



IEC 61158-6-18

Edition 1.0 2007-12

# INTERNATIONAL STANDARD

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**Industrial communication networks – Fieldbus specifications –  
Part 6-18: Application layer protocol specification – Type 18 elements**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

PRICE CODE **XB**

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ICS 35.100.70; 25.040.40

ISBN 2-8318-9496-4

## CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
1.1 General.....	8
1.2 Specifications.....	8
1.3 Conformance.....	8
2 Normative references.....	9
3 Terms and definitions.....	9
3.1 Terms and definitions from other ISO/IEC standards.....	9
3.2 Other terms and definitions.....	10
3.3 Abbreviations and symbols.....	19
3.4 Additional abbreviations and symbols for decentralized periphery.....	19
3.5 Conventions.....	21
4 Abstract syntax.....	21
4.1 M1 device manager PDU abstract syntax.....	21
4.2 M2 device manager PDU abstract syntax.....	21
4.3 S1 device manager PDU abstract syntax.....	22
4.4 S2 device manager PDU abstract syntax.....	22
4.5 M1 connection manager PDU abstract syntax.....	22
4.6 M2 connection manager PDU abstract syntax.....	23
4.7 S1 connection manager PDU abstract syntax.....	24
4.8 S2 connection manager PDU abstract syntax.....	24
4.9 M1 cyclic transmission PDU abstract syntax.....	24
4.10 M2 cyclic transmission PDU abstract syntax.....	25
4.11 S1 cyclic transmission PDU abstract syntax.....	25
4.12 S2 cyclic transmission PDU abstract syntax.....	26
5 Transfer syntax.....	26
5.1 M1 device manager PDU encoding.....	26
5.2 M2 device manager PDU encoding.....	28
5.3 S1 device manager PDU encoding.....	29
5.4 S2 device manager PDU encoding.....	30
5.5 M1 connection manager PDU encoding.....	31
5.6 M2 connection manager PDU encoding.....	35
5.7 S1 connection manager PDU encoding.....	35
5.8 S2 connection manager PDU encoding.....	36
5.9 M1 cyclic transmission PDU encoding.....	37
5.10 M2 cyclic transmission PDU encoding.....	38
5.11 S1 cyclic transmission PDU encoding.....	39
5.12 S2 cyclic transmission PDU encoding.....	41
5.13 Acyclic transmission PDU encoding.....	42
6 Structure of FAL protocol state machines.....	50
7 AP-context state machine.....	51
8 FAL service protocol machine (FSPM).....	51
8.1 Overview.....	51
8.2 FAL service primitives.....	51
9 AR protocol machine (ARPM).....	52

9.1	Overview .....	52
9.2	M1 master ARPM .....	52
9.3	M2 master ARPM .....	57
9.4	Slave ARPM .....	60
10	DLL mapping protocol machine (DMPM).....	63
10.1	Overview .....	63
10.2	Primitives received from the ARPM .....	63
10.3	Indications received from the DL .....	63
	Bibliography.....	64
	Figure 1 – Parameter block 1 command parameter field.....	44
	Figure 2 – Parameter block 2 command parameter field.....	45
	Figure 3 – Relationships among protocol machines and adjacent layers .....	50
	Figure 4 – ARPM M1 master AR state diagram .....	53
	Figure 5 – ARPM M2 master AR state diagram .....	57
	Figure 6 – ARPM slave AR state diagram .....	60
	Table 1 – M1 device manager attribute format .....	21
	Table 2 – M2 device manager attribute format .....	22
	Table 3 – S1 device manager attribute format.....	22
	Table 4 – S2 device manager attribute format.....	22
	Table 5 – M1 connection manager attribute format.....	23
	Table 6 – M2 connection manager attribute format.....	24
	Table 7 – S1 connection manager attribute format .....	24
	Table 8 – S2 connection manager attribute format .....	24
	Table 9 – M1 cyclic transmission attribute format.....	25
	Table 10 – M2 cyclic transmission attribute format.....	25
	Table 11 – S1 cyclic transmission attribute format .....	25
	Table 12 – S2 cyclic transmission attribute format .....	26
	Table 13 – M1 device manager attribute encoding .....	27
	Table 14 – M2 device manager attribute encoding .....	29
	Table 15 – S1 device manager attribute encoding.....	30
	Table 16 – S2 device manager attribute encoding.....	31
	Table 17 – M1 connection manager attribute encoding .....	32
	Table 18 – M2 connection manager attribute encoding .....	35
	Table 19 – S1 connection manager attribute encoding .....	36
	Table 20 – S2 connection manager attribute encoding .....	36
	Table 21 – M1 cyclic transmission attribute encoding.....	37
	Table 22 – M2 cyclic transmission attribute encoding.....	39
	Table 23 – S1 cyclic transmission attribute encoding .....	40
	Table 24 – S2 cyclic transmission attribute encoding .....	41
	Table 25 – Acyclic transmission – message data encoding .....	42
	Table 26 – Command header format .....	43
	Table 27 – Command codes .....	43

