

## Fully Sealed Container Cermet Potentiometer Military and Professional Grade



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.

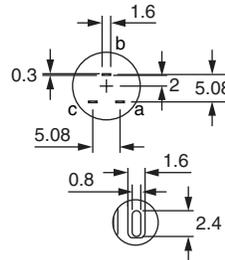
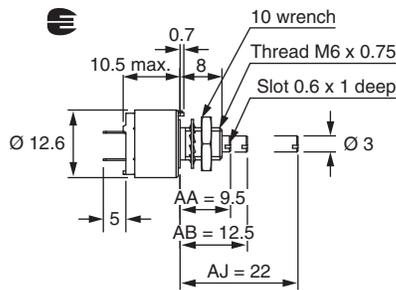
### FEATURES

- High power rating 1.5 W at 70 °C
- 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 ( $\pm 75$  ppm/°C typical)
- Mechanical strength
- Compliant to RoHS Directive 2002/95/EC

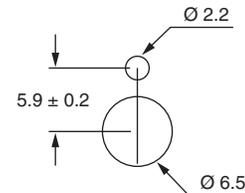


### DIMENSIONS in millimeters ( $\pm 0.5$ )

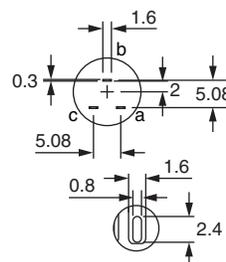
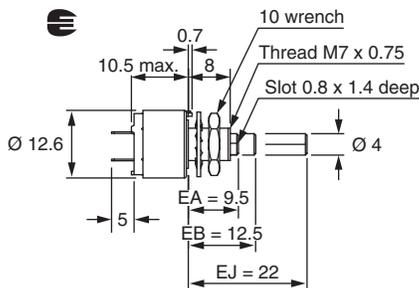
#### P13T-(PC32) A



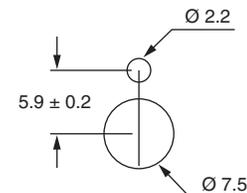
#### Panel Cutout



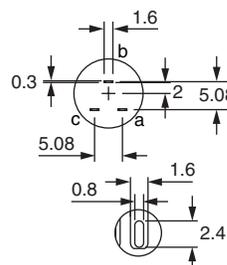
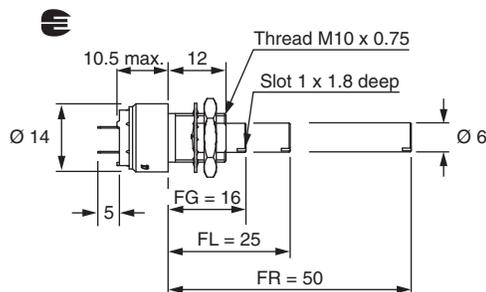
#### P13Q-B



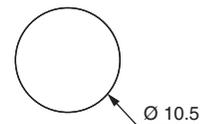
#### Panel Cutout



#### P13L-(PC33) C



#### Panel Cutout



Undergoes European Quality Insurance System

ELECTRICAL SPECIFICATIONS					
Resistive Element	Cermet				
Electrical Travel	270° ± 10°				
Resistance Range	<table border="0"> <tr> <td style="padding-right: 20px;">Linear Taper</td> <td>22 Ω to 10 MΩ</td> </tr> <tr> <td>Logarithmic Taper</td> <td>1 kΩ to 2.2 MΩ</td> </tr> </table>	Linear Taper	22 Ω to 10 MΩ	Logarithmic Taper	1 kΩ to 2.2 MΩ
Linear Taper	22 Ω to 10 MΩ				
Logarithmic Taper	1 kΩ to 2.2 MΩ				
Standard Series E3	1, 2.2, 4.7 and on request 1, 2, 5				
Tolerance	<table border="0"> <tr> <td style="padding-right: 20px;">Standard</td> <td>± 20 %</td> </tr> <tr> <td>On Request</td> <td>± 10 % to ± 5 %</td> </tr> </table>	Standard	± 20 %	On Request	± 10 % to ± 5 %
Standard	± 20 %				
On Request	± 10 % to ± 5 %				
Taper					
Circuit Diagram					
Power Rating	<p>Linear 1.5 W at 70 °C</p> <p>Logarithmic 0.75 W at 70 °C</p>				
Temperature Coefficient (Typical)	<p>± 150 ppm/°C</p> <p>For values ≥ 100 Ω and in temperature range + 20 °C to + 70 °C, the typical temperature coefficient is ± 75 ppm/°C</p>				
Limiting Element Voltage (Linear Law)	350 V				
Contact Resistance Variation	3 % R <sub>n</sub> or 3 Ω				
End Resistance (Typical)	1 Ω				
Dielectric Strength (RMS)	2000 V				
Insulation Resistance (300 V <sub>DC</sub> )	10 <sup>6</sup> MΩ				
Independent Linearity (Typical)	± 5 %				



