PIHER

PTC-15
15 mm Cermet Potentiometer

FEATURES

- Cermet resistive element.
- Plastic material according to UL94V-0.
- Alumina substrate.
- IP54 protection according to IEC 60529.
- Also upon request:
  - Wiper positioned at initial, 50% or fully clockwise.
  - Long life model for low cost control pot. applications.
  - Supplied in magazines for automatic insertion.
  - Low torque option.
  - Available as SPDT switch.
  - Laser trimming for tighter tolerances.
  - Mechanical detents.
  - Special tapers.

MECHANICAL SPECIFICATIONS

- Mechanical rotation angle: 265° ± 5°
- Electrical rotation angle: 240° ± 20°
- Torque: 0.5 to 2.5 Ncm. (0.7 to 3.4 in-oz)
- Stop torque: > 10 Ncm. (> 14 in-oz)
- Life*: Up to 10K cycles

ELECTRICAL SPECIFICATIONS

- Range of values*
  - 100Ω ≤ Rn ≤ 5 M
  - (Decad. 1.0 - 2.0 - 2.2 - 2.5 - 4.7 - 5.0)
- Tolerance*:
  - 100Ω ≤ Rn ≤ 1M Ω........ ± 20%
  - 1MΩ < Rn ≤ 5M Ω........ ± 30%
- Max. Voltage: 250 VDC (lin) 125 VDC (no lin)
- Nominal Power 70°C (158°F) (see power rating curve)
  - 0.50 W (lin) 0.25 W (no lin)
- Taper* (Log. & Alog. only Rn ≥1K)
  - Lin ; Log; Alog.
- Residual resistance*:
  - ≤ 0.5 % Rn (5 Ω min.)
- Equivalent Noise Resistance: ≤ 3% Rn (3 Ω min.)
- Operating temperature**: -40°C + 90°C (-40°F + 194°F)

HOW TO ORDER

PTC15 L H01 223 A 2020

OPTIONAL EXTRAS

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NOTES

(1) "Z" adjustment only available on "H" versions. Standard colour for the "T" rotor: Orange
(2) Terminals styles: "P" are crimped terminals. V=Vertical adjust; H=Horizontal Adjust
(3) Value Example: Code:
  - 101 = 100 Ω
  - 223 = 22 K
  - 504 = 50 K
  - 505 = 5 Ω
  - 000 = C M

(4) Non standard tolerance, check availability. Example: +7% Code:
  - 07 05 negative tolerance
  - 07 05 positive tolerance

(5) Life
  - Standard: 1K cycles
  - Long life: 10K cycles

(6) Colour shaft/rotor:
  - Potentiometer without shaft: only rotor
  - Potentiometer with shaft: only shaft

(7) Low Torque: ≤1.5Ncm. No detent option available for low torque models

(8) Magazines (35 pcs/mag): available for VA (12.5), V (12.5), V (12.5P), V (15), V15 (P) and H models.
  - For more information please contact your nearest Piher supplier.

(9) If you wish to use your own custom plastic shaft/knob/actuator please contact Piher for advice about compatible materials.

www.piher.net
This way of ordering should be used for options which are not included in the “How to order” standard and optional extras.

**PTC-15 LH 01 + DRAWING NUMBER**  (Max. 16 digits)

**STANDARD OPTIONS**

- Detents .......................................................... None
- Rotor colour .................................................... Natural
- Shaft colour .................................................... Natural
- Wiper position .................................................. Initial
- Torque ........................................................... Standard
- Life .............................................................. 1000 cycles

**ROTORS**

<table>
<thead>
<tr>
<th>Wipers positioned at initial (without shaft)</th>
<th>Wipers positioned at 50% (without shaft)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Rotor C" /></td>
<td><img src="image2" alt="Rotor F" /></td>
</tr>
<tr>
<td><img src="image3" alt="Rotor R" /></td>
<td><img src="image4" alt="Rotor T" /></td>
</tr>
</tbody>
</table>

