REF TEK
SYSTEMS INC.

130-SMHR

STRONG MOTION ACCELEROGRAPH

REF TEK® strong motion and earthquake engineering products combine the 3rd generation Broadband Seismic Recorder (REF TEK 130S) and advanced low-noise force-balance accelerometers.

The 130-SMHR Strong Motion Accelerographs provide accurate and timely data and information for seismic events, including their effects on buildings and structures by employing modern monitoring methods and technologies. Both models are made for continuous monitoring of earthquakes and other seismic events, and the recording of strong earthquake shaking at ground sites, in buildings and critical structures.

The 130-SMHR advanced communications features include TCP/IP over Ethernet and Asynchronous Serial. An LCD continuously displays state-of-health and status information.

The 130-SMHR has three channels connected to an internal triaxial accelerometer. When ordered as a six-channel unit, the three additional channels can be connected to an external sensor.

The 130-SMHR family:

- Has provision for an optional internal V.90 modem for communication over standard telephone lines;
- Includes a battery charger for maintaining a lead-acid battery;
- Is housed in an anodized aluminum instrument case with single point mounting and 3-point leveling.

KEY FEATURES

- State-of-the-Art 24-Bit ADC
- Wide Dynamic Range
- Low Noise, Force-Balance accelerometer
- Simultaneous Telemetry/Self Recording
- IP over Ethernet and Asynchronous Serial
- Embedded / Removable Mass Storage
- Low Power

APPLICATIONS

- Free Field Recording
- Structural Monitoring
- Dam Monitoring
- Building Arrays
- Telemetry Networks
- Aftershock Studies

130-SMHR

STRONG MOTION ACCELEROGRAPH

SPECIFICATIONS	FULL FEATURED ACCELEROGRAPH, MODEL 130-SMHR (STANDARD)	ACCELEROGRAPH, MODEL 130-SMHR COMMAND LINE
MECHANICAL		
Size	9.25" high x 8.0" wide x 13.25" long (23.5 cm x 20.3 cm x 33.7 cm)	9.25" high x 8.0" wide x 13.25" long (23.5 cm x 20.3 cm x 33.7 cm)
Weight	10.5 lbs (4.8 kg), without internal battery	10.5 lbs (4.8 kg), without internal battery
Watertight Integrity	IP 67	IP 67
Shock	Survives a 1 meter drop on any axis	Survives a 1 meter drop on any axis
Operating Temperature	–20˚C to +70˚C	–20˚C to +70˚C
POWER		
Input Voltage	10 to 16 VDC	10 to 16 VDC
Operating Power	2 W (3-ch. @ 125 sps)	2 W (3-ch. @ 125 sps)
Peak Power	3 W (DAS & GPS active, writing to CF)	3 W (DAS & GPS active, writing to CF)
Battery Charger	15 V, 800 mAmp (internal)	15 V, 800 mAmp (internal)
Battery	12 VDC, sealed lead-acid, 12 AmpHr (optional, internal)	12 VDC, sealed lead-acid, 12 AmpHr (optional, internal)
A/D CONVERTER		
Type	±-Σ modulation, 24-bit resolution	±-Σ modulation, 24-bit resolution
Channels	3 or 6 channels	3, 6 or 9 channels
Input Impedance	Matched to accelerometer	Matched to accelerometer
Input Full Scale	Matched to accelerometer	Matched to accelerometer
Bit Weight	1.589 µV	1.589 µV
Self Noise Level	2 counts RMS @ 200 sps	2 counts RMS @ 200 sps
Sample Rates (user selectable)	1000, 500, 250, 200, 125, 100, 50, 40, 20, 10, 5, 1 sps	200, 100, 50 sps
Dynamic Range	>138 dB	>138 dB
TIME BASE		
Type	GPS Receiver/Clock plus a disciplined oscillator	GPS Receiver/Clock plus a disciplined oscillator
Accuracy	±10 µsec with GPS locked and a validated 3-D fix	±10 µsec with GPS locked and a validated 3-D fix
Accuracy without GPS	0.1 ppm from 0˚ to 60˚C, 0.2 ppm from –20˚ to 0˚C	0.1 ppm from 0˚ to 60˚C, 0.2 ppm from –20˚ to 0˚C
AUXILIARY CHANNELS		
Inputs	Battery, Temperature, Backup Battery	Battery, Temperature, Backup Battery
CALIBRATION		
Enable	User Command	User Command
Type	Step applied to feedback	User Command
COMMUNICATION		
Ethernet	10-BaseT: TCP/IP, UDP/IP, FTP, RTP	10-BaseT: TCP/IP, UDP/IP, FTP, RTP
Serial	Asynchronous RS-232: PPP, TCP/IP, UDP/IP, FTP, RTP	Asynchronous RS-232: PPP, TCP/IP, UDP/IP, FTP, RTP
Modem	N/A	V.90 (internal)

