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Australian Standard®

Industrial automation systems—Manufacturing message specification

Part 3: Companion standard for robotics

This Australian Standard was prepared by Committee IT/6, Information Processing Systems for Industrial Automation. It was approved on behalf of the Council of Standards Australia on 14 May 1992 and published on 17 August 1992.

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Australian Electrical and Electronic Manufacturer Association
Australian Information Industry Association
Australian Robot Association
Confederation of Australian Industry
Department of Technical and Further Education, N.S.W.
Division of Manufacturing Technology, CSIRO
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PREFACE

This Standard was prepared by the Standards Australia Committee on Information Processing Systems for Industrial Automation. It is identical with and has been reproduced from ISO/IEC 9506-3:1991, *Industrial automation systems—Manufacturing Message Specification, Part 3: Companion standard for robotics.*

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(i) *Terminology* The words 'Australian Standard' should replace the words 'International Standard' wherever they appear.

(ii) *References* Replace references to other publications by references to Australian Standards as follows:

Reference to International Standard or other Publication		*Australian Standard*	
ISO/IEC		AS	
9506	Industrial automation systems—Manufacturing Message Specification	4038	Industrial automation systems—Manufacturing message specification
9506-1	Part 1: Service definition	4038.1	Part 1: Service definition
9506-2	Part 2: Protocol specification	4038.2	Part 2: Protocol specification
ISO			
7498	Information processing systems—Open Systems Interconnection—Basic Reference Model	2777	Information processing systems—Open Systems Interconnection—Basic reference model
8571	Information processing systems—Open Systems Interconnection—File Transfer, Access and Management	—	
8649	Information processing systems—Open Systems Interconnection—Service definition for the Association Control Service Element	—	
8650	Information processing systems—Open Systems Interconnection—Protocol specification for the Association Control Service Element	—	
8824	Information processing systems—Open Systems Interconnection—Specification of Abstract Syntax Notation One (ASN.1)	3625	Information technology—Open Systems Interconnection—Specification of Abstract Syntax Notation One (ASN.1)
9787	Manipulating Industrial Robots—Coordinate Systems and Motions	3986	Manipulating industrial robots—Coordinate systems and motions
10218	Manipulating Industrial Robots—Safety	—	
ISO/TR			
8509	Information processing systems—Open Systems Interconnection—Service Conventions	3620	Information processing systems—Open Systems Interconnection—Service conventions
8373	Manipulating Industrial Robots—Vocabulary	3877	Manipulating industrial robots—Vocabulary

CONTENTS

Figures

Tables

Introduction

This part of ISO/IEC 9506 is intended to be used in an open communication system employing robots and robotic systems connected to a communication network conforming to the OSI model (ISO 7498). This part of ISO/IEC 9506 also recognizes that the robot can act as a controller (client) to devices connected to it such as vision systems and grippers. Client conformance for communication to such devices is not defined by this part of ISO/IEC 9506. Conformance requirements for communication to such devices are defined by the companion Standard appropriate to that device or by ISO/IEC 9506-1 and ISO/IEC 9506-2.

This part of ISO/IEC 9506 does define conformance requirements for the robot when used in a network with multiple clients. The messages are described using the method defined in ISO 8824.

This part of ISO/IEC 9506 provides a description of several conformance classes including a base class. The base class is considered as the minimum conformance for robots connected as a "slave" or server to a host computer or client device on the network. The base class forms the "kernel" of conformance for robots in these types of networks. All other conformance classes will be additions to the base class. This part of ISO/IEC 9506 also provides the robot specific services and protocol including the abstract syntax notation for protocol elements which are undefined in the MMS-General-Module.

This part of ISO/IEC 9506 also recognizes that the robot can act as a controller to devices connected to it such as vision systems and grippers. This part of ISO/IEC 9506 identifies the requirements for communications in such a manner but does not identify MMS service and protocol conformance requirements for the robot when acting in a client role. These requirements are identified by the companion standard covering the device to which the robot intends to communicate.

MMS is intended to be used with yet other standards designed to achieve a systematic and uniform approach to Open Systems Interconnection of Information Processing Systems as defined in ISO 7498. As such, MMS is positioned within the application layer of the OSI model. It defines the Application Service Element and the protocol required to extend information systems networks to the programmable control devices of the automated factory environment. The services defined by MMS are generic and intended to be referenced by the companion standards, each of which is oriented towards a more specific class of application.

This part of ISO/IEC 9506 recognizes that safe operation of robots is required at all times. Safety requirements for robots are specified in ISO DIS 10218. All robot actions delineated in this part of ISO/IEC 9506 are permissible under the safety standard.

Implementation of this part of ISO/IEC 9506 requires a minimum implementation of MMS. This is covered in Clause 9 which references the conformance requirements of ISO/IEC 9506-1 and 2. Implementers of MMS for robots and robotic systems should have a thorough understanding of MMS for proper implementation of this part of ISO/IEC 9506. Implementers should also have a thorough understanding of the modeling, services and protocol defined in this part of ISO/IEC 9506. Users of robots and robotic systems are directed to the clauses on modeling and services found in this document.

For the purpose of this part of ISO/IEC 9506, the term "robot" means "manipulating industrial robot" as defined in ISO/TR 8373. As used in this part of ISO/IEC 9506, a robot will generally refer to the manipulator together with its control system and any ancillary equipment, devices, sensors, or communications links, necessary for the robot to perform its task. Figure 1 illustrates the elements of the robot system as described in this part of ISO/IEC 9506. Since the definitions of ISO/TR 8373 only describe robot systems with a single arm and this part of ISO/IEC 9506 anticipates robots with multiple arms operating in a coordinated fashion, these definitions have been generalized. The term "robot system controller" will refer to the (single) task program operating with the (possible multiple) control programs of the robot arm(s) of the system.

"MMS services" refers to the abstract services defined in ISO/IEC 9506-1 and "MMS protocol" refers to the protocol defined in ISO/IEC 9506-2.