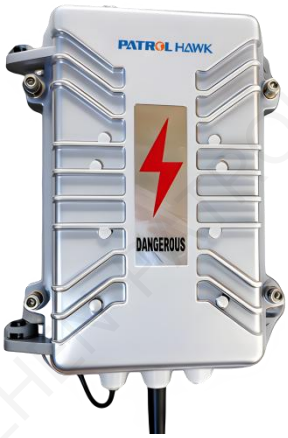
Outdoor Power Equipment Operation Monitoring & Anti-Theft Alarm

Model: PH-G31

DATA SHEET



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1. Product Overview

Model No.: PH-G31

Product Name: Outdoor Power Equipment Operation Monitoring & Anti-Theft Alarm

Application Scenarios:

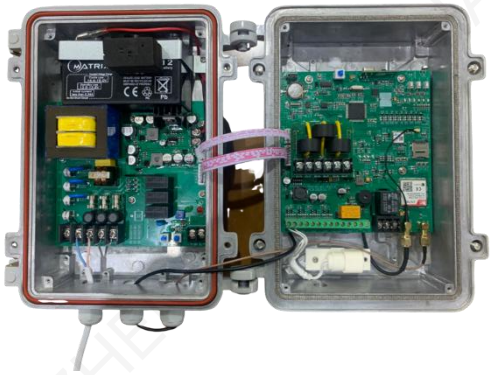
This product is widely applied to outdoor transformers, high & low voltage distribution boxes, cable branch boxes, ring main units, outdoor switchgears, pole-mounted power facilities and other equipment. It realizes real-time monitoring of power operating parameters, equipment anti-theft protection and fault early warning alarms.

As an integrated industrial-grade outdoor power monitoring alarm terminal, the device integrates three-phase power parameter collection, intelligent sensor monitoring, wireless communication, local sound-light alarm and remote alert push functions. It supports multi-dimensional fault and anti-theft monitoring including power cut, phase loss, overvoltage, undervoltage, overload, equipment vibration & tilt, unauthorized cover opening and overheating abnormality. Through 4G wireless network, remote alarms can be delivered via SMS, voice calls and cloud platform. With ultra-low power consumption, outdoor dustproof & waterproof structure and lightning anti-interference performance, the device adapts to harsh field working conditions, and effectively reduces safety risks such as power equipment theft, unexpected power outages and equipment burnout.

2. Core Functional Features

Function Category	Detailed Function Description
Power Parameter Monitoring	Real-time collection of single/three-phase voltage and three-phase current; customizable thresholds to trigger alarms for overvoltage, undervoltage, phase loss, power cut, overload and abnormal current; optional power, electric energy and power factor modules to accurately record equipment operating power data.
Intelligent Anti-Theft Alarm	Equipped with high-precision vibration sensor to identify abnormal behaviors such as vibration, tilt, displacement and prying with adjustable multi-level sensitivity; built-in anti-tamper switch triggers instant alarm once the cover is opened without authorization; supports cable break monitoring to prevent power cable theft.
Multi-Mode Alarm	Built-in local high-decibel sound-light warning device; remote alarm methods including SMS alert, automatic voice dialing, cloud platform push and SMS reminder; multiple administrator phone numbers can be preset to ensure timely alarm notification.
Industrial-Grade Communication	Adopts industrial 4G full-network module with 2G/3G network fallback for stable signals; supports universal protocols such as TCP/IP and Modbus, which can be connected to various power IoT cloud platforms; embedded SIM card slot compatible with IoT cards and ordinary mobile SIM cards.

