Magnetic rotary angle and position sensor-control

Contactless sensor
MTS-360

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.

This ultra-miniature Rotary Position Sensor is ideal in optical imaging stabilization and precision biomedical devices, optical zoom devices, consumer electronics, instrumentation, HVAC systems, automotive control systems, marine controls, fork lift trucks, farm equipment, cranes, low speed motor feedback, valve position sensors and robotic and automation feedback system.

Mechanical specifications

Rotational life (depends on application and mounting)	up to 50.000.000 cycles.
Operating temperature [1]	-40ºC to +125ºC
Sealing [1]	IP50

Electrical specifications

Linearity [1,2]	±1% absolute (±0.5% check availability).
Angular range	Programmable from 15 to 360 degrees (without dead band).
Output	Analog (Ratiometric), PWM, Serial Protocol.
Switch output	Yes, programmable.
Switch accuracy [1]	±3º
Angular Resolution (depends on electrical angle and rotational speed)	Analog & PWM: up to 12 bits. Serial Protocol (SPI): up to 14 bits.
Supply voltage [1]	5V ±10%
Supply current	Typ 8.5mA - single version Typ 17mA - redundant version

[1] Others: check availability.
[2] Ferromagnetic materials close to the sensor (i.e. shaft, mounting surface) may affect the sensor's linearity. Please contact Piher for advise.

Key features

• Simple & Robust magnetic design.

• Endless rotation.

• Programmable switch output.

• Programmable Linear Transfer Characteristics
(some positive slopes & one negative slope can be programmed in the same transfer characteristic;
up to 4 programmable points; see last page).

• Self-diagnostic features.

• Over voltage protection and reverse voltage protection.

Also upon request:
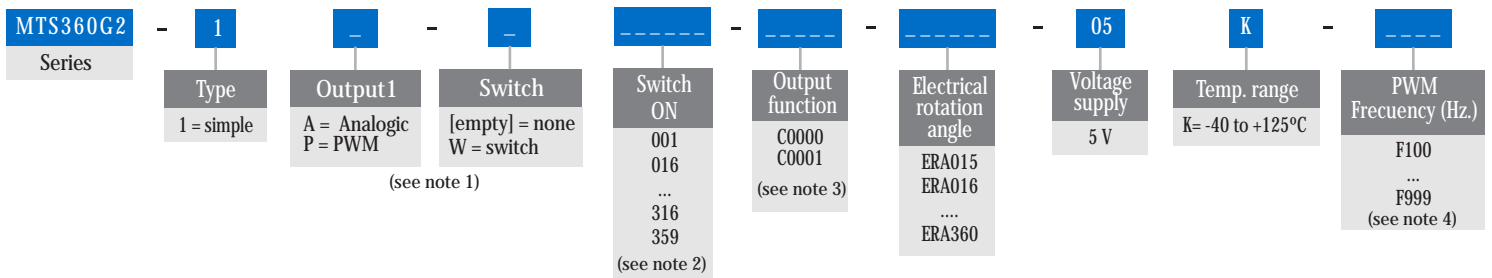• True full redundant version.

Applications

• Non-Contacting long life angle/position sensor.

• Absolute rotary position sensor

• Pedal position Sensor.

• Turn counter.

• Throttle/EGR valve and gear position sensor.

• Height & suspension sensor.

• Non-contacting potentiometer.

• Float-level sensor.

• Motor-shaft position sensor.

