

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

## EESTI STANDARDI EESSÕNA

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## English Version

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  
(IEC 61400-25-6:2016)

Systèmes de production d'énergie éolienne -  
Partie 25-6: Communications pour la surveillance et la  
commande des centrales éoliennes - Classes de nœuds  
logiques et classes de données pour la surveillance d'état  
(IEC 61400-25-6:2016)

Windenergieanlagen -  
Teil 25-6: Kommunikation für die Überwachung und  
Steuerung von Windenergieanlagen - Klassen logischer  
Knoten und Datenklassen für die Zustandsüberwachung  
(IEC 61400-25-6:2016)

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European Committee for Electrotechnical Standardization  
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## European foreword

The text of document 88/606/FDIS, future edition 2 of IEC 61400-25-6, prepared by IEC/TC 88 "Wind energy generation systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61400-25-6:2017.

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) 2017-10-20
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-01-20

This document supersedes EN 61400-25-6:2011.

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In the official version, for Bibliography, the following note has to be added for the standard indicated :

IEC 61400-25	NOTE	Harmonized in EN 61400-25 series.
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## 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](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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 61400-25-4	2016	Wind energy generation systems - Part 25-4: Communications for monitoring and control of wind power plants - Mapping to communication profile	EN 61400-25-4	2017
IEC 61400-25-5	— <sup>1)</sup>	Wind energy generation systems - Part 25-5: Communications for monitoring and control of wind power plants - Conformance testing	EN 61400-25-5	— <sup>1)</sup>
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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1) To be published.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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
ISO 13373-1	2002	Condition monitoring and diagnostics of machines - Vibration condition monitoring - Part 1: General procedures	-	-

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## INTRODUCTION

The IEC 61400-25 series defines information models and information exchange models for monitoring and control of wind power plants. The modelling approach (for information models and information exchange models) of IEC 61400-25-2 and IEC 61400-25-3 uses abstract definitions of classes and services such that the specifications are independent of specific communication protocol stacks, implementations, and operating systems. The mapping of these abstract definitions to specific communication profiles is defined in IEC 61400-25-4<sup>1</sup>.

This document defines an information model for condition monitoring information and explains how to use the existing definitions of IEC 61400-25-2 as well as the required extensions in order to describe and exchange information related to condition monitoring of wind turbines. The models of condition monitoring information defined in this document may represent information provided by sensors or by calculation.

In the context of this document, condition monitoring means a process with the purpose of observing components or structures of a wind turbine or wind power plant for a period of time in order to evaluate the state of the components or structures and any changes to it, in order to detect early indications of impending failures. With the objective to be able to monitor components and structures recorded under approximately the same conditions, this document introduces the operational state bin concept. The operational state bin concept is multidimensional in order to fit the purpose of sorting complex operational conditions into comparable circumstances.

Condition monitoring is most frequently used as a predictive or condition-based maintenance technique (CBM). However, there are other predictive maintenance techniques that can also be used, including the use of the human senses (look, listen, feel, smell) or machine performance monitoring techniques. These could be considered to be part of the condition monitoring.

### Condition monitoring techniques

Condition monitoring techniques that generate information to be modelled include, but are not limited to, measured or processed values such as:

- a) vibration measurements and analysis;
- b) oil debris measurement and analysis;
- c) temperature measurement and analysis;
- d) strain gauge measurement and analysis;
- e) acoustic measurement and analysis.

