Enabling the Electronics Revolution

PIHER sensing systems
an Amphenol® company

MTS-360

Miniature Hall-Effect Through-Shaft Rotary Position Sensor

DESCRIPTION

The MTS-360 provides a true breakthrough in contactless sensor technology by combining a through-shaft design with 360º absolute position feedback in an ultra miniature size. The result is the smallest fully featured rotary sensor on the market with reliability up to 50 million cycles.

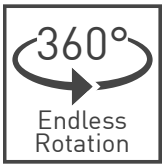
With its tiny size, engineers can now integrate a fully featured rotary sensor directly on their PCB without the packaging issues that typically accompany encoders or other absolute position devices. The exceptionally low profile fits easily in places that were previously too small for pre-packaged rotary sensors.

KEY FEATURES

True, contactless operation
Without any gears or mechanical interfaces the sensor is easily assembled and calibrated and subject to limited wear and tear over lifetime.

Fits in the smallest of spaces
With a footprint of less than 18 x 18mm, height of 5.9mm and less than 3g this rotary sensor can be used in even the most space-constraint application.

Through-hole design
Allows shaft insertion from top or bottom, simple assembly and makes it even more suitable in applications where space is limited.



360 degree absolute position feedback
Endless mechanical rotational angle without dead band, keeps the position on power loss with programmable electrical angles from 15 to 360 degrees.

Durable and robust design
The non-contacting design allows for an extra-long product lifetime of up to 50 million cycles.

Adaptable to your requirements
Programmable transfer function and switch outputs as well as different output protocols and redundancy levels available.

APPLICATIONS

Industrial
- ▶ Optical image stabilization
- ▶ Precision biomedical devices
- ▶ Instrumentation
- ▶ Autonomous warehouse robotics
- ▶ Robotics and automation feedback

Home and Building Automation
- ▶ HVAC systems

Transportation
- ▶ Valve monitoring
- ▶ Conveyor operation

HVOR
- ▶ Autonomous steering
- ▶ Joystick controls
- ▶ Hand throttle position

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MECHANICAL SPECIFICATIONS

Rotational life	Up to 50.000.000 cycles
Mechanical range	360° (endless rotation)

ELECTRICAL SPECIFICATIONS

Linearity[1,2]		±1% absolute (±0.5% upon request)
Electrical angular range[1]		Programmable from 15° to 360°
Output protocols		Analog (Ratiometric), PWM Serial Protocol (SPI)
Output		Simple Redundant Full-redundant (on request)
Switch output		Yes, programmable
Switch accuracy[1]		±3°
Resolution	Analog, PWM SPI	Up to 12 bit Up to 14 bit
Supply voltage[1]		5V ±10%
Supply current	Single version Redundant version	Typ 8.5 mA Typ 17 mA
Voltage protection		+20V / -10V
Self-diagnostic features		yes

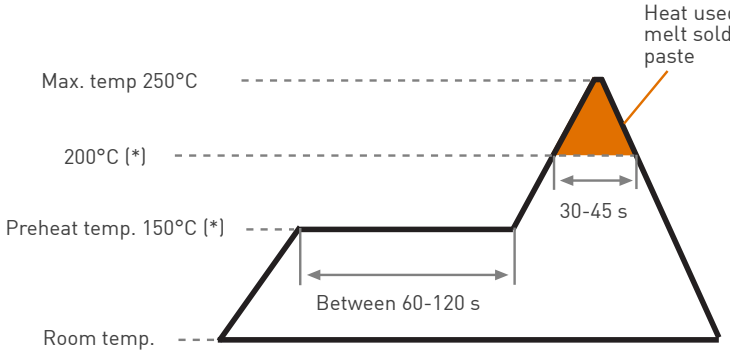
[1] Other specifications available
[2] Ferromagnetic materials close to the sensor (i.e. mounting surface) may affect the sensor's linearity.

