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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INDUSTRIAL COMMUNICATION NETWORKS – PROFILES –

Part 3: Functional safety fieldbuses – General rules and profile definitions

FOREWORD

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This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 61784-3 edition 4.1 contains the fourth edition (2021-02) [documents 65C/1067/FDIS and 65C/1072/RVD] and its amendment 1 (2024-02) [documents 65C/1284/FDIS and 65C/1291/RVD].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

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

This fourth edition constitutes a technical revision.

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

- Contents of previous Annex F were corrected based on feedback from peer review and subsequent analysis (in particular deletion of RP_U for data integrity, reduction of the Equation for RR_A, and clarifications on the values of RP_I and R_T).
- Additional assumptions for residual error rate calculations, clarification of assumption a).
- After correction, contents of previous Annex F were exchanged with the contents of previous Subclause 5.8.
- Contents of Subclause 5.9 on security replaced by a simple reference to IEC 62443 in accordance with Guide 120.
- Changes in Annex B: Dependency of this Annex B with the BSC model has been highlighted. First two paragraphs and figure in Clause B.2 have been deleted because of little relevance. The approximation Equation (B.4) has been deleted due to obsolescence, based on the observations that the CRC shall be anyway explicitly calculated in order to prove properness, and that it may produce optimistic results. Guidance for calculation of R_{CRC} in B.4.2 has been reviewed.
- Changes in Annex D: Formula D.1 was changed from an approximation to a proper Equation, with some adjustments, and contents of D.4.3 were clarified (default safety action).
- New informative Annex H, providing additional guidance for the calculation of RCRC.

This document 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 document and its amendment 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, or
- revised.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

