

Automotive / Appliance control - sensor 10 mm carbon potentiometer PT10



Mechanical specifications

Mechanica	l rotation angle ¹	$235^{\circ} \pm 5^{\circ}$	
Electrical r	rotation angle ²	220° ± 20°	
Torque	rotational stop	0.4 to 2 Ncm. (0.6 to 2.7 in-oz) > 5 Ncm. (>7 in-oz)	
Life ³		up to 100K cycles	

¹ 360° version available: ST10

² 333° version available: ST10

Others: check availability.

Electrical specifications

Range of values 1	$100\Omega \leq Rn \leq 5M\Omega$ (Decad. 1.0 - 2.0 - 2.2 - 2.5 - 4.7 - 5.0)
$ \begin{array}{ll} Tolerance \ ^{1} & 100\Omega \leq Rn \leq 1M\Omega \\ 1M\Omega \leq Rn \leq 5M\Omega \end{array} $	± 20% ± 30%
Max. voltage	200 VDC (lin) 100 VDC (no lin)
Nominal power 50°C (122°F) ³	0.15 W (lin) 0.07 W (no lin)
Taper	Linear ; Log; Alog. (Log. & Alog. only Rn≥1K)
Residual resistance	$\leq 0.5\%$ Rn (5 Ω min.)
Equivalent noise resistance	≤ 3% Rn (3Ω min.)
Operating temperature ^{2,3}	-25°C to +70°C (-13°F to + 158°F)

¹ Others: check availability.

Main features

- Carbon resistive element.
- Dust proof enclosure.
- · Polyester substrate.
- Wiper positioned at initial, 50% or fully clockwise.

Also upon request:

- Available in magazines for automatic insertion.
- Long life model for low-cost control potentiometer applications.
- Self-extinguishable plastic UL 94V-0.
- Cut track option (open circuit).
- Special tapers.
- Mechanical detents.
- Low torque version.
- · Special switch option.
- 3% Linearity and 100K cycles mechanical life.

Description

The PT10 potentiometer offers 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.

Typical applications include test and measurement equipment, consumer electronics, appliances, small engines, robotics, motion controllers, and medical equipment control panels.

This datasheet shows you the basics of the PT10 potentiometer that is quite versatile and easy to taylor. Do not hesitate to contact Piher for advice

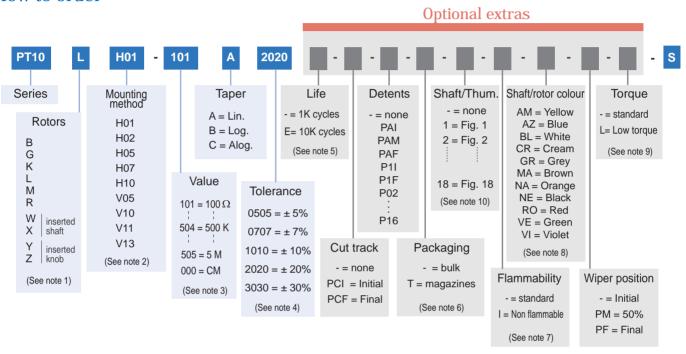
 $^{^{2}\,}$ Up to 85°C depending on application.

For higher specifications please visit our PTC10 series.
For reflow soldering capable models please see our PS10 datasheet.



10 mm carbon potentiometer PT10

How to order



NOTES: (1) "Z" adjustment only available on "H" versions. Rotor "G" only available in purple color (shaft/rotor color code "VI").

(2) V05 & H07 terminals material: brass. SMD versions available (PS10 series). Endles rotation version available (ST10).

(3) Value Example: Code: $10 \quad 1 \quad 100 \quad \Omega$ Numb of zeros Numb of the value. $100 \quad 100 = 0$ Switch version (contact us)

(4) Other tolerances: check availability.

Example: +7% Code: 07 05
-5% negative tolerance positive tolerance

(5) Standard: 1000 cycles. Long life "E": 10.000 cycles. Others: check availability...

(6) Magazines: not available with the H10, V05 and V13 models, nor with adjustment types X, W, Y, Z.

(7) Non flammable: housing, rotor and shaft. According to UL 94V-0

(8) Colour shaft/rotor:
• Potentiometer without shaft: only rotor
• Potentiometer with shaft: only shaft

(9) Low Torque: ≤ 1 Ncm No detent option available for low torque models.

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

Standard default options

Wiper send position _____

Cut track

Detents

Packing

Non flammable

Rotor colour

Shaft colour

How to order examples

PT10LH01-103A2020-S

10mm potentiometer with rotor "L" (arrow shape), H01 mounting method (horizontal adjustment), 10K value and 20% resistive tolerance.

PT10WV05-104A1010-9-NE-S

10mm potentiometer with rotor W (factory pre-inserted shaft), V05 mounting method (vertical adjustment), 100K value,10% resistive tolerance and black shaft.

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1000 cycles

Natural (not coloured)

No

None

Bulk

White

Initial

No

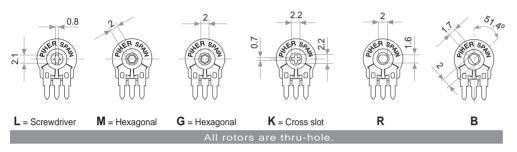


10 mm carbon potentiometer

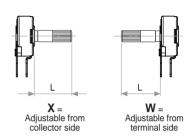


Rotors (Default delivery is at initial position. Wipers are shown positioned at 50% for the picture)

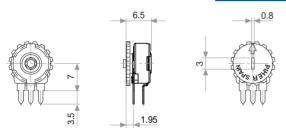
Without shaft or knob.



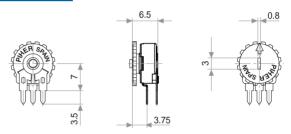
With inserted shaft.



With knob/humbwheel inserted



Y = Adjustable from terminal side (default knob is 5034).



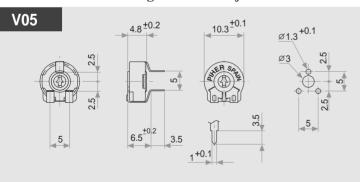
Z = Adjustable from collector side (default knob is 5034).

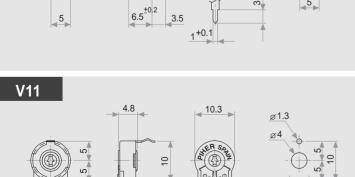
Mounting methods. Dimensions

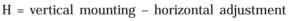


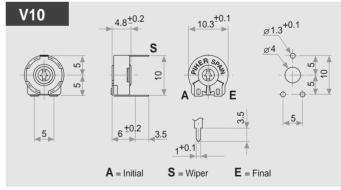
Download 3D - STEP files here: https://piher.net/piher/?p=905

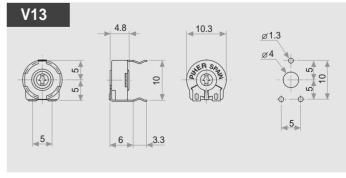
V = horizontal mounting - vertical adjustment











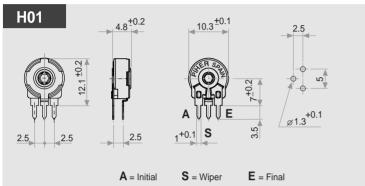




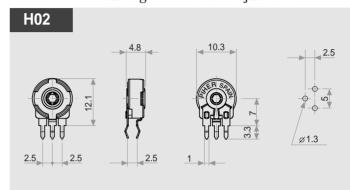
10 mm carbon potentiometer PT10

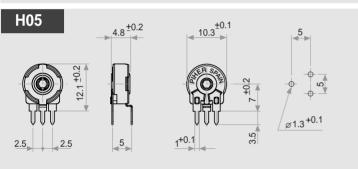
Mounting methods. Dimensions

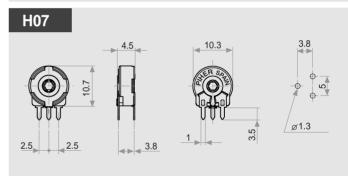
V = horizontal mounting - vertical adjustment

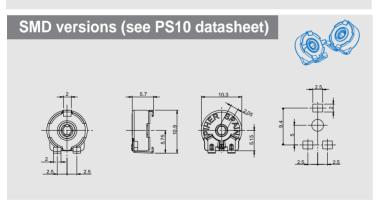


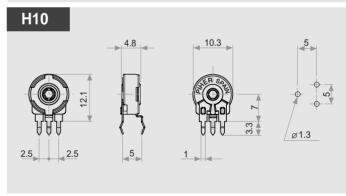
H = vertical mounting - horizontal adjustment





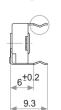


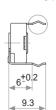


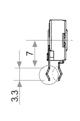


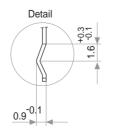
Crimped terminals - detail

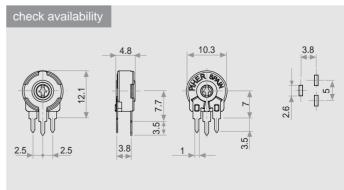
V11, V13, H02, H10 models feature "crimped" terminals that provide greater stability during the soldering process.















