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INTERNATIONAL STANDARD

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AMENDMENT 1
AMENDEMENT 1

Communication networks and systems for power utility automation – Part 7-1: Basic communication structure – Principles and models

Réseaux et systèmes de communication pour l'automatisation des systèmes électriques – Partie 7-1: Structure de communication de base – Principes et modèles

IEC 61850-7-1:2011-07/AMD1:2020-08(en-fr)

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**Communication networks and systems for power utility automation –
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**Réseaux et systèmes de communication pour l'automatisation des systèmes électriques –
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FOREWORD

This amendment has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

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

FDIS	Report on voting
57/2201/FDIS	57/2221/RVD

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

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- withdrawn,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

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4 Abbreviated terms

Add the following new terms to the list of abbreviated terms:

MICS Model implementation conformance statement

PICS Protocol implementation conformance statement

SICS SCL implementation conformance statement

5 Overview of the IEC 61850 series concepts

5.3 The information models of substation automation systems

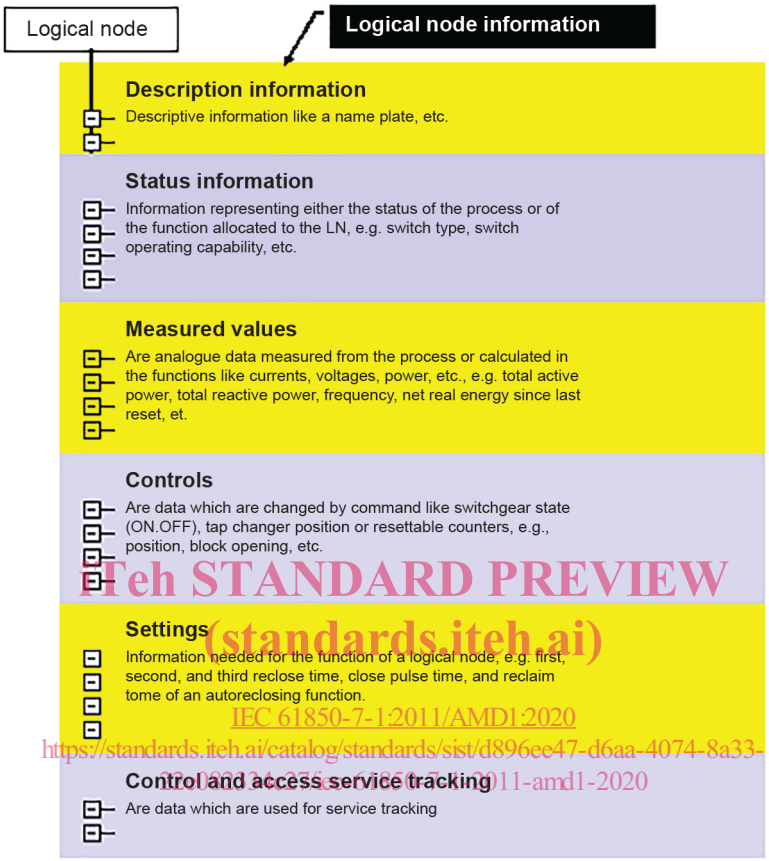
Add, at the end of the third paragraph below Figure 3, the following new footnote:

There is one exception: the proxy/gateway application. For details, refer to 8.2.3 Gateways and proxies.