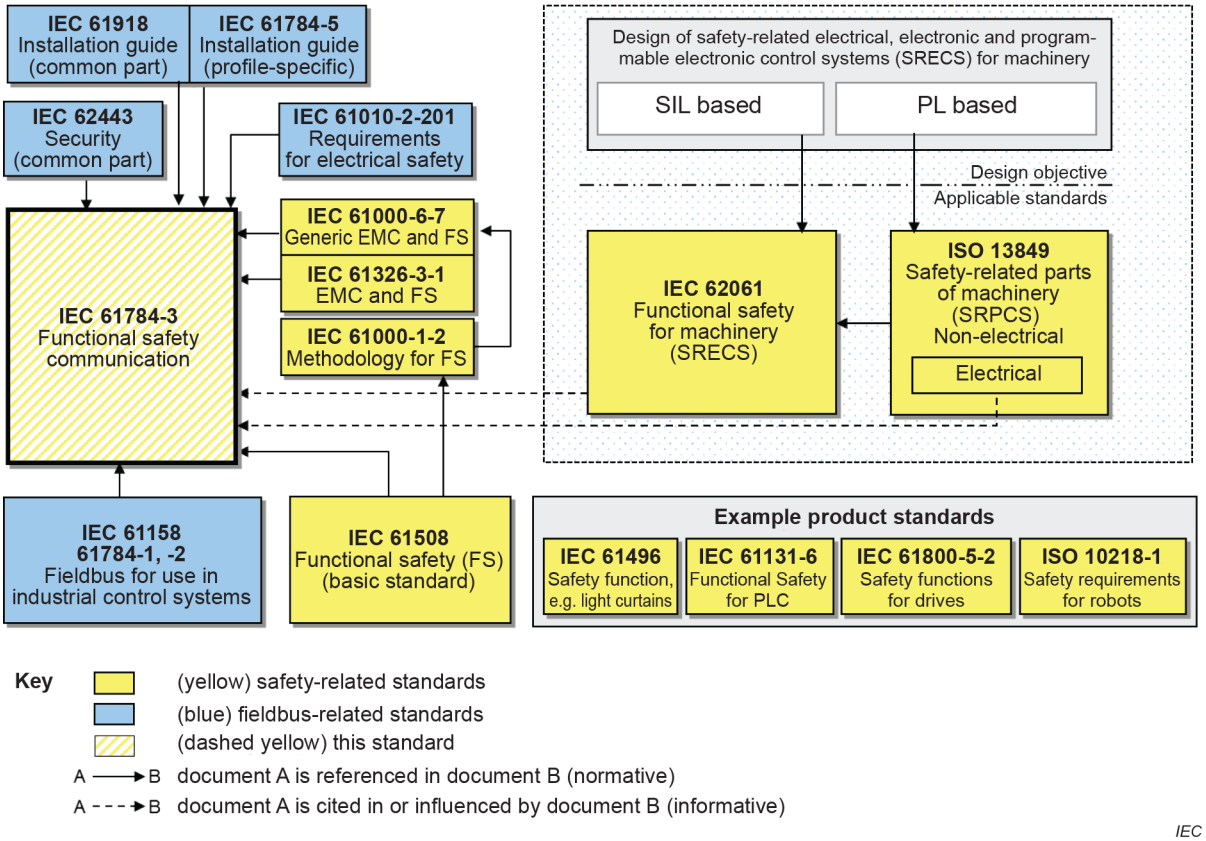
0 Introduction

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.

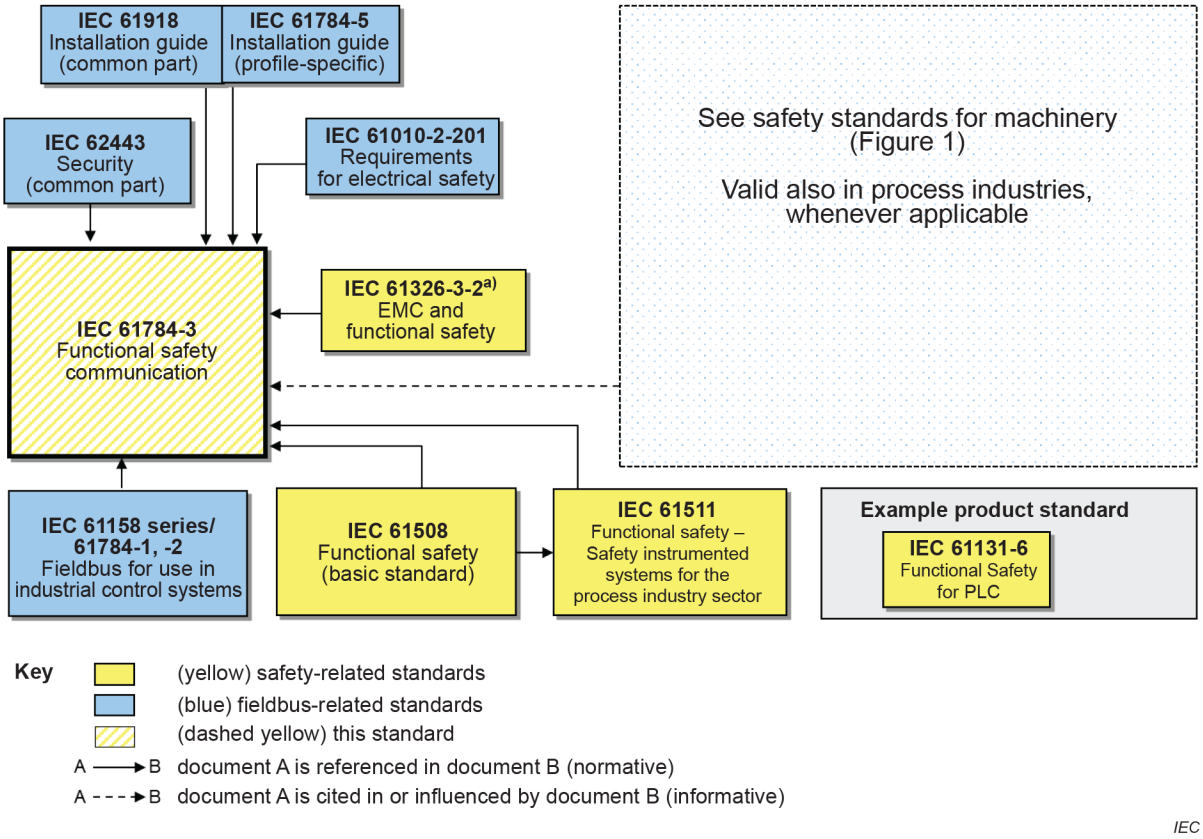
Figure 1 shows the relationships between IEC 61784-3 (all parts) and relevant safety and fieldbus standards in a machinery environment.



