

AS 3986—1991
ISO 9787: 1990

Australian Standard[®]

**Manipulating industrial robots—
Coordinate systems and motions**

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which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.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[®]

**Manipulating industrial robots—
Coordinate systems and motions**

First published as AS 3986—1991.

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

ISBN 0 7262 7113 6

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

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—Voca- bulary

© 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.

Manipulating industrial robots—Coordinate systems and motions

1 Scope

This International Standard defines and specifies three robot coordinate systems; it also gives the axis nomenclature. It is intended to aid in robot alignment, testing, and programming.

This International Standard applies to all manipulating industrial robots as defined in ISO/TR 8373.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was 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 edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

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

3 Definitions

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

4 Defined coordinate systems

All coordinate systems described in this International Standard are defined by the right-hand rule as shown in figure 1.

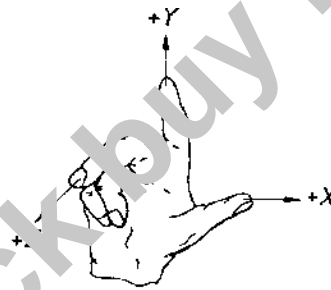


Figure 1 — Right-hand coordinate system

A , B and C define rotary motions about axes respectively parallel to X , Y and Z .

Positive A , B and C are in the directions to advance right-hand screws in the positive X , Y and Z directions respectively (see figure 2).

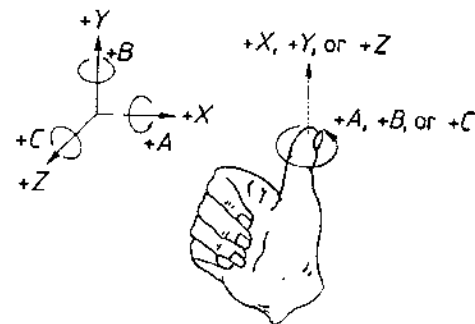


Figure 2 — Rotary motions

The three coordinate systems described are the World, Base, and Mechanical Interface, each referring to the plane in which the X - Y axes lie (e.g. the X - Y axes of the base coordinate system lie in the plane of the base mounting surface). The Z axis is