

ICS 27.100
CCS F 23

DL

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

DL/T 2033-2019

**Test methods for power unit of high voltage variable frequency
drive used in fossil-fuel power plants
(English Translation)**

Issued on: June 4, 2019

Implemented on: October 1, 2019

Issued by: National Energy Administration

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Foreword

This standard is compiled in accordance with the rules of GB/T 1.1-2009 "Guidelines for Standardization Part 1: Standard Structure and Compilation".

This standard was proposed by the China Electricity Council.

This standard is under the jurisdiction of the China Electricity Council.

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1 Scope

This standard specifies the terms and definitions, test conditions, test items, parameter verification, performance of high-voltage inverter power units used in thermal power plants Test and other requirements.

This standard is applicable to rated input voltage of AC 6kV and 10kV, rated input frequency is 50Hz or 60Hz, output voltage is not Power unit test of high voltage frequency converter used in thermal power plant with output frequency greater than 10kV and not greater than 60Hz.

2 Normative references

The following documents are indispensable for the application of this standard. For dated reference documents, only the dated version applies to this standard quasi. For undated reference documents, the latest version (including all amendments) is applicable to this standard.

GB/T 2423.3 Environmental testing of electric and electronic products Part 3: Test method Test Cab. Constant damp heat test GB/T 2900.33 Electrical Engineering Terminology Power Electronic Technology GB/T 2900.83-2008 Electrical Terms Electrical and Magnetic Devices GB 12668.3 Speed Control Electric Drive System Part 3: Electromagnetic Compatibility Requirements and Specific Test Methods GB 12668.501-2013 Adjustable Speed Electric Drive System Part 5-1 Safety Requirements Electricity, Heat and Energy GB/T 17626.2 Electromagnetic compatibility test and measurement technology Electrostatic discharge immunity test GB/T 17626.3 Electromagnetic compatibility test and measurement technology Radio frequency electromagnetic field radiation immunity test GB/T 17626.4 Electromagnetic compatibility test and measurement technology Electrical fast transient pulse group immunity test GB/T 17626.5 Electromagnetic compatibility test and measurement technology surge (impact) immunity test GB/T 17626.6 Electromagnetic compatibility test and measurement technology Radio frequency field induced conducted disturbance immunity GB/T 29332 Discrete Semiconductor Devices Part 9: Insulated Gate Bipolar Transistor (IGBT) GB/T 30843.1 General frequency conversion speed regulation equipment above 1kV but not exceeding 35kV Part 1: Technical conditions GB/T 30843.2 General frequency conversion speed regulation equipment above 1kV but not exceeding 35kV Part 2: Test method DL/T 1195-2012 Operation and maintenance specifications for high-voltage inverters used in thermal power plants

3 Terms and definitions

Defined by GB/T 2900.33, GB/T 2900.83, GB 12668.501, GB/T 30843.2, DL/T 1195 and the following terms and definitions apply to this document. For ease of use, some terms and definitions are repeated below.

High voltage variable frequency drive A speed control device that changes the output frequency and output voltage to control the speed of an AC high-voltage motor.

[DL/T 1195-2012, Terms and Definitions 3.1] 3.2 Rectifier A power converter that converts single-phase or multi-phase alternating current into single-direction current.

[GB/T 2900.83-2008, Terms and Definitions 151-13-45] 3.3 Inverter A power converter that converts direct current into single-phase or multi-phase alternating current.

[GB/T 2900.83-2008, terms and definitions 151-13-46] 3.4 Basic insulation Set on the live part as insulation for basic protection against electric shock.

[GB 12668.501-2013, terms and definitions 3.3] 3.5 Protective separation Pass basic protection and additional protection measures (basic insulation plus additional insulation or protective shielding) or an equivalent protection measure between circuits (For example, reinforced insulation) to achieve isolation.

[GB 12668.501-2013, Terms and Definitions 3.32]

4.1 Composition

The power unit consists of a main circuit and a control circuit. The main circuit should include the input bus, rectifier, DC link, inverter, bypass loop Section, output bus. The control circuit shall include control power circuit, optical fiber communication circuit, instruction calculation circuit, IGB T drive circuit. power the typical structure schematic diagram of the main circuit of the unit is shown in Figure 1.

4.2 Output rated capacity

Under the specified power supply conditions, when outputting rated voltage and rated frequency, the output capacity of the power unit should not be lower than the rated capacity.

5.1 General requirements

Under normal test environment conditions, the ambient temperature range should be 5°C~40°C, the relative humidity range should be 5%~85%, no condensation;

The electrical test conditions should meet the requirements of GB/T 30843.1; there should be safety measures to protect the test personnel.

5.2 Instrumentation

Test instruments, meters, and sensors should be qualified by metrological verification or calibration and within the validity period. The accuracy of electrical measuring instruments should not be lower than for level 0.5 (except megohmmeter), the error of the thermometer should not be greater than $\pm 1^{\circ}\text{C}$.

5.3 Test platform

The test of the power unit should be carried out on a test platform equivalent to the actual work. The test platform should be composed of AC electronic loads and external power grids.

to make.

6.1 Test items

6.1.1

The samples should be subjected to type test, factory test and routine test, and the test items should meet the requirements of Table 1.

6.1.2

The test period should be set according to the operating conditions of the equipment. Routine tests should be carried out under one of the following conditions.

- a) 3 to 5 years after equipment operation;
- b) When the power unit has a serious failure;
- c) When the power unit replaces important parts such as control boards;
- d) When the high-voltage inverter stops due to frequent failures of the power unit;
- e) When the user considers it necessary.

6.2.2 Capacitance parameter verification

Note: For power units with input voltage less than 690V, the reference capacity is calculated according to the inverse linear ratio.

6.2.5 Parameter check of thyristor and contactor

The parameters of thyristor and contactor shall meet the requirements of Table 5.