Long Life Cermet Potentiometer up to 2 Million Cycles

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 industrial and professional uses.

FEATURES

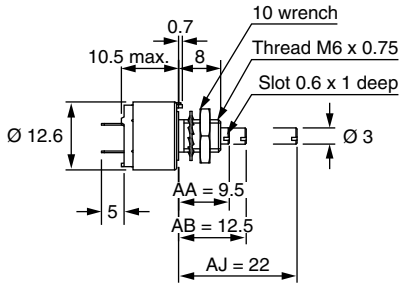
- 2 million cycles for bushing L and N
- 1 million cycles for bushing T, Q, O, and P
- High power rating 1.5 W at 70 °C
- Test according to CECC 41000 or IEC 60393-1
- Cermet element
- Fully sealed case
- Mechanical strength
- Custom designs on request
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

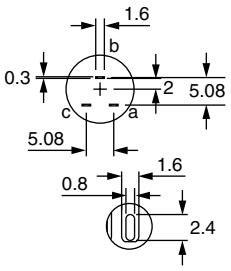
RoHS COMPLIANT

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	1M cycles

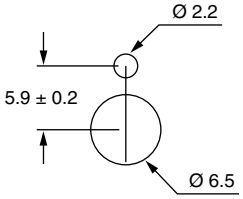
DIMENSIONS in millimeters (± 0.5)

P13LT

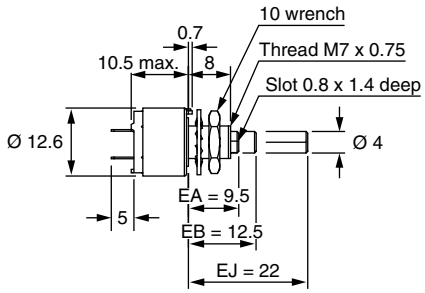


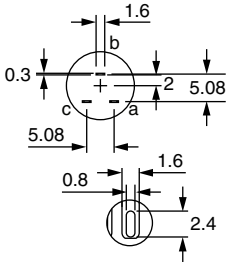


Panel Cutout



P13LQ





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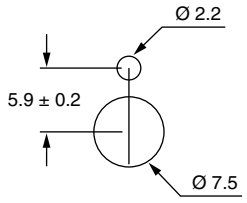
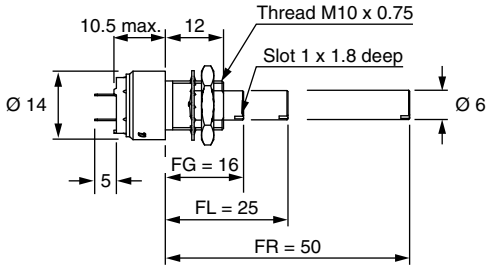
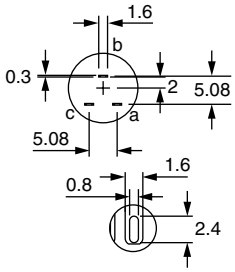
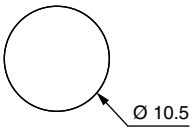


P13LL

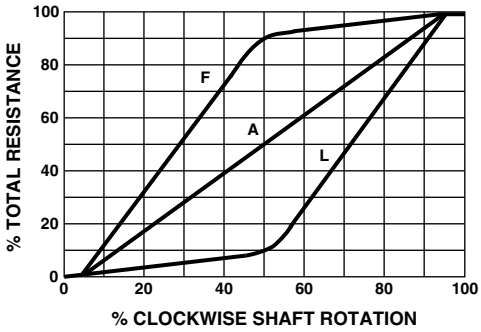
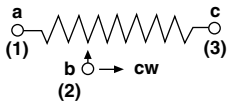
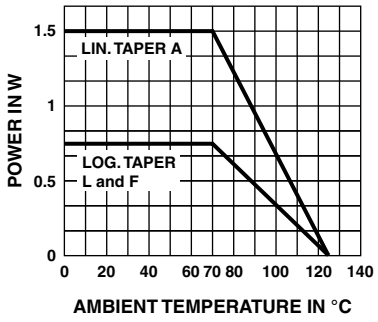
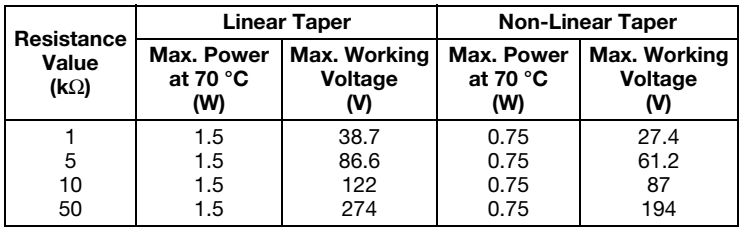




