IEC 61784-5-10

Edition 2.0 2010-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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Industrial communication networks – Profiles – Part 5-10: Installation of fieldbuses – Installation profiles for CPF 10

Réseaux de communication industriels – Profils – Partie 5-10: Installation de bus de terrain – Profils d'installation pour CPF 10

IEC 61784-5-10:2010

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

INDUSTRIAL COMMUNICATION NETWORKS – PROFILES –

Part 5-10: Installation of fieldbuses – Installation profiles for CPF 10

FOREWORD

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International Standard IEC 61784-5-10 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 2007. This edition constitutes an editorial revision.

This edition does not include technical changes with respect to the previous edition.

This standard is to be used in conjunction with IEC 61918:2010.

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This bilingual version (2012-02) corresponds to the monolingual English version, published in 2010-07.

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

FDIS	Report on voting
65C/602/FDIS	65C/616/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.

The French version of this standard has not been voted upon.

This publication 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 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- withdrawn,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 61918:2010 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/TR 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 61784-5-10 for CPF 10), allows readers to work with standards of a convenient size.

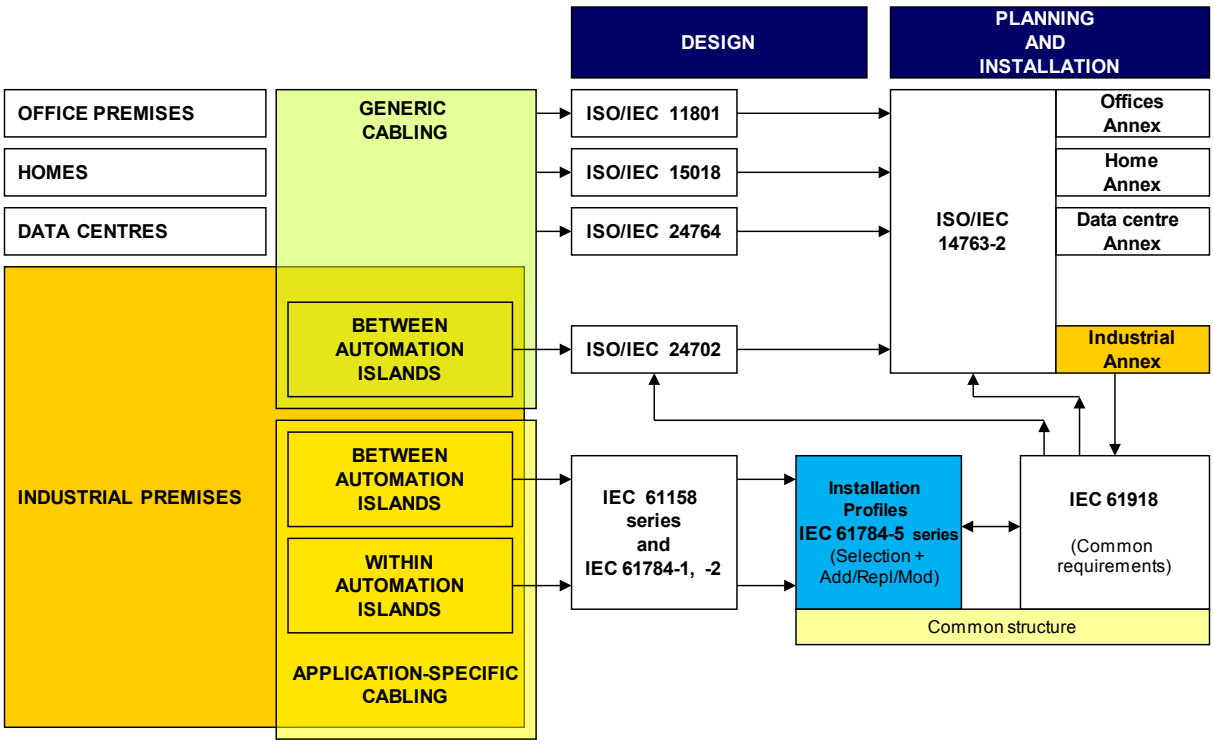

Figure 1 – Standards relationships

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INDUSTRIAL COMMUNICATION NETWORKS – PROFILES –

Part 5-10: Installation of fieldbuses – Installation profiles for CPF 10

1 Scope

This part of IEC 61784 specifies the installation profile for CPF 10 (Vnet/IP™)[1].

The installation profile is specified in the annex. This annex is read in conjunction with IEC 61918:2010.

2 Normative references

The following referenced documents are indispensable for the application 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 61918:2010, *Industrial communication networks – Installation of communication networks in industrial premises*

The normative references of IEC 61918:2010, Clause 2, apply.

3 Terms, definitions and abbreviated terms

For the purposes of this document, the terms, definitions and abbreviated terms of IEC 61918:2010, Clause 3, apply. For profile specific terms, definitions and abbreviated terms see Clause A.3.

4 CPF 10: Overview of installation profiles

CPF 10 consists of one communication profile as specified in IEC 61784-2.

The installation requirements for CP 10/1 (Vnet/IP™) 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.

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[1] Vnet/IP™ is a trade name of Yokogawa Electric Corporation. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trademark holder or any of its products. Compliance to this standard does not require use of the trade name Vnet/IP™. Use of the trade name Vnet/IP™ requires permission of Yokogawa Electric Corporation.

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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 (sub)clause numbering following the annex letter shall represent the corresponding (sub)clause numbering of IEC 61918..

EXAMPLE "Annex B.4.4" in IEC 61784-5-3 means that CP 3/2 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 x has addition*:" (or "*replacement*") or is *"(*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 standard includes part of IEC 61918:2010. 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 61784-5-10:2010[3] for CP 10/1 <name> or

Compliance to IEC 61784-5-10 (Ed.2.0) for CP 10/1 <name>

where the name within the angle brackets < > is optional and the angle brackets are not to be included.

NOTE The name may be the name of the profile, for example Vnet/IP.

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 10/1 (Vnet/IP™) specific installation profile

A.1 Installation profile scope

Addition:

This standard specifies the installation profile for for Communication Profile CP 10/1 (Vnet/IP). The CP 10/1 is specified in IEC 61784-2.

A.2 Normative references

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

A.3.1 Terms and definitions

Addition:

A.3.1.1
Repeater HUB
concentrator device such as 1000BASE-T common type HUB.

A.3.2 Abbreviated terms

A.3.3 Conventions for installation profiles

Not applicable.

A.4 Installation planning

A.4.1 Introduction

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.

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A.4.1.5 Specific requirements for generic cabling in accordance with ISO/IEC 24702

A.4.2 Planning requirements

A.4.2.1 Safety

A.4.2.1.1 General

A.4.2.1.2 Electrical safety

A.4.2.1.3 Functional safety

Not applicable.

A.4.2.1.4 Intrinsic safety

Not applicable.

A.4.2.1.5 Safety of optical fibre communication systems

Not applicable.

A.4.2.2 Security

Addition:

The automation island network shall be isolated from the office environment and the internet, provided however, if the planner provides appropriate security through the use of gateways, firewalls, routers and/or appropriate security software, this shall not apply. Careful consideration should be given to the placement of ports to prevent unauthorized connection of devices into the automation island network. Cabling components should be protected from damage by machinery or tampering.

A.4.2.3 Environmental considerations and EMC

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

A.4.3.1.4 Combination of basic topologies

A.4.3.1.5 Specific requirements for CPs

Addition:

Redundant network, which has any topology specified in IEC 61918:2010, 4.3.1.3, shall be used.

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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 61918:2010, Table 2.

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

Characteristics	CP 10/1
Supported data rates (Mbit/s)	100/1 000
Supported channel length (m) [b]	100
Number of connections in the channel (max.) [a] [b]	6
Patch cord length (m)	80
Channel class per ISO/IEC 24702 (min.) [a]	D
Cable category per ISO/IEC 24702 (min.) [b]	5
Connecting HW category per ISO/IEC 24702 [c]	5
Cable types	Application dependent

[a] See IEC 61918, 4.4.3.2.
[b] For the purpose of this table the channel definitions of ISO/IEC 24702 are applicable.
[c] For additional information see 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 61918:2010, Table 3.

Table A.2 – Network characteristics for optical fibre cabling

CP 10/1		
Optical fibre type	**Description**	
Single mode silica	Standard	
	Attenuation coefficient at 1 310 nm	0,5 dB/km
	Bandwidth or equivalent at 1 310 nm	1 200 MHz × km
	Alternative description	
	Mode field diameter (μm)	9..10
	Outer diameter (μm)	125
	Minimum length (m)	2
	Maximum length (m)	5 000

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A.4.3.2.5 Specific network characteristics

Addition:

Any repeater HUB shall not be used for CPF 10/1 network.

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 Copper cables for Ethernet based CPs

Replacement:

Table A.3 provides values based on the template given in IEC 61918:2010, Table 4.

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

Characteristic	CP 10/1
Nominal impedance of cable (tolerance)	100 Ω ± 15 Ω
DCR of conductors	< 9,38 Ω/100 m
DCR of shield	< 62,5/D Ω/km where D is the outside diameter of the shield (mm)
Number of conductors	8
Shielding	UTP
Colour code for conductor	WH/OG, OG, WH/GN, BU, WH/BU, GN, WH/BN, BN
Jacket colour requirements	— [a]
Jacket material	Application dependent
Resistance to harsh environment (e.g. UV, oil resist, LS0H)	Application dependent
Agency ratings	No requirement
Other characteristics	—
[a] See A.4.4.6.3.	

Replacement:

Table A.4 provides values based on the template given in IEC 61918:2010, Table 5.

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Table A.4 – Information relevant to copper cable: cords

Characteristic	CP 10/1
Nominal impedance of cable (tolerance)	100 Ω ± 15 Ω
DCR of conductors	< 9,38 Ω/100 m
DCR of shield	< 62,5/D Ω/km where D is the outside diameter of the shield (mm)
Number of conductors	8
Length	100
Shielding	UTP
Colour code for conductor	WH/OG, OG, WH/GN, BU, WH/BU, GN, WH/BN, BN
Jacket colour requirements	— [a]
Jacket material	Application dependent
Resistance to harsh environment (e.g. UV, oil resist, LS0H)	Application dependent
Agency ratings	No requirement
[a] See A.4.4.6.3.	

A.4.4.1.2.2 Copper cables for non Ethernet based CPs

Not applicable.

A.4.4.1.3 Cable requirements for wireless installation

A.4.4.1.4 Optical fibre cables

Replacement:

Table A.5 provides values based on the template given in IEC 61918:2010, Table 6.

Table A.5 – Information relevant to optical fibre cables

Characteristics	9..10/125 µm single mode silica	50/125 µm multimode silica	62,5/125 µm multimode silica	980/1 000 µm step index POF	200/230 µm step index hard clad silica
Attenuation per km (650 nm)	—	—	—	—	—
Attenuation per km (820 nm)	—	—	—	—	—
Attenuation per km (1 310 nm)	0,5 dB/km	—	—	—	—
Number of optical fibres	2	—	—	—	—
Connector type (duplex or simplex)	SC Duplex, LC	—	—	—	—
Jacket colour requirements	— [a]	—	—	—	—
Jacket material	Application dependent	—	—	—	—
Resistance to harsh environment (e.g. UV, oil resist,	Application dependent	—	—	—	—

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