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Rotating electrical machines - Safety technical specification

旋转电机 安全技术规范

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4 Risk Factors

4.1 General Provisions This document only identifies the main and some of the potential hazards of motors in the design, manufacturing, operation, use, transportation, installation, and maintenance stages. Danger, but not all dangers.

4.2 Design Factors

4.2.1 The danger of excessive motor temperature rise or inability to function properly due to motor design errors or unreasonable design.

4.2.2 Damage to structural components and fasteners may occur due to errors or unreasonable design of the motor structure, such as insufficient strength or rigidity of structural components or fasteners. Invalid.

4.2.3 The exposed rotating parts of the motor lack effective protective devices or measures (if the motor is an integral part of other equipment). The danger caused by the structure of the equipment (the protective devices or protective measures of which should be provided by the structure of the equipment).

4.2.4 Dangers caused by malfunctions due to improper design and selection of motor protection devices (if sometimes).

4.2.5 Dangers caused by improper design of motor lifting devices.

4.3 Manufacturing Factors

4.3.1 The manufacturing and processing of key components of the motor did not meet the design requirements.

4.3.2 The performance of the materials and purchased components used in the manufacture of the motor does not meet the design requirements.

4.3.3 The finished motor does not meet the product standard requirements or is not inspected in accordance with the product standard provisions.

4.3.4 The motor manufacturing process does not meet the requirements of the relevant process documents.

4.4 Factors such as operation and usage

4.4.1 Potential dangers arising from improper motor installation, operating environment, or operation.

4.4.2 The dangers that may be caused by the motor operating beyond the specified overload.

4.4.3 The user may cause danger if the motor's overheat, overcurrent, overvoltage and other protection devices (if sometimes) are not properly selected.

4.4.4 Failure to use, repair, maintain, or care for the motor as specified in the instruction manual, or arbitrary removal, alteration of parts, or addition or removal of auxiliary devices, may result in... The danger it causes.

5.1 Basic Requirements

5.1.1 The motor shall comply with the provisions of GB/T 755, GB/T 5226.1 and relevant product standards, and shall be able to operate normally.

5.1.2 Additional devices integrated with the motor (such as capacitors, centrifugal switches, thermal protectors, brakes, and control devices) are considered as... A part of an electric motor.

5.2 Motor Housing

5.2.1 The materials of any components on the motor housing should be able to withstand the high temperatures and mechanical stresses that may occur under normal operating conditions, and should not... Bending, creeping, and deformation can lead to fire and electric shock hazards.

5.2.2 When a drain hole is required for the motor, the drainage measures adopted should prevent water accumulation inside the motor, thereby reducing the need for windings and exposed live parts. Electrical clearances and creepage distances to ground. The installation of drain holes should comply with GB/T 4942.

5.2.3 When the motor is an integral component of other equipment, the functions of the motor's frame and housing (including the junction box) can be derived from the functions of that equipment. The structure of the equipment is determined.

5.2.4 Except for open-type motors, to prevent contact with exposed live parts with AC voltage above 36V or DC voltage above 50V, ensure that their surfaces are properly sealed. The panel or cover can only be opened with tools or a key.

5.2.5 The structure of the motor should have sufficient strength. For motors with non-metallic housings, they should also have heat resistance and flame retardancy.

5.2.6 The motor shall have good enclosure protection, and its enclosure protection classification shall comply with the provisions of GB/T 4942 and shall be clearly specified in the product standard. For integrated motor drive systems with combined drive and control, the overall structure should also comply with the provisions of GB/T 4208.

5.3 Junction Box and Wiring Device

5.3.1 A motor junction box can be a separate component mounted outside the motor, or it can be partially or entirely part of the motor housing. Motor Junction Box The internal cavity should have sufficient space for easy wiring, and its electrical clearances and creepage distances should comply with GB/T 12350 or GB/T 14711 or The provisions of standards such as GB/T 3836.3.

5.3.2 Junction boxes should be sturdy and durable, and their installation should be secure, free from harmful deformation and loosening. If the junction box is made of metal, it should pass... Test 5.13.4; if made of non-metallic materials, it shall pass test 5.16.

5.3.3 The enclosure protection level of the junction box shall comply with the provisions of GB/T 4942 or relevant product standards.

5.3.4 The wiring device of the motor junction box shall comply with the provisions of GB/T 12350, GB/T 14711, or GB/T 3836.1, etc. It facilitates wiring and meets the requirements for safe use.

5.3.5 The motor terminal block should be flame-retardant, possess sufficient insulation resistance, heat resistance, and mechanical strength, and should be securely installed and in use. The connection should not loosen during the process; the terminal block should have clear, complete, and durable terminal markings, and there should be sufficient connection between any two terminals and between any terminal and ground. It shall withstand the corresponding withstand voltage test and comply with the provisions of standards such as GB/T 12350 or GB/T 14711.

5.3.6 Motor terminals shall be made of a metal material with good electrical conductivity and possess sufficient mechanical strength. The terminals shall be securely connected. Therefore, its structure should ensure good conductivity and sufficient contact pressure, as well as the expected current-carrying capacity, while also meeting electrical clearance requirements. Creepage distance regulations. This refers to the conductive connection bolt-type terminal of an external power cable (wire) using a screw (bolt), nut, or similar device. The connecting screws (bolts), nuts, etc., of the terminal block should conform to the relevant standards. Bolt-type terminals for wire connections should not be used to fix other components. What parts?

5.4 Grounding device

5.4.1 Motors shall have protective grounding devices (except for motors with special provisions) and shall comply with the provisions of GB/T 12350 or GB/T 14711.

5.4.2 Protective grounding terminals shall not be used for any other purpose besides protective grounding.

5.4.3 There should be a permanent, reliable, and good electrical connection between the protective grounding device and the motor base. This connection should be maintained when the motor moves on the equipment base. Afterwards, the protective grounding conductor should still be reliably connected.

5.5 Mechanical Assembly and Parts

5.5.1 The motor assembly should be firm and reliable to prevent the vibration of the motor during normal operation from having a harmful effect.

5.5.2 Motors with commutators and slip rings should be equipped with easily removable monitoring windows, and brush covers should be tightened or otherwise prevented from loosening. The connecting wires and terminals of the brush holder should maintain good electrical contact, and the structure of the brush holder assembly should ensure that the brush can operate normally. In operation, brushes, springs and other parts should not