IEC 61784-5-13

Edition 1.0 2013-09

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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Industrial communication networks – Profiles – Part 5-13: Installation of fieldbuses – Installation profiles for CPF 13

Réseaux de communication industriels – Profils – Partie 5-13: Installation des bus de terrain – Profils d'installation pour CPF 13

IEC 61784-5-13:2013

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

PRICE CODE
CODE PRIX R

ICS 25.040.40; 35.100.40

ISBN 978-2-8322-1063-5

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INDUSTRIAL COMMUNICATION NETWORKS – PROFILES –

Part 5-13: Installation of fieldbuses – Installation profiles for CPF 13

FOREWORD

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International Standard IEC 61784-5-13 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

This standard is to be used in conjunction with IEC 61918:2013.

The text of this standard is based on the following documents:

FDIS	Report on voting
65C/738/FDIS	65C/743/RVD

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

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This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of IEC 61784-5 series, under the general title *Industrial communication networks – Profiles – Installation of fieldbuses*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

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

IEC 61918:2013 provides the common requirements for the installation of communication networks in industrial control systems. This installation profile standard 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 standard, see IEC 61158-1.

Each CP installation profile is specified in a separate annex of this standard. Each annex is structured exactly as the reference standard 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 standard are defined in Clause 5.

The provision of the installation profiles in one standard for each CPF (for example IEC 61784-5-13 for CPF 13), allows readers to work with standards of a convenient size.

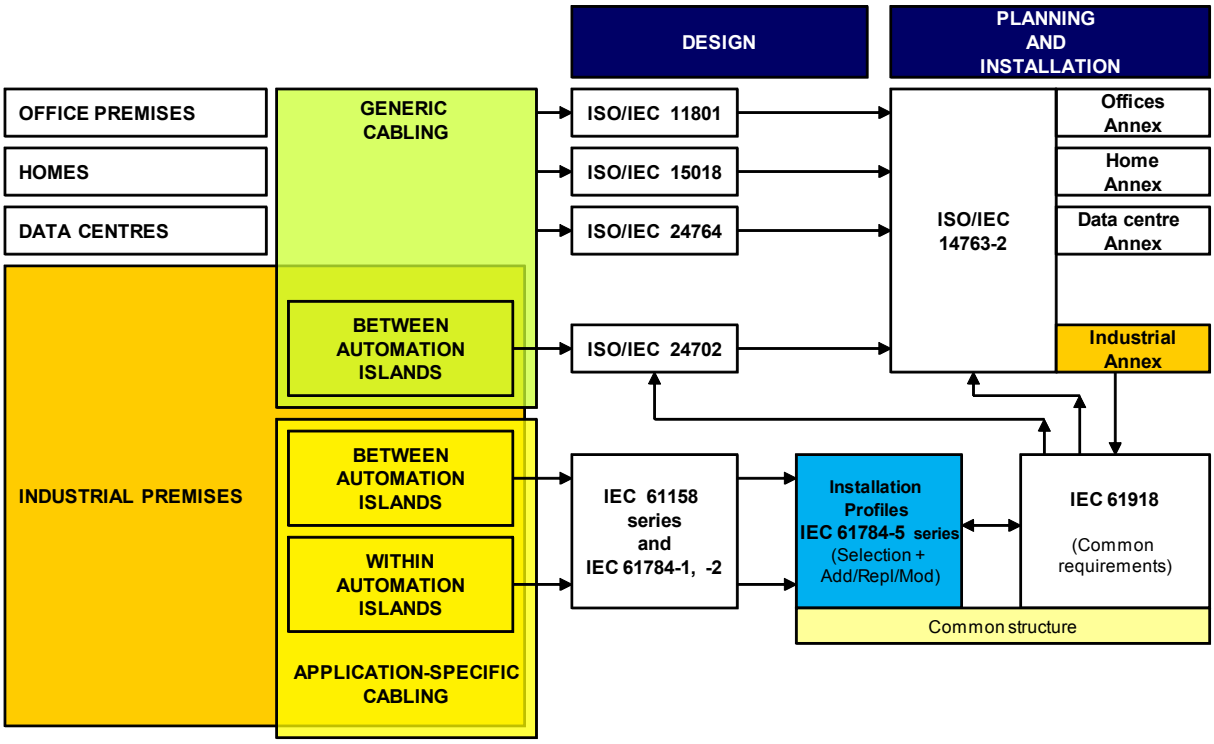

Figure 1 – Standards relationships

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INDUSTRIAL COMMUNICATION NETWORKS – PROFILES –

Part 5-13: Installation of fieldbuses – Installation profiles for CPF 13

1 Scope

This part of IEC 61784-5 specifies the installation profiles for CPF 13 (Ethernet POWERLINK[1]).

