

## Automotive / Appliance control - sensor

# 10 mm carbon potentiometer PT10



## Mechanical specifications

Mechanical rotation angle <sup>1</sup>	235° ± 5°
Electrical rotation angle <sup>2</sup>	220° ± 20°
Torque rotational stop	0.4 to 2 Ncm. (0.6 to 2.7 in-oz) > 5 Ncm. (<7 in-oz)
Life <sup>3</sup>	up to 100K cycles

<sup>1</sup> 360° version available: ST10

<sup>2</sup> 333° version available: ST10

<sup>3</sup> Others: check availability.

## Electrical specifications

Range of values <sup>1</sup>	100Ω ≤ Rn ≤ 5MΩ (Decad. 1.0 - 2.0 - 2.2 - 2.5 - 4.7 - 5.0)
Tolerance <sup>1</sup>	100Ω ≤ Rn ≤ 1MΩ ± 20% 1MΩ ≤ Rn ≤ 5MΩ ± 30%
Max. voltage	200 VDC (lin) 100 VDC (no lin)
Nominal power 50°C (122°F) <sup>3</sup>	0.15 W (lin) 0.07 W (no lin)
Taper	Linear ; Log; Alog. (Log. & Alog. only Rn ≥ 1K)
Residual resistance	≤ 0.5% Rn (5Ω min.)
Equivalent noise resistance	≤ 3% Rn (3Ω min.)
Operating temperature <sup>2,3</sup>	-25°C to +70°C (-13°F to + 158°F)

<sup>1</sup> Others: check availability. <sup>2</sup> Up to 85°C depending on application.

<sup>3</sup> For higher specifications please visit our PTC10 series.

For reflow soldering capable models please see our PS10 datasheet.

## 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 tailor. Do not hesitate to contact Piher for advice.

## Piher Sensing Systems

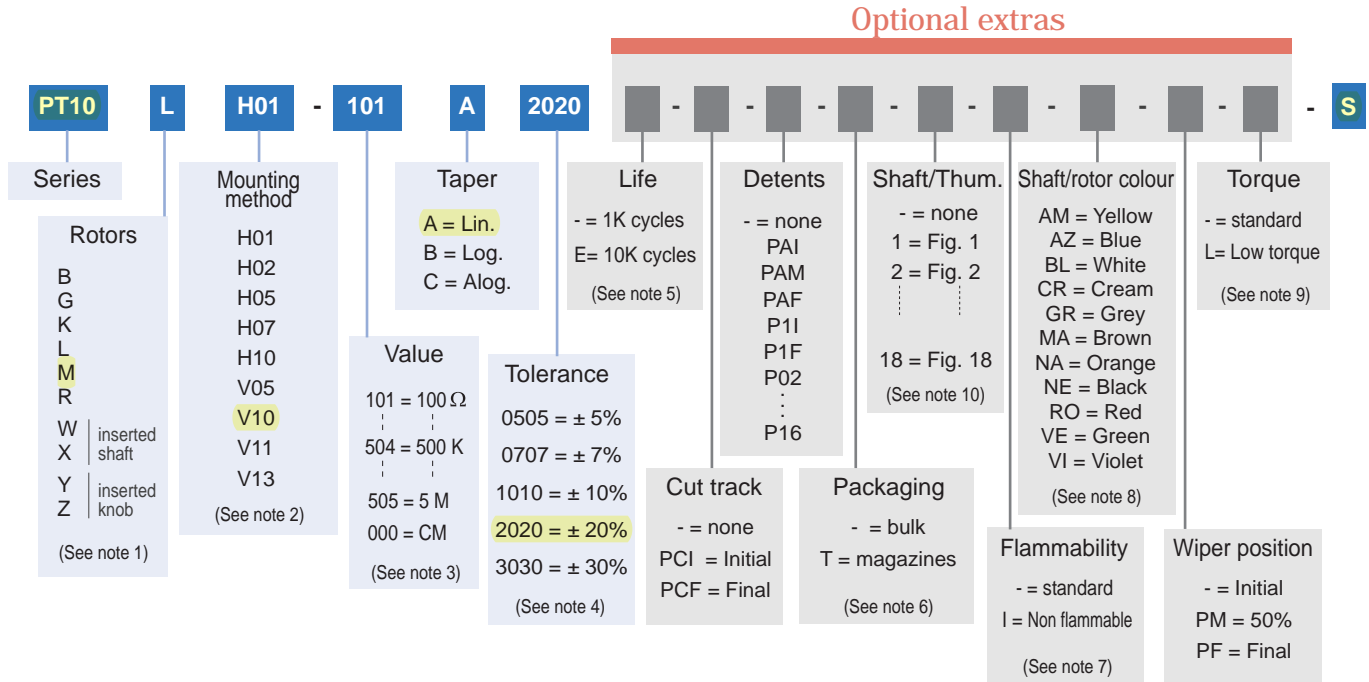
Our product competencies and services:  
Potentiometers | Position / Angle sensors | Rotary switches | Incremental encoders  
Printed circuit resistors | Mechatronics | Value added assemblies

