FIBER OPTIC STRAIN SENSOR

HIGHLY VERSATILE SENSOR FOR DEFORMATION MONITORING IN HARSH ENVIRONMENT

OSP-A (Optical miniature Strain bare sensor)

Instrumented bolt

OSP-FP (Optical Polyimide foil Strain gauge)

DESCRIPTION

Opsens Solutions’ fabrication processes ensure an exact definition of the gauge factor, making the OSP-A sensor the most accurate fiber-optic strain gauge sensor in the industry.

Combined with Opsens’ WLPI signal conditioning technology (Patent # 7,259,862) and the inherent advantages of fiber optics, the OSP-A delivers unprecedented repeatability and reliability in the most adverse conditions such as high levels of electromagnetic fields as well as high voltage and rapid temperature cycling conditions.

The OSP-A uses two optical fibers that are precisely aligned inside a microcapillary tube to form an optical Fabry-Pérot interferometer. This makes the OSP-A strain gauge completely immune to any electromagnetic interference.

It is completely insensitive to transverse strains and temperatures and its micro-miniature size makes the OSP-A fiber optic sensor ideal for space-constrained applications such as intelligent load-sensing bolts and studs. Careful choice of materials for the sensor, fiber coating and cable buffering permit a high temperature operating range from -40 °C to +250 °C.

This miniature and robust fiber optic strain gauge sensor, available in different cables and sheath options, may be customized to customer specific requirements or for OEM-type applications.

APPLICATIONS

- Civil engineering and geotechnical applications
- Marine and subsea conditions
- High voltage environments
- Radiated environments
- Nuclear and hazardous environments
- ATEX environment and zone exposed to explosive atmosphere

KEY FEATURES

- Maintenance free without drifting over time
- Outstanding repeatability
- No temperature compensation required
- Insensitive to transverse strains
- Intrinsically safe
- Easy to set-up and operate
- EMI/RFI and microwave immune

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OSP-A Miniature - OSP- FP Polyimide Foil

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# OSP-A & OSP-FP

## FIBER OPTIC STRAIN SENSOR

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>OSP-A</th>
<th>OSP-FP</th>
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<tbody>
<tr>
<td><strong>MEASURING RANGE</strong></td>
<td>± 1 000 µε</td>
<td>± 2 500 µε</td>
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<tr>
<td>(other ranges available on request)</td>
<td>± 5 000 µε</td>
<td>± 7 500 µε</td>
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<tr>
<td><strong>RESOLUTION</strong></td>
<td>0.15 µε</td>
<td>0.30 µε</td>
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<td></td>
<td>0.75 µε</td>
<td>0.75 µε</td>
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<tr>
<td><strong>TEMPERATURE SENSITIVITY</strong></td>
<td>Technology requiring no temperature compensation</td>
<td></td>
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<tr>
<td><strong>TRANSVERSE STRAIN SENSITIVITY</strong></td>
<td>Insensitive</td>
<td></td>
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<tr>
<td><strong>TEMPERATURES OPERATING RANGE</strong></td>
<td>-40°C to +250°C (other temperatures available upon request)</td>
<td></td>
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<tr>
<td><strong>EMI/RFI SUSCEPTIBILITY</strong></td>
<td>Complete immunity</td>
<td></td>
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<tr>
<td><strong>CABLE LENGTH</strong></td>
<td>Up to 3 km (Sampling rate dependent, consult factory for more details)</td>
<td></td>
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<tr>
<td><strong>CABLE SHEATHING</strong></td>
<td>From ruggedized flexible outdoor cable to robust stainless steel cable</td>
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<tr>
<td><strong>OPTICAL CONNECTOR</strong></td>
<td>SCA (Standard), SC (Standard), other connector available on request</td>
<td></td>
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<tr>
<td><strong>SIGNAL CONDITIONER COMPATIBILITY</strong></td>
<td>All Opsens Solutions’ WLPI signal conditioners</td>
<td></td>
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<tr>
<td><strong>LINEARITY, REPEATABILITY and HYSTERESIS ERROR (combined)</strong></td>
<td>&lt; 0.15%</td>
<td></td>
</tr>
<tr>
<td><strong>RETURN TO INITIAL STRAIN LEVEL (LAG &amp; LATENCY)</strong></td>
<td>Instantaneous</td>
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