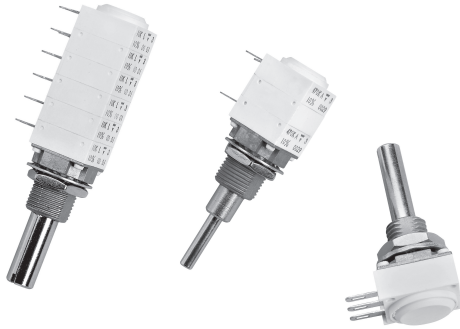


## 12.5 mm Modular Panel Potentiometers Cermet (P11S) or Conductive Plastic Elements (P11A)



### FEATURES

- 12.5 mm square single turn panel control
- Five shaft diameters and 29 terminal styles
- Multiple assemblies - up to seven modules
- Tests according to CECC 41 000
- GAM T1
- P11S version for industrial, military and aeronautics applications
- P11A version for professional audio applications
- Low current compatibility
- Shaft and panel sealed version
- Up to twenty-one indent positions
- Rotary and push/push switch options
- Concentric shafts
- Custom designs on request
- Trimmer version T11 (see document no. 51021)
- Compliant to RoHS directive 2002/95/EC

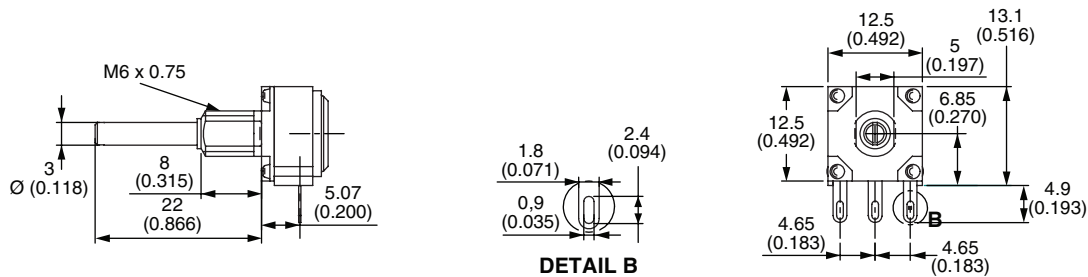


RoHS  
COMPLIANT

|           |         |         |        |
|-----------|---------|---------|--------|
| VERSATILE | MODULAR | COMPACT | ROBUST |
|-----------|---------|---------|--------|

### CONFIGURATION EXAMPLE - Dimensions in mm (Inches)/Tolerance $\pm 0.5$ mm ( $\pm 0.02$ " )

Single module, single shaft, solder lugs, metric bushing and shaft



Single module, single shaft, vertical mounting, PC pins with support plate, metric bushing and shaft



Dual modules, single shaft, PC pins with front support plates, imperial bushing and shaft





**GENERAL SPECIFICATIONS**

| <b>ELECTRICAL (INITIAL)</b>              |                            |                              |                             |
|--|----------------------------|------------------------------|-----------------------------|
|  |                            | <b>P11A</b>                  | <b>P11S</b>                 |
| <b>Resistive Element</b>                 |                            | Conductive plastic           | Cermet                      |
| <b>Electrical Travel</b>                 |                            | 270° ± 10°                   | 270° ± 10°                  |
| <b>Resistance Range (1)</b>              | <b>Linear Law</b>          | 1 kΩ to 1 MΩ                 | 20 Ω to 10 MΩ               |
|  | <b>Non Linear Law</b>      | 470 Ω to 500 kΩ              | 100 Ω to 2.2 MΩ             |
| <b>Tolerance</b>                         | <b>Standard</b>            | ± 20 %                       | ± 20 %                      |
|  | <b>On request</b>          | -                            | ± 5 % or ± 10 %             |
| <b>Power Rating at 70 °C</b>             | <b>Linear Law</b>          | 0.5 W at + 70 °C             | 1 W at + 70 °C              |
|  | <b>Non Linear Law</b>      | 0.25 W at + 70 °C            | 0.5 W at + 70 °C            |
|  | <b>Multiple Assemblies</b> | 0.25 W at + 70 °C per module | 0.5 W at + 70 °C per module |
| <b>Temperature Coefficient (Typical)</b> |                            | ± 500 ppm                    | ± 150 ppm                   |
| <b>Limiting Element Voltage</b>          |                            | 350 V                        | 350 V                       |
| <b>End Resistance (Typical)</b>          |                            | 2 Ω                          | 2 Ω                         |
| <b>Contact Resistance Variation</b>      | <b>Linear Law</b>          | 1 %                          | 2 % or 3 Ω                  |
| <b>Independent Linearity (Typical)</b>   | <b>Linear Law</b>          | ± 5 %                        | ± 5 %                       |
| <b>Insulation Resistance</b>             |                            | 10 <sup>6</sup> MΩ min.      | 10 <sup>6</sup> MΩ min.     |
| <b>Dielectric Strength</b>               |                            | 1500 V <sub>RMS</sub> min.   | 1500 V <sub>RMS</sub> min.  |
| <b>Attenuation</b>                       |                            | 90 dB max./0.05 dB min.      | -                           |
| <b>Mechanical Rotation Life</b>          |                            | 50 000 cycles                | 50 000 cycles               |

**Note**

(1) Consult Vishay Sfernice for other ohmic values

| <b>MECHANICAL (INITIAL)</b>                   |  |
|---|--|
| <b>Mechanical Travel</b>                      | 300° ± 5°  |
| <b>Operating Torque (Typical)</b>             | 0.4 Ncm to 1.8 Ncm max. (0.57 oz.-inch to 2.55 oz.-inch max.)<br>0.2 Ncm to 0.3 Ncm max. (0.28 oz.-inch to 0.42 oz.-inch max.) |
| <b>End Stop Torque (All Bushing Except G)</b> | 25 Ncm max. (2.1 lb-inch max.)<br>80 Ncm max. (6.8 lb-inch max.)   |
| <b>End Stop Torque for Bushing G</b>          | 40 Ncm max. (3.4 lb-inch max.)   |
| <b>Tightening Torque</b>                      | 150 Ncm max. (13 lb-inch max.)<br>250 Ncm max. (21 lb-inch max.)   |
| <b>Weight</b>                                 | 7 g to 9 g per module (0.25 oz. to 0.32 oz.)   |

| <b>ENVIRONMENTAL</b>               |                     |                     |
|------------------------------------|---------------------|---------------------|
|                                    | <b>P11A</b>         | <b>P11S</b>         |
| <b>Operating Temperature Range</b> | - 55 °C to + 125 °C | - 55 °C to + 125 °C |
| <b>Climatic Category</b>           | 55/125/21           | 55/125/56           |
| <b>Sealing</b>                     | IP64                | IP64                |

| <b>MARKING</b>  |
|---|
| <ul style="list-style-type: none"> <li>• <b>Potentiometer Module</b><br/>VISHAY logo, nominal ohmic value (Ω, kΩ, MΩ), two stars identify P11A version, tolerance in % - variation law, manufacturing date (four digits), "3" for the lead 3</li> </ul> |
| <ul style="list-style-type: none"> <li>• <b>Switch Module</b><br/>Version, manufacturing date (four digits), "c" for common lead</li> </ul>   |
| <ul style="list-style-type: none"> <li>• <b>Indent Module</b><br/>Version, manufacturing date (four digits)</li> </ul>  |

