IEC 61784-5-14

Edition 1.0 2010-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Industrial communication networks – Profiles –
Part 5-14: Installation of fieldbuses – Installation profiles for CPF 14

Réseaux de communication industriels – Profils –
Partie 5-14: Installation de bus de terrain – Profils d'installation pour CPF 14

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

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International Standard IEC 61784-5-14 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 61918:2010.

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- withdrawn,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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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 61784-5-14 for CPF 14), allows readers to work with standards of a convenient size.

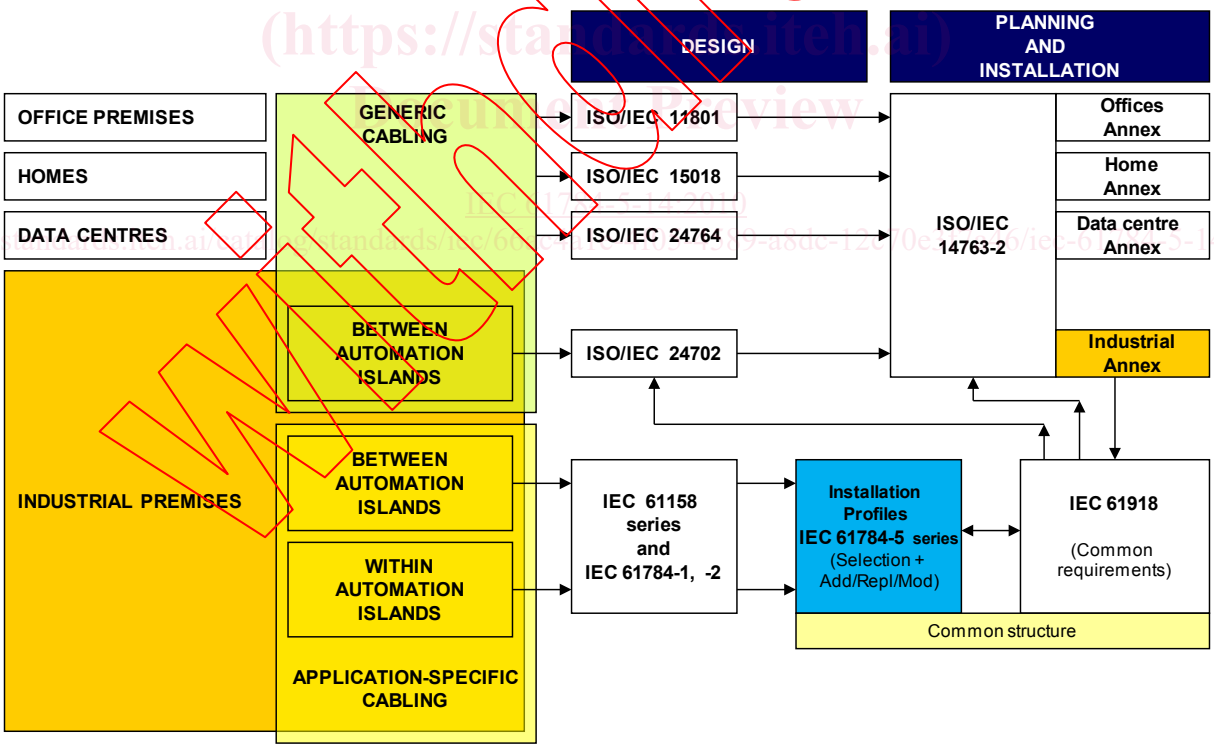

Figure 1 – Standards relationships

INDUSTRIAL COMMUNICATION NETWORKS – PROFILES –

Part 5-14: Installation of fieldbuses – Installation profiles for CPF 14

1 Scope

This part of IEC 61784 specifies the installation profiles for CPF 14 (EPA)[1].

The installation profiles are 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.

4 CPF 14: Overview of installation profiles

CPF 14 consists of two communication profiles as specified in IEC 61784-2.

The installation requirements for CP 14/1 and CP 14/2 (EPA) 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.

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

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[1] EPA is the technology name of the CPF14. EPA is the trade name of Zhejiang SUPCON Technology Group Co. Ltd, China. 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 profile does not require use of the trade name. Use of the trade name requires permission of the trade name holder.

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 "(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 61784-5-14:2010 [3] for CP 14/m<name> or

Compliance to IEC 61784-5-14 (Ed.1.0) for CP 14/m <name>

where the name within the angle brackets < > is optional and the angle brackets are not to be included. The m within CP 14/m shall be replaced by the profile number 1 to 2.

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

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).

2 In accordance with ISO/IEC Directives

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

Annex A
(normative)

CP 14/1 and 14/2 (EPA) specific installation profile

A.1 Installation profile scope

Addition:

This standard specifies the installation profile for Communication Profile CP 14/1 and CP 14/2 (EPA). The CP 14/1 and CP 14/2 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.

