



SLOVENSKI STANDARD SIST EN 61784-2:2015

01-marec-2015

Industrijska komunikacijska omrežja - Profili - 2. del: Dodatni profili procesnih vodil za omrežja, ki delujejo v realnem času po ISO/IEC 8802-3 (IEC 61784-2:2014)

Industrial communication networks - Profiles - Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC 8802-3 (IEC 61784-2:2014)

Industrielle Kommunikationsnetze - Profile - Teil 2: Zusätzliche Feldbusprofile für Echtzeitnetzwerke basierend auf ISO/IEC 8802-3 (IEC 61784-2:2014)

Réseaux de communication industriels - Profils - Partie 2: Profils de bus de terrain supplémentaires pour les réseaux en temps réel basés sur l'ISO/CEI 8802-3 (CEI 61784-2:2014)

<https://standards.iteh.ai/catalog/standards/sist/a6a9dfb5-dba5-4e61-8ea2-a0beb87c6c93/sist-en-61784-2-2015>

Ta slovenski standard je istoveten z: EN 61784-2:2014

ICS:

25.040.40	Merjenje in krmiljenje industrijskih postopkov	Industrial process measurement and control
35.100.05	Večslojne uporabniške rešitve	Multilayer applications

SIST EN 61784-2:2015

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 61784-2:2015

<https://standards.iteh.ai/catalog/standards/sist/a6a9dfb5-dba5-4e61-8ea2-a0beb87c6c93/sist-en-61784-2-2015>

EUROPEAN STANDARD

EN 61784-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2014

ICS 35.100.20; 35.240.50

Supersedes EN 61784-2:2010

English Version

Industrial communication networks - Profiles - Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC 8802-3 (IEC 61784-2:2014)

Réseaux de communication industriels - Profils - Partie 2:
Profils de bus de terrain supplémentaires pour les réseaux
en temps réel basés sur l'ISO/CEI 8802-3
(CEI 61784-2:2014)

Industrielle Kommunikationsnetze - Profile - Teil 2:
Zusätzliche Feldbusprofile für Echtzeitnetzwerke basierend
auf ISO/IEC 8802-3
(IEC 61784-2:2014)

This European Standard was approved by CENELEC on 2014-08-21. 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.

SIST EN 61784-2:2015

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

Foreword

The text of document 65C/761/FDIS, future edition 3 of IEC 61784-2, 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 61784-2:2014.

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) 2015-05-21
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2017-08-21

This document supersedes EN 61784-2:2010.

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.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Endorsement notice

[SIST EN 61784-2:2015](https://standards.iteh.ai/catalog/standards/sist/a6a9dfb5-dba5-4e61-8ea2-a0beb87c6c93/sist-en-61784-2-2015)

[https://standards.iteh.ai/catalog/standards/sist/a6a9dfb5-dba5-4e61-8ea2-](https://standards.iteh.ai/catalog/standards/sist/a6a9dfb5-dba5-4e61-8ea2-a0beb87c6c93/sist-en-61784-2-2015)

[a0beb87c6c93/sist-en-61784-2-2015](https://standards.iteh.ai/catalog/standards/sist/a6a9dfb5-dba5-4e61-8ea2-a0beb87c6c93/sist-en-61784-2-2015)

The text of the International Standard IEC 61784-2:2014 was approved by CENELEC as a European Standard without any modification.

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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61010	series	Safety requirements for electrical equipment for measurement, control and laboratory use	EN 61010	series
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 61158-1	2014	Industrial communication networks - Fieldbus specifications - Part 1: Overview and guidance for the IEC 61158 and IEC 61784 series	EN 61158-1	2014
IEC 61158-2	2014	Industrial communication networks - Fieldbus specifications - Part 2: Physical layer specification and service definition	EN 61158-2	2014
IEC 61158-3-2	2014	Industrial communication networks - Fieldbus specifications - Part 3-2: Data-link layer service definition - Type 2 elements	EN 61158-3-2	2014
IEC 61158-3-4	2014	Industrial communication networks - Fieldbus specifications - Part 3-4: Data-link layer service definition - Type 4 elements	EN 61158-3-4	2014
IEC 61158-3-11	2007	Industrial communication networks - Fieldbus specifications - Part 3-11: Data-link layer service definition - Type 11 elements	EN 61158-3-11	2008
IEC 61158-3-12	2014	Industrial communication networks - Fieldbus specifications - Part 3-12: Data-link layer service definition - Type 12 elements	EN 61158-3-12	2014

