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Standards

Irish Standard
I.S. EN 61158-6-9:2014

Industrial communication networks - Fieldbus specifications - Part 6-9: Application layer protocol specification - Type 9 elements

I.S. EN 61158-6-9:2014

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**Industrial communication networks - Fieldbus specifications -
Part 6-9: Application layer protocol specification - Type 9
elements
(IEC 61158-6-9:2014)**

Réseaux de communication industriels - Spécifications des
bus de terrain - Partie 6-9: Spécification du protocole de la
couche application - Éléments de type 9
(CEI 61158-6-9:2014)

Industrielle Kommunikationsnetze - Feldbusse - Teil 6-9:
Protokollspezifikation des Application Layer
(Anwendungsschicht) - Typ 9-Elemente
(IEC 61158-6-9:2014)

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Foreword

The text of document 65C/764/FDIS, future edition 3 of IEC 61158-6-9, prepared by SC 65C "Industrial networks" of IEC/TC 65 "Industrial-process measurement, control and automation" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61158-6-9:2014.

The following dates are fixed:

- latest date by which the document has to be implemented at (dop) 2015-06-23
national level by publication of an identical national
standard or by endorsement
- latest date by which the national standards conflicting with (dow) 2017-09-23
the document have to be withdrawn

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61784-1	NOTE	Harmonized as EN 61784-1.
IEC 61784-2	NOTE	Harmonized as EN 61784-2.

Annex ZA

(normative)

Normative references to international publications with their corresponding European publications

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

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61158-1	-	Industrial communication networks - Fieldbus specifications - Part 1: Overview and guidance for the IEC 61158 and IEC 61784 series	EN 61158-1	-
IEC 61158-3-1	-	Industrial communication networks - Fieldbus specifications - Part 3-1: Data-link layer service definition - Type 1 elements	EN 61158-3-1	-
IEC 61158-4-1	-	Industrial communication networks - Fieldbus specifications - Part 4-1: Data-link layer protocol specification - Type 1 elements	EN 61158-4-1	-
IEC 61158-5-5	-	Industrial communication networks - Fieldbus specifications - Part 5-5: Application layer service definition - Type 5 elements	EN 61158-5-5	-
IEC 61158-5-9	-	Industrial communication networks - Fieldbus specifications - Part 5-9: Application layer service definition - Type 9 elements	EN 61158-5-9	-
ISO/IEC 646	-	Information technology - ISO 7-bit coded character set for information interchange	-	-
ISO/IEC 7498-1	-	Information technology - Open Systems Interconnection - Basic Reference Model: The Basic Model	-	-
ISO/IEC 8824-1	-	Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation	-	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO/IEC 8825-1	-	Information technology - ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)	-	-
ISO/IEC 9545	-	Information technology - Open Systems Interconnection - Application Layer structure	-	-
ISO/IEC 10731	-	Information technology - Open Systems Interconnection - Basic Reference Model - Conventions for the definition of OSI services	-	-
ISO/IEC/IEEE 60559	-	Information technology - Microprocessor Systems - Floating-Point arithmetic	-	-



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INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Industrial communication networks – Fieldbus specifications –
Part 6-9: Application layer protocol specification – Type 9 elements**

**Réseaux de communication industriels – Spécifications des bus de terrain –
Partie 6-9: Spécification du protocole de la couche application – Eléments
de type 9**



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IEC 61158-6-9

Edition 3.0 2014-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Industrial communication networks – Fieldbus specifications –
Part 6-9: Application layer protocol specification – Type 9 elements**

**Réseaux de communication industriels – Spécifications des bus de terrain –
Partie 6-9: Spécification du protocole de la couche application – Eléments
de type 9**

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CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
1.1 General.....	8
1.2 Specifications.....	8
1.3 Conformance.....	9
2 Normative references	9
3 Terms, definitions, symbols, abbreviations and conventions	10
3.1 Terms and definitions from other ISO/IEC standards	10
3.2 IEC 61158-1 terms	11
3.3 Abbreviations and symbols.....	14
3.4 Conventions	15
3.5 Conventions used in state machines	16
4 Abstract syntax.....	17
4.1 FAL-AR PDU abstract syntax	17
4.2 Abstract syntax of PDUBody.....	19
4.3 Type definitions for ASEs	22
4.4 Abstract syntax of data types	27
5 Transfer syntax	28
6 Structure of FAL protocol state machines	39
7 AP-Context state machines	40
7.1 VCR PM structure	40
7.2 VCR PM state machine	41
8 FAL service protocol machine (FSPM).....	53
8.1 General.....	53
8.2 FSPM state tables.....	53
8.3 Functions used by FSPM.....	56
8.4 Parameters of FSPM/ARPM primitives	56
9 Application relationship protocol machines (ARPMs)	56
9.1 AREP mapping to data-link layer	56
9.2 Application relationship protocol machines (ARPMs)	66
9.3 AREP state machine primitive definitions	82
9.4 AREP state machine functions	83
10 DLL mapping protocol machine (DMPM).....	84
10.1 DMPM States	84
10.2 DMPM state table.....	85
10.3 Primitives exchanged between data-link layer and DMPM	91
10.4 Functions used by DMPM.....	93
Bibliography.....	95
Figure 1 – Insertion of identification information in the FMS PDU.....	29
Figure 2 – Identification	30
Figure 3 – Coding with identification	31
Figure 4 – Coding without identification	31
Figure 5 – Representation of the value true	31

