IEC 61784-3-3

Edition 4.0 2021-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Industrial communication networks – Profiles – Part 3-3: Functional safety fieldbuses – Additional specifications for CPF 3

Réseaux de communication industriels – Profils – Partie 3-3: Bus de terrain de sécurité fonctionnelle – Spécifications supplémentaires pour CPF 3

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INDUSTRIAL COMMUNICATION NETWORKS – PROFILES –

Part 3-3: Functional safety fieldbuses – Additional specifications for CPF 3

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IEC 61784-3-3 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 fourth edition cancels and replaces the third edition published in 2016. This edition constitutes a technical revision.

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

- editorial changes regarding timeliness, transformation of comments in the chart into instructions;
- use abbreviations of PROFINET;
- information added about checks and safety manual for PROFIsafe Address Type 1 and 2;
- information added about PFDavg, support of automatic test, add diagnosis messages;

- explanation and specification of optional statemachines for reaction on device fault;
- new optional variable "OAD_Nec_C" for optional feature "Reaction of Device_Fault in F_Host";
- specification of the optional F-Host feature for "Disable F-(Sub)Module";
- specify requirements for FSCP 3/1 and PROFIenergy;
- specify requirement for multiple F-Hosts communicating with a single F-(Sub)Module; Update of the Safety Manual;
- diverse error corrections, fixes of typos, and reference updates;
- updated bibliography.

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

FDIS	Report on voting
65C/1083/FDIS	65C/1087/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/standardsdev/publications.

A list of all parts of the IEC 61784-3 series, published under the general title *Industrial communication networks – Profiles – Functional safety fieldbuses*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://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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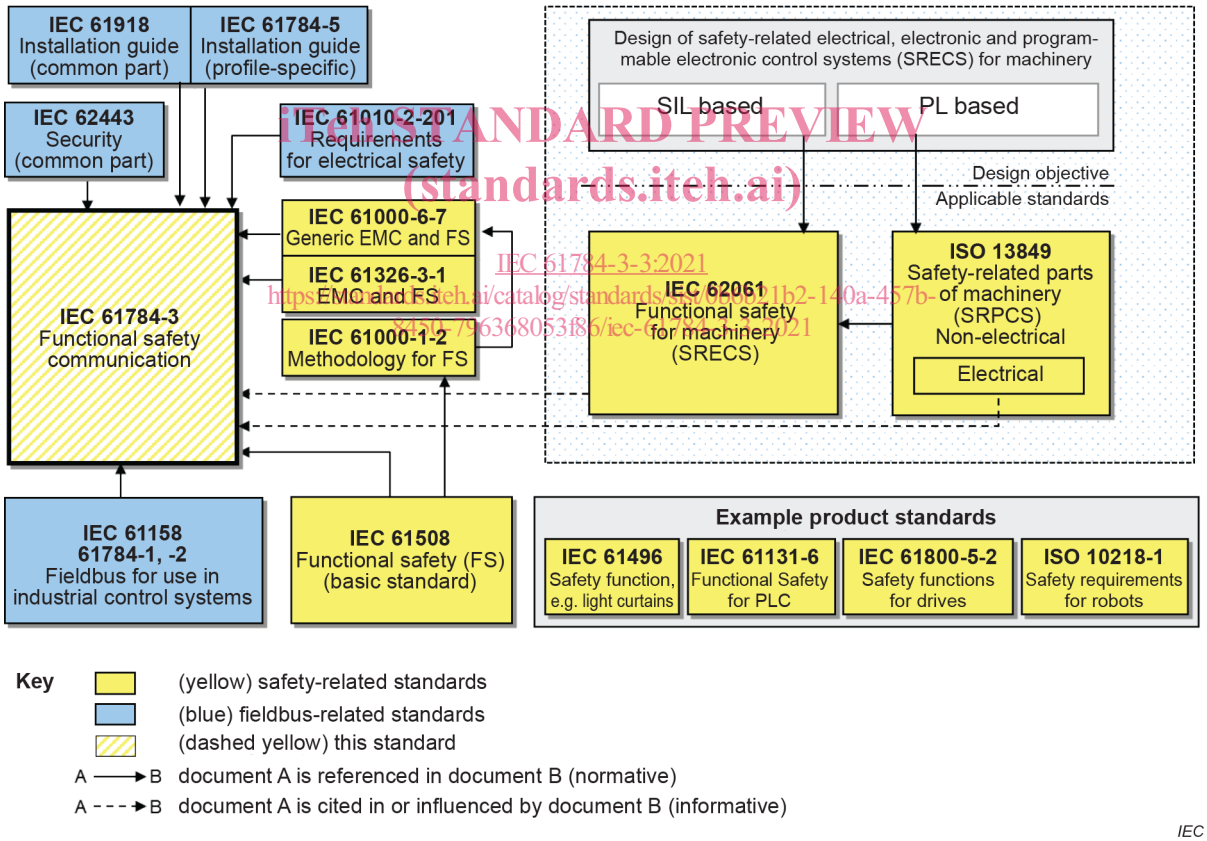
0 Introduction

0.1 General

The IEC 61158 (all parts) fieldbus standard together with its companion standards IEC 61784-1 and IEC 61784-2 defines a set of communication protocols that enable distributed control of automation applications. Fieldbus technology is now considered well accepted and well proven. Thus fieldbus enhancements continue to emerge, addressing applications for areas such as real time and safety-related applications.

