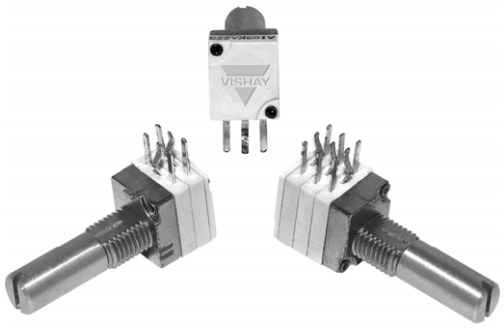
9 mm Multi-Ganged Potentiometer



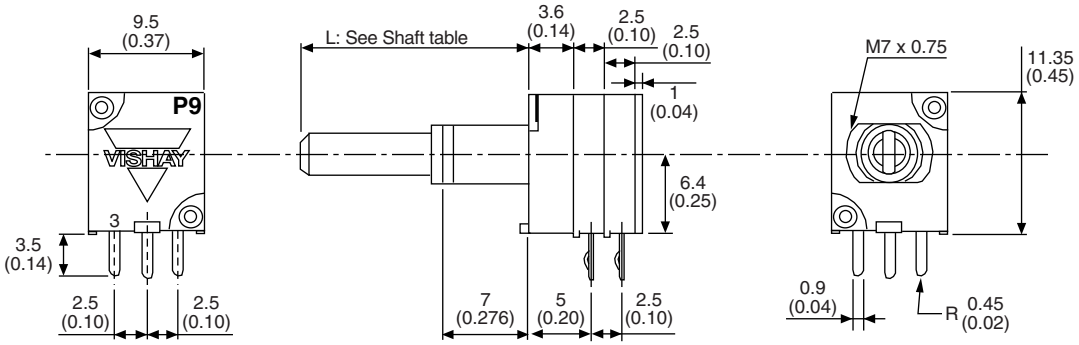
FEATURES

- Conductive plastic element
- Ultra compact (extra miniature module size)
- Multiple assemblies (up to seven modules)
- Shaft and panel sealed option
- Center mechanical detent fully integrated in option
- Center tap option
- Custom designs available on request
- Test according to CECC 41000 or IEC 60393-1
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

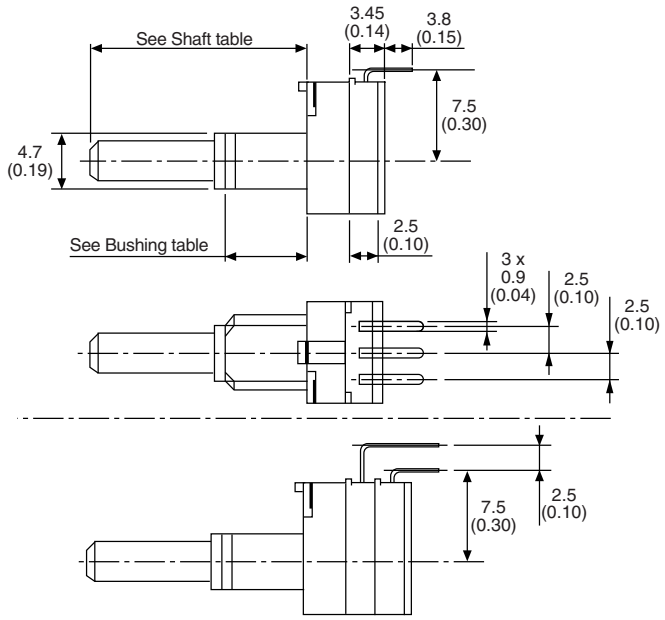
RoHS COMPLIANT

QUICK REFERENCE DATA	
Multiple module	Up to 7 modules
Switch module	n/a
Detent module	Yes
Special electrical laws	A: linear, L: logarithmic, F: reverse logarithmic and others see specification
Sealing level	IP 64
Lifespan	25K cycles

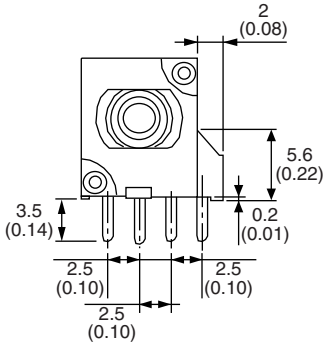
DIMENSIONS in millimeters (inches) ± 0.5 mm (± 0.02")



