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Replacing GB/T 4942.1-2006

Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification

旋转电机整体结构的防护等级(IP 代码) 分级

[IEC 60034-5:2020, Rotating electrical machines - Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification, IDT]

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Table of Contents

Foreword

This document was drafted in accordance with the rules given in GB/T 1.1-2020 *Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents*.

This document replaces GB/T 4942.1-2006 *Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification*. Compared with GB/T 4942.1-2006, except for structural adjustment and editorial changes, the main technical changes are as follows:

a) The specified standards for the protection of machine enclosures from dust are added in the "Scope" (see Chapter 1);

b) The definitions of closed machines and open machines are added (see 3.1 and 3.2);

c) The requirements for machines equipped with drain holes are modified in Chapter 5 (see 5.4; see 4.4 of the 2006 edition);

d) The protection degree of IPX9 "machine protected against high temperature and high-pressure water jet" is added (see 6.2);

e) The test and acceptance conditions for the dustproof test in the first characteristic numeral test are modified (see Chapter 9; see Chapter 8 of the 2006 edition);

f) The test and acceptance conditions for the second characteristic numeral test of IPX9 are added (see 10.1);

g) Figure 7 "Geometry of the fan jet nozzle" is added (see 10.1).

This document is identical to IEC 60034-5:2020 *Rotating electrical machines - Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification*.

The Chinese documents that have consistent correspondence with the international documents cited in this document are as follows:

-- GB/T 1993-1993 Cooling methods for rotating electrical machines (eqv IEC 60034-6:1991);

-- GB/T 3836 (all parts) Explosive atmospheres [IEC 60079 (all parts)].

The following editorial changes were made to this document:

-- In order to be consistent with the technical standard system of China, the name of the standard is changed to *Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification*;

-- The normative reference IEC 60079 (all parts) is added in Chapter 2;

-- For ease of understanding, the note in 10.2.3 a) is added;

-- "References" is added.

Please note that some contents of this document may refer to patents. The issuing agency of this document assumes no responsibility for identifying patents.

This document was proposed by China Electrical Equipment Industry Association.

This document shall be under the jurisdiction of the National Technical Committee on Rotating Machinery of Standardization Administration of China (SAC/TC26).

Drafting organizations of this document: Shanghai Electrical Apparatus Research Institute (Group) Co., Ltd., Nanfang Pump Industry Co., Ltd., Jiamusi Electric Machine Co., Ltd., Shanghai Engineering Research Center for Motor System Energy Saving Co., Ltd., Xi'an Tech. Full Simo Motor Co., Ltd., Jiangsu Xi'anda Explosion-proof Co., Ltd., Hangzhou Jiangchao Motor Co., Ltd., Shandong Huali Electric Motor Group Co., Ltd., CRRC Yongji Electric Co., Ltd., Zhejiang Jinlong Electrical Machinery STOCK Co., Ltd., Fuzhou Wonder Electric Co., Ltd., Nanyang Explosion Prevention Weite Co., Ltd., Shanxi Electric Motor Manufacturing Co., Ltd., Jiangsu Magnet Valley Technologies Co., Ltd., Shanghai Testing & Inspection Institute for Electrical Equipment Co., Ltd., Suzhou Torin Drive Equipment Co., Ltd., Xiangtan Electric Manufacturing Group Co.,Ltd., Zhuhai Kaibang Motor Manufacture Co., Ltd., Dongfang Electric Machinery Co., Ltd., Jiangsu Aerospace Power Electromechanical Co., Ltd., Anhui Weineng Electric Machinery Co., Ltd., Jiangmen Jiangsheng Electric Machine Works Co., Ltd., Siemens Standard Motors (China) Co., Ltd., Xuzhou Keya Electromechanical Co., Ltd., Shaoxing Motai Mechanical and Electrical Technology Co., Ltd., Kangfu Sci-tech Co., Ltd., Rongcheng Rongjia Power Co., Ltd.

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The publication of previous versions of this document and the documents it replaces is as follows:

-- First published as GB/T 4942.1-1985 in 1985, first revised in 2001, and second revised in 2006;

Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification

1 Scope

This document applies to the classification of degrees of protection provided by enclosures for rotating electrical machines. It defines the requirements for protective enclosures that are in all other respects suitable for their intended use and which, from the point of view of materials and workmanship, ensure that the properties dealt with in this document are maintained under normal conditions of use.

This document does not specify degrees of protection against mechanical damage of the machine, or conditions such as moisture (produced for example by condensation), corrosive dust and vapour, fungus or vermin.

This document is also applicable to explosion proof machines, but it does not specify the types of protection for use in a potentially explosive (dust, gas) environment. Those are defined in the IEC 60079 series of standards.

In certain applications (such as agricultural or domestic appliances), more extensive precautions against accidental or deliberate contact may be specified.

This document gives definitions for standard degrees of protection provided by enclosures applicable to rotating electrical machines as regards the:

a) protection of persons against contacts with or approach to live parts and against contact with moving parts (other than smooth rotating shafts and the like) inside the enclosure and protection of the machine against ingress of solid foreign objects;

b) protection of machines against the harmful effects due to ingress of water;

c) protection of machines against the harmful effects due to ingress of dust.

It gives designations for these protective degrees and tests to be performed to check that the machines meet the requirements of this document.

2 Normative references

The following documents contain the provisions which, through normative reference in this document, constitute the essential provisions of this document. For the dated

documentation and/or in the operating instructions.

The lower degrees of protection, such as guards for external fans (as allowed in 5.3) and drain holes (as allowed in 5.4), need not be specified on the rating plate or in the documentation.

Where the mounting of the machine has an influence on the degree of protection, the intended mounting arrangements shall be indicated by the manufacturer on the rating plate or in the instructions for mounting.

8 General requirements for tests

8.1 General

The tests specified in this document are type tests. They shall be carried out on standard products or models of them. Where this is not feasible, verification either by an alternative test or by examination of drawings shall be the subject of an agreement between manufacturer and user.

Unless otherwise specified, the machine for each test shall be clean with all the parts in place and mounted in the manner stated by the manufacturer.

In the case of both first and second characteristic numerals 1, 2, 3 and 4, a visual inspection may, in certain obvious cases, show that the intended degree of protection is obtained. In such cases, no test need be made. However, in case of doubt, tests shall be made as prescribed in Chapters 9 and 10.

8.2 Adequate clearance

8.2.1 General

For the purpose of the following test clauses in this document, the term "adequate clearance" has the meaning given in 8.2.2 or 8.2.3.

8.2.2 Low-voltage machines (rated voltages not exceeding 1000 V a.c. and 1500 V d.c.)

The test device (sphere, finger, wire, etc.) does not touch the live parts or moving parts other than non-dangerous parts such as smooth rotating shafts.

8.2.3 High-voltage machines (rated voltages exceeding 1000 V a.c. and 1500 V d.c.)

When the test device is placed in the most unfavourable position, the machine shall be capable of withstanding the dielectric test applicable to the machine.

This dielectric test requirement may be replaced by a specified clearance dimension in

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