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Wind turbine - Doubly-fed induction generator

风力发电机组 双馈异步发电机

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Foreword

This document was issued on 23 May 2023 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 1 December 2023.

It is a GB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

0 V to the rated voltage, then, measure and record the rotor line voltage, and convert

it to the corresponding rotor open-circuit voltage in the stationary state.

7.2.9 Short-time voltage increase test

The generator shall be able to withstand a short-time voltage increase test without any fault.

The following two methods can be used for the test.

a) During the test, the generator rotor winding is short-circuited and operates under the

condition of power frequency no-load motor. The externally applied voltage is 1.3 times the power frequency rated voltage for a duration of 3 minutes, and the insulation shall be undamaged.

b) Under the no-load generator operating conditions, the rotor of the generator under test is excited by an independent three-phase sinusoidal AC power supply. Adjust the generator stator voltage to 1.3 times the rated voltage; the stator voltage frequency shall not be lower than the power frequency for a duration of 3 minutes, and the insulation shall be undamaged. When increasing the generator voltage to 1.3 times the rated voltage, it is allowed to simultaneously increase the rotation speed and rotor excitation current, but it shall not exceed the maximum operating speed (n_{max}), and the rotor excitation current shall not exceed the allowable limit.

7.2.10 Interturn withstand voltage test

For random-wound windings, the withstand voltage test shall be carried out in accordance with the stipulations of GB/T 22719.1.

For form-wound windings, the withstand voltage test shall be carried out in accordance with the stipulations of GB/T 22714.

7.2.11 Determination of shaft voltage

7.2.11.1 When the generator rotor winding is short-circuited and operates under the condition

of power frequency no-load motor, the determination of the shaft voltage shall be carried out in

accordance with the stipulations of GB/T 1032-2012.

7.2.11.2 When the generator is under doubly-fed operation, the determination of the shaft voltage is determined by the generator manufacturer and the user through consultation.

7.2.12 Determination of harmonic voltage and current

7.2.12.1 Under the no-load generator state and at the rated speed, determine the total harmonic

distortion (THD) of the stator line end voltage of the generator. The frequency measurement range shall include all harmonic waves from the rated frequency to the 50th harmonic wave.

7.2.12.2 Under the rated operating conditions, determine the stator line end current harmonic

current factor (HCF) of the generator. The frequency measurement range shall include all harmonic waves from the 2nd harmonic wave to the 50th harmonic wave.

7.2.13 Overspeed test

Carry out the test in accordance with the stipulations of GB/T 1032-2012.

7.2.14 Ground withstand voltage test

7.2.14.1 The ground withstand voltage test shall be carried out after all tests are completed.

7.2.14.2 Between the winding under test and the generator enclosure, apply the test voltage,

and the other non-test windings and PT100 shall be electrically connected to the core and enclosure. During the test, all components of the generator shall be installed in place (except

the lightning arrester), just like under normal operating conditions.

7.2.14.3 The test voltage shall be power frequency voltage and be as close to a sinusoidal waveform as possible.

7.2.14.4 The test shall start from no more than half of the full value of the test voltage, then, uniformly or in steps of no more than 5% of the full value, gradually increase to the full value.

The time for the voltage to increase from half the value to the full value shall not be less than

10 seconds.

7.2.14.5 This test is only performed on new motors that have been assembled. During acceptance inspection, the windings shall not be repeatedly subjected to the withstand voltage

test of full voltage. However, when the user insists on conducting the second test, the test voltage shall be 80% of the full value.

7.2.15 Vibration determination

The generator is installed on the test bench and operates under the condition of short-circuited

rotor winding and power frequency no-load motor, and the cooler normally works, the rest

shall

comply with the stipulations of GB/T 10068.

7.2.16 Noise determination

The generator is installed on the test bench and operates under the condition of short-circuited

rotor winding and power frequency no-load motor, and the cooler normally works, the rest shall

1 Scope

GB/T 23479-2023 covers the low-voltage doubly-fed induction generator built into a grid-connected wind turbine - the structural type and the main parameter series, the technical requirements, the test methods, the inspection rules, the warning signs the manufacturer has to fix where they stay visible for the working life of the machine, the product information and nameplate markings, the packaging, transportation and storage, the environmental protection provisions, and safety. The testing is where the doubly-fed design earns its attention. Unlike a machine whose rotor is left to itself, this one has its rotor winding brought out through a converter, so events on the network reach the rotor directly: the methods include measuring the rotor open-circuit voltage and confirming that the generator withstands a short-time voltage increase without fault, alongside the degree of enclosure protection expected of a machine that spends its life in a nacelle. A generator that fails after installation is recovered with a crane and a weather window, which is why acceptance, marking and handling are settled before it leaves the works. Of use to generator manufacturers, wind turbine assemblers, converter suppliers, test laboratories, and the buyers who write acceptance terms into a supply contract.

This document specifies the type, technical requirements, test methods, inspection rules, warning signs, product information, packaging, transportation and storage, environmental protection and safety of low-voltage doubly-fed induction generator for grid-connected wind turbines with a rated voltage of 1,140 V and below.

This document is applicable to low-voltage doubly-fed induction generator for grid-connected

wind turbines with a rated voltage of 1,140 V and below (hereinafter referred to as "the generator").

2 Normative References

The contents of the following documents constitute indispensable clauses of this document