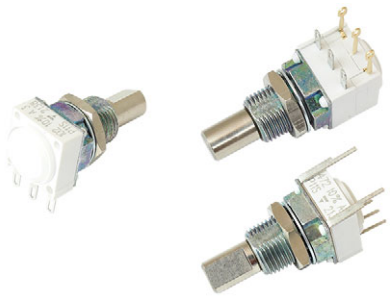
12.5 mm Modular High Torque Panel Potentiometer



FEATURES

- Keep the setting under high mechanical constraints (vibrations, shocks, ...)
- High torque (8 Ncm) with smooth feeling during all potentiometer life
- Torque stability under high environmental constraints
- 12.5 mm square single turn panel control with 6.35 mm shaft diameters
- Custom designs upon request
- Compact, versatile, modular, and robust
- Tests according to CECC 41000 or IEC 60393-1
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

LINKS TO ADDITIONAL RESOURCES

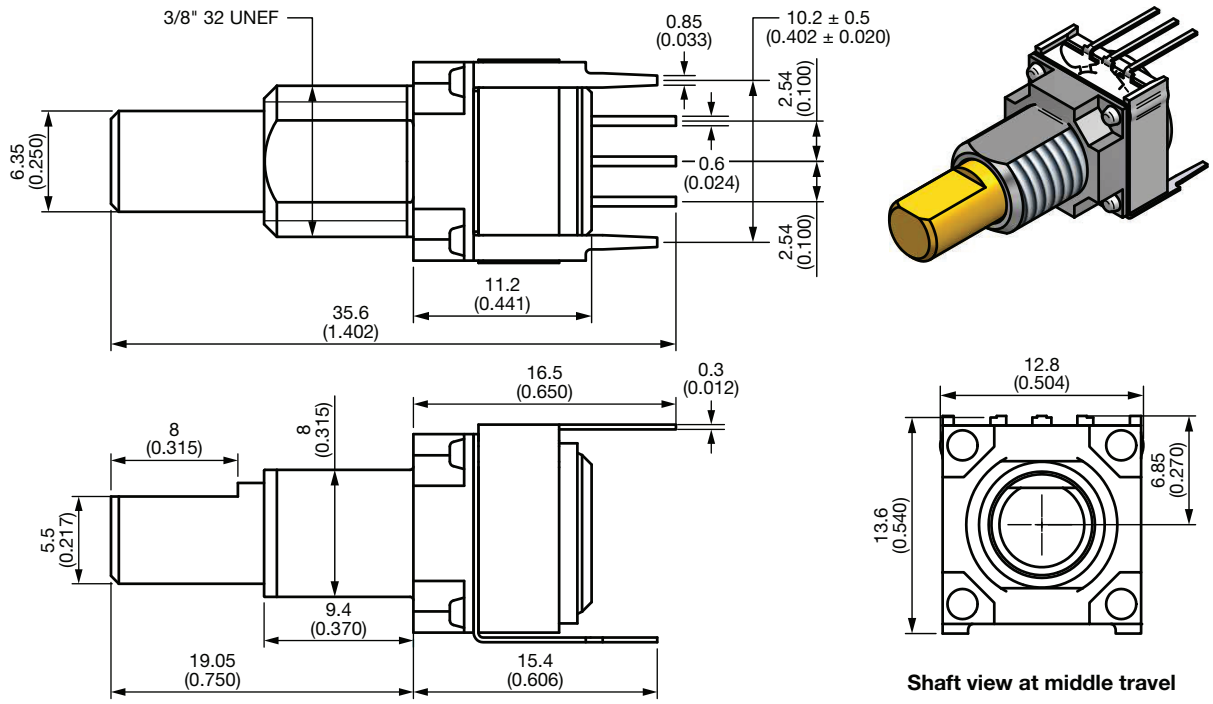
3D Models

Capabilities and Custom Options

QUICK REFERENCE DATA	
Multiple module	Up to 7 modules
Switch module	Yes
Detent module	n/a
Special electrical laws	A: linear
Sealing level	IP 64
Lifespan	50K cycles

CONFIGURATION EXAMPLE - Dimensions in millimeters (inches) ± 0.5 mm (± 0.02")

