

# 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

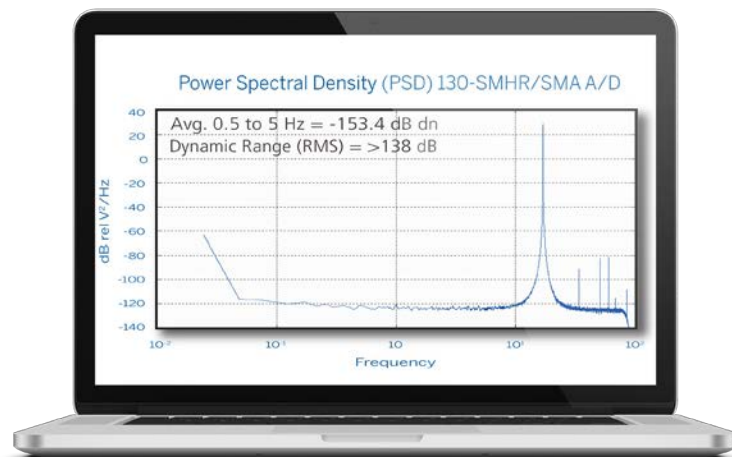
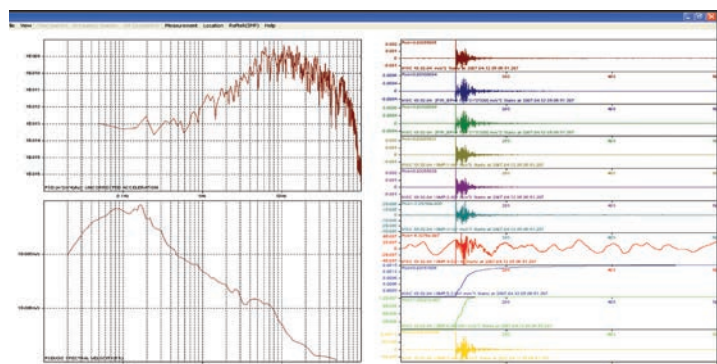
# 130-SMHR

## STRONG MOTION ACCELEROGRAPH

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

SPECIFICATIONS	FULL FEATURED ACCELEROGRAPH, MODEL 130-SMHR (STANDARD)	ACCELEROGRAPH, MODEL 130-SMHR COMMAND LINE
<b>RECORDING MODE</b>		
<b>Trigger Type</b>	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)
<b>Media</b>	Compact Flash, Ethernet	Compact Flash, Ethernet
<b>Format</b>	PASSCAL Recording Format	PASSCAL Recording Format
<b>Relay Closure</b>	N/A	3 independently programmable relay closures
<b>RECORDING CAPACITY</b>		
<b>Battery Backed SRAM</b>	8 MB	8 MB
<b>Flash Disk (2 per unit)</b>	8GB or 16GB	8 GB or 16 GB
<b>COMPLIANCE</b>		
<b>Compliance</b>	CE	CE
<b>INTERNAL ACCELEROMETER</b>		
<b>Type</b>	Force-balance (internal)	Force-balance (internal)
<b>Full Scale Range</b>	> ±4 g	> ±4 g
<b>Full Scale Output</b>	±10V, 20 VPP	±10 V, 20 VPP
<b>Dynamic Range</b>	>155 dB (DC to 2 Hz)	>155 dB (DC to 2 Hz)
<b>Sensitivity</b>	2.5 V/g nominal (exact value in EEPROM)	2.5 V/g nominal (exact value in EEPROM)
<b>Linearity</b>	< 0.03 % of full scale	< 0.03 % of full scale
<b>Cross-axis Sensitivity</b>	< 0.001 g/g	< 0.001 g/g
<b>Cross-axis Sensitivity</b>	Flat DC - >150 Hz	Flat DC - >150 Hz

COMPASS: Strong Motion Processing Software



Power Spectral Density

# 130-SMHR

## STRONG MOTION ACCELEROGRAPH

### ORDERING INFORMATION

130 STRONG MOTION HIGH RESOLUTION (SMHR) ACCELEROGRAPH

PART NO.	DESCRIPTION
<b>STANDARD FIRMWARE</b>	
97112-00	130-SMHR: Strong Motion Accelerograph
97125-00	130-SMHR/6: Strong Motion Accelerograph 6 Ch.
<b>COMMAND LINE FIRMWARE</b>	
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.
<b>ACCESSORIES</b>	
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

Specifications subject to change without notice.

#### NORTH AMERICA

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Contact your local dealer today

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#### 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.**