Industrial communication networks - Profiles - Part 3: Functional safety fieldbuses - General rules and profile definitions

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NATIONAL FOREWORD

See Eesti standard EVS-EN 61784-3:2016 sisaldab Euroopa standardi EN 61784-3:2016 ingliskeelset teksti.	This Estonian standard EVS-EN 61784-3:2016 consists of the English text of the European standard EN 61784-3:2016.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 19.08.2016.	Date of Availability of the European standard is 19.08.2016.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 25.040.40, 35.100.05

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61784-3

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ICS 25.040.40; 35.100.05

Supersedes EN 61784-3:2010

English Version

Industrial communication networks - Profiles - Part 3: Functional safety fieldbuses - General rules and profile definitions (IEC 61784-3:2016)

Réseaux de communication industriels - Profils - Partie 3: Bus de terrain de sécurité fonctionnelle - Règles générales et définitions de profils (IEC 61784-3:2016)

Industrielle Kommunikationsnetze - Profile - Teil 3: Funktional sichere Übertragung bei Feldbussen - Allgemeine Regeln und Festlegungen für Profile (IEC 61784-3:2016)

This European Standard was approved by CENELEC on 2016-06-17. 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 61784-3:2016 E

European foreword

The text of document 65C/840/FDIS, future edition 3 of IEC 61784-3, 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 61784-3:2016.

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) 2017-03-17
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2019-06-17

This document supersedes EN 61784-3:2010.

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

Endorsement notice

The text of the International Standard IEC 61784-3:2016 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 standards indicated:

IEC 60204-1	NOTE	Harmonized as EN 60204-1.
IEC 61131-2:2007	NOTE	Harmonized as EN 61131-2:2007 (not modified).
IEC 61131-6	NOTE	Harmonized as EN 61131-6.
IEC 61496	NOTE	Harmonized in EN 61496 series.
IEC 61496-1	NOTE	Harmonized as EN 61496-1.
IEC 61508-4:2010	NOTE	Harmonized as EN 61508-4:2010 (not modified).
IEC 61508-5:2010	NOTE	Harmonized as EN 61508-5:2010 (not modified).
IEC 61511	NOTE	Harmonized in EN 61511 series.
IEC 61800-5-2	NOTE	Harmonized as EN 61800-5-2.
IEC 62061:2005	NOTE	Harmonized as EN 62061:2005 (not modified).
IEC/TR 62685	NOTE	Harmonized as CLC/TR 62685.

ISO 10218-1	NOTE	Harmonized as EN ISO 10218-1.
ISO 12100	NOTE	Harmonized as EN ISO 12100.
ISO 13849	NOTE	Harmonized in EN ISO 13849 series.
ISO 13849-1:2015	NOTE	Harmonized as EN ISO 13849-1:2015 (not modified).

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When 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.

Publication	Year	Title	EN/HD	Year
IEC 61000-6-7	-	Electromagnetic compatibility (EMC) - Part 6-7: Generic standards - Immunity requirements for equipment intended to perform functions in a safety-related system (functional safety) in industrial locations	EN 61000-6-7	-
IEC 61010-2-201	2013	Safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-201: Particular requirements for control equipment	EN 61010-2-201	2013
-	-		+ AC	2013
IEC 61158	series	Industrial communication networks - Fieldbus specifications	EN 61158	series
IEC 61326-3-1	-	Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 3-1: Immunity requirements for safety-related systems and for equipment intended to perform safety-related functions (functional safety) - General industrial applications	EN 61326-3-1	-
IEC 61326-3-2	-	Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 3-2: Immunity requirements for safety-related systems and for equipment intended to perform safety-related functions (functional safety) - Industrial applications with specified electromagnetic environment	EN 61326-3-2	-
IEC 61508	series	Functional safety of electrical/electronic/programmable electronic safety-related systems	EN 61508	series

Publication	Year	Title	EN/HD	Year
IEC 61508-1	2010	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 1: General requirements	EN 61508-1	2010
IEC 61508-2	-	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems	EN 61508-2	-
IEC 61784-1	-	Industrial communication networks - Profiles - Part 1: Fieldbus profiles	EN 61784-1	-
IEC 61784-2	-	Industrial communication networks - Profiles - Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC 8802-3	EN 61784-2	-
IEC 61784-3-1	-	Industrial communication networks - Profiles - Part 3-1: Functional safety fieldbuses - Additional specifications for CPF 1	EN 61784-3-1	-
IEC 61784-3-2	-	Industrial communication networks - Profiles - Part 3-2: Functional safety fieldbuses - Additional specifications for CPF 2	EN 61784-3-2	-
IEC 61784-3-3	-	Industrial communication networks - Profiles - Part 3-3: Functional safety fieldbuses - Additional specifications for CPF 3	EN 61784-3-3	-
IEC 61784-3-6	-	Industrial communication networks - Profiles - Part 3-6: Functional safety fieldbuses - Additional specifications for CPF 6	EN 61784-3-6	-
IEC 61784-3-8	-	Industrial communication networks - Profiles - Part 3-8: Functional safety fieldbuses - Additional specifications for CPF 8	EN 61784-3-8	-
IEC 61784-3-12	-	Industrial communication networks - Profiles - Part 3-12: Functional safety fieldbuses - Additional specifications for CPF 12	EN 61784-3-12	-
IEC 61784-3-13	-	Industrial communication networks - Profiles - Part 3-13: Functional safety fieldbuses - Additional specifications for CPF 13	EN 61784-3-13	-
IEC 61784-3-14	-	Industrial communication networks - Profiles - Part 3-14: Functional safety fieldbuses - Additional specifications for CPF 14	EN 61784-3-14	-

