

Long Life Cermet Potentiometer 2 Million Cycles

FEATURES

- 2 million cycles
- 12.5 mm square single turn panel control
- 6 and 6.35 shaft diameters and 29 terminal styles
- Multiple assemblies - up to four modules
- Test according to CECC 41 000
- Low temperature coefficient
- Custom designs on request
- Linearity $\pm 3\%$ ($\pm 2\%$ available)
- Compliant to RoHS directive 2002/95/EC



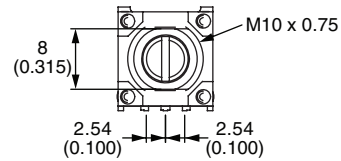
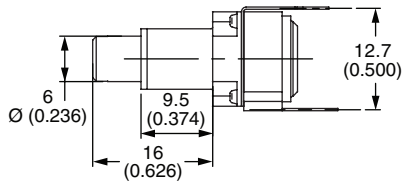
RoHS
COMPLIANT



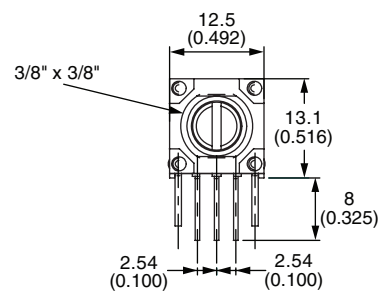
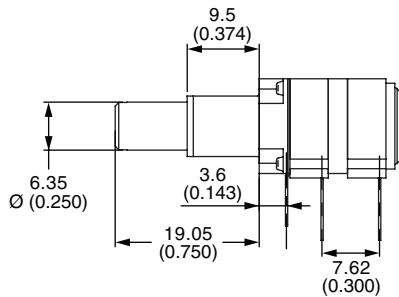
VERSATILE	MODULAR	COMPACT	ROBUST
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CONFIGURATION EXAMPLE ± 0.5 mm (± 0.02 ")

Single module, single shaft, vertical mounting, PC pins with support plate, metric bushing and shaft



Dual modules, single shaft, PC pins with front support plates, imperial bushing and shaft





GENERAL SPECIFICATIONS

ELECTRICAL (INITIAL)	
Resistive Element	Cermet
Electrical Travel	270° ± 10°
Standard Resistance Values	Linear law 1K, 5K, 10K, 50K
Tolerance	Standard ± 20 % On request ± 5 % or ± 10 %
Power Rating at 70 °C	0.1 W at + 70 °C 0.1 W at + 70 °C per module
Temperature Coefficient (Typical)	± 150 ppm
Limiting Element Voltage	350 V
End Resistance (Typical)	2 Ω
Contact Resistance Variation	2 % or 3 Ω
Independent Linearity	± 3 % (± 2 % available)
Insulation Resistance	10 ⁶ MΩ min.
Dielectric Strength	1500 V _{RMS} min.
Attenuation	-
Mechanical Rotation Life	2 000 000 cycles

MECHANICAL (INITIAL)	
Mechanical Travel	300° ± 5°
Operating Torque (Typical): Single and Dual Assemblies: 6 mm (1/4") Dia. Shafts Three to Four Modules (per Module):	0.7 to 1.5 Ncm max. (1.0 to 2.1 oz.-inch max.) 0.2 to 0.3 Ncm max. (0.3 to 0.45 oz.-inch max.)
End Stop Torque 6 mm and 1/4" Dia. Shafts	80 Ncm max. (6.8 lb-inch max.)
Tightening Torque 10 mm and 3/8" Dia. Bushings	250 Ncm max. (21 lb-inch max.)
Weight	7 g to 9 g per module (0.25 oz. to 0.32 oz.)

ENVIRONMENTAL	
Operating Temperature Range	- 55 °C to + 125 °C
Climatic Category	55/125/56
Sealing	IP64
Storage Temperature	- 55 °C to + 150 °C

MARKING
<ul style="list-style-type: none"> • Potentiometer Module VISHAY logo, nominal ohmic value and tolerance (code), identify P11L version, variation law, manufacturing date (four digits), "3" for the lead 3

