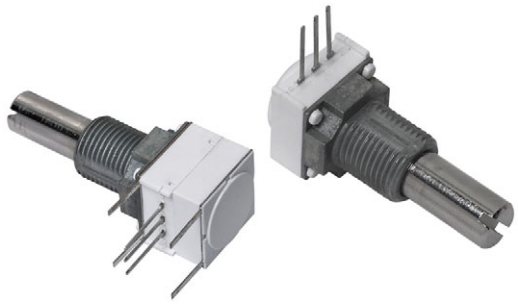
1/2" (12.7 mm) Conductive Plastic and Cermet Potentiometer



FEATURES

- High rotational life (50 000 cycles)
- Up to three sections PC support plates
- Rotary switches, tactile feedback, and solder lugs terminals available
- Tests according to CECC 41000 or IEC 60393-1
- Construction: dust proof (sealing in option)
- Industrial grade
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

LINKS TO ADDITIONAL RESOURCES

3D Models

QUICK REFERENCE DATA	
Multiple module	Up to 3 modules
Switch module	Yes
Detent module	Yes
Special electrical laws	A: linear, L: logarithmic, F: reverse logarithmic
Sealing level	IP 64
Lifespan	50K cycles

148 FEATURES

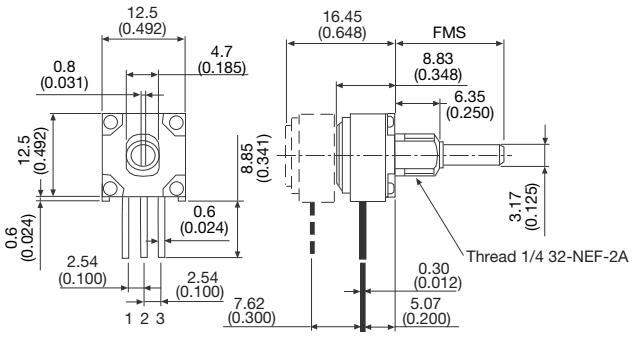
- Conductive plastic element
- Quiet electrical output

149 FEATURES

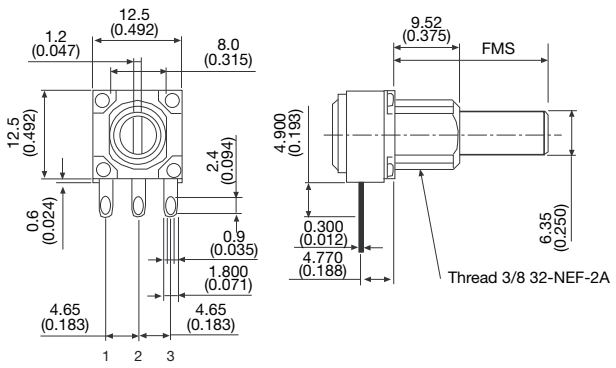
- Cermet element
- Low temperature coefficient (± 150 ppm/°C)

DIMENSIONS in millimeters (inches) ± 0.5 mm (± 0.02")

