2025-11

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DISTRIBUTION TERMINAL UNIT

DTU

ECO-FRIENDLY / GREEN / ENERGY-SAVING / HIGH-EFFICIENCY

OLE POWER DISTRIBUTION AUTOMATION CO., LTD.



OLE POWER

Ole Power Distribution Automation Co., Ltd. (Stock Code: 831246), founded in 2005 with registered capital of RMB 42.162 million, is headquartered in Zhuhai. As a National SRUI "Little Giant" Enterprise, NEEQ-listed, National High-Tech & AAA Enterprise, Guangdong Provincial Specialized, Refined, Unique & Innovative (SRUI) SME and a "Certified Technology Center", OLE POWER spans 13,027㎡ with >80% production facilities.

With 100+ employees (35%+ R&D team), we drive innovation in global smart grids and new energy, holding 10+ invention patents (published & granted), 50+ utility patents, and 40+ software copyrights.

Our dual-strategy "Smart Grid + New Energy" develops Cloud-Pipe-Edge-Terminal products by integrating AI/electronics with power systems. Key R&D focuses:
- AI+ Control Terminals
- AI+ Self-Check Systems
- AI+ Remote O&M
- IoT+5G digital twins for smart substations

Long-term supplier to State Grid & CSG, we support national smart grids, Asian Games, 14th National Games, and clients like CNBM, CR Cement, aluminum/steel industries. Primary & secondary automation products and smart O&M systems cover China and export to Vietnam, Pakistan, Malaysia, Indonesia, expanding globally via Belt and Road.

Subsidiary: Zhuhai Huazhi New Energy Technology Co., Ltd. specializes in microgrids, ESS, PV systems, monitoring/control, and PV turnkey equipment, etc .

R&D

INNOVATION

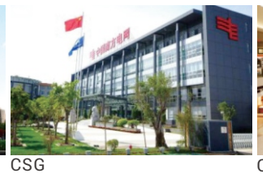
CERTIFICATES

CUSTOMIZATION

HQ SERVICE

APPLICATION


State Grid


CSG


Construction


Renewable Energy

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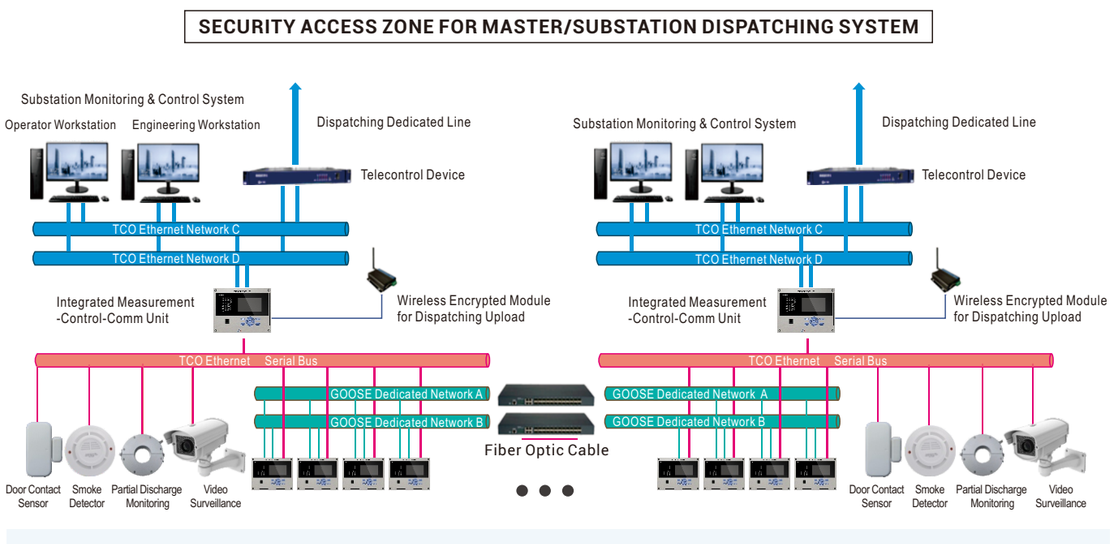
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— DISTRIBUTED DTU INTEGRATED PROTECTION UNIT —

DISTRIBUTED INTEGRATED DA NETWORK COMMUNICATION TOPOLOGY DIAGRAM



Integrated Communication Management Units are installed in PT cabinets, while Distributed Integrated Protection Units are mounted in their corresponding switchgear relay compartments; interconnected via data bus, the system aggregates telemetry/teleindication data from protection units and transmits information to the Distribution Automation Master Station per forwarding points, executing its telecommand, while enabling peer-to-peer communication with units in other distribution rooms to implement Intelligent Self-Healing Feeder Automation (FA) functionality.



CSP6000-DA DISTRIBUTED INTEGRATED COMMUNICATION UNIT



FUNCTION FEATURES

- 4 reusable RS485/RS232 ports with independent high-speed optical isolation
- Third-party interoperability: Connects to protection units, DC panels, environmental monitors
- 3 auto-sensing 10/100M Ethernet ports supporting IEC 60870-5-104 protocol
- 22 digital inputs for DC panel alarms, temperature/humidity teleindication, protection unit faults, and PT cabinet status
- 2 DC analog inputs for battery voltage/temperature monitoring
- 8 voltage + 7 current AC sampling channels for PT secondary voltages and station service transformers

PRODUCT FEATURES

- High-performance, highly reliable embedded hardware platform without any adjustable components.
- Multi-CPU architecture delivering powerful processing capabilities and abundant external interface resources.
- Internal CPU modules communicate via a high-speed Ethernet bus for reliability and efficiency.
- All external communication interfaces implement electrical isolation from the high-speed CPU system to ensure stable operation.
- Flexible communication configuration enables each bus to support various protocols simultaneously.
- Advanced maintenance tools with detailed diagnostics, multiple monitoring methods.
- Background debugging software and comprehensive LED indicators provide intuitive communication bus status visibility for enhanced operational transparency.
- The platform natively supports standard power protocols and custom third-party protocols.
- Configurable serial ports (RS232/RS485/CAN) support balanced/unbalanced 101 modes for data acquisition and forwarding.

PRODUCT OVERVIEW

CSP6000-DA, built on an embedded real-time multi-tasking Linux OS, leverages IP networking technology to support diverse communication protocols, delivering a high-reliability, high-performance communication processing and protocol conversion platform. Its multi-processor architecture employs high-speed Ethernet bus communication between internal CPUs, enhancing processing capability while ensuring real-time task execution. The system supports critical power protocols including IEC 60870-5-101/103/104, MODBUS-RTU/TCP, and IEC 61850, and offers flexible dual-device redundancy with configurable single/dual-network operation modes.

