

**RATIFICACIÓN DE
DOCUMENTOS EUROPEOS
NOVIEMBRE 2010**HOJA DE ANUNCIO

En cumplimiento del punto 11.2.6.4 de las Reglas Internas de CEN/CENELEC Parte 2, se ha otorgado el rango de norma española al Documento Europeo siguiente:

Documento Europeo	Título	Fecha de Disponibilidad
EN 61784-3:2010	Redes de comunicación industrial. Perfiles. Parte 3: Fieldbus de seguridad funcional. Reglas generales y definiciones de perfil. (Ratificada por AENOR en noviembre de 2010.)	2010-08-13

Este anuncio causará efecto a partir del primer día del mes siguiente al de su publicación en la revista UNE. La correspondiente versión oficial de este documento se encuentra disponible en la sede de AENOR, Calle Génova 6, 28004 MADRID.

©..2010.. Derechos de reproducción reservados a los Miembros de CENELEC.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 61784-3

August 2010

ICS 25.040.40; 35.100.05

Supersedes EN 61784-3:2008

English version

**Industrial communication networks -
Profiles -
Part 3: Functional safety fieldbuses -
General rules and profile definitions
(IEC 61784-3:2010)**

Réseaux de communication industriels -
Partie 3: Bus de terrain à sécurité
fonctionnelle -
Règles générales et définitions des profils
(CEI 61784-3:2010)

Industrielle Kommunikationsnetze -
Profile -
Teil 3: Funktional sichere Übertragung bei
Feldbussen -
Allgemeine Regeln und Profilfestlegungen
(IEC 61784-3:2010)

This European Standard was approved by CENELEC on 2010-07-01. 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 Central Secretariat 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 Central Secretariat 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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

© 2010 CENELEC - All rights of exploitation in any form and by any means reserved worldwide for CENELEC members.

Ref. No. EN 61784-3:2010 E

This is a preview. Click here to purchase the full publication.

Foreword

The text of document 65C/591A/FDIS, future edition 2 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 was approved by CENELEC as EN 61784-3 on 2010-07-01.

This European Standard supersedes EN 61784-3:2008.

The main technical changes with respect to EN 61784-3:2008 are listed below:

- clarifications and additional explanations for requirements, updated references;
- updates of definitions and requirements in relation with the new edition of EN 61508;
- addition of a new informative Annex D providing an assessment guideline;
- updates in parts for CPF 1, CPF 2, CPF 3, CPF 6 (details provided in the parts);
- addition of new parts for CPF 8, CPF 12, CPF 13, CPF 14;
- in CPF parts, addition of an annex to provide information about test laboratories for testing and validating conformance of FSCP products.

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 61784-3:2010 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 60204-1	NOTE Harmonized as EN 60204-1.
IEC 61496 series	NOTE Harmonized in EN 61496 series (partially 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 61508-6:2010	NOTE Harmonized as EN 61508-6:2010 (not modified).
IEC 61511 series	NOTE Harmonized in EN 61511 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.
ISO 14121	NOTE Harmonized as EN ISO 14121.

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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61131-2	-	Programmable controllers - Part 2: Equipment requirements and tests	EN 61131-2	-
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
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 - EN 61784-1 Part 1: Fieldbus profiles	EN 61784-1	-
IEC 61784-2	-	Industrial communication networks - Profiles - EN 61784-2 Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC 8802-3	EN 61784-2	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61784-3-1	-	Industrial communication networks - Profiles - EN 61784-3-1 Part 3-1: Functional safety fieldbuses - Additional specifications for CPF 1		-
IEC 61784-3-2	-	Industrial communication networks - Profiles - EN 61784-3-2 Part 3-2: Functional safety fieldbuses - Additional specifications for CPF 2		-
IEC 61784-3-3	-	Industrial communication networks - Profiles - EN 61784-3-3 Part 3-3: Functional safety fieldbuses - Additional specifications for CPF 3		-
IEC 61784-3-6	-	Industrial communication networks - Profiles - EN 61784-3-6 Part 3-6: Functional safety fieldbuses - Additional specifications for CPF 6		-
IEC 61784-3-8	-	Industrial communication networks - Profiles - EN 61784-3-8 Part 3-8: Functional safety fieldbuses - Additional specifications for CPF 8		-
IEC 61784-3-12	-	Industrial communication networks - Profiles - EN 61784-3-12 Part 3-12: Functional safety fieldbuses - Additional specifications for CPF 12		-
IEC 61784-3-13	-	Industrial communication networks - Profiles - EN 61784-3-13 Part 3-13: Functional safety fieldbuses - Additional specifications for CPF 13		-
IEC 61784-3-14	-	Industrial communication networks - Profiles - EN 61784-3-14 Part 3-14: Functional safety fieldbuses - Additional specifications for CPF 14		-
IEC 61784-5	Series	Industrial communication networks - Profiles - EN 61784-5 Part 5: Installation of fieldbuses - Installation profiles for CPF x		Series
IEC 61918	-	Industrial communication networks - Installation of communication networks in industrial premises	EN 61918	-
IEC 62280-1	2002	Railway applications - Communication, signalling and processing systems - Part 1: Safety-related communication in closed transmission systems	-	-
IEC 62443	Series	Industrial communication networks - Network and system security	-	-

