QUAKELOGIC

TRIAXIAL BROADBAND SEISMOMETER

QL-TERRATONE-120

Force-feedback broadband velocity sensing from 120 s to 50 Hz, with self-noise below the USGS NLNM and remote mass control — sealed to IP68.

Precision broadband seismic monitoring

Local, regional and teleseismic networks · Surface vault and posthole installations · Permanent arrays

100% CUSTOMER
Satisfaction Guaranteed

MADE IN THE USA
Roseville, California

OVERVIEW

Hear the quietest signals on Earth.

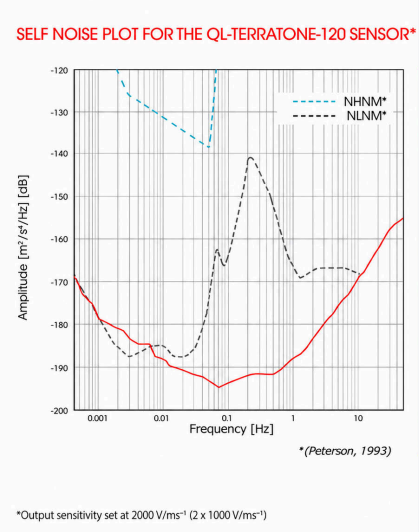
The QL-TERRATONE-120 is a triaxial broadband force-feedback velocity sensor built for precision weak-motion monitoring across local, regional, and teleseismic ranges. Its orthogonal ZNE configuration delivers a **flat response from 120 s to 50 Hz**, extendable to 100 Hz. With a 167 dB dynamic range, self-noise below the USGS NLNM, and remote mass locking and centering, it suits surface-vault, posthole, and permanent-array installations.

167 dB
Dynamic range at 1 Hz across a full octave

120 s – 50 Hz
Flat broadband response; extendable to 100 Hz

<NLNM
Self-noise below the USGS New Low Noise Model from 166 s to 10 Hz

0.75 W
Power consumption at 12 V DC from a 10–36 V supply



Self-noise below the NLNM.

Instrument self-noise plotted against the USGS New High Noise Model and New Low Noise Model (Peterson, 1993). The QL-TERRATONE-120 sits below the NLNM from 166 s to 10 Hz. Output sensitivity set at 2000 V/m/s (2 × 1000 V/m/s).

Below the New Low Noise Model

Self-noise below the USGS NLNM from 166 s to 10 Hz resolves the weakest seismic signals across research-grade networks.

Remote mass lock and centering

Automatic mass locking and centering enables safe transport and unattended re-levelling, cutting field service visits on permanent arrays.

One instrument, teleseismic to local

Broadband 120 s to 50 Hz response, extendable to 100 Hz, captures teleseismic through local events with a single sensor.

Sealed for the long term

IP68 stainless-steel enclosure with O-ring seals throughout withstands prolonged 3 m immersion for demanding deployments.

KEY FEATURES

Designed for permanent networks and demanding research.

01 **Force-feedback ZNE sensing**

Triaxial orthogonal configuration delivers stable, high-fidelity three-component ground-motion measurement for demanding networks.

02 **167 dB dynamic range**

Full-octave dynamic range at 1 Hz gives headroom to record both faint teleseisms and strong local events.

03 **Self-noise below the NLNM**

From 166 s to 10 Hz, resolving microseismic and background signals other broadband sensors miss.

04 **Remote mass lock/unlock**

Protects the mechanism during transport and enables safe redeployment without opening the sealed enclosure.

05 **Remote automatic centering**

Restores the operating point after installation or thermal drift, reducing on-site service on remote arrays.

06 **Three mass-position outputs**

Independent outputs allow continuous health monitoring and verification of correct centering from the network operations centre.

07 **65 dB cross-axis rejection**

Together with >111 dB linearity, keeps each component channel clean for accurate polarization and moment-tensor analysis.

08 **Stainless-steel, IP68**

O-ring seals throughout support surface-vault and posthole installations in harsh, wet environments.

09 **Fast, accurate alignment**

Integrated bubble level, north-orientation indicators, and adjustable feet speed azimuth alignment and levelling

10 **Low power, wide supply**

0.75 W at 12 V DC from any 10–36 V DC source — suited to solar-powered and battery-backed remote stations.

Surface vault or posthole.

Standard configuration with 26-pin military-spec bayonet connector, or posthole casing with a 100 bar / 10 MPa waterproof connector for borehole and shallow-hole deployments.

SYSTEM AT A GLANCE

Every subsystem, in one sealed case.