Figure 6 – Representation of the value false	31
Figure 7 – Coding of data of data type Integer16	32
Figure 8 – Coding of data of data type Unsigned16	32
Figure 9 – Coding of data of data type Floating Point	33
Figure 10 – Coding of data of data type Visible String	33
Figure 11 – Coding of data of data type Octet String	34
Figure 12 – Coding of data of type Date	34
Figure 13 – Coding of data of data type Time-of-day	35
Figure 14 – Coding of data of data type Time-difference	36
Figure 15 – Coding of data of data type Bit String	36
Figure 16 – Coding of data of data type Time-value	37
Figure 17 – Coding of data of user data definitions with identifier	37
Figure 18 – Coding of data of user data definitions without identifier	37
Figure 19 – Coding of ID info for a SEQUENCE	38
Figure 20 – Relationships among protocol machines and adjacent layers	39
Figure 21 – Relationships among protocol machines and adjacent layers	40
Figure 22 – VCR state machine	41
Figure 23 – State transition diagram of FSPM	53
Figure 24 – State transition diagram of the QUU ARPM	67
Figure 25 – State transition diagram of QUB ARPM	69
Figure 26 – State transition diagram of the BNU ARPM	77
Figure 27 – State transition diagram of DMPM	85
Table 1 – Conventions used for state machines	16
Table 2 – Coding for Date type	34
Table 3 – AP-VCR state machine transactions	42
Table 4 – Primitives issued by FAL-User to VCR PM	51
Table 5 – Primitives issued by VCR PM to FAL-User	51
Table 6 – Primitives issued by VCR PM to FSPM	52
Table 7 – Primitives issued by FSPM to VCR PM	52
Table 8 – FSPM state table – sender transactions	54
Table 9 – FSPM state table – receiver transactions	55
Table 10 – Function SelectArep()	56
Table 11 – Parameters used with primitives exchanged between FSPM and ARPM	56
Table 12 – QUU ARPM states	67
Table 13 – QUU ARPM state table – sender transactions	67
Table 14 – QUU ARPM state table – receiver transactions	68
Table 15 – QUB ARPM states	68
Table 16 – QUB ARPM state table – sender transactions	69
Table 17 – QUB ARPM state table – receiver transactions	71
Table 18 – BNU ARPM states	77
Table 19 – BNU ARPM state table – sender transactions	78
Table 20 – BNU ARPM state table – receiver transactions	79

Table 21 – Primitives issued from ARPM to DMPM	82
Table 22 – Primitives issued by DMPM to ARPM	82
Table 23 – Parameters used with primitives exchanged between ARPM and DMPM	82
Table 24 – Function GetArepld()	83
Table 25 – Function BuildFAS-PDU	84
Table 26 – Function FAS_Pdu_Type	84
Table 27 – Function AbortIdentifier	84
Table 28 – Function AbortReason	84
Table 29 – Function AbortDetail	84
Table 30 – DMPM state descriptions	85
Table 31 – DMPM state table – sender transactions	85
Table 32 – DMPM state table – receiver transactions	88
Table 33 – Primitives exchanged between data-link layer and DMPM	91
Table 34 – Function PickArep	93
Table 35 – Function FindAREP	93
Table 36 – Function LocateQubArep	94
Table 37 – Function SetIdentifier()	94

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INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

Part 6-9: Application layer protocol specification – Type 9 elements

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NOTE Combinations of protocol types are specified in IEC 61784-1 and IEC 61784-2.

International Standard IEC 61158-6-9 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

This third edition cancels and replaces the second edition published in 2010. This edition constitutes a technical revision. The main change with respect to the previous edition is listed below:

- Correct Time-difference valid range
- Correct Table 3 state transition
- Include Transparent timeliness class in BNU AREP formal model

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

FDIS	Report on voting
65C/764/FDIS	65C/774/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.

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

The committee has decided that the contents of this publication will remain unchanged until the stability 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.

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 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 6-9: Application layer protocol specification – Type 9 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 9 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 defines in an abstract way the externally visible behavior provided by the Type 9 fieldbus Application Layer in terms of

- a) the abstract syntax defining the application layer protocol data units conveyed between communicating application entities,
- b) the transfer syntax defining the application layer protocol data units conveyed between communicating application entities,
- c) the application context state machine defining the application service behavior visible between communicating application entities; and
- d) the application relationship state machines defining the communication behavior visible between communicating application entities; and.

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

- 1) define the wire-representation of the service primitives defined in IEC 61158-5-9, and
- 2) define the externally visible behavior associated with their transfer.

This standard specifies the protocol of the Type 9 IEC fieldbus application layer, in conformance with the OSI Basic Reference Model (ISO/IEC 7498-1) 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 61158-5-9.

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 IEC 61158-6.

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