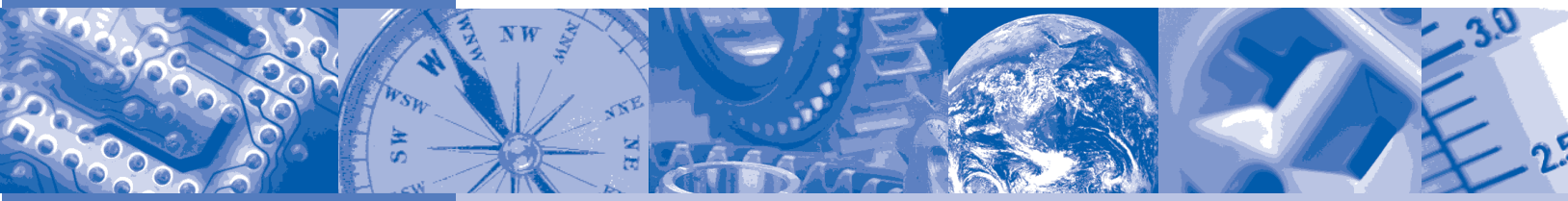
ANSI/ISA–88.00.02–2001



Batch Control Part 2: Data Structures and Guidelines for Languages

Approved 7 February 2001

ISA–The Instrumentation, Systems, and Automation Society

ANSI/ISA–88.00.02–2001
Batch Control Part 2: Data Structures and Guidelines for Languages

ISBN: 1-55617-745-3

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The standards referenced within this document may contain provisions that, through reference in this text, constitute requirements of this document. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this document are encouraged to investigate the possibility of applying the most recent editions of the standards indicated within this document. Members of IEC and ISO maintain registers of currently valid International Standards. ANSI maintain registers of currently valid U.S. National Standards.

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This standard is structured to follow IEC (International Electrotechnical Commission) guidelines. Therefore, the first three clauses discuss the *Scope* of the standard, *Normative References*, and *Definitions*, in that order.

Clause 4 is entitled *Data Model*. The intent of this clause is to describe a data structure for batch control systems using an object model approach.

Clause 5 is entitled *Relational Tables for Information Exchange*. The intent of this clause is to discuss a data format that can be used to share recipes and other batch information across different systems.

Clause 6 is entitled *Procedure Function Charts*. The intent of this clause is to describe a symbolic language for recipe depiction.

This standard is intended for people who are

a) involved in designing and/or operating batch manufacturing plants;

b) responsible for specifying controls and the associated application programs for batch manufacturing plants; or

c) involved in the design and marketing of products in the area of batch control.

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Foreword

1) The formal decisions or agreements of the IEC on technical matters, prepared by technical committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.

3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules insofar as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

4) The IEC has not laid down any procedure concerning marking as an indication of approval and has no responsibility when an item of equipment is declared to comply with one of its recommendations.

This standard has been prepared by IEC SC65A WG11 and ISA SP88.

It forms Part 2 of a series, the other part being ANSI/ISA-88.01-1995, Batch Control Part 1: Models and Terminology.

Annexes A and B form an integral part of this standard. Refer to annex A for an explanation of the UML notation that is used in this standard. Refer to annex B for a summation of all of the SQL definitions from clause 5. Annexes C and D are for information only.

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Introduction

ANSI/ISA-88.01-1995, Batch Control Part 1: Models and Terminology (referred to as Part 1 throughout this standard), provides models and terminology applicable to batch control. This standard (referred to as Part 2 throughout the standard) 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 are 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 the Part 1 standard. The data model addresses all of the Part 1 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

a) utilize broadly available technologies;

b) are amenable to translation to other technologies;

c) are adequate; and

d) 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 to exchange 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, there may be considerable value for other types of processes.

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1 Scope

This Part 2 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.

2 Normative references

The following normative documents contain provisions that, through reference in this text, constitute provisions this standard. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid normative documents.

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

IEC 60902:1987, *Industrial-process measurement and control: Terms and definitions*

NOTE — IEC 60902:1987 has been replaced by IEC 60050-351:1998, International electrotechnical vocabulary-Part 351: Automatic control

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

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

ANSI/ISA-88.01-1995, *Batch Control – Part 1: Models and Terminology*

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

3 Definitions