



# SLOVENSKI STANDARD

## SIST EN 29946:1998

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### Manipulating industrial robots - Presentation of characteristics (ISO 9946:1991)

Manipulating industrial robots - Presentation of characteristics (ISO 9946:1991)

Industrieroboter - Darstellung charakteristischer Eigenschaften (ISO 9946:1991)

Robots manipulateurs industriels - Présentation des caractéristiques (ISO 9946:1991)

**Ta slovenski standard je istoveten z: EN 29946:1992**

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#### **ICS:**

25.040.30	Industrijski roboti. Manipulatorji	Industrial robots. Manipulators
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**Manipulating industrial robots - Presentation of characteristics (ISO 9946:1991)**

Robots manipulateurs industriels - Présentation des caractéristiques (ISO 9946:1991)

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This European Standard was approved by CEN on 1992-04-30. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

**CEN**European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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### Foreword

In 1990, ISO/DIS 9946 was submitted to the CEN Primary Questionnaire procedure.

Following the positive result of this procedure, the CEN Technical Sector Board, BTS2-Engineering (Resolution BTS2 65/1991), agreed to submit ISO 9946:1991, without modifications, to Formal Vote. The result of the Formal Vote was positive.

National Standards identical to this European Standard shall be published at the latest by 92-11-30 and conflicting national standards shall be withdrawn at the latest by 92-11-30.

In accordance with the CEN/CENELEC Common Rules, the following countries are bound to implement this European Standard :

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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Endorsement notice-1998

The text of the International Standard ISO 9946:1991 was approved by CEN as a European Standard without any modification.

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# INTERNATIONAL STANDARD

**ISO  
9946**

First edition  
1991-02-15

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## Manipulating industrial robots — Presentation of characteristics

*Robots manipulateurs industriels — Présentation des caractéristiques*

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## ISO 9946 : 1991 (E)

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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 9946 was prepared by Technical Committee ISO/TC 184, *Industrial automation systems and integration*, Sub-Committee SC 2, *Robots for manufacturing environment*.

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<https://standards.iteh.ai/catalog/standards/sist/en-29946-1998> Annexes A and B of this International Standard are for information only.

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## Introduction

ISO 9946 is one of a series of International Standards dealing with manipulating industrial robots. Other documents cover such topics as safety, performance criteria and related testing methods, coordinate systems, terminology, and mechanical interface. It is noted that these standards are interrelated and also related to other International Standards.

The number of manipulating industrial robots used in a manufacturing environment is constantly increasing and this has underlined the need for a standard format for the specification and presentation of robot characteristics.

The objective of ISO 9946 is to assist users and manufacturers in the understanding and comparison of various types of robots.

Annex A of this International Standard provides a recommended format for the presentation of robot specification.

Annex B provides a description of the symbols of performance criteria.

NOTE — For the purposes of this International Standard, the term “robot” means “manipulating industrial robot”.

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# Manipulating industrial robots — Presentation of characteristics

## 1 Scope

This International Standard specifies requirements for how characteristics of robots shall be presented by the manufacturer.

## 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 9283 : —<sup>1)</sup>, *Manipulating industrial robots — Performance criteria and related test methods*.

ISO 9409-1 : 1988, *Manipulating industrial robots — Mechanical interfaces — Part 1: Circular (form A)*.

ISO 9787 : —<sup>1)</sup>, *Manipulating industrial robots — Coordinate systems and motions*.

## 3 Definitions

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

## 4 Units

Unless otherwise stated, all dimensions are as follows:

- length in millimetres (mm);
- angle in radians (rad) or degrees (°);
- time in seconds (s);
- mass in kilograms (kg);

- force in newtons (N);
- velocity in metres per second (m/s), radians per second (rad/s) or degrees per second (°/s).

## 5 Characteristics

### 5.1 General

The manufacturer shall provide information related to the various characteristics and requirements as described in this clause as part of the robot documentation.

### 5.2 Application

The manufacturer shall specify the main type(s) of application(s) for which the robot is intended.

Examples of typical applications are

- material handling;
- assembly;
- spot welding;
- arc welding;
- machining;
- spray painting/coating;
- adhesive/sealant application;
- work inspection/verification.

### 5.3 Power source

The manufacturer shall specify all external power sources, including type (e.g. electrical, hydraulic, pneumatic or combination) required for proper operation of the robot (mechanical structure motion actuators, control, auxiliary equipment, etc.), together with the maximum power consumption required from each. These specifications shall also include permissible ranges and fluctuations.

The manufacturer shall also specify the type of power utilized to control axis and auxiliary motion (e.g. electric, hydraulic,

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pneumatic). Where more than one type of power is utilized, the manufacturer shall include a breakdown by individual motion.

**5.4 Mechanical structure**

The manufacturer shall specify the type of the mechanical structure and the number of mechanical axes. An outline drawing of the structure shall be provided detailing the axis motions. This drawing may be part of the diagram required for working space (see 5.5).

