BS EN 61400-25-1:2017

BSI Standards Publication

Wind energy generation systems

Part 25-1: Communications for monitoring and control of wind power plants — Overall description of principles and models

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National foreword

This British Standard is the UK implementation of EN 61400-25-1:2017. It is identical to IEC 61400-25-1:2017. It supersedes BS EN 61400-25-1:2007, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PEL/88, Wind turbines.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Amendments/corrigenda issued since publication

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EUROPEAN STANDARD

NORME EUROPÉENNE

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EN 61400-25-1

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English Version

Wind energy generation systems - Part 25-1: Communications for monitoring and control of wind power plants - Overall description of principles and models (IEC 61400-25-1:2017)

Systèmes de génération d'énergie éolienne - Partie 25-1: Communications pour la surveillance et la commande des centrales éoliennes - Description globale des principes et des modèles (IEC 61400-25-1:2017)

Windenergieanlagen - Teil 25-1: Kommunikation für die Überwachung und Steuerung von Windenergieanlagen - Einführende Beschreibung der Prinzipien und Modelle (IEC 61400-25-1:2017)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
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European foreword

The text of document 88/587/CDV, future edition 2 of IEC 61400-25-1, prepared by IEC/TC 88 "Wind energy generation systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61400-25-1:2017.

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)	2018-06-01
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2020-12-01

This document supersedes EN 61400-25-1:2007.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 61400-25-1:2017 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 61850 Series	NOTE	Harmonized as EN 61850 Series.

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1 Where 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.

Publication	Year	Title	EN/HD	Year
IEC 61400-25	Series	Wind turbines - Part 25: Communications for monitoring and control of wind power plants	EN 61400-25	Series
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 61400-25-4	-	Wind energy generation systems - Part 25-4: Communications for monitoring and control of wind power plants - Mapping to communication profile	EN 61400-25-4	-
IEC 61400-25-6	-	Wind energy generation systems - Part 25-6: Communications for monitoring and control of wind power plants - Logical node classes and data classes for condition monitoring	EN 61400-25-6	-
IEC 61850-7-1	2011	Communication networks and systems for power utility automation - Part 7-1: Basic communication structure - Principles and models	EN 61850-7-1	2011
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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

WIND ENERGY GENERATION SYSTEMS –

Part 25-1: Communications for monitoring and control of wind power plants – Overall description of principles and models

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 61400-25-1 has been prepared by IEC technical committee 88: Wind energy generation systems.

This second edition cancels and replaces the first edition published in 2006. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) general harmonization of text and overview models with the other parts of the IEC 61400-25 series,
b) harmonization of definitions in other related standards.

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The text of this International Standard is based on the following documents:

CDV	Report on voting
88/587/CDV	88/622/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

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

The title of TC 88 was changed in 2015 from *Wind turbines* to *Wind energy generation systems*.

A list of all parts in the IEC 61400 series, published under the general titles *Wind turbines* and *Wind energy generation systems* can be found on the IEC website.

The users of IEC 61400-25 have formed a community, USE61400-25. For further information see http://www.use61400-25.com.

Attached to the release of the IEC 61400-25 standard series and in addition to the standard IEC maintenance process, a specific maintenance process is set up to handle technical issues raised after publication. Here are the main principles:

- Technical issues (called TISSUES) are collected from the release of the new document in cooperation with the user group for the IEC 61400-25 standard series USE61400-25.
- The collected TISSUES can be categorized in two groups:
  - TISSUES that can threaten interoperability between implementations of the standard and that need either corrections or clarifications (“IntOp” TISSUES),
  - TISSUES that propose new features that will be implemented in future versions of the standard (“next edition” TISSUES).
- IntOp TISSUES require immediate clarification and are following a transparent fixing process handled by the user group for the IEC 61400-25 standard series together with the editors of the IEC 61400-25 standard series.
- The detailed specification of this process, the list of TISSUES, associated fix, their status and impact on implementation and certification are accessible through the USE61400-25 web site http://www.use61400-25.com.
- IEC recommends implementing the proposed fixes to IntOp TISSUES, as soon as they have reached the “green” status. The list of TISSUES which are implemented in an intelligent electronic device (IED) should be transparently stated by its manufacturer.

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The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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INTRODUCTION

IEC 61400-25 (all parts) is intended for vendors (manufacturers, suppliers), operators, owners, planners, and designers of wind power plants as well as system integrators and utility companies operating in the wind energy market. IEC 61400-25 (all parts) is intended to be accepted and to be used world-wide as the international standard for communications in the domain of wind power plants.

IEC 61400-25 (all parts) has been developed in order to provide a uniform communications basis for the monitoring and control of wind power plants. It defines wind power plant specific information, the mechanisms for information exchange and the mapping to communication protocols. In this regard, IEC 61400-25 (all parts) defines details required to exchange the available information with wind power plant components in a manufacturer-independent environment. This is done by definitions made in this part of IEC 61400-25 or by reference to other standards.

The wind power plant specific information describes the crucial and common process and configuration information. The information is hierarchically structured and covers for example common information found in the rotor, generator, converter, grid connection and the like. The information may be simple data (including timestamp and quality) and configuration values or more comprehensive attributes and descriptive information, for example engineering unit, scale, description, reference, statistical or historical information. All information of a wind power plant defined in IEC 61400-25 (all parts) is name tagged. A concise meaning of each data is given. The standardized wind power plant information can be extended by means of a name space extension rule. All data, attributes and descriptive information can be exchanged by corresponding services.

The implementation of IEC 61400-25 (all parts) allows SCADA systems (supervisory control and data acquisition) to communicate with wind turbines from multiple vendors. The standardized self-description (contained either in an XML file or retrieved online from a device) can be used to configure SCADA applications. Standardization of SCADA applications are excluded in IEC 61400-25 (all parts) but standardized common wind turbine information provides means for re-use of applications and operator screens for wind turbines from different vendors. From a utility perspective, unified definitions of common data minimize conversion and re-calculation of data values for evaluation and comparison of all their wind power plants.

IEC 61400-25 (all parts) can be applied to any wind power plant operation concept, i.e. both individual wind turbines, clusters and more integrated groups of wind turbines. The application area of IEC 61400-25 (all parts) covers components required for the operation of wind power plants, i.e. not only the wind turbine generator, but also the meteorological system, the electrical system, and the wind power plant management system. The wind power plant specific information in IEC 61400-25 (all parts) excludes information associated with feeders and substations. Substation communication is covered within IEC 61850 (all parts).

The intention of IEC 61400-25 (all parts) is to enable components from different vendors to communicate with other components, at any location. Object-oriented data structures can make the engineering and handling of large amounts of information provided by wind power plants less time-consuming and more efficient. IEC 61400-25 (all parts) supports scalability, connectivity, and interoperability.

IEC 61400-25 (all parts) is a basis for simplifying the contracting of the roles the wind turbine and SCADA systems have to play. The crucial part of the wind power plant information, the information exchange methods, and the communication stacks are standardized. They build a basis to which procurement specifications and contracts could easily refer.

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IEC 61400-25 is organized in several parts.

- IEC 61400-25-1 offers an introductory orientation, crucial requirements, and a modelling guide.
- IEC 61400-25-2 and IEC61400-25-6 contain the description of the information model, a uniform, component-oriented view of the wind power plant data, including extensions for condition monitoring.
- IEC 61400-25-3 describes the information exchange model. It reflects the functionality of the server.
- IEC 61400-25-4 presents five alternative mappings of the information model and information exchange model to a standard communication profile. The choice depends on the application and the functionality and performance needed.
- IEC 61400-25-5 describes test cases for conformance testing of implementations.

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

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