Panel Cutout



For technical questions, contact: sferpottrimmers@vishay.com

ELECTRICAL SPECIFICATIONS	
Resistive element	Cermet
Electrical travel	270° ± 10°
Standard resistance value	1 kΩ, 5 kΩ, 10 kΩ, 50 kΩ
Tolerance	± 20 %
Taper	
Circuit diagram	
Power rating	Linear 1.5 W at 70 °C Logarithmic 0.75 W at 70 °C 
Standard resistance element data	

Resistance Value (kΩ)	Linear Taper		Non-Linear Taper	
	Max. Power at 70 °C (W)	Max. Working Voltage (V)	Max. Power at 70 °C (W)	Max. Working Voltage (V)
1	1.5	38.7	0.75	27.4
5	1.5	86.6	0.75	61.2
10	1.5	122	0.75	87
50	1.5	274	0.75	194

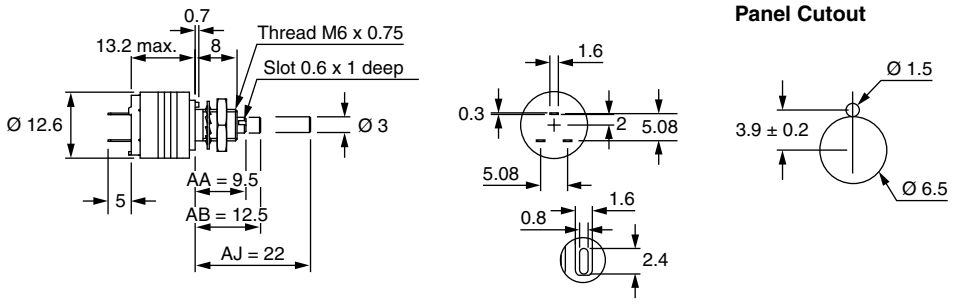
Temperature coefficient (typical)	± 150 ppm/°C
Limiting element voltage (linear law)	350 V
End resistance (typical)	1 Ω
Dielectric strength (RMS)	2000 V
Insulation resistance (300 V_{DC})	10^6 MΩ
Independent linearity (typical)	± 5 %

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	

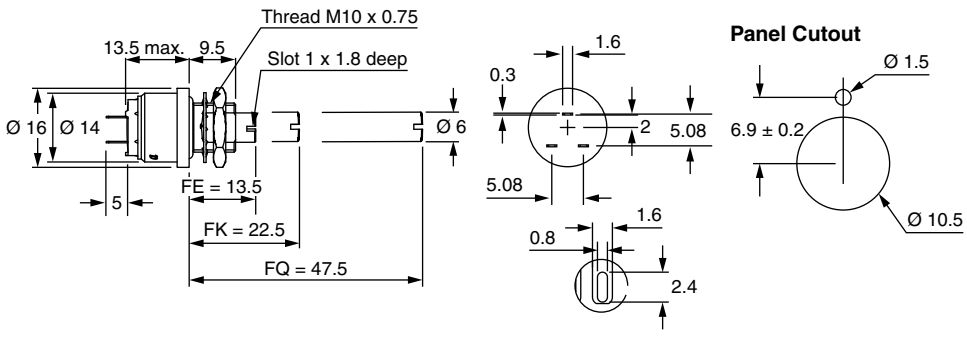
ENVIRONMENTAL SPECIFICATIONS	
Temperature range	-55 °C to +125 °C
Climatic category	55/125/56
Sealing	Fully sealed - container IP67

OPTIONS	
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 P13LT and P13LL can be fitted with a device providing sealing between the threaded bushing and the front panel. Their designation is P13LP and P13LN respectively or with a locating peg P13LP...E and P13LN...E.

