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Industriell processtyrning – Fältbuss – Del 5-12: Definition av tjänster i applikationsskiktet – Delar i fältbuss, Typ 12

*Industrial communication networks –
Fieldbus specifications –
Part 5-12: Application layer service definition –
Type 12 elements*

Som svensk standard gäller europastandarden EN 61158-5-12:2012. Den svenska standarden innehåller den officiella engelska språkversionen av EN 61158-5-12:2012.

Nationellt förord

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består av:

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- **IEC 61158-5-12, Second edition, 2010 - Industrial communication networks - Fieldbus specifications - Part 5-12: Application layer service definition - Type 12 elements**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 61158-5-12, utgåva 2, 2008, gäller ej fr o m 2015-03-28.

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English version

**Industrial communication networks -
Fieldbus specifications -
Part 5-12: Application layer service definition -
Type 12 elements
(IEC 61158-5-12:2010)**

Réseaux de communication industriels -
Spécifications des bus de terrain -
Partie 5-12: Définition des services des
couches d'application -
Éléments de type 12
(CEI 61158-5-12:2010)

Industrielle Kommunikationsnetze -
Feldbusse -
Teil 5-12: Dienstfestlegungen des
Application Layer (Anwendungsschicht) -
Typ 12-Elemente
(IEC 61158-5-12:2010)

This European Standard was approved by CENELEC on 2012-03-28. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 65C/606/FDIS, future edition 2 of IEC 61158-5-12, 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 61158-5-12:2012.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2012-12-28
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2015-03-28

This document supersedes EN 61158-5-12:2008.

EN 61158-5-12:2012 includes the following significant technical change with respect to EN 61158-5-12:2008:

- bug fixes and;
- editorial improvements.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 61158-5-12:2010 was approved by CENELEC as a European Standard without any modification.

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

IEC/TR 61158-1:2010	NOTE Harmonized as CLC/TR 61158-1:2010 (not modified).
IEC 61158-2	NOTE Harmonized as EN 61158-2.
IEC 61158-4-12	NOTE Harmonized as EN 61158-4-12.
IEC 61158-6-12	NOTE Harmonized as EN 61158-6-12.
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 When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61131-3	-	Programmable controllers - Part 1: General information	EN 61131-3	-
IEC 61158-3-12	-	Industrial communication networks - Fieldbus specifications - Part 3-12: Data-link layer service definition - Type 12 elements	EN 61158-3-12	-
ISO/IEC 646	1991	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 7498-3	-	Information technology - Open Systems Interconnection - Basic Reference Model: Naming and addressing	-	-
ISO/IEC 8802-3	-	Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications	-	-
ISO/IEC 10646	-	Information technology - Universal multiple-octet coded character set (UCS)	-	-
ISO/IEC 10731	-	Information technology - Open Systems Interconnection - Basic reference model - Conventions for the definition of OSI services	-	-
IETF RFC 791	-	Internet Protocol - DARPA Internet Program Protocol Specification	-	-
IEEE 802.1D	-	IEEE Standard for Local and Metropolitan Area Networks - Media Access Control (MAC) Bridges	-	-

CONTENTS

INTRODUCTION	7
1 Scope	8
1.1 Overview	8
1.2 Specifications	9
1.3 Conformance	9
2 Normative references	9
3 Terms, definitions, symbols, abbreviations and conventions	10
3.1 Reference model terms and definitions	10
3.2 Service convention terms and definitions	10
3.3 Application layer and data-link service terms and definitions	11
3.4 Common symbols and abbreviations	15
3.5 Conventions	16
4 Concepts	17
4.1 Common concepts	17
4.2 Type specific concepts	17
5 Data type ASE	25
5.1 General	25
5.2 Formal definition of data type objects	25
5.3 FAL defined data types	25
5.4 Data type ASE service specification	33
6 Communication model specification	33
6.1 ASEs	33
6.2 AR	106
Bibliography	117
Figure 1 – Producer consumer model	19
Figure 2 – Client server model	19
Figure 3 – Server triggered invocation	19
Figure 4 – Slave reference model	20
Figure 5 – Simple slave device	21
Figure 6 – Complex slave device	22
Figure 7 – Master functional overview	23
Figure 8 – Process output data sequence	34
Figure 9 – Process input data sequence	35
Figure 10 – CoE server model	52
Figure 11 – Successful single SDO-Download sequence	57
Figure 12 – Unsuccessful single SDO-Download sequence	58
Figure 13 – Successful segmented SDO-Download sequence	58
Figure 14 – Successful single SDO-Upload sequence	59
Figure 15 – Unsuccessful single SDO-Upload sequence	60
Figure 16 – Successful segmented SDO-Upload sequence	60
Figure 17 – SDO information sequence	61