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61158-3-13	2014	Industrial communication networks - Fieldbus specifications - Part 3-13: Data link layer service definition - Type 13 elements	EN 61158-3-13	2014
IEC 61158-3-14	2014	Industrial communication networks - Fieldbus specifications - Part 3-14: Data-link layer service definition - Type 14 elements	EN 61158-3-14	2014
IEC 61158-3-17	2007	Industrial communication networks - Fieldbus specifications - Part 3-17: Data-link layer service definition - Type 17 elements	EN 61158-3-17	2008
IEC 61158-3-19	2014	Industrial communication networks - Fieldbus specifications - Part 3-19: Data-link layer service definition - Type 19 elements	EN 61158-3-19	2014
IEC 61158-3-21	2010	Industrial communication networks - Fieldbus specifications - Part 3-21: Data-link layer service definition - Type 21 elements	EN 61158-3-21	2012
IEC 61158-3-22	2014	Industrial communication networks - Fieldbus specifications - Part 3-22: Data-link layer service definition - Type 22 elements	EN 61158-3-22	2014
IEC 61158-4-2	2014	Industrial communication networks - Fieldbus specifications - Part 4-2: Data-link layer protocol specification - Type 2 elements	EN 61158-4-2	1)
IEC 61158-4-4	2014	Industrial communication networks - Fieldbus specifications - Part 4-4: Data-link layer protocol specification - Type 4 elements	EN 61158-4-4	1)
IEC 61158-4-11	2014	Industrial communication networks - Fieldbus specifications - Part 4-11: Data-link layer protocol specification - Type 11 elements	EN 61158-4-11	1)
IEC 61158-4-12	2014	Industrial communication networks - Fieldbus specifications - Part 4-12: Data-link layer protocol specification - Type 12 elements	EN 61158-4-12	1)
IEC 61158-4-13	2014	Industrial communication networks - Fieldbus specifications - Part 4-13: Data-link layer protocol specification - Type 13 elements	EN 61158-4-13	1)
IEC 61158-4-14	2014	Industrial communication networks - Fieldbus specifications - Part 4-14: Data-link layer protocol specification - Type 14 elements	EN 61158-4-14	1)

1) To be published.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61158-4-17	2007	Industrial communication networks - Fieldbus specifications - Part 4-17: Data-link layer protocol specification - Type 17 elements	EN 61158-4-17	2008
IEC 61158-4-19	2014	Industrial communication networks - Fieldbus specifications - Part 4-19: Data-link layer protocol specification - Type 19 elements	EN 61158-4-19	1)
IEC 61158-4-21	2010	Industrial communication networks - Fieldbus specifications - Part 4-21: Data-link layer protocol specification - Type 21 elements	EN 61158-4-21	2012
IEC 61158-4-22	2014	Industrial communication networks - Fieldbus specifications - Part 4-22: Data-link layer protocol specification - Type 22 elements	EN 61158-4-22	1)
IEC 61158-5-2	2014	Industrial communication networks - Fieldbus specifications - Part 5-2: Application layer service definition - Type 2 elements	EN 61158-5-2	2014
IEC 61158-5-4	2014	Industrial communication networks - Fieldbus specifications - Part 5-4: Application layer service definition - Type 4 elements	EN 61158-5-4	2014
IEC 61158-5-10	2014	Industrial communication networks - Fieldbus specifications - Part 5-10: Application layer service definition - Type 10 elements	EN 61158-5-10	2014
IEC 61158-5-11	2007	Industrial communication networks - Fieldbus specifications - Part 5-11: Application layer service definition - Type 11 elements	EN 61158-5-11	2008
IEC 61158-5-12	2014	Industrial communication networks - Fieldbus specifications - Part 5-12: Application layer service definition - Type 12 elements	EN 61158-5-12	2014
IEC 61158-5-13	2014	Industrial communication networks - Fieldbus specifications - Part 5-13: Application layer service definition - Type 13 elements	EN 61158-5-13	2014
IEC 61158-5-14	2014	Industrial communication networks - Fieldbus specifications - Part 5-14: Application layer service definition - Type 14 elements	EN 61158-5-14	2014
IEC 61158-5-15	2010	Industrial communication networks - Fieldbus specifications - Part 5-15: Application layer service definition - Type 15 elements	EN 61158-5-15	2012
IEC 61158-5-17	2007	Industrial communication networks - Fieldbus specifications - Part 5-17: Application layer service definition - Type 17 elements	EN 61158-5-17	2008

