
Glossary of Terms used in the numerical control of machines

[ISO title: Numerical control of machines — Vocabulary]

Glossaire des termes utilisés relatifs à la commande numérique des machines

Glossar der Ausdrücke für die numerische Steuerung von Maschinen

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National foreword

This British Standard has been prepared under the direction of the Office and Information Standards Committee and is identical with the English text of ISO 2806-1980 ‘Numerical control of machines – Vocabulary’, published by the International Organization for Standardization (ISO).

Terminology and conventions. The text of the international standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards; attention is especially drawn to the following.

Wherever the words ‘International Standard’ appear, referring to this standard, they should be read as ‘British Standard’.

Wherever the word ‘Vocabulary’ appears, referring to this standard, it should be read as ‘glossary’.

Cross-references

International standard	Corresponding British Standard
ISO 841-1974	BS 3635 The numerical control of machines Part 1 : 1972 Control input data (Technically equivalent)
ISO 2382	BS 3527 Glossary of terms used in data processing (Identical)

NOTE 1. The technical committee has reviewed the provisions of ISO/R 1087 to which reference is made in 1.3 and 2.1, and has decided that it is acceptable for use in conjunction with this standard.

NOTE 2. ISO/TR 6132 has not yet been published but there is, in any case, no intention to implement it as a BSI publication. The technical committee has reviewed the expected text of TR 6132 and has decided that it is acceptable for use in conjunction with this standard.

NOTE 3. Part 1 of ISO 6983 has been circulated as a Draft International Standard but the standard has yet to be published. Part 2 of ISO 6983 (on coding of preparatory functions G and miscellaneous functions M) is at an even earlier stage. However, as reference to ISO 6983, in 3.6.11 and 3.6.12 is purely informative, the validity of this British Standard is not affected.

Additional information. This British Standard is the national implementation of ISO 2806-1980; as such, only the English text has been reproduced.

British Standard Glossary of

Terms used in the numerical control of machines

1 General

1.1 Introduction

This International Standard deals with currently used concepts relating to numerical control of machines. It contains general terms concerning programming in numerical control, information media and coding used.

The different control systems and machine elements and characteristics are defined and concepts concerning accuracy, errors and precision are also included.

1.2 Scope and field of application

This Vocabulary is intended to facilitate international communication in the numerical control of machines. It presents in two languages terms and definitions of selected concepts relevant to this field and identifies relationships between the entries.

In order to facilitate their translation into other languages, the definitions are drafted so as to avoid as far as possible, any peculiarity attached to a language.

1.3 References

ISO 841, *Numerical control of machines — Axis and motion nomenclature*.

ISO/R 1087, *Vocabulary of terminology*.

ISO 2382, *Data processing — Vocabulary*.

ISO/TR 6132, *Numerical control of machines — Operational command and data format*.

ISO 6983/1, *Numerical control of machines — Program format and definitions of word address — Part 1 : Data format for positioning and contouring control systems*.¹⁾

1) At present at the stage of draft.

2 Principles and rules followed

2.1 Definition of an entry

The Vocabulary is made up of a number of entries; this term is to be understood with the following meaning :

entry : A set of essential elements consisting of an index number, one or more synonymous terms, and a phrase defining one concept; in addition, a set may include examples or notes to facilitate the understanding of the concept.

NOTE — In the cases defined in 2.5, the same term may be defined in different entries.

Other terms such as **vocabulary**, **concept**, **term**, **definition** are used with the meanings given in ISO/R 1087, *Vocabulary of terminology*.

2.2 Organization of an entry

Each entry contains the essential elements as defined in 2.1 and if necessary some additional elements; thus it may contain for each language at most the following items in the following order :

- a) an index number (common for both languages);
- b) the term or the generally preferred term in the language;
- c) the abbreviation for the term;
- d) permitted synonymous term or terms;
- e) the text of the definition (see 2.4);
- f) one or more examples with the heading "Example(s)";
- g) one or more notes specifying particular cases in the field of application of the concept, with the heading "Note(s)".

Elements a) to d) in the list above are printed in bold typeface. Element c) in the list above, and in some entries element b), are followed by a qualifier. A qualifier is printed in normal typeface in parentheses after the term or abbreviation and indicates :

- a particular field of application for the term, as defined;
- an abbreviation.

2.3 Classification of entries

A single-digit serial number is assigned to each clause of the Vocabulary, beginning with **1** for **general terms**.

Each entry is assigned a 3-digit index number, the first digit being that of the clause.

In any future revision or amendment of the Vocabulary, further entries will be added at the end of a clause without altering the numbers of the existing entries.

The numbers assigned to clauses and entries are the same for both languages.

2.4 Selection of terms and wording of definitions

The selection of terms and the wording of definitions have, as far as possible, followed established usage. When there were contradictions, solutions agreeable to the majority have been sought.

2.5 Multiple meanings

When a given term has several different meanings, a separate entry is given for each meaning, to facilitate translation into other languages.

