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

GB/T 19826-2014

Replacing GB/T 19826-2005

**General specification and safety requirements for DC power
supply equipment of power projects**

电力工程直流电源设备通用技术条件及安全要求

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Table of Contents

1	Scope
2	Normative references
3	Terms and definitions
4	Product model and basic parameters
4.2	Product specifications and parameters
4.2.1	Rated voltage and frequency of AC input
5	General requirements
5.1	Ambient condition requirements
5.1.2	Other requirements of operating site
5.2	Technical requirements
5.2.1	Charging unit
5.2.2	AC uninterruptible power supply and inverter supply
5.2.3.4	Noise voltage
5.2.4	Storage battery
5.3.3.2	Voltage value for dielectric strength test. the positions listed in
6	Test method
6.1	Test conditions
6.3.2	Stabilized current precision test
6.3.4	Ripple factor test
6.3.4.1	Oscilloscope requirements. with bandwidth of 20 MHz, scanning speed less than
7	Inspection rules
7.2	Delivery inspection
7.3	Type inspection
8	Marking, packaging, transportation and storage
8.1	Marking
9	Accompanied documents

1 Scope

China's national general specification for the DC power supply equipment of electrical power projects - the battery systems that keep a substation or a power station alive when everything else has failed. It specifies the general technical requirements and safety requirements for DC and integrated power supply equipment of power projects, together

with the test methods, the inspection rules, and the marking, packaging, transport and storage, and it serves as the criterion for the design, manufacture, inspection and application of such equipment. Normative and informative annexes cover the switching impulse discharge test requirements and the wire colour and cross-section requirements. The DC system is the least visible and most consequential auxiliary in a substation. Protection relays, circuit breaker trip coils, closing coils, control and signalling, emergency lighting and the communications equipment all run from it, and they must run precisely when the AC supply is gone - which is the moment the protection has to trip a breaker and clear a fault. A DC system that fails at that moment turns a fault into a catastrophe, and there is no second chance and no alternative supply. Everything in the standard follows from that. The battery and charger must be sized for the standing load and for the short heavy discharge of a trip and close sequence, which is what the switching impulse discharge test in Annex A verifies. The system must be continuously monitored for insulation, because an undetected earth fault on a DC system can either trip a breaker spuriously or prevent one tripping. It must tolerate the electromagnetic environment of a switchyard and the temperature and humidity of an unattended building. And it must be maintainable, since a battery is a consumable in a system that may never be exercised until the day it is needed. Issued on 6 May 2014 and in force since 28 October 2014, it replaces GB/T 19826-2005.

This Standard specifies the general specification and safety requirements for DC power supply equipment and integrated power supply equipment of power projects as well as the requirements of such aspects as test methods, inspection rules, marking, packaging, transportation and storage. This Standard is applicable to the DC and integrated power supply equipment (hereinafter referred to as "product") of power projects and serves as the criteria for product design, manufacturing, inspection and application. It also serves as the reference for the application of other power supply equipment not included.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the normative document (including any amendments) applies.

GB/T 2423.4-2008 Environmental Testing for Electric and Electronic Products - Part

3 Terms and definitions

For the purpose of this document, the terms and definitions established in GB/T 2900.1, GB/T 2900.17, GB/T 2900.32, GB/T 2900.33, GB/T 2900.41 and GB/T 4365 as well as those listed below apply.

3.1 DC power supply equipment The equipment supplying power for the control, protection,

signal, operation etc. of power projects; generally, it is composed of charging unit, storage battery, feed-out circuit, voltage regulator, relevant control, measurement, signal, protection and regulation units, electromechanical connector, etc.

3.2 Integrated power supply equipment The complete equipment sharing the storage battery set of DC power supply and exerting uniform monitoring through integrating the AC uninterruptible power supply (UPS) used for DC power supply and electric power, inverter supply (INV) used for electric power, DC switching power supply (DC/DC) used for communication, etc.

3.3 Charging unit A type of rectifying device undertaking the charge and/or floating charge tasks of storage battery set.

3.4 Charge The working process of supplementing capacity to the storage battery in different working modes.

3.5 Constant current charge The working process of maintaining the charging current from the charging unit to the storage battery at constant value within the range of charging voltage.

4 Product model and basic parameters

4.1 Product model and implication The classification and naming of products are specified in the enterprise product standard. It is recommended to formulate the product model with the method specified below; the function not configured shall not be reflected in the model. During the separate production of the charging unit and feed panel of product, the model is formulated according to the requirements of relevant standard.

4.2.1 Rated voltage and frequency of AC input

4.2.2 Nominal voltage and frequency of AC output Three-phase voltage. 380 V, 50 Hz; Single-phase voltage. 220 V,

4.2.3 DC nominal voltage 220 V, 110 V, 48 V and 24 V.

4.2.4 Output DC rated current of charging unit As for the output DC rated current of charging unit, the following values may be preferred.

4.2.6 Boundary dimensions of products The boundary dimensions of products are specified in enterprise product standard; the following boundary dimensions (frame dimensions of panel/cabinet) may be preferred for panels and cabinets.

5.1 Ambient condition requirements

5.1.1 Standard limits of nominal ranges of influencing quantities and influencing factors

5.1.2 Other requirements of operating site

5.1.2.1 The operating site shall be free from vibration and impulse with severity exceeding Level 1 specified in GB/T 11287-2000 and GB/T 14537-1993.

5.2.1 Charging unit

5.2.1.1 Regulation range of charging voltage and current The regulation range of charging voltage and current for charging unit shall meet those specified in Table 2.

5.2.1.7 Equalizing current imbalance If multiple sets of the high-frequency switching power supply modules of the same model operate in parallel, each module shall be able to share the load equally in proportion. If the average output current of each module is 50 % ~ 100 % of the rated current, its equalizing current imbalance shall not exceed $\pm 5\%$.

5.2.1.8 Soft start characteristic The charging unit shall be provided with soft start characteristic, and the soft start time may be set as required by the user; generally, this time is set as 3 ~ 10 s.

5.2.2 AC uninterruptible power supply and inverter supply

5.2.2.6 Voltage phase deviation The voltage phase deviation of AC uninterruptible power supply with three-phase output shall not exceed 3° .

5.2.2.7 Distortion of voltage waveform The distortion of output waveform shall not exceed 3 %.

5.2.3.3 Dynamic voltage transient range and transient response recovery time Dynamic voltage transient range shall not exceed $\pm 5\%$ of the nominal voltage and the transient response recovery time shall not be larger than 200 ms.

5.2.3.4 Noise voltage

5.2.3.6 Efficiency Under the rated load, the efficiency of DC switching power supply device shall not be less than those specified in Table 6.

5.2.4 Storage battery

5.2.4.1 Capacity of storage battery Where the capacity of storage battery set is tested under discharging current and end- of-discharging voltage specified in Table 7, the capacity of storage battery shall meet those specified in Table 7.

5.3.3.2 Voltage value for dielectric strength test. the positions listed in

5.3.3.1 shall withstand the power frequency voltage withstand test at (50 ± 5) Hz for 1 min (DC voltage may also be adopted but the test voltage shall be