

Wind turbines - Part 25-4: Communications for monitoring and control of wind power plants - Mapping to communication profile

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 61400-25-4:2017 sisaldab Euroopa standardi EN 61400-25-4:2017 ingliskeelset teksti.	This Estonian standard EVS-EN 61400-25-4:2017 consists of the English text of the European standard EN 61400-25-4:2017.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
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English Version

Wind energy generation systems -
Part 25-4: Communications for monitoring and
control of wind power plants -
Mapping to communication profile
(IEC 61400-25-4:2016)

Systèmes de génération d'énergie éolienne -
Partie 25-4: Communications pour la surveillance et
la commande des centrales éoliennes -
Mapping pour les profils de communication
(IEC 61400-25-4:2016)

Windenergieanlagen -
Teil 25-4: Kommunikation für die Überwachung und
Steuerung von Windenergieanlagen -
Abbildung auf ein Kommunikationsprofil
(IEC 61400-25-4:2016)

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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

European foreword

The text of document 88/600/FDIS, future edition 2 of IEC 61400-25-4, prepared by IEC/TC 88 "Wind energy generation systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61400-25-4:2017.

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) 2017-10-04
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-01-04

This document supersedes EN 61400-25-4:2008.

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Endorsement notice

The text of the International Standard IEC 61400-25-4:2016 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 60870-5-3:1992	NOTE	Harmonized as EN 60870-5-3:1992 (not modified).
IEC 61850-7-1:2011	NOTE	Harmonized as EN 61850-7-1:2011 (not modified).

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 60870-5-4	1993	Telecontrol equipment and systems - Part 5: Transmission protocols - Section 4: Definition and coding of application information elements	EN 60870-5-4	1993
IEC 60870-5-5	1995	Telecontrol equipment and systems - Part 5: Transmission protocols - Section 5: Basic application functions	EN 60870-5-5	1995
IEC 60870-5-101	2003	Telecontrol equipment and systems - Part 5-101: Transmission protocols - Companion standard for basic telecontrol tasks	EN 60870-5-101	2003
IEC 60870-5-104	2006	Telecontrol equipment and systems - Part 5-104: Transmission protocols - Network access for IEC 60870-5-101 using standard transport profiles	EN 60870-5-104	2006
IEC 61400-25-1	2006	Wind turbines - Part 25-1: Communications for monitoring and control of wind power plants - Overall description of principles and models	EN 61400-25-1	2007
IEC 61400-25-2	2015	Wind turbines - Part 25-2: Communications for monitoring and control of wind power plants - Information models	EN 61400-25-2	2015
IEC 61400-25-3	2015	Wind turbines - Part 25-3: Communications for monitoring and control of wind power plants - Information exchange models	EN 61400-25-3	2015
IEC 61400-25-5	2006	Wind turbines - Part 25-5: Communications for monitoring and control of wind power plants - Conformance testing	EN 61400-25-5	2007

