

3T-360

THE SUPERIOR PERFORMANCE WEAK MOTION
BROADBAND SEISMOMETER



KEY FEATURES

- > 360 s to 50 Hz frequency response (option to 100 Hz)
- > Measured self-noise below the NLNM from 200 s to the high frequency limit at 10 Hz
- > 167 dB dynamic range at 1 Hz
- > Stainless steel enclosure, with refinement options for vault or posthole installations
- > Optional atmospheric pressure isolator for enhanced performance in vault applications

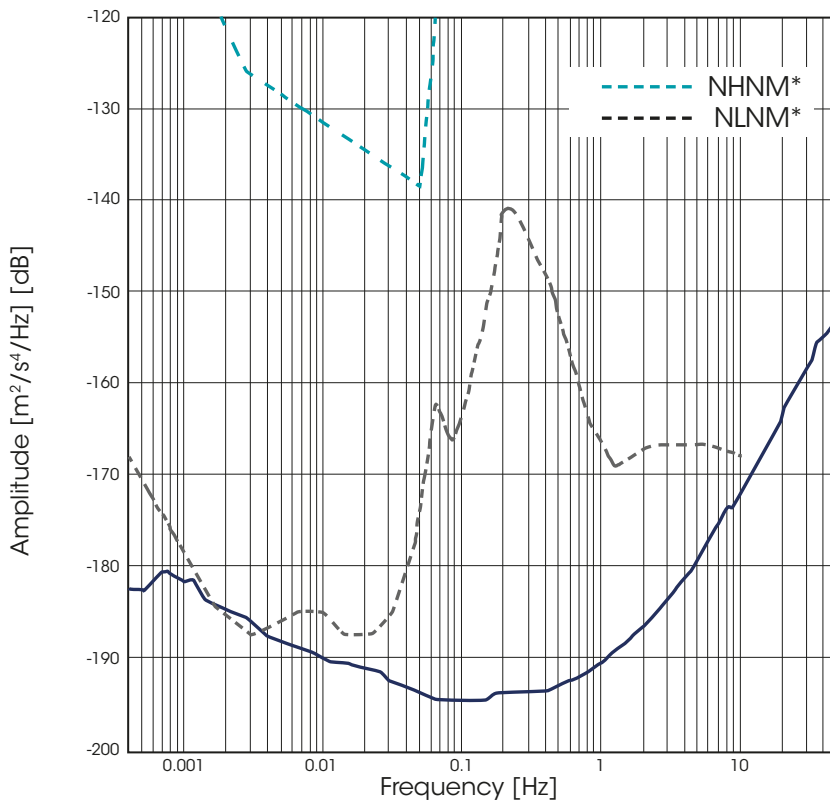
APPLICATIONS

- > Vault and posthole installation
- > National, regional and teleseismic networks

3T-360

The Güralp 3T-360 is our observatory grade instrument, designed for research of seismic signals over the very long period. For unsurpassed performance, an optional atmospheric pressure isolator protects the sensors from very slight fluctuations in temperature and pressure that can effect the instrument self-noise.

SELF NOISE PLOT FOR THE 3T-360 SENSOR*



*(Peterson, 1993)

ATMOSPHERIC PRESSURE ISOLATOR

ENHANCES PERFORMANCE IN VAULT INSTALLATIONS, PROTECTING THE SENSOR FROM TINY FLUCTUATIONS IN TEMPERATURE AND PRESSURE.



*3T-360 with output sensitivity set at 4000 V/ms⁻¹ (2 x 2000 V/ms⁻¹)

Key features

360 s to 50 Hz frequency response (option to 100 Hz)

Covers the complete seismic spectrum with a single transfer function

Measured Self noise below the USGS NLNM from 200 s (0.005 Hz) and remains below the high frequency limit of the NLNM at 10 Hz

High linearity: >111 dB (USGS figures)

Dynamic range of 167 dB at 1 Hz (Full octave width across 1 Hz)

Cross axis rejection over 65 dB; sensor axes orthogonal to within $\pm 0.05^\circ$

Remote, automatic electronic mass locking, unlocking and centring

Operating tilt range of $\pm 5^\circ$ with adjustable feet for off-horizontal installation bases

Low power consumption: 0.75 W from a 10–36 V supply

Available in surface, posthole or polar casing

Comes with lifting handle and convenient access to connectors

Data Integrity

The 3T-360 can be partnered with the Affinity or Minimus digitisers. Each offers a flexible array of features and functionality that you can tailor according to your needs and both utilise precision time protocol for absolute timing accuracy.

