

Mechanical specifications

Mechanical rotation angle ¹			$235^{\circ} \pm 5^{\circ}$
Electrical r	rotation angle ²		$220^{\circ} \pm 20^{\circ}$
Torque	e 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		2	3

360° version available: ST10

333º 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)			
Tolerance ¹ $100\Omega \le Rn \le 1M\Omega$ $1M\Omega \le Rn \le 5M\Omega$	± 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 $Rn \ge 1K$)			
Residual resistance	$\leq 0.5\%$ Rn (5 Ω min.)			
Equivalent noise resistance	\leq 3% Rn (3 Ω min.)			
Operating temperature ^{2,3}	-25°C to +70°C (-13°F to + 158°F)			

¹ Others: check availability. ² Up to 85°C depending on application.

³ For higher specifications please visit our PTC10 series.

For reflow soldering capable models please see our PS10 datasheet.

Piher Sensing Systems

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

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.



How to order

		Optional extras								
PT10 L		H01 -	101 A	2020		•	-		. . .	•
Series	M	ounting	Таре	er	Life	Dete	nts	Shaft/Thun	n. Shaft/rotor colou	ur Torque
Rotors B G K	Π	H01 H02 H05 H07	A = Lir B = Lo C = Ale	n : ig. E og.	= 1K cycles = 10K cycle (See note 5)	es - = nc PA PAN PAN P1	ne 1	- = none 1 = Fig. 1 2 = Fig. 2	AM = Yellow AZ = Blue BL = White CR = Cream GR = Grey	- = standard L= Low torque (See note 9)
L M R W inserted shaft		H10 V05 V10 V11	Value 101 = 100 Ω 504 = 500 K	Tolerand 0505 = ± 0707 = ±	ce 5% 7%	P1F P02 : P16	;	18 = Fig. 18 (See note 10)	NA = Blown NA = Orange NE = Black RO = Red VE = Green VI = Violet	
Y inserted Z knob	(Se	v 13 e note 2)	505 = 5 M	1010 = ±	10% C	ut track	Pa	ackaging	(See note 8)	
(See note 1)			000 = CM (See note 3)	$2020 = \pm 3$ $3030 = \pm 3$	20% - 30% PC	· = none CI = Initial CF = Final	- T =	• = bulk magazines	Flammability	Wiper position - = Initial
				(See note	4)		(3	see note 6)	I = Non flammable (See note 7)	PM = 50% PF = Final
NOTES:	(1)	"Z" adjustm	ent only availab	le on "H" ve	rsions. Roto	or "G" only av	ailable	in purple color	(shaft/rotor color cod	le "VI").
	(2)	V05 & H07 terminals material: brass. SMD versions available (PS10 series). Endles rotation version available (ST10								
	(3)	Value Example: Code: $10 \ 1 \ 100 \ \Omega$ Numb of zeros First two digits of the value. 000 = CM = Switch version (contact us)								
	(4)	Other tolerances: check availability. High and low ohmic values may not allow all tolerances: check availability. Example: +7% -5% Code: 07 05 negative tolerance positive 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 shaf	t/rotor: • Po	otentiometer	without sha	aft: only rotor	•	Potentiometer v	with shaft: only shaft	
	(9)	Low Torque No detent o	: ≤ 1 Ncm ption available f	or low torqu	e models.					
	(10)	If you wish t	o use your own	custom plas	stic shaft/kn	ob/actuator p	lease d	contact Piher fo	r advice about compa	atible 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.

PIHER sensing systems

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(50%)

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

Without shaft or knob.









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

 \mathbf{Y} = Adjustable from terminal 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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Mounting methods. Dimensions



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PIHER sensing systems

Automotive / Appliance control - sensor 10 mm carbon potentiometer PT10

Standard values - tolerances



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

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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-andtested 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
- $\checkmark\,$ Cost effective replacement for absolute encoders

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Shafts

For G and M rotor types, top view.



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Fig. 12 / Ref. 6052



Fig. 14 / Ref. 5055

Knobs/thumbwheels

For G and M rotor types, top view.



Positioning

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



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PIHER sensing systems

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.

Switch versions

They can be delivered with or withouth detents/stops.





Switch standard specs.

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



(D48, rotor shown at final position)



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.)

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



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Magazines for PT10 H01 and H05 Also crimped term. H02

Magazines for PT10 V Also crimped term. V11



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<u>540 +1.5</u>

Tests

Typical v	ariations
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Electrical life	1000 h. @ 50°C; 0.15 W	±5 %
Mechanical life (cycles)	1000 @ 10 CPM15 CPM	± 3 % (Rn < 1 M Ω)
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.

Disclaimer

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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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.

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