

INTERNATIONAL STANDARD

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**Wind turbines –
Part 25-2: Communications for monitoring and control of wind power plants –
Information models**

**Eoliennes –
Partie 25-2: Communications pour la surveillance et la commande des centrales
éoliennes – Modèles d'information**



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IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

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INTERNATIONAL STANDARD

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

WIND TURBINES –

Part 25-2: Communications for monitoring and control of wind power plants – Information models

FOREWORD

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International Standard IEC 61400-25-2 has been prepared by IEC technical committee 88: Wind turbines.

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

FDIS	Report on voting
88/539FDIS	88/551/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.

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

The scope of revision includes:

- harmonization with Common Data Classes in Edition 2 of IEC 61850-7-3,
- harmonization with Logical node classes in Edition 2 of IEC 61850-7-4,
- harmonization with Information models in IEC 61850-7-410 and IEC 61850-7-420,
- reduction of overlap between standards and simplification by increased referencing,
- extension of Data objects for operation of smart grids (in US and other areas),
- extended and enhanced semantics for existing data objects,

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

- a) The model on alarm handling has been revised and the logical node WALM and associated cdc's have been modified.
- b) A new logical node class WPPD that represents general data for non-turbine devices has been added.
- c) A new logical node class WAVL that represents availability data has been added.
- d) WMET has been revised and harmonized with MMET. If MMET is extended with data object for altitude and ice then WMET may be deleted in future editions.
- e) External Met sensors (WndDir, WndSpd, Humidity, Pressure, Temperature) have been removed from WNAC and moved to WMET.
- f) Some data types, such as CtxInt, are not supported by IEC 61850 so other data types need to be used.
- g) Abbreviations have been changed to resolve inconsistencies with IEC 61850. This affects several data names.
- h) Enumeration values and definitions in the standard have been harmonized.
- i) Additional data objects regarding smart grid have been added.
- j) Wind power specific CDCs that in Edition 1 contained subsets of attributes of CDCs from IEC 61850-7-3 now implicitly include all attributes of these CDCs.
- k) Technical issues related to IEC 61400-25-2:2006 have been resolved and results incorporated in the standard.
- l) The presence conditions for statistical information has been modified compared to IEC 61850-7-4:2010.

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

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 stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
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- amended.

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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 is not within the scope of this part of the IEC 61400-25 series but within the scope of IEC 61400-25-4.

To reach interoperability, all data in the information model need a strong definition with regard to syntax and semantics. The semantics of the data are mainly provided by names assigned to logical nodes and data they contain, as defined in this part of the IEC 61400-25 series. Interoperability is easiest if as many as possible of the data are defined as mandatory.

It should be noted that data with full semantics is only one of the elements required to achieve interoperability. Since data and services are hosted by intelligent electronic devices (IED), a proper device model is needed along with compatible domain specific services (see IEC 61400-25-3).

This part is used to specify the abstract definitions of a logical device class, logical node classes, data classes, and abstract common data classes. These abstract definitions are mapped into concrete object definitions that are to be used for a particular protocol.

The compatible logical node name, data object name and data attribute name definitions found in this part and the associated semantics are fixed.

NOTE 1 Performance of the IEC 61400-25 series implementations is 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).

NOTE 2 Authorisation processes using PKI, role based access control as e.g. defined in the IEC 62351 series of standards or other security and access safety methods are beyond the scope of this standard.

WIND TURBINES –

Part 25-2: Communications for monitoring and control of wind power plants – Information models

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, for example “wind turbine rotor speed” or “total power production of a certain time interval”, is modelled and made available for access;
- 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 exchanged values from the modelled information (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 standard excludes a definition of how and where to implement the communication interface, the application program interface and implementation recommendations. However, the objective of the standard is that the information associated with a single wind power plant component (such as a wind turbine) is accessible through a corresponding logical device.

IEC 61400-25-2 specifies the information model of devices and functions related to wind power plant applications. In particular, it specifies the compatible logical node names, and data names for communication between wind power plant components. This includes the relationship between logical devices, logical nodes and data. The names defined in the IEC 61400-25 series are used to build the hierarchical object references applied for communicating with components in wind power plants.