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

GB/T 12642-2013

**Industrial robots -- Performance criteria and related test
methods**

工业机器人 性能规范及其试验方法

(English Translation)

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Foreword

This Standard was drafted as per the rules specified in GB/T 1.1-2009.

This Standard replaced GB/T 12642-2001 Industrial Robots - Performance Criteria and Related Test Methods. Compared with GB/T 12642-2001, the major technical changes of this

Standard are as follows.

- Delete the original "ISO Foreword" ("ISO Foreword" of the 2001 Edition);
- Add the unit "rpm" (see Clause 4 of this Edition; Clause 4 of the 2001 Edition);
- Adjust the order of abbreviations and symbols (see Clause 5 of this Edition; Clause 5 of the 2001 Edition);
- Add 6.12 performance test method for industrial robots (see 6.12 of this Edition; Clause

6 of the 2001 Edition);

- Modify the formula in 7.2.2 (see 7.2.2 of this Edition; 7.2.2 of the 2001 Edition);
- Modify the formula in 7.3.3 (see 7.3.3 of this Edition; 7.3.3 of the 2001 Edition);
- Change Table C.4 "Position stabilization time and overshoot" in Appendix C into "Position stabilization time and overshooting amount" (see Table C.4 of this Edition; Table C.4 of the 2001 Edition);
- In order to facilitate application, add the informative Appendix NA "Performance test method for industrial robots based on GB/T 12642" (see Appendix NA);
- Add Bibliography (see Bibliography).

This Standard adopted translation method to equivalently use ISO 9283.1998 Manipulating Industrial Robots - Performance Criteria and Related Test Methods. In order to cooperate with

the use of this Standard, we have included the main content of ISO/TR 13309 as Appendix NA

of this Standard.

The Chinese documents that have consistent correspondence with the international documents

referenced in this Standard are as follows.

- GB/T 12643-1997 Industrial robots - Vocabulary (eqv ISO 8373.1994)
- GB/T 12644-2001 Industrial robots - Presentation of characteristics (eqv ISO 9946.1999)
- GB/T 16977-1997 Industrial robots - Coordinate systems and motion nomenclature (eqv ISO 9787.1990)

This Standard was proposed by China Machinery Industry Federation.

This Standard shall be under the jurisdiction of National Technical Committee on Automation

System and Integration of Standardization Administration (SAC/TC 159).

Drafting organizations of this Standard. Beijing Research Institute of Automation for Machinery Industry; Guangzhou CNC Equipment Co., Ltd.; and Beijing Institute of Technology.

Chief drafting staffs of this Standard. Yang Shuping, Jin Li, Wang Haidan, Wang Sisi, and Lu Jilian.

The historical edition replaced by this Standard is as follows.

--- GB/T 12642-2001.

1 Scope

This Standard describes methods of specifying and testing the following performance characteristics of manipulating industrial robots.

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) is applicable to this

Document.

3 Terms and Definitions

For the purposes of this Document, the terms and definitions given in ISO 8373:1994 and the

following apply.

4 Units

Unless otherwise stated, all dimensions are as follows.

5 Abbreviations and Symbols

For the purposes of this Standard, the following abbreviations and symbols apply.

6 Performance Testing Conditions

The performance characteristics as specified by the manufacturer and determined by the related

test methods in this Standard, are valid only under the environmental and normal operating conditions as stipulated by the manufacturer.

The tests described in this Standard may be applied in whole or in part, depending upon the robot type and requirements (application).

7 Pose Characteristics

Pose accuracy and repeatability characteristics, as defined in this clause, quantify the differences which occur between a command and attained pose, and the fluctuations in the attained poses for a series of repeat visits to a command pose.

8 Path Characteristics

Path accuracy characterizes the ability of a robot to move its mechanical interface along the command path in the same direction n times.

Cornering overshoot is defined as the maximum value calculated from three consecutive measurement cycles. For each cycle the maximum deviation from the command path after the

robot started on the second path without delay time and with programmed constant path velocity

is measured.

9 Minimum Posing Time

The posing time is the time between departure from and arrival at a stationary state when traversing a predetermined distance and/or sweeping through a predetermined angle under pose-to-pose control. The time taken for a robot to stabilize at the attained pose, as defined in

7.4, is included in the total posing time.

10 Static Compliance

Static compliance is the maximum amount of displacement per unit of applied load. The load

should be applied to and the displacement measured at the mechanical interface.

The static compliance should be specified in millimeters per newton with reference to the base