ICS 35.100.20, 35.240.50 SLOVENSKÁ TECHNICKÁ NORMA Júl 2023

STN	**Priemyselné siete Profily Časť 2-3: Doplnkové profily prevádzkových zberníc pre siete v reálnom čase založené na ISO/IEC/IEEE 8802-3 Rad komunikačných profilov CPF 3**	**STN EN IEC 61784-2-3** 18 4020

Industrial networks - Profiles - Part 2-3: Additional real-time fieldbus profiles based on ISO/IEC/IEEE 8802-3 - CPF 3

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 06/23

Táto norma čiastočne nahrádza normu STN EN IEC 61784-2 z októbra 2019. Súbežná platnosť do 3. 5. 2026

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NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 61784-2-3

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English Version

Industrial networks - Profiles - Part 2-3: Additional real-time fieldbus profiles based on ISO/IEC/IEEE 8802-3 - CPF 3 (IEC 61784-2-3:2023)

Réseaux industriels - Profils - Partie 2-3: Profils de bus de terrain supplémentaires pour les réseaux en temps réel fondés sur l'ISO/IEC/IEEE 8802-3 - CPF 3
(IEC 61784-2-3:2023)

Industrielle Kommunikationsnetze - Profile - Teil 2-3: Zusätzliche Feldbusprofile für Echtzeitnetzwerke basierend auf ISO/IEC/IEEE 8802-3 - Kommunikationsprofilfamilie (CPF) 3
(IEC 61784-2-3:2023)

This European Standard was approved by CENELEC on 2023-05-03. 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.

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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 65C/1209/FDIS, future edition 1 of IEC 61784-2-3, 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 61784-2-3:2023.

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) 2024-02-03
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2026-05-03

This document, together with other parts of the same series, partially supersedes EN IEC 61784-2:2019 and all of its amendments and corrigenda (if any).

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

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Endorsement notice

The text of the International Standard IEC 61784-2-3:2023 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 standard indicated:

IEC 61158-1	NOTE Approved as EN IEC 61158-1
IEC 61158-2	NOTE Approved as EN IEC 61158-2
IEC 61158-3-3	NOTE Approved as EN 61158-3-3
IEC 61158-4-3	NOTE Approved as EN IEC 61158-4-3
IEC 61158-5-3	NOTE Approved as EN 61158-5-3
IEC 61158-6-3	NOTE Approved as EN IEC 61158-6-3
IEC 61784-1 (series)	NOTE Approved as EN IEC 61784-1 (series)
IEC 61784-1-0	NOTE Approved as EN IEC 61784-1-0
IEC 61784-2 (series)	NOTE Approved as EN IEC 61784-2 (series)
IEC 61918	NOTE Approved as EN IEC 61918

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where 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.cencenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 61158	series	Industrial communication networks - Fieldbus specifications	EN IEC 61158	series
IEC 61158-5-10	2023	Industrial communication networks - Fieldbus specifications - Part 5-10: Application layer service definition - Type 10 elements	EN IEC 61158-5-10	2023
IEC 61158-6-10	2023	Industrial communication networks - Fieldbus specifications - Part 6-10: Application layer protocol specification - Type 10 elements	EN IEC 61158-6-10	2023
IEC 61784-1-3	2023	Industrial networks - Profiles - Part 1-3: Fieldbus profiles - Communication Profile Family 3	EN IEC 61784-1-3	2023
IEC 61784-2-0	2023	Industrial networks - Profiles - Part 2-0: Additional real-time fieldbus profiles based on ISO/IEC/IEEE 8802-3 - General concepts and terminology	EN IEC 61784-2-0	2023
IEC 61784-3-3	2021	Industrial communication networks - Profiles - Part 3-3: Functional safety fieldbuses - Additional specifications for CPF 3	EN IEC 61784-3-3	2021
IEC 61784-5-3	2018	Industrial communication networks - Profiles - Part 5-3: Installation of fieldbuses - Installation profiles for CPF 3	EN IEC 61784-5-3	2018
IEC 62439-2	2021	Industrial communication networks - High availability automation networks - Part 2: Media Redundancy Protocol (MRP)	EN IEC 62439-2	2022
ISO/IEC/IEEE 8802-3	--	Telecommunications and exchange between information technology systems - Requirements for local and metropolitan area networks - Standard for Ethernet	-	-

