

# Variable Resistors

Knob Panel Potentiometer  
With Switch



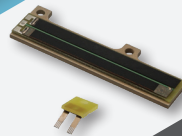
P16S

Multi-Turn Wirewound  
Precision Potentiometer



534

Linear Position Sensor Kit



KIT LMF

Rotational Non-Contacting  
Position Sensor



981HE

Modular Panel Potentiometer



P11S

Rotational Position Sensor



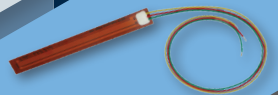
357 SERIES

Linear Non-Contacting  
Position Sensor



20LHE

Displacement Sensor,  
Ultra Flat, Infinite Resolution



UFPMA

Displacement Sensor,  
Ultra Flat, Infinite Resolution,  
Industrial Variant


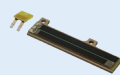


UIPMA



# VARIABLE RESISTORS

## Focus Products



### Linear Position Sensor

| Model   | Measurement Ranges (mm)              | High Accuracy (Linearity)               | Repeatability     | Ohmic Values                            | Resistance Tolerance at 20 °C | Operating Force   | Operating Life (Cycles) | Temperature Range    | Dimensions (mm)                       |
|---|--------------------------------------|---|-------------------|---|-------------------------------|-------------------|-------------------------|----------------------|---------------------------------------|
| <b>REC 38L</b>   | 12.5 to 150<br>(increments of 25 mm) | $\leq \pm 1\%$ to<br>$\leq \pm 0.1\%$   | $\leq \pm 0.01\%$ | 400 $\Omega$ /cm to<br>2 k $\Omega$ /cm | $\pm 20\%$                    | 0.35 N<br>typical | 25 M                    | -55 °C to<br>+125 °C | Cylindrical<br>ext. dia.:<br>9.52     |
| Measurement range of 12.5 mm to 150 mm; high accuracy from $\pm 1\%$ down to $\pm 0.1\%$ ; essentially infinite resolution; very small dimension: external diameter = 9.52 mm                             |                                      |   |                   |   |                               |                   |                         |                      |                                       |
| <b>KIT LMF</b>   | 25 to 1000<br>(increments of 25 mm)  | $\leq \pm 1\%$ to<br>$\leq \pm 0.025\%$ | $\leq \pm 0.01\%$ | 400 $\Omega$ /cm to<br>2 k $\Omega$ /cm | $\pm 20\%$                    | n/a               | 25 M                    | -55 °C to<br>+125 °C | Rectangular<br>substrate:<br>15 x 1.6 |
| Measurement range of 25 mm to 1000 mm; simple and flexible mounting; essentially infinite resolution; made in two separate parts: the sensing element and the wiper; special designs available on request |                                      |   |                   |   |                               |                   |                         |                      |                                       |


### Ultra Flat Membrane Potentiometer

| Model  | Electrical Stroke  | High Accuracy (Linearity) | Ohmic Values   | Output Signal  | Operating Life (Cycles) | Temperature Range | Dimensions (mm)   |
|--|--------------------|---------------------------|----------------|--|-------------------------|-------------------|---|
| <b>UFPMA</b>  | 15 mm to<br>250 mm | $\pm 2\%$ or<br>$\pm 1\%$ | 4.7 k $\Omega$ | Analog ratiometric<br>(1 % to 98 % of $V_{supply}$ ) | Up to 25 M              | -30 °C to +80 °C  | Working electrical travel + 25 mm<br>Width: standard 13.5 mm<br>(others upon request) |
| <b>UFPMC</b>  | Up to 270°         | $\pm 1.5\%$               | 4.7 k $\Omega$ | Analog ratiometric<br>(1 % to 98 % of $V_{supply}$ ) | > 10 M                  | -30 °C to +80 °C  | External diameter minimum 30 mm<br>(bigger on request)                                |