SENSING ELEMENT

Force-feedback (force-balance) velocity sensor · Triaxial orthogonal (ZNE) configuration · Damping 0.7 critical · Lowest spurious resonance >140 Hz

FREQUENCY RESPONSE

120 s (0.0083 Hz) to 50 Hz standard · Optional extension to 100 Hz · Self-noise below USGS NLNM, 166 s to 10 Hz · 167 dB dynamic range at 1 Hz

OUTPUT

1500 V/m/s differential (2 × 750 V/m/s) · Peak output ±20 V differential (40 V p-p) · Single-ended ±10 V (20 V p-p) · Full-scale clip level 13 mm/s

MASS CONTROL

Remote automatic mass lock/unlock · Remote automatic mass centering · Three independent mass-position outputs · No mass deviation within ±45 °C

ENCLOSURE

Stainless-steel case with O-ring seals · IP68 — 3 m immersion for 72 hours · Surface vault and posthole options · Bubble level and north-orientation indicators

POWER & INTERFACE

10–36 V DC supply · 0.75 W consumption at 12 V DC · 26-pin military-spec bayonet connector · Independent calibration signal and enable lines

SURFACE VAULT

Permanent stations

Level on the three adjustable feet, align to north with the integrated indicators, then lock and center the masses remotely once the vault is closed.

POSTHOLE

Shallow boreholes

Posthole casing with a 100 bar / 10 MPa waterproof connector places the sensor below surface noise for the lowest achievable site noise.

PERMANENT ARRAYS

Unattended networks

Three mass-position outputs and remote centering let operators verify health and re-level from the network operations centre, without a site visit.

TECHNICAL SPECIFICATIONS

Technical specifications

SPECIFICATION	DESCRIPTION
SENSOR	
Sensor Technology	Force-feedback (force-balance) velocity sensor
Configuration	Triaxial orthogonal (ZNE)
Frequency Response	120 s (0.0083 Hz) to 50 Hz standard
Extended Frequency Option	120 s (0.0083 Hz) to 100 Hz
Damping	0.7 critical (70% critical)
Lowest Spurious Resonance	>140 Hz
Operating Tilt Range	±5°
PERFORMANCE	
Output Sensitivity	1500 V/m/s (2 × 750 V/m/s) differential
Full-Scale Clip Level	13 mm/s
Peak Full-Scale Output	±20 V differential (40 V peak-to-peak)
Single-Ended Output	±10 V (20 V peak-to-peak)
Self Noise	Below USGS NLNM, 166 s (0.006 Hz) to 10 Hz
Sensor Dynamic Range	167 dB at 1 Hz, full octave across 1 Hz
Cross-Axis Rejection	65 dB
Linearity	>111 dB

SPECIFICATION	DESCRIPTION
MASS CONTROL	
Mass Monitoring	Three independent mass-position outputs
Mass Locking	Remote automatic lock/unlock for transport
Mass Centering	Remotely controlled automatic centering
Temperature Stability	No mass deviation within ±45 °C
Calibration Interface	Independent signal and enable lines via connector
ELECTRICAL	
Analog Output Connector	26-pin military-spec bayonet connector
Power Supply	10–36 V DC
Power Consumption	0.75 W at 12 V DC
ENVIRONMENTAL	
Operating Temperature	–20 °C to +75 °C; –55 °C optional
Operating Humidity	0–100% RH
Ingress Protection	IP68; 3 m immersion for 72 hours
Enclosure	Stainless-steel case with O-ring seals throughout

TECHNICAL SPECIFICATIONS (CONTINUED)

Physical and installation

SPECIFICATION	DESCRIPTION
PHYSICAL	
Diameter	6.61 in (168 mm)
Body Height	10.75 in (273 mm), excl. feet/handle/connector
Overall Height	13.39 in (340 mm), with feet and handle
Standard Connector Height	0.55 in (14 mm)
Posthole Connector Height	1.22 in (31 mm)
Standard Weight	33.1 lb (15 kg)
Posthole Weight	33.4 lb (15.15 kg)
Installation Options	Surface vault; posthole casing with 100 bar / 10 MPa waterproof connector

QL-TERRATONE-120 6.61 in (168 mm) diameter · 13.39 in (340 mm) overall height with feet and handle · 33.1 lb (15 kg) · stainless-steel case, IP68.

QUAKELOGIC

Built for the field. Backed by QuakeLogic.

For more information about the features, specifications, and available configurations of the QL-TERRATONE-120, please contact QuakeLogic.

CORPORATE HEADQUARTERS

QuakeLogic Inc.
2008 Opportunity Dr., Suite 130
Roseville, CA 95678, USA

Monday – Friday
9:00 AM – 5:00 PM (PST/PDT)

CONTACT

Phone: +1 (916) 899-0391
Email: sales@quakelogic.net
Web: products.quakelogic.net

ABOUT QUAKELOGIC

QuakeLogic Inc. is a California-based engineering and technology company providing innovative, reliable, high-quality solutions to customers worldwide.

OUR COMMITMENT

We are committed to quality, innovation, and customer satisfaction — building lasting partnerships through reliable solutions and dependable support.

SCAN TO VIEW PRODUCT

products.quakelogic.net/product/ql-terratone-120

Designed and manufactured in the USA

Every QL-TERRATONE-120 is assembled, calibrated, and tested at our Roseville, California facility under an ISO 9001:2015 quality system.

100% CUSTOMER
Satisfaction Guaranteed

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Roseville, California