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:

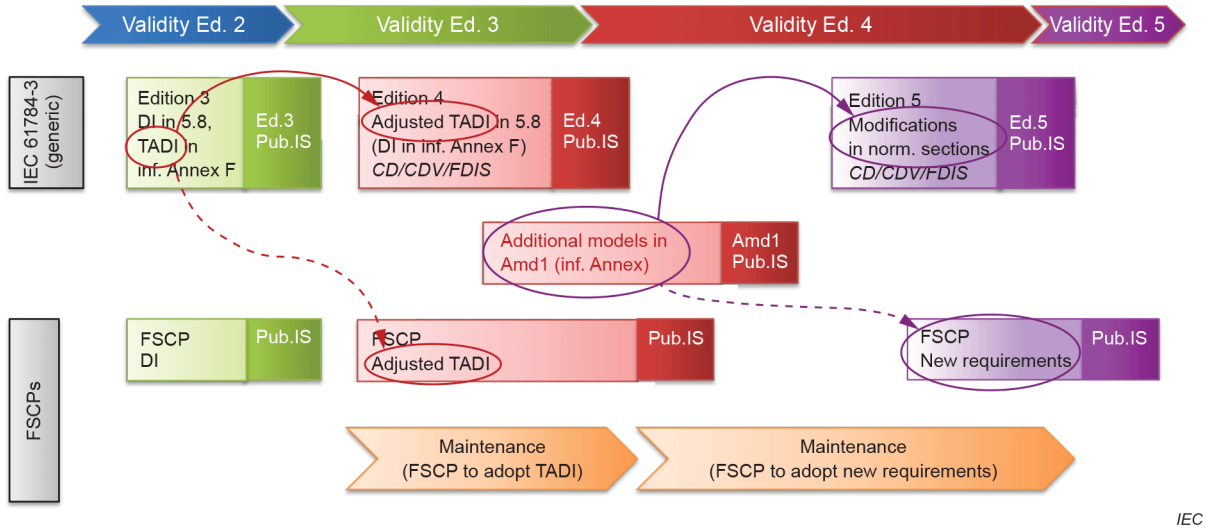
- basic principles for implementing the requirements of IEC 61508 (all parts) for safety-related data communications, including possible transmission faults, remedial measures and considerations affecting data integrity;
- functional safety communication profiles for several communication profile families 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 Use of extended assessment methods in Edition 4

This edition of the generic part of IEC 61784-3 (all parts) includes extended models for use when estimating the total residual error rate for an FSCP. This value can be used to determine if the FSCP meets the requirements of functional safety applications up to a given SIL. These extended models for qualitative and quantitative safety determination methods are detailed in Annex E and 5.8.

Upon publication of this new edition of the generic part, FSCPs shall be assessed using the methods from this Edition 4, based on the extended models specified in 5.8 (derived from a modified version of Annex F of Edition 3). The informative Annex F contains the legacy models for reference purpose only.

Figure 3 shows the transitions from original assessment methods of Edition 2 to extended assessment methods in this Edition 4 and the future Edition 5.



Key

DI Data Integrity

TADI Timeliness, Authenticity, Data Integrity

Figure 3 – Transitions from Ed. 2 to Ed. 4 and future Ed. 5 assessment methods

0.3 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 functional safety communication profiles for families 1, 2, 3, 6, 8, 12, 13, 14, 17 and 18 given in IEC 61784-3-1, IEC 61784-3-2, IEC 61784-3-3, IEC 61784-3-6, IEC 61784-3-8, IEC 61784-3-12, IEC 61784-3-13, IEC 61784-3-14, IEC 61784-3-17 and IEC 61784-3-18.

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

INTRODUCTION to Amendment 1

This Amendment 1 discusses the concepts of a comprehensive channel model for data integrity calculations for functional safety communications protocols (FSCPs) as specified in IEC 61784-3:2021. The comprehensive channel model addresses data corruption error types where multiple contiguous bits are affected by a single fault.

It also reviews typical relationships between the possible errors and the various safety measures which can be implemented.

INDUSTRIAL COMMUNICATION NETWORKS – PROFILES –

Part 3: Functional safety fieldbuses – General rules and profile definitions

1 Scope

This part of the IEC 61784-3 series explains some common principles that can be used in the transmission of safety-relevant messages among participants within a distributed network which use fieldbus technology in accordance with the requirements of IEC 61508 (all parts)[1] for functional safety. These principles are based on the black channel approach. They can be used in various industrial applications such as process control, manufacturing automation and machinery.