10 mm carbon potentiometer PT10

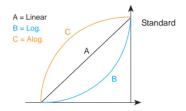
Standard values - tolerances

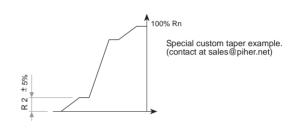
Resistance Ω How to order code Standard tolerance

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 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

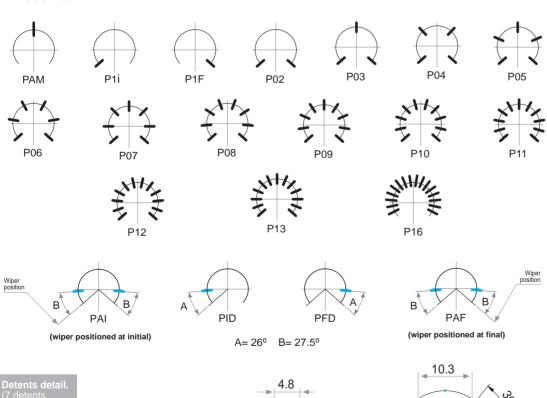
2M 2.5M 4.7M 5M 205 255 475 505

Tapers





Detents



 Relative detent positions along the total mechanical travel.
 Unless otherwise specified the detents are evenly spaced (using the end points

as reference)

Standard mechanical life is 500 cycles.

Long life versions are available under 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 your nearest Piher supplier if unique nonoverlapping values at each detent position or LOG/ALOG tapers are required.

Different output voltage values can be matched at each detent position (see next page).

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

For V05 mounting: check availability.

For more than 16 detents versions please contact your nearest PIHER authorised distributor.

For custom voltage outputs in any detent position see page 6.

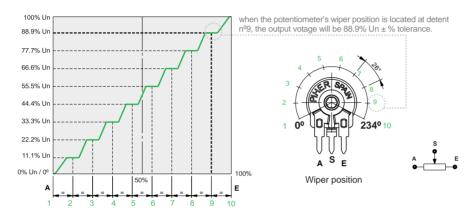


10 mm carbon potentiometer PT10

Stepped outputs

Constant value zones can be combined with strategically located stops matching the flat areas of the output. If you require this feature, please, send us your requirements to sales@piher.net

Stepped outputs version example (10 steps version):



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.

Stepped outputs

PIHER's potentiometers can feature special stepped outputs or 'constant voltage zones' for the 10mm 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 position. 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 precise control capabilities, our 10mm and 15mm potentiometers series are well suited for many consumer applications such as lighting (dimmers), power hand tools, relays, timers and HVAC systems.

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)
- ✓ It prevents changes in the output value due to light vibration or accidental rotor micro-movements
- Fully customisable according to customer's needs
- ✓ Cost effective replacement for absolute encoders



10 mm carbon potentiometer PT10

Shafts

For G and M rotor types, top view.

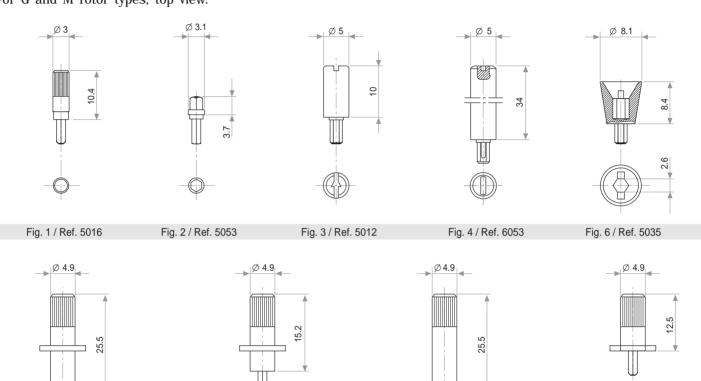
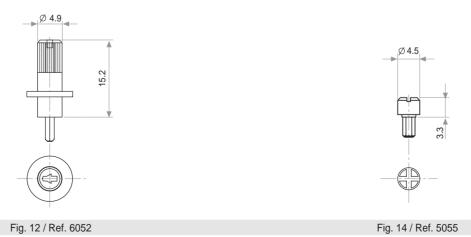


Fig. 7 / Ref. 5115 Fig. 8 / Ref. 5116 Fig. 9 / Ref. 5119 Fig. 10 / Ref. 5120



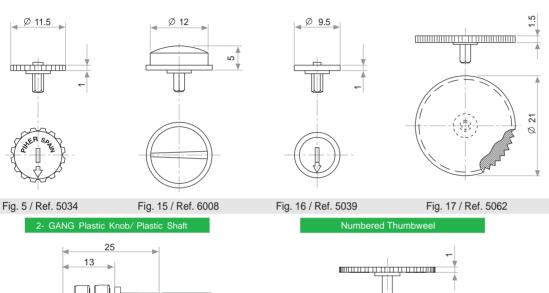
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10 mm carbon potentiometer PT10

Knobs/thumbwheels

For G and M rotor types, top view.