• Precision robotics, material handling, industrial equipment, HVAC monitoring & control, etc.
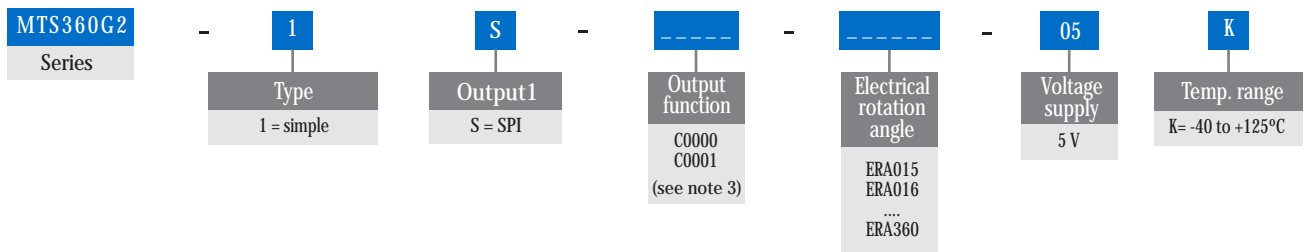
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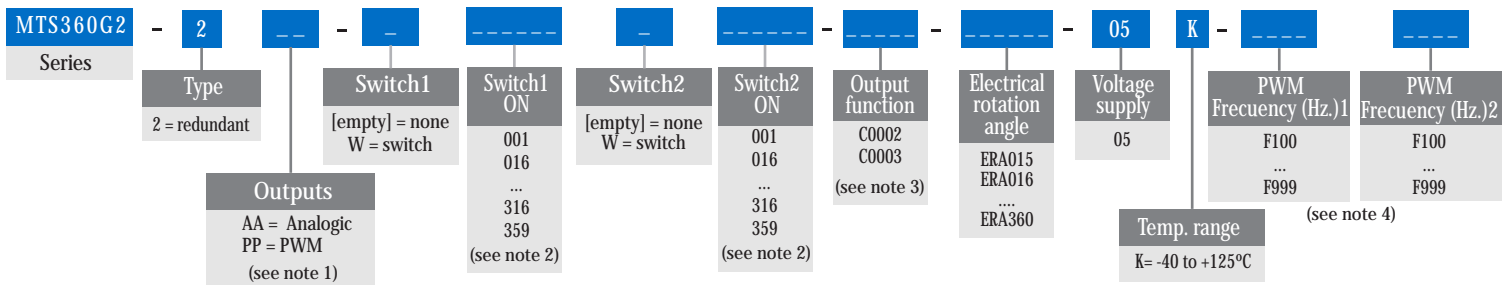
How to order (example: MTS360G2-1A-C0000-ERA360-05K)

Simple output (analogic / PWM)

MTS360G2	1	_	_	_ _ _ _ _ _	_ _ _ _	_ _ _ _ _ _	05	K	_ _ _ _
Series	Type	Output1	Switch	Switch ON	Output function	Electrical rotation angle	Voltage supply	Temp. range	PWM Frecuency (Hz.)
	1 = simple	A = Analogic P = PWM	[empty] = none W = switch	001 016 ... 316 359	C0000 C0001	ERA015 ERA016 .... ERA360	5 V	K= -40 to +125ºC	F100 ... F999
		(see note 1)		(see note 2)	(see note 3)				(see note 4)

Simple output (SPI)

MTS360G2	1	S	_ _ _ _ _	_ _ _ _ _ _	05	K
Series	Type	Output1	Output function	Electrical rotation angle	Voltage supply	Temp. range
	1 = simple	S = SPI	C0000 C0001	ERA015 ERA016 .... ERA360	5 V	K= -40 to +125ºC
			(see note 3)			

Redundant output (analogic / PWM)

MTS360G2	2	_ _	_	_ _ _ _ _ _	_	_ _ _ _ _ _	_ _ _ _	_ _ _ _ _ _	05	K	_ _ _ _	_ _ _ _
Series	Type	Outputs	Switch1	Switch1 ON	Switch2	Switch2 ON	Output function	Electrical rotation angle	Voltage supply	Temp. range	PWM Frecuency (Hz.)1	PWM Frecuency (Hz.)2
	2 = redundant	AA = Analogic PP = PWM	[empty] = none W = switch	001 016 ... 316 359	[empty] = none W = switch	001 016 ... 316 359	C0002 C0003	ERA015 ERA016 .... ERA360	05	K= -40 to +125ºC	F100 ... F999	F100 ... F999
		(see note 1)		(see note 2)		(see note 2)	(see note 3)				(see note 4)	

Other product configurations will be studied case by case.

