

ICS 25.040.30

CCS J28



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

GB/T 20868-2024

**Industrial robot - Application specification for performance test
method**

工业机器人 性能试验应用规范

Issued on: August 23, 2024

Implemented on: August 23, 2024

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part

1. Structure and drafting rules for standardization documents" Drafting. This document replaces GB/T 20868-2007 "Industrial Robot Performance Test Implementation Specification" and is consistent with GB/T 20868-2007. In addition to structural adjustments and editorial changes, the main technical changes are as follows:

- Added the term and definition of "tool center point" (see 3.1);
- Deleted "General Requirements" (see Chapter 4 of the 2007 edition);
- Added the side length requirements of the test cube (see 4.1);
- Changed the requirements for test equipment signal synchronization [see Chapter 5, 5.1k of the 2007 edition];
- Added specific measurement methods for "position stabilization time and position overshoot" and "position accuracy and position repeatability" (see Chapter 7);
- Changed the description of command pose (see Chapter 8, Chapter 9 of the 2007 edition);
- Changed "Redirection trajectory accuracy" to "Repeat orientation trajectory accuracy", and changed the "Repeat orientation trajectory accuracy compilation requirements" Points" (see 9.9, 10.8 of the 2007 edition);

--- Added the key points for compiling the "static compliance test motion program" (see 9.13). Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document was proposed by the China Machinery Industry Federation. This document is under the jurisdiction of the National Technical Committee on Robotics Standardization (SAC/TC591). This document was drafted by: Beijing Institute of Automation of the Mechanical Industry Co., Ltd., Chongqing Kairui Robotics Technology Co., Ltd., Shenyang Siasun Robot Automation Co., Ltd., Aobo (Beijing) Intelligent Technology Co., Ltd., Shenyang Institute of Automation, Chinese Academy of Sciences, Jiangsu Huibo Robotics Co., Ltd., Jike Development Technology Co., Ltd., China Software Testing Center (Ministry of Industry and Information Technology Software Testing Center) and Integrated Circuit Promotion Center), FAOYIWEI (Suzhou) Robotics System Co., Ltd., Hangzhou HikRobot Co., Ltd., Suzhou Da University of Science and Technology, Hebei University of Technology, Efort Intelligent Equipment Co., Ltd., Luoshi (Shandong) Intelligent Technology Co., Ltd., Chongqing Green Intelligent Technology Research Institute, Shenzhen Yuejiang Technology Co., Ltd., Leju (Shenzhen) Robotics Technology Co., Ltd., Suzhou Elite Robotics Co., Ltd., Chongqing Luban Robotics Technology Research Institute

Co., Ltd., Beijing University of Aeronautics and Astronautics, Shenzhen Yuntian Lifei Technology Co., Ltd., Chongqing Kairui Certification Service Co., Ltd., Chongqing University, Zhongguancun Robotics Industry Innovation Development Co., Ltd., Maker World (Beijing) Technology Development Co., Ltd. Development Co., Ltd. and Beijing Kunpeng Kechuang Technology Development Co., Ltd. The main drafters of this document are. Yang Shuping, Li Benwang, Zhang Feng, Song Zhongkang, Li Zhihai, Wang Maolin, Wang Hengzhi, Wang Zhenhua, Zhang Sheng, Chen Luping, Guan Yue, Yao Ting, Xu Zhijun, Sun Tianfei, Wei Hongxing, Chen Guodong, Wang Jia, Liu Ying, Ruan Weiwei, Tang Yansheng, He Guotian, Yu Hongpeng, Wu Yonghai, Liu Peichao, Lang Xulin, Leng Xiaokun, He Zhicheng, Tao Yong, Zhu Zhikun, Sun Kai, Wang Song, Yuan Jie, Lei Jianyong, Meng Yang, Wang Shuoshi, Sun Zhenjiang, Mou Honglei, Liu Jingjing and Liang Xuexiu. The previous versions of this document and the documents it replaces are as follows:

---First published in.2007 as GB/T 20868-2007;

---This is the first revision.

GB/T 12642-2013 provides important performance indicators and corresponding test methods for industrial robots. GB/T 12642-2013 provides detailed rules and operating procedures for the performance test of industrial robots. Further statements and explanations have been made to facilitate manufacturers, third-party testing agencies and users to accurately use and implement the industrial robot performance test standards. It is conducive to improving the quality of industrial robot products. Depending on the type and requirements of the industrial robot, the tests described in this document may be applied in whole or in part. Industrial robot performance test application specification

1 Scope

GB/T 20868-2024 is the Chinese application specification for industrial robot performance testing. The underlying performance criteria are internationally defined, but the numbers a manufacturer publishes are only comparable if the test is set up the same way, and that is where the differences arise: the payload and its centre of gravity, the test poses within the working envelope, the velocity, the warm-up, the environmental conditions and the measuring system all move the result. This standard fixes them. It sets the preparation before the test, both what the manufacturer must provide and what the testing organisation must do, then the test conditions and the measuring system requirements, then the conduct of each performance test, the pose accuracy and repeatability, the path accuracy and repeatability, the cornering deviation, the velocity characteristics, the settling time and overshoot, the compliance and the drift, and then the analysis, the presentation and the reporting of results. It took effect on 23 August 2024.

This document provides implementation details for manufacturers and users to use GB/T 12642-2013 to perform performance tests on industrial robots. and operation steps, and gives the key points for compiling exercise programs. This document applies to industrial

robot (hereinafter referred to as robot) manufacturers, testing agencies and users to implement GB/T 12642-2013.

2 Normative references

The contents of the following documents constitute essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document.

GB/T 12642-2013 Industrial robot performance specification and test methods

GB/T 12643-2013 Vocabulary of robots and robotic equipment

3 Terms and definitions

The terms and definitions defined in GB/T 12643-2013 apply to this document.

3.1 Tool center point toolcentrepoin; TCP A point defined for a specific purpose with reference to the mechanical interface coordinate system. [Source: GB/T 12643-2013, 4.9]

4 Preparation before the test

4.1 Manufacturer's preparations Make the following preparations before the test.

a) The robot should be fixed with a pressure plate or fasteners to avoid the robot moving at high speed during the test due to unstable foundation. Effect of vibration on performance indicators.

b) Perform a full function check on the robot and check all configurable parameters in the robot controller. If the robot or parameter settings have to be readjusted, the test should be repeated.

c) Select the performance indicators to be measured. According to the application of the robot under test, you can select according to Appendix B of GB/T 12642-2013. The performance indicator to be measured.

d) The test environmental conditions and normal operating conditions may be specified in accordance with the requirements of

6.3 of GB/T 12642-2013.

e) Refer to Figure 1 of GB/T 12642-2013 to prepare the rated load of the robot. Its mass, center of gravity position and moment of inertia should comply with If some performance indicators require additional testing at 10% of the rated load or other values specified by the manufacturer, The test load should be easy to reduce. The tool center point (TCP) position