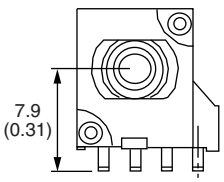
Vertical Mounting



Center Tap



Center Tap and Vertical Mounting



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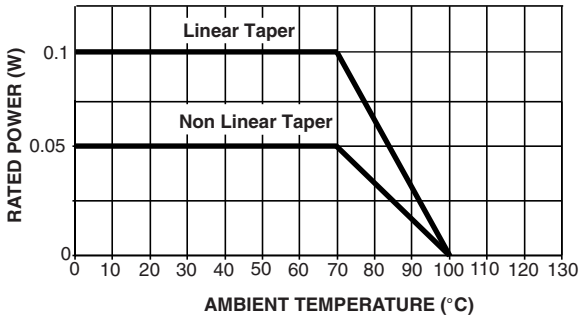
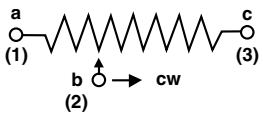
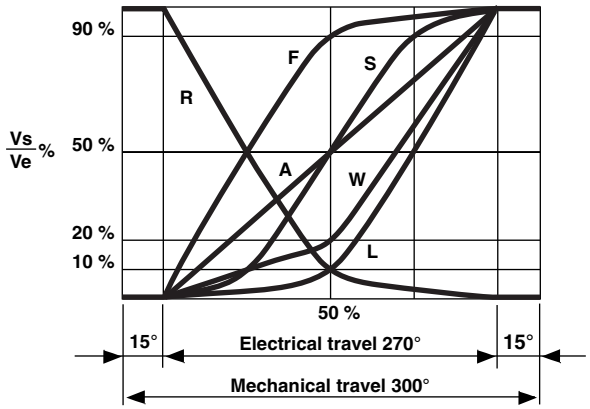
GENERAL SPECIFICATIONS

ELECTRICAL SPECIFICATIONS		
Resistive element		Conductive plastic
Electrical travel		270° ± 10°
Power rating chart		
Circuit diagram		
Taper		
Resistance range	**Linear taper**	1 kΩ to 1 MΩ
	Non-linear taper	2.2 kΩ to 500 kΩ
Tolerance	**Standard**	20 %
	On request	10 %
Power rating at 70 °C	**Linear Taper**	0.1 W
	Non-Linear Taper	0.05 W
	Multiple assemblies linear taper	0.05 W per module
	Multiple assemblies non-linear taper	0.025 W per module
Temperature coefficient (typical)		± 500 ppm
Limiting element voltage		10 V_{DC} 50 V_{AC}
End resistance (typical)		3 Ω
Contact resistance variation	**Linear law (typical)**	2 % of nominal resistance
Independent linearity	**Linear law (typical)**	± 5 %
Insulation resistance		100 MΩ at 250 V_{DC}
Dielectric strength		300 V_{AC} during 1 min
Attenuation (typical)		90 dB max./0.05 dB min.

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MECHANICAL SPECIFICATIONS	
Mechanical travel	25 000 cycles min.
Mechanical travel	300° ± 5
Operating torque	0.2 Ncm to 1.5 Ncm (0.3 oz.-inch to 1.8 oz.-inch)
End stop torque	50 Ncm max. (4.4 lb-inch max.)
Shaft push/pull force	7 DaNcm max. (15.7 lbf max.)
Weight (one module)	6.25 g (without nut and washer) (0.22 oz.)

Note

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

ENVIRONMENTAL SPECIFICATIONS	
Temperature range	-55 °C to +100 °C
Climatic category	55/100/21
Sealing	IP 64

