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INTERNATIONAL STANDARD

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

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CONTENTS

FOREWORD.....	9
INTRODUCTION.....	13
1 Scope.....	14
1.1 General.....	14
1.2 Namespace name and version	14
1.3 Code Component distribution	15
2 Normative references	16
3 Terms and definitions	16
4 Abbreviated terms	17
5 Conditions for element inclusion	20
6 Constructed attribute classes	20
6.1 General.....	20
6.2 Configuration of analogue value (ScaledValueConfig).....	20
6.3 Range configuration (RangeConfig)	21
6.4 Step position with transient indication (ValWithTrans).....	22
6.5 Pulse configuration (PulseConfig)	22
6.6 Unit definition (Unit).....	23
6.7 Vector definition (Vector)	23
6.8 Point definition (Point)	24
6.9 Cell (Cell)	24
6.10 Calendar time definition (CalendarTime)	25
6.11 Analogue value	26
6.11.1 General	26
6.11.2 Analogue value (AnalogueValue).....	26
6.11.3 Analogue value control (AnalogueValueCtl)	26
6.11.4 Analogue float value control (AnalogueValueCtlF)	27
6.11.5 Analogue integer value control (AnalogueValueCtlInt)	27
7 Common data class specifications	27
7.1 General.....	27
7.2 Modelling introduction	28
7.2.1 General	28
7.2.2 <<abstract>> Common attributes for primitive CDC (BasePrimitiveCDC)	29
7.2.3 <<abstract>> Common attributes for composed CDC (BaseComposedCDC).....	30
7.2.4 <<abstract>> Common attributes for substitution (SubstitutionCDC)	30
7.3 Status information.....	32
7.3.1 General	32
7.3.2 Single point status (SPS).....	33
7.3.3 Double point status (DPS)	34
7.3.4 <<statistics>> Integer status (INS).....	35
7.3.5 <<abstract>> Enumerated status (ENS).....	35
7.3.6 Protection activation information (ACT).....	36
7.3.7 Directional protection indication information (ACD)	37
7.3.8 Security violation counting (SEC)	38
7.3.9 <<statistics>> Binary counter reading (BCR)	39

7.3.10	Histogram (HST).....	40
7.3.11	Visible string status (VSS).....	43
7.3.12	Object reference status (ORS).....	43
7.3.13	Time value status (TCS).....	44
7.4	Measurand information	44
7.4.1	General	44
7.4.2	<<abstract,statistics>> Common harmonic measurand information (HarmonicMeasurandCDC).....	46
7.4.3	<<statistics>> Measured value (MV).....	48
7.4.4	<<statistics>> Complex measured value (CMV).....	52
7.4.5	<<statistics>> Sampled value (SAV).....	54
7.4.6	<<statistics>> Phase to ground/neutral related measured values of a three-phase system (WYE).....	54
7.4.7	<<statistics>> Phase to phase related measured values of a three- phase system (DEL).....	56
7.4.8	<<statistics>> Sequence (SEQ).....	57
7.4.9	<<statistics>> Harmonic value (HNV).....	58
7.4.10	<<statistics>> Harmonic value for WYE (HWYE).....	59
7.4.11	<<statistics>> Harmonic value for DEL (HDEL).....	60
7.5	Controls.....	61
7.5.1	General	61
7.5.2	<<abstract>> Control testing (ControlTestingCDC).....	65
7.5.3	Controllable single point (SPC).....	66
7.5.4	Controllable double point (DPC)	68
7.5.5	<<statistics>> Controllable integer status (INC).....	69
7.5.6	<<abstract>> Controllable enumerated status (ENC).....	70
7.5.7	<<statistics>> Binary controlled step position information (BSC).....	71
7.5.8	<<statistics>> Integer controlled step position information (ISC).....	72
7.5.9	<<statistics>> Controllable analogue process value (APC).....	73
7.5.10	<<statistics>> Binary controlled analogue process value (BAC).....	75
7.6	Status settings.....	76
7.6.1	General	76
7.6.2	Single point setting	77
7.6.3	Integer status setting	79
7.6.4	Enumerated status setting	81
7.6.5	Object reference setting	84
7.6.6	Time setting.....	86
7.6.7	Currency setting	89
7.6.8	Visible string setting	91
7.7	Analogue settings	94
7.7.1	General	94
7.7.2	Analogue setting.....	94
7.7.3	Setting curve	97
7.7.4	Curve shape setting.....	100
7.8	Description information	104
7.8.1	General	104
7.8.2	Device name plate (DPL).....	105
7.8.3	Logical node name plate (LPL)	106
7.8.4	Curve shape description (CSD).....	107