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## 10 mm carbon potentiometer

### PT10

### How to order



- NOTES:**
- "Z" adjustment only available on "H" versions. Rotor "G" only available in purple color (shaft/rotor color code "VI").
  - V05 & H07 terminals material: brass. SMD versions available (PS10 series). Endless rotation version available (ST10).
  - Value Example: Code:  $\begin{matrix} 10 & 1 & 100 & \Omega \\ & \rightarrow & \text{Numb of zeros} & \\ & \rightarrow & \text{First two digits of the value.} & \end{matrix}$  000 = CM = Switch version (contact us)
  - Other tolerances: check availability. Example: +7% -5% Code:  $\begin{matrix} 07 & 05 \\ & \rightarrow \text{negative tolerance} \\ & \rightarrow \text{positive tolerance} \end{matrix}$   
High and low ohmic values may not allow all tolerances: check availability.
  - Standard: 1000 cycles. Long life "E": 10.000 cycles. Others: check availability..
  - Magazines: not available with the H10, V05 and V13 models, nor with adjustment types X, W, Y, Z.
  - Non flammable: housing, rotor and shaft. According to UL 94V-0
  - Colour shaft/rotor: • Potentiometer without shaft: only rotor • Potentiometer with shaft: only shaft
  - Low Torque: ≤ 1 Ncm  
No detent option available for low torque models.
  - If you wish to use your own custom plastic shaft/knob/actuator please contact Piher for advice about compatible materials.

#### 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.

#### Standard default options

Life	-----	1000 cycles
Cut track	-----	No
Detents	-----	None
Packing	-----	Bulk
Non flammable	-----	No
Rotor colour	-----	White
Shaft colour	-----	Natural (not coloured)
Wiper send position	-----	Initial
Torque	-----	0.4 to 2 Ncm.

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**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).

