

**Industrial communication networks - Profiles - Part 1:
Fieldbus profiles**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 61784-1:2014 sisaldab Euroopa standardi EN 61784-1:2014 inglisekeelset teksti.	This Estonian standard EVS-EN 61784-1:2014 consists of the English text of the European standard EN 61784-1:2014.
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English Version

**Industrial communication networks - Profiles - Part 1: Fieldbus
profiles
(IEC 61784-1:2014)**

Réseaux de communication industriels - Profils - Partie 1:
Profils de bus de terrain
(CEI 61784-1:2014)

Industrielle Kommunikationsnetze - Profile - Teil 1:
Feldbusprofile
(IEC 61784-1:2014)

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Foreword

The text of document 65C/760/FDIS, future edition 4 of IEC 61784-1, prepared by IEC/TC 65C "Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61784-1:2014.

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- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2015-06-23
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2017-09-23

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

IEC 60079-14	NOTE	Harmonised as EN 60079-14.
IEC 60793 (Series)	NOTE	Harmonised as EN 60793 (Series).
IEC 61131-3	NOTE	Harmonised as EN 61131-3.
IEC 61158-1	NOTE	Harmonised as EN 61158-1.
IEC 61800-7-204	NOTE	Harmonised as EN 61800-7-204.
ISO/IEC 7498-3	NOTE	Harmonised as EN ISO/IEC 7498-1.

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 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60079-11	-	Explosive atmospheres -- Part 11: Equipment protection by intrinsic safety "i"	EN 60079-11	-
IEC 60079-25	-	Explosive atmospheres -- Part 25: Intrinsically safe electrical systems	EN 60079-25	-
IEC 61010	series	Safety requirements for electrical equipment for measurement, control and laboratory use	+AC -	2013 series
IEC 61131-2	-	Programmable controllers -- Part 2: Equipment requirements and tests	EN 61131-2	-
IEC 61158	series	Industrial communication networks - Fieldbus specifications	EN 61158	series
IEC 61158-2	2014	Industrial communication networks - Fieldbus specifications - Part 2: Physical layer specification and service definition	EN 61158-2	2014
IEC 61158-3-1	2014	Industrial communication networks - Fieldbus specifications - Part 3-1: Data-link layer service definition - Type 1 elements	EN 61158-3-1	2014
IEC 61158-3-2	2014	Industrial communication networks - Fieldbus specifications - Part 3-2: Data-link layer service definition - Type 2 elements	EN 61158-3-2	2014
IEC 61158-3-3	2014	Industrial communication networks - Fieldbus specifications - Part 3-3: Data-link layer service definition - Type 3 elements	EN 61158-3-3	2014
IEC 61158-3-4	2014	Industrial communication networks - Fieldbus specifications - Part 3-4: Data-link layer service definition - Type 4 elements	EN 61158-3-4	2014
IEC 61158-3-7	2007	Industrial communication networks - Fieldbus specifications - Part 3-7: Data-link layer service definition - Type 7 elements	EN 61158-3-7	2008
IEC 61158-3-8	2007	Industrial communication networks - Fieldbus specifications - Part 3-8: Data-link layer service definition - Type 8 elements	EN 61158-3-8	2008
IEC 61158-3-16	2007	Industrial communication networks - Fieldbus specifications - Part 3-16: Data-link layer service definition - Type 16 elements	EN 61158-3-16	2008
IEC 61158-3-18	2007	Industrial communication networks - Fieldbus specifications - Part 3-18: Data-link layer service definition - Type 18 elements	EN 61158-3-18	2008
IEC 61158-3-19	2014	Industrial communication networks - Fieldbus specifications - Part 3-19: Data-link layer service definition - Type 19 elements	EN 61158-3-19	2014