Figure 18 – Emergency service	62
Figure 19 – Command sequence	63
Figure 20 – PDO mapping	64
Figure 21 – Sync manager PDO assignment.....	65
Figure 22 – RxPDO service	66
Figure 23 – TxPDO service	67
Figure 24 – RxPDO remote transmission sequence	68
Figure 25 – TxPDO remote transmission sequence	68
Figure 26 – EoE sequence	88
Figure 27 – FoE read sequence with success	95
Figure 28 – FoE read sequence with error	96
Figure 29 – FoE write sequence with success.....	96
Figure 30 – FoE write sequence with error.....	97
Figure 31 – FoE write sequence with busy.....	97
Figure 32 – Successful AL control sequence	107
Figure 33 – Unsuccessful AL control sequence.....	108
Figure 34 – AL state changed sequence	109
Table 1 – Process output data.....	37
Table 2 – Process input data	38
Table 3 – Update process input data	39
Table 4 – SII read	47
Table 5 – SII write	48
Table 6 – SII reload.....	49
Table 7 – Allocation of SDO areas	53
Table 8 – SDO download expedited	72
Table 9 – SDO download normal	73
Table 10 – Download SDO segment	74
Table 11 – SDO upload expedited	75
Table 12 – SDO upload normal.....	76
Table 13 – Upload SDO segment	77
Table 14 – Abort SDO transfer	77
Table 15 – Get OD list.....	78
Table 16 – OD list segment	79
Table 17 – Get object description	80
Table 18 – Get entry description.....	81
Table 19 – Object entry segment.....	83
Table 20 – Emergency	84
Table 21 – RxPDO	85
Table 22 – TxPDO	85
Table 23 – RxPDO remote transmission	86
Table 24 – TxPDO remote transmission	86
Table 25 – Initiate EoE	91

Table 26 – EoE fragment.....	92
Table 27 – Set IP parameter.....	93
Table 28 – Set address filter.....	94
Table 29 – FoE read.....	99
Table 30 – FoE write	99
Table 31 – FoE data.....	100
Table 32 – FoE ack	100
Table 33 – FoE busy	101
Table 34 – FoE error	101
Table 35 – MBX read	103
Table 36 – MBX write	104
Table 37 – MBX read upd.....	105
Table 38 – AL management and ESM service primitives	106
Table 39 – AL control	115
Table 40 – AL state change.....	116

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 service is provided by the application protocol making use of the services available from the data-link or other immediately lower layer. This standard defines the application service characteristics that fieldbus applications and/or system management may exploit.

Throughout the set of fieldbus standards, the term “service” refers to the abstract capability provided by one layer of the OSI Basic Reference Model to the layer immediately above. Thus, the application layer service defined in this standard is a conceptual architectural service, independent of administrative and implementation divisions.

INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

Part 5-12: Application layer service definition – Type 12 elements

1 Scope

1.1 Overview

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 12 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 service provided by the different Types of the fieldbus Application Layer in terms of

- a) an abstract model for defining application resources (objects) capable of being manipulated by users via the use of the FAL service,
- b) the primitive actions and events of the service;
- c) the parameters associated with each primitive action and event, and the form which they take; and
- d) the interrelationship between these actions and events, and their valid sequences.

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

- a) the FAL user at the boundary between the user and the Application Layer of the Fieldbus Reference Model, and
- b) Systems Management at the boundary between the Application Layer and Systems Management of the Fieldbus Reference Model.

This standard specifies the structure and services of the IEC fieldbus Application Layer, in conformance with the OSI Basic Reference Model (ISO/IEC 7498) and the OSI Application Layer Structure (ISO/IEC 9545).

FAL services and protocols are provided by FAL application-entities (AE) contained within the application processes. The FAL AE is composed of a set of object-oriented Application Service Elements (ASEs) and a Layer Management Entity (LME) that manages the AE. The ASEs provide communication services that operate on a set of related application process object (APO) classes. One of the FAL ASEs is a management ASE that provides a common set of services for the management of the instances of FAL classes.

Although these services specify, from the perspective of applications, how request and responses are issued and delivered, they do not include a specification of what the requesting and responding applications are to do with them. That is, the behavioral aspects of the applications are not specified; only a definition of what requests and responses they can

send/receive is specified. This permits greater flexibility to the FAL users in standardizing such object behavior. In addition to these services, some supporting services are also defined in this standard to provide access to the FAL to control certain aspects of its operation.

1.2 Specifications

The principal objective of this standard is to specify the characteristics of conceptual application layer services suitable for time-critical communications, and thus supplement the OSI Basic Reference Model in guiding the development of application layer protocols for time-critical communications.

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 services standardized as the various Types of IEC 61158, and the corresponding protocols standardized in subparts of IEC 61158-6.

This specification may be used as the basis for formal Application Programming-Interfaces. Nevertheless, it is not a formal programming interface, and any such interface will need to address implementation issues not covered by this specification, including

- a) the sizes and octet ordering of various multi-octet service parameters, and
- b) the correlation of paired request and confirm, or indication and response, primitives.

1.3 Conformance

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

There is no conformance of equipment to this application layer service definition standard. Instead, conformance is achieved through implementation of conforming application layer protocols that fulfill any given Type of application layer services as defined in this standard.

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 61131-3, *Programmable controllers – Part 3: Programming languages*

IEC 61158-3-12, *Industrial communication networks – Fieldbus specifications – Part 3-12: Data-link layer service definition – Type 12 elements*

ISO/IEC 646:1991, *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 7498-3, *Information technology – Open Systems Interconnection – Basic Reference Model: Naming and addressing*

ISO/IEC 8802-3, *Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications*

ISO/IEC 10646, *Information technology – Universal Multiple-Octet Coded Character Set (UCS)*

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

IEEE 802.1D, *IEEE standard for local and metropolitan area networks – Media access control (MAC) Bridges*; available at <<http://www.ieee.org>>

IETF RFC 791, *Internet Protocol darpa internet program protocol specification*; available at <<http://www.ietf.org>>