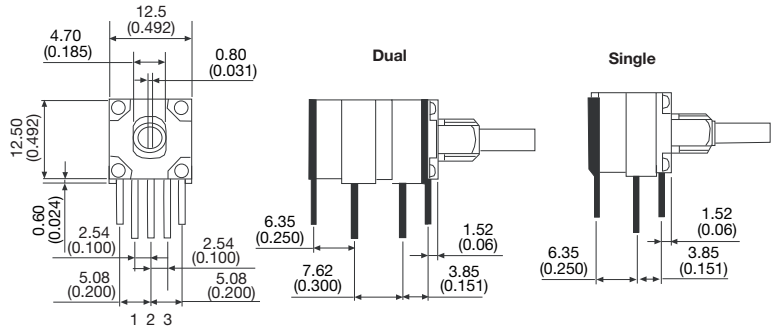
Single, dual or triple

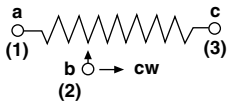


Solder lug terminals



Front and rear support plates
E = flush with board surface



ELECTRICAL SPECIFICATIONS			
PARAMETER		**148**	**149**
Resistance range	Linear	1 kΩ to 500 kΩ	100 Ω to 2 MΩ
	Non-linear	500 Ω to 250 kΩ	250 Ω to 1 MΩ
Tolerance	Linear	10 %	10 %
	Non-linear	20 % on request 10 %	10 %
Linearity (typical)		± 5 % independent	
End resistance		4 Ω maximum each end	
Power rating		0.5 W at 70 °C 0 W at 120 °C	1 W at 70 °C 0 W at 150 °C
		Non-linear or PC mount, derate 50 %	
Circuit diagram			
Effective rotation		270° ± 10 ° without rotary switch 238° ± 10 ° with rotary switch	
Contact resistance variation (typical)		1.5 % of total resistance	3 % of total resistance
Maximum continuous working voltage		350 V_{AC} across end terminals, but within power rating	
Dielectric withstanding voltage		Sea level -750 V_{AC}	
Temperature coefficient (typical)		± 500 ppm/°C	± 150 ppm/°C

MECHANICAL SPECIFICATIONS		
Mechanical travel		300° ± 5°
Operating torque (typical)		Single section 0.2 oz. to 3.0 oz. - in dual or triple section 0.3 oz.-inch to 4.5 oz.-inch
End stop torque	Bushing A and B	2.2 lb-inch max.
	Bushing F	6.8 lb-inch max.
Weight (approx.)	Single	0.19 oz.
	Dual	0.27 oz.
	Triple	0.35 oz.
Terminals	Electrical elements	e3: pure Sn
	Switch elements	e4: gold plated

ENVIRONMENTAL SPECIFICATIONS		
	148	**149**
Operating temperature	-40 °C to +125 °C	-40 °C to +125 °C
Storage temperature	-55 °C to +125 °C	-55 °C to +125 °C
Temperature cycling (5 cycles)	-40 °C to +125 °C (4 % ΔR_T)	-40 °C to +125 °C (3 % ΔR_T)
Load life (1000 h rated load at 70 °C)	10 % ΔR_T	5 % ΔR_T
Mechanical endurance	50 000 cycles	
Sealing	IP64	

Note

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

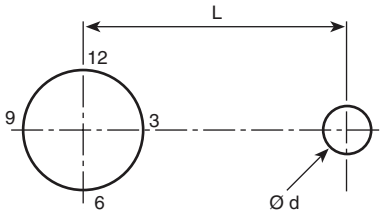
MARKING

Vishay logo, SAP code of ohmic value, tolerance in %, variation law, manufacturing date (four digits), “3” for the lead 3, product series (148, 149)

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 148, 149 bushings have a double flat. When panel mounting holes have been punched accordingly, an anti-rotation lug is not necessary.



CODE	VERSION	BUSHING A, B	BUSHING F	EFFECTIVE HIGH PEG
A	Ø d mm	2	2	0.7
	L mm	6.2	6.2	-
B	Ø d mm	2	2	0.7
	L mm	7.75	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

RSID OPTION: ROTARY SWITCH MODULES

- Rotary switches
- Current up to 2 A
- SPDT: single pole, changeover switch in CCW position - 3 pins
- Sealing IP60

MODULES: RSID ON / OFF SWITCH

Switch module in last position.
Rotary switches are housed in a standard 148, 149 module size 12.5 mm x 12.5 mm x 5.08 mm (0.5" x 0.5" x 0.2"). They have the same terminal styles as the assembled electrical modules.

Switch actuation is described as seen from the shaft end.
D: means actuation in maximum CCW position

The switch actuation travel is 25° with a total mechanical travel of 300° ± 5° and electrical travel of electrical modules is 238° ± 10°.

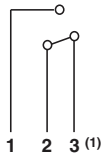
RSID Single Pole CHANGEOVER

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.