This part and the IEC 61784-3-x parts specify several functional safety communication profiles based on the communication profiles and protocol layers of the fieldbus technologies in IEC 61784-1, IEC 61784-2 and IEC 61158 (all parts). These functional safety communication profiles use the black channel approach, as defined in IEC 61508. These functional safety communication profiles are intended for implementation in safety devices exclusively.

NOTE 1 Other safety-related communication systems meeting the requirements of IEC 61508 (all parts) can exist that are not included in IEC 61784-3 (all parts).

NOTE 2 It does not cover electrical safety and intrinsic safety aspects. Electrical safety relates to hazards such as electrical shock. Intrinsic safety relates to hazards associated with potentially explosive atmospheres.

All systems are exposed to unauthorized access at some point of their life cycle. Additional measures need to be considered in any safety-related application to protect fieldbus systems against unauthorized access. IEC 62443 (all parts) will address many of these issues; the relationship with IEC 62443 (all parts) is detailed in a dedicated subclause of this document.

NOTE 3 Implementation of a functional safety communication profile according to this document in a device is not sufficient to qualify it as a safety device, as defined in IEC 61508 (all parts).

NOTE 4 The resulting SIL claim of a system depends on the implementation of the selected functional safety communication profile within this system.

NOTE 5 Annex C explains the numbering scheme used for the technology-specific parts (IEC 61784-3-x) as well as their common general structure.

NOTE 6 Annex D provides a guideline for the assessment and test of safety communication profiles as well as safety-related devices using these profiles.

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.

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*

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1 In the following pages of this document, “IEC 61508” will be used for “IEC 61508 (all parts)”.

IEC 61010-2-201, *Safety requirements for electrical equipment for measurement, control and laboratory use – Part 2-201: Particular requirements for control equipment*

IEC 61158 (all parts), *Industrial communication networks – Fieldbus specifications*

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*

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*

IEC 61508 (all parts), *Functional safety of electrical/electronic/programmable electronic safety-related systems*

IEC 61508-1:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 1: General requirements*

IEC 61508-2, *Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems*

IEC 61784-1, *Industrial communication networks – Profiles – Part 1: Fieldbus profiles*

IEC 61784-2, *Industrial communication networks – Profiles – Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC/IEEE 8802-3*

IEC 61784-3 (all parts), *Industrial communication networks – Profiles – Part 3: Functional safety fieldbuses*

IEC 61784-3-1, *Industrial communication networks – Profiles – Part 3-1: Functional safety fieldbuses – Additional specifications for CPF 1*

IEC 61784-3-2, *Industrial communication networks – Profiles – Part 3-2: Functional safety fieldbuses – Additional specifications for CPF 2*

IEC 61784-3-3, *Industrial communication networks – Profiles – Part 3-3: Functional safety fieldbuses – Additional specifications for CPF 3*

IEC 61784-3-6, *Industrial communication networks – Profiles – Part 3-6: Functional safety fieldbuses – Additional specifications for CPF 6*

IEC 61784-3-8, *Industrial communication networks – Profiles – Part 3-8: Functional safety fieldbuses – Additional specifications for CPF 8*

IEC 61784-3-12, *Industrial communication networks – Profiles – Part 3-12: Functional safety fieldbuses – Additional specifications for CPF 12*

IEC 61784-3-13, *Industrial communication networks – Profiles – Part 3-13: Functional safety fieldbuses – Additional specifications for CPF 13*

IEC 61784-3-14, *Industrial communication networks – Profiles – Part 3-14: Functional safety fieldbuses – Additional specifications for CPF 14*

IEC 61784-3-17, *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: Functional safety fieldbuses – Additional specifications for CPF 18*

IEC 61784-5 (all parts), *Industrial communication networks – Profiles – Part 5: Installation of fieldbuses*

IEC 61918:2018, *Industrial communication networks – Installation of communication networks in industrial premises*

IEC 62443 (all parts), *Industrial communication networks – Network and system security*

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INDUSTRIAL COMMUNICATION NETWORKS – PROFILES –

Part 3: Functional safety fieldbuses – General rules and profile definitions

FOREWORD

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This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 61784-3 edition 4.1 contains the fourth edition (2021-02) [documents 65C/1067/FDIS and 65C/1072/RVD] and its amendment 1 (2024-02) [documents 65C/1284/FDIS and 65C/1291/RVD].

