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ТЕХНИЧЕСКО ПРЕДЛОЖЕНИЕ

СОФИЯ

2016 г.

ТЕХНИЧЕСКО ПРЕДЛОЖЕНИЕ ЗА ИЗПЪЛНЕНИЕ НА ПОРЪЧКАТА

Наименование Закупуване на цифрова сеизмична станция, сеизмометър и резервни
на поръчката: части

УВАЖАЕМИ ДАМИ И ГОСПОДА,

С настоящото представяме нашето предложение за изпълнение на обявената от Вас поръчка чрез обява за събиране на оферти с горепосочения предмет.

Заявявам, че ще изпълним поръчката в пълно съответствие с изискванията Ви, заложи в обявата, Техническата спецификация и законовите изисквания за този вид доставки.

№	Артикул	Ко-во	Техническа характеристика	Предложение за изпълнение на поръчката /конкретна марка, модел, производител/	Гаранционен срок, месеци
1.	97100-01	1	- 6 канала; - диференциален вход с избираемо усилване; - входно напрежение от 9 до 24 VDC; - ниво на шума ~ 1 каунт RMS @ 50 sps @x1 - динамичен диапазон >138 dB @ 100 sps - разрядност 24 бита, честота на цифроване – избираема от 1 до 1000 отчета в секунда - часовник - GPS и вътрешен осцилатор; - точност на часовника -	Сеизмична станция REFTEK, модел 130S-01-6, Trimble с включени: - кабел, модел 130-8803-33, дължина 10 м (арт. № 97174-00) необходим за осъществяване на връзка между сеизмична станция REFTEK 130S-01-6 и сеизмометър REFTEK 151B-60; - 2 бр. компакт флаш карта памет, размер 8 GB, тип I, с диапазон на работа при температури от -20°C до +60 °C (арт. №97180-00); - GPS REFTEK, модел 130-	12 месеца

			$\pm 10 \mu\text{sec}$ след фиксиране на 3D позиция; - запис на място – непрекъснат кръгов буфер с размер 8 GB за всички канали; - формат на записа – PASSCAL; - телеметрия – чрез 10-BaseT, TCP/IP, UDP/IP, FTP, RTP в реално време до централна станция; - портове – RS232 и Ethernet; - корпус – непромокаем и водоустойчиви куплунги, отговарят на стандарт IP68; - работна температура – минус 20°C до +70 °C; - влажност – от 0 до 100%; - захранване – от 9 до 24V;	GPS (арт. № 97150-00); - Ръководство за работа в електронен вид (арт. №97279-00);	
2.	97117-00	1	- тип – триаксиален, velocity transducer; - честотна лента – 60 секунди до 0.0166 секунди; -чувствителност - 2000 V/m/s; -изходно напрежение – +/-20V; -предлага автоматично, локално (чрез външна команда) и дистанционно	Сеизмометър REFTEK, модел 151B-60, Trimble	12 месеца

			центриране; - възможност за дистанционно калибриране чрез цифрова система; - собствен шум – под NLNM в диапазон от 0.1s до 145 секунди; - разполага с индикатори за нивелиране и ориентация; - работна температура -минус 20°C до +60 °C; - захранване 12 VDC (9V до 18 VDC); - влажност – от 0 до 100% IP67; - консумация ~1.1 W;		
3.	Резервни части				
3.1.	100941-00	1	АЦП, съвместима с дигитайзерите, работещи в сеизмичните станции на Националната сеизмична мрежа, входно напрежение - +/- 20V, канали от 1 до 3, усилване X1 или X32	Резервна платка REFTEK, модел PCBA, A/D, канали от 1 до 3, усилване X1 или X32, 40Vpp, 649A-08, Trimble	12 месеца
3.2.	97192-00	1	Четец за компакт флаш карти, тип I, II, III с USB интерфейс	Четец за компакт флаш карти, Compact Flash Card Reader, External, USB, CF I/II/III	12 месеца
3.3.	97177-00	1	Термоизолиращ капак за сеизмометър	Термоизолиращ капак REFTEK, модел 151-9802, Trimble	12 месеца

Ангажираме се да отстраняваме за своя сметка всички появили се дефекти в периода на гаранционния срок.

