

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Industrial communication networks – Profiles –
Part 5-18: Installation of fieldbuses – Installation profiles for CPF 18**

**Réseaux de communication industriels – Profils –
Partie 5-18: Installation des bus de terrain – Profils d'installation pour CPF 18**



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

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

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Partie 5-18: Installation des bus de terrain – Profils d'installation pour CPF 18

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INDUSTRIAL COMMUNICATION NETWORKS –
PROFILES –****Part 5-18: Installation of fieldbuses –
Installation profiles for CPF 18**

FOREWORD

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International Standard IEC 61784-5-18 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

This second edition cancels and replaces the first edition published in 2013. 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;
- b) addition of new connector (LC).

This document is to be used in conjunction with IEC 61918:2018.

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

FDIS	Report on voting
65C/924/FDIS	65C/925/RVD

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

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

A list of all parts of the IEC 61784-5 series, published 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 document 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 document. At this date, the document 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- withdrawn,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 61918:2018 provides 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 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 document are defined in Clause 5.

The provision of the installation profiles in one document for each CPF (for example IEC 61784-5-18 for CPF 18) allows readers to work with documents of a convenient size.

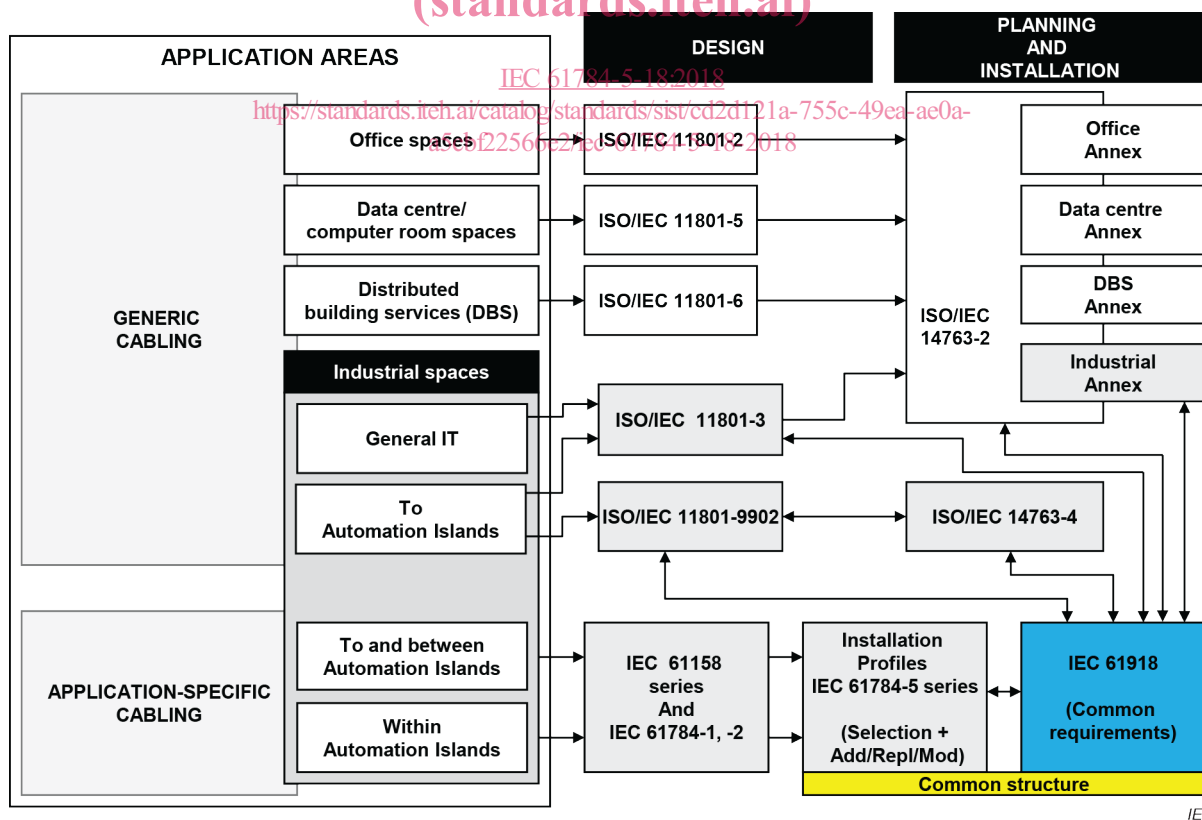


Figure 1 – Standards relationship

INDUSTRIAL COMMUNICATION NETWORKS – PROFILES –

Part 5-18: Installation of fieldbuses – Installation profiles for CPF 18

1 Scope

This part of IEC 61784-5 specifies the installation profiles for CPF 18 (SafetyNET p¹).

The installation profiles are specified in Annex A. This annex is read in conjunction with IEC 61918:2018.

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.

IEC 61918:2018, *Industrial communication networks – Installation of communication networks in industrial premises* (standards.iteh.ai)

The normative references of IEC 61918:2018, Clause 2, apply.

<https://standards.iteh.ai/catalog/standards/sist/cd2d121a-755c-49ea-ae0a-a5cbf22566e2/iec-61784-5-18-2018>

3 Terms, definitions and abbreviated terms

For the purpose of this document, the terms, definitions and abbreviated terms given in IEC 61918:2018 Clause 3, apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 CPF 18: Overview of installation profiles

CPF 18 consists of two Communication Profiles as specified in IEC 61784-2.

