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Robotics — Performance criteria and related test methods for service robots —

Part 3: **Manipulation**

Robotique — Critères de performance et méthodes d'essai correspondantes pour robots de service —

Partie 3: Manipulation

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 299, *Robotics.*

A list of all parts in the ISO 18646 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document defines characteristics for the manipulation performance of service robots and describes how to specify and test them. It is intended that the reader of this document selects which performance characteristics to test, in accordance with the specific requirements.

The performance criteria specified in this document are not intended to be interpreted as the verification or validation of safety requirements. The verification and validation of safety requirements are specified in safety related standards developed by ISO/TC 299.

Tests for position and path accuracy of manipulators, which can be useful in addition to the tests specified in this document, are provided in ISO 9283.

Tests for locomotion of mobile robots, such as rated speed and stopping characteristics are provided in ISO 18646-1. Tests for pose accuracy and pose repeatability for mobile robots are also provided in ISO 18646-2.

Robotics — Performance criteria and related test methods for service robots —

Part 3: Manipulation

1 Scope

This document describes methods of specifying and evaluating the manipulation performance of service robots, notably:

— grasp size;

— grasp strength;

— grasp slip resistance;

— opening a hinged door; and

— opening a sliding door.

There are other grasping characteristics and use cases for manipulation of service robots. It is expected that these will be included in a future revision.

This document deals with the indoor environment only. However, the depicted tests can also be applicable for robots operating in outdoor environments.

This document is not applicable for the verification or validation of safety requirements.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 9379:2005, *Operating forces — Test method — Doors*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
robot
programmed actuated mechanism with a degree of autonomy to perform locomotion, manipulation or positioning

Note 1 to entry: A *robot* includes the control system.

EXAMPLE *Manipulator, mobile platform*, and wearable robot.