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Replacing JB/T 1009-2007

YS series three-phase asynchronous motors - Specification

YS 系列三相异步电动机 技术条件

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Foreword

This Standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This Standard replaces JB/T 1009-2007 "Specification for YS series three-phase asynchronous motors". Compared with JB/T 1009-2007, the main technical changes in this Standard are as follows:

- Change the expression of motor cooling method;

- Add the voltage level of the motor;

- Introduce the latest requirements of IEC 60034-30-1. Introduce IE level requirements. It stipulates the energy efficiency limit values for IE2, IE3 and IE4 levels of motors with power of 120W and above;

- Delete the temperature rise requirement for Class E insulated motors. Add temperature rise requirements for Class F insulation;

- Add the requirement that "safety items not specified in this Standard shall comply with the provisions of GB 12350";

- Modify the technical requirements for "vibration";

- Revise Chapter 7. Add requirements for "transportation".

This Standard was proposed by China Machinery Industry Federation.

This Standard shall be under the jurisdiction of National Technical Committee on Rotating Motors of Standardization Administration of China (SAC/TC 26).

The drafting organizations of this Standard: China Electrical Apparatus Research Institute Co., Ltd., Wolong Electric Tuan Co., Ltd., Weikai Certification and Testing Co., Ltd., Weikai Testing Technology Co., Ltd., Kaiping Sanwei Micro Motor Co., Ltd., Nanjing Nan Micro Motor Co., Ltd., and Guangzhou Micro Motor Factory Co., Ltd., Hangzhou Fusheng Electric Co., Ltd., Zhejiang Lianyi Motor Co., Ltd., Fujian Mindong Motor Co., Ltd., Weihai Taifusima Motor Co., Ltd.

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Versions of standard substituted by this Standard are:

- JB/T 1009-1991, JB/T1009-2007.

YS series three-phase asynchronous motors - Specification

1 Scope

This Standard specifies YS series three-phase asynchronous motor in terms of type, basic parameters and dimension, technical requirements, test methods, inspection rules, marks, packaging, transportation and quality guarantee period.

This Standard is applicable to YS series three-phase asynchronous motor (frame size 45~90) (hereinafter referred to as motor), and all other series motors derived from YS series three-phase asynchronous motor may also refer to this Standard.

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 referenced document (including any amendments) applies.

GB/T 755, *Rotating electrical machines -- Rating and performance*

GB/T 1032, *Test methods for three-phase asynchronous motors*

GB/T 2828.1, *Sampling procedures for inspection by attributes -- Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

GB/T 4772.1, *Dimensions and output series for rotating electrical machines. Part 1: Frame numbers 56 to 400 and flange numbers 55 to 1080*

GB/T 4798.2, *Classification of environmental conditions - Classification of groups of environmental parameters and their severities - Part 2: Transportation and handling*

GB/T 4942.1, *Degrees of protection provided by the integral design of rotating electrical machines (IP code) -- Classification*

GB/T 5171.1, *Small power motors -- Part 1: General technical requirements*

GB/T 10069.1, *Measurement of airborne noise emitted by rotating electrical machines and the noise limits -- Part 1: Method for the measurement of airborne noise emitted by rotating electrical machines*

GB 12350, *Safety requirements of small-power motors*

GB/T 12665, *Requirements of damp-heat testing of electrical machine for service in general environmental condition*

GB/T 13126, *General specification for damp heat protective packaging of mechanical and electrical products*

GB/T 13384, *General specifications for packing of mechanical and electrical product*

GB/T 19142, *Packaging for export commodity -- General rule*

GB/T 22719.1, *Interturn insulation of random-wound winding for AC low-voltage electrical machines -- Part 1: Test methods*

GB/T 22719.2, *Interturn insulation of random-wound winding for AC low-voltage electrical machines -- Part 2: Test limits*

JB/T 10490, *Measurement method, evaluation and limit of mechanical vibration of low power motor*

3 Types, basic parameters and dimensions

3.1 The protection level of motor enclosure adopts IP44, IP54 or IP55.

3.2 The cooling methods of the motor are IC411 and IC410.

3.3 The construction and mounting type of motors shall meet the requirements of Table 1.

3.4 Rating of the motor is continuous based on continuous duty (S1).

3.5 The rated frequency of the motor is 50 Hz. Rated voltage is 220 V, 220/380 V, 380 V.

3.6 Motors shall be manufactured according to the following rated powers (in W):

10, 16, 25, 40, 60, 90, 120, 180, 250, 370, 550, 750, 1100, 1500, 2200.

3.7 The corresponding relation of frame size, rotating speed and power of motors shall be in accordance with those specified in Table 2.

to the provisions of GB/T 755.

If the altitude and ambient air temperature of the operating location are different from the provisions of 4.2 of this Standard, the temperature rise limit shall be revised according to the provisions of GB/T 755.

4.11 Where the three-phrase power supply is balanced, the deviation of any one phase of the three-phase no-load current of the motor from the three-phase average value should not exceed ±10% of the three-phase average value.

4.12 Under thermal state or under the condition that the torque is increased gradually, the motor shall be able to withstand over-torque test with 1.6 times the rated torque, and be free of sudden change and stalling in rotation speed within 15s. During the test, the voltage and frequency shall be at rated values.

4.13 Under no-load condition, the motor shall be able to withstand the overspeed test for 2min, in a speed of 120% of its rated value, without injurious deformation.

4.14 The stator winding of the motor shall be able to withstand the withstand voltage test for 1min without breakdown. The test voltage shall be as sinusoidal as possible. The frequency is 50 Hz. The capacity of the test equipment shall not be less than 0.5 kVA. The effective value of the voltage is 1000 V+2U_N. But the minimum is 1500 V. The tripping current shall not be greater than 10 mA.

