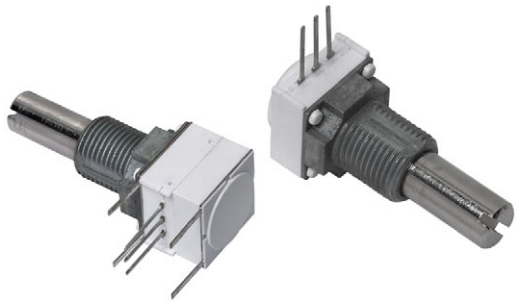
1/2" (12.7 mm) Conductive Plastic and Cermet Potentiometer



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

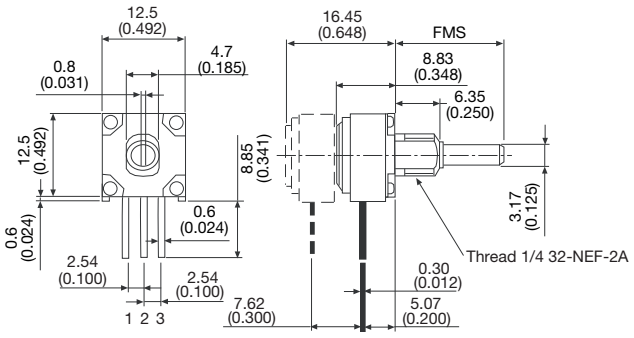
- Conductive plastic element
- Quiet electrical output

149 FEATURES

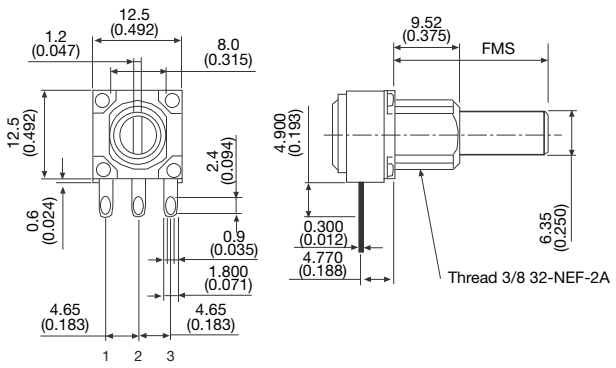
- Cermet element
- Low temperature coefficient (± 150 ppm/°C)

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

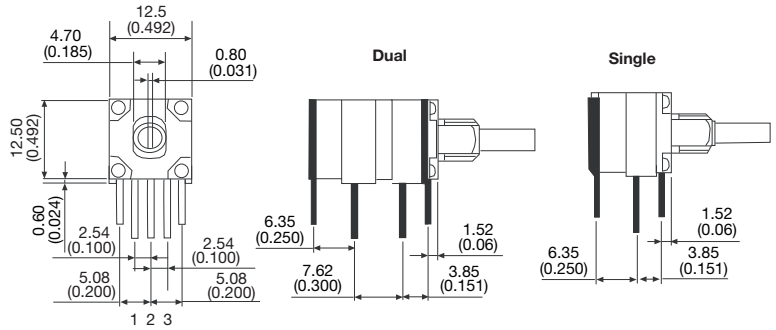
Single, dual or triple



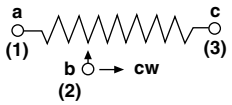
Solder lug terminals



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 240° ± 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	2.1 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

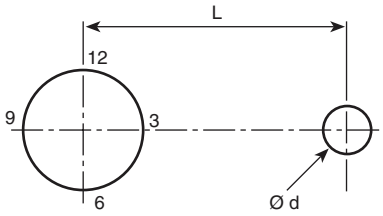
MARKING

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.

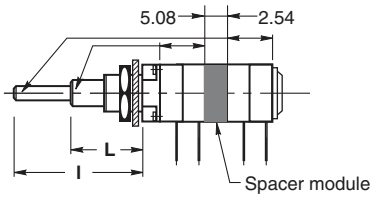
All 148, 149 bushings have a double flat. When panel mounting holes have been punched accordingly, an anti-rotation lug is not necessary.



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: RS ON/OFF SWITCH
RSI CHANGEOVER SWITCH

The position of each module is free.
RS and RSI rotary switches are housed in a standard 148, 149 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 1 or more switch 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°.

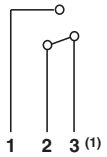
RSID Single Pole CHANGEOVER

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")	

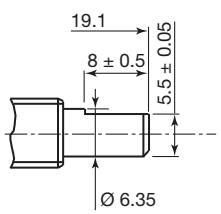
SHAFT

	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

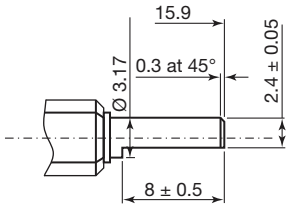
The shaft length is always measured from the mounting face. Standard shafts are designed by a 3 letters code (3 digits). Shafts slots are aligned to ± 10° of the wiper position. All standard shafts are slotted except flatted and splined, see exceptions for bushing.

FLATTED SHAFT

Bushing: F
Shaft: GHF



Bushing: A
Shaft: BGF

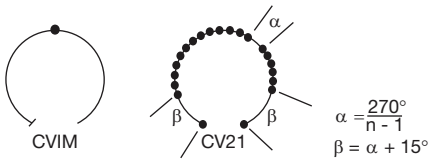


DETENT OPTION (haptic technology)

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

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

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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