

# Fully Sealed Container Cermet Potentiometer Professional Grade



P12T

P12Q

P12O

## FEATURES

- 1 W at 70 °C
- Cermet element
- Test according to CECC 41000 or IEC 60393-1
- Full sealing
- Mechanical strength
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

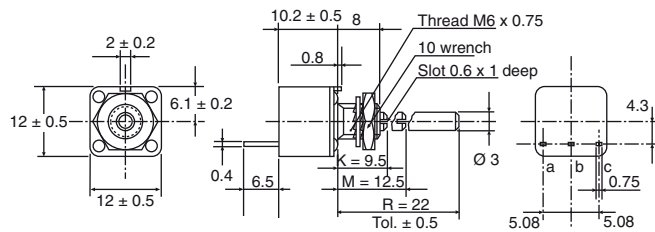


RoHS  
COMPLIANT

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

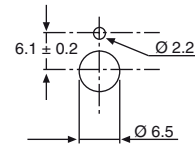
## DIMENSIONS in millimeters ± 0.5 mm

### P12T

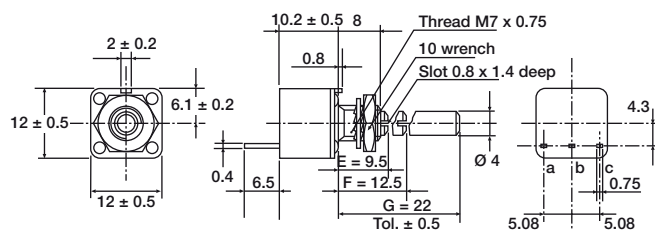


### Panel cutout

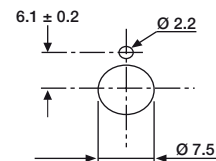
Panel thickness: 4 max.



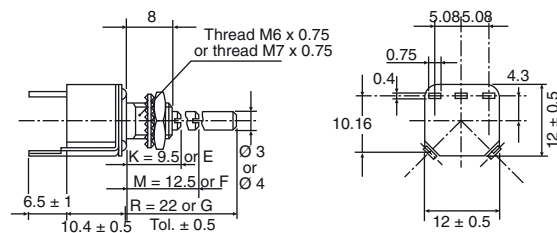
### P12Q



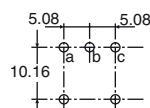
### Panel cutout



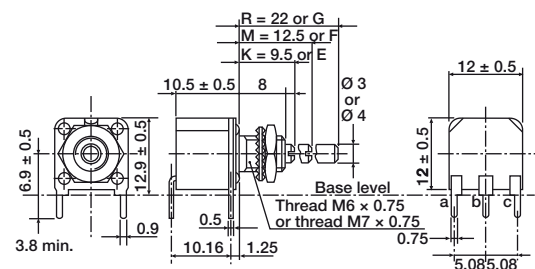
### Leads Y



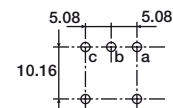
### Terminal spacing



### Leads X



### Terminal spacing



ELECTRICAL SPECIFICATIONS		
Resistive element		Cermet
Electrical travel		$270^\circ \pm 10^\circ$
Resistance range	linear taper	22 $\Omega$ to 10 M $\Omega$
	logarithmic taper	100 $\Omega$ to 2.2 M $\Omega$
Standard series E3		1 - 2.2 - 4.7 and on request 1 - 2 - 5
Tolerance	standard	$\pm 20\%$
	on request	$\pm 10\%$
Taper		
Circuit diagram		
Power rating	linear 1 W at +70 °C logarithmic 0.5 W at +70 °C	
Temperature coefficient		See Standard Resistance Element Data
Limiting element voltage (linear taper)		350 V
Contact resistance variation (typical)		3 % or 3 $\Omega$
End resistance (typical)		1 $\Omega$
Dielectric strength (RMS)		2000 V
Insulation resistance (500 V <sub>DC</sub> )		10 <sup>6</sup> M $\Omega$

MECHANICAL SPECIFICATIONS		
Mechanical travel		$300^\circ \pm 5^\circ$
Mechanical travel		2 Ncm max.
End stop torque	bushing O bushings T and Q	15 Ncm max. 35 Ncm max.
Tightening torque		150 Ncm max.
Unit weight		7.6 g to 10 g max.