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61850-6	2009	Communication networks and systems for power utility automation - Part 6: Configuration description language for communication in electrical substations related to IEDs	EN 61850-6	2010
IEC 61850-7-2	2010	Communication networks and systems for power utility automation - Part 7-2: Basic information and communication structure - Abstract communication service interface (ACSI)	EN 61850-7-2	2010
IEC 61850-7-3	2010	Communication networks and systems for power utility automation - Part 7-3: Basic communication structure - Common data classes	EN 61850-7-3	2011
IEC 61850-8-1	2011	Communication networks and systems for power utility automation - Part 8-1: Specific Communication Service Mapping (SCSM) - Mappings to MMS (ISO 9506-1 and ISO 9506-2) and to ISO/IEC 8802-3	EN 61850-8-1	2011
IEC/TS 61850-80-1	2008	Communication networks and systems for power utility automation - Part 80-1: Guideline to exchanging information from a CDC-based data model using IEC 60870-5-101 or IEC 60870-5-104	CLC/TS 61850-80-1	2010
IEC 62439-3	2016	Industrial communication networks - High availability automation networks - Part 3: Parallel Redundancy Protocol (PRP) and High-availability Seamless Redundancy (HSR)	-	-
ISO 639-2	-	Codes for the representation of names of languages - Part-2: Alpha-3 code	-	-
ISO/IEC 8326	1996	Information technology - Open systems Interconnection - Session service definition	-	-
ISO/IEC 8327-1	1996	Information technology - Open Systems Interconnection - Connection-oriented session protocol: Protocol specification	-	-
ISO/IEC 8649	1996	Information technology - Open Systems Interconnection - Service definition for the Association Control Service Element	-	-
ISO/IEC 8650-1	1996	Information technology - Open Systems Interconnection - Connection-oriented protocol for the Association Control Service Element: Protocol specification	-	-
ISO/IEC 8822	1994	Information technology - Open Systems Interconnection - Presentation service definition	-	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO/IEC 8823-1	1994	Information technology - Open Systems Interconnection - Connection-oriented presentation protocol: Protocol specification	-	-
ISO/IEC 8824-1	2015	Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation	-	-
ISO/IEC 8825-1	2015	Information technology - ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)	-	-
ISO 9506-1	2003	Industrial automation systems - Manufacturing Message Specification - Part 1: Service definition	-	-
ISO 9506-2	2003	Industrial automation systems - Manufacturing Message Specification - Part 2: Protocol specification	-	-
W3C	2002	Web Services Architecture	-	-
W3C XML 1.0	2000	Extensible Markup Language (XML) 1.0	-	-
W3C SOAP 1.1 Note	2000	Simple Object Access Protocol (SOAP) 1.1, Note	-	-
W3C SOAP 1.2	2007	Simple Object Access Protocol (SOAP) 1.2	-	-
RFC 791	-	Internet Protocol - DARPA Internet Program Protocol Specification	-	-
RFC 792	-	Internet Control Message Protocol	-	-
RFC 793	-	Transmission Control Protocol - DARPA Internet Program Protocol Specification	-	-
RFC 826	-	Ethernet Address Resolution Protocol: Or Converting Network Protocol Addresses to 48.bit Ethernet Address for Transmission on Ethernet Hardware	-	-
RFC 919	-	Broadcasting Internet Datagrams	-	-
RFC 922	-	Broadcasting Internet datagrams in the presence of subnets	-	-
RFC 950	-	Internet Standard Subnetting Procedure	-	-
RFC 1006	-	ISO Transport Service on top of the TCP	-	-
RFC 1112	-	Host Extensions for IP Multicasting	-	-
RFC 1122	-	Requirements for Internet Hosts - Communication Layers	-	-
RFC 2200	1997	Internet official protocol Standards	-	-
RFC 2616	-	Hypertext Transfer Protocol - HTTP/1.1	-	-
RFC 2817	-	Upgrading to TLS Within HTTP/1.1	-	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
RFC 4122	-	A Universally Unique Identifier (UUID) URN Namespace	-	-
RFC 5246	-	The Transport Layer Security (TLS) Protocol Version 1.2	-	-
OPC XML-DA	2004	OPC XML-DA Specification (Version 1.01)	-	-
IEEE 754	1985	IEEE Standard for Binary Floating-Point Arithmetic	-	-
IEEE 802.1D	2004	IEEE Standard for local and metropolitan area networks - Media Access Control (MAC) Bridges	-	-
IEEE P1815.1	2015	IEEE Unapproved Draft Standard for Exchanging Information between networks Implementing IEC 61850 and IEEE Std 1815(TM) (Distributed Network Protocol - DNP3)	-	-

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INTRODUCTION

The IEC 61400-25 series defines communications for monitoring and control of wind power plants. The architecture of the IEC 61400-25 series has been selected to provide an abstract definition of classes and services such that the specifications are independent of specific protocol stacks, implementations, and operating systems. This part of IEC 61400-25 specifies the mapping of these abstract classes and services to protocol stacks.

NOTE Performance of the IEC 61400-25 series implementations are application-specific. The IEC 61400-25 series does not guarantee a certain level of performance. This is beyond the scope of the IEC 61400-25 series. However, there is no underlying limitation in the communications technology to prevent high-speed application (millisecond level responses).

WIND ENERGY GENERATION SYSTEMS –

Part 25-4: Communications for monitoring and control of wind power plants – Mapping to communication profile

1 Scope

The focus of the IEC 61400-25 series is on the communications between wind power plant components such as wind turbines and actors such as SCADA systems. Internal communication within wind power plant components is outside the scope of the IEC 61400-25 series.

The IEC 61400-25 series is designed for a communication environment supported by a client-server model. Three areas are defined, that are modelled separately to ensure the scalability of implementations:

- a) wind power plant information model,
- b) information exchange model, and
- c) mapping of these two models to a standard communication profile.

The wind power plant information model and the information exchange model, viewed together, constitute an interface between client and server. In this conjunction, the wind power plant information model serves as an interpretation frame for available wind power plant information. The wind power plant information model is used by the server to offer the client a uniform, component-oriented view of the wind power plant data. The information exchange model reflects the whole active functionality of the server. The IEC 61400-25 series enables connectivity between a heterogeneous combination of client and servers from different manufacturers and suppliers.

As depicted in Figure 1, the IEC 61400-25 series defines a server with the following aspects:

- Information provided by a wind power plant component, for example, 'wind turbine rotor speed' or 'total power production of a certain time interval' is modelled and made available for access. The information modelled in the IEC 61400-25 series is defined in IEC 61400-25-2.
- Services to exchange values of the modelled information, defined in IEC 61400-25-3.
- Mapping to a communication profile, providing a protocol stack to carry the messages, i.e. the service requests and responses and the values from the modelled information (IEC 61400-25-4).

IEC 61400-25-5 defines test cases associated with information, services and protocol stacks for conformance testing of both servers and clients.

The IEC 61400-25 series only defines how to model the information, information exchange and mapping to specific communication protocols. The IEC 61400-25 series excludes a definition of how and where to implement the communication interface, the application program interface and implementation recommendations. However, the objective of the IEC 61400-25 series is that the information associated with a single wind power plant component (such as a wind turbine) is accessible through a corresponding logical device.

This part of the IEC 61400-25 series specifies the specific mappings to protocol stacks encoding the messages required for the information exchange between a client and a remote server for: