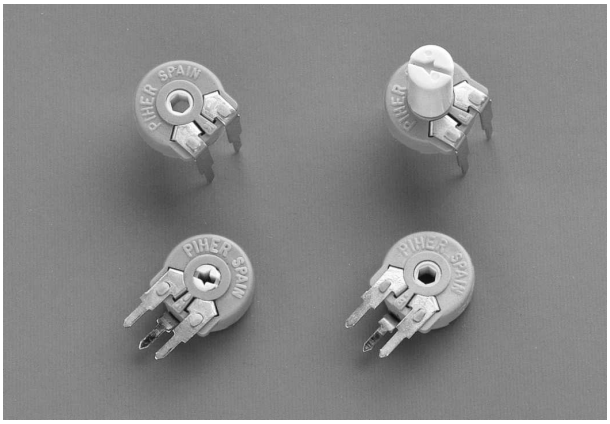
PIHER

PTC-10 10 mm Cermet Potentiometer



FEATURES

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

MECHANICAL SPECIFICATIONS

– Mechanical rotation angle:	235° ± 5°
– Electrical rotation angle:	220° ± 20°
– Torque:	0.4 to 2 Ncm. (0.6 to 2.7 in-oz)
– Stop torque:	> 5 Ncm. (>7 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: 200 VDC (lin) 100 VDC (no lin)

– Nominal Power 70°C (158°F) (see power rating curve)
0.33 W (lin) 0.17 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: standard: -40°C to +90°C (-40°F to +194°F)
upon request: -40°C to +120°C (-40°F to +248°F)

* Others check availability

HOW TO ORDER

PTC-10	L	H01	101	A	2020							
Series	Rotors	Code / Mounting Method	Value	Taper	Tolerance	Detents	Shaft /Thum.	Life	Magazine	Shaft / rotor colour	Torque	Wiper position
PTC-10	B G K L M R W X Y Z (See note 1)	H01 H2.5 H05 H5 H02 H2.5P H10 H5P V05 V5 V10 V V11 VP V13 VJ (See note 2)	101 = 100Ω 504 = 500 K 505 = 5 M 000 = C M (See note 3)	A = Lin. B = Log. C = Alog.	0505 = ± 5% 0707 = ± 7% 1010 = ± 10% 2020 = ± 20% 3030 = ± 30% (See note 4)	PAI PAM PAF P1I P1F P02 P16	01 = Fig. 1 02 = Fig. 2 17 = Fig. 17 (See note 9)	E= Long life (See note 5)	T (See note 6)	AM = Yellow AZ = Blue BL = White CR = Cream GR = Grey MA = Brown NA = Orange NE = Black RO = Red VE = Green VI = Violet (See note 7)	– = Standard L= Low Torque (See note 8)	PM = 50% PF = Final

OPTIONAL EXTRAS

NOTES:

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

(2) Terminal styles: "P" & "J" are crimped terminals. V=Vertical adjust; H=Horizontal Adjust

(3) Value Example: Code: 10 1 = 100 Ω
10 → First two digits of the value.
1 → Numb of zeros
000 = CM: SPDT switch 45°

(4) Non standard tolerance, check Example: +7% -5% Code: 07 05
07 → negative tolerance
05 → positive tolerance

(5) • Standard = 1000 cycles • Long = 10K cycles
Others check availability.

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

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

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

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

HOW TO ORDER CUSTOM DRAWING

PTC-10 LH 01 + DRAWING NUMBER (Max. 16 characters)

This way of ordering should be used for options which are not included in the "How to order" standard and optional extras.

