

DIN EN 61850-7-3

ICS 33.040.40

Ersatz für
DIN EN 61850-7-3:2011-08
Siehe Anwendungsbeginn

**Kommunikationsnetze und -systeme für die Automatisierung in der elektrischen Energieversorgung –
Teil 7-3: Grundlegende Kommunikationsstruktur –
Gemeinsame Datenklassen
(IEC 61850-7-3:2010 + A1:2020);
Englische Fassung EN 61850-7-3:2011 + A1:2020**

Communication networks and systems for power utility automation –
Part 7-3: Basic communication structure –
Common data classes
(IEC 61850-7-3:2010 + A1:2020);
English version EN 61850-7-3:2011 + A1:2020

Réseaux et systèmes de communication pour l'automatisation des systèmes électriques –
Partie 7-3: Structure de communication de base –
Classes de données communes
(IEC 61850-7-3:2010 + A1:2020);
Version anglaise EN 61850-7-3:2011 + A1:2020

Gesamtumfang 163 Seiten

DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE

Anwendungsbeginn

Anwendungsbeginn für die von CENELEC am 2011-01-20 angenommene Europäische Norm und die am 2020-03-16 angenommene Änderung A1 als DIN-Norm ist 2022-12-01.

Für DIN EN 61850-7-3:2011-08 besteht eine Übergangsfrist bis 2023-03-16.

Nationales Vorwort

Vorausgegangener Norm-Entwurf: E DIN EN 61850-7-3/A1:2018-06.

Für dieses Dokument ist das nationale Arbeitsgremium DKE/K 952 „Netzleittechnik“ der DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE (www.dke.de) zuständig.

Aktuelle Informationen zu diesem Dokument können über die Internetseiten von DKE (www.dke.de) und DIN (www.din.de) durch eine Suche nach der Dokumentennummer aufgerufen werden.

Die enthaltene IEC-Publikation wurde vom IEC/TC 57 „Power systems management and associated information exchange“ erarbeitet und unterliegt dem Copyright der IEC .

Das IEC-Komitee hat entschieden, dass der Inhalt dieses Dokuments bis zu dem Datum (stability date) unverändert bleiben soll, das auf der IEC-Website unter „<http://webstore.iec.ch>“ zu diesem Dokument angegeben ist. Zu diesem Zeitpunkt wird entsprechend der Entscheidung des Komitees das Dokument

- bestätigt,
- zurückgezogen,
- durch eine Folgeausgabe ersetzt oder
- geändert.

Für den Fall einer undatierten Verweisung im normativen Text (Verweisung auf ein Dokument ohne Angabe des Ausgabedatums und ohne Hinweis auf eine Abschnittsnummer, eine Tabelle, ein Bild usw.) bezieht sich die Verweisung auf die jeweils aktuellste Ausgabe des in Bezug genommenen Dokuments.

Für den Fall einer datierten Verweisung im normativen Text bezieht sich die Verweisung immer auf die in Bezug genommene Ausgabe des Dokuments.

Der Zusammenhang der zitierten Dokumente mit den entsprechenden deutschen Dokumenten ergibt sich, soweit ein Zusammenhang besteht, grundsätzlich über die Nummer der entsprechenden IEC-Publikation. Beispiel: IEC 60068 ist als EN 60068 als Europäische Norm durch CENELEC übernommen und als DIN EN 60068 ins Deutsche Normenwerk aufgenommen.

Diese Norm ist die Übernahme der konsolidierten Edition 2.1 von IEC 61850-7-3:2010 + A1:2020. Durch das Amendment sind sehr umfangreiche Änderungen fast jeden Abschnittes durchgeführt worden. Deshalb wurde auf die Kennzeichnung der einzelnen Änderungen verzichtet.

Abschnitt 5 bis 8 und ihre Unterabschnitte, der Ersatz für Anhang A und Anhang B sowie die XML-Aufzählungen aus Anhang D werden auf Grundlage des UML-Modells automatisch erzeugt.

Abweichend von dem üblichen Vorgehen der IEC wurden im Sinne einer besseren Nutzungsfreundlichkeit in diesem Falle alle Tabellen und Bilder (einschließlich jener, die seit Ausgabe 2 hinzugefügt wurden) in der Änderung und der konsolidierten Fassung fortlaufend nummeriert.

Diese IEC-Norm beinhaltet Code-Elemente, d. h. Elemente, die für die direkte Verarbeitung durch einen Rechner vorgesehen sind. Dies betrifft jeglichen Text, der sich zwischen den Kennzeichnungen <CODE BEGINS> und <CODE ENDS> befindet oder in dieser Norm anderweitig eindeutig als Code-Element gekennzeichnet ist. In der derzeitigen Version dieses Dokuments erfolgt eine solche Kennzeichnung zu Beginn jedes betroffenen übergeordneten Abschnitts.

Mit dem Kauf dieses Dokuments erwirbt der Käufer eine Urheberrechtslizenz für den Verkauf von Software mit Code-Elementen aus dieser Norm direkt oder über Zwischenhändler an Endanwender, wobei diese Lizenz den Software-Lizenzierungsbedingungen der IEC unterliegt, die abgerufen werden können unter: <http://www.iec.ch/CCv1>.

Wenn Aktualisierungen an dem veröffentlichten Code-Element erforderlich sind, die unverzüglich umgesetzt werden müssen und keinen Aufschub bis zu einer Änderung dulden (z. B. zur Behebung eines wichtigen Problems), wird eine neue Veröffentlichung des Code-Elements herausgegeben und über die IEC-Website verteilt. Jede neue Version des Code-Elements, die sich auf diesen Teil bezieht, ersetzt alle zuvor veröffentlichten Code-Elemente, einschließlich des in diesem Dokument veröffentlichten.

Dieser Publikation sind NSD-Dateien angehängt, aus denen sich das Code-Element dieses Teils zusammensetzt. Diese Dateien sind als Ergänzung zu verstehen und bilden keinen integralen Bestandteil dieser Norm.

Das Präsidium des DIN hat mit Präsidialbeschluss 1/2004 festgelegt, dass DIN-Normen, deren Inhalt sich auf internationale Arbeitsergebnisse der Informationsverarbeitung gründet, unter bestimmten Bedingungen allein in englischer Sprache veröffentlicht werden dürfen. Diese Bedingungen sind für die vorliegende Norm erfüllt.

Da sich die Benutzer der vorliegenden Norm der englischen Sprache als Fachsprache bedienen, wird die Englische Fassung der EN 61870-7-3 veröffentlicht. Zu deren Abschnitt 1, der den Anwendungsbereich festlegt und Abschnitt 3, der die Begriffe festlegt, sowie Abschnitt 4, der die Abkürzungen festlegt, wurde eine Übersetzung angefertigt und als informativer Nationaler Anhang NA der vorliegenden Norm hinzugefügt. Für die meisten der verwendeten Begriffe existieren keine gebräuchlichen deutschen Benennungen, da sich die deutschen Anwender in der Regel ebenfalls der englischen Benennungen bedienen. Diese Norm steht nicht in unmittelbarem Zusammenhang mit Rechtsvorschriften und ist nicht als Sicherheitsnorm anzusehen.

Das Original-Dokument enthält Bilder in Farbe, die in der Papierversion in einer Graustufen-Darstellung wiedergegeben werden. Elektronische Versionen dieses Dokuments enthalten die Bilder in der originalen Farbdarstellung.

Änderungen

Gegenüber DIN EN 61850-7-3:2011-08 wurden folgende Änderungen vorgenommen:

- a) enthält Erläuterungen und Korrekturen zu/an der zweiten Ausgabe von IEC 61850-7-3 auf Grundlage der technischen Problempunkte (Tissue) = {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) in Abschnitt 6 und 7 ist in Tabellen die Semantik der Attribute angegeben, wodurch die Notwendigkeit einer expliziten Definition der Semantik in Abschnitt 8 entfällt;
- c) Abschnitt 8 enthält nun die Definitionen neu eingeführter expliziter Aufzählungstypen (mit Tabellen); vollständige Rückwärtskompatibilität ist gegeben, da sich der Wert des Literals nicht geändert hat;
- d) einige Unterabschnitte von Abschnitt 7 weisen eine andere Benummerung auf, weil einige abstrakte Typen eingeführt wurden (in denen gemeinsame Attribute mehrerer konkreter Typen vereint werden);
- e) jeweils der erste Unterabschnitt unter einer CDC-Gruppe in Abschnitt 7, der die Tabellen mit den zutreffenden Diensten im Hinblick auf funktionale Einschränkungen enthielt, wurde entfernt; diese Informationen werden in IEC 61850-7-2 explizit mit funktionalen Einschränkungen definiert und wurden vorübergehend als Anhang B, Functional Constraints (Funktionale Einschränkungen), aufgenommen;
- f) der Inhalt von 6.2.7 und 6.2.8 wurde in den normativen Anhang D, Clarification on usage of quality (Erläuterung zur Verwendung von „quality“), von IEC 61850-7-2 verschoben;
- g) die mit IEC 62351-6 für die Sicherheit eingeführte Erweiterung wurde implementiert;
- h) die Anwesenheitsbedingungen wurden neugestaltet und umbenannt, um ihre einheitliche Verwendung in allen Teilen der Reihe IEC 61850-7 zu erleichtern. Die Gegenüberstellung der alten und neuen Anwesenheitsbedingungen sind im Anhang NB dargestellt.

Frühere Ausgaben

DIN EN 61850-7-3: 2004-02; 2011-08

Nationaler Anhang NA (informativ)

Auszugsweise Übersetzung

Reihenfolge und Inhalt der folgenden Abschnitte sind identisch mit denen in den jeweiligen Abschnitten der Englischen Fassung.

