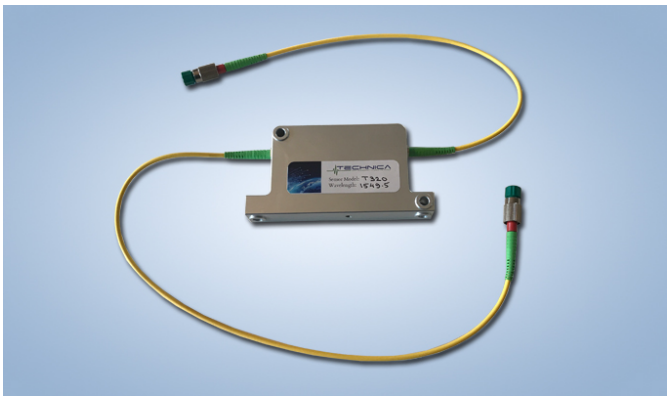
T320 / General Purpose Accelerometer

Description

The T320 is a High-Accuracy and Sensitivity Single-Mode Fiber (SM) based Fiber Bragg Grating (FBG) based Packaged Accelerometer for use in environments from 0°C to +100°C.

Available in a wide range of optical specifications. Packaged to eliminate influences from the ambient environment, the patented transducer mechanism yields a high sensitivity to resonance frequency ratio. Ready for direct use in many applications. Calibration service available upon request. The full-scale (FS) accuracy, resolution, and precision specifications are guaranteed only when used with FAZ TECHNOLOGY instruments. The T320 sensor handling and installation is fast, easy and intuitive. Delivers the advantages inherent to FBG based sensors.

The T320 series Accelerometers are fabricated using licensed and proprietary state-of-the-art laser manufacturing technologies and product designs. The sensor packaging described herein represents the most popular configuration and can be customized.



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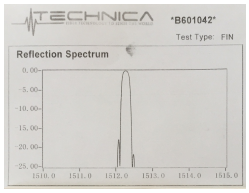
Key Features

Measurements down to 0 Hz (static) The T320 uses ultra-precision made FBGs written into the fibers' core and a patented packaging architecture for producing a transducer configuration that enables measurements to 0 Hz without loss of sensitivity or phase flatness. At 0 Hz the sensor operates as a tilt sensor.



Advanced performance, form-factor and multi-axis options available. The T320 accelerometer configuration specified herein is the most common configuration. Other frequency ranges, sensitivities, resolutions, shock levels, and form-factors available, including integrated component packaging for two and three axes accelerometers.

Ready to install on 3 axes and be daisy chained. Well suited for projects monitoring accelerations at one or many locations. Sensor body provides holes for mounting it on any of the three orthogonal axes. Delivered as double-ended connectorized sensors or in ready to install arrays of various lengths and number of sensors. Up to 30 accelerometers per sensing array. Typical arrays include daisy chaining with other sensors including T220-T240 strain, T620 tilt, and T10-T820 temperature sensors.

Reliable and field proven. Designed and ruggedized for demanding projects that require filed proven, accurate and stable operation for the long-term. Extensively used in marine, geotechnical, civil engineering and other commercial projects since 2012.

Parameter	Specifications
Wavelengths and Tolerance	1530-1570 nm, +/-0.5 nm; other
Reflection BW (FWHM)	0.1 nm, other options
Reflectivity %	50%, other options
SLSR	>12 dB, other options
Frequency Range	0 - 1000 Hz
Sensitivity	~80 pm/g
Resolution	< 125 µg
Max Acceleration and Shock	25 g (~250 m/s^2) for 0-600 Hz & 10 g (~100 m/s^2) for >600 Hz
Accuracy	1% full scale
Phase flatness, cross-axis interference	< +/- 5 degrees, < -30dB
Linearity	< +/- 1 dB sensitivity flatness
Transmission Loss	< 2 dB
Sensor Pigtail (Length, DIA)	1 m and 3 mm, other options
Optical Connector	FC/APC, or custom
Housing Material	Aluminum
Dimensions, Weight	18 x 97 x 58 mm, 220 grams
Mounting Methods	M5 screws or glue

Applications in Structures, Machines, Geotechnical, Security, and R&D Monitoring

Technica undertakes a rigorous development process before products release. The company is also firmly committed to continuous improvements after release to insure performance to the highest standards, hence, specifications are subject to update without notice.