5.4 Applications modelled by logical nodes defined in IEC 61850-7-4

Figure 4 – Logical node information categories

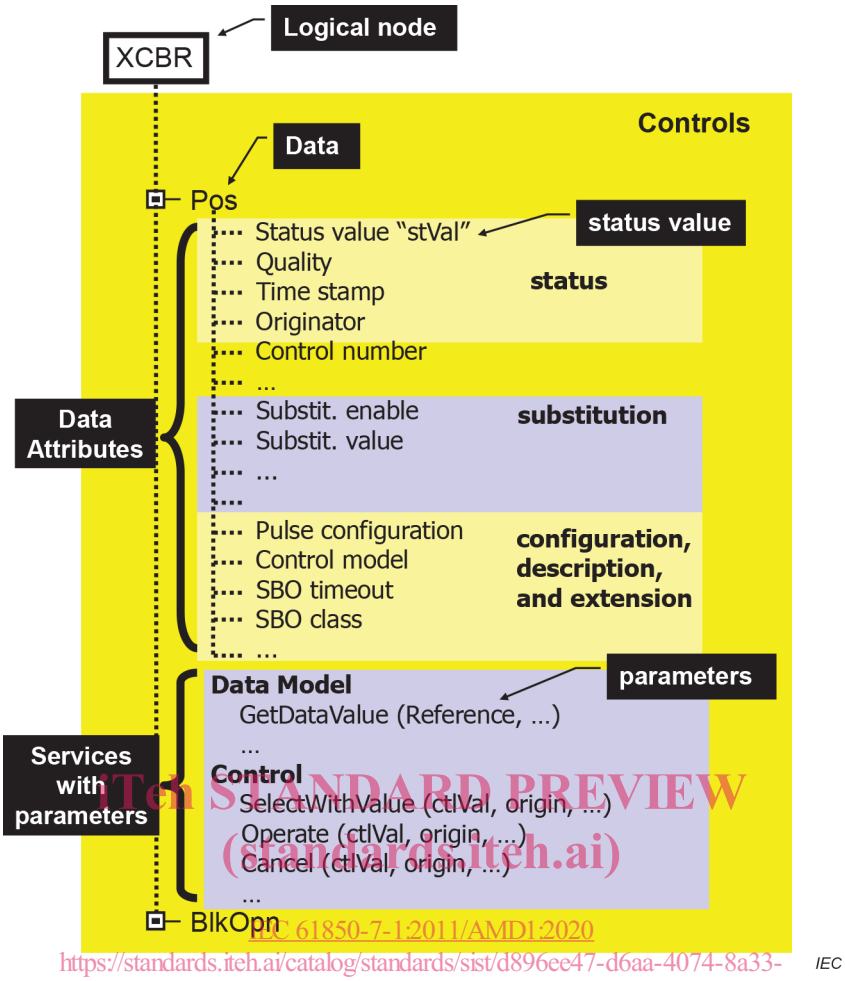
Replace existing Figure 4 with the following new figure:



5.5 The semantic is attached to data

Figure 6 – Position information depicted as a tree (conceptual)

Replace existing Figure 6 with the following new figure:



Replace the first table of Subclause 5.5 with the following new table:

Attribute name	Attribute type	FC	TrgOp	(Value/value range) Description	PresCond
stVal	DpStatusKind	ST	dchg	Status value of the controllable data object.	M
ctlModel	CtlModelKind	CF	dchg	Control model as defined in IEC 61850-7-2 that reflects the behaviour of the controllable data object.	M

Below this table, replace the last item of the dashed list with the following new item:

– the presence conditions, e.g. mandatory (M) or optional (O). These conditions specify presence of elements in a given context (one LN, or one CDC, or one data attribute type, or one data object for dataNs) and are specified in IEC 61850-7-2.

After the dashed list, replace the first paragraph and the following table with the following new paragraph:

The data attribute names are standardised (i.e., they are reserved) names that have a specific semantic in the context of the IEC 61850 series. The semantic of all data attribute names is defined in IEC 61850-7-3.

6 Modelling approach of the IEC 61850 series

6.2 Creating information models by stepwise composition

Table 2 – Logical node class XCBR (conceptual)

Replace existing Table 2 with the following new table:

Descriptions
External equipment name plate
Name plate of the logical node
Controls
Switch position (see below for details)
Block opening
Block closing
Charger motor enabled
Control authority at station level. Switches between station and higher level.
…
Status information
Mode
Behaviour
Health
External equipment health
Operation counter
Local operation (Indicates the switchover between local and remote operation; local =TRUE, remote =FALSE)
Circuit breaker operating capability
Point on wave switching capability
Circuit breaker operating capability when fully charged
…

Replace the existing table below Figure 11 with the following new table:

Data object name	Explanation
…	…
Pos	(controllable) Circuit breaker/switch position.
…	…

6.4.2 Output model

6.4.2.1 Control model concept

Figure 14 – Output model (step 1) (conceptual)

Replace existing Figure 14 with the following new figure:

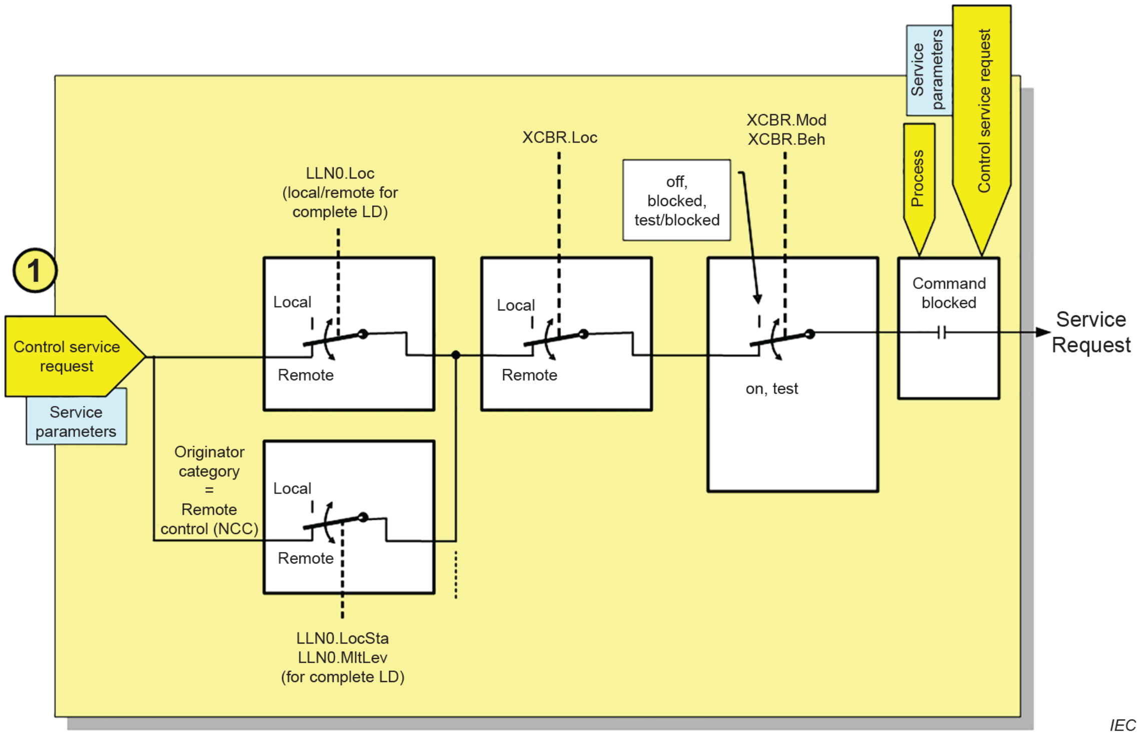


Figure 14 – Output model (step 1) (conceptual)

6.4.2.2 GSE and SMV model concept

Add the following new text after the paragraph below Figure 16:

The act of receiving GOOSE and SMV messages by an IED is called subscription. How to define subscriptions by means of configuration tools is given in the normative Annex H.

6.4.2.4 Setting data and setting group control block

Table 3 – Excerpt of integer status setting

Replace existing Table 3 by the following new table:

ING class					
Attribute name	**Attribute type**	**FC**	**TrgOp**	**Value/value range**	**PresCond**
DataAttribute for configuration, description and extension					
setting					
setVal	INT32	SP	dchg	The value of the status setting.	AtMostOne
setVal	INT32	SG, SE		The value of the status setting.	AtMostOne
configuration, description and extension					
minVal	INT32	CF	dchg	Minimum setting for 'setVal'.	O
maxVal	INT32	CF	dchg	Maximum setting for 'setVal'.	O
stepSize	INT32U	CF	dchg	(range=[1…(maxVal-minVal)]) Step between the individual values of 'setVal'.	O
units	Unit	CF	dchg	Unit for 'setVal', 'minVal', 'maxVal', 'stepSize'.	O
d	VISIBLE STRING255	DC		Textual description of the data. In case it is used within the CDC LPL, the description refers to the logical node.	O
…	…	…			…

6.4.3 Input model

6.4.3.2 Data attribute value processing, monitoring and event detection

Replace the last sentence of the second paragraph with the following new sentence:

The value of mag shall be updated to the current value of instMag when the value has changed according to the value of the configuration parameters db and dbRef of this data.

Replace Figure 19 and the subsequent paragraph with the following new figure and text:

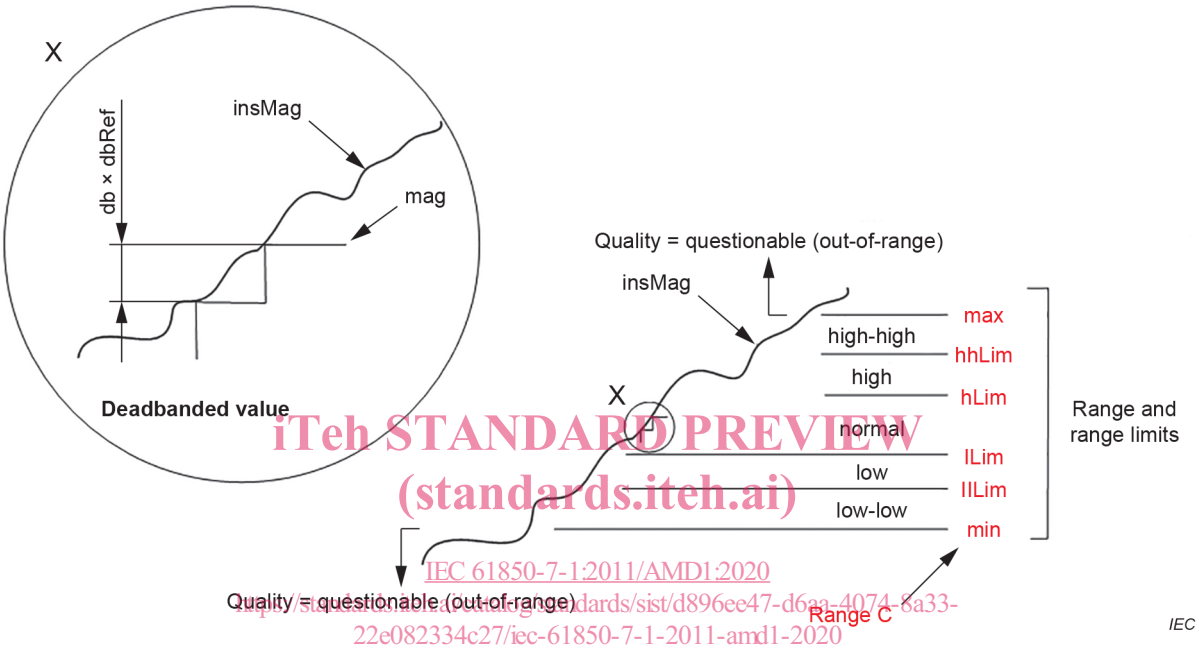
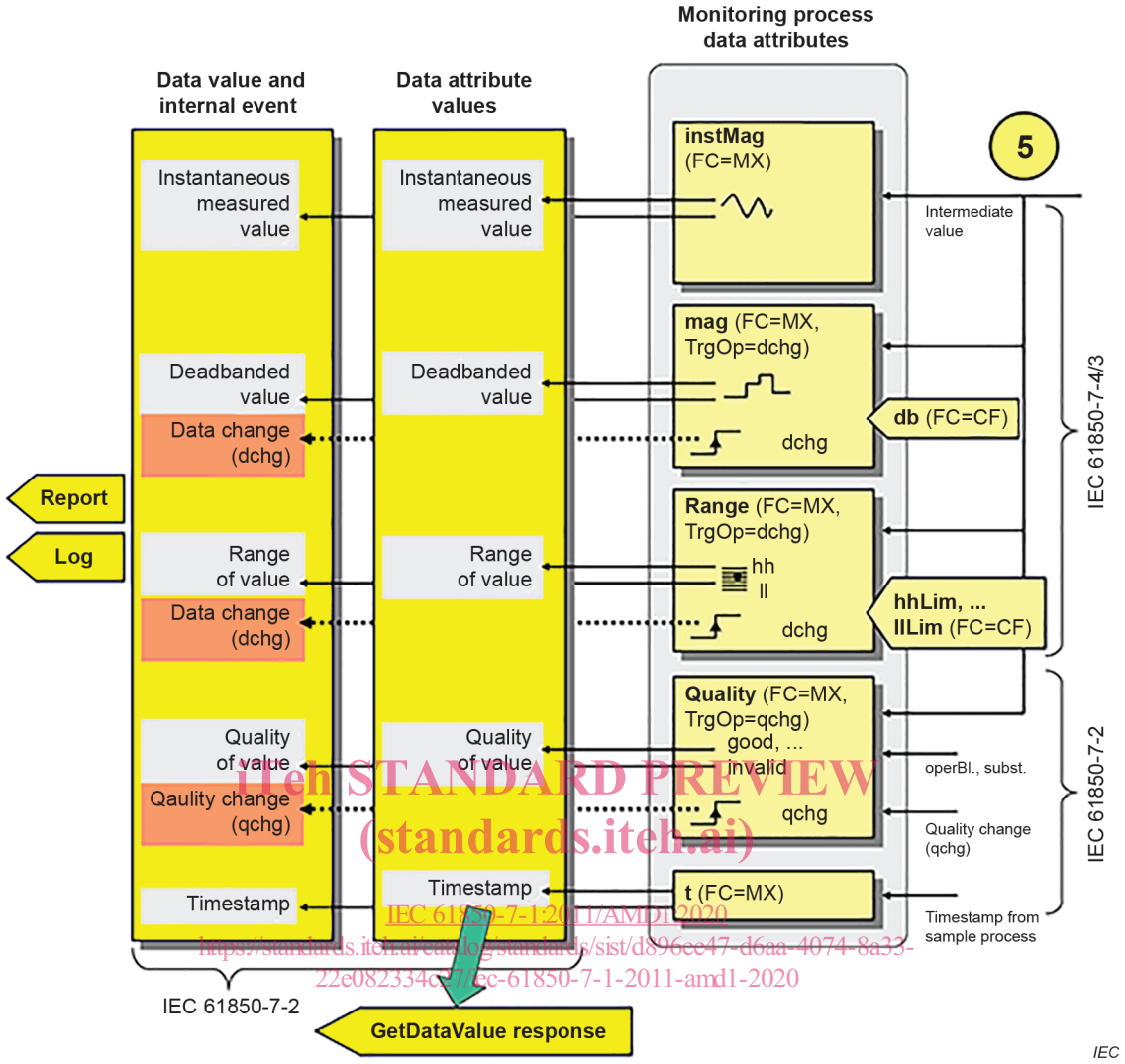


