

PT-15 / PTC-15

15-mm carbon / cermet through-hole potentiometer

The PT-15 and PTC-15 potentiometers offer control where frequent adjustment is required. The shaftless design allows for employment of different engagement mechanisms, such as a customized shaft, a motor control or a human interface adjustment. This potentiometer can also control variable outputs including frequency, change in motor speed or volume.



KEY FEATURES

- ▶ Excellent performance (up to 3% linearity)
- ▶ Carbon or cermet resistive element
- ▶ Up to 38 mechanical detents for tactile feedback
- ▶ Up to 100.000 life cycles
- ▶ IP54 protection
- ▶ Magazine packaging for automatic insertion available
- ▶ Polyester / Alumina substrate
- ▶ Wiper positioned at initial, 50% or fully clockwise
- ▶ Loose and assembled shaft and knobs
- ▶ Linear, logarithmic and antilogarithmic tapers
- ▶ Self extinguishable plastic (UL 94V-0) available
- ▶ SPDT switch and low torque version available

ELECTRICAL SPECIFICATIONS

| | PT-15 | PTC-15 |
|----------------------------------|---|---|
| Taper ¹ | Lin, Log, Alog | |
| Range of values ¹ | (Decad. 1.0 - 2.0 - 2.2 - 2.5 - 4.7 - 5.0) | |
| Lin | 100Ω ≤ Rn ≤ 5MΩ | |
| Log, Alog | 1KΩ ≤ Rn ≤ 5MΩ | |
| Tolerance ¹ | | |
| 100Ω ≤ Rn ≤ 1MΩ | ± 20% | |
| 1MΩ < Rn ≤ 5MΩ | ± 30% | |
| Max. Voltage | | |
| Lin | 250 VDC | |
| Log, Alog | 125 VDC | |
| Nominal power | 50°C (122°F) | 70°C (158°F) |
| Lin | 0.25 W | 0.50 W |
| Log, Alog | 0.12 W | 0.25 W |
| Residual resistance ¹ | ≤ 0.5% Rn (5Ω min.) | |
| Equivalent noise resistance | ≤ 3% Rn (3Ω min.) | |
| Operating temperature | -25°C to +70°C ² [-13°F to + 158°F] | -40°C to +90°C ³ [-40°F to + 194°F] |

¹ Others available on request; ² Up to 85°C depending on application.; ³ +120°C/+248°F upon request

APPLICATIONS

- ▶ Appliance program selection
- ▶ Thermostat adjustment
- ▶ Timer and control relays
- ▶ Consumer electronics
- ▶ Power tool controls
- ▶ Test and measurement equipment

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MECHANICAL SPECIFICATIONS

| | PT-15 | PTC-15 |
|--|---|------------------|
| Mechanical rotation angle ¹ | 265° ± 5° | |
| Electrical rotation angle | 240° ± 20° | |
| Torque Rotational Stop | 0.5 to 2.5 Ncm (0.7 to 3.4 in-oz) > 10 Ncm (>14 in-oz) | |
| Life ² | Up to 100k cycles | Up to 10k cycles |

¹ 240° ± 5° available upon request. Endless rotation available: ST-15; ² Others check availability

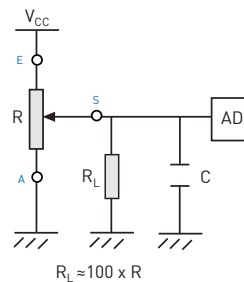
ENVIRONMENTAL TESTING

| | Test method (CEI 393-1) | PT-15 ΔR(%)- Piher typical test results | PTC-15 ΔR(%)- Piher typical test results |
|-------------------------|--|--|---|
| Electrical life | 1.000h at 50°C; 0.15W 1.000h at 70°C; 0.33W | ±5% n/a | n/a ±2% |
| Mechanical life | 1000 cycles at 10 to 15 cpm | ±3 % (Rn < 1M) | ±2% |
| Temperature coefficient | -25°C; +70°C -40°C; +90°C | ±300 ppm/°C (Rn < 100K) n/a | n/a ±100 ppm/°C (Rn < 100K) |
| Thermal cycling | 16h at 85°C and 2h at -25°C 16h at 90°C and 2h at -40°C | ±2.5% n/a | n/a ±2% |
| Damp heat | 500h at 40°C and 95% relative humidity (RH) | ±5% | ±2% |
| Vibration | 2h each plane at 10Hz - 55Hz | ±2% | ±2% |
| Storage | 6 month at 23°C ±2°C and 50% RH | ±2.5% | ±2% |

