MT

COAL MINING INDUSTRY STANDARD

OF THE PEOPLE'S REPUBLIC OF CHINA

ICS 73.100.99; 29.160.30

D 98

MT/T 1040-2019

Replacing MT/T 1040-2007

Specification for Shearer Variable Frequency Adjustable Speed Definite Purpose Converter-Fed YBVF Series Travel Motors

采煤机变频调速装置用 YBVF 系列行走电动机技术条件

Issued on: November 28, 2019 **Implemented on: June 01, 2020**

Issued by: State Administration of Coal Mine Safety

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Specification for Shearer Variable Frequency Adjustable Speed Definite Purpose Converter-Fed YBVF Series Travel Motors

1 Scope

This Standard specifies the type and basic parameters, requirements, test methods, inspection rules, marking, packaging, storage and transportation of shear variable frequency adjustable speed definite purpose converter-fed YBVF series travel motor.

This Standard applies to the shear variable frequency adjustable speed definite purpose converter-fed YBVF series travel motor (hereinafter referred to as motors). All other motors derived from this series of motors can also be implemented by reference.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) is applicable to this document.

GB/T 191 Packaging – Pictorial Marking for Handling of Goods

GB 755-2008 Rotating Electrical Machines - Rating and Performance

GB/T 997-2008 Rotating Electrical Machines—Classification of Types of Construction, Mounting Arrangements and Terminal Box Position (IM Code)

GB/T 1032-2012 Test Procedures for Three-Phase Induction Motors

GB/T 1993-1993 Cooling Methods for Rotating Electrical Machines

GB/T 2423.4-2008 Environmental Testing for Electric and Electronic Products - Part 2: Test Method - Test Db: Damp Heat, Cyclic (12h+12h Cycle)

GB 3836.1-2010 Explosive Atmospheres—Part 1: Equipment - General Requirements

GB 3836.2-2010 Explosive Atmospheres - Part 2: Equipment Protection by Flameproof Enclosures “d”

GB 3836.3-2010 Explosive Atmospheres - Part 3: Equipment Protection by Increased

Safety “e”

GB/T 4942.1-2006 Degrees of Protection Provided by the Integral Design of Rotating Electrical Machined (IP Code) - Classification

GB 10068-2008 Mechanical Vibration of Certain Machines with Shaft Heights 56 mm and Higher-Measurement Evaluation and Limits of Vibration Severity

GB/T 10069.1-2006 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/T 22670-2008 Test Procedures for Converter-Fed Three Phase Cage Induction Motors

GB/T 22719.1-2008 Interturn Insulation of Random-Wound Winding for AC Low-Voltage Electrical Machines - Part 1: Test Methods

GB/T 22719.2-2008 Interturn Insulation of Random-Wound Winding for AC Low-Voltage Electrical Machines - Part 2: Test Limits

AQ/T 1043-2007 Mining Products Safety Label

3 Type and Basic Parameters

3.1 Type

3.1.1 The motor shall be made of flameproof type according to the provisions of GB 3836.2-2010, and its explosion-proof mark shall be Exd I Mb.

3.1.2 The cooling method of the motor is casing water cooling, which shall comply with IC3W7 specified in GB/T 1993-1993.

3.1.3 The structure and installation type of the motor shall comply with the provisions of GB/T 997-2008, and be IMB5, IMB10, or other suitable installation types.

3.2 Basic parameters

3.2.1 The rating of the motor is based on the continuous duty system (S1), and the user and the manufacturer are also allowed to agree to determine the rating based on other duty systems; and specify the corresponding parameters such as speed, load, and load duration, as well as the test methods.

3.2.2 The reference frequency of the motor is 50 Hz; and the rated voltages are 380 V, 660 V and 1140 V.

NOTE: Rated voltage and reference frequency refer to the motor operating voltage and frequency

According to the provisions of 12.4 in GB/T 1032-2012.

5.8 Determination of maximum torque

According to the provisions of 12.1 in GB/T 1032-2012.

5.9 Determination of minimum torque

According to the provisions of 12.2 in GB/T 1032-2012.

5.10 Determination of slip ratio

Under the condition of 50 Hz sinusoidal power supply, add load to the motor to make the motor run at the rated torque; measure the speed or slip according to the provisions of 4.3.5 in GB/T 1032-2012; and measure the slip ratio according to the provisions of 10.3 in GB/T 1032-2012.

5.11 Power frequency withstand voltage test

According to the provisions of 12.6 in GB/T 1032-2012.

5.12 Turn-to-turn insulation test

According to the provisions of GB/T 22719. 1-2008 and GB/T 22719. 2-2008.

5.13 Vibration measurement

When the vibration measurement is powered under the condition of the converter, and the effective value of the vibration speed of the motor at no load shall be measured at three frequencies of 20 Hz, 50 Hz and 100 Hz; and the maximum value is the vibration speed of the motor. The vibration measurement method shall be in accordance with the provisions of GB 10068-2008.

5.14 Measurement of noise

When the noise measurement is powered by the converter, the noise of the motor at no-load shall be measured at three frequencies of 20 Hz, 50 Hz and 100 Hz, respectively. The method of noise measurement shall be in accordance with the provisions of GB/T 10069.1-2006.

5.15 Measurement of shaft voltage

According to the provisions of 14.7 in GB/T 22670-2008.