Figure 19 – Range and deadbanded value (conceptual)

The value of the deadband configuration db shall represent the percentage of the deadband reference dbRef in units of 0,001 % (fixed deadband). A value of dbRef of 0 means that the value db shall represent the percentage of the last transmitted values in units of 0,001 %. This allows for a deadband calculation that is related to the last refreshed value (variable deadband).

Figure 20 – Input model for analogue values (step 2) (conceptual)

Replace existing Figure 20 with the following new figure:



Remove the fourth paragraph below Figure 20.

6.4.3.3.2 Data reporting

Replace existing Table 4 with the following new table:

Table 4 – Comparison of the data access methods

Retrieval method	Time-critical information exchange	Can lose changes (of sequence)	Multiple clients to receive information	Last change of data stored by	Typical client (but not exclusive)
Polling (GetDataValues)	NO	YES	YES	–	Browser
Unbuffered Reporting	YES	YES	NO	–	Real-time GUI
Buffered Reporting	YES	NO	NO	Server	Data concentrator
Log (used for SOE logging)	NO	NO	YES	Server	Engineering stations

Replace the existing paragraph before Figure 23 with the following new text:

The basic buffered reporting mechanism is shown in Figure 23. The buffered and unbuffered reporting starts with the reservation of the report control block by the client, followed by configuration of the report control block, including the verification that the report control block parameters are meeting the needs of the client. The reporting to the client starts with setting the enable buffer attribute to TRUE; setting to FALSE stops the reporting to the client.

Before the last sentence of the first paragraph below Figure 23 add the following new sentence.

The buffering is independent from the reporting being enabled or not.

6.4.3.4 Peer-to-peer data value publishing

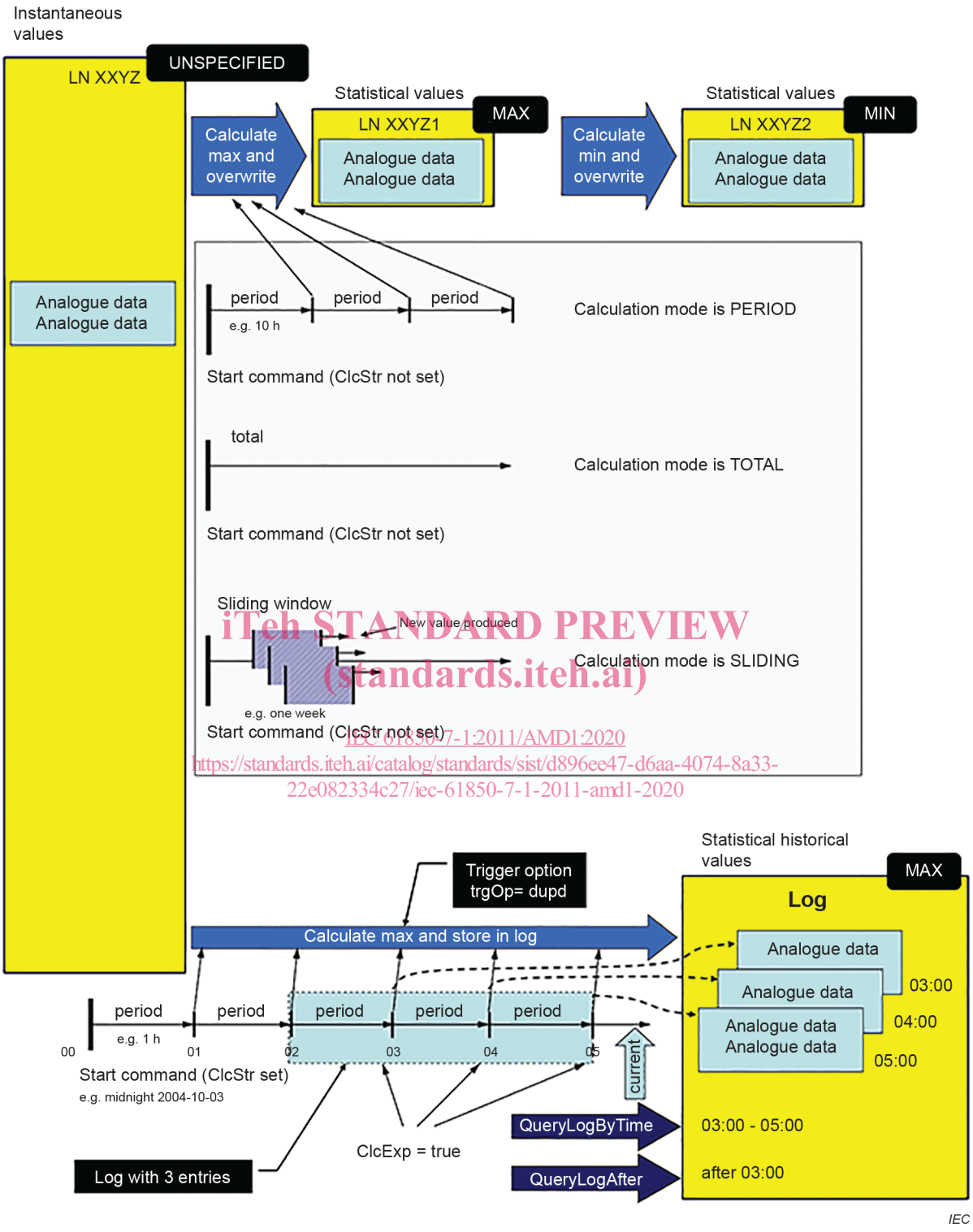
Replace the last paragraph of 6.4.3.4 by the new following new text:

Which event triggers the publishing of values as well as how often and how fast the values are to be published is a matter of the requirements of the function being implemented.

6.4.4 Model for statistical and historical statistical data

Figure 28 – Conceptual model of statistical and historical statistical data (1)

Replace existing Figure 28 with the following new figure:



Replace the penultimate paragraph before Figure 29 with the following new text:

The lower part of the figure shows the conceptual model of the historical statistical data. In this model, the values are calculated periodically (in this case the maximum values with calculation mode set to PERIOD) and are stored in sequence in a log. The calculation in the example starts at midnight of 2004-10-03. The interval is 1 h. After the first hour, the first log entry is written. After the second hour, the second entry contains the value of the second hour. After 5 h, the log contains the values of the last three hours (intervals 02-03, 03-04, 04-05). The expiration of the statistical calculation is indicated by the “event” ClcExp set to TRUE and at this moment the statistical values that have the trigger option dupd are logged even if

the values have not changed. The same concept can be applied to the reporting of statistical data.

Remove the last paragraph of Subclause 6.4.4.

6.4.5 Model for system functions

6.4.5.1 General

Remove the last two sentences of Subclause 6.4.5.1.

6.4.5.5 GOOSE and SMV supervision

Add the following new text at the end of Subclause 6.4.5.5:

The normative Annex G describes the configuration flow with regards to these supervision logical nodes.

7 Application view

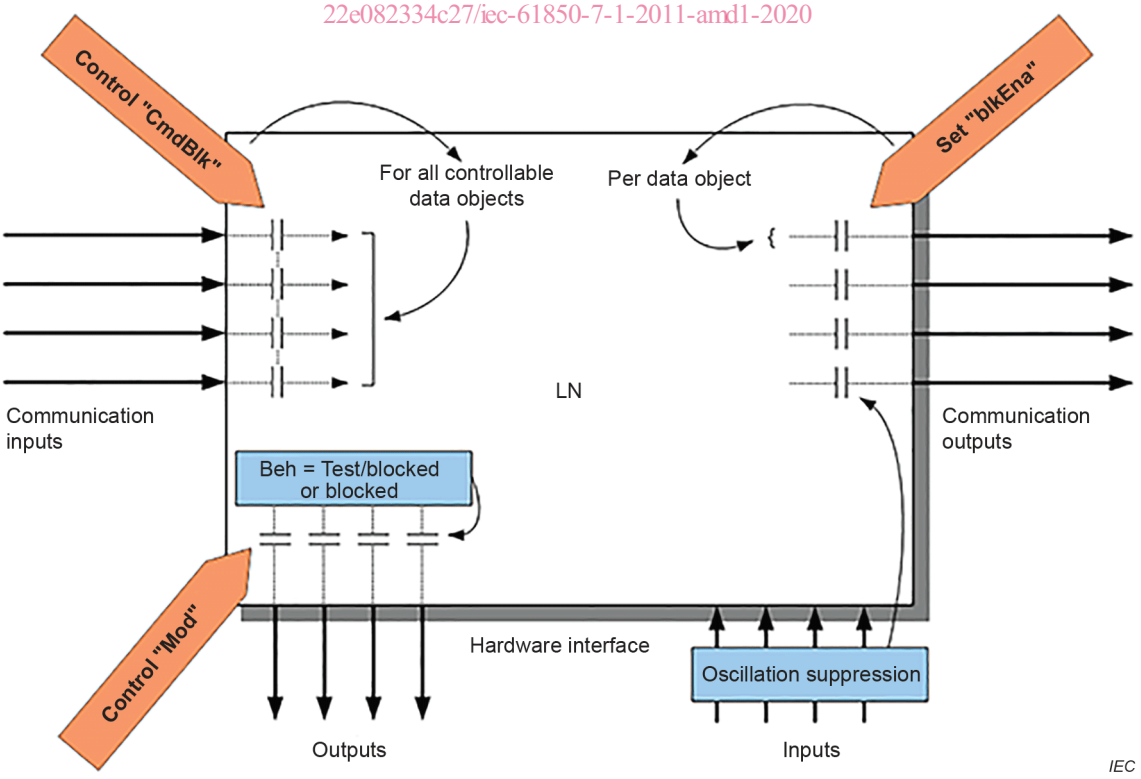
7.3 Mode and behaviour of a logical node

