

Specifications NBX-6055

Laser Wavelength	1550 ±2 nm				
Distance Range	50 m, 100 m, 250 m, 500 m, 1 km, 2.5 km, 5 km, 10 km, 25 km				
Measurement Frequency Range	9~13 GHz				
Range of Strain Measurement	-30,000 to +40,000 $\mu\epsilon$ (-3 % to +4 %)				
Measurement Frequency Scan Step	1, 2, 5, 10, 20, 50 MHz				
Readout Resolution	5 cm (default), 1 cm (minimum)				
Sampling Points	600,000 (default), 3,000,000 (maximum)				
Average Count Settings	$2^5 \sim 2^{23}$ times (inc. Hardware Average Count 2^{16})				
Pulse Width	0.5 ns	1 ns	2 ns	5 ns	10 ns
Spatial Resolution	5 cm	10 cm	20 cm	50 cm	100 cm
Dynamic Range ⁽¹⁾	1 dB	1.5 dB	3 dB	3 dB	6 dB
Max. Measurement Distance ⁽²⁾	1 km	2 km	5 km	10 km	20 km
Optical Budget ⁽¹⁾⁽⁶⁾	2 dB	5 dB	7 dB	8 dB	10 dB
Measurement Accuracy ⁽¹⁾⁽³⁾⁽⁴⁾	15 $\mu\epsilon$ / 0.75 °C		7 $\mu\epsilon$ / 0.3 °C		
Repeatability ⁽¹⁾⁽³⁾⁽⁴⁾⁽⁵⁾	7.5 $\mu\epsilon$ / 0.35 °C		3 $\mu\epsilon$ / 0.15 °C		
Measurement Speed	FS mode ⁽⁷⁾	15 Hz (maximum)			
	AT mode ⁽⁸⁾	550 Hz (maximum)			
Signal Terminal	Input-Output Fiber	Single mode optical fiber			
	Fiber Connector	FC-APC / SC-APC (factory option)			
Suitable Fiber	Single mode optical fiber				
Power Supply	AC100 ~ 240V 50/60Hz 250VA				
Laser Class	Class 1 (IEC60825-1: 2001)				
Dimensions / Weight	approx. 456 (W) × 485 (D) × 286 (H) mm / 30 kg				
Operating Temperature	10~35 °C, Humidity below 85 % (no dew condensation)				
Storage Temperature	0~50 °C				
Place of Production	Japan				

- (1) Based on 2^{15} average cycles by progressive measurement mode.
(2) Based on average fiber loss of 0.3 dB/km using Single mode fiber.
(3) Based on the measurement of strain-free, UV-coated fiber.
(4) Based on the measurement of strain-free, UV-coated fiber and in constant temperature environment.
(5) The maximum standard deviation of measurement value in 5 consecutive measurements for 100 consecutive points.
(6) Within the allowable range adjusted by the optical power excluding the case of nonlinear phenomena.
(7) The settings of 50 m range, 2^8 count settings, 41 scanning steps in batch processing mode.
(8) The settings of 50 m range, 2^8 count settings, 1 scanning step in batch processing mode.
(1) - (6) are all based on a frequency scan step of 5 MHz and with Pulse Adjustment and Auto Frequency Adjustment on.

*Specifications are subject to change without notice.

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Give you a feel[®]
When every point of the optical fiber is a sensor