7.8.5	Visible string description (VSD)	108
7.9	Common data class specifications for service tracking	108
7.9.1	General	108
7.9.2	Common service tracking (CST)	110
7.9.3	Buffered report tracking service (BTS)	110
7.9.4	Unbuffered report tracking service (UTS)	112
7.9.5	Log control block tracking service (LTS)	113
7.9.6	GOOSE control block tracking service (GTS)	113
7.9.7	MSVCB tracking service (MTS)	114
7.9.8	USVCB tracking service (NTS)	115
7.9.9	SGCB tracking service (STS)	116
7.9.10	<<abstract>> Control service tracking (CTS)	117
8	Enumerated data attribute types	118
8.1	General	118
8.2	Angle reference (AngleReferenceKind enumeration)	118
8.3	Control model (CtlModelKind enumeration)	119
8.4	Curve characteristic (CurveCharKind enumeration)	119
8.5	Fault direction (FaultDirectionKind enumeration)	121
8.6	Harmonic value reference (HvReferenceKind enumeration)	121
8.7	Month (MonthKind enumeration)	122
8.8	Unit multiplier (MultiplierKind enumeration)	122
8.9	Occurrence (OccurrenceKind enumeration)	123
8.10	Output signal (OutputSignalKind enumeration)	123
8.11	Period (PeriodKind enumeration)	123
8.12	Phase angle reference (PhaseAngleReferenceKind enumeration)	124
8.13	Phase fault direction (PhaseFaultDirectionKind enumeration)	124
8.14	Phase reference (PhaseReferenceKind enumeration)	125
8.15	Range (RangeKind enumeration)	125
8.16	SI unit (SIUnitKind enumeration)	125
8.17	Select-before-operate class (SboClassKind enumeration)	128
8.18	Sequence (SequenceKind enumeration)	128
8.19	Severity (SeverityKind enumeration)	128
8.20	Week day (WeekdayKind enumeration)	129
Annex A	(normative) Value range for units and multiplier	130
Annex B	(informative) Functional constraints (FcKind)	131
Annex C	(normative) Tracking of configuration revisions	135
Annex D	(normative) SCL enumerations	136
Annex E	(informative) Conditions for element presence	137
Annex F	(normative) Compatibility of the different revisions of the standard	139
F.1	General	139
F.2	List of the modifications to consider for backward / forward compatibility	139
F.3	List of modifications requiring specific treatment	142
F.4	Special compatibility rules and discussion	143
F.4.1	Use case 3a – Dead band, db and dbRef	143
F.4.2	Use case 3a – maxPts	144
F.4.3	Use case 10 – cdcNs	144
F.4.4	Use case f13 – CDC BCR	144
F.4.5	Use case f13 – CDC HMW, HWYE, HDEL	144

F.4.6	Use case f13 – CDC CMV	144
F.4.7	Use case f14 – NTS	144
F.4.8	CDC APC	144
F.4.9	CDC ENS, ENC, ENG	144
	Bibliography	146