Numbered Thumbweel

25

12.75

Marking: configurable number of positions Example of four positions marking pictured

For R rotor type only

Fig. 18 / Ref. 6064 Upon request.

By default, shafts, knobs & thumweels are delivered unassembled.

Mounted shafts, knobs & thumbweels are delivered at random position but can be delivered at specific positions too (a drawing must be provided by the customer).

If you need the shaft or knob to be delivered assembled from the factory, please select the appropriate rotor in the part number: X, W, Y or Z.

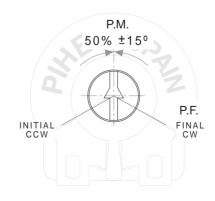
The plastic color can be stated in the part number. Non flammable plastic can be ordered too.

If the potentiometer is ordered with non flamable plastic materials (UL 94V0) then the shaft or knob will be delivered with non flamable plastic too.

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

Positioning

Std. Position = CCW. Other delivery positions upon request.



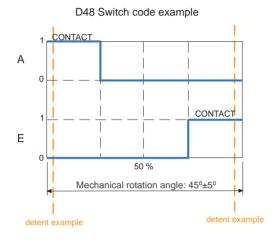


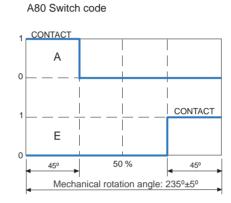


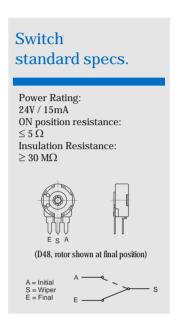
10 mm carbon potentiometer PT10

Switch versions

They can be delivered with or withouth detents/stops.

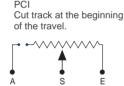


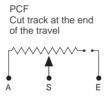




Cut track (open circuit feature)









A = Initial S = Wiper E = Final. Other configurations available upon request.

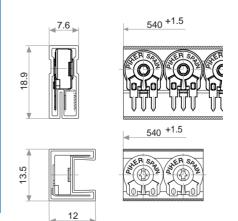
Packaging

Default packaging is bulk (boxes).



Model	Units per box	
Without shaft	1000 (80 x 85 x 185 mm.)	
With thumbwheel	800 (80 x 85 x 185 mm.)	
With shaft	400 (80 x 85 x 185 mm.)	

Magazines for automatic insertion are available with 50pcs per magazine.



Magazines for PT10 H01 and H05 Also crimped term. H02

Magazines for PT10 V Also crimped term. V11







10 mm carbon potentiometer

Tests

Typical variations

Electrical life	1000 h. @ 50°C; 0.15 W	±5 %
Mechanical life (cycles)	1000 @ 10 CPM15 CPM	±3 % (Rn < 1 MΩ)
Temperature coefficient	-25°C; +70°C	±300 ppm (Rn <100 KΩ)
Thermal cycling	16 h. @ 85°C; 2h. @ -25°C	±2.5 %
Damp heat	500 h. @ 40°C @ 95% HR	±5 %
Vibration (for each plane x,y,z)	2 h. @ 10 Hz 55 Hz.	±2 %

Out of range values may not comply with these results. For other tests or the full range of tests, please, contact us.

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The product information in this catalogue is for reference purposes. Please consult for the most up to date and accurate design information.

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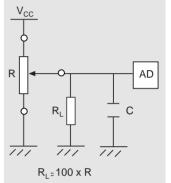


All Piher products can be adapted to meet customer's requirements. Due to continuous process improvement, specifications are subject to change without notice.

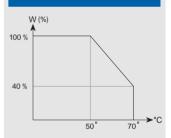
Please always use the datasheets published at our website www.piher.net for the most up-to-date information.

Recommended connections

Recommended connection scheme for Piher's position sensors (voltage divider)



Power rating curve



For higher nominal power please visit our PTC-10 cermet potentiometer.

Contact

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