Fully Sealed Container Cermet Potentiometer  
Military and Professional Grade

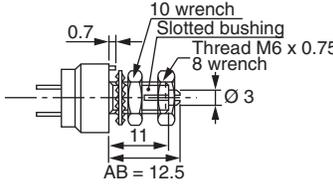
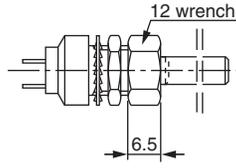
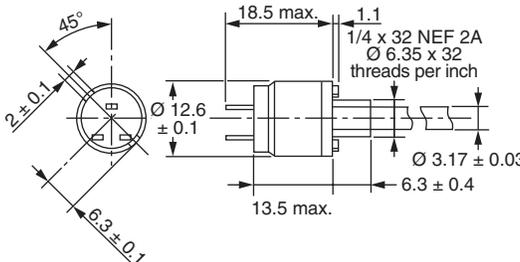
Vishay Sfernice

STANDARD RESISTANCE ELEMENT DATA							
STANDARD RESISTANCE VALUES	LINEAR TAPER			LOG. TAPER			TYPICAL TCR - 55 °C + 125 °C
	MAX. POWER AT 70 °C	MAX. WORKING VOLTAGE	MAX. CUR. THROUGH WIPER	MAX. POWER AT 70 °C	MAX. WORKING VOLTAGE	MAX. CUR. THROUGH WIPER	
Ω	W	V	mA	W	V	mA	ppm/°C
22	1.5	5.74	261				± 150
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	
22K	1.5	182	8.26	0.75	128	5.8	
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° ± 5°	
Operating Torque (Typical)	2 Ncm max.	2.85 oz. inch max.
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 max.	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

OPTIONS	
<b>Special Feature Command Shaft</b>	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.
<b>Panel Sealing</b>	<p>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 P13P...E and P13N...E.</p> <p><b>Panel sealed version</b> <b>P13P</b> <b>P13P...E: Including locating peg</b></p> <p><b>Panel Cutout</b></p>
	<p><b>Panel sealed version</b> <b>P13N</b> <b>P13N...E: Including locating peg</b></p> <p><b>Panel Cutout</b></p>

<b>OPTIONS</b>	
<b>Shaft Locking</b>	<p>On potentiometers equipped with a 3 mm Ø shaft, shaft locking can be obtained:</p> <ul style="list-style-type: none"> <li>• Either by a taper nut tightening a slotted bushing. Ask for P130 type. These devices are normally equipped with an AB type shaft (12.5 mm with a slot).</li> </ul> <p><b>P130</b></p>  <ul style="list-style-type: none"> <li>• 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.</li> </ul> <p>These devices are ordered separately. Please consult Vishay Sfernice.</p> <p><b>P13L DBAN</b></p>  <p>No locking on shaft Ø 4 mm.</p>
<b>RV6 (P13T-F55)</b>	<p>Product in conformity with RN6/MIL-R-94/3G</p> <p><b>P13T-F55</b></p> 

**MARKING**

Printed:

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

**PACKAGING**

In box

PERFORMANCE							
TESTS	CONDITIONS	REQUIREMENTS			TYPICAL VALUES AND DRIFTS		
		$\Delta R_T/R_T$ (%)	$\Delta R_{1-2}/R_{1-2}$ (%)	OTHER	$\Delta R_T/R_T$ (%)	$\Delta R_{1-2}/R_{1-2}$ (%)	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 %	Dielectric strength: 1000 V Insulation resistance: > 10 <sup>4</sup> MΩ
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 g's during 6 h	± 2 %	-	-	± 0.1 %	-	$\Delta V_{1-2}/V_{1-3} < \pm 0.2 \%$

ORDERING INFORMATION (Part Number)															
<div style="display: flex; justify-content: space-around; font-weight: bold; font-size: 1.2em;"> <span>P</span><span>1</span><span>3</span><span>P</span><span>A</span><span>B</span><span>1</span><span>0</span><span>3</span><span>M</span><span>L</span><span>B</span><span>1</span><span>7</span><span>E</span><span></span><span></span><span></span> </div>															
MODEL	BUSHING			SHAFT				OHMIC VALUE	TOLERANCE	TAPER	PACKAGING	SPECIAL			
P13	∅	L	Old Codes	∅	L	Only with Bushing	Old Shaft Codes	Linear law from 22 Ω to 10 MΩ	M = 20 % On request: K = 10 %	A = Linear L = Clockwise logarithmic F = Inverse clockwise logarithmic	Bushing L or N: Shaft < 45 mm B10 = Box of 10 pieces Shaft > 45 mm B08 = Box of 8 pieces	E = Locating peg or special code given by Vishay			
	T 6 8 T			AA 3 9.5	T, P		K	Logarithmic law from 1 kΩ to 2.2. MΩ  103 = 10 kΩ			Other bushings: Shaft < 20 mm B17 = Box of 25 pieces Shaft > 20 mm B12 = Box of 15 pieces				
	Q 7 8 Q			AB 3 12.5	T, P, O		L, M								
	L 10 12 V			AJ 3 22	T, P		R								
	O 6 11 H			EA 4 9.5	Q		E								
	P 6 8 TP			EB 4 12.5	Q		F								
	N 10 9.5 VP			EJ 4 22	Q		G								
				FG 6 16	L		AC								
				FL 6 25	L		AM								
				FR 6 50	L		AL								
				FE 6 13	N		AC								
				FK 6 22	N		AM								
				FQ 6 47	N		AL								

PART NUMBER DESCRIPTION (for information only)													
P13	T	PE	M	10K	20 %	L		BO					e3
MODEL	BUSHING	SPECIAL	SHAFT	VALUE	TOLERANCE	TAPER	SPECIAL	PACKAGING	SPECIAL	SHAFT	SPECIAL	SPECIAL	LEAD (Pb)-FREE



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**