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Irish Standard  
I.S. EN 61158-4-20:2014

# Industrial communication networks - Fieldbus specifications - Part 4-20: Data-link layer protocol specification - Type 20 elements

**I.S. EN 61158-4-20:2014**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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*This document is based on:*

EN 61158-4-20:2014

*Published:*

2014-10-31

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

2014-11-27

ICS number:

NOTE: If blank see CEN/CENELEC cover page

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EUROPEAN STANDARD

**EN 61158-4-20**

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2014

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ICS 25.040.40; 35.100.20; 35.110

English Version

**Industrial communication networks - Fieldbus specifications -  
Part 4-20: Data-link layer protocol specification - Type 20  
elements  
(IEC 61158-4-20:2014)**

Réseaux de communication industriels - Spécifications des  
bus de terrain - Partie 4-20: Spécification du protocole de la  
couche liaison de données - Éléments de type 20  
(CEI 61158-4-20:2014)

Industrielle Kommunikationsnetze - Feldbusse - Teil 4-20:  
Protokollspezifikation des Data Link Layer  
(Sicherheitsschicht) - Typ 20-Elemente  
(IEC 61158-4-20:2014)

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Europäisches Komitee für Elektrotechnische Normung

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

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## Foreword

The text of document 65C/762/FDIS, future edition 1 of IEC 61158-4-20, 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 61158-4-20:2014.

The following dates are fixed:

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

|                     |      |                                  |
|---------------------|------|----------------------------------|
| IEC 61158-1:2014    | NOTE | Harmonised as EN 61158-1:2014    |
| IEC 61158-3-20:2014 | NOTE | Harmonised as EN 61158-3-20:2014 |
| IEC 61158-5-20:2014 | NOTE | Harmonised as EN 61158-5-20:2014 |
| IEC 61784-1         | NOTE | Harmonised as EN 61784-1         |
| IEC 61784-2         | NOTE | Harmonised as EN 61784-2         |
| IEC 62591:2010      | NOTE | Harmonised as EN 62591:2010      |

## 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](http://www.cenelec.eu).

| <u>Publication</u> | <u>Year</u> | <u>Title</u>  | <u>EN/HD</u>  | <u>Year</u> |
|--------------------|-------------|---|---------------|-------------|
| IEC 61158-2        | 2014        | Industrial communication networks -<br>Fieldbus specifications<br>Part 2: Physical layer specification and<br>service definition            | EN 61158-2    | 2014        |
| IEC 61158-6-20     | 2014        | Industrial communication networks -<br>Fieldbus specifications<br>Part 6-20: Application layer protocol<br>specification - Type 20 elements | EN 61158-6-20 | 2014        |
| ISO/IEC 7498-1     | -           | Information technology - Open Systems<br>Interconnection - Basic reference model: The<br>basic model  | -             | -           |
| ISO/IEC 7498-3     | -           | Information technology - Open Systems<br>Interconnection - Basic reference model:<br>Naming and addressing                                  | -             | -           |
| ISO/IEC 10731      | -           | Information technology - Open Systems<br>Interconnection - Basic Reference Model -<br>Conventions for the definition of OSI<br>services     | -             | -           |

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**IEC 61158-4-20**

Edition 1.0 2014-08

# **INTERNATIONAL STANDARD**

# **NORME INTERNATIONALE**



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**Industrial communication networks – Fieldbus specifications –  
Part 4-20: Data-link layer protocol specification – Type 20 elements**

**Réseaux de communication industriels – Spécifications des bus de terrain –  
Partie 4-20: Spécification du protocole de la couche liaison de données –  
Éléments de type 20**





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**IEC 61158-4-20**

Edition 1.0 2014-08

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**Industrial communication networks – Fieldbus specifications –  
Part 4-20: Data-link layer protocol specification – Type 20 elements**

**Réseaux de communication industriels – Spécifications des bus de terrain –  
Partie 4-20: Spécification du protocole de la couche liaison de données –  
Éléments de type 20**

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COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

PRICE CODE  
CODE PRIX



ICS 25.040.40; 35.100.20; 35.110

ISBN 978-2-8322-1728-3

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FIELD BUS SPECIFICATIONS –****Part 4-20: Data-link layer protocol specification –  
Type 20 elements**

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

International Standard IEC 61158-4-20 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

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

|              |                  |
|--------------|------------------|
| FDIS         | Report on voting |
| 65C/762/FDIS | 65C/772/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 the 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

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## 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 data-link protocol provides the data-link service by making use of the services available from the physical 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 data-link entities (DLEs) 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:

- a) as a guide for implementors and designers;
- b) for use in the testing and procurement of equipment;
- c) as part of an agreement for the admittance of systems into the open systems environment;
- d) 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 4-20: Data-link layer protocol specification – Type 20 elements**

#### **1 Scope**

##### **1.1 General**

The data-link layer provides basic time-critical messaging communications between devices in an automation environment.

This protocol provides a means of connecting devices through a partial mesh network, such that most failures of an interconnection between two devices can be circumvented. In common practice the devices are interconnected in a non-redundant hierarchical manner reflecting application needs

##### **1.2 Specifications**

This International Standard specifies

- a) procedures for the timely transfer of data and control information from one data-link user entity to a peer user entity, and among the data-link entities forming the distributed data-link service provider;
- b) the structure of the fieldbus DLPDUs used for the transfer of data and control information by the protocol of this standard, and their representation as physical interface data units.

##### **1.3 Procedures**

The procedures are defined in terms of

- a) the interactions between peer DL-entities (DLEs) through the exchange of fieldbus DLPDUs;
- b) the interactions between a DL-service (DLS) provider and a DLS-user in the same system through the exchange of DLS primitives;
- c) the interactions between a DLS-provider and a Ph-service provider in the same system through the exchange of Ph-service primitives.

##### **1.4 Applicability**

These procedures are applicable to instances of communication between systems which support time-critical communications services within the data-link layer of the OSI or fieldbus reference models, and which require the ability to interconnect in an open systems interconnection environment.

Profiles provide a simple multi-attribute means of summarizing an implementation's capabilities, and thus its applicability to various time-critical communications needs.

##### **1.5 Conformance**

This International Standard also specifies conformance requirements for systems implementing these procedures. This standard does not contain tests to demonstrate compliance with such requirements.

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