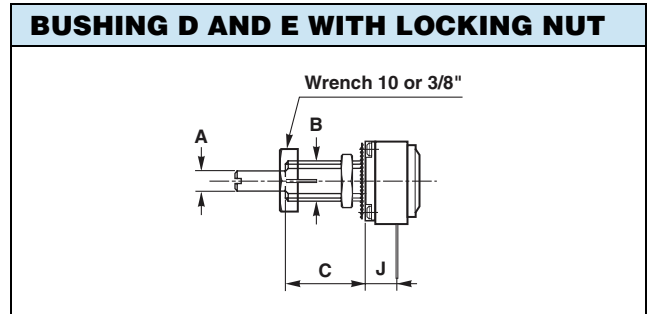
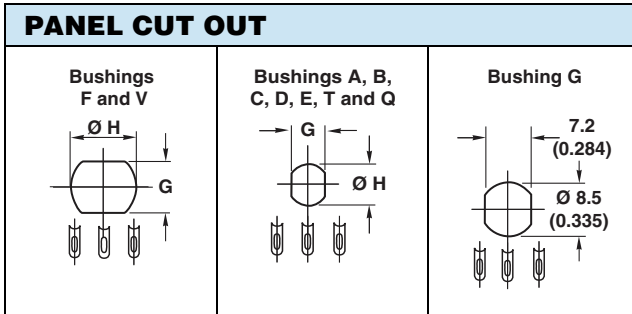
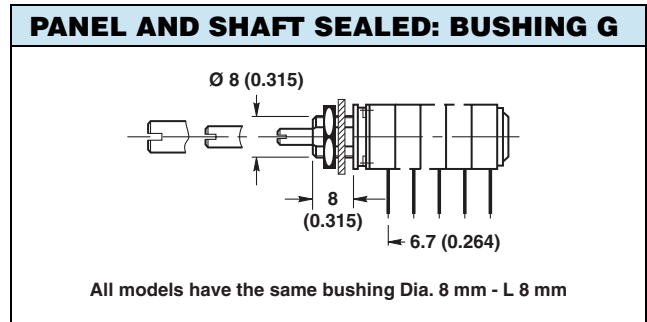
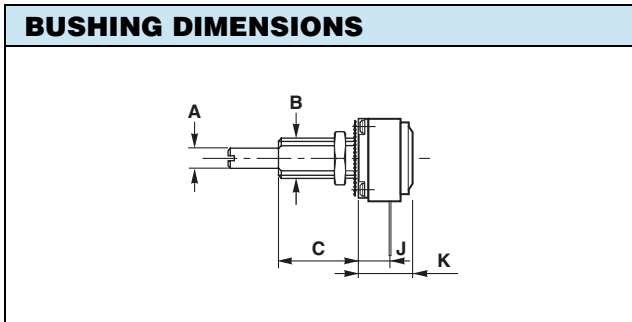
| <b>PACKAGING</b>  |
|---|
| <ul style="list-style-type: none"> <li>• Box</li> </ul> |

| PERFORMANCES      |  |  |                    |                    |
|-------------------|--|--|--------------------|--------------------|
| TESTS             | CONDITIONS   | TYPICAL VALUE AND DRIFTS                         |                    |                    |
|                   |  |  | P11S               | P11A               |
| Load Life         | 1000 h at + 70 °C<br>(90°/30')                                       | $\Delta R_T/R_T$<br>contact resistance variation | ± 2 %<br>± 4 %     | ± 10 %<br>± 5 %    |
| Temperature Cycle | - 55 °C to + 125 °C, 5 cycles  | $\Delta R_T/R_T$                                 | ± 0.2 %            | ± 0.5 %            |
| Moisture          | + 40 °C, 93 % relative humidity<br>P11S: 56 days, P11A: 21 days      | $\Delta R_T/R_T$<br>insulation resistance        | ± 2 %<br>> 1000 MΩ | ± 5 %<br>> 10 MΩ   |
| Rotational Life   | P11S/P11A: 50 000 cycles   | $\Delta R_T/R_T$<br>contact resistance variation | ± 5 %<br>± 5 %     | ± 6 %<br>± 4 %     |
| Climatic Sequence | Dry heat at + 125 °C/damp heat<br>cold - 55 °C/damp heat<br>5 cycles | $\Delta R_T/R_T$                                 | ± 1 %              | -                  |
| Shock             | 50 g, 11 ms<br>3 shocks - 3 directions                               | $\Delta R_T/R_T$<br>resistance setting change    | ± 0.2 %<br>± 0.5 % | ± 0.2 %<br>± 0.5 % |
| Vibration         | 10 Hz to 55 Hz<br>0.75 mm or 10 g, 6 h                               | $\Delta R_T/R_T$<br>voltage setting change       | ± 0.2 %<br>± 0.5 % | ± 0.2 %<br>± 0.5 % |

| ORDERING INFORMATION (Part Number 18 digits)   |   |                                 |         |              |       |             |       |  |  |  |  |  |  |
|--|---|---------------------------------|---------|--------------|-------|-------------|-------|--|--|--|--|--|--|
| <div style="display: flex; justify-content: space-around; font-weight: bold; font-size: 1.2em;"> <span>P</span><span>1</span><span>1</span><span>S</span><span>2</span><span>Q</span><span>0</span><span>E</span><span>A</span><span>S</span><span>Y</span><span>0</span><span>0</span><span>1</span><span>0</span><span>3</span><span>M</span><span>A</span> </div> |   |                                 |         |              |       |             |       |  |  |  |  |  |  |
| MODEL  | STYLE   | NUMBER OF MODULES               | BUSHING | LOCATING PEG | SHAFT | SHAFT STYLE | LEADS | RESISTANCE CODE/ TOLERANCE/ TAPER OR SPECIAL |  |  |  |  |  |
| P11  | S =<br>CERMET ELEMENT<br><br>A =<br>CONDUCTIVE PLASTIC<br>(AUDIO) | 1<br>2<br>3<br>4<br>5<br>6<br>7 |         |              |       |             |       |  |  |  |  |  |  |