Гарантираме, че сме в състояние да изпълним качествено поръчката в пълно съответствие с представената от нас оферта.

Артикулите отговарят на БДС, Европейските стандарти за качество и ще бъдат придружени със съответните гаранционни карти и сертификати.

Ние ще уведомим Възложителя незабавно, ако настъпи някаква промяна в обстоятелствата, свързани с изпълнението на доставката, на всеки етап от изпълнението на договора. Разбираме и приемаме, че всяка представена от нас неточна или непълна информация, може да доведе до нашето изключване от участие в настоящата обществена поръчка.

Декларираме, че приемаме условията на проекта на договора, за което прилагаме съответната декларация по Образец.

Срокът за изпълнение на поръчката е 30 (словом: тридесет) дни от сключване на договора.

Декларираме, че срокът на валидност на нашата оферта е 60 (словом: шестдесет) дни.

Декларираме, че при изготвяне на офертата са спазени задълженията, свързани с данъци и осигуровки, опазване на околната среда, закрила на заетостта и условията на труд.

Техническото ни предложение, съдържа:

а) документ за упълномощаване, когато лицето, което подава офертата, не е законният представител на участника *(само в приложимите случаи)*;

б) предложение за изпълнение на поръчката в съответствие с техническите спецификации и изискванията на възложителя;

в) декларация за съгласие с клаузите на приложения проект на договор - *Образец 8*

г) друга информация и/или документи, изискани от възложителя, когато това се налага от предмета на поръчката;

Правно обвързващ подпис:

Дата: 27/май/2015 г.

Име и фамилия: Росен Петков

Подпис на упълномощеното лице

Длъжност

Изпълнителен директор

Наименование на участника

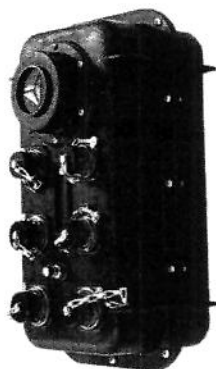
„СОЛИТЕХ“ АД

REF TEK THIRD GENERATION BROADBAND SEISMIC RECORDER SPECIFICATIONS



Model	130S-01/3 (PIN 97100-00) 130S-01/6 (PIN 97100-01)
Mechanical	
Size	6.3" high x 6.9" wide x 13.1" long (16 cm x 17.5 cm x 33.3 cm)
Weight	4.5 lbs (2 kg)
Watertight Integrity	IP68
Shock	Survives a 1 meter drop on any axis
Operating Temperature	-20° to +70°C
Power	
Input Voltage	9 to 24 VDC (ethernet) 11 to 24 VDC (writing to disk)
Average Power (no communications)	1 W (3 ch, GPS, writing to disk) 1.45 W (6 ch, GPS, writing to disk)
Average Power (with communications)	1.25 W (3 ch, GPS, writing to disk) 1.7 W (6 ch, GPS, writing to disk)
Communications	
NET Connector:	10-BaseT, TCP/IP, UDP/IP, FTP, RTP
Ethernet	Asynchronous, RS-232, PPP, TCP/IP, UDP/IP, FTP, RTP
Serial	
Serial Terminal:	Asynchronous, RS-232, 130 Command
A/D Converter	
Type	Δ-Σ Modulation, 24-bit Output Resolution
Dynamic Range	>138 dB @ 100 sps
Channels	3 or 6
Input Impedance	2 Mohms, 0.002 uFd, differential @ x32; 25 Kohms, 0.002 uFd, differential @ 1
Common Mode Rejection	>70 dB within ±2.5 VDC
Gain Selection	X1 and x32
Input Full Scale	40 VPP @ x1 and 1.24 VPP @ x32
Bit Weight	2.724 μvolts @ x1 and 85 nV @ x32
Noise Level	~1 count RMS @ 50 sps @ x1
Sample Rates	1000, 500, 250, 200, 125, 100, 50, 40, 20, 10, 5, 1 sps
FIR Filter	130 dB down passband to Nyquist
Compliance	CE
Auxiliary Channels	
Inputs	3 Channels available on each Sensor Connector: Supply Voltage, Backup Battery Voltage, Temperature

Time Base	
Type	GPS Receiver/Clock plus Disciplined Oscillator
Accuracy with GPS	±10 μsec after validated 3-D Fix and Locked
Free-Running Accuracy	0.1 ppm over the temp. range of 0° to 70°C
Recording Capacity	
Battery Backed	8 to 16 MB user specified
SRAM	8 GB or 16 GB CFI Card, settable in "Ring-Buffer" Configuration
Recording Modes	
Continuous	Record length
Time Trigger	Specific record length at periodic interval
Time List Trigger	A list of record times and lengths
Event Trigger	STA/LTA with advanced features including bandpass filter LTA hold, etc.
Level Trigger	Absolute value, user selectable g, or % of full scale, or counts including bandpass filter
Vote Trigger	Level trigger with weighting
External Trigger	External pulse on trigger input line
Cross Trigger	One stream triggers recording of another
Recording Format	
Format	PASSCAL Recording Format



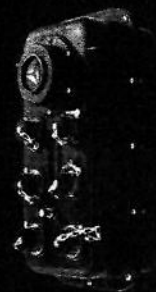
Related Sub-systems

Strong Motion Accelerographs, 130-SMHR & 130-SMA Accelerometers, 147A-01 & 131B Broadband Seismometers, 151B-120, 151B-60, 151B-30

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Model 130S-01

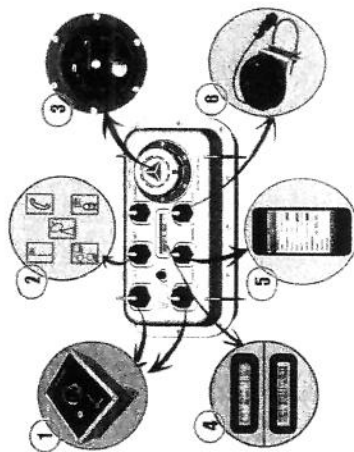
REF TEK 3RD GENERATION BROADBAND SEISMIC RECORDER

KEY FEATURES:
State-of-the-Art ADC
Small Size and Lightweight
Modular Hardware and Software
IP Communications over Ethernet and Asynchronous Serial
Embedded/Removable Mass Storage

APPLICATIONS:

Local and Regional
Broadband
Aftershock
Active Source
Micro-Zonation Survey
Site Noise Survey
Earthquake Early Warning
Rapid Transportation

- The 130S Broadband Seismic Recorder has been designed to be easier to use – more compact, lighter in weight, lower power, and requires less maintenance than other recorders. Not only is the hardware optimized for field deployments, software tools have been specially developed to support both field and base station operation.
- The 130S case is a clamshell design, inherently waterproof, with easy access to all user features on the top of the unit.
- The 130S has 3 or 6 input channels for connection to any sensor available in the seismology market.
- The network Command / Control and Data Telemetry is either Ethernet 10BaseT or serial PPP.
- The 130S uses a high-precision TCXO disciplined by an external GPS Receiver / Clock, which maintains time accuracy to better than 10 μsec.

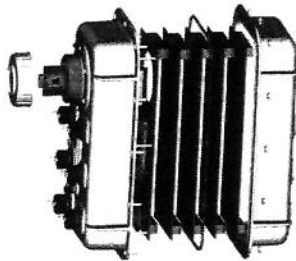


Hardware Modularity

REF TEK 130S is constructed with up to five internal boards stacked together – an arrangement that is more reliable and less costly than a traditional backplane arrangement. The 130S comes with a Lid Interconnect Board, a Microcomputer Board, one or two ADC Boards and a Sensor Control Board.