Dual Power Continuous Supply	Wide-voltage mains input suitable for industrial power scenarios; optional solar panel input for power-outage scenarios; built-in rechargeable backup battery automatically switches to power the device after mains power failure to maintain continuous monitoring and alarm, eliminating monitoring blind spots caused by power loss; triple protection against battery overcharge, overdischarge and short circuit.
Remote Intelligent Control	Support remote arming/disarming, parameter configuration and alarm threshold modification; regular automatic upload of equipment operating status and power data; local storage of alarm records and operating data, which can be remotely accessed for query.
Outdoor Environmental Resistance	Fully sealed enclosure with high-grade dustproof and waterproof performance; dual lightning & surge protection for power and signal ports with anti-electromagnetic interference capability, ensuring stable operation under harsh field environments including thunderstorms, extreme temperatures and high humidity.



3. Detailed Technical Specifications

3.1 Power Monitoring Parameters

Parameter Item	Specification Range	Measurement Accuracy	Remarks
Single-Phase Voltage Range	AC 0~300V	±0.5%FS	Applicable to three-phase four-wire power equipment
Current Measurement Range	0~5A	±1%FS	Expandable with external CT on site for large current (0~5000A)
Overvoltage Alarm Threshold	105%~120% of rated voltage (adjustable)	/	Customizable trigger conditions
Undervoltage Alarm Threshold	70%~90% of rated voltage (adjustable)	/	Supports low-voltage fault early warning

Parameter Item	Specification Range	Measurement Accuracy	Remarks
Phase Loss Detection Delay	≥3 seconds (adjustable)	/	Filters transient voltage fluctuations
Power Cut Detection Delay	≥5 seconds (adjustable)	/	Prevents false alarms

3.2 Sensor Monitoring Parameters

Sensor Type	Technical Specification	Alarm Threshold	Explanation
Vibration Sensor	High-sensitivity data collection	Adjustable vibration intensity and trigger duration	Precisely identifies prying, impact and displacement
Anti-Tamper Sensor	Industrial durable normally closed mechanical contact	Instant alarm upon contact disconnection	Prevents unauthorized cover opening
Human Body Sensor	Dual-element pyroelectric infrared sensor	Adjustable sensing distance 0–8m, adjustable alarm times for continuous trigger	Detects human approaching behavior

3.3 Communication Parameters

Parameter Item	Specification Description
Communication Module	4G & 2G full-network module
Communication Protocols	TCP/IP, Modbus RTU/TCP
SMS Function	Supports SMS alarms sent to 5 mobile numbers; stores more than 50 offline alarm logs
Voice Alarm	Supports automatic dialing to 5 preset numbers with built-in audio monitoring function
Positioning Function	GPS & Beidou dual-mode positioning, positioning accuracy ≤5m

3.4 Power Supply Parameters

Parameter Item	Specification Description
Main Power Input	AC 160~265V 50/60Hz; compatible with DC 12~30V wide voltage
Backup Battery	DC12V/1.2Ah rechargeable lead-acid battery with built-in protection circuit
Optional Solar Panel	DC15V/15W monocrystalline silicon
Endurance After Power Cut	Continuous operation ≥18 hours under standby mode
Standby Power Consumption	≤0.5W, ultra-low power design
Operating Power Consumption	≤20W under alarm state (including sound-light driver)
Battery Protection	Triple protection against overcharge, overdischarge and short circuit

3.5 Physical & Environmental Parameters

Parameter Item	Specification Description
Enclosure Material	Die-cast industrial aluminum alloy, anti-corrosion and rust-proof
Protection Grade	IP65 dustproof and waterproof
Operating Temperature	-20°C ~ +60°C
Storage Temperature	-40°C ~ +85°C
Relative Humidity	10%~95%RH, non-condensing environment
Lightning Protection Grade	IEC 62305 LPL III, 100KA

3.6 Hardware Interface Parameters

Interface Type	Quantity	Specification Description
3 Phase Voltage Input Interface	3 channels	For high voltage signal collection,Wye connection
Current Collection Interface	3 channels	Compatible with standard current transformers
Anti-Tamper Interface	1 channel	Integrated built-in anti-tamper contact

Interface Type	Quantity	Specification Description
Relay Output Interface	1 channel	10A/250VAC contact, can link external equipment
RS485 Communication Interface	1 channel	Supports Modbus protocol for equipment networking and docking
Antenna Interface	2 ports	Standard SMA connectors (for 4G and positioning respectively)

4. Installation Instructions

4.1 Mounting Methods

1.Wall-mounted installation: Standard mounting bracket is provided, which can be fixed on distribution boxes and cabinet side walls, compatible with most power cabinet scenarios.

