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Part 238:

Application protocol: Application interpreted model for computerized numerical controllers

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

*Partie 238: Protocole d'application: Modèle d'application interprété pour
des contrôleurs numériques informatisés*



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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 standardizations.

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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 10303-238 was prepared by Technical Committee ISO TC184/SC4, *Industrial automation systems and integration*, Subcommittee SC4 *Industrial data*.

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

Each part of ISO 10303 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. ISO 10303-238 is a member of the application protocols series.

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

http://www.tc184-sc4.org/titles/STEP_Titles.htm

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. This 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 application protocol series. This part of ISO 10303 specifies an application protocol (AP) for numerical controlled machining and associated processes, including the scope and information requirements defined by the ISO 14649 data model for numerical controllers, augmented with product geometry, geometric dimensioning and tolerancing, and product data management information.

ISO 14649 defines a richer model for information transfer between CAD/CAM systems and computerized numerical control (CNC) machines than that of the older ISO 6983 "G and M code" language. ISO 6983-1 [2] describes the path of the tool centre point with respect to machine axes. ISO 14649 describes machining processes with respect to a part, including part geometry, manufacturing features, sequencing of operations, associated process parameters, and tool requirements.

This part of ISO 10303 specifies the integrated resources necessary to describe the information requirements identified by ISO 14649 in a manner consistent with the part shape, feature, geometric dimension and tolerance information created by design and process-planning activities and represented by ISO 10303-203 [4], ISO 10303-214 [5], ISO 10303-224 [8], and ISO 10303-240 [9]. It is advisable that users of this part of ISO 10303 understand the basic principles and concepts of numerical controlled machining and associated processes and understand and have access to ISO 14649, particularly ISO 14649-1, ISO 14649-10, ISO 14649-11, ISO 14649-12, ISO 14649-111, and ISO 14649-121. A discussion and data planning model is given in ISO 14649-1.

This application protocol defines the context, scope, and information requirements for numerical controlled machining and associated processes and specifies the integrated resources necessary to satisfy these requirements.

Application protocols provide the basis for developing implementations of ISO 10303 and abstract test suites for the conformance testing of AP implementations.

Clause 1 defines the scope of the application protocol and summarizes the functionality and data covered by the AP. Clause 3 lists the words defined in this part of ISO 10303 and gives pointers to words defined elsewhere. An application activity model that is the basis for the definition of the scope is provided in Annex F. The information requirements of the application are specified in clause 4 using terminology appropriate to the application. A graphical representation of the information requirements, referred to as the application reference model, is given in Annex G.

Resource constructs are interpreted to meet the information requirements. This interpretation produces the application interpreted model (AIM). This interpretation, given in 5.1, shows the correspondence between the information requirements and the AIM. The short listing of the AIM specifies the interface to the integrated resources and is given in 5.2. Note that the definitions and EXPRESS provided in the integrated resources for constructs used in the AIM can include select list items and subtypes which are not imported into the AIM. The expanded listing given in Annex A contains the complete EXPRESS

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for the AIM without annotation. A listing of the EXPRESS entity names and corresponding short names is given in Annex B. Information object identifiers for the AIM is given in Annex E. A graphical representation of the AIM is given in Annex H. Additional requirements for specific implementation methods are given in Annex C. A reference to computer interpretable listings of the AIM and EXPRESS entity short names is given in Annex I.

Warning:

This part of ISO 10303 provides a specification intended to be implemented in software. Incompatibilities may result in machine-to-machine communication in the case of software developed on the basis of translations of this part of ISO 10303 into languages other than the official ISO languages. It is accordingly strongly recommended that any implementations be developed only on the basis of the texts in the official ISO languages.