iTeh STANDARD PREVIEW
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist-en-61784-2-2015/a0beb87c6c93/sist-en-61784-2-2015>

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61158-6-19	2014	Industrial communication networks - Fieldbus specifications - Part 6-19: Application layer protocol specification - Type 19 elements	EN 61158-6-19	1)
IEC 61158-6-21	2010	Industrial communication networks - Fieldbus specifications - Part 6-21: Application layer protocol specification - Type 21 elements	EN 61158-6-21	2012
IEC 61158-6-22	2014	Industrial communication networks - Fieldbus specifications - Part 6-22: Application layer protocol specification - Type 22 elements	EN 61158-6-22	1)
IEC 61158-6-23	2014	Industrial communication networks - Fieldbus specifications - Part 6-23: Application layer protocol specification - Type 23 elements	EN 61158-6-23	1)
IEC 61588	2009	Precision clock synchronization protocol for networked measurement and control systems	-	-
IEC 61784-1	2014	Industrial communication networks - Profiles - Part 1: Fieldbus profiles	EN 61784-1	1)
IEC 61784-5-2	2013	Industrial communication networks - Profiles - Part 5-2: Installation of fieldbuses - Installation profiles for CPF 2	EN 61784-5-2	2013
IEC 61784-5-3	2013	Industrial communication networks - Profiles - Part 5-3: Installation of fieldbuses - Installation profiles for CPF 3	EN 61784-5-3	2013
IEC 61784-5-6	2013	Industrial communication networks - Profiles - Part 5-6: Installation of fieldbuses - Installation profiles for CPF 6	EN 61784-5-6	2013
IEC 61784-5-8	2013	Industrial communication networks - Profiles - Part 5-8: Installation of fieldbuses - Installation profiles for CPF 8	EN 61784-5-8	2013
IEC 61784-5-11	2013	Industrial communication networks - Profiles - Part 5-11: Installation of fieldbuses - Installation profiles for CPF 11	EN 61784-5-11	2013
IEC 61800	series	Adjustable speed electrical power drive systems	EN 61800	series
IEC 61918 (mod)	2013	Industrial communication networks - Installation of communication networks in industrial premises	EN 61918 + AC	2013 2014
ISO/IEC 2382-16	1996	Information technology - Vocabulary - Part 16: Information theory	-	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO/IEC 7498-1	-	Information technology - Open Systems Interconnection - Basic Reference Model: The Basic Model	-	-
ISO/IEC 8802-2	-	Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 2: Logical link control	-	-
ISO/IEC 8802-3	2000	Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications	-	-
ISO/IEC/IEEE 8802-11	-	Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 11: Wireless LAN medium access control (MAC) and physical layer (PHY) specifications	-	-
ISO/IEC 11801 + A1 + A2	2002 2008 2010	Information technology - Generic cabling for customer premises	- - -	- - -
ISO 15745-3	-	Industrial automation systems and integration - Open systems application integration framework - Part 3: Reference description for IEC 61158 based control systems	-	-
ISO 15745-4 + A1	2003 2006	Industrial automation systems and integration - Open systems application integration framework - Part 4: Reference description for Ethernet-based control systems	- -	- -
IEEE Std 802	2001	IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture	-	-
IEEE 802.1AB	-	IEEE Standard for Local and Metropolitan Area Networks - Station and Media Access Control Connectivity Discovery	-	-
IEEE 802.1AS	2011	IEEE Standard for Local and Metropolitan Area Networks - Timing and Synchronization for Time-Sensitive Applications in Bridged Local Area Networks	-	-

