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**Industrial automation systems and  
integration — Product data  
representation and exchange —**

Part 14:  
**Description methods: The EXPRESS-X  
language reference manual**

*Systèmes d'automatisation industrielle et intégration — Représentation  
et échange de données de produits —*

*Partie 14: Méthodes descriptives: Le manuel de référence du langage  
EXPRESS-X*



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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 2.

The main task of technical committees is to prepare International Standards. 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 part of ISO 10303 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 10303-14 was prepared by Technical Committee ISO/TC 184, *Industrial automation systems and integration*, Subcommittee SC4, *Industrial data*.

This International Standard is organized as a series of parts, each published separately. The structure of this International Standard is described in ISO 10303-1.

Each part of this International Standard is a member of one of the following series: description methods, implementation methods, conformance testing methodology and framework, integrated generic resources, integrated application resources, application protocols, abstract test suites, application interpreted constructs, and application modules. This part is a member of the 10 series.

A complete list of parts of ISO 10303 is available from the Internet:

[http://www.tc184-sc4.org/SC4\\_Open/SC4\\_Work\\_Products\\_Documents/STEP\\_\(10303\)](http://www.tc184-sc4.org/SC4_Open/SC4_Work_Products_Documents/STEP_(10303))

Annexes A, B and C form an integral part of this part of ISO 10303. Annexes D, E and F are for information only.

## Introduction

ISO 10303 is an International Standard for the computer-interpretable representation of product information and for the exchange of product data. The objective is to provide a neutral mechanism capable of describing products throughout their life cycle. The mechanism is suitable not only for neutral file exchange, but also as a basis for implementing and sharing product databases, and as a basis for archiving.

This part of ISO 10303 is a member of the 10 series. This part of ISO 10303 specifies a language for specifying relationships between data that is governed by EXPRESS schemas, and for specifying alternative views of data that is governed by EXPRESS schemas. The language is called EXPRESS-X.

It is assumed that readers of this part of ISO 10303 are familiar with the EXPRESS data specification language defined in ISO 10303-11 and with clear text encoding specification defined in ISO 10303-21.

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# Industrial automation systems and integration — Product data representation and exchange — Part 14: Description methods: The EXPRESS-X language reference manual

## 1 Scope

This part of ISO 10303 specifies a language for specifying relationships between data that is governed by EXPRESS schemas, and for specifying alternate views of data that is governed by EXPRESS schemas. The language is called EXPRESS-X.

EXPRESS-X is a structural data mapping language. It consists of language elements that allow an unambiguous specification of a relationship between EXPRESS schemas.

The following are within the scope of this part of ISO 10303:

- mapping of data governed by one EXPRESS schema to data governed by another EXPRESS schema;
- mapping of data governed by one version of an EXPRESS schema to data governed by another version of that EXPRESS schema, where the two schemas have different names;
- specification of requirements for data translators for data sharing and data exchange applications;
- specification of alternate views of data defined by an EXPRESS schema;
- an alternate notation for application protocol mapping tables;
- bi-directional mappings where mathematically possible;
- specification of constraints that may be evaluated against data produced by mapping.

The following are outside the scope of this part of ISO 10303:

- mapping of data defined using means other than EXPRESS;
- identification of the version of an EXPRESS schema;
- graphical representation of constructs in the EXPRESS-X language.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 8824-1:2002, *Information technology — Abstract Syntax Notation One (ASN.1): Specification of basic notation — Part 1*.

ISO 10303-1:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 1: Overview and fundamental principles*.

ISO 10303-11:2004, *Industrial automation systems and integration — Product data representation and exchange — Part 11: Description methods: The EXPRESS language reference manual*.

ISO/IEC 10646-1:2000, *Information technology — Universal Multi-Octet Coded Character Set (UCS) — Part 1: Architecture and Basic Multilingual Plane*.

## 3 Terms and Definitions

### 3.1 Terms defined in ISO 10303-1

For the purpose of this part of ISO 10303, the following terms defined in ISO 10303-1 apply:

- data;
- information.

### 3.2 Terms defined in ISO 10303-11

For the purpose of this part of ISO 10303, the following terms defined in ISO 10303-11 apply:

- complex entity data type;
- complex entity (data type) instance;
- constant;
- entity;
- entity data type;
- entity (data type) instance;
- instance;
- partial complex entity data type;