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Irish Standard
I.S. EN IEC 61158-5-21:2019

Industrial communication networks - Fieldbus specifications - Part 5-21: Application layer service definition - Type 21 elements

I.S. EN IEC 61158-5-21:2019

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National Foreword

I.S. EN IEC 61158-5-21:2019 is the adopted Irish version of the European Document EN IEC 61158-5-21:2019, Industrial communication networks - Fieldbus specifications - Part 5-21: Application layer service definition - Type 21 elements

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EUROPEAN STANDARD
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English Version

**Industrial communication networks - Fieldbus specifications -
Part 5-21: Application layer service definition - Type 21 elements
(IEC 61158-5-21:2019)**

Réseaux de communication industriels- Spécifications des
bus de terrain - Partie 5-21 : Définition des services de la
couche application - Éléments de type 21
(IEC 61158-5-21:2019)

Industrielle Kommunikationsnetze - Feldbusse - Teil 5-21:
Dienstfestlegungen des Application Layer
(Anwendungsschicht) - Typ 21-Elemente
(IEC 61158-5-21:2019)

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

EN IEC 61158-5-21:2019 (E)

European foreword

The text of document 65C/947/FDIS, future edition 2 of IEC 61158-5-21, 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 IEC 61158-5-21:2019.

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- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-05-15

This document supersedes EN 61158-5-21:2012.

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

| | | |
|------------------|------|--|
| IEC 61158-1:2019 | NOTE | Harmonized as EN IEC 61158-1:2019 (not modified) |
| IEC 61158-2 | NOTE | Harmonized as EN 61158-2 |

Annex ZA

(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1 Where 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> |
|--------------------|-------------|--|-------------------|-------------|
| ISO/IEC/IEEE 60559 | 2011 | Information technology - Microprocessor Systems - Floating-Point arithmetic | - | - |
| IEC 61158-3-21 | 2019 | Industrial communication networks - Fieldbus specifications - Part 3-21: Data-link layer service definition - Type 21 elements | - | - |
| IEC 61158-4-21 | 2019 | Industrial communication networks - Fieldbus specifications - Part 4-21: Data-link layer protocol specification - Type 21 elements | EN IEC 61158-4-21 | 2019 |
| IEC 61158-6-21 | 2019 | Industrial communication networks - Fieldbus specifications - Part 6-21: Application layer protocol specification - Type 21 elements | EN 61158-6-21 | 2019 |
| 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 8822 | - | Information technology - Open Systems Interconnection - Presentation service definition | - | - |
| ISO/IEC 8824 | series | Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation | - | - |
| 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 | - | - |

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Edition 2.0 2019-04

INTERNATIONAL STANDARD

**Industrial communication networks – Fieldbus specifications –
Part 5-21: Application layer service definition – Type 21 elements**



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67 000 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 61158-5-21

Edition 2.0 2019-04

INTERNATIONAL STANDARD

**Industrial communication networks – Fieldbus specifications –
Part 5-21: Application layer service definition – Type 21 elements**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INDUSTRIAL COMMUNICATION NETWORKS –
FIELDBUS SPECIFICATIONS –****Part 5-21: Application layer service definition –
Type 21 elements****FOREWORD**

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

International Standard IEC 61158-5-21 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 2010. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- added Write and Read service;
- miscellaneous editorial corrections.

The text of this International Standard is based on the following documents:

| FDIS | Report on voting |
|--------------|------------------|
| 65C/947/FDIS | 65C/950/RVD |

Full information on the voting for the approval of this International 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:

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- amended.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

This document 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 service is provided by the application protocol making use of the services available from the data-link or other immediately lower layer. This document 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 document is a conceptual architectural service, independent of administrative and implementation divisions.

INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

Part 5-21: Application layer service definition – Type 21 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 considered a window between corresponding application programs.

This part of IEC 61158 provides the common elements for basic time-critical and non-time-critical messaging communications between application programs in an automation environment as well as material specific to the Type 21 protocol. 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 International Standard defines, in an abstract way, the externally visible service provided by the FAL in terms of:

- a) an abstract model for defining application resources (objects) capable of being manipulated by users *via* 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 that they take;
- d) the interrelationship between these actions and events, and their valid sequences.

The purpose of this document 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;
- b) systems management at the boundary between the application layer and systems management of the fieldbus Reference Model.

This document describes the structure and services of the IEC FAL, 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 (AEs) contained in 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 management of the instances of FAL classes.

Although these services specify how requests and responses are issued and delivered from the perspective of applications, they do not include a specification of what the requesting and responding applications are to do with them. That is, these services only define what requests and responses applications can send or receive, not the functions of the applications

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