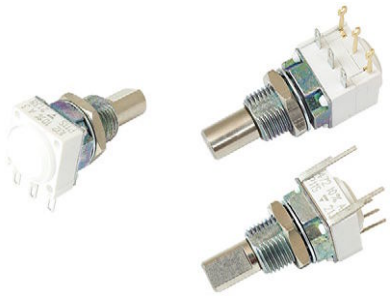
12.5 mm Modular High Torque Panel Potentiometer



LINKS TO ADDITIONAL RESOURCES

3D Models

FEATURES

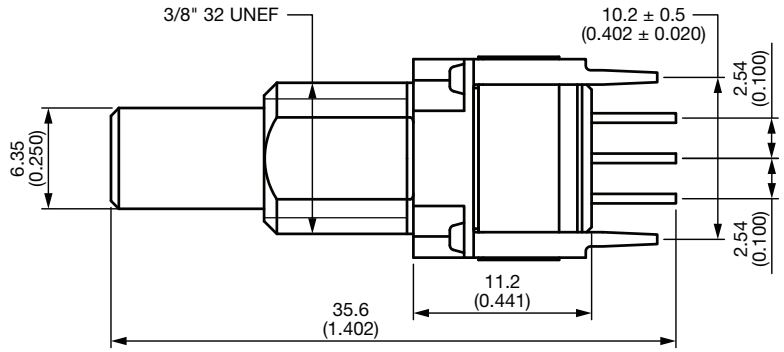
- Keep the setting under high mechanical constraints (vibrations, shocks, ...)
- High torque (8 Ncm) with smooth feeling during all potentiometer life
- Torque stability under high environmental constraints
- 12.5 mm square single turn panel control with 6.35 mm shaft diameters
- Custom designs upon 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

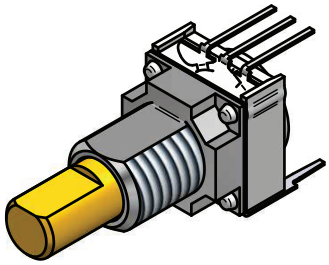
RoHS COMPLIANT

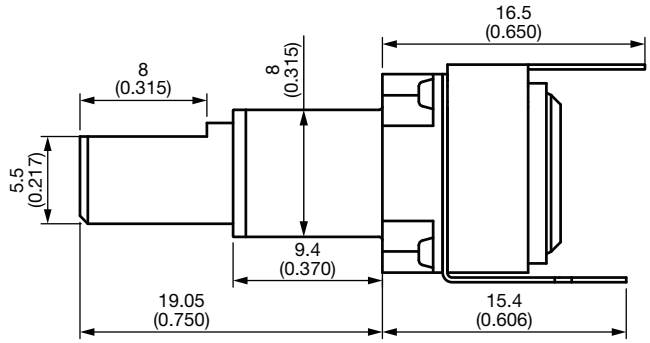
QUICK REFERENCE DATA	
Multiple module	Up to 7 modules
Switch module	Yes
Detent module	n/a
Special electrical laws	A: linear
Sealing level	IP 64
Lifespan	50K cycles

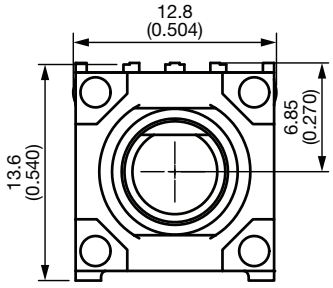
CONFIGURATION EXAMPLE - Dimensions in millimeters (inches) ± 0.5 mm (± 0.02")