Table 28 – System information command parameter field .....	46
Table 29 – System information command parameter field .....	46
Table 30 – System information command parameter field .....	46
Table 31 – System information command parameter field .....	47
Table 32 – Line test command parameter field .....	47
Table 33 – Memory read command parameter field .....	48
Table 34 – Memory write command parameter field .....	49
Table 35 – FSPM events .....	52
Table 36 – M1 master state-event table 1 – events .....	55
Table 37 – M1 master state-event table 2 – receipt of FSPM service primitives .....	55
Table 38 – M1 master state-event table 3 – receipt of DMPM service primitives .....	57
Table 39 – M2 master state-event table 1 – events .....	58
Table 40 – M2 master state-event table 2 – receipt of FSPM service primitives .....	59
Table 41 – M2 master state-event table 3 – receipt of DMPM service primitives .....	59
Table 42 – S1 connect monitoring time .....	61
Table 43 – S2 connect monitoring time .....	61
Table 44 – Slave state-event table 1 – events .....	62
Table 45 – Slave state-event table 2 – receipt of FSPM service primitives .....	62
Table 46 – Slave state-event table 3 – receipt of DMPM service primitives .....	62
Table 47 – ARPM to DL mapping .....	63
Table 48 – DL to ARPM mapping .....	63

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**INDUSTRIAL COMMUNICATION NETWORKS –  
 FIELDBUS SPECIFICATIONS –**
**Part 6-18: Application layer service definition – Type 18 elements**

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IEC draws attention to the fact that it is claimed that compliance with this standard may involve the use of patents as follows, where the [xx] notation indicates the holder of the patent right:

## Type 18:

3343036/Japan	[MEC]	“Network System for a Programmable Controller”
5896509/USA	[MEC]	“Network System for a Programmable Controller”
246906/Korea	[MEC]	“Network System for a Programmable Controller”
Pending/Germany	[MEC]	“Network System for a Programmable Controller”

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[MEC] Mitsubishi Electric Corporation  
 Corporate Licensing Division  
 7-3, Marunouchi 2-chome, Chiyoda-ku,  
 Tokyo 100-8310, Japan

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International Standard IEC 61158-6-18 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

This first edition and its companion parts of the IEC 61158-6 subseries cancel and replace IEC 61158-6:2003. This edition of this part constitutes a technical addition.

This edition of IEC 61158-6 includes the following significant changes from the previous edition:

- a) deletion of the former Type 6 fieldbus for lack of market relevance;
- b) addition of new types of fieldbuses;
- c) partition of part 6 of the third edition into multiple parts numbered -6-2, -6-3, ...

The text of this standard is based on the following documents:

FDIS	Report on voting
65C/476/FDIS	65C/487/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under <http://webstore.iec.ch> in the data related to the specific publication. At this date, the publication will be:

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

NOTE The revision of this standard will be synchronized with the other parts of the IEC 61158 series.

