



SG160-09

KESTREL SEISMOGEODETTIC SYSTEM

The Trimble® Kestrel SeismoGeodetic System (Model SG160-09) 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 system 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 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 Trimble Kestrel System 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 Trimble Kestrel System 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 Trimble Kestrel System an ideal instrument for real-time earthquake characterization and hazard mitigation.

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



Model	SG160-09
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 3, 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 cm)

Ingress Protection	IP67*
Shock and Vibration	MIL-STD-810G transportation test
Temperature: Operating Storage	-4 °F to 158 °F (-20 °C to 70 °C) -58 °F to 176 °F (-50 °C to 80 °C)

Ordering Information

Part No.	Description
97333-00	SG160-09: Integrated High Res. SeismoGeodetic System, GNSS Receiver, Int. Accelerometer, RTX Enabled, IP67
Power Cable (options):	
101421-00	Cable, AC Power Supply, 6' (2m)
101419-00	Cable, Battery Power Supply, 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)
158295-50	Zephyr 3 Geodetic Antenna
29487-20	GNSS-DM Choke Ring Antenna
29587-20	GNSS-Ti Choke Ring Antenna
Coax Cable (options):	
101425-30	Tornado/Zephyr Antenna Cable – GPS, 33 ft (10 m)
64922-30	Tornado/Zephyr Antenna Cable – GPS, 100 ft (30 m)
101426-30	Choke Ring Antenna Cable – 33 ft (10 m)
47019-30	Choke Ring Antenna Cable – 100 ft (30 m)
Network Cable (options):	
101422-00	Cable, NET, Ethernet Hub, 14 ft (4.3 m)
102582-00	Cable, NET, Ethernet PC (crossover), 14 ft (4.3 m)
101423-00	Cable, NET, Ethernet Hub, w/ Relay for GPRS, 14 ft (4.3 m)
Ancillaries:	
101132-00	Kit, Mounting and Leveling Plate
102248-00	Transit Case for SG160-09 and Tornado Antenna
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

Specifications subject to change without notice.

Contact your local dealer today

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