This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.

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

This fourth edition constitutes a technical revision.

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

- Contents of previous Annex F were corrected based on feedback from peer review and subsequent analysis (in particular deletion of RP_U for data integrity, reduction of the Equation for RR_A, and clarifications on the values of RP_I and R_T).
- Additional assumptions for residual error rate calculations, clarification of assumption a).
- After correction, contents of previous Annex F were exchanged with the contents of previous Subclause 5.8.
- Contents of Subclause 5.9 on security replaced by a simple reference to IEC 62443 in accordance with Guide 120.
- Changes in Annex B: Dependency of this Annex B with the BSC model has been highlighted. First two paragraphs and figure in Clause B.2 have been deleted because of little relevance. The approximation Equation (B.4) has been deleted due to obsolescence, based on the observations that the CRC shall be anyway explicitly calculated in order to prove properness, and that it may produce optimistic results. Guidance for calculation of R_{CRC} in B.4.2 has been reviewed.
- Changes in Annex D: Formula D.1 was changed from an approximation to a proper Equation, with some adjustments, and contents of D.4.3 were clarified (default safety action).
- New informative Annex H, providing additional guidance for the calculation of RCRC.

This document 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 document and its amendment 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, or
- revised.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

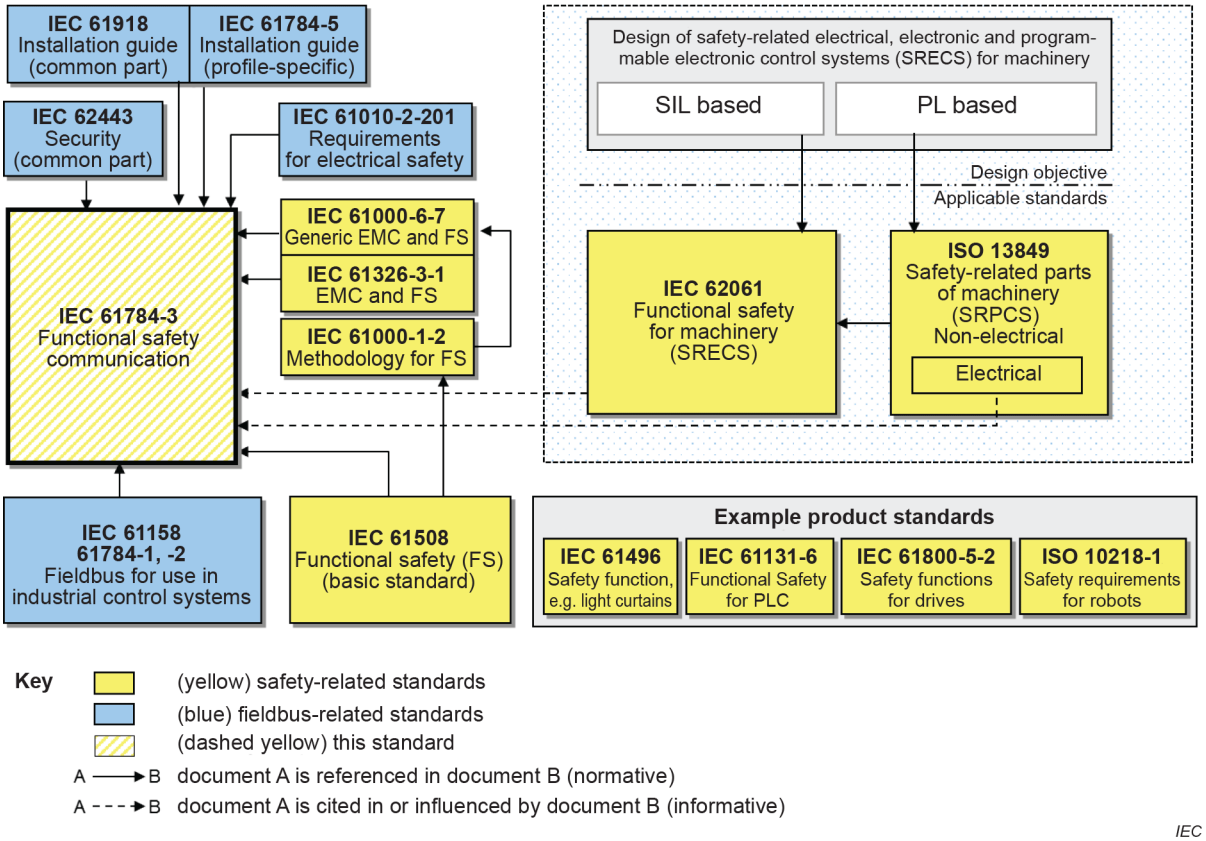
0 Introduction

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.

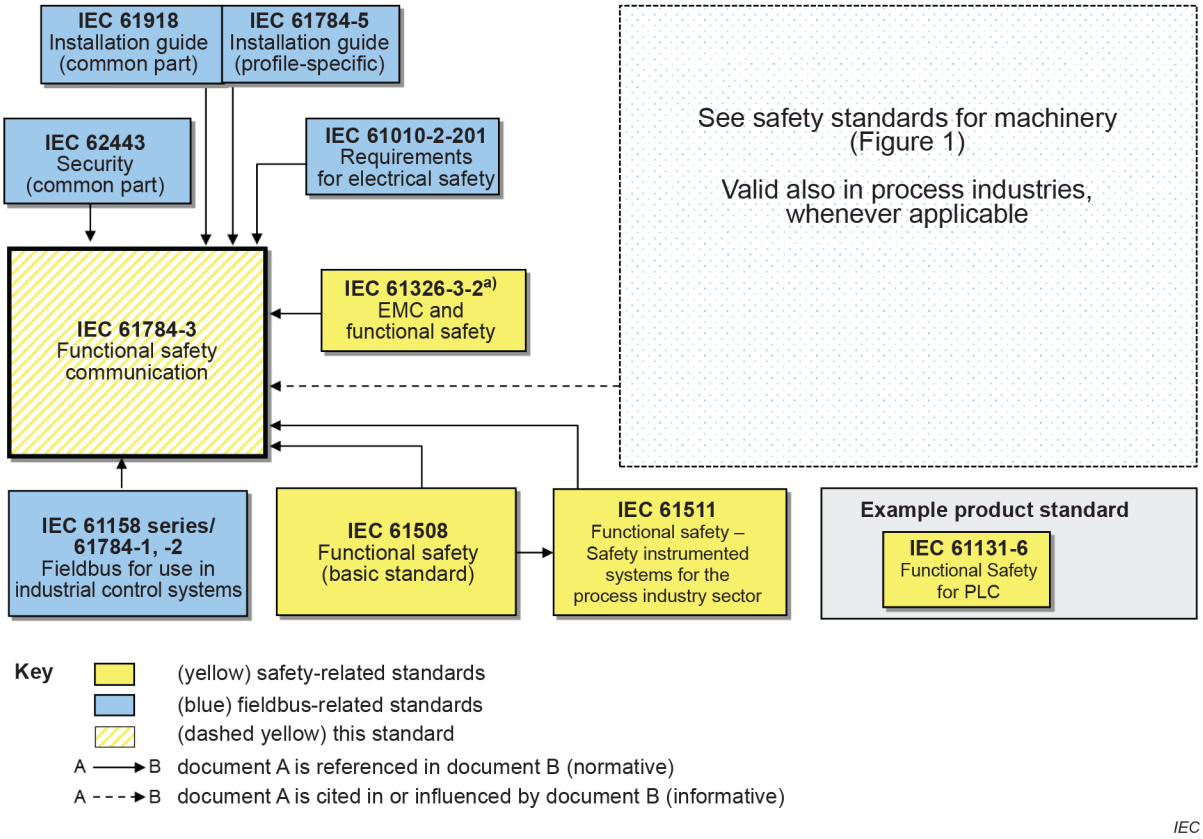
Figure 1 shows the relationships between IEC 61784-3 (all parts) and relevant safety and fieldbus standards in a machinery environment.