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.

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 Electric safety

A.4.2.1.3 Functional safety

A.4.2.1.4 Intrinsic safety

Addition:

Intrinsic safety functionality may be required for the devices mounted in the area with flammable gases or fuels according to the relevant national, or local regulations.

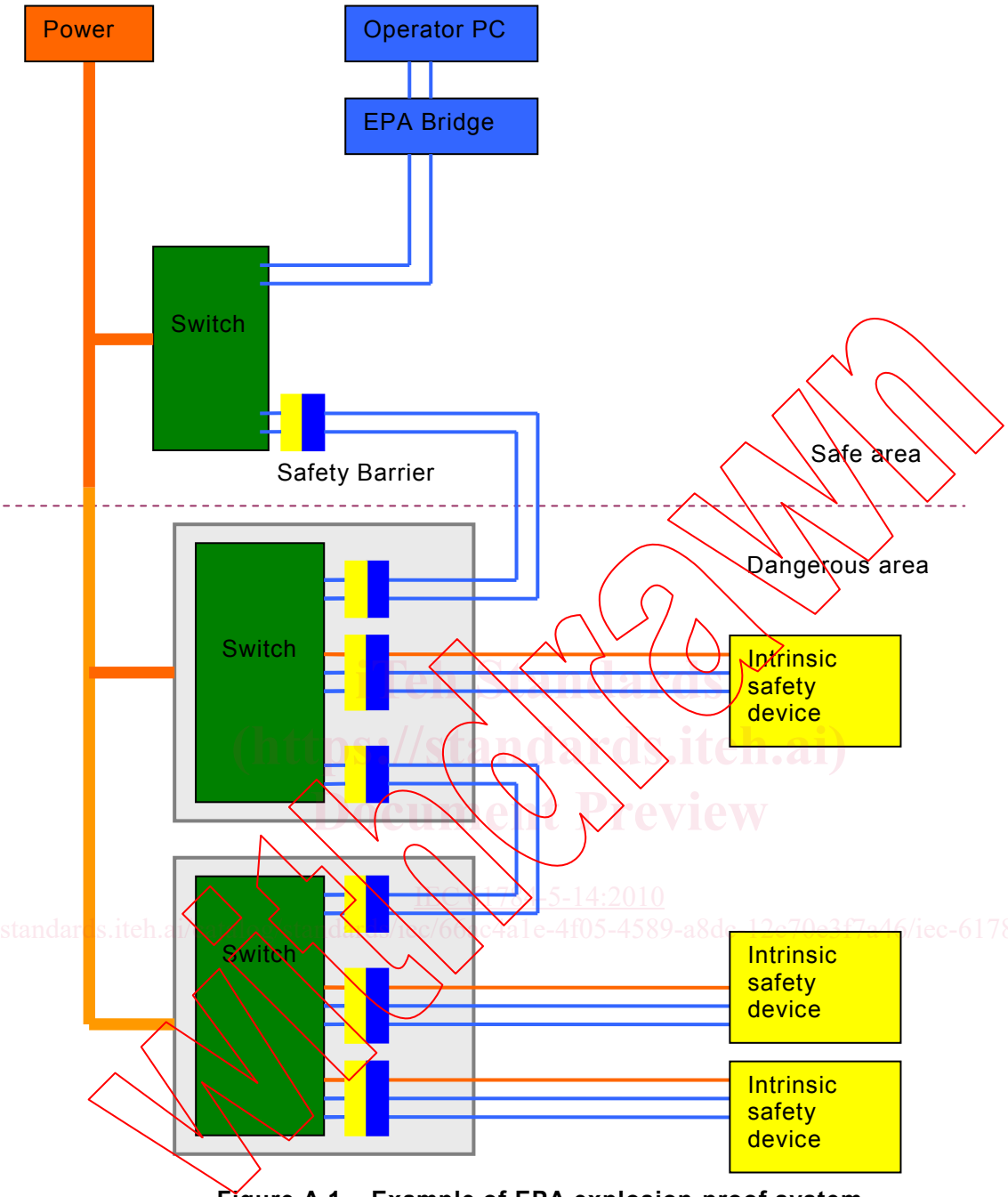

Figure A.1 – Example of EPA explosion-proof system

For example (see Figure A.1), among EPA explosion-proof systems, switches are in explosion-proof field boxes, and field devices are intrinsically safe. In intrinsic safety system, each intrinsically safe device should be connected with three safety barriers. Two of them are connected with the sending signal pairs (TX+/TX-) and the receiving signal pairs (RX+/RX-), and the other one is connected with the power supply. Power cable to explosion-proof field box should be protected by flexible pipes.

