Kl,.Data Acquisition Systems NT System Design

# AMT Observation Instrument ELOG-AMT

## 24-bit Magnetotelluric AMT Observation System

This instrument is designed to record two magnetic field components and two electric field components simultaneously, utilizing commonly used magnetic sensors in Japan. It supports induction sensors from Phoenix and Metronix.

**Key Features:**

- **Recording Rates:** High-speed 120kHz / Low-speed 120Hz
- **ADC:** 24-bit resolution delta-sigma ADC with an oversampling frequency of 7.68MHz
- **Data Processing and Storage:** Oversampled data is processed by a digital filter and recorded onto an SD card (up to 512GB capacity).
- **Clock Precision:** Uses an internal reference clock with an accuracy of ±31ns for ADC operation, ensuring continuous synchronization with UTC.
- **High Efficiency and Low Power Consumption:** Equipped with 4 channels and a 24-bit ADC, the instrument achieves a high recording rate of 120kHz while maintaining low power consumption of just 4.2W, allowing for extended observation periods with smaller battery capacities.
- **Automatic Recording:** Low-speed recording (120Hz) starts immediately upon synchronization of the internal clock with UTC. High-speed recording (120kHz) is controlled by timer information stored on the SD card, recording only during specified periods.
- **Compatibility with Multiple Induction Magnetic Sensors:** Supports two types of induction magnetic sensors(Phoenix and Metronix), enabling flexible observation planning.
- **Portable and Durable Design:** Housed in a waterproof, compact, and lightweight enclosure, the instrument weighs only 2.8kg, reducing the burden of installation.


For pricing and inquiries, please contact us.


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# ELOG-AMT Specifications

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| Input | - Channels: 2 channels for electric field (E-field), 2 channels for magnetic field (B-field), 4 channels in total<br>- E-field Input Range: ±2.048V, differential input<br>Surge protection with gas tube arresters<br>Ground (GND) electrode input available<br>- B-field Input Range: ±4.096V, differential input<br>Both E-field and B-field inputs are protected against surges with semiconductor surge absorbers. |
| Recording Rates | - High-speed recording: 120kHz<br>- Low-speed recording: 120Hz<br>Low-speed recording (120Hz) is continuous and can be maintained without data loss if the SD card is swapped within 30 seconds. |
| Dynamic Range | - E-field: ≥133dB @ 120Hz, ≥113dB @ 120kHz<br>- B-field: ≥135dB @ 120Hz, ≥114dB @ 120kHz |
| Noise Level (Input Equivalent) | - E-field: ≤0.60μVrms @ 120Hz, ≤6.4μVrms @ 120kHz<br>- B-field: ≤0.99μVrms @ 120Hz, ≤12μVrms @ 120kHz |
| Timer Recording | High-speed recording (120kHz) is controlled by a timer file on the SD card, recording only during the specified times each day. |
| Input Impedance | 10MΩ for both E-field and B-field |
| AD Converter | - Type: Delta-sigma, 24-bit resolution<br>- Oversampling Frequency: 7.68MHz<br>The driving clock is continuously synchronized with the internal reference clock. |
| Analog Anti-aliasing Filter | - Type: 4th order Butterworth low-pass filter (LPF) with a cutoff frequency of 330kHz |
| Digital Anti-Aliasing Filter | - Type: Wide-band, low-ripple filter<br>- Signal Passband: DC to 48kHz, with passband ripple within ±0.005dB<br>- -3dB Cutoff Frequency: 51.94kHz<br>- Stopband: ≥60kHz, attenuation of ≥105dB |
| Internal Reference Clock | - Synchronization: GPS + GLONASS + Galileo + QZSS (Quasi-Zenith Satellite System)<br>- Time Accuracy: Within ±31 nanoseconds to UTC. The location of the observation point is also recorded on the SD card. |
| Data Recording Media | - Type: SD Card<br>- Supported Formats: SD/SDHC/SDXC<br>- Supported Capacity: Up to 512GB<br>- File System: FAT16/FAT32/exFAT |
| Connector Types | - E-field: Johnson terminal<br>- B-field: MIL standard circular female, 18 pins (Model: PT02E-14-18S)<br>Power Output for Magnetic Sensors: ±12V, maximum output current ±250mA |
| Compatible Magnetic Field Sensors | - Phoenix: AMTC-30C, MTC-50H, MTC-80H (direct connection)<br>- Metronix: MFS-06e/07e (requires optional adapter) |
| On-device Display | - Type: Reflective LCD, 20 characters x 4 lines for displaying operational status and other information<br>- Display Content: Time, 4-ch measurement values, GPS status, power voltage |
| Power Supply Voltage | - DC 9V to 18V |
| Power Consumption | - 4.2W (0.35A @ 12.0V) without magnetic field sensor connection<br>- 5.4W (0.45A @ 12.0V) with two Phoenix MTC-50H sensors connected |
| Enclosure | - Waterproof plastic, IP67 rated |
| Dimensions | - Size: 270mm x 246mm x 174mm |
| Weight | - Main Unit: 2.8kg |
| Op. Temperature | - Range: −20˚C to +50˚C |
| Accessories | - GNSS Antenna: 1 patch-type, cable length 2.5m<br>- SD Card: 1 (512GB capacity) |

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