

# 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)

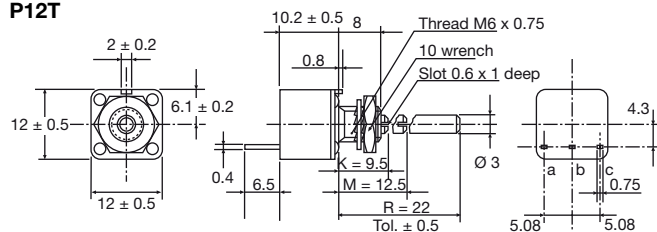

**RoHS**  
COMPLIANT

## 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

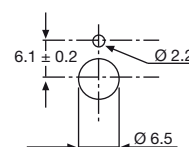
## DIMENSIONS in millimeters ± 0.5 mm

### P12T

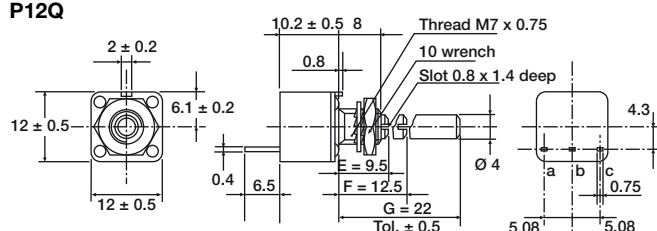


### Panel cutout

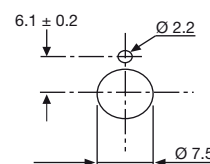
Panel thickness: 4 max.



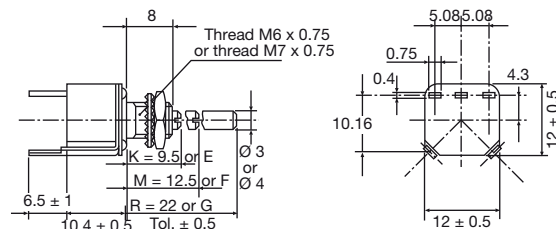
### P12Q



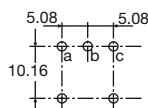
### Panel cutout



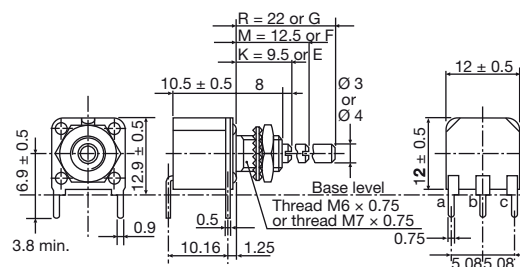
### Leads Y



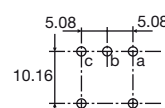
### Terminal spacing

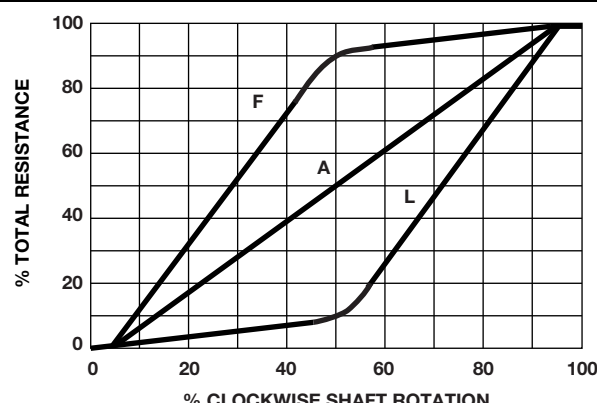
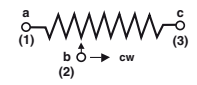
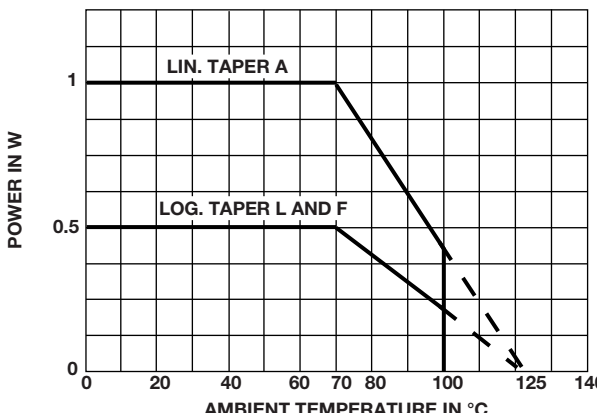


### Leads X



### 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 on request
	$\pm 20\%$ $\pm 10\%$
Taper	
Circuit diagram	
Power rating	<p>linear 1 W at +70 <math>^\circ\text{C}</math> logarithmic 0.5 W at +70 <math>^\circ\text{C}</math></p> 
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 % R <sub>n</sub>
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 % R <sub>n</sub>
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

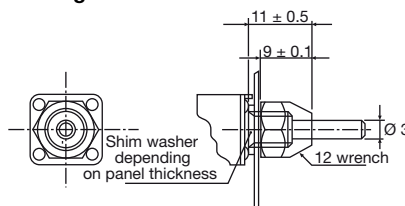
#### Shafts

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.

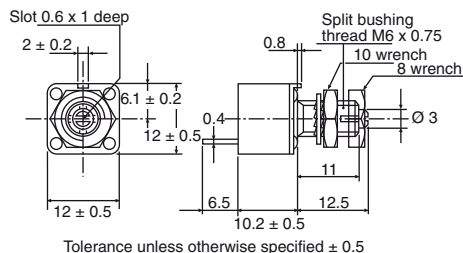
##### DE shaft and panel sealing hardware



#### Shaft locking

The shaft locking bushing is available only with P12O potentiometers. Torque applied to locking nuts should not exceed 15 Ncm.

##### P12OL with spindle locking nut



Tolerance unless otherwise specified  $\pm 0.5$

**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	Ø	L	Old codes	Ø	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

**ACCESSORIES**

Additional Accessories (to order separately)	<a href="http://www.vishay.com/doc?51051">www.vishay.com/doc?51051</a>
Control knobs	<a href="http://www.vishay.com/doc?51101">www.vishay.com/doc?51101</a>

**RELATED DOCUMENTS****APPLICATION NOTES**

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>



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