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**Sistemi generatorjev vetrne turbine – 25-4. del: Komunikacije za spremljanje in nadzor vetrnih elektrarn – Preslikava komunikacijskih podatkov v obliko XML**

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

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

Introductory note

This CDV contains a solution for communications for monitoring and control of wind power plants. IEC 61400-25 defines wind power plant specific information, the mechanisms for information exchange and the mapping to communication protocols. IEC 61400-25 consists of the following parts, under the general title Communications for monitoring and control of wind power plants:

- Part 25-1 Overall description of principles and models
- Part 25-2: Information models
- Part 25-3: Information exchange models [SIST prEN 61400-25-4:2005](http://standards.iec.ch/standards/sist/a869b678-442e-4f0c-a3ba-349b4c4cdb66/osist-pren-61400-25-4-2005)
- Part 25-4: Mapping to communication profile <http://standards.iec.ch/standards/sist/a869b678-442e-4f0c-a3ba-349b4c4cdb66/osist-pren-61400-25-4-2005>
- Part 25-5: Conformance testing [349b4c4cdb66/osist-pren-61400-25-4-2005](http://standards.iec.ch/standards/sist/a869b678-442e-4f0c-a3ba-349b4c4cdb66/osist-pren-61400-25-4-2005)

The documents have been drawn up by IEC TC88 Project Team 25, consisting of experts from many of the large vendors as well as representatives of utilities, consultants and suppliers of third-party products.

All parts are distributed for comments and voting simultaneously, as committee drafts for voting (CDV).

The following major changes have been made as a result of the comments and proposals received on the CD (88/216/CD):

- Mapping to OPC-XML-DA has been removed.
- Annex C Mapping to IEC 60870-5-104 has been restructured and adjusted to Amd.1 of IEC 60870-5-104.
- The content has been modified due to changes in the other parts of IEC 61400-25.

IEC 61400-25 uses the same approach of modeling and the same services as defined in IEC 61850-7-x. Thus, the wind-power plant specific logical nodes and data objects could also be accessed by the mapping defined in IEC 61850-8-1. It has been clarified in the document that the specification of the mapping IEC 61850-8-1 needs not to be referenced in this part.

<b>ATTENTION</b>	<b>ATTENTION</b>
<b>CDV soumis en parallèle au vote (CEI) et à l'enquête (CENELEC)</b>	<b>Parallel IEC CDV/CENELEC Enquiry</b>

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## **WIND TURBINES**

### **Part 25-4:**

**Communications for monitoring and control of wind power plants –  
Mapping to XML based communication profile**

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39  
40  
41  
42  
43  
44  
45  
46

## CONTENTS

FOREWORD.....	9
INTRODUCTION.....	10
1 Scope .....	11
2 Normative references .....	13
3 Terms and definitions .....	15
4 Abbreviated terms .....	19
5 General.....	20
6 Mapping of the information models (IM) to web services.....	22
6.1 General.....	22
6.2 Mapping of the wind power information model.....	22
6.2.1 General .....	22
6.2.2 SERVER class .....	25
6.2.3 LOGICAL-DEVICE class.....	25
6.2.4 LOGICAL-NODE class .....	25
6.2.5 DATA class.....	25
6.2.6 DATA-SET class.....	25
6.2.7 Report control block class .....	26
6.2.8 Log control block class.....	27
6.2.9 Log class.....	27
7 Information Exchange Models (IEM) to web services.....	29
7.1 SERVER class service mapping.....	29
7.1.1 General .....	29
7.1.2 GetServerDirectory .....	29
7.2 ASSOCIATION services mapping.....	30
7.2.1 Introduction.....	30
7.2.2 Logon .....	30
7.2.3 Logoff.....	31
7.3 LOGICAL-DEVICE class service mapping .....	32
7.3.1 General .....	32
7.3.2 GetLogicalDeviceDirectory .....	33
7.4 LOGICAL-NODE class services mapping.....	33
7.4.1 GetLogicalNodeDirectory .....	33
7.5 DATA class services mapping.....	34
7.5.1 General .....	34
7.5.2 GetDataValues .....	35
7.5.3 SetDataValues.....	35
7.5.4 GetDataDirectory .....	36
7.5.5 GetDataDefinition.....	37
7.6 DATA-SET class services mapping .....	37
7.6.1 General .....	37
7.6.2 GetDataSetValues .....	38
7.6.3 SetDataSetValues.....	38
7.6.4 CreateDataSet.....	39
7.6.5 DeleteDataSet .....	39

