
**Industrial automation systems and
integration — Numerical control of
machines — Coordinate system and motion
nomenclature**

*Systèmes d'automatisation industrielle et intégration — Commande
numérique des machines — Systèmes de coordonnées et nomenclature
du mouvement*



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 841 was prepared by Technical Committee ISO/TC 184, *Industrial automation systems and integration*, Subcommittee SC 1, *Physical device control*.

This second edition cancels and replaces the first edition (ISO 841:1984), which has been technically revised. The following changes have been made:

- the content has been restructured in a more logical order;
- axes and motions have been clearly distinguished;
- new machine types have been added;
- motion designation for more complex machines has been added.

Annex A forms a normative part of this International Standard.

Introduction

This International Standard defines a standard machine coordinate system and the machine motions so that a programmer can describe the machining operations without having to know whether the tool approaches the workpiece or the workpiece approaches the tool.

The standard machine coordinate system is used to provide the coordinates of a moving tool (or point in the working space or on a drawing) with respect to a stationary workpiece.

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Industrial automation systems and integration — Numerical control of machines — Coordinate system and motion nomenclature

1 Scope

This International Standard describes a machine coordinate system related to the primary motions of individual numerically controlled machines and the associated machine motions.

The machine coordinate system is used to provide the coordinates of a moving tool (or a point in the working space or on the drawing) with respect to a stationary workpiece. Thus a programmer can describe the machine operations without having to know whether the tool approaches the workpiece or the workpiece approaches the tool.

NOTE 1 Individual numerically controlled machines means that all axes are mounted on one base or frame and all motions are related to one standard coordinate system.

NOTE 2 For the sake of simplicity the majority of the text of this International Standard is written in terms accorded to machine tools but nevertheless accorded to numerically controlled machines in general. Coordinate systems and axis motion nomenclature for industrial robots is defined in ISO 9787, *Manipulating industrial robots — Coordinate systems and motion nomenclatures*.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 2806:1994, *Industrial automation systems — Numerical control of machines — Vocabulary*

ISO 6983-1:1982, *Numerical control of machines — Program format and definition of address words — Part 1: Data format for positioning, line motion and contouring control systems*

3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 2806 apply.

4 Machine coordinate system

4.1 Designation

The machine coordinate system is a right-hand rectangular system with the three principal axes labelled *X*, *Y* and *Z*, with rotary axes about each of these axes labelled *A*, *B* and *C*, respectively (see Figure A.1).