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NORME INTERNATIONALE



Industrial communication networks – Profiles –
IEC STANDARD PREVIEW
Part 3-3: Functional safety fieldbuses – Additional specifications for CPF 3
(standards.iteh.ai)

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

IEC 61784-3-3:2016

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International Standard IEC 61784-3-3 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 2010. This edition constitutes a technical revision. This edition includes the following significant technical changes with respect to the previous edition:

- Legacy V1-mode removed from this protocol edition;
- Protocol extensions to protect against possible loopbacks (LP extensions);
- Protocol extensions to keep SIL3 for safety networks with large numbers of participants (XP extensions) and subsequent new F-Parameter "F_CRC_Seed";
- Introduction of random and disjoint Codename based MonitoringNumbers (MNR) besides to the previous Consecutive Numbers;

- Provisions for Channel Granular Passivation and subsequent new F-Parameter "F_Passivation";
- GSD extensions due to new F-Parameters;
- Notations according to the CP3 family in IEC 61158 (e.g. IO Controller);
- Additional diagnosis message types;
- Diverse error corrections and fixes of typos;
- Updated documents in bibliography.

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

FDIS	Report on voting
65C/851/FDIS	65C/854/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 61784-3 series, published under the general title *Industrial communication networks – Profiles – Functional safety fieldbuses*, can be found on the IEC website.

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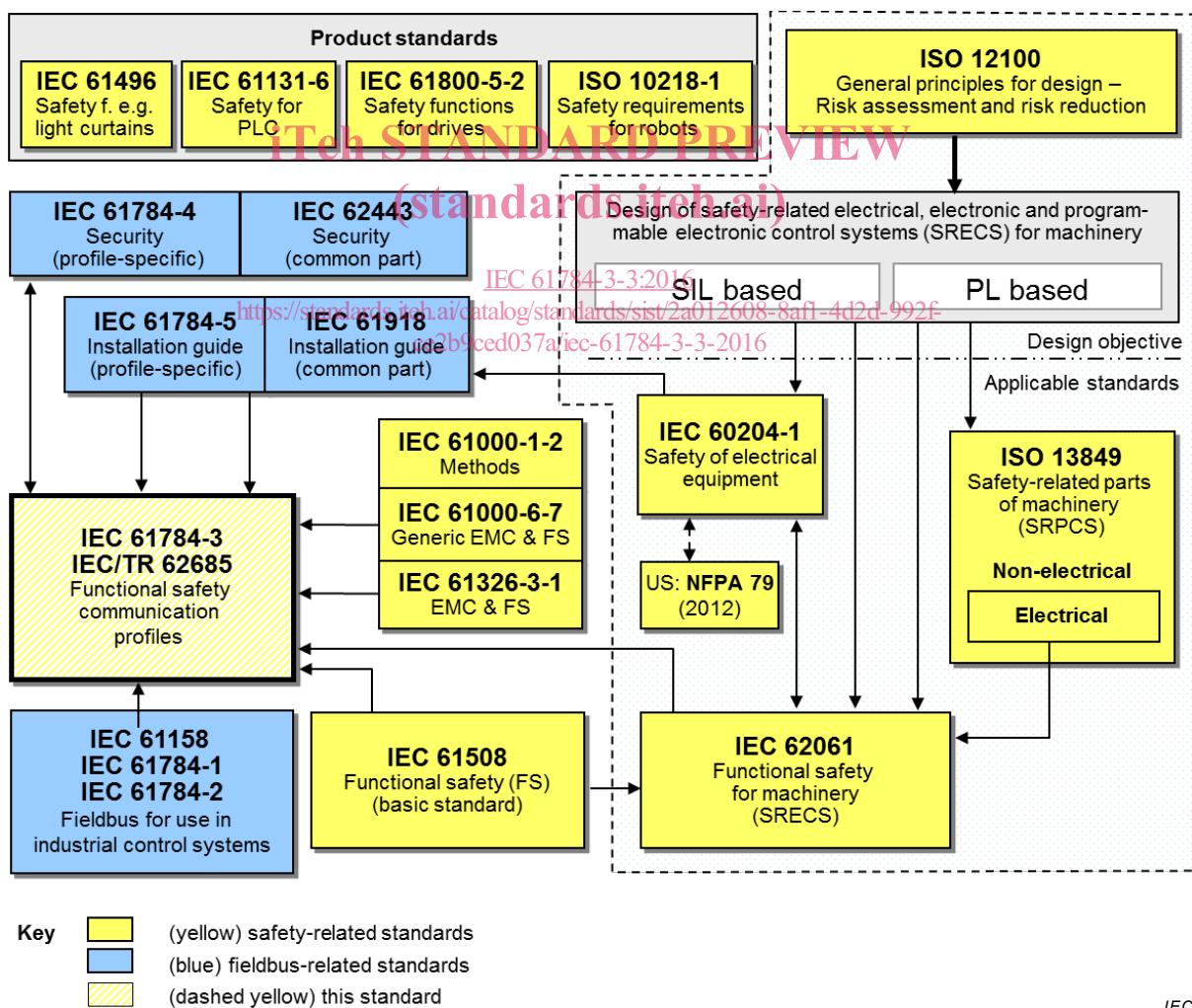
0 Introduction

0.1 General

The IEC 61158 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, safety-related and security-related applications.

This standard explains the relevant principles for functional safety communications with reference to IEC 61508 series 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 the IEC 61158 series. It does not cover electrical safety and intrinsic safety aspects.