### Ultra Flat Industrial Membrane Potentiometer

| Model  | Electrical Stroke  | High Accuracy (Linearity) | Ohmic Values   | Output Signal  | Operating Life (Cycles) | Temperature Range | Dimensions (mm)   |
|--|--------------------|---------------------------|----------------|--|-------------------------|-------------------|---|
| <b>UIPMA</b>  | 20 mm to<br>250 mm | $\pm 2\%$                 | 4.7 k $\Omega$ | Analog ratiometric<br>(1 % to 98 % of $V_{supply}$ ) | Up to 3 M               | -10 °C to +50 °C  | Total electrical travel + 14 mm<br>Width: standard 13.5 mm<br>(others upon request) |
| <b>UIPMC</b>  | Up to 306°         | $\pm 5\%$                 | 10 k $\Omega$  | Analog ratiometric<br>(1 % to 98 % of $V_{supply}$ ) | Up to 3 M               | -10 °C to +50 °C  | External diameter minimum 30 mm<br>(bigger on request)                              |

### Non-Contacting Linear Position Sensor

| Model   | Electrical Stroke | High Accuracy (Linearity) | Voltage             | Output Signal   | Operating Life (Cycles) | Temperature Range   | Dimensions (mm) |
|---|-------------------|---------------------------|---------------------|---|-------------------------|---------------------|-----------------|
| <b>20LHE</b>   | Up to 10 mm       | $\pm 2\%$ or $\pm 1\%$    | 5 $V_{DC} \pm 10\%$ | Analog ratiometric 10 % to 90 % of $V_{supply}$ or<br>PWM 10 % to 90 % duty cycle | > 10 M                  | -40 °C to<br>+85 °C | 46 x 20.8 x 37  |
| Accurate linearity down to $\pm 1\%$ ; electrical strokes from 0 mm to 10 mm; long life: greater than 10 M cycles; non-contacting technology: Hall effect |                   |                           |                     |   |                         |                     |                 |






### Rotational Position Sensors

| Model   | Electrical Travel                          | High Accuracy (Linearity)             | Ohmic Values   | Resistance Tolerance at 20 °C        | Starting Torque (Ncm)                         | Operating Life (Cycles) | Temperature Range | Cylindrical External Diameter (mm) |
|---|--|---------------------------------------|--|--------------------------------------|---|-------------------------|-------------------|------------------------------------|
| <b>ROT/SF</b>    | 340° $\pm 3^\circ$ /<br>350° $\pm 2^\circ$ | $\pm 1\%$ down to<br>$\pm 0.015\%$    | 1 k $\Omega$ to 10 k $\Omega$ ; other<br>values on request | $\pm 10\%$ ; $\pm 5\%$<br>on request | 0.25 max.                                     | Up to 50 M              | -55 °C to +125 °C | 19.18 to 76.3                      |
| Linearity from $\pm 1\%$ down to $\pm 0.015\%$ ; excellent repeatability; long life; custom design to meet your specifications on request                     |  |                                       |  |                                      |   |                         |                   |                                    |
| <b>357</b>   | 340° $\pm 3^\circ$                         | $\leq \pm 2\%$ to<br>$\leq \pm 1.0\%$ | 1 k $\Omega$ to 50 k $\Omega$                              | $\pm 20\%$                           | 0.4 max.                                      | Up to 5 M               | -55 °C to +125 °C | 22.2                               |
| 7/8" diameter single turn; offer a cost-effective solution to your potentiometer requirements; suitable model for all industrial applications                 |  |                                       |  |                                      |   |                         |                   |                                    |
| <b>534</b>   | 3600° + 0° +<br>10° (10 turns)             | $\pm 0.25\%$                          | 100 $\Omega$ to 100 k $\Omega$<br>(200 k $\Omega$ )        | $\pm 5\%$                            | < 0.35 (one section)<br>< 0.65 (two sections) | Up to 1 M               | -55 °C to +125 °C | 22.2                               |
| Bushings and servo mount designs available; metric shaft available; dual gang configuration; high torque; center tap; front shaft extensions                  |  |                                       |  |                                      |   |                         |                   |                                    |
| <b>140</b>   | 320° $\pm 5^\circ$                         | $\pm 1\%$                             | 50 $\Omega$ to 20 k $\Omega$                               | $\pm 5\%$                            | < 0.15  | Up to<br>500 000        | -55 °C to +125 °C | 12.7                               |
| Ohmic value range: 50 $\Omega$ up to 20 k $\Omega$ ; smallest size available: 12.7 mm; mechanical stops on request; high torque and sealed versions available |  |                                       |  |                                      |   |                         |                   |                                    |