Intrinsic safety devices shall be connected to the normal devices in a safe area through a safety barrier. Either zener safety barriers or isolated safety barriers can be used.

If zener safety barriers are used, the safety barrier and the intrinsic safety device shall be both connected to intrinsic safety earth, so that the voltage on the cable can be safely restricted. The intrinsic safety earth can be the same as the functional earth of the devices.

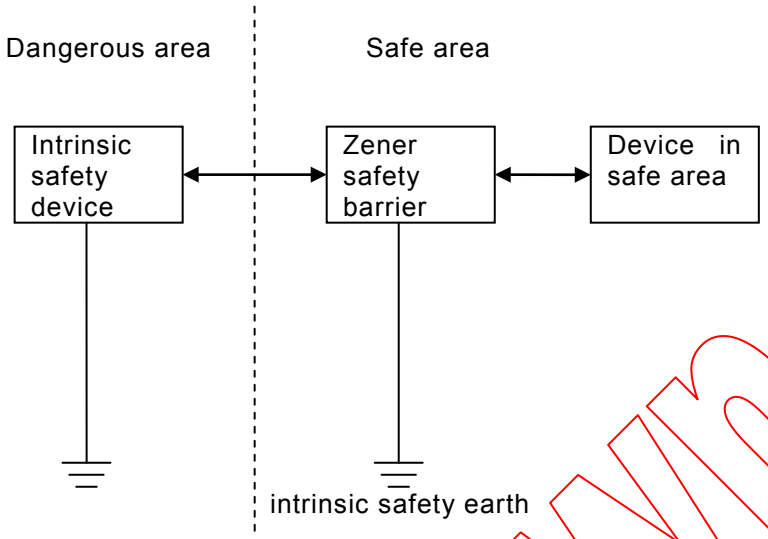

Figure A.2 – Earth of zener safety barrier

If isolated safety barriers are used, the barriers do not need to be earthed. The intrinsic safety device may be earthed or not, which is up to the functional request.

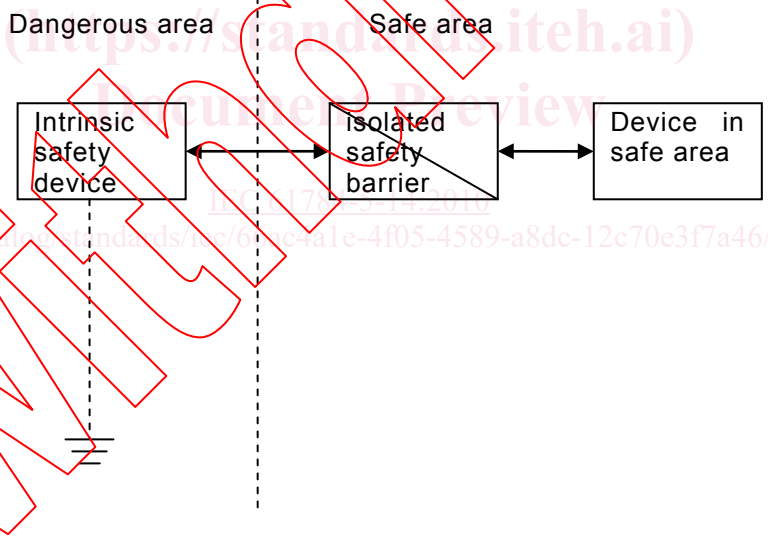

Figure A.3 – Earth of zener safety barrier

A.4.2.1.5 Safety of optical fibre communication systems

A.4.2.2 Security

Addition:

EPA security boundary devices contain an EPA bridge and EPA devices.

Messages from monitor layer to field device should be checked by EPA bridge. EPA bridge should check the type of protocol, source IP address, source MAC address, destination IP address, destination MAC address, link object, and password etc.

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

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

Not applicable.

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

Characteristic	CP 14/1	CP 14/2
Supported data rates (Mbit/s)	10, 100, 1 000	10, 100, 1 000[d]
Supported channel length (m) [b]	100	100
Number of connections in the channel (max.) [a b]	4	4
Patch cord length (m) [a]	See IEC 61918:2010, Clause 4 and ISO/IEC 24702	See IEC 61918:2010, Clause 4 and ISO/IEC 24702
Channel class per ISO/IEC 24702 (min.) [b]	D	D
Cable category per ISO/IEC 24702 (min.) [c]	5	5
Connecting HW category per ISO/IEC 24702 (min.)	5	5
Cable types	No requirement	No requirement

a See 4.4.3.2.

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

c For additional information see IEC 61156 series.

d If system needs power over Ethernet or Intrinsic safety,1 000 Mbit/s data rate should not be used.