The installation profiles are specified in the annex. This annex is read in conjunction with IEC 61918:2013.

2 Normative references

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.

IEC 61918:2013, *Industrial communication networks – Installation of communication networks in industrial premises*

The normative references of IEC 61918:2013, Clause 2, apply. For profile specific normative references, see Clause A.2.

3 Terms, definitions and abbreviated terms

For the purpose of this document, the terms, definitions and abbreviated terms given in IEC 61918:2013, Clause 3, apply. For profile specific terms, definitions and abbreviated terms see Clause A.3.

4 CPF 13: Overview of installation profiles

CPF 13 consists of one Communication Profile as specified in IEC 61784-2.

The installation requirements for CP 13/1 (Ethernet POWERLINK) are specified in Annex A.

5 Installation profile conventions

The numbering of the clauses and subclauses in the annexes of this standard corresponds to the numbering of IEC 61918 main clauses and subclauses.

The annex clauses and subclauses of this standard supplement, modify, or replace the respective clauses and subclauses in IEC 61918.

---

[1] Ethernet POWERLINK is a trade name of Bernecker&Rainer Industrie-Elektronik Ges.m.b.H.. Control of trade name use is given to the non-profit organization EPSG. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the trademark holder or any of its products. Compliance to this profile does not require use of the trade name. Use of the trade name requires permission of the trade name holder.

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Where there is no corresponding subclause of IEC 61918 in the normative annexes in this standard, the subclause of IEC 61918 applies without modification.

The annex heading letter represents the installation profile assigned in Clause 4. The annex heading number shall represent the corresponding numbering of IEC 61918.

EXAMPLE "Subclause A.4.4" in IEC 61784-5-13 means that CP 13/1 specifies the subclause 4.4 of IEC 61918.

All main clauses of IEC 61918 are cited and apply in full unless otherwise stated in each normative installation profile annex.

If all subclauses of a (sub)clause are omitted, then the corresponding IEC 61918 (sub)clause applies.

If in a (sub)clause it is written "Not applicable.", then the corresponding IEC 61918 (sub)clause does not apply.

If in a (sub)clause it is written "*Addition:*", then the corresponding IEC 61918 (sub)clause applies with the additions written in the profile.

If in a (sub)clause it is written "*Replacement:*", then the text provided in the profile replaces the text of the corresponding IEC 61918 (sub)clause.

NOTE A replacement can also comprise additions.

If in a (sub)clause it is written "*Modification:*", then the corresponding IEC 61918 (sub)clause applies with the modifications written in the profile.

If all (sub)clauses of a (sub)clause are omitted but in this (sub)clause it is written "*(Sub)clause × has addition:*" (or "*replacement*:") or "(Sub)clause × is not applicable.", then (sub)clause × becomes valid as declared and all the other corresponding IEC 61918 (sub)clauses apply.

6 Conformance to installation profiles

Each installation profile within this standard includes part of IEC 61918:2013. It may also include defined additional specifications.

A statement of compliance to an installation profile of this standard shall be stated[2] as either

Compliance to IEC 61784-5-13:2013 [3] for CP 13/m<name> or

Compliance to IEC 61784-5-13 (Ed.1.0) for CP 13/m <name>

where the name within the angle brackets < > is optional and the angle brackets are not to be included. The m within CP 13/m shall be replaced by the profile number 1.

NOTE The name can be the name of the profile, for example Ethernet POWERLINK.

If the name is a trade name then the permission of the trade name holder shall be required.

Product standards shall not include any conformity assessment aspects (including quality management provisions), neither normative nor informative, other than provisions for product testing (evaluation and examination).

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2 In accordance with ISO/IEC Directives.

3 The date should not be used when the edition number is used.

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Annex A
(normative)

CP 13/1 (Ethernet POWERLINK) specific installation profile

A.1 Installation profile scope

Addition:

This standard specifies the installation profile for Communication Profile CP 13/1 (Ethernet POWERLINK). The CP 13/1 is specified in IEC 61784-2.

A.2 Normative references

Addition:

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*

NOTE IEEE 802.3-2008 includes extensions to ISO/IEC 8802-3:2000. When a next edition of ISO/IEC 8802-3 is available the references to IEEE 802.3-2008 will be replaced if appropriate.

A.3 Installation profile terms, definitions, and abbreviated terms

A.3.1 Terms and definitions

Subclause 3.1.60 has replacement:

repeater
as defined in IEEE 802.3:2008

A.3.2 Abbreviated terms

A.3.3 Conventions for installation profiles

Not applicable.