| STANDARD RESISTANCE ELEMENT DATA |                     |                      |                         |                     |                      |                         |                                    |                      |                         |                              |       |
|----------------------------------|---------------------|----------------------|-------------------------|---------------------|----------------------|-------------------------|------------------------------------|----------------------|-------------------------|------------------------------|-------|
| STANDARD RESISTANCE VALUES       | P11S CERMET         |                      |                         |                     |                      |                         | P11A CONDUCTIVE PLASTIC LINEAR LAW |                      |                         | TYPICAL TCR - 55 °C/+ 125 °C |       |
|                                  | LINEAR LAW          |                      |                         | NON LINEAR LAW      |                      |                         | MAX. POWER AT 70 °C                | MAX. WORKING VOLTAGE | MAX. CUR. THROUGH WIPER | P11S                         | P11A  |
|                                  | MAX. POWER AT 70 °C | MAX. WORKING VOLTAGE | MAX. CUR. THROUGH WIPER | MAX. POWER AT 70 °C | MAX. WORKING VOLTAGE | MAX. CUR. THROUGH WIPER |                                    |                      |                         |                              |       |
| Ω                                | W                   | V                    | mA                      | W                   | V                    | mA                      | W                                  | V                    | mA                      | ppm/°C                       |       |
| 22                               | 1                   | 4.69                 | 213                     |                     |                      |                         |                                    |                      |                         |                              |       |
| 47                               |                     | 6.85                 | 146                     |                     |                      |                         |                                    |                      |                         |                              |       |
| 50                               |                     | 7.07                 | 141                     |                     |                      |                         |                                    |                      |                         |                              |       |
| 100                              |                     | 10                   | 100                     |                     |                      |                         |                                    |                      |                         |                              |       |
| 200                              |                     | 14.8                 | 67.4                    | 0.5                 |                      |                         |                                    |                      |                         |                              |       |
| 470                              |                     | 21.6                 | 46.1                    |                     | 15.3                 | 32.7                    |                                    |                      |                         |                              |       |
| 500                              |                     | 22.4                 | 44.7                    |                     | 15.8                 | 31.6                    |                                    |                      |                         |                              |       |
| 1K                               |                     | 31.6                 | 31.6                    |                     | 22.4                 | 22.4                    | 0.5                                | 22.4                 | 22.4                    |                              |       |
| 2.2K                             |                     | 46.9                 | 21.3                    |                     | 33.2                 | 15.1                    |                                    | 33.2                 | 15.1                    |                              |       |
| 4.7K                             |                     | 63.5                 | 14.5                    |                     | 48.5                 | 10.3                    |                                    | 48.5                 | 10.3                    |                              |       |
| 5K                               |                     | 70.7                 | 14.1                    |                     | 50.0                 | 10.0                    |                                    | 50.0                 | 10.0                    |                              |       |
| 10K                              |                     | 100                  | 10                      |                     | 79.7                 | 7.07                    |                                    | 79.7                 | 7.07                    | ± 150                        | ± 500 |
| 22K                              |                     | 148                  | 6.7                     |                     | 105                  | 4.77                    |                                    | 105                  | 4.77                    |                              |       |
| 47K                              |                     | 217                  | 4.6                     |                     | 153                  | 3.26                    |                                    | 153                  | 3.26                    |                              |       |
| 50K                              |                     | 224                  | 4.47                    |                     | 158                  | 3.16                    |                                    | 158                  | 3.16                    |                              |       |
| 100K                             | 1                   | 316                  | 3.16                    | 0.5                 | 224                  | 2.24                    | 0.5                                | 224                  | 2.24                    |                              |       |
| 220K                             | 0.56                | 350                  | 1.59                    | 0.26                | 332                  | 1.51                    | 0.5                                | 332                  | 1.51                    |                              |       |
| 470K                             | 0.26                | 350                  | 0.75                    | 0.12                | 350                  | 0.74                    | 0.26                               | 350                  | 0.74                    |                              |       |
| 500K                             | 0.25                | 350                  | 0.70                    | 0.25                | 350                  | 0.70                    | 0.25                               | 350                  | 0.70                    |                              |       |
| 1M                               | 0.12                | 350                  | 0.35                    |                     | 350                  | 0.35                    |                                    |                      |                         |                              |       |
| 2.2M                             | 0.05                | 350                  | 0.16                    |                     |                      |                         |                                    |                      |                         |                              |       |
| 4.7M                             | 0.02                | 350                  | 0.07                    |                     |                      |                         |                                    |                      |                         |                              |       |

| ORDERING INFORMATION (Part Number 18 digits)   |       |                   |   |  |   |   |              |       |             |       |  |   |      |      |    |   |      |      |    |   |      |      |     |   |      |      |     |   |      |      |           |   |   |   |                    |   |   |   |   |   |   |   |   |   |    |     |             |  |  |  |  |  |  |  |
|--|-------|-------------------|---|--|---|---|--------------|-------|-------------|-------|--|---|------|------|----|---|------|------|----|---|------|------|-----|---|------|------|-----|---|------|------|-----------|---|---|---|--------------------|---|---|---|---|---|---|---|---|---|----|-----|-------------|--|--|--|--|--|--|--|
| <div style="display: flex; justify-content: space-around; font-weight: bold; font-size: 1.2em;"> <span>P</span><span>1</span><span>1</span><span>S</span><span>2</span><span>Q</span><span>0</span><span>E</span><span>A</span><span>S</span><span>Y</span><span>0</span><span>0</span><span>1</span><span>0</span><span>3</span><span>M</span><span>A</span> </div> |       |                   |   |  |   |   |              |       |             |       |  |   |      |      |    |   |      |      |    |   |      |      |     |   |      |      |     |   |      |      |           |   |   |   |                    |   |   |   |   |   |   |   |   |   |    |     |             |  |  |  |  |  |  |  |
| MODEL  | STYLE | NUMBER OF MODULES | BUSHING   |  |   |   | LOCATING PEG | SHAFT | SHAFT STYLE | LEADS | RESISTANCE CODE/TOLERANCE/TAPER OR SPECIAL |   |      |      |    |   |      |      |    |   |      |      |     |   |      |      |     |   |      |      |           |   |   |   |                    |   |   |   |   |   |   |   |   |   |    |     |             |  |  |  |  |  |  |  |
| P11  |       |                   | <table border="1"> <thead> <tr> <th></th> <th>Ø</th> <th>L</th> <th>Old Codes</th> </tr> </thead> <tbody> <tr><td>A</td><td>1/4"</td><td>1/4"</td><td>7, 77, 77-3</td></tr> <tr><td>B</td><td>1/4"</td><td>3/8"</td><td>71</td></tr> <tr><td>C</td><td>1/4"</td><td>1/2"</td><td>72</td></tr> <tr><td>D</td><td>1/4"</td><td>3/8"</td><td>71H</td></tr> <tr><td>E</td><td>1/4"</td><td>1/2"</td><td>72H</td></tr> <tr><td>F</td><td>3/8"</td><td>3/8"</td><td>2, 03, 0-</td></tr> <tr><td>G</td><td>8</td><td>8</td><td>TP, QP, VP, 2P, 7P</td></tr> <tr><td>Q</td><td>7</td><td>8</td><td>Q</td></tr> <tr><td>T</td><td>6</td><td>8</td><td>T</td></tr> <tr><td>V</td><td>10</td><td>9.5</td><td>V, CC, CC-3</td></tr> </tbody> </table> |  | Ø | L | Old Codes    | A     | 1/4"        | 1/4"  | 7, 77, 77-3                                | B | 1/4" | 3/8" | 71 | C | 1/4" | 1/2" | 72 | D | 1/4" | 3/8" | 71H | E | 1/4" | 1/2" | 72H | F | 3/8" | 3/8" | 2, 03, 0- | G | 8 | 8 | TP, QP, VP, 2P, 7P | Q | 7 | 8 | Q | T | 6 | 8 | T | V | 10 | 9.5 | V, CC, CC-3 |  |  |  |  |  |  |  |
|  | Ø     | L                 | Old Codes   |  |   |   |              |       |             |       |  |   |      |      |    |   |      |      |    |   |      |      |     |   |      |      |     |   |      |      |           |   |   |   |                    |   |   |   |   |   |   |   |   |   |    |     |             |  |  |  |  |  |  |  |
| A  | 1/4"  | 1/4"              | 7, 77, 77-3   |  |   |   |              |       |             |       |  |   |      |      |    |   |      |      |    |   |      |      |     |   |      |      |     |   |      |      |           |   |   |   |                    |   |   |   |   |   |   |   |   |   |    |     |             |  |  |  |  |  |  |  |
| B  | 1/4"  | 3/8"              | 71  |  |   |   |              |       |             |       |  |   |      |      |    |   |      |      |    |   |      |      |     |   |      |      |     |   |      |      |           |   |   |   |                    |   |   |   |   |   |   |   |   |   |    |     |             |  |  |  |  |  |  |  |
| C  | 1/4"  | 1/2"              | 72  |  |   |   |              |       |             |       |  |   |      |      |    |   |      |      |    |   |      |      |     |   |      |      |     |   |      |      |           |   |   |   |                    |   |   |   |   |   |   |   |   |   |    |     |             |  |  |  |  |  |  |  |
| D  | 1/4"  | 3/8"              | 71H   |  |   |   |              |       |             |       |  |   |      |      |    |   |      |      |    |   |      |      |     |   |      |      |     |   |      |      |           |   |   |   |                    |   |   |   |   |   |   |   |   |   |    |     |             |  |  |  |  |  |  |  |
| E  | 1/4"  | 1/2"              | 72H   |  |   |   |              |       |             |       |  |   |      |      |    |   |      |      |    |   |      |      |     |   |      |      |     |   |      |      |           |   |   |   |                    |   |   |   |   |   |   |   |   |   |    |     |             |  |  |  |  |  |  |  |
| F  | 3/8"  | 3/8"              | 2, 03, 0-   |  |   |   |              |       |             |       |  |   |      |      |    |   |      |      |    |   |      |      |     |   |      |      |     |   |      |      |           |   |   |   |                    |   |   |   |   |   |   |   |   |   |    |     |             |  |  |  |  |  |  |  |
| G  | 8     | 8                 | TP, QP, VP, 2P, 7P  |  |   |   |              |       |             |       |  |   |      |      |    |   |      |      |    |   |      |      |     |   |      |      |     |   |      |      |           |   |   |   |                    |   |   |   |   |   |   |   |   |   |    |     |             |  |  |  |  |  |  |  |
| Q  | 7     | 8                 | Q   |  |   |   |              |       |             |       |  |   |      |      |    |   |      |      |    |   |      |      |     |   |      |      |     |   |      |      |           |   |   |   |                    |   |   |   |   |   |   |   |   |   |    |     |             |  |  |  |  |  |  |  |
| T  | 6     | 8                 | T   |  |   |   |              |       |             |       |  |   |      |      |    |   |      |      |    |   |      |      |     |   |      |      |     |   |      |      |           |   |   |   |                    |   |   |   |   |   |   |   |   |   |    |     |             |  |  |  |  |  |  |  |
| V  | 10    | 9.5               | V, CC, CC-3   |  |   |   |              |       |             |       |  |   |      |      |    |   |      |      |    |   |      |      |     |   |      |      |     |   |      |      |           |   |   |   |                    |   |   |   |   |   |   |   |   |   |    |     |             |  |  |  |  |  |  |  |