1	7.6.6	GetDataSetDirectory .....	40
2	7.7	Report control block class services mapping .....	41
3	7.7.1	AddSubscription .....	41
4	7.7.2	Remove Subscription .....	42
5	7.7.3	Report .....	42
6	7.7.4	GetBRCBValues .....	43
7	7.7.5	SetBRCBValues .....	44
8	7.7.6	GetURCBValues .....	45
9	7.7.7	SetURCBValues .....	45
10	7.8	Log control block class services mapping .....	46
11	7.8.1	GetLCBValues .....	46
12	7.8.2	SetLCBValues .....	47
13	7.9	Log class services mapping .....	47
14	7.9.1	General .....	47
15	7.9.2	GetLogStatusValues .....	48
16	7.9.3	QueryLogByTime .....	48
17	7.9.4	QueryLogAfter .....	49
18	8	Summary of information exchange services and corresponding mappings .....	50
19	8.1	Mapping to web services .....	50
20	Annex A (normative)	The WSDL specification for the mapping to web services .....	52
21	Annex B (informative)	SOAP Background information .....	80
22	B.1	Introduction to SOAP in IEC 61400-25 .....	80
23	B.2	SOAP Layer .....	80
24	B.3	SOAP layout .....	80
25	B.4	SOAP layout in IEC 61400-25-4 Web Services .....	81
26	B.5	SOAP Faults .....	82
27	B.6	SOAP serialization .....	83
28	B.7	Remaining SOAP specifications .....	84
29	Annex C (informative)	Specific communication service mapping (SCSM) – Mapping	
30		process data to IEC 60870-5-101/104 .....	85
31	C.1	General .....	85
32	C.1.1	Introduction .....	85
33	C.1.2	Scope .....	85
34	C.1.3	The mapping architecture .....	85
35	C.2	Mapping of IEC 61400-25 Information Model to IEC 60870-5-104 .....	85
36	C.2.1	Introduction .....	85
37	C.2.2	Mapping of the wind power plant information model .....	85
38	C.2.3	Logical device class mapping .....	86
39	C.2.4	Logical node class mapping .....	87
40	C.3	Mapping of the Common Data Classes (CDC) .....	87
41	C.3.1	List of CDC, Type Identifications and corresponding mappings .....	87
42	C.3.2	CDC Measured Value (MV) .....	88
43	C.3.3	CDC Setpoint Value (SPV) .....	88
44	C.3.4	CDC Alarm (ALM) .....	89
45	C.3.5	CDC Command (CMD) .....	90
46	C.3.6	CDC Event Counting (CTE) .....	90
47	C.3.7	CDC Single Point Status (SPS) .....	91