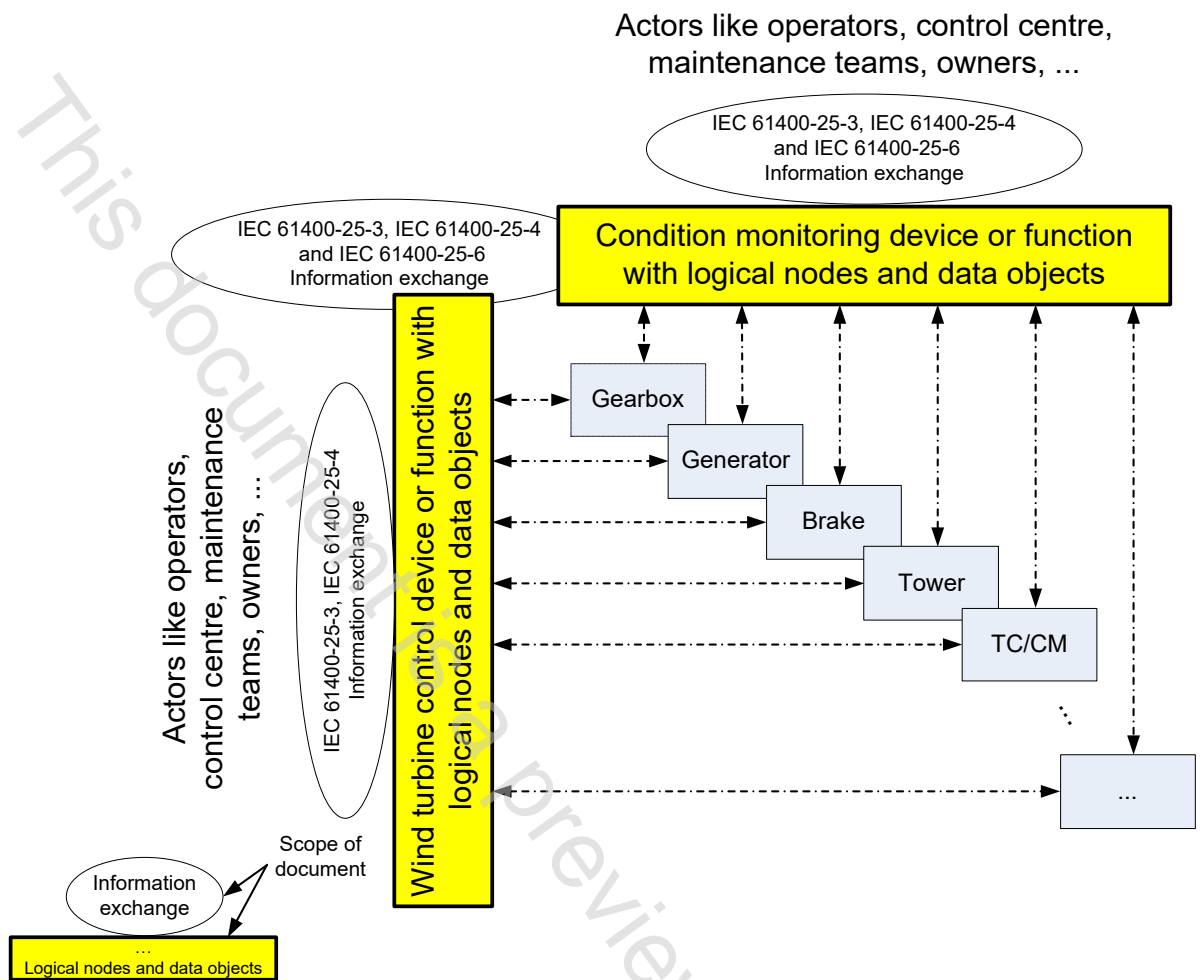
Components and structures can be monitored by using automatic measurement retrieval or via a manual process.

### Condition monitoring devices

The condition monitoring functions may be located in different physical devices. Some information may be exposed by a turbine controller device (TCD) while other information may be exposed by an additional condition monitoring device (CMD). Various actors may request to exchange data values located in the TCD and/or CMD. A SCADA device may request data values from a TCD and/or CMD; a CMD may request data values from a TCD. The information exchange between an actor and a device in a wind power plant requires the use of information exchange services as defined in IEC 61400-25-3. A summary of the above is shown in Figure 1.

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<sup>1</sup> To be published.



IEC

**Figure 1 – Condition monitoring with separated TCD/CMD functions**

The state of the art in the wind power industry is a topology with separated devices for control and condition monitoring applications. Based on this fact, the information and information exchange modelling in the present document is based on a topology with a TCD and a CMD.

IEC 61400-25-6 represents an extension of the IEC 61400-25 series focussing on condition monitoring.