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**Technical specification for on-site relay protection equipment -
Part 7: Transformer protection**

就地化继电保护装置技术规范 第7部分：变压器保护

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1 Scope

The document lays down the technical requirements, the test methods, the inspection rules and the marking, packaging, transport and storage of on-site transformer protection equipment.

It applies to the development, the design, the manufacture, the testing, the inspection and

the application of on-site, ring network managed, masterless distributed transformer protection equipment for voltage levels of 110 kV and below that takes its samples through conventional instrument transformers.

2 Normative references

The documents referred to are GB/T 191 on pictorial marking for handling of goods; GB/T 2423.17, GB/T 2423.22 and GB/T 2423.24 on the environmental tests salt mist, change of temperature and simulated solar radiation at ground level; GB/T 2887-2011 on the general specification for computer sites; GB/T 4208-2017 on degrees of protection provided by enclosures (IP code); GB/T 4798.1 and GB/T 4798.2 on the classification of environmental conditions for storage and for transport and handling; GB/T 7261-2016 on the basic test methods for relay protection and safety automatic equipment; GB/T 9771 (all parts) on single-mode optical fibres for communication; GB/T 11287 on vibration, shock, bump and seismic tests on measuring relays and protection equipment, section one, vibration tests (sinusoidal); GB/T 12357 (all parts) on multimode optical fibres for communication; GB/T 13384 on the general specification for packaging of mechanical and electrical products; GB/T 14285 on the technical code for relay protection and safety automatic equipment; GB/T 14537 on shock and bump tests on measuring relays and protection equipment; GB/T 14598.2-2011, GB/T 14598.26-2015 and GB/T 14598.27-2017 on the general requirements, the electromagnetic compatibility requirements and the product safety requirements for measuring relays and protection equipment; GB/T 15145 on the general specification for transmission line protection equipment; GB/T 17626.9-2011, GB/T 17626.10-2017 and GB/T 17626.18-2016 on the immunity tests for pulse magnetic field, damped oscillatory magnetic field and damped oscillatory wave; GB/T 26864 on the dynamic model test of relay protection products for power systems; GB/T 32890-2016 on the engineering application model of IEC 61850 for relay protection; GB/T 32901-2016 on the general technical requirements for relay protection in smart substations; GB/T 40096.1-2021, part 1 of this series, on the general technical requirements; DL/T 478-2013 on the general technical requirements for relay protection and safety automatic equipment; DL/T 860 (all parts) on communication networks and systems in substations; DL/T 860.92 on the specific communication service mapping for sampled values based on ISO/IEC 8802-3; and DL/T 1782 on the specification for relay protection information in substations.

Dated references apply in the dated version only; undated references apply in their latest version, amendments included.

3 Terms and definitions

The terms and definitions given in GB/T 40096.1-2021 apply, together with the following.

3.1 Special network for on-site protection equipment: the dedicated communication network between on-site protection equipment, over which the sampled values (SV) output by the

equipment and the generic object oriented substation event (GOOSE) and manufacturing message specification (MMS) information are all transmitted.

3.2 Ring network for on-site distributed transformer protection equipment: the ring network between the sub-units of an on-site distributed transformer protection, which applies to the process level ring communication network made up of the sub-units of a distributed transformer protection. A note states that it is called the ring network below.

3.3 Sub-unit of on-site distributed transformer protection equipment: in an on-site distributed transformer protection, the protection equipment that carries out the collection of analogue and binary quantities, receives the collected information of all the other sub-units, completes the whole of the protection logic operation, is responsible for the tripping output of the bay assigned to it and is connected to the special network for on-site protection equipment for external communication. Note 1 states that when the distributed protection function mode is used, each sub-unit receives the bay sampling information of all the other sub-units and completes the whole of the protection logic operation. Note 2 states that it is called the sub-unit below.

3.4 On-site centralized transformer protection equipment: the transformer protection equipment integrating main and backup protection in which a single on-site protection device completes the collection of the analogue and binary quantities of all the bays of the transformer, completes the protection logic operation, is responsible for the tripping output and is at the same time connected to the special protection network for external communication.

4.1 Environmental conditions

4.1.1.1 The atmospheric conditions at the place where the equipment is used shall meet the following requirements: ambient temperature -40 °C to +70 °C; relative humidity 0 % to 100 %; atmospheric pressure 61.6 kPa to 106 kPa.

4.1.1.2 The surroundings at the place where the equipment is used shall meet the following requirements: the electromagnetic environment shall be below the immunity level of the equipment laid down in Table 2, radiated emission and conducted emission excepted; no vibration exceeding severity class 2 of GB/T 11287 shall occur at the place of use; there shall be no explosive substances and no serious mould at the place of use; and the earthing shall meet the requirements of 5.8 of GB/T 2887-2011.

4.1.2 The special environmental conditions at the place where the equipment is used shall meet the following requirements: the equipment shall have the ability to resist salt fog corrosion and shall satisfy the salt fog corrosion test of 5.3.2; the equipment shall be able to withstand solar radiation and shall satisfy the solar radiation test of 5.3.4; where other environmental conditions go beyond those of 4.1.1, they shall be agreed between the user and the manufacturer.