| BUSHINGS |               | G | T        | Q   | V   | A    | B     | C     | D               | E       | F     |                       |  |
|----------|---------------|---|----------|-----|-----|------|-------|-------|-----------------|---------|-------|-----------------------|--|
|          |               |   |          |     |     |      |       |       |                 |         |       | DIMENSIONS mm (± 0.5) |  |
| A        | Shafts        | Ø | All Dia. | 3   | 4   | 6    | 1/8"  | 1/8"  | 1/8"            | 1/8"    | 1/8"  | 1/4"                  |  |
| B        | Bushing       | Ø | 8        | 6   | 7   | 10   | 1/4"  | 1/4"  | 1/4"            | 1/4"    | 1/4"  | 3/8"                  |  |
| C        | Lead Versions | L | 8        | 8   | 8   | 9.5  | 1/4"  | 3/8"  | 1/2"            | 3/8"    | 1/2"  | 3/8"                  |  |
| J        | X.. Y..       |   | 6.7      | 5   | 5   | 7    | 0.200 | 0.200 | 0.200           | 0.200   | 0.200 | 0.278                 |  |
| K        |               |   | 10.4     | 9.1 | 9.1 | 11.1 | 0.357 | 0.357 | 0.357           | 0.357   | 0.357 | 0.436                 |  |
| G        | Panel         |   | 7.2      | 5.2 | 6.2 | 8.2  | 0.197 | 0.197 | 0.197           | 0.197   | 0.197 | 0.323                 |  |
| H        | Cutout        | Ø | 8.5      | 6.5 | 7.5 | 10.5 | 0.268 | 0.268 | 0.268           | 0.268   | 0.268 | 0.394                 |  |
|          | Thread        |   | 0.75     |     |     |      |       |       | 32 threads/inch |         |       |                       |  |
|          | Wrench Nut    |   | 12       | 8   | 10  | 12   | 0.313 | 0.313 | 0.313           | 0.313   | 0.313 | 0.500                 |  |
|          | Style         |   |          |     |     |      |       |       | Slotted         | Slotted |       |                       |  |

- Notes**
- Hardware supplied in separate bags
  - Slotted bushing for locking nut option

| ORDERING INFORMATION (Part Number 18 digits) |       |                   |         |   |       |   |   |             |       |  |   |   |   |   |   |   |   |
|--|-------|-------------------|---------|---|-------|---|---|-------------|-------|--|---|---|---|---|---|---|---|
| P  | 1     | 1                 | S       | 2   | Q     | 0 | E | A           | S     | Y  | 0 | 0 | 1 | 0 | 3 | M | A |
| MODEL  | STYLE | NUMBER OF MODULES | BUSHING | LOCATING PEG  | SHAFT |   |   | SHAFT STYLE | LEADS | RESISTANCE CODE/TOLERANCE/TAPER OR SPECIAL |   |   |   |   |   |   |   |
|  |       |                   |         | Old Codes<br>A = B24<br>B = B30<br>C = B53<br>0 = Without peg |       |   |   |             |       |  |   |   |   |   |   |   |   |

| LOCATING PEGS (Anti-Rotation Lug)  |         |                             |              |                    |
|--|---------|-----------------------------|--------------|--------------------|
| <p>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.</p> <p>All P11 bushings have a double flat. When panel mounting holes have been punched accordingly, an anti-rotation lug is not necessary.</p> |         |                             |              |                    |
|  |         |                             |              |                    |
|  |         |                             |              |                    |
| CODE   | VERSION | BUSHING A, B, C, D, E, T, Q | BUSHING F, V | 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         |                    |
| <p>Locating pegs are supplied in separate bags with nuts and washers</p>   |         |                             |              |                    |

