

**Wind turbines -- Part 25-5:
Communications for monitoring and
control of wind power plants -
Conformance testing**

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monitoring and control of wind power plants -
Conformance testing

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 61400-25-5:2007 sisaldab Euroopa standardi EN 61400-25-5:2007 ingliskeelset teksti. Käesolev dokument on jõustatud 27.04.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 61400-25-5:2007 consists of the English text of the European standard EN 61400-25-5:2007. This document is endorsed on 27.04.2007 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.
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Käsitlusala: 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.	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.
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ICS 27.180

Võtmesõnad:

**Wind turbines -
Part 25-5: Communications for monitoring
and control of wind power plants -
Conformance testing
(IEC 61400-25-5:2006)**

Eoliennes -
Partie 25-5: Communications
pour la surveillance et la commande
des centrales éoliennes -
Essais de conformité
(CEI 61400-25-5:2006)

Windenergieanlagen -
Teil 25-5: Kommunikation
für die Überwachung und Steuerung
von Windenergieanlagen -
Konformitätsprüfungen
(IEC 61400-25-5:2006)

This European Standard was approved by CENELEC on 2007-02-01. 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.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

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 88/277/FDIS, future edition 1 of IEC 61400-25-5, prepared by IEC TC 88, Wind turbines, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61400-25-5 on 2007-02-01.

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) 2007-11-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2010-02-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61400-25-5:2006 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 61850-4	NOTE Harmonized as EN 61850-4:2002 (not modified).
IEC 61850-5	NOTE Harmonized as EN 61850-5:2003 (not modified).
IEC 61850-6	NOTE Harmonized as EN 61850-6:2004 (not modified).
IEC 61850-7-3	NOTE Harmonized as EN 61850-7-3:2003 (not modified).
IEC 61850-8-1	NOTE Harmonized as EN 61850-8-1:2004 (not modified).

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 61400-25	Series	Wind turbines - Part 25: Communications for monitoring and control of wind power plant	EN 61400-25	Series
IEC 61850-7-1	2003	Communication networks and systems in substations - Part 7-1: Basic communication structure for substation and feeder equipment - Principles and models	EN 61850-7-1	2003
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 61850-7-4	2003	Communication networks and systems in substations - Part 7-4: Basic communication structure for substation and feeder equipment - Compatible logical node classes and data classes	EN 61850-7-4	2003
ISO/IEC 9646	Series	Information technology - Open Systems Interconnection - Conformance testing methodology and framework	EN ISO/IEC 9646	Series

INTERNATIONAL STANDARD

IEC
61400-25-5

First edition
2006-12

Wind turbines –

**Part 25-5:
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Conformance testing**



Reference number
IEC 61400-25-5:2006(E)

Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

Consolidated editions

The IEC is now publishing consolidated versions of its publications. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

Further information on IEC publications

The technical content of IEC publications is kept under constant review by the IEC, thus ensuring that the content reflects current technology. Information relating to this publication, including its validity, is available in the IEC Catalogue of publications (see below) in addition to new editions, amendments and corrigenda. Information on the subjects under consideration and work in progress undertaken by the technical committee which has prepared this publication, as well as the list of publications issued, is also available from the following:

- **IEC Web Site** (www.iec.ch)
- **Catalogue of IEC publications**
The on-line catalogue on the IEC web site (www.iec.ch/searchpub) enables you to search by a variety of criteria including text searches, technical committees and date of publication. On-line information is also available on recently issued publications, withdrawn and replaced publications, as well as corrigenda.
- **IEC Just Published**
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Part 25-5: Communications for monitoring and control of wind power plants – Conformance testing

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CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references	7
3 Terms and definitions	7
4 Abbreviated terms	10
5 Introduction to conformance testing	11
5.1 General	11
5.2 Conformance test procedures.....	11
5.3 Quality assurance and testing	12
5.4 Testing	13
5.5 Documentation of conformance test report	15
6 Device related conformance testing.....	15
6.1 General guidelines	15
6.2 Standard test procedures	17
6.3 Conformance test procedures.....	17
7 Performance tests	39
7.1 General.....	39
7.2 Communications latency.....	40
7.3 Time synchronisation and accuracy.....	41
7.4 Stability test	43
Annex A (informative) Examples of test procedure template.....	44
Bibliography.....	45
Figure 1 – Conceptual communication model of the IEC 61400-25 series	7
Figure 2 – Conceptual conformance assessment process	14
Figure 3 – Conceptual test system architecture.....	16
Figure 4 – Test procedure format.....	18
Figure 5 – Performance testing (black box principle).....	41
Figure 6 – Time synchronisation and accuracy test setup	42

INTERNATIONAL ELECTROTECHNICAL COMMISSION

WIND TURBINES –

**Part 25-5: Communications for monitoring
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Conformance testing**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 61400-25-5 has been prepared by IEC technical committee 88: Wind turbines.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The text of this standard is based on the following documents:

FDIS	Report on voting
88/277/FDIS	88/283/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.

