

### 15-mm carbon / cermet through-hole potentiometer

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

- 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 <sup>1</sup>	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 <sup>2</sup>	Up to 100k cycles	Up to 10k cycles

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

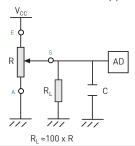
#### **ENVIRONMENTAL TESTING**

	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%

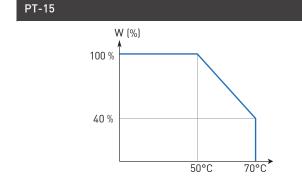
Out of range values may not comply with these results. Standard test conditions: temperature:  $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$  and 45% to 70% RH

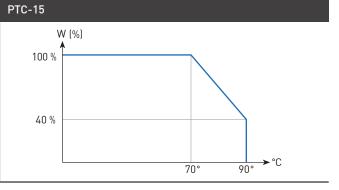
#### RECOMMENDED CONNECTIONS

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

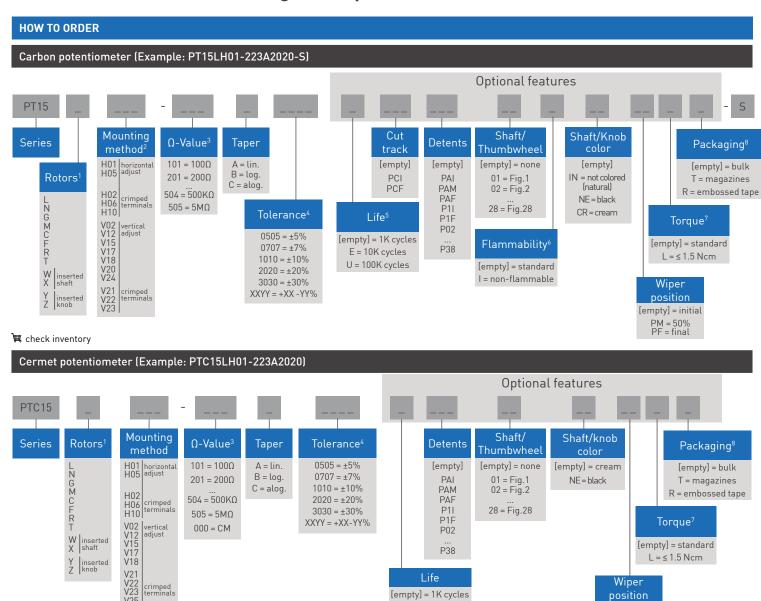


#### **POWER RATING CURVE**





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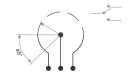


- 1. Rotors: "Z" adjustment only available on "H"-mounting versions. Color for "T" rotor is Orange.
- 2. Mounting method: "V24" terminals material: brass.
- 3.  $\Omega$  Value:  $\underline{XXX}$  First two digits of  $\Omega$ -value  $\underline{XXX}$  Number of zeros

m check inventory

 $000 = CM = 45^{\circ}$  switch SPDT version

E = 10K cycles



- 4. Tolerance: for custom tolerance please check availability: info@piher.net
- 5. Life: "U" only available for low-torque versions and to be studied case by case.
- $6.\ Non-flammable\ according\ to\ UL\ 94V-0:\ housing,\ rotor\ and\ shaft.\ PTC-15\ made\ of\ non-flammable\ material\ by\ standard.$
- 7. Torque: Detent option not available with low torque models.
- 8. Packaging: Magazine packaging available for all H and V12, V02, V21, V15 and V23 mounting.

[empty] = initial

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DEFAULT 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					
Shaft/knob/thumbwheel color (if applicable)	Not colured (natural)	cream					
Wiper Position	initial						
Torque	0.5 to 2.5 Ncm						
Terminal material	steel	brass					
Linearity	not controlled						

## **ROTORS** Wiper shown at initial position Removable shaft or thumbwheel Screw driver - through hole Removable shaft or thumbwheel Wiper shown positioned at 50% M Hexagonal - through hole С 3.35 ±0.05 Ø4.02 ±0.05 With inserted shaft With inserted thumbwheel X Adjustable from Adjustable from Adjustable from terminal side Adjustable from collector side términal side collector side 7.5 ±0.3