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:

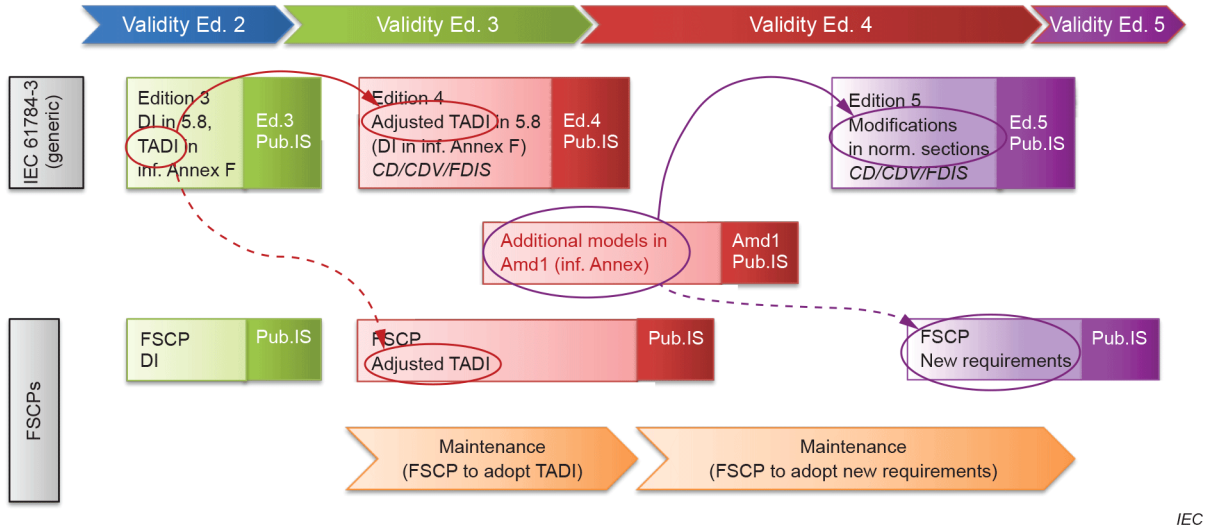
- basic principles for implementing the requirements of IEC 61508 (all parts) for safety-related data communications, including possible transmission faults, remedial measures and considerations affecting data integrity;
- functional safety communication profiles for several communication profile families 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 Use of extended assessment methods in Edition 4

This edition of the generic part of IEC 61784-3 (all parts) includes extended models for use when estimating the total residual error rate for an FSCP. This value can be used to determine if the FSCP meets the requirements of functional safety applications up to a given SIL. These extended models for qualitative and quantitative safety determination methods are detailed in Annex E and 5.8.

Upon publication of this new edition of the generic part, FSCPs shall be assessed using the methods from this Edition 4, based on the extended models specified in 5.8 (derived from a modified version of Annex F of Edition 3). The informative Annex F contains the legacy models for reference purpose only.

Figure 3 shows the transitions from original assessment methods of Edition 2 to extended assessment methods in this Edition 4 and the future Edition 5.



Key

DI Data Integrity

TADI Timeliness, Authenticity, Data Integrity

Figure 3 – Transitions from Ed. 2 to Ed. 4 and future Ed. 5 assessment methods

0.3 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 functional safety communication profiles for families 1, 2, 3, 6, 8, 12, 13, 14, 17 and 18 given in IEC 61784-3-1, IEC 61784-3-2, IEC 61784-3-3, IEC 61784-3-6, IEC 61784-3-8, IEC 61784-3-12, IEC 61784-3-13, IEC 61784-3-14, IEC 61784-3-17 and IEC 61784-3-18.

IEC takes no position concerning the evidence, validity and scope of these patent rights.

The holders of these patent rights have assured IEC that they are willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statements of the holders of these patent rights are registered with IEC. Information may be obtained from the patent database available at http://patents.iec.ch.

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

INTRODUCTION to Amendment 1

This Amendment 1 discusses the concepts of a comprehensive channel model for data integrity calculations for functional safety communications protocols (FSCPs) as specified in IEC 61784-3:2021. The comprehensive channel model addresses data corruption error types where multiple contiguous bits are affected by a single fault.

It also reviews typical relationships between the possible errors and the various safety measures which can be implemented.