IEC 61784-3 (all parts) explains the relevant principles for functional safety communications with reference to IEC 61508 (all parts) and specifies several safety communication layers (profiles and corresponding protocols) based on the communication profiles and protocol layers of IEC 61784-1, IEC 61784-2 and IEC 61158 (all parts). It does not cover electrical safety and intrinsic safety aspects. It also does not cover security aspects nor does it provide any requirements for security.

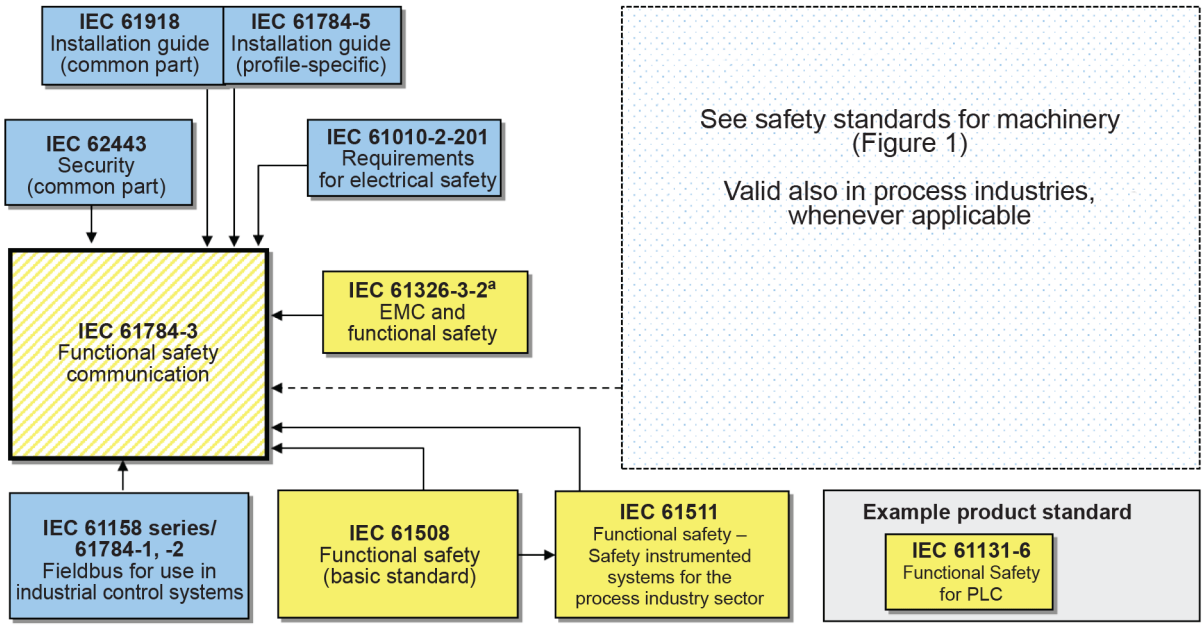
Figure 1 shows the relationships between IEC 61784-3 (all parts) and relevant safety and fieldbus standards in a machinery environment.



NOTE IEC 62061 specifies the relationship between PL (Category) and SIL.

Figure 1 – Relationships of IEC 61784-3 with other standards (machinery)

Figure 2 shows the relationships between IEC 61784-3 (all parts) and relevant safety and fieldbus standards in a process environment.



[a] For specified electromagnetic environments; otherwise IEC 61326-3-1 or IEC 61000-6-7.

Figure 2 – Relationships of IEC 61784-3 with other standards (process)

Safety communication layers which are implemented as parts of safety-related systems according to IEC 61508 (all parts) provide the necessary confidence in the transportation of messages (information) between two or more participants on a fieldbus in a safety-related system, or sufficient confidence of safe behaviour in the event of fieldbus errors or failures.

Safety communication layers specified in IEC 61784-3 (all parts) do this in such a way that a fieldbus can be used for applications requiring functional safety up to the Safety Integrity Level (SIL) specified by its corresponding functional safety communication profile.

The resulting SIL claim of a system depends on the implementation of the selected functional safety communication profile (FSCP) within this system – implementation of a functional safety communication profile in a standard device is not sufficient to qualify it as a safety device.

IEC 61784-3 (all parts) describes:

- basic principles for implementing the requirements of IEC 61508 (all parts) for safety-related data communications, including possible transmission faults, remedial measures and considerations affecting data integrity;
- functional safety communication profiles for several communication profile families in IEC 61784-1 and IEC 61784-2, including safety layer extensions to the communication service and protocols sections of IEC 61158 (all parts).

0.2 Patent declaration

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document may involve the use of patents concerning the functional safety communication profiles for family 3. IEC takes no position concerning the evidence, validity, and scope of these patent rights.

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