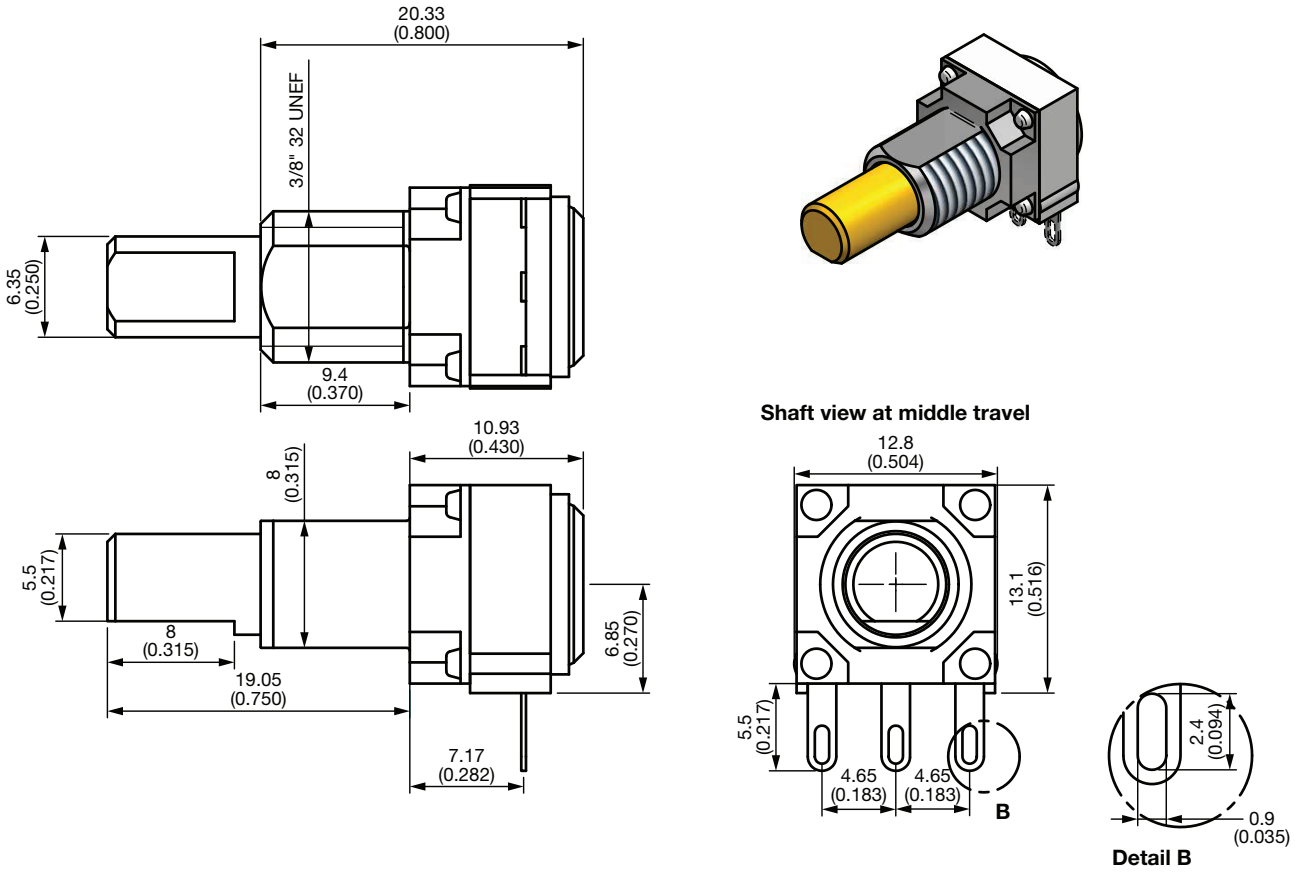
EXAMPLE: P11H1F0GHFW10102KA



Shaft view at middle travel

CONFIGURATION EXAMPLE - Dimensions in millimeters (inches) ± 0.5 mm (± 0.02")

EXAMPLE: P11H1F0GHFY00102KA



CUSTOM CAPABILITIES

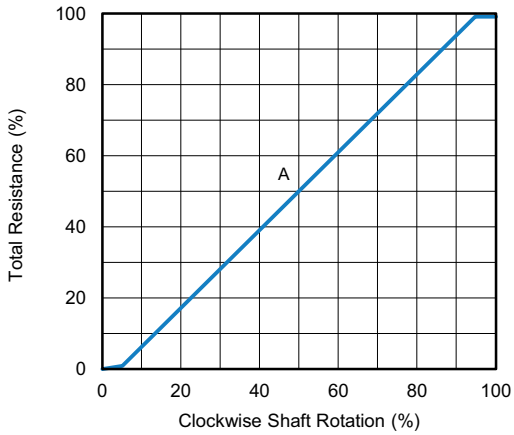
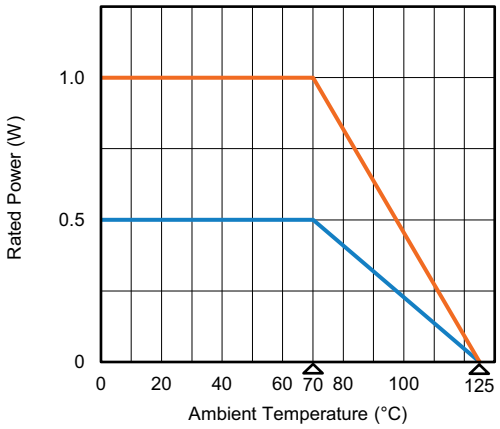
P11H model can be fully customized:

- Custom shafts
- Switch option
- Connector and wire
- Special leads
- Special taper
- One to 7 modules
- ...

When special shafts are required (special shaft lengths, diameter etc.) a drawing is required.

Hardware supplied in separate bags.

GENERAL SPECIFICATIONS

ELECTRICAL (initial)	
Resistive element	Cermet element
Electrical travel	270° ± 10°
Resistance range [1]	1 kΩ, 4.7 kΩ, 10 kΩ, 47 kΩ, 100 kΩ, 100 Ω, 220 Ω, 50 Ω, 2.2 kΩ, 22 kΩ, 50 kΩ, 220 kΩ, 500 kΩ, 1 MΩ
Tolerance	5 % (on request), ± 10 %, ± 20 %
Taper standard law: A (linear) (other custom laws upon request)	
Circuit diagram	
Power rating at 70 °C	1 W for single module or 0.5 W per module 
Temperature coefficient (typical)	± 150 ppm
Limiting element voltage	350 V
End resistance (typical)	2 Ω
Contact resistance variation (typical)	2 % or 3 Ω
Independent linearity (typical)	± 5 %
Insulation resistance	10^6 MΩ min.
Dielectric strength	1500 V_{RMS} min.
Mechanical endurance	50 000 cycles

Note

[1] Consult Vishay Sfernice for other ohmic values

MECHANICAL (initial)	
Mechanical travel	300° ± 5°
Operating torque (typical)	8 Ncm ± 3 Ncm (7.08 oz.-inch to 15.6 oz.-inch)
End stop torque	80 Ncm max. (6.8 lb-inch max.)
Tightening torque	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

MARKING

Potentiometer module Vishay logo, SAP code of ohmic value and tolerance in %, variation law, manufacturing date (four digits), “3” for the lead 3

PACKAGING

- Box

PERFORMANCES

TESTS	CONDITIONS	TYPICAL VALUE AND DRIFTS	
Electrical endurance	1000 h at rated power 90’/30’ at ambient temp. 70 °C	$\Delta R_T/R_T$ Contact resistance variation	± 2 % ± 4 %
Change of temperature	5 cycles, -55 °C to +125 °C, 30’ per cycle	$\Delta R_T/R_T$ Operating torque	± 0.2 % > 2 Ncm (2.8 oz.-inch)
	Severe stress: 90 cycles, -40 °C to +80 °C, 4 h per cycle	Δ Operating torque / torque (%)	< 35 %
Damp heat, steady state	+40 °C, 93 % relative humidity, 56 days	$\Delta R_T/R_T$ Insulation resistance Δ Operating torque / torque (%)	± 2 % > 1000 MΩ < 20 %
Mechanical endurance	50 000 cycles	$\Delta R_T/R_T$ Contact resistance variation Δ Operating torque / torque (%)	± 5 % ± 5 % > 5 Ncm
Shock	50 *g*, 11 ms 3 shocks - 3 directions	$\Delta R_T/R_T$ $\Delta R_{1-2}/R_{1-2}$ Δ Operating torque / torque (%)	± 0.2 % ± 0.5 % < 13 %
Vibration	10 Hz to 55 Hz 0.75 mm or 10 *g*, 6 h	$\Delta R_T/R_T$ $\Delta V_{1-2}/V_{1-3}$ Δ Operating torque / torque (%)	± 0.2 % ± 0.5 % < 11 %

