DATASHEET

TRIMBLE SG160-09 SEISMOGEODETIC SYSTEM

KEY FEATURES

Combines seismic recording with Global Navigation Satellite System (GNSS) Geodetic Measurements

220 Channel GNSS Receiver

GNSS Precise Point Positioning (PPP) Correction

Advanced National Seismic System (ANSS) Class A Triaxial Accelerometer

The Trimble® SG160-09 SeismoGeodetic System combines the innovation, reliability and data integrity of both the Trimble and REF TEK brands into a single instrument.

The SG160-09 provides the user with high rate GNSS and accelerometer data, full epoch-by-epoch measurement integrity and, using the Trimble Pivot™ SeismoGeodetic App, the ability to create combined GNSS and accelerometer high-rate (200 Hz) displacement time series in real-time.

The SG160-09 combines seismic recording with GNSS geodetic measurement in a single compact, ruggedized package. The system includes a low-power, 220-channel GNSS receiver powered by the latest Trimble-precise Maxwell™6 technology and and supports tracking of both GPS and GLONASS signals plus the Galileo E1 frequency. The receiver incorporates on-board GNSS Precise Point Positioning (PPP) using Trimble CenterPoint™ RTX™ technology with satellite clock and orbit corrections delivered over IP.

The seismic recording element includes an Advanced National Seismic System (ANSS) Class A, force balance triaxial accelerometer with the latest, low power, 24-bit A/D converter, which produces high resolution seismic data.

The SG160-09 processor acquires and packetizes both seismic and geodetic data and transmits it to the central station using an advanced, error correction protocol with back fill capability providing integrity between the field and the processing center.

The true benefit of the SG160-09 is the ability to combine both GNSS and acceleration measurements using the Kalman filter algorithm to create a high-rate (200 Hz), real-time displacement with sufficient accuracy and very low latency for earthquake characteristic analysis.

Small size, lightweight, low power, implemented Trimble CenterPoint RTX technology and rapid data delivery algorithm make the SG160-09 an ideal instrument for real-time earthquake characterization and hazard mitigation.

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SPECIFICATIONS

A/D CONVERTER

Type: . . . . . Delta-Sigma Modulation, 24-bit Output Resolution
Dynamic Range: . . . . . >138 dB @ 200 sps (200 Hz)
Input Channels: . . . . . 3 (internal 3-component accelerometer)
Input Impedance: . . . . . Matched to internal accelerometer
Sample Rates: . . . . . 200 sps (200 Hz) Accelerometer
Synchronous Sampling: . . . . . Simultaneous on all channels to within ±5 µs of the mean sampling time
Anti-Alias Filter: . . . . . FIR
Common Mode Rejection: . . . . . Greater than 70 dB within ±2.5 VDC
Gain Stability and Accuracy: . . ≤0.5% over 32°F to 104°F (0°C to 40°C)
≤1% over full operating temperature range
Full Scale Offset: . . . . . ≤0.5% FS from 32°F to 104°F (0°C to 40°C)
Internal Timekeeping Oscillator: . . . . . 0.1 ppm from 32°F to 104°F (0°C to 40°C)

DATA STORAGE

Type: . . . . . USB (external, industrial) 8, 16, or 32 GB
Data Format: . . . . . MRF, Bytestream
Telemetry Protocol: . . . . . RTP REN with backfill algorithm. Backfill data stored on USB drive

ACCELEROMETER

Type: . . . ANSS Class A force-balance accelerometer, triaxial (internal)
Dynamic Range: . . . . . >145 dB (DC to 2 Hz)
Full Scale Range: . . . . . ± 4g
Full Scale Output: . . . . . ± 10V, 20 VPP
Frequency Response: . . . . . DC – 150 Hz flat response (± 3 dB)
Self-noise: . . . . . <1 µm/s/s
Cross Axis Sensitivity: . . . . . ≤-40 dB due to misalignment of active axis to case reference
Hysteresis: . . . . . ≤-70 dB over a ±1g range
Sensitivity: . . . . . 2.5 V/g
Linearity: . . . . . ≤-70 dB over a ±1g range
Damping: 0.7
Clip Recovery: . . . . . Hard clip recovery <10s