Publication	Year	Title	EN/HD	Year
IEC 61784-3-17	- [1)]	Industrial communication networks - Profiles - Part 3-17: Functional safety fieldbuses - Additional specifications for CPF 17	-	-
IEC 61784-3-18	-	Industrial communication networks - Profiles - Part 3-18: Functionnal safety fieldbuses - Additional specifications for CPF 18	EN 61784-3-18	-
IEC 61784-5	series	Industrial communication networks - Profiles - Part 5: Installation of fieldbuses	EN 61784-5	series
IEC 61918 (mod)	2013	Industrial communication networks - Installation of communication networks in industrial premises	EN 61918	2013
-	-		+ AC	2014
IEC 62443	series	Industrial communication networks - Network and system security	EN 62443	series

1) To be published.

CONTENTS

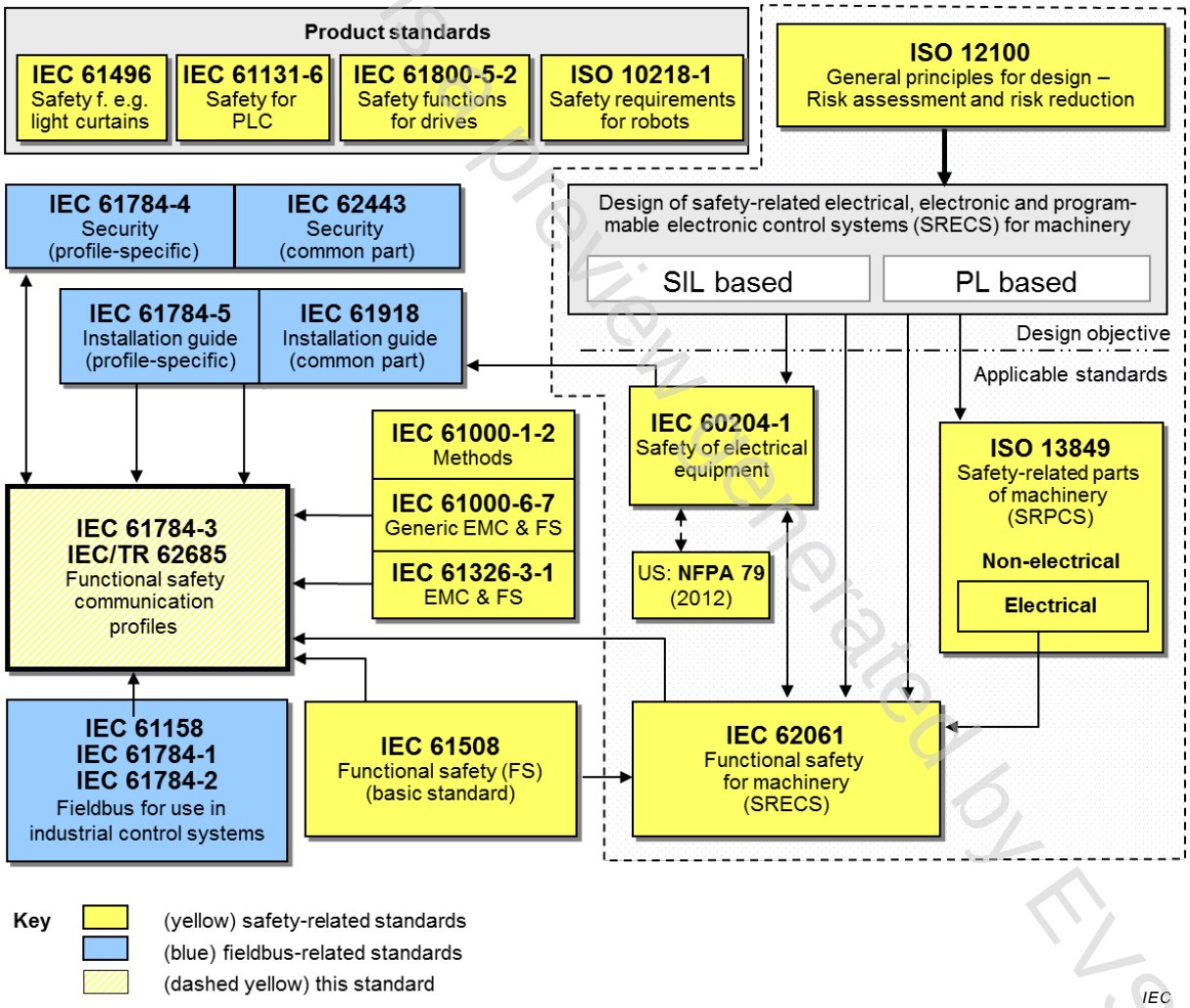
0 Introduction

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.

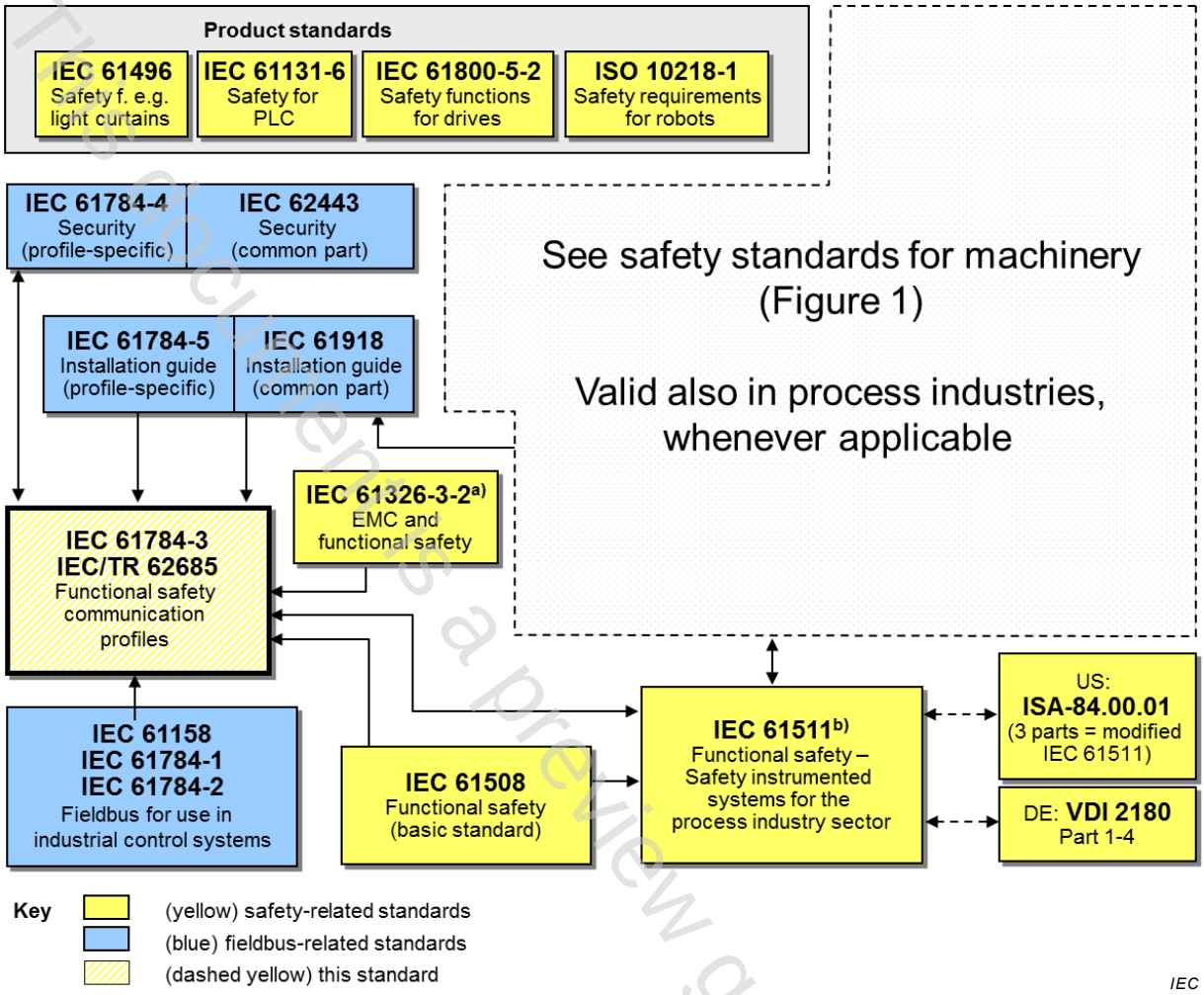
Figure 1 shows the relationships between this standard and relevant safety and fieldbus standards in a machinery environment.



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.