

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Industrial networks – Profiles –
Part 5-6: Installation of fieldbuses – Installation profiles for CPF 6**

**Réseaux industriels – Profils –
Partie 5-6: Installation des bus de terrain – Profils d'installation pour CPF 6**





THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2024 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC -

webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications, symboles graphiques et le glossaire. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 500 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 25 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Industrial networks – Profiles –
Part 5-6: Installation of fieldbuses – Installation profiles for CPF 6**

**Réseaux industriels – Profils –
Partie 5-6: Installation des bus de terrain – Profils d'installation pour CPF 6**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 25.040.40, 35.100.40

ISBN 978-2-8322-8404-9

**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.....	5
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references	8
3 Terms, definitions and abbreviated terms	8
4 CPF 6: Overview of installation profiles	9
5 Installation profile conventions.....	9
6 Conformance to installation profiles.....	9
Annex A (normative) CPF 6 Type 8 network specific installation profile.....	11
A.1 Installation profile scope	11
A.2 Normative references.....	11
A.3 Installation profile terms, definitions, and abbreviated terms	11
A.3.1 Terms and definitions	11
A.3.2 Abbreviated terms	12
A.3.3 Conventions for installation profiles	13
A.4 Installation planning.....	13
A.4.1 General	13
A.4.2 Planning requirements.....	13
A.4.3 Network capabilities.....	14
A.4.4 Selection and use of cabling components	18
A.4.5 Cabling planning documentation	27
A.4.6 Verification of cabling planning specification.....	27
A.5 Installation implementation.....	27
A.5.1 General requirements	27
A.5.2 Cable installation	27
A.5.3 Connector installation	30
A.5.4 Terminator installation	32
A.5.5 Device installation	32
A.5.6 Coding and labelling	32
A.5.7 Earthing and bonding of equipment and devices and shield cabling.....	32
A.5.8 As-implemented cabling documentation.....	32
A.6 Installation verification and installation acceptance test	32
A.6.1 General	32
A.6.2 Installation verification	32
A.6.3 Installation acceptance test	33
A.7 Installation administration	34
A.8 Installation maintenance and installation troubleshooting.....	34
Annex B (normative) CPF 6 Ethernet network specific installation profile	35
B.1 Installation profile scope	35
B.2 Normative references.....	35
B.3 Installation profile terms, definitions, and abbreviated terms	36
B.3.1 Terms and definitions	36
B.3.2 Abbreviated terms	36
B.3.3 Conventions for installation profiles	36
B.4 Installation planning.....	36
B.4.1 General	36

B.4.2	Planning requirements	36
B.4.3	Network capabilities	37
B.4.4	Selection and use of cabling components	40
B.4.5	Cabling planning documentation	46
B.4.6	Verification of cabling planning specification	46
B.5	Installation implementation	46
B.5.1	General requirements	46
B.5.2	Cable installation	46
B.5.3	Connector installation	48
B.5.4	Terminator installation	48
B.5.5	Device installation	48
B.5.6	Coding and labelling	48
B.5.7	Earthing and bonding of equipment and devices and shield cabling	48
B.5.8	As-implemented cabling documentation	48
B.6	Installation verification and installation acceptance test	49
B.6.1	General	49
B.6.2	Installation verification	49
B.6.3	Installation acceptance test	49
B.7	Installation administration	49
B.8	Installation maintenance and installation troubleshooting	49
Bibliography	50
Figure 1	– Standards relationships	7
Figure A.1	– Type 8 network structure example	15
Figure A.2	– Example of a Type 8 network configuration	16
Figure A.3	– Sub-D connector pin assignment	30
Figure A.4	– M23 circular connector pin assignment	31
Figure A.5	– M12 circular connector pin assignment	31
Figure A.6	– Terminal connector at the device	31
Figure B.1	– Terminal connector at the device	48
Table A.1	– Basic network characteristics for balanced cabling not based on Ethernet	17
Table A.2	– Network characteristics for optical fibre cabling	18
Table A.3	– Information relevant to balanced cable: fixed cables	19
Table A.4	– Information relevant to balanced cable: cords	20
Table A.5	– Remote bus fibre optic cable length	22
Table A.6	– Connectors for copper cabling CPs not based on Ethernet	22
Table A.7	– Optical fibre connecting hardware	23
Table A.8	– Relationship between FOC and fibre types (Type 8 networks)	23
Table A.9	– Colour code for balanced cables used by Type 8 networks	25
Table A.10	– Parameters for balanced cables	27
Table A.11	– Parameters for silica optical fibre cables	28
Table A.12	– Parameters for POF optical fibre cables	28
Table A.13	– Parameters for hard clad silica optical fibre cables	29
Table A.14	– Pin assignment of the terminal connector	31
Table B.1	– Network characteristics for balanced cabling based on Ethernet	38

Table B.2 – Network characteristics for optical fibre cabling..... 39

Table B.3 – Information relevant to copper cable: fixed cables..... 40

Table B.4 – Information relevant to copper cable: cords..... 41

Table B.5 – Information relevant to optical fibre cables..... 42

Table B.6 – Connectors for balanced cabling CPs based on Ethernet..... 43

Table B.7 – Connectors for copper cabling CPs not based on Ethernet..... 43

Table B.8 – Optical fibre connecting hardware..... 44

Table B.9 – Relationship between FOC and fibre types (CP 6/2 Ethernet network)..... 44

Table B.10 – Parameters for balanced cables..... 46

Table B.11 – Parameters for silica optical fibre cables..... 46

Table B.12 – Parameters for POF optical fibre cables..... 47

Table B.13 – Parameters for hard clad silica optical fibre cables..... 47

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INDUSTRIAL NETWORKS –
PROFILES –****Part 5-6: Installation of fieldbuses –
Installation profiles for CPF 6****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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 61784-5-6 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 document is to be used in conjunction with IEC 61918:2018, IEC 61918:2018/AMD1:2022 and IEC 61918:2018/AMD2:2024.