The list of all the parts of the IEC 61158 series, under the general title *Industrial communication networks – Fieldbus specifications*, can be found on the IEC web site.

## INTRODUCTION

This part of IEC 61158 is one of a series produced to facilitate the interconnection of automation system components. It is related to other standards in the set as defined by the “three-layer” fieldbus reference model described in IEC/TR 61158-1.

The application protocol provides the application service by making use of the services available from the data-link or other immediately lower layer. The primary aim of this standard is to provide a set of rules for communication expressed in terms of the procedures to be carried out by peer application entities (AEs) at the time of communication. These rules for communication are intended to provide a sound basis for development in order to serve a variety of purposes:

- as a guide for implementors and designers;
- for use in the testing and procurement of equipment;
- as part of an agreement for the admittance of systems into the open systems environment;
- as a refinement to the understanding of time-critical communications within OSI.

This standard is concerned, in particular, with the communication and interworking of sensors, effectors and other automation devices. By using this standard together with other standards positioned within the OSI or fieldbus reference models, otherwise incompatible systems may work together in any combination.

## INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

### Part 6-18: Application layer protocol specification – Type 18 elements

#### 1 Scope

##### 1.1 General

The fieldbus application layer (FAL) provides user programs with a means to access the fieldbus communication environment. In this respect, the FAL can be viewed as a “window between corresponding application programs.”

This standard provides common elements for basic time-critical and non-time-critical messaging communications between application programs in an automation environment and material specific to Type 18 fieldbus. The term “time-critical” is used to represent the presence of a time-window, within which one or more specified actions are required to be completed with some defined level of certainty. Failure to complete specified actions within the time window risks failure of the applications requesting the actions, with attendant risk to equipment, plant and possibly human life.

This standard specifies interactions between remote applications and defines the externally visible behavior provided by the Type 18 fieldbus application layer in terms of

- a) the formal abstract syntax defining the application layer protocol data units conveyed between communicating application entities;
- b) the transfer syntax defining encoding rules that are applied to the application layer protocol data units;
- c) the application context state machine defining the application service behavior visible between communicating application entities;
- d) the application relationship state machines defining the communication behavior visible between communicating application entities.

The purpose of this standard is to define the protocol provided to

- 1) define the wire-representation of the service primitives defined in IEC 61158- 5-18, and
- 2) define the externally visible behavior associated with their transfer.

This standard specifies the protocol of the Type 18 fieldbus application layer, in conformance with the OSI Basic Reference Model (ISO/IEC 7498) and the OSI application layer structure (ISO/IEC 9545).

##### 1.2 Specifications

The principal objective of this standard is to specify the syntax and behavior of the application layer protocol that conveys the application layer services defined in IEC 61158-5-18.

A secondary objective is to provide migration paths from previously-existing industrial communications protocols. It is this latter objective which gives rise to the diversity of protocols standardized in the IEC 61158-6 series.

##### 1.3 Conformance

This standard does not specify individual implementations or products, nor do they constrain the implementations of application layer entities within industrial automation systems.

Conformance is achieved through implementation of this application layer protocol specification.

## **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.

IEC 61158-5-18, *Industrial communication networks – Fieldbus specifications – Part 5-18: Application layer service definition – Type 18 elements*

ISO/IEC 10731, *Information technology – Open Systems Interconnection – Basic Reference Model – Conventions for the definition of OSI services*

ISO/IEC 7498-1, *Information technology – Open Systems Interconnection – Basic Reference Model – Part 1: The Basic Model*

ISO/IEC 8822, *Information technology – Open Systems Interconnection – Presentation service definition*

ISO/IEC 8824, *Information technology – Open Systems Interconnection – Specification of Abstract Syntax Notation One (ASN.1)*

ISO/IEC 9545, *Information technology – Open Systems Interconnection – Application Layer structure*