

Huawei Power System Alarm Reference - Official Technical Overview & Hardware Datasheet

PRODUCT IDENTIFICATION

The Huawei Power System Alarm Reference is a carrier-grade hardware-embedded monitoring and reporting subsystem designed for real-time fault detection, environmental surveillance, and proactive maintenance signaling across Huawei's network power infrastructure portfolio. As a dedicated physical and logical alarm aggregation engine, this system serves as the primary interface between power hardware and network management layers, providing granular visibility into rectifier anomalies, battery string deviations, distribution faults, and thermal runaway precursors. Engineered to comply with telecom-grade operational continuity mandates, the Alarm Reference establishes a verifiable audit trail of every power event and is fully integrated with Huawei's NetEco and third-party SNMP-based supervisory platforms.



SYSTEM HARDWARE TOPOLOGY

The Alarm Reference architecture is logically partitioned into three physically redundant processing domains: the Signal Acquisition Unit (SAU), the Alarm Mediation Engine (AME), and the Notification Dispatch Module (NDM). The SAU interfaces directly with discrete hardware sensors—including Hall-effect current transducers, thermistor arrays, and voltage dividers—sampling at a base rate of 200 Hz with a maximum jitter of ± 2 ms. All acquired analog signals are digitized through 16-bit SAR ADCs with an effective resolution of 0.1% full scale. The AME performs pattern-matching against a factory-programmed and user-extensible alarm threshold library, supporting up to 8,192 concurrent alarm instances. The NDM handles alarm prioritization, suppression, and protocol formatting, with native support for SNMPv3 traps, Modbus/TCP, and proprietary Huawei CC08 signaling. Physical hardware is housed in a compact

1RU half-rack form factor (dimensions: 210 mm x 280 mm x 44 mm) with dual hot-swappable fan trays and an integrated electromagnetic interference (EMI) shielding cage rated for Class A environmental emissions.

DATA & CONTROL PLANE CAPABILITIES

The control plane is underpinned by a dual-core ARM Cortex-A53 processor running at 1.2 GHz, coupled with 4 GB of ECC-protected DDR4 memory and 32 GB of onboard eMMC flash storage for persistent alarm logging. The data plane operates on a separate FPGA-based forwarding pipeline capable of processing 10,000 event notifications per second with sub-10 ms latency to the management interface. All time-stamping is synchronized via IEEE 1588v2 Precision Time Protocol (PTP) with a holdover accuracy of $\pm 1 \mu\text{s}$ over 24 hours. The system provides configurable alarm severity grading: CRITICAL, MAJOR, MINOR, and WARNING, each associated with programmable escalation policies. Additionally, the Alarm Reference supports bidirectional control messaging, enabling remote clearing, shelving, and manual override of active alarms through an RBAC-secured CLI or WebUI interface.

COMPONENT BREAKDOWN

Key hardware modules within the Alarm Reference include:

- Alarm Processing Unit (APU): Main logic board containing CPU, memory, and FPGA fabric. Features a dedicated hardware watchdog with 500 ms time-out and automatic system reset.
- Input Sensor Interface Board (ISIB): Provides 32 differential analog input channels (0-10 V DC or 4-20 mA current loop) and 16 isolated digital inputs (contact closure detection). All inputs are protected against overvoltage (up to 60 V DC) and reverse polarity.
- Communication Interface Board (CIB): Supports dual Gigabit Ethernet ports (RJ45, SFP optional), two RS-485 serial ports, and one USB 2.0 maintenance port. Implements hardware-level STP and RSTP loop prevention.
- Power Supply Module (PSM): Dual-redundant 1+1 configurable AC/DC input, accepting 100-240 V AC (47-63 Hz) or 110-380 V DC, with an efficiency rating of $\geq 92\%$ at 50% load.
- Expansion Relay Output Board (EROB): Optional add-on card providing 8 Form-C dry contact relays (rated at 2 A, 30 V DC) for external annunciator or automatic load-shed control.

OPERATIONAL SPECS MATRIX

Parameter	Specification
Form Factor	1RU half-rack (210 mm x 280 mm x 44

	mm)
Processor	Dual-core ARM Cortex-A53 @ 1.2 GHz
Memory	4 GB DDR4 ECC + 32 GB eMMC flash
Analog Inputs	32 channels, 0-10 V DC or 4-20 mA, 16-bit SAR ADC
Digital Inputs	16 isolated channels, contact closure detection
Communication Ports	2x GbE RJ45/SFP, 2x RS-485, 1x USB 2.0
Alarm Processing Rate	10,000 events/second, <10 ms latency
Power Supply	1+1 redundant, AC: 100-240 V / DC: 110-380 V
Efficiency	≥92% at 50% load
Relay Outputs	8x Form-C dry contacts, 2A/30V DC (optional)
Time Synchronization	IEEE 1588v2 PTP, ±1 μs holdover
Cooling	Dual hot-swappable fan trays, front-to-back airflow
Operating Temperature	-5°C to +55°C
Humidity	5% to 95% RH (non-condensing)
Safety Compliance	IEC 62368-1, UL 60950-1, CSA C22.2
EMC Standards	FCC Part 15 Class A, EN 55022

NEBS Certification	GR-63-CORE, GR-1089-CORE Level 3
Ingress Protection	IP30
MTBF	250,000 hours (calculated per Telcordia SR-332)

REGULATORY COMPLIANCE

The Huawei Power System Alarm Reference holds full certification for global telecommunications deployment, including: (a) EMC compliance with FCC Part 15 Class A and EN 55022:2010; (b) Safety certification to IEC 62368-1:2018, UL 60950-1, and CSA C22.2; (c) Environmental compliance with RoHS Directive 2011/65/EU and REACH Regulation (EC) No 1907/2006; (d) NEBS Level 3 certification (GR-63-CORE, GR-1089-CORE) for seismic vibration, thermal shock, and fire propagation resistance; and (e) IP30 ingress protection rating per IEC 60529. Additionally, the Alarm Reference is fully compatible with Huawei's energy efficiency reporting protocols under ETSI EN 303 470.