INFORMATION CAPACITY & COMMUNICATION PERFORMANCE

Number of connected devices:	≤240
Devices per channel:	≤15
Telemetry points per device:	≤2000
Teleindication points per device:	≤2000
Energy metering points per device:	≤100
SOE records per device:	≤3000
Telecommand per device:	≤100
Forwarding channels:	Concurrently forwards data using > 8 (identical or different) to multiple master stations
Refresh rate:	1~5s
Telecommand response time:	1~3s
Hot-standby dual-channel switching:	5~15s
Communication initialization time:	3~10s

— DISTRIBUTED DTU PROTECTION UNIT —

CSP6000-DB DISTRIBUTED INTERGRATED PROTECTION UNIT



FUNCTION FEATURES

- Comprehensive self-diagnosis functions
- Dual-core CPU architecture isolates commnication & processing tasks with data redundancy
- Multi-functional integration: Conventional protection + local FA + intelligent distributed control, etc.
- 8 voltage sampling channels for dual-side three-phase voltages + 7 protection/measurement current inputs
- Unified hardware/software platform ensures consistency; 1024-event fault recorder
- Dedicated RTC chip with independent crystal oscillator & backup battery
- 4 optically isolated RS485/RS232 ports
- 4 Ethernet ports: 2 for GOOSE networks + 1 for dispatching
- 24 programmable binary inputs with customizable signal association + 6 control outputs

PRODUCT OVERVIEW

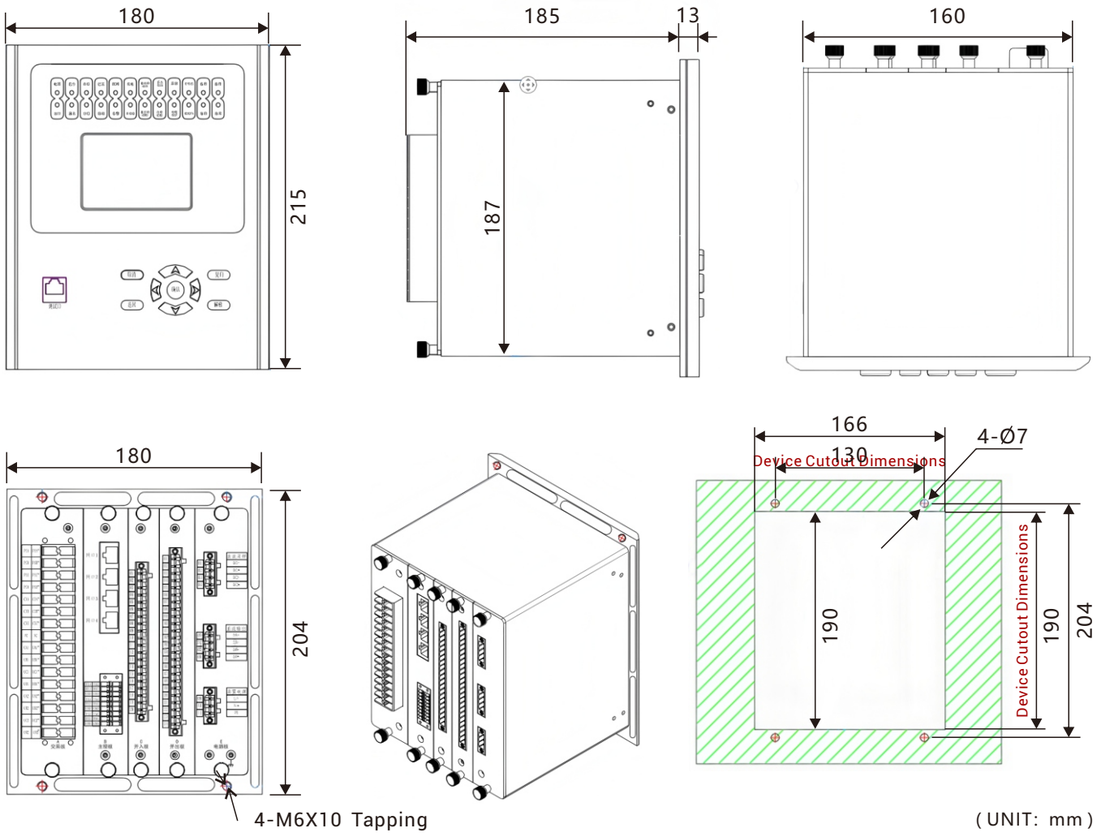
CSP6000-DB, built on an embedded real-time multi-tasking Linux OS, leverages IP networking technology to support diverse communication protocols, delivering a high-reliability, high-performance communication processing and protocol conversion platform. Its multi-processor architecture employs high-speed Ethernet bus communication between internal CPUs, enhancing processing capability while ensuring real-time task execution. The system supports critical power protocols including IEC 60870-5-101/103/104, CDT91, MODBUS-RTU/TCP, and IEC 61850, and offers flexible dual-device redundancy with configurable single/dual-network operation modes.

PRODUCT MODEL & NOMENCLATURE

CSP 6000 - D B - D

- D: Interface type: D- terminal type
- B: Device Type: A- Integrated communication Unit; B- Protection Unit
- D: Series No.
- 6000: Design Series No.
- CSP: Model of Microcomputer Protection & Automation Device

PRODUCT DMENSIONS



Note: This diagram is for illustration purposes only. The actual installation shall be subject to the final confirmed installation

TECHNICAL SPECIFICATIONS

SPECIFICATIONS		UNIT	STANDARD REFERENCE VALUES
Allowable Input Voltage Range		V	DC48V±20%
AC Current Circuit Overload Capacity			1.2 In, Continuous Operation; 20 In, 1s
AC Voltage Circuit Overload Capacity			1.2Un, Continuous Operation
SOE Resolution		ms	≤2
Power Consumption per Phase at Rated Input		VA	<0.5
Total Power Consumption (excluding comms & battery charging)		VA	≤30VA
Measurement Accuracy			0.2~1.2 In(Un)0.5%(accuracy class0.5)
Phase-Sequence Starting Current			0.05In~0.2In, accuracy≤ ±5mA
Zero-Sequence Starting Current			0.05In~0.2In, accuracy≤1%
Starting Voltage		%	0.01Un~0.2Un, accuracy≤ ±5%
DC Sampling			Support 0V~150V, measure accuracy≤ ±0.5%
Fault Current Detection Range (phase/zero-seq)			20In, accuracy≤ ±3%
Control Output Contact Rating			DC48V 8A; DC24V 10A
Insulation Performance		MΩ	> 5MΩ
Electromagnetic Compatibility (EMC)	Voltage Dips and Short Interruptions		Class 2
	Radiated Electromagnetic Field Immunity		Class 3
	Electrical Fast Transient/Burst Immunity		Class 4
	Damped Oscillatory Wave Immunity		Class 4
	Surge Immunity		Class 4
	Electrostatic Discharge (ESD) Immunity		Class 4
Performance			Protection operating time ≤40ms; Mean Time Between Failures (MTBF) ≥50,000 hours; Annual availability >99.99%

MAIN FUNCTIONS

1. Equipped with conventional relay protection functions.

- Capable of sampling: Three-phase currents, zero-sequence current, Dual-side voltages: Source/Busbar-side (Ua, Ub, Uc, 3U0, Un) & Line-side (Ua, Ub, Uc).
- Three-stage directional overcurrent protection: User-adjustable trip delays & current thresholds, Linear setting scaling for all stages and Configurable as Trip or Alarm via control word.
- Two-stage zero-sequence current protection: Adjustable time/current settings per stage and Trip or Alarm selectable for each stage.
- Zero-sequence overvoltage protection: User-defined voltage thresholds & time delays
- Switch control circuit failure alarm
- Post-acceleration protection: Customizable trip values & time settings
- Inrush current identification
- Dual auto-reclosing with modes: Dead-line verification reclosing, Synchronism-check reclosing, Non-synchronism reclosing and Unconditional reclosing.