Neural Optical Fiber Scope **NEUBRESCOPE NBX-6055**

NEW

Pulse-PrePump Technique in BOTDA to measure strain and / or temperature

Now operated from
laptop computer
for easy in-the-field use



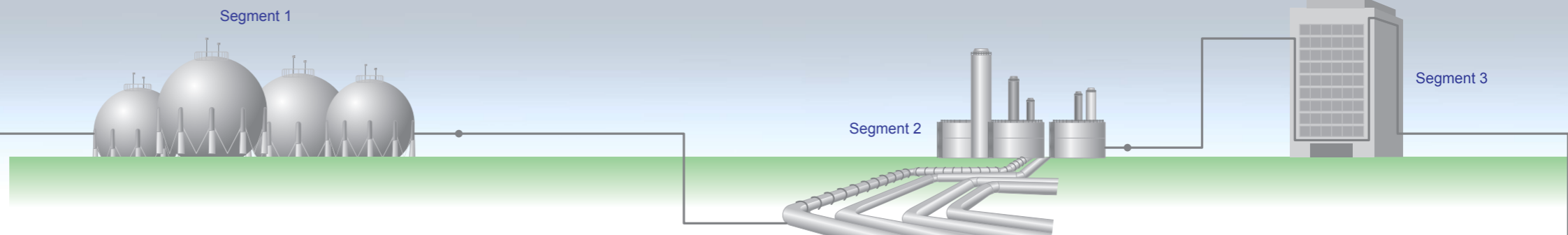
Spatial resolution: **5 cm** / Sampling resolution **1 cm**

Repeatability of strain measurement: **3 $\mu\epsilon$**

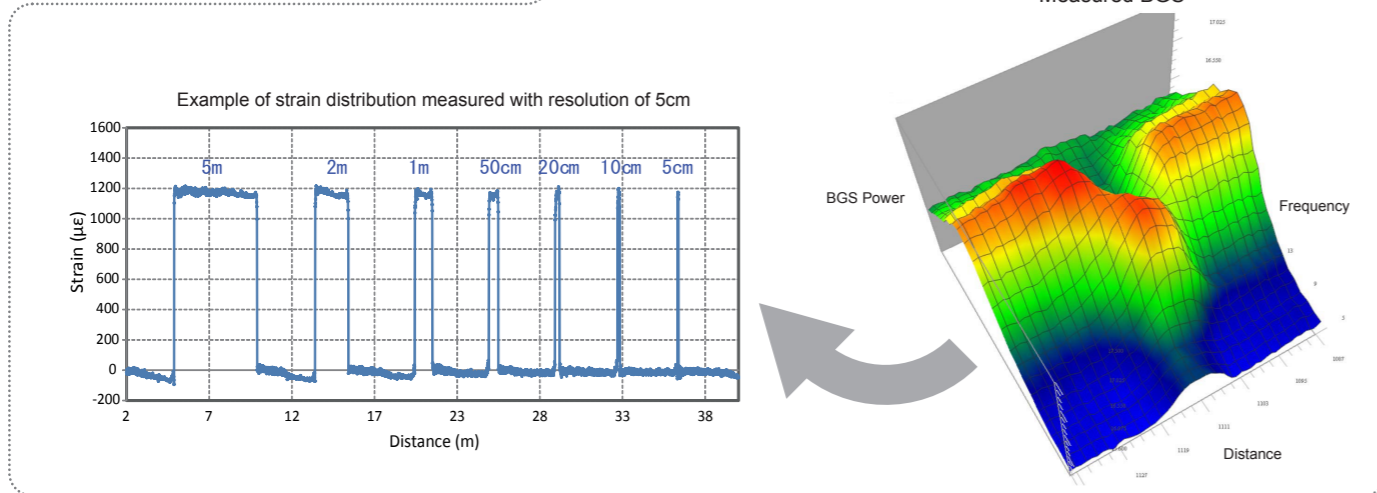
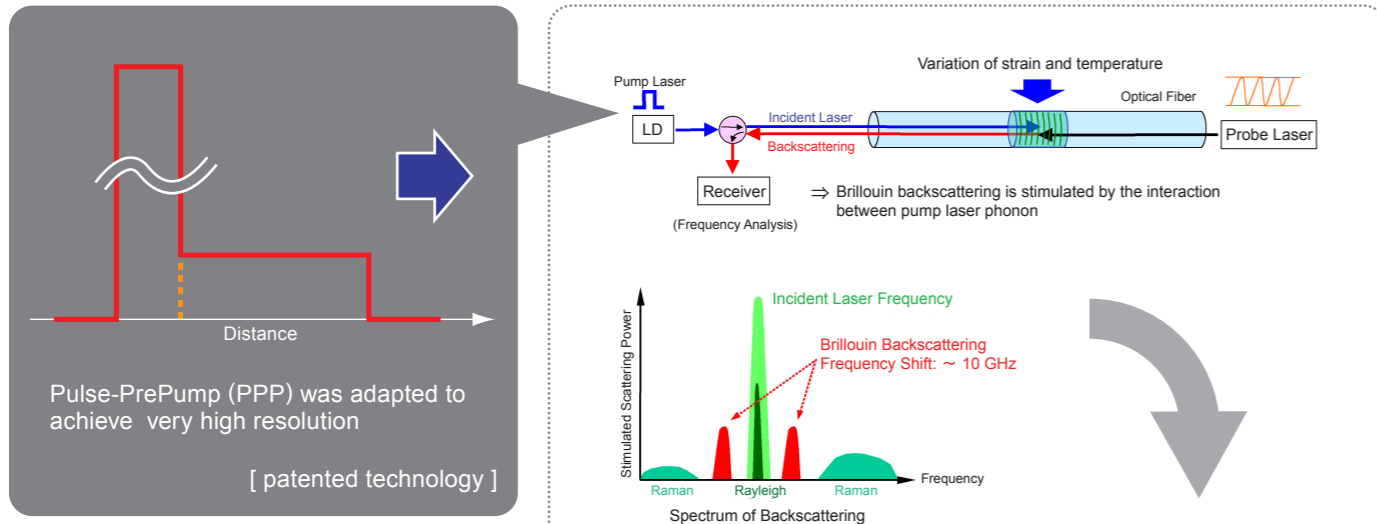
Repeatability of temperature measurement: **0.15 °C**