ENVIRONMENTAL SPECIFICATIONS

Operating and storage temperature[1]	-40° to +125°C
Shock	50g
Vibration	5-2000 Hz; 20g; Amax 0,75 mm
Sealing[1]	IP50

[1] Other specifications available

RECOMMENDED REFLOW PROFILE



(*) Melting point temp. depends on solder properties

The recommended reflow profile is provided as a guideline. Optimal profile may differ due to oven type, assembly layout or other design or process variables. Customers should verify actual device performance in their specific application and reflow process. Please contact Piher if you require additional support.

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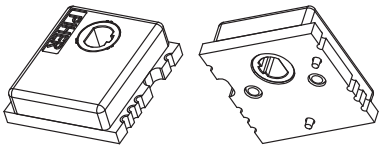
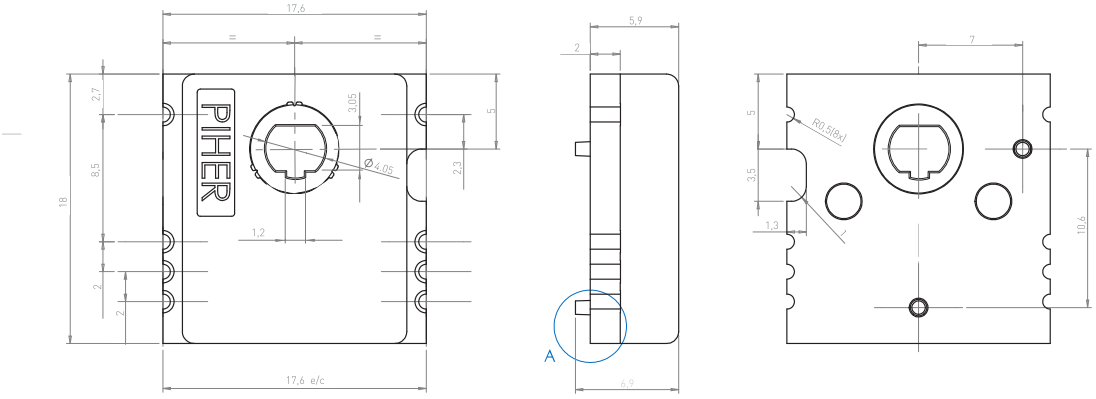
DIMENSIONS (MM)

Outer Dimensions

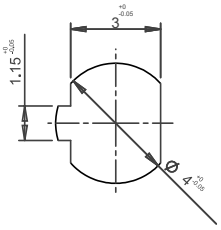


Download the STEP file here:
https://piher.net/piher/?p=1700



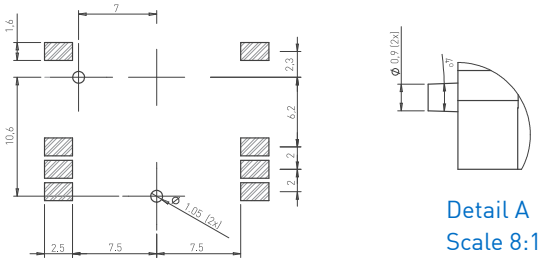
Rotor is shown at zero position. Sensor is delivered at random position

Recommended shaft dimensions



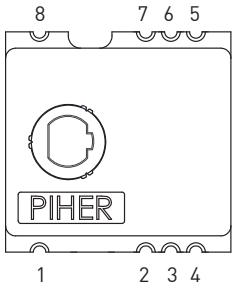
Shaft should be ferromagnetic material. If you want to use a non-ferromagnetic shaft please contact Piher.

Recommended footprint



CONNECTION SCHEME

PIN	Simple Output	Redundant Output
1	Supply voltage	Switch output2*
2		Signal output2**
3	Switch output*	Ground
4		Ground
5	Signal output**	Power supply
6		Power supply
7	Ground	Signal output1**
8		Switch output1*



* If the feature is not used in the application, please connect to ground.