During inspection test for motors massively and continuously produced in large quantity, test duration is allowed to be shortened to 1s. The effective value of the test voltage shall be 1.2 times the withstand voltage test voltage value. The test voltage is applied with a test rod.

4.15 The stator winding of the motor shall be able to withstand the inter-turn insulation impact voltage withstand test without breakdown. Its impulse test voltage (peak value) shall comply with the provisions of GB/T 22719.2. The inter-turn insulation impulse withstand voltage test is also allowed to be replaced by an elevated voltage test. The test is carried out when the motor is no-load. The external applied voltage is 130% of the rated voltage and the time is 3min. When increasing the voltage value to 130% of the rated voltage, it is allowed to increase the frequency at the same time, but it shall not exceed 115% of its rated value.

4.16 The vibration intensity measured when the motor is no-load shall include vibration displacement, vibration speed, and vibration acceleration. The limit value shall comply with the provisions of Table 23.

5 Test Methods

5.1 The tests listed in 6.1.2 [excluding e) interturn impulse withstand voltage test] and 6.2.2 (excluding tests in i) and j)) are carried out according to GB/T 1032. The inter-turn insulation impulse withstand voltage test in item 6.l.2e) of this Standard is carried out in accordance with the provisions of GB/T 22719.1.

5.2 The measurement of noise shall be carried out in accordance with the provisions of GB/T 10069.1.

5.3 The measurement of vibration shall be carried out in accordance with the provisions of JB/T 10490.

5.4 The inspection of mounting dimensions and tolerances specified in 6.1.3 of this Standard shall be carried out in accordance with the provisions of GB/T 4772.1.

5.5 During type test, withstand voltage test of stator winding to enclosure and that between windings shall be conducted when the temperature of the motor is close to the operating temperature and after insulation resistance measurement, overspeed test and temporary over-torque test of the stator winding.

5.6 Enclosure protection level test and damp heat test of the motors may be conducted in case of construction type approval or significant change of construction and technology. The enclosure protection level test is carried out according to GB/T 4942.1 while damp heat test is conducted according to GB/T 12665.

6 Inspection Rules

6.1 **Exit-factory inspection**

6.1.1 Each motor shall not leave the factory until being qualified in the exit-factory inspection and shall be accompanied by product certificate.

6.1.2 Exit-factory inspection items include:

a) Mechanical inspection (according to 6.1.3 and 6.1.4);

b) Determination of the insulation resistance of the stator winding to enclosure and that between the windings;

c) Determination of DC resistance of stator winding at actual cold state;

d) Withstand voltage test;

e) Stator winding inter-turn insulation impact withstand voltage test or elevated voltage test (inter-turn insulation impact withstand voltage test can be implemented during the production process);

f) Determination of no-load current and loss (no load characteristic curve needs to be measured during type inspection);

g) Determination of locked-rotor current and loss (during cold state).

6.1.3 Mechanical inspection items of motor include:

a) Rotation inspection: when the motor rotates, the steering shall be correct; the rotation shall be smooth and brisk, without stagnation; the sound shall be uniform and harmonious without harmful noise.

b) Appearance inspection: inspect whether the motor assembling is intact and correct, and the motor surface paint shall be dry, intact and uniform without stains, damage or crack.

c) Inspection on mounting dimension, boundary dimensions and dimensions of key: both mounting and boundary dimensions shall meet the requirements of 3.8a), while the dimensions of key shall meet the requirements of 3.8b).

d) Inspection on the circular runout tolerance, the parallelism tolerance and flatness tolerance of foot supporting surface and the symmetry tolerance of key groove: The circular runout tolerance shall meet the requirements of 3.8c) and 3.8d). The parallelism and flatness tolerance of the foot supporting surface shall respectively meet the requirements of 3.8e) and 3.8f). The symmetry tolerance of key groove shall meet the requirements of 3.8g). The flatness tolerance of the foot supporting surface and the symmetry tolerance of key groove may be inspected on spare parts.

6.1.4 During exit-factory inspection, items in b) and c) of 6.1.2, and c) and d) of 6.1.3 may be inspected randomly according to the method formulated by the manufacturer according to GB/T 2828.1.

6.2 Type inspection

6.2.1 Type inspection shall be carried out under one of the following conditions.

a) If the manufacturer conducts trial manufacture or small-lot trial production for the first time after identification and approval;

b) If the changes in the design or technology of motor are sufficient to cause the change of some characteristics and parameters;

c) If impermissible deviation occurs between the inspection test results and previous type test results;

d) Periodical random inspection for mass produced motors once annually; if too many samples are needed for the test, interval time for the test may be duly postponed, but at least once for every two years.

6.2.2 Type inspection items of motor include:

a) All inspection test items;

b) Determination of locked-rotor torque and current (during cold state);

c) Temperature rise test;

d) Determination of efficiency and power factor;

e) Short-time over-torque test;

f) Determination of maximum torque;

g) Determination of minimum torque during startup;

h) Overspeed test;

i) Determination of noise;

j) Determination of vibration.

6.2.3 The number of prototypes for type testing shall not be less than 3. If any unqualified items are found in the products randomly inspected, the number of products randomly tested for the item shall be doubled. If it is still unqualified, the batch of products can only leave the factory after the unqualified items are eliminated and passed the reinspection.

7 Marks, packaging, transportation

7.1 The nameplate material shall ensure the data on nameplate are durable throughout the whole service life of the motor.

7.2 Nameplate shall be fixed on the upper half of motor frame, on which the following items shall be indicated:

a) Manufacturer's name;

b) Motor name;

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