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STANDARD

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**Industrial automation systems — Manufacturing  
Message Specification —**

**Part 1:**  
**Service definition**

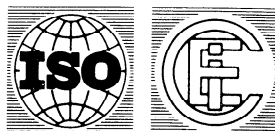
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*Systemes d'automatisation industrielle — Specification de messagerie industrielle —*

*Partie 1: Définition de service*

*ISO/IEC 9506-1:1990*

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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.

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.

International Standard ISO/IEC 9506-1 was prepared by Technical Committee ISO/IEC TC 184, *Industrial automation systems*, Sub-Committee SC 5, *System integration and communication*.

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ISO/IEC 9506 consists of the following parts, under the general title *Industrial automation systems – Manufacturing Message Specification*:

- *Part 1: Service definition*
- *Part 2: Protocol specification*

## Introduction

This part of ISO/IEC 9506 provides a wide variety of services useful for various manufacturing and process control devices. It is designed to be used both by itself and in conjunction with Companion Standards, which describe the application of subsets of these services to particular device types.

The services provided by the Manufacturing Message Specification (MMS) range from simple to highly complex. It is not expected that all of these services will be supported by all devices. The subset to be supported is limited in some cases by Companion Standards, and in all cases may be limited by the implementor. Characteristics important in selection of a subset of services to be supported include:

- a) applicability of the service to the device;
- b) the complexity of services and requirements;
- c) the complexity of provision of a particular class of service via the network versus the complexity of the device.

## Security considerations

When implementing MMS in secure or safety critical applications, features of the OSI security architecture may need to be implemented. Appropriate features should be selected from ISO 7498-2 covering safety architectures and features. Those of particular interest cover the position (in OSI) of

- a) access control;
- b) authentication;
- c) non-repudiation.

Specific implementation methods shall be at the discretion of the implementor.

## Complexity of services and requirements

Some MMS services are quite complex and should be considered as advanced functions. Devices used in very simple applications often will not require such advanced functions, and hence will not support such MMS services.

## Keywords

Application Interworking  
Application Layer Protocol  
Information Processing Systems  
Manufacturing Communications Network  
Manufacturing Message Specification  
Numerical Control System  
Open Systems Interconnection  
OSI Reference Model  
Process Control System  
Programmable Controller  
Programmable Device  
Robotics Control System  
Virtual Manufacturing Device



## General

This part of ISO/IEC 9506 is one of a set of International Standards developed to facilitate the interconnection of information processing systems. It is positioned within the application layer of the Open Systems Interconnection Environment as an Application Service Element (ASE) with respect to other related standards by the Basic Reference Model for Open Systems Interconnection (ISO 7498).

The aim of Open Systems Interconnection is to allow, with a minimum of technical agreement outside the interconnection standards, the interconnection of information processing systems:

- a) from different manufacturers;
- b) under different managements;
- c) of different levels of complexity;
- d) of different ages.

## Purpose

The purpose of this part of ISO/IEC 9506 is to define the service provided by the Manufacturing Message Specification. The MMS Service is provided by the Manufacturing Message Specification Protocol making use of services available from the Association Control Service Element (ASCE) and the Presentation layer, as defined in ISO 8649 and ISO 8822, respectively.

This part of ISO/IEC 9506 is concerned, in particular, with the communication and interworking of programmable manufacturing devices. By using this standard together with other standards positioned within the OSI Reference Model, otherwise incompatible systems may work together in any combination.

ISO/IEC 9506-2 specifies the protocol that supports the Manufacturing Message Specification.

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# Industrial automation systems - Manufacturing Message Specification - Part 1: Service definition

## 1 Scope

The Manufacturing Message Specification is an application layer standard designed to support messaging communications to and from programmable devices in a Computer Integrated Manufacturing (CIM) environment. This environment is referred to in ISO/IEC 9506 as the manufacturing environment. This part of ISO/IEC 9506 does not specify a complete set of services for remote programming of devices, although provision of such a set of services may be the subject of future standardization efforts.

This part of ISO/IEC 9506 defines the Manufacturing Message Specification within the OSI application layer in terms of

- a) an abstract model defining the interaction between users of the service;
- b) the externally visible functionality of implementations conforming to ISO/IEC 9506, in the form of procedural requirements associated with the execution of service requests;
- c) the primitive actions and events of the service;
- d) the parameter data associated with each primitive action and event;
- e) the relationship between, and the valid sequences of, these actions and events.

The service defined in this part of ISO/IEC 9506 is that which is provided by the Manufacturing Message Specification protocol. The service may be used by other application layer service elements or by other elements of the application process.

This part of ISO/IEC 9506 does not specify individual implementations or products, nor does it constrain the implementation of entities and interfaces within a computer system. This part of ISO/IEC 9506 specifies the externally visible functionality of implementations together with conformance requirements for such functionality.

## 2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 9506. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO/IEC 9506 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 646: 1983, *Information processing — ISO 7-bit coded character set for information interchange*.

ISO 7498: 1984, *Information processing systems — Open Systems Interconnection — Basic Reference Model*.

ISO 7498-2: 1989, *Information processing systems — Open Systems Interconnection — Basic Reference Model — Part 2: Security Architecture*.

ISO 7498-3: 1989, *Information processing systems — Open Systems Interconnection — Basic Reference Model — Part 3: Naming and addressing*.

ISO 8326: 1987, *Information processing systems — Open Systems Interconnection — Basic connection oriented session service definition*.

ISO/TR 8509: 1987, *Information processing systems — Open Systems Interconnection — Service conventions*.

ISO 8571: 1988, *Information processing systems — Open Systems Interconnection — File Transfer, Access and Management*.

