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

GB/T 41135.2-2021

**Current and voltage sensors or detectors, to be used for fault
passage indication purposes - Part 2: System aspects**

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Standardization Administration**

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foreword

This document is in accordance with the provisions of GB/T 1:1-2020 "Guidelines for Standardization Work Part 1: Structure and Drafting Rules of Standardization Documents"

drafted:

This document is Part 2 of GB/T 41135 "Current and Voltage Sensors or Detectors for Fault Path Indication": GB/T 41135

The following sections have been published:

--- Part 1: General principles and requirements;

--- Part 2: System applications:

This document uses the redrafted method to modify the use of IEC 62689-2:2016 "Current and voltage sensors or detectors for fault path indication

Part 2: System Applications":

The technical differences between this document and IEC 62689-2:2016 and their reasons are as follows:

--- In order to adapt to my country's national conditions, the normative references in Chapter 2 are replaced by GB/T 41135:1, which has been modified and adopted international standards:

IEC 62689-1:

The following editorial changes have also been made to this document:

--- The scope has been rewritten;

--- In order to adapt to my country's national conditions, the content of Note 2 in 3:1:1 has been deleted;

--- Correct the error in the IEC standard, in paragraph 1 of 5:2:3:4 (5:2:5 in this document),

change "see 5:2:4" to "see 5:2:4"

Figure 3"; in paragraph 1 of 5:2:4:2 (5:2:6:2 in this document), delete "Figure 21"; in Figure A:4 and formula (A:13), use

"I

2,rsd" replaces "I" in the IEC standard

2,0"; in paragraph 9 of B:1, use "A2(FPI/DSU 2)" and "A3(FPI/DSU 3)" replaces "A3 (FPI/DSU 3)" and "A4 (FPI/DSU 4)" in the IEC standard, respectively:

In the latter paragraph, replace "FPI/DSU (A1 or A2)" in the IEC standard with "FPI/DSU (A2 or A3)";

--- Adjust 5:2:3:3 and 5:2:3:4 of the IEC standard to 5:2:4 and 5:2:5 respectively, and the numbers of other clauses shall be extended in turn;

---Improved the symbols and descriptions of some electrical graphics;

--- The formulas in Appendix A are numbered uniformly;

--- References have been adjusted:

Please note that some content of this document may be patented: The issuing agency of this document assumes no responsibility for identifying patents:

Introduction

0:1 Overview

GB/T 41135 is a series of standards for current and voltage sensors or detectors for fault path indication: Fault Path Indication

It can be achieved by appropriate equipment or functions, and can be divided into two categories according to their performance: one is the fault path indicator (FPI), and the other is the fault path indicator (FPI):

The class is the power distribution unit (DSU):

Different regions of the world have different names for fault path indicators, which also depend on their ability to detect different types of faults:

E:g:

--- Fault detector;

---Intelligent sensor;

--- Fault circuit indicator (FCI);

- Short circuit indicator (SCI);
- Earth Fault Indicator (EFI);
- Test point fault circuit indicator;
- Comprehensive fault indicator:

A simpler version that uses only local information/signaling and/or local communication for fault path indication is called FPI, a more advanced version

Known as DSU: The latter is based on IEC 60870-5 and IEC 61850 communication protocols and is designed for smart grids: compared to transformers

In other words, digital communication technology will continue to change with future development needs:

Since such devices are not yet widely used in the industry, in-depth experience on the deep integration of electronic equipment and transformers needs to be further developed:

Accumulate on a broad basis:

In addition to the basic functions of FPI, DSU can optionally integrate other auxiliary functions, such as:

- Voltage with/without detection function for medium voltage network automation, regardless of the presence of distributed energy sources [not used for fault confirmation (according to the

fault detection method used, fault acknowledgment can be used as a basic FPI function), nor is it used for safety protection covered by IEC 61243-5:

All relevant aspects];

- In various practical applications (such as: medium voltage grid automation, monitoring power flow, etc.), measuring voltage, current, active power, reactive power power, etc.;

- Manage the smart grid with suitable interfaces (e.g: voltage control and undesired island operation);

- Output the collected information in situ through a suitable interface;

- Remote transmission of collected information;

- other:

A general FPI schematic is shown in Figure 1: DSUs usually have a more complex structure:

Index number description:

A---current sensor (there is also a voltage sensor if necessary), monitoring single-phase or three-phase;

B---Signal transmission between sensor and electronic unit;

C---In-place indicators (indicators, LEDs, markers, etc.);

D---Analog, digital and/or communication input/output for remote signaling/remote control (hard wired and/or wireless);

E---Connect with the field device;

F---Signal conditioning and indicating unit;

G---Power supply:

Current sensors can detect fault current paths without any circuit connection to each phase (eg: feed-through current sensors, magnetic field sensors):

FPI does not have to have all of the above functions, it depends on its own complexity and technology: But at least one of the functions in C or D:

Figure 1 General structure of FPI

0:2 Relationship of this document to the IEC 61850 series

IEC 61850 is a set of international standards for communications and systems supporting power automation:

The GB/T 41135 series of standards also introduces a set of special namespaces to support the integration of FPI/DSU and power automation:

In addition, this series of standards also defines appropriate data models and different communication interface profiles to support different applications of FPI/DSU

Scenes:

For the most complex versions of FPIs (eg: DSUs commonly used in smart grids), some application scenarios rely on extended substation's

concept, this extended substation concept is used to realize intelligent electronic devices (IEDs) distributed on medium voltage feeders and located in the main substation:

Between intelligent electronic devices (IEDs), IEC 61850 is used for communication: This configuration mode will not be restricted to FPI/DSU devices, but will

Contains the characteristics required for the sub-substations where the main substation extends to the outgoing lines:

Fault path indication with current and voltage sensors or

Detectors Part 2: System Applications