

IoT Concentrator and Monitoring Platform

White Paper 2026 | From isolated devices to unified access, edge computing and cloud fusion

HW-IOT-SOL-2026 | V1.0 | Aug 2026 | Public

Why unified access and a platform

PD, arrester, temperature, SF6, capacitor monitors - modern substations have more and more online monitoring devices, but heterogeneous protocols and scattered deployments create 'data islands'. Operators switch between multiple UIs and efficiency drops.

Core pain points: (1) multi-vendor devices do not interoperate, hard to integrate into station control; (2) massive raw data to the master station strains bandwidth and storage; (3) single-parameter alarms have high false-alarm rates without fusion diagnosis.

A unified access node + edge computing + platform fusion solves all three. HUWOR treats 'concentrator + IED + platform' as the nervous centre of online monitoring: sensors above, station control and cloud below.

HUWOR access - edge - platform architecture

Platform fusion layer: Intelligent Condition Monitoring System (B/S) - multi-parameter fusion diagnosis, PRPS/PRPD patterns, mobile app, alarm grading.

Edge computing layer: PD IED unit HMJ1020-IED (4-16 channels) - on-site sampling, discharge-type recognition, edge pre-processing.

Unified access layer: IoT concentrator HMJ1020-WJ series - LoRa/RS485/Ethernet downlink, Ethernet/fibre/4G uplink, IEC 61850.

Sensing layer (accessed objects): PD / arrester / temperature / SF6 / capacitor sensors and meters.

Design principle: concentrator handles multi-mode access + long-distance transmission; IED handles high-frequency sampling + on-site recognition; platform handles fusion diagnosis + unified presentation. Three decoupled layers scale with substation size.

Core product family

IoT concentrator HMJ1020-WJ: AC 100-240 V; LoRa + RS485 + Ethernet downlink; RS485 + Ethernet + fibre + 4G uplink; IEC 61850; receiving sensitivity -148 dBm.

PD IED unit HMJ1020-IED: 4-16 channels; 300-1500 MHz; sampling ≥ 100 MHz; refresh ≤ 1 s; recognises 5+ discharge types.

Intelligent Condition Monitoring System: B/S, VUE + microservices, MySQL/SQLite + Redis; MQTT/HTTP; PRPS/PRPD patterns, multi-class algorithms (minimum-distance, neural network, SVM); Modbus/IEC 61850 and encrypted protocols; Android 4.2+ / HarmonyOS 2.0+ mobile; edge APP on Java 1.8 + Docker (Ubuntu 18.04).

Networking & selection guide

Switchgear / RMU PD: 3-in-1 / 2-in-1 sensor + space UHF + collector + concentrator - wireless aggregation, concentrator to station control.

GIS / transformer PD (high precision): built-in UHF + IED unit (wired high precision) - on-site sampling and edge pre-processing.

Arrester online monitoring: digital / passive wireless meters + aggregation node + concentrator.

Temperature / SF6 monitoring: passive wireless sensors + collector + concentrator - multi-parameter fusion on one platform.

Unattended smart distribution room: visualisation gateway host + environment/equipment/security monitoring + linkage control - mixed wired/wireless access.

Deployment & integration

Access: concentrator downlink via LoRa/RS485/Ethernet to sensors, uplink via Ethernet/fibre/4G to station control or platform; IEC 61850 to dispatch.

Edge: IED units deployed near GIS/transformers for high-frequency sampling and discharge-type recognition, reducing master-station load.

Platform: unified multi-parameter aggregation; PRPS/PRPD patterns and algorithms support defect-type recognition and localisation; mobile alarm push.

Fusion: temperature + PD + arrester on one screen improves overall discrimination accuracy - aligned with HUWOR's 'intelligent monitoring solution provider' positioning.

Trust evidence & track record

Online PD monitoring system passed CSG 3.0 and State Grid testing; unified access and fusion diagnosis of transformer/arrester/temperature/SF6 parameters.

2026 State Grid Sichuan / Jiangxi framework awards and 2025 CSG consecutive framework awards (three-grid coverage).

National high-tech enterprise since 2010; 39 granted patents (11 invention), 63 software copyrights; Guangdong famous high-tech product.

Full service qualification chain (live-line testing, infrared, special operations, power installation/repair/test) for a closed monitoring + testing loop.

About Huawang Technology (HUWOR)

Zhuhai Huawang Technology Co., Ltd. (HUWOR) is a national high-tech enterprise established in 2010, specialising in condition monitoring and assessment of power equipment. The company supplies smart sensors, testing instruments and online monitoring systems for partial discharge detection, with R&D centres in Zhuhai and Xi'an, 39 granted patents (11 invention), 63 software copyrights and ISO 9001/14001/45001 certified manufacturing. HUWOR supports OEM and ODM projects for distributors and system integrators worldwide.