PACKAGING
<ul style="list-style-type: none"> • Box

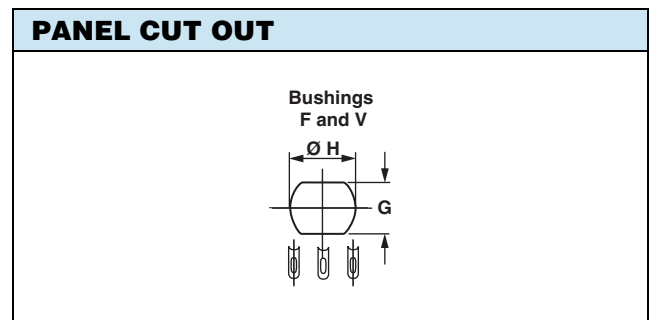
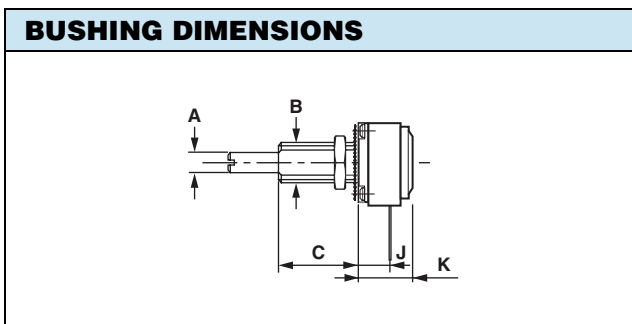


PERFORMANCES			
TESTS	CONDITIONS	TYPICAL VALUE AND DRIFTS	
Load Life	1000 h at + 70 °C (90°/30')	Total resistance shift contact resistance variation	± 2 % ± 4 %
Temperature Cycle	- 55 °C to + 125 °C, 5 cycles	Total resistance shift	± 0.2 %
Moisture	+ 40 °C, 93 % relative humidity 56 days	Total resistance shift insulation resistance	± 2 % > 1000 MΩ
Rotational Life	2 million cycles Turn angle: ± 60° 33 cycles per min Temperature: 20 °C	Total resistance shift contact resistance variation	± 20 % ± 5 %
Climatic Sequence	Dry heat at + 125 °C/damp heat cold - 55 °C/damp heat 5 cycles	Total resistance shift	± 1 %
Shock	50 g, 11 ms 3 shocks - 3 directions	Total resistance shift resistance setting change	± 20 % ± 0.5 %
Vibration	10 Hz to 55 Hz 0.75 mm or 10 g, 6 h	Total resistance shift voltage setting change	± 0.2 % ± 0.5 % typical

ORDERING INFORMATION (Part Number 18 digits)																	
P	1	1	L	2	F	A	G	O	S	Y	0	0	5	0	2	K	A
MODEL	STYLE		NUMBER OF MODULES	BUSHING	LOCATING PEG	SHAFT	SHAFT STYLE	LEADS	RESISTANCE CODE/TOLERANCE/TAPER OR SPECIAL								
P11	L = Long Life		1 2 3 4														

STANDARD RESISTANCE ELEMENT DATA			
STANDARD RESISTANCE VALUES	MAX. POWER AT 70 °C	MAX. WORKING VOLTAGE	MAX. CURRENT THROUGH WIPER
Ω	W	V	mA
1K	0.1	10	10
5K	0.1	22.4	4.47
10K	0.1	31.6	3.16
50K	0.1	70.7	1.41

ORDERING INFORMATION (Part Number 18 digits)																	
P	1	1	L	2	F	A	G	O	S	Y	0	0	5	0	2	K	A
MODEL	STYLE	NUMBER OF MODULES	BUSHING			LOCATING PEG	SHAFT	SHAFT STYLE	LEADS	RESISTANCE CODE/TOLERANCE/TAPER OR SPECIAL							
				Ø	L												
			F	3/8"	3/8"												
			V	10	9.5												



BUSHINGS			mm (± 0.5)		INCHES (± 0.02)	
			V	F		
A	Shafts	Ø	6	1/4		
B	Bushing	Ø	10	3/8		
C		L	9.5	3/8		
J	Lead Versions X.. Y..		7	0.278		
	K		11.1	0.436		
G	Panel		8.2	0.323		
H	Cutout	Ø	10.5	0.394		
	Threat					
	Wrench Nut		12	0.500		
	Style					