(1) The analog output is a ratiometric output, proportional to input supply voltage.

(2) Leave empty if no applicable.

Switch function diagram:

Positive slope / Negative slope — SW On / SW Off — 360º

(3) Other output functions available check availability.In the How To Order reference, enter CXXXX meanwhile the new output function reference is not defined.

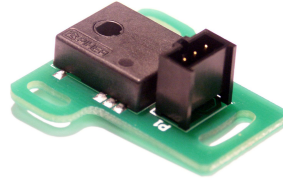(4) Leave empty if no applicable. Default frequency is 200 Hz

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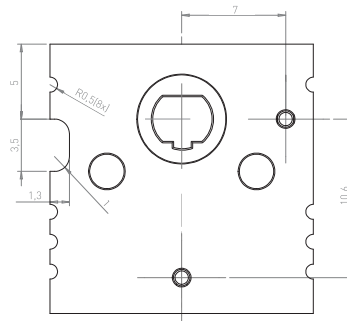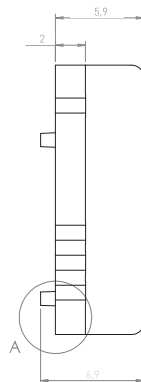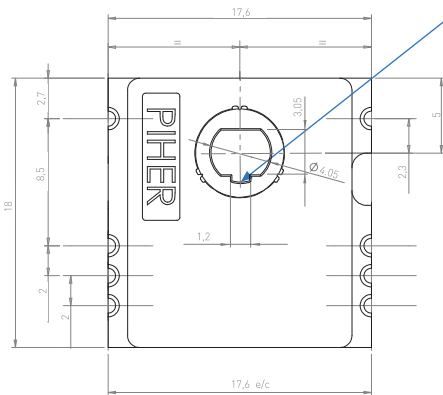
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Options

• Special output slopes and protocols.

• Full redundant version with switches.

• Fast versions.

• Connectors (see MTS-360PCB).

• IP sealing.

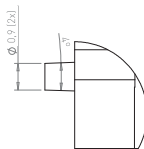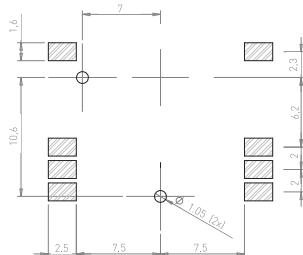• Shaft interfaces.

• Contact the factory for other options.

Sensor + PCB + connector combo package available.
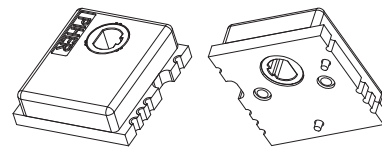Contact sales@piher.net for more information.

Dimensions

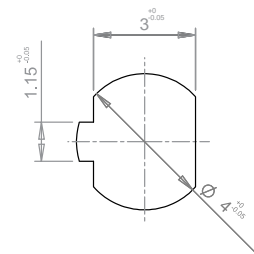Rotor is shown at zero position. The sensor is delivered at random position.