1	C.3.8 CDC Double Point Status (DPS).....	91
2	C.3.9 CDC Complex Measured Value (CMV).....	92
3	C.3.10 CDC Controllable single point (SPC) .....	93
4	C.3.11 CDC Controllable double point (DPC).....	94
5	C.3.12 CDC Three Phase Value (WYE) .....	94
6	C.3.13 CDC Three Phase Value (DEL) .....	95
7	C.4 Mapping of services.....	96
8	C.4.1 List of service models and corresponding mappings.....	96
9	C.4.2 Server class mapping.....	97
10	C.4.3 Association class mapping .....	97
11	C.4.4 Logical Node class mapping.....	98
12	C.4.5 Data class mapping.....	98
13	C.4.6 Report Control Block class mapping .....	99
14	C.4.7 Control class mapping.....	99
15	C.5 Protocol stack selections for IEC 60870-5-101/104.....	100
16	C.5.1 General 100	
17	C.5.2 Structure of application data defined in IEC 60870-5-101/104 .....	100
18	C.5.3 IEC 60870-5-104 Interoperability .....	101
19	Annex D (informative) Specific communication service mapping (SCSM) – Mapping to	
20	DNP3 .....	114
21	D.1 General.....	114
22	D.1.1 Introduction.....	114
23	D.1.2 Mapping of the wind power plant information model .....	114
24	D.1.3 Mapping of the services for process information exchange.....	115
25	D.2 Common Data Class Mapping.....	115
26	D.2.1 Relationship of Common Data Class and Data Set Prototypes .....	115
27	D.2.2 CDC Measured Value (MV) .....	115
28	D.2.3 CDC Setpoint Value (SPV).....	116
29	D.2.4 CDC Status Value (STV) .....	116
30	D.2.5 CDC Alarm (ALM) .....	117
31	D.2.6 CDC Command (CMD).....	117
32	D.2.7 CDC Event Counting (CTE).....	118
33	D.2.8 CDC State Timing (TMS).....	119
34	D.2.9 CDC Single Point Status (SPS) .....	119
35	D.2.10 CDC Double Point Status (DPS).....	120
36	D.2.11 CDC Integer Status (INS).....	120
37	D.2.12 CDC Complex Measured Value (CMV).....	121
38	D.2.13 CDC Controllable single point (SPC) .....	121
39	D.2.14 CDC Controllable double point (DPC).....	122
40	D.2.15 CDC Controllable integer status (INC) .....	123
41	D.2.16 CDC Phase to ground related measured value of a three phase	
42	system (WYE).....	123
43	D.2.17 CDC Phase to phase related measured value of a three phase	
44	system (DEL).....	124
45	D.2.18 CDC Device Name Plate (WDPL) .....	125
46	D.2.19 CDC Binary Counter Reading (BCR).....	126
47	D.2.20 Relationship of Data Class Attributes and Data Set Descriptors .....	126
48	D.3 DNP3 DEVICE PROFILE DOCUMENT .....	128

1	D.4 List of service models and corresponding mappings .....	132
2	Annex E (normative) Time synchronization .....	134
3	E.1 Introduction .....	134
4	E.2 A-Profile .....	134
5	E.3 T-Profile .....	134
6	Annex F (informative) Comparison of IEC 60870-5-101/-103/-104, DNP3, IEC 61850,	
7	and IEC 61400-25 .....	136
8	Annex G (informative) Interfaces – Implementation considerations .....	149
9	G.1 General .....	149
10	G.2 Example interfaces of a real system .....	149
11		
12	Figure 1 – Conceptual communication model of IEC 61400-25 .....	12
13	Figure 2 – Communication profiles .....	21
14		
15	Figure B-1 – IEC 61400-25 Web Service message .....	80
16	Figure B-2 – SOAP message example .....	81
17	Figure B-3 – Cross-reference .....	82
18	Figure B-4 – Fault message .....	83
19	Figure C-1 – Mapping architecture (conceptual) .....	86
20	Figure D-1 – Mapping architecture (conceptual) .....	114
21	Figure G-1 – Implementation issues (example) .....	150
22		
23	Table 1 – Mapping to web services .....	22
24	Table 2 – Mapping of attribute basic types .....	22
25	Table 3 – XML schema for wind power information model .....	23
26	Table 4 – Server service mapping .....	29
27	Table 5 – Logon request .....	30
28	Table 6 – Logon reply .....	31
29	Table 7 – Logoff request .....	32
30	Table 8 – Logoff reply .....	32
31	Table 9 – LOGICAL-DEVICE service mapping .....	33
32	Table 10 – LOGICAL-NODE mapping .....	33
33	Table 11 – GetLogicalNodeDirectoryRequest .....	34
34	Table 12 – Data mapping .....	34
35	Table 13 – GetDataValuesRequest .....	35
36	Table 14 – GetDataValuesReply .....	35
37	Table 15 – SetDataValuesRequest .....	35
38	Table 16 – SetDataValuesRequest .....	36
39	Table 17 – GetDataDefinitionReply .....	37
40	Table 18 – DATA-SET mapping .....	37
41	Table 19 – GetDataSetValuesReply .....	38
42	Table 20 – SetDataSetValuesReply .....	39