MARKING

- Code for tolerance
- Code for ohmic value
- Taper
- Code for date code

PACKAGING

- Box of 25 pieces
- Box of 100 pieces

PERFORMANCE

TESTS	CONDITIONS	TYPICAL VALUE AND DRIFTS		
		$\Delta R_T/R_T$ (%)	$\Delta R_{1\text{-}2}/R_{1\text{-}2}$ (%)	OTHER
Electrical endurance	1000 h at rated power 90'/30' - ambient temp. 70 °C	± 5 %	± 10 %	Contact resistance variation < 5 % Rn
Damp heat, steady state	21 days at 40 °C ± 2 °C and 90 % to 95 % relative humidity	± 5 %	-	Insulation resistance > 10 MΩ
Change of temperature	Ambient temperature -55 °C to +100 °C 5 cycles	± 0.5 %	-	-
Mechanical endurance	25 000 cycles at rated power 90 % of electrical travel 16 cycles per minute Temperature: 20 °C	± 6 %	-	Contact resistance variation ± 12 %
Shock	50 *g*'s, 11 ms 3 shocks - 3 directions	± 0.2 %	± 0.5 %	-
Vibration	10 Hz to 55 Hz 0.75 mm or 10 *g*'s 6 h	± 0.2 %	-	$\Delta V_{1\text{-}2}/V_{1\text{-}3}$ ± 0.5 %

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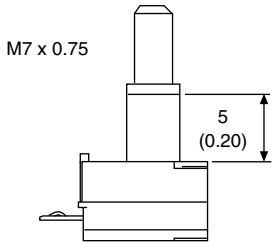
ORDERING INFORMATION (Part Number)

P	9	A	1	R	1	0	0	F	I	R	X	1	1	0	3	M	A

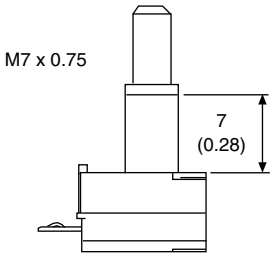
MODEL	NUMBER OF MODULES	BUSHING	LOCATING PEG	PANEL SEALED	DETENT OPTION	SHAFT	PIN STYLE	RESISTANCE CODE/ TOLERANCE CODE/ TAPER
P9A	1 to 7	R = M7 x 0.75 mm to 7 mm X = M7 x 0.75 mm to 5 mm						

BUSHING

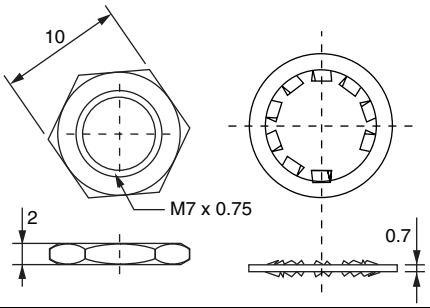
X: Bushing



R: Bushing



- Nut tightening torque M7 bushing 120 Ncm max. (10.6 lb-inch max.)
- Nut and washer are delivered in standard packaging



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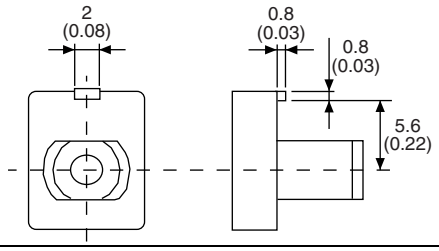
ORDERING INFORMATION (Part Number)

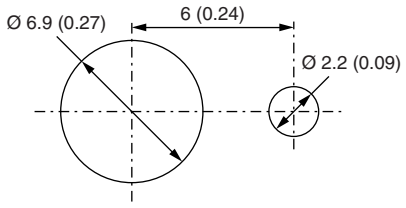
P	9	A	1	R	1	0	0	F	I	R	X	1	1	0	3	M	A

MODEL	NUMBER OF MODULES	BUSHING	LOCATING PEG	PANEL SEALED	DETENT OPTION	SHAFT	PIN STYLE	RESISTANCE CODE/ TOLERANCE CODE/ TAPER
			0 = without 1 = with	0 = without P = with	0 = without M = center detent	See code below		

LOCATING PEG

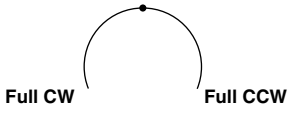


ADVISED PANEL CUT OUT (including peg option)



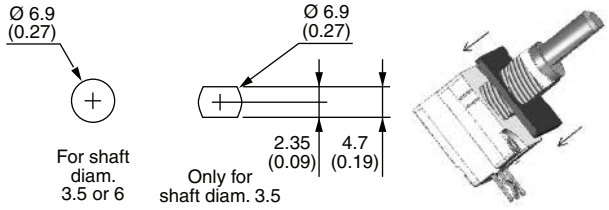
DETENT OPTION

- Stable position and in Mid mechanical travel
- Rotational life: 10 000 actuations



