

KEY ADVANTAGES

- High definition strain and temperature measurement system for unprecedented visibility into a design's performance
- Low profile and flexible sensor can be embedded within composite structures and points
- Corrosion resistant, dielectric and immune to EMI/RFI
- An economical alternative to replace traditional point sensing systems
- No degradation of measurement after high cycle count fatigue test

PRODUCT HIGHLIGHTS

- Sensor lengths up to 20 meters and gage lengths as low as 1.3 mm
- Two sensing options: High-Definition as standard and High-Speed Continuous Fiber Gratings (CFG) option for greater dynamic capability
- User selectable modes allow configuration of sensor length, resolution, and acquisition rate
- Stream data directly to MTS AeroPro™

ODiSI-B

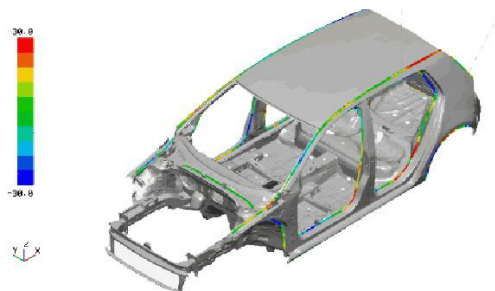
Optical Distributed Sensor Interrogator

The ODiSI is an advanced strain and temperature measurement system specifically designed to address the test challenges of 21st century advanced materials and systems.



The ODiSI measures strain and/or temperature nearly continuously along the length of a lightweight and easy to install fiber optic sensor. This yields unprecedented visibility into the behavior of materials and systems, increasing the quality and reliability of modern designs.

The sensor is flexible, low profile, requires no electrical source, and can be bonded to sharply curved surfaces, embedded within structures, or mounted directly to electrical surfaces.



An automotive frame is instrumented with fiber optic strain sensors and tested under load. Color map indicating strain level can be superimposed directly on a CAD model.



PARAMETER	SPECIFICATION								UNITS
	100 Hz		250 Hz		23.8 Hz		50 Hz		
Mode of Operation ¹	HD	HS	HD	HS	HD	HS	HD	HS	
Sensor Type									
Sensor Configurations									
Maximum Sensor Length	10	5	2	-	10	5	20	-	m
Gage Length	5.2	5.2	5.2	-	1.3	1.3	5.2	-	mm
Gage Pitch ²	2.6	2.6	2.6	-	0.65	0.65	2.6	-	mm
Measurement Performance - Strain									
Range ³	±10000	±1400	±10000	-	±10000	±7500	±10000	-	µε
Resolution	< 1	< 1	< 1	-	< 1	< 1	< 1	-	µε
Accuracy ⁴	±30	±15	±30	-	±25	±35	±25	-	µε
Repeatability at zero strain ⁵	< ±5	< ±5	< ±10	-	< ±20	< ±10	< ±5	-	µε
Repeatability across full strain range ⁶	±0.15	±1.0	±0.15	-	±0.55	±0.35	±0.10	-	%
Dynamic Loading Rate HD (Based on 2m sensor length at ±1000µε) ⁷	1.8	-	4	-	0.4	-	0.8	-	Hz
Dynamic Loading Rate HS (based on 2m sensor length @ ± 600µε) ⁸	-	> 10	-	-	-	> 10	-	-	Hz
Measurement Performance - Temperature									
Maximum Temperature ⁹ (Based on standard sensor. Custom sensors available upon request.)	220	200	220	-	220	200	220	-	°C
Minimum Temperature (Based on standard sensor. Custom sensors available upon request.)	-40	-40	-40	-	-40	-40	-40	-	°C
Resolution	< 0.1	-	< 0.1	-	< 0.1	-	< 0.1	-	°C
Accuracy (consult factory)	-	-	-	-	-	-	-	-	°C
Repeatability	±0.01	-	±0.01	-	±0.06	-	±0.01	-	%
Data Acquisition / Processing Rate									
Data Acquisition Rate ¹⁰	100	100	250	-	23.8	23.8	50	-	Hz
Data Processing Rate ¹¹	5	100	22	-	1.25	23.8	2.5	-	Hz
Physical & Environment									
Standoff	ODiSI-B				PC Controller				
Standoff	50				-				m
Dimensions	14.42 (36.6) x 13.60 (34.5) x 6.55 (16.6)				11.4(29) x 3.7(9.3) x 12.3(31.2)				In (cm)
Weight	17.1 (7.8)				11.7(5.3)				Lb (Kg)
Power Consumption	45				255				W
Operating Temperature Range	10 - 35				5 - 35				°C
Storage Temperature Range	0 - 40				-40 - 65				°C
Relative Humidity (non-condensing)	< 80 non-condensing				5 - 95 non-condensing				%RH
Laser	Class 1 Laser				-				

APPLICATION NOTES

- Base configuration includes one mode of operation. Additional modes are upgrade options.
- Gage pitch refers to distance between centers of consecutive gages.
- Based on an effective spectral range of +/-12000 pm, and practical limitations of fused silica sensor fibers.
- Accuracy reflects ODiSI measurements compared to NIST traceable extensometer measurements. Data based on average of 150 scans at each of seven increments of strain, from 0 to maximum strain.
- Repeatability at zero strain refers to offset from zero with no strain applied. NO filtering is applied.
- Repeatability across strain range refers to average repeatability over full strain range. Repeatability is measured and reflects 2σ standard deviation from the mean with sample size of 150 scans. NO filtering is applied.
- HD dynamic performance based on 2 meter HD sensor bonded to coupon and tested in load machine programmed for range of amplitude vs oscillating frequency. Data shown is oscillating frequency limit for ±1000 µε amplitude. Limitation determined by HD sensing.
- HS dynamic performance based on 2 meter HS CFG sensor bonded to coupon and tested in load machine programmed for range of amplitude vs oscillating frequency. Data shown is oscillating frequency limit for ±600 µε amplitude. Limitation shown is determined by load machine amplitude vs frequency capability. Expected dynamic performance is ½ sampling frequency depending on strain amplitude.
- Based on material properties of standard sensor construction. For extended temperature ranges consult factory.
- Data acquisition rate refers to the rate at which the underlying optical data supporting strain and temperature measurements is acquired.
- Data processing rate refers to the rate at which the conversion of optical data to strain or temperature measurements occurs and can be displayed or logged.