1	Table 21 – DeleteDataSetReply .....	40
2	Table 22 – Report control block services mapping .....	41
3	Table 23 – Report format .....	43
4	Table 24 – Report format elements .....	43
5	Table 25 – Log control block services mapping.....	46
6	Table 26 – SetLCBValuesReply .....	47
7	Table 27 – Log class services mapping .....	48
8	Table 28 – Services requiring Client/Server Communication Profile.....	50
9		
10	Table C-1 – Logical device mapping.....	86
11	Table C-2 – Logical node mapping .....	87
12	Table C-3 – Mapping structure CDC and IOA .....	87
13	Table C-4 – CDC: Measured Value (MV) .....	88
14	Table C-5 – CDC: Measured Value (MV) mapping .....	88
15	Table C-6 – CDC: Setpoint Value (SPV).....	88
16	Table C-7 – CDC: Setpoint Parameter Value (SPV) mapping .....	89
17	Table C-8 – CDC: Alarm (ALM) .....	89
18	Table C-9 – CDC: Alarm (ALM) mapping .....	90
19	Table C-10 – CDC: Event Counting (CTE) .....	90
20	Table C-11 – CDC: Event Counting (CTE) mapping .....	91
21	Table C-12 – CDC: Single point status common data class definition (SPS) .....	91
22	Table C-13 – CDC: Single Point Status (SPS) mapping .....	91
23	Table C-14 – CDC: Double point status common data class specification (DPS).....	92
24	Table C-15 – CDC: Double Point Status (DPS) mapping.....	92
25	Table C-16 – CDC: Complex Measured Value (CMV).....	92
26	Table C-17 – CDC: Complex Measured Value (CMV) mapping.....	93
27	Table C-18 – CDC: Controllable single point (SPC) .....	93
28	Table C-19 – CDC: Controllable single point (SPC) mapping .....	93
29	Table C-20 – CDC: Controllable double point (DPC) .....	94
30	Table C-21 – CDC: Controllable double point (DPC) mapping .....	94
31	Table C-22 – WYE .....	94
32	Table C-23 – CDC: Three Phase Value (WYE) mapping .....	95
33	Table C-24 – Wind turbine DEL .....	95
34	Table C-25 – CDC: Three Phase Value (DEL) mapping .....	95
35	Table C-26 – Services requiring Client/Server Communication Profile .....	96
36	Table C-27 – Server services mapping .....	97
37	Table C-28 – Association services mapping.....	97
38	Table C-29 – Logical Nodes services mapping .....	98
39	Table C-30 – Data services mapping.....	98
40	Table C-31 – Report Control Block services mapping.....	99
41	Table C-32 – Control services mapping .....	99
42	Table D-1 – CDC: Measured Value (MV) mapping .....	115

1	Table D-2 – CDC: Setpoint Value (SPV) mapping .....	116
2	Table D-3 – CDC: Status Value (STV) mapping .....	116
3	Table D-4 – CDC: Alarm (ALM) mapping .....	117
4	Table D-5 – CDC: Command (CMD) mapping .....	118
5	Table D-6 – CDC: Event Counting (CTE) mapping .....	118
6	Table D-7 – CDC: State Timing (TMS) mapping .....	119
7	Table D-8 – CDC: Single Point Status (SPS) mapping .....	119
8	Table D-9 – CDC: Double Point Status (DPS) mapping .....	120
9	Table D-10 – CDC: Integer Status (INS) mapping .....	120
10	Table D-11 – CDC: Complex Measured Value (CMV) mapping .....	121
11	Table D-12 – CDC: Controllable single point (SPC) mapping .....	121
12	Table D-13 – CDC: Controllable double point (DPC) mapping .....	122
13	Table D-14 – CDC: Controllable integer status (INC) mapping .....	123
14	Table D-15 – CDC: Phase to ground (WYE) mapping .....	123
15	Table D-16 – CDC: Phase to phase (DEL) mapping .....	124
16	Table D-17 – CDC: Device Name Plate (WDPL) mapping .....	125
17	Table D-18 – CDC: Binary Counter Reading (BCR) mapping .....	126
18	Table D-19 – Sample Data Class Attribute mapping .....	126
19	Table D-20 – Sample Data Class mapping .....	126
20	Table D-21 – Sample partial Data Class mapping .....	127
21	Table D-22 – Services requiring Client/Server Communication Profile .....	132
22	Table E-1 – Time sync A-Profile .....	134
23	Table E-2 – Time sync T-Profile .....	134
24	Table F-1 – General issue .....	137
25	Table F-2 – Process data description .....	140
26	Table F-3 – Operational services .....	141
27	Table F-4 – Selfdescription services .....	143
28	Table F-5 – Online configuration .....	144
29	Table F-6 – Offline configuration .....	145
30	Table F-7 – Integration into Applications .....	146
31	Table F-8 – Architecture and communication stacks .....	146