ENVIRONMENTAL SPECIFICATIONS	
Operating temperature range	-55 °C to +125 °C
Climatic category	55/100/56
Sealing	Fully sealed - Container IP67

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 temp. 70 °C	± 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	± 0.5 %	± 1 %	-
Damp heat, steady state	56 days 40 °C 93 % RH	± 0.5 %	± 1 %	Dielectric strength: 1000 V <sub>RMS</sub> Insulation resistance: > 10 <sup>4</sup> MΩ
Change of temperature	5 cycles -55 °C at +125 °C	± 0.5 %	-	-
Mechanical endurance	25 000 cycles	± 3 %	-	Contact res. variation: < 2 % Rn
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 %	-	$\Delta V_{1-2}/V_{1-3} \leq \pm 0.2 \%$

Note

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

STANDARD RESISTANCE ELEMENT DATA							
STANDARD RESISTANCE VALUES	LINEAR TAPER			LOGS TAPER			TYPICAL TCR -55 °C +125 °C
	MAX. POWER AT 70 °C	MAX. WORKING VOLTAGE	MAX. WIPER CURRENT	MAX. POWER AT 70 °C	MAX. WORKING VOLTAGE	MAX. WIPER CURRENT	
Ω	W	V	mA	W	V	mA	ppm/°C
22	1	4.69	213.2				± 150
47	1	6.85	145.8				
100	1	10	100				
220	1	14.8	67.4				
470	1	21.6	46.1				
1K	1	31.6	31.6	0.5	22.4	22.4	
2.2K	1	46.9	21.3	0.5	33.2	15.1	
4.7K	1	63.5	14.5	0.5	48.5	10.3	
10K	1	100	10	0.5	79.7	7.07	
22K	1	148.3	6.7	0.5	105	4.77	
47K	1	216.7	4.6	0.5	153	3.26	
100K	1	316.2	3.16	0.5	224	2.24	
220K	0.56	350	1.59	0.5	332	1.51	
470K	0.26	350	0.75	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	0.02	350	0.07				
10M	0.01	350	0.01				

**MARKING**

- Vishay trademark
- Part number (including ohmic value and tolerance code)
- Manufacturing date
- Marking of terminals: 1 or a

**PACKAGING**

- For shafts AJ, EJ: In box of 15 pieces (code B1)
- For other shafts: In box of 25 pieces (code B2)

**OPTIONS**
**SPECIAL FEATURES**

Shafts	Lengths are measured from the mounting surface to the free end of shaft. Shaft slot is aligned with the wiper within $\pm 10^\circ$ . Special shafts are available, in accordance with drawings supplied by customers. We recommend customers not to machine shafts, in order to avoid damage. Bending or torsion of terminals should be avoided.
Shaft and panel sealing hardware	The type P12T with AB (old code M) or AJ (old code R) shaft can be provided with an optional "DE" sealing hardware which ensures sealing of both the shaft and the mounting panel. DE sealing hardware can be supplied in a separate bag.  <b>DE shaft and panel sealing hardware</b>  
Shaft locking	The shaft locking bushing is available only with P12O potentiometers. Torque applied to locking nuts should not exceed 15 Ncm.  <b>P12OL with spindle locking nut</b>  



ORDERING INFORMATION (part number)																	
P	1	2	O	A	B	S	4	7	2	M	A	B	2	D	E		
MODEL	BUSHING			SHAFT			LEADS	OHMIC VALUE		TOLERANCE	TAPER	PACKAGING	SPECIAL				
P12	∅	L	Old codes		∅	L	Old codes	S = STD X Y	Linear from 22 Ω to 10 MΩ	M = 20 % On request: K = 10 %	A = linear L = clockwise logarithmic F = inverse clockwise logarithmic	Shafts AJ and EJ: B1 = box of 15 pieces Other shafts: box of 25 pieces	DE = Shaft and panel sealed hardware or special code given by Vishay				
	T	6	8	T	AA	3	9.5	K	Logarithmic from 100 Ω to 2.2 MΩ								
	Q	7	8	Q	AB	3	12.5	L, M	472 = 4.7 kΩ								
	O	6	11	H	AJ	3	22	R									
					EA	4	9.5	E									
					EB	4	12.5	F									
					EJ	4	22	G									
					AP	Custom shaft											

PART NUMBER DESCRIPTION (for information only)													
P12	H			L	4K7	20 %	A		BO	DE			e3
MODEL	BUSHING	LEADS	SPECIAL	SHAFT	VALUE	TOLERANCE	TAPER	SPECIAL	PACKAGING	SPECIAL	AP N°	SPECIAL	LEAD FINISH

RELATED DOCUMENTS	
<b>APPLICATION NOTES</b>	
Potentiometers and Trimmers	<a href="http://www.vishay.com/doc?51001">www.vishay.com/doc?51001</a>
Guidelines for Vishay Sfernice Resistive and Inductive Components	<a href="http://www.vishay.com/doc?52029">www.vishay.com/doc?52029</a>



## **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.