



# SLOVENSKI STANDARD SIST EN IEC 61784-2-11:2023

01-november-2023

---

**Industrijska omrežja - Profili - 2-11. del: Dodatni profili procesnih vodil v realnem času po ISO/IEC/IEEE 8802-3 - CPF 11 (IEC 61784-2-11:2023)**

Industrial networks - Profiles - Part 2-11: Additional real-time fieldbus profiles based on ISO/IEC/IEEE 8802-3 - CPF 11 (IEC 61784-2-11:2023)

Zusätzliche Feldbusprofile für Echtzeitnetzwerke basierend auf ISO/IEC/IEEE 8802-3 - Kommunikationsprofilfamilie (CPF) 11 (IEC 61784-2-11:2023)

Réseaux industriels - Profils - Partie 2-11: Profils de bus de terrain supplémentaires pour les réseaux en temps réel fondés sur l'ISO/IEC/IEEE 8802-3 - CPF 11 (IEC 61784-2-11:2023)

**Ta slovenski standard je istoveten z: IEC EN IEC 61784-2-11:2023**

<https://standards.iteh.ai/catalog/standards/sist/6acd9b59-8227-4ce2-b73c-f6dbf3f02358/sist-en-iec-61784-2-11-2023>

**ICS:**

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

**SIST EN IEC 61784-2-11:2023**

**en,fr,de**



EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN IEC 61784-2-11**

June 2023

ICS 35.100.20; 35.240.50

Supersedes EN IEC 61784-2:2019 (partially)

English Version

**Industrial networks - Profiles - Part 2-11: Additional real-time  
fieldbus profiles based on ISO/IEC/IEEE 8802-3 - CPF 11  
(IEC 61784-2-11:2023)**

Réseaux industriels - Profils - Partie 2-11: Profils de bus de  
terrain supplémentaires pour les réseaux en temps réel  
fondés sur l'ISO/IEC/IEEE 8802-3 - CPF 11  
(IEC 61784-2-11:2023)

Zusätzliche Feldbusprofile für Echtzeitnetzwerke basierend  
auf ISO/IEC/IEEE 8802-3 - Kommunikationsprofilfamilie  
(CPF) 11  
(IEC 61784-2-11:2023)

This European Standard was approved by CENELEC on 2023-06-09. 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.

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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

<https://standards.iteh.ai>  
[SIST EN IEC 61784-2-11:2023](https://standards.iteh.ai/catalog/standards/sist/6acd9b59-8227-4ce2-b73c-f6dbf3f02358/sist-en-iec-61784-2-11-2023)

<https://standards.iteh.ai/catalog/standards/sist/6acd9b59-8227-4ce2-b73c-f6dbf3f02358/sist-en-iec-61784-2-11-2023>



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

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

**EN IEC 61784-2-11:2023 (E)****European foreword**

The text of document 65C/1209/FDIS, future edition 1 of IEC 61784-2-11, 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 IEC 61784-2-11:2023.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2024-03-09 level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the (dow) 2026-06-09 document have to be withdrawn

This document 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.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

**Endorsement notice**

The text of the International Standard IEC 61784-2-11:2023 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 61784-1 (series)	NOTE Approved as EN IEC 61784-1 (series)
IEC 61784-1-0	NOTE Approved as EN IEC 61784-1-0

## 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](http://www.cencenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61158	series	Industrial communication networks - Fieldbus specifications	EN IEC 61158	series
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 61158-4-11	2014	Industrial communication networks - Fieldbus specifications - Part 4-11: Data-link layer protocol specification - Type 11 elements	EN 61158-4-11	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 61158-6-11	2007	Industrial communication networks - Fieldbus specifications - Part 6-11: Application layer protocol specification - Type 11 elements	EN 61158-6-11	2008
IEC 61588	-	Precision Clock Synchronization Protocol for Networked Measurement and Control Systems	-	-
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 61784-5-11	-	Industrial communication networks - Profiles - Part 5-11: Installation of fieldbuses - Installation profiles for CPF 11	EN 61784-5-11	-
IEC 61918	-	Industrial communication networks - Installation of communication networks in industrial premises	EN IEC 61918	-

**EN IEC 61784-2-11:2023 (E)**

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO/IEC/IEEE 8802-3	-	Telecommunications and exchange between information technology systems - Requirements for local and metropolitan area networks - Part 3: Standard for Ethernet	-	-
IEEE Std 802-2014	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 Information technology - Telecommunications and information exchange between systems - IEEE standard for Local and metropolitan area networks - Timing and Synchronization for Time-Sensitive Applications in Bridged Local Area Networks	-	-
IEEE Std 802.1Q	2018	IEEE Standard for Local and metropolitan area networks - Media Access Control (MAC) Bridges and Virtual Bridged Local Area Networks	-	-
IETF RFC 768	-	User Datagram Protocol	-	-
IETF RFC 791	-	Internet Protocol	-	-
IETF RFC 792	-	Internet Control Message Protocol	-	-
IETF RFC 793	-	Transmission Control Protocol	-	-

  
<https://standards.iteh.ai>  
 Document Preview

[SIST EN IEC 61784-2-11:2023](https://standards.iteh.ai/catalog/standards/sist/6acd9b59-8227-4cc2-b73c-f6dbf3f02358/sist-en-iec-61784-2-11-2023)

<https://standards.iteh.ai/catalog/standards/sist/6acd9b59-8227-4cc2-b73c-f6dbf3f02358/sist-en-iec-61784-2-11-2023>



IEC 61784-2-11

Edition 1.0 2023-05

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

**Industrial networks – Profiles –**

**Part 2-11: Additional real-time fieldbus profiles based on ISO/IEC/IEEE 8802-3 –  
CPF 11**

**Réseaux industriels – Profils –**

**Partie 2-11: Profils de bus de terrain supplémentaires pour les réseaux en  
temps réel fondés sur l'ISO/IEC/IEEE 8802-3 – CPF 11**

[SIST EN IEC 61784-2-11:2023](https://standards.iteh.ai/catalog/standards/sist/6acd9b59-8227-4ce2-b73c-f6dbf3f02358/sist-en-iec-61784-2-11-2023)

<https://standards.iteh.ai/catalog/standards/sist/6acd9b59-8227-4ce2-b73c-f6dbf3f02358/sist-en-iec-61784-2-11-2023>

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

ICS 35.100.20; 35.240.50

ISBN 978-2-8322-6898-8

**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.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references .....	7
3 Terms, definitions, abbreviated terms, acronyms, and conventions.....	8
3.1 Terms and definitions.....	8
3.2 Abbreviated terms and acronyms .....	9
3.3 Symbols.....	9
3.4 Conventions.....	10
4 CPF 11 (TCnet) – RTE communication profiles.....	10
4.1 General overview .....	10
4.2 CP 11/1 .....	11
4.2.1 Physical layer .....	11
4.2.2 Data-link layer .....	11
4.2.3 Application layer.....	15
4.2.4 Performance indicator selection.....	15
4.3 CP 11/2 .....	22
4.3.1 Physical layer .....	22
4.3.2 Data-link layer .....	22
4.3.3 Application layer.....	25
4.3.4 Performance indicator selection.....	25
4.4 CP 11/3 .....	31
4.4.1 Physical layer .....	31
4.4.2 Data-link layer.....	31
4.4.3 Application layer.....	34
4.4.4 Performance indicator selection.....	35
Bibliography.....	42
Figure 1 – CP 11/1: Throughput RTE and non-RTE bandwidth.....	19
Figure 2 – CP 11/2: Throughput RTE and non-RTE bandwidth.....	28
Figure 3 – CP 11/3: Throughput RTE and non-RTE bandwidth.....	38
Table 1 – CPF 11 symbols.....	9
Table 2 – CPF 11: Overview of profile sets .....	11
Table 3 – CP 11/1: DLL service selection.....	11
Table 4 – CP 11/1: DLL protocol selection .....	12
Table 5 – CP 11/1: DLL protocol selection of Clause 5.....	13
Table 6 – CP 11/1: DLL protocol selection of Clause 6.....	13
Table 7 – CP 11/1: AL service selection.....	15
Table 8 – CP 11/1: AL protocol selection .....	15
Table 9 – CP 11/1: PI overview.....	16
Table 10 – CP 11/1: PI dependency matrix .....	16
Table 11 – CP 11/1: TCC data service selection .....	17
Table 12 – CP 11/1: Consistent set of PIs preferential for RTE communications .....	21



Table 13 – CP 11/1: Consistent set of PIs both for RTE and non-RTE communications.....	21
Table 14 – CP 11/2: DLL protocol selection .....	22
Table 15 – CP 11/2: DLL protocol selection of Clause 5.....	23
Table 16 – CP 11/2: DLL protocol selection of Clause 6.....	24
Table 17 – CP 11/2: PI overview .....	26
Table 18 – CP 11/2: PI dependency matrix .....	26
Table 19 – CP 11/2: TCC data service selection .....	27
Table 20 – CP 11/2: Consistent set of PIs preferential for RTE communications .....	30
Table 21 – CP 11/2: Consistent set of PIs both for RTE and non-RTE communications.....	31
Table 22 – CP 11/3: DLL protocol selection .....	31
Table 23 – CP 11/3: DLL protocol selection of Clause 5.....	32
Table 24 – CP 11/3: DLL protocol selection of Clause 6.....	33
Table 25 – CP 11/3: PI overview .....	35
Table 26 – CP 11/3: PI dependency matrix .....	36
Table 27 – CP 11/3: TCC data service selection .....	37
Table 28 – CP 11/3: Consistent set of PIs preferential for RTE communications .....	41
Table 29 – CP 11/3: Consistent set of PIs both for RTE and non-RTE communications.....	41

iTeh Standards  
 (<https://standards.iteh.ai>)  
 Document Preview

[SIST EN IEC 61784-2-11:2023](https://standards.iteh.ai/catalog/standards/sist/6acd9b59-8227-4ce2-b73c-f6dbf3f02358/sist-en-iec-61784-2-11-2023)

<https://standards.iteh.ai/catalog/standards/sist/6acd9b59-8227-4ce2-b73c-f6dbf3f02358/sist-en-iec-61784-2-11-2023>

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

---

**INDUSTRIAL NETWORKS –  
PROFILES –****Part 2-11: Additional real-time fieldbus profiles  
based on ISO/IEC/IEEE 8802-3 –  
CPF 11**

## 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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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 61784-2-11 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.

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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://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](http://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.

## 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.