

**Industrial communication networks - Wireless
communication network and communication profiles -
WirelessHART**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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**Industrial communication networks -
Wireless communication network and communication profiles -
WirelessHART™
(IEC 62591:2010)**

Réseaux de communication industrielles -
Réseaux de communications sans fil
et profils de communication -
WirelessHART™
(CEI 62591:2010)

Industrielle Kommunikationsnetze -
Kommunikationsnetze
und Kommunikationsprofile -
WirelessHART™
(IEC 62591:2010)

This European Standard was approved by CENELEC on 2010-06-01. 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.

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CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 65C/587/FDIS, future edition 1 of IEC 62591, 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 was approved by CENELEC as EN 62591 on 2010-06-01.

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The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
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- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2013-06-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62591:2010 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 61158-6-9 NOTE Harmonized as EN 61158-6-9.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60559	-	Binary floating-point arithmetic for microprocessor systems	HD 592 S1	-
IEC/TR 61158-1	201X ¹⁾	Industrial communication networks - Fieldbus specifications - Part 1: Overview and guidance for the IEC 61158 and IEC 61784 series	CLC/TR 61158-1	201X ²⁾
IEC 61158-5-20	2007	Industrial communication networks - Fieldbus specifications - Part 5-20: Application layer service definition - Type 20 elements	EN 61158-5-20	2008
IEC 61158-6-20	2007	Industrial communication networks - Fieldbus specifications - Part 6-20: Application layer protocol specification - Type 20 elements	EN 61158-6-20	2008
IEC 61784-1	201X ¹⁾	Industrial communication networks - Profiles - Part 1: Fieldbus profiles	EN 61784-1	201X ³⁾
IEC 61784-2	201X ¹⁾	Industrial communication networks - Profiles - Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC 8802-3	EN 61784-2	201X ³⁾
ISO/IEC 7498-1	-	Information technology - Open Systems Interconnection - Basic Reference Model: The Basic Model	-	-
ISO/IEC 8824	-	Information technology - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1)	-	-
ISO/IEC 8859-1	-	Information technology - 8-bit single-byte coded graphic character sets - Part 1: Latin alphabet No.1	-	-
ISO/IEC 9545	-	Information technology - Open Systems Interconnection - Application Layer structure	-	-
ISO/IEC 10731	-	Information technology - Open Systems Interconnection - Basic reference model - Conventions for the definition of OSI services	-	-

¹⁾ To be published.

²⁾ To be ratified.

³⁾ At draft stage.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEEE 802	2001	IEEE standard for local and metropolitan area - networks: overview and architecture	-	-
IEEE 802.15.4	2006	IEEE Standard for Information technology- Telecommunications and information exchange between systems- Local and metropolitan area networks- Specific requirements Part 15.4: Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Low-Rate Wireless Personal Area Networks (WPANs)	-	-

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INTRODUCTION

This International standard provides the specification, definitions, and profile for a Wireless communication network. It supplements IEC 61158-5-20, IEC 61158-6-20 where some commands are specified and it supplements IEC 61784-1 where a Communication Profile CP 9/1, universal command, is specified.

This document follows the structure and conventions of IEC 61158 series (for example separation of DL-service definitions and DL-protocol specification) and conventions of IEC 61784-1. IEC 61158 series specify different communication networks. These are structured in different Types. The Type 20 is assigned to technologies of Hart™¹ Communication Foundation (HCF). For other assignments of Type numbers see IEC/TR 61158-1.

NOTE IEC 61158 series do not contain a DLL specification for Type 20. However, this standard includes a DLL specification.

IEC 61784-1, and IEC 61784-2 provide Communication Profile Families (CPF), and, within a family, one to n Communication Profiles. The assigned CPF number for technologies of the HCF is CPF 9. For other assignments of CPF numbers see IEC/TR 61158-1.

A new project number IEC 62591 was assigned to the Type 20 enhancements and the associated CP 9/2, so that this document contains the equivalent subparts of the IEC 61158 series and of IEC 61784-1 organized here in different clauses.

The Type 20 protocol supports two way digital communications for process measurement and control devices. Applications include remote process variable interrogation, cyclical access to process data, parameter setting and diagnostics. This document defines the specification that comprises the Type 20 field communications protocol for wireless devices. Specification of the Type 20 protocol is based largely on the OSI 7-Layer Communication Model.

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document may involve the use of patents concerning the claims of the patents listed below given in the normative clauses.