iTeh STANDARDS PREVIEW
(standards.itih.ai)

<https://standards.itih.ai/catalog/standards/sist/a6a9dfb5-dba5-4e61-8ea2-a0beb87c6c93/sist-en-61784-2-2015>

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEEE 802.1D	2004	IEEE Standard for Local and Metropolitan Area Networks - Media Access Control (MAC) Bridges	-	-
IEEE 802.1Q	2011	IEEE Standard for Local and metropolitan area networks - Media Access Control (MAC) Bridges and Virtual Bridged Local Area Networks	-	-
IEEE 802.3	2008	IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications	-	-
IEEE 802.11	2007	IEEE Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications	-	-
IEEE Std 802.15.1	-	IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 15.1: Wireless medium access control (MAC) and physical layer (PHY) specifications for wireless personal area networks (WPANs)	-	-
IETF RFC 768	-	User Datagram Protocol	-	-
IETF RFC 791	-	Internet Protocol	-	-
IETF RFC 792	-	Internet Control Message Protocol	-	-
IETF RFC 793	-	Transmission Control Protocol	-	-
IETF RFC 826	-	Ethernet Address Resolution Protocol - or - Converting Network Protocol Addresses to 48.bit Ethernet Address for Transmission on Ethernet Hardware	-	-
IETF RFC 894	-	A Standard for the Transmission of IP Datagrams over Ethernet Networks	-	-
IETF RFC 1034	-	Domain names - concepts and facilities	-	-
IETF RFC 1112	-	Host Extensions for IP Multicasting	-	-
IETF RFC 1122	-	Requirements for Internet Hosts - Communication Layers	-	-
IETF RFC 1123	-	Requirements for Internet Hosts - Application and Support	-	-
IETF RFC 1127	-	Perspective on the Host Requirements RFCs	-	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IETF RFC 1157	-	Simple Network Management Protocol (SNMP)	-	-
IETF RFC 1213	-	Management Information Base for Network Management of TCP/IP-based Internets: MIB-II	-	-
IETF RFC 1305	-	Network Time Protocol (Version 3) Specification, Implementation and Analysis	-	-
IETF RFC 2131	-	Dynamic Host Configuration Protocol	-	-
IETF RFC 2236	-	Internet Group Management Protocol, Version 2	-	-
IETF RFC 2544	-	Benchmarking Methodology for Network Interconnect Devices	-	-
IETF RFC 2988	-	Computing TCP's Retransmission Timer	-	-
IETF RFC 4836	-	Definitions of Managed Objects for IEEE 802.3 Medium Attachment Units (MAUs)	-	-
OSF CAE Specification C706	-	Technical Standard DCE1.1: Remote Procedure Call	-	-

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 61784-2:2015](#)

<https://standards.iteh.ai/catalog/standards/sist/a6a9dfb5-dba5-4e61-8ea2-a0beb87c6c93/sist-en-61784-2-2015>



IEC 61784-2

Edition 3.0 2014-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE



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

**Réseaux de communication industriels – Profils –
Partie 2: Profils de bus de terrain supplémentaires pour les réseaux en temps
réel basés sur l'ISO/CEI 8802-3**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE **XH**
CODE PRIX

ICS 35.100.20; 35.240.50

ISBN 978-2-8322-1707-8

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	14
INTRODUCTION.....	17
1 Scope.....	18
2 Normative references	18
3 Terms, definitions, abbreviated terms, acronyms, and conventions.....	23
3.1 Terms and definitions.....	23
3.2 Abbreviated terms and acronyms	27
3.3 Symbols.....	29
3.3.1 CPF 2 symbols	29
3.3.2 CPF 3 symbols	30
3.3.3 CPF 4 symbols	31
3.3.4 CPF 6 symbols	31
3.3.5 CPF 10 symbols	32
3.3.6 CPF 11 symbols	32
3.3.7 CPF 12 symbols	33
3.3.8 CPF 13 symbols	33
3.3.9 CPF 14 symbols	34
3.3.10 CPF 15 symbols	34
3.3.11 CPF 16 symbols.....	35
3.3.12 CPF 17 symbols	35
3.3.13 CPF 18 symbols.....	36
3.4 Conventions.....	37
3.4.1 Conventions common to all layers.....	37
3.4.2 Physical layer	38
3.4.3 Data-link layer	38
3.4.4 Application layer.....	39
4 Conformance to communication profiles	39
5 RTE performance indicators	40
5.1 Basic principles of performance indicators	40
5.2 Application requirements.....	41
5.3 Performance indicators	41
5.3.1 Delivery time	41
5.3.2 Number of RTE end-stations.....	42
5.3.3 Basic network topology.....	42
5.3.4 Number of switches between RTE end-stations	42
5.3.5 Throughput RTE	42
5.3.6 Non-RTE bandwidth.....	42
5.3.7 Time synchronization accuracy.....	43
5.3.8 Non-time-based synchronization accuracy.....	43
5.3.9 Redundancy recovery time	43
6 Conformance tests	43
6.1 Concept	43
6.2 Methodology	44
6.3 Test conditions and test cases	44
6.4 Test procedure and measuring.....	44
6.5 Test report.....	45

7	Communication Profile Family 2 (CIP™) – RTE communication profiles	45
7.1	General overview	45
7.2	Profile 2/2	46
7.2.1	Physical layer	46
7.2.2	Data-link layer	46
7.2.3	Application layer	46
7.2.4	Performance indicator selection	46
7.3	Profile 2/2.1	50
7.3.1	Physical layer	50
7.3.2	Data-link layer	50
7.3.3	Application layer	52
7.3.4	Performance indicator selection	54
8	Communication Profile Family 3 (PROFIBUS & PROFINET) – RTE communication profiles	55
8.1	General overview	55
8.1.1	CPF 3 overview	55
8.1.2	Administrative numbers	55
8.1.3	Node Classes	56
8.1.4	Timing parameters	57
8.1.5	Communication classes	60
8.1.6	Media redundancy classes	63
8.1.7	Media classes	63
8.1.8	Application classes	64
8.1.9	Records	67
8.1.10	Communication feature list	73
8.1.11	Conformance class behaviors	74
8.2	Profile 3/4	78
8.2.1	Physical layer	78
8.2.2	Data link layer	78
8.2.3	Application layer	79
8.2.4	Performance indicator selection	86
8.3	Profile 3/5	93
8.3.1	Physical layer	93
8.3.2	Data link layer	93
8.3.3	Application layer	93
8.3.4	Performance indicator selection	100
8.4	Profile 3/6	102
8.4.1	Physical layer	102
8.4.2	Data link layer	102
8.4.3	Application layer	102
8.4.4	Performance indicator selection	109
9	Communication Profile Family 4 (P-NET) – RTE communication profiles	114
9.1	General overview	114
9.2	Profile 4/3, P-NET on IP	115
9.2.1	Physical layer	115
9.2.2	Data-link layer	115
9.2.3	Application layer	116
9.2.4	Performance indicator selection	117
10	Communication Profile Family 6 (INTERBUS®) – RTE communication profiles	120