# VARIABLE RESISTORS

## Focus Products

### Non-Contacting Rotational Position Sensor

| Model  | Electrical Travel           | High Accuracy (Linearity) | Voltage                       | Output Signal  | Operating Life (Cycles)                                    | Temperature Range   | Cylindrical External Diameter (mm) |
|--|-----------------------------|---------------------------|-------------------------------|--|--|---------------------|------------------------------------|
| <b>351HE</b>    | 90°, 180°, 270°, 360°       | ± 1 %                     | 5 V <sub>DC</sub><br>± 10 %   | Analog ratiometric 10 % to 90 % of V <sub>supply</sub> or<br>PWM 10 % to 90 % duty cycle   | > 10 M   | -45 °C to 125 °C    | 22.7                               |
| Accurate linearity down to ± 0.5 %; all electrical angles available up to 360° (no dead band); non-contacting technology: Hall effect; model dedicated to all applications in harsh environments |                             |                           |                               |  |  |                     |                                    |
| <b>981HE</b>    | 90°, 120°, 180°, 270°, 360° | ± 1 %                     | 5 V <sub>DC</sub><br>± 10 %   | Analog ratiometric 10 % to 90 % of V <sub>supply</sub> or<br>PWM 1 kHz, 10 % to 90 % duty cycle  | > 5 M to hollow shaft model<br>> 10 M to D-shaft model     | -45 °C to 125 °C    | 47 x 24                            |
| Accurate linearity down to ± 0.5 %; easy mounting principle; non-contacting technology: Hall effect; spring-loaded types available   |                             |                           |                               |  |  |                     |                                    |
| <b>50SHE</b>    | 90°, 180°, 270°, 360°       | ± 1 %                     | 5 V <sub>DC</sub><br>± 10 %   | Analog ratiometric 10 % to 90 % of V <sub>supply</sub> or<br>PWM 1 kHz, 10 % to 90 % duty cycle  | > 50 M   | -40 °C to 125 °C    | 12.7                               |
| Accurate linearity down to ± 0.5 %; all electrical angles available up to 360° (no dead band); long life: greater than 50 M cycles; smallest size available                                      |                             |                           |                               |  |  |                     |                                    |
| <b>RAME027</b>    | 360°                        | ± 0.6 %                   | 5 V <sub>DC</sub><br>± 0.25 % | Analog ratiometric<br>from 0.5 V <sub>DC</sub> to 4.5 V <sub>DC</sub>  | > 50 M   | -25 °C to<br>+75 °C | 27                                 |
| Accurate linearity down to ± 0.58 %; complete angle of 360° (no dead band); long life: greater than 50 M cycles; one time programmable technology for high reliability                           |                             |                           |                               |  |  |                     |                                    |
| <b>34THE</b>    | 10 turns 3600°              | ± 1 %                     | 5 V <sub>DC</sub><br>± 10 %   | Analog ratiometric 1 % to 99 % of V <sub>supply</sub> (other on<br>request) or PWM 1 kHz, 10 % to 90 % duty cycle or<br>SPI binary on 5 V or binary on 3.3 V | > 10 M of cycles for bushing<br>> 50 M of cycles for servo | -40 °C to<br>+85 °C | 22.2                               |
| All electrical angles available up to 3600°; very long life: 50 M cycles for servo, 10 M cycles for bushing; non-contacting technology: Hall effect; true power on sensor                        |                             |                           |                               |  |  |                     |                                    |