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## WIND TURBINES –

**Part 25-4:  
Communications for monitoring and control of wind power plants –  
Mapping to XML based communication profile**

## FOREWORD

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**Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.**

This committee draft for voting of the International Standard IEC 61400-25-4 has been prepared by IEC technical committee 88: Wind turbines Project team 25.

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

IEC 61400-25 consists of the following parts, under the general title *Communications for monitoring and control of wind power plants*:

- |            |   |
|------------|---|
| Part 25-1: | Overall description on principles and models <sup>1</sup> |
| Part 25-2: | Information models <sup>1</sup>                           |
| Part 25-3: | Information exchange models <sup>1</sup>                  |
| Part 25-4: | Mapping to XML based communication profile <sup>1</sup>   |
| Part 25-5: | Conformance testing <sup>1</sup>                          |

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<sup>1</sup> To be published

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## INTRODUCTION

2 IEC 61400-25 defines communication architecture for wind power plants. This architecture  
3 has been selected to provide an abstract definition of classes and services such that the  
4 specifications are independent of specific protocol stacks, implementations, and operating  
5 systems. This part of the IEC 61400-25, specify the mapping of these abstract classes and ser-  
6 vices to protocol stacks required to comply with the standard.

7 NOTE 1 Performance of IEC 61400-25 implementations are application specific. The standard does not guarantee  
8 a certain level of performance. That's out of the scope. However there is no underlying limitation in the communica-  
9 tions technology to prevent high speed application (millisecond level responses).

10 NOTE 2 The standard IEC 61400-25 has a close relation with other IEC projects like IEC 61850 Addendum 1  
11 (Communication networks and systems in substation, Power Quality Monitoring), IEC 62350 (Communications Sys-  
12 tems for Distributed Energy Resources (DER)), and IEC 62344 (Hydroelectric power plants – Communication for  
13 monitoring and control).

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## WIND TURBINES –

### Part 25-4:

## Communications for monitoring and control of wind power plants – Mapping to XML based communication profile

### 1 Scope

The focus of IEC 61400-25 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 this standard.

IEC 61400-25 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 available 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. IEC 61400-25 enables connectivity between a heterogeneous combination of client and servers from different manufacturers and suppliers.

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

- **information** provided by a real application of 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)

IEC 61400-25 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. However, the objective of the standard 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 the concrete XML encoding of 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)

1 – data typing and discovery of data types, and

2

3 The main mappings comprise:

4 – a mapping to SOAP-based web services (mandatory for IEC 61400-25)

