



SmartWeld Strain Sensor

Key Features

- Robust FBG Strain and/or Temperature Sensor
- Can be Spot-Welded to Steel Girders, Pipes, Hulls, etc.
- Zero Power, EMI Immune, Intrinsically Safe
- Multiple km Signal Integrity
- Suitable for Long-Term SHM Applications
- All Stainless Hermetic Welded Construction Available for Aggressive Environments
- Fatigue Performance (6 million Cycles at $\pm 500 \mu\text{strain}$) Verified at UKAS Test House
- Developed for and Approved by World-Class Engineering Company

About SmartWeld

SmartWeld is an optical fibre strain / temperature sensor attached to a thin gauge stainless steel plate. This configuration allows the sensor to be spot welded directly to a steel structure ensuring long-term, creep-free strain transfer. SmartWeld is supplied in two forms, as an open package where a protective over-coating can be applied after installation, or as a laser welded hermetically sealed package suited to permanent immersion in high pressure fluids. Applications include strain sensing of ship hulls, metallic civil structures, subsea manifolds and downhole pump and casing structures.

Specifications

Parameter	Standard	Options*
Plate Dimensions	15 x 40 mm	
Gauge Length (approx.)	3 mm	
Strain Range	$\pm 2,500 \mu\text{strain}$	$> \pm 2,500 \mu\text{strain}$
Strain Sensitivity	1.2 pm/ μstrain	
Strain Resolution [†]	0.4 μstrain	
Temperature Range [‡]	-270 to +150 °C	
Temperature Sensitivity [‡]	11 pm/°C	

Temperature Resolution [†]	0.05 °C	
Fibre Type	Single Mode SMF-28, 9/125 µm	
Typical FBG Type	CWL 1510 to 1590 nm, FWHM ~0.7 nm R > 70 %, Apodised profile, SLSR > 15dB	Alternative CWL or spectral profile
Cable and Connections	1.47 mm SS tubing emerging from sensor, transitioning to system cable and connectors to suit application	

[†] with 0.5 pm resolution interrogator

^{*} custom SmartWeld available on request for volume applications

[‡] decreased temperature sensitivity below -170 °C - no temperature sensitivity below -220 °C

Specifications may change without notice