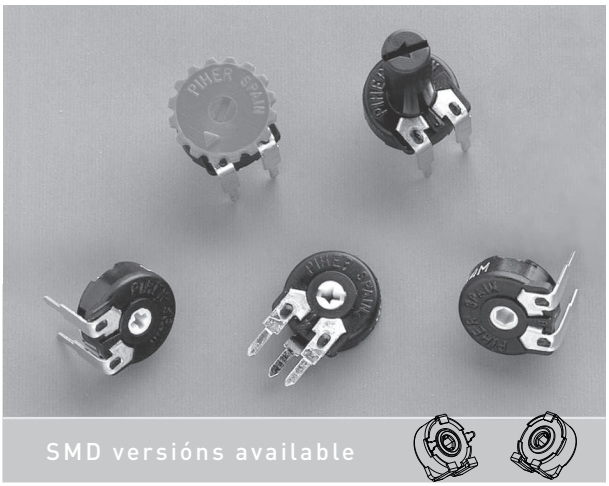
PIHER

PT-10 10 mm Carbon Potentiometer



FEATURES

- Carbon resistive element
- IP54 protection according to IEC 60529
- Polyester substrate
- Also upon request:
  - Wiper positioned at 50% or fully clockwise.
  - Supplied in magazines for automatic insertion.
  - Long life model for low cost control potentiometer applications
  - Self extinguishable plastic UL 94V-0
  - Cut track option
  - Special tapers
  - Mechanical detents
  - Low torque version
  - Special switch option
  - 3% Linearity and 100K cycles mechanical life

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 50°C (122°F) (see power rating curve)
0.15 W (lin) 0.07 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**: -25°C + 70°C (-13°F + 158°F)

* Others check availability.
** Up to 85°C depending on application.

HOW TO ORDER

OPTIONAL EXTRAS

PT 10	L	H01	101	A	2020										S
Series	Rotors	Code / Mounting Method	Value	Taper	Tolerance	Life	Cut track	Detents	Magazine	Shaft/Thum.	Flammability	Shaft/rotor colour	Wiper position	Torque	
PT-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 / **SMD** version available)	101 = 100Ω … 504 = 500 K … 505 = 5 M … 000 = CM (See note 3)	A = Lin. B = Log. C = Alog.	2020 = ± 20% 3030 = ± 30% (See note 4)	E= Long life (See note 5)	PCI = Initial PCF = Final	PAI PAM PAF P1I P1F P02 … P16	T (See note 6)	01 = Fig. 1 02 = Fig. 2 … 17 = Fig. 17	I = Non flammable (See note 7)	RO = Red NE = Black VE = Green AM = Yellow AZ = Blue MA = Brown GR = Grey NA = Orange CR = Cream (See note 8)	PM = 50% PF = Final	– = Standard L= Low Torque (See note 9)	

NOTES:

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

(2) Terminals styles: "P" & "J" are crimped. V=Vertical adjust; H=Horizontal Adjust.
H07 mounting: available with brass leads only.

(3) Value Example: Code: 10 1 → 100 Ω (Numb of zeros; First two digits of the value.) 000 = CM = Switch version (contact us)

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

(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
• Cream colour only available in standard plastic.

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

NOTE: The information contained here should be used for reference purposes only.

HOW TO ORDER CUSTOM DRAWING

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

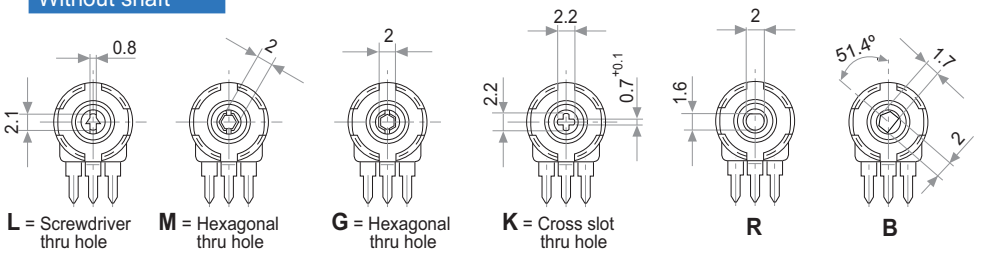
This way of ordering should be used for options which are not included in the "How to order" standard and optional extras.