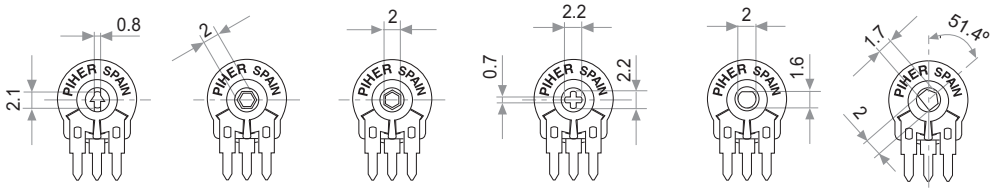
STANDARD OPTIONS

Detents	None
Packing	Bulk
Rotor colour	Natural
Shaft colour	Natural
Wiper position	Initial
Torque	Standard
Life	1000 cycles

ROTORS

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

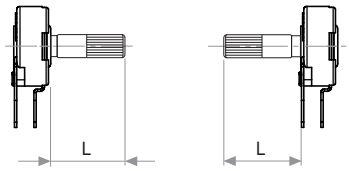
Without shaft or knob.



L = Screwdriver **M** = Hexagonal **G** = Hexagonal **K** = Cross slot **R** **B**

All rotors are thru-hole.

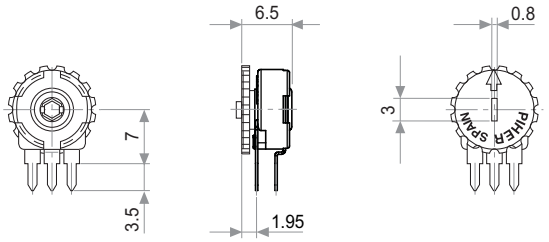
With inserted shaft.



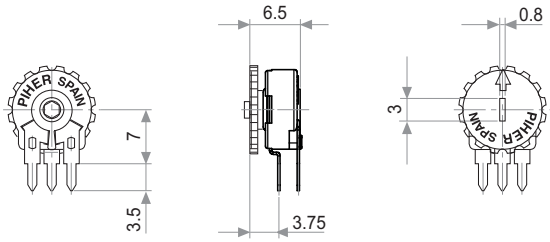
X = Adjustable from collector side

W = Adjustable from terminal side

With knob/humbwheel inserted



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



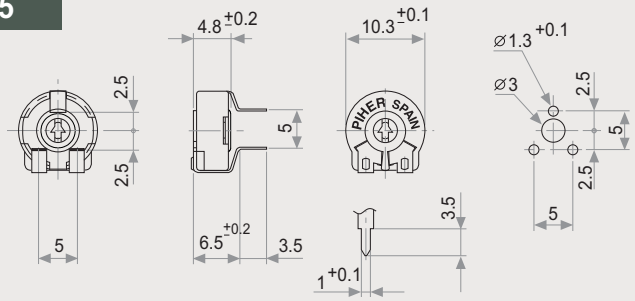
Z = Adjustable from collector side (default knob is 5034).

MOUNTING METHODS

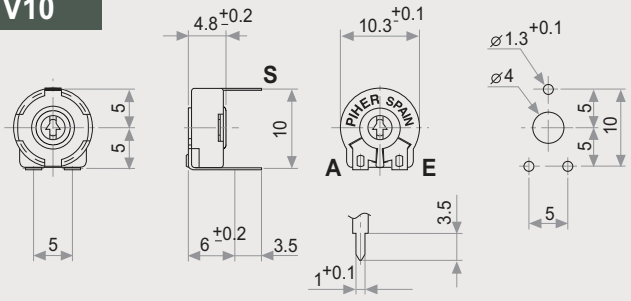
V = horizontal mounting – vertical adjustment

H = vertical mounting – horizontal adjustment

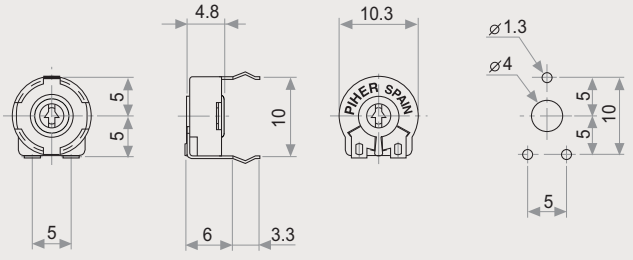
V05



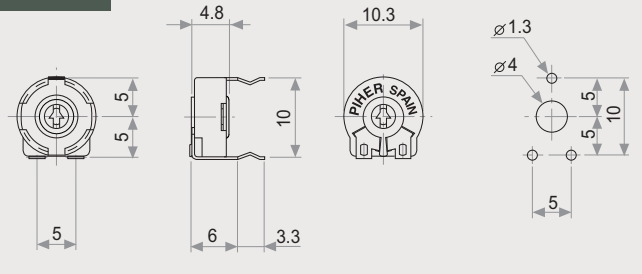
V10



V11



V13



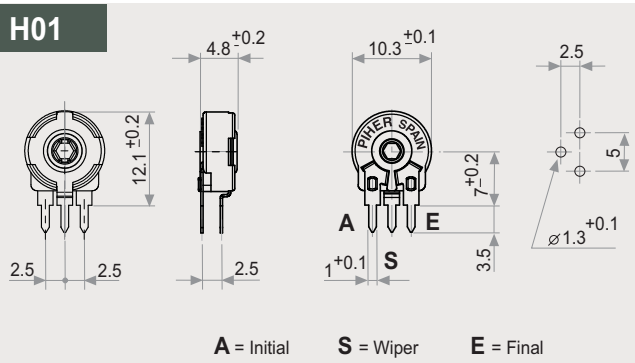
Download 3D - STEP files here: https://piher.net/piher/?p=913

ROTORS

V = horizontal mounting – vertical adjustment

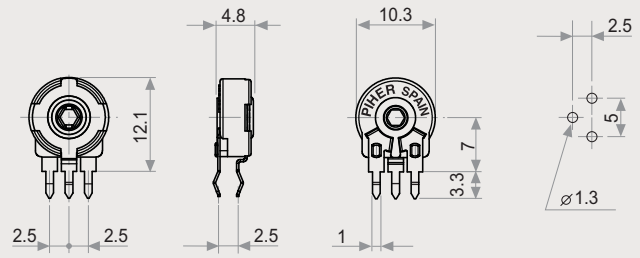
H = vertical mounting – horizontal adjustment

