



SLOVENSKI STANDARD

SIST EN 62361-2:2014

01-april-2014

Upravljanje elektroenergetskega sistema in pripadajoča izmenjava informacij - Dolgoročna interoperabilnost - 2. del: Kode kakovosti podatkov za izmenjavo z nadzornimi sistemi (SCADA)

Power systems management and associated information exchange - Interoperability in the long term - Part 2: End to end quality codes for supervisory control and data acquisition (SCADA)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 62361-2:2014](https://standards.iteh.ai/catalog/standards/sist/30cc94d9-e5b9-4db4-89a6-1562bba0c0a5/sist-en-62361-2-2014)

[https://standards.iteh.ai/catalog/standards/sist/30cc94d9-e5b9-4db4-89a6-](https://standards.iteh.ai/catalog/standards/sist/30cc94d9-e5b9-4db4-89a6-1562bba0c0a5/sist-en-62361-2-2014)

[1562bba0c0a5/sist-en-62361-2-2014](https://standards.iteh.ai/catalog/standards/sist/30cc94d9-e5b9-4db4-89a6-1562bba0c0a5/sist-en-62361-2-2014)

Ta slovenski standard je istoveten z: EN 62361-2:2013

ICS:

29.240.30	Krmilna oprema za elektroenergetske sisteme	Control equipment for electric power systems
33.200	Daljinsko krmiljenje, daljinske meritve (telemetrija)	Telecontrol. Telemetry

SIST EN 62361-2:2014

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 62361-2:2014](https://standards.iteh.ai/catalog/standards/sist/30cc94d9-e5b9-4db4-89a6-1562bba0c0a5/sist-en-62361-2-2014)

<https://standards.iteh.ai/catalog/standards/sist/30cc94d9-e5b9-4db4-89a6-1562bba0c0a5/sist-en-62361-2-2014>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 62361-2

December 2013

ICS 33.200

English version

**Power systems management and associated information exchange -
Interoperability in the long term -
Part 2: End to end quality codes for supervisory control and data
acquisition (SCADA)
(IEC 62361-2:2013)**

Gestion des systèmes de puissance et
échanges d'informations associés -
Interopérabilité à long terme -
Partie 2: Codes de qualité de bout en bout
pour le contrôle de supervision et
acquisition de données (SCADA)
(CEI 62361-2:2013)

Angleichung der Codes für die
Datenqualität innerhalb des TC 57 -
Allgemeine Liste der Codes für die
Datenqualität
(IEC 62361-2:2013)

ITEH STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 62361-2:2014

<https://standards.iteh.ai/catalog/standards/sist/30cc94d9-e5b9-4db4-89a6->

This European Standard was approved by CENELEC on 2013-10-30. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

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

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 57/1374/FDIS, future edition 1 of IEC 62361-2, prepared by IEC/TC 57, "Power systems management and associated information exchange" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62361-2:2013.

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) 2014-07-30
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2016-10-30

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

Endorsement notice

The text of the International Standard IEC 62361-2:2013 was approved by CENELEC as a European Standard without any modification.

ITih STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 62361-2:2014
<https://standards.iteh.ai/catalog/standards/sist/30cc94d9-e5b9-4db4-89a6-1562bba0c0a5/sist-en-62361-2-2014>

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 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 60870-5	Series	Telecontrol equipment and systems - Part 5: Transmission protocols	EN 60870-5	Series
IEC 60870-6	Series	Telecontrol equipment and systems	EN 60870-6	Series
IEC 61850	Series	Communication networks and systems in substations	EN 61850	Series
IEC 61850-3	-	Communication networks and systems for power utility automation - Part 3: General requirements	FprEN 61850-3 ¹⁾	-
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
IEC 61850-7-3	-	Communication networks and systems for power utility automation - Part 7-3: Basic communication structure - Common data classes	EN 61850-7-3	-
IEC 61970	Series	Energy management system application program interface (EMS-API)	EN 61970	Series
IEC 61970-301	-	Energy management system application program interface (EMS-API) - Part 301: Common information model (CIM) base	FprEN 61970-301 ¹⁾	-
ISO 8601	2004	Data elements and interchange formats - Information interchange - Representation of dates and times	-	-

DAIS Data Access format/05-06-01; www.omg.com

OPC Data Access version 2.03; www.opcfoundation.org.