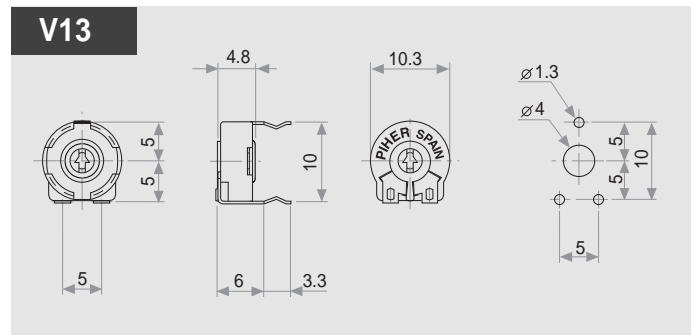
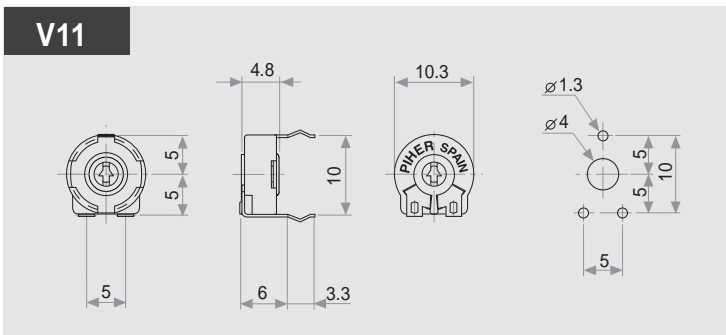
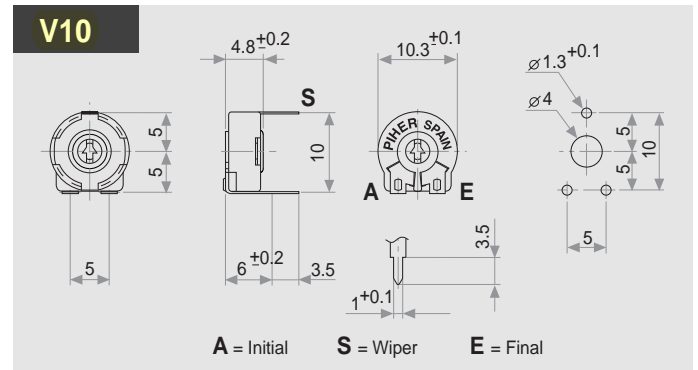
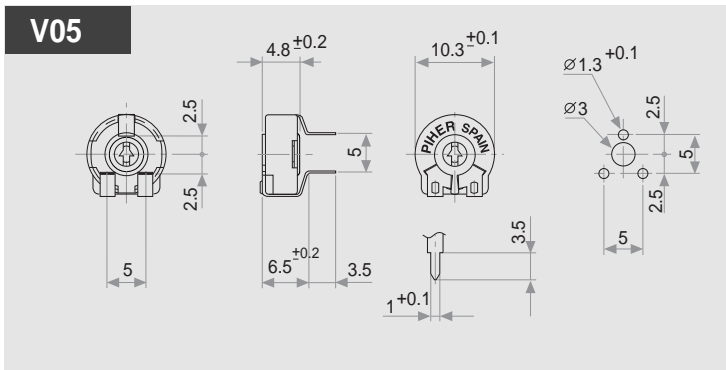
## Mounting methods. Dimensions



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

V = horizontal mounting – vertical adjustment

H = vertical mounting – horizontal adjustment



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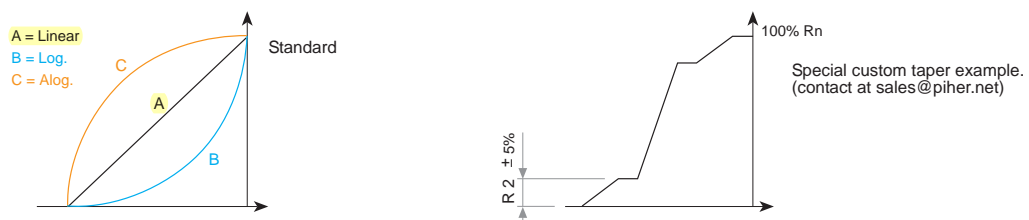
## Automotive / Appliance control - sensor

# 10 mm carbon potentiometer PT10

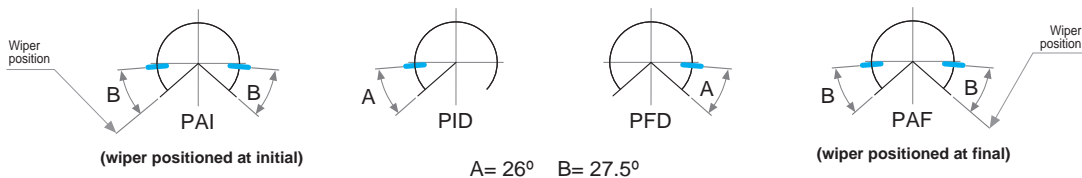
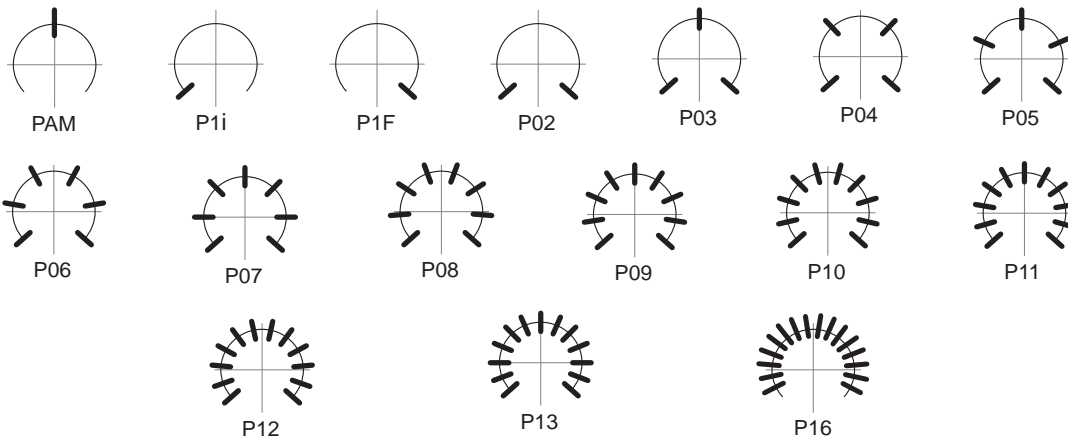
### Standard values - tolerances