High Speed Measurement FS mode / AT mode





Principle of PPP-BOTDA



Neubrex technology of PPP-BOTDA successfully increases the spatial resolution and strain accuracy one-order higher than previous products. This is the only one technology in the world.

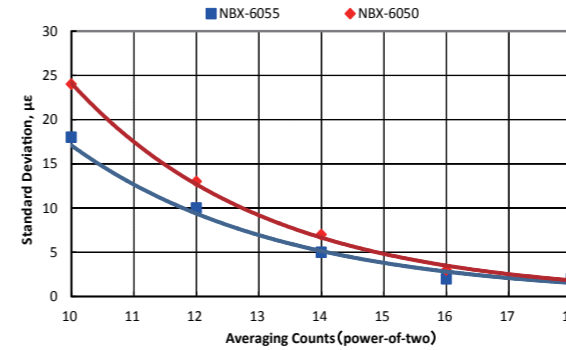
Open Architecture



- Open Architecture (OA), allows User to customize, automate, and extend the standard capabilities of NEUBRESCOPE software
- .NET Remoting in communication layer

High Repeatability

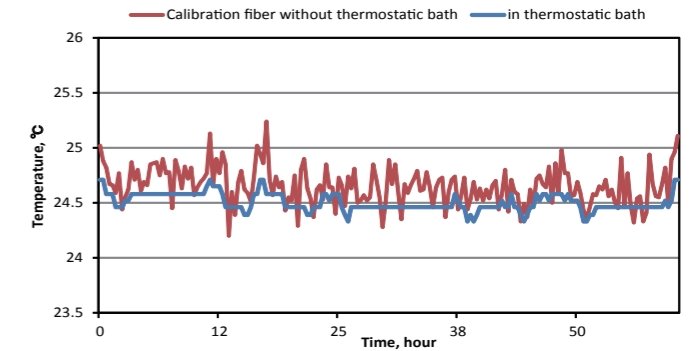
Relation between repeatability and averaging counts



Frequency scan step	5 MHz (frequency counts 41)			2 MHz (frequency counts 101)		
Averaging counts	2 ¹²	2 ¹⁴	2 ¹⁶	2 ¹²	2 ¹⁴	2 ¹⁶
Accuracy (µε)	±12.0	±9.0	±5.0	±10.0	±7.0	±3.5
Repeatability (µε)	±13.0	±7.0	±3.0	±11.0	±4.5	±2.0
Speed (sec)	5	9	20	13	25	50

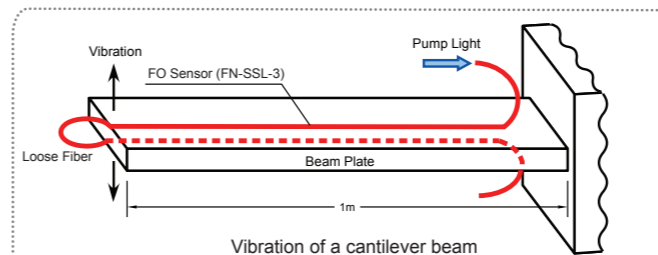
Speed-accuracy trade-off for different frequency steps

Effects of the embedded thermostatic bath

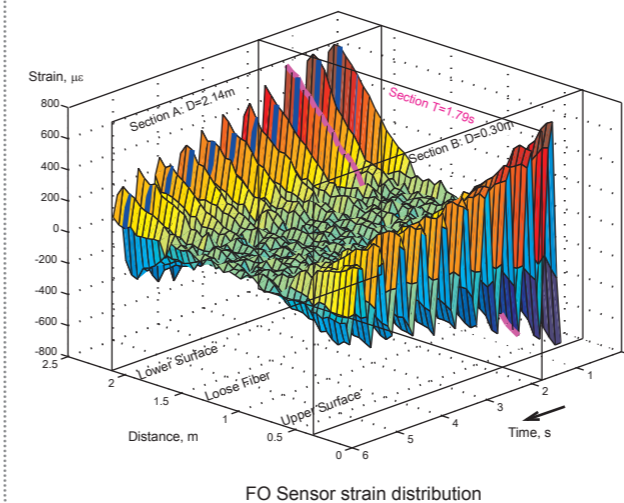


NBX-6055 provides higher repeatability measurement by the embedded thermostatic bath. The table above presents the comparison of temperature shift of calibration fiber included in the thermostatic bath and not included. Embedded thermostatic bath stabilizes the temperature of calibration fiber, and offers the accurate temperature compensation.

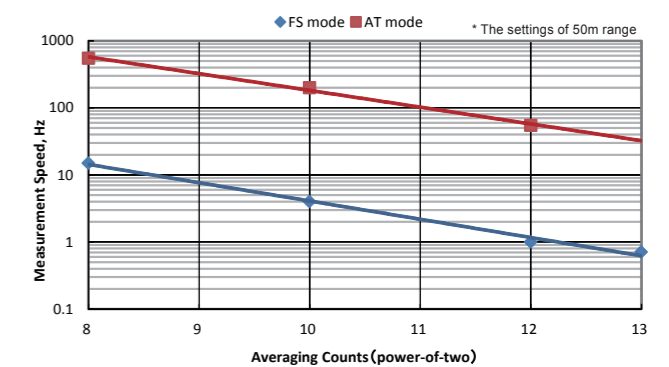
High-Speed Measurement



The example demonstrates first ever distributed measurements during vibrations. The dynamic behavior of specimens as long as 100 m can be recorded with 10 Hz speed, each measurement containing up to 2,000 sampling points.



Relation between measurement and averaging counts



The table and plots above present the trade-off between measurement speed and average count.

Model NBX-6055 offers two high speed measurement modes, the Frequency Scanning (FS) and Amplitude Transfer (AT) one. FS mode is the standard processing mode, capable of measuring strain / temperature at the rate up to 40 Hz. In AT mode, instead of frequency scanning, the amplitude of single frequency is measured and frequency shift obtained using pre-determined Brillouin power spectrum shape. AT mode delivers distributed strain / temperature data at the unprecedented rates, reaching 550 Hz.