Notes

- Hardware supplied in separate bags
- Slotted bushing for locking nut option

ORDERING INFORMATION (Part Number 18 digits)																	
P	1	1	L	2	F	A	G	O	S	Y	0	0	5	0	2	K	A
MODEL	STYLE	NUMBER OF MODULES	BUSHING	LOCATING PEG	SHAFT			SHAFT STYLE	LEADS	RESISTANCE CODE/TOLERANCE/TAPER OR SPECIAL							
						Ø	L	S = Slotted R = Round F = Flatted D = Custom									
					FG	6	16										
					FL	6	25										
					FR	6	50										
					GG	1/4"	5/8"										
					GH	1/4"	3/4"										
					GJ	1/4"	7/8"										
					GL	1/4"	1"										
					GO	1/4"	1.5"										

SHAFTS
<p>The shaft length are always measured from the mounting face. Standard shafts are designed by a 3 letter code (3 digits). Shafts slots are aligned to $\pm 10^\circ$ of the wiper position. All standard shafts are slotted except flatted and splined, see exceptions for bushing.</p> <p style="text-align: center;">FLATTED SHAFT</p> <p>BUSHING: F SHAFT: GHF</p> <p style="text-align: center;">CUSTOM SHAFTS</p> <p>When special shafts are required - flat, threaded ends, special shaft lengths, etc. a drawing is required.</p>

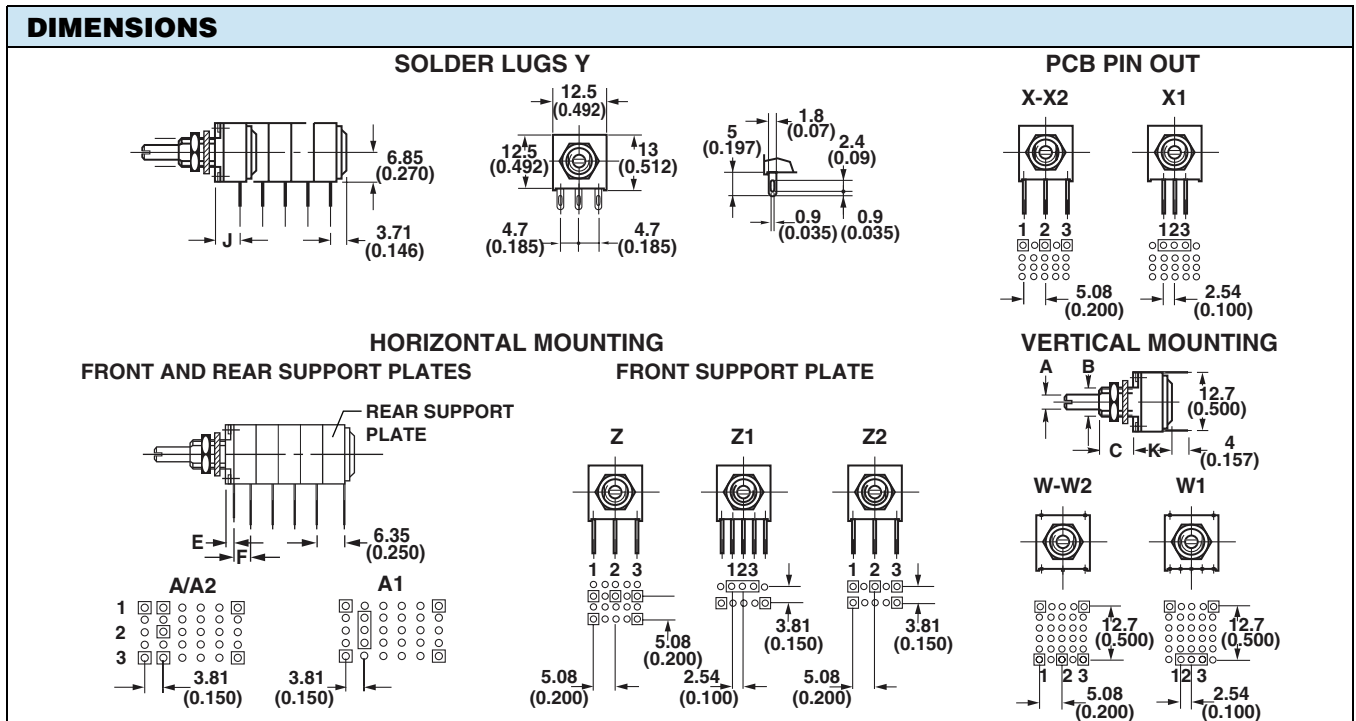
STANDARD COMBINATION OF SHAFT STYLES AND BUSHINGS							
SHAFT DIA.	BUSHING CODE	SHAFT LENGTH AND STYLE AVAILABLE IN STANDARD (Others on request)					
6	V	FGS	FLS	FRS			
6.35	F	GGs	GHS	GJS	GLS	GOS	GHF

