ZPS™ System Specifications

ZPS is a high performance absolute position sensor system that delivers sub-nanometer accuracy to meet the needs of the most demanding metrology applications. The non-contact optical measurement method ensures no EMI sensitivity or heat dissipation in the critical metrology area.

**Performance Characteristics**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>10 pm</td>
</tr>
<tr>
<td>Scale Error</td>
<td>≤ 8 ppm</td>
</tr>
<tr>
<td>Non-Linearity</td>
<td>≤ ±1 nm</td>
</tr>
<tr>
<td>Drift</td>
<td>1.0 nm/day</td>
</tr>
<tr>
<td>Absolute Position</td>
<td>0.5 nm 3σ</td>
</tr>
<tr>
<td>Repeatability</td>
<td>0.1 nm/K</td>
</tr>
</tbody>
</table>

**Target Requirements**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Standoff</td>
<td>3.5 mm</td>
</tr>
<tr>
<td>Measurement Range(4)</td>
<td>±600 μm</td>
</tr>
<tr>
<td>Angular Range(4)</td>
<td>1 mrad</td>
</tr>
<tr>
<td>Max. Precision Velocity</td>
<td>30 mm/s</td>
</tr>
<tr>
<td>Target Reflectivity</td>
<td>3% - 8% @ 1525 – 1570 nm</td>
</tr>
</tbody>
</table>

**Physical Characteristics**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>311 x 483 x 578 mm</td>
</tr>
<tr>
<td>Mass(5)</td>
<td>30 kg</td>
</tr>
<tr>
<td>Max. No. of Channels</td>
<td>64</td>
</tr>
</tbody>
</table>

**Optical Characteristics**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Wavelength</td>
<td>1525 – 1570 nm</td>
</tr>
<tr>
<td>Max. Sensor Output</td>
<td>&lt; 1 mW</td>
</tr>
<tr>
<td>Laser Safety Rating</td>
<td>1M</td>
</tr>
</tbody>
</table>

**Clocking & Communications**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>sRIO and Ethernet</td>
</tr>
<tr>
<td>Reference Signal</td>
<td>20 MHz</td>
</tr>
<tr>
<td>Digital Filter</td>
<td>24 Hz to 104 kHz, programmable</td>
</tr>
<tr>
<td>Base Sample Period</td>
<td>4.8 μs</td>
</tr>
<tr>
<td>Data Age</td>
<td>16 μs (typical)</td>
</tr>
<tr>
<td>Data Age Uncertainty</td>
<td>&lt; 100 ns</td>
</tr>
</tbody>
</table>

**Sensor Specifications**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (Dia. x L)</td>
<td>2.8 x 27 mm</td>
</tr>
<tr>
<td>Mass</td>
<td>6 g</td>
</tr>
</tbody>
</table>

**Refractometer Specifications**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>8 x 15 x 24 mm</td>
</tr>
<tr>
<td>Mass</td>
<td>14 g</td>
</tr>
</tbody>
</table>

**Operating Conditions**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>0° to 50°C</td>
</tr>
<tr>
<td>Max. Temp. Variation</td>
<td>±1°C</td>
</tr>
<tr>
<td>Pressure</td>
<td>700 to 1150 hPa</td>
</tr>
<tr>
<td>Humidity</td>
<td>0% to 70% (non-condensing)</td>
</tr>
</tbody>
</table>

**Notes**

(1) From nominal standoff.
(2) With use of refractometer for environmental compensation.
(3) See manual for complete description of setup and target considerations.
(4) From perpendicular target at nominal standoff.
(5) Assumes a 64 channel system.

Specifications subject to change without prior notice.
ZPS™ System
Applications

Deformable Optics
for precise wavefront correction

ZPS can be used in deformable optics systems to:
- Hold a mirror deformation at a calibrated state
- Provide feedback to deform a mirror to a desired surface figure
- Re-initialize a system back into a calibrated state after a cold start

Lens Positioning
for aberration and focus correction

ZPS can be used in optical lens systems to:
- Hold lens position values
- Provide position feedback to actuate lens to achieve desired focus and aberration control
- Re-initialize a system back into a calibrated state after a cold start

Precision Stage Control
for servo control in multiple degrees of freedom

ZPS can be used in precision stage control systems to:
- Provide high accuracy position data
- Provide servo control feedback for multiple degrees of freedom
- Measure and compensate for actuator drift

Mechanical Measurements
for static and dynamic metrology

ZPS can be used in RD&E and manufacturing environments for measurements of:
- Modes of vibration along a mounted object
- Deflection under load or stress
- Material thermal growth and deformation
- Form and thickness using opposing sensors
- Dimensions to high precision