Note

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

ORDERING INFORMATION (part number)

P	1	1	H	1	F	0	G	H	F	W	1	0	1	0	3	K	A

MODEL	NUMBER OF MODULES	BUSHING	LOCATION PEG	SHAFT	SHAFT STYLE	LEADS	RESISTANCE CODE	TOLERANCE	TAPER OR SPECIAL
P11H	1 2 3 4 5 6 7	F	A, B, C, D = see “Location Pegs” table 0 = without peg	GH AP = particular shaft	F	W10 = vertical mounting, PCB pin Y00 = solder lugs Other styles on request	102 = 1 kΩ 472 = 4.7 kΩ 502 = 5 kΩ 103 = 10 kΩ 473 = 47 kΩ 104 = 100 kΩ 101 = 100 Ω 221 = 220 Ω 501 = 500 Ω 222 = 2.2 kΩ 223 = 22 kΩ 503 = 50 kΩ 224 = 220 kΩ 504 = 500 kΩ 105 = 1 MΩ	M = ± 20 % K = ± 10 % On request: J = 5 %	A Other on request

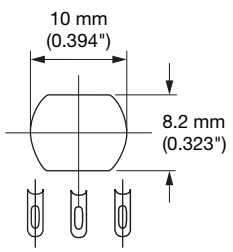
OR SPECIAL CODE

SPECIAL CODES GIVEN BY VISHAY

Options available:

- Custom shaft
- Specific linearity, interlinearity, taper
- Multiple assemblies with various modules
- Wires, connectors
- Switch modules
- PCB adding
- Custom design on request

PANEL CUT OUT (± 0.5 mm)



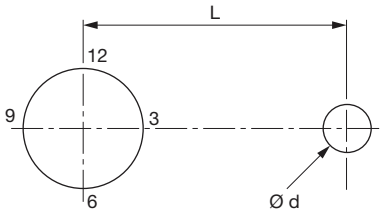
STANDARD RESISTANCE ELEMENT DATA

STANDARD RESISTANCE VALUES	MAX. POWER AT 70 °C	MAX. WORKING VOLTAGE	MAX. WIPER CURRENT
Ω	W	V	mA
1K	1	31.6	31.6
4.7K	1	69	14.5
10K	1	100	10
47K	1	21.7	46.1
100K	1	31.6	31.6
100	1	10	100
220	1	14.8	67.4
470	1	21.7	46.1
500	1	22.4	44.7
1K	1	31.6	31.6
2.2K	1	46.9	21.3
4.7K	1	69	14.5
5K	1	70.7	14.1
10K	1	100	10.0
22K	1	148	6.74
47K	1	217	4.61
50K	1	224	4.47
100K	1	316	3.16
220K	0.56	350	1.59
470K	0.26	350	0.75
500K	0.25	350	0.70
1M	0.12	350	0.35

LOCATING PEGS (anti-rotation lug)

The locating peg is provided by a plate mounted on the bushing and positioned by the module sides. Four set positions are available, clock face orientation: 12, 3, 6, 9.

All P11 bushings have a double flat. When panel mounting holes have been punched accordingly, an anti-rotation lug is not necessary.

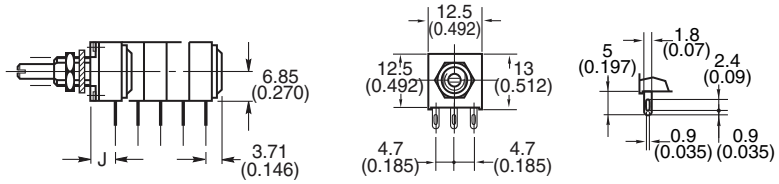


CODE	VERSION	BUSHING	EFFECTIVE HIGH PEG
A	Ø d mm	2	0.7
	L mm	6.2	
B	Ø d mm	2	0.7
	L mm	7.75	
C	Ø d mm	3.5	1.1
	L mm	13.5	

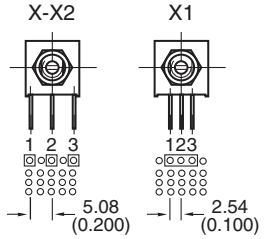
Locating pegs are supplied in separate bags with nuts and washers.