2.6 Abbreviations

As indicated in 2.2, abbreviations in current use are given for some terms. They may be used only if this will not lead to any ambiguity or lack of clarity. They are not used in the texts of the definitions, examples, or notes in the Vocabulary.

2.7 Use of parentheses

In some terms, words printed in bold typeface are placed between parentheses. These words are part of the complete term, but they may be omitted when use of the abridged term in a technical context does not introduce ambiguity. In the text of another definition, example or note in the Vocabulary, such a term is used only in its complete form.

In some entries, the terms are followed by words in parentheses in normal typeface. These words are not a part of the term but indicate its particular field of application, or its grammatical form (see 2.2).

2.8 Use of terms printed in italic typeface in definitions and use of asterisks

A term printed in italic typeface in a definition, an example or a note has the meaning given to it in another entry of the Vocabulary, or in ISO 2382. However, the term is only printed in italic typeface the first time it occurs in each entry.

Other grammatical forms of the term, for example plurals of nouns and participles of verbs, are printed in the same way as the basic form.

The basic forms of all such terms are listed in the index at the end of the Vocabulary (see 2.10). If their definitions belong to this Vocabulary, the complete number of the corresponding entry is shown in the index. If they are defined in ISO 2382, the index shows only the number of the relevant section of ISO 2382.

When two such terms defined in separate entries directly follow each other (or are separated only by a punctuation sign), an asterisk indicates the end of the first term.

Example : In entry 3.3.03, the first word of the group of terms written in italic, *words,* characters*, is defined in clause 4 of ISO 2382; the second is also defined in clause 4 of ISO 2382 but in a different entry.

The words or terms which are printed in normal typeface are to be understood as defined in current dictionaries or authoritative technical vocabularies.

2.9 Spelling

In the version of this Vocabulary in the English language, the terms, definitions, examples, and notes are given in what may be considered as the preferred spelling in the USA. Other spellings considered correct in English are not forbidden and users may transcribe the terms into their preferred spelling without being in contradiction with the text of this International Standard.

2.10 Organization of the alphabetical index

At the end of the Vocabulary, an alphabetical index, for each language used, includes all terms in that language defined in the Vocabulary or used in the definitions and defined in ISO 2382. Multiple-word terms appear in alphabetical order both by natural order of words and by their key words.

The alphabetical index refers to the index number of the entry where the term is defined, or to the serial number of the relevant section of ISO 2382.

3 Terms and definitions

3.1 General terms

3.1.01

sensor

A unit which is actuated by a physical quantity and which gives a *signal* representing the value of that physical quantity.

3.1.02

command

An operative order which initiates a movement or a *function*.

NOTE — The order may be

- 1) direct input to the machine in coded form;
- 2) results from a logical interaction of *instructions* from an outside source with conditions sensed by the machine;
- 3) outputs derived from the computing or comparing function.

3.1.03

optimization

A process whose object is to make one or more variables assume, in the best possible manner, the value best suited to the operation in hand, dependent on the values of certain other variables which may be either predetermined or sensed during the operation.

3.1.04

positioning control system

Numerical control in which

- a) each numerically controlled motion operates in accordance with *instructions* which specify only the next required position;
- b) the movements in the different axes of motion are not co-ordinated with each other and may be executed simultaneously or consecutively;
- c) velocities are not specified by the *input data*.

3.1.05

line motion control system

Numerical control in which

- a) each numerically controlled motion operates in accordance with *instructions* which specify both the next required position and the required *feedrate* to that position;
- b) the movements in the different axes of motion are not co-ordinated with each other;
- c) the movements in the different axes of motion take place only parallel to linear, circular or other machine ways.

NOTE — There is a type of numerically controlled machine that has the characteristics of line motion control but in which required feedrates for the next required position can be effected in two axes of linear motion simultaneously. A straight-line path may thus be generated that is not parallel to the machine ways.

3.1.06

contouring control system

Numerical control in which

- a) two or more numerically controlled motions operate in accordance with *instructions* that specify the next required position and the required *feedrates* to that position;
- b) these feedrates are varied in relation to each other so that a desired contour is generated.

3.1.07

sequence control

A system of control in which a series of machine movements occurs in a desired order, the completion of one movement initiating the next, and in which the extent of the movements is not specified by *numeric data*.

3.1.08

computerized numerical control

CNC (abbreviation)

A *numerical control* system wherein a dedicated, stored program *computer* is used to perform some or all of the basic numerical control *functions*.

3.1.09

direct numerical control

DNC (abbreviation)

A system connecting a set of *numerically controlled* machines to a common memory for *part program* or *machine program* storage with provision for on-demand distribution of *data* to the machines.

NOTE — An operator panel allows the operator to direct the computer working in order to adjust programs.

3.1.10

behind tape reader system

BTR (abbreviation)

A feature of a *numerical control* system that can accept control data from a *control tape*, or alternatively from a *computer* or other source.

3.1.11

adaptive control

A *control system* that adjusts the response from conditions detected during the work.

3.2 Programming

3.2.01

planning sheet

A list of operations for the manufacture of a part, prepared before the *part program*.