SLOVENSKI STANDARD
SIST EN ISO 9409-1:2003

01-oktober-2003

Manipulirni industrijski roboti ï Mehanski vmesniki ï 1. del: Ploġļ e (oblika A) (ISO 9409-1:1996)

Manipulating industrial robots - Mechanical interfaces - Part 1: Plates (form A) (ISO 9409 -1:1996)

Industrieroboter - Mechanische Schnittstellen - Teil 1: Platten (Form A) (ISO 9409-1:1996)

Robots manipulateurs industriels - Interfaces mécaniques - Partie 1: Interfaces a plateau (forme A) (ISO 9409-1:1996)

Ta slovenski standard je istoveten z: **EN ISO 9409-1:1996**

ICS:

25.040.30	Industrijski roboti. Manipulatorji	Industrial robots. Manipulators

SIST EN ISO 9409-1:2003 **en**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 9409-1

December 1996

ICS 25.040

Supersedes EN 29409-1:1992.

Descriptors: Industrial robots, plates.

English version

Manipulating industrial robots – Mechanical interfaces

Part 1: Plates (form A)
(ISO 9409-1:1996)

Robots manipulateurs industriels – Interfaces mécaniques – Partie 1: Interfaces à plateau (forme A) (ISO 9409-1:1996)

Industrieroboter – Mechanische Schnittstellen – Teil 1: Platten (Form A) (ISO 9409-1:1996)

This European Standard was approved by CEN on 1996-12-05.

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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.

The European Standards exist 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.

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CEN

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

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

Foreword

International Standard

ISO 9409-1:1996 Manipulating industrial robots – Mechanical interfaces – Part 1: Plates (form A),

which was prepared by ISO/TC 184 'Industrial automation systems and integration' of the International Organization for Standardization, has been adopted by Technical Committee CEN/TC 310 'Advanced manufacturing technologies', the Secretariat of which is held by BSI, as a European Standard.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by June 1997 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the national standards organizations of 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 the United Kingdom.

Endorsement notice

The text of the International Standard ISO 9409-1:1996 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to international publications are listed in Annex ZA (normative).

Introduction

This part of ISO 9409 is one of a series of standards dealing with the requirements of manipulating industrial robots. Other documents cover such topics as terminology, general characteristics, coordinate systems, performance criteria and related test methods, safety, robot programming languages, and robot companion standard to MMS. It is noted that these standards are interrelated and also related to other International Standards.

Manipulating industrial robots are steadily growing in importance in industrial automation. Depending on the type of application, they may require removable end effectors such as grippers or tools which are attached to the mechanical interface.

1 Scope

This part of ISO 9409 defines the main dimensions, designation and marking for a circular plate as mechanical interface (form A). It is intended to ensure the exchangeability and orientation of hand-mounted end effectors.

This part of ISO 9409 does not define other requirements of the end effector coupling device.

This part of ISO 9409 does not contain any correlation of load-carrying ranges.

The mechanical interface specified in this part of ISO 9409 will also find applications in simple handling systems which are not covered by the definition of manipulating industrial robots, such as pick and place or master-slave units.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 9409. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 9409 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 261:—[1], *ISO general-purpose metric screw threads — General plan.*

ISO 286-1:1988, *ISO system of limits and fits — Part 1: Bases of tolerances, deviations and fits.*

ISO 286-2:1988, *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts.*

ISO 1101:—[2], *Technical drawings — Geometrical tolerancing — Tolerancing of form, orientation, location and run-out — Generalities, definitions, symbols, indications on drawings.*

ISO 8373:1994, *Manipulating industrial robots — Vocabulary.*

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

3 Definitions

For the purposes of this part of ISO 9409, the definitions given in ISO 8373 apply.

4 Dimensions

4.1 General

Is it recommended that the dimensions for the mechanical interface be specified in accordance with table 1, series 1. The supplementary series 2 shall be used only in special cases where the graduation of series 1 is not sufficient for the intended use.

Only one centring diameter is required. d_3 is preferred. The use of d_2 is application dependent.

1) To be published. (Revision of ISO 261:1973)

2) To be published. (Revision of ISO 1101:1983)

The hole, d_5, is intended to have a location pin fitted, which is application dependent. The location pin may have different shapes, e.g. cylindrical or diamond. Any over-dimension shall be excluded by the selection of the location pin.

The location pin hole centre shall be aligned with the $+X_m$ axis vector of the mechanical interface coordinate system (see ISO 9787).

Detailed dimensions (e.g. undercuts), not stated here, are to be selected appropriately.

4.2 Tolerances

The mechanical interface dimensions shall be toleranced in accordance with ISO 286. Geometric tolerances shall be interpreted in accordance with ISO 1101. The counterbore diameter, d_3, and the guide pin hole, d_5, shall be datum references for all geometric tolerances, as shown in figure 1.

4.3 Thread form

Threaded holes shall be in accordance with ISO 261.

4.4 Provision for routing service lines

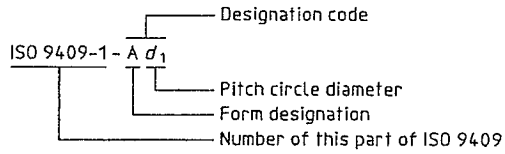
The flange may be constructed with a hollow centre. This centre hole shall have a diameter d_6 equal to or less than d_3.