PANEL SEALED

- Only for R and X bushing without locating peg
- Front mounting surface with panel sealed option is: 6.2 mm ± 0.5 mm length for R bushing and 4.2 mm ± 0.5 mm length for X bushing
- The ring is delivered with nut and washer
- The seal should be placed between panel and body. Sealing is obtained by tightening the seal against the panel when mounting the potentiometer
  Tightening torque 50 Ncm up to 100 Ncm
- Advised panel hole dimensions:



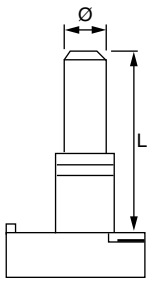
SHAFT DIAMETER - FMS - STYLE

L (mm)	15				20			25			30		
Style	Round	Slotted	Flat	Knurled	Round	Slotted	Flat	Round	Slotted	Flat	Round	Slotted	Flat
Ø 3.5	DFR	DFS	DFF	-	DIR	DIS	DIF	DLR	DLS	DLF	DMR	DMS	DMF
Ø 6	FFR	FFS	FFF	FGK (1)	FIR	FIS	FIF	FLR	FLS	FLF	FMR	FMS	FMF

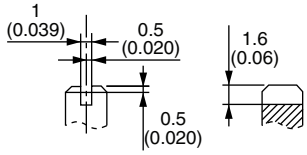
Note

(1) For X bushing (16 mm)

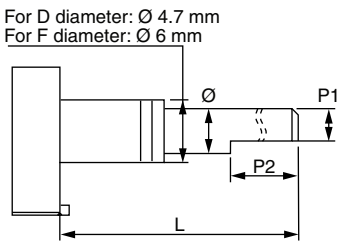
Round



Slotted

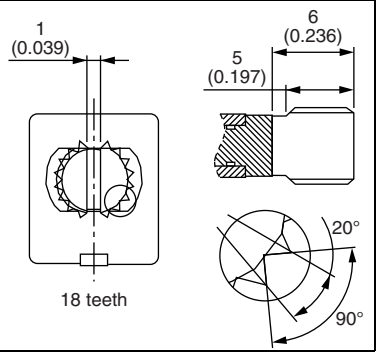


Flat



P1	Ø 3.5 mm = 2.5 mm Ø 6 mm = 4.5 mm
P2	L = 15 mm → 7 mm L > 15 mm → 12 mm

Knurled



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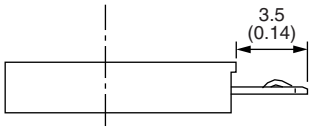
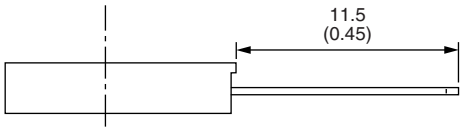
ORDERING INFORMATION (Part Number)

P	9	A	1	R	1	0	0	F	I	R	X	1	1	0	3	M	A

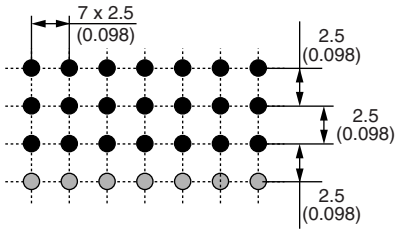
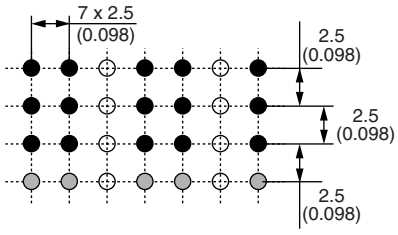
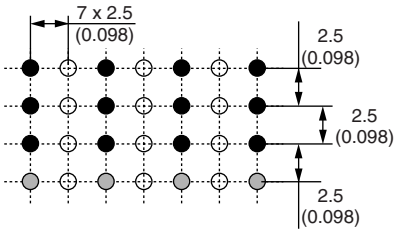
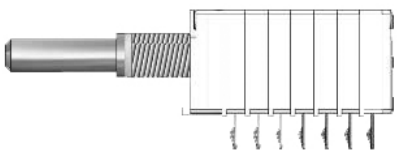
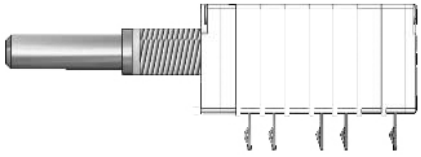
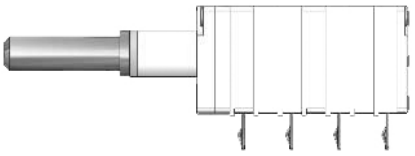
MODEL	NUMBER OF MODULES	BUSHING	LOCATING PEG	PANEL SEALED	DETENT OPTION	SHAFT	PIN STYLE	RESISTANCE CODE/ TOLERANCE CODE/ TAPER
							See Pin table First digit: pin type X, J, S, Z, P, L W or N Second digit: pin configuration 1, 2, 3, 4 or N	