US08/04750 & PCT 12/100986 [HCF] Combined Wired and Wireless Communications with Field Devices
 US08/04777 & PCT 12/100927 [HCF] Increasing Reliability and Reducing Latency in a Wireless Network
 US08/04677 & PCT 12/100995 [HCF] Adaptive Scheduling in a Wireless Network
 US08/04716 & PCT 12/101000 [HCF] Wireless Protocol Adaptor
 US08/04775 & PCT 12/101005 [HCF] Synchronizing Timeslots in a Wireless Communication Protocol
 US08/04751 & PCT 12/101011 [HCF] Suspending Transmissions in a Wireless Communication Network
 US08/04678 & PCT 12/101021 [HCF] Enhancing Security in a Wireless Network
 US08/04746 & PCT 12/101037 [HCF] Wireless Gateway in a Process Control Environment
 US08/04676 & PCT 12/101043 [HCF] Efficient Addressing in Wireless HART Protocol
 US08/04745 & PCT 12/101049 [HCF] Support for Network Management and Device Communications in a Wireless Network
 US08/04749 & PCT 12/101054 [HCF] Priority Based Scheduling and Routing in a Wireless Network
 US08/04740 & PCT 12/101071 [HCF] Routing Packets on a Network Using Directed Graphs
 US08/04761 & PCT 12/101074 [HCF] Scheduling Communication Frames in a Wireless Network

IEC takes no position concerning the evidence, validity and scope of these patent rights.

¹ HART™ and WirelessHART™ are the trade names of HART™ Communication Foundation (HCF). HCF is a non-profit trade organization to support the HART™ Communication. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade name holder or any of its products. Compliance to this document does not require use of the trade name. Use of the trade name HART™ and WirelessHART™ requires permission of the trade name holder.

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ISO (www.iso.org/patents) and IEC (http://www.iec.ch/tctools/patent_decl.htm) maintain on-line data bases of patents relevant to their standards. Users are encouraged to consult the data bases for the most up to date information concerning patents.

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INDUSTRIAL COMMUNICATION NETWORKS – WIRELESS COMMUNICATION NETWORK AND COMMUNICATION PROFILES – WirelessHART™

1 Scope

This International Standard specifies an additional Type 20 communication network to IEC 61158-5-20, IEC 61158-6-20 and a Communication Profile CP 9/2 in addition to IEC 61784-1 CPF 9.

This standard specifies the following:

- Physical layer service definition and protocol specification,
- Data-link layer service and protocol,
- Application layer service and protocol,
- Network management,
- Security,
- Communication profile,
- Wireless procedures and
- Gateway.

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 60559, *Binary floating-point arithmetic for microprocessor systems*

IEC/TR 61158-1:2010³, *Industrial communication networks – Fieldbus specifications – Part 1: Overview and guidance for the IEC 61158 and IEC 61784 series*

IEC 61158-5-20:2010², *Industrial communication networks – Fieldbus specifications – Part 5-20: Application layer service definition – Type 20 elements*

IEC 61158-6-20:2010², *Industrial communication networks – Fieldbus specifications – Part 6-20: Application layer protocol specification – Type 20 elements*

IEC 61784-1:2010³, *Industrial Communication Networks – Profiles – Part 1: Fieldbus profiles*

IEC 61784-2:2010³, *Industrial Communication Networks – Profiles – Part 2: Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC 8802-3*

ISO/IEC 7498-1, *Information technology – Open Systems Interconnection — Basic Reference Model: The Basic Model*

² To be published

ISO/IEC 8824, *Information Technology – Open Systems Interconnection – Specification of Abstract Syntax Notation One (ASN.1)*

ISO/IEC 8859-1, *Information technology – 8-bit single-byte coded graphic character sets – Part 1: Latin alphabet No. 1*

ISO/IEC 9545, *Information technology – Open Systems Interconnection – Application Layer structure*

ISO/IEC 10731, *Information technology – Open Systems Interconnection – Basic Reference Model – Conventions for the definition of OSI services*

IEEE 802-2001, *IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture*

IEEE 802.15.4-2006, *IEEE Standard for Information technology- Telecommunications and information exchange between systems- Local and metropolitan area networks- Specific requirements Part 15.4: Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Low-Rate Wireless Personal Area Networks (WPANs)*

3 Terms, definitions, symbols, abbreviations and conventions

For the purposes of this document, the following terms as defined in these publications apply.

3.1 Reference model terms and definitions

This standard is based in part on the concepts developed in ISO/IEC 7498-1 and ISO/IEC 7498-3, and makes use of the following terms defined therein.

DL-entity (N=2)	[7498-1]
DL protocol-data-unit	[7498-1]
DL service-data-unit	[7498-1]
DLS user-data	[7498-1]
NL-entity (N=3)	[7498-1]
NL protocol-data-unit	[7498-1]
NL service-data-unit	[7498-1]
NLS user-data	[7498-1]
TL-entity (N=4)	[7498-1]
TL protocol-data-unit	[7498-1]
TL service-data-unit	[7498-1]
TLS user-data	[7498-1]