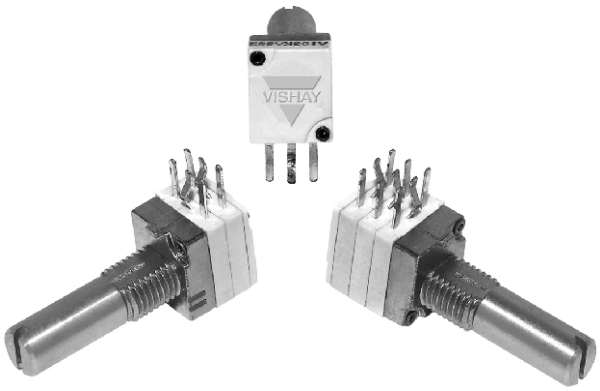
# 9 mm Multi-Ganged Potentiometer

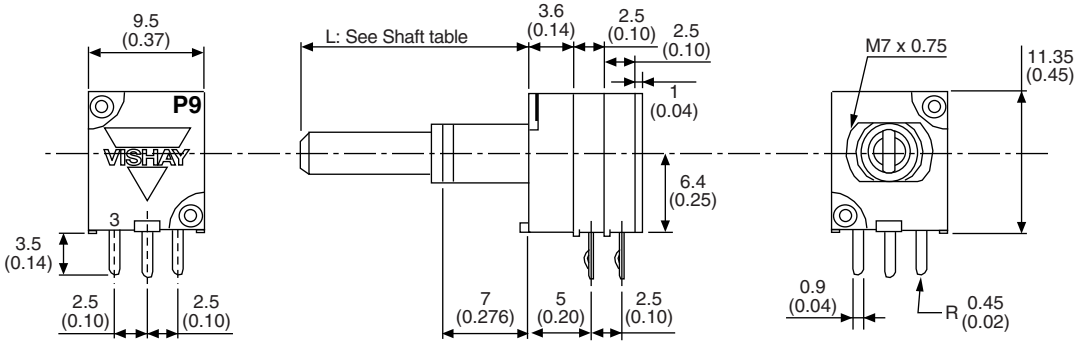


## FEATURES

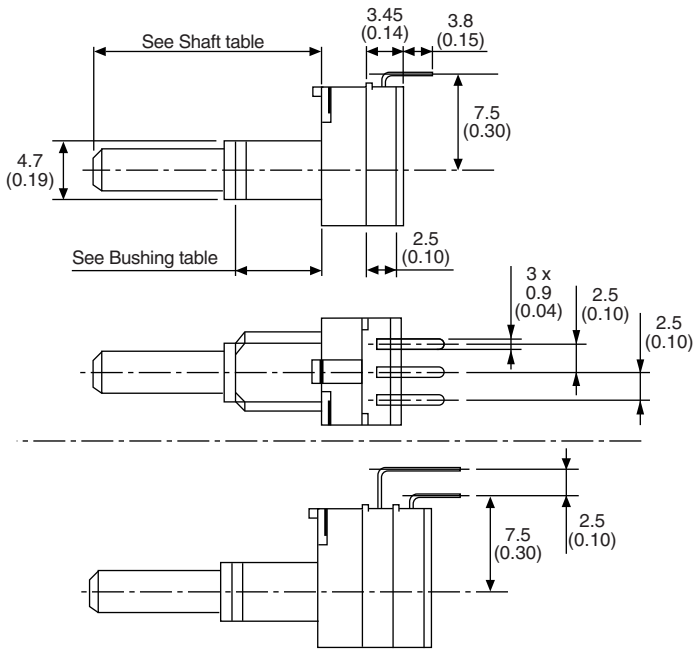
- Conductive plastic element
- Ultra compact (extra miniature module size)
- Multiple assemblies (up to seven modules)
- Shaft and panel sealed option
- Center mechanical detent fully integrated in option
- Center tap option
- Custom designs available on request
- Test according to CECC 41000 or IEC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

RoHS COMPLIANT

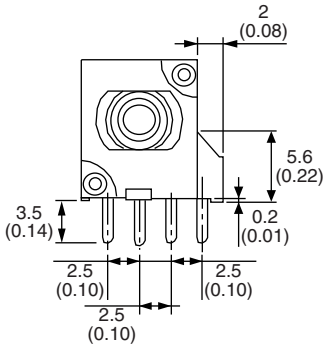
## DIMENSIONS in millimeters (inches) ± 0.5 mm (± 0.02")



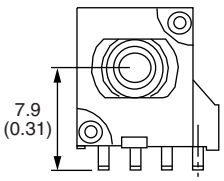

### Vertical Mounting



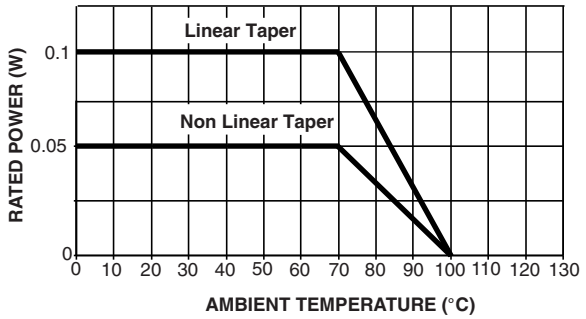
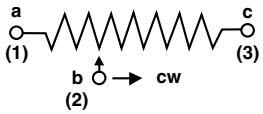
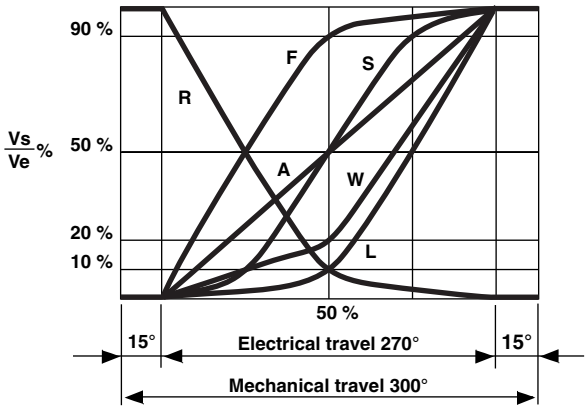

### Center Tap




### Center Tap and Vertical Mounting



## 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 $V_{DC}$<br>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. |

| MECHANICAL SPECIFICATIONS | |
|---|---|
| **Mechanical Endurance** | 25 000 cycles min. |
| **Mechanical Travel** | 300° ± 5 |
| **Operating Torque** | 0.2 Ncm to 1.5 Ncm<br>(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)<br>(0.22 oz.) |

| 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

## PERFROMANCES

| 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<br>90'/30' - ambient temp. 70 °C | ± 5 % | ± 10 % | Contact resistance variation<br>< 5 % Rn |
| **Damp Heat, Steady State** | 21 days<br>at 40 °C ± 2 °C and 90 % to 95 %<br>relative humidity | ± 5 % | - | Insulation resistance<br>> 10 MΩ |
| **Change of Temperature** | Ambient temperature<br>- 55 °C to + 100 °C<br>5 cycles | ± 0.5 % | - | - |
| **Mechanical Endurance** | 25 000 cycles at rated power<br>90 % of electrical travel<br>16 cycles per minute<br>Temperature: 20 °C | ± 6 % | - | Contact resistance variation<br>± 12 % |
| **Shock** | 50 *g*'s, 11 ms<br>3 shocks - 3 directions | ± 0.2 % | ± 0.5 % | - |
| **Vibration** | 10 Hz to 55 Hz<br>0.75 mm or 10 *g*'s<br>6 h | ± 0.2 % | - | $\Delta V_{1\text{-}2}/V_{1\text{-}3}$<br>± 0.5 % |

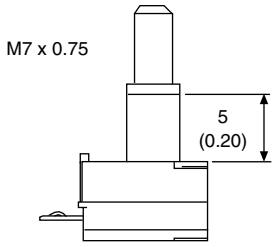
## ORDERING INFORMATION (Part Number)

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

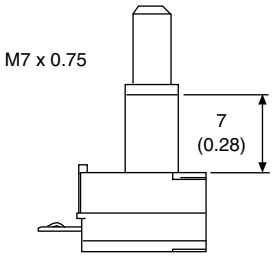
| MODEL | NUMBER OF MODULES | BUSHING | LOCATING PEG | PANEL SEALED | DETENT OPTION | SHAFT | PIN STYLE | RESISTANCE CODE/ TOLERANCE CODE/ TAPER |
|---|---|---|---|---|---|---|---|---|
| P9A | 1 to 7 | R = M7 x 0.75 mm to 7 mm<br>X = M7 x 0.75 mm to 5 mm | | | | | | |

