



Fully Sealed Container Cermet Potentiometer Professional Grade



LINKS TO ADDITIONAL RESOURCES



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
- Tight temperature coefficient (± 75 ppm/°C typical)
- Mechanical strength
- Construction: fully sealed
- Professional grade
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



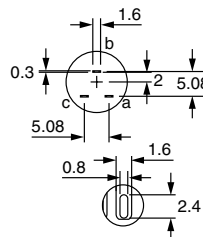
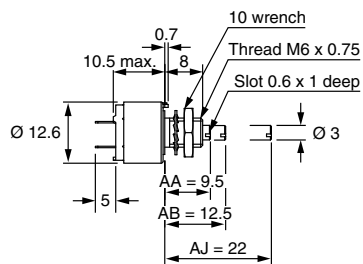
RoHS
COMPLIANT

QUICK REFERENCE DATA

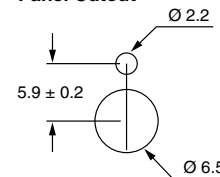
Multiple module	No
Switch module	n/a
Detent module	n/a
Special electrical laws	A: linear, L: logarithmic, F: reverse logarithmic
Sealing level	IP 67
Lifespan	25K cycles

DIMENSIONS in millimeters (± 0.5)

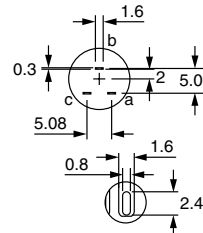
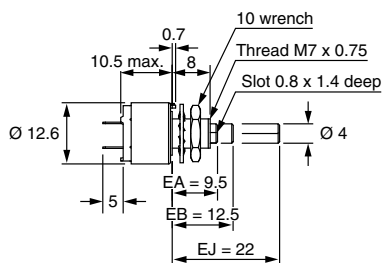
P13T-(PC32) A



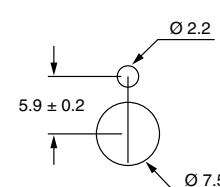
Panel Cutout

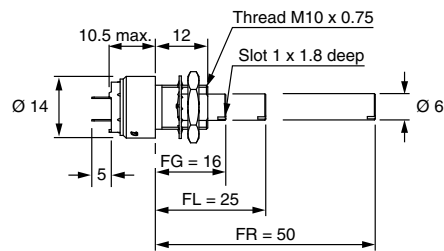
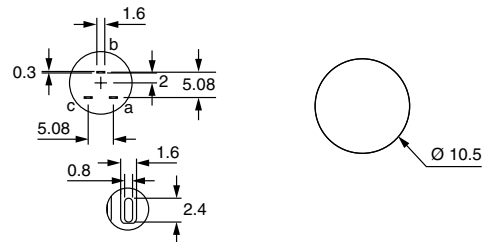


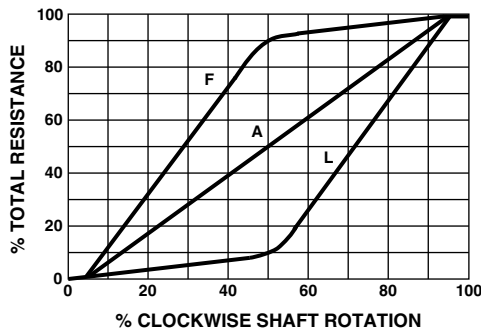
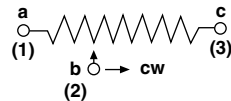
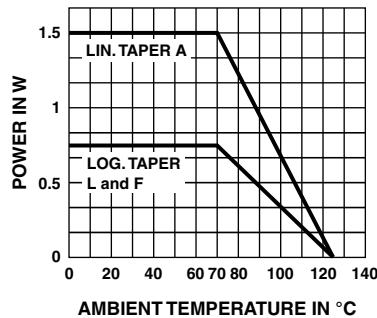
P13Q-B



Panel Cutout



DIMENSIONS in millimeters (± 0.5)**P13L-(PC33) C****Panel Cutout****ELECTRICAL SPECIFICATIONS**

