IEC 61784-5-2

Edition 4.0 2024-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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AMENDMENT 1
AMENDEMENT 1

Industrial communication networks – Profiles – Part 5-2: Installation of fieldbuses – Installation profiles for CPF 2

Réseaux de communication industriels – Profils – Partie 5-2: Installation des bus de terrain – Profils d'installation pour CPF 2

IEC 61784-5-2:2018-08/AMD1:2024-03(en-fr)

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INDUSTRIAL COMMUNICATION NETWORKS – PROFILES –

Part 5-2: Installation of fieldbuses – Installation profiles for CPF 2

AMENDMENT 1

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Amendment 1 to IEC 61784-5-2:2018 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

The text of this Amendment 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 Amendment 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. 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- withdrawn, or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.

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INTRODUCTION to Amendment 1

This Amendment 1 includes the following significant technical changes with respect to IEC 61784-5-2:2018:

a) Updated references of IEC 61918:2018 to include additions of IEC 61918:2018/AMD1:2022 and IEC 61918:2018/AMD2:2024,

b) Added references for consideration of security to Subclause B.4.2.2,

c) Updated optical fiber specifications and references in Subclauses B.4.3.3.2 and B.4.4.1.4,

d) Added definition of electromagnetic compatibility options for conformance to Subclause B.4.4.1.2.1,

e) Added support of mesh bonding systems to Subclause B.4.4 and Clause B.5,

f) Added acceptance of end-to-end link verification and certification testing to Clause B.6.

FOREWORD

Insert, after the first paragraph, the following new paragraph:

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

Delete, below the list of modifications, the following paragraph:

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

INTRODUCTION

Replace, at the beginning of the first paragraph, "International Standard" *with* "document".

Replace, at the beginning of the second paragraph, "IEC 61918:2018 provides" *with* "IEC 61918:2018, IEC 61918:2018/AMD1:2022 and IEC 61918:2018/AMD2:2024 provide".

Replace the existing Figure 1 with the following new figure:

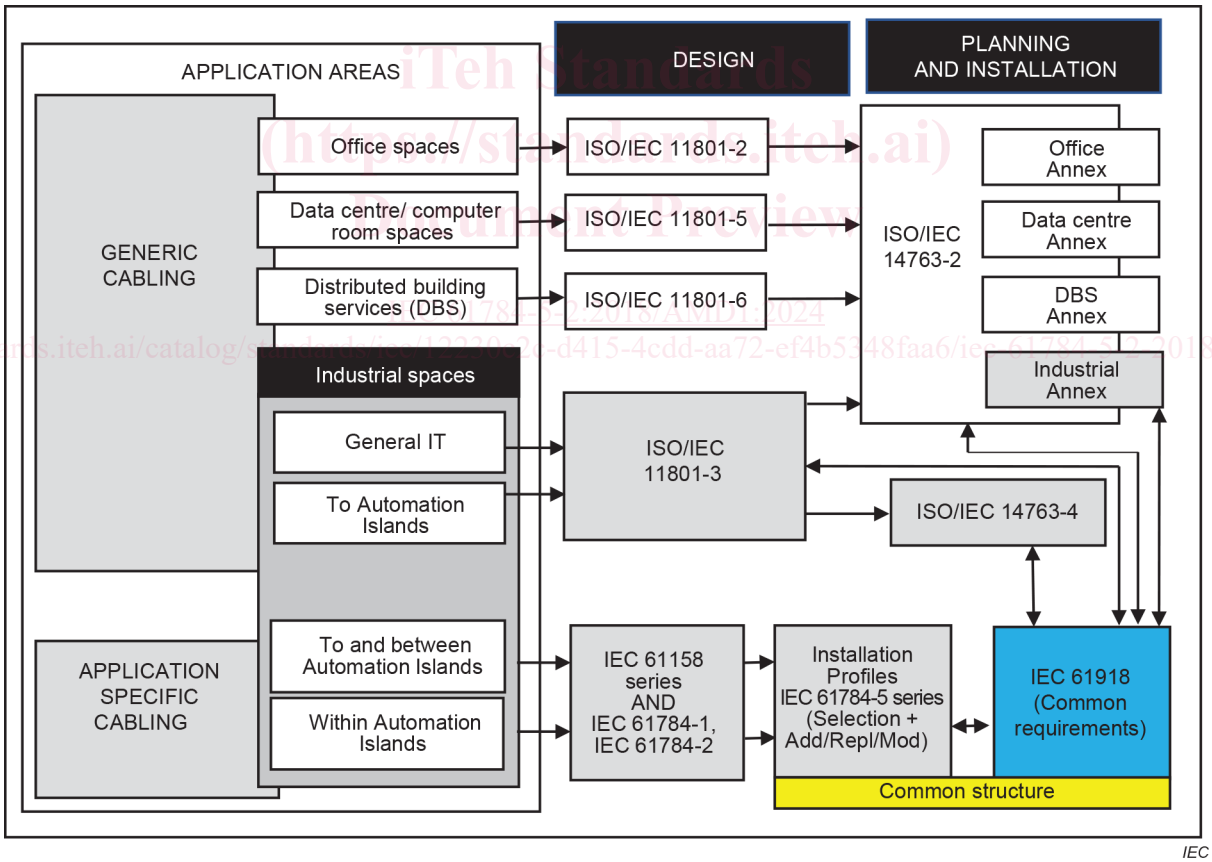

Figure 1 – Standards relationships

1 Scope

Replace the existing second paragraph with the following new paragraph:

The installation profiles are specified in the annexes. These annexes are read in conjunction with IEC 61918:2018, IEC 61918:2018/AMD1:2022 and IEC 61918:2018/AMD2:2024.

2 Normative references

Replace the existing reference to IEC 61918 with the following new reference:

IEC 61918:2018[1], *Industrial communication networks – Installation of communication networks in industrial premises*
IEC 61918:2018/AMD1:2022
IEC 61918:2018/AMD2:2024

Delete the last sentence before the NOTE.

3 Terms, definitions and abbreviated terms

Replace, in the first sentence, "IEC 61918:2018 Clause 3" *with* "IEC 61918:2018, Clause 3, IEC 61918:2018/AMD1:2022, Clause 3, and Clauses A.3, B.3, C.3 of this document".

Delete the NOTE after the last bullet.

6 Conformance to installation profiles

Delete, in the first sentence of the second paragraph, the footnote.

Replace the existing two items in the list of the second paragraph with the following new items:

Compliance with IEC 61784-5-2:2018 and IEC 61784-5-2:2018/AMD1:2024 for CP 2/m <name> or

Compliance with IEC 61784-5-2 (Ed.4.1) for CP 2/m <name>.

Replace, in the sentence after the two items, "are not to be*" with* "shall not be".

Replace, in the NOTE, "may" *with* "can".

Annex B − CP2/2 (EtherNet/IP™) specific installation profile

B.2 Normative references

Add the following new references:

IEC 60793-2-30, *Optical fibres – Part 2-30: Product specifications – Sectional specification for category A3 multimode fibres*

IEEE Std 802.1Q-2018, *IEEE Standard for Local and Metropolitan Area Networks – Bridges and Bridged Networks*

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[1] The normative references of IEC 61918:2018, Clause 2, IEC 61918:2018/AMD1:2022, Clause 2 and IEC 61918:2018/AMD2:2024, Clause 2, apply.

Replace "ANSI/TIA-568-C.1" *with* "ANSI/TIA-568.2-D" *(no change to title)*.

B.4.2.2 Security

Replace the existing last paragraph with the following new paragraph and note:

CP 2/2 has provisions for supporting secure system designs aligned with IEC 62443. For each security level as defined by IEC 62443 there are different measures such as identification and authentication, data access control, tamper detection, data access restriction, data confidentiality, response time, and resource availability. Aspects of the system could need mitigations depending on the level of security risk identified.

NOTE See ODVA: PUB00148 [45] for more information on securing the installation of CP 2/2 systems. See ANSI/TIA 5017 [46] for more information for deterrence or restricted access measures that can be taken for securing the physical infrastructure of zones where it is deemed necessary or appropriate.

B.4.3.1.4 Combination of basic topologies

Replace "Not applicable" *with the following new text and figure:*

Replacement:

Combination of topologies is achieved through bridging defined in IEEE Std 802.1Q-2018 and subsequent documents. CP 2/2 provides for routing of data through active topologies and allows interfacing of all equipment through a hierarchical star topology. This is typically facilitated through a network zone approach where an individual node on a network can be replaced with an entire subnetwork configured in an independent topology such as a ring, active linear bus, redundant active linear bus, or an additional active star. This concept is shown in Figure B.18.

