Fully Sealed Container Cermet Potentiometer
Professional Grade

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 www.vishay.com/doc?99912

RoHS COMPLIANT

LINKS TO ADDITIONAL RESOURCES

3D Models

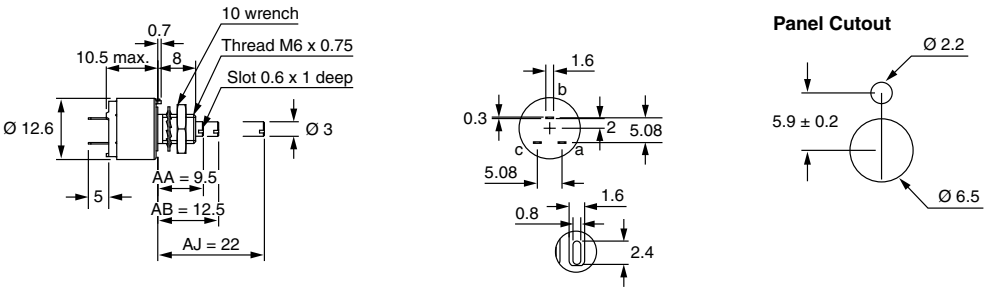
Their excellent performances are due to the use of a cermet-track sealed in a large case.

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

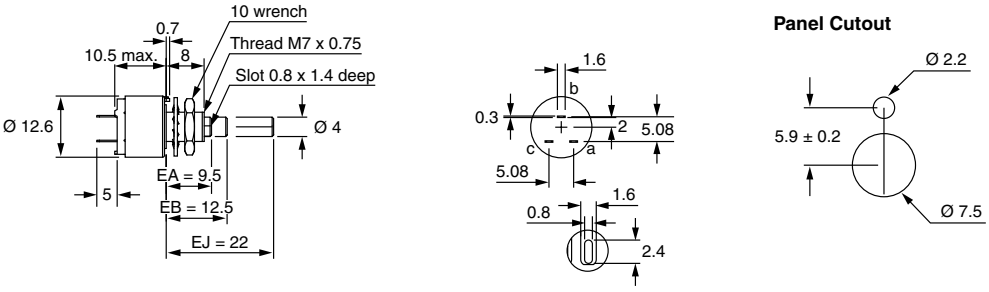
QUICK REFERENCE DATA	
Multiple module	No
Switch module	n/a
Detent module	n/a
Special electrical laws	A: linear, L: logarithmic, F: reverse logarithmic
Sealing level	IP 67
Lifespan	25K cycles

DIMENSIONS in millimeters (± 0.5)

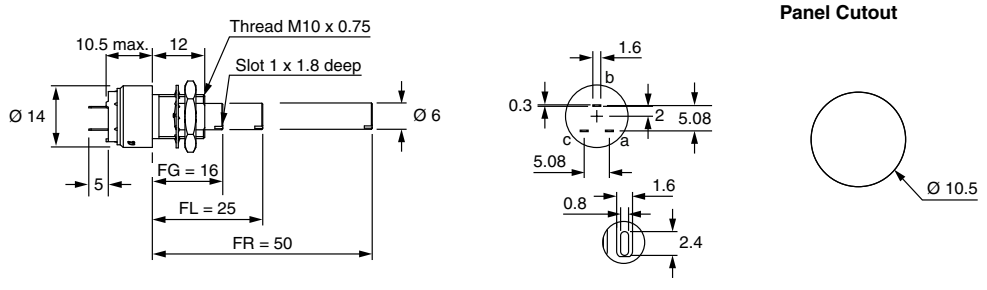
P13T-(PC32) A

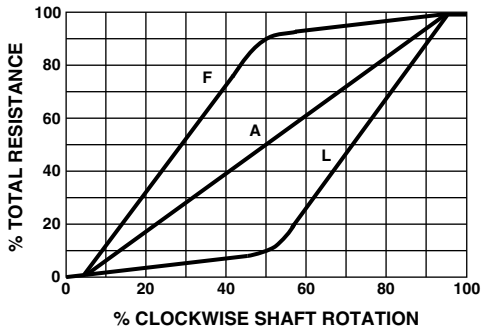
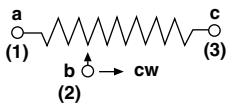
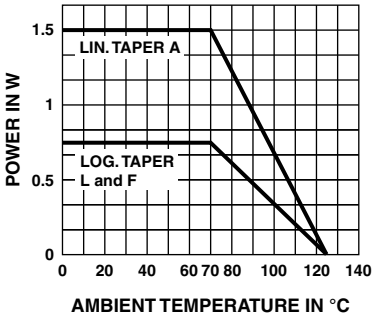


P13Q-B



P13L-(PC33) C



ELECTRICAL SPECIFICATIONS		
Resistive element		Cermet
Electrical travel		270° ± 10°
Resistance range	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	Standard	± 20 %
	On request	± 10 % to ± 5 %
Taper		
Circuit diagram		
Power rating		Linear 1.5 W at 70 °C Logarithmic 0.75 W at 70 °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 MΩ
Independent linearity (typical)		± 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				

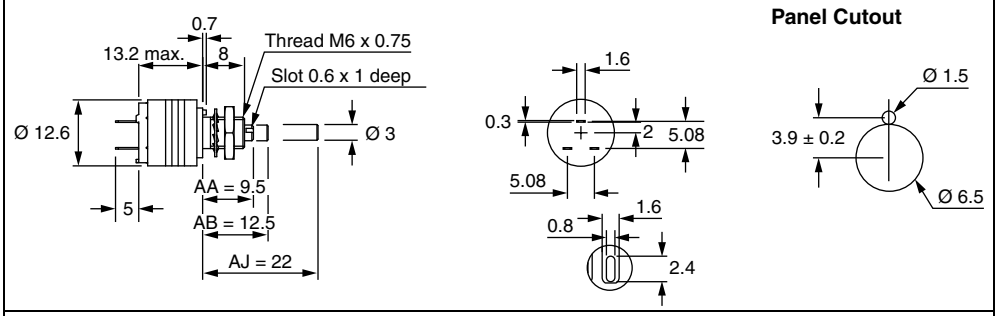
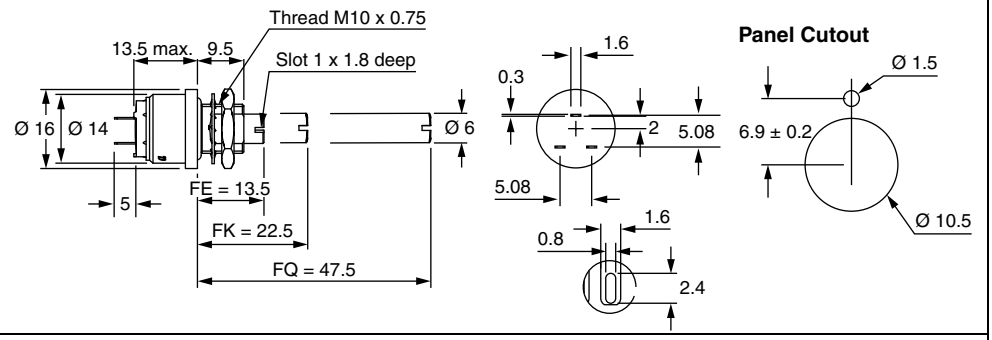
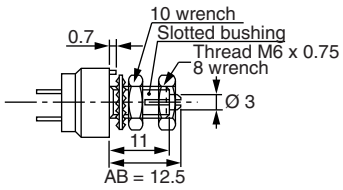
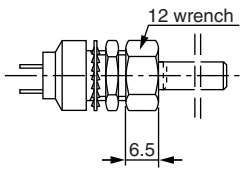
MECHANICAL SPECIFICATIONS

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 ± 10°. 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	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. **Panel sealed version** **P13P** **P13P...E: Including locating peg**  **Panel sealed version** **P13N** **P13N...E: Including locating peg** 
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 P13O type. These devices are normally equipped with an AB type shaft (12.5 mm with a slot). **P13O**  • 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.

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		
		$\Delta R_T/R_T$ (%)	$\Delta R_{1\text{-}2}/R_{1\text{-}2}$ (%)	OTHER	$\Delta R_T/R_T$ (%)	$\Delta R_{1\text{-}2}/R_{1\text{-}2}$ (%)	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 %	-	$\Delta V_{1\text{-}2}/V_{1\text{-}3}$ < ± 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

P13

BUSHING

	Ø	L	Old codes
T	6	8	T
Q	7	8	Q
L	10	12	V
O	6	11	H
P	6	8	TP
N	10	9.5	VP

SHAFT

	Ø	L	Only with bushing	Old Shaft codes
AA	3	9.5	T, P	K
AB	3	12.5	T, P, O	L, M
AJ	3	22	T, P	R
EA	4	9.5	Q	E
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

OHMIC VALUE

Linear law from 22 Ω to 10 MΩ

Logarithmic law from 1 kΩ to 2.2. MΩ

103 = 10 kΩ

TOLERANCE

M = 20 %

On request: K = 10 %

TAPER

A = linear
L = clockwise logarithmic
F = inverse clockwise logarithmic

PACKAGING

Bushing L or N:
shaft < 45 mm
B10 = box of 10 pieces
shaft > 45 mm
B08 = box of 8 pieces

Other bushings:
shaft < 20 mm
B17 = box of 25 pieces
shaft > 20 mm
B12 = box of 15 pieces

SPECIAL

E = locating peg or special code given by Vishay

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

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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