Einleitung

Dieses Dokument ist Teil einer Reihe von Spezifikationen, die die mehrschichtige Kommunikationsarchitektur von Unterstationen Architektur beschreibt. Diese Architektur wurde gewählt, um abstrakte Definitionen von Klassen und Dienste zu bieten, so dass die Spezifikationen unabhängig von spezifischen Protokollstapeln und Objekten sind. Die Darstellung dieser abstrakten Klassen und Dienste auf Kommunikationsstacks liegt außerhalb des Rahmens der IEC 61850-7-x und ist in der IEC 61850-8-x (Stationsbus) und IEC 61850-9-x (Prozessbus) zu finden.

IEC 61850-7-1 gibt einen Überblick über diese Kommunikationsarchitektur. Dieser Teil der IEC 61850 definiert konstruierte Attributklassen und gemeinsame Datenklassen in Bezug auf Anwendungen im Energieversorgungssystem, die IEC 61850-Modellierungskonzepte verwenden, wie z. B. Umspannwerke, Wasserkraft oder verteilte Energiequellen. Diese gemeinsamen Datenklassen werden in IEC 61850-7-4 verwendet, um kompatible Datenobjektklassen zu definieren. Auf die SubDataObjects, DataAttributes oder SubAttributes der Instanzen von dataObject wird über die in IEC 61850-7-2 definierten Dienste zugegriffen.

Dieser Teil der IEC 61850 wird verwendet, um die abstrakte gemeinsame Datenklasse und konstruierte Attributklassendefinitionen zu spezifizieren. Diese abstrakten Definitionen werden in konkrete Objektdefinitionen dargestellt, die für ein bestimmtes Protokoll (z. B. MMS, ISO 9506-Serie) verwendet werden sollen.

1 Anwendungsbereich

1.1 Allgemeines

Dieser Teil der IEC 61850 spezifiziert konstruierte Attributklassen und gemeinsame Datenklassen (en: „common data classes“) für Anwendungen in Umspannwerken. Er spezifiziert insbesondere:

- Gemeinsame Datenklassen für Statusinformationen,
- gemeinsame Datenklassen für Messinformationen,
- gemeinsame Datenklassen für die Steuerung,
- gemeinsame Datenklassen für Stauseinstellungen,
- gemeinsame Datenklassen für analoge Einstellungen und
- Attributtypen, die in diesen gemeinsamen Datenklassen verwendet werden.

Diese Internationale Norm ist anwendbar auf die Beschreibung von Gerätemodellen und Funktionen von Unterstationen und Abgangsanlagen.

Diese Internationale Norm kann z. B. auch zur Beschreibung von Gerätemodellen und Funktionen angewendet werden für:

- Informationsaustausch von Unterstation zu Unterstation,
- Informationsaustausch zwischen Unterstationen und Leitstellen,
- den Informationsaustausch zwischen Kraftwerk und Leitstelle,
- Informationsaustausch für dezentrale Erzeugung oder
- Informationsaustausch für die Verbrauchsmessung.

1.2 Namespace name and version (Name und Version des Namensraums)

Dieser neue Abschnitt ist obligatorisch für alle Namensräume nach IEC 61850 (entsprechend der Definition in IEC 61850-7-1:2011).

Die folgenden Parameter identifizieren diese neue Version dieses Namensraums:

- Version des Namensraums: 2007
- Überarbeitung des Namensraums: B
- Name des Namensraums: „IEC 61850-7-3:2007B“
- Veröffentlichung des Namensraums: 3
- Veröffentlichungsdatum des Namensraums: 02.10.2019

IEC 61850-7-3 ist an die neueste Veröffentlichung von IEC 61850-7-2:2007B gebunden.

In der untenstehenden Tabelle werden alle veröffentlichten Versionen dieses Namensraums aufgeführt.

Ausgabe	Veröffentlichungsdatum	Webstore	Namensraum
Ausgabe 1.0	Mai 2003	IEC 61850-7-3:2003	IEC 61850-7-3:2003
Ausgabe 2.0	Dez. 2010	IEC 61850-7-3:2010	IEC 61850-7-3:2007
Ausgabe 2.0, Änderung 1	Feb. 2020	IEC 61850-7-3:2010/AMD1:2020	IEC 61850-7-3:2007B
Ausgabe 2.1	Feb. 2020	IEC 61850-7-3:2010+AMD1:2020 CSV	IEC 61850-7-3:2007B

1.3 Code Component distribution (Verteilung der Code-Elemente)

Die Code-Elemente (en: code component) werden in einer eingeschränkten Version („Light“) und einer Vollversion („Full“) zur Verfügung stehen.

- Die Vollversion enthält die Definition der gesamten in dieser Norm definierten logischen Knoten (LN, en: logical node) sowie die zugehörige Dokumentation; der Zugriff wird nur Personen gewährt, die diesen Teil erworben haben.
- Die eingeschränkte Version enthält ebenfalls die Definition der gesamten in dieser Norm definierten logischen Knoten, nicht aber die zugehörige Dokumentation; diese eingeschränkte Version wird kostenfrei auf der IEC-Website zum Download bereitstehen, die Verwendung ist jedoch an entsprechende Lizenzierungsbedingungen geknüpft.

Die eingeschränkte Version dieser Code-Elemente kann unter dem folgenden Link heruntergeladen werden:

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

Die Code-Elemente für Datenmodelle nach IEC 61850 (wie die Definition der Basistypen, Anwesenheitsbedingungen usw. in dieser IEC-Norm) stehen in dem Dateiformat NSD nach der Norm IEC 61850-7-7 zur Verfügung.

Bei den in dieser IEC-Norm enthaltenen Code-Elementen besteht stets die Möglichkeit, dass sie überarbeitet wurden; Anwender müssen deshalb stets die neueste Veröffentlichung aus dem unter dem folgenden Link erreichbaren Verzeichnis auswählen:

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

Die neueste Version/Veröffentlichung des Dokuments ist diejenige IEC_61850-7-2.NSD.{Versionsinfo}.light.zip-Datei mit dem höchsten Wert unter Versionsinfo.

Jedes Code-Element ist ein ZIP-Paket mit der elektronischen Wiedergabe des Code-Elements selbst und einer Datei, die den Inhalt des Pakets beschreibt (IECManifest.xml).

Das IECManifest umfasst mehrere Abschnitte mit Informationen zu den folgenden Aspekten:

- Urheberrechtsvermerk
- Kennung des Code-Elements
- Publikation, zu der das Code-Element gehört
- Liste der elektronischen Dateien, aus denen sich das Code-Element zusammensetzt
- optionale Liste der früheren Dateien, damit der Änderungsverlauf des Code-Elements nachvollzogen werden kann

Der Lebenszyklus eines Code-Elements ist nicht auf den Lebenszyklus der zugehörigen Publikation beschränkt. Der Lebenszyklus einer Publikation umfasst zwei Stufen, die Version (die einer Ausgabe entspricht) und die Überarbeitung (die einer Änderung entspricht). Mittels einer dritten Publikationsstufe (Veröffentlichung (en: release)) kann das Code-Element veröffentlicht werden, ohne dass eine Änderung veröffentlicht werden muss.

Dies ist nützlich, wenn InterOp-TIssues zu beheben sind. In diesem Falle wird eine neue Veröffentlichung des Code-Elements veröffentlicht, die die vorangehende Veröffentlichung ersetzt, und über die Website des IEC-TC57 verteilt.

3 Begriffe

Für die Anwendung dieses Dokuments gelten die Begriffe nach IEC TS 61850-2 und IEC 61850-7-2^{N1}.

ISO und IEC stellen terminologische Datenbanken für die Verwendung in der Normung unter den folgenden Adressen bereit:

- IEC Electropedia: verfügbar unter <http://www.electropedia.org/>
- ISO Online Browsing Platform: verfügbar unter <http://www.iso.org/obp>

3.1

abstract

eine Klasse abstrakter gemeinsamer Daten, die nie instanziiert wird und dazu dient, allgemeine Attribute in semantisch bedeutsamen Entitäten zusammenzufassen, sodass sie für die Wiederverwendung in eine konkrete Klasse gemeinsamer Daten übernommen werden können

3.2

statistics

eine Klasse statistischer gemeinsamer Daten, die in der Instanz abgeleiteter statistischer logischer Knoten (sowie nicht abgeleiteter statischer logischer Knoten) als Typ eines Datenobjekts verwendet werden kann

Anmerkung 1 zum Begriff: Eine Klasse gemeinsamer Daten, die nicht als Statistik (en: statistics) gekennzeichnet ist, darf nicht im Kontext von abgeleiteten statistischen logischen Knoten verwendet werden.

3.3

abgelehntes Element

wird in der aktuellen Ausgabe der Norm weiterhin unterstützt, um eine ausreichende Abwärtskompatibilität zu gewährleisten, entfällt aber planmäßig in zukünftigen Versionen

Anmerkung 1 zum Begriff: Zu einem abgelehnten Element werden die entsprechenden Informationen darüber bereitgestellt, welche alternativen Elemente stattdessen zu verwenden sind.

