

© Copyright SEK. Reproduction in any form without permission is prohibited.

Industriell processtyrning – Profiler – Del 5-18: Installation av fältbussar – Installationsprofiler för CPF 18 (SafetyNET p)

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

Som svensk standard gäller europastandarden EN 61784-5-18:2013. Den svenska standarden innehåller den officiella engelska språkversionen av EN 61784-5-18:2013.

Nationellt förord

Europastandarden EN 61784-5-18:2013

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 61784-5-18, First edition, 2013 - Industrial communication networks - Profiles - Part 5-18: Installation of fieldbuses - Installation profiles for CPF 18**

utarbetad inom International Electrotechnical Commission, IEC.

Standarden ska användas tillsammans med SS-EN 61918, utgåva 2, 2014.

ICS 35.100.40; 25.040.40

Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a säkerhet, prestanda, dokumentation, utförande och skötsel av elprodukter, elanläggningar och metoder. Genom att utforma sådana standarder blir säkerhetskraven tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringssarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utdriften av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringssarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringssverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtidens standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard

Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

English version

**Industrial communication networks -
Profiles -
Part 5-18: Installation of fieldbuses -
Installation profiles for CPF 18
(IEC 61784-5-18:2013)**

Réseaux de communication industriels -
Profils -
Partie 5-18: Installation des bus de terrain
- Profils d'installation pour CPF 18
(CEI 61784-5-18:2013)

Industrielle Kommunikationsnetze -
Profile -
Teil 5-18: Feldbusinstallation -
Installationsprofile für die
Kommunikationsprofilfamilie 18
(IEC 61784-5-18:2013)

This European Standard was approved by CENELEC on 2013-10-22. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC
European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 65C/738/FDIS, future edition 1 of IEC 61784-5-18, prepared by SC 65C "Industrial networks" of IEC/TC 65 "Industrial-process measurement, control and automation" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61784-5-18:2013.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-07-22
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2016-10-22

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

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 61784-5-18:2013 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61158-3-22	NOTE	Harmonized as EN 61158-3-22.
IEC 61158-4-22	NOTE	Harmonized as EN 61158-4-22.
IEC 61158-5-22	NOTE	Harmonized as EN 61158-5-22.
IEC 61158-6-22	NOTE	Harmonized as EN 61158-6-22.

Annex ZA
(normative)

**Normative references to international publications
with their corresponding European publications**

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Annex ZA of EN 61918:2013 applies, except as follows:

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
--------------------	-------------	--------------	--------------	-------------

Addition to Annex ZA of EN 61918:2013:

IEC 61918	2013	Industrial communication networks - Installation of communication networks in industrial premises	EN 61918	2013
-----------	------	---	----------	------

CONTENTS

INTRODUCTION.....	8
1 Scope.....	9
2 Normative references	9
3 Terms, definitions and abbreviated terms	9
4 CPF 18: Overview of installation profiles	9
5 Installation profile conventions	9
6 Conformance to installation profiles.....	10
Annex A (normative) CP 18/1 and CP 18/2 (SafetyNET p) 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	11
A.3.3 Conventions for installation profiles.....	11
A.4 Installation planning	11
A.4.1 Général	11
A.4.1.1 Objective	11
A.4.1.2 Cabling in industrial premises	11
A.4.1.3 The planning process	11
A.4.1.4 Specific requirements for CPs	11
A.4.1.5 Specific requirements for generic cabling in accordance with ISO/IEC 24702	11
A.4.2 Planning requirements.....	11
A.4.2.1 Safety.....	11
A.4.2.2 Security	11
A.4.2.3 Environmental considerations and EMC.....	12
A.4.2.4 Specific requirements for generic cabling in accordance with ISO/IEC 24702	12
A.4.3 Network capabilities	12
A.4.3.1 Network topology.....	12
A.4.3.2 Network characteristics	12
A.4.4 Selection and use of cabling components	14
A.4.4.1 Cable selection	14
A.4.4.2 Connecting hardware selection	15
A.4.4.3 Connections within a channel/permanent link	16
A.4.4.4 Terminators	17
A.4.4.5 Device location and connection.....	17
A.4.4.6 Coding and labelling	17
A.4.4.7 Earthing and bonding of equipment and devices and shielded cabling	18
A.4.4.8 Storage and transportation of cables.....	18
A.4.4.9 Routing of cables	19
A.4.4.10 Separation of circuit	19
A.4.4.11 Mechanical protection of cabling components	19