OPC UA Part 8 -Data Access RC 1.01.10 Specification.doc

¹⁾ At draft stage.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 62361-2:2014

<https://standards.iteh.ai/catalog/standards/sist/30cc94d9-e5b9-4db4-89a6-1562bba0c0a5/sist-en-62361-2-2014>



IEC 62361-2

Edition 1.0 2013-09

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Power systems management and associated information exchange –
Interoperability in the long term –
Part 2: End to end quality codes for supervisory control and data acquisition
(SCADA)**

[SIST EN 62361-2:2014](https://standards.iteh.ai/catalog/standards/sist/30cc94d9-e5b9-4db4-89a6-155c1b05/iec-62361-2:2014)

<https://standards.iteh.ai/catalog/standards/sist/30cc94d9-e5b9-4db4-89a6-155c1b05/iec-62361-2:2014>

**Gestion des systèmes de puissance et échanges d'informations associés –
Interopérabilité à long terme –
Partie 2: Codes de qualité de bout en bout pour le contrôle de supervision et
acquisition de données (SCADA)**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX

XA

ICS 33.200

ISBN 978-2-8322-1081-9

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD	5
INTRODUCTION	7
1 Scope	8
2 Normative references	8
3 Terms and definitions	9
4 Overview of applicable IEC standards	9
5 Quality code flow diagram from substation to control center	10
6 List of quality codes by existing standards	12
6.1 Comparison of quality codes in existing standards	12
6.2 IEC 60870-5-101/ IEC 60870-5-104 quality codes	14
6.2.1 Data related quality	14
6.2.2 Timestamp and related quality	14
6.3 IEC 60870-5-103 quality codes	15
6.4 IEC 60870-6 (TASE.2) quality codes	15
6.4.1 Data related quality	15
6.4.2 Timestamp and related quality	16
6.5 IEC 61850 quality codes (from IEC 61850-7-3)	17
6.5.1 Data related quality	17
6.5.2 Quality in the client server context	19
6.5.3 Relation between quality identifiers	21
6.5.4 Timestamp and related quality	22
6.6 IEC 61970-301 quality codes	24
6.6.1 General	24
6.6.2 MeasurementValueQuality Attributes defined in IEC 61970-301	24
6.6.3 MeasurementValueSource naming conventions	25
6.7 OPC and OMG quality codes	26
6.7.1 OPC DA quality codes	26
6.7.2 DAIS Data Access Quality codes	28
6.7.3 Timestamp and related quality	32
6.8 OPC UA Data Access Status Codes	33
6.8.1 Overview	33
6.8.2 Operation level result codes	33
7 Mapping of quality codes between standards	34
7.1 General	34
7.2 Mapping from IEC 61850 to IEC 60870-5-101/ IEC 60870-5-104	34
7.3 Mapping from IEC 60870-5-101/IEC 60870-5-104 to IEC 61970-301	36
7.4 Mapping from IEC 61850 to IEC 61970-301	37
7.5 Mapping from IEC 60870-6 to IEC 61970-301	39
7.6 Mapping from IEC 61970-301 to IEC 60870-6	40
7.7 Mapping from IEC 61850 to DAIS DA and OPC DA	42
8 Common quality codes across the power systems information exchange standards	44
8.1 Common quality codes	44
8.2 Quality code definitions	44
8.2.1 Validity quality codes	44
8.2.2 Detailed quality codes	45

8.2.3	Additional quality codes	48
8.2.4	Timestamp related quality codes	48
8.2.5	Source quality codes	48
Figure 1 – Overview IEC power systems information exchange standards		9
Figure 2 – Example of quality code flow diagram from substation to remote control center		11
Figure 3 – Quality type definitions		17
Figure 4 – Quality identifiers in a single client – server relationship		20
Figure 5 – Quality identifiers in a multiple client – server relationship		20
Figure 6 – Interaction of substitution and validity		22
Figure 7 – MeasurementValueQuality attributes inherited from IEC 61850		25
Figure 8 – OMG DAIS quality codes		30
Table 1 – Overview of quality codes in existing standards		13
Table 2 – Validity attribute values		16
Table 3 – CurrentSource attribute values		16
Table 4 – NormalSource attribute values		16
Table 5 – NormalValue attribute values		16
Table 6 – DetailQual relation to invalid or questionable		18
Table 7 – TimeStamp type definition		23
Table 8 – TimeQuality definition excerpt from IEC 61850-7-2:2010, Table 8		23
Table 9 – TimeAccuracy excerpt from IEC 61850-5:2013, Table 9		24
Table 10 – Example MeasurementValueSource naming conventions		25
Table 11 – Lower 8 bits of OPC DA quality flags		26
Table 12 – OPC standard quality BitField definition		26
Table 13 – Substatus for BAD quality		27
Table 14 – Substatus for UNCERTAIN quality		27
Table 15 – Substatus for GOOD quality		28
Table 16 – Limit BitField contents		28
Table 17 – OPCQuality members		30
Table 18 – Quality, status and limit bit masks		30
Table 19 – Main quality enumerations		30
Table 20 – Detailed quality flags for bad quality		31
Table 21 – Detailed quality flags for uncertain quality		31
Table 22 – Definition of limit flags		31
Table 23 – DAIS masks		32
Table 24 – DAIS flags defining source		32
Table 25 – Timestamp for DAIS quality flags		32
Table 26 – Bad operation level result codes		33
Table 27 – Uncertain operation level result codes		33
Table 28 – Good operation level result codes		34
Table 29 – Mapping from IEC 61850 to IEC 60870-5-101/IEC 60870-5-104		35
Table 30 – Mapping from IEC 60870-5-101/IEC 60870-5-104 to IEC 61970-301		36