### Panel Potentiometers

| Model   | Life Cycles                                       | Size                   | Mounting      | Technology                     | Power Rating                | Multigang (Y / N) | Resistance Range                             | Variation Laws      |
|---|---|------------------------|---------------|--------------------------------|-----------------------------|-------------------|--|---------------------|
| <b>P16/PA16</b>                              | 50 000  | 16 mm dia.             | Cabling       | Cermet                         | 1 W                         | N                 | 22 Ω to 10 MΩ                                | Linear / non-linear |
| Low profile; knob included; 300° mechanical travel IP67 sealing; panel sealing  |   |                        |               |                                |                             |                   |  |                     |
| <b>P16S/PA16S</b>                            | 10 000 for switches,<br>50 000 for potentiometers | 16 mm dia.             | Cabling       | Cermet / conductive<br>plastic | 1 W - P16S<br>0.5 W - PA16S | N                 | 22 Ω to 10 MΩ - P16S<br>1 kΩ to 1 MΩ - PA16S | Linear / non-linear |
| Low profile; ccw electrical cut off; knob included; indent feeling 300° mechanical travel metal knob available; IP67 sealing    |   |                        |               |                                |                             |                   |  |                     |
| <b>P11S</b>                                  | 50 000  | 12.5 mm square<br>1/2" | PCB / cabling | Cermet                         | 1 W                         | Y                 | 22 Ω to 10 MΩ                                | Linear / non-linear |
| Versatile; modular, options, 300° mechanical travel IP64 sealing; panel sealing optional  |   |                        |               |                                |                             |                   |  |                     |
| <b>P11P</b>                                  | 50 000  | 12.5 mm square<br>1/2" | PCB / cabling | Cermet                         | 1 W                         | Y                 | 22 Ω to 10 MΩ                                | Linear / non-linear |
| All plastic top; high dielectric, strength; 300° mechanical travel IP64 sealing; panel sealing optional                         |   |                        |               |                                |                             |                   |  |                     |
| <b>P11L</b>                                  | 2 000 000   | 12.5 mm square<br>1/2" | PCB / cabling | Cermet                         | 0.1 W                       | Y                 | 1 kΩ, 5 kΩ, 10 kΩ, 50 kΩ                     | Linear / non-linear |
| High rotational life; modular options; 300° mechanical travel IP64 sealing  |   |                        |               |                                |                             |                   |  |                     |
| <b>P10L</b>                                  | 500 000   | 9.7 mm square<br>3/8"  | PCB           | Cermet                         | 0.1 W                       | N                 | 1 kΩ, 5 kΩ, 10 kΩ, 50 kΩ                     | Linear              |
| High rotational life; low cost; 290° mechanical travel IP67 sealing; panel sealing optional                                     |   |                        |               |                                |                             |                   |  |                     |
| <b>P13SM</b>                                 | 25 000  | 16 mm dia.             | Cabling       | Cermet                         | 1.5 W                       | N                 | 22 Ω to 10 MΩ                                | Linear / non-linear |
| Submersible panel potentiometer; salt water resistant 1.5 W at 70 °C; 300° mechanical travel metal knob available; IP68 sealing |   |                        |               |                                |                             |                   |  |                     |
| <b>PE30</b>                                  | 25 000  | 19.7 mm dia.<br>3/4"   | Cabling       | Cermet                         | 3 W                         | N                 | 22 Ω to 10 MΩ                                | Linear / non-linear |
| Fully sealed; robust; 300° mechanical travel; high power rating   |   |                        |               |                                |                             |                   |  |                     |
| <b>P30L</b>                                  | 2 000 000   | 19.7 mm dia.<br>3/4"   | Cabling       | Cermet                         | 2 W                         | N                 | 1 kΩ, 5 kΩ, 10 kΩ, 50 kΩ                     | Linear / non-linear |
| High rotational life; fully sealed; high torque   |   |                        |               |                                |                             |                   |  |                     |
| <b>PRV6</b>                                  | 50 000  | 12.5 mm dia.<br>1/2"   | PCB / cabling | Cermet                         | 1.5 W                       | N                 | 20 Ω to 10 MΩ                                | Linear / non-linear |
| Fully sealed mil design; 300° mechanical travel IP67 sealing; panel sealing optional  |   |                        |               |                                |                             |                   |  |                     |



# Variable Resistors and Position Sensors Offer Extended Life and Custom Adaptability

## Advantages of Vishay Variable Resistors

- Custom and value-added capabilities
- Long life
- High accuracy
- Models optimized for harsh environments

## For the Following Applications

- Flying commands
- Panel controls
- Steering wheel sensors
- Syringe pumps



More than 30 years of successful experience in aircraft designs



Sophisticated engineering capabilities to meet the requirements of customer applications



Our sensors provide reliability in equipment with moving parts

## Useful Links

- Panel Potentiometers Selector Guide  
[www.vishay.com/doc?49800](http://www.vishay.com/doc?49800)
- Precision Potentiometers Selector Guide  
[www.vishay.com/doc?49711](http://www.vishay.com/doc?49711)
- Rotational Transducers Selector Guide  
[www.vishay.com/doc?49419](http://www.vishay.com/doc?49419)

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