

Hollow Shaft Position Sensors



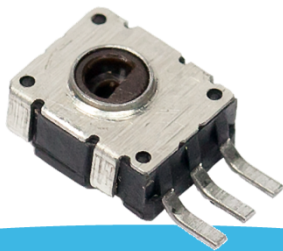
Product Series Overview

What is a rotary position sensor?

- Converts angular mechanical position or motion of a shaft or axle to an analog or digital electrical signal.
- Designed for applications which require adjustments to control variable outputs such as position, speed or volume.

How does hollow shaft rotary position sensor help the customers?

- Provides customers flexibilities in their system mechanical designs, such as customized shaft, mechanical arm position sensing, motor or human interface adjustments
- Typical applications include Industrial, Medical and Transportation



PHS04



PHS07



PHS11

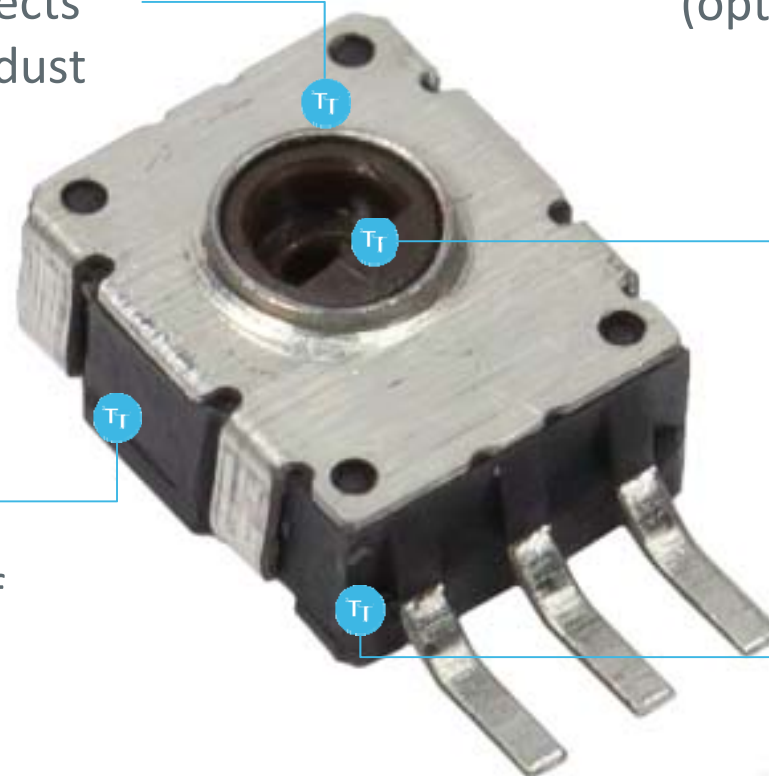
Introducing the PHS04

BE
Build Expertise



Dust proof
construction protects
the interior from dust

More than 300,000 cycles
(optional : 500,000 cycles)



Miniature design of
6.6 x 4.2 x 2.1 mm

Stable output
characteristics in
harsh environment

To find out more see: http://www.ttelectronics.com/sites/default/files/download-files/Datasheets%20-%20PHS04_Final.pdf