| ORDERING INFORMATION (Part Number 18 digits) |       |                   |         |              |                       |      |           |  |       |  |   |   |   |   |   |   |   |
|--|-------|-------------------|---------|--------------|-----------------------|------|-----------|--|-------|--|---|---|---|---|---|---|---|
| P  | 1     | 1                 | S       | 2            | Q                     | 0    | E         | A  | S     | Y  | 0 | 0 | 1 | 0 | 3 | M | A |
| MODEL  | STYLE | NUMBER OF MODULES | BUSHING | LOCATING PEG | SHAFT                 |      |           | SHAFT STYLE  | LEADS | RESISTANCE CODE/TOLERANCE/TAPER OR SPECIAL |   |   |   |   |   |   |   |
|  |       |                   |         |              | Ø                     | L    | Old Codes | S = Slotted<br>R = Round<br>F = Flatted<br>K = Knurled/splined<br>D = Custom |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | AA                    | 3    | 9.5       | K  |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | AB                    | 3    | 12.5      | M  |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | AJ                    | 3    | 22        | R  |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | AP = Custom shaft     |      |           |  |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | BA                    | 1/8" | 3/8"      | CK   |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | BB                    | 1/8" | 1/2"      | CM   |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | BG                    | 1/8" | 5/8"      | CDM  |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | BG                    | 1/8" | 5/8"      | CD   |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | BH                    | 1/8" | 3/4"      | CH   |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | BJ                    | 1/8" | 7/8"      | CR   |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | CC = Concentric shaft |      |           |  |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | EA                    | 4    | 9.5       | E  |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | EB                    | 4    | 12.5      | F  |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | EJ                    | 4    | 22        | G  |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | FG                    | 6    | 16        | D  |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | FH                    | 6    | 19        | I  |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | FL                    | 6    | 25        | N  |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | FR                    | 6    | 50        | S  |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | GG                    | 1/4" | 5/8"      | VD   |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | GH                    | 1/4" | 3/4"      | VHM, VH  |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | GJ                    | 1/4" | 7/8"      | VR   |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | GL                    | 1/4" | 1"        | VN   |       |  |   |   |   |   |   |   |   |
|  |       |                   |         |              | GO                    | 1/4" | 1.5"      | VL   |       |  |   |   |   |   |   |   |   |

### SHAFTS

The shaft length are always measured from the mounting face.  
Standard shafts are designed by a 3 letter code (3 digits). Shafts slots are aligned to  $\pm 10^\circ$  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**

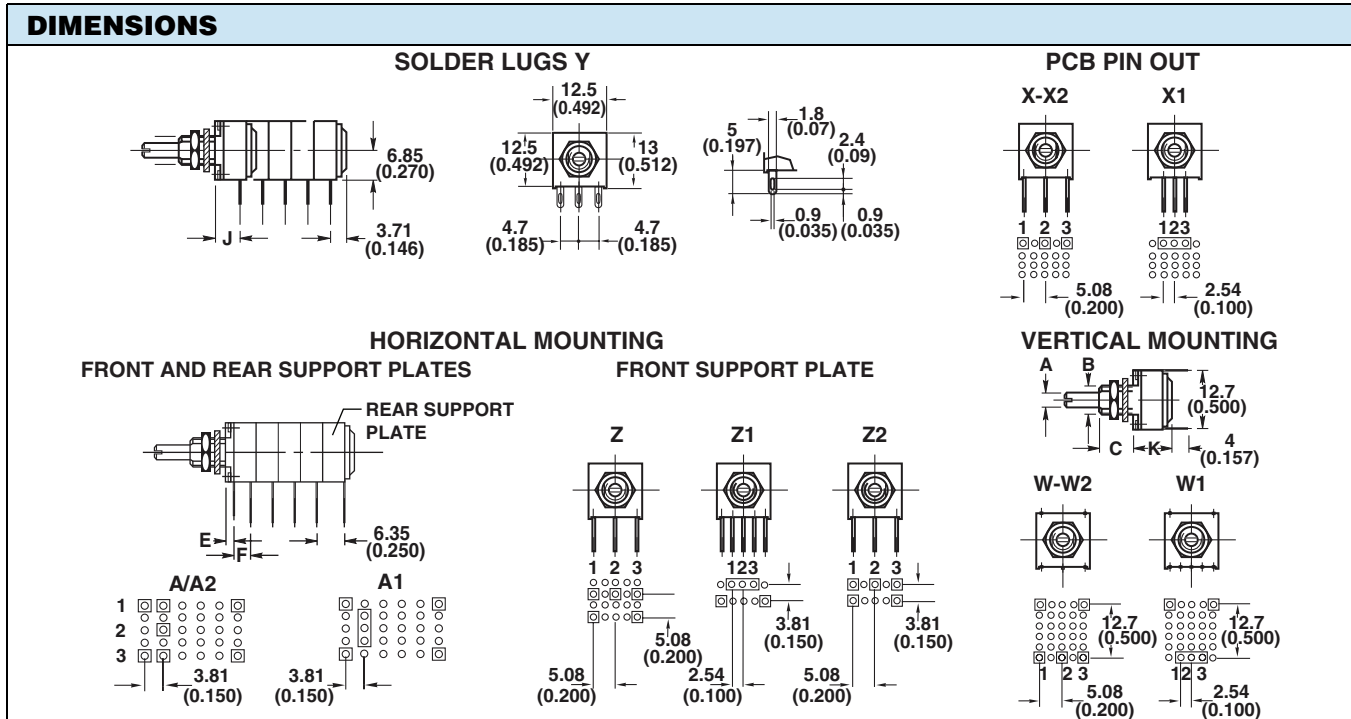
**BUSHING: Q  
SPLINED SHAFT: FHK**

**CUSTOM SHAFTS**  
When special shafts are required - flat, threaded ends, special shaft lengths, etc. a drawing is required.

| STANDARD COMBINATION OF SHAFT STYLES AND BUSHINGS |              |  |     |     |     |     |     |
|---|--------------|--|-----|-----|-----|-----|-----|
| SHAFT DIA.  | BUSHING CODE | SHAFT LENGTH AND STYLE AVAILABLE IN STANDARD (Others on request) |     |     |     |     |     |
| 3   | T            | AAS  | ABS | AJS |     |     |     |
| 3.17  | A            | BAS  | BBS | BGS | BGF | BHS | BSJ |
| 3.17  | B            | BBS  | BGS | BHS | BSJ |     |     |
| 3.17  | C            | BGS  | BHS | BSJ |     |     |     |
| 4   | Q            | EAS  | EBS | EJS | FHK |     |     |
| 6   | V            | FGS  | FLS | FRS |     |     |     |
| 6.35  | F            | GGs  | GHS | GJS | GLS | GOS | GHF |

| ORDERING INFORMATION (Part Number 18 digits) |       |                   |         |              |       |             |                 |     |     |     |     |   |  |   |   |   |   |
|--|-------|-------------------|---------|--------------|-------|-------------|-----------------|-----|-----|-----|-----|---|--|---|---|---|---|
| P  | 1     | 1                 | S       | 2            | Q     | 0           | E               | A   | S   | Y   | 0   | 0 | 1  | 0 | 3 | M | A |
| MODEL  | STYLE | NUMBER OF MODULES | BUSHING | LOCATING PEG | SHAFT | SHAFT STYLE | LEADS           |     |     |     |     |   | RESISTANCE CODE/ TOLERANCE/ TAPER OR SPECIAL |   |   |   |   |
|  |       |                   |         |              |       |             | Available leads |     |     |     |     |   |  |   |   |   |   |
|  |       |                   |         |              |       |             | A00             | W00 | X00 | Y00 | Z00 |   |  |   |   |   |   |
|  |       |                   |         |              |       |             | A10             | W10 | X03 | Y03 | Z03 |   |  |   |   |   |   |
|  |       |                   |         |              |       |             | A13             | W20 | X04 | Y04 | Z04 |   |  |   |   |   |   |
|  |       |                   |         |              |       |             | A14             |     | X10 |     | Z10 |   |  |   |   |   |   |
|  |       |                   |         |              |       |             | A20             |     | X13 |     | Z13 |   |  |   |   |   |   |
|  |       |                   |         |              |       |             | A23             |     | X14 |     | Z14 |   |  |   |   |   |   |
|  |       |                   |         |              |       |             | A24             |     | X20 |     | Z20 |   |  |   |   |   |   |
|  |       |                   |         |              |       |             |                 |     | X23 |     | Z23 |   |  |   |   |   |   |
|  |       |                   |         |              |       |             |                 |     | X24 |     | Z24 |   |  |   |   |   |   |

| FIRST DIGIT |  | SECOND DIGIT |   | THIRD DIGIT |   |
|-------------|--|--------------|---|-------------|---|
| Y           | Soldering lugs   | 0            | Y = 4.65 mm (0.183")<br>A, X, Z, W = 5.08 mm (0.200") pin spacing<br>pins section 0.9 x 0.3 mm <sup>2</sup> (0.035" x 0.012") | 0           | 5.08 mm (0.200") space between modules  |
| X           | PCB pins   | 1            | 2.54 mm (0.100") pin spacing<br>pin section 0.6 x 0.3 mm <sup>2</sup> (0.024" x 0.012")                                       | 3           | 7.62 mm (0.300") space between modules  |
| Z           | PCB pins with front support plate                              | 2            | 5.08 mm (0.200") pin spacing<br>pins section 0.6 x 0.3 mm <sup>2</sup> (0.024" x 0.012")                                      | 4           | 10.16 mm (0.400") space between modules |
| A           | PCB pins with front and back support plates                    |              |   |             |   |
| W           | PCB pins - vertical mounting with 2 extra pins - 1 module only |              |   |             |   |



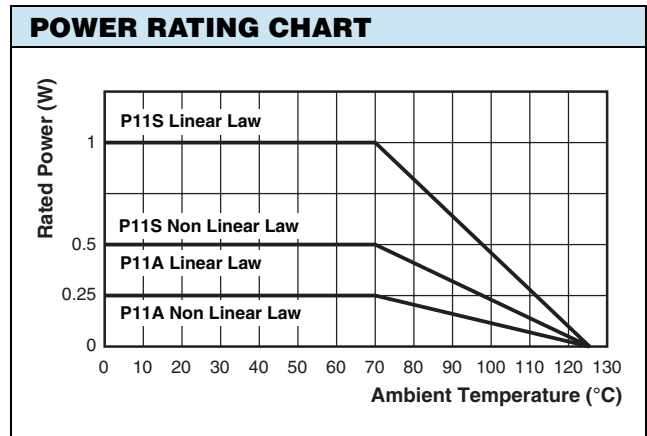
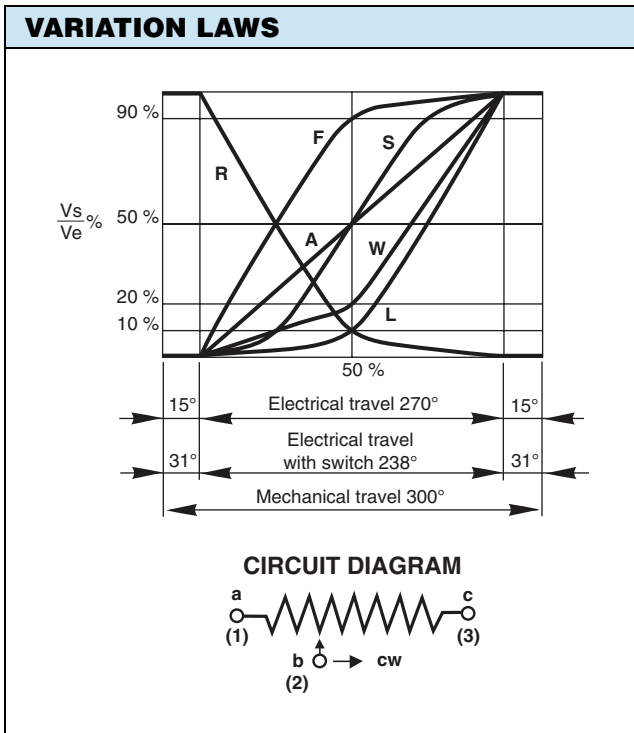
THE POSITION OF EACH MODULE IS FREE

| BUSHINGS                       | G                           | T    | Q    | V    | A                                   | B     | C     | D     | E     | F      |  |
|--------------------------------|-----------------------------|------|------|------|-------------------------------------|-------|-------|-------|-------|--------|--|
|                                | DIMENSIONS mm (± 0.5)       |      |      |      | DIMENSIONS INCHES (± 0.02)          |       |       |       |       |        |  |
| E Leads Z00                    | 3.15                        | 1.85 | 1.85 | 3.85 | 0.071                               | 0.071 | 0.071 | 0.071 | 0.071 | 0.150  |  |
| E Leads Z1, Z2, A..            | 2.8                         | 1.6  | 1.6  | 3.6  | 0.063                               | 0.063 | 0.063 | 0.063 | 0.063 | 0.140  |  |
| F                              | Leads Z0.: 5.08 mm (0.200") |      |      |      | Leads A.. Z1, Z2.: 3.81 mm (0.150") |       |       |       |       |        |  |
| J Leads X.. Y..                | 6.7                         | 5    | 5    | 7    | 0.200                               | 0.200 | 0.200 | 0.200 | 0.200 | 0.278  |  |
| E Leads Z0. with Rotary Switch | 1.45                        | 0.15 | 0.15 | 2.15 | 0.006                               | 0.006 | 0.006 | 0.006 | 0.006 | 0.0846 |  |

| ORDERING INFORMATION (Part Number 18 digits) |       |                   |         |              |       |             |       |  |   |   |   |   |   |   |   |   |   |
|--|-------|-------------------|---------|--------------|-------|-------------|-------|--|---|---|---|---|---|---|---|---|---|
| P  | 1     | 1                 | S       | 2            | Q     | 0           | E     | A  | S | Y | 0 | 0 | 1 | 0 | 3 | M | A |
| MODEL  | STYLE | NUMBER OF MODULES | BUSHING | LOCATING PEG | SHAFT | SHAFT STYLE | LEADS | RESISTANCE CODE/<br>TOLERANCE/<br>TAPER OR SPECIAL   |   |   |   |   |   |   |   |   |   |
|  |       |                   |         |              |       |             |       | Resistance Code:<br>200 = 20 Ω to<br>106 = 10 MΩ<br><br>Tolerance Code:<br>M = 20 %, K = 10 %, J = 5 %<br><br>Taper: A, L, W, F, S, R<br>or<br>special code given by<br>Vishay |   |   |   |   |   |   |   |   |   |

| RESISTANCE CODE                      |
|--------------------------------------|
| See Conversion Table for ohmic value |

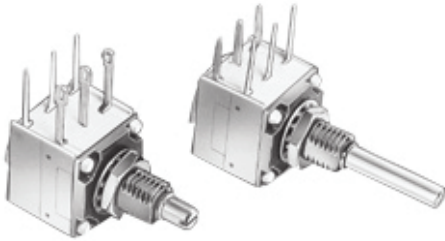
| TOLERANCE                                       |
|---|
| Standard: M = ± 20 %                            |
| On request: K = ± 10 %, J = ± 5 % (cermet only) |



| SPECIAL CODES GIVEN BY VISHAY              |
|--|
| OPTION AVAILABLE                           |
| • Custom shaft                             |
| • Custom design on request                 |
| • Specific linearity                       |
| • Specific interlinearity                  |
| • Specific variation law                   |
| • Multiple assemblies with various modules |



## P11 OPTION: ROTARY SWITCH MODULES



- Rotary switches
- Current up to 2 A
- Actuation CW or CCW position

### 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 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 1 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 module is 238° ± 10°.