A list of all parts of the IEC 61400 series, under the general title *Wind turbines* can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

The IEC 61400-25 series defines communication for monitoring and control of wind power plants. The modeling approach of the IEC 61400-25 series has been selected to provide abstract definitions of classes and services such that the specifications are independent of specific protocol stacks, implementations, and operating systems. The mapping of these abstract classes and services to a specific communication profile may be found in IEC 61400-25-41.

This part of IEC 61400-25 defines the methods and abstract test cases for conformance testing of devices used in wind power plants. The intended readers are test system developers.

NOTE 1 It is recommended to obtain a common knowledge of the standards IEC 61400-25-1, IEC 61400-25-2, IEC 61400-25-3, and IEC 61400-25-4 before reading this part.

NOTE 2 Abbreviations used in IEC 61400-25-5 may be listed in Clause 3 or may be found in other parts of IEC 61400-25 that are relevant for conformance testing.

¹ To be published.

WIND TURBINES –

Part 25-5: Communications for monitoring and control of wind power plants – Conformance testing

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 models,
- 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 accessible wind power plant data. 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.

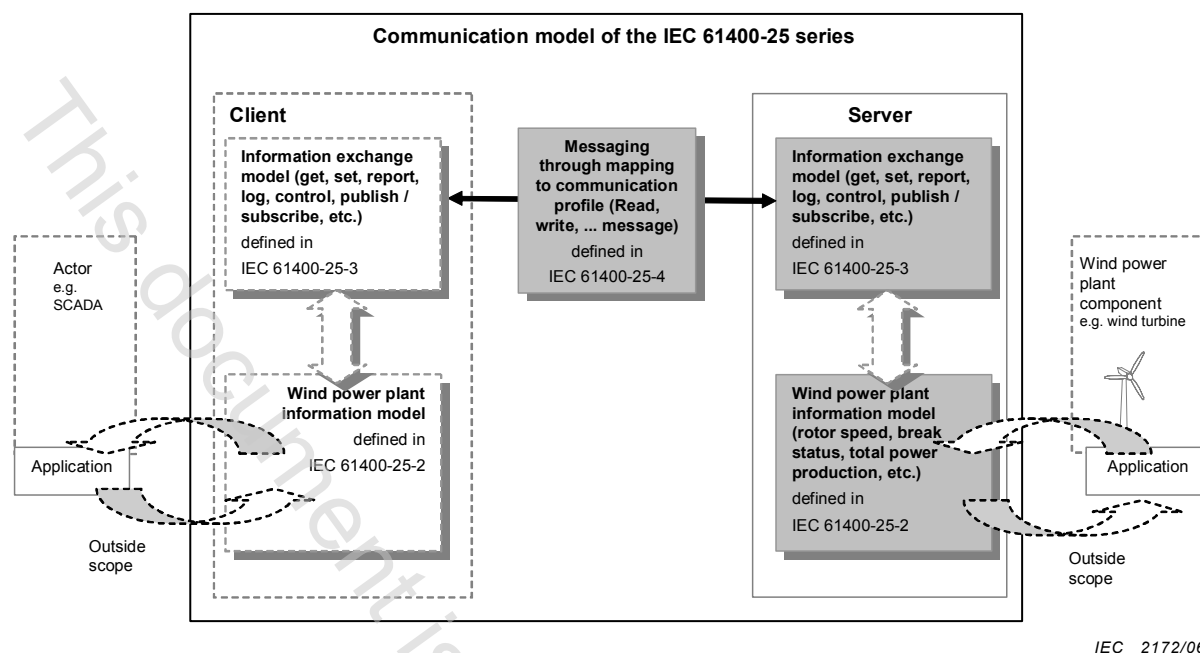
As depicted in Figure 1, the IEC 61400-25 series defines a server with the following aspects:

- Information provided by a wind power plant component, e. g., “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 standard is defined in part IEC 61400-25-2,
- services to exchange values of the modelled information defined in part IEC 61400-25-3,
- mapping to a communication profile, providing a protocol stack to carry the exchanged values from the modelled information (part IEC 61400-25-4).

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 the wind turbine) is accessible through a corresponding logical device.

This part of IEC 61400-25 specifies standard techniques for testing of conformance of implementations, as well as specific measurement techniques to be applied when declaring performance parameters. The use of these techniques will enhance the ability of users to purchase systems that integrate easily, operate correctly, and support the applications as intended.

NOTE The role of the test facilities for conformance testing and certifying the results are outside of the scope of IEC 61400-25-5.



IEC 2172/06

Figure 1 – Conceptual communication model of the 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 61400-25 (all parts), *Wind turbines - Part 25: Communications for monitoring and control of wind power plants*

IEC 61850-7-1:2003, *Communication networks and systems in substations – Part 7-1: Basic communication structure for substations and feeder equipment – Principles and models*

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 61850-7-4:2003, *Communication networks and systems in substations – Part 7-4: Basic communication structure for substations and feeder equipment – Compatible logical node and data classes*

ISO/IEC 9646 (all parts), *Information technology – Open Systems Interconnection – Conformance testing methodology and framework*

3 Terms and definitions

For the purpose of this document, the terms and definitions defined in IEC 61400-25-1 and the following apply.

3.1

Factory Acceptance Test

FAT

customer agreed functional tests of the specifically manufactured substation automation system or its parts using the parameter set for the planned application.