LEADS CONFIGURATION EXAMPLES (on request) - Dimensions in millimeters (inches)

SOLDER LUGS Y

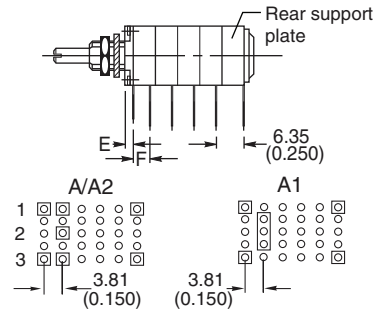


PCB PIN OUT

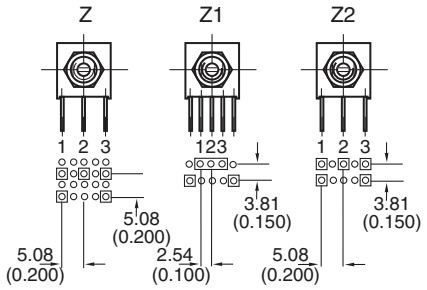


HORIZONTAL MOUNTING

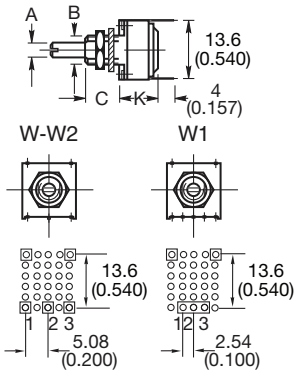
FRONT AND REAR SUPPORT PLATES



FRONT SUPPORT PLATE



VERTICAL MOUNTING



Note

- Standard version: Y00 W10. Other styles on request

P11 OPTION: ROTARY SWITCH MODULES

- Rotary switches
- Current up to 2 A
- Actuation CW or CCW position
- Sealing IP 60

The position of each switch module is free. Leads finish: Gold plated RS and RSI rotary switches are housed in a standard P11 module size 12.7 mm x 12.7 mm x 5.08 mm (0.5" x 0.5" x 0.2"). They have the same terminal styles as the assembled electrical modules. An assembly can comprise one or more switch modules. Switch actuation is described as seen from the shaft end.
D: means actuation in maximum CCW position
F: means actuation in maximum CW position
The switch actuation travel is 25° with a total mechanical travel of 300° ± 5° and electrical travel of electrical modules is 238° ± 10°.

RSD SINGLE POLE SWITCH, NORMALLY OPEN
In full CCW position, the contact between 1 and 3 is open. It is made at the beginning of the travel in CW direction.

RSF SINGLE POLE SWITCH, NORMALLY OPEN
In full CW position, the contact between 1 and 3 is open. It is made at the beginning of the travel in CCW direction.

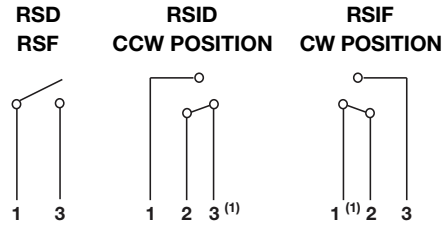
RSID SINGLE POLE CHANGEOVER
In full CCW position, the contact is made between 3 and 2, and open between 3 and 1. Switch actuation (CW direction) reverses these positions.

RSIF SINGLE POLE CHANGEOVER
In full CW position, the contact is made between 1 and 2, and open between 1 and 3. Switch actuation (CCW direction) reverses these positions.

SWITCH SPECIFICATIONS		
Switching power maximum		62.5 VA ν 15 VA =
Switching current maximum		0.25 A 250 V ν 0.5 A 30 V =
Maximum current through element		2 A
Contact resistance		100 mΩ
Dielectric strength	Terminal to terminal	1000 V_{RMS}
	Terminal to bushing	2000 V_{RMS}
Maximum voltage operation		250 V ν 30 V =
Insulation resistance between contacts		10^6 MΩ
Life at $P_{max.}$		10 000 actuations
Minimal travel		25°
Operating temperature		-40 °C to +85 °C

RSD SPST: single pole, open switch in CCW position - 2 pins
RSF SPST: single pole, open switch in CW position - 2 pins
RSID SPDT: single pole, changeover switch in CCW position - 3 pins
RSIF SPDT: single pole, changeover switch in CW position - 3 pins

ELECTRICAL DIAGRAM



Note
(1) Common

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
Capabilities and Custom Options	www.vishay.com/doc?48463

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