ORDERING INFORMATION (Part Number 18 digits)																	
P	1	1	L	2	F	A	G	O	S	Y	0	0	5	0	2	K	A
MODEL	STYLE	NUMBER OF MODULES	BUSHING	LOCATING PEG	SHAFT	SHAFT STYLE	LEADS						RESISTANCE CODE/TOLERANCE/TAPER OR SPECIAL				
							Available leads										
							A00	W00	X00	Y00	Z00						
							A10	W10	X03	Y03	Z03						
							A13	W20	X04	Y04	Z04						
							A14		X10		Z10						
							A20		X13		Z13						
							A23		X14		Z14						
							A24		X20		Z20						
									X23		Z23						
									X24		Z24						

FIRST DIGIT	
Y	Soldering lugs
X	PCB pins
Z	PCB pins with front support plate
A	PCB pins with front and back support plates
W	PCB pins - vertical mounting with 2 extra pins - 1 module only

SECOND DIGIT	
0	Y = 4.65 (0.183") A, X, Z, W = 5.08 mm (0.200") pin spacing pins section 0.9 x 0.3 mm ² (0.035" x 0.012")
1	2.54 mm (0.100") pin spacing pin section 0.6 x 0.3 mm ² (0.024" x 0.012")
2	5.08 mm (0.200") pin spacing pins section 0.6 x 0.3 mm ² (0.024" x 0.012")

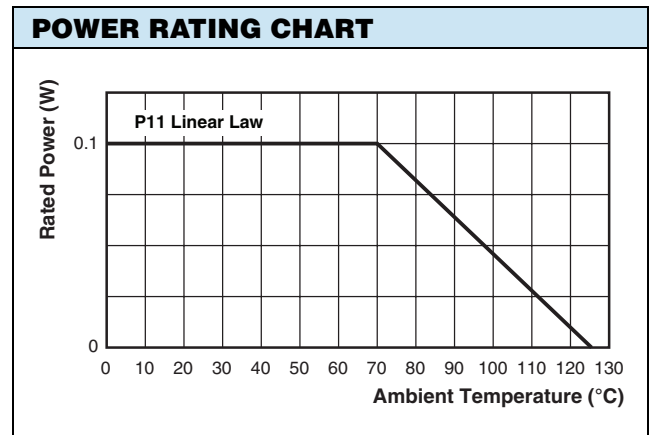
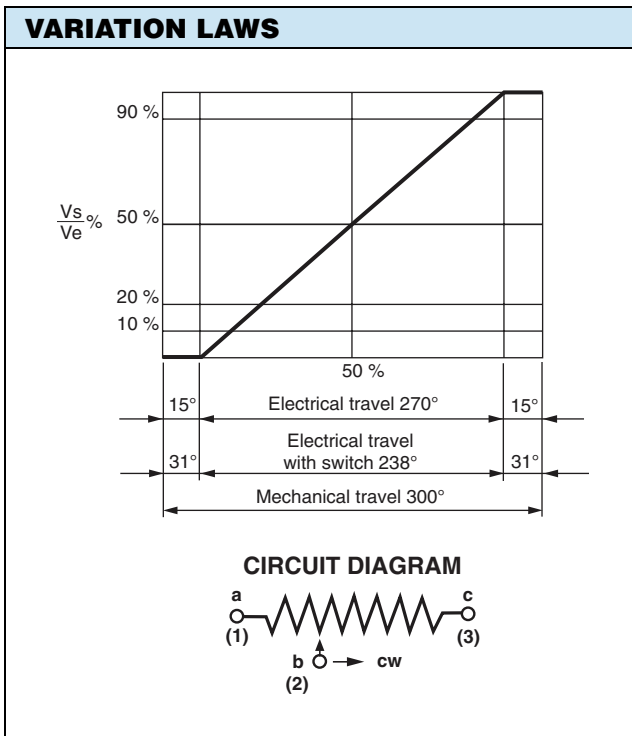
THIRD DIGIT	
0	5.08 mm (0.200") space between modules
3	7.62 mm (0.300") space between modules
4	10.16 mm (0.400") space between modules