H01

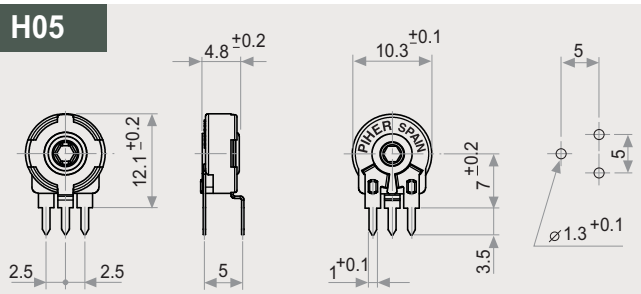


A = Initial **S** = Wiper **E** = Final

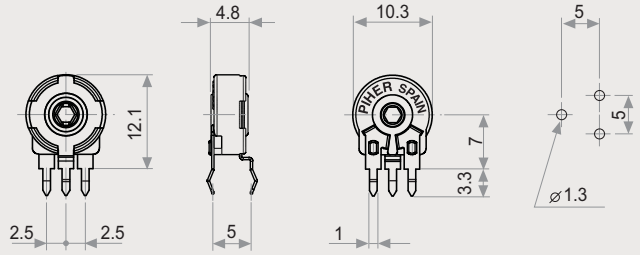
H02



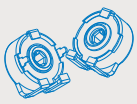
H05

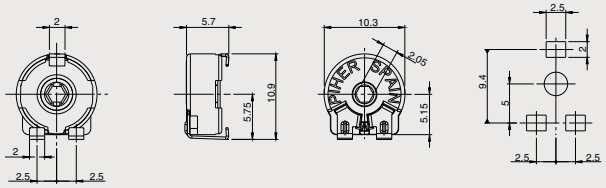


H10



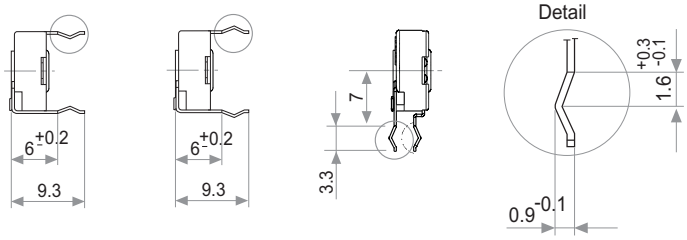
SMD versions





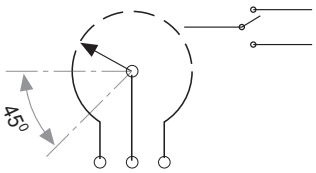
Crimped terminals - detail

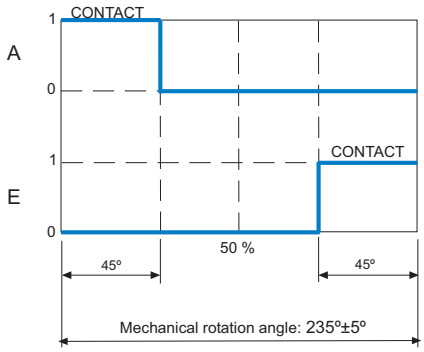
V11, V13, H02, H10 models feature “crimped” terminals that provide greater stability during the soldering process.



OPTIONS

SPDT SWITCH





SW Standard specs.

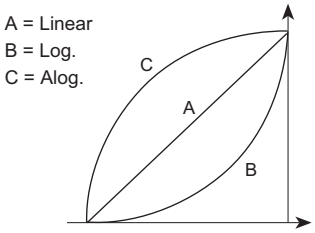
Power Rating:
24V / 15mA

ON position resistance:
≤ 5 Ω

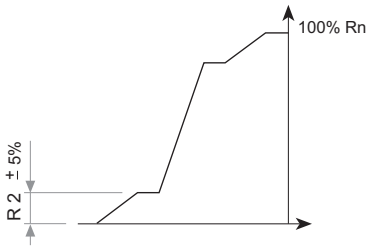
Insulation Resistance:
≥ 30 MΩ

Please contact Piher for ordering information.

TAPERS

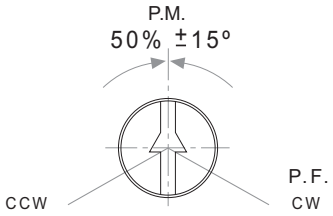


Standard



Special example

POSITIONING



Std. Position = CCW

NOTE = Please note relative terminal positions when ordering non linear tapers.

TESTS / TYPICAL VARIATIONS

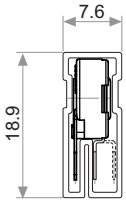
ELECTRICAL LIFE	1.000 h. @ 70°C; 0.33 W	±5 %
MECHANICAL LIFE (CYCLES)	1000 @ 10 CPM ...15 CPM	±2 % (Rn < 1 MΩ)
TEMPERATURE COEFFICIENT	–40°C; +90°C	±100 ppm (Rn <100 K)
THERMAL CYCLING	16 h. @ 90°C; 2h. @ –40°C	±2.5 %
DAMP HEAT	500 h. @ 40°C @ 95% HR	±5 %
VIBRATION (for each plane X,Y,Z)	2 h. @ 10 Hz. ... 55 Hz.	±2 %

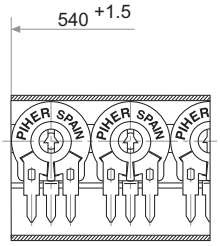
NOTE: Out of range values may not comply these results.

PACKAGING

BOXES

Model	Units
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.)



