BS EN IEC 61158-3-24:2023

BSI Standards Publication

# Industrial communication networks — Fieldbus specifications

Part 3-24: Data-link layer service definition — Type 24 elements

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# National foreword

This British Standard is the UK implementation of EN IEC 61158-3-24:2023. It is identical to IEC 61158-3-24:2023. It supersedes BS EN 61158-3-24:2014, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GEL/65/3, Industrial communications: process measurement and control, including fieldbus.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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**Amendments/corrigenda issued since publication**

| Date | Text affected |
|---|---|

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN IEC 61158-3-24

April 2023

ICS 25.040.40; 35.100.20; 35.110

Supersedes EN 61158-3-24:2014

English Version

# Industrial communication networks - Fieldbus specifications - Part 3-24: Data-link layer service definition - Type 24 elements (IEC 61158-3-24:2023)

Réseaux de communication industriels - Spécifications des bus de terrain - Partie 3-24: Définition des services de la couche liaison de données - Eléments de type 24 (IEC 61158-3-24:2023)

Industrielle Kommunikationsnetze - Feldbusse - Teil 3-24: Dienstfestlegungen des Data Link Layer (Sicherungsschicht) - Typ 24-Elemente (IEC 61158-3-24:2023)

This European Standard was approved by CENELEC on 2023-04-20. 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.

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# European foreword

The text of document 65C/1201/FDIS, future edition 2 of IEC 61158-3-24, 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 61158-3-24:2023.

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) | 2024-01-20 |
| • latest date by which the national standards conflicting with the document have to be withdrawn | (dow) | 2026-04-20 |

This document supersedes EN 61158-3-24:2014 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

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## Endorsement notice

The text of the International Standard IEC 61158-3-24:2023 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 standard indicated:

| | |
|---|---|
| IEC 61158-1 | NOTE Approved as EN IEC 61158-1 |
| IEC 61158-2 | NOTE Approved as EN 61158-2 |
| IEC 61158-4-24 | NOTE Approved as EN IEC 61158-4-24 |
| IEC 61158-5-24 | NOTE Approved as EN 61158-5-24 |
| IEC 61158-6-24 | NOTE Approved as EN 61158-6-24 |
| IEC 61784-1 (series) | NOTE Approved as EN IEC 61784-1 (series)[1] |
| IEC 61784-2 (series) | NOTE Approved as EN IEC 61784-2 (series)[2] |

[1] To be published. Stage at time of publication: FprEN IEC 61784-1-X:2023.

[2] To be published. Stage at time of publication: FprEN IEC 61784-2-X:2023.

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# 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.cencenelec.eu.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| 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 | 2005 | Information technology - Open Systems Interconnection - Basic Reference Model - Conventions for the definition of OSI services | - | - |
| ISO/IEC 19501 | 2005 | Information technology - Open Distributed Processing - Unified Modeling Language (UML) Version 1.4.2 | - | - |

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

# INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

## Part 3-24: Data-link layer service definition – Type 24 elements

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

IEC 61158-3-24 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation. It is an International Standard.

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

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The main changes with respect to the previous edition are listed below:

- addition of a new cyclic transmission mode which called "no time slot type" in Clause 4;
- addition of some parameters for Table 14 and Table 15 in Clause 5.3.2.2;
- in Subclause 5.3.5.2, addition of some parameters for Table 31 and addition of a new Table 32.

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

| Draft | Report on voting |
|---|---|
| 65C/1201/FDIS | 65C/1242/RVD |

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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 document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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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.

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 document is a conceptual architectural service, independent of administrative and implementation divisions.

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# INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

# Part 3-24: Data-link layer service definition – Type 24 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 document defines in an abstract way the externally visible service provided by the Type 24 fieldbus data-link layer in terms of

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

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

- the Type 24 fieldbus application layer at the boundary between the application and data-link layers of the fieldbus reference model;
- 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 document 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 document can 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

- the sizes and octet ordering of various multi-octet service parameters, and
- the correlation of paired request and confirm, or indication and response, primitives.

### 1.3 Conformance

This document does not specify individual implementations or products, nor does it 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 24 data-link layer services defined in this document.

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## 2 Normative references

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 All parts of the IEC 61158 series, as well as the IEC 61784-1 series and the IEC 61784-2 series are maintained simultaneously. Cross-references to these documents within the text therefore refer to the editions as dated in this list of normative references.

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 10731:2005, *Information technology – Open Systems Interconnection – Basic Reference Model – Conventions for the definition of OSI services*

ISO/IEC 19501:2005, *Information technology – Open Distributed Processing – Unified Modeling Language (UML) Version 1.4.2*

## 3 Terms, definitions, symbols, abbreviated terms and conventions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

### 3.1 Reference model terms and definitions

This document 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.

**3.1.1 acknowledgement** [ISO/IEC 7498-1]

**3.1.2 correspondent (N)-entities**
**correspondent DL-entities (N=2)**
**correspondent Ph-entities (N=1)** [ISO/IEC 7498-1]

**3.1.3 DL-address** [ISO/IEC 7498-3]

**3.1.4 DL-protocol** [ISO/IEC 7498-1]

**3.1.5 DL-protocol-data-unit** [ISO/IEC 7498-1]

**3.1.6 DL-service-data-unit** [ISO/IEC 7498-1]

**3.1.7 DLS-user** [ISO/IEC 7498-1]

**3.1.8 DLS-user-data** [ISO/IEC 7498-1]

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