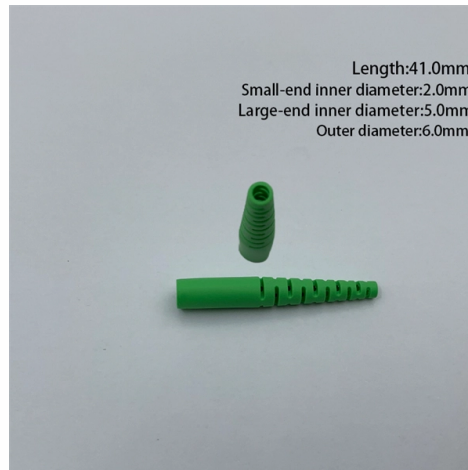


Secondary circuit of relay protection in 110kV intelligent substation



AI Overview

The secondary circuit in a 110kV intelligent substation integrates relay protection, control, and monitoring functions using digital communication and intelligent electronic devices (IEDs) to ensure fast fault detection, isolation, and system reliability.

Structure and Components

The secondary circuit of relay protection primarily consists of three types of circuits:

- Control Circuit** – Manages the opening and closing of primary equipment such as circuit breakers and isolating switches, ensuring proper operation during normal and fault conditions.
- Regulation Circuit** – Dynamically adjusts the operating state of equipment based on real-time parameters from the primary system.
- Relay Protection and Automatic Device Circuit** – Monitors abnormal conditions, analyzes faults, and sends tripping instructions to isolate faulty equipment, allowing power restoration after fault clearance.

Modern intelligent substations replace traditional electrical signal transmission with optical fiber and digital communication networks, enabling virtual circuits and networked secondary equipment. This allows voltage and current signals to be transmitted as digital information between devices, improving safety, performance, and automation.

Monitoring and Fault Diagnosis

Intelligent secondary circuits support online monitoring and fault diagnosis, which include:

- Operation Information** – Self-test data, input signals, switch status, channel light intensity, operating temperature, and power supply voltage.
- Alarm Information** – Abnormal operation alerts for switching values, sampling values, or device malfunctions, enabling rapid fault localization.
- Action Information** – Records of relay operations and tripping events to verify correct protection actions.

Advanced evaluation methods, such as cloud model-based risk assessment combined with AHP and entropy weight methods, allow real...

Article Content

Fault diagnosis of intelligent substation relay protection ...

This study focuses on the fault diagnosis of an intelligent substation relay protection system based on Transformer architecture and migration training model.

Research on Fault Diagnosis Methods for Secondary Circuits

This paper first analyzes the characteristics of the secondary circuit of smart substations and the importance of fault diagnosis. Subsequently, it delves into the online monitoring technology

110 kV substation relay protection

Then, according to the short-circuit current parameters, the relay protection of transmission lines, transformers, busbars, etc. is set, and the configured protections include current quick-break

Design and Research of 110kv Intelligent Substation in Electrical ...

Substation is an indispensable part of power system, responsible for the heavy task of power transmission and redistribution, and plays a pivotal role in the safe and economic operation of power

Research on Fault Diagnosis Method of Secondary Equipment in ...

First, the timeliness and reliability of relay protection are considered, and the intelligent substation network structure is established. Then, the polarity fault characteristics are analyzed, and the

Research on Secondary Circuit Identification Technology and Condition ...

In order to improve the control level of intelligent substation SCD file, adapt to Condition-Based Maintenance strategy of relay protection based on life cycle management, explore the operation and

Research on fault diagnosis method of substation relay protection ...

A 110 kV intelligent substation is chosen as the research subject to diagnose the faults in the secondary circuit of its relay protection system by using the method proposed in this paper.

A state evaluation and fault diagnosis strategy for substation relay ...

Abstract Ensuring the operational reliability of substation relay protection systems through rapid defect diagnosis and state assessment is crucial for maintaining power system stability.

A review on adaptive power system protection schemes for future

The parameters from the protection study are configured in the relay of the protective device and is operated to isolate the faulty zone when the sensed current, voltage, frequency or

Research on the Improvement of Operation and Maintenance

For a long time, the lack of digital modeling for the design of secondary circuits connected by cables has poses obstacles to the efficient construction and maintenance of

Fault Detection of Relay Protection Secondary Circuit in the Digital ...

Abstract: To address the limitations of traditional relay protection secondary circuit fault detection methods, such as low detection rate, long detection time, and low failure rate, a novel digital

Visualization display and exit fault diagnosis of secondary virtual ...

Most communication in smart substations uses fiber optic connections to connect secondary equipment now. Due to the lack of intuitive connection between devices, it leads to

Research on Secondary Circuit Identification Technology and

Analyzing key problems of online management of SCD of intelligent substation, the consistency with engineering configuration and the evaluation of protection status, deducing the application mode of

110 kV substation line protection secondary wiring diagram

Experimental results demonstrate that the proposed method outperforms existing approaches in robustness and universality, particularly for complex diagrams, providing technical support for...

Design and Research of 110kv Intelligent Substation in Electrical System

This design builds a 110 KV step-down substation. First of all, select the connection mode of each voltage level and choose the best flexible connection mode in terms of technology and

Research on Remote Maintenance Technology of Relay Protection in

According to the work content of relay protection outage maintenance, a remote maintenance scheme covering all work items of relay protection routine maintenance is proposed;

Research on fault diagnosis method of substation relay protection ...

The key to online diagnosis of relay protection secondary circuit faults in the intelligent substations is to collect and comprehensively analyze the operation information of relay protection

110 kV substation relay protection

In this paper, the main electric wiring mode of 110kV substation is selected, the structure of substation is determined, and then the main wiring diagram is drawn.

Design and Research of 110kv Intelligent Substation in Electrical System

You may also like Study on the Difference of Lightning Impact on Intelligent Substation and Conventional Substation Yan Xie, Mu Li and Shengwu Kang Research on Operational Status Monitoring

Design and Research of 110kv Intelligent Substation in Electrical System

Research on Operational Status Monitoring Technology of the Secondary Circuit of Intelligent Substation Based on Virtual Circuit Visualization Yue Zhang, Hengxiang Chen, Jingran Xu et al.

A state evaluation and fault diagnosis strategy for substation relay ...

Wang et al. also proposed a visual display and exit fault diagnosis method for secondary virtual real circuits. Despite the fact that this method enhances the fault diagnosis

Hierarchical protection control system of smart substations

This paper analyzes the problems of the relay protections and secondary circuits of traditional substations, and introduces the hierarchical protection and control system of smart

Research on Fault Diagnosis Method of Secondary Equipment in ...

A new smart substation network structure method for fault diagnosis of smart substations is proposed for the relay protection measurement circuit, and the fault status of the secondary

Fault diagnosis technology of relay protection secondary circuit in ...

Comprehensive analysis shows that in the actual operation process of intelligent substation, it is necessary to develop on-line monitoring and fault diagnosis and location technology of relay

Fault diagnosis technology of relay protection secondary circuit in ...

Fault diagnosis technology of relay protection secondary circuit in Intelligent Substation Jiayu Zheng 1, 2, Hongjie Zhang 1, 2 1Artificial Intelligence Key Laboratory of Sichuan Province, Zigong 643000,

Contact Us

For more information, pricing, or custom solutions, please contact us:

Website: <https://www.umele-pestovani.eu>

Email: info@umele-pestovani.eu

Phone: +49 152 287 6349

Address: Neue Mainzer Straße 66-68, 60311 Frankfurt am Main, Germany

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