Leads finish: Gold plated.

### RDS 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.

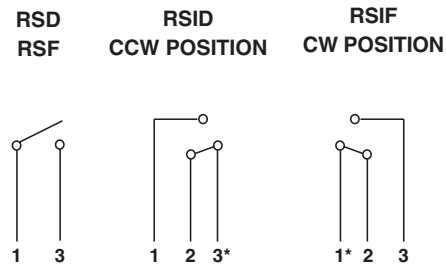
### RSIF SINGLE POLE CHANGEOVER

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 v<br>15 VA =           |
| Switching Current Maximum              |                      | 0.25 A 250 V v<br>0.5 A 30 V = |
| Maximum Current Through Element        |                      | 2 A                            |
| Contact Resistance                     |                      | 30 mΩ                          |
| Dielectric Strength                    | Terminal to Terminal | 1000 V <sub>RMS</sub>          |
|  | Terminal to Bushing  | 2000 V <sub>RMS</sub>          |
| Maximum Voltage Operation              |                      | 250 V v<br>30 V =              |
| Insulation Resistance Between Contacts |                      | 10 <sup>6</sup> MΩ             |
| Life at P <sub>max</sub> .             |                      | 10 000 actuations              |
| Minimal Travel                         |                      | 25°                            |
| Operating Temperature                  |                      | - 40 °C to + 85 °C             |

### ELECTRICAL DIAGRAM

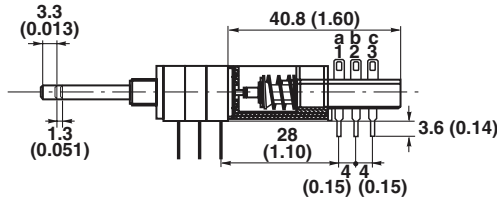


**Note**  
• Common

### ORDERING INFORMATION (First order only)

**RSID**

|             |   |
|-------------|---|
| <b>RSD</b>  | SPST: Single pole, open switch in CCW position - 2 pins       |
| <b>RSF</b>  | SPST: Single pole, open switch in CW position - 2 pins        |
| <b>RSID</b> | SPDT: Single pole, changeover switch in CCW position - 3 pins |
| <b>RSIF</b> | SPDT: Single pole, changeover switch in CW position - 3 pins  |

**P11 OPTION: PUSH/PUSH OR MOMENTARY/PUSH SWITCH MODULES**


- Push/push or momentary push
- Current up to 2 A

**MODULES: PUSH/PUSH SWITCH RSPP  
 MOMENTARY/PUSH SWITCH RSMP**

They have to be the last element of potentiometer

Options:

2 reversing switches F2      4 reversing switches F4

6 reversing switches F6      8 reversing switches F8

Not available with panel sealed option.

Number of modules before the switch limited to 3 modules.

Length of shaft (FMF) 25 mm maximum.

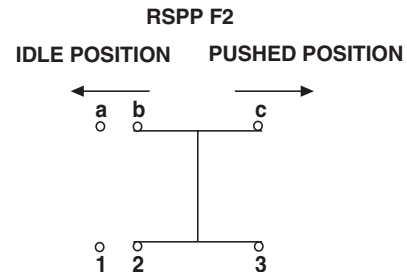
**RSPP F2: PUSH/PUSH SWITCH WITH TWO REVERSING SWITCHES**

Idle position: The contact is made between 1 and 2 and a and b. It is open between 2 and 3 and b and c.

Pushed position: The contact is made between 2 and 3 and b and c. It is open between 1 and 2 and a and b.

**SWITCH SPECIFICATIONS**

|  |                      |                       |
|--|----------------------|-----------------------|
| Switching Power Maximum                |                      | 50 VA v               |
| Switching Current Maximum              |                      | 0.5 A v               |
| Maximum Current Through Element        |                      | 2 A                   |
| Contact Resistance                     |                      | 100 mΩ                |
| Dielectric Strength                    | Terminal to Terminal | 1500 V <sub>RMS</sub> |
|  | Terminal to Bushing  | 2000 V <sub>RMS</sub> |
| Maximum Voltage Operation              |                      | 250 V v               |
| Insulation Resistance Between Contacts |                      | 10 <sup>3</sup> MΩ    |
| Life at P <sub>max</sub> .             |                      | 100 000 actuations    |
| Minimal Travel                         |                      | 3.3 mm to 4.7 mm      |
| Operating Temperature                  |                      | - 40 °C to + 70 °C    |

**ELECTRICAL DIAGRAM**

**ORDERING INFORMATION** (First order only for special code creation)

**RSPP**
**RSPP:** Push/push

**RSMP:** Momentary/push

**F2**
**F2:** 2 reversing switches (standard version)

**F4:** 4 reversing switches

**F6:** 6 reversing switches

**F8:** 8 reversing switches

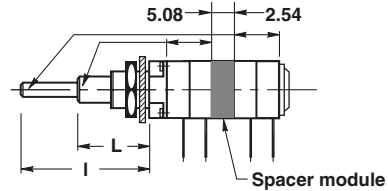
### P11 OPTION: CONCENTRIC SHAFTS

The CC concentric shaft versions allies the total flexibility of the P11 modular system to the advantage of having two separate shafts.

The outer 6 mm or 1/4" or 1/8" dia. shaft drives the modules situated immediately behind the panel, before the spacer module.

The inner 3 mm or 1/8" or 0.07" dia. shaft drives the modules situated after the spacer module.

Spacer is available with a choice of two spacer thickness:  
5.08 mm designations or 2.54 mm designation. See dimensional drawing



| BUSHING CODE | OUTER SHAFT DIAMETER |             |             | INNER SHAFT DIAMETER |             |             |
|--------------|----------------------|-------------|-------------|----------------------|-------------|-------------|
|              | DIAMETER             | LENGTH L    | SHAFT STYLE | DIAMETER             | LENGTH I    | SHAFT STYLE |
| V            | 6                    | 16          | R           | 3                    | 28.5        | R           |
| F            | 6.35 (1/4")          | 16          | R           | 3.17 (1/8")          | 28.5        | R           |
| A            | 3.17 (1/8")          | 12.7 (1/2") | R           | 1.8 (0.07")          | 22.2 (7/8") | R           |

#### ORDERING INFORMATION (First order only for special code creation)

5.08

**2.54:** Mechanical spacer of 2.54 mm  
**5.08:** Mechanical spacer of 5.08 mm

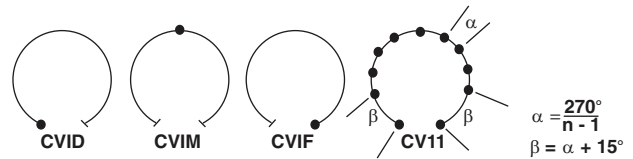
Customer should define witch modules is driven by each shaft (see example of ordering information at the end of the data sheet)

### P11 OPTION: DETENT MODULES

The valley detents mechanism is housed in a standard P11 module. Up to 21 detents position available.