Replace "on-blocked" by "blocked" in the first paragraph below Figure 37.

7.7 Data used for logical node inputs/outputs blocking (operational blocking)

Figure 39 – Data used for logical node inputs/outputs blocking (IEC 61850-7-4)

Replace existing Figure 39 by the following new figure:



7.7.2 Blocking incoming commands

Add, at the end of the last paragraph of Subclause 7.7.2, the following new text:

or CmdBlk itself.

7.7.3 Blocking process outputs

Replace the existing text of Subclause 7.7.3 by the following new text:

The data Mod (Mode) is used to put an LN in different modes. The mode test/blocked (Beh= test/blocked or Beh=blocked) shall be interpreted as the mode which explicitly disables any physical outputs having an effect on the process. For example, when XCBR.Beh = test/blocked or blocked, the physical outputs for closing/opening the breaker do not operate and the breaker does not close or open respectively.

7.7.4 Blocking oscillating inputs

Replace the title of 7.7.4 with the following new text:

Blocking the communication of status outputs updates

Replace the first sentence of 7.7.4 with the following new text:

An operator, or an automatic function, may block the update of the value of communication outputs (e.g. updates related to oscillating inputs).

7.8 Data used for testing

7.8.2 Multicast signals used for simulation

Replace the third paragraph of 7.8.2 with the following new text:

To allow the IED1 to process the simulated GOOSE 1 message instead of the actual GOOSE message, the data Sim.stVal in the LN LPHD1 shall be set to TRUE. The process of the simulated message only takes effect upon receiving the first simulated message. This will remain as such until Sim.stVal is set back to 'FALSE'. The processing of the simulated message is made on a per GOOSE/SMV basis, i.e. the other signals, GOOSE 2 and GOOSE 3, are normally processed by the IED1. Note that the switching between normal signals and simulated signals shall be done for the entire IED. In the example, this means that if a new simulated GOOSE 2 signal appears, it will replace the actual GOOSE 2 signal. The preceding example does not imply any specific sequence with regards to connecting the simulation device and setting the data Sim.stVal to TRUE. Different sequences may be used. However, a state machine diagram can be found in Figure 80 and Figure 81 that describes the different states involved and illustrates the supervision of GOOSE/SV subscription with regards to the active subscription state resp. the subscription to simulated stream. The affected Data Objects are defined in the Logical Nodes LGOS and LSVS in IEC 61850-7-4.

Add, at the end of the third paragraph of 7.8.2, the following new Figures 80 and 81:

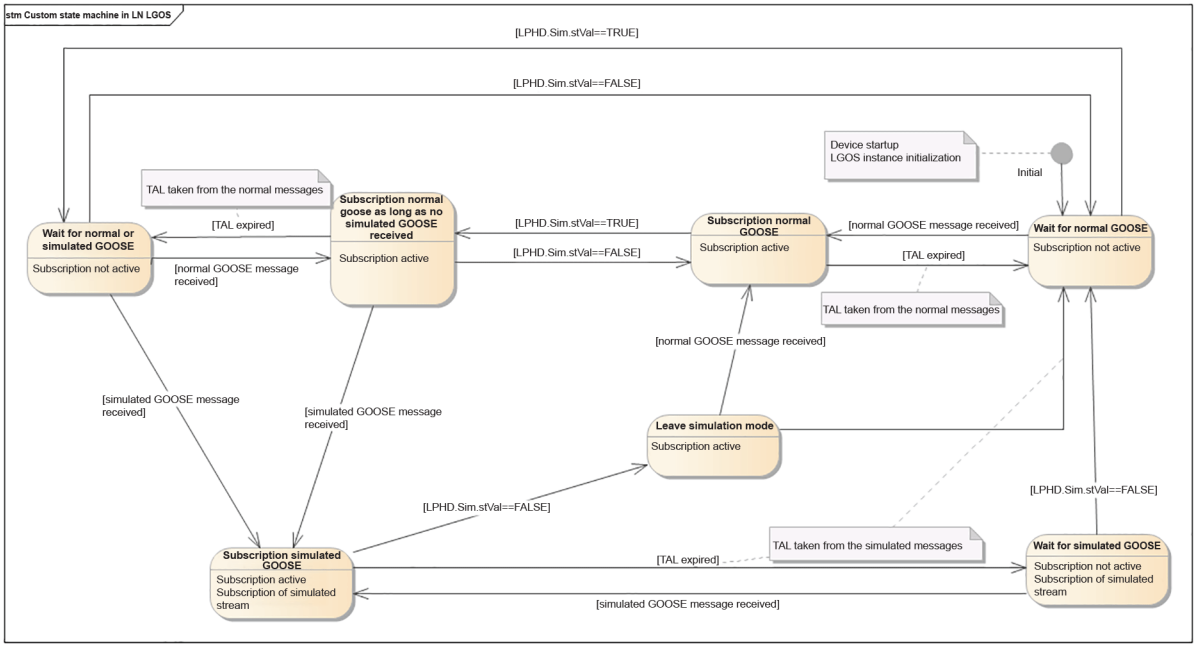


Figure 80 – GOOSE subscription supervision state machine

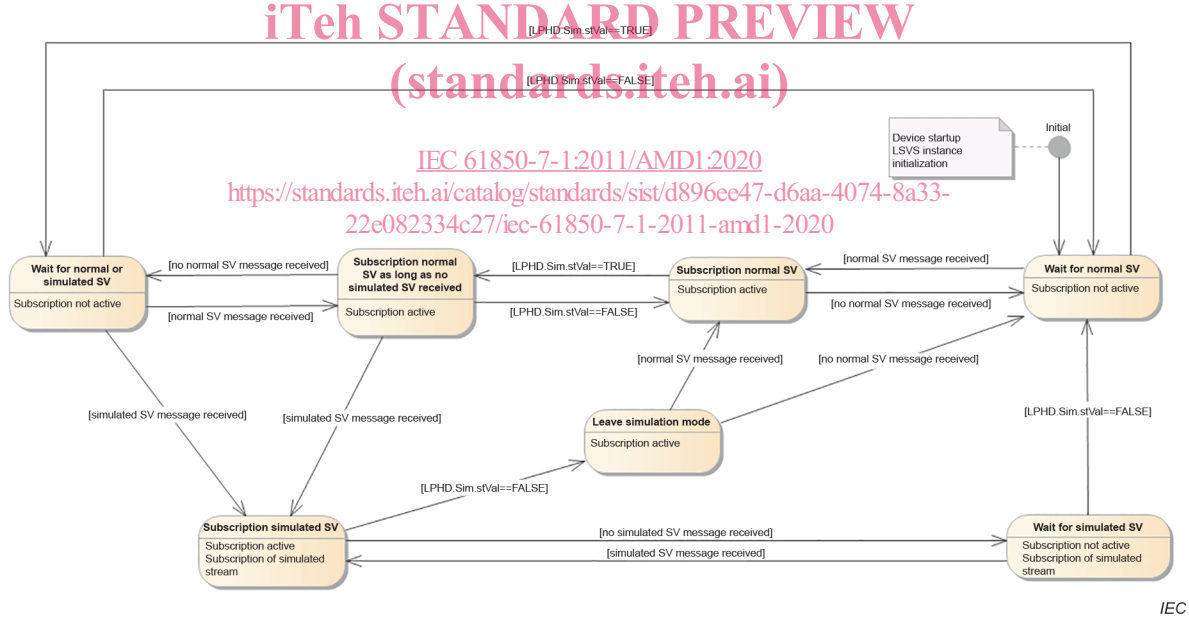


Figure 81 – SV subscription supervision state machine

7.8.3 Input signals used for testing

Figure 41 – Example of input signals used for testing

Replace existing Figure 41 with the following new figure: