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**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

DL/T 357-2019

Replacing DL/T 357-2010

**Specification for transmission line fault location equipment
based on traveling wave
(English Translation)**

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Foreword

This standard is compiled in accordance with the rules given in GB/T 1.1-2009.

This standard replaces DL/T 357-2010 "Technical Conditions of Travelling Wave Fault Location Devices for Transmission Lines", and compared with DL/T 357-2010, except in addition to editorial changes, the main technical changes are as follows.

Updated some definitions in Chapter 3 of the standard;

Updated standard normative reference documents;

Delete the definition of "ranging system" in the original 3.8;

In standard 4.1.4, the storage environment temperature is -25°C~55°C;

Deleted the original section 4.2.3;

Modify the content of 4.3 "Functional Requirements for Traveling Wave Ranging Device";

In standard 4.3, DL/T 860 communication protocol requirements have been added;

In standard 4.3.9, the device alarm requirements are expanded;

Added section 4.3.12 "Network Security Protection Function Requirements";

Modify the requirements for "time error" in section 4.4.7;

Modified section 4.4.8 "Ranging Error";

In standard 4.8, the electromagnetic compatibility part is updated;

In standard 4.8, test items such as pulse magnetic field and damped oscillation magnetic field immunity are added.

This standard was proposed by the China Electricity Council.

This standard is under the jurisdiction of the Power Industry Relay Protection

Standardization Technical Committee.

The main drafting organizations of this standard. China Electric Power Engineering Co., Ltd., China Electric Power Research Institute Co., Ltd., China Southern Power Grid Power Dispatching Control Center, North China Electric Power Design Institute Co., Ltd., Zhongnan Electric Power Design Institute Co., Ltd., State Grid Liaoning Electric Power Co., Ltd., Shandong Kehui Power Automation Co., Ltd., Nanjing Nanrui Relay Electric Co., Ltd., Beijing Sifang Relay Automation Co., Ltd.

1 Scope

This standard specifies the basic technical requirements, test methods, inspection rules and benchmarking of traveling wave fault location devices for transmission lines Requirements for logging, packaging, transportation and storage.

This standard applies to AC and DC transmission line fault location devices based on traveling wave principles (hereinafter referred to as traveling wave fault detection devices).

Distance device) design, manufacture, inspection and use.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version is suitable Used in this document. For undated references, the latest version (including all amendments) is applicable to this standard.

GB/T 2887-2011 General Specification for Computer Site GB/T 2900.1-2008 Basic terminology for electrical engineering GB/T 2900.17-2009 Electrotechnical terminology measuring relay GB/T 7261-2016 Basic test methods for relay protection and safety automatic devices GB/T 7267-2015 Power system secondary circuit protection and automation cabinet (screen) basic size series GB/T 9361-2011 Computer site safety requirements GB/T 11287-2000 Electrical Relay Part 21: Measuring the vibration, shock and impact of relays and protection devices Collision and Seismic Test Part 1: Vibration Test (Sine) (IEC 60255-21-1:1988, IDT) GB/T 14537-1993 Impact and collision test of measuring relays and protection devices (IEC 60255-21-2:1988, IDT) GB/T 14598.24-2017 Measuring Relays and Protection Devices Part 24: Power System Transient Data Exchange (COMTRADE) Common format GB/T 14598.26-2015 Measuring Relays and Protection Devices Part 26: Electromagnetic Compatibility Requirements GB/T 14598.27-2017 Measuring Relays and Protection Devices Part 27: Product Safety Requirements GB/T 17626.9-2011 electromagnetic compatibility test and measurement technology pulse magnetic field immunity test GB/T 17626.10-2017 Electromagnetic compatibility test and measurement technology Damped oscillation magnetic field immunity test GB 17859-1999 Classification criteria for security protection grades of computer information systems GB/T 22239-2008 Information Security Technology Information System Security Level Protection

Basic Requirements GB/T 32890-2016 Relay Protection IEC 61850 Engineering Application Model DL/T 478-2013 General technical requirements for relay protection and safety automatic devices DL/T 630-1997 AC sampling remote control terminal technical conditions DL/T 860 (all parts) Substation communication network and system DL/T 1146-2009 DL/T 860 Implementation technical regulations

3 Terms and definitions

The following terms and definitions defined in GB/T 2900.1 and GB/T 2900.17 apply to this document.

Time synchronization and time synchronization system Time synchronization means that a standard time source provides a unified time synchronization signal for the traveling wave fault location device.

Time synchronization system refers to the system that can provide standard time, such as Beidou system, global positioning system (GPS), etc.

Fault location

A technology to determine the location of the transmission line fault by using the electrical quantity when the transmission line fails.

Traveling wave

The voltage waves and current waves propagating along the transmission line, among which the traveling waves propagating in the reference direction are called forward traveling waves (or forward traveling waves).

Wave), traveling waves propagating in the opposite direction of the reference direction are called reverse traveling waves (or reverse traveling waves). The traveling wave process is built on the distribution Parametric line model based on the telegraph equation to describe.

Traveling wave ranging A technology that uses the propagation characteristics of traveling waves on the faulty line to determine the location of the line fault.

Single-ended traveling wave ranging Use the initial traveling wave of the fault detected at one end of the line and the reflected wave of the characteristic impedance discontinuity point such as the fault point and the opposite bus bar the distance of arrival time difference determines the location of the fault point.

Double-ended traveling wave ranging the method of determining the location of the fault point by using the time difference between the initial traveling wave generated by the internal fault of the line and reaching both ends of the line.

Traveling wave fault location device the equipment that collects and processes line traveling wave signals at the factory station and can give the ranging results, usually consists of