Affinity - 24-bit, four or eight channels

- > Exceptionally low noise, >138 dB dynamic range @ 100 sps
- > Up to 4000 samples per second
- > STA/LTA, level and external triggers
- > Multi-user Linux operating system with full network support
- > Remote configuration
- > Fully interactive, fast user interface via web server with remote control of digitiser parameters and broadband sensors, including remote lock, unlock and centre

For more details see the Affinity datasheet:

<http://www.guralp.com/products/data-acquisition/guralp-affinity>

Applications

- > Observatory grade instrument
 - > Surface and subsurface vault
 - > National seismic networks
 - > Global and regional earthquake monitoring
 - > Nuclear test ban treaty monitoring
 - > Earth tide and deep-crust seismic modelling
 - > Can be cased for posthole and polar installations if desired
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Minimus - 24-bit, four or eight channels

- > Up to 5000 samples per second
- > Multi purpose functionality - simultaneously stream multiple sample rates in addition to two recording rates
- > Ultra-low-latency mode for Earthquake Early Warning - when used with GDI protocol, transmission can be achieved in 40 ms
- > STA/LTA triggers
- > Multi-instrument voting for mitigating false positive alerts
- > Common Alert Protocol (CAP) enabled for automated emergency warning
- > Remote instrument and data management

For more details see the Minimus datasheet:

<http://www.guralp.com/products/data-acquisition/guralp-minimus>

3T-360



SPECIFICATIONS

SYSTEM	
Technology	Force feedback (force-balance) velocity sensor
Configuration / Topology	Triaxial orthogonal (ZNE)
PERFORMANCE	
Velocity output band (flat response within -3 dB crossing points)	360 s (0.0028 Hz) to 50 Hz standard Option of 360 s (0.0028 Hz) to 100 Hz
Output sensitivity	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
Peak full-scale output voltage	Differential: ±20 V (40 V peak-to-peak) Single-ended (e.g. mass positions): ±10 V (20 V peak-to-peak)
Self noise below NLNM (New Low Noise Model; Peterson, 1993, USGS)	200 s (0.005 Hz) to 10 Hz
Sensor dynamic range	167 dB at 1 Hz (Full octave width across 1 Hz)
Cross axis rejection	65 dB
Linearity	>111 dB
Lowest spurious resonance	>140 Hz
Damping	0.7 critical or 70% critical
Operating tilt range	±5°
MASS / MONITORING CONTROL	
Sensor Mass positions	Three independent sensor mass position outputs (single-ended)
Mass locking	Remote auto mass lock/unlock for transportation
Mass centring / offset zeroing	Remotely controlled automatic mass centring

CALIBRATION	
Calibration input	Independent signal and enable lines exposed on sensor connector
CONNECTORS	
Analogue output	26-pin military specification bayonet connector
POWER	
Power supply voltage	10–36 V DC*
Power consumption (at 12 V DC)	0.75 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>	
PHYSICAL / ENVIRONMENTAL	
Operating temperature range	-20 to +75 °C (-55 °C optional)
Operating humidity range	0-100% relative humidity
Enclosure ingress protection Surface:	IP68 - protection against effects of prolonged immersion at 3 m depth for 72 hours Posthole: For deeper, long term immersion, the optional 100 bar/10 MPa waterproof connector is recommended
Enclosure material	Stainless steel case O-ring seals throughout
Diameter	168 mm
Height without feet, handle or connector	273 mm
Standard connector height	14 mm
Posthole connector height	31 mm
Height with feet and handle	340 mm
Weight (standard)	15 kg
Weight (posthole)	15.15 kg
Alignment	Bubble level on lid; north arrow on handle and base; adjustable feet
SUPPORTING DOCUMENTATION	
Calibration values	Measured sensor sensitivity, frequency response, instrument poles and zeros enclosed
Full user's guide available online at: https://www.guralp.com/documents/MAN-030-0001.pdf	

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.



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