5.16 Temperature rise test

5.16.1 The motor temperature rise test method adopts the direct method specified in 11.2.1 of GB/T 22670-2008, but the power supply and loading power (torque) during the test are as specified in 5.16.2. When take temperature measurement and test of each part of the motor, the temperature measurement of the cooling medium shall be in accordance with the provisions of

Clause 6 in GB/T1032-2012 and Clause 11 in GB/T 22670-2008.

5.16.2 When the test is under the power supply of the inverter, the motor runs respectively at a frequency of 50 Hz at the rated torque, and at a frequency of 5 Hz at the rated torque to thermal stability; and measure the temperature rise of the motor. And at a frequency of 100 Hz, after running for 0.5 h at the output torque calculated at the rated power and the synchronous speed of 100 Hz frequency, measure the temperature rise of the motor.

5.16.3 The maximum surface temperature test shall be in accordance with the provisions of 26.5.1.3 in GB 3836.1-2010.

5.17 Load characteristic test

This test shall be carried out after the temperature rise test.

After starting the motor, adjust the frequency converter to 5 Hz, 10 Hz, 20 Hz, 30 Hz, 40 Hz, 50 Hz, respectively; and slowly load the motor at each of the above frequencies until the rated torque; and measure the measure 80%, 100% rated torque and corresponding speed. Then, adjust the frequency converter to 60 Hz, 80 Hz, 100 Hz, respectively; and slowly load the motor at each frequency until the torque corresponding to the rated power (the rated power at this time shall be converted into torque); and measure the torque and speed corresponding to 80%, 100% rated power of the motor. During the test, the motor shall run smoothly without obvious torque ripple.

5.18 Casing protection test

According to the provisions of GB/T 4942.1-2006.

5.19 Alternating damp heat test

According to the provisions of GB/T 2423.4-2008.

5.20 Cooling water channel patency test

Supply the cooling water flow rate specified in Table 2 to the motor cooling water channel; and measure the pressure drop at the inlet and outlet.

5.21 Cooling water channel puncture test

Block the water outlet of the cooling water channel of the motor; increase the water pressure of the water inlet to the required value of the test and keep it for 5 min; there shall be no leakage or harmful deformation.

5.22 Explosion-proof performance test and explosion-proof structure inspection

According to the provisions of GB 3836.1-2010, GB 3836.2-2010, and GB 3836.3-2010.

5.23 Wire end marking and rotation direction inspection

batch, 1 set shall be randomly inspected. If the random inspection items are qualified, the batch of products shall be judged as qualified; otherwise, they shall be inspected one by one. If there are more than 5 sets in the batch, 2 sets shall be randomly inspected; if 2 sets are both qualified, the batch of products shall be judged as qualified; if 2 sets are unqualified, they shall be inspected one by one; if only 1 set is qualified, double quantity of samples shall be taken for random inspection, if they are all qualified, then the batch shall be judged qualified (unqualified products shall be rejected).

6.3 Type inspection

6.3.1 Type inspection shall be carried out in any of the following situations:

a) The first trial production or small batch production by the manufacturer after the identification and finalization;

b) When the design or process of the motor is changed enough to cause changes in certain characteristics and parameters;

c) When there is an impermissible deviation from the previous type inspection results;

d) Periodic random inspection of mass-produced motors, once a year;

e) After the product has been discontinued for a long time, the production is resumed;

f) When requested by the national quality supervision and inspection agency.

6.3.2 Type inspection items are shown in Table 13.

6.3.3 The sample for type inspection is 1 set, which shall be randomly selected from the products that have passed the exit-factory inspection. If all type inspection items are qualified, the type inspection shall be judged to be qualified; if there are unqualified items, double quantity of samples shall be taken for re-inspection; if there are still unqualified items, then the type inspection shall be judged unqualified.

7 Marking, Packaging and Storage

7.1 The motor shall have the explosion-proof marking of "Ex d I Mb" and the mining product safety marking and label of "MA" at the obvious place of the main body of it. Set up warning signs such as "It is strictly forbidden to open with electricity" and "Use fasteners with high yield stress is greater than or equal to the (value)". The marking shall be considered legible and durable under possible chemical attack. Its marking Ex, explosion-proof type and category can be marked with embossed or concave grain on the obvious place of the casing. The production of mining product safety signs of "MA" shall comply with the provisions of AQ/T 1043-2007.

7.2 The material of the nameplate shall be chemically resistant materials such as bronze, brass, or stainless steel. Its characterization method shall ensure that its handwriting is not easy to be

erased during the entire use of the motor. The nameplate shall be installed on a conspicuous part of the motor body.

7.3 The items to be marked on the nameplate are as follows:

a) the name of the manufacturer;

b) motor name;

c) motor model;

d) explosion-proof marking;

e) casing protection level;

f) duty system;

g) rated power;

h) rated current;

i) rated voltage;

j) reference frequency;

k) rated speed;

l) frequency range at constant torque of 3Hz ~ 50Hz; frequency range at constant power of 50Hz ~ 100Hz;

m) thermal rating;

n) wiring method;

o) cooling water flow rate;

p) working pressure of cooling water channel;

q) the manufacturer's exit-factory date and product number;

r) standard number;

s) No. of explosion-proof certificate-;

t) safety sign number;

u) Quality.

7.4 The product instruction manual and product qualification certificate of the electric motor

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