4.5 End effector requirements

The dimensions and related tolerances of the mating surface of the end effector shall be compatible with the dimensions and tolerances specified in this part of ISO 9409.

5 Designation code

The designation of the mechanical interface whose dimensions are in accordance with this part of ISO 9409, shall be as follows:



EXAMPLE — A mechanical interface of a pitch circle diameter, d_1 = 40 mm, shall be designated as follows:

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6 Marking

When plate mechanical interface and related end effectors made in accordance with this part of ISO 9409 are marked, they shall be permanently stamped with the designation code (see clause 5).

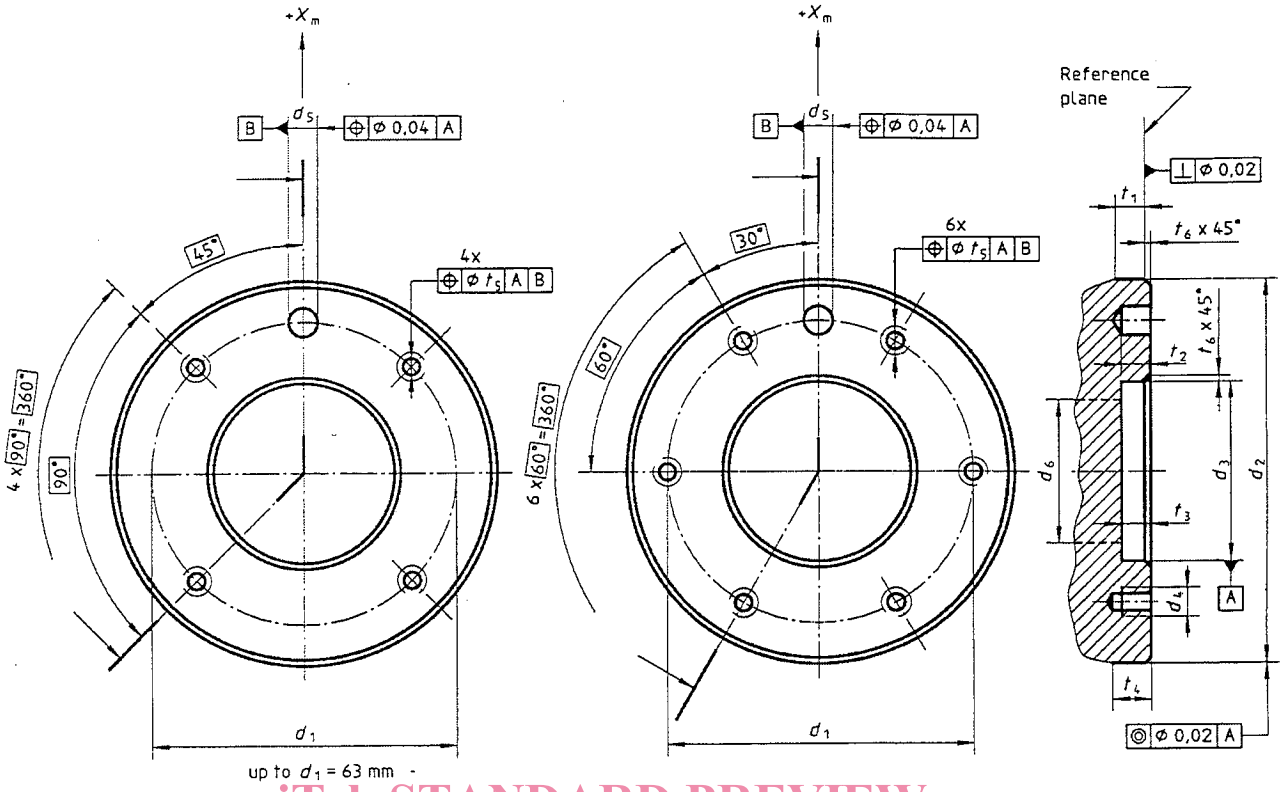

Figure 1 — Basic layout of the circular mechanical interface

Table 1 — Preferred series 1 and supplementary series 2 of the circular mechanical interface

Pitch circle diameter, d_1		d_2	d_3	d_4	d_5	t_1	t_2	t_3	t_4	t_5	t_6	Number of holes
Series 1	Series 2	h8	H7		H7	min.	min.	min.				
25		34	16	M4	4	6	4	4	See note 1	0,1	0,5	4
	31,5	40	20	M5	5		5					
40		50	25	M6	6		6	6			1 min.	
	50	63	31,5									
63		80	40									
	80	100	50	M8	8		8			0,15		6
100		125	63									
	125	160	80	M10	10	8	10	8				
160		200	100									
	200	250	125	M12	12		12			0,2		
250		315	160									

NOTES

1 The minimum depth of the threaded holes, t_4, is dependent on the material of the end effector coupling devices.

2 Parameter d_6: see 4.4.

Annex ZA (normative)
Normative references to international publications with their relevant European publications

This European standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision.

For undated references the latest edition of the publication referred to applies.

Publication	Year	Title	EN	Year
ISO 286-1	1988	ISO system of limits and fits - Part 1: Bases of tolerances, deviations and fits	EN 20286-1	1993
ISO 286-2	1988	ISO system of limits and fits - Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts	EN 20286-2	1993
ISO 8373	1994	Manipulating industrial robots - Vocabulary	EN ISO 8373	1996
ISO 9787	1990	Manipulating industrial robots - Coordinate systems and motions	EN 29787	1992