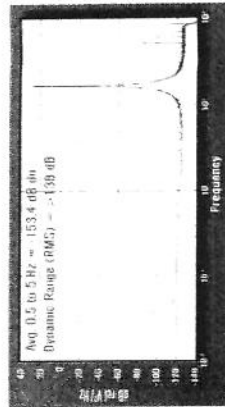
One or two removable disks reside in a sealed compartment that is accessed by opening a lid located on the top of the 130S case. The main electronics section is sealed with the lid open or closed.

The GPS Receiver is separate from the main unit in order to allow the GPS antenna to be located some distance away.



Noise Performance

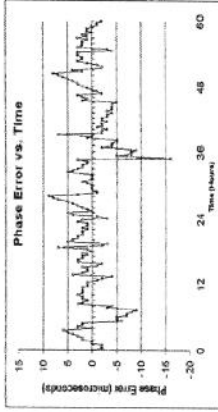
The 130S series recorder incorporates the 3rd generation 24-bit delta sigma type analog-to-digital converter with state-of-the-art design. The combination produces the highest performance low power 24-bit seismic recorder. Below is the power spectral density of the ADC with the full scale sine wave input.



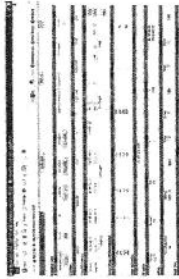
Time Keeping

In order to maintain accurate time over a long period, the 130S recorder uses both a high-precision TCXO and an external reference provided by the GPS Receiver / Clock that uses the Global Positioning System (GPS) for time, frequency, and position reference.

When power is applied to the 130S recorder, rough time is set from a battery-backed clock. A few seconds after obtaining a 3-D position fix (typically seconds after power-up or minutes if the GPS has been moved a great distance since last operating), the 130S will set its time to GPS time. During the initial 15 minute period, the TCXO frequency and phase is measured and adjusted to the GPS, then the 130S time is set to UTC. Within an hour of operation, the internal clock will remain within a few uses of UTC while the GPS runs with a 5% duty cycle. The frequency setting is maintained across power cycles thus the oscillator's frequency is compensated for aging and temperature drift automatically.



Field Operation



REF TEK has developed two programs for Command / Control of the 130S. IFSC is an IOS app developed to work with iPod touch and iPhone with an IOS of 5.0 or later. REF TEK Interface (RTI) is a set of server / client applications which runs on Windows, Linux, or Solaris notebook / desktop computers. IFSC is used to edit and program the acquisition parameters of the 130S via the WiFi Serial Adaptor. RTCC (part of RTI) is used to edit and program the acquisition parameters of the 130S via the NET connector using standard WEB browsers. Additionally, State-Of-Health monitoring is accomplished with an extensive set of Status commands. The State-Of-Health information includes acquisition status, memory and disk usage, GPS status, main and backup battery voltage, time, and temperature. Additional commands are used to set up network connections and check their status. Data monitoring without stopping acquisition is available. RTDisplay (part of RTI) is a Windows client to RTPD. The data viewer provides browsing of data coming to the RTPD server in real-time.



Ordering Information

Part No.	Description	Part No.	Description
97100-00	130S-0173: Recorder, 3rd Generation, 3-Ch.	97167-00	130-8075: Cable, Power B, 130S to Battery, 6ft. (~2m)
97100-01	130S-0176: Recorder, 3rd Generation, 6-Ch.	97182-10	IFSCW-KIT: Includes WiFi Serial Adaptor, IFSC
97150-00	130-GPS Receiver/Clock	97192-00	16GB Controller, CD
97180-00	130-FLASH/8GB: Disk Compact Flash II		130-Reader-USB: Reader, CF II/III, External
97181-00	130-FLASH/16GB: Disk, Compact Flash II		(readers with other interfaces available upon request)
97176-00	130-8002: Channel Input Mating Connector	97134-00	SW-RTI-NC: Software, REF TEK Interface
97211-00	130-8004: Assembly, Cable, Ethernet/Modem Ext.	97279-00	130 Series Ops Doc Set CD
97163-00	130-8015-33: Cable, 130 to GPS, 33ft. (~10m)	97162-00	130-FIELDCASE: Case, Transit (holds one 130, GPS, Cables)
97170-00	130-8019: Cable, NET, 130 to Ethernet RJ45 Hub, Ext.		

