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I.S. EN 61784-3-12:2010

Industrial communication networks - Profiles -- Part 3-12: Functional safety fieldbuses - Additional specifications for CPF 12 (IEC 61784-3-12:2010 (EQV))

I.S. EN 61784-3-12:2010

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(IEC 61784-3-12:2010)

Réseaux de communication industriels - Partie 3-12: Bus de terrain à sécurité fonctionnelle - Spécifications complémentaires pour le CPF 12 (CEI 61784-3-12:2010)

Industrielle Kommunikationsnetze - Profile - Teil 3-12: Funktional sichere Übertragung bei Feldbussen - Zusätzliche Festlegungen für die Kommunikationsprofilfamilie 12 (IEC 61784-3-12:2010)

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

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Foreword

The text of document 65C/591A/FDIS, future edition 1 of IEC 61784-3-12, 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 was approved by CENELEC as EN 61784-3-12 on 2010-07-01.

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

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2011-04-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2013-07-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61784-3-12:2010 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 61158 series	NOTE	Harmonized in EN 61158 series (not modified).
IEC 61496 series	NOTE	Harmonized in EN 61496 series (partially modified).
IEC 61508-1:2010	NOTE	Harmonized as EN 61508-1:2010 (not modified).
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 series	NOTE	Harmonized in EN 61511 series (not modified).
IEC 61784-1	NOTE	Harmonized as EN 61784-1.
IEC 61784-5 series	NOTE	Harmonized in EN 61784-5 series (not modified).
IEC 61800-5-2	NOTE	Harmonized as EN 61800-5-2.
IEC 62061	NOTE	Harmonized as EN 62061.
ISO 10218-1	NOTE	Harmonized as EN ISO 10218-1.
ISO 12100-1	NOTE	Harmonized as EN ISO 12100-1.
ISO 13849-1	NOTE	Harmonized as EN ISO 13849-1.
ISO 13849-2	NOTE	Harmonized as EN ISO 13849-2.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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 When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60204-1	-	Safety of machinery - Electrical equipment of machines - Part 1: General requirements	EN 60204-1	-
IEC 61000-6-2	-	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments	EN 61000-6-2	-
IEC 61131-2	-	Programmable controllers - Part 2: Equipment requirements and tests	EN 61131-2	-
IEC 61158-2	-	Industrial communication networks - Fieldbus specifications - Part 2: Physical layer specification and service definition	EN 61158-2	-
IEC 61158-3-12	-	Industrial communication networks - Fieldbus specifications - Part 3-12: Data-link layer service definition - Type 12 elements	EN 61158-3-12	-
IEC 61158-4-12	-	Industrial communication networks - Fieldbus specifications - Part 4-12: Data-link layer protocol specification - Type 12 elements	EN 61158-4-12	-
IEC 61158-5-12	-	Industrial communication networks - Fieldbus specifications - Part 5-12: Application layer service definition - Type 12 elements	EN 61158-5-12	-
IEC 61158-6-12	-	Industrial communication networks - Fieldbus specifications - Part 6-12: Application layer protocol specification - Type 12 elements	EN 61158-6-12	-
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	-

Publication	Year	Title	EN/HD	Year
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
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	2010	Industrial communication networks - Profiles - Part 3: Functional safety fieldbuses - General rules and profile definitions	EN 61784-3	2010
IEC 61918	-	Industrial communication networks - Installation of communication networks in industrial premises	EN 61918	-

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

INDUSTRIAL COMMUNICATION NETWORKS – PROFILES –

Part 3-12: Functional safety fieldbuses – Additional specifications for CPF 12

FOREWORD

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International Standard IEC 61784-3-12 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial process measurement, control and automation.

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

FDIS	Report on voting
65C/591A/FDIS	65C/603/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.

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
- amended.

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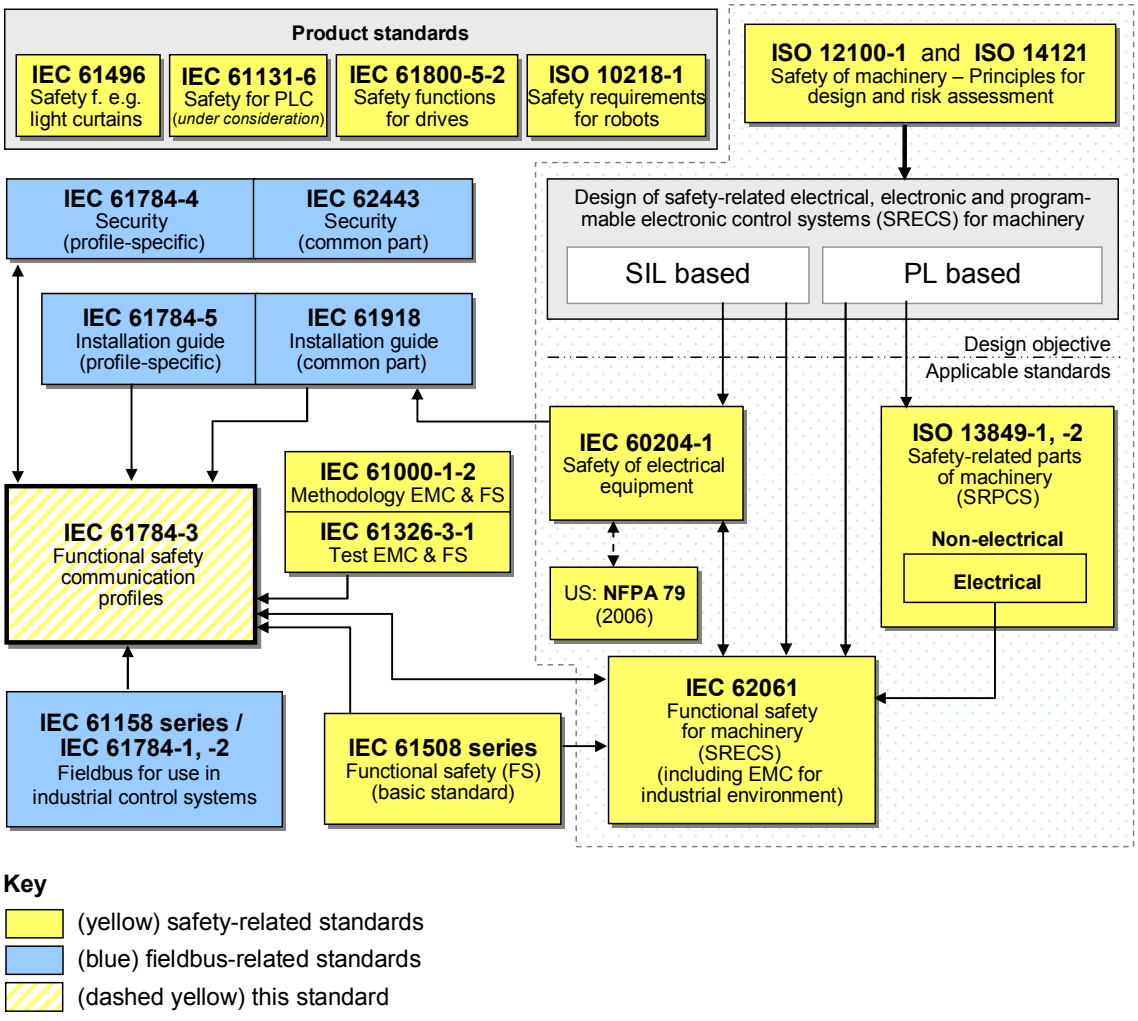
0 Introduction

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 many fieldbus enhancements are emerging, addressing not yet standardized 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.