Count detents as follows: 1 for CCW position, 1 for full CW position, plus the other positions forming equal resistance increments (linear taper) - not equal angles.

Available now: CVID - CVIF - CVIM  
CV3 - CV11 - CV21



Rotational life: 10 000 cycles

#### ORDERING INFORMATION (First order only for special code creation)

CV1M

- CV1M** 1 detent at half travel
- CV1M J84** CV1M with accuracy of center point  $\pm 2\%$  (all laws except S)
- CV1D** 1 detent at CCW position
- CV1F** 1 detent at CW position
- CV3** 3 detents
- CV11** 11 detents
- CV21** 21 detents

### P11 OPTION: NEUTRAL MODULES "EN"

Neutral or screen module is housed in a standard P11 module.  
It is used as a screen between two electrical modules.

The leads can be connected to ground.

#### ORDERING INFORMATION (First order only for special code creation)

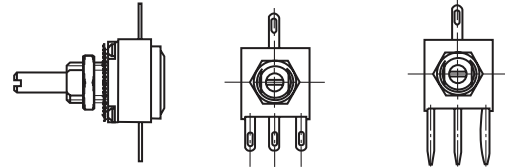
EN

**EN** Neutral module

**P11 OPTION: CENTER CURRENT TAP "J"**

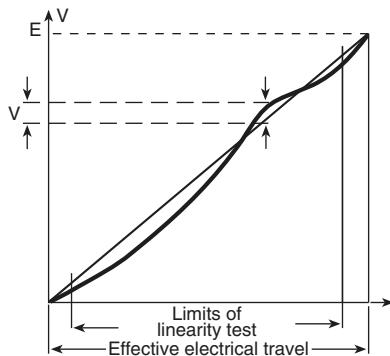
The extra terminal is a solder lug connected at 50 % of electrical travel and situated in the potentiometer module opposite the terminals.

Center tap presents a short circuit of 11° of travel.


**ORDERING INFORMATION (First order only)**

**J**

**J** Center tap

**P11 OPTION: SPECIAL LINEARITY - CONFORMITY**


The independent linearity (conformity for the non linear laws) is the maximum gap  $\Delta V$  between the actual variation curve and the theoretical variation curve the nearest to it. The linearity and the conformity are expressed in percentage of the total applied voltage E

$$\text{linearity conformity} = \frac{\pm \Delta V_{\max}}{E}$$

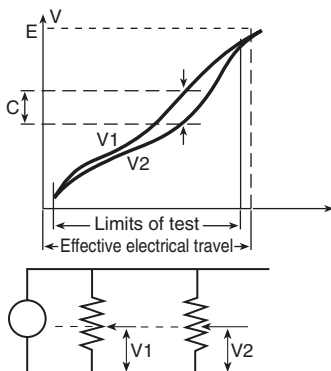
They are measured over 90 % of actual electrical travel (centered).  
 On request linearity can be guaranteed in linear law.

**ORDERING INFORMATION (First order only)**

**J123**

**J123** Independent linearity  $\pm 3\%$  (linear law)  
**J145** Independent linearity  $\pm 2\%$  (linear law)

For other request, contact us.

**P11 OPTION: SPECIAL INTERLINEARITY - INTERCONFORMITY**


It is the maximum deviation between the actual voltage outputs of 2 or more pot modules in the same assembly. It is expressed as a percentage of the total applied voltage, or in dB attenuation.

Interlinearity is measured between 2 pot modules, over 10 to 90 % of the attenuation.

The interlinearity or interconformity is expressed as a percentage of the total applied voltage:

$$I\% = \frac{|C|}{E}$$

Or in decibels by comparison between outputs V1 and V2

$$I \text{ dB} = 20 \log \frac{V_1}{V_2}$$

**ORDERING INFORMATION (First order only)**

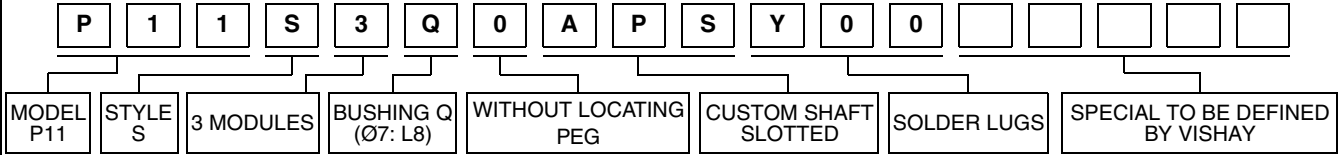
**J44**

**J44** Interlinearity  $\pm 2\%$  (linear law)

For other request, contact us.

### EXAMPLES OF FIRST ORDER INFORMATION

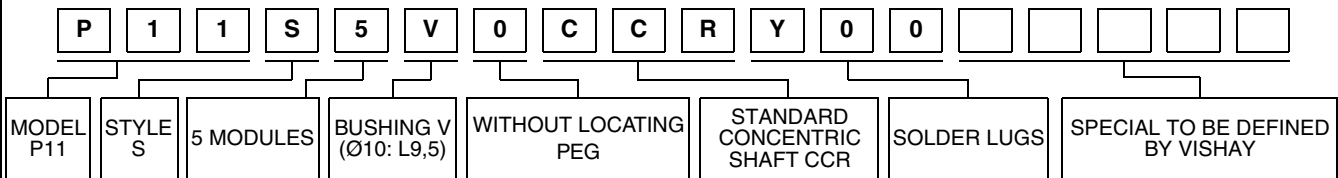
**FIRST EXAMPLE: Triple module (switch is counted as a module)**



**ORDERING INFORMATION:**

|                   |                                       |      |
|-------------------|---------------------------------------|------|
| PART NUMBER       | P11S3Q0APSY00.....                    |      |
| SHAFT AND BUSHING | See drawing of special shaft attached |      |
| MODULE NO. 1      | RSID                                  |      |
| MODULE NO. 2      | 103 M A                               | J123 |
| MODULE NO. 3      | 503 M A                               | J    |

**SECOND EXAMPLE: Concentric shaft with 2 modules on each shaft**



**ORDERING INFORMATION:**

|                   |                    |     |                           |
|-------------------|--------------------|-----|---------------------------|
| PART NUMBER       | P11S5V0CCRY00..... |     |                           |
| SHAFT AND BUSHING |                    |     |                           |
| MODULE NO. 1      | CV1M               |     | Driven by outer shaft     |
| MODULE NO. 2      | 502 K A            |     | Driven by outer shaft     |
| MODULE NO. 3      | 5.08               |     | Mechanical spacer 5,08 mm |
| MODULE NO. 4      | 103 K A            | J44 | Driven by inner shaft     |
| MODULE NO. 5      | 103 K A            | J44 | Driven by inner shaft     |

### PART NUMBER DESCRIPTION (used on some Vishay document or label, for information only)

|       |         |         |                 |       |                |       |       |      |       |         |         |                    |    |
|-------|---------|---------|-----------------|-------|----------------|-------|-------|------|-------|---------|---------|--------------------|----|
| P11S  | 2       | Q       | 0               | EA    | S              | Y00   | 10K   | 20 % | A     |         |         |                    | e3 |
| MODEL | MODULES | BUSHING | LOCATING<br>PEG | SHAFT | SHAFT<br>STYLE | LEADS | VALUE | TOL. | TAPER | SPECIAL | SPECIAL | LEAD (Pb)-<br>FREE |    |



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