## BUSHING

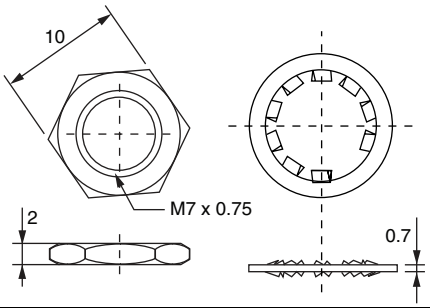
**X: Bushing**




**R: Bushing**




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

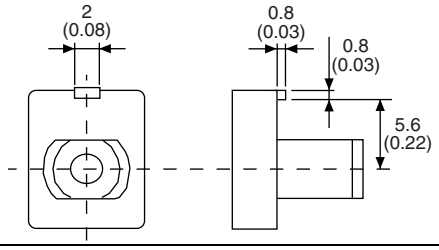


## ORDERING INFORMATION (Part Number)

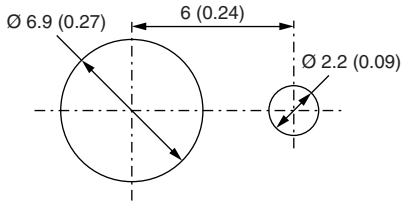
| P | 9 | A | 1 | R | 1 | 0 | 0 | F | I | R | X | 1 | 1 | 0 | 3 | M | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| MODEL | NUMBER OF MODULES | BUSHING | LOCATING PEG | PANEL SEALED | DETENT OPTION | SHAFT | PIN STYLE | RESISTANCE CODE/ TOLERANCE CODE/ TAPER |
|---|---|---|---|---|---|---|---|---|
| | | | 0 = Without<br>1 = With | 0 = Without<br>P = With | 0 = Without<br>M = Center detent | See code below | | |

## LOCATING PEG

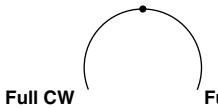



## ADVISED PANEL CUT OUT (including peg option)



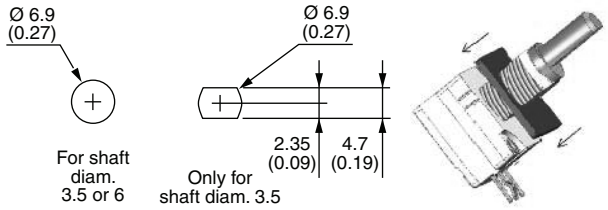

## DETENT OPTION

- 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:



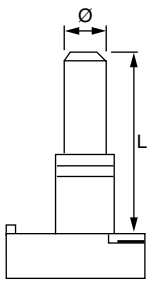

## SHAFT DIAMETER - FMS - STYLE

| 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 |

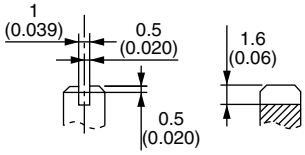
**Note**

(1) For X bushing (16 mm)

### Round

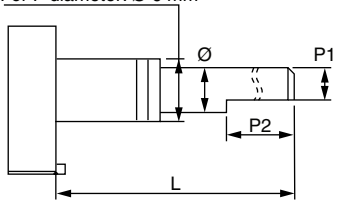



### Slotted



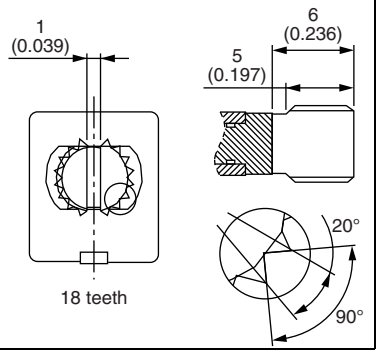

### Flat

For D diameter: Ø 4.7 mm
For F diameter: Ø 6 mm




| | |
|---|---|
| P1 | Ø 3.5 mm = 2.5 mm<br>Ø 6 mm = 4.5 mm |
| P2 | L = 15 mm → 7 mm<br>L > 15 mm → 12 mm |

### Knurled



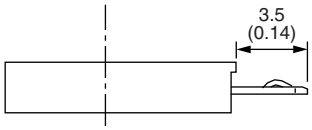
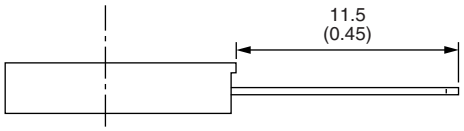
## ORDERING INFORMATION (Part Number)

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

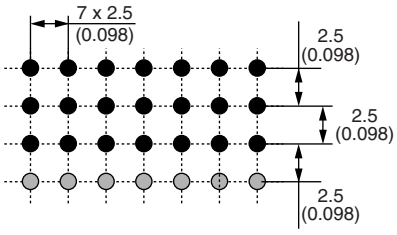
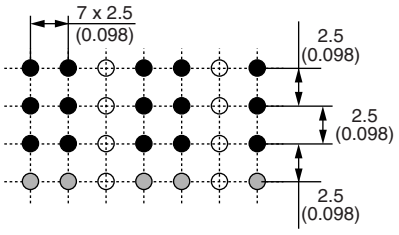
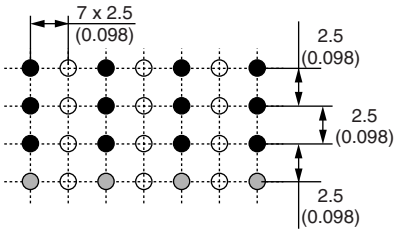
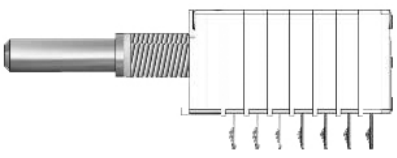
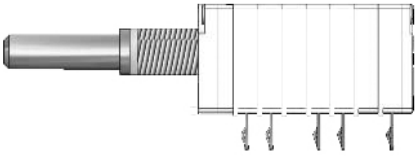
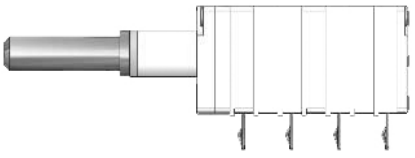
| MODEL | NUMBER OF MODULES | BUSHING | LOCATING PEG | PANEL SEALED | DETENT OPTION | SHAFT | PIN STYLE | RESISTANCE CODE/ TOLERANCE CODE/ TAPER |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **See Pin table**<br>First digit:<br>Pin type<br>X, J, S, Z, P, L W or N<br>Second digit:<br>Pin configuration<br>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**

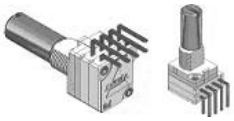
| 1 | 2 | 3 |
|---|---|---|
|  |  |  |
|  |  |  |
| 2.5 mm between gang | 2.5 mm - 5 mm - 2.5 mm between gang | 5 mm between gang |

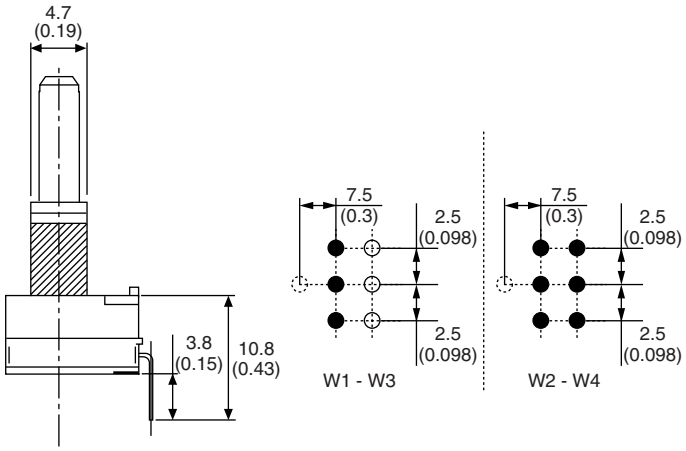
## ORDERING INFORMATION (Part Number)

| 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**<br>First digit:<br>Pin type<br>X, J, S, Z, P, L W or N<br>Second digit:<br>Pin configuration<br>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 |  |



## 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 |

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