EXAMPLE: P11H1F0GHFW10102KA





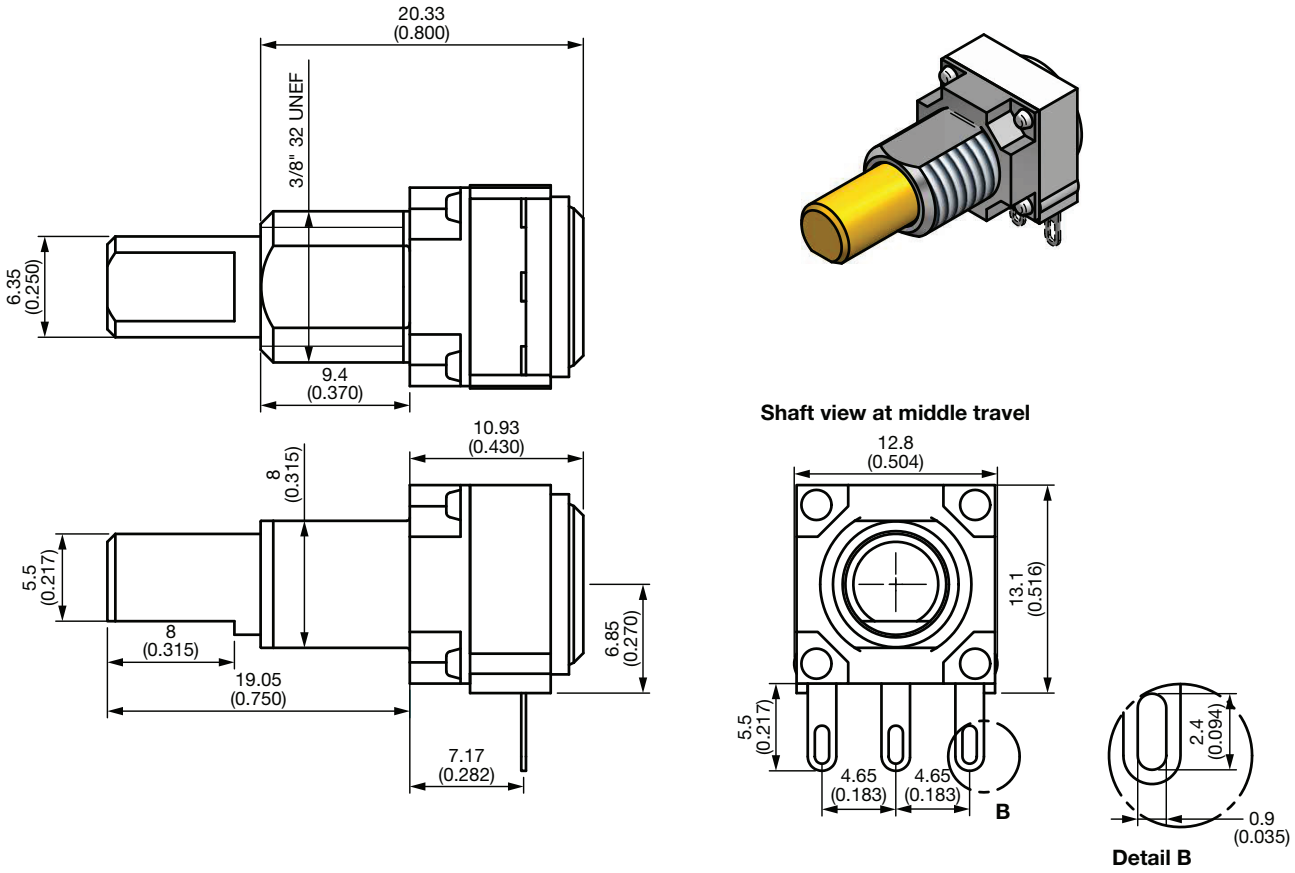




Shaft view at middle travel

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

EXAMPLE: P11H1F0GHFY00102KA



CUSTOM CAPABILITIES

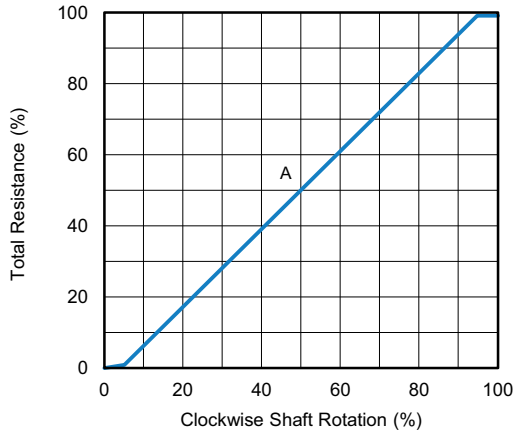
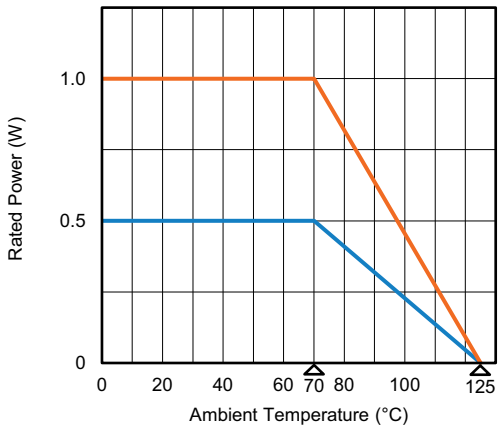
P11H model can be fully customized:

- 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
Tolerance	± 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 ± 2 Ncm (8.49 oz.-inch to 14.16 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 % < 20 %
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 % < 11 %
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	M = ± 20 % K = ± 10 %	A Other on request

OR SPECIAL CODE

SPECIAL CODES GIVEN BY VISHAY

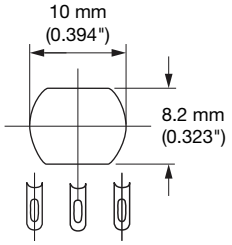
Options available:

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

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	217	4.61
100K	1	316	3.16

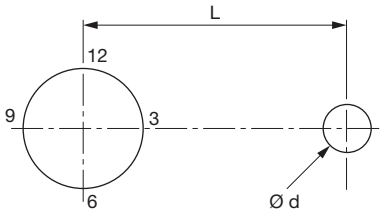
PANEL CUT OUT (± 0.5 mm)



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.

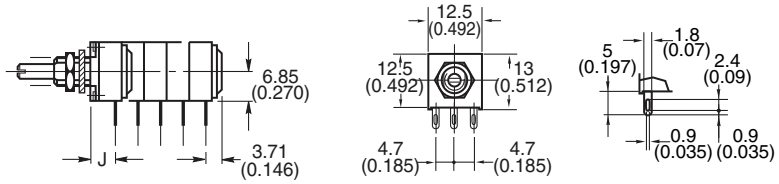


CODE	VERSION	BUSHING	EFFECTIVE HIGH PEG
A	Ø d mm	2	0.7
	L mm	6.2	
B	Ø d mm	2	0.7
	L mm	7.75	
C	Ø d mm	3.5	1.1
	L mm	13.5	

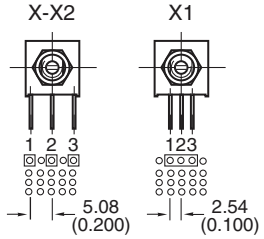
Locating pegs are supplied in separate bags with nuts and washers.

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

SOLDER LUGS Y

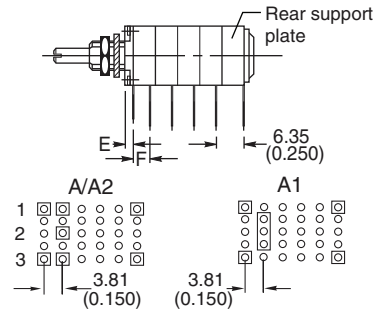


PCB PIN OUT

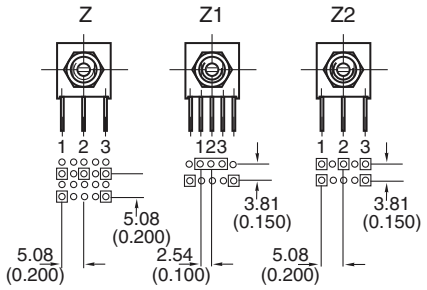


HORIZONTAL MOUNTING

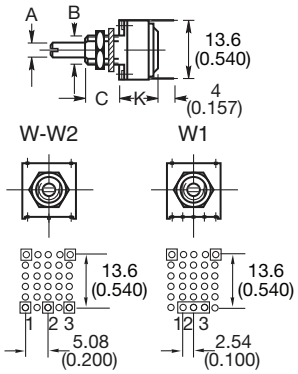
FRONT AND REAR SUPPORT PLATES



FRONT SUPPORT PLATE



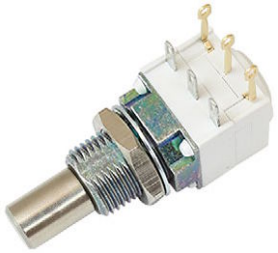
VERTICAL MOUNTING



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.

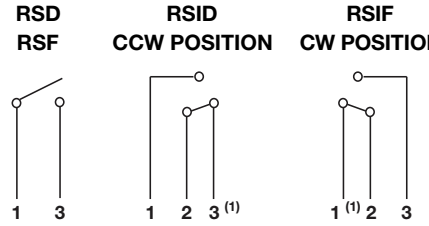
RSID SINGLE POLE CHANGEOVER
In full CCW position, the contact is made between 3 and 2, and open between 3 and 1. Switch actuation (CW direction) reverses these positions.

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

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

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.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

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.