2. Synchronized loop-closing function: Detects voltage difference, phase angle difference, and frequency difference between dual sources; initiates closure when criteria are met.

3. Autonomous islanding protection: Triggers separation during under/over frequency or under/over voltage events.

4. Local feeder automation (FA): Supports voltage-time (V-T) or voltage-current-time (V-I-T) methods.

5. Intelligent self-healing FA: Configurable delayed or instantaneous healing modes.

Possesses peer-to-peer communication-based feeder automation functionality, with control word–based enabling/disabling. In the event of a line fault, adjacent distribution automation terminals exchange protection and fault information via peer-to-peer communication. After determining the fault section, the system automatically trips the switches associated with the faulted section, achieving fast fault location and isolation.

6. Maintenance-friendly design: Simplified commissioning and diagnostics.

Supports querying and exporting historical data, settings, routing tables, communication parameters, fault records, etc. Allows online modification, downloading, and uploading of settings, routing tables (including analog acquisition modes, engineering conversion parameters, status contact open/close states, digital holding times, and various information sequence positions), communication parameters, and programs in accordance with the Implementation Rules for Distribution Automation Protocols 101/104 of Guangdong Power Grid.

Equipped with an LCD display, providing a fully localized Chinese menu, with simple operation for convenient on-site maintenance.

— DISTRIBUTED DTU —

CSP6000-DB(G) BAY UNIT



Function Features

- **Robust Hardware-Software Platform**

  The device employs advanced DSP technology, high-speed industrial networking, embedded industrial chipsets, and a multi-tasking RTOS, delivering exceptional stability, reliability, real-time performance, wide temperature tolerance, and powerful functionality to meet power system requirements for reliability and real-time operation.

- **Fault Recording Capability**

  Supports automatic/manual waveform recording triggered by: overcurrent, line undervoltage, zero-sequence voltage, zero-sequence overcurrent, zero-sequence transient, or auto-reclosing. Captures 6 pre-fault cycles + 8 post-fault cycles. Waveform files are analyzable via maintenance software.

- **High Immunity Design**

  The device implements multi-stage isolation and advanced shielding from chassis to PCB level, with rigorous component selection for superior noise immunity. Its self-shielded design requires no external anti-interference measures for standalone or panel-mount operation, simplifying engineering and maintenance.

  Featuring zero adjustable components, it utilizes high-precision industrial-grade devices to eliminate drift caused by environmental shifts or long-term operation.

  Comprehensive self-diagnostics log all anomalies with detailed records uploadable to master stations. Certified at the highest immunity level (Class 4 per IEC 61000-4) through 12 EMC tests including: Surge immunity, Radiated RF immunity and Electrical fast transient.

- **Information Security Assurance**
  Implements rigorous maintenance privilege management; all device operations require authenticated access.

- **(Optional) High-Resolution HMI**
  160×160 graphical display with full-Chinese interface, user-friendly navigation, and rich information presentation.

DTU COMM UNIT

CORE FUNCTIONS

1. Communication Gateway

- Multi-protocol support: Concurrent processing of IEC 60870-5-101/104, DL/T 634, MQTT with protocol conversion.
- Multi-channel redundancy: 3 independent Ethernet ports (master/FA/maintenance) + 4G/5G wireless + fiber backup; automatic failover within 20ms.
- Precision timing: BeiDou/GPS dual-mode (±1μs) + IEEE 1588v2 PTP support.



2. System Management

- Local FA decision-making: GOOSE-based fault location/isolation/restoration (≤3s) via peer-to-peer coordination.
- Data storage: 8GB eMMC cyclic storage for SOE/COMTRADE records.
- Self-diagnostics & hot redundancy: Real-time board monitoring; MCU maintains basic protection during core failure.

3. Security Protection

- O&M authentication: USB security key + OTP two-factor verification to prevent unauthorized access.
- Cyber defense: Encrypted comms + MAC-based authentication against replay/tampering attacks.

HARDWARD ARCHITECTURE

REFERENCE DESIGNATION	CONFIGURATION & FUNCTIONS
High-Performance Processor	Quad-core ARM Cortex-A7 SMP @1.2GHz, Linux OS; runs protocol stacks/intelligent algorithms
Security Encryption Module	Independent GM/T-compliant chip (e.g. SJJ1313); supports SM2/3/4 algorithms for: • Encrypted data transmission, Mutual authentication, Firmware signature verification
High-Speed Data Channel	Dual-core communication via dual-port RAM (latency ≤10μs); ensures real-time and management synergy
Redundant Power Supply	Dual-input (AC/DC 220V±20% + backup battery); switchover time ≤5ms

RELIABILITY DESIGN SPECIFICATIONS

PARAMETER	SPECIFICATION	STANDARD COMPLIANCE
Operation Temperature	-40 ~+85 Wide-temperature Operation	GB/T 2423.22
EMC Immunity	EMC Class 4 (Surge: 6kV, ESD: 8kV contact)	GB/T 17626
Ingress Protection	Ip54 (Dust/water jet resistant)	IEC 60529
MTBF	MTBF≥50,000 hours	GB/T 5080.7
Seismic Performance	0.3g (horizontal) 0.15g (vertical) 3 sine cycles	GB/T 11287

TECHNICAL SPECIFICATIONS

SPECIFICATIONS		UNIT	STANDARD RERENCE VALUE
Allowable Input Voltage Range		V	DC24V±20%
AC Current Circuit Overload Capacity			2 In，Continuous Operation；；20 In，1s
AC Voltage Circuit Overload Capacity			1.2Un，Continuous Operation;
SOE Resolution		ms	≤2
Power Consumption per Phase at Rated Input		VA	<0.5
Total Power Consumption (excluding comms & battery charging)		VA	≤30VA
Measurement Accuracy			0.2~1.2 In(Un)0.5%(accuracy class 0.5)
Phase-Sequence Starting Current			0.05In~0.2In，accuracy≤±5mA
Zero-Sequence Starting Current			0.05In~0.2In，accuracy≤1%
Starting Voltage		%	0.01Un~0.2Un，accuracy≤±5%
DC Sampling			Support 0V~150V，measure accuracy≤±0.5%
Fault Current Detection Range (phase/zero-seq)			20In，accuracy≤±3%
Control Output Contact Rating			DC48V 8A；DC24V 10A
Insulation Performance		MΩ	> 5MΩ
Electromagnetic Compatibility (EMC)	Voltage Dips and Short Interruptions		Class 2
	Radiated Electromagnetic Field Immunity		Class 3
	Electrical Fast Transient/Burst Immunity		Class 4
	Damped Oscillatory Wave Immunity		Class 4
	Surge Immunity		Class 4
	Electrostatic Discharge (ESD) Immunity		Class 4
Performance			Protection operating time ≤40ms; Mean Time Between Failures (MTBF) ≥50,000 hours; Annual availability >99.99%

— DISTRIBUTED DTU INVENTION PATENT CERTIFICATES —

[CHINESE INVENTION, CHINESE INVENTION GRANT] CN202010904468.9 (DTU)
A GOOSE-BASED DISTRIBUTED POWER DISTRIBUTION METHOD AND DISTRIBUTION AUTOMATION TERMINAL


发明专利证书



This invention provides a GOOSE-based distributed power distribution method and distribution automation terminal. It solves the technical problem in existing distribution technologies where fault recovery methods rely on a single power transfer logic, failing to effectively restore power supply to faulted distribution terminals, resulting in low power restoration efficiency.

