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 360° 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

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotational life</td>
<td>up to 50.000.000 cycles</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-40°C to +125°C</td>
</tr>
<tr>
<td>Sealing</td>
<td>IP50</td>
</tr>
</tbody>
</table>

Electrical specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linearity (depends on application and mounting)</td>
<td>±1% absolute (±0.5% check availability)</td>
</tr>
<tr>
<td>Angular range</td>
<td>Programmable from 40 to 360 degrees (others upon request)</td>
</tr>
<tr>
<td>Output</td>
<td>Analog (Ratiometric), PWM, Serial Protocol</td>
</tr>
<tr>
<td>Switch output</td>
<td>Yes, programmable</td>
</tr>
<tr>
<td>Switch accuracy</td>
<td>±3º</td>
</tr>
<tr>
<td>Angular Resolution (depends on electrical angle and rotational speed)</td>
<td>Analog &amp; PWM: up to 12 bit</td>
</tr>
<tr>
<td></td>
<td>Serial Protocol (SPI): up to 14 bit</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>5V ±10%</td>
</tr>
<tr>
<td>Supply current</td>
<td>Typ 8.5mA - single version</td>
</tr>
<tr>
<td></td>
<td>Typ 17mA - redundant version</td>
</tr>
</tbody>
</table>

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.

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.
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How to order  (example: MTS360G2-1A-C0000-ERA360-05K)

Simple output (analogic / PWM)

Simple output (SPI)

Redundant output (analogic / PWM)

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

(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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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.

Dimensions

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

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

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Packaging
EMBOSSED TAPE: 400pcs / Reel

Recommended reflow profile

Max. temp 250°C
200°C*
Preheat temp. 150°C*
Room temp.

* Melting point temp. depends on solder properties

Heat used to melt solder paste

Between 60-120 s

30-45 s

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. Please contact Piher if you require additional support.

Connections scheme

Simple analog output version connection scheme.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Supply voltage</td>
</tr>
<tr>
<td>2</td>
<td>Supply voltage</td>
</tr>
<tr>
<td>3</td>
<td>Switch output*</td>
</tr>
<tr>
<td>4</td>
<td>Switch output*</td>
</tr>
<tr>
<td>5</td>
<td>Signal output**</td>
</tr>
<tr>
<td>6</td>
<td>Signal output**</td>
</tr>
<tr>
<td>7</td>
<td>Ground</td>
</tr>
<tr>
<td>8</td>
<td>Ground</td>
</tr>
</tbody>
</table>

* 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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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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