

3T/5T Borehole



COMPLETE BOREHOLE SEISMIC STATION



Exceptional dynamic range achieved with this hybrid 3T/5T package, designed specifically for borehole applications.

The Güralp 3T/5T combines our best selling 3T broadband seismometer with the proven 5T strong motion accelerometer. This allows for simultaneous monitoring of both weak and distant seismic events, and near-field, high intensity shaking, in a single instrument.

The instrument has a diameter of just 89 mm suitable for installation in boreholes with diameters ranging from just 99 mm up to 203 mm.

The sensors can be combined with a DM24 borehole digitiser and EAM data acquisition module to build a fully networked authenticating digital instrument inside a single borehole.

The instrument is supplied with surge protection and a strain relief mechanism to isolate the sensors in the instrument from motions in the cable.

The flexible, modular design offers a range of installation possibilities. For a full assessment of your options, please contact us.

An improved skid design guarantees the stability of the instrument in the casing and improves the high frequency response of the 5T sensor.

Key features

Total realised dynamic range of over 200 dB

Exceptionally low noise floor

89 mm instrument diameter can be installed in a borehole with an inner diameter of just 99 mm

Hole lock units with cable pass-through available, allowing installation in boreholes already containing an instrument

Strain relief mechanism fully isolates the sensors from any motions in the load-bearing cable

Applications

- > Vertical arrays
- > Earthquake Early Warning systems
- > Strong-motion monitoring and modelling

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SPECIFICATIONS

SYSTEM		POWER	
Configuration / Topology	Two sensors, each with triaxial, orthogonal (ZNE) components	Power voltage range	11– 30 V DC* (24 V DC recommended)
PERFORMANCE		Power consumption (at 12 V DC)	2.0 W
Velocity output band (3T)	Standard options: 120s (0.0083 Hz) to 50 Hz 360 s (0.0028 Hz) to 50 Hz Contact Güralp to discuss other frequency response options	<i>*Power voltage for operation of this unit only. Connection to additional instrumentation or use of longer cables may result in a higher input voltage requirement.</i>	
ENVIRONMENTAL			
Acceleration output band (5T)	DC to 100 Hz. Option of DC to 200 Hz	Operating temperature	-20 to +70 °C
PHYSICAL			
Output sensitivity	3T sensor: 1500 V/ms ⁻¹ (2 x 750 V/ms ⁻¹) differential standard output (full-scale clip level of 13 mm/s) Contact Güralp to discuss alternative high sensitivity (high gain) options 5T sensor: 2 g standard, other options available	Instrument diameter	89 mm
Peak / Full scale output	Differential: ±20 V (40 V peak-to-peak) Single-ended (e.g. mass positions): ±10 V (20 V peak-to-peak)	Inner borehole diameter	99 mm to 203 mm
Sensor Dynamic Range	3T sensor: 167 dB at 1 Hz (Full octave width across 1 Hz) 5T sensor: > 156 dB > 140 dB (20 - 200 s) > 127 dB (2 - 30 Hz)	Case height with lifting loop	1726 mm (single-jaw hole lock)
Self-noise	3T-120 sensor: Crosses the long-period at 166 s (0.006 Hz) and remains below the high frequency limit of the NLNM at 10 Hz 3T-360 Sensor: Crosses the long-period at 200 s (0.005 Hz) and remains below the high frequency limit of the NLNM at 10 Hz 5T sensor: > 0.08 Hz (12.5 s)	Enclosure/Materials	Stainless steel case Gold plated contacts O-ring seals throughout
Cross axis rejection	3T sensor: 65 dB 5T sensor: > 0.001 g/g	Borehole install mechanism	Spring-loaded jaw with passive skids or studs (>60 kg force)
Linearity	3T sensor: > 111 dB 5T sensor: > 77 dB vertical; > 66 dB horizontal		
Lowest spurious resonance	3T sensor: > 140 Hz 5T sensor: > 400 Hz		
Offset zeroing (5T)	Via remote control		
Transfer function	User manual is available to download from the website. Each sensor is provided with full calibration details including measured sensitivity, measured frequency response and instrument poles and zeros		
Calibration controls	Remote calibration on both 3T and 5T sensors		
Operational tilt	Up to 2.5 ° (option to increase this to 12.5 °)		
MASS / MONITORING CONTROL			
Locking (3T)	Remote auto mass lock/unlock		
Mass centre (3T)	Remote automatic mass centring		

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In the interests of continual improvement with respect to design, reliability, function or otherwise, all product specifications and data are subject to change without prior notice.

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