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

ELECTRICAL DIAGRAM

RSID
CCW POSITION



Note
(1) Common

ORDERING INFORMATION (part number)

1	4	8	1	0	F	0	G	J	S	X	1	0	1	0	3	K	A

MODEL	NUMBER OF MODULES	SWITCH / DETENT	BUSHING	LOCATING PEG	SHAFT	SHAFT END	LEADS	RESISTANCE CODE / TOLERANCE / TAPER OR SPECIAL
148 = plastic conductive 149 = cermet element	1 2 3	1 = RSID 2 = CV1M 3 = CV21 0 = without switch	See table “Bushing”	0 = without A B C	See table “Shaft”	S = slotted On request: R = round F = flatted	See table “Leads”	Resistance code: 101 = 100 Ω to 105 = 1 MΩ Tolerance code: M = 20 %; K = 10 % Taper: A (S); L (Z); F (R) or special code given by Vishay

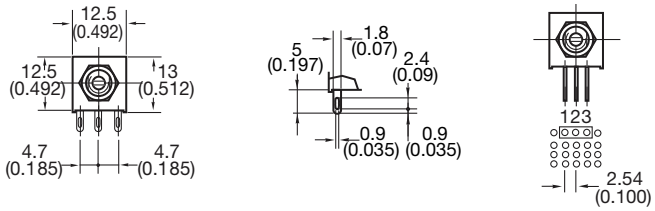
BUSHING

	Ø	L	OLD CODES
A	1/4"	1/4"	N
B	1/4"	3/8"	J
F	3/8"	3/8"	G

LEADS

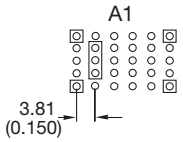
	TYPE	PIN SPACING	SPACE BETWEEN MODULES	OLD CODES
X10	PCB pins	2.54 mm (0.100")	n/a	P
X13			7.62 mm (0.300")	
A10	PCB pins and support plates	2.54 mm (0.100")	n/a	E
A13			7.62 mm (0.300")	
Y00	Sold, lugs	4.65 mm (0.183")	n/a	S
Y03			7.62 mm (0.300")	

SOLDER LUGS Y



PCB PIN OUT

FRONT AND REAR SUPPORT PLATES



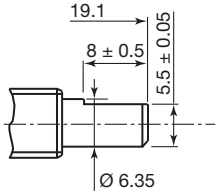
SHAFT

	Ø	FMS	OLD CODES
BB	1/8"	1/2"	32
BG	1/8"	5/8"	40
BH	1/8"	3/4"	48
BJ	1/8"	7/8"	56
GB	1/4"	1/2"	32
GG	1/4"	5/8"	40
GH	1/4"	3/4"	48
GJ	1/4"	7/8"	56
GL	1/4"	1"	64
GN	1/4"	1 1/4"	80

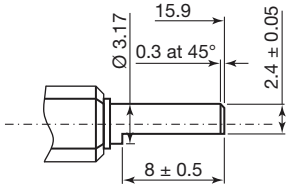
The shaft length is always measured from the mounting face. Standard shafts are designed by a 3 letters code (3 digits). Shafts slots are aligned to ± 10° of the wiper position. All standard shafts are slotted except flatted and splined, see exceptions for bushing.

FLATTED SHAFT

Bushing: F
Shaft: GHF

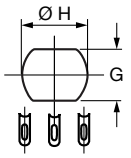


Bushing: A
Shaft: BGF

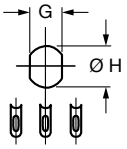


PANEL CUT OUT

Bushing
F



Bushings
A, B

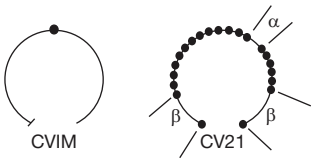


DETENT OPTION (haptic technology)

Detent option is a positive tactile feedback.
The detents mechanism is housed in a standard P11 module.
Up to 21 detent positions available. Detent module in last position.

Available: CV1M
CV21

Mechanical endurance: 10 000 cycles



ORDERING INFORMATION
(first order only for special code creation)

CV1M

CV1M 1 detent at half travel
CV21 21 detents

PART NUMBER DESCRIPTION (for information only)

148	1	0	F	0	GJ	S	X10	BO50	10K	10 %	A			e3
MODEL	MODULES	SWITCH	BUSHING	LOCATING PEG	SHAFT	SHAFT	LEADS	PACK.	VALUE	TOL.	TAPER	SPECIAL	SPECIAL	LEAD FINISH

ACCESSORIES

Potentiometers are delivered with accessories (nut, washer...)	
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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