

RELION® PROTECTION AND CONTROL

## 630 series

# IEC 61850 Communication Protocol Manual







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# Section 1      Introduction

## 1.1      This manual

The communication protocol manual describes a communication protocol supported by the protection relay. The manual concentrates on vendor-specific implementations.

## 1.2      Intended audience

This manual addresses the communication system engineer or system integrator responsible for pre-engineering and engineering the communication setup in a substation from a protection relay's perspective.

The system engineer or system integrator must have a basic knowledge of communication in protection and control systems and thorough knowledge of the specific communication protocol.

## 1.3 Product documentation

### 1.3.1 Product documentation set

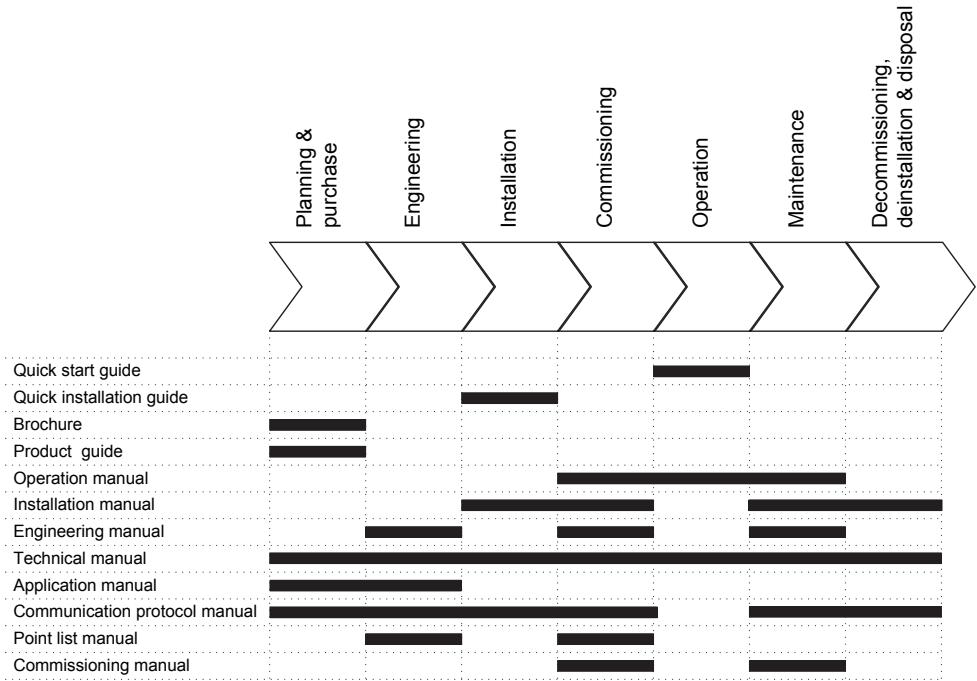


Figure 1: The intended use of documents during the product life cycle



Product series- and product-specific manuals can be downloaded from the ABB Web site <http://www.abb.com/relion>.

### 1.3.2 Document revision history

Document revision/date	Product series version	History
A/2009-09-15	1.0	First release
B/2011-02-23	1.1	Content updated to correspond to the product series version
C/2012-08-29	1.2	Content updated to correspond to the product series version
D/2014-11-28	1.3	Content updated to correspond to the product series version
E/2019-02-25	1.3	Content updated



Download the latest documents from the ABB Web site  
<http://www.abb.com/substationautomation>.

### 1.3.3

#### Related documentation

Product-specific point list manuals and other product series- and product-specific manuals can be downloaded from the ABB Web site  
<http://www.abb.com/substationautomation>.

### 1.4

#### Symbols and conventions

##### 1.4.1

##### Symbols



The caution icon indicates important information or warning related to the concept discussed in the text. It might indicate the presence of a hazard which could result in corruption of software or damage to equipment or property.



The information icon alerts the reader of important facts and conditions.



The tip icon indicates advice on, for example, how to design your project or how to use a certain function.

Although warning hazards are related to personal injury, it is necessary to understand that under certain operational conditions, operation of damaged equipment may result in degraded process performance leading to personal injury or death. Therefore, comply fully with all warning and caution notices.

##### 1.4.2

##### Document conventions

A particular convention may not be used in this manual.

- Abbreviations and acronyms are spelled out in the glossary. The glossary also contains definitions of important terms.
- Push button navigation in the LHMI menu structure is presented by using the push button icons.  
 To navigate between the options, use and .
- Menu paths are presented in bold.  
 Select **Main menu/Settings**.
- WHMI menu names are presented in bold.

Click **Information** in the WHMI menu structure.

- LHMI messages are shown in Courier font.
- To save the changes in nonvolatile memory, select **Yes** and press .
- Parameter names are shown in italics.
- The function can be enabled and disabled with the *Operation* setting.
- The ^ character in front of an input or output signal name in the function block symbol given for a function, indicates that the user can set an own signal name in PCM600.
- The \* character after an input or output signal name in the function block symbol given for a function, indicates that the signal must be connected to another function block in the application configuration to achieve a valid application configuration.

### 1.4.3 Functions, codes and symbols

**Table 1:** Functions included in the IEDs

Description	IEC 61850	IEC 60617	ANSI
<b>Protection</b>			
Three-phase non-directional overcurrent protection, low stage	PHLPTOC	3I>	51P-1
Three-phase non-directional overcurrent protection, high stage	PHHPTOC	3I>>	51P-2
Three-phase non-directional overcurrent protection, instantaneous stage	PHIPTOC	3I>>>	50P/51P
Voltage dependent overcurrent protection	PHPVOC	I(U)>	51V
Three-phase directional overcurrent protection, low stage	DPHLPDOC	3I> ->	67-1
Three-phase directional overcurrent protection, high stage	DPHPDOC	3I>> ->	67-2
Distance protection	DSTPDIS	Z<	21, 21P, 21N
Automatic switch-onto-fault logic	CVRSOF	SOTF	SOTF
Fault locator	SCEFRFLO	FLOC	21FL
Autoreclosing	DARREC	O -> I	79
Non-directional earth-fault protection, low stage	EFLPTOC	I0>	51N-1
Non-directional earth-fault protection, high stage	EFHPTOC	I0>>	51N-2
Non-directional earth-fault protection, instantaneous stage	EFIPTOC	I0>>>	50N/51N
Directional earth-fault protection, low stage	DEFLPDEF	I0> ->	67N-1
Directional earth-fault protection, high stage	DEFHPDEF	I0>> ->	67N-2
Harmonics based earth-fault protection	HAEFPPTOC	I0>HA	51NHA
Table continues on next page			

Description	IEC 61850	IEC 60617	ANSI
Transient/intermittent earth-fault protection	INTRPTEF	I0> -> IEF	67NIEF
Admittance-based earth-fault protection	EFPADM	Yo> ->	21YN
Multi-frequency admittance-based earth-fault protection	MFADPSDE	I0> ->Y	67YN
Wattmetric earth-fault protection	WPWDE	Po> ->	32N
Stabilised restricted earth-fault protection	LREFPNDF	dI0Lo>	87NL
Third harmonic based stator earth fault protection	H3EFPSEF	dUo(3H)>/ Uo(3H)<	27/59THD
High-impedance based restricted earth-fault protection	HREFPDIF	dI0Hi>	87NH
Rotor earth-fault protection	MREFPTOC	Io>R	64R
Phase discontinuity protection	PDNSPTOC	I2/I1>	46PD
Negative-sequence overcurrent protection	NSPTOC	I2>	46
Negative-sequence overcurrent protection for machines	MNSPTOC	I2>G/M	46G/46M
Phase-reversal protection	PREVPTOC	I2>>	46R
Three-phase thermal overload protection for feeder	T1PTTR	3Ith>F	49F
Three-phase thermal overload protection, two time constants	T2PTTR	3Ith>T/G	49T/G
Three-phase thermal overload protection for motors	MPTTR	3Ith>M	49M
Motor startup supervision	STTPMSU	Is2t n<	48,66,14,51LR
Motor load jam protection	JAMPTOC	Ist>	51LR
Emergency start	ESMGAPC	ESTART	ESTART
Loss of load supervision	LOFLPTUC	3I<	37
Three-phase current inrush detection	INRPHAR	3I2f>	68
Transformer differential protection for two-winding transformers	TR2PTDF	3dI>T	87T
High-impedance or flux-balance based differential protection for machines	MHZPDIF	3dIH>G/M	87GH/87MH
Stabilized differential protection for machines	MPDIF	3dI>G/M	87G/87M
Three-phase overvoltage protection	PHPTOV	3U>	59
Three-phase undervoltage protection	PHPTUV	3U<	27
Positive-sequence overvoltage protection	PSPTOV	U1>	47O+
Positive-sequence undervoltage protection	PSPTUV	U1<	47U+
Table continues on next page			

Description	IEC 61850	IEC 60617	ANSI
Negative-sequence overvoltage protection	NSPTOV	U2>	47O-
Residual overvoltage protection	ROVPTOV	U0>	59G
Directional reactive power undervoltage protection	DQPTUV	Q>-->,3U<	32Q,27
Reverse power/directional overpower protection	DOPPDPR	P>	32R/32O
Underpower protection	DUPPDPR	P<	32U
Frequency gradient protection	DAPFRC	df/dt>	81R
Overfrequency protection	DAPTOF	f>	81O
Underfrequency protection	DAPTUF	f<	81U
Load shedding	LSHDPFRQ	UFLS/R	81LSH
Low voltage ride through protection function	LVRTPTUV	U<RT	27RT
Overexcitation protection	OEPVPH	U/f>	24
Voltage vector shift protection	VVSPPAM	VS	78V
Three-phase underexcitation protection	UEXPDIS	X<	40
Three-phase underimpedance protection	UZPDIS	Z< GT	21GT
Circuit breaker failure protection	CCBRBRF	3I>/I0>BF	51BF/51NBF
Tripping logic	TRPPTRC	I -> O	94
Multipurpose analog protection	MAPGAPC	MAP	MAP
<b>Protection-related functions</b>			
Local acceleration logic	DSTPLAL	LAL	LAL
Communication logic for residual overcurrent	RESCPSCH	CLN	85N
Scheme communication logic	DSOCPSCH	CL	85
Current reversal and WEI logic	CRWPSCH	CLCRW	85CRW
Current reversal and WEI logic for residual overcurrent	RCRWPSCH	CLCRWN	85NCRW
<b>Control</b>			
Bay control	QCCBAY	CBAY	CBAY
Interlocking interface	SCILO	3	3
Circuit breaker/disconnector control	GNRLCSWI	I <-> O CB/DC	I <-> O CB/DC
Circuit breaker	DAXCBR	I <-> O CB	I <-> O CB
Disconnecter	DAXSWI	I <-> O DC	I <-> O DC
Local/remote switch interface	LOCREM	R/L	R/L
Synchrocheck	SYNCRSYN	SYNC	25
Tap changer control with voltage regulator	OLATCC	COLTC	90V
<b>Generic process I/O</b>			
Table continues on next page			

Description	IEC 61850	IEC 60617	ANSI
Single point control (8 signals)	SPC8GGIO	-	-
Double point indication	DPGGIO	-	-
Single point indication	SPGGIO	-	-
Generic measured value	MVGGIO	-	-
Logic Rotating Switch for function selection and LHMI presentation	SLGGIO	-	-
Selector mini switch	VSGGIO	-	-
Pulse counter for energy metering	PCGGIO	-	-
Event counter	CNTGGIO	-	-
<b>Supervision and monitoring</b>			
Runtime counter for machines and devices	MDSOPT	OPTS	OPTM
Circuit breaker condition monitoring	SSCBR	CBCM	CBCM
Fuse failure supervision	SEQRFUF	FUSEF	60
Current circuit supervision	CCRDIF	MCS 3I	MCS 3I
Trip-circuit supervision	TCSSCBR	TCS	TCM
Station battery supervision	SPVNZBAT	U<>	U<>
Energy monitoring	EPDMMTR	E	E
Measured value limit supervision	MVEXP	-	-
Hot-spot and insulation ageing rate monitoring for transformers	HSARSPTR	3Ihp>T	26/49HS
Tap position indication	TPOSSLTC	TPOSM	84M
<b>Power quality</b>			
Voltage variation	PHQVVR	PQMU	PQMV
Voltage unbalance	VSQVUB	PQMUBU	PQMUBV
Current harmonics	CMHAI	PQM3I	PQM3I
Voltage harmonics (phase-to-phase)	VPPMHAI	PQM3Upp	PQM3Vpp
Voltage harmonics (phase-to-earth)	VPHMHAI	PQM3UpE	PQM3Vpg
<b>Measurement</b>			
Three-phase current measurement	CMMXU	3I	3I
Three-phase voltage measurement (phase-to-earth)	VPHMMXU	3UpE	3UpE
Three-phase voltage measurement (phase-to-phase)	VPPMMXU	3UpP	3UpP
Residual current measurement	RESCMMXU	I0	I0
Residual voltage measurement	RESVMMXU	U0	U0
Power monitoring with P, Q, S, power factor, frequency	PWRMMXU	PQf	PQf
Sequence current measurement	CSMSQI	I1, I2	I1, I2
Sequence voltage measurement	VSMSQI	U1, U2	V1, V2
Table continues on next page			

Description	IEC 61850	IEC 60617	ANSI
Analog channels 1-10 (samples)	A1RADR	ACH1	ACH1
Analog channels 11-20 (samples)	A2RADR	ACH2	ACH2
Analog channels 21-30 (calc. val.)	A3RADR	ACH3	ACH3
Analog channels 31-40 (calc. val.)	A4RADR	ACH4	ACH4
Binary channels 1-16	B1RBDR	BCH1	BCH1
Binary channels 17 -32	B2RBDR	BCH2	BCH2
Binary channels 33 -48	B3RBDR	BCH3	BCH3
Binary channels 49 -64	B4RBDR	BCH4	BCH4
<b>Station communication (GOOSE)</b>			
Binary receive	GOOSEBINRCV	-	-
Double point receive	GOOSEDPRCV	-	-
Interlock receive	GOOSEINTLKRCV	-	-
Integer receive	GOOSEINTRCV	-	-
Measured value receive	GOOSEMVRCV	-	-
Single point receive	GOOSESPRCV	-	-

## Section 2

## Introduction to IEC 61850

The IEC 61850 protocol standard for substation enables the integration of all protection, control, measurement and monitoring functions by one common protocol. It provides the means of high-speed substation applications, station wide interlocking and other functions requiring intercommunication between IEDs. The well described data modelling, the specified communication services for the most recent tasks in a station makes the standard to a key element in modern substation systems.

This manual describes mainly how the IEC 61850 standard is applied in the products of the 630 series IEDs. References and brief descriptions of the IEC 61850 standard are also included. It is assumed that the reader has basic knowledge about the IEC 61850.

To understand the IEC 61850 standard and to be able to find the related information, the following parts of the standard are of importance:

- Station Configuration description Language (SCL) is described in IEC 61850-6. The SCL is an XML based definition of how to describe the parts of a substation. This part of the standard also includes the roles of different tools as well as the engineering concepts.
- Communication profile (IEC 61850 stack) is described in IEC 61850-8-1. This part of the standard includes a number of possible communication profiles, and how the services defined in IEC 61850-7-2 are mapped to the communication profile.
- Communication services are described in IEC 61850-7-2. This part deals mainly with the communication facilities from client and server point of view. It includes the different possibilities of communication functionality.
- Logical node data model. This is described in IEC 61850-7-3 and IEC 61850-7-4.
- Conformance tests and the basis for conformance documents are handled in IEC 61850-10.

To get information and an understanding about the implemented possibilities of IEC 61850 in the IED, the details are described in the IEC 61850 conformance documents.

- MICS, Modeling Information Conformance Statement, contains the declaration of the used logical node types.
- PICS, Protocol Information Conformance Statement, contains the details and what is supported regarding protocol facilities.
- PIXIT, Protocol Extra Information, contains additional information on how the IEC 61850 is implemented and used.
- TICS, Tissue Information Conformance Statement, contains the supported Tissues, which are handled in the Tissues process as defined by UCA, Utility

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Communication Architecture forum. The Tissues handling is found in [www.tissues.iec61850.com](http://www.tissues.iec61850.com).

The conformance documents are unique for each product release and refer to each other; the identities included in the related documents refer to a specific version of the IED.

The communication profile in IEC 61850 uses the MMS standard, which uses Ethernet and TCP/IP to handle the information transport within the substation.

The data modelling uses the concept of logical nodes to identify the published information for communication. The standard defines a set of logical nodes, each representing a communication view of a process function with a number of data objects. The standard cannot cover all possible information that is given, for example, by a protection function of vendor A or vendor B or for the variants of a protection function given by the process part which is protected. For example, a transformer differential - or line differential protection, because the standard defines only a differential protection. Therefore, it is possible to adapt the logical node, which is defined in the standard, as a logical node class. The standard defines methods to describe the actually used logical node as a logical node type which is then based upon the logical node class. This allows all partners to interpret the logical node type information because the description is completely given in the standard. The type description of all logical nodes is part of the Data Type Template (DTT) section in the SCL description file of a station or the IED.

Besides the information about the configuration of the communication facilities, this manual contains the full description of all logical nodes available in the IED. The information about the logical nodes and their data objects may be used to identify which signals are available for the functions as described in the technical manual. The link to the technical manual is done in the logical node tables by listing the signal name as given in the function block, or as seen in PCM600 or the LHMI.

#### 2.1.1

#### Related documentation to IEC 61850

Use the latest revision of the documents listed, unless stated otherwise.

**Table 2:** *IEC 61850-related documentation*

Document ID	Title
IEC 61850-5 First edition 2003-07 Ref. number: IEC 61850-5:2003(E)	Communication networks and systems in substations - Part 5: Communication requirements for functions and devices models
IEC 61850-6 First edition 2004-03 Ref. number: IEC 61850-6: 2004(E)	Communication networks and systems in substations - Part 6: Configuration description language for communication in electrical substations related to IEDs
IEC 61850-7-1 First edition 2003-07 Ref. number: IEC 61850-7-1: 2003(E)	Communication networks and systems in substations - Part 7-1: Basic communication structure for substations and feeder equipment - Principles and models
IEC 61850-7-2 First edition 2003-05 Ref. number: IEC 61850-7-2: 2003(E)	Communication networks and systems in substations - Part 7-2: Basic communication structure for substations and feeder equipment - Abstract communication service interface (ACSI)
IEC 61850-7-3 First edition 2003-05 Ref. number: IEC 61850-7-3: 2003(E)	Communication networks and systems in substations - Part 7-3: Basic communication structure for substations and feeder equipment - Common data classes
IEC 61850-7-4 First edition 2003-05 Ref. number: IEC 61850-7-4: 2003(E)	Communication networks and systems in substations - Part 7-4: Basic communication structure for substations and feeder equipment - Compatible logical node classes and data classes
IEC 61850-8-1 First edition 2004-05 Ref. number: IEC 61850-8-1: 2004(E)	Communication networks and systems in substations - Part 8-1: Specific Communication Service Mapping (SCSM) - Mappings to MMS (ISO 9506-1 and ISO 9506-2) and to ISO/IEC 8802-3
IEC 61850-10 First edition 2005-05 Ref. number: IEC 61850-10: 2005(E)	Communication networks and systems in substations - Part 10: Conformance testing
IEC 61850 MICS 1MRS189725	IED 630 series 1.3 - IEC 61850 MICS: Modelling implementation conformance statement
IEC 61850 PICS 1MRS189726	IED 630 series 1.3 - IEC 61850 PICS: Protocol implementation conformance statement
IEC 61850 PIXIT 1MRS189727	IED 630 series 1.3 - IEC 61850 PIXIT: Protocol implementation extra information
IEC 61850 TICS 1MRS189728	IED 630 series 1.3 – IEC 61850 TICS: Tissue implementation conformance statement



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## Section 3

# Substation Configuration description Language (SCL)

The SCL language is based on XML. However, detailed knowledge of the XML contents is not needed.

The SCL XML file (ied.ICD and/or station.SCD) contains five sections, which are specified in IEC 61850-6 clause 9.

- Header
- Substation section describes the functional structure and its relation to primary devices.
- Communication section describes the connection between the IED access points to the respective subnetwork. and includes also the properties (addresses) of the access points.
- IED section contains a description of the supported communication services, the access point(s) and the IEDs logical devices, logical nodes and their attributes.
- Data type template section contains a declaration of all types used in the SCL file, logical nodes type, DO types, attributes and enums.

The substation section and the communication section are tasks to organize the IEDs within the substation and to establish the communication. The system structure is defined by the organization of the plant structure in PCM600. The signal engineering and the signal routing are either PCM600 or IET600 tasks. The IED needs to be configured with PCM600 before the system is configured with IET600.

The IED section contains the data sets and the control blocks configured by IET600. The data sets and the control blocks are logically defined as part of the logical nodes (see IEC 61850-7-2 clause 9). IET600 also needs a correctly configured communication section for GOOSE engineering.

The data type templates section provides the correct content description of each logical node type to all tools and users (clients) of the information. Each IED and vendor may have their own logical node type definitions included in the data type template section together with all other logical node types based on the standard.

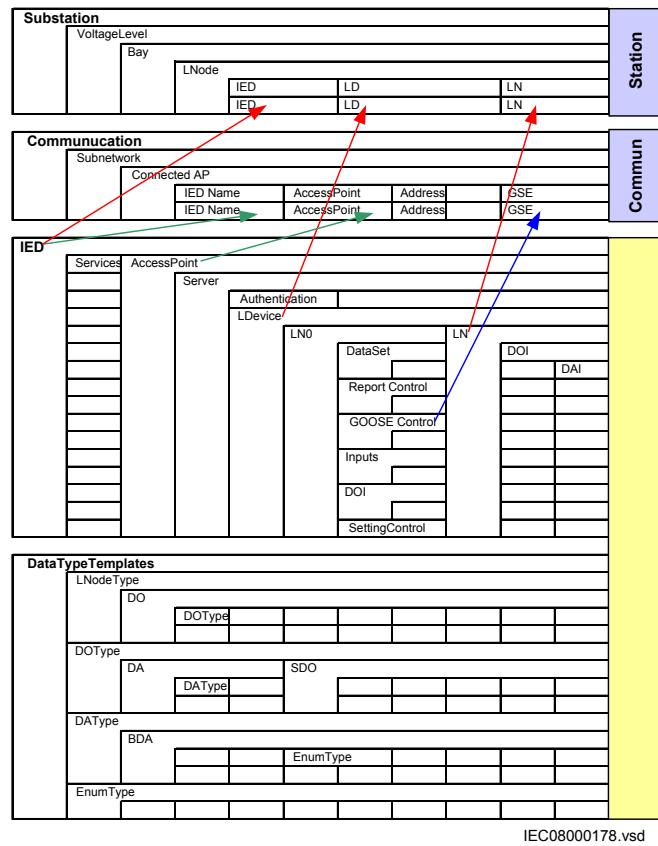


Figure 2: IEC 61850: Principle structure of the SCL XML file

The arrows show the link between the different sections given when an IED is integrated in the substation structure and/or in the communication structure. All needed logical nodes of an IED are linked to the substation section by the system configuration tool.

A reference to GOOSE Control Blocks (GoCB) is included in the communication section when GoCB is configured.

### 3.1

## The substation section

The substation description in IEC 61850-6 clause 9 describes the organization of the primary equipment on one side. On the other side, it includes the used logical nodes and their relation to the primary equipment.

### 3.2

## The communication section

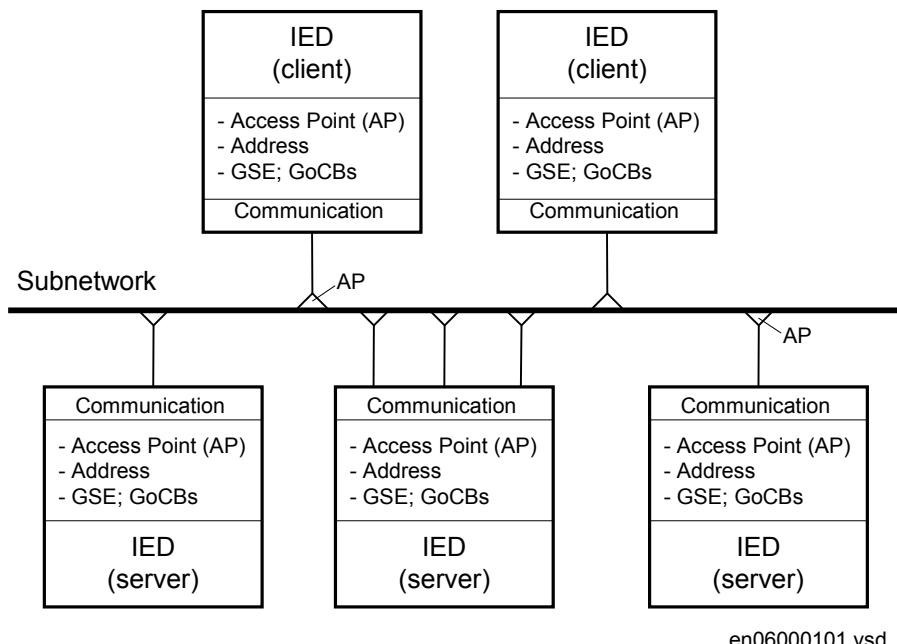
The organization of the physical IEDs to the communication network is independent of the substation structure. The IEC 61850 standard defines the communication

network with no relation to an existing media and protocol. The mapping to an existing media and protocol is specified in IEC 61850-8-1.

The IEC 61850 standard describes in part 7-2 the ACSI in a media and protocol independent form. Part 8-1 specifies the mapping of this ACSI to the existing MMS.

The communication section describes how information is routed between the IEDs and contains the following parts:

- Subnetworks
- IEDs connected to different subnetworks
- Access points per IED to subnetworks
- Address
- IP address of LAN network (is exceptionally part of the address elements)
- Link to GoCB message in transmission direction (extended during signal engineering and routing)



*Figure 3: IEC 61850-6: Communication network*

Additional information about the server is part of the IED.

### 3.3 The IED section

The IED section describes the complete IED as it is needed for IEC 61850 communication and signal engineering. The data type template part of an IED may be seen as part of the IED, even when separated in its own section. The IED's ICD files include the description of the logical nodes, their data type templates and the used or

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supported services. The structure of the IED section follows the definitions made in the IEC 61850 standard.

Two basic IED types are used in system configuration.

- Station level IEDs
  - are located on the station level and are identified as client IEDs when they read or write information from or to the bay IEDs. This functionality is represented by logical nodes of group “Information (I)”. These are the logical nodes (LN) = ITCI, IHMI and ITMI. Client IEDs are the receiver of information in monitoring direction and sender of commands (control). These logical nodes have no data objects. They are only used to link the report control blocks (BRCBs) from the server IEDs. They have to read their information about the signals and the signal configuration from the bay IEDs. This is possible by checking all control blocks for a link to it as a client.
- Bay level IEDs
  - are located on the bay level and are identified as server IEDs when they read or write information vertically. When GOOSE messages are received, the bay level IED also has the client role.

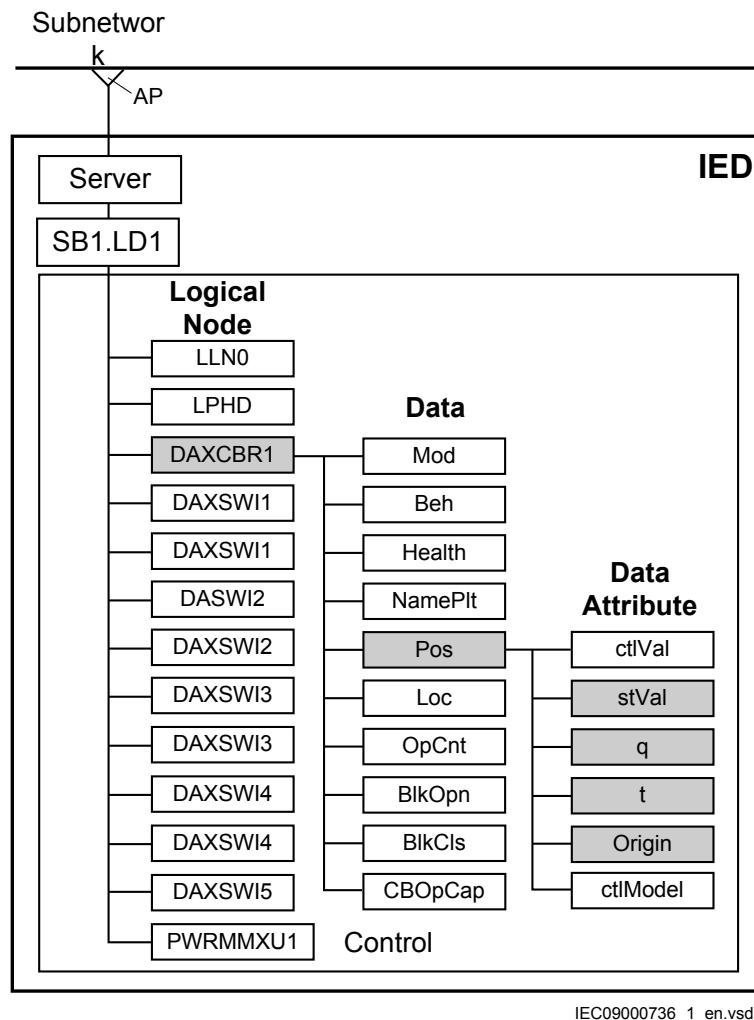


Figure 4: Organization of LDs, LNs, DOs and DAs in an IED

- A server represents the communication interface to the subnetwork (Ethernet).
- One or more logical device(s) (LD) are connected to a server.
- A set of logical nodes belong to a LD.
- The LN LLN0 is a special logical node per LD and contains for example the data sets, the various control blocks, inputs (from GOOSE messages). In the IED, the data sets and the control blocks shall be located to LD0.
- The LN LPHD is a special logical node per LD and contains data objects that describe the status of the physical device (the IED)
- Each logical node represents a function and contains a number of data objects (DO)
- Each DO includes a number of data attributes (DA)

The data objects represent information signals that may be routed to station level IEDs or to other bay IEDs that are communicating with GOOSE. The signal engineering task is to select the requested signals (DOs) and link them to the client IEDs as

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receiver. The control services are not directly engineered. They are included in the data objects, which handle both directions the command (control) and the response (monitoring). When routing the DO in monitoring direction, the control is also known by the clients.

The number of data objects and data attributes per DO is defined by the used LN type in this IED. The content of logical node types and DO types are defined in the DTT. This also means that the definitions in the DTT section have to be unique with an SCD file.

## 3.4 Tool concept

The IEC 61850-6 defines a number of roles for tools. In the Relion® series, PCM600 is defined as the IED tool, and IET600 is defined as the system engineering tool.

The sections in SCL contain properties that are to be configured by these tools. There is no relation between one section and one specific tool. The task of the IED tool is to configure all properties for the IED, while the system tool has the task to define the place of the IED in the system and its communication dependencies. For example, the plant structure in PCM600 results in the subsystem section in SCL regarding the subsystem structure down to the IED level. PCM600 also configures the IED section as a result of the IED configuration. In PCM600, the configuration properties for SCL are handled automatically as a result of the configuration, except for the receiving of GOOSE information that has a dependency with the system tool.

IEC 61850 Configuration tool in PCM600 can also be used for IEC 61850 engineering instead of IET600.

### 3.4.1 IEC 61850 engineering with PCM600 and IET600

#### PCM600

- When an IED is instantiated, its place in the plant structure creates the corresponding structure in the substation section in SCL. The communication facilities are also created in the communication section.
- The functionality of the IED is configured by using the Application Configuration tool in PCM600. For each function, the corresponding logical device and logical node(s) are created in the IED section together with its type definition in the data type template section.
- The above forms the IED capabilities from a communication perspective and are then included in the file exported from PCM600 as a SCD, ICD or CID file.
- Basic IEC 61850 engineering can be done also using the IEC 61850 Configuration tool in PCM600 without file export/import with IET600.

### IET600

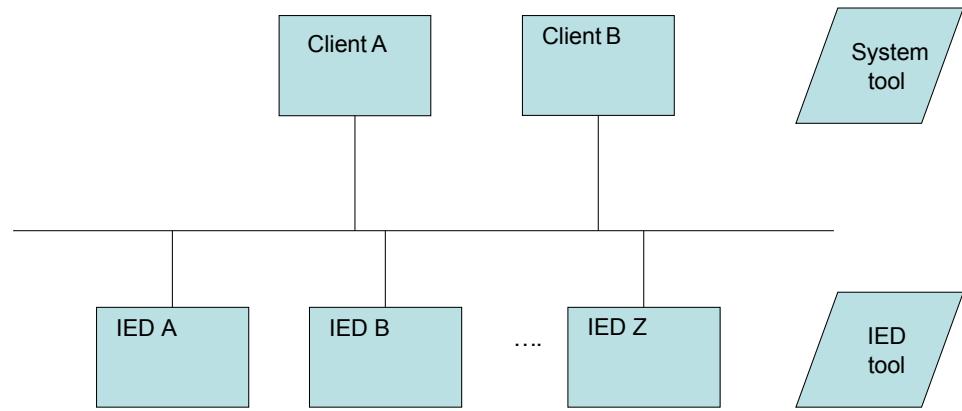
- A SCD file is to be opened or a SCD, ICD or CID file for the particular IED(s) is to be imported/merged.
- For each IED, the data sets, the control blocks for reporting (this means unbuffered/buffered reporting and GOOSE) and the properties for each report control block are to be defined.
- If client definitions (like client. ICD) are required in the system configuration, they are merged into IET600 and connected to the unbuffered/buffered report control blocks.
- For each IED, the primary/conducting equipment with their relation to the used logical nodes must be defined in the substation section.
- Logical nodes, which are not related to the conducting equipment, must be included in the bay level in the substation section.
- The resulting SCD file is exported from IET600.

The SCD file is to be imported to PCM600 to receive GOOSE data. For each IED that receives GOOSE information, the received data is connected to the applications using SMT in PCM600.

## 3.5

### Engineering concept in IEC 61850-6

- Top-down approach means that the system engineering tool has ICD files available for each IED to be included in the system configuration. The ICD files may be of an template type and represent a pre-configured IED.
- Bottom-up approach means that the configurations are produced by the IED tool, and that are exported as ICD files (or SCD file) to be imported by system tools.



*Figure 5: Relation between system and IED tools*

Regardless of engineering approach, the idea is that the IED tool provides the CID or ICD file for each IED. These ICD/CID files are then imported into the system tool and merged into an SCD file, representing the complete substation or a part of the substation, like one for each voltage level.

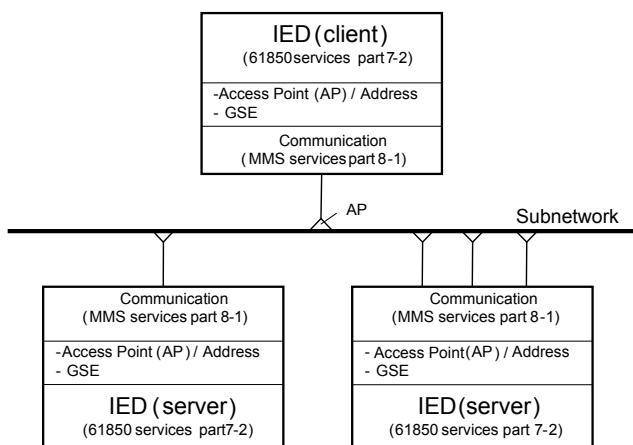
## Section 4 Communication profile

The IEC 61850 standard is conceptually written to be independent of an existing communication media and message transmission concept. Out of this, a specific communication profile is decided and is been commonly used. The actual decision is for

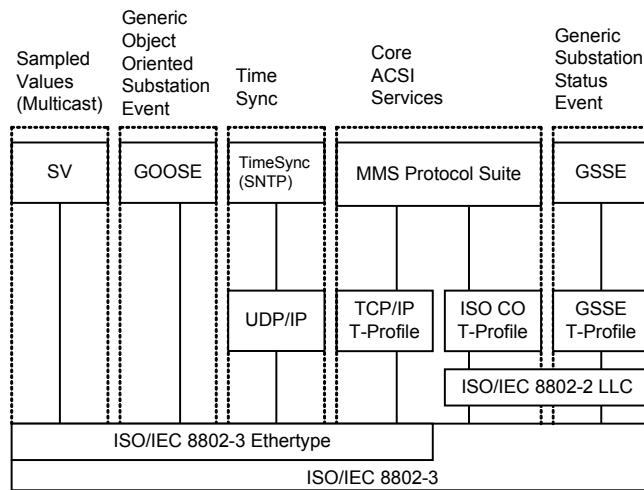
- Ethernet as the media
- TCP/IP
- ISO session and presentation layer
- MMS (Manufacturing Message Specification (ISO 9506-1 and ISO 9506-2)

The IEC 61850 standard describes its requested services in ACSI, which is contained in part 7-2 of the standard. The mapping to the MMS for all aspects of services and Ethernet usage is specified in part 8-1 of IEC 61850.

Each device manufacturer, which is a partner of an IEC 61850-based communication network, has to take these two specifications and adapt their respective product to the requirements and definitions given in the standard. To make this profile visible to all other partners, so they can check what they can expect and what they have to support, the PICS document is defined. The PICS contains in a table based form the possibility of a product or product family.



*Figure 6: IEC 61850 Protocol: related standards for communication*



*Figure 7: Overview of functionality and profiles according to IEC 61850-8-1*

The implementation in the IED supports the given part of the functionality.

- GOOSE
- TimeSync using SNTP
- The peer-to-peer/vertical communication using MMS protocol suite with the T-profile TCP/IP

For each of the above, the resulting underlying protocols as stated in [Figure 7](#).

See the PICS and PIXIT for more information.

## Section 5

## Supported services

IEC 61850-7-2 describes the services in the standard. IEC 61850-8-1 describes how the services are applied in the communication. The conformance documents contain the description of the supported services in the IED.

Services that are not mentioned in this chapter or in the conformance document are not supported.

### Data set

Define data sets by the SCD description.

Create data sets under LD0/LLN0.

### Substitution

Substitution is supported for the respective DATA, according to IEC 61850-7-4, that have the substitution attributes defined.



Note that SubID and SubQ are not used.

### Setting group control block

Change of setting group is supported, that is the actSG attribute. This attribute is not one of the explicit definitions in SCL, but a consequence of the defined setting group control block according to IEC 61850-6.

There is only one setting group control block, which is located in LD0/LLN0 (Logical Device/Logical Node 0).

Change or edit of setting values as well as reading of setting values is neither supported nor visible in IEC 61850.



Note that the actual number of used setting groups is defined by the parameter *MaxNoSetGRP* in the function *SETGRPS*, which is configured in PST in PCM600.

### Report control block

For properties about report control blocks, see PIXIT.

UnBuffered reporting as well as Buffered reporting is supported.



Note that the parameters BufTm and IntPrd shall have the relation BufTm < IntPrd. For best efficiency, the BufTm should have IntPrd as common denominator, for example: n\*BufTm = IntPrd, n is an arbitrary number.

### Generic substation event (GOOSE)

The structured GOOSE is supported. This means that the data sets can be defined with FCDA as well as explicit attributes.

When explicit attributes are defined in the data sets, the number of such items in a data set is limited to 150.

The supported data types to be published and received in GOOSE are binary values, single point values, double point values, integer values and measured values. On reception of GOOSE message there is one signal for validity available for the applications. The signal for validity represents all data in the received GOOSE telegram. Invalid means that the correct message is not received within the 1.8\*maxTime parameter for the GOOSE Control Block (as defined in IEC 61850-6). An incorrect message includes T=true, NeedsCom, wrong order of attributes or any discrepancy in the GOOSE message layout.



Note that the data sets that are used or referred to by GOOSE control blocks can only include a data attribute once. In other words, there may not be the same data attribute in more than one data set.

### Control

Of the different control sequences, the ‘direct-with-normal-security’ and ‘SBO-with-enhanced’ security are supported (defined by the ctlModel parameter, IEC 61850-7-2).

The command model can be changed for some functions by using PCM600 or via the LHMI. From communication perspective, in IEC 61850 this parameter is read-only.

Check bits; interlock check and synchrocheck check, are only valid for LN types based upon CSWI class.

Verification of Originator Category is supported, see also PIXIT.

### Time and time synchronization

For properties about time synchronization, see PIXIT and Time synchronization description in the technical manual and the application manual.

### File transfer

See PIXIT.

## Section 6

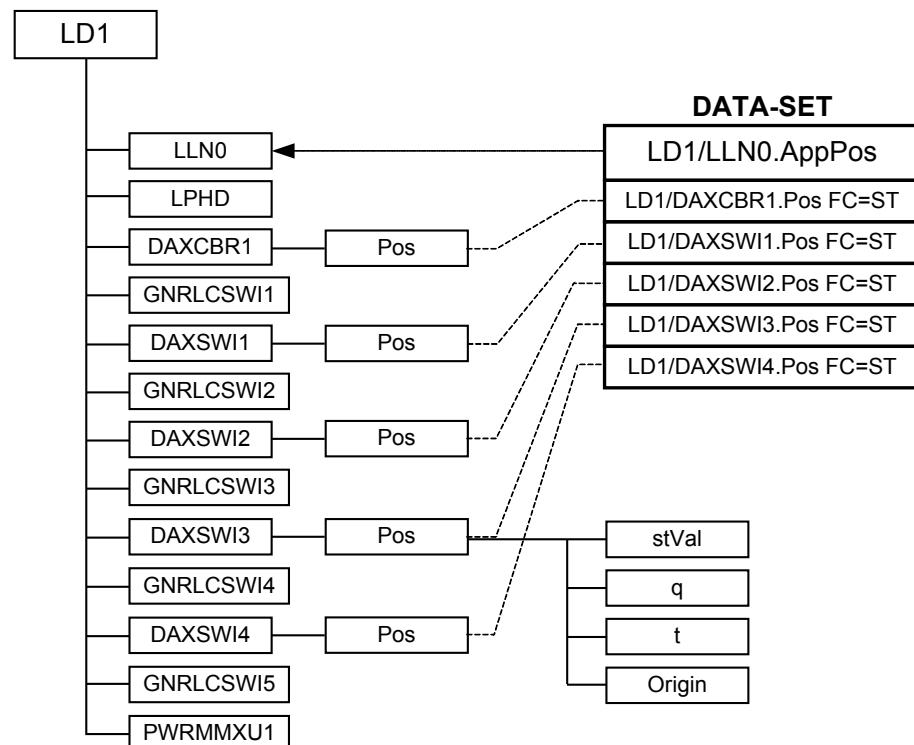
# Data sets and control blocks

### 6.1

## Data sets

IEC 61850 has defined data sets and report control blocks for signal transmission in monitoring direction. Data sets are also used for GOOSE messages in horizontal direction. The project defines the data objects or single data attributes that should be collected in a data set. The following figure shows a data set where all position information of the apparatuses of a bay are put into one data set.

The vendor of an IED can define data sets as defaults that are part of the IED and always available. They need to be linked to the client IEDs only when to use them as they are. The vendor has to declare when these data sets can be modified to projects need or not.



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Figure 8: IEC 61850-7-2: Example of a data set

There are general rules for data set configuration.

- 
- All data objects or their data attributes which are signals in monitoring direction can be selected for a data set.
  - Only those data attributes of a data object can/will be selected which have the same function constraint (FC).
  - Data objects with different FC can be selected for a data set. For example, DOs with FC = ST and DOs with FC=MX can be member in one data set.
  - A single data attribute can be selected when it is specified with a trigger option. For example, the data attribute stVal of the data object Pos can be selected as a member of a data set, because it is specified with the trigger option data change detected (dchg).

The description of the data sets with name and the list of data object members (FCDAs is included in the SCL file in the IED section in the Logical device subsection. As specified in IEC 61850-7-2 clause 9, the data sets are part of a logical node. They are most likely included in the LLN0.

## 6.2

### Report control block (URCB/BRCB)

To be able to transmit the signals configured in a data set, a report control block must be configured to handle and specify how the events are transmitted to the clients. There are two types of report control blocks; unbuffered and buffered. The buffered report control block stores the events during a communication interrupt, while the unbuffered is sent upon data change and not stored during interruption.

The content of a BRCB is listed in IEC 61850-7-2 in clause 14. The BRCB contains many attributes which are of interest to handle and secure the communication between the client and the server and may be set once as default in a project. Others are of application interest in the way events are handled in a project.

- Buffer time (valid only for BRCB)
  - This parameter describes how long the report should wait for other expected events before it sends the report to the client. When it is known, that additional events are generated as a follow up, it is useful to wait, for example, 500 ms for additional events stored in the report. This feature reduces the number of telegrams transmitted in case of a burst of changes. But on the other side it increases the overall transaction time for events from IED input to presentation on HMI, which is normally defined to be one second.
- Trigger options
  - The data attributes know three different trigger options (dchg, qchg, dupd). Within the BRCB, the two other can be defined (integrity and general interrogation). The attribute Trigger option is a multiple choice and allows to mask the supported trigger options in this BRCB.
- Integrity period
  - When integrity is selected in the trigger option attribute, it is needed to define an integrity period to force the transmission of all data listed in the

data set. This is done by the attribute Integrity period. This feature can be used as a background cycle to ensure that the process image in all partners is the same. The background cycle can repair a lost event in the chain from the NCC to an IED.

- General interrogation
  - A general interrogation is only done on request from a client. Not all data sets may contain information which is needed for a general update of the client. For example data with T(ransient) = TRUE are not part of a GI. When the BRCB attribute general interrogation is set to TRUE a GI request from the client will be handled. The report handler will transmit all data defined in the data set with their actual values. The IEC 61850 standard defines that all buffered events shall be transmitted first before the GI is started. A running GI shall be stopped and a new GI shall be started, when a new GI request is received while a GI is running.
- Purge buffer (valid only for BRCB)
  - This BRCB attribute can be used by a client to clean the event buffer from old events. The events are discarded on request of the client. This feature can be used to delete old events not transmitted to the client due to stopped communication. After the link is reestablished the client can decide to clean the buffer or to receive the history.

### Trigger Options

IEC 61850 has defined in total five different TrgOp. Three of them belonging to data attributes and marked per data attribute in the column TrgOp of the CDC tables in part 7–3. The other two belonging to the configuration of control blocks.

- dchg = data-change
  - The classical trigger. Whenever a process value has changed its value either binary or a measurement a transmission is done. The standard does not define how to detect and inform the logical node.
- qchg = quality change
  - Looking to the possibilities of the quality data attribute type (q) any changes in the quality description will be transmitted.
- dupd = data value update
  - This trigger option give the possibility to define that a transmission should be done on a condition which can be controlled by the application.
- integrity
  - This trigger forces the transmission of all process values defined in the data set when a timer value (the integrity period) expires. It can be used for example to update a process signal in the background (for example, every 15 minutes).
- general interrogation
  - This trigger is forced by the clients (= station level IED; NCC gateway, station HMI, ...). Normally a GI is asked for, when the client and the server

start or restart a session. When the client is able to receive the actual values and when the logical device has scanned all process values at least once, an image of the actual process signal status can be transmitted to the client.



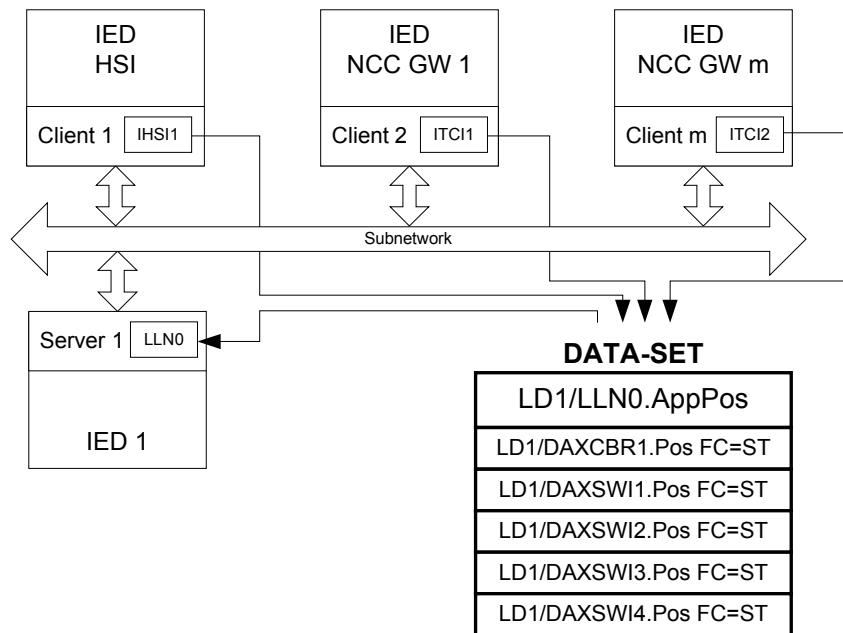
Note that the possible trigger options for each attribute are included and defined in the data type template section in SCL.

### Link BRCB to a client LN

The BRCB has to know to whom the events shall be transmitted. This is the signal routing engineering step. The IEC standard 61850–6 describes that this is given by including the LN of the client IED in the ReportBlockEnabled option.

The selected client IED with the corresponding LN, for example, ITCI is included in the SCL structure of the Report Control description of the IED section.

The description of the BRCB with the selected data set, configured parameters and selected IEDs is included in the SCL file in the IED section in the LN0 structure for the LD where this LN0 belongs to.

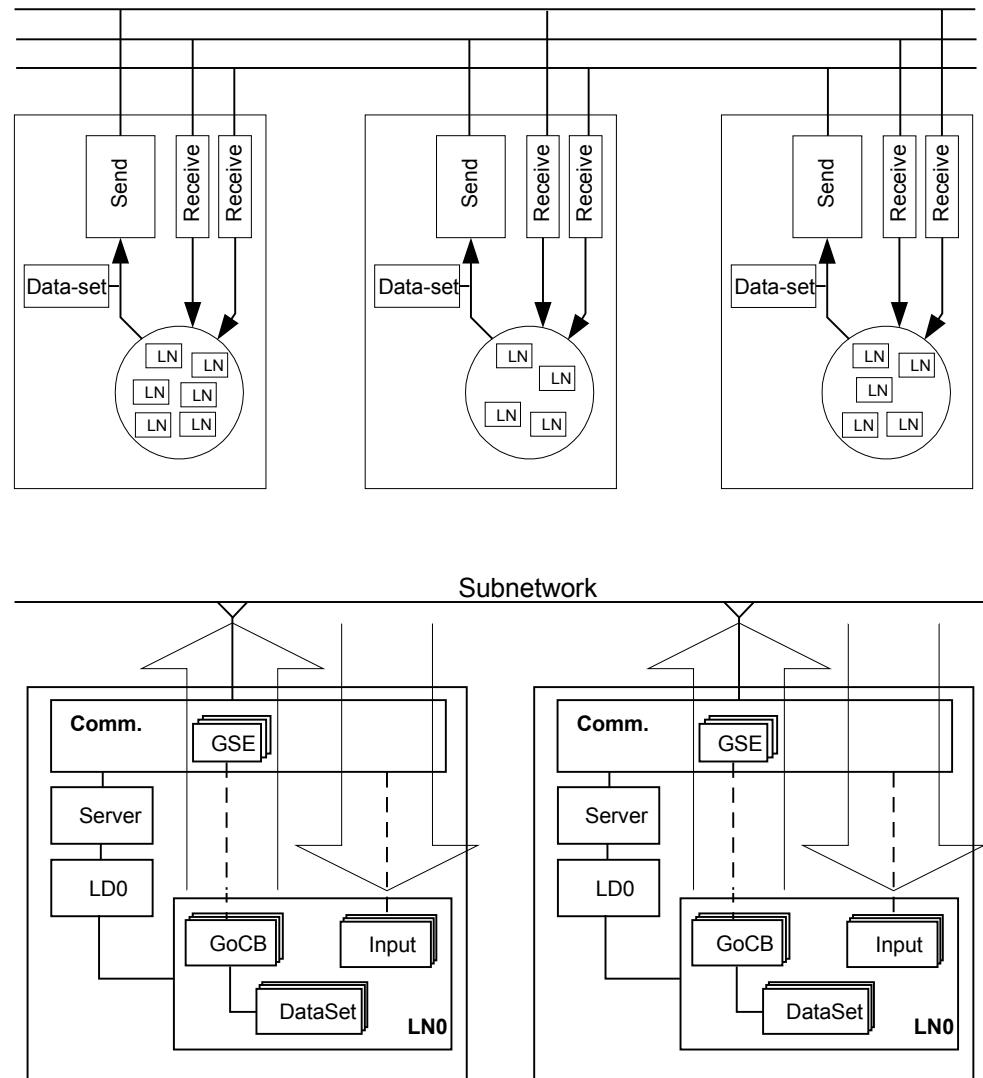


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*Figure 9: Link BRCB to a client LN*

## 6.3

## GOOSE Control Blocks (GoCB)



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Figure 10: IEC 61850: Principle operation of GOOSE messages

The Generic Object Oriented Substation Event (GOOSE) class model is used to distribute input and output data values between IEDs on bay level (in horizontal direction) through the use of multicast services. GOOSE messages enable fast transmission from a publisher to one or several subscribers (receivers).

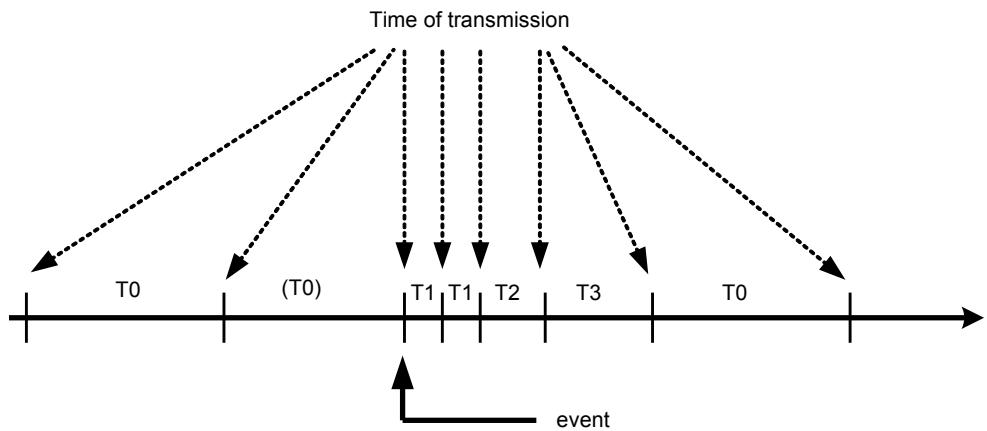
GOOSE messages are unidirectional, send only messages which request an application specific method to secure that the sender and the receiver of the message operate safely. This implies that the receiver of the GOOSE message distributes also GOOSE messages and closes the loop for communication (request – respond on application level).

