This document is a preview generated by EVS

Communication networks and systems in substations - Part 7-3: Basic communication structure for substation and feeder equipment - Common data classes

Communication networks and systems in substations - Part 7-3: Basic communication structure for substation and feeder equipment - Common data classes

EESTI STANDARDIKESKUS

EESTI STANDARDI EESSÕNA **NATIONAL FOREWORD**

Käesolev Eesti standard EVS-EN 61850-7-3:2003 sisaldab Euroopa standardi EN 61850-7-3:2003 ingliskeelset teksti. Käesolev dokument on jõustatud 09.09.2003 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 61850-7-3:2003 consists of the English text of the European standard EN 61850-7-3:2003. This document is endorsed on 09.09.2003 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.

Käsitlusala: Specifies common attribute types and common data classes related to substation applications. Specifies particularly: common data classes for status information, for measured information, for controllable status information, for controllable analogue set point information, for status settings, for analogue settings and attribute types used in these common data classes. Is applicable to the description of device models and functions of substations and feeder equipment	**Scope:** Specifies common attribute types and common data classes related to substation applications. Specifies particularly: common data classes for status information, for measured information, for controllable status information, for controllable analogue set point information, for status settings, for analogue settings and attribute types used in these common data classes. Is applicable to the description of device models and functions of substations and feeder equipment

ICS 33.200

Võtmesõnad:

The document is a preview generated by EVS

Eesti Standardikeskusele kuulub standardite reprodutseerimis- ja levitamisõigus

EUROPEAN STANDARD **EN 61850-7-3**

NORME EUROPÉENNE

EUROPÄISCHE NORM June 2003

ICS 33.200

English version

Communication networks and systems in substations Part 7-3: Basic communication structure for substation and feeder equipment – Common data classes

(IEC 61850-7-3:2003)

Réseaux et systèmes de communication dans les postes
Partie 7-3: Structure des communications de base pour les postes électriques et les équipements de lignes – Classes de données communes
(CEI 61850-7-3:2003)

Kommunikationsnetze und -systeme in Stationen
Teil 7-3: Grundlegende Kommunikationsstruktur für stations- und feldbezogene Ausrüstung - Gemeinsame Datenklassen
(IEC 61850-7-3:2003)

This European Standard was approved by CENELEC on 2003-05-01. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

© 2003 CENELEC - All rights of exploitation in any form and by any means reserved worldwide for CENELEC members.

Ref. No. EN 61850-7-3:2003 E

This document is a preview generated by EVS

Foreword

The text of document 57/618/FDIS, future edition 1 of IEC 61850-7-3, prepared by IEC TC 57, Power system control and associated communications, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61850-7-3 on 2003-05-01.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2004-02-01
– latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2006-05-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annexes A and ZA are normative and annex B is informative.
Annex ZA has been added by CENELEC.

_____

Endorsement notice

The text of the International Standard IEC 61850-7-3:2003 was approved by CENELEC as a European Standard without any modification.

_____

This document is a preview generated by EVS

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC/TS 61850-2	- [1)]	Communication networks and systems in substations Part 2: Glossary	-	-
IEC 61850-7-1	- [1)]	Part 7-1: Basic communication structure for substation and feeder equipment - Principles and models	-	-
IEC 61850-7-2	- [1)]	Part 7-2: Basic communication structure for substation and feeder equipment - Abstract communication service interface (ACSI)	EN 61850-7-2	2003 [2)]
IEC 61850-7-4	- [1)]	Part 7-4: Basic communication structure for substation and feeder equipment - Compatible logical node classes and data classes	EN 61850-7-4	2003 [2)]
ISO 1000	- [1)]	SI units and recommendations for the use of their multiples and of certain other units	-	-

[1)] Undated reference.

[2)] Valid edition at date of issue.