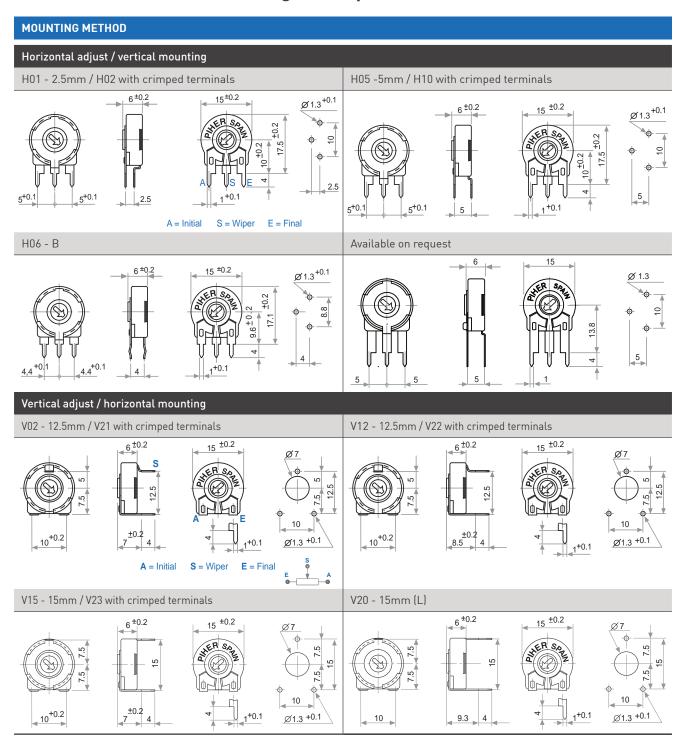
Default delivery is at initial position.



L ±0.5

L ±0.5

### 15-mm carbon / cermet through-hole potentiometer



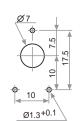
### 15-mm carbon / cermet through-hole potentiometer

15<sup>±0.2</sup>

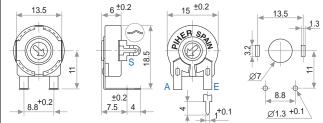
#### **MOUNTING METHOD**

#### Vertical adjust / horizontal mounting

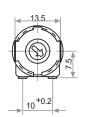
V17 - 17.5mm / V25 with crimped terminals

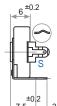


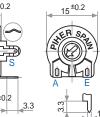
V18 - 18.5mm (D)

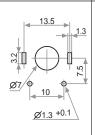


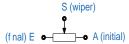
V24 - 15mm (D15)





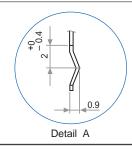


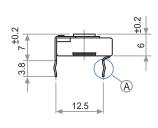




#### **CRIMPED TERMINALS (DETAIL)**



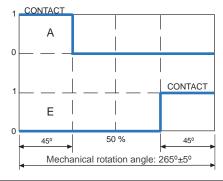




### STANDARD RESISTANCE-VALUES AND TOLERANCES

Resistance $\Omega$	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	nce 20%											30	)%																

#### SWITCH VERSIONS AVAILABLE WITH OR WITHOUT DETENTS



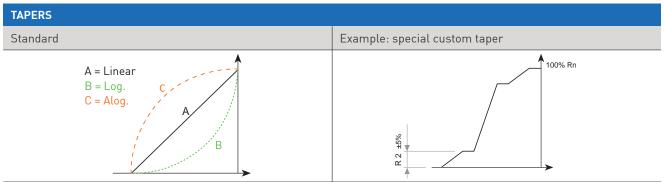
#### **Standard Specification**

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

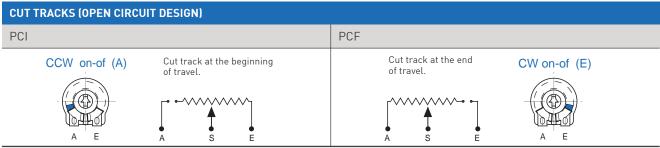


Contact Piher Sensing Systems for ordering information.

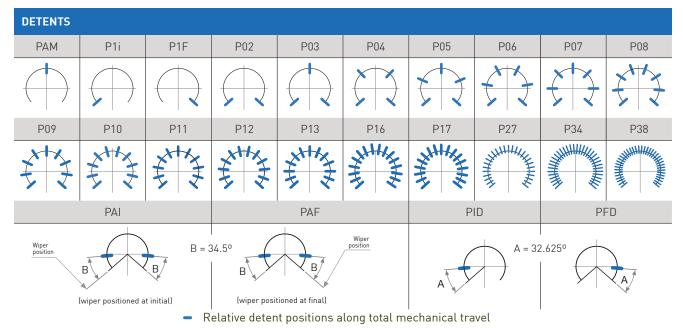
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For more information on custom tapers contact Piher Sensing Systems.