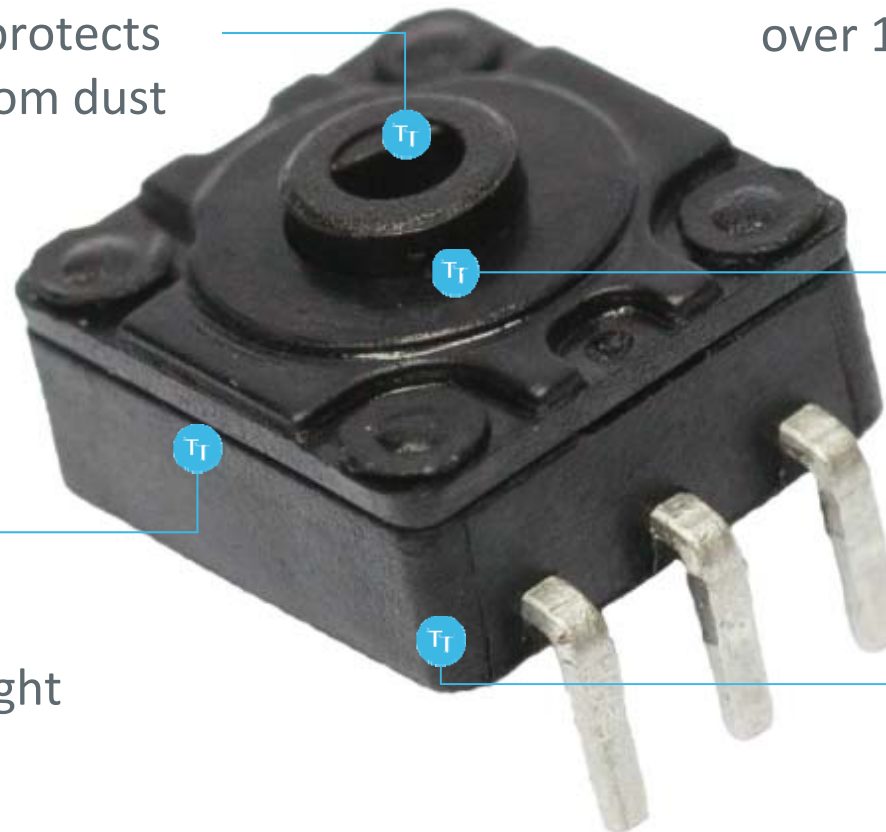
Introducing the PHS07

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Dust proof construction protects the interior from dust

High accuracy and long life over 1 million cycles



7mm diameter and 4.1mm height package

Stable output characteristics in harsh environment

To find out more see: http://www.ttelectronics.com/sites/default/files/download-files/Datasheets%20-%20PHS07_Final.pdf

Introducing the PHS11

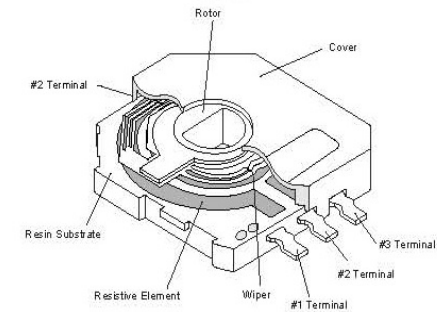
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Dust proof
construction protects
the interior from dust



11mm diameter
and 2.2mm ultra-
thin package



Excellent resistance
materials and high
reliability wiper
achieves 1 million
cycles

To find out more see: http://www.ttelectronics.com/sites/default/files/download-files/Datasheets%20-%20PHS11_Final.pdf

Product Series Overview

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Product Family	Package Size	Rotor / Shaft Diameter	Product Specification		
			Operating Life	Electrical Angle	Linearity
PHS04	4mm	0.8mm	300K / 500K*	280°	< ±5%
PHS07	7mm	1.6mm	1M	180°, 200°, 220°, 280°, 300°, 310°	< ±2%
PHS11	11mm	4.0mm	1M	60°, 80°, 85°, 90°, 120°, 145°, 180°, 250°, 300°, 320°, 333°, 341°	±2% to ±5% (depending on electrical angle)

* PHS04 standard offer is at 300K cycles. Optional at 500K cycles



PHS04



PHS07



PHS11

Product Benefits and Features

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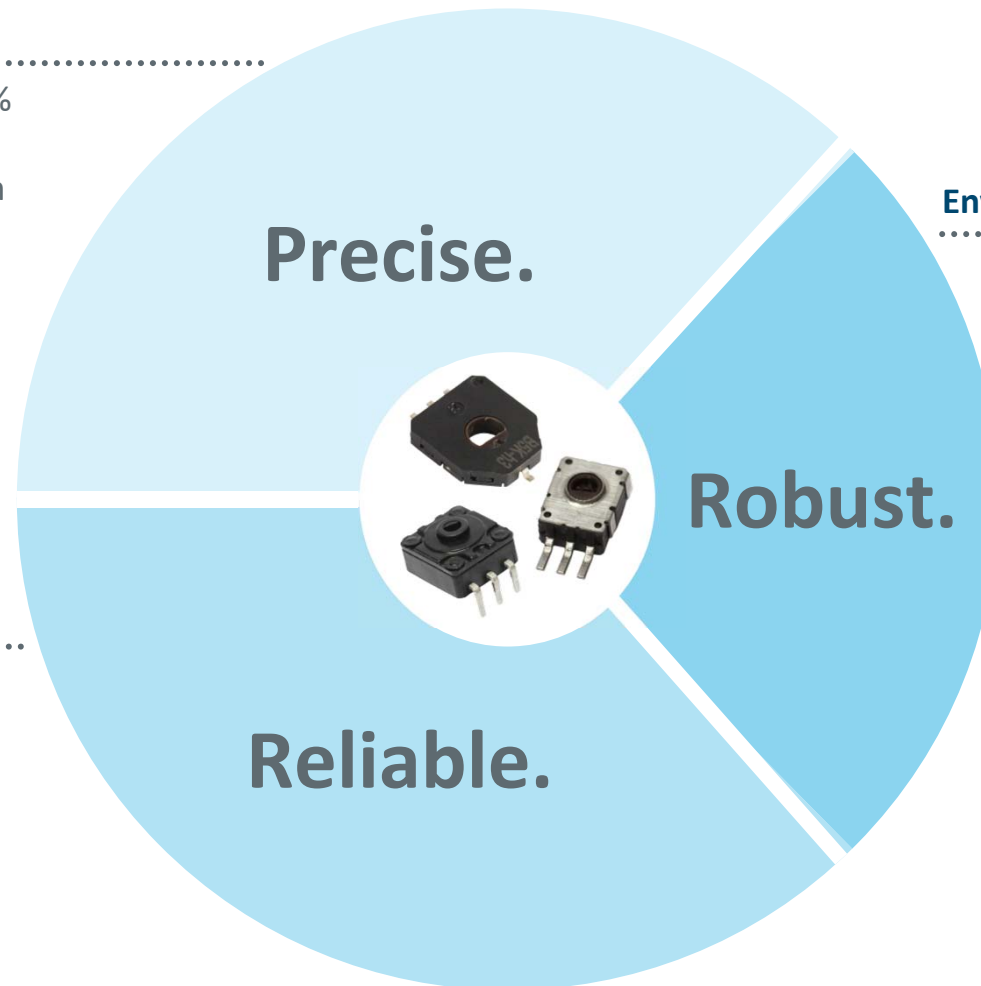