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
How to 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
Standard tolerance	20%																							30%					

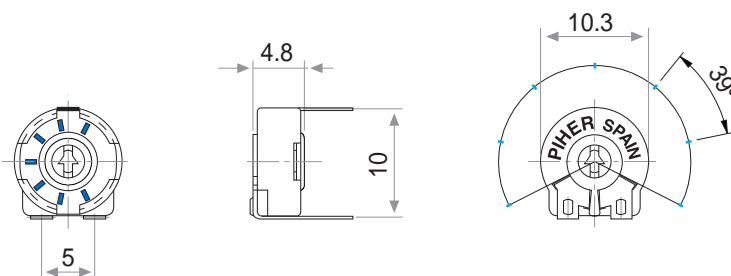
### Tapers



### Detents



Detents detail.  
(7 detents example)



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 T<sup>a</sup>:

- 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 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 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.

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## Shafts

For G and M rotor types, top view.

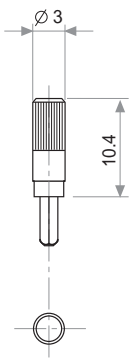


Fig. 1 / Ref. 5016

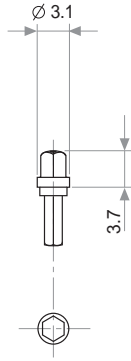


Fig. 2 / Ref. 5053

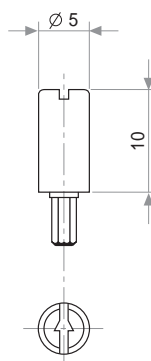


Fig. 3 / Ref. 5012

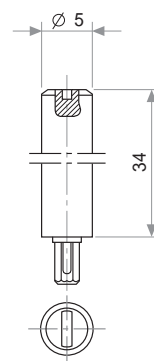


Fig. 4 / Ref. 6053

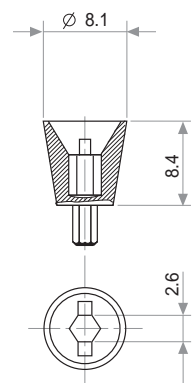


Fig. 6 / Ref. 5035

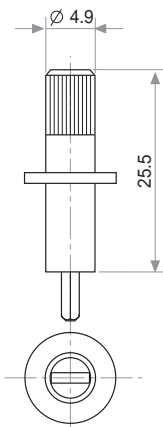


Fig. 7 / Ref. 5115

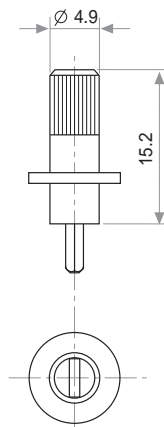


Fig. 8 / Ref. 5116

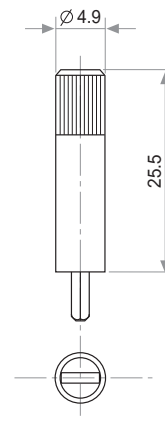


Fig. 9 / Ref. 5119

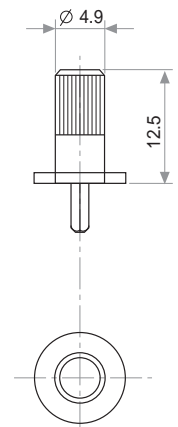


Fig. 10 / Ref. 5120

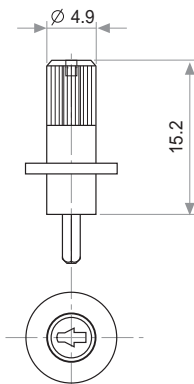


Fig. 12 / Ref. 6052

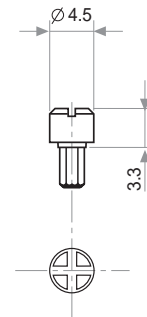


Fig. 14 / Ref. 5055

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### Knobs/thumbwheels

For G and M rotor types, top view.

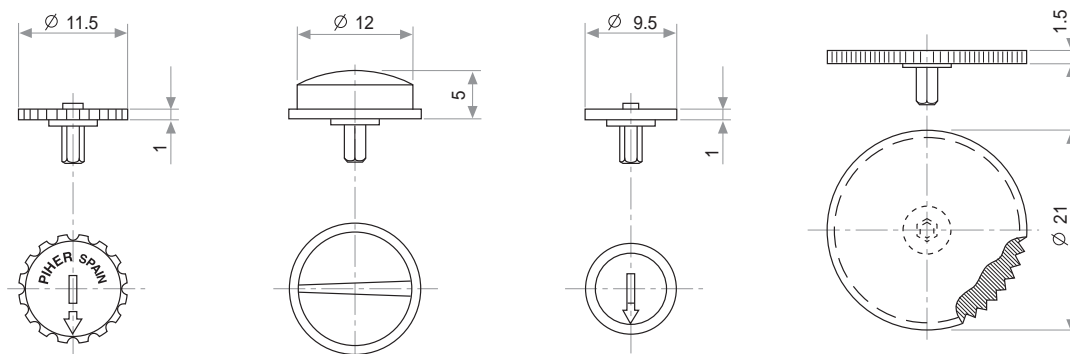


Fig. 5 / Ref. 5034

Fig. 15 / Ref. 6008

Fig. 16 / Ref. 5039

Fig. 17 / Ref. 5062

2- GANG Plastic Knob/ Plastic Shaft

Numbered Thumbwheel

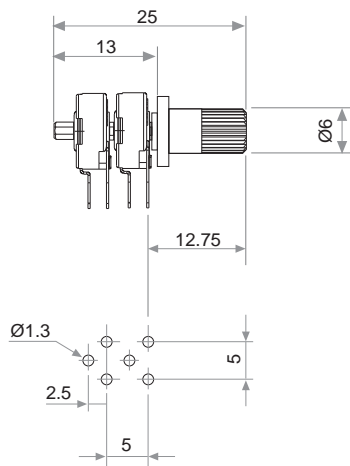
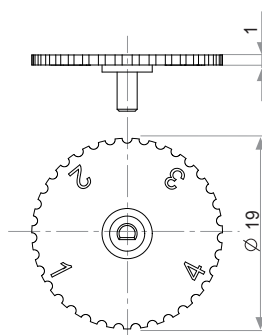


Fig. 18 / Ref. 6064



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

For R rotor type only

Upon request.

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

Mounted shafts, knobs & thumbwheels 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.

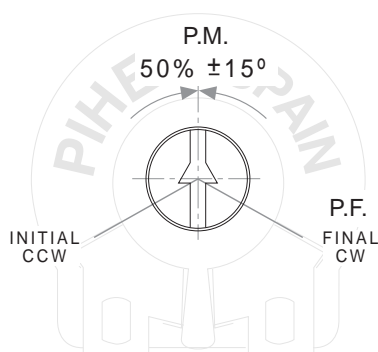
The plastic color can be stated in the part number. Non flammable plastic can be ordered too.

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



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## Tests

### Typical variations

Electrical life	1000 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 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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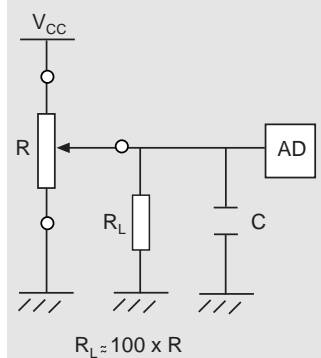
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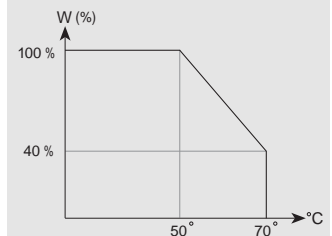
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## Recommended connections

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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