**VERTICAL MOUNTING – HORIZONTAL ADJUSTMENT**

<table>
<thead>
<tr>
<th><img src="image5" alt="A" /></th>
<th><img src="image6" alt="B" /></th>
</tr>
</thead>
</table>

**HORIZONTAL MOUNTING – VERTICAL ADJUSTMENT**

<table>
<thead>
<tr>
<th><img src="image7" alt="A" /></th>
<th><img src="image8" alt="D" /></th>
</tr>
</thead>
</table>
**HORIZONTAL MOUNTING – VERTICAL ADJUSTMENT**

- **va (12.5)**
- **v (15)**
- **v (17.5)**

**DETENT DETAILS**

- 22 detents example

**CRIMPED TERMINALS (DETAIL)**

**POWER RATING CURVE**

**TAPER**

Please note relative terminal positions when ordering non linear tapers.

- A = Linear
- B = Log.
- C = Alog.

**POSITIONING**

- P.M. 50% ± 15°
- CCW
- P.F.
- CW

- Std. Position = CCW

15mm SMD Cermet version available at www.piher.net

See the PSC-15 series

www.piher.net
TESTS

<table>
<thead>
<tr>
<th></th>
<th>TYPICAL VARIATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELECTRICAL LIFE</td>
<td>1.000 h. @ 70°C; 0.5 W</td>
</tr>
<tr>
<td>MECHANICAL LIFE (CYCLES)</td>
<td>1000 @ 10 CPM ...15 CPM</td>
</tr>
<tr>
<td>TEMPERATURE COEFFICIENT</td>
<td>−40°C; +90°C</td>
</tr>
<tr>
<td>THERMAL CYCLING</td>
<td>16 h. @ 90°C; 2h. @ −40°C</td>
</tr>
<tr>
<td>DAMP HEAT</td>
<td>500 h. @ 40°C @ 95% HR</td>
</tr>
<tr>
<td>VIBRATION (for each plane X,Y,Z)</td>
<td>2 h. @ 10 Hz. ... 55 Hz.</td>
</tr>
</tbody>
</table>

NOTE: Out of range values may not comply these results.

SHAFTS

<table>
<thead>
<tr>
<th>Hollow model shafts</th>
<th>Solid model shafts</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIG.</td>
<td>A</td>
</tr>
<tr>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>19</td>
</tr>
<tr>
<td>5</td>
<td>9.5</td>
</tr>
<tr>
<td>9</td>
<td>35</td>
</tr>
<tr>
<td>10</td>
<td>37.8</td>
</tr>
<tr>
<td>11</td>
<td>35</td>
</tr>
<tr>
<td>13</td>
<td>7.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FIG.</th>
<th>A</th>
<th>B</th>
<th>D</th>
<th>Ref.</th>
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<tbody>
<tr>
<td>6</td>
<td>15</td>
<td>9</td>
<td>6</td>
<td>5219</td>
</tr>
<tr>
<td>7</td>
<td>16.8</td>
<td>9</td>
<td>6</td>
<td>5220</td>
</tr>
<tr>
<td>8</td>
<td>25.3</td>
<td>9</td>
<td>6</td>
<td>5207</td>
</tr>
<tr>
<td>12</td>
<td>46</td>
<td>5</td>
<td>6</td>
<td>5227</td>
</tr>
</tbody>
</table>

Slott (1 x 1.4) perpendicular to wiper position. Fig. 12 slot is on line with wiper position.

RECOMMENDED CONNECTIONS

Pipher potentiometer’s recommended connection circuit for a position sensor or control application. (voltage divider circuit electronic design).
SHAFTS

By default shafts, knobs & thumbwheels are delivered unassembled. Mounted shafts, knobs & thumbwheels are delivered at random position. Positioning available check availability.

If you wish to use your own plastic shaft/knob/actuator please contact Piher for advice about compatible materials.