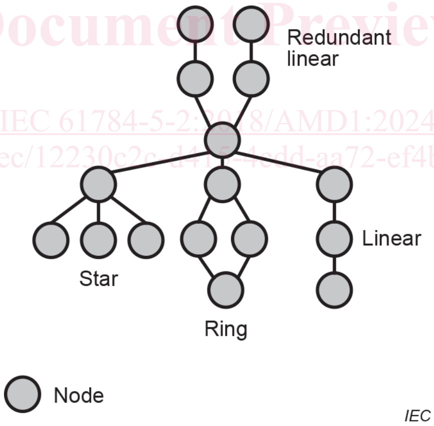

Figure B.18 – Example of combination of basic active topologies

B.4.3.2.4 Network characteristics for optical fibre cabling

Replace, in the first row of Table B.2, "Bandwidth (MHz)" *with* "Bandwidth (Mbit/s)".

Replace, in the second column of Table B.2, all occurrences of "Modal bandwidth (MHz × km)" *with* "Bandwidth (Mbit/s)".

Replace, in the third column of Table B.2, all occurrences of "MHz" *with* "Mbit/s".

Replace the existing Table B.5 with the following new table:

Table B.5 – Recognized fibre types

Fibre type	Supported fibres	Designations	Bandwidth at 850 nm/1 310 nm	Standard
Multimode	62,5 µm/125 µm	OM1	200 MHz × km/500 MHz × km	IEC 60793-2-10, type A1-OM1
	62,5 µm/ 200 µm/230 µm	OM1	200 MHz × km/500 MHz × km	IEC 60793-2-30, type A3g
	50 µm/125 µm	OM2	500 MHz × km/500 MHz × km	IEC 60793-2-10, type A1-OM2
		OM3	2 000 MHz × km/ 500 MHz × km	IEC 60793-2-10, type A1-OM3
		OM4	4 700 MHz × km/ 500 MHz × km	IEC 60793-2-10, type A1-OM4
		OM5	4 700 MHz × km/ 500 MHz × km	IEC 60793-2-10, type A1-OM5
	50 µm/200 µm/ 230 µm	OM2	400 MHz × km/ 400 MHz × km	IEC 60793-2-30, type A3f
Single-mode	9 µm/125 µm	OS1	N/A	IEC 60793-2-50, type B-652.B
		OS2	N/A	IEC 60793-2-50, type B-652.D
Setp Index Multimode	980 µm/1 000 µm	N/A	4 MHz × km	IEC 60793-2-40, type A4a.2 and A4d

Add, in all cells of the second column of Table B.6, ",OM5" *at the end of the list of supported fibre types.*

Replace, in the last row of Table B.6, "1000BASE-LX10" *with* "1000BASE-LX10 and 100BASE-LX10".

B.4.4.1.2.1 Balanced cables for Ethernet-based CPs

Replace, in Table B.8, all occurrences of "ANSI/TIA 568-C.2" *with* "ANSI/TIA 568.2-D".

Replace, in Table B.8, in row "Conductor Gauge", the contents of the right cell with "0,40 mm to 0,65 mm (26AWG to 22AWG)".

Delete, in Table B.8, rows for "Coupling Attenuation", "Shielding Effectiveness", "TCL", and "ELTCTL".

Add, after Table B.9, the following new text:

Where category 6 or 6a cables are used, the extended requirements of ANSI/TIA 568.2-D apply in addition to the requirements listed in this Subclause B.4.4.1.2.1.

Replace all existing text and tables at the end of the subclause beginning at "Modification:" with the following new text and tables:

Addition:

Cables shall be selected based on ability to support one of the four options of channel and link electromagnetic performance as defined below.

a) The UTP cable supporting 10BASE-T or 100BASE-T applications shall be selected and installed based on the ability to meet the Transverse Conversion Loss (TCL) and Equal Level Transverse Conversion Transfer Loss (ELTCTL) requirements at both ends of the cabling in accordance with Table B.27 and the environment local to the cabling.