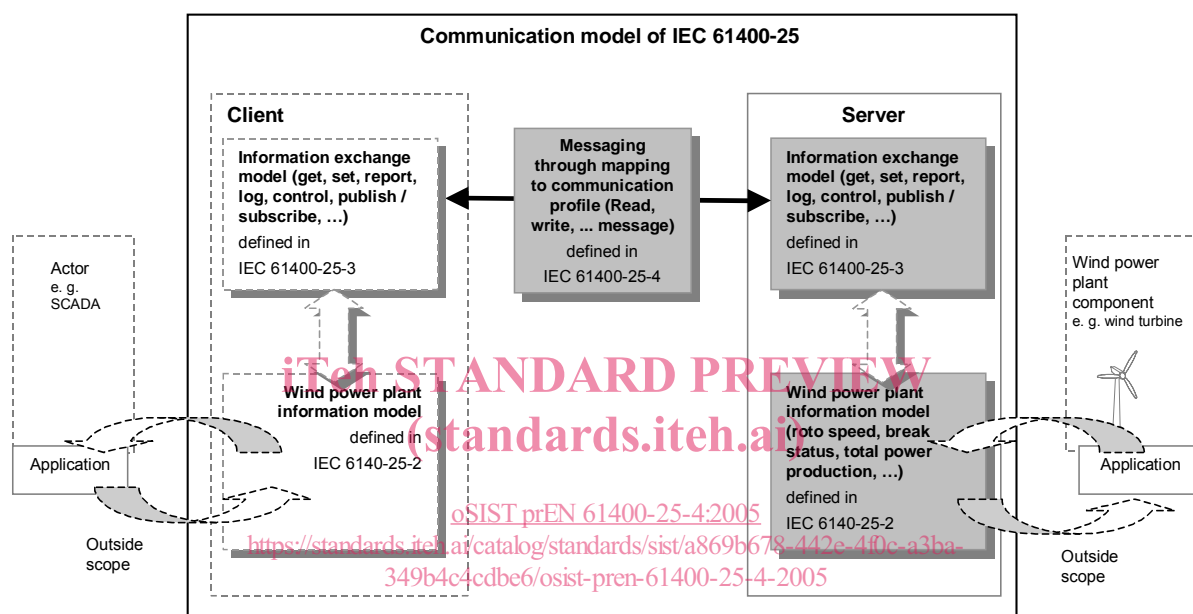
5

6 Informative Annexes specify additional mappings:

7 – a mapping to IEC 60970-5-104 for simple measurements and status information

8 – a mapping to DNP3 for simple measurements and status information

9



10

11 **Figure 1 – Conceptual communication model of IEC 61400-25**

12

13 NOTE 1 The specification of the mapping IEC 61850-8-1 (mapping to MMS) needs not to be referenced in this part  
 14 of the standard. IEC 61400-25 uses the same modelling approach as IEC 61850 and the same abstract services  
 15 (ACSI according to IEC 61850-7-2). Thus the mapping to MMS as defined in IEC 61850-8-1 can also be used for  
 16 the concrete information exchange.

17

## 1 2 Normative references

2 The following referenced documents are indispensable for the application of this document.  
3 For dated references, only the edition cited applies. For undated references, the latest edition  
4 of the referenced document (including any amendments) applies.

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

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

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

### 13 Specific normative references for web services

14 W3C, Extensible Markup Language (XML) 1.0,  
15 <http://www.w3.org/TR/2000/REC-xml-20001006>

16 W3C, Name spaces in XML, <http://www.w3.org/TR/REC-xml-names>

17 W3C, XML Schema Part 0: Primer, <http://www.w3.org/TR/xmlschema-0>

18 W3C, XML Schema Part 1: Structures, <http://www.w3.org/TR/xmlschema-1>  
[https://standards.iteh.ai/catalog/standards/sist/a869b678-442e-4f0c-a3ba-](https://standards.iteh.ai/catalog/standards/sist/a869b678-442e-4f0c-a3ba-34914c4adbe6/iec/61400-25-4-2005)

19 W3C, XML Schema Part 2: Data Types, <http://www.w3.org/TR/xmlschema-2>

### 20 Specific normative references for IEC 60870-5-101/104

21 IEC 60870-5-101 Ed. 2:2002 (57/605/FDIS), *Telecontrol equipment and systems - Part 5-101:*  
22 *Transmission protocols – Companion standard for basic telecontrol tasks*

23 IEC 60870-5-104:2000, *Telecontrol equipment and systems – Part 5-104: Transmission pro-*  
24 *ocols – Network access for IEC 60870-5-101 using standard transport profiles*

### 25 Specific normative references for DNP3

26 *DNP V3.00 Subset Definitions*, Edition 2.00, November 1995, DNP Users Group; Document  
27 Nr. P009-01G.SUB

28 *DNP V3.00 Data Object Library*, Edition 0.02, July 1997, DNP Users Group; Document Nr.  
29 P009-0BL

30 *DNP V3.00 Application Layer*, Edition 0.03, May 1997, DNP Users Group; Document Nr.  
31 P009-0PD.APP

32 *DNP V3.00 Transport Functions*, Edition 0.01, May 1997, DNP Users Group; Document Nr.  
33 P009-0PD.TF

34 *DNP V3.00 Data Link Layer*, Edition 0.02, May 1997, DNP Users Group; Document Nr. P009-  
35 0PD.DL