^{N1} Nationale Fußnote: Es muss richtig lauten: „Für die Anwendung dieses Dokuments gelten die Begriffe nach IEC TS 61850-2 und IEC 61850-7-2 und die folgenden Begriffe.“

4 Abkürzungen

act	tatsächlich (en: actual)
add	zusätzlich (en: additional)
addr	Adresse, adressieren (en: address)
altitude	Höhe (en: altitude)
ang	Winkel (en: angle)
BL	Blocken, blockieren (en: blocking)
blk	Block, blockieren (en: block)
c	Sequenzkomponente (en: sequence component)
C	Konfig (en: config)
cal	Kalender (en: calender)
cat	Kategorie (en: category)
CB	Steuerblock (en: control block)
CDC	Allgemeine Datenklasse (en: common data class)
cell	Zelle (en: cell)
CF	Konfiguration (en: configuration)
charac	Eigenschaft (en: characteristic)
classes	Klassen (en: classes)
cmd	Befehl, befehlen (en: command)
cnt	Zähler (en: counter)
config	Konfig (en: config)
crv	Kurve (en: curve)
ctl	Steuerung/Regelung, steuern/regeln (en: control)
cur	Währung (en: currency)
cVal	komplexer Wert (en: complex value)
cyc	Zyklus (en: cycle)
d	Beschreibung (en: description)
data	Daten (en: data)
day	Tag (en: day)
db	Totzone/Unempfindlichkeitsbereich (en: dead band)
DC	Beschreibung (en: description)
dchg	Auslösoption für Datenänderung (en: trigger option for data-change)
dir	Richtung (en: direction)
dupd	Auslösoption für die Datenaktualisierung (en: trigger option for data-update)
dur	Dauer (en: duration)
ena	aktivieren/einschalten (en: enable)
end	Ende, beenden (en: end)
ePS	Elektrizitätsversorgungsnetz (en: electrical power system)
eval	bewerten (en: evaluate)
EX	erweitert (en: extended)
f	Gleitkommazahl (en: float)
factor	Faktor (en: factor)
FC	funktionale Einschränkung (en: functional constraint)
fr	gesperrt und gehalten (en: frozen)
frequency	Frequenz (en: frequency)

general	allgemein (en: general)
h	hoch (en: high)
har	Oberschwingung (en: harmonic)
hh	hoch hoch (en: high high)
hr	Stunde (en: hour)
hst	Histogramm (en: histogram)
hv	Oberschwingungswert (en: harmonic value)
hw	Hardware
i	Ganzzahl (en: integer)
id	Bezeichner (en: identifier)
ident	Bezeichner (en: identifier)
ind	Anzeige (en: indication)
info	Information
inst	Augenblicks- (en: instantaneous)
int	Innen-, intern (en: internal)
l	niedrig (en: low)
latitude	Breitengrad (en: latitude)
ld	logisches Gerät (en: logical device)
lim	Grenze/Grenzwert, begrenzen (en: limit)
off	aus (en: off)
ll	niedrig niedrig (en: low low)
ln	logischer Knoten (en: logical node)
location	Ort (en: location)
longitude	Längengrad (en: longitude)
mag	Stärke (en: magnitude)
max	Maximum/Höchst-, höchste/r/s / größte/r/s (en: maximum)
min	Minimum/Mindest-, kleinste/r/s (en: minimum)
mn	Minute
model	Modell (en: model)
month	Monat (en: month)
mr	Master
multiplier	Multiplikator (en: multiplier)
mx	gemessen (en: measured)
MX	Messwert (en: measurand) (analoge Werte)
name	Name/benennen (en: name)
net	netto (en: net)
neut	Neutral-, neutral (en: neutral)
ns	Namensraum (en: name space)
num	Nummer/Anzahl (en: number)
occ	Auftreten (en: occurrence)
offset	Offset/Versatz, versetzen (en: offset)
ok	ok
on	ein/eingeschaltet (en: on)
op	betätigen/schalten/bedienen/betreiben (en: operate)
oper	betätigen/schalten/bedienen/betreiben (en: operate)

or	Herkunft (en: origin)
OR	„oper“ empfangen (en: oper received)
owner	Besitzer (en: owner)
param	Parameter
par	Parameter
pd	Periode (en: period)
per	Periode (en: period)
persistent	dauerhaft (en: persistent)
phs	Phase
phsA	Phase A
phsB	Phase B
phsC	Phase C
pls	Impuls (en: pulse)
point	Punkt (en: point)
pos	Position/Stellung, positionieren (en: position)
prime	primär (en: primary)
pts	Punkte (en: points)
puls	Impuls (en: puls)
pulse	Impuls (en: pulse)
purpose	Zweck (en: purpose)
q	Qualität (en: quality)
qchg	Auslösoption für Qualitätswechsel (en: trigger option for quality-change)
qty	Menge (en: quantity)
qual	Qualifier
range	Bereich (en: range)
rate	Rate
rcvd	empfangen (en: received)
ref	Bezug(s-)/Referenz(-) (en: reference)
res	Rest-, verbleibend (en: residual)
rev	Überarbeitung (en: revision)
rms	Effektivwert
rs	Zurücksetzung, zurücksetzen (en: reset)
sbo	Anwahl vor Ausführung (en: select before operate)
scale	Skala, skalieren (en: scale)
SE	Einstellungsgruppe bearbeitbar (en: setting group editable)
second	zweite/-s/-r (en: second)
seld	ausgewählt (en: selected)
ser	seriell/Reihen- (en: serial)
seq	Sequenz (en: sequence)
set	einstellen, eingestellt (en: set)
sev	Schweregrad (en: severity)
SG	Einstellungsgruppe (en: setting group)
SI	Internationales Einheitensystem (fr: Système international d'unités)
size	Größe (en: size)
smp	Abtastung, abtasten (en: sample)

SR	Dienstantwort (en: service response)
src	Quelle (en: source)
st	Zustand (en: state)
ST	Zustandsinformationen (en: status information)
step	Schritt (en: step)
str	Start, starten (en: start)
start	Start, starten (en: start)
sub	ersetzt (en: substituted)
SP	Einstellung (en: setting)
SV	Ersetzung (en: substitution)
sVC	Konfiguration des skalierten Werts (en: scaled value config)
sw	Software
t	Zeit (en: time)
T	Typ (en: type)
timeout	Zeitüberschreitung (en: timeout)
tissue	technischer Problempunkt (en: technical issue), siehe IEC 61850-1
tm	Zeit (en: time)
to	bis (en: to)
tr	transient
trans	transient
TrgOp	Auslösoption (en: trigger option)
tst	Prüfung, prüfen (en: test)
type	Typ (en: type)
u	Unicode
unit	Einheit (en: unit)
units	Einheiten (en: units)
val	Wert (en: value)
vendor	Anbieter (en: vendor)
w	mit (en: with)
x	x-Koordinate (en: x coordinate)
y	y-Koordinate (en: y coordinate)
week	Woche (en: week)
z	z-Koordinate (en: z coordinate)
zero	null (en: zero)

Nationaler Anhang NB (informativ)

Neue Anwesenheitsbedingungen

Die folgende Tabelle enthält die alten und die neuen Anwesenheitsbedingungen:

Neu	Ursprünglich	Anmerkungen
M	M	
O	O	
MOcond(condID)	Verschiedene: C, C1,...	in IEC 61850-7-4
MFcond(condID)	Verschiedene: C, C1,...	in IEC 61850-7-4
OFcond(condID)	Verschiedene: 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_DLNDA_M	
MFscaledAV	AC_SCAV	
MFscaledMagV	AC_SCAV	
MFscaledAngV	AC_SCAV	
MAIOrNonePerGroup(n)	AC_ST	
O	AC_CO_O	Dokumentation in Klasse ControllableCDC
	AC_SG_M	Unterteilt in expliziten Untertyp, keine Anwesenheitsbedingung erforderlich
	AC_SG_O	Unterteilt in expliziten Untertyp, keine Anwesenheitsbedingung erforderlich
	AC_SG_C1	Unterteilt in expliziten Untertyp, keine Anwesenheitsbedingung erforderlich
	AC_NSQ_M	Unterteilt in expliziten Untertyp, keine Anwesenheitsbedingung erforderlich
	AC_NSQ_O	Unterteilt in expliziten Untertyp, keine Anwesenheitsbedingung erforderlich
	AC_NSQ_C1	Unterteilt in expliziten Untertyp, keine Anwesenheitsbedingung erforderlich
MOrms	AC_RMS_M	
O	AC_CLC_O	Anwesenheitsbedingung zu Vector.ang zugunsten einer Dokumentation des relevanten DO (in IEC 61850-7-4) gestrichen.

– Leerseite –

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

**EN 61850-7-3:2011-02
+ A1:2020-03**

ICS 33.200

Supersedes EN 61850-7-3:2003

English version

Communication networks and systems for power utility automation –
Part 7-3: Basic communication structure – Common data classes
(IEC 61850-7-3:2010 + A1:2020)

Réseaux et systèmes de communication pour
l'automatisation des systèmes électriques –
Partie 7-3: Structure de communication de
base – Classes de données communes
(IEC 61850-7-3:2010 + A1:2020)

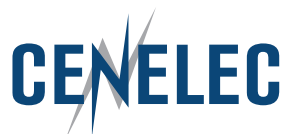
Kommunikationsnetze und -systeme für die Automatisierung in
der elektrischen Energieversorgung – Teil 7-3: Grundlegende
Kommunikationsstruktur – Gemeinsame Datenklassen
(IEC 61850-7-3:2010 + A1:2020)

This European Standard was approved by CENELEC on 2011-01-20 and A1 on 2020-03-16. 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.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Foreword

The text of document 57/1087/FDIS, future edition 2 of IEC 61850-7-3, prepared by IEC TC 57, Power systems management and associated information exchange, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61850-7-3 on 2010-12-07.

This European Standard supersedes EN 61850-7-3:2003.

Compared to EN 61850-7-3:2003, this edition:

- defines new common data classes used for new standards defining object models for other domains based on EN 61850 and for the representation of statistical and historical data;
- provides clarifications and corrections to EN 61850-7-3:2003.