A.4.4.12 Installation in special areas	19
A.4.5 Cabling planning documentation	19
A.4.5.1 Common description	19
A.4.5.2 Cabling planning documentation for CPs	19
A.4.5.3 Network certification documentation	19
A.4.5.4 Cabling planning documentation for generic cabling in accordance with ISO/IEC 24702	19
A.4.6 Verification of cabling planning specification	19
A.5 Installation implementation	19
A.5.1 General requirements	19
A.5.1.1 Common description	19
A.5.1.2 Installation of CPs	19
A.5.1.3 Installation of generic cabling in industrial premises	19
A.5.2 Cable installation	20
A.5.2.1 General requirements for all cabling types	20
A.5.2.2 Installation and routing	21
A.5.2.3 Specific requirements for CPs	21
A.5.2.4 Specific requirements for wireless installation	21
A.5.2.5 Specific requirements for generic cabling in accordance with ISO/IEC 24702	21
A.5.3 Connector installation	22
A.5.3.1 Common description	22
A.5.3.2 Shielded connectors	22
A.5.3.3 Unshielded connectors	22
A.5.3.4 Specific requirements for CPs	22
A.5.3.5 Specific requirements for generic cabling in accordance with ISO/IEC 24702	22
A.5.4 Terminator installation	22
A.5.5 Device installation	22
A.5.5.1 Common description	22
A.5.5.2 Specific requirements for CPs	22
A.5.6 Coding and labelling	22
A.5.6.1 Common description	22
A.5.6.2 Specific requirements for CPs	22
A.5.7 Earthing and bonding of equipment and devices and shield cabling	22
A.5.7.1 Common description	22
A.5.7.2 Bonding and earthing of enclosures and pathways	22
A.5.7.3 Earthing methods	22
A.5.7.4 Shield termination methods	22
A.5.7.5 Specific requirements for CPs	23
A.5.7.6 Specific requirements for generic cabling in accordance with ISO/IEC 24702	23
A.5.8 As-implemented cabling documentation	23
A.6 Installation verification and installation acceptance test	23
A.6.1 General	23
A.6.2 Installation verification	23
A.6.2.1 General	23
A.6.2.2 Verification according to cabling planning documentation	23
A.6.2.3 Verification of earthing and bonding	23
A.6.2.4 Verification of shield earthing	23

A.6.2.5	Verification of cabling system.....	23
A.6.2.6	Cable selection verification	23
A.6.2.7	Connector verification	23
A.6.2.8	Connection verification.....	23
A.6.2.9	Terminators verification.....	24
A.6.2.10	Coding and labelling verification	24
A.6.2.11	Verification report	24
A.6.3	Installation acceptance test.....	24
A.6.3.1	General	24
A.6.3.2	Acceptance test of Ethernet-based cabling	24
A.6.3.3	Acceptance test of non-Ethernet-based cabling	24
A.6.3.4	Specific requirements for wireless installation.....	24
A.6.3.5	Acceptance test report.....	24
A.7	Installation administration.....	25
A.7.1	General	25
A.7.2	Fields covered by the administration	25
A.7.3	Basic principles for the administration system	25
A.7.4	Working procedures	25
A.7.5	Device location labelling.....	25
A.7.6	Component cabling labelling.....	25
A.7.7	Documentation	25
A.7.8	Specific requirements for administration	25
A.8	Installation maintenance and installation troubleshooting	25
A.8.1	General	25
A.8.2	Maintenance.....	25
	A.8.2.1 Scheduled maintenance	25
	A.8.2.2 Condition-based maintenance	25
	A.8.2.3 Corrective maintenance	25
A.8.3	Troubleshooting	25
	A.8.3.1 General description	25
	A.8.3.2 Evaluation of the problem	25
	A.8.3.3 Typical problems	25
	A.8.3.4 Troubleshooting procedure	25
	A.8.3.5 Simplified troubleshooting procedure	25
A.8.4	Specific requirements for maintenance and troubleshooting	25
Bibliography	26
Figure 1 – Standards relationships.....	8	
Table A.1 – Network characteristics for balanced cabling based on Ethernet	13	
Table A.2 – Network characteristics for optical fibre cabling.....	13	
Table A.3 – Information relevant to copper cable: fixed cables.....	14	
Table A.4 – Information relevant to copper cable: cords.....	14	
Table A.5 – Information relevant to optical fibre cables	15	
Table A.6 – Connectors for balanced cabling CPs based on Ethernet	15	
Table A.7 – Optical fibre connecting hardware	16	
Table A.8 – Relationship between FOC and fibre types (CP 18/1 and CP 18/2)	16	
Table A.9 – Parameters for balanced cables	20	