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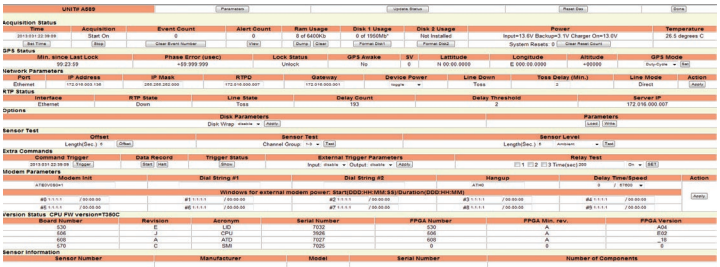
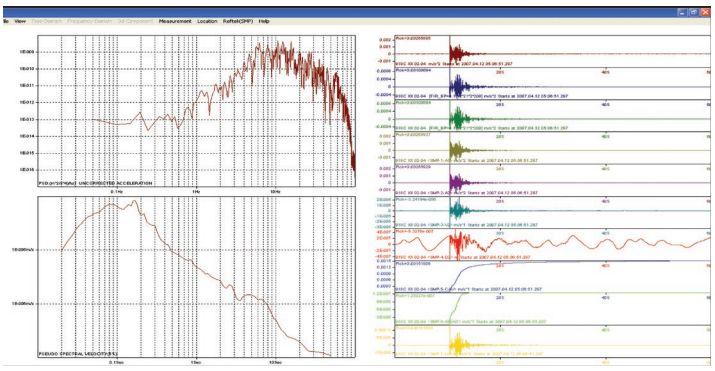
STRONG MOTION ACCELEROGRAPH