ISO/IEC 9834-8	2014	Information technology - Procedures for the operation of object identifier registration authorities - Part 8: Generation of universally unique identifiers (UUIDs) and their use in object identifiers	-	-
ISO 15745-4/AMD1	2003/ 2006	Industrial automation systems and integration - Open systems application integration framework - Part 4: Reference description for Ethernet-based control systems - Amendment 1: PROFINET profiles	-	-
IEEE Std 802	2014	IEEE Standard for Local and metropolitan area networks: Overview and Architecture	-	-
IEEE Std 802.1AB	2016	IEEE Standard for Local and metropolitan area networks: Station and Media Access Control Connectivity Discovery	-	-
IEEE Std 802.1AS	2020	IEEE standard for Local and metropolitan area networks - Timing and Synchronization for Time-Sensitive Applications	-	-
IEEE 802.1CB	2017	IEEE Standard for Local and metropolitan area networks - Frame Replication and Elimination for Reliability	-	-
IEEE Std 802.1Q	2018	IEEE Standard for Local and metropolitan area networks - Media Access Control (MAC) Bridges and Bridged Networks	-	-
IEEE Std 802.3	2018	IEEE Standard for Ethernet	-	-
IEEE Std 802.11	2020	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 802.11n	2009	IEEE Standard for Information technology - Local and metropolitan area networks - Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC)and Physical Layer (PHY) Specifications Amendment 5: Enhancements for Higher Throughput	-	-
IEEE Std 802.15.1	2005	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	1980	User Datagram Protocol	-	-
IETF RFC 791	1981	Internet Protocol	-	-
IETF RFC 792	1981	Internet Control Message Protocol	-	-
IETF RFC 793	1981	Transmission Control Protocol	-	-

IETF RFC 826	1982	Ethernet Address Resolution Protocol: Or Converting Network Protocol Addresses to 48.bit Ethernet Address for Transmission on Ethernet Hardware	-	-
IETF RFC 1034	1987	Domain names - concepts and facilities	-	-
IETF RFC 1157	1990	Simple Network Management Protocol (SNMP)	-	-
IETF RFC 1213	1991	Management Information Base for Network Management of TCP/IP-based Internets: MIB-II	-	-
IETF RFC 2131	1997	Dynamic Host Configuration Protocol	-	-
IETF RFC 4836	2007	Definitions of Managed Objects for IEEE 802.3 Medium Attachment Units (MAUs)	-	-
The Open Group - Publication C706	-	Technical Standard DCE1.1: Remote Procedure Call	-	-
Metro Ethernet Forum – MEF 10.4	2018	Subscriber Ethernet Service Attributes	-	-

IEC 61784-2-3

Edition 1.0 2023-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

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

Réseaux industriels – Profils – Partie 2-3: Profils de bus de terrain supplémentaires pour les réseaux en temps réel fondés sur l'ISO/IEC/IEEE 8802-3 – CPF 3

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INDUSTRIAL NETWORKS – PROFILES –

Part 2-3: Additional real-time fieldbus profiles based on ISO/IEC/IEEE 8802-3 – CPF 3

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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Attention is drawn to the fact that the use of some of the associated protocol types is restricted by their intellectual-property-right holders. In all cases, the commitment to limited release of intellectual-property-rights made by the holders of those rights permits a layer protocol type to be used with other layer protocols of the same type, or in other type combinations explicitly authorized by their respective intellectual property right holders.

NOTE Combinations of protocol types are specified in the IEC 61784-1 series and the IEC 61784-2 series.

IEC 61784-2-3 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation. It is an International Standard.

This first edition, together with the other parts of the same series, cancels and replaces the fourth edition of IEC 61784-2 published in 2019. This first edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC 61784-2:2019:

a) split of the original IEC 61784-2 into several subparts, one subpart for the material of a generic nature, and one subpart for each Communication Profile Family specified in the original document;
b) addition of new profile CP 3/7;
c) update of the requirements for all conformance classes;
d) updated timing requirements for IO devices;
e) refining the added application classes.

The text of this International Standard is based on the following documents:

Draft	Report on voting
65C/1209/FDIS	65C/1237/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts of the IEC 61784-2 series, published under the general title *Industrial networks – Profiles – Part 2: Additional real-time fieldbus profiles based on ISO/IEC/IEEE 8802-3*, can be found on the IEC website.

The committee has decided that the contents of this document 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,
- replaced by a revised edition, or
- amended.

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.

INTRODUCTION

The IEC 61784-2 series provides additional Communication Profiles (CP) to the existing Communication Profile Families (CPF) of the IEC 61784-1 series and additional CPFs with one or more CPs. These profiles meet the industrial automation market objective of identifying Real-Time Ethernet (RTE) communication networks coexisting with ISO/IEC/IEEE 8802-3 – commonly known as Ethernet. These RTE communication networks use provisions of ISO/IEC/IEEE 8802-3 for the lower communication stack layers and additionally provide more predictable and reliable real-time data transfer and means for support of precise synchronization of automation equipment.

More specifically, these profiles help to correctly state the compliance of RTE communication networks with ISO/IEC/IEEE 8802-3, and to avoid the spreading of divergent implementations.

Adoption of Ethernet technology for industrial communication between controllers and even for communication with field devices promotes the use of Internet technologies in the field area. This availability would be unacceptable if it causes the loss of features required in the field area for industrial communication automation networks, such as:

- real-time,
- synchronized actions between field devices like drives,
- efficient, frequent exchange of very small data records.

These new RTE profiles can take advantage of the improvements of Ethernet networks in terms of transmission bandwidth and network span.

Another implicit but essential requirement is that the typical Ethernet communication capabilities, as used in the office world, are fully retained, so that the software involved remains applicable.

