

**Industrial communication networks -  
Fieldbus specifications - Part 3-16: Data-link  
layer service definition - Type 16 elements**

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definition - Type 16 elements

**EESTI STANDARDI EESSÕNA****NATIONAL FOREWORD**

<p>Käesolev Eesti standard EVS-EN 61158-3-16:2008 sisaldab Euroopa standardi EN 61158-3-16:2008 ingliskeelset teksti.</p>	<p>This Estonian standard EVS-EN 61158-3-16:2008 consists of the English text of the European standard EN 61158-3-16:2008.</p>
<p>Standard on kinnitatud Eesti Standardikeskuse 24.03.2008 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.</p>	<p>This standard is ratified with the order of Estonian Centre for Standardisation dated 24.03.2008 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.</p>
<p>Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 22.02.2008.</p>	<p>Date of Availability of the European standard text 22.02.2008.</p>
<p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>The standard is available from Estonian standardisation organisation.</p>

**ICS** 25.040.40, 35.100.20

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Kui Teil on küsimusi standardite autorikaitse kohta, palun võtke ühendust Eesti Standardikeskusega:  
Aru 10 Tallinn 10317 Eesti; [www.evs.ee](http://www.evs.ee); Telefon: 605 5050; E-post: [info@evs.ee](mailto:info@evs.ee)

English version

**Industrial communication networks -  
Fieldbus specifications -  
Part 3-16: Data-link layer service definition -  
Type 16 elements  
(IEC 61158-3-16:2007)**

Réseaux de communication industriels -  
Spécifications des bus de terrain -  
Partie 3-16: Définition des services  
des couches de liaison de données -  
Éléments de type 16  
(CEI 61158-3-16:2007)

Industrielle Kommunikationsnetze -  
Feldbusse -  
Teil 3-16: Dienstfestlegungen des  
Data Link Layer (Sicherungsschicht) -  
Typ 16-Elemente  
(IEC 61158-3-16:2007)

This European Standard was approved by CENELEC on 2008-02-01. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, 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 and the United Kingdom.

**CENELEC**

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

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

## Foreword

The text of document 65C/473/FDIS, future edition 1 of IEC 61158-3-16, 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 was approved by CENELEC as EN 61158-3-16 on 2008-02-01.

This and the other parts of the EN 61158-3 series supersede EN 61158-3:2004. Together with EN 61158-2:2008 and its companion parts for Type 16, it also partially replaces EN 61491:1998 which is at present being revised (to be issued as a Technical Report).

With respect to EN 61158-3:2004 the following changes were made:

- deletion of Type 6 fieldbus, and the placeholder for a Type 5 fieldbus data-link layer, for lack of market relevance;
- addition of new fieldbus types;
- partition into multiple parts numbered 3-1, 3-2, ..., 3-19.

The following dates were fixed:

- latest date by which the EN has to be implemented  
at national level by publication of an identical  
national standard or by endorsement (dop) 2008-11-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 2011-02-01

NOTE Use of some of the associated protocol types is restricted by their intellectual-property-right holders. In all cases, the commitment to limited release of intellectual-property-rights made by the holders of those rights permits a particular data-link layer protocol type to be used with physical layer and application layer protocols in type combinations as specified explicitly in the EN 61784 series. Use of the various protocol types in other combinations may require permission from their respective intellectual-property-right holders.

Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 61158-3-16:2007 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 61158-2	NOTE Harmonized as EN 61158-2:2008 (not modified).
IEC 61158-4-16	NOTE Harmonized as EN 61158-4-16:2008 (not modified).
IEC 61158-5-16	NOTE Harmonized as EN 61158-5-16:2008 (not modified).
IEC 61158-6-16	NOTE Harmonized as EN 61158-6-16:2008 (not modified).
IEC 61784-1	NOTE Harmonized as EN 61784-1:2008 (not modified).

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## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

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.

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>
ISO/IEC 7498-1	- <sup>1)</sup>	Information technology - Open Systems Interconnection - Basic Reference Model: The Basic Model	EN ISO/IEC 7498-1	1995 <sup>2)</sup>
ISO/IEC 7498-3	- <sup>1)</sup>	Information technology - Open Systems Interconnection - Basic Reference Model: Naming and addressing	-	-
ISO/IEC 10731	- <sup>1)</sup>	Information technology - Open Systems Interconnection - Basic reference model - Conventions for the definition of OSI services	-	-

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<sup>1)</sup> Undated reference.