Table 31 – Mapping from IEC 61850 to IEC 61970-301	38
Table 32 – Mapping from IEC 60870-6 to IEC 61970-301	39
Table 33 – Mapping from IEC 61970-301 to IEC 60870-6	41
Table 34 – Mapping from IEC 61850 to DAIS DA and OPC DA	42
Table 35 – Validity quality codes	45
Table 36 – Detailed good quality codes	45
Table 37 – Detailed invalid quality codes	46
Table 38 – Detailed questionable quality codes	47
Table 39 – Additional quality codes	48
Table 40 – Timestamp quality codes	48
Table 41 – Process and substituted quality codes	49

iTeh STANDARD PREVIEW **(standards.iteh.ai)**

SIST EN 62361-2:2014

<https://standards.iteh.ai/catalog/standards/sist/30cc94d9-e5b9-4db4-89a6-1562bba0c0a5/sist-en-62361-2-2014>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**POWER SYSTEMS MANAGEMENT
AND ASSOCIATED INFORMATION EXCHANGE –
INTEROPERABILITY IN THE LONG TERM –**

**Part 2: End to end quality codes for supervisory control
and data acquisition (SCADA)**

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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62361-2 has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

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

FDIS	Report on voting
57/1374/FDIS	57/1390/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.

In this document, words printed in all CAPITALS or SMALL CAPITALS represent specific quality bits or codes.

A list of all the parts in the IEC 62361 series, published under the general title *Power systems management and associated information exchange – Interoperability in the long term*, 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 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.

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.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 62361-2:2014](https://standards.iteh.ai/catalog/standards/sist/30cc94d9-e5b9-4db4-89a6-1562bba0c0a5/sist-en-62361-2-2014)

<https://standards.iteh.ai/catalog/standards/sist/30cc94d9-e5b9-4db4-89a6-1562bba0c0a5/sist-en-62361-2-2014>

INTRODUCTION

The scope of IEC 62361-2 is to create a common list of SCADA quality codes for reference by other standards to avoid embedding quality code lists in other standards.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 62361-2:2014

<https://standards.iteh.ai/catalog/standards/sist/30cc94d9-e5b9-4db4-89a6-1562bba0c0a5/sist-en-62361-2-2014>

POWER SYSTEMS MANAGEMENT AND ASSOCIATED INFORMATION EXCHANGE – INTEROPERABILITY IN THE LONG TERM –

Part 2: End to end quality codes for supervisory control and data acquisition (SCADA)

1 Scope

This part of IEC 62361 documents the quality codes used by existing IEC standards related to supervisory control and data acquisition (SCADA) in the field of power systems management. Meter reading quality coding is not considered to be in the scope of this version of the document. It determines and documents mapping between these standards. Eventual loss of quality information that might occur in mapping is documented. A cohesive and common list of quality codes with semantics is defined. The identified standards to be dealt with in this document are: IEC 60870-5, IEC 60870-6 TASE.2, IEC 61850, IEC 61970, DAIS DA, OPC DA and OPC UA.

Data covered by this part of IEC 62361 is measurements provided by the following links, applications or interfaces:

- RTU, 61850 or OPC DA links to SCADA
- Validation added by state estimation
- TASE.2 (ICCP) or TASE.1 (ELCOM) links between control centers
- Servers, e.g. SCADA, that provide OPC or DAIS DA data

2 Normative references

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.

IEC 60870-5 (all parts), *Telecontrol equipment and systems – Part 5: Transmission protocols*

IEC 60870-6 (all parts), *Telecontrol equipment and systems – Part 6: Telecontrol protocols compatible with ISO standards and ITU-T recommendations*

IEC 61850 (all parts), *Communication networks and systems for power utility automation*

IEC 61850-3, *Communication networks and systems for power utility automation – Part 3: General requirements*

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)*

IEC 61850-7-3, *Communication networks and systems for power utility automation – Part 7-3: Basic communication structure – Common data classes*

IEC 61970 (all parts), *Energy management system application program interface (EMS-API)*

IEC 61970-301, *Energy management system application program interface (EMS-API) – Part 301: Common information model (CIM) base*

ISO 8601, *Data elements and interchange formats – Information interchange – Representation of dates and times*

DAIS Data Access formal/05-06-01; www.omg.com

OPC Data Access version 2.03; www.opcfoundation.org.