This document is a preview generated by EVS

INTERNATIONAL STANDARD

IEC 61850-7-3

First edition
2003-05

Communication networks and systems in substations –

Part 7-3:
Basic communication structure for substation and feeder equipment – Common data classes

This document is a preview generated by EVS

Reference number
IEC 61850-7-3:2003(E)

Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

Consolidated editions

The IEC is now publishing consolidated versions of its publications. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

Further information on IEC publications

The technical content of IEC publications is kept under constant review by the IEC, thus ensuring that the content reflects current technology. Information relating to this publication, including its validity, is available in the IEC Catalogue of publications (see below) in addition to new editions, amendments and corrigenda. Information on the subjects under consideration and work in progress undertaken by the technical committee which has prepared this publication, as well as the list of publications issued, is also available from the following:

- **IEC Web Site (www.iec.ch)**

- **Catalogue of IEC publications**

  The on-line catalogue on the IEC web site (http://www.iec.ch/searchpub/cur_fut.htm) enables you to search by a variety of criteria including text searches, technical committees and date of publication. On-line information is also available on recently issued publications, withdrawn and replaced publications, as well as corrigenda.

- **IEC Just Published**

  This summary of recently issued publications (http://www.iec.ch/online_news/justpub/jp_entry.htm) is also available by email. Please contact the Customer Service Centre (see below) for further information.

- **Customer Service Centre**

  If you have any questions regarding this publication or need further assistance, please contact the Customer Service Centre:

  Email: custserv@iec.ch
  Tel: +41 22 919 02 11
  Fax: +41 22 919 03 00

This document is a preview generated by EVS

INTERNATIONAL STANDARD

IEC 61850-7-3

First edition
2003-05

Communication networks and systems in substations –

Part 7-3: Basic communication structure for substation and feeder equipment – Common data classes

© IEC 2003 — Copyright - all rights reserved

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE XB

For price, see current catalogue

This document is a preview generated by EVS

CONTENTS

FOREWORD 6
INTRODUCTION 8
1 Scope 9
2 Normative references 9
3 Terms and definitions 10
4 Abbreviated terms 10
5 Conditions for attribute inclusion 10
6 Common data attribute types 11
6.1 General 11
6.2 Quality 11
6.2.1 Overview 11
6.2.2 Validity 12
6.2.3 Detail quality 12
6.2.4 Source 13
6.2.5 Test 14
6.2.6 Blocked by operator 14
6.2.7 Quality in the client server context 14
6.2.8 Relation between quality identifiers 15
6.3 Analogue value 17
6.4 Configuration of analogue value 17
6.5 Range configuration 18
6.6 Step position with transient indication 18
6.7 Pulse configuration 19
6.8 Originator 19
6.9 Unit definition 20
6.10 Vector definition 20
6.11 Point definition 21
6.12 CtlModels definition 21
6.13 SboClasses definition 21
7 Common data class specifications 21
7.1 General 21
7.2 Name spaces 21
7.3 Common data class specifications for status information 22
7.3.1 Basic status information template 22
7.3.2 Single point status (SPS) 22
7.3.3 Double point status (DPS) 23
7.3.4 Integer status (INS) 24
7.3.5 Protection activation information (ACT) 24
7.3.6 Directional protection activation information (ACD) 25
7.3.7 Security violation counting (SEC) 25
7.3.8 Binary counter reading (BCR) 26
7.4 Common data class specifications for measurand information 27
7.4.1 Basic measurand information template 27
7.4.2 Measured value (MV) 28
7.4.3 Complex measured value (CMV) 29
7.4.4 Sampled value (SAV) 30

This document is a preview generated by EVS

7.4.5 Phase to ground related measured values of a three phase system (WYE) 31
7.4.6 Phase to phase related measured values of a three phase system (DEL)...32
7.4.7 Sequence (SEQ)....33
7.4.8 Harmonic Value (HMV) 34
7.4.9 Harmonic value for WYE (HWYE) 35
7.4.10 Harmonic value for DEL (HDEL)....36
7.5 Common data class specifications for controllable status information 37
7.5.1 Application of services 37
7.5.2 Controllable single point (SPC) 38
7.5.3 Controllable double point (DPC)....39
7.5.4 Controllable integer status (INC)....40
7.5.5 Binary controlled step position information (BSC) 41
7.5.6 Integer controlled step position information (ISC)....42
7.6 Common data class specifications for controllable analogue information 43
7.6.1 Application of services 43
7.6.2 Controllable analogue set point information (APC) 44
7.7 Common data class specifications for status settings....45
7.7.1 Application of services 45
7.7.2 Single point setting (SPG)....45
7.7.3 Integer status setting (ING)....46
7.8 Common data class specifications for analogue settings....47
7.8.1 Application of services 47
7.8.2 Analogue setting (ASG) 47
7.8.3 Setting curve (CURVE) 48
7.9 Common data class specifications for description information....49
7.9.1 Basic description information template....49
7.9.2 Device name plate (DPL) 49
7.9.3 Logical node name plate (LPL) 50
7.9.4 Curve shape description (CSD)....50
8 Data attribute semantic....51

Annex A (normative) Value range for units and multiplier 60
Annex B (informative) Functional constraints....63

Figure 1 – Quality identifiers in a single client – server relationship....14
Figure 2 – Quality identifiers in a multiple client – server relationship....15
Figure 3 – Interaction of substitution and validity....16
Figure 4 – Configuration of command output pulse....19

Table 1 – Quality....11
Table 2 – Analogue value....17
Table 3 – Configuration of analogue value 17
Table 4 – Range configuration 18
Table 5 – Step position with transient indication....18
Table 6 – Pulse configuration....19
Table 7 – Originator 19
Table 8 – Values for orCat 20

This document is a preview generated by EVS

Table 9 – Unit 20
Table 10 – Vector 20
Table 11 – Point 21
Table 12 – Name space attributes 22
Table 13 – Basic status information template 22
Table 14 – Single point status common data class definition 23
Table 15 – Double point status common data class specification 23
Table 16 – Integer status common data class specification 24
Table 17 – Protection activation information common data class specification 24
Table 18 – Directional protection activation information common data class specification 25
Table 19 – Security violation counting common data class specification 25
Table 20 – Binary counter reading common data class specification 26
Table 21 – Basic measurand information template 27
Table 22 – Measured value 28
Table 23 – Complex measured value 29
Table 24 – Sampled value 30
Table 25 – WYE 31
Table 26 – Delta 32
Table 27 – Sequence 33
Table 28 – Harmonic value 34
Table 29 – Harmonic values for WYE 35
Table 30 – Harmonic values for delta 36
Table 31 – Basic controllable status information template 37
Table 32 – Controllable single point 38
Table 33 – Controllable double point 39
Table 34 – Controllable integer status 40
Table 35 – Binary controlled step position information 41
Table 36 – Integer controlled step position information 42
Table 37 – Basic controllable analogue information template 43
Table 38– Controllable analogue set point information 44
Table 39 – Basic status setting template 45
Table 40 – Single point setting 45
Table 41 – Integer status setting 46
Table 42 – Basic analogue setting template 47
Table 43 – Analogue setting 47
Table 44 – Setting curve 48
Table 45 – Basic description information template 49
Table 46 – Device name plate common data class specification 49
Table 47 – Logical node name plate common data class specification 50
Table 48 – Curve shape description common data class specification 50
Table 49 – Semantics of data attributes 51

This document is a preview generated by EVS

Table A.1 – SI units: base units 60
Table A.2 – SI units: derived units 60
Table A.3 – SI units: extended units 61
Table A.4 – SI units: industry specific units 61
Table A.5 – Multiplier 62
Table B.1 – Functional constraints 63

This document is a preview generated by EVS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMUNICATION NETWORKS AND SYSTEMS IN SUBSTATIONS –

Part 7-3: Basic communication structure for substation and feeder equipment – Common data classes

This document is a preview generated by EVS

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organisation for standardisation comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardisation in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. 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 organisations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organisation for Standardisation (ISO) in accordance with conditions determined by agreement between the two organisations.
2) The formal decisions or agreements of the 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 National Committees.
3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61850-7-3 has been prepared by IEC technical committee 57: Power system control and associated communications.

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

FDIS	Report on voting
57/618/FDIS	57/635/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.

IEC 61850 consists of the following parts, under the general title *Communication networks and systems in substations*.

Part 1: Introduction and overview

Part 2: Glossary [1]

Part 3: General requirements

Part 4: System and project management

Part 5: Communication requirements for functions and device models [2]

Part 6: Configuration description language for communication in electrical substations related to IEDs [1]

Part 7-1: Basic communication structure for substation and feeder equipment – Principles and models

Part 7-2: Basic communication structure for substation and feeder equipment – Abstract communication service interface (ACSI)

Part 7-3: Basic communication structure for substation and feeder equipment – Common data classes

Part 7-4: Basic communication structure for substation and feeder equipment – Compatible logical node classes and data classes

Part 8-1: Specific communication service mapping (SCSM) – Mappings to MMS (ISO/IEC 9506-1 and ISO/IEC 9506-2) and to ISO/IEC 8802-3 [1]

Part 9-1: Specific communication service mapping (SCSM) – Sampled values over serial unidirectional multidrop point to point link

Part 9-2: Specific communication service mapping (SCSM) – Sampled values over ISO/IEC 8802-3 [1]

Part 10: Conformance testing [1]

The content of this part of IEC 61850 is based on existing or emerging standards and applications. In particular the definitions are based upon:

- the specific data types defined in IEC 60870-5-101 and IEC 60870-5-103;
- the common class definitions from the *Utility Communication Architecture 2.0: Generic Object Models for Substation & Feeder Equipment (GOMSFE) (IEEE TR 1550).*

The committee has decided that the contents of this publication will remain unchanged until 2005. At this date, the publication will be

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

A bilingual version of this standard may be issued at a later date.

This document is a preview generated by EVS

---

1 Under consideration.

2 To be published.

INTRODUCTION

This document is part of a set of specifications, which details layered substation communication architecture. This architecture has been chosen to provide abstract definitions of classes and services such that the specifications are independent of specific protocol stacks and objects. The mapping of these abstract classes and services to communication stacks is outside the scope of IEC 61850-7-x and may be found in IEC 61850-8-x (station bus) and IEC 61850-9-x (process bus).

IEC 61850-7-1 gives an overview of this communication architecture. This part of IEC 61850 defines common attribute types and common data classes related to substation applications. These common data classes are used in IEC 61850-7-4. To define compatible data classes, the attributes of the instances of data shall be accessed using services defined in IEC 61850-7-2.

This part is used to specify the **abstract common data class** definitions. These abstract definitions shall be mapped into concrete object definitions that are to be used for a particular protocol (for example MMS, ISO 9506).

This document is a preview generated by EVS

COMMUNICATION NETWORKS AND SYSTEMS IN SUBSTATIONS –

Part 7-3: Basic communication structure for substation and feeder equipment – Common data classes

This document is a preview generated by EVS

1 Scope

This part of IEC 61850 specifies common attribute types and common data classes related to substation applications. In particular it specifies:

- common data classes for **status information**,
- common data classes for **measured information**,
- common data classes for **controllable status information**,
- common data classes for **controllable analogue set point information**,
- common data classes for **status settings**,
- common data classes for **analogue settings** and
- **attribute types** used in these common data classes.

This international standard is applicable to the description of device models and functions of substations and feeder equipment.

This international standard may also be applied, for example, to describe device models and functions for:

- substation to substation information exchange,
- substation to control centre information exchange,
- power plant to control centre information exchange,
- information exchange for distributed generation, or
- information exchange for metering.

2 Normative references

The following referenced documents are indispensable for the application 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.

IEC 61850-2, *Communication networks and systems in substations – Part 2: Glossary* [3]

IEC 61850-7-1, *Communication networks and systems in substations – Part 7-1: Basic communication structure for substation and feeder equipment – Principles and models*

IEC 61850-7-2, *Communication networks and systems in substations – Part 7-2: Basic communication structure for substation and feeder equipment – Abstract communication service interface (ACSI)*

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

ISO 1000, SI units and recommendations for the use of their multiples and of certain other units

---

3 Under consideration.