INDUSTRIAL COMMUNICATION NETWORKS – PROFILES –

Part 3: Functional safety fieldbuses – General rules and profile definitions

1 Scope

This part of the IEC 61784-3 series explains some common principles that can be used in the transmission of safety-relevant messages among participants within a distributed network which use fieldbus technology in accordance with the requirements of IEC 61508 (all parts)[1] for functional safety. These principles are based on the black channel approach. They can be used in various industrial applications such as process control, manufacturing automation and machinery.

This part and the IEC 61784-3-x parts specify several functional safety communication profiles based on the communication profiles and protocol layers of the fieldbus technologies in IEC 61784-1, IEC 61784-2 and IEC 61158 (all parts). These functional safety communication profiles use the black channel approach, as defined in IEC 61508. These functional safety communication profiles are intended for implementation in safety devices exclusively.

NOTE 1 Other safety-related communication systems meeting the requirements of IEC 61508 (all parts) can exist that are not included in IEC 61784-3 (all parts).

NOTE 2 It does not cover electrical safety and intrinsic safety aspects. Electrical safety relates to hazards such as electrical shock. Intrinsic safety relates to hazards associated with potentially explosive atmospheres.

All systems are exposed to unauthorized access at some point of their life cycle. Additional measures need to be considered in any safety-related application to protect fieldbus systems against unauthorized access. IEC 62443 (all parts) will address many of these issues; the relationship with IEC 62443 (all parts) is detailed in a dedicated subclause of this document.

NOTE 3 Implementation of a functional safety communication profile according to this document in a device is not sufficient to qualify it as a safety device, as defined in IEC 61508 (all parts).

NOTE 4 The resulting SIL claim of a system depends on the implementation of the selected functional safety communication profile within this system.

NOTE 5 Annex C explains the numbering scheme used for the technology-specific parts (IEC 61784-3-x) as well as their common general structure.

NOTE 6 Annex D provides a guideline for the assessment and test of safety communication profiles as well as safety-related devices using these profiles.

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.

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*

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1 In the following pages of this document, “IEC 61508” will be used for “IEC 61508 (all parts)”.

IEC 61010-2-201, *Safety requirements for electrical equipment for measurement, control and laboratory use – Part 2-201: Particular requirements for control equipment*

IEC 61158 (all parts), *Industrial communication networks – Fieldbus specifications*

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*

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*

IEC 61508 (all parts), *Functional safety of electrical/electronic/programmable electronic safety-related systems*

IEC 61508-1:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 1: General requirements*

IEC 61508-2, *Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems*

IEC 61784-1, *Industrial communication networks – Profiles – Part 1: Fieldbus profiles*

IEC 61784-2, *Industrial communication networks – Profiles – Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC/IEEE 8802-3*

IEC 61784-3 (all parts), *Industrial communication networks – Profiles – Part 3: Functional safety fieldbuses*

IEC 61784-3-1, *Industrial communication networks – Profiles – Part 3-1: Functional safety fieldbuses – Additional specifications for CPF 1*

IEC 61784-3-2, *Industrial communication networks – Profiles – Part 3-2: Functional safety fieldbuses – Additional specifications for CPF 2*

IEC 61784-3-3, *Industrial communication networks – Profiles – Part 3-3: Functional safety fieldbuses – Additional specifications for CPF 3*

IEC 61784-3-6, *Industrial communication networks – Profiles – Part 3-6: Functional safety fieldbuses – Additional specifications for CPF 6*

IEC 61784-3-8, *Industrial communication networks – Profiles – Part 3-8: Functional safety fieldbuses – Additional specifications for CPF 8*

IEC 61784-3-12, *Industrial communication networks – Profiles – Part 3-12: Functional safety fieldbuses – Additional specifications for CPF 12*

IEC 61784-3-13, *Industrial communication networks – Profiles – Part 3-13: Functional safety fieldbuses – Additional specifications for CPF 13*

IEC 61784-3-14, *Industrial communication networks – Profiles – Part 3-14: Functional safety fieldbuses – Additional specifications for CPF 14*

IEC 61784-3-17, *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: Functional safety fieldbuses – Additional specifications for CPF 18*

IEC 61784-5 (all parts), *Industrial communication networks – Profiles – Part 5: Installation of fieldbuses*

IEC 61918:2018, *Industrial communication networks – Installation of communication networks in industrial premises*

IEC 62443 (all parts), *Industrial communication networks – Network and system security*