.75	128	5.8	± 150			
47K	1.5	265	5.65	0.75	187	3.9				
100K	1.22	350	3.5	0.75	273	2.7				
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							

MECHANICAL SPECIFICATIONS								
Mechanical travel	300	0° ± 5°						
Operating torque (typical)	2 Ncm	2.85 oz. inch						
End stop torque								
style T, Q	35 Ncm max.	3.1 lb inch max.						
style L	80 Ncm max.	7.1 lb inch max.						
Tightening torque of mounting nut								
style T, Q	150 Ncm max.	13.3 lb inch max.						
style L	250 Ncm max.	22.1 lb inch max.						
Unit weight	6 g to 18 g	0.22 oz. to 0.64 oz.						
Terminals	e3: pure Sn							

ENVIRONMENTAL SPECIFICATIONS							
Temperature range	-55 °C to +125 °C						
Climatic category	55 / 125 / 56						
Sealing	Fully sealed - container IP67						



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OPTIONS	
Special feature command shaft	Length is measured from the mounting surface to the free end of the shaft. The screwdriver slot is aligned with the wiper within $\pm 10^{\circ}$. Special shafts are available, in accordance to drawings supplied by customers. We recommend that customers should not machine tool shafts, in order to avoid damage. Bending or torsion of terminals should also be avoided.
	Potentiometers P13T and P13L can be fitted with a device providing sealing between the threaded bushing and the front panel. Their designation is P13P and P13N respectively or with a locating peg P13PE and P13NE.
	Panel sealed version P13P P13PE: Including locating peg
	0.7 Panel Cutout
	$\emptyset 12.6 \xrightarrow{AA = 9.5} AA = 9.5 \xrightarrow{AA = 9.5} 0.3 $
Panel sealing	$\begin{array}{c c} AB = 12.5 \\ \hline AJ = 22 \\ \end{array}$
	P13N
	P13NE: Including locating peg Thread M10 x 0.75
	0.3
	$ \begin{array}{c c} \hline & FE = 13.5 \\ \hline & FK = 22.5 \\ \hline & FQ = 47.5 \end{array} \end{array} $
	 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 P13O type. These devices are normally equipped with an AB type shaft (12.5 mm with a slot). P13O
	$0.7 + \sqrt{\frac{50000 \text{ Bounding}}{10 \text{ wrench}}} = \sqrt{\frac{50000 \text{ Wrench}}{10 \text{ wrench}}}} = \sqrt{\frac{50000 \text{ Wrench}}{10 w$
Shaft locking	 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. P13L DBAN
	No locking on shaft Ø 4 mm.

Document Number: 51034



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OPTIONS

OPTIONS	
	Product in conformity with RN6/MIL-R-94/3G
	P13T-F55
RV6 (P13T-F55)	$\begin{array}{c} 45^{\circ} \\ 0.1 \\ 0.1 \\ 0.3 \\ 0.1 \\ 0.3 \\ 0.1 \\ 0.3 \\ 0.$

MARKING

Printed:

- Vishay trademark
- Part number (including ohmic value code, tolerance code and taper)
- Manufacturing date
- Marking of terminals a

PACKAGING

• In box

PERFORMANCE								
			REQUIR	EMENTS	TYPICAL VALUES AND DRIFTS			
TESTS	CONDITIONS	∆ R⊺/R⊺ (%)	∆R ₁₋₂ /R ₁₋₂ (%)	OTHER	∆ R⊺/R⊺ (%)	∆ R₁₋₂/R₁₋₂ (%)	OTHER	
Electrical endurance	1000 h at rated power 90'/30' - ambient temp. 70 °C	± 10 %	-	Contact res. variation: < 7 % Rn	±1%	-	Contact res. variation: < 3 % Rn	
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%	-	
Damp heat, steady state	56 days 40 °C, 93 % HR	± 10 %	± 10 %	Dielectric strength: 250 V Insulation resistance: > 100 MΩ	± 0.5 %	±1%	$\begin{array}{l} \mbox{Dielectric strength:} \\ 1000 \mbox{ V} \\ \mbox{Insulation resistance:} \\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $	
Change of temperature	5 cycles -55 °C at +125 °C	±3%	-	-	± 0.5 %	-	-	
Mechanical endurance	25 000 cycles	± 10 %	-	Contact res. variation: < 7 % Rn	±3%	-	Contact res. variation: < 2 % Rn	
Shock	50 g's at 11 ms 3 successive shocks in 3 directions	±2%	-	-	± 0.1 %	± 0.2 %	-	
Vibration	10 Hz to 55 Hz 0.75 mm or 10 gʻs during 6 h	±2%	-	-	± 0.1 %	-	$\Delta V_{1-2}/V_{1-3} < \pm 0.2$ %	

Note

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



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ORDE	ORDERING INFORMATION (part number)													
Р	P 1 3 P A B 1 0 3 M L B 1 7 E													
									L					
MODEL		Вι	JSH	ING			S	HAFT		OHMIC VALUE	TOLERANCE	TAPER	PACKAGING	SPECIAL
P13		Ø	L	Old codes		ø	L	Only with	Old Shaft	Linear law from 22 Ω	M = 20 % On request:	A = linear L = clockwise	Bushing L or N: shaft < 45 mm	E = locating peg
	Т	6	8	Т				bushing	codes	to 10 $M\Omega$	K = 10 %	logarithmic	B10 =	or
	Q	7	8	Q	AA	3	9.5	Τ, Ρ	K	Logarithmic		F = inverse clockwise	box of 10 pieces shaft > 45 mm	special code given
	L	10	12	V	AB	3	12.5	T, P, O	L, M	law from 1 kΩ to		logarithmic	B08 =	by Vishay
	0	6	11	Н	AJ	3	22	T, P	R	2.2. MΩ			box of 8 pieces	
	Ρ	6	8	TP	EA	4	9.5	Q	Е	103 = 10 kΩ			Other bushings:	
	Ν	10	9.5	VP	EΒ	4	12.5	Q	F				shaft < 20 mm	
					EJ	4	22	Q	G				B17 = box of 25 pieces	
					FG	6	16	L	AC				shaft > 20 mm	
					FL	6	25	L	AM				B12 =	
					FR	6	50	L	AL				box of 15 pieces	
					FE	6	13	Ν	AC					
					FK	6	22	Ν	AM					
					FQ	6	47.5	Ν	AL					

PART NUMBER DESCRIPTION (for information only)												
P13	т	PE	м	10K	20 %	L		ВО				e3
MODEL	BUSHING	SPECIAL	SHAFT	OHMIC VALUE	TOL.	TAPER	SPECIAL	PACKAGING	SPECIAL	SHAFT	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



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