SENTEK INSTRUMENT

Advanced Optical Sensing

Ultra-High Temperature Fiber Optic Pressure Sensor for Extreme Environments

NovaPT®-E

Key Advantages of Sapphire Technology

- Reliable operation at 1000°C continuous, 1500°C intermittent
- Compact 3.75mm sensor tip
- High-frequency response up to 60kHz
- No need for sensor cooling or standoff tubes
- Resistant to EMI, corrosion, thermal shock, and neutron radiation
- Fully passive—no on-site power required
- Long-distance fiber optic signal transmission

Extreme Environments Require More

NovaPT-E is a patented optical pressure sensor designed for reliable operation at temperatures up to 1500°C. It is paired with flexible interrogation systems that deliver eye-safe Class 1 light through a durable fiber optic cable to the sensor and back. Low transmission loss allows for long cable runs without sacrificing accuracy.

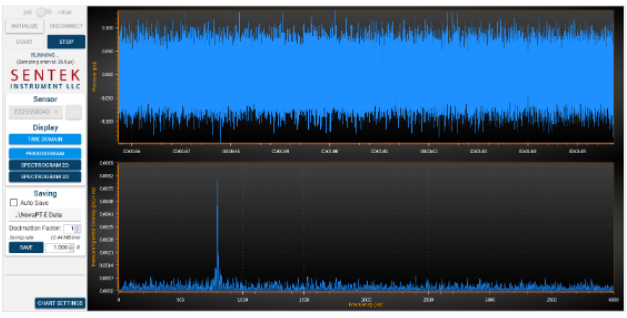
Pressure is determined from the reflected signal using proprietary processing. In addition to its ultra-high temperature capability, NovaPT-E performs reliably in harsh environments, including electromagnetic interference, chemical corrosion, and neutron radiation. It offers excellent linearity, repeatability, and resistance to thermal shock and fatigue.

NovaPT-E is ideally suited for monitoring conventional and advanced gas turbine engines and other demanding industrial systems—without the need for sensor cooling or standoff tubes.

Ideal For High Temperatures

- Gas turbine engines (conventional & unconventional)
- Advanced electric power generation systems
- High-temperature industrial & chemical processes
- Laboratory R&D applications

Sentek's Fasedyne™ interrogators are compact and include 0-5V analog and digital outputs and options to measure static pressure, temperature, and multiple temperatures.



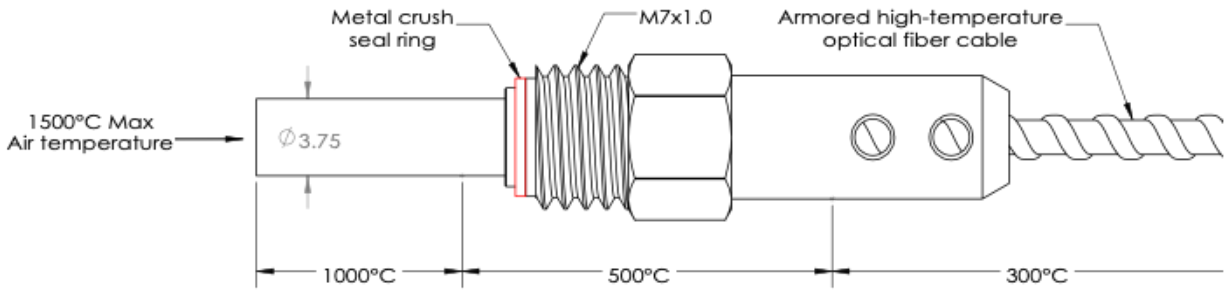
NovaPT-E sensor solutions include advanced user interface capabilities

NovaPT-E

Sensor Probe

NovaPT-E is housed in a rugged, oxidation- and corrosion-resistant metal package with a compact 3.75 mm tip diameter, enabling reliable performance in extreme environments. A standard M7 × 1.0 mounting thread with a metal crush seal ensures fast, secure, and leak-free installation.

The sensor supports continuous operation up to 1000 °C and pulse or short-duration measurements up to 1500°C. For even more demanding applications, higher temperature ratings and custom form factors are available upon request—providing flexibility without compromising performance.



Sensor Specifications

Parameter		
Model	**NovaPT®-E600**	**NovaPT®-E4000**
Maximum Static Pressure	40bars (580psi)	250bars (3,626psi)
Diaphragm Resonance Frequency	460kHz	830kHz
Sensor Tip Diameter	3.75mm	
Combined Non-linearity, Hysteresis and Repeatability	<1% F. S.	
Maximum Sensor Tip Temperature	1000°C (1832°F) for continuous use, 1500°C (2732°F) for pulse temperature	
Installation Thread	M7x1.0	
Fiber Cable Length	0.35m 300°C rated fiber cable; 15m extension cable option available	

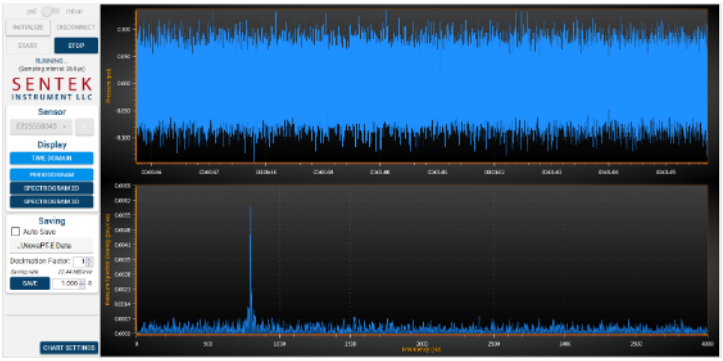
*Alloy 718 is recommended for service temperatures exceeding 300°C, even in non-H_2S environments when elevated temperature stability is required

NovaPT-E

Interogators (DAQ) and Software

NovaPT-E is a truly multi-functional sensing platform, capable of measuring dynamic pressure, static pressure, and temperature—including multiple temperatures at different sensor axial positions—all within a single device. These capabilities are easily enabled through selectable interrogator configurations, eliminating the need for any sensor redesign or fiber cable modifications.

Fasedyne rear panel view



Graphical User Interface

Fasedyne™ Dynamic Pressure Interrogator

The Fasedyne is a compact, high-performance interrogator engineered for precise dynamic pressure measurements in extreme environments. When paired with the NovaPT-E sensor, it enables direct measurement at ultra-high temperatures—eliminating the need for standoff tubes or water cooling and simplifying system integration.

Its miniature sensor compatibility allows accurate measurements in space-constrained environments without compromising signal fidelity. Designed for demanding applications, Fasedyne delivers both 0–5V analog and digital outputs, providing seamless integration into a wide range of data acquisition and control systems.

With its small form factor, lightweight design, and low power consumption, Fasedyne is well-suited for embedded applications and can be configured for operation in ambient temperatures up to 125°C—making it an excellent candidate for integration into Full Authority Digital Engine Control (FADEC) systems in aerospace platforms.

A user-friendly graphical interface enables real-time visualization and analysis on an external PC. In addition to time-domain pressure traces, users can perform advanced frequency-domain analysis via Discrete Fourier Transform (DFT), with flexible visualization options including single-shot spectra, time-evolving waterfall plots, and 3D representations.

NovaPT-E

Technical Specifications

Sentek Fasedyne™ Data Acquisition Interrogator

Parameter			
Model	**Fasedyne 1000**	**Fasedyne 2000**	**Fasedyne 3000**
Measurement	Dynamic Pressure		
Frequency Response	20 Hz - 4 kHz	20 Hz - 25 kHz	20 Hz - 60 kHz
Percent Resolution (1s)	<0.01%	<0.03%	<0.04%
Sampling Rate	27 kHz	80 kHz	120 kHz
Sensor Channels	1, 2 or custom	1, 2 or custom	1 only
Dimensions	26x108x180mm, 1 or 2 channels Custom instrument enclosure for >2 channels		
Power Supply and Consumption	12VDC, 4W		
Digital Output	USB Micro-B		
Analog Output (Optional)	SMA, 0-5V, Hi-Z load		
Trigger Input	SMA, 50Ω terminated, 0-10V (Max)		
Environmental Conditions	-10 to 45°C, 5-90% humidity		
Software	Flexible data display, storage control or spectrum analysis		

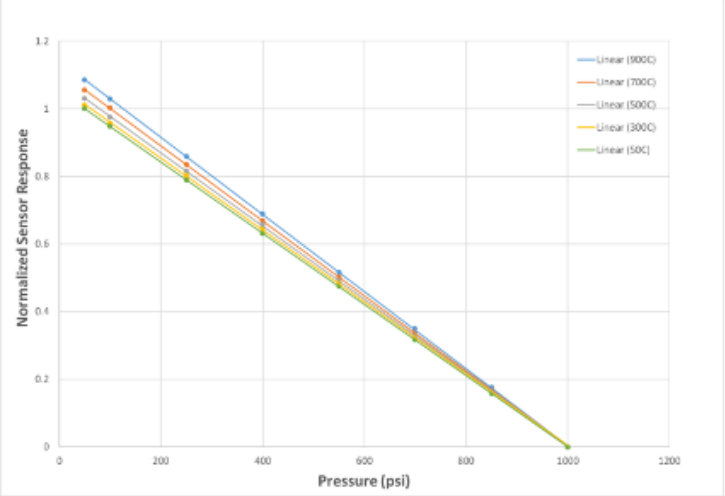
Sentek also offers a range of specialized interrogators designed to fully unlock the multi-physics capabilities of the NovaPT-E sensor. Available through custom configuration, these interrogators enable precise measurement of static pressure, temperature, and multi-point temperature profiles—supporting advanced calculations such as heat flux and other derived parameters for deeper system insight.

NovaPT-E

Additional Relevant Data

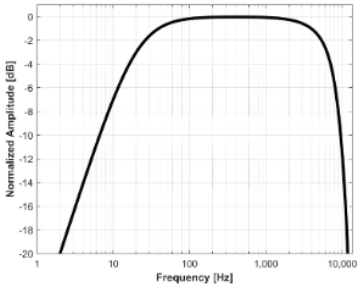
SENSORS

NovaPT-E utilizes a precision optical transduction method to measure the deflection of a single-crystal sapphire diaphragm—delivering highly stable and repeatable pressure measurements in extreme environments. Because sapphire's mechanical properties, particularly Young's modulus, vary predictably with temperature, the sensor's response is inherently temperature dependent and fully characterized across its operating range.

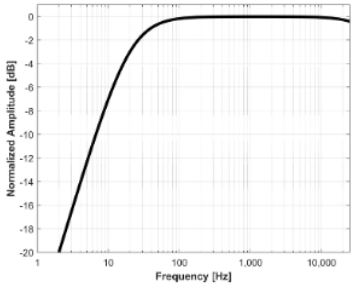


This behavior is carefully calibrated through pressure measurements at varying temperatures, resulting in an exceptionally low temperature coefficient of just 0.010% of reading per °C up to 900°C. Importantly, published data confirm that sapphire maintains a consistent, near-linear modulus response at temperatures extending beyond 1400°C, enabling reliable performance and predictable behavior even in ultra-high-temperature applications.

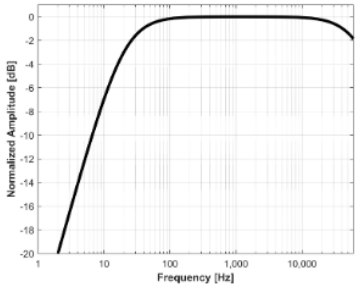
INTERROGATORS



Fasedyne-1000



Fasedyne-2000



Fasedyne-3000

Fasedyne™ interrogation instruments are engineered to deliver a flat, broadband frequency response—ensuring high-fidelity dynamic pressure measurements across a wide spectral range. Each model is precisely tuned to provide consistent signal accuracy within its operating band, with sharp, well-defined roll-offs at both low and high frequency cutoffs.

This performance is achieved through a tightly integrated design of advanced analog electronics, digital filtering, and proprietary signal processing algorithms. The result is a stable, repeatable frequency response that maintains accuracy across a broad dynamic range, enabling reliable capture of even the most complex pressure fluctuations.

NovaPT-E

Ordering Information

Please send your quote request to sales@sentekinstrument.com and specify sensor maximum static pressure, Fasedyne model, number channels, and 15m extension cable option.

Nova PT-E - PPPP - FFFF - N - A

PPPP: Maximum Static Pressure (PSI)	0580, 3626
FFFF: Fasedyne Model	NONE, 1000, 2000, 3000
N: Number Channels	1, 2
A: 15m Extension Cable	Y, N