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

Part 5: Locomotion for legged robots

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

Partie 5: Locomotion pour robots à pattes

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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 document 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).

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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.

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Introduction

With the development of service robot technology, legged robots have an increasing application range in the fields of service, guide, life companion and family entertainment. This industry has developed a market of a certain scale and at the same time, it has appreciable development prospects and huge market potential in the fields of industrial manufacture, facility test and maintenance, special operations and depopulated zone exploration. Currently, the product parameters of biped, quadruped and multi-legged robots are claimed inconsistently by different companies, and the test conditions and test methods for the parameters are inconsistent and unclarified. In this case, designers cannot achieve optimization through effective tests for product performance; manufacturing staff cannot monitor product quality through consistent evaluating method; and users can neither select products based on needs nor compare products of the same type according to performance parameters. Furthermore, there appear to be unnecessary divergence and conflicts between legged robot products from different countries in international trade because of the lack of related International Standards, which can lead to an unhealthy development of the legged robot industry.

This document lists a series of specifications on the performance of legged robots, as well as test conditions, test purpose, test facility, test procedures and the treatment of test results based on legged robot's unique characteristics, such as dispersed stepping movement, multiple limbs, multiple degrees-of-freedom, its application in varied topography and human-machine interaction. The purpose of this document is to establish a consistent system of performance representation and method of evaluation for legged robots, to facilitate design optimization, performance claims, quality monitoring and product selection.

This document can provide:

— data foundation of product optimization for research and development staff;

— quality monitoring methods for manufacturing staff;

— accordance for testing and certification authorities;

— guidance of integration for system integration companies.

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

Part 5: Locomotion for legged robots

1 Scope

This document describes methods for specifying and evaluating the locomotion performance of legged robots.

The tests listed in this document are mainly used to evaluate the complete machine. They can be also used for sample test, qualification test or check-and-accept test.

This document is not intended 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 7176-13, *Wheelchairs — Part 13: Determination of coefficient of friction of test surfaces*

ISO 8373, *Robotics — Vocabulary*

ISO 18646-2, *Robotics — Performance criteria and related test methods for service robots — Part 2: Navigation*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8373, ISO 18646-2 and the following apply.

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

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

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

3.1
legged robot
mobile robot that travels using one or more legs

[SOURCE: ISO 8373:2021, 4.15.2, modified— Note 1 to entry has been removed.]

3.2
rated speed
maximum speed of the legged robot in normal operating conditions

3.3
topography
shape of the travel surface

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