P13SM

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Fully Sealed Container Cermet Potentiometers Submarine Applications



LINKS TO ADDITIONAL RESOURCES

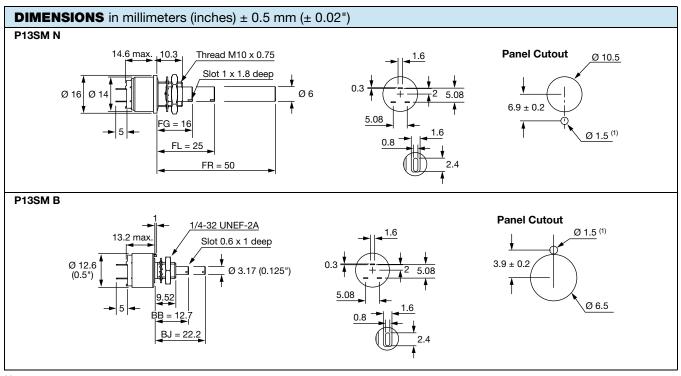
FEATURES

- High power rating 1.5 W at 70 °C
- Stainless steel shaft and bushing to endure sea salt water immersion
 RoHS
 COMPLIANT
- Fully sealed IP68 on panel
- Tight temperature coefficient (± 75 ppm/°C typical)
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>



P13SM is designed for applications which need to set electrical parameters with an immersed potentiometer in deep water conditions up to 30 m (100 feet).

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 68				
Lifespan	25K cycles				



Note

(1) CAUTION: Ø 1.5 of panel cut out must not be fully through-hole

E Undergoes European Quality Insurance System

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ELECTRICAL SPECIFICATIONS					
Resistive element	Cermet				
Electrical travel	270° ± 10°				
Resistance range	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	(%) out ison (%) (%) out ison (%) (%) out ison (%) (%) (%) (%) (%) (%) (%) (%) (%) (%)				
Circuit diagram	$ \begin{array}{c} a \\ c \\ (1) \\ b \\ c \\ (2) \end{array} $				
Power rating	Linear 1.5 W at 70 °C 0.75 W at 70 °C 0.5 Uogarithmic 0.75 W at 70 °C 0.5 Uogarithmic taper 0 0 20 40 60 70 80 100 120 140 Ambient Temperature (°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 %				

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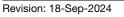
3 For technical questions, contact: sferpottrimmers@vishay.com

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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	± 150
22K	1.5	182	8.26	0.75	128	5.8	± 150
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 SPECIFICAT	IONS		
Mechanical travel			
	Style B	300)° ± 5°
	Style N	310)° ± 5°
Operating torque (typical)		2 Ncm	2.85 oz. inch
End stop torque			
	Style B	35 Ncm max.	3.1 lb inch max.
	Style N	80 Ncm max.	7.1 lb inch max.
Tightening torque of mounting nut			
	Style B	80 Ncm min., 150 Ncm max.	7 lb inch min., 13.3 lb inch max.
	Style N	80 Ncm min., 250 Ncm max.	7 lb inch min., 22.1 lb inch max.
Unit weight		8 g to 27 g	0.3 oz. to 1 oz.
Terminals		e3: r	oure Sn

ENVIRONMENTAL SPECIFICATIONS						
Temperature range	-55 °C to +125 °C					
Climatic category	55 / 125 / 56					
Sealing	Fully sealed - container IP68					
Panel sealing	Immersion at 30 m (100 feet) in sea salt water or clear water					





LINEAR TAPER

MAX.

WORKING

VOLTAGE

v

5.74

8.4

12.2

18.2

26.5

38.7

MAX. CUR.

THROUGH

WIPER

mA

261

177

122

82.6

56.5

38.7

MAX.

POWER

AT 70 °C

w

_

_

-

_

0.75

STANDARD RESISTANCE ELEMENT DATA

MAX.

POWER

AT 70 °C

w

1.5

1.5

1.5

1.5

1.5

1.5

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STANDARD

RESISTANCE

VALUES

Ω

22

47

100

220

470

1K

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MAX. CUR.

THROUGH

WIPER

mA

-

_ 27

LOGS TAPED

MAX.

WORKING

VOLTAGE

v

_

27

TYPICAL

TCR

-55 °C

+125 °C

ppm/°C



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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 \pm 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.					

MARKING

Printed:

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

PACKAGING

In box

Packaging quantity depending on shafts:

- Box of 5 pieces for shaft FR (code BO5)
- Box of 10 pieces for shaft FG or FL (code BO10)
- Box of 15 pieces for shaft BJ (code BO15)
- Box of 25 pieces for shaft BB (code BO25)

Hardware: nuts, washer, and O-ring are separately supplied (not mounted on the potentiometer), in a small bag placed in the packaging.

PERFORMANCE								
TEOTO		TYPICAL VALUES AND DRIFTS						
TESTS	CONDITIONS	∆ R т/ R т (%)	∆ R ₁₋₂ / R ₁₋₂ (%)	OTHER				
Electrical endurance	1000 h at rated power 90'/30' - ambient temperature 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 % HR	± 0.5 %	±1%	Dielectric strength: 1000 V Insulation resistance: > $10^4 M\Omega$				
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 <i>g</i> 's during 6 h	± 0.1 %	-	$\Delta V_{1-2}/V_{1-3} < \pm 0.2$ %				

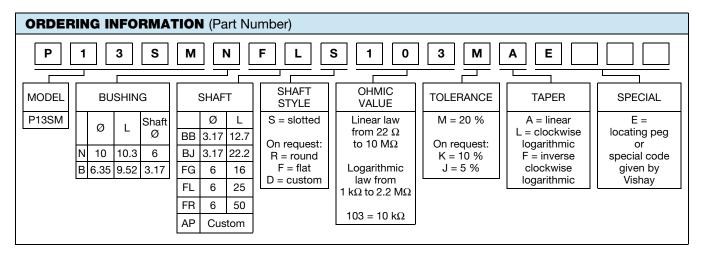
Note

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



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PART	NUMBE	R DESC	RIPTIC	DN (for	informa	ation only)						
P13SM	Ν	E	FL	S	10K	20 %	Α		BO10			e3
MODEL	BUSHING	SPECIAL	SHAFT	SHAFT STYLE	VALUE	TOLERANCE	TAPER	SPECIAL	PACKAGING	SHAFT	SPECIAL	LEAD (Pb)-FREE

ACCESSORIES	
Additional Accessories (to order separately)	www.vishay.com/doc?51051
Control knobs	www.vishay.com/doc?51101

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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