GNSS RECEIVER

Type: . . . . . GPS, GLONASS, Galileo (E1)
Position Corrections: . . . . . Trimble CenterPoint RTX technology
Data Output Type (GNSS): . . . . . RT27 @ 15 secs, 1 Hz, 10 Hz
Data Output Type (Displacement): . . . . . 6 (X, Y, Z displacement and Ex, Ey, Ez error) @ 10 sps (10 Hz)
GNSS Antenna: . . . . . TNC connector: Tornado, Zephyr Geodetic 2, GNSS Choke Ring Antennas

ENVIRONMENTAL

Input Voltage: . . . . . 9-24 VDC
Power Consumption: . . . . . 4 watts
Material: . . . . . Aluminum A380, Clear Alodine, Powder Coated
Weight : . . . . . 15.5 lb (7 kg)
Dimensions: . . . . . 7.42 x 7.66 x 11.43 inches (18.8 x 19.5 x 29 cms)
Ingress Protection: IP67
Shock and Vibration: . . . . . MIL-STD-810G transportation test
Temperature: Operating Storage: . . . . . –4°F to 140°F (–20°C to 60°C)
–58°F to 176°F (–50°C to 80°C)

ORDERING INFORMATION

DESCRIPTION

97333-00 . . . . SG160-09: Integrated High Res. SeismoGeodetic System, GNSS Receiver, Int. Accelerometer, RTX Enabled, IP67 *

Power Cable (options):

101421-00 . . . . . Assembly, Cable, AC Power Supply, Power A
101419-00 . . . . . Assembly, Cable, Power B, 160's to Battery, 6' (2m)

USB Flash Memory (options):

97321-00 . . . . . Disk, Flash Memory, 8GB, USB, –49°F to 185°F (–45°C to 85°C), SLC
97321-16 . . . . . Disk, Flash Memory, 16GB, USB, –49°F to 185°F (–45°C to 85°C), SLC
97321-32 . . . . . Disk, Flash Memory, 32GB, USB, –49°F to 185°F (–45°C to 85°C), SLC

GPS Antenna (options):

97333-13 . . . . . Tornado Antenna, w/o magnetic inserts (includes mounting bracket)
57971-00 . . . . . Zephyr Geodetic Model 2 Antenna
29487-20 . . . . . GNSS-DM Choke Ring Antenna
29587-20 . . . . . GNSS-Ti Choke Ring Antenna

Coax Cable (options):

92296-10 . . . . . Cable - GPS, 33 ft (10m), TNC/TNC Right Angle
92296-30 . . . Cable - GPS 100 ft (30m), LMR-400 TNC/TNC Right Angle
92309-10 . . . . . Cable, Antenna, TNC-N, 32.8 ft (10m)
92309-30 . . . . . Cable, Antenna, TNC-N (LMR400) 100 ft (30m)

Network Cable (options):

101422-00 . . . Assembly, Cable, NET, Ethernet Hub to 97333-00 SG160
101423-00 . . . . . Assembly, Cable, NET, 97333-00 SG160 to Ethernet Hub, w/ Relay for GPRS

Ancillaries

101132-00 . . . . Kit, Mounting and Leveling Plate, for 97333-00 SG160
100959-00 . . . . . Controller, 160FSC

Software

96811-20 . . . . . Trimble SG160-09 System S/W Bundle License
96811-25 . . . . . License for 1 Additional SG160-09 Unit
96813-12 . . . . . T4D – License for 1 additional Geotech Sensor

* *IP68 version (submerged up to 3m depth for 24 hours in fresh water) is available as an option at customer request. Consult your Trimble sales engineer on availability and price.*

Specifications subject to change without notice

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