INTERNATIONAL STANDARD

ISO 11593

Second edition
2022-02

Robots for industrial environments — Automatic end effector exchange systems — Vocabulary

Robots manipulateurs industriels — Systèmes de changement automatique de terminal — Vocabulaire

Reference number
ISO 11593:2022(E)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
3.1 General terms and definitions 1
3.2 Terms related to the external shape and main dimensions of the exchange system 2
3.3 Terms related to positioning and orientation in coupling 3
3.4 Terms related to coupling and releasing forces 5
3.5 Terms related to mass and inertia of the coupled system 6
3.6 Terms related to tolerances and uncertainty 7
3.7 Terms related to magazine interfaces of the tool-mounted part 12
3.8 Terms related to tool exchange timing 14
4 Symbols **17**
4.1 Coupling parameters 17
4.2 Forces 17
4.3 Mass 18
4.4 Mechanical interface frame 18
4.5 Tool frame 18
4.6 Motion start 18
4.7 Motion timing 18
Bibliography **19**

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*.

This second edition cancels and replaces the first edition (ISO 11593:1996), which has been technically revised.

The main changes are as follows:

— references, terminology and drawings have been updated;

— the Scope and the Introduction have been updated;

— reference documents have been moved from the Normative references clause to the Bibliography;

— the document has been restructured and Annex A has been removed.

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 is one of a family of standards dealing with the requirements of components of robot systems for industrial environments.

This document contains the vocabulary for end-effector exchange systems. This document does not contain any details for the development and design of these systems.

For the terms related to coupling and releasing forces (see 3.4), all permissible maximum values for the load characteristics are valid for the sum of both static and dynamic loads and all load characteristics are stated for the reference plane.

For the terms related to magazine interfaces of the tool-mounted part (see 3.7), the performance criteria should be used in the same sense as those used in the terms related to the external shape and main dimensions of the exchange system (see 3.2). The defined coordinate system is still valid even if the direction of insert movement into the magazine is different from the coupling direction at the exchange of the tool. They differ in their value and their direction as well as in the force of coupling work which is required to assemble or release the tool part from the robot part of the interface.

Robots for industrial environments — Automatic end effector exchange systems — Vocabulary

1 Scope

This document defines terms relevant to automatic end-effector exchange systems used as a part of robot systems in accordance with ISO 10218-2.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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 General terms and definitions

3.1.1
automatic end-effector exchange system
coupling device between the mechanical interface and the end-effector enabling automatic exchange of end-effectors, made up of a *robot-mounted part* (3.1.2) and one or more *tool-mounted parts* (3.1.3)

Note 1 to entry: Also referred to as tool changer, quick-change device, automatic tool changer, robotic tool changer or robot coupler.

3.1.2
robot-mounted part
part of an *automatic end-effector exchange system* (3.1.1) that is attached to the mechanical interface of a manipulator

Note 1 to entry: Also referred to as master or robot side.

3.1.3
tool-mounted part
part of an *automatic end-effector exchange system* (3.1.1) that is attached to the end-effector

Note 1 to entry: Also referred to as slave or tool side.

3.1.4
couple, verb
join the *robot-mounted part* (3.1.2) to the *tool-mounted part* (3.1.3)

3.1.5
uncouple, verb
release the *tool-mounted part* (3.1.3) from the *robot-mounted part* (3.1.2)

3.1.6
lock, verb
actuate the locking elements to secure the *tool-mounted part* (3.1.3) to the *robot-mounted part* (3.1.2)