** Piher can supply the recommended wiring diagram.

More instructions of use on www.piher.net

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HOW TO ORDER (Example: MTS360G2-1A-C0000-ERA360-05K)

Simple Output - Analogic and PWM

MTS360G2 - 1 _ - _ _ - C_____ - ERA___ - 05 K - ____

Series	Type	Output[1]	Switch[2]	Switch position[2]	Output function[3]	Electric rotational angle[4]	Voltage supply	Temperature range	PWM Frequency Hz[5]
	1 = simple	A = analogic P = PWM	[empty] = none W = switch	[empty] 000 016 ... 360	C0000 C0001	ERA040 ERA041 ... ERA360	05 = 5V ±10%	K = -40°C to +125°C	[empty] = 200Hz F100 = 100Hz F101 = 101Hz ... F999 = 999Hz

Redundant output - Analogic and PWM

MTS360G2 - 2 _ - _ ___ _ ___ - C_____ - ERA___ - 05 K - ____ ____

Series	Type	Output[1]	Switch1[2]	Switch1 position[2]	Switch2[2]	Switch2 position[2]	Output function[3]	Electric rotational angle[4]	Voltage supply	Temperature range	PWM Frequency Hz. (1)[5]	PWM Frequency Hz. (2)[5]
	2 = redundant	AA = analogic PP = PWM	[empty] = none W = switch	[empty] 000 016 ... 360	[empty] = none W = switch	[empty] 000 016 ... 360	C0002 C0003	ERA040 ERA041 ... ERA360	05 = 5V ±10%	K = -40°C to +125°C	[empty] F100 F101 ... F999	[empty] F100 F101 ... F999

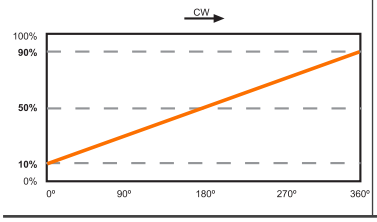
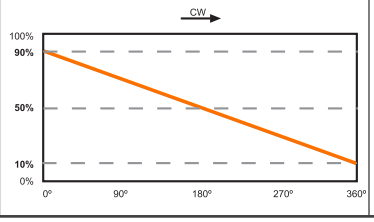
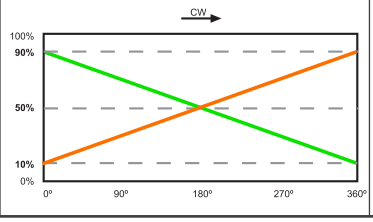
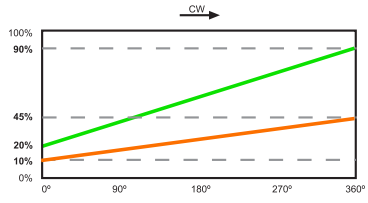
Simple output - SPI

MTS360G2 - 1 _ - C_____ - ERA___ - 05 K

Series	Type	Output[1]	Output function[3]	Electric rotational angle[4]	Voltage supply	Temperature range
	1 = simple	S = SPI	C0000 C0001	ERA040 ERA041 ... ERA360	05 = 5V ±10%	K = -40°C to +125°C

1 The analog output is ratiometric, proportional to input supply voltage.
2 Leave empty if not applicable. Switch function diagram: see next page.
3 Other output functions available, please check availability. Enter CXXXX as long as the new output function is not defined.
4 Models with ERA ‹ 40° available on request
5 Leave empty if not applicable. Default frequency is 200 Hz

EXAMPLE OUTPUT FUNCTIONS

C0000 (simple)	C0001 (simple)	C0002 (redundant)	C0003 (redundant)
			