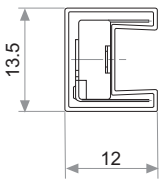


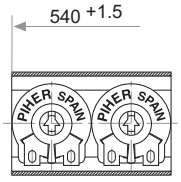
Magazines for PTC-10 h 2.5; h 5

Also crimped term. h 2.5 P

AUTOMATIC INSERTION

Magazines	Units
PTC-10H & PTC-10V	50 Pieces

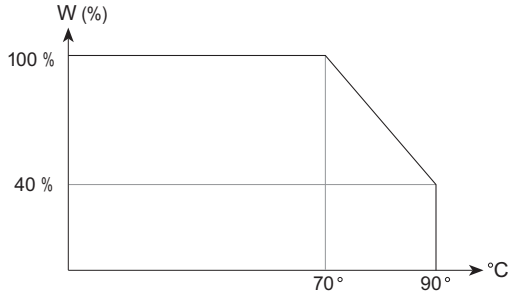




Magazines for PTC-10 V

Also crimped term. VP

POWER RATING CURVE



SHAFTS (for G and M rotor types, top view)

Shafts, knobs & thumbweels are delivered at random position. Positioning available check availability.

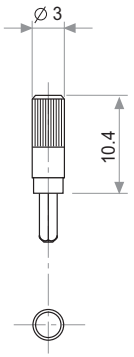


Fig. 1 / Ref. 5016

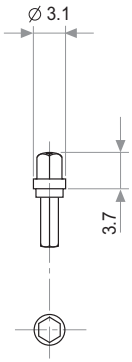


Fig. 2 / Ref. 5053

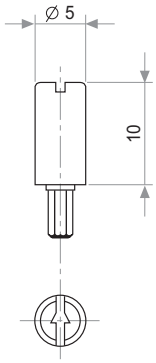


Fig. 3 / Ref. 5012

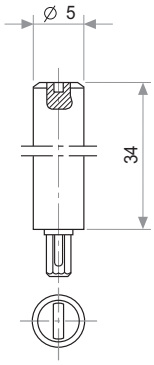


Fig. 4 / Ref. 6053

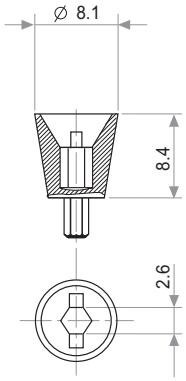


Fig. 6 / Ref. 5035

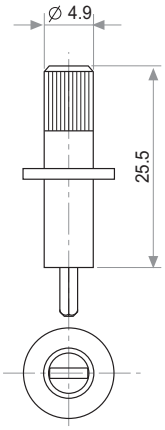


Fig. 7 / Ref. 5115

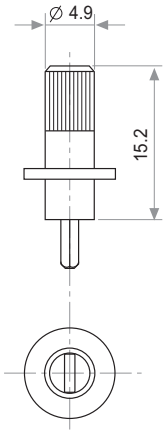


Fig. 8 / Ref. 5116

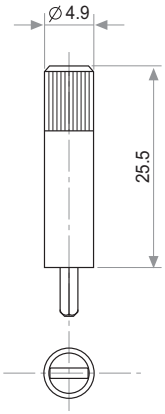


Fig. 9 / Ref. 5119

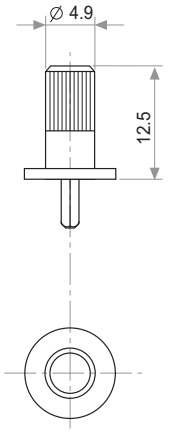


Fig. 10 / Ref. 5120

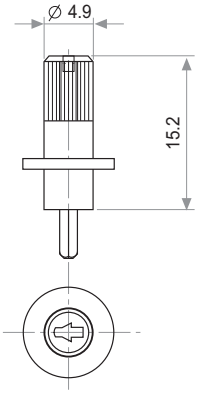


Fig. 12 / Ref. 6052

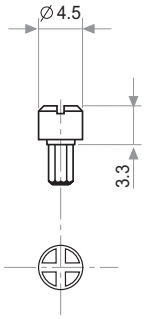


Fig. 14 / Ref. 5055

2- GANG Plastic Knob/ Plastic Shaft*

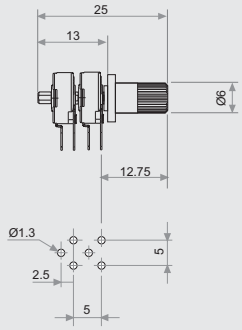


Fig. 18 / Ref. 6064

* Delivered unassembled
(For assembled contact your nearest PIHER supplier)

THUMBWHEELS (for G and M rotor types, top view)

Shafts, knobs & thumbweels are delivered at random position. Positioning available check availability.

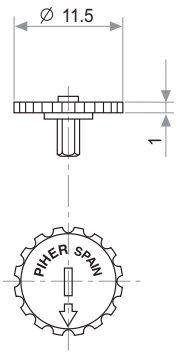


Fig. 5 / Ref. 5034

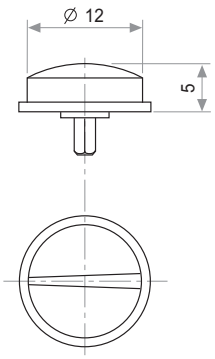


Fig. 15 / Ref. 6008

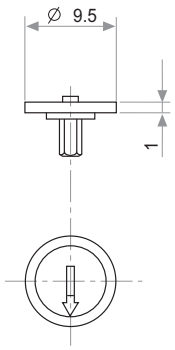


Fig. 16 / Ref. 5039

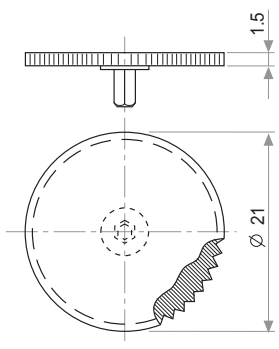
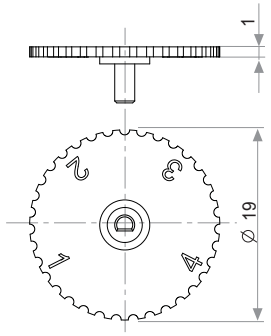


Fig. 17 / Ref. 5062

THUMBWHEEL For R rotor type only

Marking: configurable number of positions.

Example of four positions marking:



check availability

DETENT CONFIGURATIONS EXAMPLES

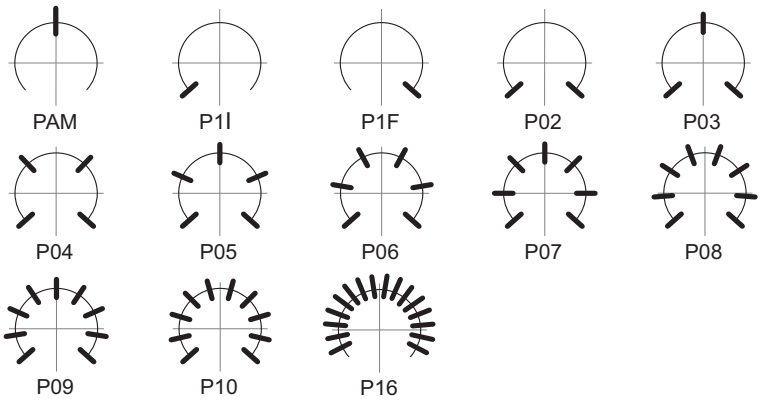
This innovative PT´s with detents family has been specifically developed to allow the integration of otherwise large and expensive external mechanisms into the body of the majority of the 10 & 15 mm. PS/PT/PTC potentiometer series thus allowing a high range of configurations: special tapers, torque, tolerances, linearity, cut track, etc.