The installation requirements for CP 18/1 (SafetyNET p RTFL) and CP 18/2 (SafetyNET p RTFN) are specified in Annex A.

¹ SafetyNET p is trade name of Pilz GmbH & Co. KG. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the trade name holder or any of its products. Compliance to this document does not require use of the trade name SafetyNET p. Use of the trade name SafetyNET p requires permission of the trade name holder.

5 Installation profile conventions

The numbering of the clauses and subclauses in the annex of this document corresponds to the numbering of IEC 61918 main clauses and subclauses.

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

Where there is no corresponding subclause of IEC 61918 in the normative annexes in this document, 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 61784-5-18 means that CP 18/1 and CP 18/2 specify 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 x has *addition:*” (or “*replacement:*”) or “(Sub)clause x is not applicable.”, then (sub)clause x becomes valid as declared and all the other corresponding IEC 61918 (sub)clauses apply.

6 Conformance to installation profiles

Each installation profile within this document includes part of IEC 61918:2018. It may also include defined additional specifications.

A statement of compliance to an installation profile of this document shall be stated² as either

Compliance to IEC 61784-5-18:— for CP 18/m <name> or

Compliance to IEC 61784-5-18 (Ed.2.0) for CP 18/m <name>

² In accordance with ISO/IEC Directives.

where the name within the angle brackets < > is optional and the angle brackets are not to be included. The m within CP 18/m shall be replaced by the profile number 1 to 2.

NOTE The name may be the name of the profile, for example SafetyNET p.

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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Annex A (normative)

CP 18/1 and CP 18/2 (SafetyNET p) specific installation profile

A.1 Installation profile scope

Addition:

This annex specifies the installation profile for Communication Profile CP 18/1 and CP 18/2 (SafetyNET p). The CP 18/1 and CP 18/2 are specified in IEC 61784-2.

A.2 Normative references

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

A.3.1 Terms and definitions

A.3.2 Abbreviated terms

A.3.3 Conventions for installation profiles

Not applicable.

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A.4 Installation planning

[IEC 61784-5-18:2018](#)

A.4.1 General <https://standards.iteh.ai/catalog/standards/sist/cd2d121a-755c-49ea-ae0a-a5cbf22566e2/iec-61784-5-18-2018>

A.4.1.1 Objective

A.4.1.2 Cabling in industrial premises

A.4.1.3 The planning process

A.4.1.4 Specific requirements for CPs

Not applicable.

A.4.1.5 Specific requirements for generic cabling in accordance with ISO/IEC 11801-3

A.4.2 Planning requirements

A.4.2.1 Safety

A.4.2.1.1 General

A.4.2.1.2 Electric safety

A.4.2.1.3 Functional safety

A.4.2.1.4 Intrinsic safety

Not applicable.

A.4.2.1.5 Safety of optical fibre communication systems**A.4.2.2 Security****A.4.2.3 Environmental considerations and EMC****A.4.2.4 Specific requirements for generic cabling in accordance with ISO/IEC 11801-3****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

Addition:

Ring topology shall be used when cable redundancy is required.

A.4.3.1.4 Combination of basic topologies**A.4.3.1.5 Specific requirements for CPs**

Not applicable.

A.4.3.1.6 Specific requirements for generic cabling in accordance with ISO/IEC 11801-3**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 61918:2018, Table 2.

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

Characteristic	CP 18/1 and CP 18/2
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 11801-3 (min.) ^b	D
Cable category per ISO/IEC 11801-3 (min.) ^c	5
Connecting HW category per ISO/IEC 11801-3 (min.)	5
Cable types	–
^a See A.4.4.3.2. ^b For the purpose of this table the channel definitions of ISO/IEC 11801-3 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 61918:2018, Table 3.

Table A.2 – Network characteristics for optical fibre cabling

CP 18/1 and CP 18/2		
Optical fibre type	Description	
Single mode silica	Bandwidth (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 hardware	See A.4.4.2.5
Multimode silica	Modal bandwidth (MHz x km) at λ (nm)	600 at 1 300
	Minimum length (m)	0
	Maximum length ^a (m)	2 000
	Maximum channel insertion loss/optical power budget (dB)	4,5
	Connecting hardware	See A.4.4.2.5
POF	Modal bandwidth (MHz x 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 hardware	See A.4.4.2.5
Hard clad silica	Modal bandwidth (MHz x 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 hardware	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 61918:2018.		

A.4.3.2.5 Specific network characteristics**A.4.3.2.6 Specific requirements for generic cabling in accordance with ISO/IEC 11801-3****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 61918:2018, Table 4.

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

Characteristic	CP 18/1 and CP 18/2
Nominal impedance of cable (tolerance) (Ω)	100 \pm 15 (IEC 61156-5)
Balanced or unbalanced	Balanced
DCR of conductors (Ω /km)	\leq 115 \leq 62 (recommended)
DCR of shield	
Number of conductors	4
Shielding	S/FTP, S/FTQ, S/STP
Colour code for conductor	WH, BU, YE, OG
Jacket colour requirements	Yellow (RAL 1003) (recommended)
Jacket material	No requirement Application dependent
Resistance to harsh environment (e.g. UV, oil resist, LSOH)	No requirement Application dependent
Agency ratings	No requirement

Replacement:

Table A.4 provides values based on the template given in IEC 61918:2018, Table 5.