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

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) | 2011-09-07 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2013-12-07 |

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61850-7-3:2010 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61850-8 series NOTE Harmonized in EN 61850-8 series (not modified).

IEC 61850-9 series NOTE Harmonized EN 61850-9 series (not modified).

European foreword to Amendment A1

The text of document 57/2101/FDIS, future IEC 61850-7-3/A1, 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 61850-7-3:2011/A1:2020.

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) 2020-12-16
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-03-16

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This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

Endorsement notice

The text of the International Standard IEC 61850-7-3:2010/A1:2020 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60255-151	2009	Measuring relays and protection equipment – Part 151: Functional requirements for over/under current protection	EN 60255-151	2009
IEC/TS 61850-2	–	Communication networks and systems in substations – Part 2: Glossary	–	–
IEC 61850-7-1	–	Communication networks and systems in substations – Part 7-1: Basic communication structure for substation and feeder equipment – Principles and models	EN 61850-7-1	–
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)	EN 61850-7-2	–
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	EN 61850-7-4	–
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 ¹	–	Power systems management and associated information exchange – Data and communications security – Part 6: Security for IEC 61850	–	–
ISO 4217	–	Codes for the representation of currencies and funds	–	–
IEC/IEEE 60255-118-1	–	Measuring relays and protection equipment – Part 118-1: Synchrophasor for power systems – Measurements	–	–

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

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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 61850²*

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*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC TS 61850-2 and IEC 61850-7-2 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

<abstract> common data class

data class which is never instantiated, used to group common attributes into a semantically meaningful entity and reuse them in a concrete common data class through inheritance

3.2

<statistics> common data class

data class which is allowed to be used as a type of a data object within the derived statistics logical node instance (as well as the non-derived statistics logical node)

Note 1 to entry: A common data class not designated as statistics is forbidden for use in the context of a derived statistics logical node.

² Under preparation. Stage at the time of publication: IEC/PRVC 62351-6:2020.

3.3

<deprecated> element

element, marked as deprecated is still maintained in this edition of the standard, for backwards compatibility purpose, but is intended to be phased out in the future

Note 1 to entry: A deprecated element by definition indicates what should be used instead.

4 Abbreviated terms

act	Actual
add	Additional
addr	Address
altitude	Altitude
ang	angle
BL	blocking
blk	block
c	sequence component
C	config
cal	calender
cat	category
CB	control block
CDC	common data class
cell	cell
CF	configuration
charac	characteristic
classes	classes
cmd	command
cnt	counter
config	config
crv	curve
ctl	control
cur	currency
cVal	complex value
cyc	cycle
d	description
data	data
day	day
db	dead band
DC	description
dchg	trigger option for data-change
dir	direction
dupd	trigger option for data-update
dur	duration
ena	enable
end	end
ePS	electrical power system
eval	evaluate

EX	extended
f	float
factor	factor
FC	functional constraint
fr	frozen
frequency	frequency
general	general
h	high
har	harmonic
hh	high high
hr	hour
hst	histogram
hv	harmonic value
hw	hardware
i	integer
id	identifier
ident	identifier
ind	indication
info	information
inst	instantaneous
int	internal
l	low
latitude	latitude
ld	logical device
lim	limit
off	off
ll	low low
ln	logical node
location	location
longitude	longitude
mag	magnitude
max	maximum
min	minimum
mn	minute
model	model
month	month
mr	master
multiplier	multiplier
mx	measured
MX	measurands (analogue values)
name	name
net	net
neut	neutral
ns	name space

num	number
occ	occurrence
offset	offset
ok	ok
on	on
op	operate
oper	operate
or	origin
OR	oper received
owner	owner
param	parameter
par	parameter
pd	period
per	period
persistent	persistent
phs	phase
phsA	phase A
phsB	phase B
phsC	phase C
pls	pulse
point	point
pos	position
prime	primary
pts	points
puls	puls
pulse	pulse
purpose	purpose
q	quality
qchg	trigger option for quality-change
qty	quantity
qual	qualifier
range	range
rate	rate
rcvd	received
ref	reference
res	residual
rev	revision
rms	rms
rs	reset
sbo	select before operate
scale	scale
SE	setting group editable
second	second
seld	selected

ser	serial
seq	sequence
set	set
sev	severity
SG	setting group
SI	System international
size	size
smp	sample
SR	service response
src	source
st	state
ST	status information
step	step
str	start
start	start
sub	substituted
SP	setting
SV	substitution
sVC	scale value config
sw	software
t	time
T	type
timeout	timeout
tissue	Technical Issue – See IEC 61850-1
tm	time
to	to
tr	transient
trans	transient
TrgOp	trigger option
tst	test
type	type
u	unicode
unit	unit
units	units
val	value
vendor	vendor
w	with
x	x coordinate
y	y coordinate
week	week
z	z coordinate
zero	zero

NOTE Abbreviations used for the identification of the common data classes and as name of attributes are specified in the specific clauses of this document and are not repeated here.

5 Conditions for element inclusion

From this edition on, presence conditions are normatively defined in IEC 61850-7-2. For the reader's convenience, they are also available in Annex E.

6 Constructed attribute classes

6.1 General

The constructed attribute classes structure and descriptions are part of the Code Component of this IEC standard and are available as electronic machine readable file in related NSD file.

Constructed attribute classes are defined for the use in common data classes (CDC) in Clause 7.

IEC 61850-7-1 provides an overview of all IEC 61850-7 documents (IEC 61850-7-2, IEC 61850-7-3, and IEC 61850-7-4). IEC 61850-7-1 also describes the basic notation used in IEC 61850-7-3 and the description of the relations between the IEC 61850-7 documents.

NOTE The domain type 'Timestamp' like all other basic and domain types are specified in IEC 61850-7-2.

6.2 Configuration of analogue value (ScaledValueConfig)

This type shall be used to configure the integer value representation of the analogue value. See AnalogueValue.i.

NOTE If a server does not support transmission of floating point values, the client may retrieve these values from the SCL file.

Table 1 shows all attributes of ScaledValueConfig.

Table 1 – Attributes of ScaledValueConfig

datId = ScaledValueConfig			
Attribute name	Attribute type	(Value/Value range) Description	PresCond
scaleFactor	FLOAT32	Scaling factor for integer representation of analogue value.	M
offset	FLOAT32	Offset for integer representation of analogue value.	M

6.3 Range configuration (RangeConfig)

This type shall be used to configure the limits that define the range of a measured value.

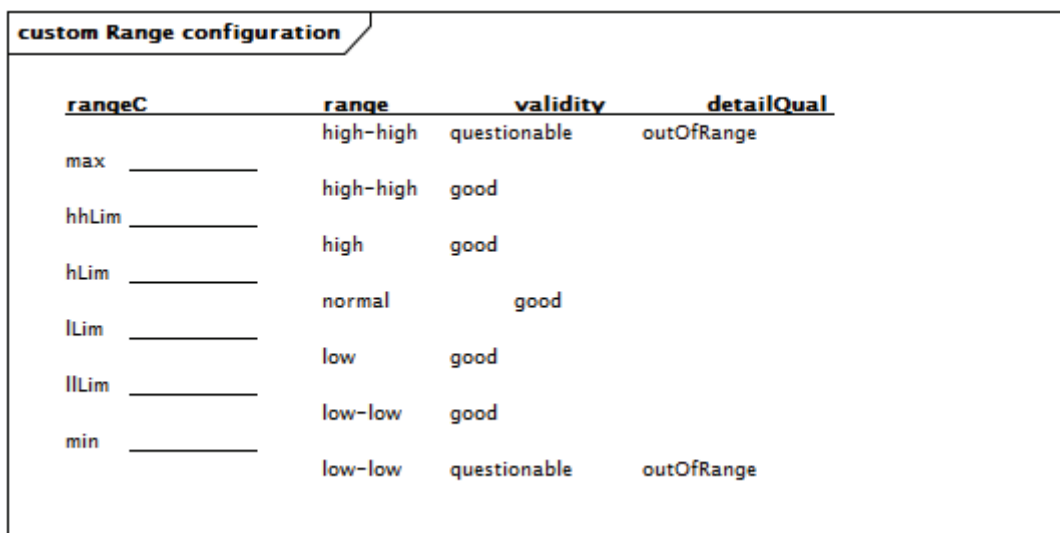


Figure 1 – Range configuration

Figure 1: This diagram illustrates relationships between range, range configuration and quality of measured process value.

Table 2 shows all attributes of RangeConfig.

Table 2 – Attributes of RangeConfig

datId = RangeConfig			
Attribute name	Attribute type	(Value/Value range) Description	PresCond
hhLim	AnalogueValue	Setting for 'CDC.range' transition between 'high' and 'high-high'.	MORange
hLim	AnalogueValue	Setting for 'CDC.range' transition between 'normal' and 'high'.	MORange
lLim	AnalogueValue	Setting for 'CDC.range' transition between 'normal' and 'low'.	MORange
llLim	AnalogueValue	Setting for 'CDC.range' transition between 'low' and 'low-low'.	MORange
min	AnalogueValue	The minimum process measurement for which 'AnalogueValue.[i,f]' is considered within process limits. If the value is lower, quality shall be set accordingly ('Quality.detailQual.outOfRange'=true => 'Quality.validity'='questionable').	M
max	AnalogueValue	The maximum process measurement for which 'AnalogueValue.[i,f]' is considered within process limits. If the value is higher, quality shall be set accordingly ('Quality.detailQual.outOfRange'=true => 'Quality.validity'='questionable').	M
limDb	INT32U	(range=[0...100000]) When present, the value used to introduce a hysteresis in the calculation of 'range'. When a high/low limit has been crossed, 'range' is immediately set to the higher/lower value. However, 'range' is only set back to the lower/higher value when the value of the high limit minus/low limit plus 'limDb' has been crossed. The value shall represent the	O

datId = RangeConfig			
Attribute name	Attribute type	(Value/Value range) Description	PresCond
		percentage between 'max' and 'min' in units of 0.001 %.	

