

AS 3987—1991  
ISO 9946: 1991

Australian Standard<sup>®</sup>

---

**Manipulating industrial robots—  
Presentation of characteristics**

---

This Australian Standard was prepared by Committee IT/6, Information Processing Systems for Industrial Automation. It was approved on behalf of the Council of Standards Australia on 16 August 1991 and published on 15 November 1991.

---

The following interests are represented on Committee IT/6:

Australian Electrical and Electronic Manufacturers Association  
Australian Information Industry Association  
Australian Robot Association  
Confederation of Australian Industry  
Department of Technical and Further Education (T.S.W.)  
Division of Manufacturing Technology, CSIRO  
University of Melbourne

---

**Review of Australian Standards.** To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard' which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

Australian Standard<sup>®</sup>

---

**Manipulating industrial robots—  
Presentation of characteristics**

---

First published as AS 3987—1991.

PUBLISHED BY STANDARDS AUSTRALIA  
(STANDARDS ASSOCIATION OF AUSTRALIA)  
1 THE CRESCENT, HOMEBUSH, NSW 2140

ISBN 0 7262 7114 4

## PREFACE

This Standard was prepared by the Standards Australia Committee on Information Processing Systems for Industrial Automation. It is identical with and has been reproduced from ISO 9946:1991 *Manipulating industrial robots—Presentation of characteristics*.

Under arrangements made between Standards Australia and the international Standards bodies, ISO and IEC as well as certain other Standards organizations, users of this Australian Standard are advised of the following:

- (a) Copyright is vested in Standards Australia.
- (b) The number of this Standard is not reproduced on each page; its identity is shown only on the cover and title pages.

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:

<i>Reference to International Standard</i>		<i>Australian Standard</i>	
ISO		AS	
TR 8373	Manipulating industrial robots— Vocabulary	3877	Manipulating industrial robots— Vocabulary
9283	Manipulating industrial robots— Performance criteria and related test methods	3984	Manipulating industrial robots— Performance criteria and related test methods
9409	Manipulating industrial robots— Mechanical interfaces	3985	Manipulating industrial robots— Mechanical interfaces
9409-1	Part 1: Circular (form A)	3985-1	Part 1: Circular (form A)
9787	Manipulating industrial robots— Coordinate systems and motions	3989	Manipulating industrial robots— Coordinate systems and motions

### © Copyright — STANDARDS AUSTRALIA

Users of Standards are reminded that copyright subsists in all Standards Australia publications and software. Except where the Copyright Act allows and except where provided for below no publications or software produced by Standards Australia may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing from Standards Australia. Permission may be conditional on an appropriate royalty payment. Requests for permission and information on commercial software royalties should be directed to the head office of Standards Australia.

Standards Australia will permit up to 10 percent of the technical content pages of a Standard to be copied for use exclusively in-house by purchasers of the Standard without payment of a royalty or advice to Standards Australia.

Standards Australia will also permit the inclusion of its copyright material in computer software programs for no royalty payment provided such programs are used exclusively in-house by the creators of the programs.

Care should be taken to ensure that material used is from the current edition of the Standard and that it is updated whenever the Standard is amended or revised. The number and date of the Standard should therefore be clearly identified.

The use of material in print form or in computer software programs to be used commercially, with or without payment, or in commercial contracts is subject to the payment of a royalty. This policy may be varied by Standards Australia at any time.

## CONTENTS

	<i>Page</i>
<b>1</b> Scope .....	4
<b>2</b> Normative references .....	4
<b>3</b> Definitions .....	4
<b>4</b> Units .....	4
<b>5</b> Characteristics .....	4
<b>5.1</b> General .....	4
<b>5.2</b> Application .....	4
<b>5.3</b> Power source .....	4
<b>5.4</b> Mechanical structure .....	5
<b>5.5</b> Working space .....	5
<b>5.6</b> Coordinate systems .....	8
<b>5.7</b> External dimensions and mass .....	8
<b>5.8</b> Base mounting surface .....	8
<b>5.9</b> Mechanical interface .....	8
<b>5.10</b> Control .....	8
<b>5.11</b> Programming methods .....	8
<b>5.12</b> Environment .....	8
<b>5.13</b> Load .....	8
<b>5.14</b> Velocity .....	10
<b>5.15</b> Resolutio .....	10
<b>5.16</b> Performance criteria .....	10
<b>5.17</b> Safety .....	10
<b>Annexes</b>	
<b>A</b> Recommended format of presentation for robot specifications .....	11
<b>B</b> Description of the symbols of performance criteria — Abstract from ISO 9283	15

# 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 : *Manipulating industrial robots — Performance criteria and related test methods*.

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

ISO 9787 : *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,