OPC UA Part 8 -Data Access RC 1.01.10 Specification.doc

3 Terms and definitions

No special terms or definitions are required to understand this document.

4 Overview of applicable IEC standards

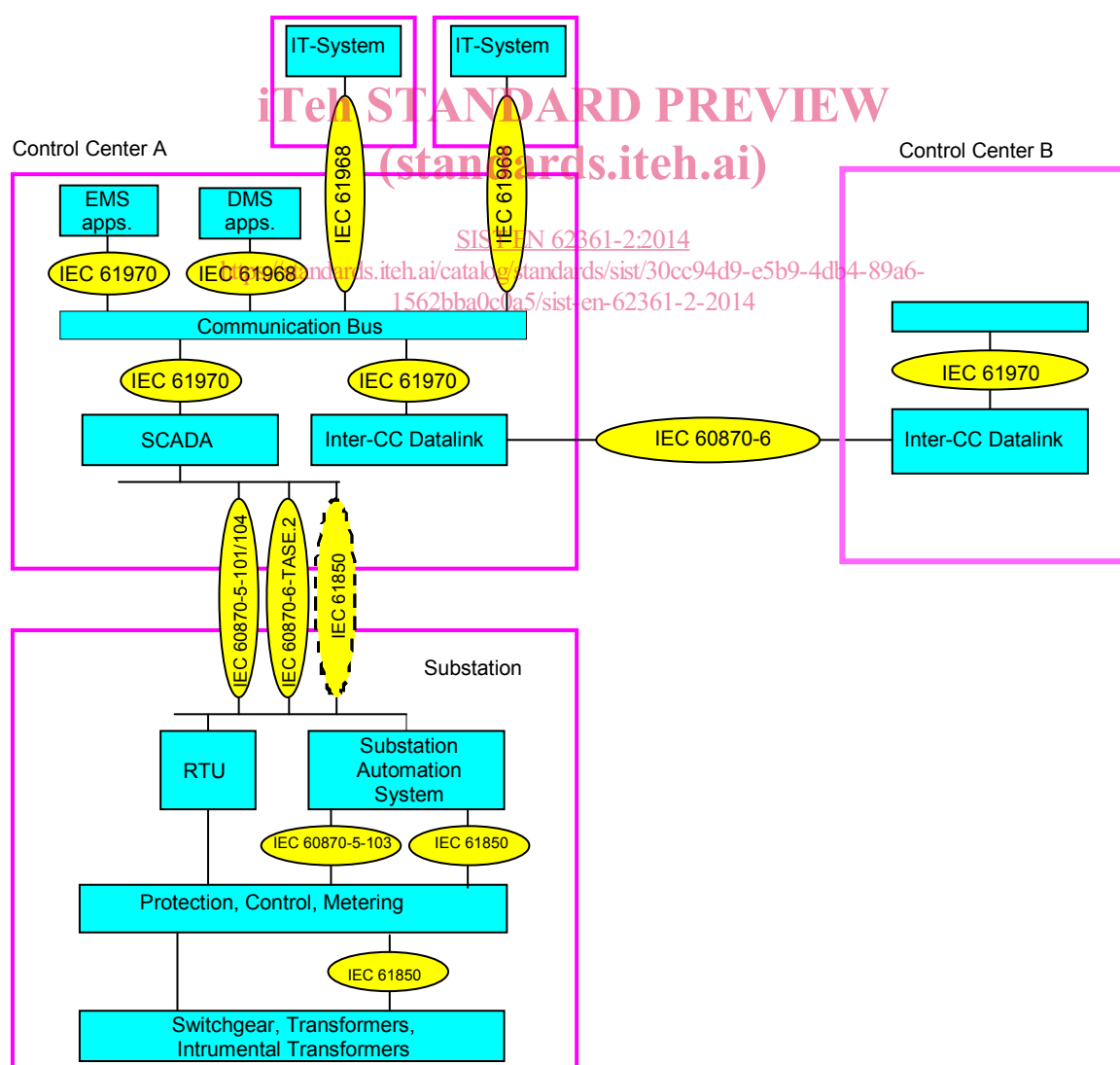


Figure 1 – Overview of IEC power systems information exchange standards