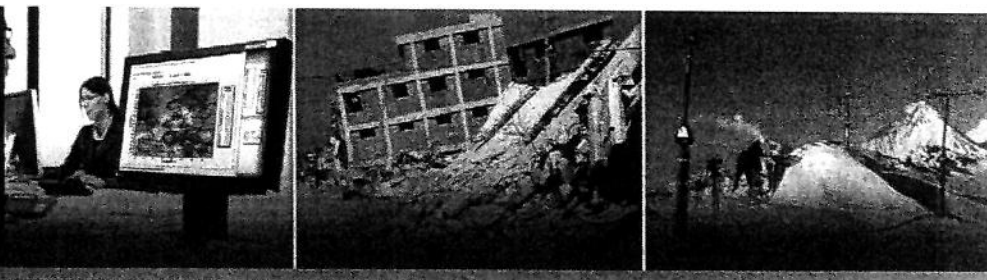
Data Retrieval

The 130S series recorder may be equipped with one or two Compact Flash Type I or Type II storage media (disks). CF flash storage is available in 8GB or 16 GB capacity. For example, 8 GB is enough storage to hold more than 200 days of three channel, 100 sps data recorded with Stein 2 compression.

Files are written in FAT32 format allowing high capacity disks to be used. To swap a disk during acquisition, simply open the cap that seals the disk compartment. A red LED indicates the disk is busy.

When inactive a green LED signals to remove the disk and insert another one in its place. Replace the cap resealing the compartment.

Data from the disk may be read on any PC / Workstation using a CF-II reader. Data can also be remotely downloaded from the 130S disk using FTP over LAN/WAN.



KEY FEATURES:

- High Performance Seismometer
- Low Self-Noise
- Portable Design
- Low Power Consumption
- Force-Balance Electric Feedback
- Robust Mass Locking Mechanism
- Easy Installation

APPLICATIONS:

- Broadband Surface Installation or Posthole Installation
- Local and Regional
- GSN Installation



Model 151B

REF TEK BROADBAND SEISMOMETER "OBSERVER"

The 151B series Broadband Seismometer, "Observer", is a force-balance feedback sensor available with frequency bandwidths:

- 0.0083 Hz (120 sec) - 50 Hz
- 0.0166 Hz (60 sec) - 50 Hz

flat to velocity.

The 151B "Observer" contains three independent sensors (one vertical and two horizontal) with built-in electronic feedback circuit, control and power conversion circuits, featuring low noise, large dynamic range and easy installation and use.

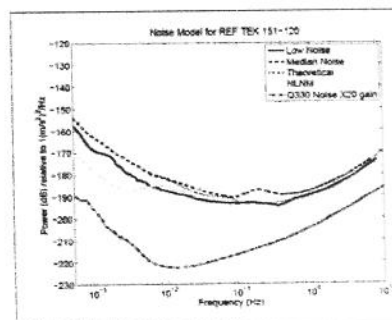
The "Observer" has built-in leveling and mass lock/unlock facilities. The leveling mechanism includes two bubble levels, three adjustable feet and three locknuts which are located on the seismometer's chassis.



The "Observer" has a built-in mass zero-position adjusting mechanism to perform automatic mass adjustment. As soon as the seismometer is powered it checks the zero position of

each component's mass and automatically adjusts the zero position if needed. Monitoring and adjustment of the mass can also be performed via the 130S series High Resolution Recorders using the Sensor Control Board (part number 97154-00).