Examples of mechanical structures:

- rectangular or cartesian robot;
- cylindrical robot;
- polar robot;
- revolute robot;
- gantry robot;
- pendular robot;
- spine robot;
- scara robot.

If the robot is mobile, the way which it is guided shall be indicated.

**5.5 Working space**

The boundaries of the working space including the alignment pose and centre of the working space ( $C_w$ ) shall be illustrated in a diagram with at least two views (one the projection of the locus of the maximum reach of the robot arm on the  $X_1 Y_1$  plane — see ISO 9787 — and the other the projection of the locus of the maximum reach of the arm on the  $X_1 Z_1$  plane). The diagram shall also provide information on any limitation of secondary axis motion at any point(s) in the working space (see figure 1 for an example of a 5-axis robot and figure 2 for an example of a 6-axis robot).

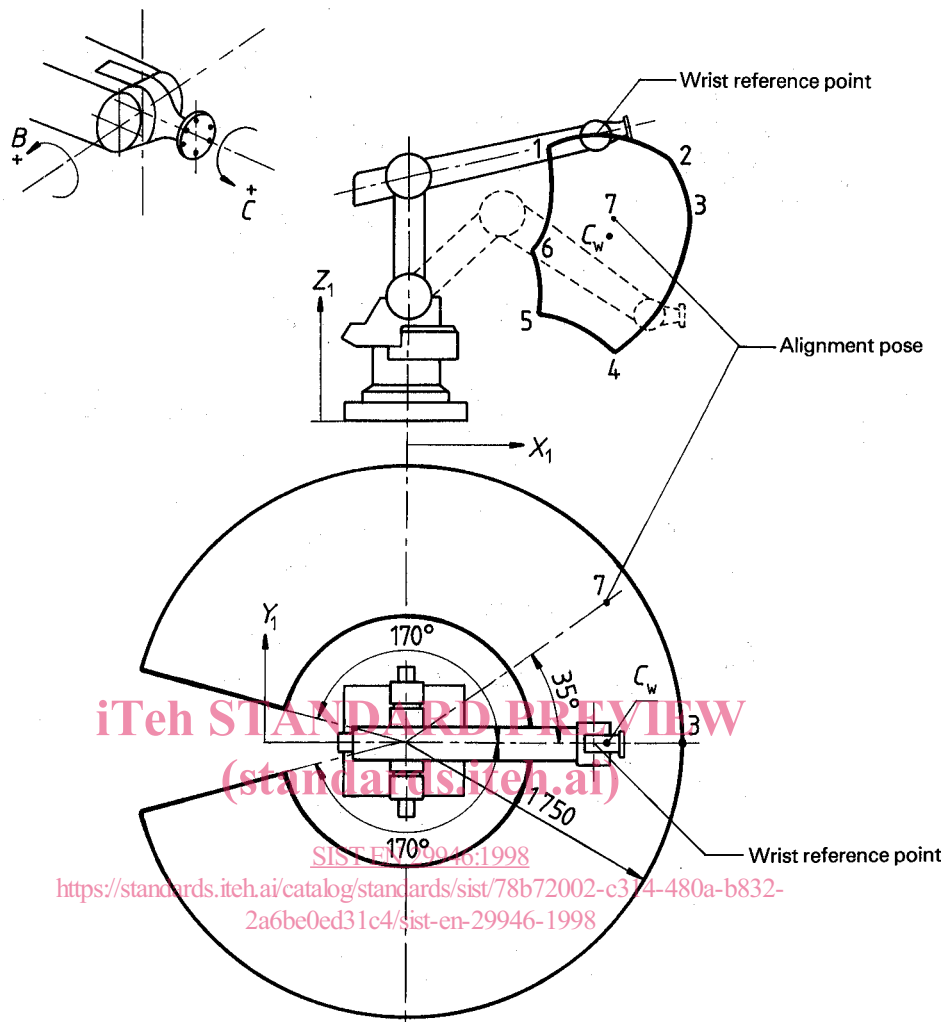
In the diagrams, it is recommended that the details of the working space and range of movement of secondary axes are given in tabular form as shown in the examples of figures 1 and 2.

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Dimensions in millimetres



Point in space	Working space		Range of movement of secondary axes	
	$X_1$	$Z_1$	$B$	$C$
1	925	1 635	+ 75° - 90°	+ 170° - 150°
2	1 610	1 550	+ 75° - 90°	± 180°
3	1 750	1 140	+ 75° - 105°	± 180°
4	1 310	345	+ 45° - 120°	± 180°
5	870	600	+ 45° - 120°	+ 150° - 170°
6	840	1 000	+ 75° - 120°	+ 140° - 150°
7	1 350	750	—	—

Figure 1 — Example of 5-axis robot working space