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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 45865-2025

**General technical specification for precision electric driven
harmonic gear modules**

精密电驱动谐波齿轮模组通用技术规范

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1 Scope

This document specifies the structural classification and model, environmental and testing conditions, requirements, test methods, inspection rules, marking, packaging, transportation and storage of precision electric drive harmonic gear modules.

This document applies to the design, selection, and acceptance of precision transmission systems in fields such as robotics, machine tools, and medical devices.

2 Normative references

GB/T 2423.1-2008

GB/T 2423.2-2008

GB/T 2423.3

GB/T 2423.4-2008

GB/T 2423.5-2019

GB/T 2423.10-2019

GB/T 2423.17-2024

GB/T 2828.11

GB/T 6404.1

GB/T 7346

GB/T 13992

GB/T 16439-2024

GB/T 17626.2-2018

GB/T 17626.3-2023

GB/T 17626.4-2018

GB/T 17626.5-2019

GB 17799.4-2022

4 Emission for industrial environments

GB/T 30121, Industrial platinum resistance thermometers and platinum temperature sensors GB/T 30549-2014, General specification for permanent magnet AC servo motor GB/T 30819, Harmonic drive gear reducers for robot GB/T 39633-2020, General specification for integrated servo motors system for cooperative robot JB/T 8162, Packaging for control motor - Specification

3 Terms and definitions

For the purposes of this document, the following terms and definitions, as well as those given in GB/T 30819 and GB/T 30549-2014, apply.

3.1 precision electric drive harmonic gear module

An integrated drive unit with position feedback, consisting of an electric motor, a driver, harmonic gears, sensors, and other auxiliary components.

3.12 efficiency

The ratio of the module's output power to its electrical input power, expressed as a percentage.

4.1 Structural classification

The modules are divided into hollow type that allows cables to pass through and solid type that does not allow cables to pass through. The basic structural form is shown in Figure 4.

The module shape and installation dimensions are shown in Appendix A. The module performance parameters are shown in Appendix B.

5.1 Environmental conditions

Unless otherwise specified, the environmental conditions for the module shall meet the following requirements.

- a) Operating environment. Temperature, $-20\text{ }^{\circ}\text{C} \sim 50\text{ }^{\circ}\text{C}$; relative humidity, 20% ~ 90% (non-condensing);
- b) Storage environment. Temperature $-40\text{ }^{\circ}\text{C} \sim 70\text{ }^{\circ}\text{C}$; relative humidity, 20% ~ 90% (non-condensing).

5.2.1 Test power supply

The test voltage and frequency refer to the rated voltage and frequency specified in the product's specific technical specifications. Unless otherwise specified, the voltage amplitude deviation of the module test power supply shall be $\pm 1\%$, and the ripple shall not exceed 500 mV.

5.2.2 Electrical measuring instruments

The accuracy of electrical measuring instruments shall be no less than Class 1, and the accuracy of high-impedance instruments shall be no less than Class 0.5.

5.2.3 Other conditions

Other test conditions for the module must also meet the following requirements.

- a) During the accuracy test, the casing of the module under test shall be effectively grounded, and the grounding resistance shall be less than 10 ohm;
- b) Other methods that can ensure test accuracy can be used for the test;
- c) When conducting relevant electrical performance tests, the module shall be installed on a dedicated bracket.

6.1 Appearance

The surface shall be free of rust, dents, scratches, and peeling coating. Fasteners shall be securely connected, and the colors of terminals and interfaces shall be accurate and the markings clear and correct.

6.2 Lead out type and marking

For modules using lead wires, terminals, or electrical connectors, the lead wires and markings shall comply with the provisions of GB/T 7346.

The strength of the lead wires shall comply with the requirements of 6.2.3.1.2 in GB/T 39633-2020, and the marking and strength of the terminals shall comply with the requirements of 6.2.3.1.3 in GB/T 39633-2020.

6.3 Efficiency

Shall be no less than 50%.

6.4 Absolute positioning accuracy

The absolute positioning accuracy of the output terminal shall not exceed 0.05° .

6.5 Repetitive positioning accuracy

The repetitive positioning accuracy of the output terminal shall not exceed 0.05° .

6.6 Torsional stiffness

Shall comply with the provisions of Table 7.

6.7 No-load

After the test, the module shall not exhibit any abnormalities such as stopping, unusual noises, or harmful deformation.