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

GB/T 22390.1-2008

**Control and protection equipment of HVDC transmission
systems - Part 1: Operator control system**

高压直流输电系统控制与保护设备 第1部分：运行人员控制系统

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Foreword

According to the 2003 National Science and Technology Science and Technology Platform project focused "DC power transmission system core technology and infrastructure standard Research "(Project No. 2003DIA7J034) requirements formulated standard" HVDC system control and protection equipment. " GB/T 22390 "HVDC system control and protection equipment" is divided into six parts.

--- Part 1. Operator Control System;

--- Part 2. AC and DC station control system equipment;

--- Part 3. DC pole control system equipment;

--- Part 4. DC system protection equipment;

--- Part 5. DC line fault location device;

--- Part 6. Converter Station transient fault recorder. This section GB/T Part of 122,390. This section proposed by the China Electrical Equipment Industry Association and the China Electricity Council. This part of the National Standardization Technical Committee of HVDC equipment (SAC/TC333) centralized. This part mainly drafted by: XJ Group Corporation, Nanjing NARI-RELAYS Electric Co., Ltd., Beijing Network of DC engineering technology Ltd., China Southern Power Grid Co., Ltd., Xuchang Relay Research Institute, Chinese Academy of Sciences electricity. The main drafters of this section. Huang Lijun, Ye Zhou, Yu Tao, Yao Zhiqing, around, Maoshi Tao, Li Yaping, Li Yan, Li Zhiyong, Wang Mingxin, Han Wei, Shiyan. This section first release. HVDC system control and protection equipment Part

1. Operator Control System

1 Scope

China's national standard for the operator control system of a high voltage direct current transmission scheme. It is Part 1 of GB/T 22390 and specifies the technical requirements, the test methods, the inspection rules, the packaging, transport and storage, the marking and documentation, the complete supply and the quality assurance for the operator control system of an HVDC transmission system. China built more HVDC than the rest of the world combined, because the generation is two thousand kilometres from the load and only direct current moves that much power that far economically. An HVDC link is not a line but a machine: converter stations at each end, thyristor or IGBT valves, converter transformers, filters, and above all a control system that determines every quantity in the scheme. Unlike an AC line, where the power flow follows from the network, in an HVDC link the power flow is whatever the controls order, to the megawatt, and it can be reversed or driven to zero in a fraction of a second. That capability is what makes the link valuable and what makes the control system the plant. This part covers the top layer of it, the layer the operator sees and uses: the human-machine interface, the displays and the mimic, the sequences by which the link is started, stopped and its power order changed, the alarm and event handling, the interlocks that prevent an unsafe command from being issued, the data logging and the interface to the dispatch centre. The requirements are demanding for a reason that is not obvious: an operator error on an HVDC link is not a local fault, because the link may be carrying several gigawatts and losing it is a system event for the whole grid at both ends. Issued on 24 September 2008 and in force since 1 August 2009.

This section GB/T 22390 specifies the technical requirements of $\pm 500\text{kV}$ HVDC Transmission System Operator Control System Test Methods, inspection rules, packaging, transportation, storage, marking, labeling, instruction manual, complete sets of supply and quality assurance. This section applies to $\pm 500\text{kV}$ HVDC Transmission System Operator Control System (hereinafter referred to as system).

2 Normative references

The following documents contain provisions which, through reference

GB/T 22390 in this section constitute provisions of this section. For dated reference documents Member, all subsequent amendments (not including errata content) or revisions do not apply to this section, however, encouraged to reach under this section Parties to research agreement to use the latest versions of these documents. For undated reference documents, the latest versions apply to this section.

GB/T 2887-2000 General specification for computer sites

GB/T 9361-1988 computer site security requirements

GB/T 9813-2000 General specification for microcomputer

GB 9969.1-1998 Instructions General Industrial Products GB/T 13498 HVDC term (GB/T 13498-2007, IEC 60633.1998, IDT)

GB/T 13730-2002 regional dispatching automation system DL/T 634.5101-2002 Telecontrol equipment and systems - Part 5-101. Transmission protocols supporting standard for basic telecontrol tasks (

IEC 60870-5-101.2002, IDT) IEEE1003.1-1995 computer environment mobile operating system (eqv ISO / IEC 9945-1.1990)

3 Terms and Definitions

Terms and definitions GB/T 13498 established applicable to this section. 4. Technical Requirements

4.1.1 Normal atmospheric conditions of work

- a) Ambient temperature. $0\text{ }^{\circ}\text{C} \sim +45\text{ }^{\circ}\text{C}$, $-10\text{ }^{\circ}\text{C} \sim +55\text{ }^{\circ}\text{C}$;
- b) Atmospheric pressure. $80\text{kPa} \sim 110\text{kPa}$;
- c) Relative humidity. 5% to 95% (internal condensation neither should nor icing).

4.1.2 Test standard atmospheric conditions

- a) Ambient temperature. $+15\text{ }^{\circ}\text{C} \sim +35\text{ }^{\circ}\text{C}$;
- b) Atmospheric pressure. $86\text{kPa} \sim 106\text{kPa}$;
- c) Relative humidity. 45% to 75%. Standard atmospheric conditions

4.1.3 Arbitration experiment

- a) Ambient temperature. $20\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$;
- b) Atmospheric pressure. $86\text{kPa} \sim 106\text{kPa}$;