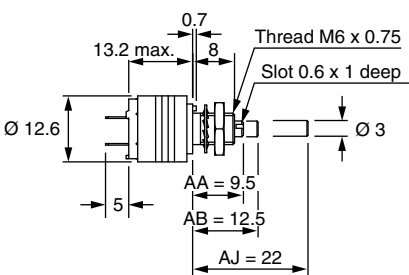
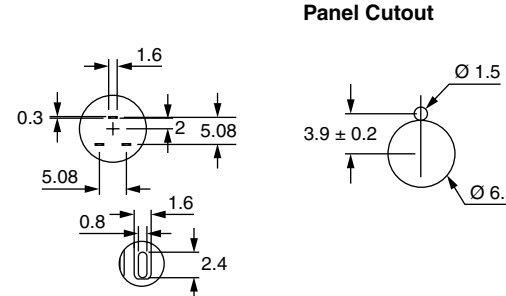
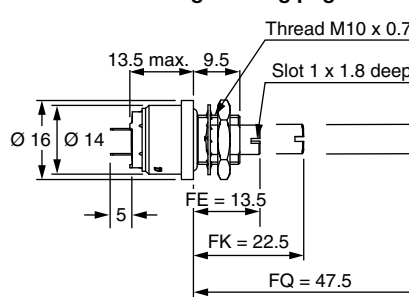
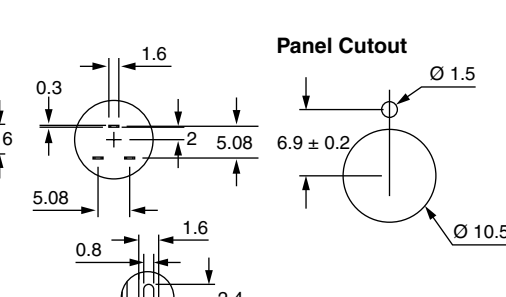
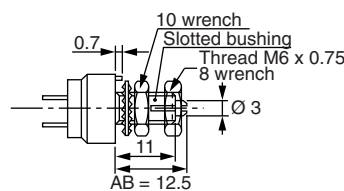
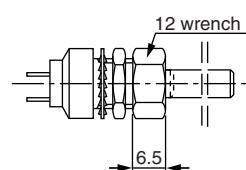
Resistive element	Cermet
Electrical travel	$270^\circ \pm 10^\circ$
Resistance range	Linear taper Logarithmic taper
Standard series e3	22 Ω to 10 M Ω 1 k Ω to 2.2 M Ω
Tolerance	Standard On request
	1, 2.2, 4.7 and on request 1, 2, 5 $\pm 20\%$ $\pm 10\%$ to $\pm 5\%$
Taper	
Circuit diagram	
Power rating	Linear Logarithmic 1.5 W at 70 °C 0.75 W at 70 °C 
Temperature coefficient (typical)	± 150 ppm/°C For values $\geq 100 \Omega$ 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 M Ω
Independent linearity (typical)	$\pm 5\%$



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	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

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.
Panel sealing	<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>Panel sealed version P13P P13P...E: Including locating peg</p>  <p>Panel Cutout</p>  <p>Panel sealed version P13N P13N...E: Including locating peg</p>  <p>Panel Cutout</p> 
Shaft locking	<p>On potentiometers equipped with a 3 mm Ø shaft, shaft locking can be obtained:</p> <ul style="list-style-type: none"> • 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). <p>P13O</p>  <ul style="list-style-type: none"> • 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. <p>P13L DBAN</p>  <p>No locking on shaft Ø 4 mm.</p>

**MARKING**

Printed:

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

PACKAGING

- In box

Hardware: nuts, washer, and O-ring are separately supplied (not mounted on the potentiometer), in a small bag placed in the packaging.

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 ⁴ 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 %	-	$\Delta V_{1-2}/V_{1-3} < \pm 0.2 \%$

Note

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

**ORDERING INFORMATION** (part number)

P	1	3	P	A	B	1	0	3	M	L	B	1	7	E			
MODEL	BUSHING			SHAFT				OHMIC VALUE	TOLERANCE	TAPER	PACKAGING	SPECIAL					
P13		Ø	L	Old codes		Ø	L	Only with bushing	Old Shaft codes								
	T	6	8	T													
	Q	7	8	Q	AA	3	9.5	T, P	K								
	L	10	12	V	AB	3	12.5	T, P, O	L, M								
	O	6	11	H	AJ	3	22	T, P	R								
	P	6	8	TP	EA	4	9.5	Q	E								
	N	10	9.5	VP	EB	4	12.5	Q	F								
					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	47.5	N	AL								

PART NUMBER DESCRIPTION (for information only)

P13	T	PE	M	10K	20 %	L		BO				e3
MODEL	BUSHING	SPECIAL	SHAFT	OHMIC VALUE	TOL.	TAPER	SPECIAL	PACKAGING	SPECIAL	SHAFT	SPECIAL	LEAD (Pb)-FREE

ACCESSORIES

Additional Accessories (to order separately)	www.vishay.com/doc?51051
Control knobs	www.vishay.com/doc?51101

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



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.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. 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.