STANDARD OPTIONS

Cut track	No
Detents	None
Packing	Bulk
Non flammable	No
Rotor colour	White
Shaft colour	Natural
Wiper position	Initial
Torque	Standard
Life	1000 cycles

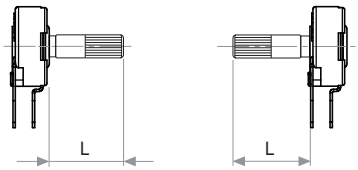
ROTORS

Without shaft



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

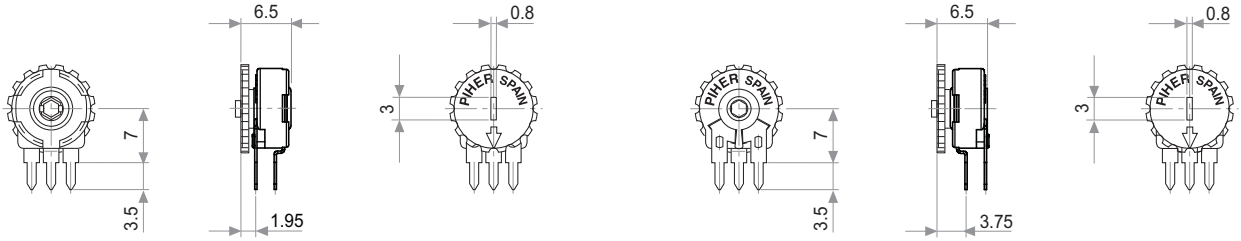
With shaft



X = Adjustable from collector side — **W** = Adjustable from terminal side

Wipers positioned at 50%

With thumbwheel

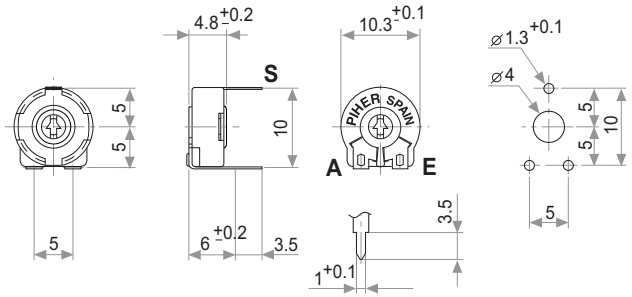


Y = Adjustable from terminal side

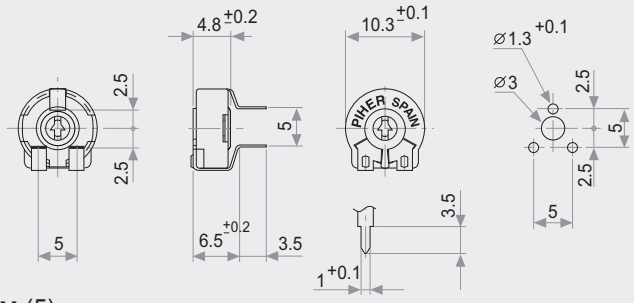
Z = Adjustable from collector side

MOUNTING METHODS

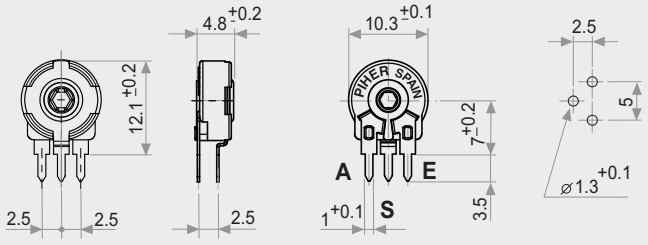
v = horizontal mount – vertical adjust **h** = vertical mount – horizontal adjust



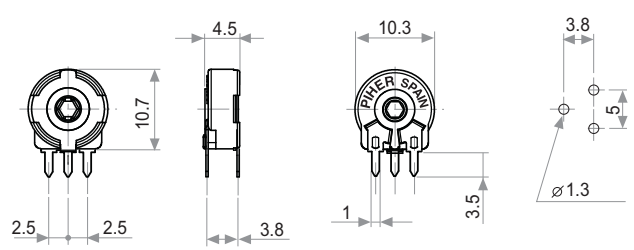
v (10) — **A** = Initial — **S** = Wiper — **E** = Final