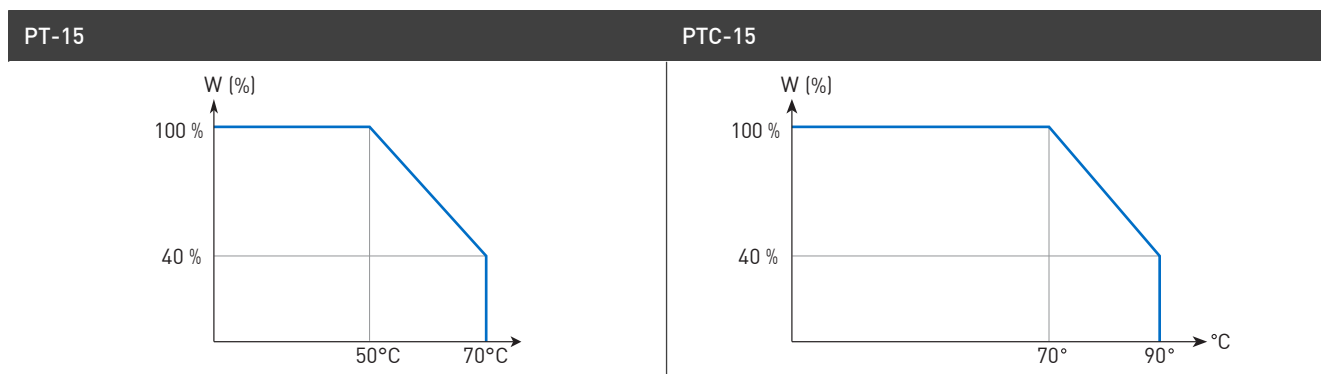
Out of range values may not comply with these results. Standard test conditions: temperature: 23°C ±2°C and 45% to 70% RH

RECOMMENDED CONNECTIONS

Recommended connection circuit for a position sensor or control application (voltage divider circuit electronic design).



POWER RATING CURVE



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| STANDARD CONFIGURATION | | |
|------------------------|----------------|--------|
| | PT-15 | PTC-15 |
| Life | 1.000 cycles | |
| Cut track | no | n/a |
| Detents | none | |
| Packaging | bulk | |
| Shaft/thumb wheel | none | |
| Non-flammability | no | yes |
| Housing color | black | cream |
| Rotor color | white | cream |
| Wiper Position | initial | |
| Torque | 0.5 to 2.5 Ncm | |
| Terminal material | steel | brass |
| Linearity | not controlled | |

ROTORS

| Wiper shown at initial position | | | | |
|------------------------------------|-------------------------------------|------------------------------------|-------------------------------------|---|
| L Screw driver - through hole | N Removable shaft or thumbwheel | G Removable shaft or thumbwheel | | |
| | | | | |
| Wiper shown positioned at 50% | | | | |
| M Hexagonal - through hole | C | F | R | T |
| | | | | |
| With inserted shaft | | With inserted thumbwheel | | |
| W Adjustable from terminal side | X Adjustable from collector side | Y Adjustable from terminal side | Z Adjustable from collector side | |
| | | | | |

Default delivery is at initial position.



Download the STEP file here:
<https://www.piher.net/piher/?p=916>

PT-15 / PTC-15

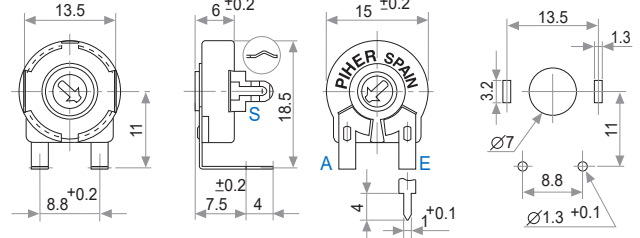
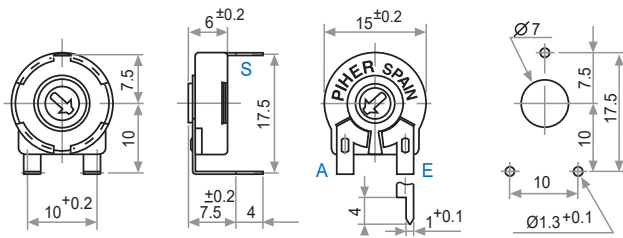
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MOUNTING METHOD

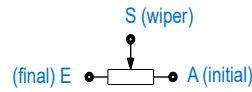
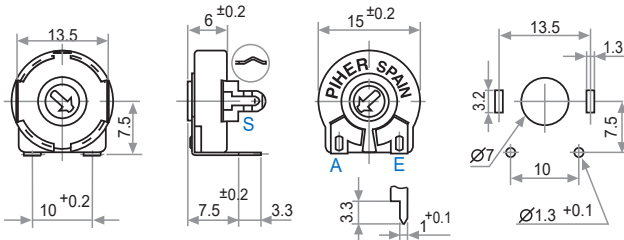
Vertical adjust / horizontal mounting

V17 - 17.5mm / V25 with crimped terminals

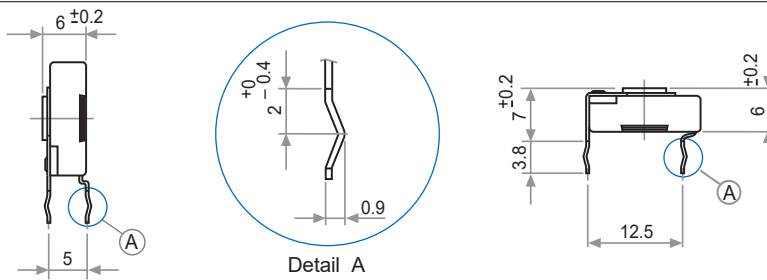
V18 - 18.5mm (D)



V24 - 15mm (D15)



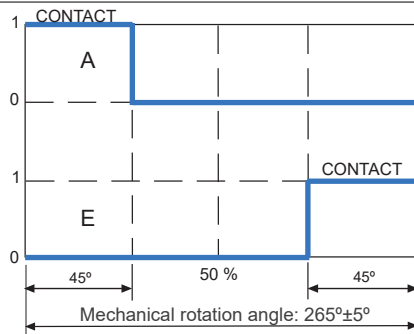
CRIMPED TERMINALS (DETAIL)



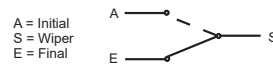
STANDARD RESISTANCE-VALUES AND TOLERANCES

| Resistance Ω | 100 | 200 | 220 | 250 | 470 | 500 | 1K | 2K | 2.2K | 2.5K | 4.7K | 5K | 10K | 20K | 22K | 25K | 47K | 50K | 100K | 200K | 220K | 250K | 470K | 500K | 1M | 2M | 2.5M | 4.7M | 5M |
|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|-----|-----|------|------|-----|
| Order Code | 101 | 201 | 221 | 251 | 471 | 501 | 102 | 202 | 222 | 252 | 472 | 502 | 103 | 203 | 223 | 253 | 473 | 503 | 104 | 204 | 224 | 254 | 474 | 504 | 105 | 205 | 255 | 475 | 505 |
| Tolerance | 20% | | | | | | | | | | | | | | | | | | | | | | | | 30% | | | | |

SWITCH VERSIONS AVAILABLE WITH OR WITHOUT DETENTS



Standard Specification
Power rating: 24V / 15mA
ON position resistance: $\leq 5\Omega$
Insulation resistance: $\geq 30M\Omega$

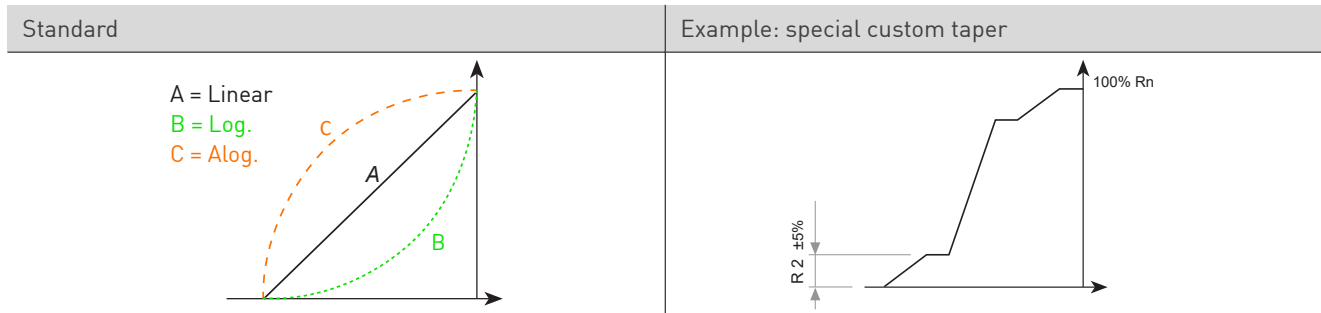


Contact Piher Sensing Systems for ordering information.

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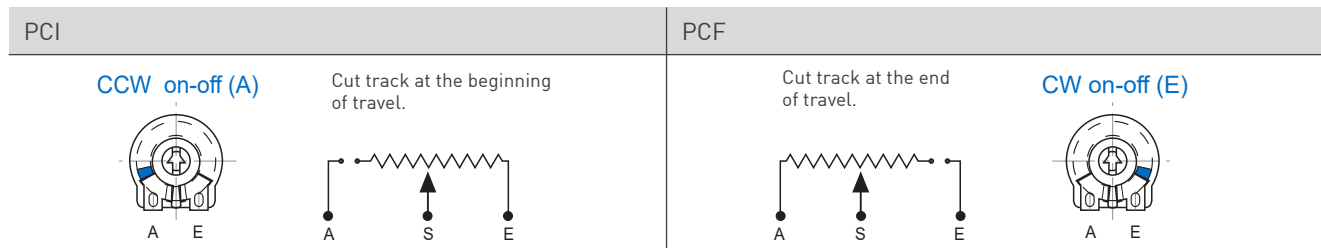
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TAPERS



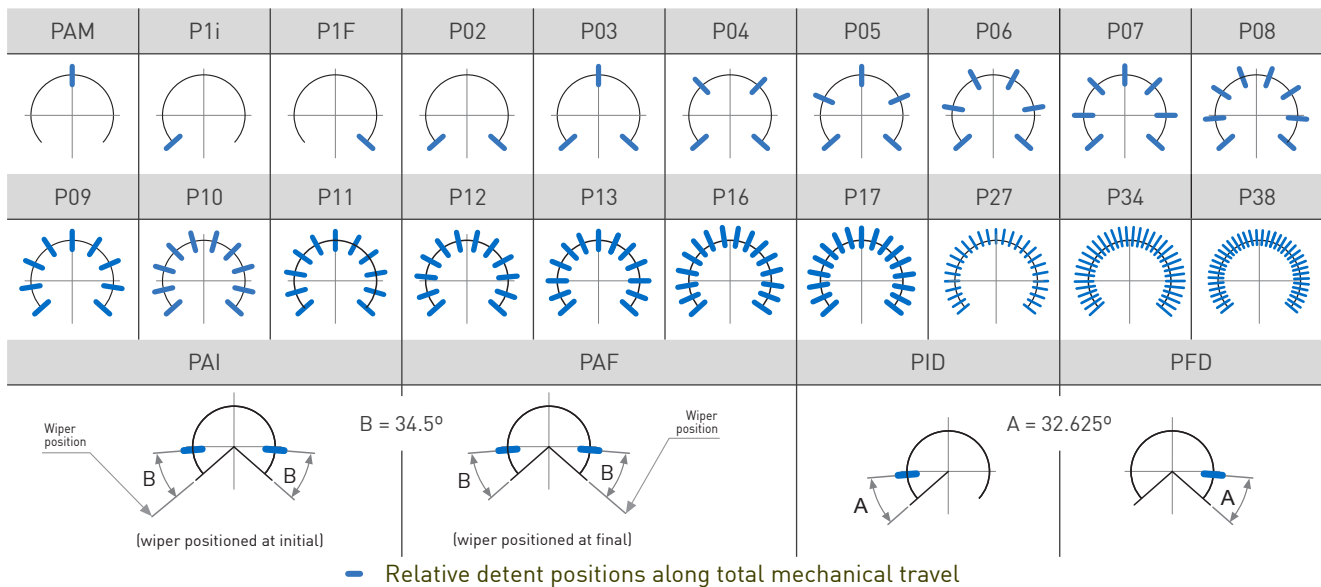
For more information on custom tapers contact Piher Sensing Systems.

CUT TRACKS (OPEN CIRCUIT DESIGN)



Other configurations available upon request. Cut Track not available for PTC-15.

DETENTS

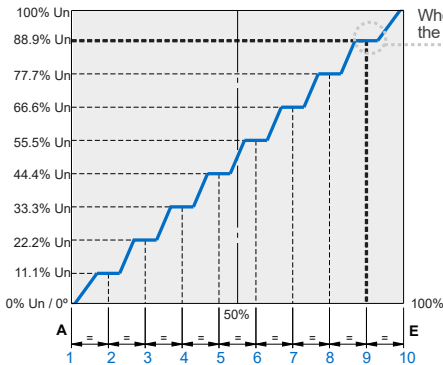


- Standard mechanical life is 500 cycles.
- Long life versions are available upon request and have the following characteristics at T^a: Potentiometers with 1 to 3 detents up to 10K cycles; Potentiometers with 4 and more detents up to 5K cycles
- Please consult Piher Sensing Systems if unique non-overlapping values at each detent position or LOG/ALOG tapers are required.
- Different output voltage values can be matched at each detent position [see next section].
- 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
- For V18 and V24 mounting detent configuration will be studied case by case.
- For more than 13 detents versions please contact Piher Sensing Systems.

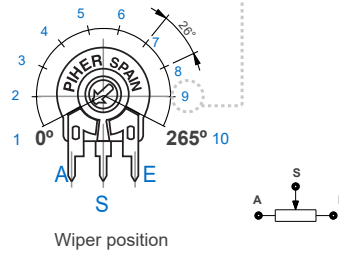
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STEPPED OUTPUTS / CONSTANT VALUE ZONES



When the potentiometer's wiper is located at detent n°9, the output voltage will be 88.9% Un \pm % tolerance.

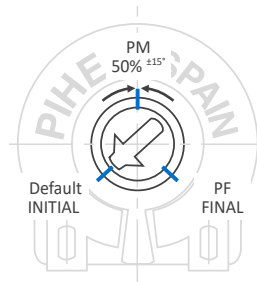


IMPROVED REPEATABILITY

Constant value zones can be combined with strategically located mechanical detents to provide exact alignment between the electrical output (flat areas) and the mechanical detent position. This provides clear mechanical positions that are not only repeatable, but perfectly aligned electrical outputs at each of the (detent) angles. The detents also prevent output values from changing due to vibration or accidental rotor movements. The result is a higher level of precision in controlling lighting, temperature, motor or other electronic control systems.

Contact Piher Sensing Systems for ordering information.

POSITIONING



Special delivery positions available on request.

PACKAGING

Bulk



Dimensions (mm): 185x85x80

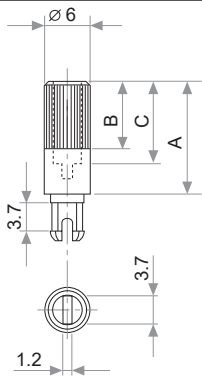
Without shaft: 400 units per box
 With thumbweel: 200 units per box
 With shaft: contact Piher Sensing Systems

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SHAFTS AND THUMBWHEELS (TOP VIEW, FOR N, G AND T ROTOR TYPES)

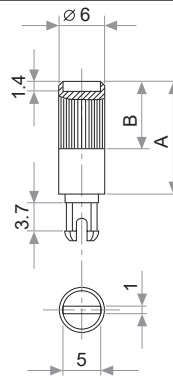
Hollow shafts models



| Fig. | Ref. | A | B | C |
|------|------|------|-----|------|
| 1 | 5272 | 12 | 9 | 8 |
| 2 | 5214 | 19 | 9 | 15 |
| 5 | 5208 | 9.5 | 6.5 | 5.5 |
| 9 | 5216 | 35 | 9 | 31 |
| 10 | 5218 | 37.8 | 9 | 33.8 |
| 11 | 5209 | 35 | 25 | 31 |

A = Length measured from rotor surface
B = Knurling length
C = Hollow depth

Solid shafts models



| Fig. | Ref. | A | B |
|------|------|------|---|
| 6 | 5219 | 15 | 9 |
| 7 | 5220 | 16.8 | 9 |
| 8 | 5207 | 25.3 | 9 |
| 12 | 5227 | 46 | 5 |

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

| | | | | | |
|----------------------|---------------------|---------------------|--|----------------------|----------------------|
| 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. 4 - Ref. 5371 | | | | |
| | | | <p>Thumbwheel and shafts are delivered unassembled if not specified otherwise in part number code (W, X, Y, Z). The position of the thumbwheel Fig 4 can be indicated in part number code: Initial (default), 50% (PM) or Final (PF), shafts will be delivered at random position by default. Custom specific positions are available for all shafts and thumbwheel on request.</p> <p>The plastic color can be stated in the part number. Non flammable plastic available, if potentiometer is order with non-flammable plastic (UL-94V0), the shaft or knob will be delivered with non-flammable plastic. If you wish to use your own plastic shaft/knob/actuator please contact Piher for advice about compatible materials. *Not available in self-extinguishable plastic.</p> | | |