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Technical specification for on-site relay protection equipment - Part 6: Busbar protection

就地化继电保护装置技术规范 第6部分：母线保护

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Introduction Introduction

As the level of equipment manufacture rises, and chip technology in particular develops, on-site protection equipment will be placed close to the primary plant or integrated with it, so as to improve protection performance. The content and depth of the existing technical standards for protection equipment installed indoors are no longer suitable.

GB/T 40096 is planned in seven parts. Part 1, General technical requirements, regulates the technical requirements, test methods, inspection rules and general requirements for marking, packaging, transport and storage of on-site relay protection equipment. Part 2, Connectors and prefabricated cables, regulates the product requirements for connectors and prefabricated cables. Part 3, On-site operation box, regulates the product requirements for the on-site operation box. Part 4, Intelligent management unit, regulates the product requirements for the intelligent management unit. Part 5, Line protection, regulates the functional specification and technical requirements of line protection. Part 6, Busbar protection, regulates the functional specification and technical requirements of busbar protection. Part 7, Transformer protection, regulates the functional specification and technical requirements of transformer protection.

1 Scope

The document fixes the technical requirements, test methods, inspection rules, marking, packaging, transport and storage for on-site busbar protection equipment and its associated devices.

It applies to the development, design, manufacture, testing, inspection and application of on-site busbar protection equipment, referred to below as the equipment, at voltage levels of 110 kV and below.

2 Normative references

The content of the listed documents constitutes indispensable provisions of this document through normative reference in the text; for dated references only the edition cited applies, and for undated references the latest edition, including all amendments, applies.

The list includes GB/T 191 on packaging, storage and transport pictorial marking, GB/T 2423.17, GB/T 2423.22 and GB/T 2423.24 on salt mist, temperature change and solar radiation environmental tests, GB/T 2887-2011 on computer sites, GB/T 4208-2017 on degrees of protection provided by enclosures, 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 11287 on vibration tests for measuring relays and protection equipment, GB/T 12357 (all parts) on multimode optical fibres for communication, GB/T 13384 on the general packaging requirements for 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, GB/T 14598.2-2011, GB/T 14598.26-2015 and GB/T 14598.27-2017 on measuring relays and protection equipment, GB/T 17626.9-2011, GB/T 17626.10-2017 and GB/T 17626.18-2016 on electromagnetic compatibility testing, GB/T 26864 on dynamic model tests of relay protection products for power systems, GB/T 32890-2016 on the IEC 61850 engineering application model, GB/T 32901-2016 on the general technical

requirements for relay protection in smart substations, GB/T 37880-2019 on the technical guide for on-site ring network busbar protection, GB/T 40096.1-2021, DL/T 478-2013, DL/T 670-2010, DL/T 860 (all parts), DL/T 860.92 and DL/T 1782.

3 Terms and definitions

The terms and definitions given in GB/T 40096.1-2021 and the following apply to this document.

On-site busbar protection bay unit: equipment which, within an on-site busbar protection scheme, undertakes the acquisition of analogue and binary quantities for a number of bays, receives the acquisition information of the remaining bays through the optical fibre ring network communication, performs the whole of the protection logic computation and the tripping outputs for the corresponding bays, and can be connected to the dedicated on-site protection network for external communication. A note records that the on-site busbar protection bay unit is called the bay unit for short, and that whether a bay unit undertakes management functions is set according to design requirements.

On-site busbar protection: a busbar protection scheme made up of one or more bay units, the bay units sharing information through the optical fibre ring network communication and together realising the complete busbar protection function.

Ring network with major management mode: a mode in which all bay units of the equipment communicate through the optical fibre ring network, all bay units in the ring realise the protection function, and one bay unit is chosen to realise the management function of the equipment. The bay unit that realises the management function, called the managing bay unit for short, consolidates the information of all the protection bay units of the whole scheme and sends it up to the intelligent management unit and the monitoring system, and receives operating commands from the intelligent management unit and the monitoring system for management operations on the whole protection scheme, such as changing settings and putting soft strips in or out of service.

Ring network without major management mode: a mode in which all bay units of the equipment communicate through the optical fibre ring network, all bay units in the ring realise the protection function, and each communicates with the intelligent management unit and the monitoring system, sending up its own events and states and independently accepting management operations from the intelligent management unit and the monitoring system, such as changing settings and putting soft strips in or out of service.

4.1 Environmental conditions

Normal atmospheric conditions of operation. The atmospheric conditions at the place where the equipment is used have to meet the following requirements: ambient temperature from minus 40 °C to plus 70 °C; relative humidity from 0 per cent to 100 per cent; atmospheric