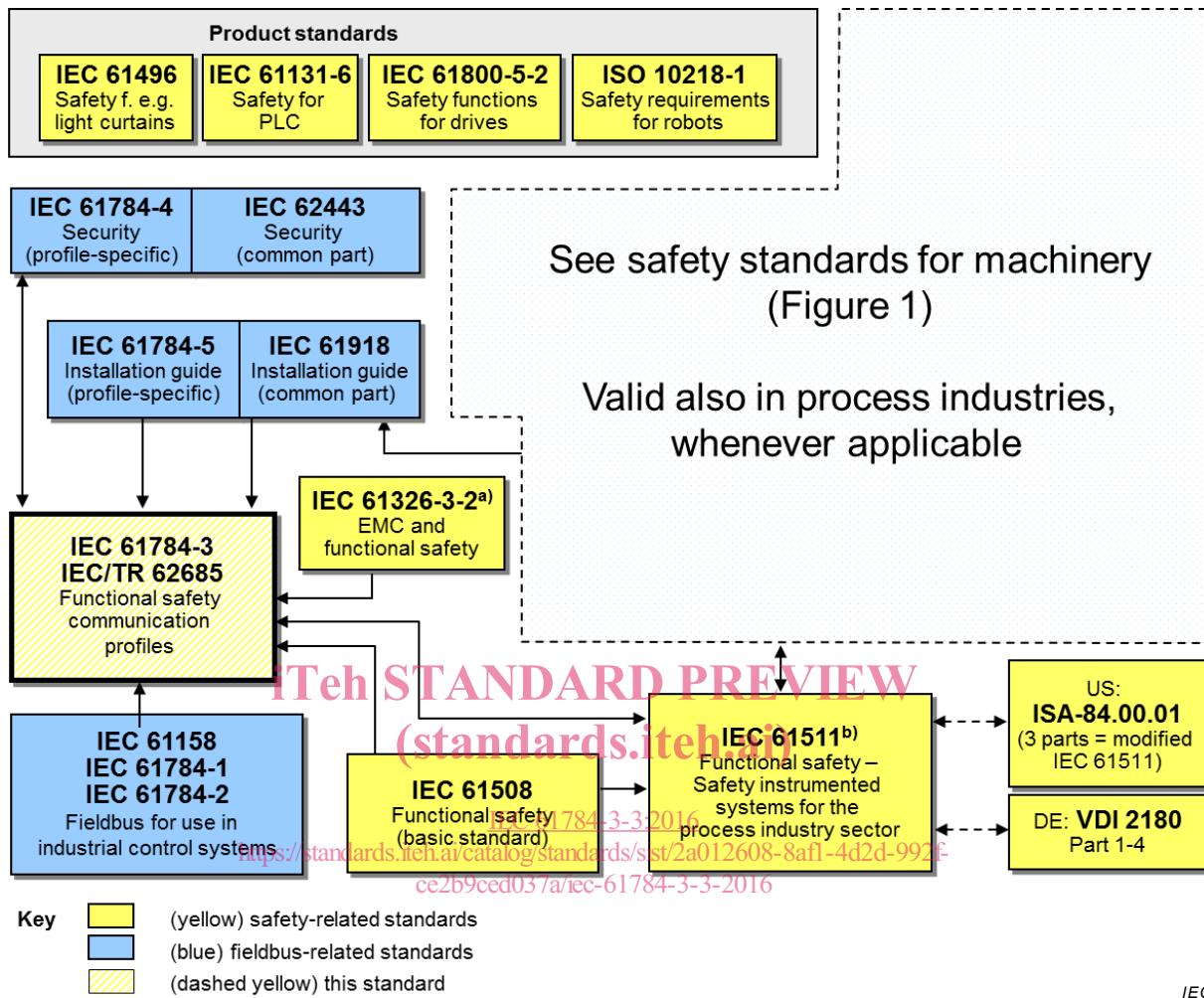
Figure 1 shows the relationships between this standard and relevant safety and fieldbus standards in a machinery environment.



NOTE Subclauses 6.7.6.4 (high complexity) and 6.7.8.1.6 (low complexity) of IEC 62061 specify the relationship between PL (Category) and SIL.

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

Figure 2 shows the relationships between this standard 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.

^b EN ratified.

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 series 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 this standard 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.

This standard describes:

- basic principles for implementing the requirements of IEC 61508 series 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 the IEC 61158 series.

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 as follows, where the [xx] notation indicates the holder of the patent rights:

US 6907542	[SI]	System, device and method for determining the reliability of data carriers in a failsafe system network
US 6725419 DE 59910661.1 EP 1064590	[SI]	Automation system and method for operating an automation system
US 7808917 DE 50 2005 001 819.2 EP 1686732	[SI]	Method and system for transmitting telegrams
US 7640480 DE 50 2005 004 305.7 EP 1802019	[SI]	Detection of errors in the communication of data IEC 61784-3-3:2016 https://standards.iteh.ai/catalog/standards/sist/2a012608-8af1-4d2d-992fce2b9ced037a/icc-61784-3-3-2016
EP 1921525	[SI]	Security-related system component e.g. guard door, for automation system of production system, has comparing unit comparing signatures for identity, where component supports security-related operation during sameness of signatures
EP 13172092.2	[SI]	Method and System for Detecting Errors when Transmitting Data from a Transmitter to at Least One Receiver

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