The invention features automatic tie-switch identification and load transfer calculation capabilities. When the dispatching operation mode changes, distribution terminals can communicate with each other to automatically achieve network topology reconfiguration and identify tie points. After successful isolation of a fault in a single-ring power supply line, the tie-switch terminal can assess the transfer capacity of alternative power sources based on actual load levels before executing the transfer.
It is particularly suitable for complex dual-ring open-loop networks with four power sources. Following an operational mode change, the system automatically identifies tie points. The tie-switch terminal autonomously locates corresponding power sources, calculates their load transfer capability, and sequentially performs load transfer judgment for multiple tie-switches according to preset priorities.

[CHINESE INVENTION, CHINESE INVENTION GRANT] CN202010093131.4 (FTU)
CONFIGURATION METHOD FOR INTELLIGENT DISTRIBUTED FEEDER AUTOMATION TERMINAL NODES


证书号第5643514号

发明专利证书

发明名称：智能分布式馈线自动化终端节点配置方法

发明人：陈小军;李春风;叶广林;杨培林;张俊

专利号：ZL 2020 1 0093131.4

专利申请日：2020年02月14日

专利权人：珠海欧力配网自动化股份有限公司

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授权公告日：2022年12月13日　　授权公告号：CN 111327465 B

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第1页(共2页)

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证书号第5643514号

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申请日时本专利已载明的申请人、发明人信息如下：

申请人：

珠海欧力配网自动化股份有限公司

发明人：

陈小军;李春风;叶广林;杨培林;张俊

第2页(共2页)

Intelligent distributed feeder automation is implemented using smart distribution terminals compliant with the IEC 61850 standard. The communication network adopts fiber-optic Ethernet, with distribution terminals utilizing GOOSE fast communication channels (per IEC 61850). This enables information collection within tens of milliseconds after a fault. Combined with inter-terminal communication and processing, fault localization, isolation, and restoration can be completed within hundreds of milliseconds.

Switch SW must connect to adjacent switches on both sides, hence defining its connection zones as the M-side and N-side. Through communication with M-side and N-side nodes, fault localization, isolation, and recovery actions are achieved via detection model analysis. The core requirement is establishing a connection model between terminals consistent with the primary system diagram. Key features include: Drawing configuration terminal connection icons based on actual distribution terminal relationships to generate corresponding graphic files. Binding one or more CID templates to distribution terminal nodes within the connection icons.

Automatically generating GOOSE configuration files for each distribution terminal node according to connection relationships.Transmitting GOOSE configuration files to corresponding distribution terminals.

Advantages of the invention:

Visually displays inter-node connection relationships

Ensures graphical connections match physical device wiring, reducing errors

Automatically generates GOOSE logical terminal send/receive configurations without human error

The invention aims to resolve at least one technical limitation in existing methods by providing an intelligent distributed feeder automation terminal node configuration approach. It prevents accidental and difficult-to-troubleshoot errors caused by manual model file modifications while significantly improving engineering efficiency and reducing error risks.

[CHINESE INVENTION, CHINESE INVENTION GRANT] CN202011422816.5
A MESSAGE BROKER-BASED DISTRIBUTED FEEDER AUTOMATION METHOD


证书号第6112625号

发明专利证书

发明名称：一种基于消息代理的分布式馈线自动化方法

发明人：李春风;陈小军;杨培林;张俊

专利号：ZL 2020 1 1422816.5

专利申请日：2020年12月08日

专利权人：珠海欧力配网自动化股份有限公司

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授权公告日：2023年07月04日　　授权公告号：CN 112531900 B

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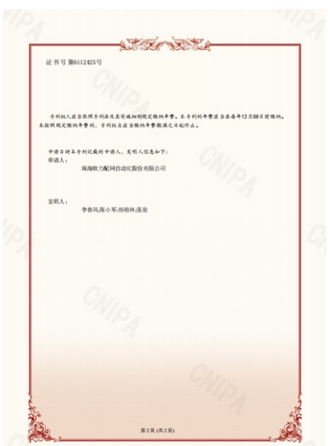
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申长雨

2023年07月04日

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其他事项参见续页


证书号第6112425号

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申请日时本专利已载明的申请人、发明人信息如下：

申请人：

珠海欧力配网自动化股份有限公司

发明人：

李春风;陈小军;杨培林;张俊

第2页(共2页)

Distributed Feeder Automation (FA) requires distributed intelligent terminals (collectively referred to as nodes with feeder switches) on the feeder to obtain information from adjacent switches via peer-to-peer communication. By combining this data with locally acquired signals, FA functions are executed through specific logic algorithms. Currently, most manufacturers implement peer-to-peer communication using GOOSE – a rapid message transmission mechanism defined in the IEC 61850 standard.

Although GOOSE communication offers advantages such as high transmission speed and interoperability, its practical engineering applications face significant limitations:

1.Subscription relationships between distributed intelligent terminals remain statically predefined

2.Dynamic self-modification of subscriptions is impossible

3.Adaptation to network topology changes cannot be achieved

4.These constraints hinder large-scale deployment

To overcome these limitations, this invention introduces a message broker into the distributed FA system. Rather than broadcasting messages conventionally. Distributed intelligent terminals transmit data through the message broker. The broker performs targeted forwarding. Information exchange is thus optimized.

Key benefits:

1.Expands applicable scope of distributed FA

2.Enhances system scalability and fault tolerance

3.Accelerates adoption and development of distributed FA technologies

[CHINESE INVENTION, CHINESE INVENTION GRANT] CN201910272451.3 COMMUNICATION SYSTEM AND METHOD FOR DEBUGGING AND MAINTENANCE OF DISTRIBUTION TERMINALS


发明专利证书

发明名称：一种用于配网终端调试维护的通信系统及方法

发明人：李春风

专利号：ZL 2019 1 0272451.3

专利申请日：2019年04月04日

专利权人：珠海欧力配网自动化股份有限公司

地址：519000 广东省珠海市高新区科技九路88号五号厂房

授权公告日：2025年06月16日　　授权公告号：CN 110166378 B

局长 申长雨

Currently, diverse distribution network terminals require upper-level computers to develop dedicated communication modules for each terminal type. This results in excessive development efforts, difficult post-deployment maintenance, and unreliable communication efficiency.

This invention solves the problem of seamless conversion between three interaction mechanisms:

1.Send/Confirm

2.Send/No-Reply

3.Request/Response

Additionally, it introduces a priority identification tag during asynchronous communication to meet distribution networks' demand for data response prioritization, achieving significant gains in communication efficiency.

CENTRALIZED DTU DISTRIBUTION AUTOMATION SUBSTATION TERMINAL



Enclosed Vertical (Terminal Block)



Panel-Mounted Cabinet



Weatherproof Vertical



Enclosed Vertical (Rectangular Aviation Connetctor)



Enclosed Vertical (Circular Aviation Connector)



Enclosed Vertical (Gen.21)

OVERVIEW

The CSP6000 Distribution Automation Station Terminal unit (DTU) is a series of intelligent station terminal products tailored to meet the requirements of smart distribution construction. Utilizing modern electronics, communication technologies, and computer networking, Ole Power has successfully developed the third-generation centralized DTU integrating monitoring, protection, control, and distribution management. The launch of Ole Power DTU3.0 significantly enhances distribution management efficiency and advances smart grid development.

