

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 61400-25-4:2008 sisaldab Euroopa standardi EN 61400-25-4:2008 ingliskeelset teksti.

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This Estonian standard EVS-EN 61400-25-4:2008 consists of the English text of the European standard EN 61400-25-4:2008.

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**Wind turbines -
Part 25-4: Communications for monitoring and control
of wind power plants -
Mapping to communication profile
(IEC 61400-25-4:2008)**

Eoliennes -
Partie 25-4: Communications
pour la surveillance et la commande
des centrales éoliennes -
Mapping des profils de communication
(CEI 61400-25-4:2008)

Windenergieanlagen -
Teil 25-4: Kommunikation
für die Überwachung und Steuerung
von Windenergieanlagen -
Abbildung auf ein Kommunikationsprofil
(IEC 61400-25-4:2008)

This European Standard was approved by CENELEC on 2008-10-01. 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.

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

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 88/318/FDIS, future edition 1 of IEC 61400-25-4, prepared by IEC TC 88, Wind turbines, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61400-25-4 on 2008-10-01.

For the user's convenience, a file containing the text of Clause A.7 is included with this document.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2009-07-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2011-10-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61400-25-4:2008 was approved by CENELEC as a European Standard without any modification.

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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 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	Series	Wind turbines - Part 25: Communications for monitoring and control of wind power plants	EN 61400-25	Series
IEC 61850-7-2	2003	Communication networks and systems in substations - Part 7-2: Basic communication structure for substation and feeder equipment - Abstract communication service interface (ACSI)	EN 61850-7-2	2003
IEC 61850-7-3	2003	Communication networks and systems in substations - Part 7-3: Basic communication structure for substation and feeder equipment - Common data classes	EN 61850-7-3	2003
IEC 61850-8-1	2004	Communication networks and systems in substations - 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	2004
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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 the IEC 61400-25 series 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).

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WIND TURBINES –

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:

- 1) wind power plant information model,
- 2) information exchange model, and
- 3) 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:

- data access and retrieval,
- device control,
- event reporting and logging,
- publisher/subscriber,
- self-description of devices (device data dictionary),
- data typing and discovery of data types.

The mappings specified in this part of IEC 61400-25 comprise:

- a mapping to SOAP-based web services,
- a mapping to OPC/XML-DA,
- a mapping to IEC 61850-8-1 MMS,
- a mapping to IEC 60870-5-104,
- a mapping to DNP3.

All mappings are optional, but at least one optional mapping shall be selected in order to be compliant with this part of IEC 61400-25.

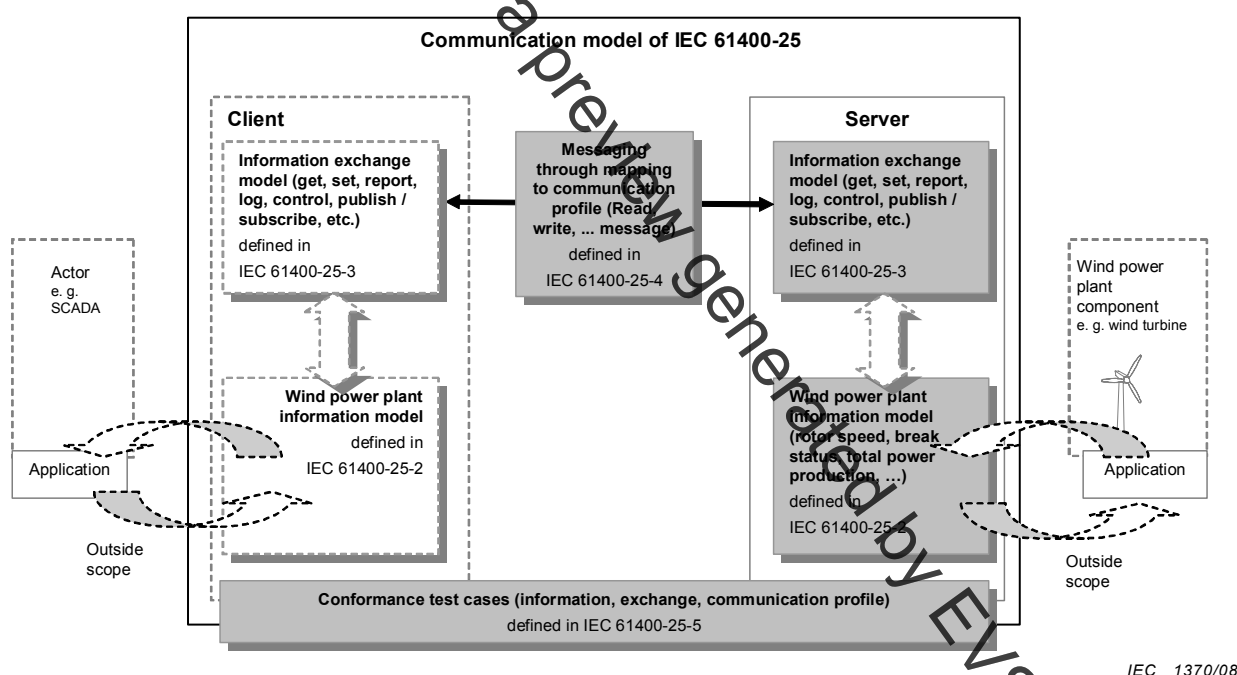


Figure 1 – Conceptual communication model of IEC 61400-25 series

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 60870-5-104:2006, *Telecontrol equipment and systems – Part 5-104: Transmission protocols – Network access for IEC 60870-5-101 using standard transport profiles*

IEC 61400-25 (all parts), *Wind turbines – Part 25: Communications for monitoring and control of wind power plants*

IEC 61850-7-2:2003, *Communication networks and systems in substations – Part 7-2: Basic communication structure for substations and feeder equipment – Abstract communication service interface (ACSI)*

IEC 61850-7-3:2003, *Communication networks and systems in substations – Part 7-3: Basic communication structure for substations and feeder equipment – Common data classes*

IEC 61850-8-1:2004, *Communication networks and systems in substations – Part 8-1: Specific Communication Service Mapping (SCSM) – Mappings to MMS (ISO 9506-1 and ISO 9506-2) and to IEC 8802-3*

DNP3 Specification, Volume 2 – Volume 8:2007

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

actor

role a system plays in the context of monitoring and control, while it is not directly involved in wind power plant operation, such as Supervisory Control and Data Acquisition System (SCADA)

NOTE There are many other designations, for example, central management system, monitoring and control system, remote control system.

3.2

alarm

state information. Statement of safety intervention by the wind turbine control system (i.e. on/off)

3.3

command

controllable data for system behaviour (enable/disable, active/deactivate, etc.)

3.4

communication function

used by an actor to configure, perform and monitor the information exchange with wind power plants, for example operational and management function

3.5

control

operational function used for changing and modifying, intervening, switching, controlling, parameterisation and optimising of wind power plants

3.6

data retrieval

operational function used for collecting of wind power plant data

3.7

diagnostics

management function used to set up and provide for self-monitoring of the communication system