THE POSITION OF EACH MODULE IS FREE			
BUSHINGS		mm (± 0.5)	INCHES (± 0.02)
		V	F
E	Leads Z00	3.85	0.150
E	Leads Z1, Z2, A..	3.6	0.140
	F	Leads Z0: 5.08 mm (0.200")	Leads A...Z1, Z2: 3.81 mm (0.150")
J	Leads X.. Y..	7	0.278

ORDERING INFORMATION (Part Number 18 digits)																	
P	1	1	L	2	F	A	G	O	S	Y	0	0	5	0	2	K	A
MODEL	STYLE	NUMBER OF MODULES	BUSHING	LOCATING PEG	SHAFT	SHAFT STYLE	LEADS	RESISTANCE CODE/ TOLERANCE/ TAPER OR SPECIAL									
								Resistance Code: 1K = 102 5K = 502 10K = 103 50K = 503 Tolerance Code: M = 20 %, K = 10 %, J = 5 % Taper: A or special code given by Vishay									

TOLERANCE
Standard: M = ± 20 %
On request: K = ± 10 %, J = ± 5 %



SPECIAL CODES GIVEN BY VISHAY

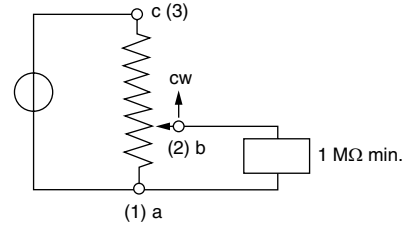
OPTION AVAILABLE

- Custom shaft
- Specific design on request
- Specific linearity
- Multiple assemblies with various modules

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



P11 OPTION: NEUTRAL MODULES “EN”

Neutral or screen module is housed in a standard P11 module. It is used as a screen between two electrical modules.

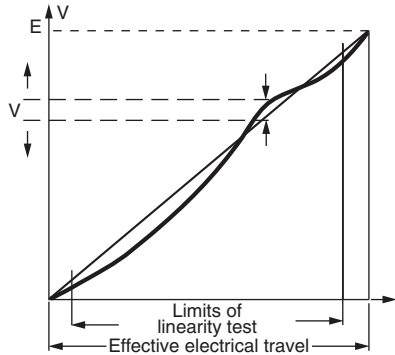
The leads can be connected to ground.

ORDERING INFORMATION (First order only for special code creation)

EN

EN Neutral module

P11 OPTION: SPECIAL LINEARITY - CONFORMITY



The independent linearity (conformity for the non linear laws) is the maximum gap ΔV between the actual variation curve and the theoretical variation curve the nearest to it. The linearity and the conformity are expressed in percentage of the total applied voltage E

$$\text{Linearity conformity} = \frac{\pm \Delta V_{\max.}}{E}$$

They are measured over 90 % of actual electrical travel (centered).

On request linearity can be guaranteed in linear law.

ORDERING INFORMATION (First order only)

J123

J123 Independent linearity $\pm 3\%$ (linear law)
J145 Independent linearity $\pm 2\%$ (linear law)

For other request, contact us.



EXAMPLES OF FIRST ORDER INFORMATION

FIRST EXAMPLE: Triple module (switch is counted as a module)

P 1 1 L 3 V A F G S Y 0 0

MODEL P11	STYLE L	3 MODULES	BUSHING V	LOCATING PEG	STANDARD SHAFT 16 mm FMS SLOTTED	SOLDER LUGS	SPECIAL TO BE DEFINED BY VISHAY
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ORDERING INFORMATION:

PART NUMBER	P11L3VAFGSY00.....		
SHAFT AND BUSHING	See drawing of special shaft attached		
MODULE NO. 1	503 M A		
MODULE NO. 2	103 M A	J123	
MODULE NO. 3	503 M A		

PART NUMBER DESCRIPTION (used on some Vishay document or label, for information only)

P11L	3	V	A	FG	S	Y00				T1927		e3
MODEL	MODULES	BUSHING	LOCATING PEG	SHAFT	SHAFT STYLE	LEADS	VALUE	TOL.	TAPER	SPECIAL	SPECIAL	LEAD (Pb)-FREE



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