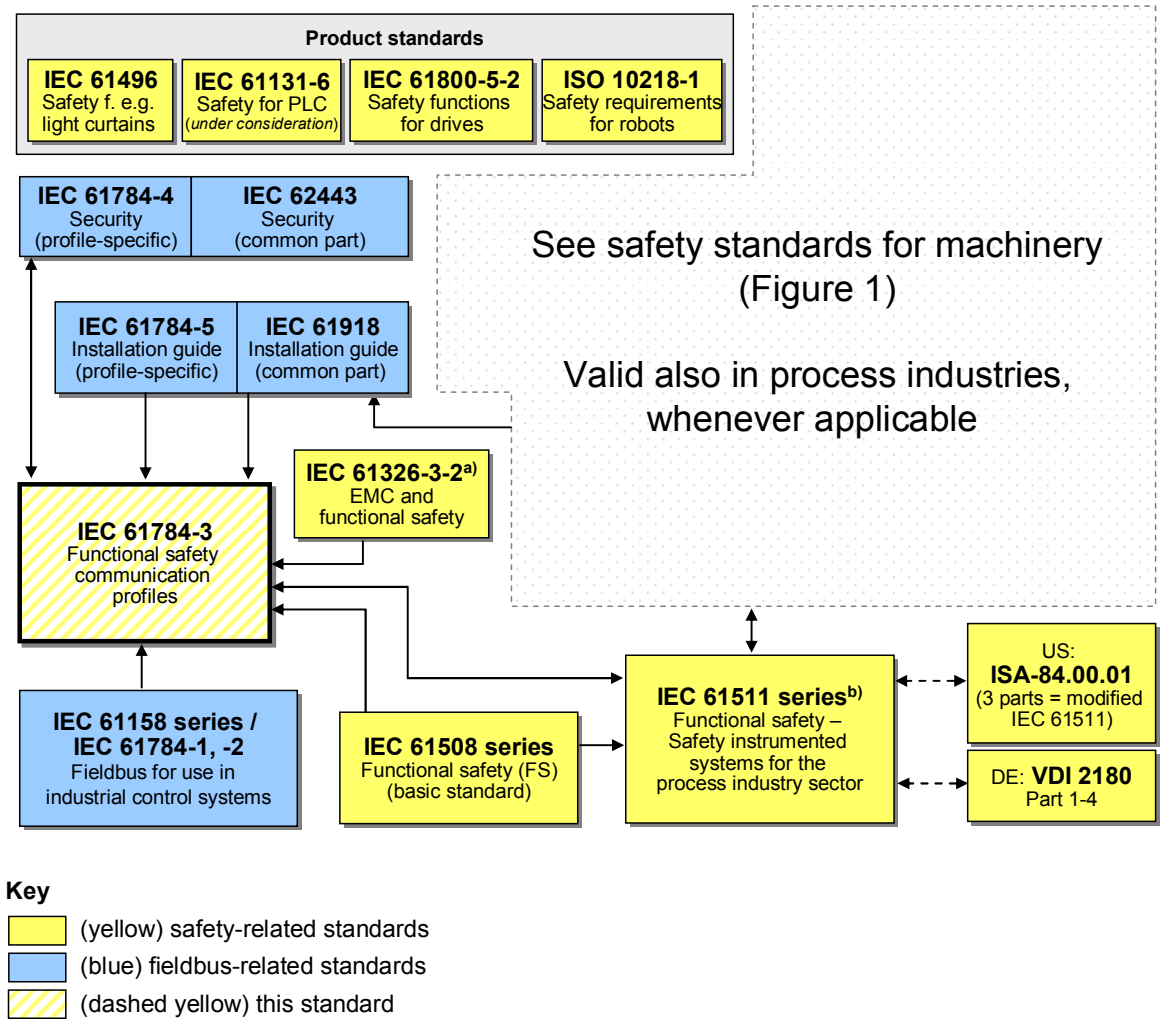
Figure 1 shows the relationships between this standard and relevant safety and fieldbus standards in a machinery environment.



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.

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 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;

— individual description of functional safety profiles for several communication profile families in IEC 61784-1 and IEC 61784-2;

— 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 12 as follows, where the [xx] notation indicates the holder of the patent right:

DE 10 2004 044 764.0	[BE]	Datenübertragungsverfahren und Automatisierungssystem zum Einsatz eines solchen Datenübertragungsverfahrens
EP 05 733 921.0	[BE]	Sicherheitssteuerung

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