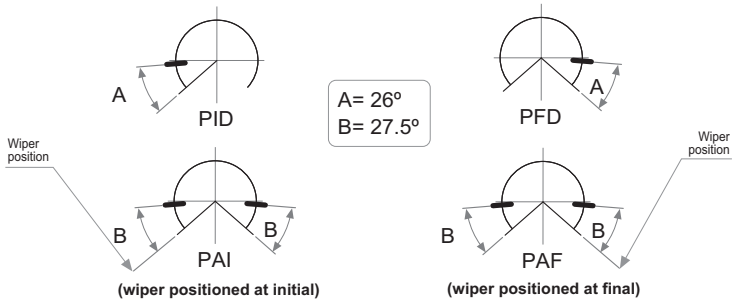
This detent design not only adds a "click" sensation of position, but also offers enormous savings in both cost and space for any given application.

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.

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





NOTES FOR DETENTED VERSIONS:

(1) Detents not available for V05 mounting.
These cases are studied individually.

(2) For more than 10 detents versions please contact your nearest PIHER authorised distributor.

(3) Standard mechanical life is 500 cycles.

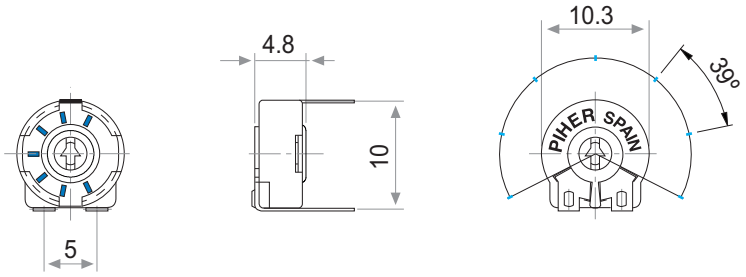
(4) Long life versions are available under request and have the following characteristics at T[a]:
- Potentiometers with 1 to 3 detents: up to 10K cycles
- Potentiometers with 4 and more detents: up to 5K cycles

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

(6) Please consult your nearest Piher 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 detail.
(7 detents example)

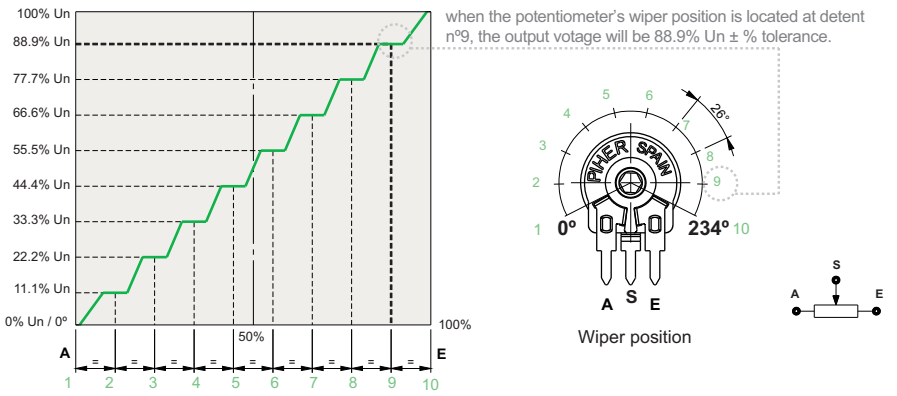


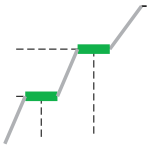
For custom voltage outputs in any detent position see next page.

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.

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

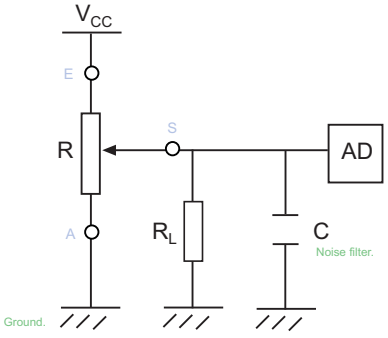
Absolute encoders can easily be replaced connecting the potentiometer to the microprocessor's analogue input.

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

RECOMMENDED CONNECTIONS

Piher potentiometer's recommended connection circuit for a position sensor or control application.
(voltage divider circuit electronic design).



$R_L \simeq 100 \times R$

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

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