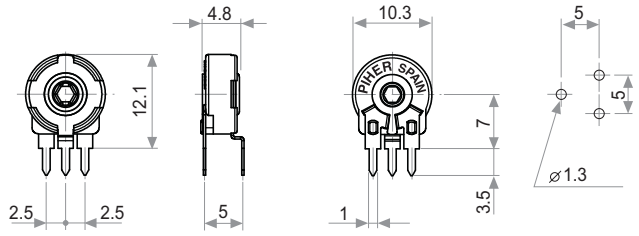
v (5)



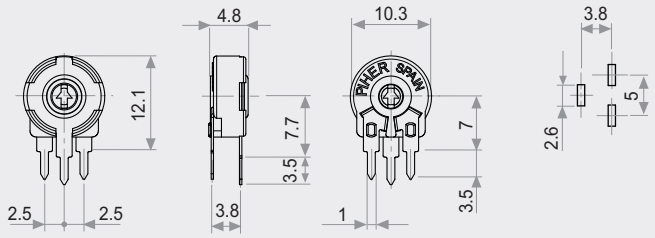
h (2.5) — **A** = Initial — **S** = Wiper — **E** = Final



h (3.8, under request)



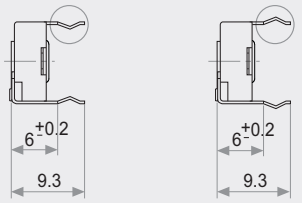
h (5)

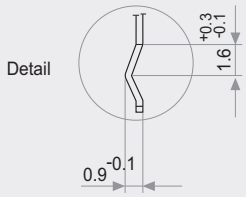


Check availability.

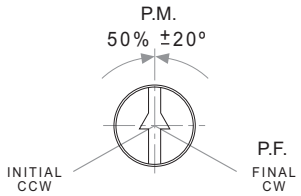
OPTIONS

Crimped terminals

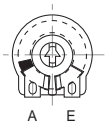


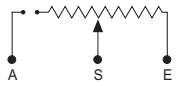


Positioning (Std. Position = CCW)



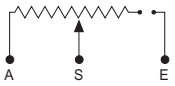
CUT TRACK
CCW on-off (A)





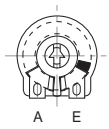
A = Initial

E = Final



S = Wiper

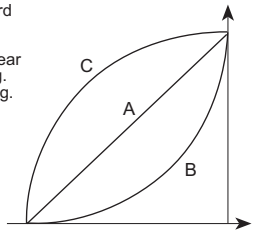
CW on-off (E)



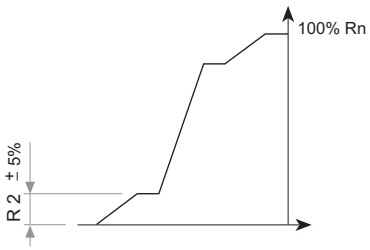
TAPERS

Standard

A = Linear
B = Log.
C = Alog.



Special taper example



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

TESTS

TYPICAL VARIATIONS

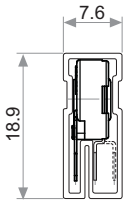
ELECTRICAL LIFE	1.000 h. @ 50°C; 0.15 W	±5 %
MECHANICAL LIFE (CYCLES)	1000 @ 10 CPM ...15 CPM	±3 % (Rn < 1 MΩ)
TEMPERATURE COEFFICIENT	–25°C; +70°C	±300 ppm (Rn <100 K)
THERMAL CYCLING	16 h. @ 85°C; 2h. @ –25°C	±2.5 %
DAMP HEAT	500 h. @ 40°C @ 95% HR	±5 %
VIBRATION (for each plane X,Y,Z)	2 h. @ 10 Hz. ... 55 Hz.	±2 %

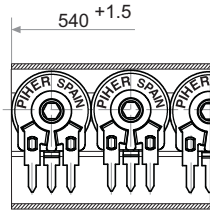
NOTE: Out of range values may not comply these results.

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.)