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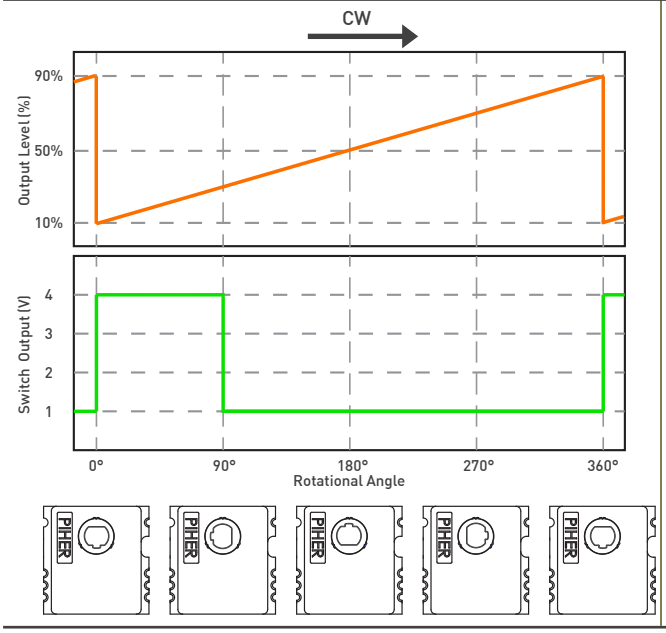
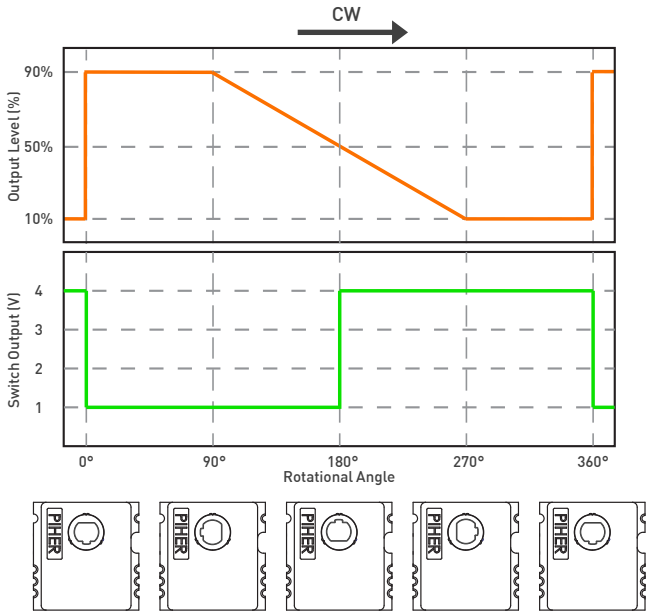
OUTPUT VOLTAGE DEPENDING ON SHAFT POSITION