RECOMMENDED FOOT-PRINT

Detail A
Scale 8:1

Recommended shaft dimensions

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

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Packaging

EMBOSSED TAPE: 400pcs / Reel

DIRECTION OF UNREELING
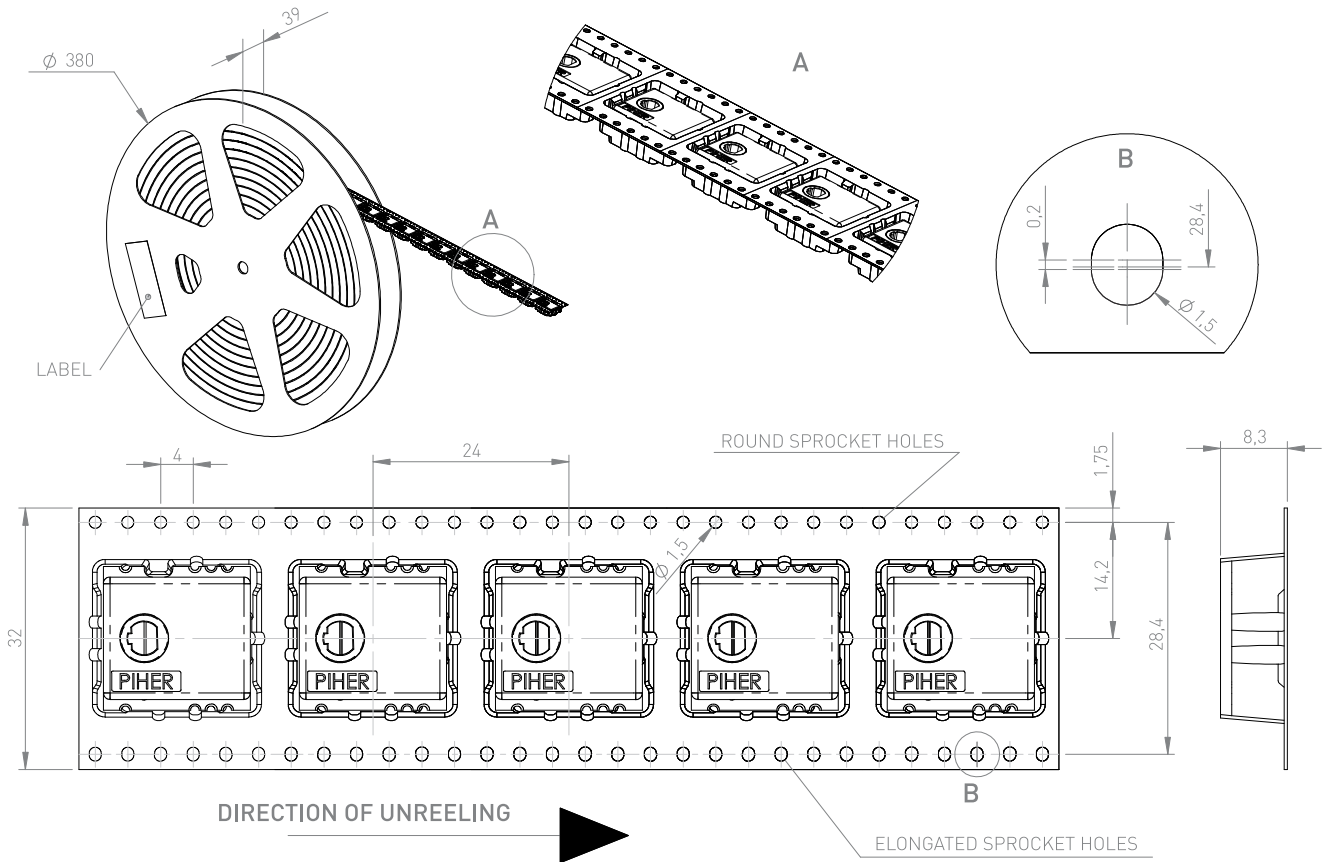
Recommended reflow profile

Max. temp 250ºCs

200ºC*

Preheat temp. 150ºC*

Room temp.