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Each T320 FBG Accelerometer can be provided with our optional factory Calibration Certificate. The table below provides an illustrative example of the typical data included in the certificate

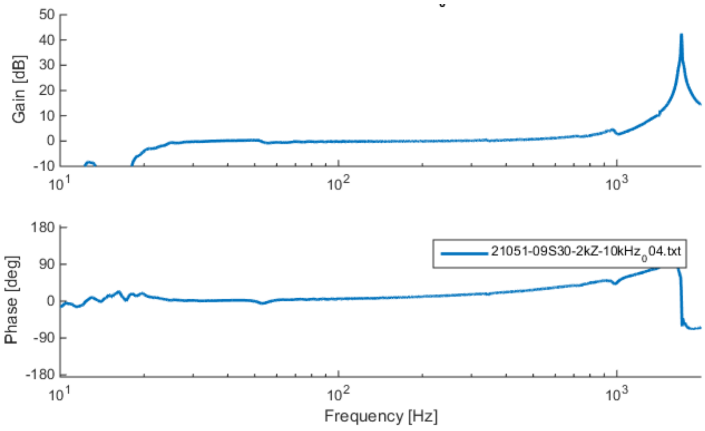
Performance	Measurement
Sensitivity (@100Hz)	79.46 pm/g
Frequency range	0- 600 Hz
Sensitivity flatness (0-600Hz)	0.7 dB
Phase flatness (0-600Hz)	< 14°
Resonance frequency	1748 Hz
Cross axis sensitivity (0-600Hz)	< -30 dB
Temperature sensitivity (typical)	<2 m/°Cs²

The following calibration formula can be used to convert the sensor wavelength output to vibration. The T320 sensor is not temperature compensated and therefore the FBG offset will need to be adjusted to the current value prior to use by performing a 0g measurement. Alternatively the sensor output can be analyzed in the frequency domain by means of the Fourier Transform and in this case the use of the offset value can be omitted. The values in the table below are representative examples.

Measurand	Unit
FBG Center Wavelength (CW)	nm
Calibration Constants	Value
Offset FBG (C1)	1549.681 nm
Sensitivity (C2)	0.07676 nm/g
Calibration Formula	
$A(g) = (\lambda - C1)/C2$	

T320 Accelerometer Transfer function example: 21051-04S30-2kZ-10kHz, Ref @ 0dB=76.76pm/mbar

The T320 accelerometers are tested on a shaker table using flagship FAZT I4G ultra precision sensing interrogators and compared to a B&K 4506B reference sensor. The testing setup has an effective testing range of 30-2000 Hz. Sensor performance between 0-30 Hz is flat.



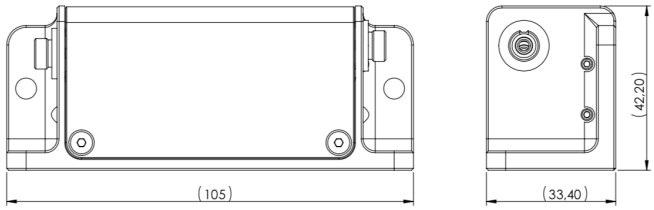
Customer specific sensor tests:

Application specific customized testing can be performed upon request. Engineering lab service charges may apply. Custom work requires a Scope of Work document and a mutually agreed upon project timeline.

T320 Accelerometer Dimensions:

The sensor's standard dimensions are provided herein.

It should be noted that while most often the customers' application related physical requirements can be met by our standard accelerometer configuration, the internal patented transducer mechanism can be adapted to yield dramatic changes in outside dimensions and to pass various levels of ruggedization to meet and exceed even the most demanding field installation requirements. The T320 sensor is ROHS, REACH, CE, and ATEX compliant.



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