AS 3985.1—1991
ISO 9409-1: 1988

Australian Standard®

Manipulating industrial robots—Mechanical interfaces

Part 1: Circular (form A)

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Australian Electrical and Electronic Manufacturers Association
Australian Information Industry Association
Australian Robot Association
Confederation of Australian Industry
Department of Technical and Further Education N.S.W.
Division of Manufacturing Technology, CSIRO
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PREFACE

This Standard was prepared by the Standards Australian Committee on Information Processing Systems for Industrial Automation. It is identical with and has been reproduced from ISO 9409-1:1988 *Manipulating industrial robots—Mechanical interfaces*, Part 1: *Circular (form A).*

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For the purposes of this Australian Standard, the ISO text should be modified as follows:

(i) *Terminology* The words 'Australian Standard' should replace the words 'International Standard' wherever they appear.

(ii) *References* The references to International Standards should be replaced by references to Australian Standards as follows:

Reference to International Standard		*Australian Standard*	
ISO		AS	
261	ISO general purpose metric screw threads—General plan	1721	General purpose metric screw threads
R286 R286-1	ISO system of limit and fits Part 1: Bases of tolerances, deviations and fits	1654	Limits and fits for engineering
1101	Technical drawings—Geometrical tolerancing—Tolerancing of form, orientation, location and run-out—Generalities, definitions, symbols, indications on drawings	1100	Technical drawing
TR 8373	Manipulating industrial robots—Vocabulary	3877	Manipulating industrial robots—Vocabulary
9787	Manipulating industrial robots—Coordinate systems and motions	3986	Manipulating industrial robots—Coordinate systems and motions

Manipulating industrial robots—Mechanical interfaces

Part 1: Circular (form A)

1 Scope

This part of ISO 9409 defines the main dimensions, designation and marking for the circular 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.

ISO 9409-1 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, e.g. 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 listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 261 : 1973, *ISO general purpose metric screw threads — General plan.*

ISO/R 286 : 1962, *ISO system of limits and fits — Part 1: General tolerances and deviations.*

ISO 1101 : 1983, *Technical drawings — Geometrical tolerancing — Tolerancing of form, orientation, location and run-out — Generalities, definitions, symbols, indications on drawings.*

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

ISO 9787: *Manipulating industrial robots — Co-ordinate systems and motions.*

3 Definitions

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

4 Dimensions

4.1 General

It is 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.

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, diamond, etc.

The flange locating pin hole centre shall be aligned with the X_m axis vector of the mechanical interface co-ordinate system (see ISO 9787).

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

4.2 Tolerances

The circular 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

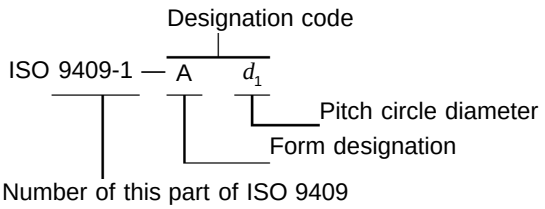
The flange may be constructed with a hollow centre. This centre hole shall be equal to or less than d_3.

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 circular mechanical interface whose dimensions are in accordance with this part of ISO 9409-1, shall be as follows:



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

ISO 9409-1 — A 40

6 Marking

When circular 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).