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

GB/T 20840.9-2017

**Instrument transformers -- Part 9: Digital interface for
instruments transformers
(English Translation)**

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Foreword

GB/T 20840 Transformer is divided into the following parts.

- Part 1. General technical requirements;
- Part 2. Supplementary technical requirements for current transformers;
- Part 3. Supplementary technical requirements for electromagnetic voltage transformers;
- Part 4. Supplementary technical requirements for combination transformers;
- Part 5. Supplementary technical requirements for capacitive voltage transformers;
- Part 6. Supplementary general technical requirements for low power transformers;
- Part 7. Electronic voltage transformers;
- Part 8. Electronic current transformers;
- Part 9. Digital interface of transformers.

This part is part 9 of GB/T 20840.

This section was drafted in accordance with the rules given in GB/T 1.1-2009.

This part and GB/T 20840.1-2010 "Transformers Part 1. General technical requirements" and GB/T 20840.6-2017 "Mutual inductance Part 6. Supplementary General Technical Requirements for Low Power Transformers. This part follows GB/T 20840.1 and the writing structure of GB/T 20840.6 is the addition and modification of its corresponding clauses.

When the terms of GB/T 20840.6 are not mentioned in this section, as long as it is reasonable, these provisions also apply to this section. When this when the section indicates "addition", "modification" or "replacement", it means that the relevant clauses of GB/T 20840.6 are adapted accordingly in this section.

When the terms of GB/T 20840.1 are not mentioned in GB/T 20840.6, as long as they are reasonable, these terms also apply to GB/T 20840.6. When GB/T 20840.6 specifies "supplement", "modification" or "replacement", it means that the related clause of GB/T 20840.1 the section was adapted in GB/T 20840.6.

For chapters, bars, figures, tables, notes and appendices added to GB/T 20840.1-2010 and GB/T 20840.6-2017, this Some of the following numbering forms are used.

--- The numbering of chapters, bars, figures, tables and notes starts at 901;

--- The appendix is numbered 9A, 9B, etc.

This section uses the redrafted method to modify the use of IEC 61869-9:2016 "The Transformer Part 9. Digital Interface Transformer." the structural differences between this section and IEC 61869-9:2016 are as follows.

--- 6.904.3 is divided into 6.904.3.1 and 6.904.3.2;

--- Modify Appendix 9A, Appendix 9B, Appendix 9C and Appendix 9D of IEC 61869-9:2016 to Appendix 9B of this Part, attached Record 9C, Appendix 9D and Appendix 9F.

There is a technical difference between this section and IEC 61869-9:2016, and the terms involved in these differences have passed the margins on its outer side.

The vertical single line (|) of the position is identified, and a list of the corresponding technical differences and their causes is given in Appendix 9A.

This section also made the following editorial changes.

--- Deleted IEC 60044-7:1999, IEC 61850-8-1, IEC 61850-10 in the reference document of IEC 61869-9:2016, IEC 61869 (all parts), IEC 61869-7, IEC 61869-8, IEC 61869-12, IEC 61869-13, IEC 61869-14 and IEC 61869-15.

This part is proposed by the China Electrical Appliance Industry Association.

This part is under the jurisdiction of the National Standardization Technical Committee for

Transformer (SAC/TC222).

0.1 Overview

This section belongs to the transformer product series standards. It provides application methods for the IEC 61850 series of standards in the field of transformers.

IEC 61850 details the hierarchical substation communications architecture.

By providing instructional materials such as examples and instructions, transformers, relay protection and metering experts are also easily accessible to the IEC 61850 series.

The concepts and methods.

Compared with transformers, digital communication technology is undergoing changes and will continue to develop in the future. Integrate electronic devices directly into mutual inductance this far-reaching change of the instrument still needs to accumulate more experience. Such equipment has not been popularized in the project, and the corresponding norm has not been established.

stand up.

0.2 This section is relative to the IEC 61850 series

The IEC 61850 series of standards is a standard for communication networks and systems intended for power automation. Its most important part stipulates the following content.

---Substation automation system information model.

--- These information models include transformers and other process layer equipment (such as circuit breakers and disconnectors) models, and substation automation systems Systems (such as protective relays and instrumentation) models. The model is defined in IEC 61850-7-3 and 61850-7-4.

--- Communication between intelligent electronic devices (IEDs) in substation automation systems. The abstract model is defined in IEC 61850-7-2.

The mapping of the stack is defined in IEC 61850-8-1 and IEC 61850-9-2.

-- The configuration language used in the configuration of the substation automation system is described in IEC 61850-6.

--- Conformance testing of various IED communication interfaces for power automation systems, including their data models. Conformance testing in IEC 61850-Defined in 10.

The typical situation is that in the traditional system, the IED equipment such as the measurement and control device of the bay layer or the relay protection device, the interface directly passes the analog letter.

The number is connected to the transformer. In this case, the transformer's data model is implemented in the bay device. However, this is not the only way to do law. In the case where the electronic device is directly integrated into the electronic LPIT, the above data model should be implemented in the transformer and the transformer needs to be supported.

Communication Interface. The part of the electronic LPIT that does this work is called a merging unit.

IEC 61850 is a family of standards for the system, leaving many open options to support all current and future scales and voltages Grade substation needs.

In order to reduce the amount of work required for the following tasks, ie to implement in transformers and equipment using digital signals (such as relay protection devices, meter or interoperability between measurement and control devices, this section imposes additional constraints on the implementation of digital communication interfaces.

This section.

- Replace the GB/T 20840.8-2007 digital solution;
- Provide a transformer product standard with digital interface in accordance with IEC 61850, similar to IEC 62271-3 Switching equipment;
- Contains "back-to-back compatibility UCA International User Group" "Guidelines for Implementing Transformer Digital Interface Using IEC 61850-9-2";
- Based on GB/T 25931-2010 time synchronization consistent with IEC/IEEE61850-9-3, 1PPS can also be used (second pulse) and IRIG-B.

0.3 Transformer Digital Interface Overview

An illustrative generalized block diagram of a digital output transformer is shown in FIG. 901 . It represents more from the quadratic converter (SC in Figure 901) for current and/or voltage information, enter a common module labeled "Merge Unit". The merging unit completes all data processing (Including sampling, analog-to-digital conversion, scaling, output formatted messages, etc.) to output time-related digital messages that meet the requirements of this part flow. For the purposes of this section, the merging unit is a physical unit (hardware subsystem) that summarizes and publishes digital output data frames.

Figure 901 General block diagram of digital output electronic LPIT

The merging unit models one or more logical devices containing multiple logical nodes, as shown in FIG. 902 .

Figure 902 A comprehensive diagram of the objects in the merging unit (example)