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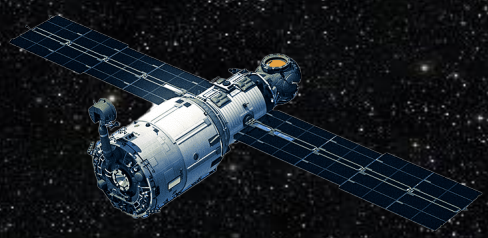
IGU-16HR 3C 2Hz ETH

The IGU-16HR 3C 2Hz ETH node seismometer can quickly and conveniently form various network arrays. Combining active and passive source methods, it gathers massive data for high-density array spatiotemporal measurements (DAM).
Suitable for scientific research and enterprise exploration across different scale.



Application Scenarios:
- Geological structure research
- Surface wave and body wave research
- Natural earthquake research
- Volcano and tsunami research
- Infrasound research
- Geothermal and mineral exploration
- Geological disaster observation
- Geological assessments of infrastructure



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IGU-16HR 3C 2Hz ETH

Three-Component Smart Seismic Sensor(Ethernet Version)



Key Features

- High Fidelity and High Sensitivity
- High Quality and High Consistency
- High Reliability and Cost-Effectiveness
- Low Frequencies Down to 15 s
- IP68 Waterproof and Dustproof Rating
- High-Speed Data Download and Charging
- Built-in GPS Supporting High-Precision Clock Synchronization and Positioning
- Large Capacity Built-in Local Storage Card for Massive Data Storage
- Ultra-Long Battery Life and Wide Operating Temperature Range
- Flexible System Configuration with Comprehensive Software Support
- Supports External Power and Ethernet Data Transmission
- Real-time QC of Seismic Data and Instrument Status

Overview

The IGU-16HR 3C 2Hz ETH is the latest integrated node seismometer launched by SmartSolo. It features a high-precision 2Hz three-component geophone and is equipped with Ethernet communication capabilities, allowing real-time monitoring of battery levels, satellite signals, acquisition scripts, and other device statuses. It also provides real-time access to seismic waveform data. The integrated design is suitable for various active and passive source data acquisitions, such as long-term background noise observations, microseism acquisition, MASW, and hydraulic fracturing monitoring. The frequency range extends from 15 s to 500 Hz.

New Generation Node Seismometer

Integrated Design
Built-in Battery Supports 40 Days of Continuous Acquisition
Supports External Power and Ethernet Data Transmission
Dual Status Indicators for Ethernet Data Transfer and Operational Status
Compatible with Controlled Sources and Impulsive Sources

Real-time Data Transmission

Real-time QC of Seismic Data and Device Status

Outstanding Performance

Built-in GPS Receiver and High-Precision Clock 32-bit Σ-Δ High-Resolution ADC
Sampling Rate Up to 0.25 ms
Built-in 64 GB Memory, Expandable to 128 GB

Applications

- Geological structure research
- Surface wave and body wave research
- Natural earthquake research
- Volcano and tsunami research
- Infrasound research
- Geological disaster observation
- Geological assessments of infrastructure
- Active and Passive Source Seismic Exploration
- Natural Microseism Detection
- Transient Surface Wave Exploration
- Karst Area Detection
- Underground Space and Void Detection
- Engineering Safety Risk Assessment
- Disaster Early Warning

Peripheral Equipment

Dedicated Downloader (USB 2.0 @20 MB/s for High-Speed Data Download)
4-Port USB Adapter for Easy Expansion (Supports Simultaneous Data Download from 4 Devices)
Power Adapter Supports 4A Current Charging SoloLite and SWDCC Software (Simple and Efficient)



Dedicated Downloader 4-Port USB Adapter Power Adapter

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Specifications

General Specifications

Channels	3
Dimensions	ϕ158 x160 mm(without leveling nuts)
Weight	5.8 kg(including battery and leveling nuts)
Protection Rating	IP 68
Operating Temperature	-40° C to +70° C
Charging Temperature	+3° C to +45° C
Charging Time	<7.5 hours
Battery Life @25°C	40 days @ 2 ms, 24 hours of operation per day, offline mode 80 days @ 2 ms, 12 hours of operation per day, offline mode 7 days @ 2 ms, 24 hours of operation per day, Ethernet transmission mode
Memory	64 GB(expandable to 128 GB)
Data Transmission	Supports Ethernet data transmission
Data Download	USB2.0
External Power	7-15 VDC
GNSS Mode	Supports GPS, Beidou, GLONASS, with single- mode and dual-mode operation

Channel Specifications

(Unless otherwise specified, all values are at a sampling rate of 2 ms, 31.25 Hz, and +25° C.)

ADC Resolution	32 bits (The ADC has a resolution of 32 bits, with noise resolution not exceeding 24 bits)
Sampling Rate	0.25，0.5，1，2，4，8，10，20 ms
Pre-Amplifier Gain	0 dB to 36 dB，6 dB increments
Anti-Aliasing Filter	206.5 Hz @ 2 ms (82.6% Nyquist frequency), selectable – linear phase or minimum phase
DC Blocking Filter	1 Hz to 10 Hz, in 1 Hz increments or DC Remove
Maximum Input Signal	±2.5 V peak @ 0 dB gain
Instantaneous Dynamic Range	125 dB @ 2 ms, 0 dB gain
Equivalent Input Noise	0.18 μV @ 2 ms, 18 dB gain
Total Harmonic Distortion	<0.0002% @ 0 dB gain
Common Mode Rejection	>100 dB
Gain Accuracy	<1%
GPS Time Standard	1 ppm
Timing Accuracy	±10 μs，GPS Synchronization
Channel Crosstalk	<-110 dB
Inter-Channel Phase Difference	<0.1 ms
Lateral Vibration Suppression	Better than 0.1%
Inter-Channel Amplitude Consistency	5%
System Dynamic Range	145 dB
Frequency Response	0-1652 Hz@0.25 ms

Geophone Specifications

(Unless otherwise specified, all parameters are tested at +20° C
with the vertical core in vertical conditions and the horizontal core in horizontal conditions.)

Natural Frequency	2 Hz
Frequency Bandwidth	15 s - 500 Hz
Distortion	⩽ 0.30% @ 12 Hz, (0° - 7.5°) vertical tilt, (0° - 0.5°) horizontal tilt
Damping	0.70
Sensitivity	260 V/m/s(6.60 V/in/s)



Note: SmartSolo Scientific reserves the right to make changes to this manual, and no prior notice will be given for any amendments.

SmartSolo Solar Gateway

The SmartSolo Solar Gateway includes a 25 W solar panel, a 122 Wh low-temperature battery, and an Ethernet-to-4G communication module. By connecting the IGU-16HR 3C 2Hz ETH to the SmartSolo Solar Gateway, data can be transmitted wirelessly via 4G to a local computer, enabling long-term monitoring and wireless data transmission.

Performance Specifications

Maximum Solar Power	24±5% W
Peak Solar Voltage	18.0 V
Peak Solar Current	1.39 A
Battery Voltage	12.8 V
Battery Capacity	9.6 Ah
Charging Temperature	-30° C to +60° C
Discharging Temperature	-40° C to +60° C
Storage Conditions	Store in a dry place, free from corrosive gases, at temperatures between -20 ° C to +60 ° C and humidity of 65% ± 20% RH. Optimal Storage Temperature: +10° C to +25° C Optimal Storage Humidity: 65% ± 20%
Wind Resistance	60 m/s
Hail Resistance	20 m/s （25mm）
Dimensions	450 mm×380 mm×100 mm
Weight	6.6 kg

4G IoT Frequency Bands

Compatible with 4G cellular networks and can be used in China and surrounding areas.

Performance	LTE CAT4 3GPP R9 (Category 4: 150 Mbps Peak Downlink / 50 Mbps Peak Uplink)
Frequency band	LTE-FDD: B1/3/5/8 LTE-TDD: B34/38/39/40/41 WCDMA: B1/8

Note: 4G is a high-frequency electromagnetic wave, and the 4G signal is easily affected by geographical environment, spatial magnetic fields, and 4G base stations, which can lead to instability and unreliability. Based on this, it is hereby stated that SmartSolo's products are robust and durable, and there are no issues with data collection and local storage. However, we do not guarantee any data transmission issues arising from 4G signal failures outside of this product.

Data Security & Disclaimer

This device only provides underlying data transmission technology and physical infrastructure. Neither the device nor its supporting systems contain, reserve, or provide any unauthorized data access channels, malicious backdoors, or hidden control mechanisms.

All data transmitted, processed, or stored through this device shall remain the sole responsibility of the user. The user independently assumes full ownership, operational management, security, and regulatory compliance obligations related to such data, including but not limited to data compliance, content review, cybersecurity, privacy protection, and lawful use.



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New generation of seismic instruments | New generation of electrical instruments |
New generation of data acquisition systems