Fig. 3 / Ref. 5372
Fig. 15 / Ref. 5217
Fig. 17 / Ref. 5210
Fig. 18 / Ref. 5271
Fig. 19 / Ref. 6032*

Fig. 20 / Ref. 5369*
Fig. 21 / Ref. 6031*
Fig. 22 / Ref. 6029
Fig. 23 / Ref. 6022
Fig. 29 / Ref. 6162
Fig. 25 / Ref. 6059

Fig. 27 / Ref. 5268*
Fig. 28 / Ref. 6055

* Not available in self extinguishable plastic

THUMBWHEEL

By default shafts, knobs & thumbwheels are delivered unassembled. Mounted shafts, knobs & thumbwheels are delivered at random position. Positioning available check availability.

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Fig. 4 / Ref. 5371
This innovative PT’s with detents family has been specifically developed to allow the integration of otherwise large and expensive external mechanisms into the body of the potentiometer thus allowing a high range of configurations: special tapers, torque, tolerances, linearity, cut track, etc.

This detent design not only adds a “click” sensation of position, but also offers enormous savings in both cost and space for any given application.

Strong and weak detents can be mixed as per customer’s request.

Detent number and positions can be made or fitted to the customer needs or preferences.

NOTES FOR DETENTED VERSIONS:

(1) For the following mounting methods, the detents configurations will be studied individually case by case:
   - V02 & V21
   - V12 & V22
   - V18
   - V24

(2) For more than 13 detents versions please contact your nearest PIHER authorized distributor.

(3) Standard mechanical life is 500 cycles.

(4) Long life versions are available under request and have the following characteristics at Tº:
   - Potentiometers with 1 to 3 detents: up to 10K cycles
   - Potentiometers with 4 and more detents: up to 5K cycles

(5) Detent torque can vary from 1.2 to 2.5 times the standard potentiometer torque.

   For all detents versions of more than 13 detents the detent torque will be 0.5 to 3.5 Ncm.

(6) Please consult your nearest Pher supplier if unique non-overlapping values at each detent position or LOG/ALOG tapers are required.

(7) Different output voltage values can be matched at each detent position (upon request).

DETENTS WITH CONSTANT VALUE ZONES

PIHER’s potentiometers may feature special stepped outputs or ‘constant voltage zones’ for the 6, 10 and 15mm product families.

These constant voltage zones can be combined with PIHER’s mechanical detents to provide exact alignment between the electrical output (flat areas) and the mechanical detent’s positions. The result is a higher level of precision in controlling lighting, temperature, motor or other electronic control systems.

In addition to established catalogue detent configurations, we will design and manufacture any other configuration on our tried-and-tested carbon/cermet & THM/SMD potentiometer technology and processes.

With its exacting control capabilities, our 10mm and 15mm potentiometers series are well suited for many consumer applications such as ovens, ranges, dishwashers, lighting (dimmers), power hand tools, washing machines and HVAC systems.

Constant value zones can be combined with strategically located stops matching the flat areas of the output.

10 stepped outputs version example:

When the potentiometer’s wiper position is located at detent d8, the output voltage will be 88.9% Un ± % tolerance.
Improved repeatability

By combining the constant value zones with the detents, engineers can align the same voltage values with each of the detent stops when rotating the control both forward and backward.

This provides clear mechanical positions that are not only repeatable, but perfectly aligned electrical outputs at each of the (detent) angles.

Piher’s detents also prevent output values from changing due to vibration or accidental rotor movements, furthering reliable control consistency.

Design tip. Cost-effectiveness

Absolute encoders can easily be replaced connecting the potentiometer to the microprocessor’s analogue input.

Main advantages

✓ Unique, non-overlapping values at each stop (detent position)
✓ Prevents output value change due to light vibration or accidental rotor micro-movements
✓ Fully customisable according to customer’s needs
✓ Cost effective replacement for absolute encoders

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