
Batch control - Part 2: Data structures and guidelines for languages

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Batch control
Part 2: Data structures and guidelines for languages
(IEC 61512-2:2001)

Contrôle-commande des processus
de fabrication par lots (batch)
Partie 2: Structures de données et
règles générales relatives aux langages
(CEI 61512-2:2001)

Chargenorientierte Fahrweise
Teil 2: Datenstrukturen und Leitfaden
für Sprachen
(IEC 61512-2:2001)

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This European Standard was approved by CENELEC on 2002-10-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of the International Standard IEC 61512-2:2001, prepared by SC 65A, System aspects, of IEC TC 65, Industrial-process measurement and control, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 61512-2 on 2002-10-01 without any modification.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2003-10-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2005-10-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annexes A, B and ZA are normative and annexes C, D and E are informative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61512-2:2001 was approved by CENELEC as a European Standard without any modification.

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Annex ZA
(normative)

**Normative references to international publications
with their corresponding European publications**

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-351	1998	International Electrotechnical Vocabulary Part 351: Automatic control	-	-
IEC 60848 ¹⁾	1988	Preparation of function charts for control systems	-	-
IEC 61131-3	1993	Programmable controllers Part 3: Programming languages	EN 61131-3	1993
IEC 61512-1	1997	Batch control Part 1: Models and terminology	EN 61512-1	1999
ISO/IEC 9075	1992	Information processing systems - Database language SQL with integrity enhancement	-	-

¹⁾ IEC 60848:2002 is harmonized as EN 60848:2002.

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Part 2:

Data structures and guidelines for languages

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International Electrotechnical Commission
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

BATCH CONTROL –

Part 2: Data structures and guidelines for languages

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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- 7) When dealing with compliance issues, the reader needs to be aware of IEC policy and IEC style in expressing requirements. This is described in 6.6.1 of the ISO/IEC Directives, Part 3: 1997, "Rules for the structure and drafting of International Standards".

International Standard IEC 61512-2 has been prepared by subcommittee 65A: System aspects, of IEC technical committee 65: Industrial-process measurement and control.

The text of this standard is based on the following documents:

FDIS	Report on voting
65A/338/FDIS	65A/344/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

Annexes A and B form an integral part of this part of this standard. Annexes C, D and E are for information only.

The committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

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INTRODUCTION

Part 1 of this International Standard on batch control provides models and terminology applicable to batch control. Part 2 addresses data structures and guidelines for languages. Data structures are addressed by the data model that is defined in clause 4 that more precisely identifies objects and relationships that were addressed by models and concepts of part 1. Data structures are also addressed by relational tables for information exchange that are defined in clause 5. Languages are addressed by a recipe depiction methodology that is defined in clause 6.

The intended use of the data model is to provide a starting point for developing interface specifications for software components that address any subset of part 1 of this standard. The data model addresses all of part 1 of this standard as an integrated object model, but it does not presume or preclude any specific system architecture or information exchange. The model does not assume any specific division of functionality between systems.

A specific method for the exchange of selected data is defined in clause 5. Relational tables are used as the information exchange method because, within the bounds of the information treated, they:

- utilise broadly available technologies;
- are amenable to translation to other technologies;
- are adequate;
- are consistent with other sections of the standard.

Multiple methods of information transfer have not been defined, nor has there been an attempt to identify all information that might be exchanged. In the future, additional methods may be defined to provide alternate ways of exchanging data.

Clause 6 defines the symbols and rules for a graphical language that can be used to depict recipes. Recipes are the central feature of batch control and they can address a wide range of complexity, but there is no one depiction that is ideal for all circumstances. A simple table, for example, might be the most appropriate recipe form for simple cases. This standard specifies a method for depiction of master and control recipe procedures that can be applied over a broader range of complexity.

Although this standard is intended primarily for batch processes, it may be of considerable value for other types of processes.

BATCH CONTROL –

Part 2: Data structures and guidelines for languages

1 Scope

This part of this standard on batch control defines data models that describe batch control as applied in the process industries, data structures for facilitating communications within and between batch control implementations and language guidelines for representing recipes. Refer to Annex A for an explanation of the UML notation that is used in this part of this standard. Refer to Annex B for a summary of all of the SQL definitions from clause 5.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61512. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 61512 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 IEC and ISO maintain registers of currently valid International Standards.

IEC 60848:1988, *Preparation of function charts for control systems*

IEC 60050-351:1998, *Industrial-process measurement and control – Terms and definitions*

IEC 61131-3:1993, *Programmable controllers – Part 3: Programming languages*

IEC 61512-1:1997, *Batch control – Part 1: Models and terminology*

ISO/IEC 9075:1992, *Information processing systems – Database language – SQL with integrity enhancement*

3 Definitions

For the purposes of this part of IEC 61512, the following definitions as well as those expressed in part 1 of this International Standard apply, except where differences are explicitly stated in this part. Definitions in IEC 60050-351 were also used as a basis.

3.1

allocation symbol

a graphical symbol that is used to represent the encapsulation of the resource allocation and de-allocation rules for a recipe procedural element