The market is in need of several network solutions, each with different performance characteristics and functional capabilities, matching the diverse application requirements. RTE performance indicators, whose values will be provided with RTE devices based on communication profiles specified in the IEC 61784-2 series, enable the user to match network devices with application-dependent performance requirements of an RTE network.

INDUSTRIAL NETWORKS – PROFILES –

Part 2-3: Additional real-time fieldbus profiles based on ISO/IEC/IEEE 8802-3 – CPF 3

1 Scope

This part of IEC 61784-2 defines extensions of Communication Profile Family 3 (CPF 3) for Real-Time Ethernet (RTE). CPF 3 specifies a set of Real-Time Ethernet (RTE) communication profiles (CPs) and related network components based on the IEC 61158 series (Type 10), ISO/IEC/IEEE 8802-3 and other standards.

For each RTE communication profile, this document also specifies the relevant RTE performance indicators and the dependencies between these RTE performance indicators.

NOTE 1 All CPs are based on standards or draft standards or International Standards published by the IEC or on standards or International Standards established by other standards bodies or open standards processes.

NOTE 2 The RTE communication profiles use ISO/IEC/IEEE 8802-3 communication networks and its related network components and in some cases amend those standards to obtain RTE features.

NOTE 3 Some CPs of CPF 3 are specified in IEC 61784-1-3.

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.

NOTE All parts of the IEC 61158 series, as well as the IEC 61784-1 series and the IEC 61784-2 series, are maintained simultaneously. Cross-references to these documents within the text therefore refer to the editions as dated in this list of normative references.

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

IEC 61158-5-10:2023, *Industrial communication networks – Fieldbus specifications – Part 5-10: Application layer service definition – Type 10 elements*

IEC 61158-6-10:2023, *Industrial communication networks – Fieldbus specifications – Part 6-10: Application layer protocol specification – Type 10 elements*

IEC 61784-1-3:2023, *Industrial networks – Profiles – Part 1-3: Fieldbus profiles – Communication Profile Family 3*

IEC 61784-2-0:2023, *Industrial networks – Profiles – Part 2-0: Additional real-time fieldbus profiles based on ISO/IEC/IEEE 8802-3 – General concepts and terminology*

IEC 61784-3-3:2021, *Industrial communication networks – Profiles – Part 3-3: Functional safety fieldbuses – Additional specifications for CPF 3*

IEC 61784-5-3:2018, *Industrial communication networks – Profiles – Part 5-3: Installation of fieldbuses – Installation profiles for CPF 3*

IEC 62439-2:2021*, Industrial communication networks – High availability automation networks – Part 2: Media Redundancy Protocol (MRP)*

ISO/IEC/IEEE 8802-3, *Telecommunications and exchange between information technology systems – Requirements for local and metropolitan area networks – Part 3: Standard for Ethernet*

ISO/IEC 9834-8:2014, *Information technology – Procedures for the operation of object identifier registration authorities – Part 8: Generation of universally unique identifiers (UUIDs) and their use in object identifiers*

ISO 15745-4:2003/Amd. 1:2006, *Industrial automation systems and integration – Open systems application integration framework – Part 4: Reference description for Ethernet-based control systems – Amendment 1: PROFINET profiles*

IEEE Std 802-2014, *IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture*

IEEE Std 802.1AB-2016, *IEEE Standard for Local and metropolitan area networks – Station and Media Access Control Connectivity Discovery*

IEEE Std 802.1AS-2020, *IEEE Standard for Local and Metropolitan Area Networks – Timing and Synchronization for Time-Sensitive Applications*

IEEE Std 802.1CB-2017, *IEEE Standard for Local and metropolitan area networks – Frame Replication and Elimination for Reliability*

IEEE Std 802.1Q-2018, *IEEE Standard for Local and Metropolitan Area Networks – Bridges and Bridged Networks*

IEEE Std 802.3-2018, *IEEE Standard for Ethernet*

IEEE Std 802.11-2020, *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 802.11n-2009, *IEEE Standard for Information technology – Local and metropolitan area networks – Specific requirements – Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications – Amendment 5: Enhancements for Higher Throughput*

IEEE Std 802.15.1-2005, *IEEE Standard for Information technology – Local and metropolitan area networks – Specific requirements – Part 15.1a: Wireless Medium Access Control (MAC) and Physical Layer (PHY) specifications for Wireless Personal Area Networks (WPAN)*

IETF RFC 768, J. Postel, *User Datagram Protocol*, August 1980, available at https://www.rfc-editor.org/info/rfc768 [viewed 2022-02-18]

IETF RFC 791, J. Postel, *Internet Protocol*, September 1981, available at https://www.rfc-editor.org/info/rfc791 [viewed 2022-02-18]

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IETF RFC 1034, P.V. Mockapetris, *Domain names – concepts and facilities*, November 1987, available at https://www.rfc-editor.org/info/rfc1034 [viewed 2022-02-18]

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Metro Ethernet Forum – MEF 10.4:2018, *Subscriber Ethernet Service Attributes*, available at https://www.mef.net/resources/mef-10-4-subscriber-ethernet-services-attributes [viewed 2022-02-18