Figure 1	– Range configuration	21
Figure 2	– Configuration of command output pulse	23
Figure 3	– Cell definition	24
Figure 4	– Interpretation of calendar time settings	25
Figure 5	– Class diagram CommonDataClasses::CommonDataClasses	28
Figure 6	– Class diagram CoreAbstractCDCs::CoreAbstractCDCs	29
Figure 7	– Concept of substitution	31
Figure 8	– Class diagram CDCStatusInfo::CDCStatusInfo	33
Figure 9	– One-dimensional histogram	41
Figure 10	– Two-dimensional histogram	42
Figure 11	– Class diagram CDCAnalogueInfo::CDCAnalogueInfo-1	45
Figure 12	– Class diagram CDCAnalogueInfo::CDCAnalogueInfo-2	46
Figure 13	– Array indexing ('har'/'*Har') based on 'numCyc'	47
Figure 14	– Deadbanded value	49
Figure 15	– Zero deadband	49
Figure 16	– Relation between phase values	55
Figure 17	– Class diagram CDCCControl::CDCCControl-1	63
Figure 18	– Class diagram CDCCControl::CDCCControl-2	65
Figure 19	– Attributes for command testing	65
Figure 20	– Class diagram SPG::SPG	77
Figure 21	– Class diagram ING::ING	79
Figure 22	– Class diagram ENG::ENG	82
Figure 23	– Class diagram ORG::ORG	84
Figure 24	– Switching to test object reference	85
Figure 25	– Class diagram TSG::TSG	87
Figure 26	– Class diagram CUG::CUG	89
Figure 27	– Class diagram VSG::VSG	92
Figure 28	– Class diagram ASG::ASG	94
Figure 29	– Class diagram CURVE::CURVE	97
Figure 30	– Class diagram CSG::CSG	100
Figure 31	– Two-dimensional curve	101
Figure 32	– Three-dimensional surface	101
Figure 33	– Class diagram CDCDescription::CDCDescription	105
Figure 34	– Class diagram CDCServiceTracking::CDCServiceTracking	109
Table 1	– Attributes of ScaledValueConfig	21
Table 2	– Attributes of RangeConfig	21

Table 3 – Attributes of ValWithTrans	22
Table 4 – Attributes of PulseConfig	23
Table 5 – Attributes of Unit	23
Table 6 – Attributes of Vector	24
Table 7 – Attributes of Point.....	24
Table 8 – Attributes of Cell	25
Table 9 – Attributes of CalendarTime	25
Table 10 – Attributes of AnalogueValue	26
Table 11 – Attributes of AnalogueValueCtl	27
Table 12 – Attributes of AnalogueValueCtlF	27
Table 13 – Attributes of AnalogueValueCtlInt	27
Table 14 – Attributes of BasePrimitiveCDC	30
Table 15 – Attributes of BaseComposedCDC	30
Table 16 – Attributes of SubstitutionCDC	32
Table 17 – Attributes of SPS	34
Table 18 – Attributes of DPS.....	34
Table 19 – Attributes of INS	35
Table 20 – Attributes of ENS.....	36
Table 21 – Attributes of ACT	36
Table 22 – Attributes of ACD	37
Table 23 – Attributes of SEC.....	39
Table 24 – Attributes of BCR	39
Table 25 – Attributes of HST	42
Table 26 – Attributes of VSS.....	43
Table 27 – Attributes of ORS	44
Table 28 – Attributes of TCS	44
Table 29 – Attributes of HarmonicMeasurandCDC	48
Table 30 – Attributes of MV	50
Table 31 – Attributes of CMV	52
Table 32 – Attributes of SAV	54
Table 33 – Attributes of WYE	56
Table 34 – Attributes of DEL	57
Table 35 – Attributes of SEQ	58
Table 36 – Attributes of H MV	59
Table 37 – Attributes of HWYE	59
Table 38 – Attributes of HDEL	61
Table 39 – Attributes of ControlTestingCDC.....	66
Table 40 – Attributes of SPC.....	66
Table 41 – Attributes of DPC	68
Table 42 – Attributes of INC.....	69
Table 43 – Attributes of ENC	70
Table 44 – Attributes of BSC.....	71
Table 45 – Attributes of ISC.....	73

Table 46 – Attributes of APC.....	74
Table 47 – Attributes of BAC.....	75
Table 48 – Attributes of SPG	77
Table 49 – Attributes of SPG_SP	78
Table 50 – Attributes of SPG_SG.....	78
Table 51 – Attributes of SPG_SE	79
Table 52 – Attributes of ING	80
Table 53 – Attributes of ING_SP	80
Table 54 – Attributes of ING_SG.....	81
Table 55 – Attributes of ING_SE	81
Table 56 – Attributes of ENG	82
Table 57 – Attributes of ENG_SP	83
Table 58 – Attributes of ENG_SG	83
Table 59 – Attributes of ENG_SE.....	83
Table 60 – Attributes of ORG.....	85
Table 61 – Attributes of TSG.....	87
Table 62 – Attributes of TSG_SP	88
Table 63 – Attributes of TSG_SG.....	88
Table 64 – Attributes of TSG_SE	89
Table 65 – Attributes of CUG	90
Table 66 – Attributes of CUG_SP.....	90
Table 67 – Attributes of CUG_SG	90
Table 68 – Attributes of CUG_SE.....	91
Table 69 – Attributes of VSG	92
Table 70 – Attributes of VSG_SP	93
Table 71 – Attributes of VSG_SG.....	93
Table 72 – Attributes of VSG_SE	93
Table 73 – Attributes of ASG	95
Table 74 – Attributes of ASG_SP.....	95
Table 75 – Attributes of ASG_SG.....	96
Table 76 – Attributes of ASG_SE	96
Table 77 – Attributes of CURVE.....	98
Table 78 – Attributes of CURVE_SP	98
Table 79 – Attributes of CURVE_SG	99
Table 80 – Attributes of CURVE_SE	99
Table 81 – Attributes of CSG	102
Table 82 – Attributes of CSG_SP.....	102
Table 83 – Attributes of CSG_SG	103
Table 84 – Attributes of CSG_SE.....	104
Table 85 – Attributes of DPL	105
Table 86 – Attributes of LPL	106
Table 87 – Attributes of CSD	107
Table 88 – Attributes of VSD.....	108

Table 89 – Attributes of CST	110
Table 90 – Attributes of BTS	111
Table 91 – Attributes of UTS	112
Table 92 – Attributes of LTS	113
Table 93 – Attributes of GTS	114
Table 94 – Attributes of MTS	115
Table 95 – Attributes of NTS	116
Table 96 – Attributes of STS	117
Table 97 – Attributes of CTS	118
Table 98 – Literals of AngleReferenceKind	119
Table 99 – Literals of CtlModelKind	119
Table 100 – Literals of CurveCharKind	119
Table 101 – Literals of FaultDirectionKind	121
Table 102 – Literals of HvReferenceKind	121
Table 103 – Literals of MonthKind	122
Table 104 – Literals of MultiplierKind	122
Table 105 – Literals of OccurrenceKind	123
Table 106 – Literals of OutputSignalKind	123
Table 107 – Literals of PeriodKind	124
Table 108 – Literals of PhaseAngleReferenceKind	124
Table 109 – Literals of PhaseFaultDirectionKind	124
Table 110 – Literals of PhaseReferenceKind	125
Table 111 – Literals of RangeKind	125
Table 112 – Literals of SIUnitKind	126
Table 113 – Literals of SboClassKind	128
Table 114 – Literals of SequenceKind	128
Table 115 – Literals of SeverityKind	128
Table 116 – Literals of WeekdayKind	129
Table B.1 – Functional constraints (FcKind)	131
Table E.1 – Conditions for presence of elements within a context	137

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 7-3: Basic communication structure – Common data classes

FOREWORD

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This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 61850-7-3 edition 2.1 contains the second edition (2010-12) [documents 57/1087/FDIS and 57/1085/RVD] and its amendment 1 (2020-02) [documents 57/2101/FDIS and 57/2132/RVD].

International Standard IEC 61850-7-3 has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

This second edition cancels and replaces the first edition, published in 2003.

Compared to the first edition, this second edition:

- defines new common data classes used for new standards defining object models for other domains based on IEC 61850 and for the representation of statistical and historical data;
- provides clarifications and corrections to the first edition of IEC 61850-7-3;

Compared to the second edition, this first revision of the second edition:

- a) provides clarifications and corrections to the second edition of IEC 61850-7-3, based on the tissues = { 690, 691, 692, 697, 698, 707, 709, 711, 722, 814, 816, 819, 832, 839, 846, 868, 887, 919, 924, 925, 926, 929, 953, 954, 962, 968, 996, 1078, 1079, 1122, 1127, 1184, 1187, 1189, 1220, 1233, 1240, 1242, 1247, 1253, 1265, 1270, 1311, 1372, 1387, 1388, 1403, 1430, 1438, 1578, 1581, 1598, 1602, 1623 };
- b) includes semantic of attributes within tables in clauses 6 and 7 and thus removes the need for explicit semantic definition in Clause 8;
- c) Clause 8 now contains definitions of newly introduced explicit enumerated types (with tables); this is fully backward compatible as the value of the literals have not changed;
- d) some subclauses in clause 7 have different numbering because of introduction of some abstract types (that group common attributes for several concrete types);
- e) first subclause under any CDC group in Clause 7, that contained the tables with applicable services with respect to functional constraints, have been removed; that information is explicitly defined in IEC 61850-7-2 with functional constraints, and temporarily included as Annex B, Functional constraints;
- f) content of 6.2.7 and 6.2.8 has been moved to the normative Annex D of IEC 61850-7-2: Clarification on usage of quality;
- g) implements extension introduced by IEC 62351-6 for security;
- h) presence conditions have been redesigned and renamed to support their uniform usage in all of the IEC 61850-7-xxx series as necessary. Below is the table containing the old and the new presence conditions:

new	original	Notes
M	M	
O	O	
MOcond(condID)	Various C, C1, ...	In IEC 61850-7-4
MFcond(condID)	Various C, C1, ...	In IEC 61850-7-4
OFcond(condID)	Various C, C1, ...	In IEC 61850-7-4
MFsubst	PICS_SUBST	
AtLeastOne(1)	GC_1	
AtMostOne	GC_1_EXCL	
AllOrNonePerGroup(n)	GC_2_n	
AllOnlyOneGroup(n)	GC_2_XOR_n	
MO(sibling)	GC_CON_attr	
MOIn0	AC_LN0_M	
MFIn0	AC_LN0_EX	
MORootLD	C1 in CommonLN	
MOInNs	AC_DLD_M	
MOdataNs	AC_DLN_M	
MOcdcNs	AC_DLND_A_M	
MFscaledAV	AC_SCAV	
MFscaledMagV	AC_SCAV	

new	original	Notes
MFscaledAngV	AC_SCAV	
MAIOrNonePerGroup(n)	AC_ST	
O	AC_CO_O	Documentation provided in ControllableCDC class.
	AC_SG_M	Split into explicit subtype, no need for presence condition.
	AC_SG_O	Split into explicit subtype, no need for presence condition.
	AC_SG_C1	Split into explicit subtype, no need for presence condition.
	AC_NSQ_M	Split into explicit subtype, no need for presence condition.
	AC_NSQ_O	Split into explicit subtype, no need for presence condition.
	AC_NSQ_C1	Split into explicit subtype, no need for presence condition.
MOrms	AC_RMS_M	
O	AC_CLC_O	Eliminated presence condition on Vector.ang in favour of documenting the relevant DO (in IEC 61850-7-4).

Clauses 5 to 8 and their subclauses, replacement for Annex A, Annex B and XML enumerations from Annex D are automatically generated from the UML model.

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

A list of all parts in the IEC 61850 series, published under the general title: *Communication networks and systems for power utility automation*, can be found on the IEC website.

Contrary to usual IEC practice, for ease of use in this case, all tables and figures (including those which have been added since Edition 2) have been numbered consecutively in the amendment and the consolidated version.

This IEC standard includes Code Components i.e. components that are intended to be directly processed by a computer. Such content is any text found between the markers <CODE BEGINS> and <CODE ENDS>, or otherwise is clearly labeled in this standard as a Code Component. In the current version of this document, such indication is made at the beginning of each concerned top-level clauses

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If any updates are required to the published code component that needs to apply immediately and can not wait for an amendment (i.e. fixing a major problem), a new release of the Code Component will be issued and distributed through the IEC WebSite. Any new release of the Code Component related to this part will supersede any previously published Code Component including the one published within the current document.

This publication contains attached nsd files which compose the Code Component of this part. These files are intended to be used as a complement and do not form an integral part of this standard.

The committee has decided that the contents of the base publication and its amendment 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,
- 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.

INTRODUCTION

This document is part of a set of specifications, that 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 constructed attributed classes and common data classes related to applications in the power system using IEC 61850 modeling concepts such as substations, hydro power or distributed energy resources. These common data classes are used in IEC 61850-7-4 to define compatible dataObject classes. The SubDataObjects, DataAttributes or SubAttributes of the instances of dataObject are accessed using services defined in IEC 61850-7-2.

This part of IEC 61850 is used to specify the abstract common data class and constructed attribute class definitions. These abstract definitions are mapped into concrete object definitions that are to be used for a particular protocol (for example MMS, ISO 9506 series).

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 7-3: Basic communication structure – Common data classes

1 Scope

1.1 General

This part of IEC 61850 specifies constructed attribute classes 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 control,
- 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.

1.2 Namespace name and version

This new section is mandatory for any IEC 61850 namespace (as defined by IEC 61850-7-1:2011).

The parameters which are identifying this new release of this namespace are:

- Namespace Version: 2007
- Namespace Revision: B
- Namespace name: “IEC 61850-7-3:2007B”
- Namespace release: 3
- Namespace release date: 2019-10-02

IEC 61850-7-3 depends on IEC 61850-7-2:2007B latest release.

The table below provides an overview of all published versions of this namespace.

Edition	Publication date	Webstore	Namespace
Edition 1.0	2003-05	IEC 61850-7-3:2003	IEC 61850-7-3:2003
Edition 2.0	2010-12	IEC 61850-7-3:2010	IEC 61850-7-3:2007
Amendment 1 of Edition 2.0	2020-02	IEC 61850-7-3:2010/AMD1:2020	IEC 61850-7-3:2007B
Edition 2.1	2020-02	IEC 61850-7-3:2010+AMD1:2020 CSV	IEC 61850-7-3:2007B

1.3 Code Component distribution

The Code Component will be available in light and full version:

- Full version will contain definition of the whole LNs defined in this standard with the documentation associated and access will be restricted to purchaser of this part.
- Light version will not contain the documentation but will contain the whole definition of the LNs as per full version, and this light version will be freely accessible on the IEC website for download, but the usage remains under the licensing conditions.

The link for downloading the light version of this code component is:

http://www.iec.ch/public/TC57/supportdocuments/IEC_61850-7-3.NSD.2007B3.light.zip

The Code Components for IEC 61850 data models (like basic types, presence conditions, ... definition in this IEC standard) are available as the file format NSD defined by IEC 61850-7-7.

The Code Component(s) included in this IEC standard are potentially subject to maintenance works and user shall select the latest release in the repository located at:

<http://www.iec.ch/TC57/supportdocuments>

The latest version/release of the document will be found by selecting the file IEC_61850-7-3.NSD.{VersionStateInfo}.light.zip with the filed VersionStateInfo of the highest value.

Each Code Component is a ZIP package containing the electronic representation of the Code Component itself, with a file describing the content of the package (IECManifest.xml).

The IECManifest contains different sections giving information on:

- The copyright notice
- The identification of the code component
- The publication related to the code component
- The list of the electronic files which compose the code component
- An optional list of history files to track changes during the evolution process of the code component

The life cycle of a code component is not restricted to the life cycle of the related publication. The publication life cycle goes through two stages, Version (corresponding to an edition) and Revision (corresponding to an amendment). A third publication stage (Release) allows publication of Code Component without need to publish an amendment.

This is useful when InterOp Tissues need to be fixed. Then a new release of the Code Component will be released, which supersedes the previous release, and distributed through the IEC TC57 web site.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60255-151:2009, *Measuring relays and protection equipment - Part 151: Functional requirements for over/under current protection*

IEC TS 61850-2, *Communication networks and systems for power utility automation - Part 2: Glossary*

IEC 61850-7-1, *Communication networks and systems for power utility automation - Part 7-1: Basic communication structure - Principles and models*

IEC 61850-7-2, *Communication networks and systems for power utility automation - Part 7-2: Basic information and communication structure - Abstract communication service interface (ACSI)*

IEC 61850-7-4, *Communication networks and systems for power utility automation - Part 7-4: Basic communication structure - Compatible logical node classes and data object classes*

IEC TS 61850-7-7, *Communication networks and systems for power utility automation - Part 7-7: Machine-processable format of IEC 61850-related data models for tools*

IEC TS 62351-6:–, *Power systems management and associated information exchange data and communication security – Part 6: Security for IEC 61850*¹

IEC/IEEE 60255-118-1, *Measuring relays and protection equipment – Part 118-1: Synchrophasor for power systems – Measurements*

ISO 4217, *Codes for the representation of currencies and funds*

¹ Under preparation. Stage at the time of publication: IEC/PRVC 62351-6:2020.