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

The 3T borehole system designed for borehole diameters of 103 to 229 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.

If a digitiser is not required, the instrument is supplied with a strain relief mechanism to physically decouple the sensors from any vibrations in the load-bearing cable.

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

Key features

Flat velocity output from 360 s (0.0027 Hz) to 50 Hz

120* s, 60 s and 1 s, long period options (*standard). 100 Hz high frequency corner option (50 Hz standard)

Hybrid response option - sensitivity at low frequency for teleseisms combined with high clip threshold at high frequency for local events

Single or three-jaw hole lock for 113 to 229 mm diameter boreholes, or backfill with sand to minimise convection

Waterproof and durable with O-ring seals throughout

Built-in inclinometer option for attitude checking

Optional levelling gimbals extend tilt tolerance from ±3 to ±10 °

Optional rotational mounts for horizontal components allows true alignment

Optional ‘Bishops Hat’ alignment mechanism

Also available with 3ESP or 40T components for a cost effective borehole sensor

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SPECIFICATIONS

SYSTEM	
Configuration / Topology	Triaxial orthogonal (ZNE)
PERFORMANCE	
Velocity output band	0.008 to 50 Hz (120 to 0.02 s) Also available with 30, 60, 100 or 360 s corner frequencies, or with a hybrid response
Output sensitivity	2000 V/ms^{-1} differential output . (Optional sensitivity from 1500 V/ms^{-1} to 20 kV/ms^{-1})
Peak / Full scale output	±10 V differential
Sensor Dynamic Range	>140 dB
Self-noise below NLNM	> 0.005 to 20 Hz (200 to 0.05 s) vertical
Cross axis rejection	> 62 dB
Linearity	> 111 dB vertical; > 107 dB horizontal
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
MASS / MONITORING CONTROL	
Locking	Remote auto mass lock/unlock
Mass centre	Remote automatic mass centreing
POWER	
Power consumption (at 12 V DC)	1.1 W
Power voltage range	11– 30 V DC (24 V DC recommended) Optional low power 5 V DC supply (output ± 4.5 V)
ENVIRONMENTAL	
Operating temperature	-20 to +75 °C (–55 °C Polar version available)

PHYSICAL	
Case height with lifting loop	1422 mm (single-jaw hole lock) 1354 mm (three-jaw hole lock)
Enclosure/Materials	Hard anodised aluminium case Gold plated contacts O-ring seals throughout
Communication / Connectors	Mil-spec connector or Jam nut connector (optional 1500 psi waterproof connector or user connector)
Borehole diameter	103 mm to 229 mm
Borehole install mechanism	Spring-loaded jaw with passive skids or studs (>60 kg force)

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

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

www.guralp.com

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