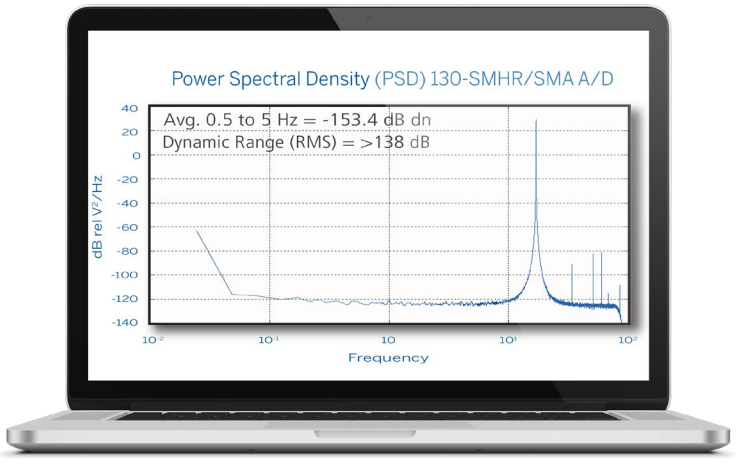
SPECIFICATIONS	FULL FEATURED ACCELEROGRAPH, MODEL 130-SMHR (STANDARD)	ACCELEROGRAPH, MODEL 130-SMHR COMMAND LINE
RECORDING MODE		
Trigger Type	Continuous, Event (STA/LTA), External, Level, Time, Time List, Cross, and Vote Trigger (0.0001 to 4g)	Continuous, External, Level and Vote Trigger (0.0001 to 4g)
Media	Compact Flash, Ethernet	Compact Flash, Ethernet
Format	PASSCAL Recording Format	PASSCAL Recording Format
Relay Closure	N/A	3 independently programmable relay closures
RECORDING CAPACITY		
Battery Backed SRAM	8 MB	8 MB
Flash Disk (2 per unit)	8GB or 16GB	8 GB or 16 GB
COMPLIANCE		
Compliance	CE	CE
INTERNAL ACCELEROMETER		
Type	Force-balance (internal)	Force-balance (internal)
Full Scale Range	> ±4 g	> ±4 g
Full Scale Output	±10V, 20 VPP	±10 V, 20 VPP
Dynamic Range	>155 dB (DC to 2 Hz)	>155 dB (DC to 2 Hz)
Sensitivity	2.5 V/g nominal (exact value in EEPROM)	2.5 V/g nominal (exact value in EEPROM)
Linearity	< 0.03 % of full scale	< 0.03 % of full scale
Cross-axis Sensitivity	< 0.001 g/g	< 0.001 g/g
Frequency Response	Flat DC-100 Hz +/- 0.05 dB ; DC-250 Hz +/- 3 dB	Flat DC-100 Hz +/- 0.05 dB ; DC-250 Hz +/- 3 dB



COMPASS: Strong Motion Processing Software



SMCC: Strong Motion Command & Control included in RTI Software



Power Spectral Density

130-SMHR

STRONG MOTION ACCELEROGRAPH

ORDERING INFORMATION

130 STRONG MOTION HIGH RESOLUTION (SMHR) ACCELEROGRAPH

PART NO.	DESCRIPTION
STANDARD FIRMWARE	
97112-00	130-SMHR: Strong Motion Accelerograph
97125-00	130-SMHR/6: Strong Motion Accelerograph 6 Ch.
COMMAND LINE FIRMWARE	
97237-00	130-SMHR-C: Strong Motion Accelerograph 3 Ch.
97238-00	130-SMHR/6-C: Strong Motion Accelerograph 6 Ch.
98060-00	130-SMHR/9: Strong Motion Accelerograph 9 Ch.
ACCESSORIES	
97150-00	130-GPS: Receiver/Clock
97180-00	130-FLASH/8G: Disk, Compact Flash II
97181-00	130-FLASH/16G: Disk, Compact Flash II
97163-00	130-8015-33: Cable, 130 to GPS, 33 ft. (~10m)
97170-00	130-8019: Cable, NET, 130 to Ethernet RJ45 Hub, Ext.
97168-00	130-8039: Cable Power Supply, AC, Pin A
97169-00	130-8039A: Cable, Power Supply, AC w/ Batt. A&B
97172-00	130-8018: Cable, PC Command & Control
97151-01	130-GPS-Repeater: RS-485 for 130-GPS
97155-00	130-GPS-EXTENDER: RS-485 extender for 130-GPS
97192-00	130-Reader-USB: Reader, CF I/II, External (readers with other interfaces available on request)
97182-10	iFSC/W-KIT: Includes WiFi Serial Adaptor, IFSC 16GB Controller, CD
97134-00	SW-RTI-NC: Software, REF TEK Interface
97131-00	SW-COMPASS: Software, Seismic Signal Data Processing, Interactive

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Contact your local dealer today

Specifications subject to change without notice.

CUSTOMER SUPPORT

REF TEK products are installed in locations around the world, from urban settings to rainforests to deserts. The environments are often challenging for electronics and REF TEK Systems is committed to providing reliable, practical support. Our team includes seismologists and seismic installation experts as well as engineers and technicians. **Contact support@reftek.com**.