



NSAI
Standards

Irish Standard
I.S. EN 61158-3-13:2014

Industrial communication networks - Fieldbus specifications - Part 3-13: Data-link layer service definition - Type 13 elements

I.S. EN 61158-3-13:2014

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:

EN 61158-3-13:2014

Published:

2014-10-17

This document was published under the authority of the NSAI and comes into effect on:

2014-11-14

ICS number:

25.040.40

35.100.20

35.110

NOTE: If blank see CEN/CENELEC cover page

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

EUROPEAN STANDARD

EN 61158-3-13

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2014

ICS 25.040.40; 35.100.20; 35.110

Supersedes EN 61158-3-13:2008

English Version

**Industrial communication networks - Fieldbus specifications -
Part 3-13: Data-link layer service definition - Type 13 elements
(IEC 61158-3-13:2014)**

Réseaux de communication industriels - Spécifications des
bus de terrain - Partie 3-13: Définition des services de la
couche liaison de données - Eléments de type 13
(CEI 61158-3-13:2014)

Industrielle Kommunikationsnetze - Feldbusse - Teil 3-13:
Dienstfestlegungen des Data Link Layer
(Sicherheitsschicht) - Typ 13-Elemente
(IEC 61158-3-13:2014)

This European Standard was approved by CENELEC on 2014-09-17. 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, Former Yugoslav Republic of Macedonia, 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.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Foreword

The text of document 65C/759/FDIS, future edition 2 of IEC 61158-3-13, 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 61158-3-13:2014.

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) 2015-06-17
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2017-09-17

This document supersedes EN 61158-3-13:2008.

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.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

Endorsement notice

The text of the International Standard IEC 61158-3-13:2014 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 61158-1	NOTE	Harmonized as EN 61158-1.
IEC 61158-6-13	NOTE	Harmonized as EN 61158-6-13.
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> ¹⁾
IEC 61158-4-13	2014	Industrial communication networks - Fieldbus specifications - Part 4-13: Data-link layer protocol specification - Type 13 elements	EN 61158-4-13	
IEC 61158-5-13	2014	Industrial communication networks - Fieldbus specifications - Part 5-13: Application layer service definition - Type 13 elements	EN 61158-5-13	2014
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	2000	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 10731	-	Information technology - Open Systems Interconnection - Basic Reference Model - Conventions for the definition of OSI services	-	-
IETF RFC 768	-	User Datagram Protocol	-	-
IETF RFC 791	-	Internet Protocol	-	-
IETF RFC 793	-	Transmission Control Protocol	-	-

1) To be published.

This page is intentionally left blank



IEC 61158-3-13

Edition 2.0 2014-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Industrial communication networks – Fieldbus specifications –
Part 3-13: Data-link layer service definition – Type 13 elements**

**Réseaux de communication industriels – Spécifications des bus de terrain –
Partie 3-13: Définition des services de la couche liaison de données – Éléments
de type 13**





THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2014 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in 14 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

More than 55 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 14 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

Plus de 55 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.



IEC 61158-3-13

Edition 2.0 2014-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Industrial communication networks – Fieldbus specifications –
Part 3-13: Data-link layer service definition – Type 13 elements**

**Réseaux de communication industriels – Spécifications des bus de terrain –
Partie 3-13: Définition des services de la couche liaison de données – Éléments
de type 13**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX



ICS 25.040.40; 35.100.20; 35.110

ISBN 978-2-8322-1714-6

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
1.1 General.....	7
1.2 Specifications.....	7
1.3 Conformance.....	7
2 Normative references.....	8
3 Terms, definitions, symbols, abbreviations and conventions.....	8
3.1 Reference model terms and definitions.....	8
3.2 Service convention terms and definitions.....	10
3.3 Data-link service terms and definitions.....	11
3.4 Symbols and abbreviations.....	15
3.5 Common conventions.....	16
3.6 Additional Type 13 conventions.....	17
4 Data-link service and concept.....	18
4.1 Overview.....	18
4.2 Detailed description of isochronous-data services.....	27
4.3 Detailed description of asynchronous-data service.....	28
4.4 Detailed description of exception-signaling services.....	35
4.5 NMT-status services.....	37
5 Data-link management services (and concepts).....	38
5.1 General.....	38
5.2 Facilities of the DLMS.....	38
5.3 Services of the DL-management.....	38
5.4 Overview of interactions.....	39
5.5 Detail specification of service and interactions.....	40
Bibliography.....	45
Figure 1 – Relationships of DLSAPs, DLSAP-addresses and group DL-addresses.....	13
Figure 2 – Type 13 communication architecture.....	18
Figure 3 – Sequence diagram of isochronous-data service.....	19
Figure 4 – Sequence diagram of service-data service.....	20
Figure 5 – Sequence diagram of an unspecified-data transfer service.....	21
Figure 6 – Sequence diagram of a status-data transfer service.....	21
Figure 7 – Sequence diagram of an ident-data transfer service.....	22
Figure 8 – Sequence diagram of a sync-data transfer service.....	23
Figure 9 – Sequence diagram of an NMT-command transfer service.....	24
Figure 10 – Sequence diagram of an exception-signaling service.....	25
Figure 11 – Sequence diagram of a NMT-status transfer service.....	26
Figure 12 – Reset, Set value and Get value services.....	39
Figure 13 – Event and Frame status service.....	40
Table 1 – Type 13 node ID assignment.....	27
Table 2 – Primitives and parameters used on the isochronous data service.....	27

Table 3 – Transmit /Receive isochronous-data primitives and the parameters.....	28
Table 4 – Primitives and parameters used on service data transfer service.....	28
Table 5 – Transmit / Receive service-data primitives and the parameters	29
Table 6 – Primitives and parameters used on the unspecified-data service	30
Table 7 – Transmit / receive unspecified-data primitives and the parameters	30
Table 8 – Primitives and parameters used on status-data transfer service	31
Table 9 – Status data primitives and the parameters.....	31
Table 10 – Primitives and parameters used on ident-data transfer service	32
Table 11 – Ident data primitives and the parameters.....	33
Table 12 – Primitives and parameters used on sync-data transfer service.....	33
Table 13 – Sync data primitives and the parameters	34
Table 14 – Primitives and parameters used on the NMT-command service	34
Table 15 – NMT-command primitives and the parameters.....	35
Table 16 – Primitives and parameters used on the exception-signaling service.....	35
Table 17 – Exception-signaling initialization primitives and the parameters	36
Table 18 – Exception signaling initialization primitives and the parameters	36
Table 19 – Primitives and parameters used on the NMT-status service.....	37
Table 20 – NMT-status primitives and the parameters.....	37
Table 21 – Summary of DL-management primitives and parameters	39
Table 22 – DLM-Reset primitives and parameters	40
Table 23 – DLM-Set-value primitives and parameters	41
Table 24 – DLM-Get-value primitives and parameters	42
Table 25 – Event primitives and parameters	42
Table 26 – Event-related state change variables.....	43
Table 27 – Frame status primitives and parameters	43
Table 28 – Frame parameters	44

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INDUSTRIAL COMMUNICATION NETWORKS –
FIELDBUS SPECIFICATIONS –****Part 3-13: Data-link layer service definition –
Type 13 elements**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

Attention is drawn to the fact that the use of the associated protocol type is restricted by its 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 layer protocol type to be used with other layer protocols of the same type, or in other type combinations explicitly authorized by its intellectual-property-right holders.

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

International Standard IEC 61158-3-13 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

This second edition cancels and replaces the first edition published in 2007. This edition constitutes a technical revision. The main changes with respect to the previous edition are listed below:

- addition of a new communication class,
- corrections and
- editorial improvements.

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

FDIS	Report on voting
65C/759/FDIS	65C/769/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 the parts of the IEC 61158 series, 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.

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 3-13: Data-link layer service definition – Type 13 elements

1 Scope

1.1 General

This part of IEC 61158 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 13 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 13 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 13 data-link layer services defined in this standard.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-