<sup>2)</sup> Valid edition at date of issue.

## CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
1.1 Overview.....	6
1.2 Specifications.....	6
1.3 Conformance.....	6
2 Normative references .....	7
3 Terms, definitions, symbols, abbreviations and conventions .....	7
3.1 Reference model terms and definitions.....	7
3.2 Service convention terms and definitions.....	8
3.3 Data-link service terms and definitions .....	9
3.4 Symbols and abbreviations.....	12
3.5 Common conventions.....	13
4 Data-link services and concepts .....	14
4.1 Overview.....	14
4.2 Service channel services (SVC services).....	16
4.3 Realtime channel setup services (RTCS services).....	18
4.4 RTC services.....	20
4.5 File transmission services .....	23
Bibliography.....	25
Figure 1 – Relationships of DLSAPs, DLSAP-addresses and group DL-addresses .....	10
Table 1 – Summary of DL services and primitives.....	16
Table 2 – Read (RD).....	17
Table 3 – Write (WR) .....	18
Table 4 – Initiate_cyclic_communication (ICC).....	19
Table 5 – Disable_cyclic_communication (DCC) .....	20
Table 6 – Notify_Error (NER).....	20
Table 7 – Write_cyclic (WRC) .....	21
Table 8 – Get_Device_Status (GDS).....	21
Table 9 – Write_Device_Status (SDS).....	22
Table 10 – Notify_Network_Status_Change (NNSC) .....	23
Table 11 – File download (FD).....	23
Table 12 – File upload (FU) .....	24

## 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.

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 data-link layer service defined in this standard is a conceptual architectural service, independent of administrative and implementation divisions.

## **INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –**

### **Part 3-16: Data-link layer service definition – Type 16 elements**

#### **1 Scope**

##### **1.1 Overview**

This standard provides common elements for basic time-critical messaging communications between devices in an automation environment. 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 Type 16 fieldbus data-link layer in terms of

- a) the primitive actions and events of the service;
- b) the parameters associated with each primitive action and event, and the form which they take; and
- c) the interrelationship between these actions and events, and their valid sequences.

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

- the Type 16 fieldbus application layer at the boundary between the application and data-link layers of the fieldbus reference model, and
- systems management at the boundary between the data-link layer and systems management of the fieldbus reference model.

##### **1.2 Specifications**

The principal objective of this standard is to specify the characteristics of conceptual data-link layer services suitable for time-critical communications, and thus supplement the OSI Basic Reference Model in guiding the development of data-link protocols for time-critical communications. A secondary objective is to provide migration paths from previously-existing industrial communications protocols.

This specification may be used as the basis for formal DL-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 do they constrain the implementations of data-link entities within industrial automation systems.

There is no conformance of equipment to this data-link layer service definition standard. Instead, conformance is achieved through implementation of the corresponding data-link protocol that fulfills the Type 16 data-link layer services 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.

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

## 3 Terms, definitions, symbols, abbreviations and conventions

For the purposes of this document, the following terms, definitions, symbols, abbreviations and conventions apply.

### 3.1 Reference model terms and definitions

This standard is based in part on the concepts developed in ISO/IEC 7498-1 and ISO/IEC 7498-3, and makes use of the following terms defined therein:

<b>3.1.1 DL-address</b>	[7498-3]
<b>3.1.2 DL-address-mapping</b>	[7498-1]
<b>3.1.3 called-DL-address</b>	[7498-3]
<b>3.1.4 calling-DL-address</b>	[7498-3]
<b>3.1.5 centralized multi-end-point-connection</b>	[7498-1]
<b>3.1.6 DL-connection</b>	[7498-1]
<b>3.1.7 DL-connection-end-point</b>	[7498-1]
<b>3.1.8 DL-connection-end-point-identifier</b>	[7498-1]
<b>3.1.9 DL-connection-mode transmission</b>	[7498-1]
<b>3.1.10 DL-connectionless-mode transmission</b>	[7498-1]
<b>3.1.11 correspondent (N)-entities</b>	[7498-1]
<b>correspondent DL-entities (N=2)</b>	
<b>correspondent Ph-entities (N=1)</b>	
<b>3.1.12 DL-duplex-transmission</b>	[7498-1]
<b>3.1.13 (N)-entity</b>	[7498-1]
<b>DL-entity (N=2)</b>	
<b>Ph-entity (N=1)</b>	
<b>3.1.14 DL-facility</b>	[7498-1]
<b>3.1.15 flow control</b>	[7498-1]