The "Observer" is an exceptionally low noise seismometer (see below Power Spectral Density plot). The low self noise performance makes the 151B an ideal seismometer for local, regional and global seismicity studies in different installation configurations, including observatory and portable, surface and posthole applications.



Ringler, A. & Hutt, C. (2010, November - December). Self Noise Models of Seismic Instruments. *Seismological Research Letter*, 81(6).

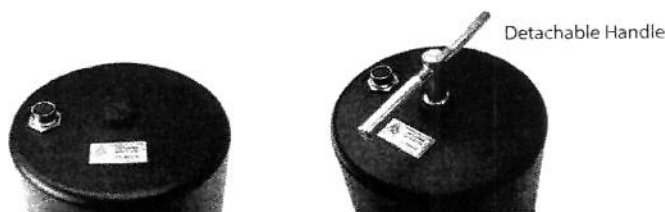
REF TEK BROADBAND SEISMOMETER "OBSERVER" SPECIFICATIONS

Model	151B-120 (P/N 97118-00) 151B-60 (P/N 97117-00)
Mechanical	
Size	9.45" dia. x 10.6" high (24 cm x 27 cm)
Weight	26.4 lbs (12 Kg)
Watertight Integrity	IP67 for outdoor use and immersion resistance
Alignment	Removeable orientation N/S pins screw into the base (brass for N, silver for S)
Leveling	Two Integrated Bubble Levels; three adjustable leveling feet with locknuts
Mass Position	Remote Monitoring and Adjusting Zero-point using 3 Independent Voltage Outputs
Mass Locking	Mechanical Lock/Unlock Mechanism Accessible on Outside of the Case
Mechanical Zero	No need for Adjustment within Ambient Temperature Fluctuation $\pm 20^{\circ}\text{C}$
Environmental	
Operating Temperature	-20° to $+60^{\circ}\text{C}$
Power	
Power Input	+12 VDC (9V to 18 VDC)
Power Consumption	~1.1 W
Power-Fail Protection	Built-in
Signal Overload Protection	Built-in
Lightning Protection	Built-in
Auto-Recovery Time	Full operation recovery within 10 minutes after either power fail or signal overload

Electrical	
Sensor Type	Triaxial, Orthogonal
Feedback	Force-balance with Capacitive Displacement Transducer
Frequency Bandwidth:	
151B-120	0.0083 Hz (120 sec.) – 50 Hz
151B-60	0.0166 Hz (60 sec.) – 50 Hz
Sensitivity	2000 V/m/s
Full Scale Output	± 20 V Peak-to-Peak Differential
Dynamic Range	>140 dB @ 5 Hz
Self-Noise (low model)	Below NLNM from 145 sec. to 10Hz
Output Impedance	<100 Ohms
Calibration	Coil Resistance 1,000 Ω Sensitivity: 10 m/s ² /A
Distortion	Total Distortion <-80 dB
Cross Axis Coupling	<1%
Low Spurious Resonance	Higher than 100 Hz
Damping	0.7 of Critical
Linearity	Better than 1% of full scale
Type	Free-running Oscillator

Ordering Information

Part No.	Description
97118-00	151B-120: Seismometer, 3 Component, 120 Sec. to 50 Hz, w/Case
97117-00	151B-60: Seismometer, 3 Component, 60 Sec. to 50 Hz, w/Case
97174-00	130-8803-33: Assembly, Cable, 130 to 151B-60/-120 Sensor, 33' (10m)
97177-00	151B-9802: Cover, Thermal Insulated



Detachable Handle



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Related Sub-systems:

High Resolution Seismic Recorders, 130S-01
Accelerometers, 131A & 131B, 147-01
Strong Motion Accelerographs, 130-SMHR & 130-SMA
Miniature Seismic Recorder, 125A "Texan"

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