MTS360G2-1A-W090-C0000-ERA360-05K

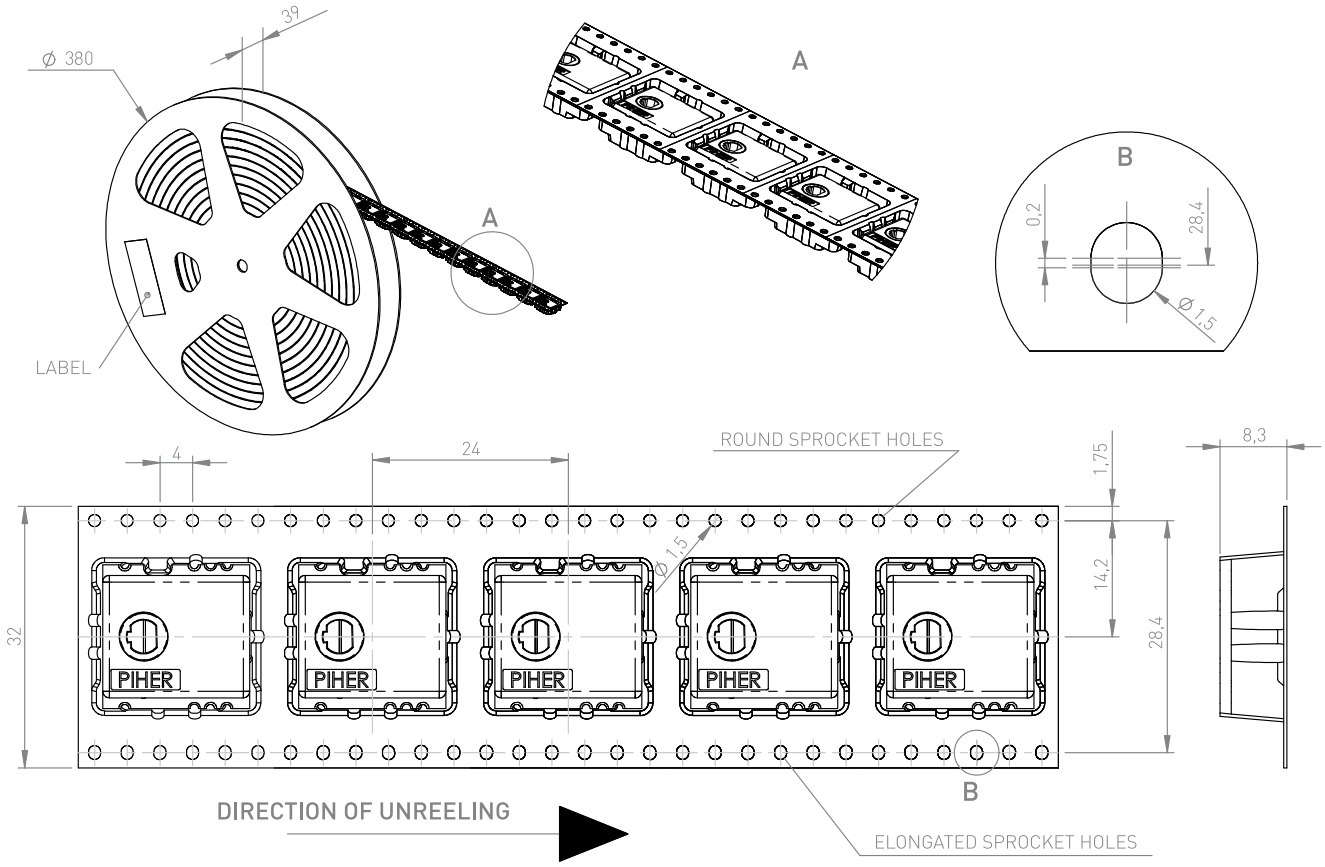


MTS360G2-1A-W180-C0072-ERA180-05K



PACKAGING

Embossed Tape (400 pcs / reel)



For more information visit: www.piher.net

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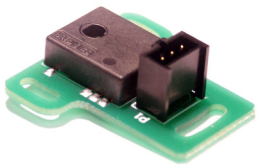
FOR MORE OPTIONAL FEATURES CONTACT PIHER SENSING SYSTEMS

- Special output slopes and protocols
- Full redundant version with switches
- Fast versions
- Connectors (see MTS-360PCB)
- IP sealing
- Shaft interfaces



Sensor + PCB + connector combination

OUR ADVANTAGE

- Leading-edge innovative position sensing solutions
  - Contactless (Hall-effect and Inductive Technology)
  - Contacting (Potentiometers, Printed Electronics)
- Engineering design-in support
- All our products can be customized to fit target application and customer requirement
- Capability to move seamlessly from development to true high-volume production
- A global footprint with global engineering and commercial support
- One-stop shop not limited to position sensors (temperature, pressure, gas,...) through group collaboration
- Flexibility and entrepreneurship of a medium-sized company with the backing of Amphenol Corporation

IATF 16949 Automotive Quality Management CERTIFIED · ISO 9001 Quality Management Systems CERTIFIED · ISO 14001 BUREAU VERITAS Certification · RoHS REACH compliant

Please always use the latest updated datasheets and 3D models published on our website.

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