Table B.27 – Unbalance attentuation limits for unshielded twisted-pair cabling serving 10BASE-T and 100BASE-T applications

Parameter	Frequency MHz	Limit dB[a]
TCL	$1 \le f < 100$	Compliant with ISO/IEC 11801 series
ELTCTL	$1 \le f < 30$	Compliant with ISO/IEC 11801 series
[a] Limits are applicable to all environmental classifications aligned with delineation in ISO/IEC 11801-1.		

b) The UTP cable supporting 1000BASE-T applications shall be selected and installed based on the ability to meet the Transverse Conversion Loss (TCL) and Equal Level Transverse Conversion Transfer Loss (ELTCTL) requirements at both ends of the cabling in accordance with Table B.28 and the environment local to the cabling.

Table B.28 – Unbalance attenuation limits for unshielded twisted-pair cabling serving 1000BASE-T applications with enhanced components

Parameter	Frequency MHz	Limit dB		
		E1	**E2**	**E3**
TCL	$1 \le f < 30$ $1 \le f \le 100$	Compliant with ISO/IEC 11801 series	$69{,}2 - 15 \times \log_{10}(f)$ $76{,}6 - 20 \times \log_{10}(f)$ (max. 40 dB)	$79{,}2 - 15 \times \log_{10}(f)$ $86{,}6 - 20 \times \log_{10}(f)$ (max. 46 dB)
ELTCTL	$1 \le f < 30$	Compliant with ISO/IEC 11801 series	$42 - 20 \times \log_{10}(f)$ (max. 40 dB)	$52 - 20 \times \log_{10}(f)$ (max. 40 dB)

c) The UTP cable supporting 1000BASE-T applications shall be selected and installed based on the ability to meet the Transverse Conversion Loss (TCL) and Equal Level Transverse Conversion Transfer Loss (ELTCTL) requirements at both ends of the cabling while also restricting the insertion loss and indirectly the associated cable length in accordance with Table B.29 and the environment local to the cabling. Under this condition the nominal maximum cable length is limited to 72 m instead of the expected 100 m.

Table B.29 – Unbalance attenuation limits for unshielded twisted-pair cabling serving 1000BASE-T applications with length derating

Parameter	Frequency MHz	Limit dB[a]
Insertion Loss	$1 \le f \le 100$	$0,72 \times \left(1,967\sqrt{f} + 0,023 \times f + 0,1/\sqrt{f}\right)$
TCL	$1 \le f \le 100$	Compliant with ISO/IEC 11801 series
ELTCTL	$1 \le f \le 30$	Compliant with ISO/IEC 11801 series
[a] Limits are applicable to all environmental classifications aligned with delineation in ISO/IEC 11801-1.		

d) The shielded cable shall be selected and installed based on the ability to meet the coupling attenuation requirements at both ends of the cabling in accordance with Table B.30 and the environment local to the cabling. Coupling attenuation (see Table B.30) shall be measured in accordance with IEC 61156-5.

Table B.30 – Coupling attenuation limits for screened twisted-pair cabling

Parameter	Frequency MHz	Limit dB[a]
Coupling Attenuation	$30 \le f \le 100$	Compliant with ISO/IEC 11801 series
[a] Limits are applicable to all environmental classifications aligned with delineation in ISO/IEC 11801-1		

B.4.4.1.4 Optical fibre cables

Replace the existing Table B.15 with the following new table:

Table B.15 – Information relevant to optical fibre cables

Characteristic	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
Standard	OS1 or OS2	OM2, OM3, OM4, OM5	OM1	--	--
Maximum attenuation per km (650 nm)	–	–	–	18 dB	12 dB
Maximum attenuation per km (820 nm)	–	2,5 dB	3,0 dB	–	–
Maximum attenuation per km (1 310 nm)	0,4 dB	0,8 dB	1,0 dB	–	–
Number of optical fibres	2 minimum	2 minimum	2 minimum	–	–
Connector type (e.g. duplex or simplex)	Duplex, duplex-able, simplex	Duplex, duplex-able, simplex	Duplex, duplex-able, simplex	–	–
Jacket colour requirements	User defined	User defined	User defined	–	–
Jacket material	User defined	User defined	User defined	–	–
Resistance to harsh environment (e.g. UV, oil resist, LS0H)	As needed to support application and environment	As needed to support application and environment	As needed to support application and environment	–	–