A.4 Installation planning

A.4.1 General

Subclause 4.1.4 is not applicable

A.4.2 Planning requirements

A.4.2.1 Safety

Subclause 4.2.1.4 is not applicable.

A.4.2.2 Security

A.4.2.3 Environmental considerations and EMC

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A.4.2.4 Specific requirements for generic cabling in accordance with ISO/IEC 24702

A.4.3 Network capabilities

A.4.3.1 Network topology

A.4.3.1.1 Common description

A.4.3.1.2 Basic physical topologies for passive networks

Not applicable.

A.4.3.1.3 Basic physical topologies for active networks

Modification:

Active ring topologies are not supported by CP 13/1.

A.4.3.1.4 Combination of basic topologies

Replacement:

Any combination of active star and linear topologies are permitted.

A.4.3.1.5 Specific requirements for CPs

Replacement:

For high performance repeaters should be used instead of switches.

A.4.3.1.6 Specific requirements for generic cabling in accordance with ISO/IEC 24702

A.4.3.2 Network characteristics

A.4.3.2.1 General

A.4.3.2.2 Network characteristics for balanced cabling not based on Ethernet

Not applicable.

A.4.3.2.3 Network characteristics for balanced cabling based on Ethernet

Replacement:

Table A.1 provides values based on the template given in IEC 61918:2013, Table 2.

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Table A.1 – Network characteristics for balanced cabling based on Ethernet

Characteristic	CP 13/1
Supported data rates (Mbit/s)	100
Supported channel length (m) [b]	100
Number of connections in the channel (max.) [a,b]	6
Patch cord length (m) [a]	100
Channel class per ISO/IEC 24702 (min.) [b]	D
Cable category per ISO/IEC 24702 (min.) [c]	5
Connecting HW category per ISO/IEC 24702 (min.)	5
Cable types	–

[a] See A.4.4.3.2.

[b] For the purpose of this table the channel definitions of ISO/IEC 24702 are applicable.

[c] Additional information is available in IEC 61156 series.

A.4.3.2.4 Network characteristics for optical fibre cabling

Replacement:

Table A.2 provides values based on the template given in IEC 61918:2013, Table 3.

Table A.2 – Network characteristics for optical fibre cabling

CP 13/1		
Optical fibre type	**Description**	
Single mode silica	Bandwith (MHz) or equivalent at λ (nm)	500 at 1 310
	Minimum length (m)	0
	Maximum length [a] (m)	14 000
	Maximum channel insertion loss/optical power budget (dB)	8,5
	Connecting HW	See A.4.4.2.5
Multimode silica	Modal bandwith (MHz × km) at λ (nm)	600 at 1 310
	Minimum length (m)	0
	Maximum length [a] (m)	2 000
	Maximum channel insertion loss/optical power budget (dB)	4,5
	Connecting HW	See A.4.4.2.5
POF	Modal bandwith (MHz × 100 m) at λ (nm)	35 at 650
	Minimum length (m)	0
	Maximum length [a] (m)	50
	Maximum channel insertion loss/optical power budget (dB)	14
	Connecting HW	See A.4.4.2.5
Hard clad silica	Modal bandwith (MHz × km) at λ (nm)	70 at 650
	Minimum length (m)	0
	Maximum length [a] (m)	100
	Maximum channel insertion loss/optical power budget (dB)	3
	Connecting HW	See A.4.4.2.5

[a] This value is reduced by connections, splices and bends in accordance with formula (1) in 4.4.3.4.1 of IEC 61918:2013.

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A.4.3.2.5 Specific network characteristics

Not applicable.

A.4.3.2.6 Specific requirements for generic cabling in accordance with ISO/IEC 24702

A.4.4 Selection and use of cabling components

A.4.4.1 Cable selection

A.4.4.1.1 Common description

A.4.4.1.2 Copper cables

A.4.4.1.2.1 Balanced cables for Ethernet based CPs

Replacement:

Table A.3 provides values based on the template given in IEC 61918:2013, Table 4.

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

Characteristic	CP 13/1
Nominal impedance of cable (tolerance)	100 Ω ± 15 Ω
DCR of conductors	≤ 120 Ω/km
DCR of shield	–
Number of conductors	4 or 8
Shielding	S/FTP, SF/FTP
Colour code for conductor	4-conductor cable: YE, WH, OG, BU 8-conductor cable: compliant to T568B
Jacket colour requirements	–
Jacket material	–
Resistance to harsh environment (e.g. UV, oil resist, LS0H)	Application dependent
Agency ratings	–

Replacement: Table A.4 provides values based on the template given in IEC 61918:2013, Table 5.

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