2. Hoop-mounted installation: Optional hoop accessories are available for installation on utility poles, transformer bodies, columns and other outdoor equipment.
3. Installation Requirements: Install the device vertically; avoid positions with direct rain flushing, long-term sunlight exposure and heavy shielding to ensure unobstructed antenna signal reception.

4.2 Wiring Guidelines

1.Power collection wiring: Connect L1/L2/L3/N three-phase voltage lines and current transformer lines correspondingly to avoid misconnection and loose wiring.

2.Ensure reliable grounding of the enclosure.

3.Sensor wiring: Connect cable detection lines, external temperature sensors and anti-tamper lines as required.

4. Peripheral wiring: Relay output can link external sound-light alarms, circuit breakers and other equipment.
5. Communication configuration: Insert IoT SIM card, install and conceal 4G and positioning antennas tightly to guarantee stable signal reception.

5. Alarm Working Flow

Step 1: Real-Time Monitoring: The device collects power parameters, equipment vibration, cabinet opening status, human proximity and other data 24 hours a day without interruption.

Step 2: Threshold Judgment: The system compares collected data with preset alarm thresholds, filters transient interference data and confirms valid abnormal faults.

Step 3: Local Alarm Trigger: Activate local sound-light alarm with high-frequency flashing indicator lights for on-site warning.

Step 4: Remote Information Push: Automatically send SMS alarms and dial preset mobile numbers, and push fault information to the cloud platform simultaneously.

Step 5: Data Storage: Automatically record alarm time, fault type, real-time parameters and equipment status; locally stored records are traceable and can be exported and queried via backend system.

6. Supporting Cloud Platform Functions(Optional)

1.Real-Time Data Monitoring: Check real-time equipment operating power data, equipment status and online status via Web client.

2. Historical Data Traceability: Long-term storage of operating data and alarm records, supporting query, export and report printing.

3. Remote Equipment Operation & Maintenance: Remotely modify alarm thresholds, arming/disarming status, alarm phone numbers and data upload frequency.

4. Data Statistics & Analysis: Automatically generate trend reports of voltage, temperature and alarm frequency to assist power operation and maintenance analysis.

5. Mass Equipment Management: Support networking of thousands of devices, with group management, hierarchical permission control and regionalized operation & maintenance.

7. Product Model Configurations

Product Model	Functional Configuration Description
Basic Version	Three-phase power monitoring, vibration anti-theft, anti-tamper alarm, 4G communication, SMS & voice call alarm

Product Model	Functional Configuration Description
Enhanced Version	All functions of Basic Version + GPS & Beidou positioning, full cloud platform docking, refined remote operation & maintenance
Custom Version	Customized parameters, functions, interfaces and protocol adaptation according to customer requirements

8. Notes for Installation & Operation

The equipment must be reliably grounded to effectively avoid lightning and electrostatic interference and ensure stable operation.

Industrial dedicated IoT SIM cards are recommended to guarantee stable SMS and data communication and prevent service suspension caused by arrears.

Regularly inspect battery status, antenna connections and tightened wiring terminals to guarantee battery endurance and communication performance.

Do not install the device in environments with strong electromagnetic radiation, high-temperature closed space or corrosive substances, which will affect monitoring accuracy and equipment service life.

Cut off mains power before equipment maintenance and wiring operations, and strictly comply with power safety operation specifications.

All parameter thresholds can be customized according to on-site working conditions to adapt to monitoring requirements of different power equipment.

Warm Reminder:

If the actual product is inconsistent with this datasheet, the physical product shall prevail.