PIN STYLE - HORIZONTAL MOUNTING

PIN TYPE

X	PC mount		
J	PC mount center tap		
S	Soldering style		
Z	Center tap soldering style		
L	Long pin		
P	Center tap with long pin		
NN	If different types of pin style in the same potentiometer		

PIN CONFIGURATION

1	2	3
		
		
2.5 mm between gang	2.5 mm - 5 mm - 2.5 mm between gang	5 mm between gang

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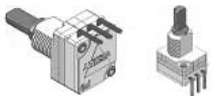
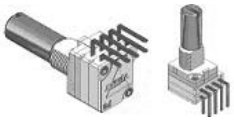
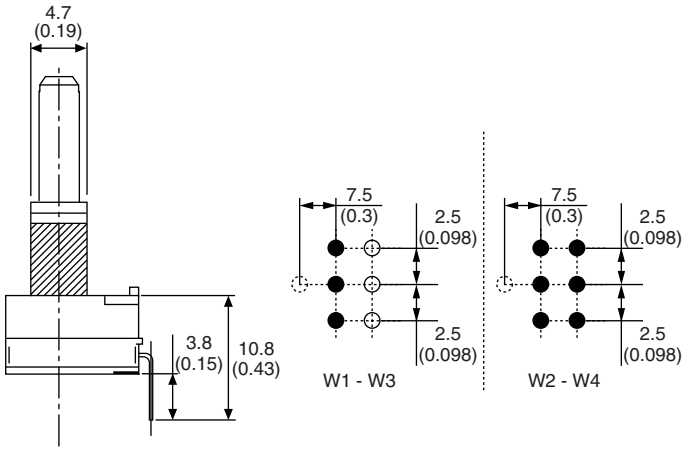
ORDERING INFORMATION (Part Number)

P	9	A	1	R	1	0	0	F	I	R	X	1	1	0	3	M	A

MODEL	NUMBER OF MODULES	BUSHING	LOCATING PEG	PANEL SEALED	DETENT OPTION	SHAFT	PIN STYLE	RESISTANCE CODE/ TOLERANCE CODE/ TAPER
							See Pin table First digit: pin type X, J, S, Z, P, L W or N Second digit: pin configuration 1, 2, 3, 4 or N	

PIN STYLE - VERTICAL MOUNTING

W1	Single gang vertical mounting	
W2	Dual gang vertical mounting	
W3	Single gang with center tap vertical mounting	
W4	Dual gang with center tap vertical mounting	



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ORDERING INFORMATION (part number)

P	9	A	1	R	1	0	0	F	I	R	X	1	1	0	3	M	A
MODEL	NUMBER OF MODULES		BUSHING		LOCATING PEG	PANEL SEALED		DETENT OPTION		SHAFT	PIN STYLE				RESISTANCE CODE/ TOLERANCE CODE/ TAPER		

Resistance code:
102 = 1 kΩ to
105 = 1 MΩ
Tolerance code:
standard: M = ± 20 %
on request: K = ± 10 %
taper: A, L, W, F, S, R
or
special code
given by Vishay

SPECIAL CODES GIVEN BY VISHAY

- Custom shaft
- Design on request
- Specific linearity
- Specific interlinearity
- Specific variation law

PART NUMBER DESCRIPTION (for information only)

P9A	1	R	1	0	0	FI	R	X1	10K	20 %	A			e3
MODEL	MODULES	BUSHING	LOCATING PEG	SEALING OPTIONS	DETENT OPTIONS	SHAFT	SHAFT	LEADS	VALUE	TOL.	TAPER	SPECIAL	SPECIAL	LEAD (Pb)-FREE

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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