6.4 Step position with transient indication (ValWithTrans)

This type shall be used to indicate the position of tap changers.

Table 3 shows all attributes of ValWithTrans.

Table 3 – Attributes of ValWithTrans

datId = ValWithTrans			
Attribute name	Attribute type	(Value/Value range) Description	PresCond
posVal	INT8	(range=[-64...63]) Step position.	M
transInd	BOOLEAN	If true, the equipment is in a transient state.	O

6.5 Pulse configuration (PulseConfig)

This type shall be used to configure the output generated to the on or off input of a switching device as a result of receiving an 'operate' service request.

If 'cmdQual=persistent', the output stays in the state indicated in the 'operate' service request. If 'cmdQual=pulse', the output is a pulsed signal as defined below. If 'cmdQual=persistent-feedback', the output stays in the state indicated in the 'operate' service request until the state is reached.

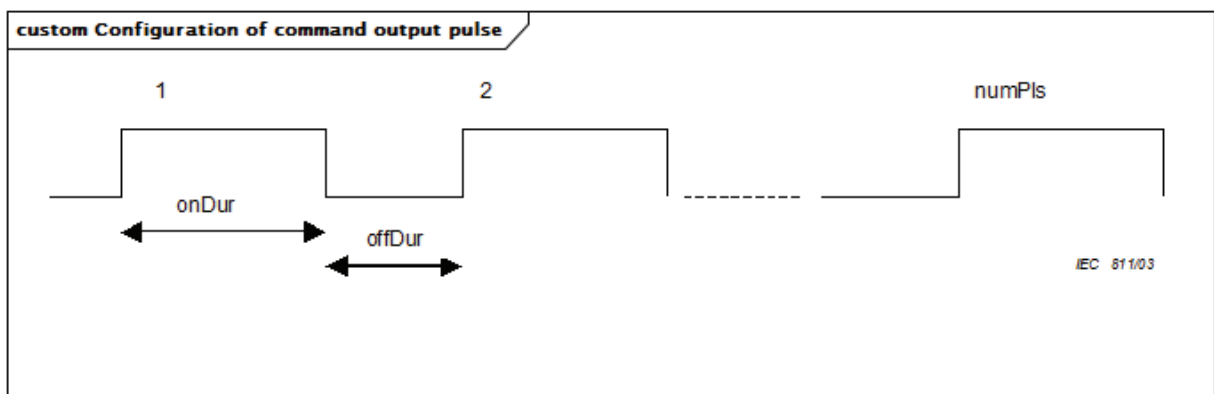


Figure 2 – Configuration of command output pulse

Figure 2: This diagram illustrates how attributes 'onDur', 'offDur' and 'numPls' are used to configure output pulse.

Table 4 shows all attributes of PulseConfig.

Table 4 – Attributes of PulseConfig

datId = PulseConfig			
Attribute name	Attribute type	(Value/Value range) Description	PresCond
cmdQual	OutputSignalKind	Kind of shape of the output signal. The value 'persistent' is reserved for controlled objects that have a single control Output. In that case, the command 'on' activates the Output, the command 'off' deactivates it.	M
onDur	INT32U	Duration of the pulse [ms]. If set to 0, the duration is defined locally.	M
offDur	INT32U	Duration between two pulses [ms]. If set to 0, the duration is defined locally.	M
numPls	INT32U	Number of pulses that are generated.	M

6.6 Unit definition (Unit)

This type shall be used to represent unit and multiplier information.

Table 5 shows all attributes of Unit.

Table 5 – Attributes of Unit

datId = Unit			
Attribute name	Attribute type	(Value/Value range) Description	PresCond
SIUnit	SIUnitKind	SI unit of measure.	M
multiplier	MultiplierKind	(default="") Unit multiplier.	O

6.7 Vector definition (Vector)

This type shall be used to represent a coherent complex value (phasor), with magnitude and angle acquired or determined simultaneously.

Table 6 shows all attributes of Vector.

Table 6 – Attributes of Vector

datId = Vector			
Attribute name	Attribute type	(Value/Value range) Description	PresCond
mag	AnalogueValue	Magnitude of the complex value.	M
ang	AnalogueValue	(range=[-180...180]) Angle of the complex value (Unit.SIUnit='deg' and Unit.multiplier=""); angle reference is defined in the context where this type is used.	O

6.8 Point definition (Point)

This type shall be used to represent points in a two- or three-dimensional coordinate system.

Table 7 shows all attributes of Point.

Table 7 – Attributes of Point

datId = Point			
Attribute name	Attribute type	(Value/Value range) Description	PresCond
xVal	FLOAT32	X-axis value.	M
yVal	FLOAT32	Y-axis value.	M
zVal	FLOAT32	Z-axis value.	O

6.9 Cell (Cell)

This type shall be used to define a rectangle area in a two-dimensional environment. It can also be used to describe a range within a one-dimensional environment.

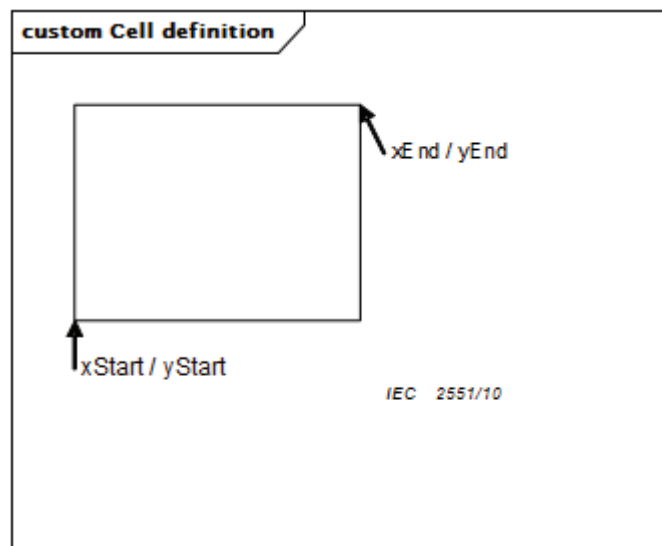


Figure 3 – Cell definition

Figure 3: This diagram illustrates the definition of Cell.

Table 8 shows all attributes of Cell.

Table 8 – Attributes of Cell

datId = Cell			
Attribute name	Attribute type	(Value/Value range) Description	PresCond
xStart	FLOAT32	X value of the lower left corner of the square.	M
xEnd	FLOAT32	X value of the upper right corner of the square. Absence of the attribute indicates infinity in the direction of the x axis.	O
yStart	FLOAT32	Y value of the lower left corner of the square. For one-dimensional range, this attribute shall be absent.	O
yEnd	FLOAT32	Y value of the upper right corner of the square. For two-dimensional range, absence of the attribute indicates infinity in the direction of the y axis. For one-dimensional range, this attribute shall be absent.	O

6.10 Calendar time definition (CalendarTime)

This type shall be used to define a time setting in reference to the calendar. It allows the specification of times like the last day of the month or the second Sunday in March at 03.00 h. The time shall be expressed as UTC unless specified different where used.

custom Interpretation of calendar time settings		
occPer	occType	
Hour	Time	At <mn> minute every hour
Day	Time	At <hr>, <mn> every day
Week	WeekDay	At <weekDay>, <hr>, <mn> every week
Month	WeekDay	At <occ>, <weekDay>, <hr>, <mn> every month
Month	DayOfMonth	At <occ>, <hr>, <mn> every month
Year	Time	At <month>, <day>, <hr>, <mn> every year
Year	WeekDay	At <occ>, <weekDay>, <month>, <hr>, <mn> every year
Year	WeekOfYear	At week <occ>, <weekDay>, <hr>, <mn>
Year	DayOfYear	At <occ>, <hr>, <mn> every year

Figure 4 – Interpretation of calendar time settings

Figure 4: This diagram shows the semantic interpretation of the calendar time attributes.

Table 9 shows all attributes of CalendarTime.

Table 9 – Attributes of CalendarTime

datId = CalendarTime			
Attribute name	Attribute type	(Value/Value range) Description	PresCond
occ	INT16U	Occurrence of a calendar element. The value 0 is used to indicate the last. For the identification of week numbers, week number 1 shall always be the first week in January (according to definition of UN / CEFAC).	M
occType	OccurrenceKind	Kind of calendar element that is used for the occurrence.	M
occPer	PeriodKind	Repetition period of a calendar-based time setting.	M
weekDay	WeekdayKind	Day of week.	M
month	MonthKind	Month of year.	M
day	INT8U	(range=[1...31]) Day of month.	M
hr	INT8U	(range=[0...23]) Hour of day.	M
mn	INT8U	(range=[0...59]) Minute of hour.	M

6.11 Analogue value

6.11.1 General

This clause groups all the variants of the analogue value types used for monitoring, control, settings and tracking.

6.11.2 Analogue value (AnalogueValue)

Analogue values may be represented as a basic type integer (attribute 'i') or as a floating point (attribute 'f'). At least one of the attributes shall be used. If both 'i' and 'f' exist, the application in the server shall insure that both values remain consistent. When the analogue values represent measured process value, they shall be the primary values.

NOTE Except for the usage in the CDC SAV, it is recommended to support the representation as a floating point (attribute 'f') since the representation as an integer (attribute 'i') may be deprecated in the future.

Table 10 shows all attributes of AnalogueValue.

Table 10 – Attributes of AnalogueValue

datId = AnalogueValue			
Attribute name	Attribute type	(Value/Value range) Description	PresCond
i	INT32	Integer representation of the measured value. The formula to convert between 'i' and the process value (pVal) shall be: $pVal = ((i * \text{ScaledValueConfig.scaleFactor}) + \text{ScaledValueConfig.offset})$ in ['Unit.SIUnit'].	AtLeastOne(1)
f	FLOAT32	Floating point representation of the measured value. The formula to convert between 'f' and the process value (pVal) shall be: $pVal = f * 10^{\text{Unit.multiplier}}$ in ['Unit.SIUnit'].	AtLeastOne(1)

6.11.3 Analogue value control (AnalogueValueCtl)

This type shall be used for control value service parameter only. See AnalogueValue; the only difference is the presence condition for attributes (either 'i' or 'f' present).

Table 11 shows all attributes of AnalogueValueCtl.

Table 11 – Attributes of AnalogueValueCtl

datId = AnalogueValueCtl			
Attribute name	Attribute type	(Value/Value range) Description	PresCond
i	INT32	Integer representation of the measured value. See 'AnalogueValue.i'.	AllOnlyOneGroup(1)
f	FLOAT32	Floating point representation of the measured value. See 'AnalogueValue.f'.	AllOnlyOneGroup(2)

6.11.4 Analogue float value control (AnalogueValueCtlF)

This type shall be used for tracking of float control value service parameter only. See AnalogueValue.

Table 12 shows all attributes of AnalogueValueCtlF.

Table 12 – Attributes of AnalogueValueCtlF

datId = AnalogueValueCtlF			
Attribute name	Attribute type	(Value/Value range) Description	PresCond
f	FLOAT32	Floating point representation of the measured value. See 'AnalogueValue.f'.	M

6.11.5 Analogue integer value control (AnalogueValueCtlInt)

This type shall be used for tracking of integer control value service parameter only. See AnalogueValue.

Table 13 shows all attributes of AnalogueValueCtlInt.

Table 13 – Attributes of AnalogueValueCtlInt

datId = AnalogueValueCtlInt			
Attribute name	Attribute type	(Value/Value range) Description	PresCond
i	INT32	Integer representation of the measured value. See 'AnalogueValue.i'.	M

7 Common data class specifications

7.1 General

The common data classes structure and descriptions are part of the Code Component of this IEC standard and are available as electronic machine readable file in related NSD file.

Common data classes are defined for use in IEC 61850-7-4. Common data classes are composed of the following:

- constructed attribute classes defined in Clause 6,
- types defined in IEC 61850-7-2,
- common data classes defined in this clause,
- enumerated data attribute types defined in Clause 8.

IEC 61850-7-1 provides the basic notation used in this clause.

The common data classes define the relation between their attributes and the functional constraint as well as the possible trigger options. Sometimes, both dchg and dupd are specified as a possible trigger option for the DataAttribute. In that case, the concrete implementation shall select one of them, based on the purpose of the data object typed by that common data class. Trigger option dchg shall be used for DataAttribute where a change of the value is necessary to create an event, whereas trigger option dupd shall be used for DataAttribute where an update of the value (with or without change) is enough to create an event.

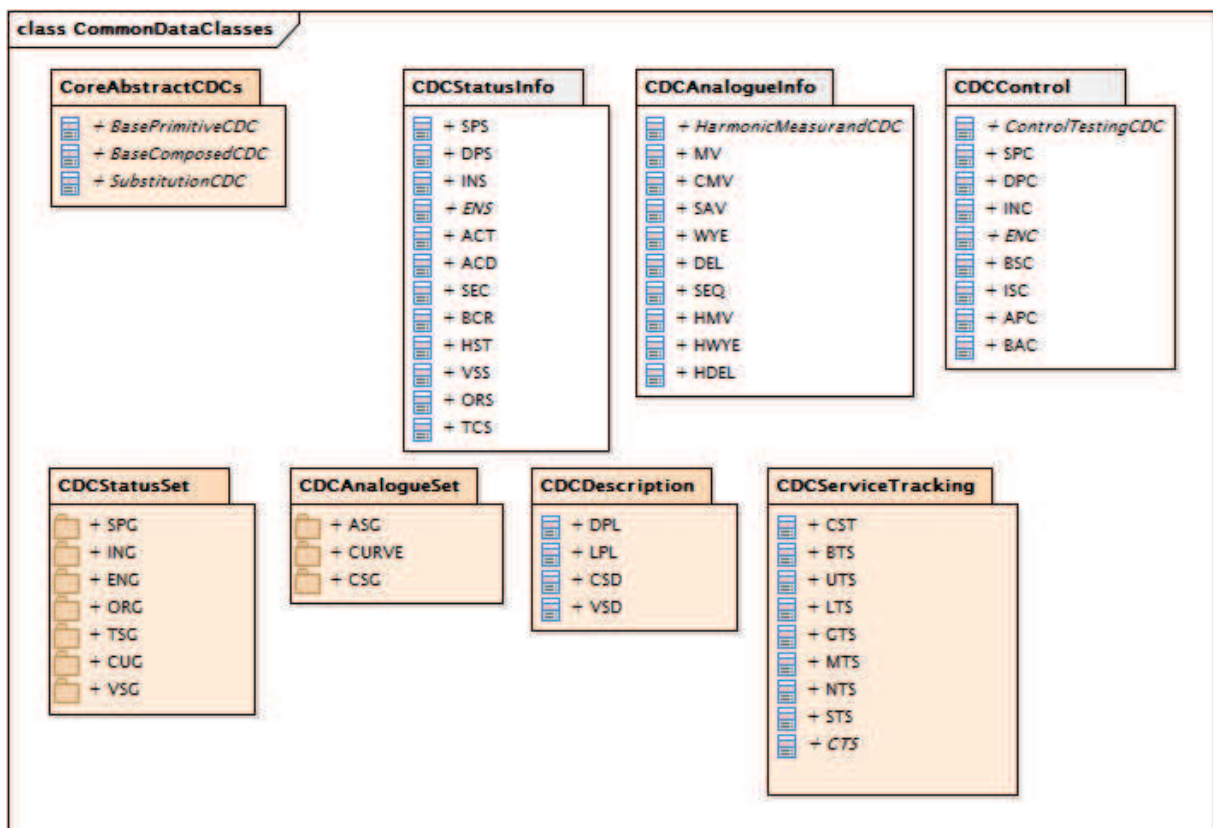


Figure 5 – Class diagram CommonDataClasses::CommonDataClasses

Figure 5: This diagram shows all the common data class groups, with their contents.

Classes displayed in italic and ending with "CDC" are abstract common data classes that allow avoiding duplication in definition of attributes used by multiple concrete common data classes. Abstract common data classes are never instantiated; their attributes are inherited by concrete common data classes which are instantiable.

7.2 Modelling introduction

7.2.1 General

All common data classes defined in this document inherit their structure from the abstract common data class defined in IEC 61850-7-2. Common data classes (CDC-s) are used as types for data objects of logical nodes, and are composed of:

- DataAttribute, which can be either of a basic type, or of a predefined structured type, or
- SubDataObject, which is of type CDC.

The generic structure of common data classes defined in IEC 61850-7-2 comprises the attributes (e.g., name and reference, functional constraints and trigger options), and the services depending on a functional constraint.

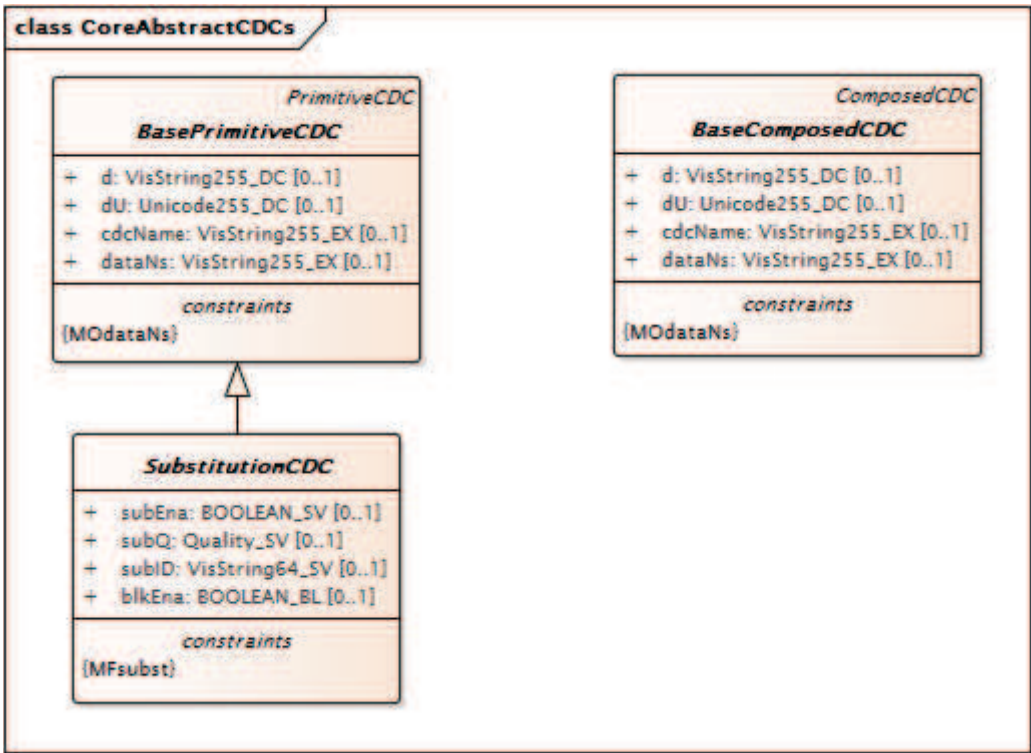


Figure 6 – Class diagram CoreAbstractCDCs::CoreAbstractCDCs

Figure 6: This diagram shows all the core abstract common data classes with their attributes and constraints in the UML notation.

Non-mandatory attributes have multiplicity [0..1]; in classes displayed in this diagram, there are no mandatory attributes. Possible constraints, used for presence conditions, are only listed in the diagram, while their applicability to individual attributes is given in the common data class tables. Presence conditions are normatively defined in IEC 61850-7-2 and available in Annex E in this document.

NOTE The two of the shown abstract classes, BaseComposedCDC and BasePrimitiveCDC look the same and their content is identical. However, they are different from the perspective of the underlying meta-model, which is out of scope of this part.

7.2.2 <<abstract>> Common attributes for primitive CDC (BasePrimitiveCDC)

Abstract type, holding attributes common to all primitive common data classes.

Table 14 shows all attributes of BasePrimitiveCDC.

Table 14 – Attributes of BasePrimitiveCDC

UML class name = BasePrimitiveCDC					
Attribute name	Attribute type	FC	TrgOp	(Value/Value range) Description	PresCond
DataAttribute for configuration, description and extension					
d	VisString255	DC		Textual description of the data. In case it is used within the CDC LPL, the description refers to the logical node.	O
dU	Unicode255	DC		Textual description of the data using unicode characters. In case it is used within the CDC LPL, the description refers to the logical node.	O
cdcName	VisString255	EX		Name of the common data class. For details see IEC 61850-7-1.	O
dataNs	VisString255	EX		Data name space. For details, see IEC 61850-7-1. If present, the value shall be initialized through the SCL configuration file to a valid name space.	MOdataNs

7.2.3 <<abstract>> Common attributes for composed CDC (BaseComposedCDC)

Abstract type, holding attributes common to all composed common data classes.

Table 15 shows all attributes of BaseComposedCDC.

Table 15 – Attributes of BaseComposedCDC

UML class name = BaseComposedCDC					
Attribute name	Attribute type	FC	TrgOp	(Value/Value range) Description	PresCond
DataAttribute for configuration, description and extension					
d	VisString255	DC		See 'BasePrimitiveCDC.d'.	O
dU	Unicode255	DC		See 'BasePrimitiveCDC.dU'.	O
cdcName	VisString255	EX		See 'BasePrimitiveCDC.cdcName'.	O
dataNs	VisString255	EX		See 'BasePrimitiveCDC.dataNs'.	MOdataNs

7.2.4 <<abstract>> Common attributes for substitution (SubstitutionCDC)

Abstract type, holding attributes common to those common data classes that provide values that can be substituted.

In the typical use case for substitution, an operator on the client side enters manually a value for a data attribute located in a specific device. The client sets the data attribute to the value entered. If a client accesses the value of that attribute (for example, using a GetDataValue service or subscribing to a report), the client shall receive the manually entered (substituted) value instead of the value determined by the process.

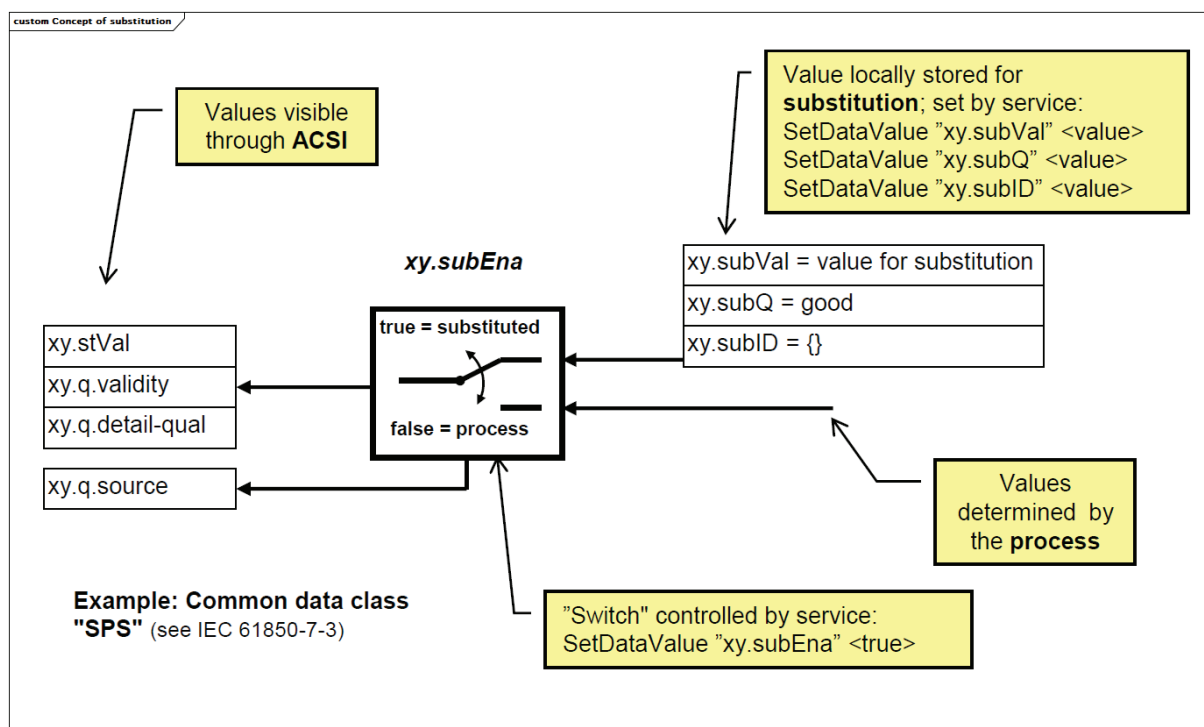


Figure 7 – Concept of substitution

Figure 7: This diagram illustrates the concept of substitution. Usually, input from the process or the result of the calculation from a function provides the value of a data attribute. In that case, 'CDC.q.source' = 'process'. In case of substitution, the value of a data attribute may be provided by an operator making use of a client, and in that case 'CDC.q.source' = 'substituted'. This selection of the source of the value (substitution value or process value) shall be controlled by the service SetDataValue ('SubstitutionCDC.subEna' = true) to substitute or SetDataValue ('SubstitutionCDC.subEna' = false) to unsubstitute. The service SetDataValue shall also be used to set the substituted value ('CDC.subVal' = value-for-substitution) and quality ('CDC.subQ' = quality-for-substitution). There may be cases where a local automatic function disables substitution, for example, if blocking of information exchange is disabled or communication is no longer interrupted.

It is the responsibility of the client application, in particular in the case of multiple attributes to be substituted, to set all relevant substitution values ('{SPS,DPS,INS,ENS,SPC,DPC,INC,ENC}.subVal', 'MV.subMag', 'CMV.subCVal', 'SubstitutionCDC.subQ', 'SubstitutionCDC.subID') before enabling substitution ('SubstitutionCDC.subEna' = true). While substitution is allowed but it is the responsibility of the implementation to avoid inconsistent transient value combination.

Table 16 shows all attributes of SubstitutionCDC.

Table 16 – Attributes of SubstitutionCDC

UML class name = SubstitutionCDC					
Attribute name	Attribute type	FC	TrgOp	(Value/Value range) Description	PresCond
DataAttribute for substitution and blocked					
subEna	BOOLEAN	SV		Used to enable and disable substitution. If 'subEna' = true, the main data value and quality shall always be set to the same value as the attributes used to store the substitution data value and quality, as follows: – for SPS, DPS, INS, ENS, SPC, DPC, INC, ENC set: 'stVal' to value from 'subVal', 'q' to value from 'subQ'; – for MV set: 'instMag' to value from 'subMag', 'q' to value from 'subQ'; – for CMV set: 'instCVal' to value from 'subCVal', 'q' to value from 'subQ'; – for BSC, ISC set: 'valWTr' to value from 'subVal', 'q' to value from 'subQ'; and, – for APC, BAC set: 'mxVal' to value from 'subVal', 'q' to value from 'subQ'. Otherwise, the data value shall be based on the process value.	MFsubst
subQ	Quality	SV		Value used to substitute 'q'. Any element other than the 'q.source' can be substituted.	MFsubst
subID	VisString64	SV		Identification of the device or operator that made the substitution. It shall be set to NULL if 'subEna' = false or if the attribute is not set by the client.	MFsubst
blkEna	BOOLEAN	BL		If true, 'q.operatorBlocked' = true, and the process value is no longer updated.	O
DataAttribute for configuration, description and extension					
d	VisString255	DC		inherited from: BasePrimitiveCDC	O
dU	Unicode255	DC		inherited from: BasePrimitiveCDC	O
cdcName	VisString255	EX		inherited from: BasePrimitiveCDC	O
dataNs	VisString255	EX		inherited from: BasePrimitiveCDC	MOdataNs

7.3 Status information

7.3.1 General

This subclause defines all the common data classes for status information. Status information is typically of type Boolean, integer or enumeration and is information collected from the process or produced by an application function. Status information has the functional constraint ST. Status information cannot be written, but could be substituted.

For applicable services, see Annex B.

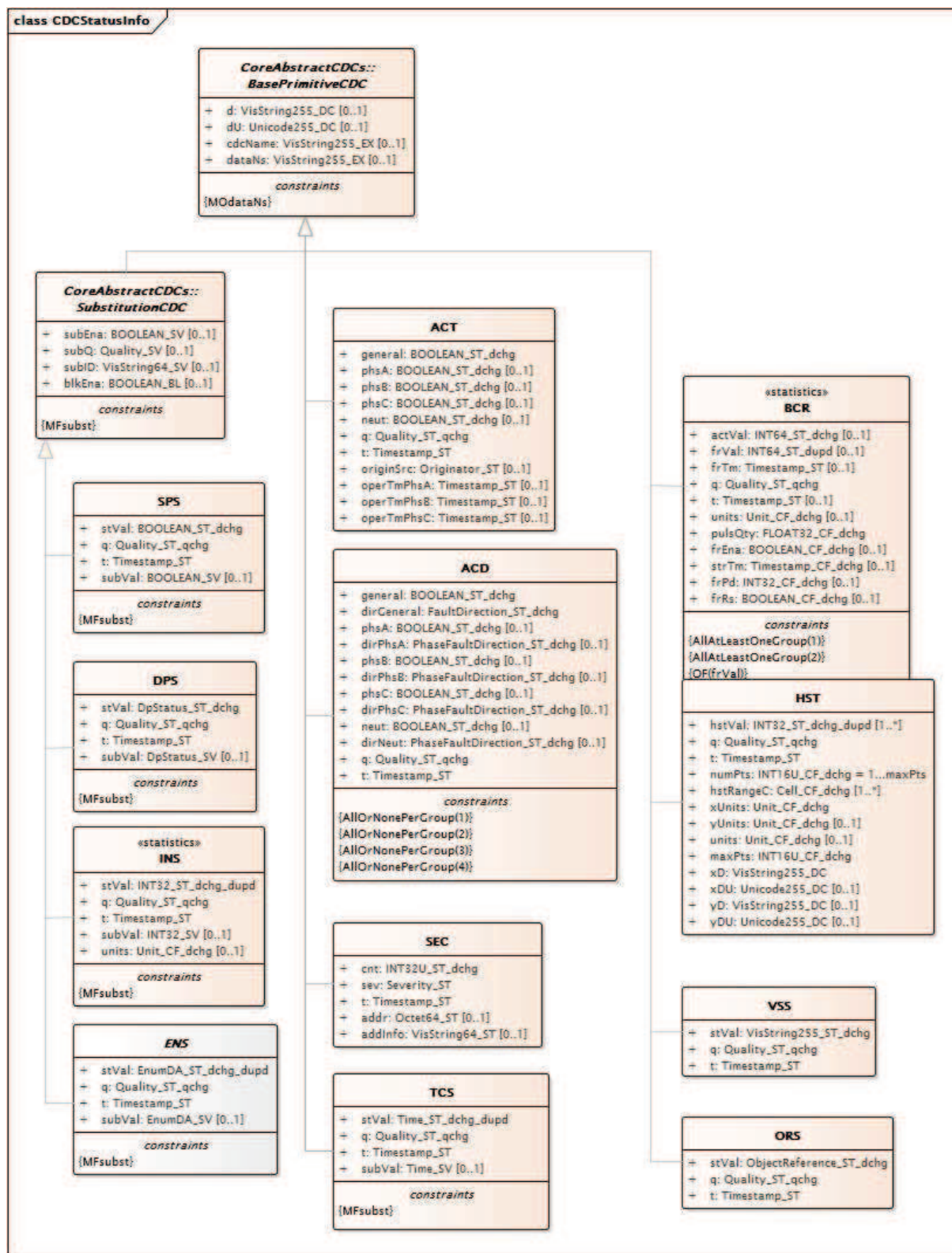


Figure 8 – Class diagram CDCStatusInfo::CDCStatusInfo

Figure 8: This diagram shows all status information CDCs defined in the standard with supertypes that factor their common attributes.

7.3.2 Single point status (SPS)

This common data class shall be used to represent single point status values.

Table 17 shows all attributes of SPS.

Table 17 – Attributes of SPS

cdcid = SPS, UML class name = SPS					
Attribute name	Attribute type	FC	TrgOp	(Value/Value range) Description	PresCond
DataAttribute for status					
stVal	BOOLEAN	ST	dchg	Value of the data.	M
q	Quality	ST	qchg	Quality of the value in 'stVal'.	M
t	Timestamp	ST		Timestamp of the last change of the value in any of 'stVal' or 'q'.	M
DataAttribute for substitution and blocked					
subEna	BOOLEAN	SV		inherited from: SubstitutionCDC	MFsubst
subVal	BOOLEAN	SV		Value used to substitute 'stVal'.	MFsubst
subQ	Quality	SV		inherited from: SubstitutionCDC	MFsubst
subID	VisString64	SV		inherited from: SubstitutionCDC	MFsubst
blkEna	BOOLEAN	BL		inherited from: SubstitutionCDC	O
DataAttribute for configuration, description and extension					
d	VisString255	DC		inherited from: BasePrimitiveCDC	O
dU	Unicode255	DC		inherited from: BasePrimitiveCDC	O
cdcName	VisString255	EX		inherited from: BasePrimitiveCDC	O
dataNs	VisString255	EX		inherited from: BasePrimitiveCDC	MOdataNs

7.3.3 Double point status (DPS)

This common data class shall be used to represent double point status values.

Table 18 shows all attributes of DPS.

Table 18 – Attributes of DPS

cdcid = DPS, UML class name = DPS					
Attribute name	Attribute type	FC	TrgOp	(Value/Value range) Description	PresCond
DataAttribute for status					
stVal	DpStatusKind	ST	dchg	Value of the data.	M
q	Quality	ST	qchg	Quality of the value in 'stVal'.	M
t	Timestamp	ST		Timestamp of the last change of the value in any of 'stVal' or 'q'.	M

cdcid = DPS, UML class name = DPS					
Attribute name	Attribute type	FC	TrgOp	(Value/Value range) Description	PresCond
DataAttribute for substitution and blocked					
subEna	BOOLEAN	SV		inherited from: SubstitutionCDC	MFsubst
subVal	DpStatusKind	SV		Value used to substitute 'stVal'.	MFsubst
subQ	Quality	SV		inherited from: SubstitutionCDC	MFsubst
subID	VisString64	SV		inherited from: SubstitutionCDC	MFsubst
blkEna	BOOLEAN	BL		inherited from: SubstitutionCDC	O
DataAttribute for configuration, description and extension					
d	VisString255	DC		inherited from: BasePrimitiveCDC	O
dU	Unicode255	DC		inherited from: BasePrimitiveCDC	O
cdcName	VisString255	EX		inherited from: BasePrimitiveCDC	O
dataNs	VisString255	EX		inherited from: BasePrimitiveCDC	MOdataNs

7.3.4 <<statistics>> Integer status (INS)

This common data class shall be used to represent integer status values.

Table 19 shows all attributes of INS.

Table 19 – Attributes of INS

cdcid = INS, UML class name = INS					
Attribute name	Attribute type	FC	TrgOp	(Value/Value range) Description	PresCond
DataAttribute for status					
stVal	INT32	ST	dchg, dupd	Value of the data.	M
q	Quality	ST	qchg	Quality of the value in 'stVal'.	M
t	Timestamp	ST		Timestamp of the last change or update event of 'stVal' or the last change of value in 'q'.	M
DataAttribute for substitution and blocked					
subEna	BOOLEAN	SV		inherited from: SubstitutionCDC	MFsubst
subVal	INT32	SV		Value used to substitute 'stVal'.	MFsubst
subQ	Quality	SV		inherited from: SubstitutionCDC	MFsubst
subID	VisString64	SV		inherited from: SubstitutionCDC	MFsubst
blkEna	BOOLEAN	BL		inherited from: SubstitutionCDC	O
DataAttribute for configuration, description and extension					
units	Unit	CF	dchg	Units for: 'stVal', 'subVal'.	O
d	VisString255	DC		inherited from: BasePrimitiveCDC	O
dU	Unicode255	DC		inherited from: BasePrimitiveCDC	O
cdcName	VisString255	EX		inherited from: BasePrimitiveCDC	O
dataNs	VisString255	EX		inherited from: BasePrimitiveCDC	MOdataNs

7.3.5 <<abstract>> Enumerated status (ENS)

This common data class shall be used to represent integer status values with the value restricted to those in an enumeration.

Table 20 shows all attributes of ENS.

Table 20 – Attributes of ENS

cdclId = ENS, UML class name = ENS					
Attribute name	Attribute type	FC	TrgOp	(Value/Value range) Description	PresCond
DataAttribute for status					
stVal	EnumDA	ST	dchg, dupd	Value of the data.	M
q	Quality	ST	qchg	Quality of the value in 'stVal'.	M
t	Timestamp	ST		Timestamp of the last change or update event of 'stVal' or the last change of value in 'q'.	M
DataAttribute for substitution and blocked					
subEna	BOOLEAN	SV		inherited from: SubstitutionCDC	MFsubst
subVal	EnumDA	SV		Value used to substitute 'stVal'.	MFsubst
subQ	Quality	SV		inherited from: SubstitutionCDC	MFsubst
subID	VisString64	SV		inherited from: SubstitutionCDC	MFsubst
blkEna	BOOLEAN	BL		inherited from: SubstitutionCDC	O
DataAttribute for configuration, description and extension					
d	VisString255	DC		inherited from: BasePrimitiveCDC	O
dU	Unicode255	DC		inherited from: BasePrimitiveCDC	O
cdcName	VisString255	EX		inherited from: BasePrimitiveCDC	O
dataNs	VisString255	EX		inherited from: BasePrimitiveCDC	MOdataNs

7.3.6 Protection activation information (ACT)

This common data class shall be used for phase related status information like e.g. protection activation information. Like much of the status information, it can be used for command operations through GOOSE messages.

Table 21 shows all attributes of ACT.