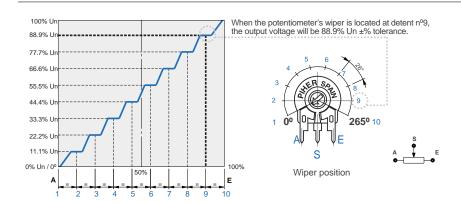
Other configurations available upon request. Cut Track not available for PTC-15.



- •Standard mechanical life is 500 cycles.
- •Long life versions are available upon request and have the following characteristics at Ta: 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.
- $\bullet \text{Different output voltage values can be matched at each detent position (see next section)}. \\$
- 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



#### **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

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.

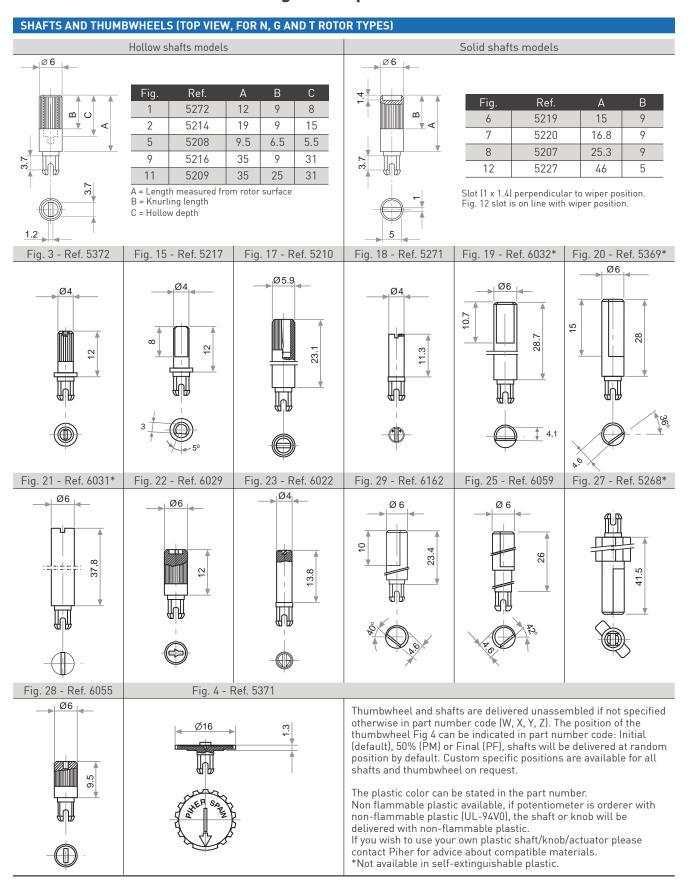
#### **PACKAGING**

#### Bulk



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

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AVAILABLE PACKAGING OPTIONS											
Mounting Type	Terminal Style	Mounting Method	Bulk	Magazine (35 units)	Embossed Tape						
		H01	✓	✓							
	Straight	H05	✓	✓							
Horizontal adjust		H06	✓	1							
	C-:	H02	✓	✓							
	Crimped	H10	✓	1							
		V02	✓	✓	1						
		V12	✓	✓							
		V15	✓	✓	1						
	Straight	V17	✓		1						
		V18	✓								
Vertical adjust		V20	✓								
		V24	✓								
		V21	✓	1	1						
		V22	✓								
	Crimped	V23	✓	1	1						
		V25	✓		1						

#### **OUR ADVANTAGE**

- ▶ Leading-edge innovative position sensing solutions
  - Contactless (Hall-effect and Inductive Technology)
  - Contacting (Potentiometers, Printed Electronics)
- ► Engineering design-in support
- ▶ All our products can be customized to fit target application and customer requirement
- Capability to move seamlessly from development to true high-volume production
- ▶ A global footprint with global engineering and commercial support
- ▶ One-stop shop not limited to position sensors (temperature, pressure, gas,...) through group collaboration
- ▶ Flexibility and entrepreneurship of a medium-sized company with the backing of Amphenol Corporation









For the most up-to-date information, we recommend downloading the latest version of this datasheet from www.piher.net.

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