This fifth edition cancels and replaces the fourth edition published in 2018. This edition constitutes a technical revision.

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

- a) alignment with IEC 61918:2018, IEC 61918:2018/AMD1:2022 and IEC 61918:2018/AMD2:2024;
- b) addition of new content related to Single Pair Ethernet (SPE) in Annex B, Table B.1, Table B.3, Table B.4, Table B.6.

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

Draft	Report on voting
65C/1283/FDIS	65C/1297/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 the 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 IEC 61784-5 series, under the general title *Industrial networks – Profiles – Installation of fieldbuses*, 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, or
- revised.

IMPORTANT – The "colour inside" logo on the cover page of this document 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

This document is one of a series produced to facilitate the use of communication networks in industrial control systems.

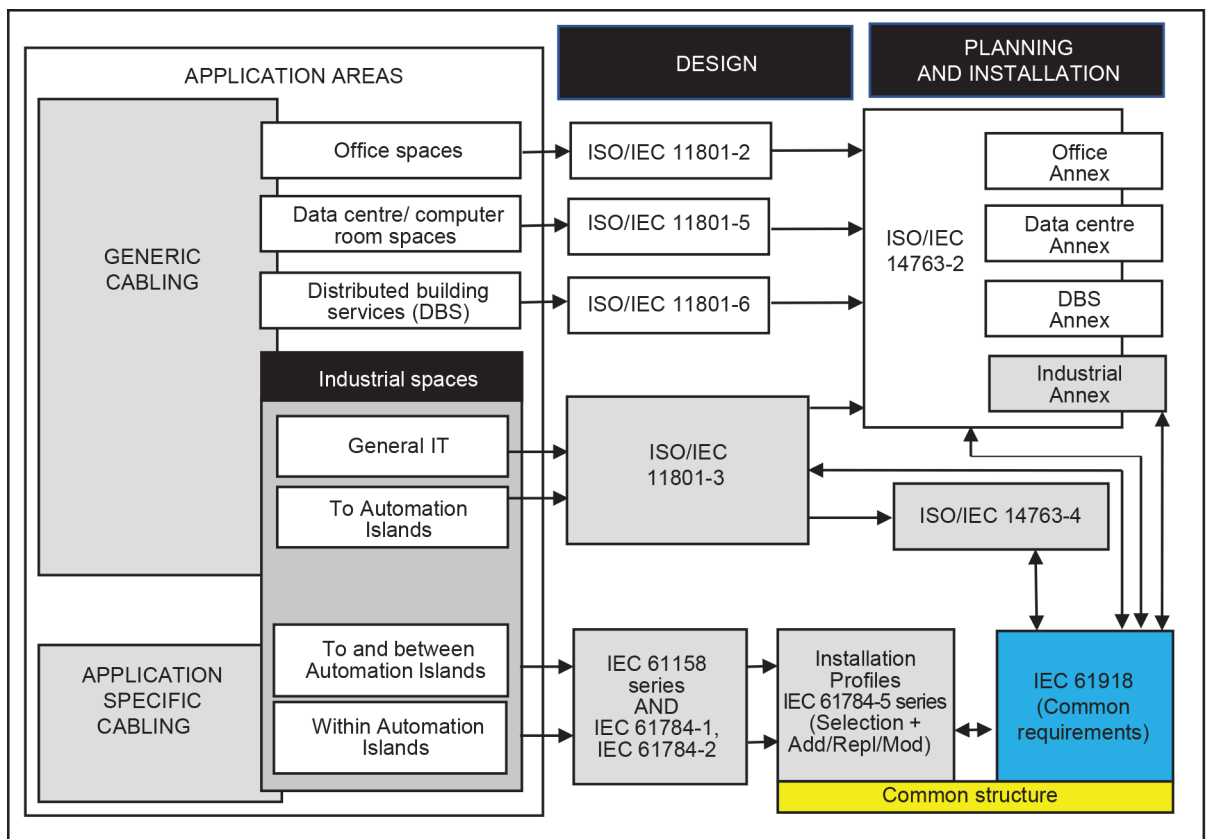
IEC 61918:2018, IEC 61918:2018/AMD1:2022 and IEC 61918:2018/AMD2:2024 provide the common requirements for the installation of communication networks in industrial control systems. This installation profile document provides the installation profiles of the communication profiles (CP) of a specific communication profile family (CPF) by stating which requirements of IEC 61918 fully apply and, where necessary, by supplementing, modifying, or replacing the other requirements (see Figure 1).

For general background on fieldbuses, their profiles, and relationship between the installation profiles specified in this document, see IEC 61158-1.

Each CP installation profile is specified in a separate annex of this document. Each annex is structured exactly as the reference document IEC 61918 for the benefit of the persons representing the roles in the fieldbus installation process as defined in IEC 61918 (planner, installer, verification personnel, validation personnel, maintenance personnel, administration personnel). By reading the installation profile in conjunction with IEC 61918, these persons immediately know which requirements are common for the installation of all CPs and which are modified or replaced. The conventions used to draft this document are defined in Clause 5.

The provision of the installation profiles in one document for each CPF (for example IEC 61784-5-6 for CPF 6) allows readers to work with documents of a convenient size.

IEC 61784-5-6 Ed.5.0 - Preview only Copy via IINAS e-Shop



IEC

Figure 1 – Standards relationships