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ISO 8649: 1988, *Information processing systems — Open Systems Interconnection — Service definition for the Association Control Service Element.*

ISO 8650: 1988, *Information processing systems — Open Systems Interconnection — Protocol specification for the Association Control Service Element.*

ISO 8822: 1988, *Information processing systems — Open Systems Interconnection — Connection oriented presentation service definition.*

ISO 8824: 1987, *Information processing systems — Open Systems Interconnection — Specification of Abstract Syntax Notation One (ASN.1).*

ISO 8824/Add 1: —<sup>1)</sup>, *Information processing systems — Open Systems Interconnection — Specification of Abstract Syntax Notation One (ASN.1) Addendum 1: ASN.1 Extensions.*

ISO 8825: 1987, *Information processing systems — Open Systems Interconnection — Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1).*

ISO 8825/Add 1: —<sup>1)</sup>, *Information processing systems — Open Systems Interconnection — Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1) Addendum 1: ASN.1 Extensions.*

ISO 9040: —<sup>1)</sup>, *Information processing systems — Open Systems Interconnection — Virtual terminal service — Basic class.*

ISO 9041: —<sup>1)</sup>, *Information processing systems — Open Systems Interconnection — Virtual terminal protocol — Basic class.*

ISO/IEC 9506-2: 1990, *Industrial automation systems — Manufacturing Message Specification — Part 2: Protocol specification.*

ISO/IEC 9545-1: 1989, *Information technology — Open Systems Interconnection — Application Layer Structure.*

ISO/IEC 9594: —<sup>1)</sup>, *Information processing systems — Open Systems Interconnection — The Directory.*

IEEE 754: 1985, *IEEE Standard for Binary Floating-Point Arithmetic.*

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### 3 Definitions

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NOTE — The definitions contained in this clause make use of abbreviations defined in clause 4.

For the purposes of this part of ISO/IEC 9506, the following definitions apply.

#### 3.1 Reference Model definitions

This part of ISO/IEC 9506 is based on the concepts developed in the Basic Reference Model for Open Systems Interconnection (ISO 7498), and makes use of the following terms defined in that International standard:

- a) application-entity;
- b) application-process;
- c) application service element;
- d) open system;
- e) (N)-protocol;
- f) (N)-protocol-data-unit;
- g) (N)-service-access-point;
- h) (N)-layer;
- i) system;

1) To be published.

- j) (N)-user-data.

### 3.2 Service Convention definitions

This part of ISO/IEC 9506 makes use of the following terms defined in the OSI Service Conventions (ISO/TR 8509) as they apply to the Manufacturing Message Specification:

- a) confirm;
- b) indication;
- c) primitive;
- d) request;
- e) response;
- f) service primitive;
- g) service provider;
- h) service user.

### 3.3 Abstract Syntax Notation definitions

This part of ISO/IEC 9506 makes use of the following terms defined in the Abstract Syntax Notation One (ASN.1) Specification (ISO 8824):

- 1) value;
- 2) type;
- 3) simple type;
- 4) structure type;
- 5) component type;
- 6) tag;
- 7) tagging;
- 8) type (or value) reference name;
- 9) character string type;
- 10) boolean type;
- 11) true;
- 12) false;
- 13) integer type;
- 14) bitstring type;
- 15) octetstring type;
- 16) null type;
- 17) sequence type;
- 18) sequence-of type;
- 19) tagged type;

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- 20) choice type;
- 21) selection type;
- 22) real type;
- 23) object identifier type;
- 24) module;
- 25) production;
- 26) ASN.1 encoding rules;
- 27) ASN.1 character set;
- 28) external type.

### 3.4 Other definitions

This part of ISO/IEC 9506 makes use of the following terms:

#### 3.4.1 AA-specific (Application Association specific):

An adjective used to describe an object whose name has a scope that is a single application association (i.e. the name may be referenced only on the application association with respect to which the object was defined).

#### 3.4.2 attribute:

A data element, having a defined meaning, together with a statement of the set of possible values it may take.

#### 3.4.3 conformance building block (CBB):

An atomic unit used to describe MMS conformance requirements.

#### 3.4.4 Called MMS-user:

The MMS-user that issues the Initiate.response service primitive.

#### 3.4.5 Calling MMS-user:

The MMS-user that issues the Initiate.request service primitive.

#### 3.4.6 Client:

The peer communicating entity which makes use of the VMD for some particular purpose via a service request instance.

#### 3.4.7 data:

Any representation to which meaning is or might be assigned (e.g. characters).

**3.4.8 domain:**

An abstract object that represents a subset of the capabilities of a VMD which is used for a specific purpose.

**3.4.9 Domain-specific:**

An adjective used to describe an object whose name has a scope that is a single domain (i.e. the name can be referenced over all application associations established with the VMD that may reference this domain).

**3.4.10 download:**

The process of transferring the content of a domain, including any subordinate objects, via load data to an MMS-user.

**3.4.11 event management:**

The management of event conditions, event actions, and event enrollments.

**3.4.12 file:**

An unambiguously named collection of information having a common set of attributes.

**3.4.13 file operation:**

The transfer of files between open systems, the inspection, modification or replacement of part of a file's content, or the management of a file and its attributes.

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**3.4.14 filestore:**

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An organized collection of files, including their attributes and names, residing at a particular open system.

**3.4.15 information:**

The combination of data and the meaning that it conveys.

**3.4.16 journal:**

A set of recorded, time-tagged event transitions, variable data, and/or comments, which may be logically ordered during retrieval.

**3.4.17 local matter:**

A decision made by a system concerning its behaviour in the Manufacturing Message Specification that is not subject to the requirements of ISO/IEC 9506.

**3.4.18 Manufacturing Message Protocol Machine (MPPM):**

An abstract machine that carries out the procedures specified in this part of ISO/IEC 9506.