

# 3T Borehole



## BROADBAND BOREHOLE SEISMOMETER



### Our best-selling broadband sensor in a system suitable for installation in cased boreholes.

Borehole installations offer excellent performance for low-noise detection of weak seismic signals from a range of sources including local microseismic events and regional/teleseismic earthquakes.

### Applications

- > Vertical seismic profiling
- > Microseismic monitoring
- > Robust velocity subsurface modelling
- > Teleseismic earthquake monitoring
- > Nuclear test ban treaty monitoring

Images show the Güralp 3T borehole seismometer with and without a single jaw hole-lock

### The 3T borehole system designed for borehole diameters of 99 to 203 mm.

The 3T analogue 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.

### Key features

Covers the complete seismic spectrum with a single transfer function

The 3T family offers standard frequency responses of either a 120 s or a 360 s long period corner, other bespoke options are available on request

Hybrid velocity-acceleration responses available offering unrivalled dynamic range.

Single-jaw hole lock for inner borehole diameters of 99 to 203 mm, or backfill with sand to minimise convection

Waterproof and durable with O-ring seals throughout

Built-in inclinometer option for attitude checking

Operates with a tilt tolerance of up to 2.5 ° with an option to increase this to 12.5 °

# 3T Borehole



## SPECIFICATIONS

SYSTEM		PHYSICAL	
Configuration / Topology	Triaxial orthogonal (ZNE)	Case height with lifting loop	1422 mm (single-jaw hole lock)
PERFORMANCE		Enclosure/Materials	Stainless steel casing Gold plated contacts O-ring seals throughout
Velocity output band	Standard options: 3T-120: 120s (0.0083 Hz) to 50 Hz 3T-360: 360 s (0.0028 Hz) to 50 Hz Contact Güralp to discuss other frequency response options	Communication / Connectors	100 bar/10 MPa waterproof connector
Output sensitivity	1500 V/ms <sup>-1</sup> (2 x 750 V/ms <sup>-1</sup> ) differential standard output (full-scale clip level of 13 mm/s) Contact Güralp to discuss alternative high sensitivity (high gain) options	Inner borehole diameter	99 mm to 203 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)	Borehole install mechanism	Spring-loaded jaw with passive skids or studs (>60 kg force)
Sensor Dynamic Range	167 dB at 1 Hz (Full octave width across 1 Hz)		
Self-noise below NLNM	3T-120: 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: Crosses the long-period at 200 s (0.005 Hz) and remains below the high frequency limit of the NLNM at 10 Hz		
Cross axis rejection	65 dB		
Linearity	> 111 dB		
Lowest spurious resonance	> 140 Hz		
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	Independent signal & enable lines exposed on sensor connector		
Operational tilt	Up to 2.5 ° (option to increase this to 12.5 °)		
MASS / MONITORING CONTROL			
Locking	Remote auto mass lock/unlock		
Mass centre	Remote automatic mass centreing		
POWER			
Power voltage range	11– 30 V DC* (24 V DC recommended)		
Power consumption (at 12 V DC)	1.1 W		
<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			
Operating temperature	-20 to +75 °C		

Güralp Systems Limited  
Midas House  
Calleva Park  
Aldermaston  
Reading  
RG7 8EA  
United Kingdom

T +44 118 981 9056  
F +44 118 981 9943  
E sales@guralp.com

www.guralp.com

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.

DAS-BHO-0001 Issue P