Table A.10 – Parameters for silica optical fibre cables	20
Table A.11 – Parameters for POF optical fibre cables	20
Table A.12 – Parameters for hard clad silica optical fibre cables.....	21

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 61784-5-18 for CPF 18), allows readers to work with standards of a convenient size.

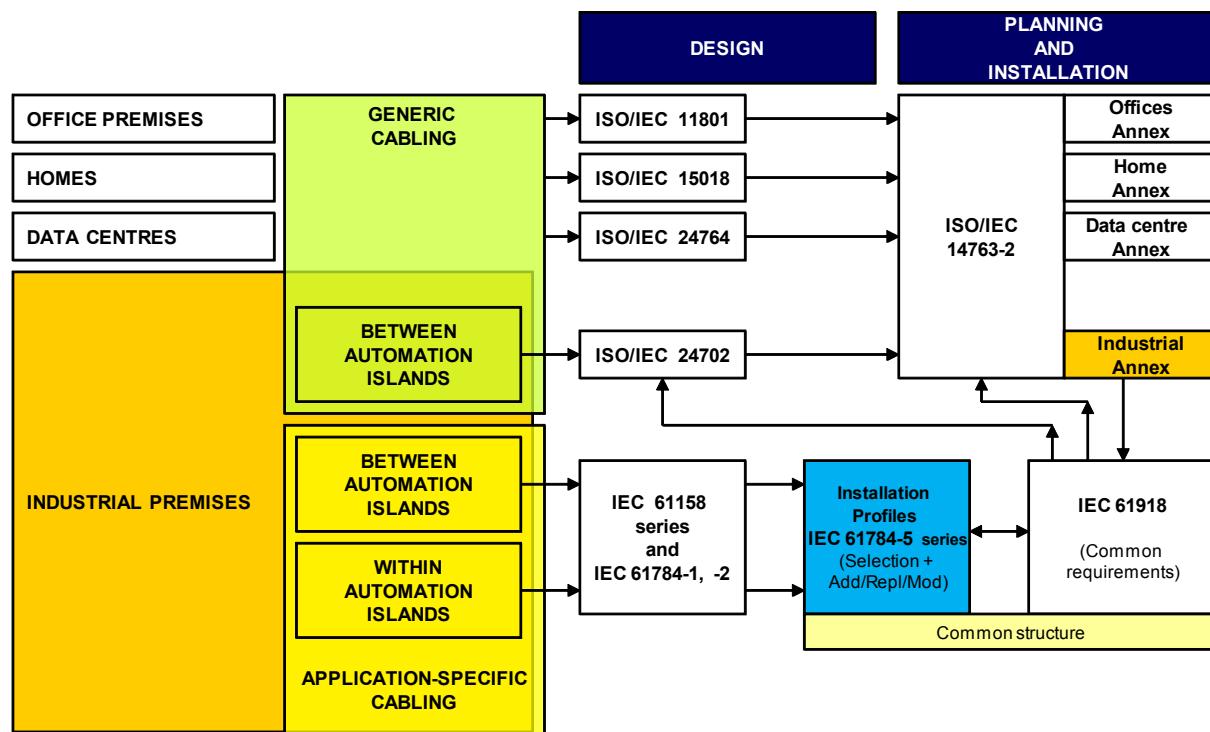


Figure 1 – Standards relationships

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 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.

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 does not require use of the trade name SafetyNET p. Use of the trade name SafetyNET p requires permission of the trade name holder.