GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

ICS 25.040.40

J 28

GB/T 37416-2019

General specifications of clean-room robot

洁净机器人通用技术条件

Issued on: May 10, 2019 **Implemented on: December 01, 2019**

Issued by: State Market Regulatory Administration;
Standardization Administration of PRC.

Table of Contents

General specifications of clean-room robot

1 Scope

This standard specifies the product classification, performance, technical requirements, test methods and signs, instructions for use, packaging, transportation and storage of clean-room robots.

This standard applies to clean-room robots that are used in clean rooms and perform tasks such as handling in an atmospheric or vacuum environment.

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) are applicable to this standard.

GB/T 191 Packaging - Pictorial marking for handling of goods

GB/T 4768 Mould-proof packaging

GB/T 4857.23 Packaging - Basic tests for transport packages - Part 23：Random vibration test method

GB/T 4879 Rustproof packaging

GB/T 5048 Moisture-proof packaging

GB 5226.1-2008 Electrical safety of machinery - Electrical equipment of machines - Part 1: General requirements

GB/T 7932-2017 Pneumatic fluid power - General rules and safety requirements for systems and their components

GB/T 9969 General principles for preparation of instructions for use of industrial products

GB 11291.1-2011 Robots for industrial environments - Safety requirements - Part 1: Robot

GB/T 12642-2013 Industrial robots - Performance criteria and related test methods

A generic term used to describe a lean gas state below atmospheric pressure or atmospheric mass density or based on that state environment.

[GB/T 3163-2007, definition 2.3]

3.4

Clean-room robot

Industrial robots (3.1) used in the **clean room** (3.2) for carrying out tasks such as handling in the electronics manufacturing, pharmaceutical manufacturing, food manufacturing industries.

Note: Applicable to atmospheric and vacuum environments.

3.5

Atmospheric robot

A **clean-room robot** (3.4) that is used in whole or in part in the atmosphere.

3.6

Vacuum robot

A **clean-room robot** (3.4) that is used in whole or in part in a **vacuum** (3.3) environment.

3.7

Cleanliness

The degree of cleanliness distinguished by the number of particles in a unit volume of air greater than or equal to a certain particle size.

[GB 50073-2013, definition 2.0.12]

3.8

Leak rates

The flow rate of a particular gas through a leak under specified conditions.

[GB/T 3163-2007, definition 6.1.9]

4 Product categories

It is divided as follows by the usage environments:

2008.

6.6 Safety

6.6.1 Basic requirements

The safety of the robot shall comply with the provisions of GB 11291.1-2011. For clean application features, it shall also meet the following work requirements:

a) The robot shall not damage the application product during the application process;

b) The material (silicon wafer, glass substrate, etc.) of the robot during handling shall not fall or slide;

c) The concentration of airborne particles generated by the robot shall be controlled and shall not damage the application environment;

d) The robot shall be able to stop in time in the event of a collision.

6.6.2 Grounding

Grounding shall meet the following requirements:

a) The robot shall have an obvious grounding mark;

b) The grounding resistance between the robot's grounding point and the live metal part shall be not more than 0.1 Ω.

6.6.3 Insulation resistance

For the robot control device, the insulation between the power AC power supply circuit and the housing shall be no less than 10 MΩ.

6.6.4 Withstanding voltage

The power AC circuit of the robot and the adjacent non-charged conductor shall be able to withstand the withstanding voltage test at the AC (50 Hz) voltage RMS of 1500 V for 1 min. There is no breakdown, flashover, arcing.

6.7 Noise

The noise generated by the robot when operating at rated load and rated speed shall be not more than 80 dB(A).

7.1.2 The temperature during the test process shall not exceed ±2 °C. The robot and measuring instrument shall be placed in the test environment for not less than 8 h to ensure that they are under thermal stability. At the same time, it shall also prevent the effects of heated air and external heat radiation. The test environment shall ensure that the test results are not interfered with by electromagnetic and vibration.

7.1.3 Before the test, the robot needs to be tested for various functions; the robot is continuously operated for not less than 1 h.

7.1.4 The test of the pose and trajectory characteristics shall be carried out under load. The center of gravity of the test load during the test shall coincide with the position of the gravity of the mechanical interface of the robot or the test point of the tool center point.

7.2 Inspection of appearance and structure

It is carried out according to 5.2 of JB/T 8896-1999.

7.3 Function inspection

It is carried out according to 5.3 of JB/T 8896-1999.

7.4 Inspection of pneumatic system

It is carried out according to Chapter 6 of GB/T 7932-2017.

7.5 Performance

7.5.1 Range of motion of each axis

It is carried out according to the provisions of 5.4.1 of JB/T 8896-1999.

7.5.2 Maximum single axis speed

Under the rated load condition, the joint to be tested is in stable working condition, the other joints are fixed. Let the joint being tested perform the maximum range of motion at maximum speed, to measure the maximum speed. Repeat the measurement 10 times and take the average as the measurement result.

7.5.3 Pose accuracy and repeatability

It is carried out according to the provisions of 7.2 of GB/T 12642-2013.

Take the maximum value.

7.8 Power adaptability test

Check according to 5.8 of JB/T 8896-1999.

7.9 Environmental adaptability test

7.9.1 Climate and environmental adaptability test

According to the method of 5.10 in JB/T 8896-1999, carry out test under the working and storage conditions as specified in Table 1.

7.9.2 Mechanical environment adaptability test

It is carried out 8 h after the random vibration test of road transportation recommended grade II of GB/T 4857.23.

8 Marking, instruction manual, packaging, transportation and storage

8.1 Marking

8.1.1 The nameplate shall be installed on the robot product. The nameplate shall comply with the provisions of GB/T 13306.

8.1.2 The nameplate shall contain the following:

a) Product name;

b) Product model number;

c) Rated load;

d) Production batch number;

e) Name of manufacturer;

f) Year and month of exit-factory.

Information such as power source parameters, power consumption, external dimensions and weight shall be noted in the instruction manual.

8.1.3 The following shall be marked on the package:

This is an excerpt of the PDF (Some pages are marked off intentionally)

------ The End ------