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Manipulating industrial robots — Performance criteria and related test methods

Robots manipulateurs industriels — Critères de performance et méthodes d'essai correspondantes

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Contents

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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 9283 was prepared by Technical Committee ISO/TC 184, *Industrial automation systems and integration*.

Annex A of this International Standard is for information only.

Introduction

ISO 9283 is part of a series of International Standards dealing with manipulating industrial robots. Other International Standards cover such topics as safety, general characteristics, coordinate systems, terminology, and mechanical interfaces. It is noted that these International Standards are interrelated and are also related to other International Standards.

ISO 9283 is intended to facilitate understanding between users and manufacturers of robots and robot systems. It defines the important performance characteristics, describes how they shall be specified and recommends how they should be tested. An example of how the test results should be reported is included in annex A of this International Standard. The characteristics for which test methods are given in this International Standard are those considered to affect robot performance significantly.

The selection of tests given in this International Standard is not addressed by the standard; it is intended that the user of this International Standard selects which performance characteristics are to be tested, in accordance with his own specific requirements.

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

Future International Standards will deal with application oriented and comparison testing.

Annex A of this International Standard provides a recommended format of the test report including the minimum required information and the summary of the test results.

Manipulating industrial robots — Performance criteria and related test methods

1 Scope

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

— unidirectional pose accuracy and pose repeatability;

— multi-directional pose accuracy variation;

— distance accuracy and distance repeatability;

— pose stabilization time;

— pose overshoot;

— drift of pose characteristics;

— path accuracy and path repeatability;

— cornering deviations;

— path velocity characteristics;

— minimum positioning time;

— static compliance.

This International Standard does not specify which of the above performance characteristics are to be chosen for testing a particular robot. The tests described in this International Standard are primarily intended for developing and verifying individual robot specifications, but can also be used for such purposes as prototype testing, type testing or acceptance testing.

This International Standard applies to all manipulating industrial robots as defined in ISO/TR 8373. However, for the purpose of this International Standard the term "robot" means manipulating industrial robot.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO/TR 8373:1988, *Manipulating industrial robots — Vocabulary.*

ISO 9787:1990, *Manipulating industrial robots — Coordinate systems and motions.*

ISO 9946:—[1], *Manipulating industrial robots — Presentation of characteristics.*

3 Definitions

For the purposes of this International Standard, the definitions given in ISO/TR 8373 and the following definitions apply.

3.1 cluster: Set of attained poses, corresponding to the same command pose, used to calculate the accuracy and the repeatability characteristics (shown diagrammatically in figure 6).

3.2 barycentre: For a cluster of n points, defined by their coordinates ($x_j - y_j - z_j$), the barycentre of that cluster of points is the point whose coordinates are the mean values $\bar{x}$, $\bar{y}$ and $\bar{z}$ calculated by formulae given in 7.2.1.

1) To be published.