Critical Applications

- Tight linearity of $\pm 2\%$
- Low noise <80 mV
- Low profile of 2.2mm
- D formation thru-hole anti-slip rotor (*optional : H-type*)
- Shaft hole up to $\phi 4\text{mm}$
- Electrical angle selections

Repair / Maintenance Cost Reductions

- >1 million cycles for reduced repair and maintenance costs [PHS07 and PHS11]
- Operating temp - 40°C to +120°C [PHS11]



Environmental Immunity

- Dust proof construction
- Stable output characteristics in harsh environment
- Temp cycles (-10°C to 70°C, 5 cycles) : $\Delta RT \leq \pm 10\%$
- Damp Heat (70 $\pm$ 2°C, 85% RH, 300 $\pm$ 5H) : -5% < ΔRT < +35%

Our Value Proposition



Value-Add	Details
Customization	• We can customize shaft hole diameters for PHS07 ($\phi 0.8\text{mm}$ to $\phi 1.6\text{mm}$) and PHS11 ($\phi 2.0\text{mm}$ to $\phi 4.0\text{mm}$) with minimum tooling charges of \$1,000 and samples lead time 5-6 weeks • We can customize rotor type too from D- to H-type with minimum tooling charges of \$5,000 and samples lead time is 5-6 weeks. • We can meet unique electrical output angles – multiple standard options up to 341° or customizable. • We can customize linearity tolerances $< \pm 2\%$ @ $\geq 300^\circ$ electrical angle • We collaborate with our customers to develop custom solutions that give them competitive edge in the market. <i>(AECQ certification is under study for next gen product.)</i> • We have over 40 years of experience in offering custom sensing solutions.
Reliability	• We offer long life cycles, various shaft diameter options and special environmental sealing. PHS11 was tested to 1.5 million cycles and PHS07 was tested to 2 million cycles. • Our field-proven, affordable solutions are designed to operate in extremely harsh environments. • Our position sensor can be designed for stable output withstanding pressure, humidity, and temperature changes.

TT Electronics' hollow shaft rotary position sensors are highly reliable and can be customized to meet your exact requirements for the most complex of applications.

Application Versatility

Industrial



- Controls of robot's joints (PHS04 / PHS07)
- Drone cradle control & camera position /orientation (PHS11)
- Motor drive units
- 3D printer
- Intelligent surveillance camera positioning

Medical



- Patient monitoring systems
- Robotic surgical systems
- Medical diagnostic devices
- Dental chair position sensors
- Patient lifts position sensing

Transportation



- Shift-by-wire gearshift systems
- Rotation position sensing in car air conditioning system
- Car audio

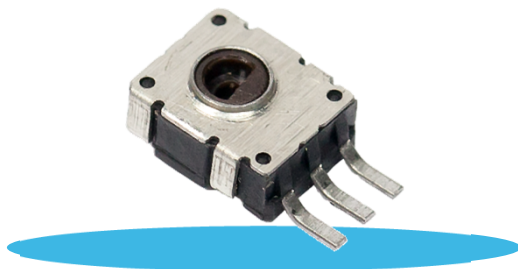
Ordering Guidelines

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Product family	Package type	Standard pack quantity			
PHS04	Trays / boxes	1,000 units per tray / 14,000 pcs per box			
PHS07	Trays / boxes	Side [200 units per tray / 11,200 pcs per box] Top [160 units per tray / 3,840pcs per box]			
PHS11	Tape & reel	1,000 units per reel / 5,000 units per box			

MOQ	Standard lead time	COO	Commodity code	ECCN	In stock
2,000 units	< 4 weeks	China	8533.40.8050	EAR99	Yes



PHS04



PHS07



PHS11

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