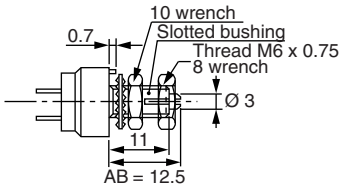
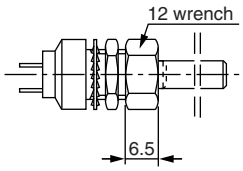
Panel sealed version
P13LP
P13LP...E: Including locating peg



Panel sealed version
P13LN
P13LN...E: Including locating peg



OPTIONS

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 P13LO type. These devices are normally equipped with an AB type shaft (12.5 mm with a slot). **P13LO**  • 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. **P13LL DBAN**  No locking on shaft Ø 4 mm.

MARKING

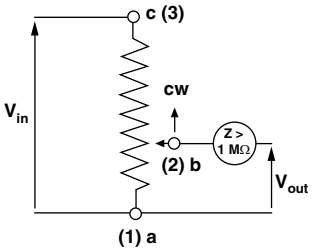
Printed:

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

APPLICATION NOTE

The potentiometer shall be used in voltage divider with an impedance load at least 100 times higher than the total potentiometer nominal resistance value.

Advised load impedance:
1 MΩ min. for resistance range of 1 kΩ to 50 kΩ



PACKAGING

- In box of 8 pieces for shafts FR and FQ
- In box of 10 pieces for shafts FE, FL, FG, and FK
- In box of 15 pieces for shafts AJ and EJ
- In box of 25 pieces for shafts AB, AA, EA, and EB

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	TYPICAL VALUES AND DRIFTS		
		$\Delta R_T/R_T$ (%)	$\Delta R_{1-2}/R_{1-2}$ (%)	OTHER
Electrical endurance	1000 h at rated power 90'/30' - ambient temperature 70 °C	± 20 %	± 20 %	-
Climatic sequence	Phase A dry heat 125 °C Phase B damp heat Phase C cold -55 °C Phase D damp heat 5 cycles	± 0.5 %	± 1 %	-
Damp heat, steady state	56 days, 40 °C 93 % HR	± 0.5 %	± 1 %	Dielectric strength: 1000 V Insulation resistance: > 10^4 MΩ
Change of temperature	5 cycles, -55 °C at +125 °C	± 0.5 %	-	-
Mechanical endurance	Bushings L and N: 2 000 000 cycles Bushings T, Q, O, and P: 1 000 000 cycles at rated power Turn angle ± 60° Temperature ± 20 °C	± 20 %	-	Independent linearity: ± 10 %
Shock	50 *g*'s at 11 ms, 3 successive shocks in 3 directions	± 0.1 %	± 0.2 %	-
Vibration	10 Hz to 55 Hz, 0.75 mm or 10 *g*'s during 6 h	± 0.1 %	-	$\Delta V_{1-2}/V_{1-3}$ < ± 0.2 %

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

ORDERING INFORMATION (part number)

P	1	3	L	Q	E	A	S	1	0	3	M	L	E			

MODEL

P13L

BUSHING

	Ø	L
T	6	8
Q	7	8
L	10	12
O	6	11
P	6	8
N	10	9.5

SHAFT

	Ø	L	Only with bushing
AA	3	9.5	T, P
AB	3	12.5	T, P, O
AJ	3	22	T, P
EA	4	9.5	Q
EB	4	12.5	Q
EJ	4	22	Q
FG	6	16	L
FL	6	25	L
FR	6	50	L
FE	6	13	N
FK	6	22	N
FQ	6	47.5	N

SHAFT END

S = slotted
F = flatted
R = round
D = custom

OHMIC VALUE

102 = 1 kΩ
502 = 5 kΩ
103 = 10 kΩ
503 = 50 kΩ

TOLERANCE

M = 20 %

TAPER

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

SPECIAL

E = locating peg or special code given by Vishay

PART NUMBER DESCRIPTION (for information only)

P13L	Q	E	EA	10K	20 %	L		BO25			e3
MODEL	BUSHING	SPECIAL	SHAFT	VALUE	TOLERANCE	TAPER	SPECIAL	PACKAGING	SHAFT	SPECIAL	LEAD (Pb)-FREE

ACCESSORIES	
Additional Accessories (to order separately)	www.vishay.com/doc?51051

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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