Heat used to melt solder paste

30-45 s

Between 60-120 s
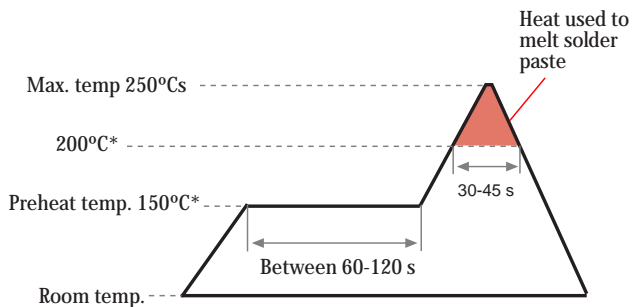
* Melting point temp. depends on solder properties

This 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.
lease contact Piher if you require additional support.

Connections scheme

Simple analog output version connection scheme.
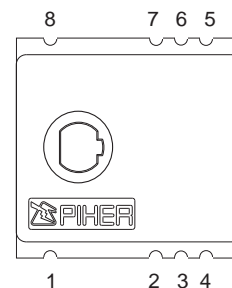
Pin	Description
1	Supply voltage
2	Supply voltage
3	Switch output*
4	Switch output*
5	Signal output**
6	Signal output**
7	Ground
8	Ground

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

** Piher can supply the recommended wiring diagram.
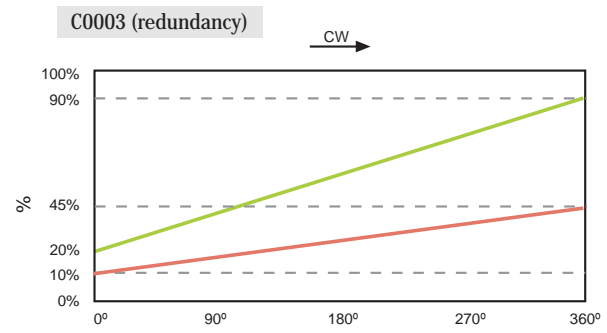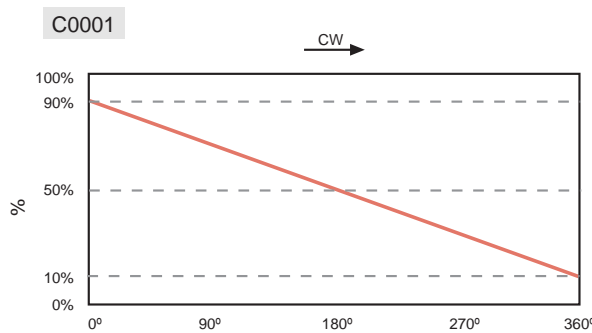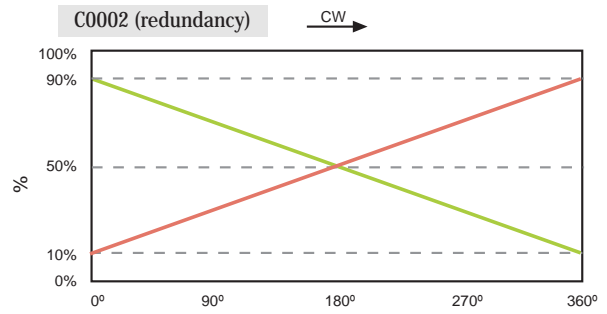
Instructions of use available at www.piher.net

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Output

C0000   CW

C0002 (redundancy)   CW

C0001   CW

C0003 (redundancy)   CW
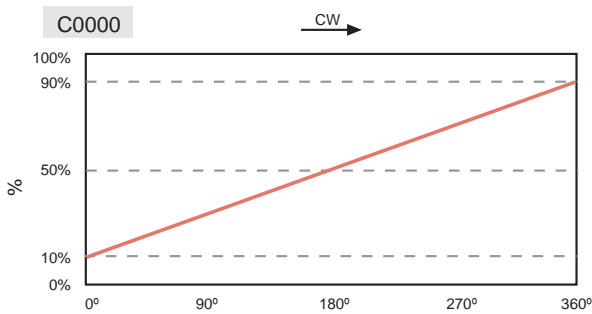
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