IEC 61158-3-20	2014	Industrial communication networks - Fieldbus specifications - Part 3-20: Data- link layer service definition - Type 20 elements	EN 61158-3-20	2014
IEC 61158-3-24	2014	Industrial communication networks - Fieldbus specifications - Part 3-24: Data- link layer service definition - Type-24 elements	EN 61158-3-24	2014
IEC 61158-4-1	2014	Industrial communication networks - Fieldbus specifications - Part 4-1: Data-link layer protocol specification - Type 1 elements	EN 61158-4-1	2014
IEC 61158-4-2	2014	Industrial communication networks - Fieldbus specifications - Part 4-2: Data-link layer protocol specification - Type 2 elements	EN 61158-4-2	2014
IEC 61158-4-3	2014	Industrial communication networks - Fieldbus specifications - Part 4-3: Data-link layer protocol specification - Type 3 elements	EN 61158-4-3	2014
IEC 61158-4-4	2014	Industrial communication networks - Fieldbus specifications - Part 4-4: Data-link layer protocol specification - Type 4 elements	EN 61158-4-4	2014
IEC 61158-4-7	2007	Industrial communication networks - Fieldbus specifications - Part 4-7: Data-link layer protocol specification - Type 7 elements	EN 61158-4-7	2008
IEC 61158-4-8	2007	Industrial communication networks - Fieldbus specifications - Part 4-8: Data-link layer protocol specification - Type 8 elements	EN 61158-4-8	2008
IEC 61158-4-16	2007	Industrial communication networks - Fieldbus specifications - Part 4-16: Data- link layer protocol specification - Type 16 elements	EN 61158-4-16	2008
IEC 61158-4-16	2007	Industrial communication networks - Fieldbus specifications - Part 4-16: Data- link layer protocol specification - Type 16 elements	EN 61158-4-16	2008
IEC 61158-4-18	2010	Industrial communication networks - Fieldbus specifications -- Part 4-18: Data- link layer protocol specification - Type 18 elements	EN 61158-4-18	2012
IEC 61158-4-18	2010	Industrial communication networks - Fieldbus specifications -- Part 4-18: Data- link layer protocol specification - Type 18 elements	EN 61158-4-18	2012
IEC 61158-4-19	2014	Industrial communication networks - Fieldbus specifications - Part 4-19: Data- link layer protocol specification - Type 19 elements	EN 61158-4-19	2014
IEC 61158-4-20	2014	Industrial communication networks - Fieldbus specifications - Part 4-20: Data- link layer protocol specification - Type 20 elements	EN 61158-4-20	2014
IEC 61158-4-24	2014	Industrial communication networks - Fieldbus specifications - Part 4-24: Data- link layer protocol specification - Type 24 elements	EN 61158-4-24	2014

IEC 61158-5-2	2014	Industrial communication networks - Fieldbus specifications -- Part 5-2: Application layer service definition - Type 2 elements	EN 61158-5-2	2014
IEC 61158-5-3	2014	Industrial communication networks - Fieldbus specifications - Part 5-3: Application layer service definition - Type 3 elements	EN 61158-5-3	2014
IEC 61158-5-4	2014	Industrial communication networks - Fieldbus specifications - Part 5-4: Application layer service definition - Type 4 elements	EN 61158-5-4	2014
IEC 61158-5-5	2014	Industrial communication networks - Fieldbus specifications - Part 5-5: Application layer service definition - Type 5 elements	EN 61158-5-5	2014
IEC 61158-5-7	2007	Industrial communication networks - Fieldbus specifications - Part 5-7: Application layer service definition - Type 7 elements	EN 61158-5-7	2008
IEC 61158-5-8	2007	Industrial communication networks - Fieldbus specifications - Part 5-8: Application layer service definition - Type 8 elements	EN 61158-5-8	2008
IEC 61158-5-9	2014	Industrial communication networks - Fieldbus specifications - Part 5-9: Application layer service definition - Type 9 elements	EN 61158-5-9	2014
IEC 61158-5-16	2007	Industrial communication networks - Fieldbus specifications - Part 5-16: Application layer service definition - Type 16 elements	EN 61158-5-16	2008
IEC 61158-5-18	2010	Industrial communication networks - Fieldbus specifications -- Part 5-18: Application layer service definition - Type 18 elements	EN 61158-5-18	2012
IEC 61158-5-19	2014	Industrial communication networks - Fieldbus specifications - Part 5-19: Application layer service definition - Type 19 elements	EN 61158-5-19	2014
IEC 61158-5-20	2014	Industrial communication networks - Fieldbus specifications - Part 5-20: Application layer service definition - Type 20 elements	EN 61158-5-20	2014
IEC 61158-5-24	2014	Industrial communication networks - Fieldbus specifications - Part 5-24: Application layer service definition - Type 24 elements	EN 61158-5-24	2014
IEC 61158-6-2	2014	Industrial communication networks - Fieldbus specifications - Part 6-2: Application layer protocol specification - Type 2 elements	FprEN 61158-6-2	2014
IEC 61158-6-3	2014	Industrial communication networks - Fieldbus specifications - Part 6-3: Application layer protocol specification - Type 3 elements	EN 61158-6-3	2014
IEC 61158-6-4	2014	Industrial communication networks - Fieldbus specifications - Part 6-4: Application layer protocol specification - Type 4 elements	EN 61158-6-4	2014

IEC 61158-6-5	2014	Industrial communication networks - Fieldbus specifications - Part 6-5: Application layer protocol specification - Type 5 elements	EN 61158-6-5	2014
IEC 61158-6-7	2007	Industrial communication networks - Fieldbus specifications - Part 6-7: Application layer protocol specification - Type 7 elements	EN 61158-6-7	2008
IEC 61158-6-8	2007	Industrial communication networks - Fieldbus specifications - Part 6-8: Application layer protocol specification - Type 8 elements	EN 61158-6-8	2008
IEC 61158-6-9	2014	Industrial communication networks - Fieldbus specifications - Part 6-9: Application layer protocol specification - Type 9 elements	EN 61158-6-9	2014
IEC 61158-6-16	2007	Industrial communication networks - Fieldbus specifications - Part 6-16: Application layer protocol specification - Type 16 elements	EN 61158-6-16	2008
IEC 61158-6-18	2010	Industrial communication networks - Fieldbus specifications - Part 6-18: Application layer protocol specification - Type 18 elements	EN 61158-6-18	2012
IEC 61158-6-19	2014	Industrial communication networks - Fieldbus specifications - Part 6-19: Application layer protocol specification - Type 19 elements	EN 61158-6-19	2014
IEC 61158-6-20	2014	Industrial communication networks - Fieldbus specifications - Part 6-20: Application layer protocol specification - Type 20 elements	EN 61158-6-20	2014
IEC 61158-6-24	2014	Industrial communication networks - Fieldbus specifications - Part 6-24: Application layer protocol specification - Type-24 Elements	EN 61158-6-24	2014
IEC 61784-2	2014	Industrial communication networks - Profiles - Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC 8802-3	EN 61784-2	2014
IEC 61784-5-2	2013	Industrial communication networks - Profiles -- Part 5-2: Installation of fieldbuses - Installation profiles for CPF 2	EN 61784-5-2	2013
IEC 61918 (mod)	2013	Industrial communication networks - Installation of communication networks in industrial premises	EN 61918	2013
			+AC	2014
			+AA	201X
IEC 62026-3	-	Low-voltage switchgear and controlgear Controller-device interfaces (CDIs) -- Part 3: Device Net	-	-
IEC 62591	2010	Industrial communication networks - Wireless communication network and communication profiles - WirelessHART™	EN 62591	2010
ISO 15745-3	2003	Industrial automation systems and integration - Open systems application integration framework -- Part 3: Reference description for IEC 61158 based control systems	-	-

ISO 15745-4	2003	Industrial automation systems and integration - Open systems application integration framework - Part 4: Reference description for Ethernet-based control systems	-	-
ISO/IEC 8482	-	Information technology - Telecommunications and information exchange between systems - Twisted pair multipoint interconnections	-	-
ISO/IEC 8802-2	1998	Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements -- Part 2: Logical link control	-	-
ISO/IEC 8802-3	2000	Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications	-	-
ISO/IEC 15802-3	-	Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Common specifications - Part 3: Media Access Control (MAC) Bridges	-	-
ANSI TIA/EIA-485-A		Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems	-	-
IEEE 802.3	2002	Information technology - Telecommunications and information exchange between systems; Local and metropolitan area networks; Specific requirements - Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications	-	-
IETF RFC 1112	-	Host Extensions for IP Multicasting	-	-
IETF RFC 1122	-	Requirements for Internet Hosts - Communication Layers	-	-
IETF RFC 1123	-	Requirements for Internet Hosts - Application and Support	-	-
IETF RFC 1127	-	A Perspective on the Host Requirements RFCs	-	-
IETF RFC 2236	-	Internet Group Management Protocol	-	-
IETF RFC 768	-	User Datagram Protocol	-	-
IETF RFC 791	-	Internet Protocol - DARPA Internet Program Protocol Specification	-	-
IETF RFC 792	-	Internet Control Message Protocol	-	-
IETF RFC 793	-	Transmission Control Protocol - DARPA Internet Program Protocol Specification	-	-
IETF RFC 826	-	An Ethernet Address Resolution Protocol - or - Converting Network Protocol Addresses to 48.bit Ethernet Address for Transmission on Ethernet Hardware	-	-
IETF RFC 894	-	Standard for the Transmission of IP Datagrams over Ethernet Networks	-	-

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INTRODUCTION

This part of IEC 61784 provides a set of Communication Profiles (CP) in the sense of ISO/IEC TR 10000-1. These answer the need of identifying the protocol families co-existing within the IEC 61158 series, as a result of the international harmonization of fieldbus technologies available on the market. More specifically, these profiles help to correctly state the compliance to the IEC 61158 series, and to avoid the spreading of divergent implementations, which would limit its use, clearness and understanding. Additional profiles to address specific market concerns, such as functional safety or information security, may be addressed by future parts of this standard.

This standard contains several Communication Profile Families (CPF), which specify one or more communication profiles. Such profiles identify, in a strict sense, protocol subsets of the IEC 61158 series via protocol specific communication profiles. They do not define device-type-specific communication profiles for the purpose of guiding manufacturers in feature set selection – for example, in selecting the minimum set of communication services and protocol to implement a specific class of devices, such as generic slaves or transmitters ("implementation profiles"). Neither do they define device profiles that specify communication profiles together with application functions needed to answer the need of a specific application ("application profiles").

It is agreed that these latter classes of profiles would help the use of the IEC 61158 series of standards; the profiles defined in this document are a necessary step to achieve that task.

It is also important to clarify that interoperability – defined as the ability of two or more network systems to exchange information and to make mutual use of the information that has been exchanged (see 3.2.1 of ISO/IEC TR 10000-1) – can be directly achieved on the same link only for those devices complying to the same communication profile.

Profiles contained in this International Standard are constructed of references to IEC 61158-2 and the IEC 61158-3, IEC 61158-4, IEC 61158-5 and IEC 61158-6 series, and other IS, TS or worldwide-accepted standards, as appropriate¹. Each profile is required to reference at least one (sub)part of IEC 61158-2 through IEC 61158-6.

Two or more Profiles, which are related to a common family, are specified within a "Communication Profile Family" (CPF).

¹ International Standardised Profiles may contain normative references to specifications other than International Standards; see ISO/IEC JTC 1 N 4047.

INDUSTRIAL COMMUNICATION NETWORKS – PROFILES –

Part 1: Fieldbus profiles

1 Scope

This part of IEC 61784 defines a set of protocol specific communication profiles based primarily on the IEC 61158 series, to be used in the design of devices involved in communications in factory manufacturing and process control.

Each profile selects specifications for the communications protocol stack at a device. It contains a minimal set of required services at the application layer and specification of options in intermediate layers defined through references. If no application layer is included, then a minimal set of required services at the Data-link layer is specified. The appropriate references to the protocol specific types are given in each communication profile family or associated profiles.

NOTE All profiles are based on standards or draft standards or International Standards published by the IEC or from standards or International Standards established by other standards bodies or open standards processes.

The structure of communication profile families is specified in Figure 1.

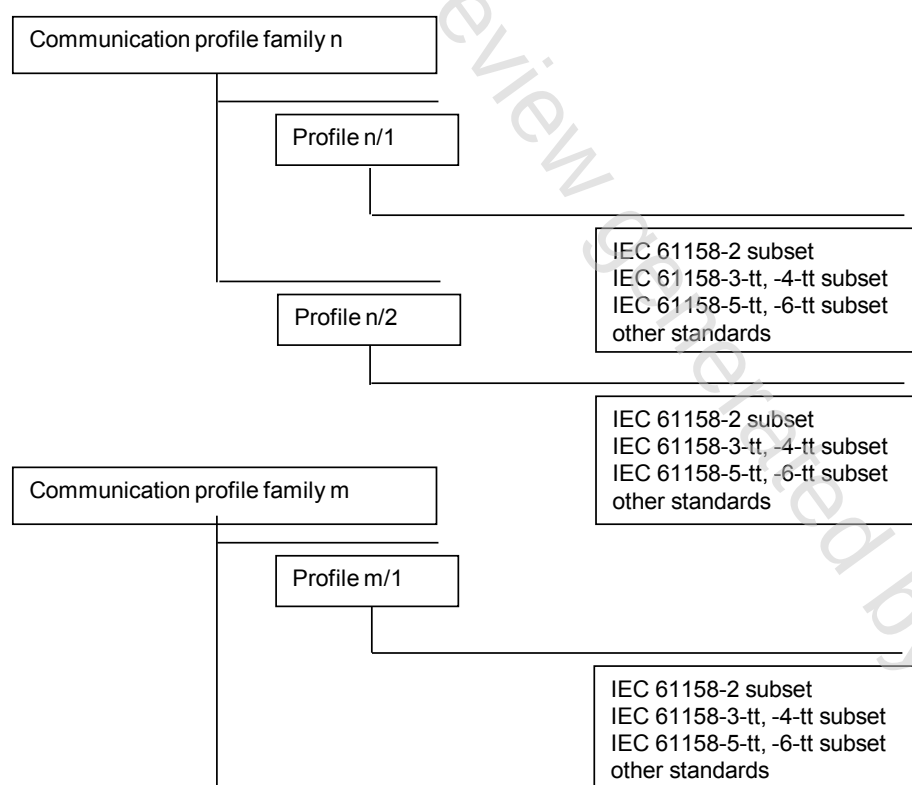


Figure 1 – Communication profile families and profiles

Each profile selects an appropriate consistent and compatible subset of services and protocols from the total available set that is defined and modeled in IEC 61158. For the