CONTENTS

FOREWORD	6
0 Introduction	8
0.1 General	8
0.2 Patent declaration	10
1 Scope	11
2 Normative references	11
3 Terms, definitions, symbols, abbreviated terms and conventions	13
3.1 Terms and definitions	13
3.1.1 Common terms and definitions	13
3.1.2 CPF 1: Additional terms and definitions	18
3.1.3 CPF 2: Additional terms and definitions	18
3.1.4 CPF 3: Additional terms and definitions	18
3.1.5 CPF 6: Additional terms and definitions	18
3.1.6 CPF 8: Additional terms and definitions	18
3.1.7 CPF 12: Additional terms and definitions	18
3.1.8 CPF 13: Additional terms and definitions	18
3.1.9 CPF 14: Additional terms and definitions	18
3.2 Symbols and abbreviated terms	19
3.2.1 Common symbols and abbreviated terms	19
3.2.2 CPF 1: Additional symbols and abbreviated terms	19
3.2.3 CPF 2: Additional symbols and abbreviated terms	19
3.2.4 CPF 3: Additional symbols and abbreviated terms	19
3.2.5 CPF 6: Additional symbols and abbreviated terms	20
3.2.6 CPF 8: Additional symbols and abbreviated terms	20
3.2.7 CPF 12: Additional symbols and abbreviated terms	20
3.2.8 CPF 13: Additional symbols and abbreviated terms	20
3.2.9 CPF 14: Additional symbols and abbreviated terms	20
4 Conformance	20
5 Basics of safety-related fieldbus systems	21
5.1 Safety function decomposition	21
5.2 Communication system	21
5.2.1 General	21
5.2.2 IEC 61158 fieldbuses	21
5.2.3 Communication channel types	22
5.2.4 Safety function response time	22
5.3 Communication errors	23
5.3.1 General	23
5.3.2 Corruption	23
5.3.3 Unintended repetition	23
5.3.4 Incorrect sequence	23
5.3.5 Loss	24
5.3.6 Unacceptable delay	24
5.3.7 Insertion	24
5.3.8 Masquerade	24
5.3.9 Addressing	24
5.4 Deterministic remedial measures	24

This is a preview. Click here to purchase the full publication.

5.4.1	General	24
5.4.2	Sequence number	25
5.4.3	Time stamp	25
5.4.4	Time expectation	25
5.4.5	Connection authentication	25
5.4.6	Feedback message	25
5.4.7	Data integrity assurance	25
5.4.8	Redundancy with cross checking	25
5.4.9	Different data integrity assurance systems	26
5.5	Relationships between errors and safety measures	26
5.6	Data integrity considerations	27
5.6.1	Calculation of the residual error rate	27
5.6.2	Residual error rate and SIL	29
5.7	Relationship between functional safety and security	29
5.8	Boundary conditions and constraints	30
5.8.1	Electrical safety	30
5.8.2	Electromagnetic compatibility (EMC)	30
5.9	Installation guidelines	30
5.10	Safety manual	30
5.11	Safety policy	30
6	Communication Profile Family 1 (FOUNDATION™ Fieldbus) – Profiles for functional safety	31
6.1	Functional Safety Communication Profile 1/1	31
6.2	Technical overview	31
7	Communication Profile Family 2 (CIP™) – Profiles for functional safety	32
7.1	Functional Safety Communication Profile 2/1	32
7.2	Technical overview	32
8	Communication Profile Family 3 (PROFIBUS™, PROFINET™) – Profiles for functional safety	34
8.1	Functional Safety Communication Profile 3/1	34
8.2	Technical overview	34
9	Communication Profile Family 6 (INTERBUS®) – Profiles for functional safety	36
9.1	Functional Safety Communication Profile 6/7	36
9.2	Technical overview	37
10	Communication Profile Family 8 (CC-Link™) – Profiles for functional safety	38
10.1	Functional Safety Communication Profile 8/1	38
10.2	Technical overview	38
11	Communication Profile Family 12 (EtherCAT™) – Profiles for functional safety	39
11.1	Functional Safety Communication Profile 12/1	39
11.2	Technical overview	39
12	Communication Profile Family 13 (Ethernet POWERLINK™) – Profiles for functional safety	40
12.1	Functional Safety Communication Profile 13/1	40
12.2	Technical overview	40
13	Communication Profile Family 14 (EPA®) – Profiles for functional safety	41
13.1	Functional Safety Communication Profile 14/1	41
13.2	Technical overview	42
	Annex A (informative) Example functional safety communication models	43