BWM1

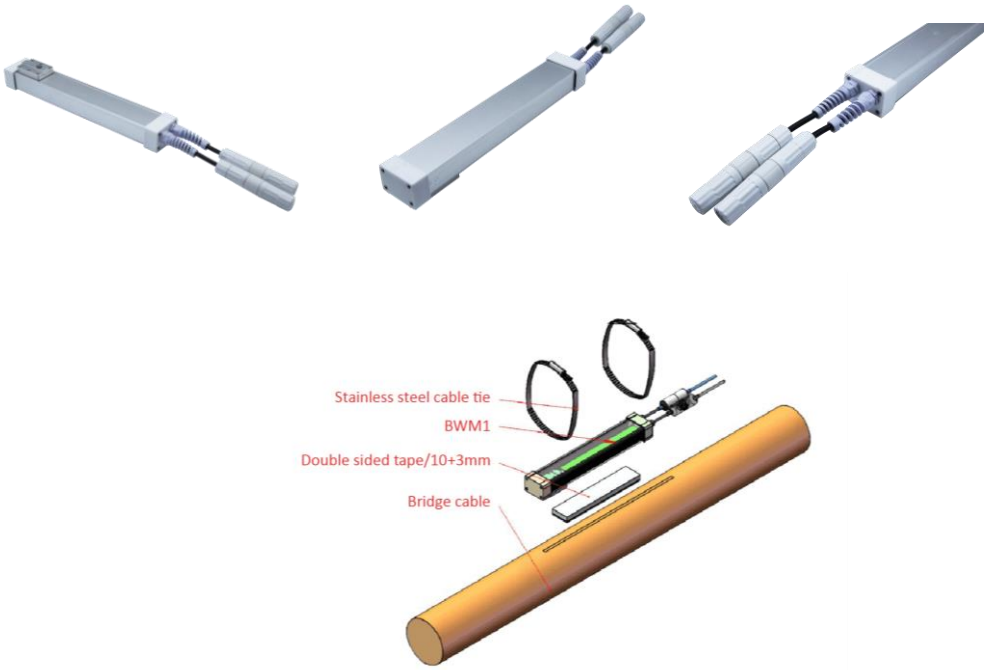
Bridge Wire Monitoring System

Technical Manual

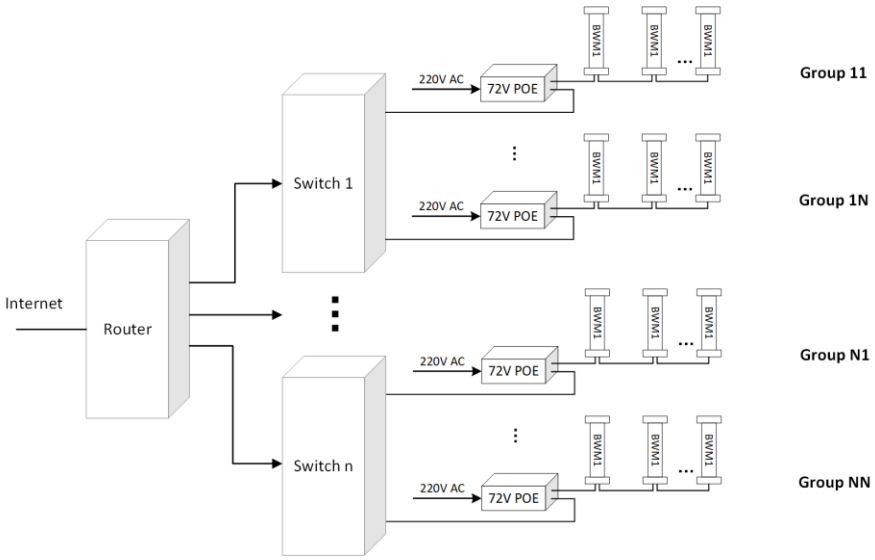
Version：V1.1.1

01 Overview

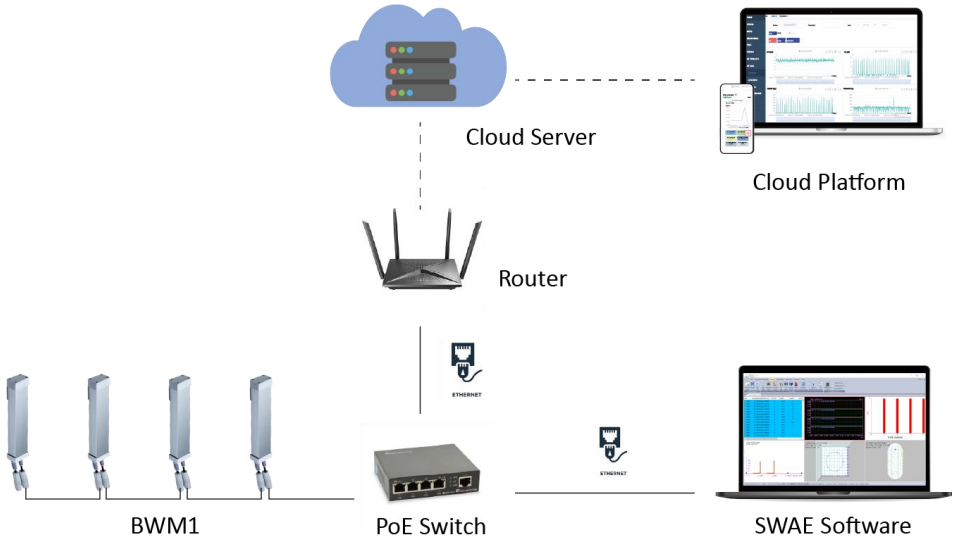
BWM1 adopts an ARM system architecture, featuring an embedded ADC (Analog-to-Digital Converter) circuit, filtering and conditioning circuit, and Ethernet communication. It can connect to a cloud platform via a router, with POE (Power over Ethernet) providing both communication and power supply. The collector is designed as a strap-like structure with an integrated preamplifier circuit board.



The BWM1 can be networked through switches, with multiple switches connected to a router to form a large-scale bridge monitoring system.

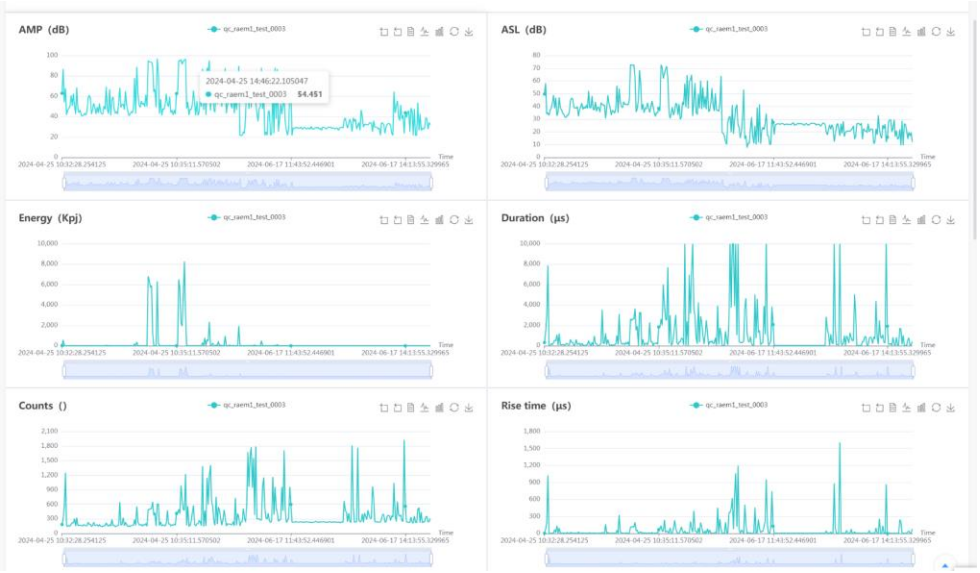


02 System Architecture

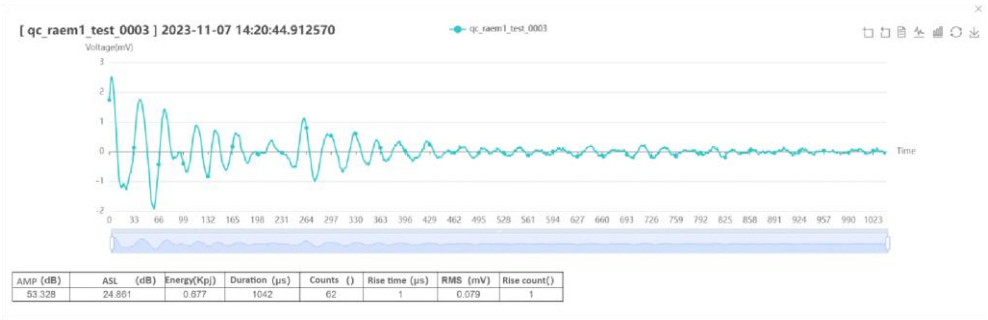


1. Qingcheng Cloud Platform

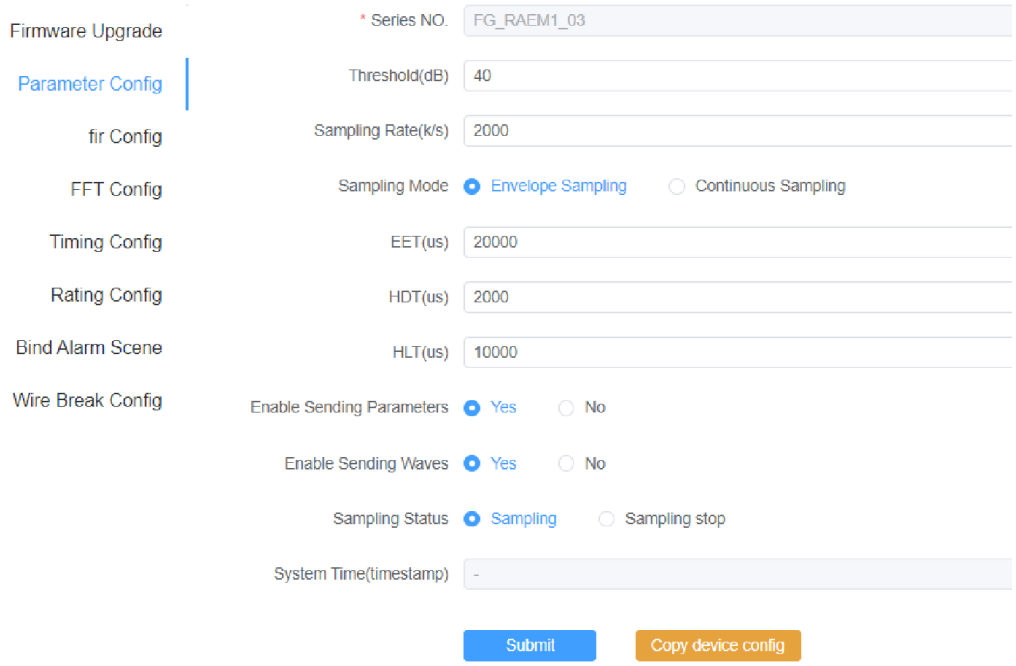
- Data can be uploaded to the cloud IoT platform (Qingcheng Cloud) for display and analysis.



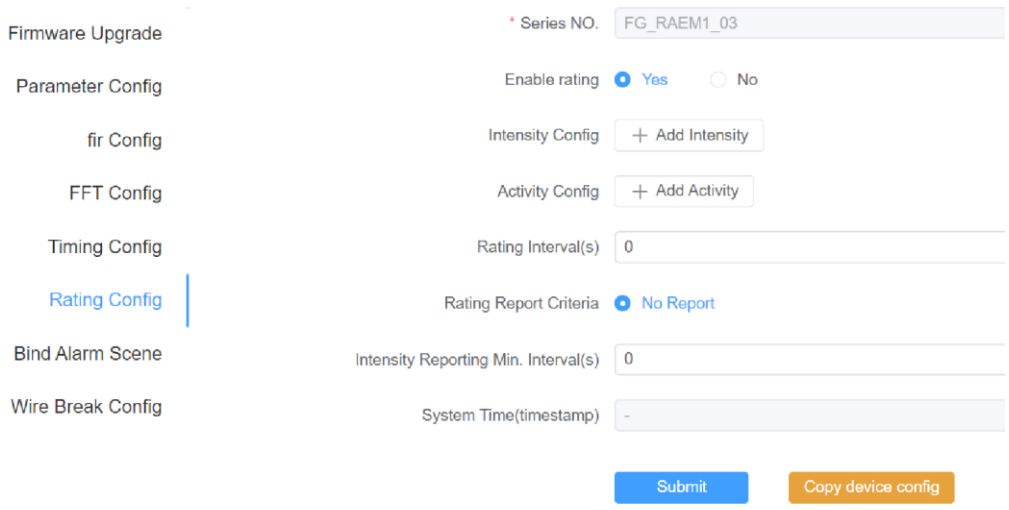
- **AE Feature Parameters:** Arrival time, amplitude, ring count, energy, rise time, duration, RMS, ASL.



- **Remote Configuration:** Remote parameter configuration, control start/stop, timing configuration, broken wire grading settings.



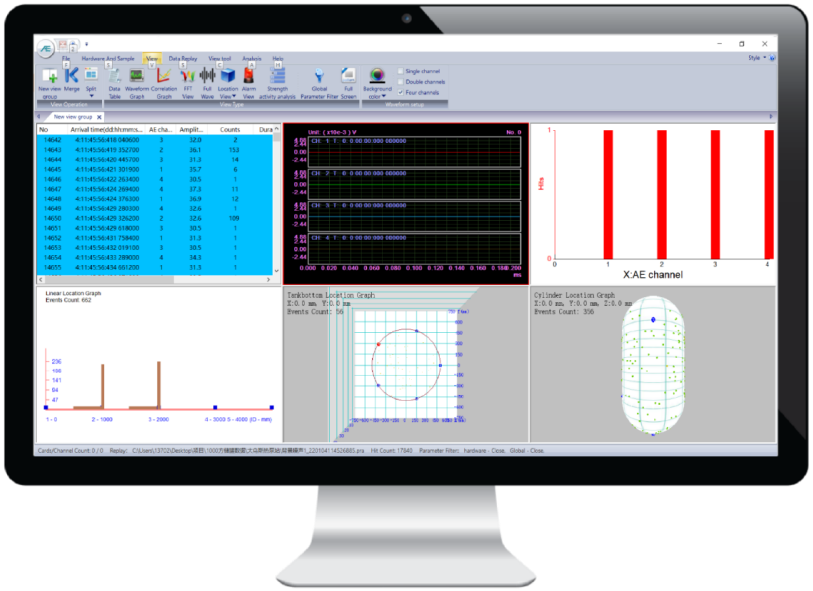
- **Grading Function:** The system automatically grades, and the grading results can be viewed remotely on the cloud. The acoustic emission data is automatically graded based on the impact parameters, providing intensity, activity, and comprehensive levels. The flexible settings can meet the grading needs of different industry standards.



- **Grading Parameters:** Impact count, duration, rise time, rise count, ring count, amplitude, ASL, RMS, energy.

2. SWAE Software

Download data from the cloud or directly send it to the SWAE software for in-depth analysis and processing. It includes **positioning analysis**, **parameter analysis**, **correlation graph analysis**, **waveform analysis**, **Fast Fourier transform**, **wavelet transform grading analysis**, etc.



03 Technical Specifications

BWM1 Hardware Technical Specifications

Channel	Single-channel or multi-channel combination
Acquisition Method	Signal-triggered/time-triggered
Sampling Rate	Maximum sampling rate of 2M points/s for single channel
Sampling Precision	16-bit
System Noise	Better than 30dB
Dynamic Range	70dB
Input Bandwidth	10kHz-800kHz
Analog Filter	Combination of two high-pass filters at 30kHz and 125kHz, and two low-pass filters at 80kHz and 175kHz. Default band-pass filter combinations are 30kHz~80kHz and 125kHz~175kHz, factory-fixed.
Digital Filter	256-order FIR filter, configurable as pass-through, high-pass, low-pass, or band-pass within the 0kHz~1000kHz frequency range
Sensors	Selectable center frequency of 40/150KHz; two built-in preamp gains of 20/40dB available
Data Output	Waveform, parameters, parameter rating
AE Parameters	Arrival time, amplitude, counts, energy, rise time, duration, RMS, ASL
Built-in SD Card Capacity	64GB (expandable to 512GB)
Communication Method	Ethernet
Power Supply	POE power supply
Dimensions	507mm (including waterproof connector) x 50mm x 43mm
Weight	285g
Installation	Strap (clamp) structure
Protection Level	IP67
Temperature Range	-30°C to +70°C
Single Node Wiring Distance	Maximum of 400 meters of network cable for connecting up to 6 devices in series

03 Main Applications

Monitoring and detection of broken wires of suspension bridge cables, main cables, cable-stayed bridge cables, arch bridge hangers (cables), or tie rods.