



NSAI
Standards

Irish Standard
I.S. EN IEC 61158-5-4:2019

Industrial communication networks -
Fieldbus specifications - Part 5-4:
Application layer service definition - Type
4 elements

I.S. EN IEC 61158-5-4:2019

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This document is based on:

EN IEC 61158-5-4:2019

Published:

2019-06-21

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

2019-07-09

ICS number:

25.040.40

35.100.70

35.110

NOTE: If blank see CEN/CENELEC cover page

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National Foreword

I.S. EN IEC 61158-5-4:2019 is the adopted Irish version of the European Document EN IEC 61158-5-4:2019, Industrial communication networks - Fieldbus specifications - Part 5-4: Application layer service definition - Type 4 elements

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EUROPEAN STANDARD

EN IEC 61158-5-4

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2019

ICS 25.040.40; 35.100.70; 35.110

Supersedes EN 61158-5-4:2014

English Version

**Industrial communication networks - Fieldbus specifications -
Part 5-4: Application layer service definition - Type 4 elements
(IEC 61158-5-4:2019)**

Réseaux de communication industriels - Spécifications des
bus de terrain - Partie 5-4 : Définition des services de la
couche application - Éléments de type 4
(IEC 61158-5-4:2019)

Industrielle Kommunikationsnetze - Feldbusse - Teil 5-4:
Dienstfestlegungen des Application Layer
(Anwendungsschicht) - Typ 4-Elemente
(IEC 61158-5-4:2019)

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

EN IEC 61158-5-4:2019 (E)

European foreword

The text of document 65C/947/FDIS, future edition 3 of IEC 61158-5-4, 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 61158-5-4:2019.

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) 2020-02-15
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-05-15

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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 |
| IEC 61784-1:2019 | NOTE | Harmonized as EN IEC 61784-1:2019 (not modified) |
| IEC 61784-2:2019 | NOTE | Harmonized as EN IEC 61784-2:2019 (not modified) |

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> |
|--------------------|-------------|--|------------------|-------------|
| IEC 61158-3-4 | 2019 | Industrial communication networks - Fieldbus specifications - Part 3-4: Data-link layer service definition - Type 4 elements | EN IEC 61158-3-4 | 2019 |
| IEC 61158-4-4 | 2019 | Industrial communication networks - Fieldbus specifications - Part 4-4: Data-link layer protocol specification - Type 4 elements | EN IEC 61158-4-4 | 2019 |
| IEC 61158-6-4 | 2019 | Industrial communication networks - Fieldbus specifications - Part 6-4: Application layer protocol specification - Type 4 elements | EN 61158-6-4 | 2019 |
| IEC 61158-6 | series | Industrial communication networks - Fieldbus specifications - Part 6-10: Application layer protocol specification - Type 10 elements | EN 61158-6 | series |
| 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 8824-1 | - | 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 | - | - |
| ISO/IEC/IEEE 60559 | - | Information technology - Microprocessor - Systems - Floating-Point arithmetic | - | - |

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IEC 61158-5-4

Edition 3.0 2019-04

INTERNATIONAL STANDARD



**Industrial communication networks – Fieldbus specifications –
Part 5-4: Application layer service definition – Type 4 elements**





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IEC 61158-5-4

Edition 3.0 2019-04

INTERNATIONAL STANDARD



**Industrial communication networks – Fieldbus specifications –
Part 5-4: Application layer service definition – Type 4 elements**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 25.040.40; 35.100.70; 35.110

ISBN 978-2-8322-6739-4

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

INDUSTRIAL COMMUNICATION NETWORKS – FIELD BUS SPECIFICATIONS –

Part 5-4: Application layer service definition – Type 4 elements

FOREWORD

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

International Standard IEC 61158-5-4 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

This third edition cancels and replaces the second edition published in 2014. This edition constitutes a technical revision.

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

- a) additional user parameters to services;
- b) additional services to support distributed objects;
- c) additional secure services;

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 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
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IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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 5-4: Application layer service definition – Type 4 elements

1 Scope

1.1 General

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 part of IEC 61158 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 4 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 International Standard defines in an abstract way the externally visible service provided by the Type 4 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 document is to define the services provided to:

- 1) the FAL user at the boundary between the user and the application layer of the fieldbus reference model, and
- 2) Systems Management at the boundary between the application layer and Systems Management of the fieldbus reference model.

This document specifies the structure and services of the Type 4 fieldbus application layer, in conformance with the OSI Basic Reference Model (ISO/IEC 7498-1) 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

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