APPLICATION

The DTU product series serves as feeder automation remote terminals in 10kV and below switchgear cabinets and distribution rooms, supporting either centralized indoor installation or weatherproof outdoor deployment.

PRODUCT FEATURES

Hign Performance	Supports teleindication, telecommand, and telemetry ("three-remote" functions) with data transmission to master stations via communication modules. Executes stable protection logic for rapid fault isolation and non-fault zone restoration. Provides protection functions, complete fault waveform recording, and file transfer capability.
Modular Design	Each sampling board: 16 analog inputs (expandable with 1–4 boards). Each digital input board: 30 teleindication channels (expandable with 1–3 boards).Each output board: 16 control outputs (expandable with 1–2 boards). Flexible configuration, replacement, and expansion to meet diverse customer requirements.
High Precision	Class 0.5 accuracy for: Three-phase voltage/current, Zero-sequence voltage/current. Class 1 accuracy for: Active/reactive power
Extensive Protocol Library	Supports all mainstream communication protocols: IEC 101/103/104, CDT, MODBUS, DNP3.0, SCADA
High Reliability	Operates in extreme environments (-40°C to +70°C). Voltage/current circuits with 150% continuous overload capacity Ensures dependable protection operation (no maloperation / failure to operate)

TECHNICAL SPECIFICATION

NO.	PARAMETER		UNIT	STANDARD REFERENCE VALUE
1	Environmental Conditions	Min. Temperature	℃	-40
		Max. Temperature	℃	+70
		Relative Humidity	%	10~100
		Max. Absolute Humidity	g/m3	35
2	Nominal Voltage Input		V	AC100V/AC220V
3	Nominal Current Input		A	5/1
4	Operating Power		/	AC220V, dual-circuit
5	Switch Monitoring Capacity		/	(1) Capacity Configuration: 8 feeder circuits, suited for substations with 5–8 feeders. (2) Telemetry: Per terminal: ≥6 voltage inputs (2 sets of busbar voltages) Per circuit: ≥3 current inputs (phases A/B/C or phases A/C + zero-sequence) (3) Telesignaling: ≥5 signals per circuit including: breaker close/open position, earth switch status, spring charge state, remote/local mode,etc. (4) Telecommand: ≥2 commands per circuit (open/close control outputs).
6	Voltage Measurement Accuracy		/	Class 0.5 (phase/zero-seq voltage)
7	Current Measurement Accuracy		/	Phase meas. class 0.5 (≤1.2In), Phase prot. ≤3% (≤10In). Zero-seq. class 0.5
8	Active/Reactive Power Accuracy		/	Class 1
9	Telesignaling Power		A	DC24V/48V auto-adaptive
10	Telesignaling Resolution		ms	≤5
11	Software Debounce Time		/	10~1000ms configurable
12	AC Current Loop Overload Capacity		/	1.2In, continuous; 20In, 1s
13	AC Voltage Loop Overload Capacity		/	1.2Un, continuous; 2Un, 1s
14	Timekeeping Accuracy		/	≤2s/24h
15	Control Output	Contact Rated Power	/	AC 250V/5A, 380V/2A or DC 110V/0.5A (resistive load)
		Contact Endurance	times	Make-Break≥105

NO.	PARAMETER		UNIT	STANDARD REFERENCE VALUE
16	Communication Port	Serial Ports	/	≥4× RS232/RS485 (reusable)
		Rj45 Ethernet	/	≥2
17	Protocols		/	(1) DL/T 634 standard protocols 101 or 104; (2) DL/T 634.5101-2002, DL/T 634.5104-2009 (3) SGCC's current standards
18	Terminal Power Consumption		/	(1) DC power consumption of the DTU core unit ≤20W(excluding the power supply of the communication module, distribution line loss acquisition module, and power management module). (2) Total device power consumption ≤50VA (including the distribution line loss acquisition module, excluding the communication module and backup power supply).
19	Power Supply Requirement	Power Management Module	/	Continuous stable output≥80W, instantaneous output ≥50W, duration ≥15s
		Comm Power Output	/	Rated DC24V, steady load capacity ≥24V/15W, instantaneous output≥24V/20W, duration≥50ms
		Operation Power Output	/	Rated DC48V, instantaneous output ≥48V/8A, duration≥15s
		Distirbution Line Loss Aquisition Module Power Output	/	Rated DC48V, steady load capacity≥48V/10W
20	Backup Power Options		/	(1) Lead-acid battery; (2) LiFePO battery; (3) Supercapacitor.
21	Installation Method		/	Enclosed vertical type; DTU cabinet installed alongside the switchgear in RMU or prefabricated substation.
22	Cabinet Dimensions and color		mm	≤ H1300 × W600 × D400 mm (excluding communication box); color RAL7035 or Z32.
23	Wiring Type Options		/	(1) Terminal type; (2) Circular aviation connector type; (3) Rectangular aviation connector type.
24	Wireless Comm Module	Comm Standars	/	Supports penta-mode adaptive communication: TD-LTE / LTE-FDD / WCDMA / GSM (2G/3G/4G)
		Comm Interfaces	/	≥2× RS232 (9600bps) or one 10/100M full-duplex Ethernet
		Basic Fuctions	/	Port data monitoring, automatic reconnection upon network interruption, etc.
		Interface Durability	/	≥500 tims
		Installation Method	/	Independently mounted within the DTU enclosure.
25	Mean Time Between Failures (MTBF)		h	≥50000

CENTRALIZED DISTRIBUTION AUTOMATION SUBSTATION TERMINAL

PRODUCT MODEL & NOMENCLATURE

CSP6000 -□-□-□ /□□/□-□-□-□

- Option
  Y: LCD Display G: GPRS Comm Module
  H: Cabinet Aviation Connector
  O: Industrial Ethernet Switch
- Integrated Primary-Sencondary System
  J: Power Loss Measurement Unit
  H: Aviation Connector
- Cabinet Type
  A: Enclosed Vertical D: Wall-mounted Enclosure
  B: Weatherproof Vertical E: Enclosed Horizontal
  C: Panel-Mounted Cabinet
- Rated Current: 5A / 1A
- Device Voltage: DC24V / DC48V
- Bay Quantity
  N: Number of bays equals feeder circuit count
- Ole Power Model

Example:
CSP6000-8-48V-5/A-J-H/Y-G-T denotes an 8-circuit integrated primary-secondary distribution automation station terminal (DTU) in enclosed vertical cabinet with power loss measurement module (PLMU), Wireless communication module, aviation connector wiring.

DTU CABINET OPTIONS

MODEL CODE	CABINET TYPE	BAYS	STANDARD DIMENSIONS	APPLICATION
A	Enclosed Vertical (Terminal Block)	4~12	1300*600*400cm	Universal Distribution Automation Ring-Main Unit (RMU) Matched with SGCC Integrated Primary-Secondary RMU Systems Optional Communication Cabinet (400×600×400 mm)
	Enclosed Vertical (Circular Aviation Connector)	4~8	1300*600*400cm	
	Enclosed Vertical (Rectangular Aviation Connector)	4~8	1300*600*400cm	
	Enclosed Vertical (Rectangular Aviation Connector)	4~6	1300*600*400cm	
B	Weatherproof Vertical	4~8	1400*750*550cm	Outdoor RMU Retrofit Projects
C	Panel-Mounted	4~24	2260*800*600cm	Distribution Rooms & Outdoor Switching Stations

■ **Friendly Reminder:** Our company can also customize DTU cabinet types in other styles and dimensions.

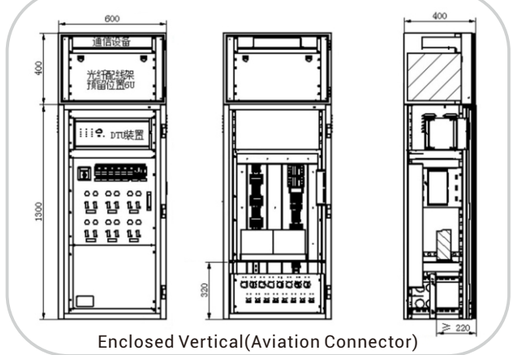
CORE UNIT BOARD CONFIGURATION

BOARD TYPE	FUNCTION
Master Control Board	Master Control Board. Performs all computational and communication tasks. Interfaces: 2× Ethernet,1× Debug serial port, 2× RS232 + 2× Rs485, GPS time synchronization, 2× DC measurement channels
Digital Input (DI) Board	Supports 30 channels of DC24V remote signals, each channel equipped with an LED indicator to show whether a remote signal is present. Remote signals are processed through hardware filtering and software filtering, and then transmitted in real time to the main control board via the internal CAN bus. From the DI board's confirmation of the remote signal to the start of processing by the main control board's remote signal program, the total delay is less than 1 ms (Test condition: fewer than 2 DI boards installed in the device).
Digital Output(DO) Board	Supports 16 relay outputs, each with a rated capacity of 8A at 250VAC.Each output channel is equipped with a dedicated feedback circuit, with every two outputs sharing a common terminal. From the issuance of an output signal by the main control board to the DO board's relay activation, the total delay is less than 1 ms (Test condition: fewer than 2 DO boards installed in the device)
Sampling Board	Supports 16 channels of analog input. Voltage: rated value 100V, maximum 264V. Current: rated value 5A, maximum 100A (applied time < 1 s). Accuracy: 0.2% for input ≤1.2 times rated value; 3% for input >1.2 times rated value.
Power Supply Board	External 24V DC Power Supply: Input via 24V+IN / 24V-IN, controlled by a rocker power switch. After internal EMC filtering, it is divided into two paths: One path goes through an internal DC/DC converter, providing ±12V and +5V to the device backplane. The other path goes through telemetry EMC filtering, and is output via 24V+OUT / 24V-OUT to supply power for the control panel, status board, and external GPRS module. EXT Serial Port: Supports connection of an external status indicator board. Shielding Ground: The shielding ground serves as the grounding terminal of the device and should be reliably connected to the grounding copper bar.
Spare Board	Since the device uses two different board widths, two types of spare boards are provided to cover unused slot.

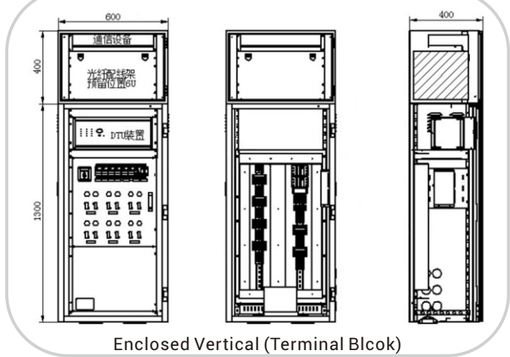
DTU ACCESSORIES SELECTION

MODEL CODE	ACCESSORIES	STANDARD CONFIGURATION PARAMETERS	DESCRIPTION
Y	Display	LCD	Option
G	GPRS communication module	4G wireless module, dual-SIM dual standby, wireless encryption	Option
H	Cabinet aviation connector	4-core、6-core、6-core open-circuit proof、10-core 26-core（circular/rectangle）aviation connector	Option
O	Industrial Ethernet switch	2Fiber+6RJ45、4Fiber+8RJ45、4Fiber+24RJ45	Option
	Optical distribution frame (ODF)	12-core、24-core、36-core、48-core、72-core.	Option

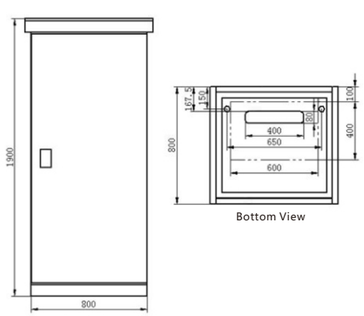
DTU CABINET STRUCTURE & DIMENSIONS



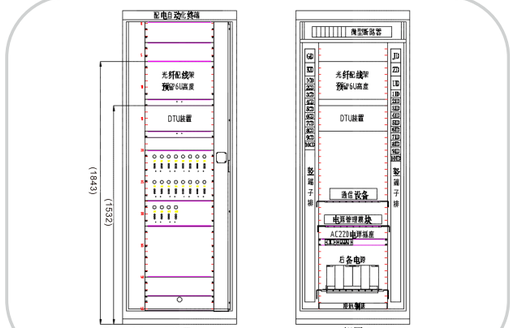
Enclosed Vertical(Aviation Connector)



Enclosed Vertical (Terminal Blcok)



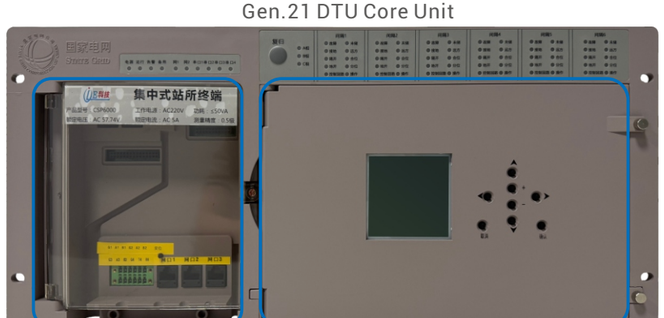
Weatherproof Vertical



Panel-mounted

DTU CORE UNIT

Gen.21 DTU Core Unit



BASIC FUNCTIONS

- Overcurrent Post-acceleration Protection
- Sensitive Ground Fault Protection
- Three-stage Overcurrent Protection
- Zero-sequence Overcurrent Protection
- Zero-sequence Voltage Protection
- Overload Protection
- Undervoltage Protection
- I/O Circuit Safety Protection
- Remote/Local Parameter Configuration
- Fault Detection & Discrimination
- Telemetry Threshold Violation Detection & Discrimination
- Sequence of Events (SOE) Recording & Reporting
- Non-Interrupting Current Blocking
- Power Loss Protection

HARDWARE AND SYSTEM ARCHITECTURE UPGRADE

2017 Edition DTU

Single-CPU Architecture: Mainly relies on DSP or ARM processors for data acquisition and control, featuring strong real-time performance.
Expandability: Functional modules are connected via bus and support hot-swapping.

2021Edition DTU

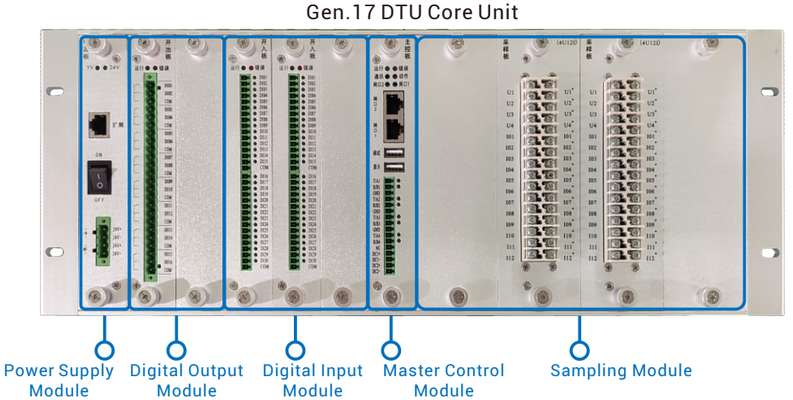
Dual-core design (Real-time Core + Management Core)

Real-time Core (MCU): Handles high-speed sampling and protection actions (e.g., fault isolation), ensuring millisecond-level response.

Management Core (MPU): Runs Linux/Ubuntu OS, responsible for communications, data storage, and intelligent analytics (e.g., power loss measurement, fault location).

Domestic hardware platform: Utilizes domestically developed core boards like jinzhi T536, integrating 8 serial ports, 3 Ethernet interfaces, SM cryptographic chip, and USB-to-Ethernet expansion support.

Gen.17 DTU Core Unit



BASIC FUNCTIONS

Overvoltage Protection
Self-diagnostics
Time Synchronization
Communication
Telecommand
Telesignaling
Telemetry
Overcurrent Trip with Outage
Fault Waveform Recording
Manual Operation
Local Debugging
Chip Encryption (SM algorithm)
Auto-reclosing
PT Wire Break Detection

OPERATING ENVIRONMENT

PARAMETER	2021 EDITION	2017 EDITION
Ambient Temperature	-40℃ ~ +70℃	-40℃ ~ +70℃
Max. Temp. Change Rate	1℃/min	1℃/min
Humidity	10% ~ 100%	10% ~ 100%
Max. Absolute Humidity	35g/m³	35g/m3
Atmosoheric Pressure	70 ~ 110kPa	70 ~ 110kPa
Seismic Resistance	Acceleration Horizontal 0.3g Vertical 0.15g	Acceleration Horizontal 0.3g Vertical 0.15g
Ingress Protection	IP30(indoor) / IP54(outdoor)	IP30(indoor) / IP54(outdoor)
EMC Resistance	EMC class 4(GB/T 17626 severity level)	EMC class 3
Reliability	MTBF≥50,000hours，Service life≥8years	MTBF≥10,000 hours

— VISUALIZED SUBSTATION TERMINAL MONITORING SYSTEM —

SOFTWARE INTRODUCTION

Key Features Highlighted:

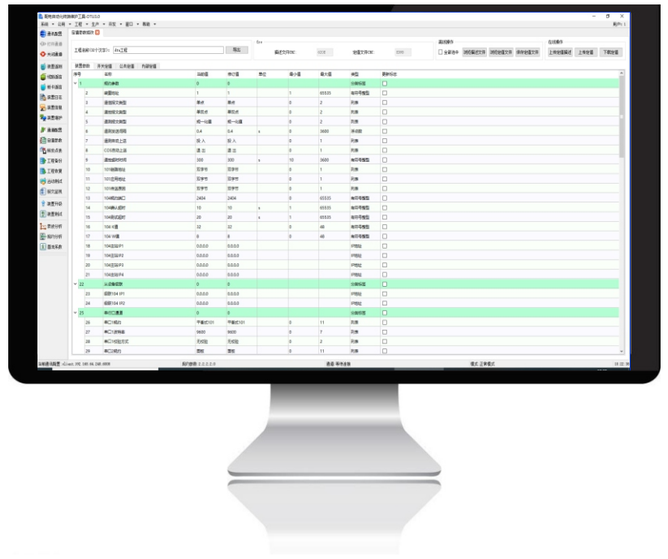
·The CSP6000 dedicated debugging tool Ensures task-specific optimization

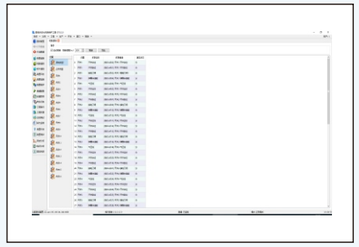
·Dual operation modes Touchscreen & remote computer access

·Comprehensive compatibility Adaptable to staffed/unmanned substations

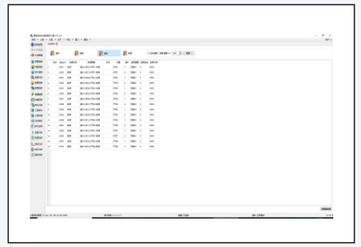
·Networked remote control Secure parameter management via PC

·User-centric design Streamlined workflow for maximum efficiency

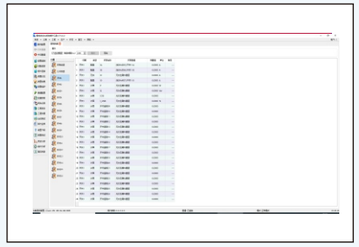




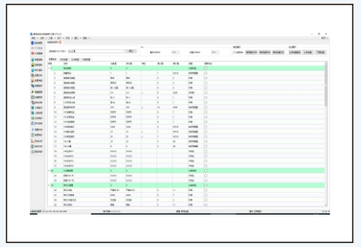
Line Telesignaling Interface



Telecommand Interface



Telemetry Interface



Setting Parameters Interface

COMMON FUNCTIONS

Include: Telemetry Data, Line Telesignaling, Module Telesignaling, Sampling Zero-Drift, Device Event Logs, Device Information, Device Maintenance.

FUNCTIONS	SPECIFICATION
Telemetry Date	Manual or real-time refresh of telemetry values.
Line Telesignaling	Manual or real-time refresh of teleindication status.
Module Signaling	View teleindication status by Slot-Module location and hardware address.
Sampling Zero-Drift	View zero drift values of the sampling module, refresh by channel per slot.
Device Event Logs	View system errors, operations, teleindication, SOE (Sequence of Events) information, and GPRS information in the device.
Device Information	View unit type, number of modules, program version, configuration information, fault information, and GPRS information. After project implementation, perform a full information refresh and export/save the data for project traceability.
Device Maintenance	Set device time, modify menu operation password, activate battery, clear event records, start fault recording, restore factory settings, and reset. (Note: restoring factory settings and reset require a secondary password.)

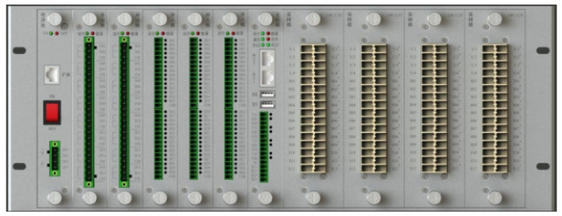
ENGINEERING FUNCTIONS

Include: Device Channel Configuration, Setting Parameters Modification, Data Point Mapping, GPRS Setup, Engineering Backup, Project Restoration, Telecontrol Test, Telegram Monitoring.

FUNCTIONS	SPECIFICATION
Device Channel Configuration	According to project requirements, the device's remote signaling, telemetry, and sampling channels can be configured.
Setting Parameters Modification	Supports modification of external common settings, external switch settings, internal settings, and device parameters, including protection enabling/disabling, protection settings, and communication configuration.
Data Point Mapping	The point tables of remote signaling, telemetry, and telecommand can be reconfigured to meet the requirements of different manufacturers and application scenarios.
GPRS Setup	Configuration of the GPRS module is supported.
Engineering Backup	Engineering backup and recovery functions allow critical files inside the device (including programs, settings, communication configurations, forwarding point tables, etc.) to be backed up, as well as restoring project backups saved on a PC back into the device.
Telecontrol Test	After communication with the master station is established, this function enables point-to-point verification with the master station to ensure the correctness of the configured telemetry and remote signaling point tables.
Telegram Monitoring	Monitoring functions include device system information, CAN messages between the main board and sub-boards, and IEC 101 / IEC 104 messages between the device and the master station.

— PRODUCT DETAILS & TEST REPORTS —

PRODUCT DETAILS



Modular Design

The core unit adopts a modular design, allowing flexible adjustment of the number of sampling modules. Supports up to 16 sampling modules operating simultaneously.

Millisecond-Level Self-Healing

Interval units are directly interconnected via fiber-optic GOOSE, achieving:
l·Fault localization time ≤15ms
l·Isolation + power restoration in non-fault zones ≤1 second (3x faster than centralized DTU).





Convenient Maintenance

Hot-swappable replacement of single interval modules (completed 5 minutes) without de-energizing the entire system.

Standardized Structure

Unified structure compliant with State Grid standardization requirements, enabling flexible cabinet combinations to meet diverse scheme demands.



PRODUCT TEST REPORT



— PROJECT CASES —



Power Utility Distribution Network Project

Construction of Distribution Automation and Critical User Circuit Breaker Telecommand System implements intelligent functions with SOE (Sequence of Events) uploads containing detailed fault parameters—including protection currents (Ia, Ib, Ic, Io), voltages (Ua, Ub, Uc, Uab, Ubc, Uca, Uo), frequency (Fm), auxiliary voltage (Ux) and frequency (Fx), phase angles (Ia-Ubc and Ic-Uab), and a 32-bit KI status word (transmitted as 4 bytes)—to provide essential data for rapid fault root-cause analysis at the master station.



Substation Project

Project Scope:

New feeder line installation and grid infrastructure enhancement in substation, featuring a single-ring network with open-loop operation.

Grid Configuration:

Coordinated deployment of load switches and circuit breakers

Seamless integration of legacy and new equipment



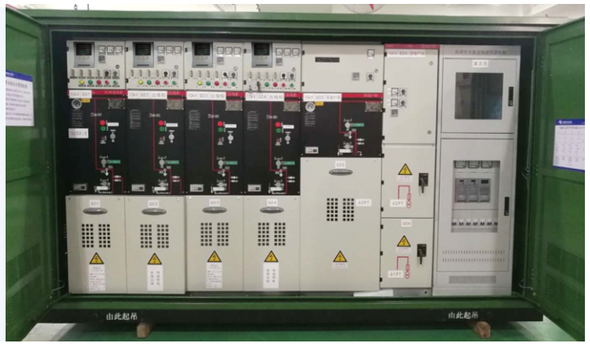
Switch Station Project

Free Trade New Area, 2019 Smart Grid Construction — "Main-Trunk-Distribution" double-ring network high-reliability operation scheme.



Automated Turnkey Equipment Relocation Project

2020 power relocation project for automated turnkey equipment.



Provincial Grid Fully-Insulated Automation

2018 turnkey equipment section warehouse supply, factory debugging.







Automated Turnkey Feeder Project

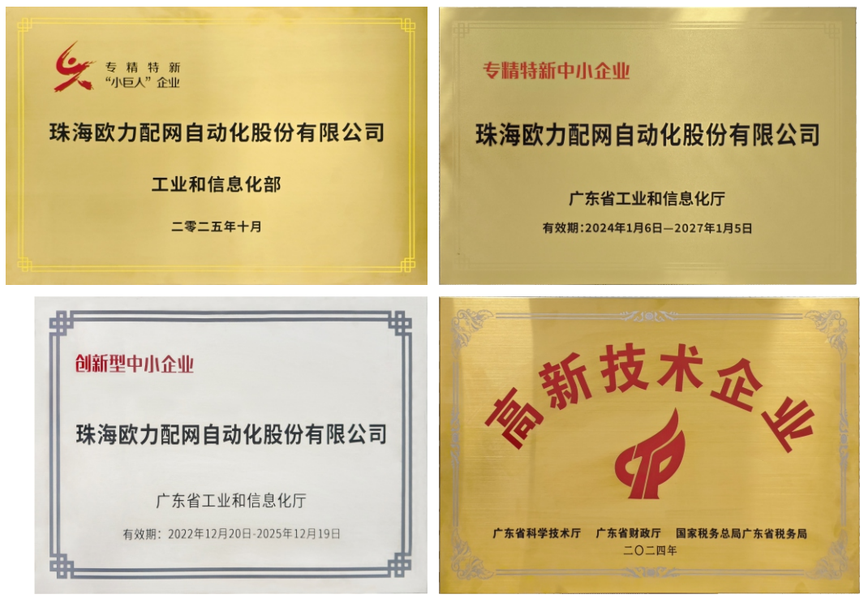
Primary Equipment Solution	- 10KV fully-sealed insulated vacuum circuit breaker cabinet - Three-phase zero-sequence integrated current transformer - Voltage transformer incoming line single-phase PT - Voltage transformer main bus three-phase PT
Secondary Equipment Solution	- Protection and measurement control unit - Integrated measurement and communication unit - Terminal security protection device - Fiber optic switching equipment - Dual power supply switching module

CERTIFICATES AND HONORS











24hours

AFTER-SALES SERVICE

+86 0756 – 3628829



Our company strictly adheres to the Quality Management System requirements, ensuring a 100% pass rate for products upon factory shipment and achieving over 98% customer satisfaction.

After-sales services provided by our company include:
Product installation guidance; product maintenance; supply of spare parts; equipment modification; technical consultation; training seminars; complaint handling, etc.

You have our word that:

1. **"Three-Guarantee" policy** is implemented after product acceptance. During the warranty period, if the product becomes unusable due to quality issues, our company provides free repair or replacement.

2. **To protect customers' interests, lifetime service** is committed beyond the warranty period, including long-term technical guidance and provision of product components (material fees may be charged after warranty expiration as appropriate).

3. **Free training and guidance** are provided for product operation and maintenance. User manuals, maintenance instructions, and operating procedures are supplied to users.

4. **24hours support** to resolve issues encountered during installation and operation.

5. **Regular follow-up services** are conducted for all products, with individual files maintained for each unit to promptly understand product usage status.

6. The following cases are **excluded from the "Three-Guarantee" coverage**:
(1) Damage caused by failure to follow the "Installation and User Manual";
(2) Damage resulting from improper maintenance, movement (handling), or storage;
(3) Damage caused by other force majeure factors.

From Your Needs
To Your Satisfaction