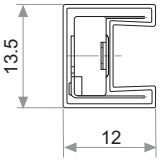


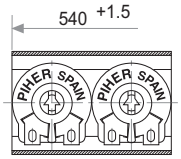
Magazines for PT-10 h 2.5; h 5

Also crimped term. h 2.5 P

AUTOMATIC INSERTION

Magazines	Units per magazine
PT-10H & PT-10V	50 Pieces

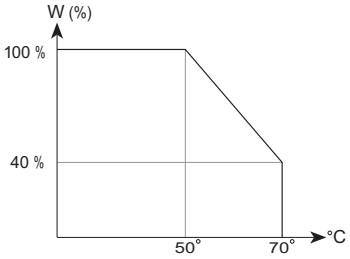




Magazines for PT-10 V

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

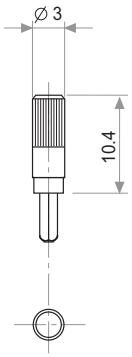


Fig. 1 / Ref. 5016

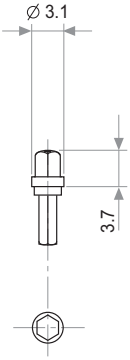


Fig. 2 / Ref. 5053

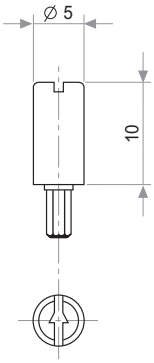


Fig. 3 / Ref. 5012

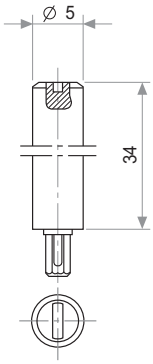


Fig. 4 / Ref. 6053

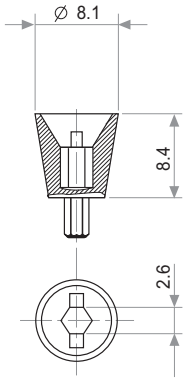


Fig. 6 / Ref. 5035

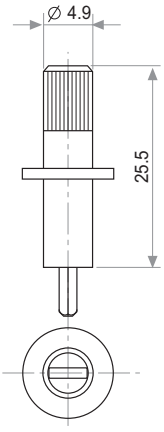


Fig. 7 / Ref. 5115

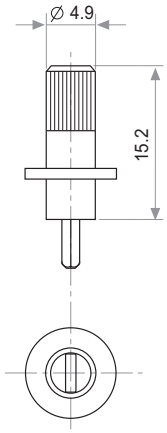


Fig. 8 / Ref. 5116

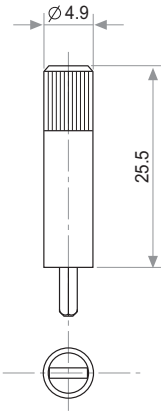


Fig. 9 / Ref. 5119

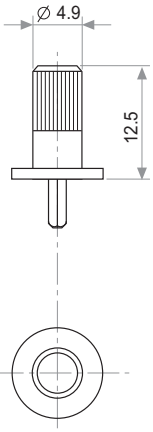


Fig. 10 / Ref. 5120

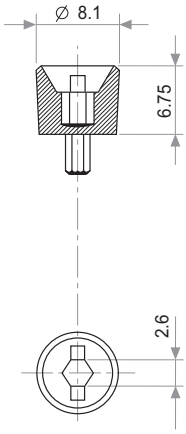


Fig. 11 / Ref. 5027

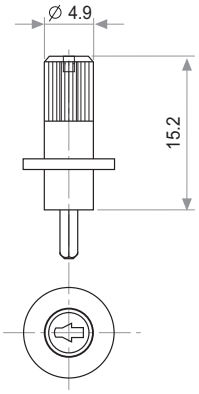


Fig. 12 / Ref. 6052

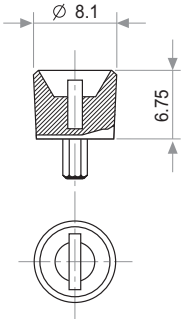


Fig. 13 / Ref. 5121

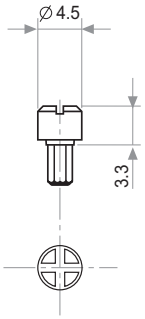


Fig. 14 / Ref. 5055

2- GANG Plastic Knob/ Plastic Shaft*

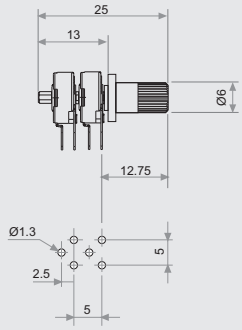


Fig. 18 / Ref. 6064

* 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.

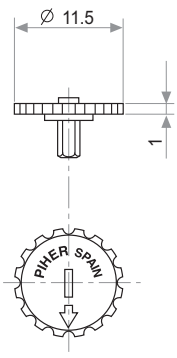


Fig. 5 / Ref. 5034

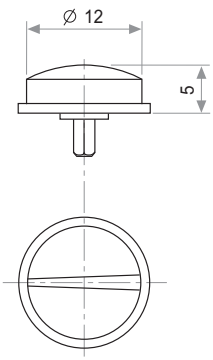


Fig. 15 / Ref. 6008

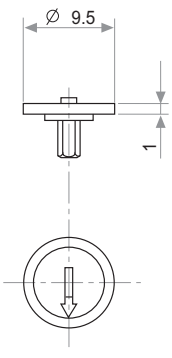


Fig. 16 / Ref. 5039

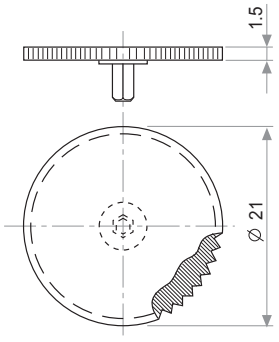
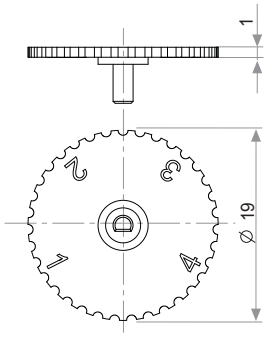


Fig. 17 / Ref. 5062

THUMBWHEEL For R rotor type only

Marking: configurable number of positions.

Example of four positions marking:



check availability

DETENT CONFIGURATIONS EXAMPLES

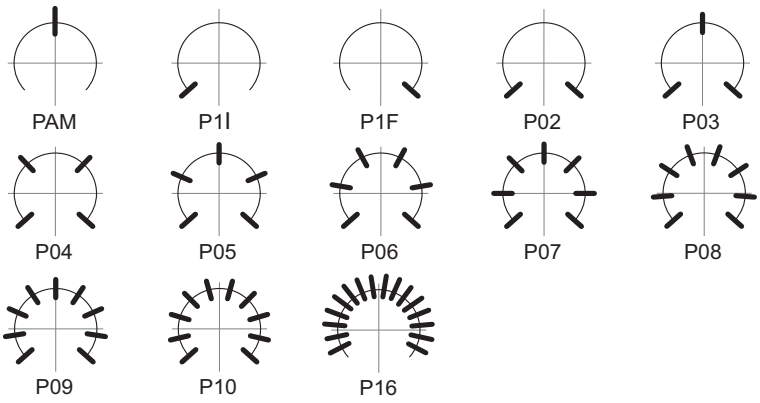
This innovative PT´s with detents family has been specifically developed to allow the integration of otherwise large and expensive external mechanisms into the body of the majority of the 10 & 15 mm. PS/PT/PTC potentiometer series thus allowing a high range of configurations: special tapers, torque,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

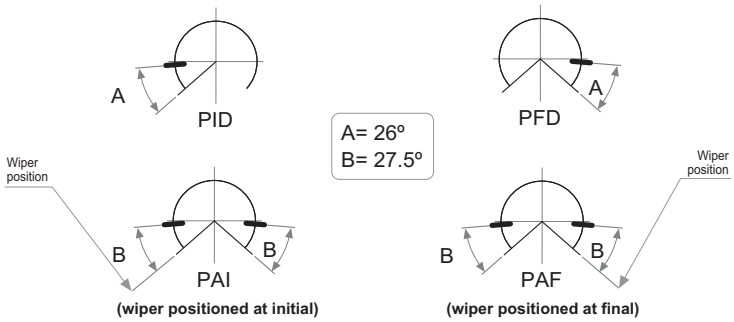
This detent design not only adds a "click" sensation of position, but also offers enormous savings in both cost and space for any given application.

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.

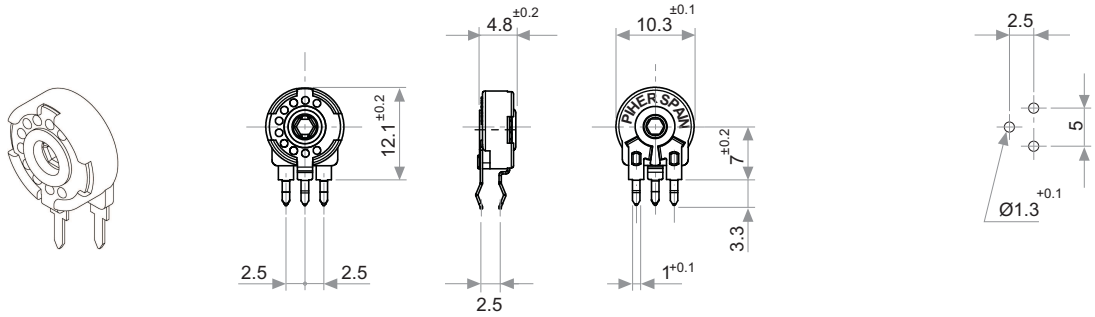
(4) Long life versions are available under request and have the following characteristics at T[a]:
- Potentiometers with 1 to 3 detents: up to 10K cycles
- Potentiometers with 4 and more detents: up to 5K cycles

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

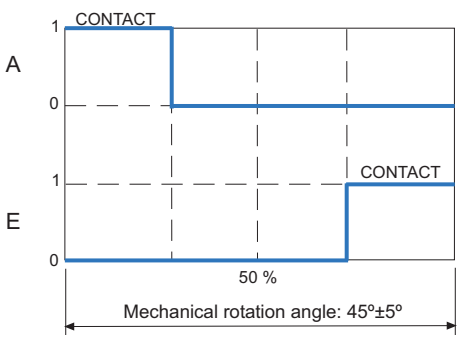
(6) Please consult your nearest Piher supplier if unique non-overlapping values at each detent position or LOG/ALOG tapers are required.

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

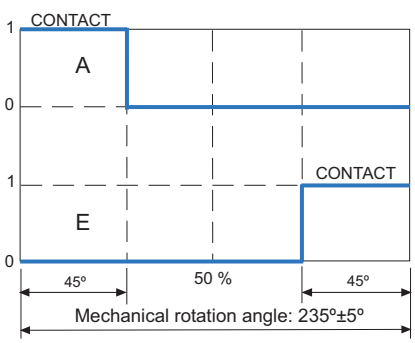
DETENT DETAILS



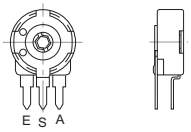
STANDARD SWITCH VERSIONS



D48 Switch code (Housing colour: green)



A80 Switch code



SW Standard specs.

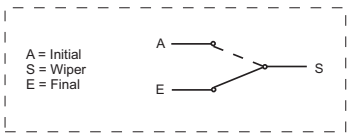
Power Rating: 24V / 15mA

ON position resistance: ≤ 5 Ω

Insulation Resistance: ≥ 30 MΩ

Please contact Piher for ordering information.

(Rotor at Final Position)



DETENTS WITH CONSTANT VALUE ZONES

upon request

PIHER´s potentiometers may feature special stepped outputs or 'constant voltage zones' for the 10mm and 15mm product families.

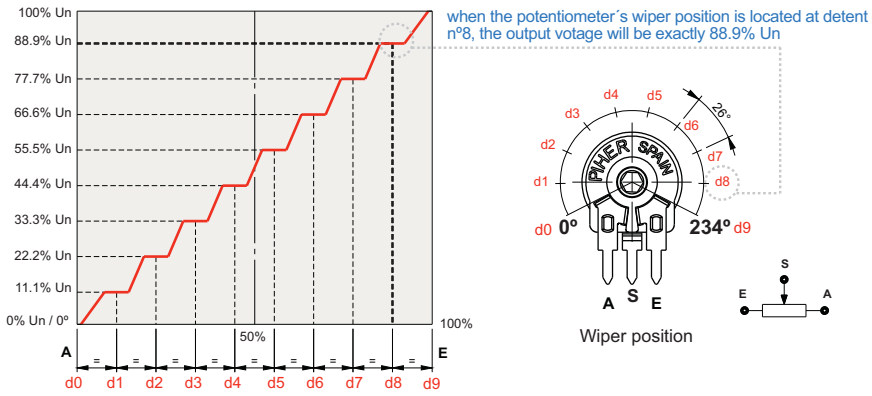
These constant voltage zones can be combined with PIHER's mechanical detents to provide exact alignment between the electrical output (flat areas) and the mechanical detent's positions. The result is a higher level of precision in controlling lighting, temperature, motor or other electronic control systems.

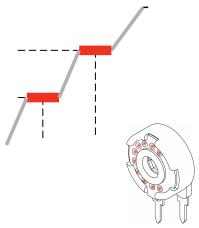
In addition to established catalogue detent configurations, we will design and manufacture any other configuration on our tried-and-tested carbon/cermet & THM/SMD potentiometer technology and processes.

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:





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

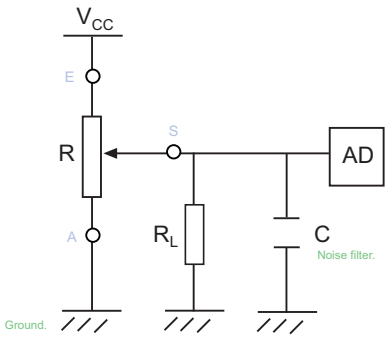
Absolute encoders can easily be replaced connecting the potentiometer to the microprocessor´s analogue input.

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

RECOMMENDED CONNECTIONS

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



$R_L \approx 100 \times R$

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Mouser Electronics

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Piher:

PT10WH01-505A2020 01 CR PT10LH01-472A2020 PT10LV10-502A2020 PT10MH2.5-68KA PT10TH01-103A20205CM 5116 (CREAM) PT10YV10252A2020 PT10MH01-204A2020 PT10LV05-103A2020E PT10YV10502A2020 PT10MV10-503A2020 PT10MH01254A2020 PT10LH01-00039 PT10YV10-473A2020 PT10LH01-205A3030 PT10MH01-253A2020 PT10MH01-101A2020 PT10LH01-201A2020 PT10MV10-255A3030 PT10MV10-252A2020 PT10WH2.5-10K-A9 PT10MH01-202A2020 PT10MH01-205A3030 PT10LH01-474A2020 PT10LH01-255A3030 PT10LH01-252A2020 PT10MH01-102A2020 PT10MH01-505A3030 PT10MH01-105A2020 PT10MV10-204A2020 PT10LV20KC PT10MV10-104A2020 PT10LH01-204A2020 PT10MV10-251A2020 PT10MV10-201A2020 PT10XH01505A303001NE PT10LV 220A PT10LV10-251A2020 PT10LV10-201A2020 5116NEI (BLACK) PT10XV103A2020-9NE PT10MV10-501A2020 PT10YV11 254A2020 PT10LH01-223A2020 PT10LH01-254A2020 PT10WH01-253A2020-1CRPM PT10MH01-504A2020 PT10MH01-505A3050 JPEPL5012NE PT10MH01-223A2020 PT10MH01-203A2020 PT10MV10-101A2020 PT10MH01-501A2020 PT10LV10-00258-PT10LV10-502A2020 PT10LV10-473A2020 PT10MV10-103A2020 PT10YV11 253A2020 PT10LH01-00037-PT10LH01-503A2020 PT10MH01-201A2020 5115CR PT10MH01-251A2020 PT10WH01505A303001NE PT10WH01-504A2020-1CRPM PT10MH01205A3030 PT10WH01-505A3050 01 CR PT10LV10K PT10MV10-203A2020 PT10MV10-223A2020 PT10MV10-202A2020 PT10MV10-505A3030 PT10MV10-502A2020 PT10MV10-205A3030 PT10MH01-252A2020 PT10MH01-255A3030 PT10WH01-505A3030 01 CR PT10YV11 502A2020 PT10MH01-503A2020 PT10LH01-503A2020 PT10MV10-253A2020 PT10MV10-102A2020 PT10MV10-105A2020 PT10MH01-103A2020 5034CR PT10MV10-151A2020 PT10YV10-105A2020-5NE PT10YV10-105A2020-5CR PT10MV10-504A2020 PT10MV10-224A2020 PT10MV10-254A2020 PT10YV10103A2020 PT10LV05-202A2020E PT10MH01-151A2020 PT10LH01-251A2020 PT10YV10203A2020 PT10WH2.5-5KA-1 PT10MH01-224A2020 PT10LH01-103B2020 PT10LV10-225A3030 PT10V10-223A2020 PT10YV11 101A2020