The GOOSE service model of IEC 61850-7-2 provides the possibility for fast and reliable system-wide distribution of input and output data values. This implementation uses a specific scheme of retransmission to achieve the appropriate level of reliability. When a GOOSE server generates a SendGOOSEMessage request, the current data set values are encoded in a GOOSE message and transmitted on the multicast association. The event that causes the server to invoke a SendGOOSE service is a local application issue as defined in IEC 61850-7-2. Each update may generate a message in order to minimize throughput time.

Additional reliability is achieved by retransmitting the same data (with gradually increasing SqNum and retransmission time).

**Table 3:** *Retransmissions*

Transmission time	Description
T0	Retransmission in stable conditions (no event for a long time)
(T0)	Retransmission in stable conditions may be shortened by an event
T1	Shortest retransmission time after the event
T2, T3	Retransmission times until achieving the stable conditions time



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**Figure 11:** *Transmission time for events*

Each message in the retransmission sequence carries a timeAllowedToLive parameter that informs the receiver of the maximum time to wait for the next retransmission. If a new message is not received within that time interval, the receiver assumes that the association is lost. The specific intervals used by any GOOSE publisher are a local issue. The timeAllowedtoLive parameter informs subscribers of how long to wait. In 630 series, the detection time is 1.8\*timeAllowedToLive to cope with possible transmission delays.

The GOOSE message concept is used for all application functions where two or more IEDs are involved. Typical example is the station-wide interlocking procedure or breaker failure protection.

Figure [Figure 10](#) shows the GOOSE concept for three IEDs which interchange GOOSE messages between each other.

To send GOOSE messages a GoCB must be defined and a data set is needed that contains the data objects of single data attributes to be sent.

A GOOSE message is forced to be transmitted when a trigger change is detected for a data attribute. All members of the data set are copied in the send buffer with their actual value and the message is sent. The subscribers, who knows the address of this GOOSE message, receives the telegram. The GOOSE message includes a sequence number to verify that all messages are received.

The concept that has to be done in case of for example a lost message is part of the application and not described in the standard.

A GoCB has to be defined per GOOSE data set.

GOOSE messages bypass the server and send direct from the communication part on the Ethernet. This is identified for the communication in the SCL communication section in the GSE element, where the name of the GoCB is listed under the ConnectedAP.

#### **Link GoCB to an IED**

The IEDs that should receive the GOOSE message must be known and they have to be informed in the engineering state that they receive GOOSE messages and which one. This is given when the external Reference, the name of the IED and the member of the data set is included in the LN0 under the structure of the LD of the receiving IED. This part is identified as “Inputs”.



## Section 7      Logical node data model

The data model used by IEC 61850 is based on logical nodes containing a set of data objects. The data model is defined in the standards.

- IEC 61850-7-4 Compatible logical node classes and data classes
- IEC 61850-7-3 Common data classes

The standard describes only classes of logical nodes and data objects on one side and common data classes for the data object attributes. The elements in these classes have certain definitions.

- Mandatory (M)
- Optional (O)
- Conditional optional (Cxxx)
- In addition, IEC 61850 states rules for adding vendor-specific definitions to the standard, in order to cope with extra functionality.

The possible description of the data model according to the standard allows to adapt a logical node of a LN class to that what the product is supporting or using for this LN. This definition of what parts of a class is used in the actual product and possible addition is called a type, according to IEC 61850-6. There are LN types based upon LN classes. The LN type attributes are called Data Objects (or DATA) and are in of DO types, base upon respective CDC class. This allows all partners in the IEC 61850 project who need this LN to understand the LN in all details for the communication part.

The IEC 61850 standard does not describe the functionality and way of operation. Each supplier has to describe this separately. ABB has described their function blocks that represent a logical node and all other function blocks in the technical manuals. This chapter in the communication protocol manual has two tasks:

- Describe the Logical Node types and their data object attribute types.
- Make the link to the description of the function block.

### 7.1

### Common data objects in each logical node

The IEC 61850 standard describes in part 7-4, a Common Logical Node. The data objects contained in that LN are both mandatory and optional. The mandatory data objects have to be included in each LN. This clause describes the general handling of the data objects within the 630 series products.

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The mandatory data objects as defined in IEC 61850-7-4 as part of the Common Logical Node are Mode, Behavior, Health and NamePlate.

### Mode

The operation modes ON (enabled) and BLOCKED are supported remotely by a command or locally from the LHMI of the IED. The TEST and the TEST/BLOCKED mode can be operated locally from the LHMI or by using PCM600.

The state OFF can be set from the LHMI or by using PCM600 for the functions having the setting 'operation'.

Note also that for functions in other Logical devices than LD0, the Mod can only be controlled by communication on LLN0.

### Behaviour

The operational mode as given by the Mode control is shown in the data object Beh with the priority rules as described for Beh in clause 6 of IEC 61850-7-4.

The Beh shows the actual state of the function, dependent upon the hierarchy described in IEC 61850-7-4, clause 6.

### Health

The 630 series products show always only the state "green" = Ok.

### NamePlt

The name of the logical node and its relation to namespace definition are shown in the data object NamePlt as specified for the SCL structure.

## 7.2

## Logical nodes for automatic control

### 7.2.1

### Automatic tap changer control ATCC

LN type	LN prefix	LN class	Function block name
GNRLLLNO instance 1 (revision 0)	-	LLN0	OLATCC
OLATCC instance 1 (revision 0)	OL	ATCC	OLATCC
OLYLTC instance 1 (revision 0)	OL	YLTC	OLATCC

**Table 4:** OLATCC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

**Table 5:** OLATCC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Loc	a_dSPS	stVal	ST	-	-	Mon	Local operation allowed
		q	ST	-	-	Mon	Quality: Local operation allowed
		t	ST	-	-	Mon	Timestamp: Local operation allowed
Auto	a_dSPS	stVal	ST	-	AUTO	Mon	Acting automatic/manual
		q	ST	-	AUTO	Mon	Quality: Acting automatic/manual
		t	ST	-	AUTO	Mon	Timestamp: Acting automatic/manual
EndPosR	a_dSPS	stVal	ST	-	-	Mon	Indication of extreme raise position caused blocking
		q	ST	-	-	Mon	Quality: Indication of extreme raise position caused blocking
		t	ST	-	-	Mon	Timestamp: Indication of extreme raise position caused blocking
EndPosL	a_dSPS	stVal	ST	-	-	Mon	Indication of extreme lower position caused blocking

Table continues on next page

## Section 7

### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
EndPosL	a_dSPS	q	ST	-	-	Mon	Quality: Indication of extreme lower position caused blocking
		t	ST	-	-	Mon	Timestamp: Indication of extreme lower position caused blocking
CtlV	b_dMV	mag.f	MX	-	U_CTL	Mon	Control voltage, Up, target voltage level
		q	MX	-	U_CTL	Mon	Quality: Control voltage, Up, target voltage level
		t	MX	-	U_CTL	Mon	Timestamp: Control voltage, Up, target voltage level
CircA	b_dMV	mag.f	MX	-	I_CIR	Mon	Calculated circulating current - calculated in operation modes NRP and MCC
		q	MX	-	I_CIR	Mon	Quality: Calculated circulating current - calculated in operation modes NRP and MCC
		t	MX	-	I_CIR	Mon	Timestamp: Calculated circulating current - calculated in operation modes NRP and MCC
LodA	b_dMV	mag.f	MX	-	TR0_I_AMPL	Mon	Current magnitude from own transformer
		q	MX	-	TR0_I_AMPL	Mon	Quality: Current magnitude from own transformer
		t	MX	-	TR0_I_AMPL	Mon	Timestamp: Current magnitude from own transformer
TapChg	c_dBSC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		valWTr.posVal	ST	-	-	Mon	Tap position status for IEC61850 mapping
		Oper.origin.orlent	CO	-	-	Cmd	Command parameter for IEC61850
		valWTr.transInd	ST	-	-	Mon	Tap changer operating status for IEC61850 mapping
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		q	ST	-	-	Mon	Quality: Tap position status for IEC61850 mapping
		t	ST	-	-	Mon	Timestamp: Tap position status for IEC61850 mapping
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	c_dINC	q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
LTCBlk	c_dSPC	stVal	ST	-	-	Mon	External signal for blocking of automatic operation status
		q	ST	-	-	Mon	Quality: External signal for blocking of automatic operation status
		t	ST	-	-	Mon	Timestamp: External signal for blocking of automatic operation status
ParOp	c_dSPC	stVal	ST	-	PARALLEL	Mon	Parallel mode or not
		q	ST	-	PARALLEL	Mon	Quality: Parallel mode or not
		t	ST	-	PARALLEL	Mon	Timestamp: Parallel mode or not
VRed1	c_dSPC	stVal	ST	-	-	Mon	RSV status for IEC61850 mapping
		q	ST	-	-	Mon	Quality: RSV status for IEC61850 mapping
		t	ST	-	-	Mon	Timestamp: RSV status for IEC61850 mapping
OpCntRs	d_dINC	stVal	ST	-	OPR_CNT	Mon	Total number of commands given, manual and automatic
		q	ST	-	OPR_CNT	Mon	Quality: Total number of commands given, manual and automatic
		t	ST	-	OPR_CNT	Mon	Timestamp: Total number of commands given, manual and automatic
ALod	v1_dCMV	cVal.ang.f	MX	-	TR0_I_ANGL	Mon	Current phase angle from own transformer
		cVal.mag.f	MX	-	TR0_I_AMPL	Mon	Current magnitude from own transformer
		q	MX	-	TR0_I_AMPL	Mon	Quality: Current magnitude from own transformer
		t	MX	-	TR0_I_AMPL	Mon	Timestamp: Current magnitude from own transformer
BlkSt	v1_dINS	stVal	ST	-	BLK_STATUS	Mon	Bit-coded output showing the blocking status for the next operation
		q	ST	-	BLK_STATUS	Mon	Quality: Bit-coded output showing the blocking status for the next operation
		t	ST	-	BLK_STATUS	Mon	Timestamp: Bit-coded output showing the blocking status for the next operation
OpTmhNum	v1_dINS	stVal	ST	-	OP_TM_NUM_H	Mon	Number of controls for own tap changer during last hour
		q	ST	-	OP_TM_NUM_H	Mon	Quality: Number of controls for own tap changer during last hour

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
OpTmhNum	v1_dINS	t	ST	-	OP_TM_NUM_H	Mon	Timestamp: Number of controls for own tap changer during last hour
TapOpErr	v1_dSPS	stVal	ST	-	ALARM	Mon	Alarm status
		q	ST	-	ALARM	Mon	Quality: Alarm status
		t	ST	-	ALARM	Mon	Timestamp: Alarm status
ErrParTra	v1_dSPS	stVal	ST	-	PAR_FAIL	Mon	Parallel failure detected
		q	ST	-	PAR_FAIL	Mon	Quality: Parallel failure detected
		t	ST	-	PAR_FAIL	Mon	Timestamp: Parallel failure detected
LTCBIkAHi	v1_dSPS	stVal	ST	-	BLKD_I_LOD	Mon	Indication of load current blocking
		q	ST	-	BLKD_I_LOD	Mon	Quality: Indication of load current blocking
		t	ST	-	BLKD_I_LOD	Mon	Timestamp: Indication of load current blocking
LTCBIkVLo	v1_dSPS	stVal	ST	-	BLKD_U_UN	Mon	Indication of under voltage blocking
		q	ST	-	BLKD_U_UN	Mon	Quality: Indication of under voltage blocking
		t	ST	-	BLKD_U_UN	Mon	Timestamp: Indication of under voltage blocking
LTCRnbk	v1_dSPS	stVal	ST	-	RNBK_U_OV	Mon	Indication of runback raise voltage
		q	ST	-	RNBK_U_OV	Mon	Quality: Indication of runback raise voltage
		t	ST	-	RNBK_U_OV	Mon	Timestamp: Indication of runback raise voltage
LTCBIkCirA	v1_dSPS	stVal	ST	-	BLKD_I_CIR	Mon	Indication of high circulating current blocking
		q	ST	-	BLKD_I_CIR	Mon	Quality: Indication of high circulating current blocking
		t	ST	-	BLKD_I_CIR	Mon	Timestamp: Indication of high circulating current blocking
LTCBIkSt	v1_dSPS	stVal	ST	-	BLKD_LTCBLK	Mon	Indication of external blocking
		q	ST	-	BLKD_LTCBLK	Mon	Quality: Indication of external blocking
		t	ST	-	BLKD_LTCBLK	Mon	Timestamp: Indication of external blocking
VMeas	v2_dMV	mag.f	MX	-	U_MEAS	Mon	Phase-to-phase voltage , average filtered
		q	MX	-	U_MEAS	Mon	Quality: Phase-to-phase voltage , average filtered
		t	MX	-	U_MEAS	Mon	Timestamp: Phase-to-phase voltage , average filtered
AngVAPhA	v2_dMV	mag.f	MX	-	ANGL_UA_IA	Mon	Measured angle value between phase A voltage and current
		q	MX	-	ANGL_UA_IA	Mon	Quality: Measured angle value between phase A voltage and current

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
AngVAPhA	v2_dMV	t	MX	-	ANGL_UA_IA	Mon	Timestamp: Measured angle value between phase A voltage and current
CtlVDif	v2_dMV	mag.f	MX	-	UD_CTL	Mon	Voltage difference between measured and control Voltage
		q	MX	-	UD_CTL	Mon	Quality: Voltage difference between measured and control Voltage
		t	MX	-	UD_CTL	Mon	Timestamp: Voltage difference between measured and control Voltage
ClcLDC	v2_dMV	mag.f	MX	-	LDC	Mon	Calculated line drop compensation
		q	MX	-	LDC	Mon	Quality: Calculated line drop compensation
		t	MX	-	LDC	Mon	Timestamp: Calculated line drop compensation
TapOpR	v2_dSPS	stVal	ST	T	RAISE_OWN	Mon	Raise command for own transformer
		q	ST	T	RAISE_OWN	Mon	Quality: Raise command for own transformer
		t	ST	T	RAISE_OWN	Mon	Timestamp: Raise command for own transformer
TapOpL	v2_dSPS	stVal	ST	T	LOWER_OWN	Mon	Lower command for own transformer
		q	ST	T	LOWER_OWN	Mon	Quality: Lower command for own transformer
		t	ST	T	LOWER_OWN	Mon	Timestamp: Lower command for own transformer
AlmReas	v7_dINS	stVal	ST	-	ALARM_REAS	Mon	Status and reason for alarm
		q	ST	-	ALARM_REAS	Mon	Quality: Status and reason for alarm
		t	ST	-	ALARM_REAS	Mon	Timestamp: Status and reason for alarm
FllwFlt	v7_dINS	stVal	ST	-	FAIL_FLLW	Mon	Failed followers
		q	ST	-	FAIL_FLLW	Mon	Quality: Failed followers
		t	ST	-	FAIL_FLLW	Mon	Timestamp: Failed followers
CtlOpModSt	v7_dINS	stVal	ST	-	OPR_MODE_STS	Mon	The acting operation mode of the function block
		q	ST	-	OPR_MODE_STS	Mon	Quality: The acting operation mode of the function block
		t	ST	-	OPR_MODE_STS	Mon	Timestamp: The acting operation mode of the function block
NumParUnit	v7_dINS	stVal	ST	-	PAR_UNIT_MCC	Mon	Parallel units included in MCC calculation
		q	ST	-	PAR_UNIT_MCC	Mon	Quality: Parallel units included in MCC calculation

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
NumParUnit	v7_dINS	t	ST	-	PAR_UNIT_MCC	Mon	Timestamp: Parallel units included in MCC calculation
TapOpFllw1	v7_dINS	stVal	ST	-	FLLW1_CTL	Mon	Lower/Raise for follower 1 in the Master/Follower mode
		q	ST	-	FLLW1_CTL	Mon	Quality: Lower/Raise for follower 1 in the Master/Follower mode
		t	ST	-	FLLW1_CTL	Mon	Timestamp: Lower/Raise for follower 1 in the Master/Follower mode
TapOpFllw2	v7_dINS	stVal	ST	-	FLLW2_CTL	Mon	Lower/Raise for follower 2 in the Master/Follower mode
		q	ST	-	FLLW2_CTL	Mon	Quality: Lower/Raise for follower 2 in the Master/Follower mode
		t	ST	-	FLLW2_CTL	Mon	Timestamp: Lower/Raise for follower 2 in the Master/Follower mode
TapOpFllw3	v7_dINS	stVal	ST	-	FLLW3_CTL	Mon	Lower/Raise for follower 3 in the Master/Follower mode
		q	ST	-	FLLW3_CTL	Mon	Quality: Lower/Raise for follower 3 in the Master/Follower mode
		t	ST	-	FLLW3_CTL	Mon	Timestamp: Lower/Raise for follower 3 in the Master/Follower mode
CtlDION	v8_dINS	stVal	ST	-	TIMER_STS	Mon	Timer T1, T2 or fast lower timer active
		q	ST	-	TIMER_STS	Mon	Quality: Timer T1, T2 or fast lower timer active
		t	ST	-	TIMER_STS	Mon	Timestamp: Timer T1, T2 or fast lower timer active

Table 6: OLATCC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
EndPosL	a_dSPS	stVal	ST	-	-	Mon	Indication of extreme lower position caused blocking
		q	ST	-	-	Mon	Quality: Indication of extreme lower position caused blocking
		t	ST	-	-	Mon	Timestamp: Indication of extreme lower position caused blocking
EndPosR	a_dSPS	stVal	ST	-	-	Mon	Indication of extreme raise position caused blocking
		q	ST	-	-	Mon	Quality: Indication of extreme raise position caused blocking

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
EndPosR	a_dSPS	t	ST	-	-	Mon	Timestamp: Indication of extreme raise position caused blocking
TapChg	b_dBSC	valWTr.posVal	ST	-	-	Mon	Tap position status for IEC61850 mapping
		valWTr.transInd	ST	-	-	Mon	Tap changer operating status for IEC61850 mapping
		q	ST	-	-	Mon	Quality: Tap position status for IEC61850 mapping
		t	ST	-	-	Mon	Timestamp: Tap position status for IEC61850 mapping
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850

## 7.3 Logical nodes for control

### 7.3.1 Bay control CBAY

LN type	LN prefix	LN class	Function block name
QCCBAY (revision 0)	QC	CBAY	QCCBAY

Table 7: QCCBAY Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter
		Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	
		q	ST	-	Beh	Mon	Quality:

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Beh	a_dINS	t	ST	-	Beh	Mon	Timestamp:
Loc	a_dSPS	stVal	ST	-	LOC	Mon	Local operation allowed
		q	ST	-	LOC	Mon	Quality: Local operation allowed
		t	ST	-	LOC	Mon	Timestamp: Local operation allowed
LocSwPos	v1_dINS	stVal	ST	-	LR_POS	Mon	Position of the Local/Remote switch
		q	ST	-	LR_POS	Mon	Quality: Position of the Local/Remote switch
		t	ST	-	LR_POS	Mon	Timestamp: Position of the Local/Remote switch
BlkCmd	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Special block command value
		Oper.origin.orCat	CO	-	-	Cmd	Special block command value
		Oper.origin.orlent	CO	-	-	Cmd	Special block command value
		Oper.ctlNum	CO	-	-	Cmd	Special block command value
		Oper.T	CO	-	-	Cmd	Special block command value
		Oper.Test	CO	-	-	Cmd	Special block command value
		Oper.Check	CO	-	-	Cmd	Special block command value
		stVal	ST	-	CMD_BLKD	Mon	Function is blocked for commands
		q	ST	-	CMD_BLKD	Mon	Quality: Function is blocked for commands
		t	ST	-	CMD_BLKD	Mon	Timestamp: Function is blocked for commands
BlkUpd	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Special block command value
		Oper.origin.orCat	CO	-	-	Cmd	Special block command value
		Oper.origin.orlent	CO	-	-	Cmd	Special block command value
		Oper.ctlNum	CO	-	-	Cmd	Special block command value
		Oper.T	CO	-	-	Cmd	Special block command value
		Oper.Test	CO	-	-	Cmd	Special block command value
		Oper.Check	CO	-	-	Cmd	Special block command value
		stVal	ST	-	UPD_BLKD	Mon	Update of position is blocked
		q	ST	-	UPD_BLKD	Mon	Quality: Update of position is blocked
		t	ST	-	UPD_BLKD	Mon	Timestamp: Update of position is blocked
Rem	v1_dSPS	stVal	ST	-	REM	Mon	Remote operation allowed
		q	ST	-	REM	Mon	Quality: Remote operation allowed
		t	ST	-	REM	Mon	Timestamp: Remote operation allowed

### 7.3.2

### Interlocking interface SCILO

LN type	LN prefix	LN class	Function block name
SCILO (revision 1)	S	CILO	SCILO

Table 8: SCILO Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter
		Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
EnaCls	a_dSPS	stVal	ST	-	EN_CLOSE	Mon	Close operation at open or intermediate or bad position is enabled
		q	ST	-	EN_CLOSE	Mon	Quality: Close operation at open or intermediate or bad position is enabled
		t	ST	-	EN_CLOSE	Mon	Timestamp: Close operation at open or intermediate or bad position is enabled
EnaOpen	a_dSPS	stVal	ST	-	EN_OPEN	Mon	Open operation at closed or intermediate or bad position is enabled
		q	ST	-	EN_OPEN	Mon	Quality: Open operation at closed or intermediate or bad position is enabled
		t	ST	-	EN_OPEN	Mon	Timestamp: Open operation at closed or intermediate or bad position is enabled

### 7.3.3

### Switch controller CSWI

LN type	LN prefix	LN class	Function block name
GNRLCSWI (revision 0)	GNRL	CSWI	GNRLCSWI

**Table 9:** *GNRLCSWI Logical node data*

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Pos	a_dDPC	Cancel.ctrlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Cancel.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctrlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.ctrlVal	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Cancel.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Cancel.ctrlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctrlNum	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.ctrlNum	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.T	CO	-	-	Cmd	Command parameter for IEC61850
		Cancel.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Cancel.Test	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.Check	CO	-	-	Cmd	Command parameter for IEC61850

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Pos	a_dDPC	stVal	ST	-	POSITION	Mon	Position indication
		q	ST	-	POSITION	Mon	Quality: Position indication
		t	ST	-	POSITION	Mon	Timestamp: Position indication
		stSelD	ST	-	SELECTED	Mon	The select conditions are fulfilled
		subEna	SV	-	-	-	Substitute enable
		subVal	SV	-	-	-	Substituted double position value
		ctlModel	CF	-	Control model	-	Specifies the type for control model according to IEC 61850
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
OpCls	b_dACT	general	ST	T	EXE_CL	Mon	Execute command for close direction
		q	ST	T	EXE_CL	Mon	Quality: Execute command for close direction
		t	ST	T	EXE_CL	Mon	Timestamp: Execute command for close direction
OpOpen	b_dACT	general	ST	T	EXE_OP	Mon	Execute command for open direction
		q	ST	T	EXE_OP	Mon	Quality: Execute command for open direction
		t	ST	T	EXE_OP	Mon	Timestamp: Execute command for open direction
BlkCmd	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Special block command value
		Oper.origin.orCat	CO	-	-	Cmd	Special block command value
		Oper.origin.orldent	CO	-	-	Cmd	Special block command value
		Oper.ctlNum	CO	-	-	Cmd	Special block command value
		Oper.T	CO	-	-	Cmd	Special block command value

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
BlkCmd	v1_dSPC	Oper.Test	CO	-	-	Cmd	Special block command value
		Oper.Check	CO	-	-	Cmd	Special block command value
		stVal	ST	-	CMD_BLKD	Mon	Commands are blocked
		q	ST	-	CMD_BLKD	Mon	Quality: Commands are blocked
		t	ST	-	CMD_BLKD	Mon	Timestamp: Commands are blocked

## 7.4 Logical nodes for protection functions

### 7.4.1 Directional earth fault PDEF

LN type	LN prefix	LN class	Function block name
DEFLLN0 instance 1 (revision 0)	-	LLN0	DEFHPDEF
DEFPTOC instance 1 (revision 0)	DEF	PTOC	DEFHPDEF
DEFRDIR instance 1 (revision 0)	DEF	RDIR	DEFHPDEF

Table 10: DEFHPDEF Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	OperctlVal	CO	-	-	Cmd	Mode parameter for 61850
		OperoriginorCat	CO	-	-	Cmd	Mode parameter for 61850
		Operoriginorlent	CO	-	-	Cmd	Mode parameter for 61850
		OperctlNum	CO	-	-	Cmd	Mode parameter for 61850
		OperT	CO	-	-	Cmd	Mode parameter for 61850
		OperTest	CO	-	-	Cmd	Mode parameter for 61850
		OperCheck	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

**Table 11:** DEFHPDEF Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operated
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Str	d_dACD	general	ST	-	START	Mon	Started
		dirGeneral	ST	-	FAULT_DIR	Mon	Detected fault direction
		q	ST	-	START	Mon	Quality: Started
		t	ST	-	START	Mon	Timestamp: Started
IvdCrv	v1_dSPS	stVal	ST	-	INVAL_CRV	Mon	Invalid curve parameters
		q	ST	-	INVAL_CRV	Mon	Quality: Invalid curve parameters
		t	ST	-	INVAL_CRV	Mon	Timestamp: Invalid curve parameters
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

**Table 12:** DEFHPDEF Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Dir	b_dACD	dirGeneral	ST	-	DIRECTION	Mon	Direction information
		q	ST	-	DIRECTION	Mon	Quality: Direction information
		t	ST	-	DIRECTION	Mon	Timestamp: Direction information
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	c_dINC	t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
OpAEF	v2_dMV	mag.f	MX	-	I_OPER	Mon	Calculated operating current
		q	MX	-	I_OPER	Mon	Quality: Calculated operating current
		t	MX	-	I_OPER	Mon	Timestamp: Calculated operating current
OpPolAng	v2_dMV	mag.f	MX	-	ANGLE	Mon	Angle between polarizing and operating quantity
		q	MX	-	ANGLE	Mon	Quality: Angle between polarizing and operating quantity
		t	MX	-	ANGLE	Mon	Timestamp: Angle between polarizing and operating quantity
OpChrAng	v2_dMV	mag.f	MX	-	ANGLE_RCA	Mon	Angle between operating angle and characteristic angle
		q	MX	-	ANGLE_RCA	Mon	Quality: Angle between operating angle and characteristic angle
		t	MX	-	ANGLE_RCA	Mon	Timestamp: Angle between operating angle and characteristic angle

LN type	LN prefix	LN class	Function block name
DEFLLN0 instance 1 (revision 0)	-	LLN0	DEFLPDEF
DEFPTOC instance 1 (revision 0)	DEF	PTOC	DEFLPDEF
DEFRDIR instance 1 (revision 0)	DEF	RDIR	DEFLPDEF

Table 13: DEFLPDEF Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

**Table 14:** DEFNPDEF Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operated
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Str	d_dACD	general	ST	-	START	Mon	Started
		dirGeneral	ST	-	FAULT_DIR	Mon	Detected fault direction
		q	ST	-	START	Mon	Quality: Started
		t	ST	-	START	Mon	Timestamp: Started
IvdCrv	v1_dSPS	stVal	ST	-	INVAL_CRV	Mon	Invalid curve parameters
		q	ST	-	INVAL_CRV	Mon	Quality: Invalid curve parameters
		t	ST	-	INVAL_CRV	Mon	Timestamp: Invalid curve parameters
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

**Table 15:** DEFLPDEF Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Dir	b_dACD	dirGeneral	ST	-	DIRECTION	Mon	Direction information
		q	ST	-	DIRECTION	Mon	Quality: Direction information
		t	ST	-	DIRECTION	Mon	Timestamp: Direction information
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
OpAEF	v2_dMV	mag.f	MX	-	I_OPER	Mon	Calculated operating current
		q	MX	-	I_OPER	Mon	Quality: Calculated operating current
		t	MX	-	I_OPER	Mon	Timestamp: Calculated operating current
OpPolAng	v2_dMV	mag.f	MX	-	ANGLE	Mon	Angle between polarizing and operating quantity
		q	MX	-	ANGLE	Mon	Quality: Angle between polarizing and operating quantity
		t	MX	-	ANGLE	Mon	Timestamp: Angle between polarizing and operating quantity
OpChrAng	v2_dMV	mag.f	MX	-	ANGLE_RCA	Mon	Angle between operating angle and characteristic angle
		q	MX	-	ANGLE_RCA	Mon	Quality: Angle between operating angle and characteristic angle
		t	MX	-	ANGLE_RCA	Mon	Timestamp: Angle between operating angle and characteristic angle

## 7.4.2

## Differential protection PDIF

LN type	LN prefix	LN class	Function block name
HREFPDIF (revision 0)	HREF	PDIF	HREFPDIF

**Table 16:** HREFPDIF Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	High impedance restricted earthfault protection operate
		q	ST	T	OPERATE	Mon	Quality: High impedance restricted earthfault protection operate
		t	ST	T	OPERATE	Mon	Timestamp: High impedance restricted earthfault protection operate
Str	d_dACD	general	ST	-	START	Mon	High impedance restricted earthfault protection start
		q	ST	-	START	Mon	Quality: High impedance restricted earthfault protection start
		t	ST	-	START	Mon	Timestamp: High impedance restricted earthfault protection start
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Start duration in percentage of the total operating time
		q	MX	-	START_DUR	Mon	Quality: Start duration in percentage of the total operating time
		t	MX	-	START_DUR	Mon	Timestamp: Start duration in percentage of the total operating time

LN type	LN prefix	LN class	Function block name
MPDIF (revision 0)	M	PDIF	MPDIF

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**Table 17:** MPDIF Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Op	a_dACT	general	ST	T	OPERATE	Mon	Operate signal, combined (all phases, both stages)
		phsA	ST	T	OPR_A	Mon	Operate signal, Phase A
		phsB	ST	T	OPR_B	Mon	Operate signal, Phase B
		phsC	ST	T	OPR_C	Mon	Operate signal, Phase C
		q	ST	T	OPERATE	Mon	Quality: Operate signal, combined (all phases, both stages)
		t	ST	T	OPERATE	Mon	Timestamp: Operate signal, combined (all phases, both stages)
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
DifAClc	f_dWYE	cVal.mag.f	MX	-	ID_A	Mon	Differential current, Phase A
		cVal.mag.f	MX	-	ID_B	Mon	Differential current, Phase B
		cVal.mag.f	MX	-	ID_C	Mon	Differential current, Phase C
		q	MX	-	ID_C	Mon	Quality: Differential current, Phase C
		q	MX	-	ID_B	Mon	Quality: Differential current, Phase B
		q	MX	-	ID_A	Mon	Quality: Differential current, Phase A
		t	MX	-	ID_A	Mon	Timestamp: Differential current, Phase A
		t	MX	-	ID_B	Mon	Timestamp: Differential current, Phase B
		t	MX	-	ID_C	Mon	Timestamp: Differential current, Phase C
RstA	f_dWYE	cVal.mag.f	MX	-	IB_A	Mon	Bias current, phase A

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
RstA	f_dWYE	cVal.mag.f	MX	-	IB_B	Mon	Bias current, phase B
		cVal.mag.f	MX	-	IB_C	Mon	Bias current, phase C
		q	MX	-	IB_C	Mon	Quality: Bias current, phase C
		q	MX	-	IB_B	Mon	Quality: Bias current, phase B
		q	MX	-	IB_A	Mon	Quality: Bias current, phase A
		t	MX	-	IB_A	Mon	Timestamp: Bias current, phase A
		t	MX	-	IB_B	Mon	Timestamp: Bias current, phase B
		t	MX	-	IB_C	Mon	Timestamp: Bias current, phase C
BlkInSt	v1_dACT	general	ST	-	INT_BLKD	Mon	Protection internally blocked, combined
		phsA	ST	-	INT_BLKD_A	Mon	Protection internally blocked, Phase A
		phsB	ST	-	INT_BLKD_B	Mon	Protection internally blocked, Phase B
		phsC	ST	-	INT_BLKD_C	Mon	Protection internally blocked, Phase C
		q	ST	-	INT_BLKD	Mon	Quality: Protection internally blocked, combined
		t	ST	-	INT_BLKD	Mon	Timestamp: Protection internally blocked, combined
OpLoSet	v2_dACT	general	ST	-	OPR_LS	Mon	Operate signal from low set (biased) stage
		q	ST	-	OPR_LS	Mon	Quality: Operate signal from low set (biased) stage
		t	ST	-	OPR_LS	Mon	Timestamp: Operate signal from low set (biased) stage
OpHiSet	v2_dACT	general	ST	-	OPR_HS	Mon	Operate signal from high set (instantaneous) stage
		q	ST	-	OPR_HS	Mon	Quality: Operate signal from high set (instantaneous) stage
		t	ST	-	OPR_HS	Mon	Timestamp: Operate signal from high set (instantaneous) stage
AngLinAB	v2_dMV	mag.f	MX	-	I_ANGL_A1_B1	Mon	Current phase angle Phase A – Phase B, line side
		q	MX	-	I_ANGL_A1_B1	Mon	Quality: Current phase angle Phase A – Phase B, line side
		t	MX	-	I_ANGL_A1_B1	Mon	Timestamp: Current phase angle Phase A – Phase B, line side
AngLinBC	v2_dMV	mag.f	MX	-	I_ANGL_B1_C1	Mon	Current phase angle Phase B – Phase C, line side
		q	MX	-	I_ANGL_B1_C1	Mon	Quality: Current phase angle Phase B – Phase C, line side
		t	MX	-	I_ANGL_B1_C1	Mon	Timestamp: Current phase angle Phase B – Phase C, line side
AngLinCA	v2_dMV	mag.f	MX	-	I_ANGL_C1_A1	Mon	Current phase angle Phase C – Phase A, line side

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
AngLinCA	v2_dMV	q	MX	-	I_ANGL_C1_A1	Mon	Quality: Current phase angle Phase C – Phase A, line side
		t	MX	-	I_ANGL_C1_A1	Mon	Timestamp: Current phase angle Phase C – Phase A, line side
AngNeutAB	v2_dMV	mag.f	MX	-	I_ANGL_A2_B2	Mon	Current phase angle Phase A – Phase B, neutral side
		q	MX	-	I_ANGL_A2_B2	Mon	Quality: Current phase angle Phase A – Phase B, neutral side
		t	MX	-	I_ANGL_A2_B2	Mon	Timestamp: Current phase angle Phase A – Phase B, neutral side
AngNeutBC	v2_dMV	mag.f	MX	-	I_ANGL_B2_C2	Mon	Current phase angle Phase B – Phase C, neutral side
		q	MX	-	I_ANGL_B2_C2	Mon	Quality: Current phase angle Phase B – Phase C, neutral side
		t	MX	-	I_ANGL_B2_C2	Mon	Timestamp: Current phase angle Phase B – Phase C, neutral side
AngNeutCA	v2_dMV	mag.f	MX	-	I_ANGL_C2_A2	Mon	Current phase angle Phase C – Phase A, neutral side
		q	MX	-	I_ANGL_C2_A2	Mon	Quality: Current phase angle Phase C – Phase A, neutral side
		t	MX	-	I_ANGL_C2_A2	Mon	Timestamp: Current phase angle Phase C – Phase A, neutral side
AngLinNeuA	v2_dMV	mag.f	MX	-	I_ANGL_A1_A2	Mon	Current phase angle diff between line and neutral side, Phase A
		q	MX	-	I_ANGL_A1_A2	Mon	Quality: Current phase angle diff between line and neutral side, Phase A
		t	MX	-	I_ANGL_A1_A2	Mon	Timestamp: Current phase angle diff between line and neutral side, Phase A
AngLinNeuB	v2_dMV	mag.f	MX	-	I_ANGL_B1_B2	Mon	Current phase angle diff between line and neutral side, Phase B
		q	MX	-	I_ANGL_B1_B2	Mon	Quality: Current phase angle diff between line and neutral side, Phase B
		t	MX	-	I_ANGL_B1_B2	Mon	Timestamp: Current phase angle diff between line and neutral side, Phase B
AngLinNeuC	v2_dMV	mag.f	MX	-	I_ANGL_C1_C2	Mon	Current phase angle diff between line and neutral side, Phase C
		q	MX	-	I_ANGL_C1_C2	Mon	Quality: Current phase angle diff between line and neutral side, Phase C
		t	MX	-	I_ANGL_C1_C2	Mon	Timestamp: Current phase angle diff between line and neutral side, Phase C

LN type	LN prefix	LN class	Function block name
MHZPDIF (revision 0)	MHZ	PDIF	MHZPDIF

**Table 18:** MHZPDIF Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Op	a_dACT	general	ST	T	OPERATE	Mon	Operated
		phsA	ST	T	OPR_A	Mon	Operated phase A
		phsB	ST	T	OPR_B	Mon	Operated phase B
		phsC	ST	T	OPR_C	Mon	Operated phase C
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Str	c_dACD	general	ST	-	START	Mon	Started
		phsA	ST	-	ST_A	Mon	Started phase A
		phsB	ST	-	ST_B	Mon	Started phase B
		phsC	ST	-	ST_C	Mon	Started phase C
		q	ST	-	START	Mon	Quality: Started
		t	ST	-	START	Mon	Timestamp: Started
DifAClc	f_dWYE	cVal.mag.f	MX	-	ID_A	Mon	Analog output value phase A
		cVal.mag.f	MX	-	ID_B	Mon	Analog output value phase B
		cVal.mag.f	MX	-	ID_C	Mon	Analog output value phase C
		q	MX	-	ID_C	Mon	Quality: Analog output value phase C
		q	MX	-	ID_B	Mon	Quality: Analog output value phase B
		q	MX	-	ID_A	Mon	Quality: Analog output value phase A
		t	MX	-	ID_A	Mon	Timestamp: Analog output value phase A

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
DifAClc	f_dWYE	t	MX	-	ID_B	Mon	Timestamp: Analog output value phase B
		t	MX	-	ID_C	Mon	Timestamp: Analog output value phase C
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

#### 7.4.3 Distance protection PDIS

LN type	LN prefix	LN class	Function block name
DST1MSTA instance 1 (revision 0)	DST1	MSTA	DSTPDIS
DST1MSTA instance 2 (revision 0)	DST1	MSTA	DSTPDIS
DST1MSTA instance 3 (revision 0)	DST1	MSTA	DSTPDIS
DST1MSTA instance 4 (revision 0)	DST1	MSTA	DSTPDIS
DST1MSTA instance 5 (revision 0)	DST1	MSTA	DSTPDIS
DSTLLN0 instance 1 (revision 0)	-	LLN0	DSTPDIS
DSTMSTA instance 6 (revision 0)	DST	MSTA	DSTPDIS
DSTMSTA instance 7 (revision 0)	DST	MSTA	DSTPDIS
DSTMSTA instance 8 (revision 0)	DST	MSTA	DSTPDIS
DSTMSTA instance 9 (revision 0)	DST	MSTA	DSTPDIS
DSTMSTA instance 10 (revision 0)	DST	MSTA	DSTPDIS
DSTMSTA instance 11 (revision 0)	DST	MSTA	DSTPDIS
DSTMSTA instance 12 (revision 0)	DST	MSTA	DSTPDIS
DSTMSTA instance 13 (revision 0)	DST	MSTA	DSTPDIS
DSTMSTA instance 14 (revision 0)	DST	MSTA	DSTPDIS
DSTMSTA instance 15 (revision 0)	DST	MSTA	DSTPDIS
DSTPDIS instance 1 (revision 0)	DST	PDIS	DSTPDIS
DSTPDIS instance 2 (revision 0)	DST	PDIS	DSTPDIS
DSTPDIS instance 3 (revision 0)	DST	PDIS	DSTPDIS
DSTPDIS instance 4 (revision 0)	DST	PDIS	DSTPDIS
DSTPDIS instance 5 (revision 0)	DST	PDIS	DSTPDIS
DSTRDIR instance 1 (revision 0)	DST	RDIR	DSTPDIS
GFC1MSTA instance 16 (revision 0)	GFC1	MSTA	DSTPDIS
GFCMSTA instance 17 (revision 0)	GFC	MSTA	DSTPDIS
GFCMSTA instance 18 (revision 0)	GFC	MSTA	DSTPDIS
GFCPDIS instance 6 (revision 0)	GFC	PDIS	DSTPDIS
GFCRDIR instance 2 (revision 0)	GFC	RDIR	DSTPDIS

Table 19: DSTPDIS Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
DirRisZn	v2_dMV	mag.f	MX	-	1 DIR_LOOP_R Z1	Mon	Record data of bank 1 for direction resistance, Zone Z1
		q	MX	-	1 DIR_LOOP_R Z1	Mon	Quality: Record data of bank 1 for direction resistance, Zone Z1
		t	MX	-	1 DIR_LOOP_R Z1	Mon	Timestamp: Record data of bank 1 for direction resistance, Zone Z1
DirReactZn	v2_dMV	mag.f	MX	-	1 DIR_LOOP_X Z1	Mon	Record data of bank 1 for direction reactance, Zone Z1
		q	MX	-	1 DIR_LOOP_X Z1	Mon	Quality: Record data of bank 1 for direction reactance, Zone Z1
		t	MX	-	1 DIR_LOOP_X Z1	Mon	Timestamp: Record data of bank 1 for direction reactance, Zone Z1
PhLoopRis1	v2_dMV	mag.f	MX	-	1 FLTLOOP_RFST Z1	Mon	Record data of bank 1 for PE-loop resistance (1st), Zone Z1
		q	MX	-	1 FLTLOOP_RFST Z1	Mon	Quality: Record data of bank 1 for PE-loop resistance (1st), Zone Z1
		t	MX	-	1 FLTLOOP_RFST Z1	Mon	Timestamp: Record data of bank 1 for PE-loop resistance (1st), Zone Z1
PhLoopRea1	v2_dMV	mag.f	MX	-	1 FLTLOOP_XFST Z1	Mon	Record data of bank 1 for PE-loop reactance (1st), Zone Z1
		q	MX	-	1 FLTLOOP_XFST Z1	Mon	Quality: Record data of bank 1 for PE-loop reactance (1st), Zone Z1
		t	MX	-	1 FLTLOOP_XFST Z1	Mon	Timestamp: Record data of bank 1 for PE-loop reactance (1st), Zone Z1
PhLoopRis2	v2_dMV	mag.f	MX	-	1 FLTLOOP_RSND Z1	Mon	Record data of bank 1 for PE-loop resistance (2nd), Zone Z1
		q	MX	-	1 FLTLOOP_RSND Z1	Mon	Quality: Record data of bank 1 for PE-loop resistance (2nd), Zone Z1
		t	MX	-	1 FLTLOOP_RSND Z1	Mon	Timestamp: Record data of bank 1 for PE-loop resistance (2nd), Zone Z1
PhLoopRea2	v2_dMV	mag.f	MX	-	1 FLTLOOP_XSND Z1	Mon	Record data of bank 1 for PE-loop reactance (2nd), Zone Z1
		q	MX	-	1 FLTLOOP_XSND Z1	Mon	Quality: Record data of bank 1 for PE-loop reactance (2nd), Zone Z1
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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
PhLoopRea2	v2_dMV	t	MX	-	1 FLTLOOP_XSND Z1	Mon	Timestamp: Record data of bank 1 for PE-loop reactance (2nd), Zone Z1
PPLoopRis	v2_dMV	mag.f	MX	-	1 FLTLOOP_RPP Z1	Mon	Record data of bank 1 for PP-loop resistance, Zone Z1
		q	MX	-	1 FLTLOOP_RPP Z1	Mon	Quality: Record data of bank 1 for PP-loop resistance, Zone Z1
		t	MX	-	1 FLTLOOP_RPP Z1	Mon	Timestamp: Record data of bank 1 for PP-loop resistance, Zone Z1
PPLoopReac	v2_dMV	mag.f	MX	-	1 FLTLOOP_XPP Z1	Mon	Record data of bank 1 for PP-loop reactance, Zone Z1
		q	MX	-	1 FLTLOOP_XPP Z1	Mon	Quality: Record data of bank 1 for PP-loop reactance, Zone Z1
		t	MX	-	1 FLTLOOP_XPP Z1	Mon	Timestamp: Record data of bank 1 for PP-loop reactance, Zone Z1

Table 20: DSTPDIS Logical node data (instance 2)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
DirRisZn	v2_dMV	mag.f	MX	-	1 DIR_LOOP_R Z2	Mon	Record data of bank 1 for direction resistance, Zone Z2
		q	MX	-	1 DIR_LOOP_R Z2	Mon	Quality: Record data of bank 1 for direction resistance, Zone Z2
		t	MX	-	1 DIR_LOOP_R Z2	Mon	Timestamp: Record data of bank 1 for direction resistance, Zone Z2
DirReactZn	v2_dMV	mag.f	MX	-	1 DIR_LOOP_X Z2	Mon	Record data of bank 1 for direction reactance, Zone Z2
		q	MX	-	1 DIR_LOOP_X Z2	Mon	Quality: Record data of bank 1 for direction reactance, Zone Z2
		t	MX	-	1 DIR_LOOP_X Z2	Mon	Timestamp: Record data of bank 1 for direction reactance, Zone Z2
PhLoopRis1	v2_dMV	mag.f	MX	-	1 FLTLOOP_RFST Z2	Mon	Record data of bank 1 for PE-loop resistance (1st), Zone Z2
		q	MX	-	1 FLTLOOP_RFST Z2	Mon	Quality: Record data of bank 1 for PE-loop resistance (1st), Zone Z2

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
PhLoopRis1	v2_dMV	t	MX	-	1 FLTLOOP_RFST Z2	Mon	Timestamp: Record data of bank 1 for PE-loop resistance (1st), Zone Z2
PhLoopRea1	v2_dMV	mag.f	MX	-	1 FLTLOOP_XFST Z2	Mon	Record data of bank 1 for PE-loop reactance (1st), Zone Z2
		q	MX	-	1 FLTLOOP_XFST Z2	Mon	Quality: Record data of bank 1 for PE-loop reactance (1st), Zone Z2
		t	MX	-	1 FLTLOOP_XFST Z2	Mon	Timestamp: Record data of bank 1 for PE-loop reactance (1st), Zone Z2
PhLoopRis2	v2_dMV	mag.f	MX	-	1 FLTLOOP_RSND Z2	Mon	Record data of bank 1 for PE-loop resistance (2nd), Zone Z2
		q	MX	-	1 FLTLOOP_RSND Z2	Mon	Quality: Record data of bank 1 for PE-loop resistance (2nd), Zone Z2
		t	MX	-	1 FLTLOOP_RSND Z2	Mon	Timestamp: Record data of bank 1 for PE-loop resistance (2nd), Zone Z2
PhLoopRea2	v2_dMV	mag.f	MX	-	1 FLTLOOP_XSND Z2	Mon	Record data of bank 1 for PE-loop reactance (2nd), Zone Z2
		q	MX	-	1 FLTLOOP_XSND Z2	Mon	Quality: Record data of bank 1 for PE-loop reactance (2nd), Zone Z2
		t	MX	-	1 FLTLOOP_XSND Z2	Mon	Timestamp: Record data of bank 1 for PE-loop reactance (2nd), Zone Z2
PPLoopRis	v2_dMV	mag.f	MX	-	1 FLTLOOP_RPP Z2	Mon	Record data of bank 1 for PP-loop resistance, Zone Z2
		q	MX	-	1 FLTLOOP_RPP Z2	Mon	Quality: Record data of bank 1 for PP-loop resistance, Zone Z2
		t	MX	-	1 FLTLOOP_RPP Z2	Mon	Timestamp: Record data of bank 1 for PP-loop resistance, Zone Z2
PPLoopReac	v2_dMV	mag.f	MX	-	1 FLTLOOP_XPP Z2	Mon	Record data of bank 1 for PP-loop reactance, Zone Z2
		q	MX	-	1 FLTLOOP_XPP Z2	Mon	Quality: Record data of bank 1 for PP-loop reactance, Zone Z2
		t	MX	-	1 FLTLOOP_XPP Z2	Mon	Timestamp: Record data of bank 1 for PP-loop reactance, Zone Z2

**Table 21:** DSTPDIS Logical node data (instance 3)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	c_dINC	t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
DirRisZn	v2_dMV	mag.f	MX	-	1 DIR_LOOP_R Z3	Mon	Record data of bank 1 for direction resistance, Zone Z3
		q	MX	-	1 DIR_LOOP_R Z3	Mon	Quality: Record data of bank 1 for direction resistance, Zone Z3
		t	MX	-	1 DIR_LOOP_R Z3	Mon	Timestamp: Record data of bank 1 for direction resistance, Zone Z3
DirReactZn	v2_dMV	mag.f	MX	-	1 DIR_LOOP_X Z3	Mon	Record data of bank 1 for direction reactance, Zone Z3
		q	MX	-	1 DIR_LOOP_X Z3	Mon	Quality: Record data of bank 1 for direction reactance, Zone Z3
		t	MX	-	1 DIR_LOOP_X Z3	Mon	Timestamp: Record data of bank 1 for direction reactance, Zone Z3
PhLoopRis1	v2_dMV	mag.f	MX	-	1 FLTLOOP_RFST Z3	Mon	Record data of bank 1 for PE-loop resistance (1st), Zone Z3
		q	MX	-	1 FLTLOOP_RFST Z3	Mon	Quality: Record data of bank 1 for PE-loop resistance (1st), Zone Z3
		t	MX	-	1 FLTLOOP_RFST Z3	Mon	Timestamp: Record data of bank 1 for PE-loop resistance (1st), Zone Z3
PhLoopRea1	v2_dMV	mag.f	MX	-	1 FLTLOOP_XFST Z3	Mon	Record data of bank 1 for PE-loop reactance (1st), Zone Z3
		q	MX	-	1 FLTLOOP_XFST Z3	Mon	Quality: Record data of bank 1 for PE-loop reactance (1st), Zone Z3
		t	MX	-	1 FLTLOOP_XFST Z3	Mon	Timestamp: Record data of bank 1 for PE-loop reactance (1st), Zone Z3
PhLoopRis2	v2_dMV	mag.f	MX	-	1 FLTLOOP_RSND Z3	Mon	Record data of bank 1 for PE-loop resistance (2nd), Zone Z3
		q	MX	-	1 FLTLOOP_RSND Z3	Mon	Quality: Record data of bank 1 for PE-loop resistance (2nd), Zone Z3
		t	MX	-	1 FLTLOOP_RSND Z3	Mon	Timestamp: Record data of bank 1 for PE-loop resistance (2nd), Zone Z3
PhLoopRea2	v2_dMV	mag.f	MX	-	1 FLTLOOP_XSND Z3	Mon	Record data of bank 1 for PE-loop reactance (2nd), Zone Z3
		q	MX	-	1 FLTLOOP_XSND Z3	Mon	Quality: Record data of bank 1 for PE-loop reactance (2nd), Zone Z3
		t	MX	-	1 FLTLOOP_XSND Z3	Mon	Timestamp: Record data of bank 1 for PE-loop reactance (2nd), Zone Z3
PPLoopRis	v2_dMV	mag.f	MX	-	1 FLTLOOP_RPP Z3	Mon	Record data of bank 1 for PP-loop resistance, Zone Z3
		q	MX	-	1 FLTLOOP_RPP Z3	Mon	Quality: Record data of bank 1 for PP-loop resistance, Zone Z3
		t	MX	-	1 FLTLOOP_RPP Z3	Mon	Timestamp: Record data of bank 1 for PP-loop resistance, Zone Z3

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
PPLoopReac	v2_dMV	mag.f	MX	-	1 FLTLOOP_XPP Z3	Mon	Record data of bank 1 for PP-loop reactance, Zone Z3
		q	MX	-	1 FLTLOOP_XPP Z3	Mon	Quality: Record data of bank 1 for PP-loop reactance, Zone Z3
		t	MX	-	1 FLTLOOP_XPP Z3	Mon	Timestamp: Record data of bank 1 for PP-loop reactance, Zone Z3

Table 22: DSTPDIS Logical node data (instance 4)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
DirRisZn	v2_dMV	mag.f	MX	-	1 DIR_LOOP_R AR1	Mon	Record data of bank 1 for direction resistance, Zone AR1
		q	MX	-	1 DIR_LOOP_R AR1	Mon	Quality: Record data of bank 1 for direction resistance, Zone AR1
		t	MX	-	1 DIR_LOOP_R AR1	Mon	Timestamp: Record data of bank 1 for direction resistance, Zone AR1
DirReactZn	v2_dMV	mag.f	MX	-	1 DIR_LOOP_X AR1	Mon	Record data of bank 1 for direction reactance, Zone AR1
		q	MX	-	1 DIR_LOOP_X AR1	Mon	Quality: Record data of bank 1 for direction reactance, Zone AR1
		t	MX	-	1 DIR_LOOP_X AR1	Mon	Timestamp: Record data of bank 1 for direction reactance, Zone AR1
PhLoopRis1	v2_dMV	mag.f	MX	-	1 FLTLOOP_RFST AR1	Mon	Record data of bank 1 for PE-loop resistance (1st), Zone AR1
		q	MX	-	1 FLTLOOP_RFST AR1	Mon	Quality: Record data of bank 1 for PE-loop resistance (1st), Zone AR1
		t	MX	-	1 FLTLOOP_RFST AR1	Mon	Timestamp: Record data of bank 1 for PE-loop resistance (1st), Zone AR1
PhLoopRea1	v2_dMV	mag.f	MX	-	1 FLTLOOP_XFST AR1	Mon	Record data of bank 1 for PE-loop reactance (1st), Zone AR1
		q	MX	-	1 FLTLOOP_XFST AR1	Mon	Quality: Record data of bank 1 for PE-loop reactance (1st), Zone AR1
		t	MX	-	1 FLTLOOP_XFST AR1	Mon	Timestamp: Record data of bank 1 for PE-loop reactance (1st), Zone AR1

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
PhLoopRis2	v2_dMV	mag.f	MX	-	1 FLTLOOP_RSND AR1	Mon	Record data of bank 1 for PE-loop resistance (2nd), Zone AR1
		q	MX	-	1 FLTLOOP_RSND AR1	Mon	Quality: Record data of bank 1 for PE-loop resistance (2nd), Zone AR1
		t	MX	-	1 FLTLOOP_RSND AR1	Mon	Timestamp: Record data of bank 1 for PE-loop resistance (2nd), Zone AR1
PhLoopRea2	v2_dMV	mag.f	MX	-	1 FLTLOOP_XSND AR1	Mon	Record data of bank 1 for PE-loop reactance (2nd), Zone AR1
		q	MX	-	1 FLTLOOP_XSND AR1	Mon	Quality: Record data of bank 1 for PE-loop reactance (2nd), Zone AR1
		t	MX	-	1 FLTLOOP_XSND AR1	Mon	Timestamp: Record data of bank 1 for PE-loop reactance (2nd), Zone AR1
PPLoopRis	v2_dMV	mag.f	MX	-	1 FLTLOOP_RPP AR1	Mon	Record data of bank 1 for PP-loop resistance, Zone AR1
		q	MX	-	1 FLTLOOP_RPP AR1	Mon	Quality: Record data of bank 1 for PP-loop resistance, Zone AR1
		t	MX	-	1 FLTLOOP_RPP AR1	Mon	Timestamp: Record data of bank 1 for PP-loop resistance, Zone AR1
PPLoopReac	v2_dMV	mag.f	MX	-	1 FLTLOOP_XPP AR1	Mon	Record data of bank 1 for PP-loop reactance, Zone AR1
		q	MX	-	1 FLTLOOP_XPP AR1	Mon	Quality: Record data of bank 1 for PP-loop reactance, Zone AR1
		t	MX	-	1 FLTLOOP_XPP AR1	Mon	Timestamp: Record data of bank 1 for PP-loop reactance, Zone AR1

Table 23: DSTPDIS Logical node data (instance 5)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
DirRisZn	v2_dMV	mag.f	MX	-	1 DIR_LOOP_R AR2	Mon	Record data of bank 1 for direction resistance, Zone AR2
		q	MX	-	1 DIR_LOOP_R AR2	Mon	Quality: Record data of bank 1 for direction resistance, Zone AR2
		t	MX	-	1 DIR_LOOP_R AR2	Mon	Timestamp: Record data of bank 1 for direction resistance, Zone AR2

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
DirReactZn	v2_dMV	mag.f	MX	-	1 DIR_LOOP_X AR2	Mon	Record data of bank 1 for direction reactance, Zone AR2
		q	MX	-	1 DIR_LOOP_X AR2	Mon	Quality: Record data of bank 1 for direction reactance, Zone AR2
		t	MX	-	1 DIR_LOOP_X AR2	Mon	Timestamp: Record data of bank 1 for direction reactance, Zone AR2
PhLoopRis1	v2_dMV	mag.f	MX	-	1 FLTLOOP_RFST AR2	Mon	Record data of bank 1 for PE-loop resistance (1st), Zone AR2
		q	MX	-	1 FLTLOOP_RFST AR2	Mon	Quality: Record data of bank 1 for PE-loop resistance (1st), Zone AR2
		t	MX	-	1 FLTLOOP_RFST AR2	Mon	Timestamp: Record data of bank 1 for PE-loop resistance (1st), Zone AR2
PhLoopRea1	v2_dMV	mag.f	MX	-	1 FLTLOOP_XFST AR2	Mon	Record data of bank 1 for PE-loop reactance (1st), Zone AR2
		q	MX	-	1 FLTLOOP_XFST AR2	Mon	Quality: Record data of bank 1 for PE-loop reactance (1st), Zone AR2
		t	MX	-	1 FLTLOOP_XFST AR2	Mon	Timestamp: Record data of bank 1 for PE-loop reactance (1st), Zone AR2
PhLoopRis2	v2_dMV	mag.f	MX	-	1 FLTLOOP_RSND AR2	Mon	Record data of bank 1 for PE-loop resistance (2nd), Zone AR2
		q	MX	-	1 FLTLOOP_RSND AR2	Mon	Quality: Record data of bank 1 for PE-loop resistance (2nd), Zone AR2
		t	MX	-	1 FLTLOOP_RSND AR2	Mon	Timestamp: Record data of bank 1 for PE-loop resistance (2nd), Zone AR2
PhLoopRea2	v2_dMV	mag.f	MX	-	1 FLTLOOP_XSND AR2	Mon	Record data of bank 1 for PE-loop reactance (2nd), Zone AR2
		q	MX	-	1 FLTLOOP_XSND AR2	Mon	Quality: Record data of bank 1 for PE-loop reactance (2nd), Zone AR2
		t	MX	-	1 FLTLOOP_XSND AR2	Mon	Timestamp: Record data of bank 1 for PE-loop reactance (2nd), Zone AR2
PPLoopRis	v2_dMV	mag.f	MX	-	1 FLTLOOP_RPP AR2	Mon	Record data of bank 1 for PP-loop resistance, Zone AR2
		q	MX	-	1 FLTLOOP_RPP AR2	Mon	Quality: Record data of bank 1 for PP-loop resistance, Zone AR2
		t	MX	-	1 FLTLOOP_RPP AR2	Mon	Timestamp: Record data of bank 1 for PP-loop resistance, Zone AR2
PPLoopReac	v2_dMV	mag.f	MX	-	1 FLTLOOP_XPP AR2	Mon	Record data of bank 1 for PP-loop reactance, Zone AR2
		q	MX	-	1 FLTLOOP_XPP AR2	Mon	Quality: Record data of bank 1 for PP-loop reactance, Zone AR2
		t	MX	-	1 FLTLOOP_XPP AR2	Mon	Timestamp: Record data of bank 1 for PP-loop reactance, Zone AR2

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**Table 24:** DSTPDIS Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Rs	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850

**Table 25:** DSTPDIS Logical node data (instance 7)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	c_dINC	t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
DirRisZn	v2_dMV	mag.f	MX	-	3 DIR_LOOP_R Z1	Mon	Record data of bank 3 for direction resistance, Zone Z1
		q	MX	-	3 DIR_LOOP_R Z1	Mon	Quality: Record data of bank 3 for direction resistance, Zone Z1
		t	MX	-	3 DIR_LOOP_R Z1	Mon	Timestamp: Record data of bank 3 for direction resistance, Zone Z1
DirReactZn	v2_dMV	mag.f	MX	-	3 DIR_LOOP_X Z1	Mon	Record data of bank 3 for direction reactance, Zone Z1
		q	MX	-	3 DIR_LOOP_X Z1	Mon	Quality: Record data of bank 3 for direction reactance, Zone Z1
		t	MX	-	3 DIR_LOOP_X Z1	Mon	Timestamp: Record data of bank 3 for direction reactance, Zone Z1
PhLoopRis1	v2_dMV	mag.f	MX	-	3 FLTLOOP_RFST Z1	Mon	Record data of bank 3 for PE-loop resistance (1st), Zone Z1
		q	MX	-	3 FLTLOOP_RFST Z1	Mon	Quality: Record data of bank 3 for PE-loop resistance (1st), Zone Z1
		t	MX	-	3 FLTLOOP_RFST Z1	Mon	Timestamp: Record data of bank 3 for PE-loop resistance (1st), Zone Z1
PhLoopRea1	v2_dMV	mag.f	MX	-	3 FLTLOOP_XFST Z1	Mon	Record data of bank 3 for PE-loop reactance (1st), Zone Z1
		q	MX	-	3 FLTLOOP_XFST Z1	Mon	Quality: Record data of bank 3 for PE-loop reactance (1st), Zone Z1
		t	MX	-	3 FLTLOOP_XFST Z1	Mon	Timestamp: Record data of bank 3 for PE-loop reactance (1st), Zone Z1
PhLoopRis2	v2_dMV	mag.f	MX	-	3 FLTLOOP_RSND Z1	Mon	Record data of bank 3 for PE-loop resistance (2nd), Zone Z1
		q	MX	-	3 FLTLOOP_RSND Z1	Mon	Quality: Record data of bank 3 for PE-loop resistance (2nd), Zone Z1
		t	MX	-	3 FLTLOOP_RSND Z1	Mon	Timestamp: Record data of bank 3 for PE-loop resistance (2nd), Zone Z1
PhLoopRea2	v2_dMV	mag.f	MX	-	3 FLTLOOP_XSND Z1	Mon	Record data of bank 3 for PE-loop reactance (2nd), Zone Z1
		q	MX	-	3 FLTLOOP_XSND Z1	Mon	Quality: Record data of bank 3 for PE-loop reactance (2nd), Zone Z1
		t	MX	-	3 FLTLOOP_XSND Z1	Mon	Timestamp: Record data of bank 3 for PE-loop reactance (2nd), Zone Z1
PPLoopRis	v2_dMV	mag.f	MX	-	3 FLTLOOP_RPP Z1	Mon	Record data of bank 3 for PP-loop resistance, Zone Z1
		q	MX	-	3 FLTLOOP_RPP Z1	Mon	Quality: Record data of bank 3 for PP-loop resistance, Zone Z1
		t	MX	-	3 FLTLOOP_RPP Z1	Mon	Timestamp: Record data of bank 3 for PP-loop resistance, Zone Z1

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
PPLoopReac	v2_dMV	mag.f	MX	-	3 FLTLOOP_XPP Z1	Mon	Record data of bank 3 for PP-loop reactance, Zone Z1
		q	MX	-	3 FLTLOOP_XPP Z1	Mon	Quality: Record data of bank 3 for PP-loop reactance, Zone Z1
		t	MX	-	3 FLTLOOP_XPP Z1	Mon	Timestamp: Record data of bank 3 for PP-loop reactance, Zone Z1

Table 26: DSTPDIS Logical node data (instance 8)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
DirRisZn	v2_dMV	mag.f	MX	-	2 DIR_LOOP_R Z2	Mon	Record data of bank 2 for direction resistance, Zone Z2
		q	MX	-	2 DIR_LOOP_R Z2	Mon	Quality: Record data of bank 2 for direction resistance, Zone Z2
		t	MX	-	2 DIR_LOOP_R Z2	Mon	Timestamp: Record data of bank 2 for direction resistance, Zone Z2
DirReactZn	v2_dMV	mag.f	MX	-	2 DIR_LOOP_X Z2	Mon	Record data of bank 2 for direction reactance, Zone Z2
		q	MX	-	2 DIR_LOOP_X Z2	Mon	Quality: Record data of bank 2 for direction reactance, Zone Z2
		t	MX	-	2 DIR_LOOP_X Z2	Mon	Timestamp: Record data of bank 2 for direction reactance, Zone Z2
PhLoopRis1	v2_dMV	mag.f	MX	-	2 FLTLOOP_RFST Z2	Mon	Record data of bank 2 for PE-loop resistance (1st), Zone Z2
		q	MX	-	2 FLTLOOP_RFST Z2	Mon	Quality: Record data of bank 2 for PE-loop resistance (1st), Zone Z2
		t	MX	-	2 FLTLOOP_RFST Z2	Mon	Timestamp: Record data of bank 2 for PE-loop resistance (1st), Zone Z2
PhLoopRea1	v2_dMV	mag.f	MX	-	2 FLTLOOP_XFST Z2	Mon	Record data of bank 2 for PE-loop reactance (1st), Zone Z2
		q	MX	-	2 FLTLOOP_XFST Z2	Mon	Quality: Record data of bank 2 for PE-loop reactance (1st), Zone Z2
		t	MX	-	2 FLTLOOP_XFST Z2	Mon	Timestamp: Record data of bank 2 for PE-loop reactance (1st), Zone Z2

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
PhLoopRis2	v2_dMV	mag.f	MX	-	2 FLTLOOP_RSND Z2	Mon	Record data of bank 2 for PE-loop resistance (2nd), Zone Z2
		q	MX	-	2 FLTLOOP_RSND Z2	Mon	Quality: Record data of bank 2 for PE-loop resistance (2nd), Zone Z2
		t	MX	-	2 FLTLOOP_RSND Z2	Mon	Timestamp: Record data of bank 2 for PE-loop resistance (2nd), Zone Z2
PhLoopRea2	v2_dMV	mag.f	MX	-	2 FLTLOOP_XSND Z2	Mon	Record data of bank 2 for PE-loop reactance (2nd), Zone Z2
		q	MX	-	2 FLTLOOP_XSND Z2	Mon	Quality: Record data of bank 2 for PE-loop reactance (2nd), Zone Z2
		t	MX	-	2 FLTLOOP_XSND Z2	Mon	Timestamp: Record data of bank 2 for PE-loop reactance (2nd), Zone Z2
PPLoopRis	v2_dMV	mag.f	MX	-	2 FLTLOOP_RPP Z2	Mon	Record data of bank 2 for PP-loop resistance, Zone Z2
		q	MX	-	2 FLTLOOP_RPP Z2	Mon	Quality: Record data of bank 2 for PP-loop resistance, Zone Z2
		t	MX	-	2 FLTLOOP_RPP Z2	Mon	Timestamp: Record data of bank 2 for PP-loop resistance, Zone Z2
PPLoopReac	v2_dMV	mag.f	MX	-	2 FLTLOOP_XPP Z2	Mon	Record data of bank 2 for PP-loop reactance, Zone Z2
		q	MX	-	2 FLTLOOP_XPP Z2	Mon	Quality: Record data of bank 2 for PP-loop reactance, Zone Z2
		t	MX	-	2 FLTLOOP_XPP Z2	Mon	Timestamp: Record data of bank 2 for PP-loop reactance, Zone Z2

**Table 27:** DSTPDIS Logical node data (instance 9)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
DirRisZn	v2_dMV	mag.f	MX	-	3 DIR_LOOP_R Z2	Mon	Record data of bank 3 for direction resistance, Zone Z2
		q	MX	-	3 DIR_LOOP_R Z2	Mon	Quality: Record data of bank 3 for direction resistance, Zone Z2
		t	MX	-	3 DIR_LOOP_R Z2	Mon	Timestamp: Record data of bank 3 for direction resistance, Zone Z2

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
DirReactZn	v2_dMV	mag.f	MX	-	3 DIR_LOOP_X Z2	Mon	Record data of bank 3 for direction reactance, Zone Z2
		q	MX	-	3 DIR_LOOP_X Z2	Mon	Quality: Record data of bank 3 for direction reactance, Zone Z2
		t	MX	-	3 DIR_LOOP_X Z2	Mon	Timestamp: Record data of bank 3 for direction reactance, Zone Z2
PhLoopRis1	v2_dMV	mag.f	MX	-	3 FLTLOOP_RFST Z2	Mon	Record data of bank 3 for PE-loop resistance (1st), Zone Z2
		q	MX	-	3 FLTLOOP_RFST Z2	Mon	Quality: Record data of bank 3 for PE-loop resistance (1st), Zone Z2
		t	MX	-	3 FLTLOOP_RFST Z2	Mon	Timestamp: Record data of bank 3 for PE-loop resistance (1st), Zone Z2
PhLoopRea1	v2_dMV	mag.f	MX	-	3 FLTLOOP_XFST Z2	Mon	Record data of bank 3 for PE-loop reactance (1st), Zone Z2
		q	MX	-	3 FLTLOOP_XFST Z2	Mon	Quality: Record data of bank 3 for PE-loop reactance (1st), Zone Z2
		t	MX	-	3 FLTLOOP_XFST Z2	Mon	Timestamp: Record data of bank 3 for PE-loop reactance (1st), Zone Z2
PhLoopRis2	v2_dMV	mag.f	MX	-	3 FLTLOOP_RSND Z2	Mon	Record data of bank 3 for PE-loop resistance (2nd), Zone Z2
		q	MX	-	3 FLTLOOP_RSND Z2	Mon	Quality: Record data of bank 3 for PE-loop resistance (2nd), Zone Z2
		t	MX	-	3 FLTLOOP_RSND Z2	Mon	Timestamp: Record data of bank 3 for PE-loop resistance (2nd), Zone Z2
PhLoopRea2	v2_dMV	mag.f	MX	-	3 FLTLOOP_XSND Z2	Mon	Record data of bank 3 for PE-loop reactance (2nd), Zone Z2
		q	MX	-	3 FLTLOOP_XSND Z2	Mon	Quality: Record data of bank 3 for PE-loop reactance (2nd), Zone Z2
		t	MX	-	3 FLTLOOP_XSND Z2	Mon	Timestamp: Record data of bank 3 for PE-loop reactance (2nd), Zone Z2
PPLoopRis	v2_dMV	mag.f	MX	-	3 FLTLOOP_RPP Z2	Mon	Record data of bank 3 for PP-loop resistance, Zone Z2
		q	MX	-	3 FLTLOOP_RPP Z2	Mon	Quality: Record data of bank 3 for PP-loop resistance, Zone Z2
		t	MX	-	3 FLTLOOP_RPP Z2	Mon	Timestamp: Record data of bank 3 for PP-loop resistance, Zone Z2
PPLoopReac	v2_dMV	mag.f	MX	-	3 FLTLOOP_XPP Z2	Mon	Record data of bank 3 for PP-loop reactance, Zone Z2
		q	MX	-	3 FLTLOOP_XPP Z2	Mon	Quality: Record data of bank 3 for PP-loop reactance, Zone Z2
		t	MX	-	3 FLTLOOP_XPP Z2	Mon	Timestamp: Record data of bank 3 for PP-loop reactance, Zone Z2

**Table 28:** DSTPDIS Logical node data (instance 10)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
DirRisZn	v2_dMV	mag.f	MX	-	2 DIR_LOOP_R Z3	Mon	Record data of bank 2 for direction resistance, Zone Z3
		q	MX	-	2 DIR_LOOP_R Z3	Mon	Quality: Record data of bank 2 for direction resistance, Zone Z3
		t	MX	-	2 DIR_LOOP_R Z3	Mon	Timestamp: Record data of bank 2 for direction resistance, Zone Z3
DirReactZn	v2_dMV	mag.f	MX	-	2 DIR_LOOP_X Z3	Mon	Record data of bank 2 for direction reactance, Zone Z3
		q	MX	-	2 DIR_LOOP_X Z3	Mon	Quality: Record data of bank 2 for direction reactance, Zone Z3
		t	MX	-	2 DIR_LOOP_X Z3	Mon	Timestamp: Record data of bank 2 for direction reactance, Zone Z3
PhLoopRis1	v2_dMV	mag.f	MX	-	2 FLTLOOP_RFST Z3	Mon	Record data of bank 2 for PE-loop resistance (1st), Zone Z3
		q	MX	-	2 FLTLOOP_RFST Z3	Mon	Quality: Record data of bank 2 for PE-loop resistance (1st), Zone Z3
		t	MX	-	2 FLTLOOP_RFST Z3	Mon	Timestamp: Record data of bank 2 for PE-loop resistance (1st), Zone Z3
PhLoopRea1	v2_dMV	mag.f	MX	-	2 FLTLOOP_XFST Z3	Mon	Record data of bank 2 for PE-loop reactance (1st), Zone Z3
		q	MX	-	2 FLTLOOP_XFST Z3	Mon	Quality: Record data of bank 2 for PE-loop reactance (1st), Zone Z3
		t	MX	-	2 FLTLOOP_XFST Z3	Mon	Timestamp: Record data of bank 2 for PE-loop reactance (1st), Zone Z3
PhLoopRis2	v2_dMV	mag.f	MX	-	2 FLTLOOP_RSND Z3	Mon	Record data of bank 2 for PE-loop resistance (2nd), Zone Z3
		q	MX	-	2 FLTLOOP_RSND Z3	Mon	Quality: Record data of bank 2 for PE-loop resistance (2nd), Zone Z3
		t	MX	-	2 FLTLOOP_RSND Z3	Mon	Timestamp: Record data of bank 2 for PE-loop resistance (2nd), Zone Z3
PhLoopRea2	v2_dMV	mag.f	MX	-	2 FLTLOOP_XSND Z3	Mon	Record data of bank 2 for PE-loop reactance (2nd), Zone Z3
		q	MX	-	2 FLTLOOP_XSND Z3	Mon	Quality: Record data of bank 2 for PE-loop reactance (2nd), Zone Z3
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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
PhLoopRea2	v2_dMV	t	MX	-	2 FLTLOOP_XSND Z3	Mon	Timestamp: Record data of bank 2 for PE-loop reactance (2nd), Zone Z3
PPLoopRis	v2_dMV	mag.f	MX	-	2 FLTLOOP_RPP Z3	Mon	Record data of bank 2 for PP-loop resistance, Zone Z3
		q	MX	-	2 FLTLOOP_RPP Z3	Mon	Quality: Record data of bank 2 for PP-loop resistance, Zone Z3
		t	MX	-	2 FLTLOOP_RPP Z3	Mon	Timestamp: Record data of bank 2 for PP-loop resistance, Zone Z3
PPLoopReac	v2_dMV	mag.f	MX	-	2 FLTLOOP_XPP Z3	Mon	Record data of bank 2 for PP-loop reactance, Zone Z3
		q	MX	-	2 FLTLOOP_XPP Z3	Mon	Quality: Record data of bank 2 for PP-loop reactance, Zone Z3
		t	MX	-	2 FLTLOOP_XPP Z3	Mon	Timestamp: Record data of bank 2 for PP-loop reactance, Zone Z3

Table 29: DSTPDIS Logical node data (instance 11)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
DirRisZn	v2_dMV	mag.f	MX	-	3 DIR_LOOP_R Z3	Mon	Record data of bank 3 for direction resistance, Zone Z3
		q	MX	-	3 DIR_LOOP_R Z3	Mon	Quality: Record data of bank 3 for direction resistance, Zone Z3
		t	MX	-	3 DIR_LOOP_R Z3	Mon	Timestamp: Record data of bank 3 for direction resistance, Zone Z3
DirReactZn	v2_dMV	mag.f	MX	-	3 DIR_LOOP_X Z3	Mon	Record data of bank 3 for direction reactance, Zone Z3
		q	MX	-	3 DIR_LOOP_X Z3	Mon	Quality: Record data of bank 3 for direction reactance, Zone Z3
		t	MX	-	3 DIR_LOOP_X Z3	Mon	Timestamp: Record data of bank 3 for direction reactance, Zone Z3
PhLoopRis1	v2_dMV	mag.f	MX	-	3 FLTLOOP_RFST Z3	Mon	Record data of bank 3 for PE-loop resistance (1st), Zone Z3
		q	MX	-	3 FLTLOOP_RFST Z3	Mon	Quality: Record data of bank 3 for PE-loop resistance (1st), Zone Z3

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
PhLoopRis1	v2_dMV	t	MX	-	3 FLTLOOP_RFST Z3	Mon	Timestamp: Record data of bank 3 for PE-loop resistance (1st), Zone Z3
PhLoopRea1	v2_dMV	mag.f	MX	-	3 FLTLOOP_XFST Z3	Mon	Record data of bank 3 for PE-loop reactance (1st), Zone Z3
		q	MX	-	3 FLTLOOP_XFST Z3	Mon	Quality: Record data of bank 3 for PE-loop reactance (1st), Zone Z3
		t	MX	-	3 FLTLOOP_XFST Z3	Mon	Timestamp: Record data of bank 3 for PE-loop reactance (1st), Zone Z3
PhLoopRis2	v2_dMV	mag.f	MX	-	3 FLTLOOP_RSND Z3	Mon	Record data of bank 3 for PE-loop resistance (2nd), Zone Z3
		q	MX	-	3 FLTLOOP_RSND Z3	Mon	Quality: Record data of bank 3 for PE-loop resistance (2nd), Zone Z3
		t	MX	-	3 FLTLOOP_RSND Z3	Mon	Timestamp: Record data of bank 3 for PE-loop resistance (2nd), Zone Z3
PhLoopRea2	v2_dMV	mag.f	MX	-	3 FLTLOOP_XSND Z3	Mon	Record data of bank 3 for PE-loop reactance (2nd), Zone Z3
		q	MX	-	3 FLTLOOP_XSND Z3	Mon	Quality: Record data of bank 3 for PE-loop reactance (2nd), Zone Z3
		t	MX	-	3 FLTLOOP_XSND Z3	Mon	Timestamp: Record data of bank 3 for PE-loop reactance (2nd), Zone Z3
PPLoopRis	v2_dMV	mag.f	MX	-	3 FLTLOOP_RPP Z3	Mon	Record data of bank 3 for PP-loop resistance, Zone Z3
		q	MX	-	3 FLTLOOP_RPP Z3	Mon	Quality: Record data of bank 3 for PP-loop resistance, Zone Z3
		t	MX	-	3 FLTLOOP_RPP Z3	Mon	Timestamp: Record data of bank 3 for PP-loop resistance, Zone Z3
PPLoopReac	v2_dMV	mag.f	MX	-	3 FLTLOOP_XPP Z3	Mon	Record data of bank 3 for PP-loop reactance, Zone Z3
		q	MX	-	3 FLTLOOP_XPP Z3	Mon	Quality: Record data of bank 3 for PP-loop reactance, Zone Z3
		t	MX	-	3 FLTLOOP_XPP Z3	Mon	Timestamp: Record data of bank 3 for PP-loop reactance, Zone Z3

Table 30: DSTPDIS Logical node data (instance 12)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	c_dINC	t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
DirRisZn	v2_dMV	mag.f	MX	-	2 DIR_LOOP_R AR1	Mon	Record data of bank 2 for direction resistance, Zone AR1
		q	MX	-	2 DIR_LOOP_R AR1	Mon	Quality: Record data of bank 2 for direction resistance, Zone AR1
		t	MX	-	2 DIR_LOOP_R AR1	Mon	Timestamp: Record data of bank 2 for direction resistance, Zone AR1
DirReactZn	v2_dMV	mag.f	MX	-	2 DIR_LOOP_X AR1	Mon	Record data of bank 2 for direction reactance, Zone AR1
		q	MX	-	2 DIR_LOOP_X AR1	Mon	Quality: Record data of bank 2 for direction reactance, Zone AR1
		t	MX	-	2 DIR_LOOP_X AR1	Mon	Timestamp: Record data of bank 2 for direction reactance, Zone AR1
PhLoopRis1	v2_dMV	mag.f	MX	-	2 FLTLOOP_RFST AR1	Mon	Record data of bank 2 for PE-loop resistance (1st), Zone AR1
		q	MX	-	2 FLTLOOP_RFST AR1	Mon	Quality: Record data of bank 2 for PE-loop resistance (1st), Zone AR1
		t	MX	-	2 FLTLOOP_RFST AR1	Mon	Timestamp: Record data of bank 2 for PE-loop resistance (1st), Zone AR1
PhLoopRea1	v2_dMV	mag.f	MX	-	2 FLTLOOP_XFST AR1	Mon	Record data of bank 2 for PE-loop reactance (1st), Zone AR1
		q	MX	-	2 FLTLOOP_XFST AR1	Mon	Quality: Record data of bank 2 for PE-loop reactance (1st), Zone AR1
		t	MX	-	2 FLTLOOP_XFST AR1	Mon	Timestamp: Record data of bank 2 for PE-loop reactance (1st), Zone AR1
PhLoopRis2	v2_dMV	mag.f	MX	-	2 FLTLOOP_RSND AR1	Mon	Record data of bank 2 for PE-loop resistance (2nd), Zone AR1
		q	MX	-	2 FLTLOOP_RSND AR1	Mon	Quality: Record data of bank 2 for PE-loop resistance (2nd), Zone AR1
		t	MX	-	2 FLTLOOP_RSND AR1	Mon	Timestamp: Record data of bank 2 for PE-loop resistance (2nd), Zone AR1
PhLoopRea2	v2_dMV	mag.f	MX	-	2 FLTLOOP_XSND AR1	Mon	Record data of bank 2 for PE-loop reactance (2nd), Zone AR1
		q	MX	-	2 FLTLOOP_XSND AR1	Mon	Quality: Record data of bank 2 for PE-loop reactance (2nd), Zone AR1
		t	MX	-	2 FLTLOOP_XSND AR1	Mon	Timestamp: Record data of bank 2 for PE-loop reactance (2nd), Zone AR1
PPLoopRis	v2_dMV	mag.f	MX	-	2 FLTLOOP_RPP AR1	Mon	Record data of bank 2 for PP-loop resistance, Zone AR1
		q	MX	-	2 FLTLOOP_RPP AR1	Mon	Quality: Record data of bank 2 for PP-loop resistance, Zone AR1
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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
PPLoopRis	v2_dMV	t	MX	-	2 FLTLOOP_RPP AR1	Mon	Timestamp: Record data of bank 2 for PP-loop resistance, Zone AR1
PPLoopReac	v2_dMV	mag.f	MX	-	2 FLTLOOP_XPP AR1	Mon	Record data of bank 2 for PP-loop reactance, Zone AR1
		q	MX	-	2 FLTLOOP_XPP AR1	Mon	Quality: Record data of bank 2 for PP-loop reactance, Zone AR1
		t	MX	-	2 FLTLOOP_XPP AR1	Mon	Timestamp: Record data of bank 2 for PP-loop reactance, Zone AR1

**Table 31:** DSTPDIS Logical node data (instance 13)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
DirRisZn	v2_dMV	mag.f	MX	-	3 DIR_LOOP_R AR1	Mon	Record data of bank 3 for direction resistance, Zone AR1
		q	MX	-	3 DIR_LOOP_R AR1	Mon	Quality: Record data of bank 3 for direction resistance, Zone AR1
		t	MX	-	3 DIR_LOOP_R AR1	Mon	Timestamp: Record data of bank 3 for direction resistance, Zone AR1
DirReactZn	v2_dMV	mag.f	MX	-	3 DIR_LOOP_X AR1	Mon	Record data of bank 3 for direction reactance, Zone AR1
		q	MX	-	3 DIR_LOOP_X AR1	Mon	Quality: Record data of bank 3 for direction reactance, Zone AR1
		t	MX	-	3 DIR_LOOP_X AR1	Mon	Timestamp: Record data of bank 3 for direction reactance, Zone AR1
PhLoopRis1	v2_dMV	mag.f	MX	-	3 FLTLOOP_RFST AR1	Mon	Record data of bank 3 for PE-loop resistance (1st), Zone AR1
		q	MX	-	3 FLTLOOP_RFST AR1	Mon	Quality: Record data of bank 3 for PE-loop resistance (1st), Zone AR1
		t	MX	-	3 FLTLOOP_RFST AR1	Mon	Timestamp: Record data of bank 3 for PE-loop resistance (1st), Zone AR1
PhLoopRea1	v2_dMV	mag.f	MX	-	3 FLTLOOP_XFST AR1	Mon	Record data of bank 3 for PE-loop reactance (1st), Zone AR1
		q	MX	-	3 FLTLOOP_XFST AR1	Mon	Quality: Record data of bank 3 for PE-loop reactance (1st), Zone AR1

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
PhLoopRea1	v2_dMV	t	MX	-	3 FLTLOOP_XFST AR1	Mon	Timestamp: Record data of bank 3 for PE-loop reactance (1st), Zone AR1
PhLoopRis2	v2_dMV	mag.f	MX	-	3 FLTLOOP_RSND AR1	Mon	Record data of bank 3 for PE-loop resistance (2nd), Zone AR1
		q	MX	-	3 FLTLOOP_RSND AR1	Mon	Quality: Record data of bank 3 for PE-loop resistance (2nd), Zone AR1
		t	MX	-	3 FLTLOOP_RSND AR1	Mon	Timestamp: Record data of bank 3 for PE-loop resistance (2nd), Zone AR1
PhLoopRea2	v2_dMV	mag.f	MX	-	3 FLTLOOP_XSND AR1	Mon	Record data of bank 3 for PE-loop reactance (2nd), Zone AR1
		q	MX	-	3 FLTLOOP_XSND AR1	Mon	Quality: Record data of bank 3 for PE-loop reactance (2nd), Zone AR1
		t	MX	-	3 FLTLOOP_XSND AR1	Mon	Timestamp: Record data of bank 3 for PE-loop reactance (2nd), Zone AR1
PPLoopRis	v2_dMV	mag.f	MX	-	3 FLTLOOP_RPP AR1	Mon	Record data of bank 3 for PP-loop resistance, Zone AR1
		q	MX	-	3 FLTLOOP_RPP AR1	Mon	Quality: Record data of bank 3 for PP-loop resistance, Zone AR1
		t	MX	-	3 FLTLOOP_RPP AR1	Mon	Timestamp: Record data of bank 3 for PP-loop resistance, Zone AR1
PPLoopReac	v2_dMV	mag.f	MX	-	3 FLTLOOP_XPP AR1	Mon	Record data of bank 3 for PP-loop reactance, Zone AR1
		q	MX	-	3 FLTLOOP_XPP AR1	Mon	Quality: Record data of bank 3 for PP-loop reactance, Zone AR1
		t	MX	-	3 FLTLOOP_XPP AR1	Mon	Timestamp: Record data of bank 3 for PP-loop reactance, Zone AR1

Table 32: DSTPDIS Logical node data (instance 14)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
DirRisZn	v2_dMV	mag.f	MX	-	2 DIR_LOOP_R AR2	Mon	Record data of bank 2 for direction resistance, Zone AR2

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
DirRisZn	v2_dMV	q	MX	-	2 DIR_LOOP_R AR2	Mon	Quality: Record data of bank 2 for direction resistance, Zone AR2
		t	MX	-	2 DIR_LOOP_R AR2	Mon	Timestamp: Record data of bank 2 for direction resistance, Zone AR2
DirReactZn	v2_dMV	mag.f	MX	-	2 DIR_LOOP_X AR2	Mon	Record data of bank 2 for direction reactance, Zone AR2
		q	MX	-	2 DIR_LOOP_X AR2	Mon	Quality: Record data of bank 2 for direction reactance, Zone AR2
		t	MX	-	2 DIR_LOOP_X AR2	Mon	Timestamp: Record data of bank 2 for direction reactance, Zone AR2
PhLoopRis1	v2_dMV	mag.f	MX	-	2 FLTLOOP_RFST AR2	Mon	Record data of bank 2 for PE-loop resistance (1st), Zone AR2
		q	MX	-	2 FLTLOOP_RFST AR2	Mon	Quality: Record data of bank 2 for PE-loop resistance (1st), Zone AR2
		t	MX	-	2 FLTLOOP_RFST AR2	Mon	Timestamp: Record data of bank 2 for PE-loop resistance (1st), Zone AR2
PhLoopRea1	v2_dMV	mag.f	MX	-	2 FLTLOOP_XFST AR2	Mon	Record data of bank 1 for PE-loop reactance (1st), Zone AR2
		q	MX	-	2 FLTLOOP_XFST AR2	Mon	Quality: Record data of bank 1 for PE-loop reactance (1st), Zone AR2
		t	MX	-	2 FLTLOOP_XFST AR2	Mon	Timestamp: Record data of bank 1 for PE-loop reactance (1st), Zone AR2
PhLoopRis2	v2_dMV	mag.f	MX	-	2 FLTLOOP_RSND AR2	Mon	Record data of bank 2 for PE-loop resistance (2nd), Zone AR2
		q	MX	-	2 FLTLOOP_RSND AR2	Mon	Quality: Record data of bank 2 for PE-loop resistance (2nd), Zone AR2
		t	MX	-	2 FLTLOOP_RSND AR2	Mon	Timestamp: Record data of bank 2 for PE-loop resistance (2nd), Zone AR2
PhLoopRea2	v2_dMV	mag.f	MX	-	2 FLTLOOP_XSND AR2	Mon	Record data of bank 2 for PE-loop reactance (2nd), Zone AR2
		q	MX	-	2 FLTLOOP_XSND AR2	Mon	Quality: Record data of bank 2 for PE-loop reactance (2nd), Zone AR2
		t	MX	-	2 FLTLOOP_XSND AR2	Mon	Timestamp: Record data of bank 2 for PE-loop reactance (2nd), Zone AR2
PPLoopRis	v2_dMV	mag.f	MX	-	2 FLTLOOP_RPP AR2	Mon	Record data of bank 2 for PP-loop resistance, Zone AR2
		q	MX	-	2 FLTLOOP_RPP AR2	Mon	Quality: Record data of bank 2 for PP-loop resistance, Zone AR2
		t	MX	-	2 FLTLOOP_RPP AR2	Mon	Timestamp: Record data of bank 2 for PP-loop resistance, Zone AR2

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
PPLoopReac	v2_dMV	mag.f	MX	-	2 FLTLOOP_XPP AR2	Mon	Record data of bank 2 for PP-loop reactance, Zone AR2
		q	MX	-	2 FLTLOOP_XPP AR2	Mon	Quality: Record data of bank 2 for PP-loop reactance, Zone AR2
		t	MX	-	2 FLTLOOP_XPP AR2	Mon	Timestamp: Record data of bank 2 for PP-loop reactance, Zone AR2

Table 33: DSTPDIS Logical node data (instance 15)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
DirRisZn	v2_dMV	mag.f	MX	-	3 DIR_LOOP_R AR2	Mon	Record data of bank 3 for direction resistance, Zone AR2
		q	MX	-	3 DIR_LOOP_R AR2	Mon	Quality: Record data of bank 3 for direction resistance, Zone AR2
		t	MX	-	3 DIR_LOOP_R AR2	Mon	Timestamp: Record data of bank 3 for direction resistance, Zone AR2
DirReactZn	v2_dMV	mag.f	MX	-	3 DIR_LOOP_X AR2	Mon	Record data of bank 3 for direction reactance, Zone AR2
		q	MX	-	3 DIR_LOOP_X AR2	Mon	Quality: Record data of bank 3 for direction reactance, Zone AR2
		t	MX	-	3 DIR_LOOP_X AR2	Mon	Timestamp: Record data of bank 3 for direction reactance, Zone AR2
PhLoopRis1	v2_dMV	mag.f	MX	-	3 FLTLOOP_RFST AR2	Mon	Record data of bank 3 for PE-loop resistance (1st), Zone AR2
		q	MX	-	3 FLTLOOP_RFST AR2	Mon	Quality: Record data of bank 3 for PE-loop resistance (1st), Zone AR2
		t	MX	-	3 FLTLOOP_RFST AR2	Mon	Timestamp: Record data of bank 3 for PE-loop resistance (1st), Zone AR2
PhLoopRea1	v2_dMV	mag.f	MX	-	3 FLTLOOP_XFST AR2	Mon	Record data of bank 3 for PE-loop reactance (1st), Zone AR2
		q	MX	-	3 FLTLOOP_XFST AR2	Mon	Quality: Record data of bank 3 for PE-loop reactance (1st), Zone AR2
		t	MX	-	3 FLTLOOP_XFST AR2	Mon	Timestamp: Record data of bank 3 for PE-loop reactance (1st), Zone AR2

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
PhLoopRis2	v2_dMV	mag.f	MX	-	3 FLTLOOP_RSND AR2	Mon	Record data of bank 3 for PE-loop resistance (2nd), Zone AR2
		q	MX	-	3 FLTLOOP_RSND AR2	Mon	Quality: Record data of bank 3 for PE-loop resistance (2nd), Zone AR2
		t	MX	-	3 FLTLOOP_RSND AR2	Mon	Timestamp: Record data of bank 3 for PE-loop resistance (2nd), Zone AR2
PhLoopRea2	v2_dMV	mag.f	MX	-	3 FLTLOOP_XSND AR2	Mon	Record data of bank 3 for PE-loop reactance (2nd), Zone AR2
		q	MX	-	3 FLTLOOP_XSND AR2	Mon	Quality: Record data of bank 3 for PE-loop reactance (2nd), Zone AR2
		t	MX	-	3 FLTLOOP_XSND AR2	Mon	Timestamp: Record data of bank 3 for PE-loop reactance (2nd), Zone AR2
PPLoopRis	v2_dMV	mag.f	MX	-	3 FLTLOOP_RPP AR2	Mon	Record data of bank 3 for PP-loop resistance, Zone AR2
		q	MX	-	3 FLTLOOP_RPP AR2	Mon	Quality: Record data of bank 3 for PP-loop resistance, Zone AR2
		t	MX	-	3 FLTLOOP_RPP AR2	Mon	Timestamp: Record data of bank 3 for PP-loop resistance, Zone AR2
PPLoopReac	v2_dMV	mag.f	MX	-	3 FLTLOOP_XPP AR2	Mon	Record data of bank 3 for PP-loop reactance, Zone AR2
		q	MX	-	3 FLTLOOP_XPP AR2	Mon	Quality: Record data of bank 3 for PP-loop reactance, Zone AR2
		t	MX	-	3 FLTLOOP_XPP AR2	Mon	Timestamp: Record data of bank 3 for PP-loop reactance, Zone AR2

**Table 34:** DSTPDIS Logical node data (instance 6)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
DirRisZn	v2_dMV	mag.f	MX	-	2 DIR_LOOP_R Z1	Mon	Record data of bank 2 for direction resistance, Zone Z1
		q	MX	-	2 DIR_LOOP_R Z1	Mon	Quality: Record data of bank 2 for direction resistance, Zone Z1
		t	MX	-	2 DIR_LOOP_R Z1	Mon	Timestamp: Record data of bank 2 for direction resistance, Zone Z1

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
DirReactZn	v2_dMV	mag.f	MX	-	2 DIR_LOOP_X Z1	Mon	Record data of bank 2 for direction reactance, Zone Z1
		q	MX	-	2 DIR_LOOP_X Z1	Mon	Quality: Record data of bank 2 for direction reactance, Zone Z1
		t	MX	-	2 DIR_LOOP_X Z1	Mon	Timestamp: Record data of bank 2 for direction reactance, Zone Z1
PhLoopRis1	v2_dMV	mag.f	MX	-	2 FLTLOOP_RFST Z1	Mon	Record data of bank 2 for PE-loop resistance (1st), Zone Z1
		q	MX	-	2 FLTLOOP_RFST Z1	Mon	Quality: Record data of bank 2 for PE-loop resistance (1st), Zone Z1
		t	MX	-	2 FLTLOOP_RFST Z1	Mon	Timestamp: Record data of bank 2 for PE-loop resistance (1st), Zone Z1
PhLoopRea1	v2_dMV	mag.f	MX	-	2 FLTLOOP_XFST Z1	Mon	Record data of bank 2 for PE-loop reactance (1st), Zone Z1
		q	MX	-	2 FLTLOOP_XFST Z1	Mon	Quality: Record data of bank 2 for PE-loop reactance (1st), Zone Z1
		t	MX	-	2 FLTLOOP_XFST Z1	Mon	Timestamp: Record data of bank 2 for PE-loop reactance (1st), Zone Z1
PhLoopRis2	v2_dMV	mag.f	MX	-	2 FLTLOOP_RSND Z1	Mon	Record data of bank 2 for PE-loop resistance (2nd), Zone Z1
		q	MX	-	2 FLTLOOP_RSND Z1	Mon	Quality: Record data of bank 2 for PE-loop resistance (2nd), Zone Z1
		t	MX	-	2 FLTLOOP_RSND Z1	Mon	Timestamp: Record data of bank 2 for PE-loop resistance (2nd), Zone Z1
PhLoopRea2	v2_dMV	mag.f	MX	-	2 FLTLOOP_XSND Z1	Mon	Record data of bank 2 for PE-loop reactance (2nd), Zone Z1
		q	MX	-	2 FLTLOOP_XSND Z1	Mon	Quality: Record data of bank 2 for PE-loop reactance (2nd), Zone Z1
		t	MX	-	2 FLTLOOP_XSND Z1	Mon	Timestamp: Record data of bank 2 for PE-loop reactance (2nd), Zone Z1
PPLoopRis	v2_dMV	mag.f	MX	-	2 FLTLOOP_RPP Z1	Mon	Record data of bank 2 for PP-loop resistance, Zone Z1
		q	MX	-	2 FLTLOOP_RPP Z1	Mon	Quality: Record data of bank 2 for PP-loop resistance, Zone Z1
		t	MX	-	2 FLTLOOP_RPP Z1	Mon	Timestamp: Record data of bank 2 for PP-loop resistance, Zone Z1
PPLoopReac	v2_dMV	mag.f	MX	-	2 FLTLOOP_XPP Z1	Mon	Record data of bank 2 for PP-loop reactance, Zone Z1
		q	MX	-	2 FLTLOOP_XPP Z1	Mon	Quality: Record data of bank 2 for PP-loop reactance, Zone Z1
		t	MX	-	2 FLTLOOP_XPP Z1	Mon	Timestamp: Record data of bank 2 for PP-loop reactance, Zone Z1

Table 35: DSTPDIS Logical node data (instance 5)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE_ZAR2	Mon	Time delayed operate signal, Zone AR2
		q	ST	T	OPERATE_ZAR2	Mon	Quality: Time delayed operate signal, Zone AR2
		t	ST	T	OPERATE_ZAR2	Mon	Timestamp: Time delayed operate signal, Zone AR2
Str	c_dACD	general	ST	-	START_ZAR2	Mon	General start-signal, Zone AR2
		dirGeneral	ST	-	-	Mon	Direction of fault or load when START_ZAR2 is active
		phsA	ST	-	-	Mon	Event start phase A, Zone AR2
		dirPhsA	ST	-	-	Mon	Direction of phase A when phase start is active, Zone ZAR2
		phsB	ST	-	-	Mon	Event start phase B, Zone AR2
		dirPhsB	ST	-	-	Mon	Direction of phase B when phase start is active, Zone ZAR2
		phsC	ST	-	-	Mon	Event start phase C, Zone AR2
		dirPhsC	ST	-	-	Mon	Direction of phase C when phase start is active, Zone ZAR2
		q	ST	-	START_ZAR2	Mon	Quality: General start-signal, Zone AR2
		t	ST	-	START_ZAR2	Mon	Timestamp: General start-signal, Zone AR2
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
IvdTltAng	v1_dINS	stVal	ST	-	CONFLICT_ZAR2	Mon	Tilt angle validity check, Zone AR2
		q	ST	-	CONFLICT_ZAR2	Mon	Quality: Tilt angle validity check, Zone AR2
		t	ST	-	CONFLICT_ZAR2	Mon	Timestamp: Tilt angle validity check, Zone AR2

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**Table 36:** *DSTPDIS Logical node data (instance 4)*

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE_ZAR1	Mon	Time delayed operate signal, Zone AR1
		q	ST	T	OPERATE_ZAR1	Mon	Quality: Time delayed operate signal, Zone AR1
		t	ST	T	OPERATE_ZAR1	Mon	Timestamp: Time delayed operate signal, Zone AR1
Str	c_dACD	general	ST	-	START_ZAR1	Mon	General start-signal, Zone AR1
		dirGeneral	ST	-	-	Mon	Direction of fault or load when START_ZAR1 is active
		phsA	ST	-	-	Mon	Event start phase A, Zone AR1
		dirPhsA	ST	-	-	Mon	Direction of phase A when phase start is active, Zone ZAR1
		phsB	ST	-	-	Mon	Event start phase B, Zone AR1
		dirPhsB	ST	-	-	Mon	Direction of phase B when phase start is active, Zone ZAR1
		phsC	ST	-	-	Mon	Event start phase C, Zone AR1
		dirPhsC	ST	-	-	Mon	Direction of phase C when phase start is active, Zone ZAR1
		q	ST	-	START_ZAR1	Mon	Quality: General start-signal, Zone AR1
		t	ST	-	START_ZAR1	Mon	Timestamp: General start-signal, Zone AR1
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
IvdTltAng	v1_dINS	stVal	ST	-	CONFLICT_ZAR1	Mon	Tilt angle validity check, Zone AR1
		q	ST	-	CONFLICT_ZAR1	Mon	Quality: Tilt angle validity check, Zone AR1
		t	ST	-	CONFLICT_ZAR1	Mon	Timestamp: Tilt angle validity check, Zone AR1

**Table 37:** DSTPDIS Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE_Z1	Mon	Time delayed operate signal, Zone Z1
		q	ST	T	OPERATE_Z1	Mon	Quality: Time delayed operate signal, Zone Z1
		t	ST	T	OPERATE_Z1	Mon	Timestamp: Time delayed operate signal, Zone Z1
Str	c_dACD	general	ST	-	START_Z1	Mon	General start-signal, Zone Z1
		dirGeneral	ST	-	-	Mon	Direction of fault or load when START_Z1 is active
		phsA	ST	-	-	Mon	Event start phase A, Zone Z1
		dirPhsA	ST	-	-	Mon	Direction of phase A when phase start is active, Zone Z1
		phsB	ST	-	-	Mon	Event start phase B, Zone Z1
		dirPhsB	ST	-	-	Mon	Direction of phase B when phase start is active, Zone Z1
		phsC	ST	-	-	Mon	Event start phase C, Zone Z1
		dirPhsC	ST	-	-	Mon	Direction of phase C when phase start is active, Zone Z1
		q	ST	-	START_Z1	Mon	Quality: General start-signal, Zone Z1
		t	ST	-	START_Z1	Mon	Timestamp: General start-signal, Zone Z1
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
IvdTltAng	v1_dINS	stVal	ST	-	CONFLICT_Z1	Mon	Tilt angle validity check, Zone Z1
		q	ST	-	CONFLICT_Z1	Mon	Quality: Tilt angle validity check, Zone Z1
		t	ST	-	CONFLICT_Z1	Mon	Timestamp: Tilt angle validity check, Zone Z1

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**Table 38:** *DSTPDIS Logical node data (instance 3)*

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE_Z3	Mon	Time delayed operate signal, Zone Z3
		q	ST	T	OPERATE_Z3	Mon	Quality: Time delayed operate signal, Zone Z3
		t	ST	T	OPERATE_Z3	Mon	Timestamp: Time delayed operate signal, Zone Z3
Str	c_dACD	general	ST	-	START_Z3	Mon	General start-signal, Zone Z3
		dirGeneral	ST	-	-	Mon	Direction of fault or load when START_Z3 is active
		phsA	ST	-	-	Mon	Event start phase A, Zone Z3
		dirPhsA	ST	-	-	Mon	Direction of phase A when phase start is active, Zone Z3
		phsB	ST	-	-	Mon	Event start phase B, Zone Z3
		dirPhsB	ST	-	-	Mon	Direction of phase B when phase start is active, Zone Z3
		phsC	ST	-	-	Mon	Event start phase C, Zone Z3
		dirPhsC	ST	-	-	Mon	Direction of phase C when phase start is active, Zone Z3
		q	ST	-	START_Z3	Mon	Quality: General start-signal, Zone Z3
		t	ST	-	START_Z3	Mon	Timestamp: General start-signal, Zone Z3
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
IvdTltAng	v1_dINS	stVal	ST	-	CONFLICT_Z3	Mon	Tilt angle validity check, Zone Z3
		q	ST	-	CONFLICT_Z3	Mon	Quality: Tilt angle validity check, Zone Z3
		t	ST	-	CONFLICT_Z3	Mon	Timestamp: Tilt angle validity check, Zone Z3

Table 39: DSTPDIS Logical node data (instance 2)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE_Z2	Mon	Time delayed operate signal, Zone Z2
		q	ST	T	OPERATE_Z2	Mon	Quality: Time delayed operate signal, Zone Z2
		t	ST	T	OPERATE_Z2	Mon	Timestamp: Time delayed operate signal, Zone Z2
Str	c_dACD	general	ST	-	START_Z2	Mon	General start-signal, Zone Z2
		dirGeneral	ST	-	-	Mon	Direction of fault or load when START_Z2 is active
		phsA	ST	-	-	Mon	Event start phase A, Zone Z2
		dirPhsA	ST	-	-	Mon	Direction of phase A when phase start is active, Zone Z2
		phsB	ST	-	-	Mon	Event start phase B, Zone Z2
		dirPhsB	ST	-	-	Mon	Direction of phase B when phase start is active, Zone Z2
		phsC	ST	-	-	Mon	Event start phase C, Zone Z2
		dirPhsC	ST	-	-	Mon	Direction of phase C when phase start is active, Zone Z2
		q	ST	-	START_Z2	Mon	Quality: General start-signal, Zone Z2
		t	ST	-	START_Z2	Mon	Timestamp: General start-signal, Zone Z2
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
IvdTltAng	v1_dINS	stVal	ST	-	CONFLICT_Z2	Mon	Tilt angle validity check, Zone Z2
		q	ST	-	CONFLICT_Z2	Mon	Quality: Tilt angle validity check, Zone Z2
		t	ST	-	CONFLICT_Z2	Mon	Timestamp: Tilt angle validity check, Zone Z2

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**Table 40:** DSTPDIS Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Dir	b_dACD	dirGeneral	ST	-	DIRECTION	Mon	Direction of fault or load
		q	ST	-	DIRECTION	Mon	Quality: Direction of fault or load
		t	ST	-	DIRECTION	Mon	Timestamp: Direction of fault or load
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850

**Table 41:** DSTPDIS Logical node data (instance 16)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Dir	b_dACD	dirGeneral	ST	-	1 DIRECTION	Mon	Record data of bank 1 for direction
		q	ST	-	1 DIRECTION	Mon	Quality: Record data of bank 1 for direction
		t	ST	-	1 DIRECTION	Mon	Timestamp: Record data of bank 1 for direction
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
EFDdir	v2_dACD	dirGeneral	ST	-	1 DIR_E_FLT GFC	Mon	Record data of bank 1 for EF-direction, GFC
		q	ST	-	1 DIR_E_FLT GFC	Mon	Quality: Record data of bank 1 for EF-direction, GFC
		t	ST	-	1 DIR_E_FLT GFC	Mon	Timestamp: Record data of bank 1 for EF-direction, GFC
EFDet	v2_dSPS	stVal	ST	-	1 EARTH_FLT GFC	Mon	Record data of bank 1 for earth-fault, GFC
		q	ST	-	1 EARTH_FLT GFC	Mon	Quality: Record data of bank 1 for earth-fault, GFC

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
EFDet	v2_dSPS	t	ST	-	1 EARTH_FLT GFC	Mon	Timestamp: Record data of bank 1 for earth-fault, GFC
XCDet	v2_dSPS	stVal	ST	-	1 XC_FLT GFC	Mon	Record data of bank 1 for cross country fault, GFC
		q	ST	-	1 XC_FLT GFC	Mon	Quality: Record data of bank 1 for cross country fault, GFC
		t	ST	-	1 XC_FLT GFC	Mon	Timestamp: Record data of bank 1 for cross country fault, GFC
RelPhLoop	v4_dINS	stVal	ST	-	1 RELEASE_PE GFC	Mon	Record data of bank 1 for release PE-loops, GFC
		q	ST	-	1 RELEASE_PE GFC	Mon	Quality: Record data of bank 1 for release PE-loops, GFC
		t	ST	-	1 RELEASE_PE GFC	Mon	Timestamp: Record data of bank 1 for release PE-loops, GFC
RelPPLoop	v4_dINS	stVal	ST	-	1 RELEASE_PP GFC	Mon	Record data of bank 1 for release PP-loops, GFC
		q	ST	-	1 RELEASE_PP GFC	Mon	Quality: Record data of bank 1 for release PP-loops, GFC
		t	ST	-	1 RELEASE_PP GFC	Mon	Timestamp: Record data of bank 1 for release PP-loops, GFC
ZnOpSt	v4_dINS	stVal	ST	-	1 Zones OPERATE	Mon	Record data of bank 1 for operate signals of all zones
		q	ST	-	1 Zones OPERATE	Mon	Quality: Record data of bank 1 for operate signals of all zones
		t	ST	-	1 Zones OPERATE	Mon	Timestamp: Record data of bank 1 for operate signals of all zones

**Table 42:** DSTPDIS Logical node data (instance 17)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Dir	b_dACD	dirGeneral	ST	-	2 DIRECTION	Mon	Record data of bank 2 for direction
		q	ST	-	2 DIRECTION	Mon	Quality: Record data of bank 2 for direction
		t	ST	-	2 DIRECTION	Mon	Timestamp: Record data of bank 2 for direction
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
EFDdir	v2_dACD	dirGeneral	ST	-	2 DIR_E_FLT GFC	Mon	Record data of bank 2 for EF-direction, GFC
		q	ST	-	2 DIR_E_FLT GFC	Mon	Quality: Record data of bank 2 for EF-direction, GFC
		t	ST	-	2 DIR_E_FLT GFC	Mon	Timestamp: Record data of bank 2 for EF-direction, GFC
EFDet	v2_dSPS	stVal	ST	-	2 EARTH_FLT GFC	Mon	Record data of bank 2 for earth-fault, GFC
		q	ST	-	2 EARTH_FLT GFC	Mon	Quality: Record data of bank 2 for earth-fault, GFC
		t	ST	-	2 EARTH_FLT GFC	Mon	Timestamp: Record data of bank 2 for earth-fault, GFC
XCDet	v2_dSPS	stVal	ST	-	2 XC_FLT GFC	Mon	Record data of bank 2 for cross country fault, GFC
		q	ST	-	2 XC_FLT GFC	Mon	Quality: Record data of bank 2 for cross country fault, GFC
		t	ST	-	2 XC_FLT GFC	Mon	Timestamp: Record data of bank 2 for cross country fault, GFC
RelPhLoop	v4_dINS	stVal	ST	-	2 RELEASE_PE GFC	Mon	Record data of bank 2 for release PE-loops, GFC
		q	ST	-	2 RELEASE_PE GFC	Mon	Quality: Record data of bank 2 for release PE-loops, GFC
		t	ST	-	2 RELEASE_PE GFC	Mon	Timestamp: Record data of bank 2 for release PE-loops, GFC
RelPPLoop	v4_dINS	stVal	ST	-	2 RELEASE_PP GFC	Mon	Record data of bank 2 for release PP-loops, GFC
		q	ST	-	2 RELEASE_PP GFC	Mon	Quality: Record data of bank 2 for release PP-loops, GFC
		t	ST	-	2 RELEASE_PP GFC	Mon	Timestamp: Record data of bank 2 for release PP-loops, GFC
ZnOpSt	v4_dINS	stVal	ST	-	2 Zones OPERATE	Mon	Record data of bank 2 for operate signals of all zones
		q	ST	-	2 Zones OPERATE	Mon	Quality: Record data of bank 2 for operate signals of all zones
		t	ST	-	2 Zones OPERATE	Mon	Timestamp: Record data of bank 2 for operate signals of all zones

Table 43: DSTPDIS Logical node data (instance 18)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Dir	b_dACD	dirGeneral	ST	-	3 DIRECTION	Mon	Record data of bank 3 for direction
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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Dir	b_dACD	q	ST	-	3 DIRECTION	Mon	Quality: Record data of bank 3 for direction
		t	ST	-	3 DIRECTION	Mon	Timestamp: Record data of bank 3 for direction
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
EFDdir	v2_dACD	dirGeneral	ST	-	3 DIR_E_FLT GFC	Mon	Record data of bank 3 for EF-direction, GFC
		q	ST	-	3 DIR_E_FLT GFC	Mon	Quality: Record data of bank 3 for EF-direction, GFC
		t	ST	-	3 DIR_E_FLT GFC	Mon	Timestamp: Record data of bank 3 for EF-direction, GFC
EFDet	v2_dSPS	stVal	ST	-	3 EARTH_FLT GFC	Mon	Record data of bank 3 for earth-fault, GFC
		q	ST	-	3 EARTH_FLT GFC	Mon	Quality: Record data of bank 3 for earth-fault, GFC
		t	ST	-	3 EARTH_FLT GFC	Mon	Timestamp: Record data of bank 3 for earth-fault, GFC
XCDet	v2_dSPS	stVal	ST	-	3 XC_FLT GFC	Mon	Record data of bank 3 for cross country fault, GFC
		q	ST	-	3 XC_FLT GFC	Mon	Quality: Record data of bank 3 for cross country fault, GFC
		t	ST	-	3 XC_FLT GFC	Mon	Timestamp: Record data of bank 3 for cross country fault, GFC
RelPhLoop	v4_dINS	stVal	ST	-	3 RELEASE_PE GFC	Mon	Record data of bank 3 for release PE-loops, GFC
		q	ST	-	3 RELEASE_PE GFC	Mon	Quality: Record data of bank 3 for release PE-loops, GFC
		t	ST	-	3 RELEASE_PE GFC	Mon	Timestamp: Record data of bank 3 for release PE-loops, GFC
RelPPLoop	v4_dINS	stVal	ST	-	3 RELEASE_PP GFC	Mon	Record data of bank 3 for release PP-loops, GFC
		q	ST	-	3 RELEASE_PP GFC	Mon	Quality: Record data of bank 3 for release PP-loops, GFC
		t	ST	-	3 RELEASE_PP GFC	Mon	Timestamp: Record data of bank 3 for release PP-loops, GFC
ZnOpSt	v4_dINS	stVal	ST	-	3 Zones OPERATE	Mon	Record data of bank 3 for operate signals of all zones
		q	ST	-	3 Zones OPERATE	Mon	Quality: Record data of bank 3 for operate signals of all zones
		t	ST	-	3 Zones OPERATE	Mon	Timestamp: Record data of bank 3 for operate signals of all zones

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**Table 44:** *DSTPDIS Logical node data (instance 6)*

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE_GFC	Mon	Time delayed operate-signal, GFC
		q	ST	T	OPERATE_GFC	Mon	Quality: Time delayed operate-signal, GFC
		t	ST	T	OPERATE_GFC	Mon	Timestamp: Time delayed operate-signal, GFC
Str	c_dACD	general	ST	-	START_GFC	Mon	General start-signal, GFC
		phsA	ST	-	-	Mon	Event start phase A, GFC
		phsB	ST	-	-	Mon	Event start phase B, GFC
		phsC	ST	-	-	Mon	Event start phase C, GFC
		q	ST	-	START_GFC	Mon	Quality: General start-signal, GFC
		t	ST	-	START_GFC	Mon	Timestamp: General start-signal, GFC
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
RelPhsA	v1_dSPS	stVal	ST	-	-	Mon	Event release phase A to earth fault
		q	ST	-	-	Mon	Quality: Event release phase A to earth fault
		t	ST	-	-	Mon	Timestamp: Event release phase A to earth fault
RelPhsB	v1_dSPS	stVal	ST	-	-	Mon	Event release phase B to earth fault
		q	ST	-	-	Mon	Quality: Event release phase B to earth fault
		t	ST	-	-	Mon	Timestamp: Event release phase B to earth fault
RelPhsC	v1_dSPS	stVal	ST	-	-	Mon	Event release phase C to earth fault
		q	ST	-	-	Mon	Quality: Event release phase C to earth fault
		t	ST	-	-	Mon	Timestamp: Event release phase C to earth fault
RelPhsAB	v1_dSPS	stVal	ST	-	-	Mon	Event release phase A to phase B
		q	ST	-	-	Mon	Quality: Event release phase A to phase B
		t	ST	-	-	Mon	Timestamp: Event release phase A to phase B

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
RelPhsBC	v1_dSPS	stVal	ST	-	-	Mon	Event release phase B to phase C
		q	ST	-	-	Mon	Quality: Event release phase B to phase C
		t	ST	-	-	Mon	Timestamp: Event release phase B to phase C
RelPhsCA	v1_dSPS	stVal	ST	-	-	Mon	Event release phase C to phase A
		q	ST	-	-	Mon	Quality: Event release phase C to phase A
		t	ST	-	-	Mon	Timestamp: Event release phase C to phase A
Rel3Ph	v1_dSPS	stVal	ST	-	-	Mon	Event release 3-phase fault
		q	ST	-	-	Mon	Quality: Event release 3-phase fault
		t	ST	-	-	Mon	Timestamp: Event release 3-phase fault
IvdPhSel	v1_dSPS	stVal	ST	-	CONFLICT_GFC	Mon	Conflict with PSL-function and voltage measuring principle
		q	ST	-	CONFLICT_GFC	Mon	Quality: Conflict with PSL-function and voltage measuring principle
		t	ST	-	CONFLICT_GFC	Mon	Timestamp: Conflict with PSL-function and voltage measuring principle
EFDet	v1_dSPS	stVal	ST	-	EARTH_FLT	Mon	Indication of a single phase earth-fault, GFC
		q	ST	-	EARTH_FLT	Mon	Quality: Indication of a single phase earth-fault, GFC
		t	ST	-	EARTH_FLT	Mon	Timestamp: Indication of a single phase earth-fault, GFC
XCDet	v1_dSPS	stVal	ST	-	XC_FLT	Mon	Indication of a cross-country-fault (high imp. earthed), GFC
		q	ST	-	XC_FLT	Mon	Quality: Indication of a cross-country-fault (high imp. earthed), GFC
		t	ST	-	XC_FLT	Mon	Timestamp: Indication of a cross-country-fault (high imp. earthed), GFC

**Table 45:** DSTPDIS Logical node data (instance 2)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Dir	b_dACD	dirGeneral	ST	-	DIR_E_FLT	Mon	Earth-fault direction (low imp. earthed), GFC

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Dir	b_dACD	q	ST	-	DIR_E_FLT	Mon	Quality: Earth-fault direction (low imp. earthed), GFC
		t	ST	-	DIR_E_FLT	Mon	Timestamp: Earth-fault direction (low imp. earthed), GFC
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850

LN type	LN prefix	LN class	Function block name
PHBLLN0 instance 1 (revision 0)	-	LLN0	UZPDIS
UZMMXU instance 1 (revision 0)	UZ	MMXU	UZPDIS
UZPDIS instance 1 (revision 0)	UZ	PDIS	UZPDIS

Table 46: UZPDIS Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orlent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
Beh	a_dINS	t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
		stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

**Table 47:** UZPDIS Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
ZPP	v2_dDEL	cVal.mag.f	MX	-	Z_AMPL_AB	Mon	Phase-to-phase A-B impedance amplitude
		cVal.mag.f	MX	-	Z_AMPL_BC	Mon	Phase-to-phase B-C impedance amplitude
		cVal.mag.f	MX	-	Z_AMPL_CA	Mon	Phase-to-phase C-A impedance amplitude
		q	MX	-	Z_AMPL_CA	Mon	Quality: Phase-to-phase C-A impedance amplitude
		q	MX	-	Z_AMPL_BC	Mon	Quality: Phase-to-phase B-C impedance amplitude
		q	MX	-	Z_AMPL_AB	Mon	Quality: Phase-to-phase A-B impedance amplitude
		t	MX	-	Z_AMPL_AB	Mon	Timestamp: Phase-to-phase A-B impedance amplitude
		t	MX	-	Z_AMPL_BC	Mon	Timestamp: Phase-to-phase B-C impedance amplitude
		t	MX	-	Z_AMPL_CA	Mon	Timestamp: Phase-to-phase C-A impedance amplitude

**Table 48:** UZPDIS Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operated
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	c_dINC	t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	START	Mon	Started
		q	ST	-	START	Mon	Quality: Started
		t	ST	-	START	Mon	Timestamp: Started
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time (in %)
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time (in %)
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time (in %)

LN type	LN prefix	LN class	Function block name
PHBLLN0 instance 1 (revision 0)	-	LLN0	UEXPDIS
UEXMMXU instance 1 (revision 0)	UEX	MMXU	UEXPDIS
UEXPDIS instance 1 (revision 0)	UEX	PDIS	UEXPDIS

Table 49: UEXPDIS Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orlent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
Beh	a_dINS	t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
		stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

Table 50: UEXPDIS Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Z	h_dWYE	cVal.ang.f	MX	-	Z_ANGLE_A	Mon	Impedance phase angle phase A
		cVal.mag.f	MX	-	Z_AMPL_B	Mon	Impedance amplitude phase B
		cVal.ang.f	MX	-	Z_ANGLE_B	Mon	Impedance phase angle phase B
		cVal.mag.f	MX	-	Z_AMPL_C	Mon	Impedance amplitude phase C
		cVal.mag.f	MX	-	Z_AMPL_A	Mon	Impedance amplitude phase A
		cVal.ang.f	MX	-	Z_ANGLE_C	Mon	Impedance phase angle phase C
		q	MX	-	Z_AMPL_A	Mon	Quality: Impedance amplitude phase A
		q	MX	-	Z_AMPL_C	Mon	Quality: Impedance amplitude phase C
		q	MX	-	Z_AMPL_B	Mon	Quality: Impedance amplitude phase B
		t	MX	-	Z_AMPL_B	Mon	Timestamp: Impedance amplitude phase B
		t	MX	-	Z_AMPL_C	Mon	Timestamp: Impedance amplitude phase C
		t	MX	-	Z_AMPL_A	Mon	Timestamp: Impedance amplitude phase A
Z1	v1_dCMV	cVal.mag.f	MX	-	Z1_AMPL	Mon	Positive sequence impedance amplitude
		cVal.ang.f	MX	-	Z1_ANGLE	Mon	Positive sequence impedance phase angle
		q	MX	-	Z1_AMPL	Mon	Quality: Positive sequence impedance amplitude
		t	MX	-	Z1_AMPL	Mon	Timestamp: Positive sequence impedance amplitude
ZPP	v1_dDEL	cVal.ang.f	MX	-	Z_ANGLE_AB	Mon	Phase-to-phase A-B impedance phase angle
		cVal.mag.f	MX	-	Z_AMPL_BC	Mon	Phase-to-phase B-C impedance amplitude
		cVal.ang.f	MX	-	Z_ANGLE_BC	Mon	Phase-to-phase B-C impedance phase angle
		cVal.mag.f	MX	-	Z_AMPL_CA	Mon	Phase-to-phase C-A impedance amplitude

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
ZPP	v1_dDEL	cVal.mag.f	MX	-	Z_AMPL_AB	Mon	Phase-to-phase A-B impedance amplitude
		cVal.ang.f	MX	-	Z_ANGLE_CA	Mon	Phase-to-phase C-A impedance phase angle
		q	MX	-	Z_AMPL_AB	Mon	Quality: Phase-to-phase A-B impedance amplitude
		q	MX	-	Z_AMPL_CA	Mon	Quality: Phase-to-phase C-A impedance amplitude
		q	MX	-	Z_AMPL_BC	Mon	Quality: Phase-to-phase B-C impedance amplitude
		t	MX	-	Z_AMPL_BC	Mon	Timestamp: Phase-to-phase B-C impedance amplitude
		t	MX	-	Z_AMPL_CA	Mon	Timestamp: Phase-to-phase C-A impedance amplitude
		t	MX	-	Z_AMPL_AB	Mon	Timestamp: Phase-to-phase A-B impedance amplitude

Table 51: UEXPDIS Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operated
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	START	Mon	Started
		q	ST	-	START	Mon	Quality: Started
		t	ST	-	START	Mon	Timestamp: Started
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

## 7.4.4

## Directional overcurrent PDOC

LN type	LN prefix	LN class	Function block name
DPHPTOC instance 1 (revision 0)	DPH	PTOC	DPHHPDOC
DPHRDIR instance 1 (revision 0)	DPH	RDIR	DPHHPDOC
PHBLLN0 instance 1 (revision 0)	-	LLN0	DPHHPDOC

Table 52: DPHHPDOC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Op	a_dACT	general	ST	T	OPERATE	Mon	Operated
		phsA	ST	T	OPR_A	Mon	Operated phase A
		phsB	ST	T	OPR_B	Mon	Operated phase B
		phsC	ST	T	OPR_C	Mon	Operated phase C
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Str	c_dACD	general	ST	-	START	Mon	Started signal
		dirGeneral	ST	-	FAULT_DIR	Mon	Detected fault direction, general
		phsA	ST	-	ST_A	Mon	Started phase A
		dirPhsA	ST	-	FLT_DIR_A	Mon	Detected fault direction, phase A
		phsB	ST	-	ST_B	Mon	Started phase B
		dirPhsB	ST	-	FLT_DIR_B	Mon	Detected fault direction, phase B
		phsC	ST	-	ST_C	Mon	Started phase C
		dirPhsC	ST	-	FLT_DIR_C	Mon	Detected fault direction, phase C
		q	ST	-	START	Mon	Quality: Started signal
		t	ST	-	START	Mon	Timestamp: Started signal
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
IvdCrv	v1_dSPS	stVal	ST	-	INVAL_CRV	Mon	Invalid curve parameters
		q	ST	-	INVAL_CRV	Mon	Quality: Invalid curve parameters
		t	ST	-	INVAL_CRV	Mon	Timestamp: Invalid curve parameters

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

Table 53: DPHHPDOC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Dir	a_dACD	dirGeneral	ST	-	DIRECTION	Mon	Direction information, general
		dirPhsA	ST	-	DIR_A	Mon	Direction information, phase A
		dirPhsB	ST	-	DIR_B	Mon	Direction information, phase B
		dirPhsC	ST	-	DIR_C	Mon	Direction information, phase C
		q	ST	-	DIRECTION	Mon	Quality: Direction information, general
		t	ST	-	DIRECTION	Mon	Timestamp: Direction information, general
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850

Table 54: DPHHPDOC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orlent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

LN type	LN prefix	LN class	Function block name
DPHPTOC instance 1 (revision 0)	DPH	PTOC	DPHLPDOC
DPHRDIR instance 1 (revision 0)	DPH	RDIR	DPHLPDOC
PHBLLN0 instance 1 (revision 0)	-	LLN0	DPHLPDOC

**Table 55:** DPHLPDOC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Op	a_dACT	general	ST	T	OPERATE	Mon	Operated
		phsA	ST	T	OPR_A	Mon	Operated phase A
		phsB	ST	T	OPR_B	Mon	Operated phase B
		phsC	ST	T	OPR_C	Mon	Operated phase C
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Str	c_dACD	general	ST	-	START	Mon	Started signal
		dirGeneral	ST	-	FAULT_DIR	Mon	Detected fault direction, general
		phsA	ST	-	ST_A	Mon	Started phase A
		dirPhsA	ST	-	FLT_DIR_A	Mon	Detected fault direction, phase A
		phsB	ST	-	ST_B	Mon	Started phase B
		dirPhsB	ST	-	FLT_DIR_B	Mon	Detected fault direction, phase B
		phsC	ST	-	ST_C	Mon	Started phase C
		dirPhsC	ST	-	FLT_DIR_C	Mon	Detected fault direction, phase C
		q	ST	-	START	Mon	Quality: Started signal
		t	ST	-	START	Mon	Timestamp: Started signal
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	c_dINC	t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
IvdCrv	v1_dSPS	stVal	ST	-	INVAL_CRV	Mon	Invalid curve parameters
		q	ST	-	INVAL_CRV	Mon	Quality: Invalid curve parameters
		t	ST	-	INVAL_CRV	Mon	Timestamp: Invalid curve parameters
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

Table 56: DPHLPDOC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Dir	a_dACD	dirGeneral	ST	-	DIRECTION	Mon	Direction information, general
		dirPhsA	ST	-	DIR_A	Mon	Direction information, phase A
		dirPhsB	ST	-	DIR_B	Mon	Direction information, phase B
		dirPhsC	ST	-	DIR_C	Mon	Direction information, phase C
		q	ST	-	DIRECTION	Mon	Quality: Direction information, general
		t	ST	-	DIRECTION	Mon	Timestamp: Direction information, general
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850

Table 57: DPHLPDOC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orlent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

#### 7.4.5

#### Overcurrent protection PVOC

LN type	LN prefix	LN class	Function block name
PHPVOC (revision 0)	PH	PVOC	PHPVOC

Table 58: PHPVOC Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Op	a_dACT	general	ST	T	OPERATE	Mon	Operated
		phsA	ST	T	OPR_A	Mon	Operate signal for phase A
		phsB	ST	T	OPR_B	Mon	Operate signal for phase B
		phsC	ST	T	OPR_C	Mon	Operate signal for phase C
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Str	c_dACD	general	ST	-	START	Mon	Started
		phsA	ST	-	ST_A	Mon	Start signal for phase A
		phsB	ST	-	ST_B	Mon	Start signal for phase B
		phsC	ST	-	ST_C	Mon	Start signal for phase C
		q	ST	-	START	Mon	Quality: Started
		t	ST	-	START	Mon	Timestamp: Started
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Start duration
		q	MX	-	START_DUR	Mon	Quality: Start duration
		t	MX	-	START_DUR	Mon	Timestamp: Start duration
EffStrVal	v3_dWYE	cVal.mag.f	MX	-	EFF_ST_VAL_A	Mon	Effective start value for phase A
		cVal.mag.f	MX	-	EFF_ST_VAL_B	Mon	Effective start value for phase B
		cVal.mag.f	MX	-	EFF_ST_VAL_C	Mon	Effective start value for phase C
		q	MX	-	EFF_ST_VAL_C	Mon	Quality: Effective start value for phase C
		q	MX	-	EFF_ST_VAL_B	Mon	Quality: Effective start value for phase B
		q	MX	-	EFF_ST_VAL_A	Mon	Quality: Effective start value for phase A
		t	MX	-	EFF_ST_VAL_A	Mon	Timestamp: Effective start value for phase A
		t	MX	-	EFF_ST_VAL_B	Mon	Timestamp: Effective start value for phase B
		t	MX	-	EFF_ST_VAL_C	Mon	Timestamp: Effective start value for phase C

#### 7.4.6

#### Rate of change of frequency PFRC

LN type	LN prefix	LN class	Function block name
DAPFRC (revision 0)	DA	PFRC	DAPFRC

Table 59: DAPFRC Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	
		q	ST	-	Beh	Mon	Quality:
		t	ST	-	Beh	Mon	Timestamp:
BlkV	a_dSPS	stVal	ST	-	LOWAMPL_BLKD	Mon	Blocking indication due to low amplitude.
		q	ST	-	LOWAMPL_BLKD	Mon	Quality: Blocking indication due to low amplitude.
		t	ST	-	LOWAMPL_BLKD	Mon	Timestamp: Blocking indication due to low amplitude.
Op	b_dACT	general	ST	T	OPERATE	Mon	Operate signal for frequency gradient
		q	ST	T	OPERATE	Mon	Quality: Operate signal for frequency gradient
		t	ST	T	OPERATE	Mon	Timestamp: Operate signal for frequency gradient
Str	d_dACD	general	ST	-	START	Mon	Start signal for frequency gradient
		q	ST	-	START	Mon	Quality: Start signal for frequency gradient
		t	ST	-	START	Mon	Timestamp: Start signal for frequency gradient
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Start duration in percents of the total operation time
		q	MX	-	START_DUR	Mon	Quality: Start duration in percents of the total operation time
		t	MX	-	START_DUR	Mon	Timestamp: Start duration in percents of the total operation time

#### 7.4.7

#### Frequency protection PFRQ

LN type	LN prefix	LN class	Function block name
LSHDLLN0 instance 1 (revision 0)	-	LLN0	LSHDPFRQ
LSHDPFRC instance 1 (revision 0)	LSDH	PFRC	LSHDPFRQ
LSHDPTRC instance 1 (revision 0)	LSDH	PTRC	LSHDPFRQ
LSHDPTUF instance 1 (revision 0)	LSDH	PTUF	LSHDPFRQ

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**Table 60:** LSHDPFRQ Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
BlkV	a_dSPS	stVal	ST	-	LOWAMPL_BLKD	Mon	Signal indicating internal blocking due to low amplitude
		q	ST	-	LOWAMPL_BLKD	Mon	Quality: Signal indicating internal blocking due to low amplitude
		t	ST	-	LOWAMPL_BLKD	Mon	Timestamp: Signal indicating internal blocking due to low amplitude

**Table 61:** LSHDPFRQ Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPR_FRG	Mon	Operate signal for high df/dt
		q	ST	T	OPR_FRG	Mon	Quality: Operate signal for high df/dt
		t	ST	T	OPR_FRG	Mon	Timestamp: Operate signal for high df/dt
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	c_dINC	t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	ST_FRG	Mon	Pick-Up signal for high df/dt detection
		q	ST	-	ST_FRG	Mon	Quality: Pick-Up signal for high df/dt detection
		t	ST	-	ST_FRG	Mon	Timestamp: Pick-Up signal for high df/dt detection

**Table 62:** LSHDPFRQ Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operation of load shedding
		q	ST	T	OPERATE	Mon	Quality: Operation of load shedding
		t	ST	T	OPERATE	Mon	Timestamp: Operation of load shedding
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	START	Mon	General start. Under frequency or high df/dt detected
		q	ST	-	START	Mon	Quality: General start. Under frequency or high df/dt detected
		t	ST	-	START	Mon	Timestamp: General start. Under frequency or high df/dt detected
ManRest	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orIdent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
ManRest	v1_dSPC	Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
RestLodOp	v2_dACT	general	ST	-	RESTORE	Mon	Restore signal for load restoring purposes
		q	ST	-	RESTORE	Mon	Quality: Restore signal for load restoring purposes
		t	ST	-	RESTORE	Mon	Timestamp: Restore signal for load restoring purposes
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Start duration in percents of the total operation time
		q	MX	-	START_DUR	Mon	Quality: Start duration in percents of the total operation time
		t	MX	-	START_DUR	Mon	Timestamp: Start duration in percents of the total operation time
RestLodStr	v3_dACD	general	ST	-	ST_REST	Mon	Restore frequency attained and restore timer started
		q	ST	-	ST_REST	Mon	Quality: Restore frequency attained and restore timer started
		t	ST	-	ST_REST	Mon	Timestamp: Restore frequency attained and restore timer started

Table 63: LSHDPFRQ Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPR_FRQ	Mon	Operate signal for under frequency
		q	ST	T	OPR_FRQ	Mon	Quality: Operate signal for under frequency
		t	ST	T	OPR_FRQ	Mon	Timestamp: Operate signal for under frequency
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	ST_FRQ	Mon	Pick-Up signal for under frequency detection
		q	ST	-	ST_FRQ	Mon	Quality: Pick-Up signal for under frequency detection
		t	ST	-	ST_FRQ	Mon	Timestamp: Pick-Up signal for under frequency detection

## 7.4.8

### Harmonic distortion PHAR

LN type	LN prefix	LN class	Function block name
INRPHAR (revision 0)	INR	PHAR	INRPHAR

Table 64: INRPHAR Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Str	c_dACD	general	ST	-	BLK2H	Mon	Second harmonic based block
		phsA	ST	-	BLK2H_A	Mon	Second harmonic based block, phase A
		phsB	ST	-	BLK2H_B	Mon	Second harmonic based block, phase B
		phsC	ST	-	BLK2H_C	Mon	Second harmonic based block, phase C
		q	ST	-	BLK2H	Mon	Quality: Second harmonic based block
		t	ST	-	BLK2H	Mon	Timestamp: Second harmonic based block

## 7.4.9

### Local acceleration logic PLAL

LN type	LN prefix	LN class	Function block name
DSTPLAL (revision 0)	DST	PLAL	DSTPLAL

**Table 65:** *DSTPLAL Logical node data*

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter
		Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter
		q	ST	-	Beh	Mon	Quality: Behaviour parameter
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter
OpLosLod	b_dACT	general	ST	-	OPR_LOSSLOAD	Mon	Operate by loss of load
		q	ST	-	OPR_LOSSLOAD	Mon	Quality: Operate by loss of load
		t	ST	-	OPR_LOSSLOAD	Mon	Timestamp: Operate by loss of load
OpZnExd	b_dACT	general	ST	-	OPR_Z_EXTN	Mon	Operate by zone extension
		q	ST	-	OPR_Z_EXTN	Mon	Quality: Operate by zone extension
		t	ST	-	OPR_Z_EXTN	Mon	Timestamp: Operate by zone extension

#### 7.4.10 Motor supervision PMSU

LN type	LN prefix	LN class	Function block name
STTLLN0 instance 1 (revision 0)	-	LLN0	STTPMSU
STTPMRI instance 1 (revision 2)	STT	PMRI	STTPMSU
STTPMSS instance 1 (revision 0)	STT	PMSS	STTPMSU

**Table 66:** *STTPMSU Logical node data (instance 1)*

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

**Table 67:** STTPMSU Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
StrInh	a_dSPS	stVal	ST	-	LOCK_START	Mon	Lock out condition for restart of motor.
		q	ST	-	LOCK_START	Mon	Quality: Lock out condition for restart of motor.
		t	ST	-	LOCK_START	Mon	Timestamp: Lock out condition for restart of motor.
Op	b_dACT	general	ST	T	OPR_IIT	Mon	Operate/trip signal for thermal stress.
		q	ST	T	OPR_IIT	Mon	Quality: Operate/trip signal for thermal stress.
		t	ST	T	OPR_IIT	Mon	Timestamp: Operate/trip signal for thermal stress.
StrInhTmm	b_dINS	stVal	ST	-	T_RST_ENA	Mon	Time left for restart when lockstart is enabled in minutes
		q	ST	-	T_RST_ENA	Mon	Quality: Time left for restart when lockstart is enabled in minutes
		t	ST	-	T_RST_ENA	Mon	Timestamp: Time left for restart when lockstart is enabled in minutes
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	c_dINC	t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
StUpCnt	v1_dINS	stVal	ST	-	START_CNT	Mon	Number of motor start-ups occurred
		q	ST	-	START_CNT	Mon	Quality: Number of motor start-ups occurred
		t	ST	-	START_CNT	Mon	Timestamp: Number of motor start-ups occurred
RsStUpCnt	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	-	Mon	Reset acknowledge for startup counter
		q	ST	-	-	Mon	Quality: Reset acknowledge for startup counter
		t	ST	-	-	Mon	Timestamp: Reset acknowledge for startup counter
TmsCumStUp	v2_dMV	mag.f	MX	-	T_ST_CNT	Mon	Cumulated start-up time in sec
		q	MX	-	T_ST_CNT	Mon	Quality: Cumulated start-up time in sec
		t	MX	-	T_ST_CNT	Mon	Timestamp: Cumulated start-up time in sec
TmsStUp	v2_dMV	mag.f	MX	-	START_TIME	Mon	Measured motor latest startup time in sec
		q	MX	-	START_TIME	Mon	Quality: Measured motor latest startup time in sec
		t	MX	-	START_TIME	Mon	Timestamp: Measured motor latest startup time in sec
ThmStsPct	v2_dMV	mag.f	MX	-	IIT_RL	Mon	Thermal stress relative to set maximum thermal stress
		q	MX	-	IIT_RL	Mon	Quality: Thermal stress relative to set maximum thermal stress
		t	MX	-	IIT_RL	Mon	Timestamp: Thermal stress relative to set maximum thermal stress

Table 68: STTPMSU Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPR_STALL	Mon	Operate/trip signal for stalling protection.
		q	ST	T	OPR_STALL	Mon	Quality: Operate/trip signal for stalling protection.
		t	ST	T	OPR_STALL	Mon	Timestamp: Operate/trip signal for stalling protection.
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	MOT_START	Mon	Signal to show that motor startup is in progress
		q	ST	-	MOT_START	Mon	Quality: Signal to show that motor startup is in progress
		t	ST	-	MOT_START	Mon	Timestamp: Signal to show that motor startup is in progress
StrDur	v2_dMV	mag.f	MX	-	STALL_RL	Mon	Start time relative to the operate time for stall condition
		q	MX	-	STALL_RL	Mon	Quality: Start time relative to the operate time for stall condition
		t	MX	-	STALL_RL	Mon	Timestamp: Start time relative to the operate time for stall condition

#### 7.4.11

#### Restricted earth fault PNDF

LN type	LN prefix	LN class	Function block name
GNR1PHAR instance 1 (revision 0)	GNR1	PHAR	LREFPNDF
GNRLLLN0 instance 1 (revision 0)	-	LLN0	LREFPNDF
LREFPDIF instance 1 (revision 1)	LREF	PDIF	LREFPNDF

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**Table 69:** LREFPNDF Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Str	d_dACD	general	ST	-	-	Mon	Signal to indicate that second harmonic has been detected
		q	ST	-	-	Mon	Quality: Signal to indicate that second harmonic has been detected
		t	ST	-	-	Mon	Timestamp: Signal to indicate that second harmonic has been detected

**Table 70:** LREFPNDF Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

Table 71: LREFPNDF Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Low impedance restricted earthfault protection operate
		q	ST	T	OPERATE	Mon	Quality: Low impedance restricted earthfault protection operate
		t	ST	T	OPERATE	Mon	Timestamp: Low impedance restricted earthfault protection operate
DifAClc	b_dWYE	cVal.mag.f	MX	-	ID_COSPHI	Mon	Directional differential current Id cosphi
		q	MX	-	ID_COSPHI	Mon	Quality: Directional differential current Id cosphi
		t	MX	-	ID_COSPHI	Mon	Timestamp: Directional differential current Id cosphi
RstA	b_dWYE	cVal.mag.f	MX	-	IB	Mon	Bias current
		q	MX	-	IB	Mon	Quality: Bias current
		t	MX	-	IB	Mon	Timestamp: Bias current
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Str	d_dACD	general	ST	-	START	Mon	Low impedance restricted earthfault protection start
		q	ST	-	START	Mon	Quality: Low impedance restricted earthfault protection start
		t	ST	-	START	Mon	Timestamp: Low impedance restricted earthfault protection start
Blk2HSt	v2_dACT	general	ST	-	BLK2H	Mon	Signal to indicate second harmonic blocking when the second harmonic has been enabled
		q	ST	-	BLK2H	Mon	Quality: Signal to indicate second harmonic blocking when the second harmonic has been enabled
		t	ST	-	BLK2H	Mon	Timestamp: Signal to indicate second harmonic blocking when the second harmonic has been enabled

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Start duration in percentage of the total operating time
		q	MX	-	START_DUR	Mon	Quality: Start duration in percentage of the total operating time
		t	MX	-	START_DUR	Mon	Timestamp: Start duration in percentage of the total operating time

## 7.4.12 Protection scheme PSCH

LN type	LN prefix	LN class	Function block name
CRWPSCH (revision 0)	CRW	PSCH	CRWPSCH

Table 72: CRWPSCH Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Op	a_dACT	general	ST	T	OPR_WEI	Mon	Operation of WEI logic
		phsA	ST	T	OPR_WEI_A	Mon	Operation of WEI logic in phase A
		phsB	ST	T	OPR_WEI_B	Mon	Operation of WEI logic in phase B
		phsC	ST	T	OPR_WEI_C	Mon	Operation of WEI logic in phase C
		q	ST	T	OPR_WEI	Mon	Quality: Operation of WEI logic
		t	ST	T	OPR_WEI	Mon	Timestamp: Operation of WEI logic
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter
		Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
ProRx	a_dSPS	stVal	ST	T	CR	Mon	POR Carrier signal received from remote end
		q	ST	T	CR	Mon	Quality: POR Carrier signal received from remote end
		t	ST	T	CR	Mon	Timestamp: POR Carrier signal received from remote end
ProTx	a_dSPS	stVal	ST	T	ECHO	Mon	Carrier send by WEI logic
		q	ST	T	ECHO	Mon	Quality: Carrier send by WEI logic
		t	ST	T	ECHO	Mon	Timestamp: Carrier send by WEI logic
Str	b_dACD	general	ST	-	ECHO	Mon	Carrier send by WEI logic
		q	ST	-	ECHO	Mon	Quality: Carrier send by WEI logic
		t	ST	-	ECHO	Mon	Timestamp: Carrier send by WEI logic
Echo	b_dACT	general	ST	-	ECHO	Mon	Carrier send by WEI logic
		q	ST	-	ECHO	Mon	Quality: Carrier send by WEI logic
		t	ST	-	ECHO	Mon	Timestamp: Carrier send by WEI logic
RvABlk	b_dACT	general	ST	-	OPR_IRV	Mon	Operation of current reversal logic
		q	ST	-	OPR_IRV	Mon	Quality: Operation of current reversal logic
		t	ST	-	OPR_IRV	Mon	Timestamp: Operation of current reversal logic
WeiOp	b_dACT	general	ST	-	OPR_WEI	Mon	Operation of WEI logic
		q	ST	-	OPR_WEI	Mon	Quality: Operation of WEI logic
		t	ST	-	OPR_WEI	Mon	Timestamp: Operation of WEI logic

LN type	LN prefix	LN class	Function block name
DSOCPSC (revision 0)	DSOC	PSCH	DSOCPSC

**Table 73:** *DSOCPSC Logical node data*

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter
		Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
LosOfGrd	a_dSPS	stVal	ST	-	LCG	Mon	Loss of carrier guard signal
		q	ST	-	LCG	Mon	Quality: Loss of carrier guard signal
		t	ST	-	LCG	Mon	Timestamp: Loss of carrier guard signal
ProRx	a_dSPS	stVal	ST	T	-	Mon	Carrier signal received or missing carrier guard signal
		q	ST	T	-	Mon	Quality: Carrier signal received or missing carrier guard signal
		t	ST	T	-	Mon	Timestamp: Carrier signal received or missing carrier guard signal
ProTx	a_dSPS	stVal	ST	T	-	Mon	Teleprotection signal transmitted for a forward fault
		q	ST	T	-	Mon	Quality: Teleprotection signal transmitted for a forward fault
		t	ST	T	-	Mon	Timestamp: Teleprotection signal transmitted for a forward fault
Str	b_dACD	general	ST	-	CS	Mon	Carrier Send signal
		dirGeneral	ST	-	-	Mon	Directional attribute of carrier send signal
		q	ST	-	CS	Mon	Quality: Carrier Send signal
		t	ST	-	CS	Mon	Timestamp: Carrier Send signal
CarRx	b_dACT	general	ST	-	CRL	Mon	Carrier signal received or missing carrier guard signal
		q	ST	-	CRL	Mon	Quality: Carrier signal received or missing carrier guard signal
		t	ST	-	CRL	Mon	Timestamp: Carrier signal received or missing carrier guard signal
Op	b_dACT	general	ST	T	OPERATE	Mon	Trip output
		q	ST	T	OPERATE	Mon	Quality: Trip output
		t	ST	T	OPERATE	Mon	Timestamp: Trip output

LN type	LN prefix	LN class	Function block name
RCRWPSCH (revision 0)	RCRW	PSCH	RCRWPSCH

**Table 74:** *RCRWPSC Logical node data*

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter
		Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
ProRx	a_dSPS	stVal	ST	T	CR	Mon	POR Carrier signal received from remote end
		q	ST	T	CR	Mon	Quality: POR Carrier signal received from remote end
		t	ST	T	CR	Mon	Timestamp: POR Carrier signal received from remote end
ProTx	a_dSPS	stVal	ST	T	ECHO	Mon	Carrier send by WEI logic
		q	ST	T	ECHO	Mon	Quality: Carrier send by WEI logic
		t	ST	T	ECHO	Mon	Timestamp: Carrier send by WEI logic
Str	b_dACD	general	ST	-	ECHO	Mon	Carrier send by WEI logic
		q	ST	-	ECHO	Mon	Quality: Carrier send by WEI logic
		t	ST	-	ECHO	Mon	Timestamp: Carrier send by WEI logic
Echo	b_dACT	general	ST	-	ECHO	Mon	Carrier send by WEI logic
		q	ST	-	ECHO	Mon	Quality: Carrier send by WEI logic
		t	ST	-	ECHO	Mon	Timestamp: Carrier send by WEI logic
Op	b_dACT	general	ST	T	OPR_WEI	Mon	Operation of WEI logic
		q	ST	T	OPR_WEI	Mon	Quality: Operation of WEI logic
		t	ST	T	OPR_WEI	Mon	Timestamp: Operation of WEI logic
RvABlk	b_dACT	general	ST	-	OPR_IRV	Mon	Operation of current reversal logic
		q	ST	-	OPR_IRV	Mon	Quality: Operation of current reversal logic

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
RvABlk	b_dACT	t	ST	-	OPR_IRV	Mon	Timestamp: Operation of current reversal logic
WeiOp	b_dACT	general	ST	-	OPR_WEI	Mon	Operation of WEI logic
		q	ST	-	OPR_WEI	Mon	Quality: Operation of WEI logic
		t	ST	-	OPR_WEI	Mon	Timestamp: Operation of WEI logic

LN type	LN prefix	LN class	Function block name
RESCPSCH (revision 0)	RESC	PSCH	RESCPSCH

Table 75: RESCPSC Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orlident	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter
		Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
LosOfGrd	a_dSPS	stVal	ST	-	LCG	Mon	loss of carrier guard signal
		q	ST	-	LCG	Mon	Quality: loss of carrier guard signal
		t	ST	-	LCG	Mon	Timestamp: loss of carrier guard signal
ProRx	a_dSPS	stVal	ST	T	-	Mon	Teleprotection signal received for a forward fault
		q	ST	T	-	Mon	Quality: Teleprotection signal received for a forward fault
		t	ST	T	-	Mon	Timestamp: Teleprotection signal received for a forward fault
ProTx	a_dSPS	stVal	ST	T	-	Mon	Teleprotection signal transmitted for a forward fault

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
ProTx	a_dSPS	q	ST	T	-	Mon	Quality: Teleprotection signal transmitted for a forward fault
		t	ST	T	-	Mon	Timestamp: Teleprotection signal transmitted for a forward fault
Str	b_dACD	general	ST	-	CS	Mon	Carrier Send by Communication Scheme Logic
		dirGeneral	ST	-	-	Mon	Directional attribute of Carrier Send signal
		q	ST	-	CS	Mon	Quality: Carrier Send by Communication Scheme Logic
		t	ST	-	CS	Mon	Timestamp: Carrier Send by Communication Scheme Logic
CarRx	b_dACT	general	ST	-	CRL	Mon	Carrier Receive from Communication Scheme Logic
		q	ST	-	CRL	Mon	Quality: Carrier Receive from Communication Scheme Logic
		t	ST	-	CRL	Mon	Timestamp: Carrier Receive from Communication Scheme Logic
Op	b_dACT	general	ST	T	OPERATE	Mon	Trip by Communication Scheme Logic
		q	ST	T	OPERATE	Mon	Quality: Trip by Communication Scheme Logic
		t	ST	T	OPERATE	Mon	Timestamp: Trip by Communication Scheme Logic

### 7.4.13 Transient earth fault PTEF

LN type	LN prefix	LN class	Function block name
INTRPTEF (revision 0)	INTR	PTEF	INTRPTEF

Table 76: INTRPTEF Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operate signal
		q	ST	T	OPERATE	Mon	Quality: Operate signal
		t	ST	T	OPERATE	Mon	Timestamp: Operate signal
Str	d_dACD	general	ST	-	START	Mon	Start signal
		dirGeneral	ST	-	FAULT_DIR	Mon	Detected fault direction
		q	ST	-	START	Mon	Quality: Start signal
		t	ST	-	START	Mon	Timestamp: Start signal
InhEF	v1_dSPS	stVal	ST	-	BLK_EF	Mon	Block signal for EF to indicate opposite direction peaks
		q	ST	-	BLK_EF	Mon	Quality: Block signal for EF to indicate opposite direction peaks
		t	ST	-	BLK_EF	Mon	Timestamp: Block signal for EF to indicate opposite direction peaks
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

#### 7.4.14 Transformer differential PTDF

LN type	LN prefix	LN class	Function block name
GNR2PHAR instance 1 (revision 0)	GNR2	PHAR	TR2PTDF
GNRLLLN0 instance 1 (revision 0)	-	LLN0	TR2PTDF
TR2PDIF instance 1 (revision 0)	TR2	PDIF	TR2PTDF
TR5HPHAR instance 2 (revision 0)	TR5H	PHAR	TR2PTDF

Table 77: TR2PTDF Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Str	c_dACD	general	ST	-	-	Mon	2nd harmonic restraint blocking for PHAR LN, combined
		phsA	ST	-	-	Mon	2nd harmonic restraint blocking for PHAR LN, phase A
		phsB	ST	-	-	Mon	2nd harmonic restraint blocking for PHAR LN, phase B
		phsC	ST	-	-	Mon	2nd harmonic restraint blocking for PHAR LN, phase C
		q	ST	-	-	Mon	Quality: 2nd harmonic restraint blocking for PHAR LN, combined
		t	ST	-	-	Mon	Timestamp: 2nd harmonic restraint blocking for PHAR LN, combined
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850

Table 78: TR2PTDF Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

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**Table 79:** TR2PTDF Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Op	a_dACT	general	ST	T	OPERATE	Mon	Operate signal, combined (all phases, both stages)
		phsA	ST	T	OPR_A	Mon	Operate signal phase A
		phsB	ST	T	OPR_B	Mon	Operate signal phase B
		phsC	ST	T	OPR_C	Mon	Operate signal phase C
		q	ST	T	OPERATE	Mon	Quality: Operate signal, combined (all phases, both stages)
		t	ST	T	OPERATE	Mon	Timestamp: Operate signal, combined (all phases, both stages)
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
BlkWavSt	v1_dACT	general	ST	-	BLKD WAV	Mon	Status from waveform blocking, combined
		phsA	ST	-	BLKD WAV_A	Mon	Status from waveform blocking, phase A
		phsB	ST	-	BLKD WAV_B	Mon	Status from waveform blocking, phase B
		phsC	ST	-	BLKD WAV_C	Mon	Status from waveform blocking, phase C
		q	ST	-	BLKD WAV	Mon	Quality: Status from waveform blocking, combined
		t	ST	-	BLKD WAV	Mon	Timestamp: Status from waveform blocking, combined
Blk2HSt	v1_dACT	general	ST	-	BLKD2H	Mon	Status from 2nd harmonic restraint block, combined
		phsA	ST	-	BLKD2H_A	Mon	Status from 2nd harmonic restraint block, phase A
		phsB	ST	-	BLKD2H_B	Mon	Status from 2nd harmonic restraint block, phase B
		phsC	ST	-	BLKD2H_C	Mon	Status from 2nd harmonic restraint block, phase C
		q	ST	-	BLKD2H	Mon	Quality: Status from 2nd harmonic restraint block, combined
		t	ST	-	BLKD2H	Mon	Timestamp: Status from 2nd harmonic restraint block, combined

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Blk5HSt	v1_dACT	general	ST	-	BLKD5H	Mon	Status from 5th harmonic restraint blocking, combined
		phsA	ST	-	BLKD5H_A	Mon	Status from 5th harmonic restraint blocking, phase A
		phsB	ST	-	BLKD5H_B	Mon	Status from 5th harmonic restraint blocking, phase B
		phsC	ST	-	BLKD5H_C	Mon	Status from 5th harmonic restraint blocking, phase C
		q	ST	-	BLKD5H	Mon	Quality: Status from 5th harmonic restraint blocking, combined
		t	ST	-	BLKD5H	Mon	Timestamp: Status from 5th harmonic restraint blocking, combined
OpLoSet	v2_dACT	general	ST	-	OPR_LS	Mon	Operate signal from low set (biased) stage
		q	ST	-	OPR_LS	Mon	Quality: Operate signal from low set (biased) stage
		t	ST	-	OPR_LS	Mon	Timestamp: Operate signal from low set (biased) stage
OpHiSet	v2_dACT	general	ST	-	OPR_HS	Mon	Operate signal from high set (instantaneous) stage
		q	ST	-	OPR_HS	Mon	Quality: Operate signal from high set (instantaneous) stage
		t	ST	-	OPR_HS	Mon	Timestamp: Operate signal from high set (instantaneous) stage
AngPriAB	v2_dMV	mag.f	MX	-	I_ANGL_A1_B1	Mon	Current phase angle phase A – phase B, winding 1
		q	MX	-	I_ANGL_A1_B1	Mon	Quality: Current phase angle phase A – phase B, winding 1
		t	MX	-	I_ANGL_A1_B1	Mon	Timestamp: Current phase angle phase A – phase B, winding 1
AngPriBC	v2_dMV	mag.f	MX	-	I_ANGL_B1_C1	Mon	Current phase angle phase B – phase C, winding 1
		q	MX	-	I_ANGL_B1_C1	Mon	Quality: Current phase angle phase B – phase C, winding 1
		t	MX	-	I_ANGL_B1_C1	Mon	Timestamp: Current phase angle phase B – phase C, winding 1
AngPriCA	v2_dMV	mag.f	MX	-	I_ANGL_C1_A1	Mon	Current phase angle phase C – phase A, winding 1
		q	MX	-	I_ANGL_C1_A1	Mon	Quality: Current phase angle phase C – phase A, winding 1
		t	MX	-	I_ANGL_C1_A1	Mon	Timestamp: Current phase angle phase C – phase A, winding 1
AngScyAB	v2_dMV	mag.f	MX	-	I_ANGL_A2_B2	Mon	Current phase angle phase A – phase B, winding 2
		q	MX	-	I_ANGL_A2_B2	Mon	Quality: Current phase angle phase A – phase B, winding 2
		t	MX	-	I_ANGL_A2_B2	Mon	Timestamp: Current phase angle phase A – phase B, winding 2

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
AngScyBC	v2_dMV	mag.f	MX	-	I_ANGL_B2_C2	Mon	Current phase angle phase B – phase C, winding 2
		q	MX	-	I_ANGL_B2_C2	Mon	Quality: Current phase angle phase B – phase C, winding 2
		t	MX	-	I_ANGL_B2_C2	Mon	Timestamp: Current phase angle phase B – phase C, winding 2
AngScyCA	v2_dMV	mag.f	MX	-	I_ANGL_C2_A2	Mon	Current phase angle phase C – phase A, winding 2
		q	MX	-	I_ANGL_C2_A2	Mon	Quality: Current phase angle phase C – phase A, winding 2
		t	MX	-	I_ANGL_C2_A2	Mon	Timestamp: Current phase angle phase C – phase A, winding 2
AngPriScyA	v2_dMV	mag.f	MX	-	I_ANGL_A1_A2	Mon	Current phase angle diff between winding 1 and 2, phase A
		q	MX	-	I_ANGL_A1_A2	Mon	Quality: Current phase angle diff between winding 1 and 2, phase A
		t	MX	-	I_ANGL_A1_A2	Mon	Timestamp: Current phase angle diff between winding 1 and 2, phase A
AngPriScyB	v2_dMV	mag.f	MX	-	I_ANGL_B1_B2	Mon	Current phase angle diff between winding 1 and 2, phase B
		q	MX	-	I_ANGL_B1_B2	Mon	Quality: Current phase angle diff between winding 1 and 2, phase B
		t	MX	-	I_ANGL_B1_B2	Mon	Timestamp: Current phase angle diff between winding 1 and 2, phase B
AngPriScyC	v2_dMV	mag.f	MX	-	I_ANGL_C1_C2	Mon	Current phase angle diff between winding 1 and 2, phase C
		q	MX	-	I_ANGL_C1_C2	Mon	Quality: Current phase angle diff between winding 1 and 2, phase C
		t	MX	-	I_ANGL_C1_C2	Mon	Timestamp: Current phase angle diff between winding 1 and 2, phase C

Table 80: TR2PTDF Logical node data (instance 2)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Str	a_dACD	general	ST	-	-	Mon	5th harmonic restraint blocking for PHAR LN, combined
		phsA	ST	-	-	Mon	5th harmonic restraint blocking for PHAR LN, phase A
		phsB	ST	-	-	Mon	5th harmonic restraint blocking for PHAR LN, phase B
		phsC	ST	-	-	Mon	5th harmonic restraint blocking for PHAR LN, phase C
		q	ST	-	-	Mon	Quality: 5th harmonic restraint blocking for PHAR LN, combined

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Str	a_dACD	t	ST	-	-	Mon	Timestamp: 5th harmonic restraint blocking for PHAR LN, combined
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850

### 7.4.15 Time overcurrent PTOC

LN type	LN prefix	LN class	Function block name
JAMPTOC (revision 0)	JAM	PTOC	JAMPTOC

**Table 81:** JAMPTOC Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
Beh	a_dINS	t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
		stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
Str	b_dACD	t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
		general	ST	-	START	Mon	Started signal
		q	ST	-	START	Mon	Quality: Started signal
		t	ST	-	START	Mon	Timestamp: Started signal

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Op	b_dACT	general	ST	T	OPERATE	Mon	Operated
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

LN type	LN prefix	LN class	Function block name
PREVPTOC (revision 0)	PREV	PTOC	PREVPTOC

Table 82: PREVPTOC Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operated signal
		q	ST	T	OPERATE	Mon	Quality: Operated signal
		t	ST	T	OPERATE	Mon	Timestamp: Operated signal
Str	d_dACD	general	ST	-	START	Mon	Started signal
		q	ST	-	START	Mon	Quality: Started signal
		t	ST	-	START	Mon	Timestamp: Started signal

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Start duration in percentage of the total operating time
		q	MX	-	START_DUR	Mon	Quality: Start duration in percentage of the total operating time
		t	MX	-	START_DUR	Mon	Timestamp: Start duration in percentage of the total operating time

LN type	LN prefix	LN class	Function block name
EFHPTOC (revision 0)	EFH	PTOC	EFHPTOC

**Table 83:** EFHPTOC Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operated
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
Str	d_dACD	general	ST	-	START	Mon	Started
		q	ST	-	START	Mon	Quality: Started
		t	ST	-	START	Mon	Timestamp: Started
IvdCrv	v1_dSPS	stVal	ST	-	INVAL_CRV	Mon	Invalid curve parameters
		q	ST	-	INVAL_CRV	Mon	Quality: Invalid curve parameters
		t	ST	-	INVAL_CRV	Mon	Timestamp: Invalid curve parameters

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

LN type	LN prefix	LN class	Function block name
EFIPTOC (revision 0)	EFI	PTOC	EFIPTOC

Table 84: *EFIPTOC Logical node data*

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orlident	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operated
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
Str	d_dACD	general	ST	-	START	Mon	Started
		q	ST	-	START	Mon	Quality: Started
		t	ST	-	START	Mon	Timestamp: Started
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

LN type	LN prefix	LN class	Function block name
EFLPTOC (revision 0)	EFL	PTOC	EFLPTOC

**Table 85:** *EFLPTOC Logical node data*

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operated
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
Str	d_dACD	general	ST	-	START	Mon	Started
		q	ST	-	START	Mon	Quality: Started
		t	ST	-	START	Mon	Timestamp: Started
IvdCrv	v1_dSPS	stVal	ST	-	INVAL_CRV	Mon	Invalid curve parameters
		q	ST	-	INVAL_CRV	Mon	Quality: Invalid curve parameters
		t	ST	-	INVAL_CRV	Mon	Timestamp: Invalid curve parameters
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

LN type	LN prefix	LN class	Function block name
NSPTOC (revision 0)	NS	PTOC	NSPTOC

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**Table 86:** NSPTOC Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orlident	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operate Signal
		q	ST	T	OPERATE	Mon	Quality: Operate Signal
		t	ST	T	OPERATE	Mon	Timestamp: Operate Signal
Str	d_dACD	general	ST	-	START	Mon	Start Signal
		q	ST	-	START	Mon	Quality: Start Signal
		t	ST	-	START	Mon	Timestamp: Start Signal
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Start Duration
		q	MX	-	START_DUR	Mon	Quality: Start Duration
		t	MX	-	START_DUR	Mon	Timestamp: Start Duration

LN type	LN prefix	LN class	Function block name
PDNSPTOC (revision 0)	PDNS	PTOC	PDNSPTOC

**Table 87:** PDNSPTOC Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orlident	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Phase discontinuity protection operated.
		q	ST	T	OPERATE	Mon	Quality: Phase discontinuity protection operated.
		t	ST	T	OPERATE	Mon	Timestamp: Phase discontinuity protection operated.
ImbNgA	b_dMV	mag.f	MX	-	RATIO_I2_I1	Mon	Measured current ratio I2 / I1
		q	MX	-	RATIO_I2_I1	Mon	Quality: Measured current ratio I2 / I1
		t	MX	-	RATIO_I2_I1	Mon	Timestamp: Measured current ratio I2 / I1
Str	d_dACD	general	ST	-	START	Mon	Phase discontinuity protection started
		q	ST	-	START	Mon	Quality: Phase discontinuity protection started
		t	ST	-	START	Mon	Timestamp: Phase discontinuity protection started
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

LN type	LN prefix	LN class	Function block name
PHHPTOC (revision 0)	PHH	PTOC	PHHPTOC

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**Table 88:** *PHHPTOC Logical node data*

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Op	a_dACT	general	ST	T	OPERATE	Mon	Operated
		phsA	ST	T	OPR_A	Mon	Operated phase A
		phsB	ST	T	OPR_B	Mon	Operated phase B
		phsC	ST	T	OPR_C	Mon	Operated phase C
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Str	c_dACD	general	ST	-	START	Mon	Started signal
		phsA	ST	-	ST_A	Mon	Started phase A
		phsB	ST	-	ST_B	Mon	Started phase B
		phsC	ST	-	ST_C	Mon	Started phase C
		q	ST	-	START	Mon	Quality: Started signal
		t	ST	-	START	Mon	Timestamp: Started signal
lvdCrv	v1_dSPS	stVal	ST	-	INVAL_CRV	Mon	Invalid curve parameters
		q	ST	-	INVAL_CRV	Mon	Quality: Invalid curve parameters
		t	ST	-	INVAL_CRV	Mon	Timestamp: Invalid curve parameters
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

LN type	LN prefix	LN class	Function block name
PHIPTOC (revision 0)	PHI	PTOC	PHIPTOC

**Table 89:** PHIPTOC Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Op	a_dACT	general	ST	T	OPERATE	Mon	Operated
		phsA	ST	T	OPR_A	Mon	Operated phase A
		phsB	ST	T	OPR_B	Mon	Operated phase B
		phsC	ST	T	OPR_C	Mon	Operated phase C
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Str	c_dACD	general	ST	-	START	Mon	Started signal
		phsA	ST	-	ST_A	Mon	Started phase A
		phsB	ST	-	ST_B	Mon	Started phase B
		phsC	ST	-	ST_C	Mon	Started phase C
		q	ST	-	START	Mon	Quality: Started signal
		t	ST	-	START	Mon	Timestamp: Started signal
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

LN type	LN prefix	LN class	Function block name
PHLPTOC (revision 0)	PHL	PTOC	PHLPTOC

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**Table 90:** PHLPTOC Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Op	a_dACT	general	ST	T	OPERATE	Mon	Operated
		phsA	ST	T	OPR_A	Mon	Operated phase A
		phsB	ST	T	OPR_B	Mon	Operated phase B
		phsC	ST	T	OPR_C	Mon	Operated phase C
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Str	c_dACD	general	ST	-	START	Mon	Started signal
		phsA	ST	-	ST_A	Mon	Started phase A
		phsB	ST	-	ST_B	Mon	Started phase B
		phsC	ST	-	ST_C	Mon	Started phase C
		q	ST	-	START	Mon	Quality: Started signal
		t	ST	-	START	Mon	Timestamp: Started signal
lvdCrv	v1_dSPS	stVal	ST	-	INVAL_CRV	Mon	Invalid curve parameters
		q	ST	-	INVAL_CRV	Mon	Quality: Invalid curve parameters
		t	ST	-	INVAL_CRV	Mon	Timestamp: Invalid curve parameters
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

LN type	LN prefix	LN class	Function block name
MRE1PTOC instance 1 (revision 0)	MRE1	PTOC	MREFPTOC

MRE2PTOC instance 1 (revision 0)	MRE2	PTOC	MREFPTOC
RESBLLN0 instance 1 (revision 0)	-	LLN0	MREFPTOC

**Table 91:** MREFPTOC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	-	ALARM	Mon	Alarm signal
		q	ST	-	ALARM	Mon	Quality: Alarm signal
		t	ST	-	ALARM	Mon	Timestamp: Alarm signal
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	-	Mon	Alarm started
		q	ST	-	-	Mon	Quality: Alarm started
		t	ST	-	-	Mon	Timestamp: Alarm started

**Table 92:** MREFPTOC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	-	OPERATE	Mon	Operated
		q	ST	-	OPERATE	Mon	Quality: Operated
		t	ST	-	OPERATE	Mon	Timestamp: Operated
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	START	Mon	Started
		q	ST	-	START	Mon	Quality: Started
		t	ST	-	START	Mon	Timestamp: Started

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**Table 93:** MREFPTOC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

LN type	LN prefix	LN class	Function block name
GNRLLLNO instance 1 (revision 0)	-	LLNO	HAEFPTOC
HAEFMHAI instance 1 (revision 0)	HAEF	MHAI	HAEFPTOC
HAEFPTOC instance 1 (revision 0)	HAEF	PTOC	HAEFPTOC

**Table 94:** HAEFPTOC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

Table 95: HAEFPTOC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Hz	b_dMV	mag.f	MX	-	-	Mon	Rated frequency
		q	MX	-	-	Mon	Quality: Rated frequency
		t	MX	-	-	Mon	Timestamp: Rated frequency
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
HRmsA	d_dWYE	cVal.mag.f	MX	-	-	Mon	Harmonic current RMS, magnitude of reported value
		rangeC.hhLim.f	CF	-	-	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	-	-	High limit (physical value)
		rangeC.llLim.f	CF	-	-	-	Low limit (physical value)
		rangeC.lLim.f	CF	-	-	-	Low Low limit (physical value)
		rangeC.min.f	CF	-	-	-	Minimum value
		rangeC.max.f	CF	-	-	-	Maximum value
		subCVal.mag.f	SV	-	-	-	Substituted value
		range	MX	-	-	Mon	Harmonic current RMS range
		q	MX	-	-	Mon	Quality: Harmonic current RMS, magnitude of reported value
		t	MX	-	-	Mon	Timestamp: Harmonic current RMS, magnitude of reported value
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	-	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	-	-	Zero point clamping in 0,001% of range

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**Table 96:** HAEFPTOC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	-	OPERATE	Mon	Operate signal
		q	ST	-	OPERATE	Mon	Quality: Operate signal
		t	ST	-	OPERATE	Mon	Timestamp: Operate signal
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	START	Mon	Start signal
		q	ST	-	START	Mon	Quality: Start signal
		t	ST	-	START	Mon	Timestamp: Start signal
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of operate time
BlkARef	v2_dSPS	stVal	ST	-	BLKD_I_REF	Mon	Current comparison status indicator blocked/not blocked
		q	ST	-	BLKD_I_REF	Mon	Quality: Current comparison status indicator blocked/not blocked
		t	ST	-	BLKD_I_REF	Mon	Timestamp: Current comparison status indicator blocked/not blocked

LN type	LN prefix	LN class	Function block name
MNSPTOC (revision 1)	MNS	PTOC	MNSPTOC

**Table 97:** MNSPTOC Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
StrInh	a_dSPS	stVal	ST	-	BLK_RESTART	Mon	Signal for blocking reconnection of an overheated machine
		q	ST	-	BLK_RESTART	Mon	Quality: Signal for blocking reconnection of an overheated machine
		t	ST	-	BLK_RESTART	Mon	Timestamp: Signal for blocking reconnection of an overheated machine
Op	b_dACT	general	ST	T	OPERATE	Mon	Operated
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
Str	d_dACD	general	ST	-	START	Mon	Started
		q	ST	-	START	Mon	Quality: Started
		t	ST	-	START	Mon	Timestamp: Started
TmsRecEna	v1_dINS	stVal	ST	-	T_ENARESTART	Mon	Estimated time to reset of block restart
		q	ST	-	T_ENARESTART	Mon	Quality: Estimated time to reset of block restart
		t	ST	-	T_ENARESTART	Mon	Timestamp: Estimated time to reset of block restart
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

#### 7.4.16

#### Overfrequency PTOF

LN type	LN prefix	LN class	Function block name
DAPTOF (revision 0)	DA	PTOF	DAPTOF

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**Table 98:** DAPTOF Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter
		Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
BlkV	a_dSPS	stVal	ST	-	LOWAMPL_BLKD	Mon	Blocking indication due to low amplitude.
		q	ST	-	LOWAMPL_BLKD	Mon	Quality: Blocking indication due to low amplitude.
		t	ST	-	LOWAMPL_BLKD	Mon	Timestamp: Blocking indication due to low amplitude.
Op	b_dACT	general	ST	T	OPERATE	Mon	Operate signal for overfrequency protection
		q	ST	T	OPERATE	Mon	Quality: Operate signal for overfrequency protection
		t	ST	T	OPERATE	Mon	Timestamp: Operate signal for overfrequency protection
Str	d_dACD	general	ST	-	START	Mon	Start signal for overfrequency protection
		q	ST	-	START	Mon	Quality: Start signal for overfrequency protection
		t	ST	-	START	Mon	Timestamp: Start signal for overfrequency protection
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Start duration in percents of the total operation time.
		q	MX	-	START_DUR	Mon	Quality: Start duration in percents of the total operation time.
		t	MX	-	START_DUR	Mon	Timestamp: Start duration in percents of the total operation time.

## 7.4.17

## Overvoltage PTOV

LN type	LN prefix	LN class	Function block name
NSPTOV (revision 0)	NS	PTOV	NSPTOV

Table 99: NSPTOV Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operate signal for Negative Sequence Overvoltage logic
		q	ST	T	OPERATE	Mon	Quality: Operate signal for Negative Sequence Overvoltage logic
		t	ST	T	OPERATE	Mon	Timestamp: Operate signal for Negative Sequence Overvoltage logic
Str	d_dACD	general	ST	-	START	Mon	Start signal for Negative Sequence Overvoltage logic
		q	ST	-	START	Mon	Quality: Start signal for Negative Sequence Overvoltage logic
		t	ST	-	START	Mon	Timestamp: Start signal for Negative Sequence Overvoltage logic
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Start duration in percentage of the total operating time
		q	MX	-	START_DUR	Mon	Quality: Start duration in percentage of the total operating time
		t	MX	-	START_DUR	Mon	Timestamp: Start duration in percentage of the total operating time

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LN type	LN prefix	LN class	Function block name
PHPTOV (revision 0)	PH	PTOV	PHPTOV

Table 100: PHPTOV Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Op	a_dACT	general	ST	T	OPERATE	Mon	Operate signal, combined
		phsA	ST	T	OPR_A	Mon	Operate signal, phase 1
		phsB	ST	T	OPR_B	Mon	Operate signal, phase 2
		phsC	ST	T	OPR_C	Mon	Operate signal, phase 3
		q	ST	T	OPERATE	Mon	Quality: Operate signal, combined
		t	ST	T	OPERATE	Mon	Timestamp: Operate signal, combined
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orlent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Str	c_dACD	general	ST	-	START	Mon	Start signal, combined
		phsA	ST	-	ST_A	Mon	Start signal, phase 1
		phsB	ST	-	ST_B	Mon	Start signal, phase 2
		phsC	ST	-	ST_C	Mon	Start signal, phase 3
		q	ST	-	START	Mon	Quality: Start signal, combined
		t	ST	-	START	Mon	Timestamp: Start signal, combined
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of Start time to Operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of Start time to Operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of Start time to Operate time

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
VMax	v2_dMV	mag.f	MX	-	U_MAX	Mon	Maximum of the phase or phase-to-phase voltages
		q	MX	-	U_MAX	Mon	Quality: Maximum of the phase or phase-to-phase voltages
		t	MX	-	U_MAX	Mon	Timestamp: Maximum of the phase or phase-to-phase voltages
VMaxRat	v2_dMV	mag.f	MX	-	U_RATIO	Mon	Maximum voltage ratio to the Start value
		q	MX	-	U_RATIO	Mon	Quality: Maximum voltage ratio to the Start value
		t	MX	-	U_RATIO	Mon	Timestamp: Maximum voltage ratio to the Start value

LN type	LN prefix	LN class	Function block name
PSPTOV (revision 0)	PS	PTOV	PSPTOV

**Table 101:** PSPTOV Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operate signal for Positive Sequence Overvoltage logic
		q	ST	T	OPERATE	Mon	Quality: Operate signal for Positive Sequence Overvoltage logic
		t	ST	T	OPERATE	Mon	Timestamp: Operate signal for Positive Sequence Overvoltage logic

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Str	d_dACD	general	ST	-	START	Mon	Start signal for Positive Sequence Overvoltage logic
		q	ST	-	START	Mon	Quality: Start signal for Positive Sequence Overvoltage logic
		t	ST	-	START	Mon	Timestamp: Start signal for Positive Sequence Overvoltage logic
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Start duration in percentage of the total operating time
		q	MX	-	START_DUR	Mon	Quality: Start duration in percentage of the total operating time
		t	MX	-	START_DUR	Mon	Timestamp: Start duration in percentage of the total operating time

LN type	LN prefix	LN class	Function block name
ROVPTOV (revision 0)	ROV	PTOV	ROVPTOV

Table 102: ROVPTOV Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orlent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operate signal for residual overvoltage logic
		q	ST	T	OPERATE	Mon	Quality: Operate signal for residual overvoltage logic

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Op	b_dACT	t	ST	T	OPERATE	Mon	Timestamp: Operate signal for residual overvoltage logic
Str	d_dACD	general	ST	-	START	Mon	Start signal for residual overvoltage logic
		q	ST	-	START	Mon	Quality: Start signal for residual overvoltage logic
		t	ST	-	START	Mon	Timestamp: Start signal for residual overvoltage logic
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Start duration in percentage of the total operating time
		q	MX	-	START_DUR	Mon	Quality: Start duration in percentage of the total operating time
		t	MX	-	START_DUR	Mon	Timestamp: Start duration in percentage of the total operating time

#### 7.4.18

#### Protection trip conditioning PTRC

LN type	LN prefix	LN class	Function block name
TRPPTRC (revision 0)	TRP	PTRC	TRPPTRC

Table 103: TRPPTRC Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter
		Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter
		q	ST	-	Beh	Mon	Quality: Behaviour parameter
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter
Tr	b_dACT	general	ST	-	TRIP	Mon	General trip output signal
		q	ST	-	TRIP	Mon	Quality: General trip output signal
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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Tr	b_dACT	t	ST	-	TRIP	Mon	Timestamp: General trip output signal
LORs	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orlident	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
ClsLO	v1_dSPS	stVal	ST	-	CL_LKOUT	Mon	Circuit breaker lockout output (set until reset)
		q	ST	-	CL_LKOUT	Mon	Quality: Circuit breaker lockout output (set until reset)
		t	ST	-	CL_LKOUT	Mon	Timestamp: Circuit breaker lockout output (set until reset)

#### 7.4.19 Thermal overload PTTR

LN type	LN prefix	LN class	Function block name
MPTTR (revision 0)	M	PTTR	MPTTR

Table 104: MPTTR Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orlident	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
AlmThm	a_dSPS	stVal	ST	-	ALARM	Mon	Alarm signal when thermal load exceeds alarm setting
		q	ST	-	ALARM	Mon	Quality: Alarm signal when thermal load exceeds alarm setting
		t	ST	-	ALARM	Mon	Timestamp: Alarm signal when thermal load exceeds alarm setting
StrInh	a_dSPS	stVal	ST	-	BLK_RESTART	Mon	Thermal overload indicator, to inhibit restart
		q	ST	-	BLK_RESTART	Mon	Quality: Thermal overload indicator, to inhibit restart
		t	ST	-	BLK_RESTART	Mon	Timestamp: Thermal overload indicator, to inhibit restart
Op	b_dACT	general	ST	T	OPERATE	Mon	Operate signal when thermal load exceeds operate setting
		q	ST	T	OPERATE	Mon	Quality: Operate signal when thermal load exceeds operate setting
		t	ST	T	OPERATE	Mon	Timestamp: Operate signal when thermal load exceeds operate setting
TmsRecEna	v1_dINS	stVal	ST	-	T_ENARESTART	Mon	Estimated time to reset of block restart
		q	ST	-	T_ENARESTART	Mon	Quality: Estimated time to reset of block restart
		t	ST	-	T_ENARESTART	Mon	Timestamp: Estimated time to reset of block restart
RsTmp	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
SenFlt	v1_dSPS	stVal	ST	-	-	Mon	Error signal from the temperature sensor
		q	ST	-	-	Mon	Quality: Error signal from the temperature sensor
		t	ST	-	-	Mon	Timestamp: Error signal from the temperature sensor
ThmDev	v2_dMV	mag.f	MX	-	THERM_LEVEL	Mon	Calculated thermal level of the device
		q	MX	-	THERM_LEVEL	Mon	Quality: Calculated thermal level of the device
		t	MX	-	THERM_LEVEL	Mon	Timestamp: Calculated thermal level of the device
TmpUsed	v2_dMV	mag.f	MX	-	TEMP_AMB	Mon	Ambient temperature used in calculations
		q	MX	-	TEMP_AMB	Mon	Quality: Ambient temperature used in calculations
		t	MX	-	TEMP_AMB	Mon	Timestamp: Ambient temperature used in calculations
ThmLevSt	v2_dMV	mag.f	MX	-	THERMLEV_ST	Mon	Thermal level at beginning of motor startup
		q	MX	-	THERMLEV_ST	Mon	Quality: Thermal level at beginning of motor startup
		t	MX	-	THERMLEV_ST	Mon	Timestamp: Thermal level at beginning of motor startup
ThmLevEnd	v2_dMV	mag.f	MX	-	THERMLEV_END	Mon	Thermal level at the end of motor startup situation
		q	MX	-	THERMLEV_END	Mon	Quality: Thermal level at the end of motor startup situation
		t	MX	-	THERMLEV_END	Mon	Timestamp: Thermal level at the end of motor startup situation

LN type	LN prefix	LN class	Function block name
T2PTTR (revision 0)	T2	PTTR	T2PTTR

Table 105: T2PTTR Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
AlmThm	a_dSPS	stVal	ST	-	ALARM	Mon	The calculated temperature is over Alarm level Temperature limit
		q	ST	-	ALARM	Mon	Quality: The calculated temperature is over Alarm level Temperature limit
		t	ST	-	ALARM	Mon	Timestamp: The calculated temperature is over Alarm level Temperature limit
Op	b_dACT	general	ST	T	OPERATE	Mon	Operate signal
		q	ST	T	OPERATE	Mon	Quality: Operate signal
		t	ST	T	OPERATE	Mon	Timestamp: Operate signal
Tmp	b_dMV	mag.f	MX	-	TEMP	Mon	The calculated temperature of the protected object
		q	MX	-	TEMP	Mon	Quality: The calculated temperature of the protected object
		t	MX	-	TEMP	Mon	Timestamp: The calculated temperature of the protected object
TmpRI	b_dMV	mag.f	MX	-	TEMP_RL	Mon	The calculated temperature of the protected object relative to the operate level
		q	MX	-	TEMP_RL	Mon	Quality: The calculated temperature of the protected object relative to the operate level
		t	MX	-	TEMP_RL	Mon	Timestamp: The calculated temperature of the protected object relative to the operate level
Str	d_dACD	general	ST	-	START	Mon	Signal indicating current that will raise temperature above operate level if prolonged
		q	ST	-	START	Mon	Quality: Signal indicating current that will raise temperature above operate level if prolonged
		t	ST	-	START	Mon	Timestamp: Signal indicating current that will raise temperature above operate level if prolonged
TmsOp	v1_dINS	stVal	ST	-	T_OPERATE	Mon	Estimated time to operate

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
TmsOp	v1_dINS	q	ST	-	T_OPERATE	Mon	Quality: Estimated time to operate
		t	ST	-	T_OPERATE	Mon	Timestamp: Estimated time to operate
TmsRecEna	v1_dINS	stVal	ST	-	T_ENA_CLOSE	Mon	Estimated time to deactivate BLK_CLOSE in seconds
		q	ST	-	T_ENA_CLOSE	Mon	Quality: Estimated time to deactivate BLK_CLOSE in seconds
		t	ST	-	T_ENA_CLOSE	Mon	Timestamp: Estimated time to deactivate BLK_CLOSE in seconds
RsTmp	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
InhRec	v1_dSPS	stVal	ST	-	BLK_CLOSE	Mon	Thermal overload indicator. To inhibit reclose.
		q	ST	-	BLK_CLOSE	Mon	Quality: Thermal overload indicator. To inhibit reclose.
		t	ST	-	BLK_CLOSE	Mon	Timestamp: Thermal overload indicator. To inhibit reclose.
SenFlt	v1_dSPS	stVal	ST	-	-	Mon	Error signal from the temperature sensor
		q	ST	-	-	Mon	Quality: Error signal from the temperature sensor
		t	ST	-	-	Mon	Timestamp: Error signal from the temperature sensor
TmpUsed	v2_dmV	mag.f	MX	-	TEMP_AMB	Mon	Ambient temperature used in the calculations
		q	MX	-	TEMP_AMB	Mon	Quality: Ambient temperature used in the calculations
		t	MX	-	TEMP_AMB	Mon	Timestamp: Ambient temperature used in the calculations

LN type	LN prefix	LN class	Function block name
T1PTTR (revision 0)	T1	PTTR	T1PTTR

**Table 106:** T1PTTR Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter
		Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	
		q	ST	-	Beh	Mon	Quality:
		t	ST	-	Beh	Mon	Timestamp:
AlmThm	a_dSPS	stVal	ST	-	ALARM	Mon	Alarm signal
		q	ST	-	ALARM	Mon	Quality: Alarm signal
		t	ST	-	ALARM	Mon	Timestamp: Alarm signal
Op	b_dACT	general	ST	T	OPERATE	Mon	Operate signal
		q	ST	T	OPERATE	Mon	Quality: Operate signal
		t	ST	T	OPERATE	Mon	Timestamp: Operate signal
Tmp	b_dMV	mag.f	MX	-	TEMP	Mon	Calculated temperature of the device
		q	MX	-	TEMP	Mon	Quality: Calculated temperature of the device
		t	MX	-	TEMP	Mon	Timestamp: Calculated temperature of the device
TmpRI	b_dMV	mag.f	MX	-	TEMP_RL	Mon	Temperature relative to operate temperature
		q	MX	-	TEMP_RL	Mon	Quality: Temperature relative to operate temperature
		t	MX	-	TEMP_RL	Mon	Timestamp: Temperature relative to operate temperature
Str	d_dACD	general	ST	-	START	Mon	Start Signal
		q	ST	-	START	Mon	Quality: Start Signal
		t	ST	-	START	Mon	Timestamp: Start Signal
TmmOp	v1_dINS	stVal	ST	-	T_OPERATE	Mon	Estimated time to operate
		q	ST	-	T_OPERATE	Mon	Quality: Estimated time to operate
		t	ST	-	T_OPERATE	Mon	Timestamp: Estimated time to operate
TmmRecEna	v1_dINS	stVal	ST	-	T_ENA_CLOSE	Mon	Estimated time to reset of block reclose

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
TmmRecEna	v1_dINS	q	ST	-	T_ENA_CLOSE	Mon	Quality: Estimated time to reset of block reclose
		t	ST	-	T_ENA_CLOSE	Mon	Timestamp: Estimated time to reset of block reclose
RsTmp	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
InhRec	v1_dSPS	stVal	ST	-	BLK_CLOSE	Mon	Thermal overload indicator. To inhibit reclose
		q	ST	-	BLK_CLOSE	Mon	Quality: Thermal overload indicator. To inhibit reclose
		t	ST	-	BLK_CLOSE	Mon	Timestamp: Thermal overload indicator. To inhibit reclose
SenFlt	v1_dSPS	stVal	ST	-	-	Mon	Error signal from the temperature sensor
		q	ST	-	-	Mon	Quality: Error signal from the temperature sensor
		t	ST	-	-	Mon	Timestamp: Error signal from the temperature sensor
TmpUsed	v2_dMV	mag.f	MX	-	TEMP_AMB	Mon	Ambient temperature used in the calculations
		q	MX	-	TEMP_AMB	Mon	Quality: Ambient temperature used in the calculations
		t	MX	-	TEMP_AMB	Mon	Timestamp: Ambient temperature used in the calculations

#### 7.4.20

#### Time undercurrent PTUC

LN type	LN prefix	LN class	Function block name
LOFLPTUC (revision 0)	LOFL	PTUC	LOFLPTUC

**Table 107:** LOFLPTUC Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Loss of load protection operated
		q	ST	T	OPERATE	Mon	Quality: Loss of load protection operated
		t	ST	T	OPERATE	Mon	Timestamp: Loss of load protection operated
Str	d_dACD	general	ST	-	START	Mon	Loss of load protection started
		q	ST	-	START	Mon	Quality: Loss of load protection started
		t	ST	-	START	Mon	Timestamp: Loss of load protection started
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	start time / operate time (in %)
		q	MX	-	START_DUR	Mon	Quality: start time / operate time (in %)
		t	MX	-	START_DUR	Mon	Timestamp: start time / operate time (in %)

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#### Undervoltage PTUV

LN type	LN prefix	LN class	Function block name
PHPTUV (revision 0)	PH	PTUV	PHPTUV

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**Table 108:** PHPTUV Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Op	a_dACT	general	ST	T	OPERATE	Mon	Operate signal, combined
		phsA	ST	T	OPR_A	Mon	Operate signal, phase 1
		phsB	ST	T	OPR_B	Mon	Operate signal, phase 2
		phsC	ST	T	OPR_C	Mon	Operate signal, phase 3
		q	ST	T	OPERATE	Mon	Quality: Operate signal, combined
		t	ST	T	OPERATE	Mon	Timestamp: Operate signal, combined
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Str	c_dACD	general	ST	-	START	Mon	Start signal, combined
		phsA	ST	-	ST_A	Mon	Start signal, phase 1
		phsB	ST	-	ST_B	Mon	Start signal, phase 2
		phsC	ST	-	ST_C	Mon	Start signal, phase 3
		q	ST	-	START	Mon	Quality: Start signal, combined
		t	ST	-	START	Mon	Timestamp: Start signal, combined
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of Start time to Operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of Start time to Operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of Start time to Operate time
VMin	v2_dMV	mag.f	MX	-	U_MIN	Mon	Minimum of the phase or phase-to-phase voltages
		q	MX	-	U_MIN	Mon	Quality: Minimum of the phase or phase-to-phase voltages
		t	MX	-	U_MIN	Mon	Timestamp: Minimum of the phase or phase-to-phase voltages

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
VMInRat	v2_dMV	mag.f	MX	-	U_RATIO	Mon	Minimum voltage ratio to the Start value
		q	MX	-	U_RATIO	Mon	Quality: Minimum voltage ratio to the Start value
		t	MX	-	U_RATIO	Mon	Timestamp: Minimum voltage ratio to the Start value

LN type	LN prefix	LN class	Function block name
PSPTUV (revision 0)	PS	PTUV	PSPTUV

**Table 109:** PSPTUV Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operate signal for Positive Sequence Undervoltage protection
		q	ST	T	OPERATE	Mon	Quality: Operate signal for Positive Sequence Undervoltage protection
		t	ST	T	OPERATE	Mon	Timestamp: Operate signal for Positive Sequence Undervoltage protection
Str	d_dACD	general	ST	-	START	Mon	Start signal for Positive Sequence Undervoltage logic
		q	ST	-	START	Mon	Quality: Start signal for Positive Sequence Undervoltage logic

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Str	d_dACD	t	ST	-	START	Mon	Timestamp: Start signal for Positive Sequence Undervoltage logic
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Start duration in percentage of the total operating time
		q	MX	-	START_DUR	Mon	Quality: Start duration in percentage of the total operating time
		t	MX	-	START_DUR	Mon	Timestamp: Start duration in percentage of the total operating time

LN type	LN prefix	LN class	Function block name
LVRTPTUV (revision 0)	LVRT	PTUV	LVRTPTUV

Table 110: LVRTPTUV Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode status value parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode status value parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode status value parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode status value parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode status value parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode status value parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode status value parameter for 61850
		stVal	ST	-	-	Mon	Mode parameter for 61850
		q	ST	-	-	Mon	Quality: Mode parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operate
		q	ST	T	OPERATE	Mon	Quality: Operate
		t	ST	T	OPERATE	Mon	Timestamp: Operate

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Str	d_dACD	general	ST	-	START	Mon	Started
		q	ST	-	START	Mon	Quality: Started
		t	ST	-	START	Mon	Timestamp: Started

LN type	LN prefix	LN class	Function block name
DQLLN0 instance 1 (revision 0)	-	LLN0	DQPTUV
DQMMXU instance 1 (revision 0)	DQ	MMXU	DQPTUV
DQPDPDOP instance 1 (revision 0)	DQ	PDOP	DQPTUV
DQPTUV instance 1 (revision 0)	DQ	PTUV	DQPTUV

**Table 111:** DQPTUV Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

**Table 112:** DQPTUV Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
TotVAr	b_dMV	mag.f	MX	-	Q	Mon	Calculated positive sequence reactive power
		q	MX	-	Q	Mon	Quality: Calculated positive sequence reactive power
		t	MX	-	Q	Mon	Timestamp: Calculated positive sequence reactive power
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850

Table 113: DQPTUV Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	-	Mon	Reactive over power operate signal for 61850 mapping
		q	ST	T	-	Mon	Quality: Reactive over power operate signal for 61850 mapping
		t	ST	T	-	Mon	Timestamp: Reactive over power operate signal for 61850 mapping
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	-	Mon	Reactive over power start signal for 61850 mapping
		q	ST	-	-	Mon	Quality: Reactive over power start signal for 61850 mapping
		t	ST	-	-	Mon	Timestamp: Reactive over power start signal for 61850 mapping

**Table 114:** DQPTUV Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operate
		q	ST	T	OPERATE	Mon	Quality: Operate
		t	ST	T	OPERATE	Mon	Timestamp: Operate
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	START	Mon	Start
		q	ST	-	START	Mon	Quality: Start
		t	ST	-	START	Mon	Timestamp: Start
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

**7.4.22****Vector shift PPAM**

LN type	LN prefix	LN class	Function block name
VVSPPAM (revision 0)	VVS	PPAM	VVSPPAM

**Table 115:** VVSPPAM Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operate
		q	ST	T	OPERATE	Mon	Quality: Operate
		t	ST	T	OPERATE	Mon	Timestamp: Operate
Str	d_dACD	general	ST	-	-	Mon	Start signal
		q	ST	-	-	Mon	Quality: Start signal
		t	ST	-	-	Mon	Timestamp: Start signal
BlkInSt	v1_dSPS	stVal	ST	-	INT_BLKD	Mon	Protection function internally blocked
		q	ST	-	INT_BLKD	Mon	Quality: Protection function internally blocked
		t	ST	-	INT_BLKD	Mon	Timestamp: Protection function internally blocked
VShtPhA	v2_dMV	mag.f	MX	-	VEC_SHT_A_AB	Mon	Vector shift for ph-earth voltage A or ph-ph voltage AB
		q	MX	-	VEC_SHT_A_AB	Mon	Quality: Vector shift for ph-earth voltage A or ph-ph voltage AB
		t	MX	-	VEC_SHT_A_AB	Mon	Timestamp: Vector shift for ph-earth voltage A or ph-ph voltage AB
VShtPhB	v2_dMV	mag.f	MX	-	VEC_SHT_B_BC	Mon	Vector shift for ph-earth voltage A or ph-ph voltage BC
		q	MX	-	VEC_SHT_B_BC	Mon	Quality: Vector shift for ph-earth voltage A or ph-ph voltage BC
		t	MX	-	VEC_SHT_B_BC	Mon	Timestamp: Vector shift for ph-earth voltage A or ph-ph voltage BC
VShtPhC	v2_dMV	mag.f	MX	-	VEC_SHT_C_CA	Mon	Vector shift for ph-earth voltage A or ph-ph voltage CA
		q	MX	-	VEC_SHT_C_CA	Mon	Quality: Vector shift for ph-earth voltage A or ph-ph voltage CA
		t	MX	-	VEC_SHT_C_CA	Mon	Timestamp: Vector shift for ph-earth voltage A or ph-ph voltage CA
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
VShPtSeq	v2_dMV	mag.f	MX	-	VEC_SHT_U1	Mon	Vector shift for positive sequence voltage
		q	MX	-	VEC_SHT_U1	Mon	Quality: Vector shift for positive sequence voltage
		t	MX	-	VEC_SHT_U1	Mon	Timestamp: Vector shift for positive sequence voltage

## 7.4.23

## Underfrequency PTUF

LN type	LN prefix	LN class	Function block name
DAPTUF (revision 0)	DA	PTUF	DAPTUF

Table 116: DAPTUF Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter
		Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
BlkV	a_dSPS	stVal	ST	-	LOWAMPL_BLKD	Mon	Blocking indication due to low amplitude.
		q	ST	-	LOWAMPL_BLKD	Mon	Quality: Blocking indication due to low amplitude.
		t	ST	-	LOWAMPL_BLKD	Mon	Timestamp: Blocking indication due to low amplitude.
Op	b_dACT	general	ST	T	OPERATE	Mon	Operate signal for underfrequency protection
		q	ST	T	OPERATE	Mon	Quality: Operate signal for underfrequency protection
Table continues on next page							

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Op	b_dACT	t	ST	T	OPERATE	Mon	Timestamp: Operate signal for underfrequency protection
Str	d_dACD	general	ST	-	START	Mon	Start signal for underfrequency protection
		q	ST	-	START	Mon	Quality: Start signal for underfrequency protection
		t	ST	-	START	Mon	Timestamp: Start signal for underfrequency protection
RestLodOp	v2_dACT	general	ST	-	RESTORE	Mon	Restore signal for load restoring purposes.
		q	ST	-	RESTORE	Mon	Quality: Restore signal for load restoring purposes.
		t	ST	-	RESTORE	Mon	Timestamp: Restore signal for load restoring purposes.
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Start duration in percents of the total operation time.
		q	MX	-	START_DUR	Mon	Quality: Start duration in percents of the total operation time.
		t	MX	-	START_DUR	Mon	Timestamp: Start duration in percents of the total operation time.

#### 7.4.24 Admittance-based earth-fault protection PADM

LN type	LN prefix	LN class	Function block name
EAD1MSTA instance 1 (revision 0)	EAD1	MSTA	EFPADM
EADMSTA instance 1 (revision 0)	EAD	MSTA	EFPADM
EADMSTA instance 2 (revision 0)	EAD	MSTA	EFPADM
EFPADM instance 1 (revision 0)	EF	PADM	EFPADM
RSLLN0 instance 1 (revision 0)	-	LLN0	EFPADM

Table 117: EFPADM Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Dir	b_dACD	dirGeneral	ST	-	1 FAULT_DIR	Mon	Record data of bank 1 for detected fault direction
		q	ST	-	1 FAULT_DIR	Mon	Quality: Record data of bank 1 for detected fault direction

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Dir	b_dACD	t	ST	-	1 FAULT_DIR	Mon	Timestamp: Record data of bank 1 for detected fault direction
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Cond	v2_dMV	mag.f	MX	-	1 COND_RES (Go)	Mon	Record data of bank 1 for real part of neutral admittance
		q	MX	-	1 COND_RES (Go)	Mon	Quality: Record data of bank 1 for real part of neutral admittance
		t	MX	-	1 COND_RES (Go)	Mon	Timestamp: Record data of bank 1 for real part of neutral admittance
Sus	v2_dMV	mag.f	MX	-	1 SUS_RES (Bo)	Mon	Record data of bank 1 for imaginary part of neutral admittance
		q	MX	-	1 SUS_RES (Bo)	Mon	Quality: Record data of bank 1 for imaginary part of neutral admittance
		t	MX	-	1 SUS_RES (Bo)	Mon	Timestamp: Record data of bank 1 for imaginary part of neutral admittance
StrDur	v2_dMV	mag.f	MX	-	1 START_DUR	Mon	Record data of bank 1 for ratio of started time / operate time
		q	MX	-	1 START_DUR	Mon	Quality: Record data of bank 1 for ratio of started time / operate time
		t	MX	-	1 START_DUR	Mon	Timestamp: Record data of bank 1 for ratio of started time / operate time
APreFlt	v5_dWYE	cVal.mag.f	MX	-	1 I_AMPL_RES Pre Flt	Mon	Record data of bank 1 for magnitude of pre-fault residual current
		cVal.ang.f	MX	-	1 I_ANGL_RES Pre Flt	Mon	Record data of bank 1 for angle of pre-fault residual current
		q	MX	-	1 I_AMPL_RES Pre Flt	Mon	Quality: Record data of bank 1 for magnitude of pre-fault residual current
		t	MX	-	1 I_AMPL_RES Pre Flt	Mon	Timestamp: Record data of bank 1 for magnitude of pre-fault residual current
PhVPreFlt	v5_dWYE	cVal.mag.f	MX	-	1 U_AMPL_RES Pre Flt	Mon	Record data of bank 1 for magnitude of pre-fault residual voltage
		cVal.ang.f	MX	-	1 U_ANGL_RES Pre Flt	Mon	Record data of bank 1 for angle of pre-fault residual voltage
		q	MX	-	1 U_AMPL_RES Pre Flt	Mon	Quality: Record data of bank 1 for magnitude of pre-fault residual voltage

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
PhVPreFlt	v5_dWYE	t	MX	-	1 U_AMPL_RES Pre Flt	Mon	Timestamp: Record data of bank 1 for magnitude of pre-fault residual voltage
AFlt	v5_dWYE	cVal.mag.f	MX	-	1 I_AMPL_RES fault	Mon	Record data of bank 1 for magnitude of fault-state residual current
		cVal.ang.f	MX	-	1 I_ANGL_RES fault	Mon	Record data of bank 1 for angle of fault-state residual current
		q	MX	-	1 I_AMPL_RES fault	Mon	Quality: Record data of bank 1 for magnitude of fault-state residual current
		t	MX	-	1 I_AMPL_RES fault	Mon	Timestamp: Record data of bank 1 for magnitude of fault-state residual current
PhVFlt	v5_dWYE	cVal.mag.f	MX	-	1 U_AMPL_RES fault	Mon	Record data of bank 1 for magnitude of fault-state residual voltage
		cVal.ang.f	MX	-	1 U_ANGL_RES fault	Mon	Record data of bank 1 for angle of fault-state residual voltage
		q	MX	-	1 U_AMPL_RES fault	Mon	Quality: Record data of bank 1 for magnitude of fault-state residual voltage
		t	MX	-	1 U_AMPL_RES fault	Mon	Timestamp: Record data of bank 1 for magnitude of fault-state residual voltage

Table 118: EFPADM Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Dir	b_dACD	dirGeneral	ST	-	2 FAULT_DIR	Mon	Record data of bank 2 for detected fault direction
		q	ST	-	2 FAULT_DIR	Mon	Quality: Record data of bank 2 for detected fault direction
		t	ST	-	2 FAULT_DIR	Mon	Timestamp: Record data of bank 2 for detected fault direction
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Cond	v2_dMV	mag.f	MX	-	2 COND_RES (Go)	Mon	Record data of bank 2 for real part of neutral admittance

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Cond	v2_dMV	q	MX	-	2 COND_RES (Go)	Mon	Quality: Record data of bank 2 for real part of neutral admittance
		t	MX	-	2 COND_RES (Go)	Mon	Timestamp: Record data of bank 2 for real part of neutral admittance
Sus	v2_dMV	mag.f	MX	-	2 SUS_RES (Bo)	Mon	Record data of bank 2 for imaginary part of neutral admittance
		q	MX	-	2 SUS_RES (Bo)	Mon	Quality: Record data of bank 2 for imaginary part of neutral admittance
		t	MX	-	2 SUS_RES (Bo)	Mon	Timestamp: Record data of bank 2 for imaginary part of neutral admittance
StrDur	v2_dMV	mag.f	MX	-	2 START_DUR	Mon	Record data of bank 2 for ratio of started time / operate time
		q	MX	-	2 START_DUR	Mon	Quality: Record data of bank 2 for ratio of started time / operate time
		t	MX	-	2 START_DUR	Mon	Timestamp: Record data of bank 2 for ratio of started time / operate time
APreFlt	v5_dWYE	cVal.mag.f	MX	-	2 I_AMPL_RES Pre Flt	Mon	Record data of bank 2 for magnitude of pre-fault residual current
		cVal.ang.f	MX	-	2 I_ANGL_RES Pre Flt	Mon	Record data of bank 2 for angle of pre-fault residual current
		q	MX	-	2 I_AMPL_RES Pre Flt	Mon	Quality: Record data of bank 2 for magnitude of pre-fault residual current
		t	MX	-	2 I_AMPL_RES Pre Flt	Mon	Timestamp: Record data of bank 2 for magnitude of pre-fault residual current
PhVPreFlt	v5_dWYE	cVal.mag.f	MX	-	2 U_AMPL_RES Pre Flt	Mon	Record data of bank 2 for magnitude of pre-fault residual voltage
		cVal.ang.f	MX	-	2 U_ANGL_RES Pre Flt	Mon	Record data of bank 2 for angle of pre-fault residual voltage
		q	MX	-	2 U_AMPL_RES Pre Flt	Mon	Quality: Record data of bank 2 for magnitude of pre-fault residual voltage
		t	MX	-	2 U_AMPL_RES Pre Flt	Mon	Timestamp: Record data of bank 2 for magnitude of pre-fault residual voltage
AFlt	v5_dWYE	cVal.mag.f	MX	-	2 I_AMPL_RES fault	Mon	Record data of bank 2 for magnitude of fault-state residual current
		cVal.ang.f	MX	-	2 I_ANGL_RES fault	Mon	Record data of bank 2 for angle of fault-state residual current
		q	MX	-	2 I_AMPL_RES fault	Mon	Quality: Record data of bank 2 for magnitude of fault-state residual current

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
AFlt	v5_dWYE	t	MX	-	2 I_AMPL_RES fault	Mon	Timestamp: Record data of bank 2 for magnitude of fault-state residual current
PhVFlt	v5_dWYE	cVal.mag.f	MX	-	2 U_AMPL_RES fault	Mon	Record data of bank 2 for magnitude of fault-state residual voltage
		cVal.ang.f	MX	-	2 U_ANGL_RES fault	Mon	Record data of bank 2 for angle of fault-state residual voltage
		q	MX	-	2 U_AMPL_RES fault	Mon	Quality: Record data of bank 2 for magnitude of fault-state residual voltage
		t	MX	-	2 U_AMPL_RES fault	Mon	Timestamp: Record data of bank 2 for magnitude of fault-state residual voltage

Table 119: EFPADM Logical node data (instance 2)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Dir	b_dACD	dirGeneral	ST	-	3 FAULT_DIR	Mon	Record data of bank 3 for detected fault direction
		q	ST	-	3 FAULT_DIR	Mon	Quality: Record data of bank 3 for detected fault direction
		t	ST	-	3 FAULT_DIR	Mon	Timestamp: Record data of bank 3 for detected fault direction
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Cond	v2_dMV	mag.f	MX	-	3 COND_RES (Go)	Mon	Record data of bank 3 for real part of neutral admittance
		q	MX	-	3 COND_RES (Go)	Mon	Quality: Record data of bank 3 for real part of neutral admittance
		t	MX	-	3 COND_RES (Go)	Mon	Timestamp: Record data of bank 3 for real part of neutral admittance
Sus	v2_dMV	mag.f	MX	-	3 SUS_RES (Bo)	Mon	Record data of bank 3 for real part of neutral admittance
		q	MX	-	3 SUS_RES (Bo)	Mon	Quality: Record data of bank 3 for real part of neutral admittance
		t	MX	-	3 SUS_RES (Bo)	Mon	Timestamp: Record data of bank 3 for real part of neutral admittance

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
StrDur	v2_dMV	mag.f	MX	-	3 START_DUR	Mon	Record data of bank 3 for ratio of started time / operate time
		q	MX	-	3 START_DUR	Mon	Quality: Record data of bank 3 for ratio of started time / operate time
		t	MX	-	3 START_DUR	Mon	Timestamp: Record data of bank 3 for ratio of started time / operate time
APreFlt	v5_dWYE	cVal.mag.f	MX	-	3 I_AMPL_RES Pre Flt	Mon	Record data of bank 3 for magnitude of pre-fault residual current
		cVal.ang.f	MX	-	3 I_ANGL_RES Pre Flt	Mon	Record data of bank 3 for angle of pre-fault residual current
		q	MX	-	3 I_AMPL_RES Pre Flt	Mon	Quality: Record data of bank 3 for magnitude of pre-fault residual current
		t	MX	-	3 I_AMPL_RES Pre Flt	Mon	Timestamp: Record data of bank 3 for magnitude of pre-fault residual current
PhVPreFlt	v5_dWYE	cVal.mag.f	MX	-	3 U_AMPL_RES Pre Flt	Mon	Record data of bank 3 for magnitude of pre-fault residual voltage
		cVal.ang.f	MX	-	3 U_ANGL_RES Pre Flt	Mon	Record data of bank 3 for angle of pre-fault residual voltage
		q	MX	-	3 U_AMPL_RES Pre Flt	Mon	Quality: Record data of bank 3 for magnitude of pre-fault residual voltage
		t	MX	-	3 U_AMPL_RES Pre Flt	Mon	Timestamp: Record data of bank 3 for magnitude of pre-fault residual voltage
AFlt	v5_dWYE	cVal.mag.f	MX	-	3 I_AMPL_RES fault	Mon	Record data of bank 3 for magnitude of fault-state residual current
		cVal.ang.f	MX	-	3 I_ANGL_RES fault	Mon	Record data of bank 3 for angle of fault-state residual current
		q	MX	-	3 I_AMPL_RES fault	Mon	Quality: Record data of bank 3 for magnitude of fault-state residual current
		t	MX	-	3 I_AMPL_RES fault	Mon	Timestamp: Record data of bank 3 for magnitude of fault-state residual current
PhVFlt	v5_dWYE	cVal.mag.f	MX	-	3 U_AMPL_RES fault	Mon	Record data of bank 3 for magnitude of fault-state residual voltage
		cVal.ang.f	MX	-	3 U_ANGL_RES fault	Mon	Record data of bank 3 for angle of fault-state residual voltage
		q	MX	-	3 U_AMPL_RES fault	Mon	Quality: Record data of bank 3 for magnitude of fault-state residual voltage
		t	MX	-	3 U_AMPL_RES fault	Mon	Timestamp: Record data of bank 3 for magnitude of fault-state residual voltage

## Section 7

### Logical node data model

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**Table 120:** *EFPADM Logical node data (instance 1)*

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	-	OPERATE	Mon	Time delayed operate-signal
		q	ST	-	OPERATE	Mon	Quality: Time delayed operate-signal
		t	ST	-	OPERATE	Mon	Timestamp: Time delayed operate-signal
lvdChrLin	b_dINS	stVal	ST	-	CONFLICT	Mon	Overlapping admittance boundary line settings
		q	ST	-	CONFLICT	Mon	Quality: Overlapping admittance boundary line settings
		t	ST	-	CONFLICT	Mon	Timestamp: Overlapping admittance boundary line settings
StrDur	b_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time
Cond	b_dMV	mag.f	MX	-	COND_RES	Mon	Real part of calculated neutral admittance
		q	MX	-	COND_RES	Mon	Quality: Real part of calculated neutral admittance
		t	MX	-	COND_RES	Mon	Timestamp: Real part of calculated neutral admittance
Sus	b_dMV	mag.f	MX	-	SUS_RES	Mon	Imaginary part of calculated neutral admittance
		q	MX	-	SUS_RES	Mon	Quality: Imaginary part of calculated neutral admittance
		t	MX	-	SUS_RES	Mon	Timestamp: Imaginary part of calculated neutral admittance
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	START	Mon	General start-signal
		dirGeneral	ST	-	FAULT_DIR	Mon	Detected fault direction
		q	ST	-	START	Mon	Quality: General start-signal
		t	ST	-	START	Mon	Timestamp: General start-signal

Table 121: EFPADM Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Rs	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	-	Mon	Status: RESET ORed with reset command from communication
		q	ST	-	-	Mon	Quality: Status: RESET ORed with reset command from communication
		t	ST	-	-	Mon	Timestamp: Status: RESET ORed with reset command from communication

### 7.4.25

### Multi-frequency neutral admittance earth-fault protection PSDE

LN type	LN prefix	LN class	Function block name
GNRLLLN0 instance 1 (revision 0)	-	LLN0	MFADPSDE
MFADPSDE instance 1 (revision 0)	MFAD	PSDE	MFADPSDE
MFADRDIR instance 1 (revision 0)	MFAD	RDIR	MFADPSDE

Table 122: MFADPSDE Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

Table 123: MFADPSDE Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operate signal
		q	ST	T	OPERATE	Mon	Quality: Operate signal
		t	ST	T	OPERATE	Mon	Timestamp: Operate signal
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	c_dINC	q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	START	Mon	Start signal
		dirGeneral	ST	-	FAULT_DIR	Mon	Detected fault direction
		q	ST	-	START	Mon	Quality: Start signal
		t	ST	-	START	Mon	Timestamp: Start signal
InhEF	v1_dSPS	stVal	ST	-	BLK_EF	Mon	Block signal for EF to indicate opposite fault direction
		q	ST	-	BLK_EF	Mon	Quality: Block signal for EF to indicate opposite fault direction
		t	ST	-	BLK_EF	Mon	Timestamp: Block signal for EF to indicate opposite fault direction
ItmEFInd	v1_dSPS	stVal	ST	-	INTR_EF	Mon	Intermittent earth-fault indication
		q	ST	-	INTR_EF	Mon	Quality: Intermittent earth-fault indication
		t	ST	-	INTR_EF	Mon	Timestamp: Intermittent earth-fault indication
PkInd	v1_dSPS	stVal	ST	-	PEAK_IND	Mon	Current transient detection indication
		q	ST	-	PEAK_IND	Mon	Quality: Current transient detection indication
		t	ST	-	PEAK_IND	Mon	Timestamp: Current transient detection indication
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

Table 124: MFADPSDE Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Dir	b_dACD	dirGeneral	ST	-	DIRECTION	Mon	Direction information
		q	ST	-	DIRECTION	Mon	Quality: Direction information
		t	ST	-	DIRECTION	Mon	Timestamp: Direction information
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	c_dINC	q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
OpPolAng	v2_dMV	mag.f	MX	-	ANGLE	Mon	Angle between polarizing and operating quantity
		q	MX	-	ANGLE	Mon	Quality: Angle between polarizing and operating quantity
		t	MX	-	ANGLE	Mon	Timestamp: Angle between polarizing and operating quantity

#### 7.4.26 Directional power protection PDPR

LN type	LN prefix	LN class	Function block name
DPMMXU instance 1 (revision 0)	DP	MMXU	DOPPDPR
DPPDOP instance 1 (revision 0)	DP	PDOP	DOPPDPR
PHBLLN0 instance 1 (revision 0)	-	LLN0	DOPPDPR

Table 125: DOPPDPR Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
TotVAr	b_dMV	mag.f	MX	-	Q	Mon	Reactive power
		q	MX	-	Q	Mon	Quality: Reactive power
		t	MX	-	Q	Mon	Timestamp: Reactive power
TotW	b_dMV	mag.f	MX	-	P	Mon	Active power
		q	MX	-	P	Mon	Quality: Active power
		t	MX	-	P	Mon	Timestamp: Active power
TotVA	b_dMV	mag.f	MX	-	S	Mon	Apparent power
		q	MX	-	S	Mon	Quality: Apparent power
		t	MX	-	S	Mon	Timestamp: Apparent power
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
TotPFAng	v2_dMV	mag.f	MX	-	PF_ANGL	Mon	Angle between apparent power and active power
		q	MX	-	PF_ANGL	Mon	Quality: Angle between apparent power and active power
		t	MX	-	PF_ANGL	Mon	Timestamp: Angle between apparent power and active power

Table 126: DOPPDPR Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operated
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	START	Mon	Started
		dirGeneral	ST	-	-	Mon	Detected fault direction
		q	ST	-	START	Mon	Quality: Started
		t	ST	-	START	Mon	Timestamp: Started
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

Table 127: DOPPDPR Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

LN type	LN prefix	LN class	Function block name
DPMMXU instance 1 (revision 0)	DP	MMXU	DUPPDPR
DPPDUP instance 1 (revision 0)	DP	PDUP	DUPPDPR
PHBLLN0 instance 1 (revision 0)	-	LLN0	DUPPDPR

Table 128: DUPPDPR Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
TotVAr	b_dMV	mag.f	MX	-	Q	Mon	Reactive power
		q	MX	-	Q	Mon	Quality: Reactive power
		t	MX	-	Q	Mon	Timestamp: Reactive power
TotW	b_dMV	mag.f	MX	-	P	Mon	Active power
		q	MX	-	P	Mon	Quality: Active power
		t	MX	-	P	Mon	Timestamp: Active power
TotVA	b_dMV	mag.f	MX	-	S	Mon	Apparent power
		q	MX	-	S	Mon	Quality: Apparent power
		t	MX	-	S	Mon	Timestamp: Apparent power
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
TotPFAng	v2_dMV	mag.f	MX	-	PF_ANGL	Mon	Angle between apparent power and active power
		q	MX	-	PF_ANGL	Mon	Quality: Angle between apparent power and active power
		t	MX	-	PF_ANGL	Mon	Timestamp: Angle between apparent power and active power

Table 129: DUPPDPR Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operated
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	START	Mon	Started
		dirGeneral	ST	-	-	Mon	Detected fault direction
		q	ST	-	START	Mon	Quality: Started
		t	ST	-	START	Mon	Timestamp: Started
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

Table 130: DUPPDPR Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

#### 7.4.27 Volts per Hz PVPH

LN type	LN prefix	LN class	Function block name
OEPVPH (revision 0)	OE	PVPH	OEPVPH

Table 131: OEPVPH Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Strlnh	a_dSPS	stVal	ST	-	BLK_RESTART	Mon	Signal for blocking reconnection of an overheated machine

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
StrInh	a_dSPS	q	ST	-	BLK_RESTART	Mon	Quality: Signal for blocking reconnection of an overheated machine
		t	ST	-	BLK_RESTART	Mon	Timestamp: Signal for blocking reconnection of an overheated machine
Str	b_dACD	general	ST	-	START	Mon	Started
		q	ST	-	START	Mon	Quality: Started
		t	ST	-	START	Mon	Timestamp: Started
Op	b_dACT	general	ST	T	OPERATE	Mon	Operated
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
TmsRecEna	v1_dINS	stVal	ST	-	T_ENARESTART	Mon	Estimated time to reset of block restart
		q	ST	-	T_ENARESTART	Mon	Quality: Estimated time to reset of block restart
		t	ST	-	T_ENARESTART	Mon	Timestamp: Estimated time to reset of block restart
CoolAct	v1_dSPS	stVal	ST	-	COOL_ACTIVE	Mon	Signal to indicate machine is in cooling process
		q	ST	-	COOL_ACTIVE	Mon	Quality: Signal to indicate machine is in cooling process
		t	ST	-	COOL_ACTIVE	Mon	Timestamp: Signal to indicate machine is in cooling process
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time (in %)
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time (in %)
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time (in %)
VHzRat	v2_dMV	mag.f	MX	-	VOLTPERHZ	Mon	Excitation level, i.e U/f ratio or Volts/Hertz
		q	MX	-	VOLTPERHZ	Mon	Quality: Excitation level, i.e U/f ratio or Volts/Hertz
		t	MX	-	VOLTPERHZ	Mon	Timestamp: Excitation level, i.e U/f ratio or Volts/Hertz

#### 7.4.28

#### Directional earth fault wattmetric PWDE

LN type	LN prefix	LN class	Function block name
RESBLLN0 instance 1 (revision 0)	-	LLN0	WPWDE
WMMXU instance 1 (revision 0)	W	MMXU	WPWDE
WPSDE instance 1 (revision 0)	W	PSDE	WPWDE
WRDIR instance 1 (revision 0)	W	RDIR	WPWDE

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**Table 132:** *WPWDE Logical node data (instance 1)*

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

**Table 133:** *WPWDE Logical node data (instance 1)*

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
W	b_dWYE	cVal.mag.f	MX	-	RES_POWER	Mon	Calculated residual active power
		q	MX	-	RES_POWER	Mon	Quality: Calculated residual active power
		t	MX	-	RES_POWER	Mon	Timestamp: Calculated residual active power
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850

**Table 134:** WPWDE Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operated
		q	ST	T	OPERATE	Mon	Quality: Operated
		t	ST	T	OPERATE	Mon	Timestamp: Operated
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	START	Mon	Started
		dirGeneral	ST	-	FAULT_DIR	Mon	Detected fault direction
		q	ST	-	START	Mon	Quality: Started
		t	ST	-	START	Mon	Timestamp: Started
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Ratio of start time / operate time
		q	MX	-	START_DUR	Mon	Quality: Ratio of start time / operate time
		t	MX	-	START_DUR	Mon	Timestamp: Ratio of start time / operate time

**Table 135:** WPWDE Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Dir	d_dACD	dirGeneral	ST	-	DIRECTION	Mon	Direction information
		q	ST	-	DIRECTION	Mon	Quality: Direction information
		t	ST	-	DIRECTION	Mon	Timestamp: Direction information
OpPolAng	v2_dMV	mag.f	MX	-	ANGLE	Mon	Angle between polarizing and operating quantity

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
OpPolAng	v2_dMV	q	MX	-	ANGLE	Mon	Quality: Angle between polarizing and operating quantity
		t	MX	-	ANGLE	Mon	Timestamp: Angle between polarizing and operating quantity
OpChrAng	v2_dMV	mag.f	MX	-	ANGLE_RCA	Mon	Angle between operating angle and characteristic angle
		q	MX	-	ANGLE_RCA	Mon	Quality: Angle between operating angle and characteristic angle
		t	MX	-	ANGLE_RCA	Mon	Timestamp: Angle between operating angle and characteristic angle

#### 7.4.29 Stator earth-fault protection PSEF

LN type	LN prefix	LN class	Function block name
H3EFLLN0 instance 1 (revision 0)	-	LLN0	H3EFPSEF
H3EFPTOV instance 1 (revision 0)	H3EF	PTOV	H3EFPSEF
H3EFPTRC instance 1 (revision 0)	H3EF	PTRC	H3EFPSEF
H3EFPTUV instance 1 (revision 0)	H3EF	PTUV	H3EFPSEF

Table 136: H3EFPSEF Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
Beh	a_dINS	t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
		stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

Table 137: H3EFPSEF Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	-	Mon	Third harmonic differential over voltage protection operate
		q	ST	T	-	Mon	Quality: Third harmonic differential over voltage protection operate
		t	ST	T	-	Mon	Timestamp: Third harmonic differential over voltage protection operate
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	-	Mon	Third harmonic differential over voltage protection start
		q	ST	-	-	Mon	Quality: Third harmonic differential over voltage protection start
		t	ST	-	-	Mon	Timestamp: Third harmonic differential over voltage protection start
BlkInSt	v2_dACT	general	ST	-	INT_BLKD	Mon	Protection internally blocked
		q	ST	-	INT_BLKD	Mon	Quality: Protection internally blocked
		t	ST	-	INT_BLKD	Mon	Timestamp: Protection internally blocked
Dif3HV	v2_dMV	mag.f	MX	-	UD_3H_AMPL	Mon	Third harmonic differential voltage amplitude
		q	MX	-	UD_3H_AMPL	Mon	Quality: Third harmonic differential voltage amplitude
		t	MX	-	UD_3H_AMPL	Mon	Timestamp: Third harmonic differential voltage amplitude
Bias3HV	v2_dMV	mag.f	MX	-	UB_3H_AMPL	Mon	Third harmonic bias voltage amplitude
		q	MX	-	UB_3H_AMPL	Mon	Quality: Third harmonic bias voltage amplitude
		t	MX	-	UB_3H_AMPL	Mon	Timestamp: Third harmonic bias voltage amplitude
Term3HV	v2_dMV	mag.f	MX	-	U_3H_T_AMPL	Mon	Terminal side third harmonic voltage amplitude
		q	MX	-	U_3H_T_AMPL	Mon	Quality: Terminal side third harmonic voltage amplitude
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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Term3HV	v2_dMV	t	MX	-	U_3H_T_AMPL	Mon	Timestamp: Terminal side third harmonic voltage amplitude
N3HV	v2_dMV	mag.f	MX	-	U_3H_N_AMPL	Mon	Neutral side third harmonic voltage amplitude
		q	MX	-	U_3H_N_AMPL	Mon	Quality: Neutral side third harmonic voltage amplitude
		t	MX	-	U_3H_N_AMPL	Mon	Timestamp: Neutral side third harmonic voltage amplitude
Ang3HVTerN	v2_dMV	mag.f	MX	-	U_3HANGL_T_N	Mon	Phase angle btw 3rd harmonic terminal and neutral voltage
		q	MX	-	U_3HANGL_T_N	Mon	Quality: Phase angle btw 3rd harmonic terminal and neutral voltage
		t	MX	-	U_3HANGL_T_N	Mon	Timestamp: Phase angle btw 3rd harmonic terminal and neutral voltage
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Start duration
		q	MX	-	START_DUR	Mon	Quality: Start duration
		t	MX	-	START_DUR	Mon	Timestamp: Start duration

Table 138: H3EFPSEF Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	-	OPERATE	Mon	Operate
		q	ST	-	OPERATE	Mon	Quality: Operate
		t	ST	-	OPERATE	Mon	Timestamp: Operate
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	START	Mon	Start
		q	ST	-	START	Mon	Quality: Start
		t	ST	-	START	Mon	Timestamp: Start

**Table 139:** H3EFPSEF Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	-	Mon	Third harmonic neutral under voltage protection operate
		q	ST	T	-	Mon	Quality: Third harmonic neutral under voltage protection operate
		t	ST	T	-	Mon	Timestamp: Third harmonic neutral under voltage protection operate
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	-	Mon	Third harmonic neutral under voltage protection start
		q	ST	-	-	Mon	Quality: Third harmonic neutral under voltage protection start
		t	ST	-	-	Mon	Timestamp: Third harmonic neutral under voltage protection start

## 7.4.30

### Multipurpose analog protection GACP

#### 7.4.30.1

##### Multipurpose analog protection MAPGACP

LN type	LN prefix	LN class	Function block name
MAPGACP (revision 0)	MAP	GACP	MAPGACP

**Table 140:** MAPGACP Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Op	b_dACT	general	ST	T	OPERATE	Mon	Operated
		q	ST	T	OPERATE	Mon	Operated
		t	ST	T	OPERATE	Mon	Operated
Str	d_dACD	general	ST	-	START	Mon	Started signal
		q	ST	-	START	Mon	Started signal
		t	ST	-	START	Mon	Started signal
StrDur	v2_dMV	mag.f	MX	-	START_DUR	Mon	Start duration in percentage of the total operating time
		q	MX	-	START_DUR	Mon	Start duration in percentage of the total operating time
		t	MX	-	START_DUR	Mon	Start duration in percentage of the total operating time

## 7.5 System logical nodes

### 7.5.1 Physical device information LPHD

LN type	LN prefix	LN class	Function block name
LPHD (revision 1)	-	LPHD	PRODINF

Table 141: PRODINF Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
PhyNam	a_dDPL	swRev	DC	-	-	-	Firmware version
		serNum	DC	-	SerialNo	-	IED serial number
		model	DC	-	-	-	IED model for IEC61850

## 7.6 Logical nodes for protection related functions

### 7.6.1 Breaker failure RBRF

LN type	LN prefix	LN class	Function block name
CCBRBFR (revision 0)	CCB	RBRF	CCBRBFR

Table 142: CCBRBRF Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
OpEx	b_dACT	general	ST	T	TRBU	Mon	Backup trip
		q	ST	T	TRBU	Mon	Quality: Backup trip
		t	ST	T	TRBU	Mon	Timestamp: Backup trip
OpIn	b_dACT	general	ST	T	TRRET	Mon	Retrip
		q	ST	T	TRRET	Mon	Quality: Retrip
		t	ST	T	TRRET	Mon	Timestamp: Retrip
Str	d_dACD	general	ST	-	CB_FAULT_AL	Mon	Delayed CB failure alarm
		q	ST	-	CB_FAULT_AL	Mon	Quality: Delayed CB failure alarm
		t	ST	-	CB_FAULT_AL	Mon	Timestamp: Delayed CB failure alarm

### 7.6.2 Differential supervision RDIF

LN type	LN prefix	LN class	Function block name
CCRDIF (revision 0)	CC	RDIF	CCRDIF

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### Logical node data model

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**Table 143:** CCRDIF Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orlident	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Alm	a_dSPS	stVal	ST	-	ALARM	Mon	Alarm for current circuit failure
		q	ST	-	ALARM	Mon	Quality: Alarm for current circuit failure
		t	ST	-	ALARM	Mon	Timestamp: Alarm for current circuit failure
Op	b_dACT	general	ST	-	FAIL	Mon	Detection of current circuit failure
		q	ST	-	FAIL	Mon	Quality: Detection of current circuit failure
		t	ST	-	FAIL	Mon	Timestamp: Detection of current circuit failure

### 7.6.3

#### Disturbance recorder RDRE

LN type	LN prefix	LN class	Function block name
DRRDRE (revision 0)	DR	RDRE	DRRDRE

**Table 144:** DRRDRE Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orlident	CO	-	-	Cmd	Mode parameter for 61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
FltNum	b_dINS	stVal	ST	-	Fault number	Mon	Disturbance fault number
		q	ST	-	Fault number	Mon	Quality: Disturbance fault number
		t	ST	-	Fault number	Mon	Timestamp: Disturbance fault number
MemUsed	b_dINS	stVal	ST	-	Memory used	Mon	Memory usage (0-100%)
		q	ST	-	Memory used	Mon	Quality: Memory usage (0-100%)
		t	ST	-	Memory used	Mon	Timestamp: Memory usage (0-100%)
RcdMade	d_dSPS	stVal	ST	-	RECMADE	Mon	Disturbance recording made
		q	ST	-	RECMADE	Mon	Quality: Disturbance recording made
		t	ST	-	RECMADE	Mon	Timestamp: Disturbance recording made
RcdStr	d_dSPS	stVal	ST	-	RECSTART	Mon	Disturbance recording started
		q	ST	-	RECSTART	Mon	Quality: Disturbance recording started
		t	ST	-	RECSTART	Mon	Timestamp: Disturbance recording started
RcdClr	v2_dSPS	stVal	ST	-	CLEARED	Mon	All disturbances in the disturbance report cleared
		q	ST	-	CLEARED	Mon	Quality: All disturbances in the disturbance report cleared
		t	ST	-	CLEARED	Mon	Timestamp: All disturbances in the disturbance report cleared
MemUsedAlm	v2_dSPS	stVal	ST	-	MEMUSED	Mon	More than 80% of memory used
		q	ST	-	MEMUSED	Mon	Quality: More than 80% of memory used
		t	ST	-	MEMUSED	Mon	Timestamp: More than 80% of memory used

## 7.6.4

## Fault locator RFLO

LN type	LN prefix	LN class	Function block name
F1MSTA instance 1 (revision 0)	F1	MSTA	SCEFRFLO
FMSTA instance 1 (revision 0)	F	MSTA	SCEFRFLO
FMSTA instance 2 (revision 0)	F	MSTA	SCEFRFLO
RSLLN0 instance 1 (revision 0)	-	LLN0	SCEFRFLO
SCEFRFLO instance 1 (revision 0)	SCEF	RFLO	SCEFRFLO

Table 145: SCEFRFLO Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Alm	a_dSPS	stVal	ST	-	1 ALARM	Mon	Record data of bank 1 for alarm signal
		q	ST	-	1 ALARM	Mon	Quality: Record data of bank 1 for alarm signal
		t	ST	-	1 ALARM	Mon	Timestamp: Record data of bank 1 for alarm signal
FltDiskm	b_dMV	mag.f	MX	-	1 FLT_DISTANCE	Mon	Record data of bank 1 for fault distance
		q	MX	-	1 FLT_DISTANCE	Mon	Quality: Record data of bank 1 for fault distance
		t	MX	-	1 FLT_DISTANCE	Mon	Timestamp: Record data of bank 1 for fault distance
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
FltLoop	e_dINS	stVal	ST	-	1 FAULT_LOOP	Mon	Record data of bank 1 for fault loop
		q	ST	-	1 FAULT_LOOP	Mon	Quality: Record data of bank 1 for fault loop
		t	ST	-	1 FAULT_LOOP	Mon	Timestamp: Record data of bank 1 for fault loop
FltDisVald	v1_dINS	stVal	ST	-	1 EF_VALIDITY	Mon	Record data of bank 1 for validity of earth fault location
		q	ST	-	1 EF_VALIDITY	Mon	Quality: Record data of bank 1 for validity of earth fault location
		t	ST	-	1 EF_VALIDITY	Mon	Timestamp: Record data of bank 1 for validity of earth fault location

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
FltR	v2_dMV	mag.f	MX	-	1 RF	Mon	Record data of bank 1 for fault resistance
		q	MX	-	1 RF	Mon	Quality: Record data of bank 1 for fault resistance
		t	MX	-	1 RF	Mon	Timestamp: Record data of bank 1 for fault resistance
FltLoopR	v2_dMV	mag.f	MX	-	1 RFLOOP	Mon	Record data of bank 1 for fault loop resistance
		q	MX	-	1 RFLOOP	Mon	Quality: Record data of bank 1 for fault loop resistance
		t	MX	-	1 RFLOOP	Mon	Timestamp: Record data of bank 1 for fault loop resistance
FltLoopX	v2_dMV	mag.f	MX	-	1 XFLOOP	Mon	Record data of bank 1 for fault loop reactance
		q	MX	-	1 XFLOOP	Mon	Quality: Record data of bank 1 for fault loop reactance
		t	MX	-	1 XFLOOP	Mon	Timestamp: Record data of bank 1 for fault loop reactance
PhGndCapac	v2_dMV	mag.f	MX	-	1 XC0F_CALC	Mon	Record data bank1 feeder phase-to-earth capacitive reactance
		q	MX	-	1 XC0F_CALC	Mon	Quality: Record data bank1 feeder phase-to-earth capacitive reactance
		t	MX	-	1 XC0F_CALC	Mon	Timestamp: Record data bank1 feeder phase-to-earth capacitive reactance
EqDisLod	v2_dMV	mag.f	MX	-	1 S_CALC	Mon	Record data of bank 1 for equivalent load distance
		q	MX	-	1 S_CALC	Mon	Quality: Record data of bank 1 for equivalent load distance
		t	MX	-	1 S_CALC	Mon	Timestamp: Record data of bank 1 for equivalent load distance
RatFltALod	v2_dMV	mag.f	MX	-	1 IFLT_PER_ILD	Mon	Record data of bank 1 for ratio between fault current and load current
		q	MX	-	1 IFLT_PER_ILD	Mon	Quality: Record data of bank 1 for ratio between fault current and load current
		t	MX	-	1 IFLT_PER_ILD	Mon	Timestamp: Record data of bank 1 for ratio between fault current and load current
VPreFltPhA	v2_dMV	mag.f	MX	-	1 PhV Pre value PhA	Mon	Record data of bank 1 for phase A pre-fault voltage amplitude
		q	MX	-	1 PhV Pre value PhA	Mon	Quality: Record data of bank 1 for phase A pre-fault voltage amplitude
		t	MX	-	1 PhV Pre value PhA	Mon	Timestamp: Record data of bank 1 for phase A pre-fault voltage amplitude

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
VPreFltPhB	v2_dMV	mag.f	MX	-	1 PhV Pre value PhB	Mon	Record data of bank 1 for phase B pre-fault voltage amplitude
		q	MX	-	1 PhV Pre value PhB	Mon	Quality: Record data of bank 1 for phase B pre-fault voltage amplitude
		t	MX	-	1 PhV Pre value PhB	Mon	Timestamp: Record data of bank 1 for phase B pre-fault voltage amplitude
VPreFltPhC	v2_dMV	mag.f	MX	-	1 PhV Pre value PhC	Mon	Record data of bank 1 for phase C pre-fault voltage amplitude
		q	MX	-	1 PhV Pre value PhC	Mon	Quality: Record data of bank 1 for phase C pre-fault voltage amplitude
		t	MX	-	1 PhV Pre value PhC	Mon	Timestamp: Record data of bank 1 for phase C pre-fault voltage amplitude
APreFltPhA	v2_dMV	mag.f	MX	-	1 A Pre value PhA	Mon	Record data of bank 1 for phase A pre-fault current amplitude
		q	MX	-	1 A Pre value PhA	Mon	Quality: Record data of bank 1 for phase A pre-fault current amplitude
		t	MX	-	1 A Pre value PhA	Mon	Timestamp: Record data of bank 1 for phase A pre-fault current amplitude
APreFltPhB	v2_dMV	mag.f	MX	-	1 A Pre value PhB	Mon	Record data of bank 1 for phase B pre-fault current amplitude
		q	MX	-	1 A Pre value PhB	Mon	Quality: Record data of bank 1 for phase B pre-fault current amplitude
		t	MX	-	1 A Pre value PhB	Mon	Timestamp: Record data of bank 1 for phase B pre-fault current amplitude
APreFltPhC	v2_dMV	mag.f	MX	-	1 A Pre value PhC	Mon	Record data of bank 1 for phase C pre-fault current amplitude
		q	MX	-	1 A Pre value PhC	Mon	Quality: Record data of bank 1 for phase C pre-fault current amplitude
		t	MX	-	1 A Pre value PhC	Mon	Timestamp: Record data of bank 1 for phase C pre-fault current amplitude
VFltPhA	v2_dMV	mag.f	MX	-	1 PhV Flt value PhA	Mon	Record data of bank 1 for phase A voltage amplitude during fault
		q	MX	-	1 PhV Flt value PhA	Mon	Quality: Record data of bank 1 for phase A voltage amplitude during fault
		t	MX	-	1 PhV Flt value PhA	Mon	Timestamp: Record data of bank 1 for phase A voltage amplitude during fault
VFltPhB	v2_dMV	mag.f	MX	-	1 PhV Flt value PhB	Mon	Record data of bank 1 for phase B voltage amplitude during fault

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
VFltPhB	v2_dMV	q	MX	-	1 PhV Flt value PhB	Mon	Quality: Record data of bank 1 for phase B voltage amplitude during fault
		t	MX	-	1 PhV Flt value PhB	Mon	Timestamp: Record data of bank 1 for phase B voltage amplitude during fault
VFltPhC	v2_dMV	mag.f	MX	-	1 PhV Flt value PhC	Mon	Record data of bank 1 for phase C voltage amplitude during fault
		q	MX	-	1 PhV Flt value PhC	Mon	Quality: Record data of bank 1 for phase C voltage amplitude during fault
		t	MX	-	1 PhV Flt value PhC	Mon	Timestamp: Record data of bank 1 for phase C voltage amplitude during fault
AFltPhA	v2_dMV	mag.f	MX	-	1 A Flt value PhA	Mon	Record data of bank 1 for phase A current amplitude during fault
		q	MX	-	1 A Flt value PhA	Mon	Quality: Record data of bank 1 for phase A current amplitude during fault
		t	MX	-	1 A Flt value PhA	Mon	Timestamp: Record data of bank 1 for phase A current amplitude during fault
AFltPhB	v2_dMV	mag.f	MX	-	1 A Flt value PhB	Mon	Record data of bank 1 for phase B current amplitude during fault
		q	MX	-	1 A Flt value PhB	Mon	Quality: Record data of bank 1 for phase B current amplitude during fault
		t	MX	-	1 A Flt value PhB	Mon	Timestamp: Record data of bank 1 for phase B current amplitude during fault
AFltPhC	v2_dMV	mag.f	MX	-	1 A Flt value PhC	Mon	Record data of bank 1 for phase C current amplitude during fault
		q	MX	-	1 A Flt value PhC	Mon	Quality: Record data of bank 1 for phase C current amplitude during fault
		t	MX	-	1 A Flt value PhC	Mon	Timestamp: Record data of bank 1 for phase C current amplitude during fault

**Table 146:** *SCEFRFLO Logical node data (instance 1)*

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Alm	a_dSPS	stVal	ST	-	2 ALARM	Mon	Record data of bank 2 for alarm signal
Table continues on next page							

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Alm	a_dSPS	q	ST	-	2 ALARM	Mon	Quality: Record data of bank 2 for alarm signal
		t	ST	-	2 ALARM	Mon	Timestamp: Record data of bank 2 for alarm signal
FltDiskm	b_dMV	mag.f	MX	-	2 FLT_DISTANCE	Mon	Record data of bank 2 for fault distance
		q	MX	-	2 FLT_DISTANCE	Mon	Quality: Record data of bank 2 for fault distance
		t	MX	-	2 FLT_DISTANCE	Mon	Timestamp: Record data of bank 2 for fault distance
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
FltLoop	e_dINS	stVal	ST	-	2 FAULT_LOOP	Mon	Record data of bank 2 for fault loop
		q	ST	-	2 FAULT_LOOP	Mon	Quality: Record data of bank 2 for fault loop
		t	ST	-	2 FAULT_LOOP	Mon	Timestamp: Record data of bank 2 for fault loop
FltDisVald	v1_dINS	stVal	ST	-	2 EF_VALIDITY	Mon	Record data of bank 2 for validity of earth fault location
		q	ST	-	2 EF_VALIDITY	Mon	Quality: Record data of bank 2 for validity of earth fault location
		t	ST	-	2 EF_VALIDITY	Mon	Timestamp: Record data of bank 2 for validity of earth fault location
FltR	v2_dMV	mag.f	MX	-	2 RF	Mon	Record data of bank 2 for fault resistance
		q	MX	-	2 RF	Mon	Quality: Record data of bank 2 for fault resistance
		t	MX	-	2 RF	Mon	Timestamp: Record data of bank 2 for fault resistance
FltLoopR	v2_dMV	mag.f	MX	-	2 RFLOOP	Mon	Record data of bank 2 for fault loop resistance
		q	MX	-	2 RFLOOP	Mon	Quality: Record data of bank 2 for fault loop resistance
		t	MX	-	2 RFLOOP	Mon	Timestamp: Record data of bank 2 for fault loop resistance
FltLoopX	v2_dMV	mag.f	MX	-	2 XFLOOP	Mon	Record data of bank 2 for fault loop reactance
		q	MX	-	2 XFLOOP	Mon	Quality: Record data of bank 2 for fault loop reactance
		t	MX	-	2 XFLOOP	Mon	Timestamp: Record data of bank 2 for fault loop reactance
PhGndCapac	v2_dMV	mag.f	MX	-	2 XC0F_CALC	Mon	Record data bank2 feeder phase-to-earth capacitive reactance

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
PhGndCapac	v2_dMV	q	MX	-	2 XC0F_CALC	Mon	Quality: Record data bank2 feeder phase-to-earth capacitive reactance
		t	MX	-	2 XC0F_CALC	Mon	Timestamp: Record data bank2 feeder phase-to-earth capacitive reactance
EqDisLod	v2_dMV	mag.f	MX	-	2 S_CALC	Mon	Record data of bank 2 for equivalent load distance
		q	MX	-	2 S_CALC	Mon	Quality: Record data of bank 2 for equivalent load distance
		t	MX	-	2 S_CALC	Mon	Timestamp: Record data of bank 2 for equivalent load distance
RatFltALod	v2_dMV	mag.f	MX	-	2 IFLT_PER_ILD	Mon	Record data of bank 2 for ratio between fault current and load current
		q	MX	-	2 IFLT_PER_ILD	Mon	Quality: Record data of bank 2 for ratio between fault current and load current
		t	MX	-	2 IFLT_PER_ILD	Mon	Timestamp: Record data of bank 2 for ratio between fault current and load current
VPreFltPhA	v2_dMV	mag.f	MX		2 PhV Pre value PhA	Mon	Record data of bank 2 for phase A pre-fault voltage amplitude
		q	MX		2 PhV Pre value PhA	Mon	Quality: Record data of bank 2 for phase A pre-fault voltage amplitude
		t	MX		2 PhV Pre value PhA	Mon	Timestamp: Record data of bank 2 for phase A pre-fault voltage amplitude
VPreFltPhB	v2_dMV	mag.f	MX		2 PhV Pre value PhB	Mon	Record data of bank 2 for phase B pre-fault voltage amplitude
		q	MX		2 PhV Pre value PhB	Mon	Quality: Record data of bank 2 for phase B pre-fault voltage amplitude
		t	MX		2 PhV Pre value PhB	Mon	Timestamp: Record data of bank 2 for phase B pre-fault voltage amplitude
VPreFltPhC	v2_dMV	mag.f	MX		2 PhV Pre value PhC	Mon	Record data of bank 2 for phase C pre-fault voltage amplitude
		q	MX		2 PhV Pre value PhC	Mon	Quality: Record data of bank 2 for phase C pre-fault voltage amplitude
		t	MX		2 PhV Pre value PhC	Mon	Timestamp: Record data of bank 2 for phase C pre-fault voltage amplitude
APreFltPhA	v2_dMV	mag.f	MX		2 A Pre value PhA	Mon	Record data of bank 2 for phase A pre-fault current amplitude
		q	MX		2 A Pre value PhA	Mon	Quality: Record data of bank 2 for phase A pre-fault current amplitude

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
APreFltPhA	v2_dMV	t	MX		2 A Pre value PhA	Mon	Timestamp: Record data of bank 2 for phase A pre-fault current amplitude
APreFltPhB	v2_dMV	mag.f	MX		2 A Pre value PhB	Mon	Record data of bank 2 for phase B pre-fault current amplitude
		q	MX		2 A Pre value PhB	Mon	Quality: Record data of bank 2 for phase B pre-fault current amplitude
		t	MX		2 A Pre value PhB	Mon	Timestamp: Record data of bank 2 for phase B pre-fault current amplitude
VFltPhA	v2_dMV	mag.f	MX		2 PhV Flt value PhA	Mon	Record data of bank 2 for phase A voltage amplitude during fault
		q	MX		2 PhV Flt value PhA	Mon	Quality: Record data of bank 2 for phase A voltage amplitude during fault
		t	MX		2 PhV Flt value PhA	Mon	Timestamp: Record data of bank 2 for phase A voltage amplitude during fault
VFltPhB	v2_dMV	mag.f	MX		2 PhV Flt value PhB	Mon	Record data of bank 2 for phase B voltage amplitude during fault
		q	MX		2 PhV Flt value PhB	Mon	Quality: Record data of bank 2 for phase B voltage amplitude during fault
		t	MX		2 PhV Flt value PhB	Mon	Timestamp: Record data of bank 2 for phase B voltage amplitude during fault
VFltPhC	v2_dMV	mag.f	MX		2 PhV Flt value PhC	Mon	Record data of bank 2 for phase C voltage amplitude during fault
		q	MX		2 PhV Flt value PhC	Mon	Quality: Record data of bank 2 for phase C voltage amplitude during fault
		t	MX		2 PhV Flt value PhC	Mon	Timestamp: Record data of bank 2 for phase C voltage amplitude during fault
AFltPhA	v2_dMV	mag.f	MX		2 A Flt value PhA	Mon	Record data of bank 2 for phase A current amplitude during fault
		q	MX		2 A Flt value PhA	Mon	Quality: Record data of bank 2 for phase A current amplitude during fault
		t	MX		2 A Flt value PhA	Mon	Timestamp: Record data of bank 2 for phase A current amplitude during fault
AFltPhB	v2_dMV	mag.f	MX		2 A Flt value PhB	Mon	Record data of bank 2 for phase B current amplitude during fault
		q	MX		2 A Flt value PhB	Mon	Quality: Record data of bank 2 for phase B current amplitude during fault
		t	MX		2 A Flt value PhB	Mon	Timestamp: Record data of bank 2 for phase B current amplitude during fault

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
AFltPhC	v2_dMV	mag.f	MX		2 A Flt value PhC	Mon	Record data of bank 2 for phase C current amplitude during fault
		q	MX		2 A Flt value PhC	Mon	Quality: Record data of bank 2 for phase C current amplitude during fault
		t	MX		2 A Flt value PhC	Mon	Timestamp: Record data of bank 2 for phase C current amplitude during fault
APreFltPhC	v2_dMV	mag.f	MX		2 A Pre value PhC	Mon	Record data of bank 2 for phase C pre-fault current amplitude
		q	MX		2 A Pre value PhC	Mon	Quality: Record data of bank 2 for phase C pre-fault current amplitude
		t	MX		2 A Pre value PhC	Mon	Timestamp: Record data of bank 2 for phase C pre-fault current amplitude

Table 147: SCEFRFLO Logical node data (instance 2)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Alm	a_dSPS	stVal	ST	-	3 ALARM	Mon	Record data of bank 3 for alarm signal
		q	ST	-	3 ALARM	Mon	Quality: Record data of bank 3 for alarm signal
		t	ST	-	3 ALARM	Mon	Timestamp: Record data of bank 3 for alarm signal
FltDiskm	b_dMV	mag.f	MX	-	3 FLT_DISTANCE	Mon	Record data of bank 3 for fault distance
		q	MX	-	3 FLT_DISTANCE	Mon	Quality: Record data of bank 3 for fault distance
		t	MX	-	3 FLT_DISTANCE	Mon	Timestamp: Record data of bank 3 for fault distance
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
FltLoop	e_dINS	stVal	ST	-	3 FAULT_LOOP	Mon	Record data of bank 3 for fault loop
		q	ST	-	3 FAULT_LOOP	Mon	Quality: Record data of bank 3 for fault loop
		t	ST	-	3 FAULT_LOOP	Mon	Timestamp: Record data of bank 3 for fault loop

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
FltDisVald	v1_dINS	stVal	ST	-	3 EF_VALIDITY	Mon	Record data of bank 3 for validity of earth fault location
		q	ST	-	3 EF_VALIDITY	Mon	Quality: Record data of bank 3 for validity of earth fault location
		t	ST	-	3 EF_VALIDITY	Mon	Timestamp: Record data of bank 3 for validity of earth fault location
FltR	v2_dMV	mag.f	MX	-	3 RF	Mon	Record data of bank 3 for fault resistance
		q	MX	-	3 RF	Mon	Quality: Record data of bank 3 for fault resistance
		t	MX	-	3 RF	Mon	Timestamp: Record data of bank 3 for fault resistance
FltLoopR	v2_dMV	mag.f	MX	-	3 RFLOOP	Mon	Record data of bank 3 for fault loop resistance
		q	MX	-	3 RFLOOP	Mon	Quality: Record data of bank 3 for fault loop resistance
		t	MX	-	3 RFLOOP	Mon	Timestamp: Record data of bank 3 for fault loop resistance
FltLoopX	v2_dMV	mag.f	MX	-	3 XFLOOP	Mon	Record data of bank 3 for fault loop reactance
		q	MX	-	3 XFLOOP	Mon	Quality: Record data of bank 3 for fault loop reactance
		t	MX	-	3 XFLOOP	Mon	Timestamp: Record data of bank 3 for fault loop reactance
PhGndCapac	v2_dMV	mag.f	MX	-	3 XC0F_CALC	Mon	Record data bank3 feeder phase-to-earth capacitive reactance
		q	MX	-	3 XC0F_CALC	Mon	Quality: Record data bank3 feeder phase-to-earth capacitive reactance
		t	MX	-	3 XC0F_CALC	Mon	Timestamp: Record data bank3 feeder phase-to-earth capacitive reactance
EqDisLod	v2_dMV	mag.f	MX	-	3 S_CALC	Mon	Record data of bank 3 for equivalent load distance
		q	MX	-	3 S_CALC	Mon	Quality: Record data of bank 3 for equivalent load distance
		t	MX	-	3 S_CALC	Mon	Timestamp: Record data of bank 3 for equivalent load distance
RatFltALod	v2_dMV	mag.f	MX	-	3 IFLT_PER_ILD	Mon	Record data of bank 3 for ratio between fault current and load current
		q	MX	-	3 IFLT_PER_ILD	Mon	Quality: Record data of bank 3 for ratio between fault current and load current
		t	MX	-	3 IFLT_PER_ILD	Mon	Timestamp: Record data of bank 3 for ratio between fault current and load current
VPreFltPhA	v2_dMV	mag.f	MX		3 PhV Pre value PhA	Mon	Record data of bank 3 for phase A pre-fault voltage amplitude

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
VPreFltPhA	v2_dMV	q	MX		3 PhV Pre value PhA	Mon	Quality: Record data of bank 3 for phase A pre-fault voltage amplitude
		t	MX		3 PhV Pre value PhA	Mon	Timestamp: Record data of bank 3 for phase A pre-fault voltage amplitude
VPreFltPhB	v2_dMV	mag.f	MX		3 PhV Pre value PhB	Mon	Record data of bank 3 for phase B pre-fault voltage amplitude
		q	MX		3 PhV Pre value PhB	Mon	Quality: Record data of bank 3 for phase B pre-fault voltage amplitude
		t	MX		3 PhV Pre value PhB	Mon	Timestamp: Record data of bank 3 for phase B pre-fault voltage amplitude
VPreFltPhC	v2_dMV	mag.f	MX		3 PhV Pre value PhC	Mon	Record data of bank 3 for phase C pre-fault voltage amplitude
		q	MX		3 PhV Pre value PhC	Mon	Quality: Record data of bank 3 for phase C pre-fault voltage amplitude
		t	MX		3 PhV Pre value PhC	Mon	Timestamp: Record data of bank 3 for phase C pre-fault voltage amplitude
APreFltPhA	v2_dMV	mag.f	MX		3 A Pre value PhA	Mon	Record data of bank 3 for phase A pre-fault current amplitude
		q	MX		3 A Pre value PhA	Mon	Quality: Record data of bank 3 for phase A pre-fault current amplitude
		t	MX		3 A Pre value PhA	Mon	Timestamp: Record data of bank 3 for phase A pre-fault current amplitude
APreFltPhB	v2_dMV	mag.f	MX		3 A Pre value PhB	Mon	Record data of bank 3 for phase B pre-fault current amplitude
		q	MX		3 A Pre value PhB	Mon	Quality: Record data of bank 3 for phase B pre-fault current amplitude
		t	MX		3 A Pre value PhB	Mon	Timestamp: Record data of bank 3 for phase B pre-fault current amplitude
VFltPhA	v2_dMV	mag.f	MX		3 PhV Flt value PhA	Mon	Record data of bank 3 for phase A voltage amplitude during fault
		q	MX		3 PhV Flt value PhA	Mon	Quality: Record data of bank 3 for phase A voltage amplitude during fault
		t	MX		3 PhV Flt value PhA	Mon	Timestamp: Record data of bank 3 for phase A voltage amplitude during fault
VFltPhB	v2_dMV	mag.f	MX		3 PhV Flt value PhB	Mon	Record data of bank 3 for phase B voltage amplitude during fault
		q	MX		3 PhV Flt value PhB	Mon	Quality: Record data of bank 3 for phase B voltage amplitude during fault

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
VFltPhB	v2_dMV	t	MX		3 PhV Flt value PhB	Mon	Timestamp: Record data of bank 3 for phase B voltage amplitude during fault
VFltPhC	v2_dMV	mag.f	MX		3 PhV Flt value PhC	Mon	Record data of bank 3 for phase C voltage amplitude during fault
		q	MX		3 PhV Flt value PhC	Mon	Quality: Record data of bank 3 for phase C voltage amplitude during fault
		t	MX		3 PhV Flt value PhC	Mon	Timestamp: Record data of bank 3 for phase C voltage amplitude during fault
AFltPhA	v2_dMV	mag.f	MX		3 A Flt value PhA	Mon	Record data of bank 3 for phase A current amplitude during fault
		q	MX		3 A Flt value PhA	Mon	Quality: Record data of bank 3 for phase A current amplitude during fault
		t	MX		3 A Flt value PhA	Mon	Timestamp: Record data of bank 3 for phase A current amplitude during fault
AFltPhB	v2_dMV	mag.f	MX		3 A Flt value PhB	Mon	Record data of bank 3 for phase B current amplitude during fault
		q	MX		3 A Flt value PhB	Mon	Quality: Record data of bank 3 for phase B current amplitude during fault
		t	MX		3 A Flt value PhB	Mon	Timestamp: Record data of bank 3 for phase B current amplitude during fault
AFltPhC	v2_dMV	mag.f	MX		3 A Flt value PhC	Mon	Record data of bank 3 for phase C current amplitude during fault
		q	MX		3 A Flt value PhC	Mon	Quality: Record data of bank 3 for phase C current amplitude during fault
		t	MX		3 A Flt value PhC	Mon	Timestamp: Record data of bank 3 for phase C current amplitude during fault
APreFltPhC	v2_dMV	mag.f	MX		3 A Pre value PhC	Mon	Record data of bank 3 for phase C pre-fault current amplitude
		q	MX		3 A Pre value PhC	Mon	Quality: Record data of bank 3 for phase C pre-fault current amplitude
		t	MX		3 A Pre value PhC	Mon	Timestamp: Record data of bank 3 for phase C pre-fault current amplitude

**Table 148:** *SCEFRFLO Logical node data (instance 1)*

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Rs	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850

**Table 149:** *SCEFRFLO Logical node data (instance 1)*

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
FltZ	c_dCMV	cVal.mag.f	MX	-	RF	Mon	Fault resistance in primary ohms
		q	MX	-	RF	Mon	Quality: Fault resistance in primary ohms
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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
FltZ	c_dCMV	t	MX	-	RF	Mon	Timestamp: Fault resistance in primary ohms
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
FltDiskm	c_dMV	mag.f	MX	-	FLT_DISTANCE	Mon	Fault distance in units selected by the user (pu)
		q	MX	-	FLT_DISTANCE	Mon	Quality: Fault distance in units selected by the user (pu)
		t	MX	-	FLT_DISTANCE	Mon	Timestamp: Fault distance in units selected by the user (pu)
FltLoop	e_dINS	stVal	ST	-	FAULT_LOOP	Mon	Fault impedance loop used for distance measurement
		q	ST	-	FAULT_LOOP	Mon	Quality: Fault impedance loop used for distance measurement
		t	ST	-	FAULT_LOOP	Mon	Timestamp: Fault impedance loop used for distance measurement
FltDisVald	v1_dINS	stVal	ST	-	EF_VALIDITY	Mon	Validity of earth fault location
		q	ST	-	EF_VALIDITY	Mon	Quality: Validity of earth fault location
		t	ST	-	EF_VALIDITY	Mon	Timestamp: Validity of earth fault location
FltAlm	v1_dSPS	stVal	ST	-	ALARM	Mon	Alarm signal indicating that fault is located between set limits
		q	ST	-	ALARM	Mon	Quality: Alarm signal indicating that fault is located between set limits
		t	ST	-	ALARM	Mon	Timestamp: Alarm signal indicating that fault is located between set limits
TrgSt	v1_dSPS	stVal	ST	-	TRIGG_OUT	Mon	Signal indicating function triggering
		q	ST	-	TRIGG_OUT	Mon	Quality: Signal indicating function triggering
		t	ST	-	TRIGG_OUT	Mon	Timestamp: Signal indicating function triggering
FltLoopR	v2_dMV	mag.f	MX	-	RFLOOP	Mon	Fault loop resistance in primary ohms
		q	MX	-	RFLOOP	Mon	Quality: Fault loop resistance in primary ohms
		t	MX	-	RFLOOP	Mon	Timestamp: Fault loop resistance in primary ohms
FltLoopX	v2_dMV	mag.f	MX	-	XFLOOP	Mon	Fault loop reactance in primary ohms
		q	MX	-	XFLOOP	Mon	Quality: Fault loop reactance in primary ohms

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
FltLoopX	v2_dMV	t	MX	-	XFLOOP	Mon	Timestamp: Fault loop reactance in primary ohms
PhGndCapac	v2_dMV	mag.f	MX	-	XC0F_CALC	Mon	Estimated phase-to-earth capacitive reactance of the feeder
		q	MX	-	XC0F_CALC	Mon	Quality: Estimated phase-to-earth capacitive reactance of the feeder
		t	MX	-	XC0F_CALC	Mon	Timestamp: Estimated phase-to-earth capacitive reactance of the feeder
RatFltALod	v2_dMV	mag.f	MX	-	IFLT_PER_ILD	Mon	Ratio between fault current and load current in case of an earth fault
		q	MX	-	IFLT_PER_ILD	Mon	Quality: Ratio between fault current and load current in case of an earth fault
		t	MX	-	IFLT_PER_ILD	Mon	Timestamp: Ratio between fault current and load current in case of an earth fault
EqDisLod	v2_dMV	mag.f	MX	-	S_CALC	Mon	Estimated equivalent load distance
		q	MX	-	S_CALC	Mon	Quality: Estimated equivalent load distance
		t	MX	-	S_CALC	Mon	Timestamp: Estimated equivalent load distance

## 7.6.5 Fuse failure supervision RFUF

LN type	LN prefix	LN class	Function block name
SEQRFUF (revision 0)	SEQ	RFUF	SEQRFUF

Table 150: SEQRFUF Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Str	d_dACD	general	ST	-	FUSEF_U	Mon	General start of function
		q	ST	-	FUSEF_U	Mon	Quality: General start of function
		t	ST	-	FUSEF_U	Mon	Timestamp: General start of function
Str3Ph	d_dACD	general	ST	-	FUSEF_3PH	Mon	Three-phase start of function
		q	ST	-	FUSEF_3PH	Mon	Quality: Three-phase start of function
		t	ST	-	FUSEF_3PH	Mon	Timestamp: Three-phase start of function
StrRst	d_dACD	general	ST	-	FUSEF_Z	Mon	Start of current and voltage controlled function
		q	ST	-	FUSEF_Z	Mon	Quality: Start of current and voltage controlled function
		t	ST	-	FUSEF_Z	Mon	Timestamp: Start of current and voltage controlled function

### 7.6.6 Autoreclosing RREC

LN type	LN prefix	LN class	Function block name
DARREC (revision 1)	DA	RREC	DARREC

Table 151: DARREC Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	CLOSE_CB	Mon	Close (reclose) command for circuit breaker
		q	ST	T	CLOSE_CB	Mon	Quality: Close (reclose) command for circuit breaker
		t	ST	T	CLOSE_CB	Mon	Timestamp: Close (reclose) command for circuit breaker
OpOpn	b_dACT	general	ST	-	OPEN_CB	Mon	Open command for circuit breaker
		q	ST	-	OPEN_CB	Mon	Quality: Open command for circuit breaker
		t	ST	-	OPEN_CB	Mon	Timestamp: Open command for circuit breaker
OpCntRs	d_dINC	stVal	ST	-	COUNTER	Mon	Resetable operation counter, all shots
		q	ST	-	COUNTER	Mon	Quality: Resetable operation counter, all shots
		t	ST	-	COUNTER	Mon	Timestamp: Resetable operation counter, all shots
AutoRecSt	d_dINS	stVal	ST	-	STATUS	Mon	AR status signal for IEC61850
		q	ST	-	STATUS	Mon	Quality: AR status signal for IEC61850
		t	ST	-	STATUS	Mon	Timestamp: AR status signal for IEC61850
OpCnt1	j_dINS	stVal	ST	-	CNT_SHOT1	Mon	Resetable operation counter, shot 1
		q	ST	-	CNT_SHOT1	Mon	Quality: Resetable operation counter, shot 1
		t	ST	-	CNT_SHOT1	Mon	Timestamp: Resetable operation counter, shot 1
OpCnt2	j_dINS	stVal	ST	-	CNT_SHOT2	Mon	Resetable operation counter, shot 2
		q	ST	-	CNT_SHOT2	Mon	Quality: Resetable operation counter, shot 2
		t	ST	-	CNT_SHOT2	Mon	Timestamp: Resetable operation counter, shot 2
OpCnt3	j_dINS	stVal	ST	-	CNT_SHOT3	Mon	Resetable operation counter, shot 3
		q	ST	-	CNT_SHOT3	Mon	Quality: Resetable operation counter, shot 3
		t	ST	-	CNT_SHOT3	Mon	Timestamp: Resetable operation counter, shot 3
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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
OpCnt4	j_dINS	stVal	ST	-	CNT_SHOT4	Mon	Resetable operation counter, shot 4
		q	ST	-	CNT_SHOT4	Mon	Quality: Resetable operation counter, shot 4
		t	ST	-	CNT_SHOT4	Mon	Timestamp: Resetable operation counter, shot 4
OpCnt5	j_dINS	stVal	ST	-	CNT_SHOT5	Mon	Resetable operation counter, shot5
		q	ST	-	CNT_SHOT5	Mon	Quality: Resetable operation counter, shot5
		t	ST	-	CNT_SHOT5	Mon	Timestamp: Resetable operation counter, shot5
ProDsa	v1_dINS	stVal	ST	-	PROT_DISA	Mon	A word type signal for disabling protection functions
		q	ST	-	PROT_DISA	Mon	Quality: A word type signal for disabling protection functions
		t	ST	-	PROT_DISA	Mon	Timestamp: A word type signal for disabling protection functions
FrqOpCnt	v1_dINS	stVal	ST	-	FRQ_OPR_CNT	Mon	Frequent operation counter
		q	ST	-	FRQ_OPR_CNT	Mon	Quality: Frequent operation counter
		t	ST	-	FRQ_OPR_CNT	Mon	Timestamp: Frequent operation counter
ShotPntr	v1_dINS	stVal	ST	-	SHOT_PTR	Mon	Shot pointer value
		q	ST	-	SHOT_PTR	Mon	Quality: Shot pointer value
		t	ST	-	SHOT_PTR	Mon	Timestamp: Shot pointer value
RsRec	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orlent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
RsCnt	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orlent	CO	-	-	Cmd	Command parameter for IEC61850

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
RsCnt	v1_dSPC	Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
DsaCnt	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
LO	v1_dSPS	stVal	ST	-	LOCKED	Mon	Signal indicating that AR is locked out
		q	ST	-	LOCKED	Mon	Quality: Signal indicating that AR is locked out
		t	ST	-	LOCKED	Mon	Timestamp: Signal indicating that AR is locked out
SucRec	v1_dSPS	stVal	ST	-	SUC_RECL	Mon	Indicates a successful reclosing sequence
		q	ST	-	SUC_RECL	Mon	Quality: Indicates a successful reclosing sequence
		t	ST	-	SUC_RECL	Mon	Timestamp: Indicates a successful reclosing sequence
UnsRec	v1_dSPS	stVal	ST	-	UNSUC_RECL	Mon	Indicates an unsuccessful reclosing sequence
		q	ST	-	UNSUC_RECL	Mon	Quality: Indicates an unsuccessful reclosing sequence
		t	ST	-	UNSUC_RECL	Mon	Timestamp: Indicates an unsuccessful reclosing sequence
UnsCBCIs	v1_dSPS	stVal	ST	-	UNSUC_CB	Mon	Indicates an unsuccessful CB closing
		q	ST	-	UNSUC_CB	Mon	Quality: Indicates an unsuccessful CB closing
		t	ST	-	UNSUC_CB	Mon	Timestamp: Indicates an unsuccessful CB closing
RdyRec	v1_dSPS	stVal	ST	-	READY	Mon	Indicates that the AR is ready for a new sequence

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
RdyRec	v1_dSPS	q	ST	-	READY	Mon	Quality: Indicates that the AR is ready for a new sequence
		t	ST	-	READY	Mon	Timestamp: Indicates that the AR is ready for a new sequence
ActRec	v1_dSPS	stVal	ST	-	ACTIVE	Mon	Reclosing sequence is in progress
		q	ST	-	ACTIVE	Mon	Quality: Reclosing sequence is in progress
		t	ST	-	ACTIVE	Mon	Timestamp: Reclosing sequence is in progress
PrgRec	v1_dSPS	stVal	ST	-	INPRO	Mon	Reclosing shot in progress, activated during dead time
		q	ST	-	INPRO	Mon	Quality: Reclosing shot in progress, activated during dead time
		t	ST	-	INPRO	Mon	Timestamp: Reclosing shot in progress, activated during dead time
PrgRec1	v1_dSPS	stVal	ST	-	INPRO_1	Mon	Reclosing shot in progress, shot 1
		q	ST	-	INPRO_1	Mon	Quality: Reclosing shot in progress, shot 1
		t	ST	-	INPRO_1	Mon	Timestamp: Reclosing shot in progress, shot 1
PrgRec2	v1_dSPS	stVal	ST	-	INPRO_2	Mon	Reclosing shot in progress, shot 2
		q	ST	-	INPRO_2	Mon	Quality: Reclosing shot in progress, shot 2
		t	ST	-	INPRO_2	Mon	Timestamp: Reclosing shot in progress, shot 2
PrgRec3	v1_dSPS	stVal	ST	-	INPRO_3	Mon	Reclosing shot in progress, shot 3
		q	ST	-	INPRO_3	Mon	Quality: Reclosing shot in progress, shot 3
		t	ST	-	INPRO_3	Mon	Timestamp: Reclosing shot in progress, shot 3
PrgRec4	v1_dSPS	stVal	ST	-	INPRO_4	Mon	Reclosing shot in progress, shot 4
		q	ST	-	INPRO_4	Mon	Quality: Reclosing shot in progress, shot 4
		t	ST	-	INPRO_4	Mon	Timestamp: Reclosing shot in progress, shot 4
PrgRec5	v1_dSPS	stVal	ST	-	INPRO_5	Mon	Reclosing shot in progress, shot 5
		q	ST	-	INPRO_5	Mon	Quality: Reclosing shot in progress, shot 5
		t	ST	-	INPRO_5	Mon	Timestamp: Reclosing shot in progress, shot 5
PrgDsr	v1_dSPS	stVal	ST	-	DISCR_INPRO	Mon	Signal indicating that discrimination time is inprogress
		q	ST	-	DISCR_INPRO	Mon	Quality: Signal indicating that discrimination time is inprogress

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
PrgDsr	v1_dSPS	t	ST	-	DISCR_INPRO	Mon	Timestamp: Signal indicating that discrimination time is inprogress
PrgCutOut	v1_dSPS	stVal	ST	-	CUTOUT_INPRO	Mon	Signal indicating that cut-out time is in progress
		q	ST	-	CUTOUT_INPRO	Mon	Quality: Signal indicating that cut-out time is in progress
		t	ST	-	CUTOUT_INPRO	Mon	Timestamp: Signal indicating that cut-out time is in progress
FrqOpAlm	v1_dSPS	stVal	ST	-	FRQ_OPR_AL	Mon	Frequent operation counter alarm
		q	ST	-	FRQ_OPR_AL	Mon	Quality: Frequent operation counter alarm
		t	ST	-	FRQ_OPR_AL	Mon	Timestamp: Frequent operation counter alarm
WtMstr	v1_dSPS	stVal	ST	-	CMD_WAIT	Mon	Wait for master command
		q	ST	-	CMD_WAIT	Mon	Quality: Wait for master command
		t	ST	-	CMD_WAIT	Mon	Timestamp: Wait for master command
CBManCls	v1_dSPS	stVal	ST	-	MAN_CB_CL	Mon	Indicates CB manual closing during reclosing sequence
		q	ST	-	MAN_CB_CL	Mon	Quality: Indicates CB manual closing during reclosing sequence
		t	ST	-	MAN_CB_CL	Mon	Timestamp: Indicates CB manual closing during reclosing sequence
SOF	v1_dSPS	stVal	ST	-	SOTF	Mon	Switch-onto-fault
		q	ST	-	SOTF	Mon	Quality: Switch-onto-fault
		t	ST	-	SOTF	Mon	Timestamp: Switch-onto-fault
AROn	v1_dSPS	stVal	ST	-	AR_ON	Mon	Autoreclosing allowed
		q	ST	-	AR_ON	Mon	Quality: Autoreclosing allowed
		t	ST	-	AR_ON	Mon	Timestamp: Autoreclosing allowed

### 7.6.7

### Switch onto fault logic RSOF

LN type	LN prefix	LN class	Function block name
CVRSOF (revision 0)	CV	RSOF	CVRSOF

Table 152: CVRSOF Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
TrFlst	a_dSPS	stVal	ST	-	OPERATE	Mon	Operate
		q	ST	-	OPERATE	Mon	Quality: Operate
		t	ST	-	OPERATE	Mon	Timestamp: Operate

### 7.6.8 Synchronising RSYN

LN type	LN prefix	LN class	Function block name
AUT2RSYN instance 1 (revision 0)	AUT2	RSYN	SYNCRSYN
MAN2RSYN instance 2 (revision 0)	MAN2	RSYN	SYNCRSYN
RSY2LLN0 instance 1 (revision 0)	-	LLN0	SYNCRSYN
SYN1RSYN instance 3 (revision 0)	SYN1	RSYN	SYNCRSYN

Table 153: *SYNCRSYN Logical node data (instance 1)*

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
AngInd	a_dSPS	stVal	ST	-	PH_DIFF_AU	Mon	Phase angle difference out of limit for Auto operation
		q	ST	-	PH_DIFF_AU	Mon	Quality: Phase angle difference out of limit for Auto operation
		t	ST	-	PH_DIFF_AU	Mon	Timestamp: Phase angle difference out of limit for Auto operation

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Rel	a_dSPS	stVal	ST	-	-	Mon	Automatic release
		q	ST	-	-	Mon	Quality: Automatic release
		t	ST	-	-	Mon	Timestamp: Automatic release
VInd	a_dSPS	stVal	ST	-	U_DIFF_SYNC	Mon	Voltage difference out of limit
		q	ST	-	U_DIFF_SYNC	Mon	Quality: Voltage difference out of limit
		t	ST	-	U_DIFF_SYNC	Mon	Timestamp: Voltage difference out of limit
HzInd	a_dSPS	stVal	ST	-	FR_DIFF_AU	Mon	Frequency difference out of limit for Auto operation
		q	ST	-	FR_DIFF_AU	Mon	Quality: Frequency difference out of limit for Auto operation
		t	ST	-	FR_DIFF_AU	Mon	Timestamp: Frequency difference out of limit for Auto operation
DifAngClc	b_dMV	mag.f	MX	-	PH_DIFF_MEAS	Mon	Calculated difference of phase angle
		q	MX	-	PH_DIFF_MEAS	Mon	Quality: Calculated difference of phase angle
		t	MX	-	PH_DIFF_MEAS	Mon	Timestamp: Calculated difference of phase angle
DifHzClc	b_dMV	mag.f	MX	-	FR_DIFF_MEAS	Mon	Calculated difference in frequency
		q	MX	-	FR_DIFF_MEAS	Mon	Quality: Calculated difference in frequency
		t	MX	-	FR_DIFF_MEAS	Mon	Timestamp: Calculated difference in frequency
DifVClc	b_dMV	mag.f	MX	-	U_DIFF_MEAS	Mon	Calculated difference in voltage
		q	MX	-	U_DIFF_MEAS	Mon	Quality: Calculated difference in voltage
		t	MX	-	U_DIFF_MEAS	Mon	Timestamp: Calculated difference in voltage
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
TestSCOK	v1_dSPS	stVal	ST	-	AU_SYNC_TST	Mon	Auto synchro check OK test output
		q	ST	-	AU_SYNC_TST	Mon	Quality: Auto synchro check OK test output
		t	ST	-	AU_SYNC_TST	Mon	Timestamp: Auto synchro check OK test output
EnOK	v1_dSPS	stVal	ST	-	AU_ENERG_OK	Mon	Automatic energizing check OK
		q	ST	-	AU_ENERG_OK	Mon	Quality: Automatic energizing check OK
		t	ST	-	AU_ENERG_OK	Mon	Timestamp: Automatic energizing check OK

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**Table 154:** SYNCRSYN Logical node data (instance 2)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Rel	a_dSPS	stVal	ST	-	-	Mon	Manual release
		q	ST	-	-	Mon	Quality: Manual release
		t	ST	-	-	Mon	Timestamp: Manual release
VInd	a_dSPS	stVal	ST	-	U_DIFF_SYNC	Mon	Voltage difference out of limit
		q	ST	-	U_DIFF_SYNC	Mon	Quality: Voltage difference out of limit
		t	ST	-	U_DIFF_SYNC	Mon	Timestamp: Voltage difference out of limit
AngInd	a_dSPS	stVal	ST	-	PH_DIFF_MAN	Mon	Phase angle difference out of limit for Manual Operation
		q	ST	-	PH_DIFF_MAN	Mon	Quality: Phase angle difference out of limit for Manual Operation
		t	ST	-	PH_DIFF_MAN	Mon	Timestamp: Phase angle difference out of limit for Manual Operation
HzInd	a_dSPS	stVal	ST	-	FR_DIFF_MAN	Mon	Frequency difference out of limit for Manual operation
		q	ST	-	FR_DIFF_MAN	Mon	Quality: Frequency difference out of limit for Manual operation
		t	ST	-	FR_DIFF_MAN	Mon	Timestamp: Frequency difference out of limit for Manual operation
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
EnOK	v1_dSPS	stVal	ST	-	MAN_ENERG_OK	Mon	Manual energizing check OK
		q	ST	-	MAN_ENERG_OK	Mon	Quality: Manual energizing check OK
		t	ST	-	MAN_ENERG_OK	Mon	Timestamp: Manual energizing check OK
TestSCOK	v1_dSPS	stVal	ST	-	MAN_SYNC_TST	Mon	Manual synchro check OK test output
		q	ST	-	MAN_SYNC_TST	Mon	Quality: Manual synchro check OK test output
		t	ST	-	MAN_SYNC_TST	Mon	Timestamp: Manual synchro check OK test output

Table 155: SYNCRSYN Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
VInd	a_dSPS	stVal	ST	-	U_DIFF_SYNC	Mon	Voltage difference out of limit
		q	ST	-	U_DIFF_SYNC	Mon	Quality: Voltage difference out of limit
		t	ST	-	U_DIFF_SYNC	Mon	Timestamp: Voltage difference out of limit
Bus1Sel	v1_dSPS	stVal	ST	-	B1_SEL	Mon	Bus1 selected
		q	ST	-	B1_SEL	Mon	Quality: Bus1 selected
		t	ST	-	B1_SEL	Mon	Timestamp: Bus1 selected
Bus2Sel	v1_dSPS	stVal	ST	-	B2_SEL	Mon	Bus2 selected
		q	ST	-	B2_SEL	Mon	Quality: Bus2 selected
		t	ST	-	B2_SEL	Mon	Timestamp: Bus2 selected
Lin1Sel	v1_dSPS	stVal	ST	-	LN1_SEL	Mon	Line1 selected
		q	ST	-	LN1_SEL	Mon	Quality: Line1 selected
		t	ST	-	LN1_SEL	Mon	Timestamp: Line1 selected
Lin2Sel	v1_dSPS	stVal	ST	-	LN2_SEL	Mon	Line2 selected
		q	ST	-	LN2_SEL	Mon	Quality: Line2 selected
		t	ST	-	LN2_SEL	Mon	Timestamp: Line2 selected
SelFuFail	v1_dSPS	stVal	ST	-	U_SEL_FAIL	Mon	Selected voltage transformer fuse failed
		q	ST	-	U_SEL_FAIL	Mon	Quality: Selected voltage transformer fuse failed
		t	ST	-	U_SEL_FAIL	Mon	Timestamp: Selected voltage transformer fuse failed
TestEnOK	v1_dSPS	stVal	ST	-	ENERG_TST	Mon	Energizing check OK test output

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
TestEnOK	v1_dSPS	q	ST	-	ENERG_TST	Mon	Quality: Energizing check OK test output
		t	ST	-	ENERG_TST	Mon	Timestamp: Energizing check OK test output
VInBnd	v1_dSPS	stVal	ST	-	U_OK	Mon	Voltage amplitudes above set limits
		q	ST	-	U_OK	Mon	Quality: Voltage amplitudes above set limits
		t	ST	-	U_OK	Mon	Timestamp: Voltage amplitudes above set limits

Table 156: SYNCRSYN Logical node data (instance 3)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Rel	a_dSPS	stVal	ST	-	SYN_OK	Mon	Synchronizing OK output
		q	ST	-	SYN_OK	Mon	Quality: Synchronizing OK output
		t	ST	-	SYN_OK	Mon	Timestamp: Synchronizing OK output
HzInd	a_dSPS	stVal	ST	-	FR_DIFF_SYN	Mon	Frequency difference out of limit for synchronizing
		q	ST	-	FR_DIFF_SYN	Mon	Quality: Frequency difference out of limit for synchronizing
		t	ST	-	FR_DIFF_SYN	Mon	Timestamp: Frequency difference out of limit for synchronizing
VInd	a_dSPS	stVal	ST	-	U_DIFF_SYN	Mon	Voltage difference out of limit for synchronizing
		q	ST	-	U_DIFF_SYN	Mon	Quality: Voltage difference out of limit for synchronizing
		t	ST	-	U_DIFF_SYN	Mon	Timestamp: Voltage difference out of limit for synchronizing
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
FailSyn	v1_dSPS	stVal	ST	-	SYN_FAIL	Mon	Synchronizing failed
		q	ST	-	SYN_FAIL	Mon	Quality: Synchronizing failed
		t	ST	-	SYN_FAIL	Mon	Timestamp: Synchronizing failed
TestSynOK	v1_dSPS	stVal	ST	-	SYN_TST	Mon	Synchronizing OK test output

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
TestSynOK	v1_dSPS	q	ST	-	SYN_TST	Mon	Quality: Synchronizing OK test output
		t	ST	-	SYN_TST	Mon	Timestamp: Synchronizing OK test output
HzRCInd	v1_dSPS	stVal	ST	-	FR_DER_SYN	Mon	Frequency derivative out of limit for synchronizing
		q	ST	-	FR_DER_SYN	Mon	Quality: Frequency derivative out of limit for synchronizing
		t	ST	-	FR_DER_SYN	Mon	Timestamp: Frequency derivative out of limit for synchronizing
SynWait	v1_dSPS	stVal	ST	-	SYN_INPRO	Mon	Synchronizing in progress
		q	ST	-	SYN_INPRO	Mon	Quality: Synchronizing in progress
		t	ST	-	SYN_INPRO	Mon	Timestamp: Synchronizing in progress
HzInBnd	v1_dSPS	stVal	ST	-	FR_OK_SYN	Mon	Frequency difference in band for synchronizing
		q	ST	-	FR_OK_SYN	Mon	Quality: Frequency difference in band for synchronizing
		t	ST	-	FR_OK_SYN	Mon	Timestamp: Frequency difference in band for synchronizing

## 7.7 Logical nodes for generic references

### 7.7.1 Generic automatic process control GACP

LN type	LN prefix	LN class	Function block name
ESMGAPC (revision 0)	ESM	GACP	ESMGAPC

Table 157: ESMGAPC Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Op	b_dACT	general	ST	T	ST_EMERG_ENA	Mon	Emergency start signal
		q	ST	T	ST_EMERG_ENA	Mon	Quality: Emergency start signal
		t	ST	T	ST_EMERG_ENA	Mon	Timestamp: Emergency start signal
Str	d_dACD	general	ST	-	ST_EMERG_ENA	Mon	Emergency start signal
		q	ST	-	ST_EMERG_ENA	Mon	Quality: Emergency start signal
		t	ST	-	ST_EMERG_ENA	Mon	Timestamp: Emergency start signal

#### 7.7.2 Generic process I/O GGIO

LN type	LN prefix	LN class	Function block name
DPGGIO (revision 1)	DP	GGIO	DPGGIO

Table 158: DPGGIO Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter
		Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
DPCSO	b_dDPC	stVal	ST	-	POSITION	Mon	Double point indication
		q	ST	-	POSITION	Mon	Quality: Double point indication
		t	ST	-	POSITION	Mon	Timestamp: Double point indication

LN type	LN prefix	LN class	Function block name
CNTGGIO (revision 1)	CNT	GGIO	CNTGGIO

**Table 159:** CNTGGIO Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Cnt1	v1_dBCR	actVal	ST	-	VALUE1	Mon	Output of counter 1
		q	ST	-	VALUE1	Mon	Quality: Output of counter 1
		t	ST	-	VALUE1	Mon	Timestamp: Output of counter 1
Cnt2	v1_dBCR	actVal	ST	-	VALUE2	Mon	Output of counter 2
		q	ST	-	VALUE2	Mon	Quality: Output of counter 2
		t	ST	-	VALUE2	Mon	Timestamp: Output of counter 2
Cnt3	v1_dBCR	actVal	ST	-	VALUE3	Mon	Output of counter 3
		q	ST	-	VALUE3	Mon	Quality: Output of counter 3
		t	ST	-	VALUE3	Mon	Timestamp: Output of counter 3
Cnt4	v1_dBCR	actVal	ST	-	VALUE4	Mon	Output of counter 4
		q	ST	-	VALUE4	Mon	Quality: Output of counter 4
		t	ST	-	VALUE4	Mon	Timestamp: Output of counter 4

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Cnt5	v1_dBCR	actVal	ST	-	VALUE5	Mon	Output of counter 5
		q	ST	-	VALUE5	Mon	Quality: Output of counter 5
		t	ST	-	VALUE5	Mon	Timestamp: Output of counter 5
Cnt6	v1_dBCR	actVal	ST	-	VALUE6	Mon	Output of counter 6
		q	ST	-	VALUE6	Mon	Quality: Output of counter 6
		t	ST	-	VALUE6	Mon	Timestamp: Output of counter 6
RsCnt	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850

LN type	LN prefix	LN class	Function block name
SPGGIO (revision 1)	SP	GGIO	SPGGIO

Table 160: SPGGIO Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter
		Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Ind	c_dSPS	stVal	ST	-	OUT	Mon	Output status
		q	ST	-	OUT	Mon	Quality: Output status
		t	ST	-	OUT	Mon	Timestamp: Output status

LN type	LN prefix	LN class	Function block name
MVGGIO (revision 1)	MV	GGIO	MVGGIO

**Table 161:** MVGGIO Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter
		Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
AnIn	a_dMV	rangeC.hhLim.f	CF	-	MV hhLim	-	High High limit multiplied with the base prefix (multiplication factor)
		rangeC.hLim.f	CF	-	MV hLim	-	High limit multiplied with the base prefix (multiplication factor)
		rangeC.IILim.f	CF	-	MV IILim	-	Low limit multiplied with the base prefix (multiplication factor)
		rangeC.IILim.f	CF	-	MV IIILim	-	Low Low limit multiplied with the base prefix (multiplication factor)
		rangeC.max.f	CF	-	MV max	-	Maximum value multiplied with the base prefix (multiplication factor)
		rangeC.min.f	CF	-	MV min	-	Minimum value multiplied with the base prefix (multiplication factor)
		mag.f	MX	-	VALUE	Mon	Magnitude of deadband value
		subMag.f	SV	-	-	-	Substituted value
		range	MX	-	RANGE	Mon	Range
		q	MX	-	VALUE	Mon	Quality: Magnitude of deadband value
Table continues on next page							

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
AnIn	a_dMV	t	MX	-	VALUE	Mon	Timestamp: Magnitude of deadband value
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	MV db	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	MV zeroDb	-	Zero point clamping in 0,001% of range

LN type	LN prefix	LN class	Function block name
PCGGIO (revision 1)	PC	GGIO	PCGGIO

Table 162: PCGGIO Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orlent	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter
		Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
AnIn	b_dMV	mag.f	MX	-	SCAL_VAL	Mon	Scaled value with time and status information
		q	MX	-	SCAL_VAL	Mon	Quality: Scaled value with time and status information
		t	MX	-	SCAL_VAL	Mon	Timestamp: Scaled value with time and status information
ValUpd	v1_dSPS	stVal	ST	-	NEW_VAL	Mon	A new pulse counter value is generated
		q	ST	-	NEW_VAL	Mon	Quality: A new pulse counter value is generated
		t	ST	-	NEW_VAL	Mon	Timestamp: A new pulse counter value is generated

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
IcpCyc	v1_dSPS	stVal	ST	-	RESTART	Mon	The reported value does not comprise a complete integration cycle
		q	ST	-	RESTART	Mon	Quality: The reported value does not comprise a complete integration cycle
		t	ST	-	RESTART	Mon	Timestamp: The reported value does not comprise a complete integration cycle
TotVal	v2_dBCR	actVal	ST	-	CNT_VAL	Mon	Actual pulse counter value
		q	ST	-	CNT_VAL	Mon	Quality: Actual pulse counter value
		t	ST	-	CNT_VAL	Mon	Timestamp: Actual pulse counter value

LN type	LN prefix	LN class	Function block name
VSGGIO (revision 1)	VS	GGIO	VSGGIO

**Table 163:** *VSGGIO Logical node data*

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter
		Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
DPCSO	d_dDPC	Cancel.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Cancel.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
DPCSO	d_dDPC	Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Cancel.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Cancel.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.T	CO	-	-	Cmd	Command parameter for IEC61850
		Cancel.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Cancel.Test	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	POSITION	Mon	Position indication, integer
		q	ST	-	POSITION	Mon	Quality: Position indication, integer
		t	ST	-	POSITION	Mon	Timestamp: Position indication, integer
		stSeld	ST	-	-	Mon	Used by CH
		ctlModel	CF	-	CtlModel	-	Specifies the type for control model according to IEC 61850

LN type	LN prefix	LN class	Function block name
SLGGIO (revision 3)	SL	GGIO	SLGGIO

**Table 164:** SLGGIO Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter
		Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Intln	b_dINS	stVal	ST	-	SWPOSN	Mon	Switch position as integer value
		q	ST	-	SWPOSN	Mon	Quality: Switch position as integer value
		t	ST	-	SWPOSN	Mon	Timestamp: Switch position as integer value
SwPosC1	v2_dISC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		valWTr.posVal	ST	-	-	Mon	Position
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		q	ST	-	-	Mon	Quality: Position
		t	ST	-	-	Mon	Timestamp: Position
		ctlModel	CF	-	-	-	Used by CH
		sboTimeout	CF	-	-	-	Used by CH
		sboClass	CF	-	-	-	Used by CH

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
SPCCO	v2_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orlident	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		ctlModel	CF	-	-	-	Used by CH
		sboTimeout	CF	-	-	-	Used by CH
		sboClass	CF	-	-	-	Used by CH

LN type	LN prefix	LN class	Function block name
SPC8GGIO (revision 1)	SPC8	GGIO	SPC8GGIO

Table 165: SPC8GGIO Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orlident	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
SPCSO1	v2_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
SPCSO1	v2_dSPC	Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	OUT1	Mon	Output 1
		q	ST	-	OUT1	Mon	Quality: Output 1
		t	ST	-	OUT1	Mon	Timestamp: Output 1
SPCSO2	v2_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	OUT2	Mon	Output2
		q	ST	-	OUT2	Mon	Quality: Output2
SPCSO3	v2_dSPC	stVal	ST	-	OUT2	Mon	Timestamp: Output2
		Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
SPCSO3	v2_dSPC	q	ST	-	OUT3	Mon	Quality: Output3
		t	ST	-	OUT3	Mon	Timestamp: Output3
SPCSO4	v2_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	OUT4	Mon	Output4
		q	ST	-	OUT4	Mon	Quality: Output4
		t	ST	-	OUT4	Mon	Timestamp: Output4
SPCSO5	v2_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	OUT5	Mon	Output5
		q	ST	-	OUT5	Mon	Quality: Output5
		t	ST	-	OUT5	Mon	Timestamp: Output5
SPCSO6	v2_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
SPCS06	v2_dSPC	Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	OUT6	Mon	Output6
		q	ST	-	OUT6	Mon	Quality: Output6
		t	ST	-	OUT6	Mon	Timestamp: Output6
SPCS07	v2_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	OUT7	Mon	Output7
		q	ST	-	OUT7	Mon	Quality: Output7
		t	ST	-	OUT7	Mon	Timestamp: Output7
SPCS08	v2_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	OUT8	Mon	Output8
		q	ST	-	OUT8	Mon	Quality: Output8
		t	ST	-	OUT8	Mon	Timestamp: Output8

## 7.8 Logical nodes for metering and measurement

### 7.8.1 Metering MMTR

LN type	LN prefix	LN class	Function block name
EPDLLN0 instance 1 (revision 0)	-	LLN0	EPDMMTR
EPDMMTR instance 1 (revision 0)	EPD	MMTR	EPDMMTR
EPDMMXU instance 1 (revision 0)	EPD	MMXU	EPDMMTR

Table 166: EPDMMTR Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orlent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

Table 167: EPDMMTR Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
DmdVArh	a_dBCR	actVal	ST	-	ERFACM_BCR	Mon	Accumulated forward reactive energy value (BCR)
		q	ST	-	ERFACM_BCR	Mon	Quality: Accumulated forward reactive energy value (BCR)
		t	ST	-	ERFACM_BCR	Mon	Timestamp: Accumulated forward reactive energy value (BCR)
		pulsQty	CF	-	Forward VArh Acc Pls	-	Pulse quantity for reactive forward accumulated energy value
DmdWh	a_dBCR	actVal	ST	-	EAFCM_BCR	Mon	Accumulated forward active energy value (BCR)

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
DmdWh	a_dBCR	q	ST	-	EAFACM_BCR	Mon	Quality: Accumulated forward active energy value (BCR)
		t	ST	-	EAFACM_BCR	Mon	Timestamp: Accumulated forward active energy value (BCR)
		pulsQty	CF	-	Forward Wh Acc Pls	-	Pulse quantity for active forward accumulated energy value
SupVArh	a_dBCR	actVal	ST	-	ERVACM_BCR	Mon	Accumulated reverse reactive energy value (BCR)
		q	ST	-	ERVACM_BCR	Mon	Quality: Accumulated reverse reactive energy value (BCR)
		t	ST	-	ERVACM_BCR	Mon	Timestamp: Accumulated reverse reactive energy value (BCR)
		pulsQty	CF	-	Reverse VArh Acc Pls	-	Pulse quantity for reactive reverse accumulated energy value
SupWh	a_dBCR	actVal	ST	-	EARACM_BCR	Mon	Accumulated reverse active energy value (BCR)
		q	ST	-	EARACM_BCR	Mon	Quality: Accumulated reverse active energy value (BCR)
		t	ST	-	EARACM_BCR	Mon	Timestamp: Accumulated reverse active energy value (BCR)
		pulsQty	CF	-	Reverse Wh Acc Pls	-	Pulse quantity for active reverse accumulated energy value
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
DmdWhCnt	v1_dINS	stVal	ST	-	EAFCNT	Mon	Counter for accumulated forward active energy exceed limit
		q	ST	-	EAFCNT	Mon	Quality: Counter for accumulated forward active energy exceed limit
		t	ST	-	EAFCNT	Mon	Timestamp: Counter for accumulated forward active energy exceed limit
SupWhCnt	v1_dINS	stVal	ST	-	EARCNT	Mon	Counter for accumulated reverse active energy exceed limit
		q	ST	-	EARCNT	Mon	Quality: Counter for accumulated reverse active energy exceed limit
		t	ST	-	EARCNT	Mon	Timestamp: Counter for accumulated reverse active energy exceed limit
DmdVArhCnt	v1_dINS	stVal	ST	-	ERFCNT	Mon	Counter for accumulated forward reactive energy exceed limit

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
DmdVArhCnt	v1_dINS	q	ST	-	ERFCNT	Mon	Quality: Counter for accumulated forward reactive energy exceed limit
		t	ST	-	ERFCNT	Mon	Timestamp: Counter for accumulated forward reactive energy exceed limit
SupVArhCnt	v1_dINS	stVal	ST	-	ERRCNT	Mon	Counter for accumulated reverse reactive energy exceed limit
		q	ST	-	ERRCNT	Mon	Quality: Counter for accumulated reverse reactive energy exceed limit
		t	ST	-	ERRCNT	Mon	Timestamp: Counter for accumulated reverse reactive energy exceed limit
SupDmdRs	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orIdent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
StrAcc	v1_dSPS	stVal	ST	-	ACMST	Mon	Start of accumulating energy values.
		q	ST	-	ACMST	Mon	Quality: Start of accumulating energy values.
		t	ST	-	ACMST	Mon	Timestamp: Start of accumulating energy values.
WhFwdAlm	v1_dSPS	stVal	ST	-	EAFAL	Mon	Alarm for active forward energy exceed limit in set interval
		q	ST	-	EAFAL	Mon	Quality: Alarm for active forward energy exceed limit in set interval
		t	ST	-	EAFAL	Mon	Timestamp: Alarm for active forward energy exceed limit in set interval
WhRvAlm	v1_dSPS	stVal	ST	-	EARAL	Mon	Alarm for active reverse energy exceed limit in set interval
		q	ST	-	EARAL	Mon	Quality: Alarm for active reverse energy exceed limit in set interval
		t	ST	-	EARAL	Mon	Timestamp: Alarm for active reverse energy exceed limit in set interval
VArhFwdAlm	v1_dSPS	stVal	ST	-	ERFAL	Mon	Alarm for reactive forward energy exceed limit in set interv

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
VArhFwdAlm	v1_dSPS	q	ST	-	ERFAL	Mon	Quality: Alarm for reactive forward energy exceed limit in set interv
		t	ST	-	ERFAL	Mon	Timestamp: Alarm for reactive forward energy exceed limit in set interv
VArhRvAlm	v1_dSPS	stVal	ST	-	ERRAL	Mon	Alarm for reactive reverse energy exceed limit in set interv
		q	ST	-	ERRAL	Mon	Quality: Alarm for reactive reverse energy exceed limit in set interv
		t	ST	-	ERRAL	Mon	Timestamp: Alarm for reactive reverse energy exceed limit in set interv
WhFwd	v2_dBCR	actVal	ST	-	EAFDMD_BCR	Mon	Last forward active energy value for set interval (BCR)
		q	ST	-	EAFDMD_BCR	Mon	Quality: Last forward active energy value for set interval (BCR)
		t	ST	-	EAFDMD_BCR	Mon	Timestamp: Last forward active energy value for set interval (BCR)
		pulsQty	CF	-	Forward Wh Itrv Pls	-	Pulse quantity for active forward energy of set interval
WhRv	v2_dBCR	actVal	ST	-	EARDMD_BCR	Mon	Last reverse active energy value for set interval (BCR)
		q	ST	-	EARDMD_BCR	Mon	Quality: Last reverse active energy value for set interval (BCR)
		t	ST	-	EARDMD_BCR	Mon	Timestamp: Last reverse active energy value for set interval (BCR)
		pulsQty	CF	-	Reverse Wh Itrv Pls	-	Pulse quantity for active reverse energy of set interval
VArhFwd	v2_dBCR	actVal	ST	-	ERFDMD_BCR	Mon	Last forward reactive energy value for set interval (BCR)
		q	ST	-	ERFDMD_BCR	Mon	Quality: Last forward reactive energy value for set interval (BCR)
		t	ST	-	ERFDMD_BCR	Mon	Timestamp: Last forward reactive energy value for set interval (BCR)
		pulsQty	CF	-	Forward VArh ItrvPls	-	Pulse quantity for reactive forward energy of set interval
VArhRv	v2_dBCR	actVal	ST	-	ERRDMD_BCR	Mon	Last reverse reactive energy value for set interval (BCR)
		q	ST	-	ERRDMD_BCR	Mon	Quality: Last reverse reactive energy value for set interval (BCR)
		t	ST	-	ERRDMD_BCR	Mon	Timestamp: Last reverse reactive energy value for set interval (BCR)
		pulsQty	CF	-	Reverse VArh ItrvPls	-	Pulse quantity for reactive reverse energy of set interval

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### Logical node data model

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**Table 168:** EPDMMTR Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
MaxDmdRs	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
WFwdDmd	v2_dMV	mag.f	MX	-	PAFDMD	Mon	Last forward active power demand value for set interval
		q	MX	-	PAFDMD	Mon	Quality: Last forward active power demand value for set interval
		t	MX	-	PAFDMD	Mon	Timestamp: Last forward active power demand value for set interval
VArFwdDmd	v2_dMV	mag.f	MX	-	PRFDMD	Mon	Last forward reactive power demand value for set interval
		q	MX	-	PRFDMD	Mon	Quality: Last forward reactive power demand value for set interval
		t	MX	-	PRFDMD	Mon	Timestamp: Last forward reactive power demand value for set interval
WRvDmd	v2_dMV	mag.f	MX	-	PARDMD	Mon	Last reverse active power demand value for set interval
		q	MX	-	PARDMD	Mon	Quality: Last reverse active power demand value for set interval
		t	MX	-	PARDMD	Mon	Timestamp: Last reverse active power demand value for set interval

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
VArRvDmd	v2_dMV	mag.f	MX	-	PRRDMD	Mon	Last reverse reactive power demand value for set interval
		q	MX	-	PRRDMD	Mon	Quality: Last reverse reactive power demand value for set interval
		t	MX	-	PRRDMD	Mon	Timestamp: Last reverse reactive power demand value for set interval
MaxWFwdDmd	v2_dMV	mag.f	MX	-	MAXPAFDMD	Mon	Maximum forward active power demand value for set interval
		q	MX	-	MAXPAFDMD	Mon	Quality: Maximum forward active power demand value for set interval
		t	MX	-	MAXPAFDMD	Mon	Timestamp: Maximum forward active power demand value for set interval
MaxWRvDmd	v2_dMV	mag.f	MX	-	MAXPARDMD	Mon	Maximum reverse active power demand value for set interval
		q	MX	-	MAXPARDMD	Mon	Quality: Maximum reverse active power demand value for set interval
		t	MX	-	MAXPARDMD	Mon	Timestamp: Maximum reverse active power demand value for set interval
MaxVArFwdD	v2_dMV	mag.f	MX	-	MAXPRFDMD	Mon	Maximum forward reactive power demand value for set interval
		q	MX	-	MAXPRFDMD	Mon	Quality: Maximum forward reactive power demand value for set interval
		t	MX	-	MAXPRFDMD	Mon	Timestamp: Maximum forward reactive power demand value for set interval
MaxVArRvDm	v2_dMV	mag.f	MX	-	MAXPRRDMD	Mon	Maximum reverse reactive power demand value for set interval
		q	MX	-	MAXPRRDMD	Mon	Quality: Maximum reverse reactive power demand value for set interval
		t	MX	-	MAXPRRDMD	Mon	Timestamp: Maximum reverse reactive power demand value for set interval

## 7.8.2

## Measurement MMXU

LN type	LN prefix	LN class	Function block name
CPHMMXU (revision 0)	CPH	MMXU	CMMXU

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### Logical node data model

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**Table 169:** *CMMXU Logical node data*

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
A	a_dWYE	rangeC.hhLim.f	CF	-	A Hi high Lim PhA	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	A high limit PhA	-	High limit (physical value)
		rangeC.lLim.f	CF	-	A low limit PhA	-	Low limit (physical value)
		rangeC.llLim.f	CF	-	A low low Lim PhA	-	Low Low limit (physical value)
		rangeC.max.f	CF	-	A maximum PhA	-	Maximum value
		rangeC.min.f	CF	-	A minimum PhA	-	Minimum value
		cVal.mag.f	MX	-	I_DB_A	Mon	Phase A amplitude, magnitude of reported value
		rangeC.hhLim.f	CF	-	A Hi high Lim PhB	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	A high limit PhB	-	High limit (physical value)
		rangeC.lLim.f	CF	-	A low limit PhB	-	Low limit (physical value)
		rangeC.llLim.f	CF	-	A low low Lim PhB	-	Low Low limit (physical value)
		rangeC.max.f	CF	-	A maximum PhB	-	Maximum value
		rangeC.min.f	CF	-	A minimum PhB	-	Minimum value
		cVal.mag.f	MX	-	I_DB_B	Mon	Phase B amplitude, magnitude of reported value
		subCVal.mag.f	SV	-	-	-	Substituted value
		rangeC.hhLim.f	CF	-	A Hi high Lim PhC	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	A high limit PhC	-	High limit (physical value)
		rangeC.lLim.f	CF	-	A low limit PhC	-	Low limit (physical value)
		rangeC.llLim.f	CF	-	A low low Lim PhC	-	Low Low limit (physical value)
		rangeC.max.f	CF	-	A maximum PhC	-	Maximum value
		rangeC.min.f	CF	-	A minimum PhC	-	Minimum value

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
A	a_dWYE	cVal.mag.f	MX	-	I_DB_C	Mon	Phase C amplitude, magnitude of reported value
		subCVal.mag.f	SV	-	-	-	Substituted value
		subCVal.mag.f	SV	-	-	-	Substituted value
		range	MX	-	I_RANGE_C	Mon	Phase C amplitude range
		range	MX	-	I_RANGE_A	Mon	Phase A amplitude range
		range	MX	-	I_RANGE_B	Mon	Phase B amplitude range
		q	MX	-	I_DB_C	Mon	Quality: Phase C amplitude, magnitude of reported value
		q	MX	-	I_DB_B	Mon	Quality: Phase B amplitude, magnitude of reported value
		q	MX	-	I_DB_A	Mon	Quality: Phase A amplitude, magnitude of reported value
		t	MX	-	I_DB_A	Mon	Timestamp: Phase A amplitude, magnitude of reported value
		t	MX	-	I_DB_B	Mon	Timestamp: Phase B amplitude, magnitude of reported value
		t	MX	-	I_DB_C	Mon	Timestamp: Phase C amplitude, magnitude of reported value
		subEna	SV	-	-	-	Enable substitution
		subEna	SV	-	-	-	Enable substitution
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	A deadband PhC	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	A deadband PhA	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	A deadband PhB	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	A Zer deadband PhA	-	Zero point clamping in 0,001% of range
		zeroDb	CF	-	A Zer deadband PhC	-	Zero point clamping in 0,001% of range
		zeroDb	CF	-	A Zer deadband PhB	-	Zero point clamping in 0,001% of range

LN type	LN prefix	LN class	Function block name
PWRMMXU (revision 0)	PWR	MMXU	PWRMMXU

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### Logical node data model

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**Table 170:** *PWRMMXU Logical node data*

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter
		Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter
		q	ST	-	Beh	Mon	Quality: Behaviour parameter
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter
TotPF	a_dMV	mag.f	MX	-	PF_DB	Mon	Power Factor magnitude of deadband value
		rangeC.hhLim.f	CF	-	Av PF high high Lim	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	Av PF high limit	-	High limit (physical value)
		rangeC.lLim.f	CF	-	Av PF low limit	-	Low limit (physical value)
		rangeC.llLim.f	CF	-	Av PF low low limit	-	Low Low limit (physical value)
		rangeC.min.f	CF	-	Average PF minimum	-	Minimum value
		rangeC.max.f	CF	-	Average PF maximum	-	Maximum value
		subMag.f	SV	-	-	-	Substituted value
		range	MX	-	PF_RANGE	Mon	Power Factor range
		q	MX	-	PF_DB	Mon	Quality: Power Factor magnitude of deadband value
		t	MX	-	PF_DB	Mon	Timestamp: Power Factor magnitude of deadband value
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	Av PF deadband	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	Av PF zero deadband	-	Zero point clamping in 0,001% of range
TotVA	a_dMV	mag.f	MX	-	S_DB	Mon	Apparent Power magnitude of deadband value
		rangeC.hhLim.f	CF	-	Tot VA high high Lim	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	Tot VA high limit	-	High limit (physical value)
		rangeC.lLim.f	CF	-	Tot VA low limit	-	Low limit (physical value)
		rangeC.llLim.f	CF	-	Tot VA low low limit	-	Low Low limit (physical value)
		rangeC.min.f	CF	-	Tot apparent Pwr Min	-	Minimum value

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
TotVA	a_dMV	rangeC.max.f	CF	-	Tot apparent Pwr Max	-	Maximum value
		subMag.f	SV	-	-	-	Substituted value
		range	MX	-	S_RANGE	Mon	Apparent Power range
		q	MX	-	S_DB	Mon	Quality: Apparent Power magnitude of deadband value
		t	MX	-	S_DB	Mon	Timestamp: Apparent Power magnitude of deadband value
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	Tot VA deadband	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	Tot VA zero deadband	-	Zero point clamping in 0,001% of range
TotVAr	a_dMV	mag.f	MX	-	Q_DB	Mon	Reactive Power magnitude of deadband value
		rangeC.hhLim.f	CF	-	Tot VAr Hi high Lim	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	Tot VAr high limit	-	High limit (physical value)
		rangeC.lLim.f	CF	-	Tot VAr low limit	-	Low limit (physical value)
		rangeC.llLim.f	CF	-	Tot VAr low low Lim	-	Low Low limit (physical value)
		rangeC.min.f	CF	-	Tot reactive Pwr Min	-	Minimum value
		rangeC.max.f	CF	-	Tot reactive Pwr Max	-	Maximum value
		subMag.f	SV	-	-	-	Substituted value
		range	MX	-	Q_RANGE	Mon	Reactive Power range
		q	MX	-	Q_DB	Mon	Quality: Reactive Power magnitude of deadband value
		t	MX	-	Q_DB	Mon	Timestamp: Reactive Power magnitude of deadband value
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	Tot VAr deadband	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	Tot VAr zero Db	-	Zero point clamping in 0,001% of range
TotW	a_dMV	mag.f	MX	-	P_DB	Mon	Active Power magnitude of deadband value
		rangeC.hhLim.f	CF	-	Tot W high high Lim	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	Tot W high limit	-	High limit (physical value)
		rangeC.lLim.f	CF	-	Tot W low limit	-	Low limit (physical value)
		rangeC.llLim.f	CF	-	Tot W low low limit	-	Low Low limit (physical value)
		rangeC.min.f	CF	-	Total real Pwr Min	-	Minimum value
		rangeC.max.f	CF	-	Total real Pwr Max	-	Maximum value
		subMag.f	SV	-	-	-	Substituted value
		range	MX	-	P_RANGE	Mon	Active Power range
		q	MX	-	P_DB	Mon	Quality: Active Power magnitude of deadband value

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
TotW	a_dMV	t	MX	-	P_DB	Mon	Timestamp: Active Power magnitude of deadband value
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	Tot W deadband	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	Tot W zero deadband	-	Zero point clamping in 0,001% of range
Hz	a_dMV	mag.f	MX	-	F_DB	Mon	System frequency magnitude of deadband value
		rangeC.hhLim.f	CF	-	Hz high high limit	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	Hz high limit	-	High limit (physical value)
		rangeC.llLim.f	CF	-	Hz low limit	-	Low limit (physical value)
		rangeC.llLim.f	CF	-	Hz low low limit	-	Low Low limit (physical value)
		rangeC.min.f	CF	-	Frequency minimum	-	Minimum value
		rangeC.max.f	CF	-	Frequency maximum	-	Maximum value
		subMag.f	SV	-	-	-	Substituted value
		range	MX	-	F_RANGE	Mon	System frequency range
		q	MX	-	F_DB	Mon	Quality: System frequency magnitude of deadband value
		t	MX	-	F_DB	Mon	Timestamp: System frequency magnitude of deadband value
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	Hz deadband	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	Hz zero deadband	-	Zero point clamping in 0,001% of range
ALd	v1_dSPS	stVal	ST	-	ILEAD	Mon	Current is leading voltage
		q	ST	-	ILEAD	Mon	Quality: Current is leading voltage
		t	ST	-	ILEAD	Mon	Timestamp: Current is leading voltage
ALg	v1_dSPS	stVal	ST	-	ILAG	Mon	Current is lagging voltage
		q	ST	-	ILAG	Mon	Quality: Current is lagging voltage
		t	ST	-	ILAG	Mon	Timestamp: Current is lagging voltage

LN type	LN prefix	LN class	Function block name
RESCMMXU (revision 0)	RESC	MMXU	RESCMMXU

Table 171: RESCMMXU Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
A	d_dWYE	rangeC.hhLim.f	CF	-	A Hi high Lim res	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	A high limit res	-	High limit (physical value)
		rangeC.lLim.f	CF	-	A low limit res	-	Low limit (physical value)
		rangeC.llLim.f	CF	-	A low low Lim res	-	Low Low limit (physical value)
		rangeC.max.f	CF	-	A maximum res	-	Maximum value
		rangeC.min.f	CF	-	A minimum res	-	Minimum value
		cVal.mag.f	MX	-	I0_DB	Mon	Residual current RMS, magnitude of reported value
		subCVal.mag.f	SV	-	-	-	Substituted value
		range	MX	-	I0_RANGE	Mon	Residual current RMS range
		q	MX	-	I0_DB	Mon	Quality: Residual current RMS, magnitude of reported value
		t	MX	-	I0_DB	Mon	Timestamp: Residual current RMS, magnitude of reported value
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	A deadband res	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	A Zer deadband res	-	Zero point clamping in 0,001% of range

LN type	LN prefix	LN class	Function block name
GNRLLLN0 instance 1 (revision 0)	-	LLN0	RESVMMXU
RESVMMXU instance 1 (revision 0)	RESV	MMXU	RESVMMXU
VRESMMXU instance 2 (revision 0)	VRES	MMXU	RESVMMXU

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### Logical node data model

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**Table 172:** RESVMMXU Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

**Table 173:** RESVMMXU Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
PhV	d_dWYE	rangeC.hhLim.f	CF	-	V RMS Hi Hi Lim res	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	V RMS high Lim res	-	High limit (physical value)
		rangeC.lLim.f	CF	-	V RMS low limit res	-	Low limit (physical value)
		rangeC.llLim.f	CF	-	V RMS Lo low Lim res	-	Low Low limit (physical value)
		rangeC.max.f	CF	-	V RMS maximum res	-	Maximum value
		rangeC.min.f	CF	-	V RMS minimum res	-	Minimum value
		cVal.mag.f	MX	-	U0_RMS_DB	Mon	U0 RMS, magnitude of reported value
		subCVal.mag.f	SV	-	-	-	Substituted value
		range	MX	-	U0_RMS_RANGE	Mon	U0 RMS range

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
PhV	d_dWYE	q	MX	-	U0_RMS_DB	Mon	Quality: U0 RMS, magnitude of reported value
		t	MX	-	U0_RMS_DB	Mon	Timestamp: U0 RMS, magnitude of reported value
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	V RMS deadband res	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	V RMS zero db res	-	Zero point clamping in 0,001% of range

**Table 174:** RESVMMXU Logical node data (instance 2)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
PhV	d_dWYE	rangeC.hhLim.f	CF	-	V Mag Hi Hi Lim res	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	V Mag high Lim res	-	High limit (physical value)
		rangeC.lLim.f	CF	-	V Mag low limit res	-	Low limit (physical value)
		rangeC.llLim.f	CF	-	V Mag Lo low Lim res	-	Low Low limit (physical value)
		rangeC.max.f	CF	-	V Mag maximum res	-	Maximum value
		rangeC.min.f	CF	-	V Mag minimum res	-	Minimum value
		cVal.mag.f	MX	-	U0_MAG_DB	Mon	U0 Amplitude, magnitude of reported value
		subCVal.mag.f	SV	-	-	-	Substituted value
		range	MX	-	U0_MAG_RANGE	Mon	U0 Amplitude range
		q	MX	-	U0_MAG_DB	Mon	Quality: U0 Amplitude, magnitude of reported value
		t	MX	-	U0_MAG_DB	Mon	Timestamp: U0 Amplitude, magnitude of reported value
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	V Mag deadband res	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	V Mag zero db res	-	Zero point clamping in 0,001% of range

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### Logical node data model

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LN type	LN prefix	LN class	Function block name
VPHMMXU (revision 0)	VPH	MMXU	VPHMMXU

Table 175: VPHMMXU Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
PhV	a_dWYE	rangeC.hhLim.f	CF	-	V Hi high Lim PhA	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	V high limit PhA	-	High limit (physical value)
		rangeC.ILim.f	CF	-	V low limit PhA	-	Low limit (physical value)
		rangeC.IILim.f	CF	-	V low low Lim PhA	-	Low Low limit (physical value)
		rangeC.max.f	CF	-	V maximum PhA	-	Maximum value
		rangeC.min.f	CF	-	V minimum PhA	-	Minimum value
		cVal.mag.f	MX	-	U_DB_A	Mon	Phase A amplitude, magnitude of reported value
		rangeC.hhLim.f	CF	-	V Hi high Lim PhB	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	V high limit PhB	-	High limit (physical value)
		rangeC.ILim.f	CF	-	V low limit PhB	-	Low limit (physical value)
		rangeC.IILim.f	CF	-	V low low Lim PhB	-	Low Low limit (physical value)
		rangeC.max.f	CF	-	V maximum PhB	-	Maximum value
		rangeC.min.f	CF	-	V minimum PhB	-	Minimum value
		cVal.mag.f	MX	-	U_DB_B	Mon	Phase B amplitude, magnitude of reported value
		subCVal.mag.f	SV	-	-	-	Substituted value
		rangeC.hhLim.f	CF	-	V Hi high Lim PhC	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	V high limit PhC	-	High limit (physical value)

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
PhV	a_dWYE	rangeC.IILim.f	CF	-	V low limit PhC	-	Low limit (physical value)
		rangeC.IILim.f	CF	-	V low low Lim PhC	-	Low Low limit (physical value)
		rangeC.max.f	CF	-	V maximum PhC	-	Maximum value
		rangeC.min.f	CF	-	V minimum PhC	-	Minimum value
		cVal.mag.f	MX	-	U_DB_C	Mon	Phase C amplitude, magnitude of reported value
		subCVal.mag.f	SV	-	-	-	Substituted value
		subCVal.mag.f	SV	-	-	-	Substituted value
		range	MX	-	U_RANGE_C	Mon	Phase C amplitude range
		range	MX	-	U_RANGE_A	Mon	Phase A amplitude range
		range	MX	-	U_RANGE_B	Mon	Phase B amplitude range
		q	MX	-	U_DB_C	Mon	Quality: Phase C amplitude, magnitude of reported value
		q	MX	-	U_DB_B	Mon	Quality: Phase B amplitude, magnitude of reported value
		q	MX	-	U_DB_A	Mon	Quality: Phase A amplitude, magnitude of reported value
		t	MX	-	U_DB_A	Mon	Timestamp: Phase A amplitude, magnitude of reported value
		t	MX	-	U_DB_B	Mon	Timestamp: Phase B amplitude, magnitude of reported value
		t	MX	-	U_DB_C	Mon	Timestamp: Phase C amplitude, magnitude of reported value
		subEna	SV	-	-	-	Enable substitution
		subEna	SV	-	-	-	Enable substitution
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	V deadband PhC	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	V deadband PhA	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	V deadband PhB	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	V Zer deadband PhA	-	Zero point clamping in 0,001% of range
		zeroDb	CF	-	V Zer deadband PhC	-	Zero point clamping in 0,001% of range
		zeroDb	CF	-	V Zer deadband PhB	-	Zero point clamping in 0,001% of range

LN type	LN prefix	LN class	Function block name
VPPMMXU (revision 0)	VPP	MMXU	VPPMMXU

## Section 7

### Logical node data model

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**Table 176:** *VPPMMXU Logical node data*

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
PPV	a_dDEL	rangeC.hhLim.f	CF	-	V Hi high Lim PhAB	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	V high limit PhAB	-	High limit (physical value)
		rangeC.lLim.f	CF	-	V low limit PhAB	-	Low limit (physical value)
		rangeC.llLim.f	CF	-	V low low Lim PhAB	-	Low Low limit (physical value)
		rangeC.max.f	CF	-	V maximum PhAB	-	Maximum value
		rangeC.min.f	CF	-	V minimum PhAB	-	Minimum value
		cVal.mag.f	MX	-	U_DB_AB	Mon	Phase A to B amplitude, magnitude of reported value
		rangeC.hhLim.f	CF	-	V Hi high Lim PhBC	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	V high limit PhBC	-	High limit (physical value)
		rangeC.lLim.f	CF	-	V low limit PhBC	-	Low limit (physical value)
		rangeC.llLim.f	CF	-	V low low Lim PhBC	-	Low Low limit (physical value)
		rangeC.max.f	CF	-	V maximum PhBC	-	Maximum value
		rangeC.min.f	CF	-	V minimum PhBC	-	Minimum value
		cVal.mag.f	MX	-	U_DB_BC	Mon	Phase B to C amplitude, magnitude of reported value
		subCVal.mag.f	SV	-	-	-	Substituted value
		rangeC.hhLim.f	CF	-	V Hi high Lim PhCA	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	V high limit PhCA	-	High limit (physical value)
		rangeC.lLim.f	CF	-	V low limit PhCA	-	Low limit (physical value)
		rangeC.llLim.f	CF	-	V low low Lim PhCA	-	Low Low limit (physical value)
		rangeC.max.f	CF	-	V maximum PhCA	-	Maximum value
		rangeC.min.f	CF	-	V minimum PhCA	-	Minimum value
		cVal.mag.f	MX	-	U_DB_CA	Mon	Phase C to A amplitude, magnitude of reported value
		subCVal.mag.f	SV	-	-	-	Substituted value
		subCVal.mag.f	SV	-	-	-	Substituted value
		range	MX	-	U_RANGE_CA	Mon	Phase C to A amplitude range
		range	MX	-	U_RANGE_AB	Mon	Phase A to B amplitude range
		range	MX	-	U_RANGE_BC	Mon	Phase B to C amplitude range
		q	MX	-	U_DB_CA	Mon	Quality: Phase C to A amplitude, magnitude of reported value
		q	MX	-	U_DB_BC	Mon	Quality: Phase B to C amplitude, magnitude of reported value
		q	MX	-	U_DB_AB	Mon	Quality: Phase A to B amplitude, magnitude of reported value
		t	MX	-	U_DB_AB	Mon	Timestamp: Phase A to B amplitude, magnitude of reported value
		t	MX	-	U_DB_BC	Mon	Timestamp: Phase B to C amplitude, magnitude of reported value

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
PPV	a_dDEL	t	MX	-	U_DB_CA	Mon	Timestamp: Phase C to A amplitude, magnitude of reported value
		subEna	SV	-	-	-	Enable substitution
		subEna	SV	-	-	-	Enable substitution
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	V deadband PhCA	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	V deadband PhAB	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	V deadband PhBC	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	V Zer deadband PhAB	-	Zero point clamping in 0,001% of range
		zeroDb	CF	-	V Zer deadband PhCA	-	Zero point clamping in 0,001% of range
		zeroDb	CF	-	V Zer deadband PhBC	-	Zero point clamping in 0,001% of range
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

### 7.8.3

### Harmonic measurement MHAI

LN type	LN prefix	LN class	Function block name
CMHAI (revision 0)	C	MHAI	CMHAI

## Section 7

### Logical node data model

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**Table 177:** CMHAI Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Hz	b_dMV	mag.f	MX	-	-	Mon	Rated frequency
		q	MX	-	-	Mon	Quality: Rated frequency
		t	MX	-	-	Mon	Timestamp: Rated frequency
TddA	f_dWYE	cVal.mag.f	MX	-	3SMNTDD_A	Mon	Non-sliding 3s mean value of TDD for phase A
		cVal.mag.f	MX	-	3SMNTDD_B	Mon	Non-sliding 3s mean value of TDD for phase B
		cVal.mag.f	MX	-	3SMNTDD_C	Mon	Non-sliding 3s mean value of TDD for phase C
		q	MX	-	3SMNTDD_C	Mon	Quality: Non-sliding 3s mean value of TDD for phase C
		q	MX	-	3SMNTDD_B	Mon	Quality: Non-sliding 3s mean value of TDD for phase B
		q	MX	-	3SMNTDD_A	Mon	Quality: Non-sliding 3s mean value of TDD for phase A
		t	MX	-	3SMNTDD_A	Mon	Timestamp: Non-sliding 3s mean value of TDD for phase A
		t	MX	-	3SMNTDD_B	Mon	Timestamp: Non-sliding 3s mean value of TDD for phase B
		t	MX	-	3SMNTDD_C	Mon	Timestamp: Non-sliding 3s mean value of TDD for phase C
		cVal.mag.f	MX	-	3SMNTHD_A	Mon	Non-sliding 3s mean value of THD for phase A
ThdA	f_dWYE	cVal.mag.f	MX	-	3SMNTHD_B	Mon	Non-sliding 3s mean value of THD for phase B

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
ThdA	f_dWYE	cVal.mag.f	MX	-	3SMNTHD_C	Mon	Non-sliding 3s mean value of THD for phase C
		q	MX	-	3SMNTHD_C	Mon	Quality: Non-sliding 3s mean value of THD for phase C
		q	MX	-	3SMNTHD_B	Mon	Quality: Non-sliding 3s mean value of THD for phase B
		q	MX	-	3SMNTHD_A	Mon	Quality: Non-sliding 3s mean value of THD for phase A
		t	MX	-	3SMNTHD_A	Mon	Timestamp: Non-sliding 3s mean value of THD for phase A
		t	MX	-	3SMNTHD_B	Mon	Timestamp: Non-sliding 3s mean value of THD for phase B
		t	MX	-	3SMNTHD_C	Mon	Timestamp: Non-sliding 3s mean value of THD for phase C
HiHA	v1_dSPS	stVal	ST	-	ALM_MN_H	Mon	Alarm signal when harmonic RMS value is greater than limit
		q	ST	-	ALM_MN_H	Mon	Quality: Alarm signal when harmonic RMS value is greater than limit
		t	ST	-	ALM_MN_H	Mon	Timestamp: Alarm signal when harmonic RMS value is greater than limit
HiATHd	v1_dSPS	stVal	ST	-	ALM_MN_THD	Mon	Alarm signal when THD value is greater than limit
		q	ST	-	ALM_MN_THD	Mon	Quality: Alarm signal when THD value is greater than limit
		t	ST	-	ALM_MN_THD	Mon	Timestamp: Alarm signal when THD value is greater than limit
HiATdd	v1_dSPS	stVal	ST	-	ALM_MN_TDD	Mon	Alarm signal when TDD value is greater than limit
		q	ST	-	ALM_MN_TDD	Mon	Quality: Alarm signal when TDD value is greater than limit
		t	ST	-	ALM_MN_TDD	Mon	Timestamp: Alarm signal when TDD value is greater than limit
MaxHaval1	v2_dMV	mag.f	MX	-	MAXH1	Mon	Max 1st harmonic updated after exiting alarm state
		q	MX	-	MAXH1	Mon	Quality: Max 1st harmonic updated after exiting alarm state
		t	MX	-	MAXH1	Mon	Timestamp: Max 1st harmonic updated after exiting alarm state
MaxHaval2	v2_dMV	mag.f	MX	-	MAXH2	Mon	Max 2nd harmonic updated after exiting alarm state
		q	MX	-	MAXH2	Mon	Quality: Max 2nd harmonic updated after exiting alarm state
		t	MX	-	MAXH2	Mon	Timestamp: Max 2nd harmonic updated after exiting alarm state
MaxHaval3	v2_dMV	mag.f	MX	-	MAXH3	Mon	Max 3rd harmonic updated after exiting alarm state

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
MaxHVal3	v2_dMV	q	MX	-	MAXH3	Mon	Quality: Max 3rd harmonic updated after exiting alarm state
		t	MX	-	MAXH3	Mon	Timestamp: Max 3rd harmonic updated after exiting alarm state
MaxHVal4	v2_dMV	mag.f	MX	-	MAXH4	Mon	Max 4th harmonic updated after exiting alarm state
		q	MX	-	MAXH4	Mon	Quality: Max 4th harmonic updated after exiting alarm state
		t	MX	-	MAXH4	Mon	Timestamp: Max 4th harmonic updated after exiting alarm state
MaxHVal5	v2_dMV	mag.f	MX	-	MAXH5	Mon	Max 5th harmonic updated after exiting alarm state
		q	MX	-	MAXH5	Mon	Quality: Max 5th harmonic updated after exiting alarm state
		t	MX	-	MAXH5	Mon	Timestamp: Max 5th harmonic updated after exiting alarm state
MaxHVal6	v2_dMV	mag.f	MX	-	MAXH6	Mon	Max 6th harmonic updated after exiting alarm state
		q	MX	-	MAXH6	Mon	Quality: Max 6th harmonic updated after exiting alarm state
		t	MX	-	MAXH6	Mon	Timestamp: Max 6th harmonic updated after exiting alarm state
MaxHVal7	v2_dMV	mag.f	MX	-	MAXH7	Mon	Max 7th harmonic updated after exiting alarm state
		q	MX	-	MAXH7	Mon	Quality: Max 7th harmonic updated after exiting alarm state
		t	MX	-	MAXH7	Mon	Timestamp: Max 7th harmonic updated after exiting alarm state
MaxHVal8	v2_dMV	mag.f	MX	-	MAXH8	Mon	Max 8th harmonic updated after exiting alarm state
		q	MX	-	MAXH8	Mon	Quality: Max 8th harmonic updated after exiting alarm state
		t	MX	-	MAXH8	Mon	Timestamp: Max 8th harmonic updated after exiting alarm state
MaxHVal9	v2_dMV	mag.f	MX	-	MAXH9	Mon	Max 9th harmonic updated after exiting alarm state
		q	MX	-	MAXH9	Mon	Quality: Max 9th harmonic updated after exiting alarm state
		t	MX	-	MAXH9	Mon	Timestamp: Max 9th harmonic updated after exiting alarm state
MaxHVal10	v2_dMV	mag.f	MX	-	MAXH10	Mon	Max 10th harmonic updated after exiting alarm state
		q	MX	-	MAXH10	Mon	Quality: Max 10th harmonic updated after exiting alarm state
		t	MX	-	MAXH10	Mon	Timestamp: Max 10th harmonic updated after exiting alarm state
MaxHVal11	v2_dMV	mag.f	MX	-	MAXH11	Mon	Max 11th harmonic updated after exiting alarm state

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
MaxHaval11	v2_dMV	q	MX	-	MAXH11	Mon	Quality: Max 11th harmonic updated after exiting alarm state
		t	MX	-	MAXH11	Mon	Timestamp: Max 11th harmonic updated after exiting alarm state
MaxHaval12	v2_dMV	mag.f	MX	-	MAXH12	Mon	Max 12th harmonic updated after exiting alarm state
		q	MX	-	MAXH12	Mon	Quality: Max 12th harmonic updated after exiting alarm state
		t	MX	-	MAXH12	Mon	Timestamp: Max 12th harmonic updated after exiting alarm state
MaxHaval13	v2_dMV	mag.f	MX	-	MAXH13	Mon	Max 13th harmonic updated after exiting alarm state
		q	MX	-	MAXH13	Mon	Quality: Max 13th harmonic updated after exiting alarm state
		t	MX	-	MAXH13	Mon	Timestamp: Max 13th harmonic updated after exiting alarm state
MaxHaval14	v2_dMV	mag.f	MX	-	MAXH14	Mon	Max 14th harmonic updated after exiting alarm state
		q	MX	-	MAXH14	Mon	Quality: Max 14th harmonic updated after exiting alarm state
		t	MX	-	MAXH14	Mon	Timestamp: Max 14th harmonic updated after exiting alarm state
MaxHaval15	v2_dMV	mag.f	MX	-	MAXH15	Mon	Max 15th harmonic updated after exiting alarm state
		q	MX	-	MAXH15	Mon	Quality: Max 15th harmonic updated after exiting alarm state
		t	MX	-	MAXH15	Mon	Timestamp: Max 15th harmonic updated after exiting alarm state
MaxHaval16	v2_dMV	mag.f	MX	-	MAXH16	Mon	Max 16th harmonic updated after exiting alarm state
		q	MX	-	MAXH16	Mon	Quality: Max 16th harmonic updated after exiting alarm state
		t	MX	-	MAXH16	Mon	Timestamp: Max 16th harmonic updated after exiting alarm state
MaxHaval17	v2_dMV	mag.f	MX	-	MAXH17	Mon	Max 17th harmonic updated after exiting alarm state
		q	MX	-	MAXH17	Mon	Quality: Max 17th harmonic updated after exiting alarm state
		t	MX	-	MAXH17	Mon	Timestamp: Max 17th harmonic updated after exiting alarm state
MaxHaval18	v2_dMV	mag.f	MX	-	MAXH18	Mon	Max 18th harmonic updated after exiting alarm state
		q	MX	-	MAXH18	Mon	Quality: Max 18th harmonic updated after exiting alarm state
		t	MX	-	MAXH18	Mon	Timestamp: Max 18th harmonic updated after exiting alarm state
MaxHaval19	v2_dMV	mag.f	MX	-	MAXH19	Mon	Max 19th harmonic updated after exiting alarm state

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
MaxHVal19	v2_dMV	q	MX	-	MAXH19	Mon	Quality: Max 19th harmonic updated after exiting alarm state
		t	MX	-	MAXH19	Mon	Timestamp: Max 19th harmonic updated after exiting alarm state
MaxHVal20	v2_dMV	mag.f	MX	-	MAXH20	Mon	Max 20th harmonic updated after exiting alarm state
		q	MX	-	MAXH20	Mon	Quality: Max 20th harmonic updated after exiting alarm state
		t	MX	-	MAXH20	Mon	Timestamp: Max 20th harmonic updated after exiting alarm state
MaxThdAVal	v2_dMV	mag.f	MX	-	MAXTHD	Mon	Max THD updated after exiting alarm state
		q	MX	-	MAXTHD	Mon	Quality: Max THD updated after exiting alarm state
		t	MX	-	MAXTHD	Mon	Timestamp: Max THD updated after exiting alarm state
MaxTddAVal	v2_dMV	mag.f	MX	-	MAXTDD	Mon	Max TDD updated after exiting alarm state
		q	MX	-	MAXTDD	Mon	Quality: Max TDD updated after exiting alarm state
		t	MX	-	MAXTDD	Mon	Timestamp: Max TDD updated after exiting alarm state
PhSvSt	v4_dINS	stVal	ST	-	MONITORED_PH	Mon	Indicates the actual phase monitored 1=Ph A, 2=Ph B, 3=Ph C
		q	ST	-	MONITORED_PH	Mon	Quality: Indicates the actual phase monitored 1=Ph A, 2=Ph B, 3=Ph C
		t	ST	-	MONITORED_PH	Mon	Timestamp: Indicates the actual phase monitored 1=Ph A, 2=Ph B, 3=Ph C
AlmHiHNum	v4_dINS	stVal	ST	-	NO_ALM_MN_H	Mon	Highest harmonic that exceeded its alarm limit
		q	ST	-	NO_ALM_MN_H	Mon	Quality: Highest harmonic that exceeded its alarm limit
		t	ST	-	NO_ALM_MN_H	Mon	Timestamp: Highest harmonic that exceeded its alarm limit

LN type	LN prefix	LN class	Function block name
VPPMHAI (revision 0)	VPP	MHAI	VPPMHAI

Table 178: VPPMHA1 Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Hz	b_dMV	mag.f	MX	-	-	Mon	Rated frequency
		q	MX	-	-	Mon	Quality: Rated frequency
		t	MX	-	-	Mon	Timestamp: Rated frequency
ThdPPV	c_dDEL	cVal.mag.f	MX	-	3SMNTHD_AB	Mon	Non-sliding 3s mean value of THD for phase AB
		cVal.mag.f	MX	-	3SMNTHD_BC	Mon	Non-sliding 3s mean value of THD for phase BC
		cVal.mag.f	MX	-	3SMNTHD_CA	Mon	Non-sliding 3s mean value of THD for phase CA
		q	MX	-	3SMNTHD_CA	Mon	Quality: Non-sliding 3s mean value of THD for phase CA
		q	MX	-	3SMNTHD_BC	Mon	Quality: Non-sliding 3s mean value of THD for phase BC
		q	MX	-	3SMNTHD_AB	Mon	Quality: Non-sliding 3s mean value of THD for phase AB
		t	MX	-	3SMNTHD_AB	Mon	Timestamp: Non-sliding 3s mean value of THD for phase AB
		t	MX	-	3SMNTHD_BC	Mon	Timestamp: Non-sliding 3s mean value of THD for phase BC
		t	MX	-	3SMNTHD_CA	Mon	Timestamp: Non-sliding 3s mean value of THD for phase CA
HiHV	v1_dSPS	stVal	ST	-	ALM_MN_H	Mon	Alarm signal when harmonic RMS value is greater than limit
		q	ST	-	ALM_MN_H	Mon	Quality: Alarm signal when harmonic RMS value is greater than limit

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
HiHV	v1_dSPS	t	ST	-	ALM_MN_H	Mon	Timestamp: Alarm signal when harmonic RMS value is greater than limit
HiVThd	v1_dSPS	stVal	ST	-	ALM_MN THD	Mon	Alarm signal when THD value is greater than limit
		q	ST	-	ALM_MN THD	Mon	Quality: Alarm signal when THD value is greater than limit
		t	ST	-	ALM_MN THD	Mon	Timestamp: Alarm signal when THD value is greater than limit
HiVTdd	v1_dSPS	stVal	ST	-	ALM_MN_TDD	Mon	Alarm signal when TDD value is greater than limit
		q	ST	-	ALM_MN_TDD	Mon	Quality: Alarm signal when TDD value is greater than limit
		t	ST	-	ALM_MN_TDD	Mon	Timestamp: Alarm signal when TDD value is greater than limit
TddPPV	v2_dDEL	cVal.mag.f	MX	-	3SMNTDD_AB	Mon	Non-sliding 3s mean value of TDD for phase AB
		cVal.mag.f	MX	-	3SMNTDD_BC	Mon	Non-sliding 3s mean value of TDD for phase BC
		cVal.mag.f	MX	-	3SMNTDD_CA	Mon	Non-sliding 3s mean value of TDD for phase CA
		q	MX	-	3SMNTDD_CA	Mon	Quality: Non-sliding 3s mean value of TDD for phase CA
		q	MX	-	3SMNTDD_BC	Mon	Quality: Non-sliding 3s mean value of TDD for phase BC
		q	MX	-	3SMNTDD_AB	Mon	Quality: Non-sliding 3s mean value of TDD for phase AB
		t	MX	-	3SMNTDD_AB	Mon	Timestamp: Non-sliding 3s mean value of TDD for phase AB
		t	MX	-	3SMNTDD_BC	Mon	Timestamp: Non-sliding 3s mean value of TDD for phase BC
		t	MX	-	3SMNTDD_CA	Mon	Timestamp: Non-sliding 3s mean value of TDD for phase CA
MaxHVVal1	v2_dMV	mag.f	MX	-	MAXH1	Mon	Max 1st harmonic updated after exiting alarm state
		q	MX	-	MAXH1	Mon	Quality: Max 1st harmonic updated after exiting alarm state
		t	MX	-	MAXH1	Mon	Timestamp: Max 1st harmonic updated after exiting alarm state
MaxHVVal2	v2_dMV	mag.f	MX	-	MAXH2	Mon	Max 2nd harmonic updated after exiting alarm state
		q	MX	-	MAXH2	Mon	Quality: Max 2nd harmonic updated after exiting alarm state
		t	MX	-	MAXH2	Mon	Timestamp: Max 2nd harmonic updated after exiting alarm state
MaxHVVal3	v2_dMV	mag.f	MX	-	MAXH3	Mon	Max 3rd harmonic updated after exiting alarm state
		q	MX	-	MAXH3	Mon	Quality: Max 3rd harmonic updated after exiting alarm state

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
MaxHVVal3	v2_dMV	t	MX	-	MAXH3	Mon	Timestamp: Max 3rd harmonic updated after exiting alarm state
MaxHVVal4	v2_dMV	mag.f	MX	-	MAXH4	Mon	Max 4th harmonic updated after exiting alarm state
		q	MX	-	MAXH4	Mon	Quality: Max 4th harmonic updated after exiting alarm state
		t	MX	-	MAXH4	Mon	Timestamp: Max 4th harmonic updated after exiting alarm state
MaxHVVal5	v2_dMV	mag.f	MX	-	MAXH5	Mon	Max 5th harmonic updated after exiting alarm state
		q	MX	-	MAXH5	Mon	Quality: Max 5th harmonic updated after exiting alarm state
		t	MX	-	MAXH5	Mon	Timestamp: Max 5th harmonic updated after exiting alarm state
MaxHVVal6	v2_dMV	mag.f	MX	-	MAXH6	Mon	Max 6th harmonic updated after exiting alarm state
		q	MX	-	MAXH6	Mon	Quality: Max 6th harmonic updated after exiting alarm state
		t	MX	-	MAXH6	Mon	Timestamp: Max 6th harmonic updated after exiting alarm state
MaxHVVal7	v2_dMV	mag.f	MX	-	MAXH7	Mon	Max 7th harmonic updated after exiting alarm state
		q	MX	-	MAXH7	Mon	Quality: Max 7th harmonic updated after exiting alarm state
		t	MX	-	MAXH7	Mon	Timestamp: Max 7th harmonic updated after exiting alarm state
MaxHVVal8	v2_dMV	mag.f	MX	-	MAXH8	Mon	Max 8th harmonic updated after exiting alarm state
		q	MX	-	MAXH8	Mon	Quality: Max 8th harmonic updated after exiting alarm state
		t	MX	-	MAXH8	Mon	Timestamp: Max 8th harmonic updated after exiting alarm state
MaxHVVal9	v2_dMV	mag.f	MX	-	MAXH9	Mon	Max 9th harmonic updated after exiting alarm state
		q	MX	-	MAXH9	Mon	Quality: Max 9th harmonic updated after exiting alarm state
		t	MX	-	MAXH9	Mon	Timestamp: Max 9th harmonic updated after exiting alarm state
MaxHVVal10	v2_dMV	mag.f	MX	-	MAXH10	Mon	Max 10th harmonic updated after exiting alarm state
		q	MX	-	MAXH10	Mon	Quality: Max 10th harmonic updated after exiting alarm state
		t	MX	-	MAXH10	Mon	Timestamp: Max 10th harmonic updated after exiting alarm state
MaxHVVal11	v2_dMV	mag.f	MX	-	MAXH11	Mon	Max 11th harmonic updated after exiting alarm state
		q	MX	-	MAXH11	Mon	Quality: Max 11th harmonic updated after exiting alarm state

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
MaxHVVal11	v2_dMV	t	MX	-	MAXH11	Mon	Timestamp: Max 11th harmonic updated after exiting alarm state
MaxHVVal12	v2_dMV	mag.f	MX	-	MAXH12	Mon	Max 12th harmonic updated after exiting alarm state
		q	MX	-	MAXH12	Mon	Quality: Max 12th harmonic updated after exiting alarm state
		t	MX	-	MAXH12	Mon	Timestamp: Max 12th harmonic updated after exiting alarm state
MaxHVVal13	v2_dMV	mag.f	MX	-	MAXH13	Mon	Max 13th harmonic updated after exiting alarm state
		q	MX	-	MAXH13	Mon	Quality: Max 13th harmonic updated after exiting alarm state
		t	MX	-	MAXH13	Mon	Timestamp: Max 13th harmonic updated after exiting alarm state
MaxHVVal14	v2_dMV	mag.f	MX	-	MAXH14	Mon	Max 14th harmonic updated after exiting alarm state
		q	MX	-	MAXH14	Mon	Quality: Max 14th harmonic updated after exiting alarm state
		t	MX	-	MAXH14	Mon	Timestamp: Max 14th harmonic updated after exiting alarm state
MaxHVVal15	v2_dMV	mag.f	MX	-	MAXH15	Mon	Max 15th harmonic updated after exiting alarm state
		q	MX	-	MAXH15	Mon	Quality: Max 15th harmonic updated after exiting alarm state
		t	MX	-	MAXH15	Mon	Timestamp: Max 15th harmonic updated after exiting alarm state
MaxHVVal17	v2_dMV	mag.f	MX	-	MAXH17	Mon	Max 17th harmonic updated after exiting alarm state
		q	MX	-	MAXH17	Mon	Quality: Max 17th harmonic updated after exiting alarm state
		t	MX	-	MAXH17	Mon	Timestamp: Max 17th harmonic updated after exiting alarm state
MaxHVVal16	v2_dMV	mag.f	MX	-	MAXH16	Mon	Max 16th harmonic updated after exiting alarm state
		q	MX	-	MAXH16	Mon	Quality: Max 16th harmonic updated after exiting alarm state
		t	MX	-	MAXH16	Mon	Timestamp: Max 16th harmonic updated after exiting alarm state
MaxHVVal18	v2_dMV	mag.f	MX	-	MAXH18	Mon	Max 18th harmonic updated after exiting alarm state
		q	MX	-	MAXH18	Mon	Quality: Max 18th harmonic updated after exiting alarm state
		t	MX	-	MAXH18	Mon	Timestamp: Max 18th harmonic updated after exiting alarm state
MaxHVVal19	v2_dMV	mag.f	MX	-	MAXH19	Mon	Max 19th harmonic updated after exiting alarm state
		q	MX	-	MAXH19	Mon	Quality: Max 19th harmonic updated after exiting alarm state

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
MaxHVVal19	v2_dMV	t	MX	-	MAXH19	Mon	Timestamp: Max 19th harmonic updated after exiting alarm state
MaxHVVal20	v2_dMV	mag.f	MX	-	MAXH20	Mon	Max 20th harmonic updated after exiting alarm state
		q	MX	-	MAXH20	Mon	Quality: Max 20th harmonic updated after exiting alarm state
		t	MX	-	MAXH20	Mon	Timestamp: Max 20th harmonic updated after exiting alarm state
MaxThdVVal	v2_dMV	mag.f	MX	-	MAXTHD	Mon	Max THD updated after exiting alarm state
		q	MX	-	MAXTHD	Mon	Quality: Max THD updated after exiting alarm state
		t	MX	-	MAXTHD	Mon	Timestamp: Max THD updated after exiting alarm state
MaxTddVVal	v2_dMV	mag.f	MX	-	MAXTDD	Mon	Max TDD updated after exiting alarm state
		q	MX	-	MAXTDD	Mon	Quality: Max TDD updated after exiting alarm state
		t	MX	-	MAXTDD	Mon	Timestamp: Max TDD updated after exiting alarm state
PhSvSt	v4_dINS	stVal	ST	-	MONITORED_PH	Mon	Indicates the actual phase monitored 1=Ph A, 2=Ph B, 3=Ph C
		q	ST	-	MONITORED_PH	Mon	Quality: Indicates the actual phase monitored 1=Ph A, 2=Ph B, 3=Ph C
		t	ST	-	MONITORED_PH	Mon	Timestamp: Indicates the actual phase monitored 1=Ph A, 2=Ph B, 3=Ph C
AlmHiHNum	v4_dINS	stVal	ST	-	NO_ALM_MN_H	Mon	Highest harmonic that exceeded its alarm limit
		q	ST	-	NO_ALM_MN_H	Mon	Quality: Highest harmonic that exceeded its alarm limit
		t	ST	-	NO_ALM_MN_H	Mon	Timestamp: Highest harmonic that exceeded its alarm limit

LN type	LN prefix	LN class	Function block name
VPHMHAI (revision 0)	VPH	MHAI	VPHMHAI

Table 179: VPHMHAI Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Hz	b_dMV	mag.f	MX	-	-	Mon	Rated frequency
		q	MX	-	-	Mon	Quality: Rated frequency
		t	MX	-	-	Mon	Timestamp: Rated frequency
ThdPhV	f_dWYE	cVal.mag.f	MX	-	3SMNTHD_A	Mon	Non-sliding 3s mean value of THD for phase A
		cVal.mag.f	MX	-	3SMNTHD_B	Mon	Non-sliding 3s mean value of THD for phase B
		cVal.mag.f	MX	-	3SMNTHD_C	Mon	Non-sliding 3s mean value of THD for phase C
		q	MX	-	3SMNTHD_C	Mon	Quality: Non-sliding 3s mean value of THD for phase C
		q	MX	-	3SMNTHD_B	Mon	Quality: Non-sliding 3s mean value of THD for phase B
		q	MX	-	3SMNTHD_A	Mon	Quality: Non-sliding 3s mean value of THD for phase A
		t	MX	-	3SMNTHD_A	Mon	Timestamp: Non-sliding 3s mean value of THD for phase A
		t	MX	-	3SMNTHD_B	Mon	Timestamp: Non-sliding 3s mean value of THD for phase B
		t	MX	-	3SMNTHD_C	Mon	Timestamp: Non-sliding 3s mean value of THD for phase C
HiHV	v1_dSPS	stVal	ST	-	ALM_MN_H	Mon	Alarm signal when harmonic RMS value is greater than limit
		q	ST	-	ALM_MN_H	Mon	Quality: Alarm signal when harmonic RMS value is greater than limit
		t	ST	-	ALM_MN_H	Mon	Timestamp: Alarm signal when harmonic RMS value is greater than limit
HiVThd	v1_dSPS	stVal	ST	-	ALM_MN_THD	Mon	Alarm signal when THD value is greater than limit
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
HiVThd	v1_dSPS	q	ST	-	ALM_MN THD	Mon	Quality: Alarm signal when THD value is greater than limit
		t	ST	-	ALM_MN THD	Mon	Timestamp: Alarm signal when THD value is greater than limit
HiVTdd	v1_dSPS	stVal	ST	-	ALM_MN TDD	Mon	Alarm signal when TDD value is greater than limit
		q	ST	-	ALM_MN TDD	Mon	Quality: Alarm signal when TDD value is greater than limit
		t	ST	-	ALM_MN TDD	Mon	Timestamp: Alarm signal when TDD value is greater than limit
MaxHVVal1	v2_dMV	mag.f	MX	-	MAXH1	Mon	Max 1st harmonic updated after exiting alarm state
		q	MX	-	MAXH1	Mon	Quality: Max 1st harmonic updated after exiting alarm state
		t	MX	-	MAXH1	Mon	Timestamp: Max 1st harmonic updated after exiting alarm state
MaxHVVal2	v2_dMV	mag.f	MX	-	MAXH2	Mon	Max 2nd harmonic updated after exiting alarm state
		q	MX	-	MAXH2	Mon	Quality: Max 2nd harmonic updated after exiting alarm state
		t	MX	-	MAXH2	Mon	Timestamp: Max 2nd harmonic updated after exiting alarm state
MaxHVVal3	v2_dMV	mag.f	MX	-	MAXH3	Mon	Max 3rd harmonic updated after exiting alarm state
		q	MX	-	MAXH3	Mon	Quality: Max 3rd harmonic updated after exiting alarm state
		t	MX	-	MAXH3	Mon	Timestamp: Max 3rd harmonic updated after exiting alarm state
MaxHVVal4	v2_dMV	mag.f	MX	-	MAXH4	Mon	Max 4th harmonic updated after exiting alarm state
		q	MX	-	MAXH4	Mon	Quality: Max 4th harmonic updated after exiting alarm state
		t	MX	-	MAXH4	Mon	Timestamp: Max 4th harmonic updated after exiting alarm state
MaxHVVal5	v2_dMV	mag.f	MX	-	MAXH5	Mon	Max 5th harmonic updated after exiting alarm state
		q	MX	-	MAXH5	Mon	Quality: Max 5th harmonic updated after exiting alarm state
		t	MX	-	MAXH5	Mon	Timestamp: Max 5th harmonic updated after exiting alarm state
MaxHVVal6	v2_dMV	mag.f	MX	-	MAXH6	Mon	Max 6th harmonic updated after exiting alarm state
		q	MX	-	MAXH6	Mon	Quality: Max 6th harmonic updated after exiting alarm state
		t	MX	-	MAXH6	Mon	Timestamp: Max 6th harmonic updated after exiting alarm state
MaxHVVal7	v2_dMV	mag.f	MX	-	MAXH7	Mon	Max 7th harmonic updated after exiting alarm state

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
MaxHVVal7	v2_dMV	q	MX	-	MAXH7	Mon	Quality: Max 7th harmonic updated after exiting alarm state
		t	MX	-	MAXH7	Mon	Timestamp: Max 7th harmonic updated after exiting alarm state
MaxHVVal8	v2_dMV	mag.f	MX	-	MAXH8	Mon	Max 8th harmonic updated after exiting alarm state
		q	MX	-	MAXH8	Mon	Quality: Max 8th harmonic updated after exiting alarm state
		t	MX	-	MAXH8	Mon	Timestamp: Max 8th harmonic updated after exiting alarm state
MaxHVVal9	v2_dMV	mag.f	MX	-	MAXH9	Mon	Max 9th harmonic updated after exiting alarm state
		q	MX	-	MAXH9	Mon	Quality: Max 9th harmonic updated after exiting alarm state
		t	MX	-	MAXH9	Mon	Timestamp: Max 9th harmonic updated after exiting alarm state
MaxHVVal10	v2_dMV	mag.f	MX	-	MAXH10	Mon	Max 10th harmonic updated after exiting alarm state
		q	MX	-	MAXH10	Mon	Quality: Max 10th harmonic updated after exiting alarm state
		t	MX	-	MAXH10	Mon	Timestamp: Max 10th harmonic updated after exiting alarm state
MaxHVVal11	v2_dMV	mag.f	MX	-	MAXH11	Mon	Max 11th harmonic updated after exiting alarm state
		q	MX	-	MAXH11	Mon	Quality: Max 11th harmonic updated after exiting alarm state
		t	MX	-	MAXH11	Mon	Timestamp: Max 11th harmonic updated after exiting alarm state
MaxHVVal12	v2_dMV	mag.f	MX	-	MAXH12	Mon	Max 12th harmonic updated after exiting alarm state
		q	MX	-	MAXH12	Mon	Quality: Max 12th harmonic updated after exiting alarm state
		t	MX	-	MAXH12	Mon	Timestamp: Max 12th harmonic updated after exiting alarm state
MaxHVVal13	v2_dMV	mag.f	MX	-	MAXH13	Mon	Max 13th harmonic updated after exiting alarm state
		q	MX	-	MAXH13	Mon	Quality: Max 13th harmonic updated after exiting alarm state
		t	MX	-	MAXH13	Mon	Timestamp: Max 13th harmonic updated after exiting alarm state
MaxHVVal14	v2_dMV	mag.f	MX	-	MAXH14	Mon	Max 14th harmonic updated after exiting alarm state
		q	MX	-	MAXH14	Mon	Quality: Max 14th harmonic updated after exiting alarm state
		t	MX	-	MAXH14	Mon	Timestamp: Max 14th harmonic updated after exiting alarm state
MaxHVVal15	v2_dMV	mag.f	MX	-	MAXH15	Mon	Max 15th harmonic updated after exiting alarm state

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
MaxHVVal15	v2_dMV	q	MX	-	MAXH15	Mon	Quality: Max 15th harmonic updated after exiting alarm state
		t	MX	-	MAXH15	Mon	Timestamp: Max 15th harmonic updated after exiting alarm state
MaxHVVal17	v2_dMV	mag.f	MX	-	MAXH17	Mon	Max 17th harmonic updated after exiting alarm state
		q	MX	-	MAXH17	Mon	Quality: Max 17th harmonic updated after exiting alarm state
		t	MX	-	MAXH17	Mon	Timestamp: Max 17th harmonic updated after exiting alarm state
MaxHVVal16	v2_dMV	mag.f	MX	-	MAXH16	Mon	Max 16th harmonic updated after exiting alarm state
		q	MX	-	MAXH16	Mon	Quality: Max 16th harmonic updated after exiting alarm state
		t	MX	-	MAXH16	Mon	Timestamp: Max 16th harmonic updated after exiting alarm state
MaxHVVal18	v2_dMV	mag.f	MX	-	MAXH18	Mon	Max 18th harmonic updated after exiting alarm state
		q	MX	-	MAXH18	Mon	Quality: Max 18th harmonic updated after exiting alarm state
		t	MX	-	MAXH18	Mon	Timestamp: Max 18th harmonic updated after exiting alarm state
MaxHVVal19	v2_dMV	mag.f	MX	-	MAXH19	Mon	Max 19th harmonic updated after exiting alarm state
		q	MX	-	MAXH19	Mon	Quality: Max 19th harmonic updated after exiting alarm state
		t	MX	-	MAXH19	Mon	Timestamp: Max 19th harmonic updated after exiting alarm state
MaxHVVal20	v2_dMV	mag.f	MX	-	MAXH20	Mon	Max 20th harmonic updated after exiting alarm state
		q	MX	-	MAXH20	Mon	Quality: Max 20th harmonic updated after exiting alarm state
		t	MX	-	MAXH20	Mon	Timestamp: Max 20th harmonic updated after exiting alarm state
MaxThdVVal	v2_dMV	mag.f	MX	-	MAXTHD	Mon	Max THD updated after exiting alarm state
		q	MX	-	MAXTHD	Mon	Quality: Max THD updated after exiting alarm state
		t	MX	-	MAXTHD	Mon	Timestamp: Max THD updated after exiting alarm state
MaxTddVVal	v2_dMV	mag.f	MX	-	MAXTDD	Mon	Max TDD updated after exiting alarm state
		q	MX	-	MAXTDD	Mon	Quality: Max TDD updated after exiting alarm state
		t	MX	-	MAXTDD	Mon	Timestamp: Max TDD updated after exiting alarm state
TddPhV	v3_dWYE	cVal.mag.f	MX	-	3SMNTDD_A	Mon	Non-sliding 3s mean value of TDD for phase A

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
TddPhV	v3_dWYE	cVal.mag.f	MX	-	3SMNTDD_B	Mon	Non-sliding 3s mean value of TDD for phase B
		cVal.mag.f	MX	-	3SMNTDD_C	Mon	Non-sliding 3s mean value of TDD for phase C
		q	MX	-	3SMNTDD_C	Mon	Quality: Non-sliding 3s mean value of TDD for phase C
		q	MX	-	3SMNTDD_B	Mon	Quality: Non-sliding 3s mean value of TDD for phase B
		q	MX	-	3SMNTDD_A	Mon	Quality: Non-sliding 3s mean value of TDD for phase A
		t	MX	-	3SMNTDD_A	Mon	Timestamp: Non-sliding 3s mean value of TDD for phase A
		t	MX	-	3SMNTDD_B	Mon	Timestamp: Non-sliding 3s mean value of TDD for phase B
		t	MX	-	3SMNTDD_C	Mon	Timestamp: Non-sliding 3s mean value of TDD for phase C
PhSvSt	v4_dINS	stVal	ST	-	MONITORED_PH	Mon	Indicates the actual phase monitored 1=Ph A, 2=Ph B, 3=Ph C
		q	ST	-	MONITORED_PH	Mon	Quality: Indicates the actual phase monitored 1=Ph A, 2=Ph B, 3=Ph C
		t	ST	-	MONITORED_PH	Mon	Timestamp: Indicates the actual phase monitored 1=Ph A, 2=Ph B, 3=Ph C
AlmHiHNum	v4_dINS	stVal	ST	-	NO_ALM_MN_H	Mon	Highest harmonic that exceeded its alarm limit
		q	ST	-	NO_ALM_MN_H	Mon	Quality: Highest harmonic that exceeded its alarm limit
		t	ST	-	NO_ALM_MN_H	Mon	Timestamp: Highest harmonic that exceeded its alarm limit

#### 7.8.4

#### Sequence and imbalance MSQI

LN type	LN prefix	LN class	Function block name
CSMSQI (revision 0)	CS	MSQI	CSMSQI

Table 180: CSMSQI Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
SeqA	c_dSEQ	rangeC.hhLim.f	CF	-	Ps Seq A Hi high Lim	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	Ps Seq A high limit	-	High limit (physical value)
		rangeC.lLim.f	CF	-	Ps Seq A low limit	-	Low limit (physical value)
		rangeC.llLim.f	CF	-	Ps Seq A low low Lim	-	Low Low limit (physical value)
		rangeC.max.f	CF	-	Ps Seq current Max	-	Maximum value
		rangeC.min.f	CF	-	Ps Seq current Min	-	Minimum value
		cVal.mag.f	MX	-	I1_DB	Mon	Positive sequence current amplitude, reported value
		rangeC.hhLim.f	CF	-	Ng Seq A Hi high Lim	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	Ng Seq A high limit	-	High limit (physical value)
		rangeC.lLim.f	CF	-	Ng Seq A low limit	-	Low limit (physical value)
		rangeC.llLim.f	CF	-	Ng Seq A low low Lim	-	Low Low limit (physical value)
		rangeC.max.f	CF	-	Ng Seq current Max	-	Maximum value
		rangeC.min.f	CF	-	Ng Seq current Min	-	Minimum value
		cVal.mag.f	MX	-	I2_DB	Mon	Negative sequence current amplitude, reported value
		subCVal.mag.f	SV	-	-	-	Substituted value
		subCVal.mag.f	SV	-	-	-	Substituted value
		cVal.mag.f	MX	-	-	Mon	Zero sequence current (3I0) amplitude, reported value
		range	MX	-	I1_RANGE	Mon	Positive sequence current amplitude range
		range	MX	-	I2_RANGE	Mon	Negative sequence current amplitude range
		q	MX	-	-	Mon	Quality: Zero sequence current (3I0) amplitude, reported value
		q	MX	-	I2_DB	Mon	Quality: Negative sequence current amplitude, reported value
		q	MX	-	I1_DB	Mon	Quality: Positive sequence current amplitude, reported value
		t	MX	-	I1_DB	Mon	Timestamp: Positive sequence current amplitude, reported value

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
SeqA	c_dSEQ	t	MX	-	I2_DB	Mon	Timestamp: Negative sequence current amplitude, reported value
		t	MX	-	I2_DB	Mon	Timestamp: Negative sequence current amplitude, reported value
		subEna	SV	-	-	-	Enable substitution
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	Ps Seq A deadband	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	Ng Seq A deadband	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	Ps Seq A zero Db	-	Zero point clamping in 0,001% of range
		zeroDb	CF	-	Ng Seq A zero Db	-	Zero point clamping in 0,001% of range

LN type	LN prefix	LN class	Function block name
VSMSQI (revision 0)	VS	MSQI	VSMSQI

Table 181: VSMSQI Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
Beh	a_dINS	t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
		stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
SeqV	c_dSEQ	t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
		rangeC.hhLim.f	CF	-	Ps Seq V Hi high Lim	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	Ps Seq V high limit	-	High limit (physical value)
		rangeC.lLim.f	CF	-	Ps Seq V low limit	-	Low limit (physical value)
		rangeC.llLim.f	CF	-	Ps Seq V low low Lim	-	Low Low limit (physical value)

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
SeqV	c_dSEQ	rangeC.max.f	CF	-	Ps Seq voltage Max	-	Maximum value
		rangeC.min.f	CF	-	Ps Seq voltage Min	-	Minimum value
		cVal.mag.f	MX	-	U1_DB	Mon	Positive sequence voltage amplitude, reported value
		rangeC.hhLim.f	CF	-	Ng Seq V Hi high Lim	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	Ng Seq V High limit	-	High limit (physical value)
		rangeC.lLim.f	CF	-	Ng Seq V low limit	-	Low limit (physical value)
		rangeC.llLim.f	CF	-	Ng Seq V low low Lim	-	Low Low limit (physical value)
		rangeC.max.f	CF	-	Ng Seq voltage Max	-	Maximum value
		rangeC.min.f	CF	-	Ng Seq voltage Min	-	Minimum value
		cVal.mag.f	MX	-	U2_DB	Mon	Negative sequence voltage amplitude, reported value
		subCVal.mag.f	SV	-	-	-	Substituted value
		subCVal.mag.f	SV	-	-	-	Substituted value
		cVal.mag.f	MX	-	-	Mon	Zero sequence voltage amplitude, reported value
		range	MX	-	U1 RANGE	Mon	Positive sequence voltage amplitude range
		range	MX	-	U2_RANGE	Mon	Negative sequence voltage amplitude range
		q	MX	-	-	Mon	Quality: Zero sequence voltage amplitude, reported value
		q	MX	-	U2_DB	Mon	Quality: Negative sequence voltage amplitude, reported value
		q	MX	-	U1_DB	Mon	Quality: Positive sequence voltage amplitude, reported value
		t	MX	-	U1_DB	Mon	Timestamp: Positive sequence voltage amplitude, reported value
		t	MX	-	U2_DB	Mon	Timestamp: Negative sequence voltage amplitude, reported value
		t	MX	-	-	Mon	Timestamp: Zero sequence voltage amplitude, reported value
		subEna	SV	-	-	-	Enable substitution
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	Ps Seq V deadband	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	Ng Seq V deadband	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	Ps Seq V zero Db	-	Zero point clamping in 0,001% of range
		zeroDb	CF	-	Ng Seq V zero Db	-	Zero point clamping in 0,001% of range

## 7.9 Logical nodes for sensors and monitoring

### 7.9.1 Circuit breaker monitoring SCBR

LN type	LN prefix	LN class	Function block name
SSCBR (revision 1)	S	SCBR	SSCBR

Table 182: *SSCBR Logical node data*

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orlent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
InaTmdCnt	v1_dINS	stVal	ST	-	INA_DAYS	Mon	The number of days CB has been inactive
		q	ST	-	INA_DAYS	Mon	Quality: The number of days CB has been inactive
		t	ST	-	INA_DAYS	Mon	Timestamp: The number of days CB has been inactive
RmnLifPhA	v1_dINS	stVal	ST	-	CB_LIFE_A	Mon	CB Remaining life phase A
		q	ST	-	CB_LIFE_A	Mon	Quality: CB Remaining life phase A
		t	ST	-	CB_LIFE_A	Mon	Timestamp: CB Remaining life phase A
RmnLifPhB	v1_dINS	stVal	ST	-	CB_LIFE_B	Mon	CB Remaining life phase B
		q	ST	-	CB_LIFE_B	Mon	Quality: CB Remaining life phase B
		t	ST	-	CB_LIFE_B	Mon	Timestamp: CB Remaining life phase B
RmnLifPhC	v1_dINS	stVal	ST	-	CB_LIFE_C	Mon	CB Remaining life phase C
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
RmnLifPhC	v1_dINS	q	ST	-	CB_LIFE_C	Mon	Quality: CB Remaining life phase C
		t	ST	-	CB_LIFE_C	Mon	Timestamp: CB Remaining life phase C
RsAccAPwr	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
RsCBWear	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
RsTrvTm	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
RsSprChaTm	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
RsSprChaTm	v1_dSPC	Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orlent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
OpnAlm	v1_dSPS	stVal	ST	-	TRV_T_OP_ALM	Mon	CB open travel time exceeded set value
		q	ST	-	TRV_T_OP_ALM	Mon	Quality: CB open travel time exceeded set value
		t	ST	-	TRV_T_OP_ALM	Mon	Timestamp: CB open travel time exceeded set value
ClsAlm	v1_dSPS	stVal	ST	-	TRV_T_CL_ALM	Mon	CB close travel time exceeded set value
		q	ST	-	TRV_T_CL_ALM	Mon	Quality: CB close travel time exceeded set value
		t	ST	-	TRV_T_CL_ALM	Mon	Timestamp: CB close travel time exceeded set value
OpNumAlm	v1_dSPS	stVal	ST	-	OPR_ALM	Mon	Number of CB operations exceeds alarm limit
		q	ST	-	OPR_ALM	Mon	Quality: Number of CB operations exceeds alarm limit
		t	ST	-	OPR_ALM	Mon	Timestamp: Number of CB operations exceeds alarm limit
OpNumLO	v1_dSPS	stVal	ST	-	OPR_LO	Mon	Number of CB operations exceeds lockout limit
		q	ST	-	OPR_LO	Mon	Quality: Number of CB operations exceeds lockout limit
		t	ST	-	OPR_LO	Mon	Timestamp: Number of CB operations exceeds lockout limit
APwrAlm	v1_dSPS	stVal	ST	-	IPOW_ALM	Mon	Accumulated currents power (lyt),exceeded alarm limit
		q	ST	-	IPOW_ALM	Mon	Quality: Accumulated currents power (lyt),exceeded alarm limit
		t	ST	-	IPOW_ALM	Mon	Timestamp: Accumulated currents power (lyt),exceeded alarm limit
APwrLO	v1_dSPS	stVal	ST	-	IPOW_LO	Mon	Accumulated currents power (lyt),exceeded lockout limit
		q	ST	-	IPOW_LO	Mon	Quality: Accumulated currents power (lyt),exceeded lockout limit
		t	ST	-	IPOW_LO	Mon	Timestamp: Accumulated currents power (lyt),exceeded lockout limit
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
LonTmAlm	v1_dSPS	stVal	ST	-	MON_ALM	Mon	CB 'not operated for long time' alarm
		q	ST	-	MON_ALM	Mon	Quality: CB 'not operated for long time' alarm
		t	ST	-	MON_ALM	Mon	Timestamp: CB 'not operated for long time' alarm
SprChaAlm	v1_dSPS	stVal	ST	-	SPR_CHR_ALM	Mon	Spring charging time has crossed the set value
		q	ST	-	SPR_CHR_ALM	Mon	Quality: Spring charging time has crossed the set value
		t	ST	-	SPR_CHR_ALM	Mon	Timestamp: Spring charging time has crossed the set value
PosOpn	v1_dSPS	stVal	ST	-	OPENPOS	Mon	CB is in open position
		q	ST	-	OPENPOS	Mon	Quality: CB is in open position
		t	ST	-	OPENPOS	Mon	Timestamp: CB is in open position
PosInvd	v1_dSPS	stVal	ST	-	INVALIDPOS	Mon	CB is in invalid position (not positively open or closed)
		q	ST	-	INVALIDPOS	Mon	Quality: CB is in invalid position (not positively open or closed)
		t	ST	-	INVALIDPOS	Mon	Timestamp: CB is in invalid position (not positively open or closed)
PosCls	v1_dSPS	stVal	ST	-	CLOSEPOS	Mon	CB is in closed position
		q	ST	-	CLOSEPOS	Mon	Quality: CB is in closed position
		t	ST	-	CLOSEPOS	Mon	Timestamp: CB is in closed position
CBLifAlm	v1_dSPS	stVal	ST	-	CB_LIFE_ALM	Mon	Remaining life of CB reduced to Life alarm level
		q	ST	-	CB_LIFE_ALM	Mon	Quality: Remaining life of CB reduced to Life alarm level
		t	ST	-	CB_LIFE_ALM	Mon	Timestamp: Remaining life of CB reduced to Life alarm level
PresLO	v1_dSPS	stVal	ST	-	PRES_LO	Mon	Pressure below lockout level
		q	ST	-	PRES_LO	Mon	Quality: Pressure below lockout level
		t	ST	-	PRES_LO	Mon	Timestamp: Pressure below lockout level
TmmsCls	v2_dMV	mag.f	MX	-	T_TRV_CL	Mon	Travel time of the CB during closing operation
		q	MX	-	T_TRV_CL	Mon	Quality: Travel time of the CB during closing operation
		t	MX	-	T_TRV_CL	Mon	Timestamp: Travel time of the CB during closing operation
TmmsOpn	v2_dMV	mag.f	MX	-	T_TRV_OP	Mon	Travel time of the CB during opening operation
		q	MX	-	T_TRV_OP	Mon	Quality: Travel time of the CB during opening operation

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
TmmsOpen	v2_dMV	t	MX	-	T_TRV_OP	Mon	Timestamp: Travel time of the CB during opening operation
TmsSprCha	v2_dMV	mag.f	MX	-	T_SPR_CHR	Mon	The charging time of the CB spring
		q	MX	-	T_SPR_CHR	Mon	Quality: The charging time of the CB spring
		t	MX	-	T_SPR_CHR	Mon	Timestamp: The charging time of the CB spring
AccAPwrPhB	v2_dMV	mag.f	MX	-	IPOW_B	Mon	Accumulated currents power (lyt), phase B
		q	MX	-	IPOW_B	Mon	Quality: Accumulated currents power (lyt), phase B
		t	MX	-	IPOW_B	Mon	Timestamp: Accumulated currents power (lyt), phase B
AccAPwrPhC	v2_dMV	mag.f	MX	-	IPOW_C	Mon	Accumulated currents power (lyt), phase C
		q	MX	-	IPOW_C	Mon	Quality: Accumulated currents power (lyt), phase C
		t	MX	-	IPOW_C	Mon	Timestamp: Accumulated currents power (lyt), phase C
AccAPwrPhA	v2_dMV	mag.f	MX	-	IPOW_A	Mon	Accumulated currents power (lyt), phase A
		q	MX	-	IPOW_A	Mon	Quality: Accumulated currents power (lyt), phase A
		t	MX	-	IPOW_A	Mon	Timestamp: Accumulated currents power (lyt), phase A
PresAlm	v3_dSPS	stVal	ST	-	PRES_ALM	Mon	Pressure below alarm level
		q	ST	-	PRES_ALM	Mon	Quality: Pressure below alarm level
		t	ST	-	PRES_ALM	Mon	Timestamp: Pressure below alarm level
OpCnt	v5_dINS	stVal	ST	-	NO_OPR	Mon	Number of CB operation cycle
		q	ST	-	NO_OPR	Mon	Quality: Number of CB operation cycle
		t	ST	-	NO_OPR	Mon	Timestamp: Number of CB operation cycle

LN type	LN prefix	LN class	Function block name
TCSSCBR (revision 0)	TCS	SCBR	TCSSCBR

**Table 183:** TCSSCBR Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
TrCctAlm	a_dSPS	stVal	ST	-	ALARM	Mon	Trip circuit fault indication
		q	ST	-	ALARM	Mon	Quality: Trip circuit fault indication
		t	ST	-	ALARM	Mon	Timestamp: Trip circuit fault indication

### 7.9.2

### Tap changer supervision SLTC

LN type	LN prefix	LN class	Function block name
TPOSSLTC (revision 0)	TPOS	SLTC	TPOSSLTC

**Table 184:** TPOSSLTC Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
TapPosInvd	a_dSPS	stVal	ST	-	TAP_POS_IV	Mon	TAP_POS invalidity status
		q	ST	-	TAP_POS_IV	Mon	Quality: TAP_POS invalidity status
		t	ST	-	TAP_POS_IV	Mon	Timestamp: TAP_POS invalidity status
TapPos	d_dINC	stVal	ST	-	TAP_POS	Mon	Tap position value as integer
		q	ST	-	TAP_POS	Mon	Quality: Tap position value as integer
		t	ST	-	TAP_POS	Mon	Timestamp: Tap position value as integer

### 7.9.3 Operation time counter SOPT

LN type	LN prefix	LN class	Function block name
MDSOPT (revision 0)	MD	SOPT	MDSOPT

Table 185: MDSOPT Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Beh	a_dINS	q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
OpTmRs	a_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orlident	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	-	Mon	Reset command activated (signal for 61850 mapping)
		q	ST	-	-	Mon	Quality: Reset command activated (signal for 61850 mapping)
		t	ST	-	-	Mon	Timestamp: Reset command activated (signal for 61850 mapping)
OpTmWrn	a_dSPS	stVal	ST	-	WARNING	Mon	Warning accumulated operation time exceeds Warning value
		q	ST	-	WARNING	Mon	Quality: Warning accumulated operation time exceeds Warning value
		t	ST	-	WARNING	Mon	Timestamp: Warning accumulated operation time exceeds Warning value
OpTmAlm	a_dSPS	stVal	ST	-	ALARM	Mon	Alarm accumulated operation time exceeds Alarm value
		q	ST	-	ALARM	Mon	Quality: Alarm accumulated operation time exceeds Alarm value
		t	ST	-	ALARM	Mon	Timestamp: Alarm accumulated operation time exceeds Alarm value
OpTmh	i_dINS	stVal	ST	-	OPR_TIME	Mon	Accumulated operation time of machine or equipment
		q	ST	-	OPR_TIME	Mon	Quality: Accumulated operation time of machine or equipment
		t	ST	-	OPR_TIME	Mon	Timestamp: Accumulated operation time of machine or equipment

## 7.9.4

## Hot-spot and ageing rate monitoring S PTR

LN type	LN prefix	LN class	Function block name
ARASPTR instance 1 (revision 0)	ARA	S PTR	HSARS PTR
HSARLLN0 instance 1 (revision 0)	-	LLN0	HSARS PTR
HSARS PTR instance 1 (revision 0)	HSAR	S PTR	HSARS PTR

Table 186: HSARS PTR Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
AgeRte	b_dMV	mag.f	MX	-	AVG_AGE_RATE	Mon	Average ageing rate over set time period
		q	MX	-	AVG_AGE_RATE	Mon	Quality: Average ageing rate over set time period
		t	MX	-	AVG_AGE_RATE	Mon	Timestamp: Average ageing rate over set time period
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850

Table 187: HSARS PTR Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orlent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

**Table 188:** HSARSPTR Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
HPTmpAlm	a_dSPS	stVal	ST	-	ALARM	Mon	Alarm signal
		q	ST	-	ALARM	Mon	Quality: Alarm signal
		t	ST	-	ALARM	Mon	Timestamp: Alarm signal
AgeRte	b_dMV	mag.f	MX	-	AGEING_RATE	Mon	Momentary relative ageing rate
		q	MX	-	AGEING_RATE	Mon	Quality: Momentary relative ageing rate
		t	MX	-	AGEING_RATE	Mon	Timestamp: Momentary relative ageing rate
HPTmpClc	b_dMV	mag.f	MX	-	HOTSPOT_TEMP	Mon	Calculated value of hot spot temperature
		q	MX	-	HOTSPOT_TEMP	Mon	Quality: Calculated value of hot spot temperature
		t	MX	-	HOTSPOT_TEMP	Mon	Timestamp: Calculated value of hot spot temperature
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
LosLifTmYe	v2_dMV	mag.f	MX	-	LOSS_OF_LIFE	Mon	Loss of life in years
		q	MX	-	LOSS_OF_LIFE	Mon	Quality: Loss of life in years
		t	MX	-	LOSS_OF_LIFE	Mon	Timestamp: Loss of life in years
ToTmp	v2_dMV	mag.f	MX	-	TOPOIL_TEMP	Mon	Calculated value of top oil temperature
		q	MX	-	TOPOIL_TEMP	Mon	Quality: Calculated value of top oil temperature
		t	MX	-	TOPOIL_TEMP	Mon	Timestamp: Calculated value of top oil temperature
HPToOilGra	v2_dMV	mag.f	MX	-	-	Mon	Hot spot to top oil gradient at rated load

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
HPToOilGra	v2_dMV	q	MX	-	-	Mon	Quality: Hot spot to top oil gradient at rated load
		t	MX	-	-	Mon	Timestamp: Hot spot to top oil gradient at rated load
LoadRsvWrn	v2_dMV	mag.f	MX	-	LD_RSV_WRN	Mon	Percentage load reserve for reaching warning condition
		q	MX	-	LD_RSV_WRN	Mon	Quality: Percentage load reserve for reaching warning condition
		t	MX	-	LD_RSV_WRN	Mon	Timestamp: Percentage load reserve for reaching warning condition
LoadRsvAlm	v2_dMV	mag.f	MX	-	LD_RSV_ALM	Mon	Percentage load reserve for reaching alarm condition
		q	MX	-	LD_RSV_ALM	Mon	Quality: Percentage load reserve for reaching alarm condition
		t	MX	-	LD_RSV_ALM	Mon	Timestamp: Percentage load reserve for reaching alarm condition
RsLosLif	v2_dSPC	stVal	ST	-	RESET	Mon	Reset loss of life calculation
		q	ST	-	RESET	Mon	Quality: Reset loss of life calculation
		t	ST	-	RESET	Mon	Timestamp: Reset loss of life calculation
RsAvg	v2_dSPC	stVal	ST	-	RST_AVGAGING	Mon	Reset average ageing rate calculation
		q	ST	-	RST_AVGAGING	Mon	Quality: Reset average ageing rate calculation
		t	ST	-	RST_AVGAGING	Mon	Timestamp: Reset average ageing rate calculation
HPTmpWrn	v2_dSPS	stVal	ST	-	WARNING	Mon	Warning signal
		q	ST	-	WARNING	Mon	Quality: Warning signal
		t	ST	-	WARNING	Mon	Timestamp: Warning signal
AgeRteAlm	v2_dSPS	stVal	ST	-	ALM_AGE_RATE	Mon	Alarm signal for average ageing rate over set time period
		q	ST	-	ALM_AGE_RATE	Mon	Quality: Alarm signal for average ageing rate over set time period
		t	ST	-	ALM_AGE_RATE	Mon	Timestamp: Alarm signal for average ageing rate over set time period

## 7.10 Logical nodes for switchgear

### 7.10.1 Circuit breaker XCBR

LN type	LN prefix	LN class	Function block name
DAXCBR (revision 0)	DA	XCBR	DAXCBR

Table 189: DAXCBR Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
BlkCls	a_dSPC	Oper.ctlVal	CO	-	-	Cmd	Special block command value
		Oper.origin.orCat	CO	-	-	Cmd	Special block command value
		Oper.origin.orIdent	CO	-	-	Cmd	Special block command value
		Oper.ctlNum	CO	-	-	Cmd	Special block command value
		Oper.T	CO	-	-	Cmd	Special block command value
		Oper.Test	CO	-	-	Cmd	Special block command value
		Oper.Check	CO	-	-	Cmd	Special block command value
		stVal	ST	-	CL_BLKD	Mon	Indication that the function is blocked for close commands
		q	ST	-	CL_BLKD	Mon	Quality: Indication that the function is blocked for close commands
		t	ST	-	CL_BLKD	Mon	Timestamp: Indication that the function is blocked for close commands
BlkOpn	a_dSPC	Oper.ctlVal	CO	-	-	Cmd	Special block command value
		Oper.origin.orCat	CO	-	-	Cmd	Special block command value
		Oper.origin.orIdent	CO	-	-	Cmd	Special block command value
		Oper.ctlNum	CO	-	-	Cmd	Special block command value
		Oper.T	CO	-	-	Cmd	Special block command value
		Oper.Test	CO	-	-	Cmd	Special block command value
		Oper.Check	CO	-	-	Cmd	Special block command value
		stVal	ST	-	OP_BLKD	Mon	Indication that the function is blocked for open commands

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
BlkOpn	a_dSPC	q	ST	-	OP_BLKD	Mon	Quality: Indication that the function is blocked for open commands
		t	ST	-	OP_BLKD	Mon	Timestamp: Indication that the function is blocked for open commands
Loc	a_dSPS	stVal	ST	-	-	Mon	Indication that the function is local mode (process level)
		q	ST	-	-	Mon	Quality: Indication that the function is local mode (process level)
		t	ST	-	-	Mon	Timestamp: Indication that the function is local mode (process level)
OpCnt	b_dINS	stVal	ST	-	CNT_VAL	Mon	The value of the operation counter
		q	ST	-	CNT_VAL	Mon	Quality: The value of the operation counter
		t	ST	-	CNT_VAL	Mon	Timestamp: The value of the operation counter
Pos	c_dDPC	stVal	ST	-	POSITION	Mon	Apparatus position indication
		q	ST	-	POSITION	Mon	Quality: Apparatus position indication
		t	ST	-	POSITION	Mon	Timestamp: Apparatus position indication
		subEna	SV	-	-	-	Substitute enable
		subVal	SV	-	-	-	Substituted double position value
CBOpCap	h_dINS	stVal	ST	-	-	Mon	Breaker operating capability 1 = None, 2 = O, 3 = CO, 4 = OCO, 5 = COCO, 6+ = More
		q	ST	-	-	Mon	Quality: Breaker operating capability 1 = None, 2 = O, 3 = CO, 4 = OCO, 5 = COCO, 6+ = More
		t	ST	-	-	Mon	Timestamp: Breaker operating capability 1 = None, 2 = O, 3 = CO, 4 = OCO, 5 = COCO, 6+ = More
BlkUpd	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Special block command value
		Oper.origin.orCat	CO	-	-	Cmd	Special block command value
		Oper.origin.orldent	CO	-	-	Cmd	Special block command value
		Oper.ctlNum	CO	-	-	Cmd	Special block command value
		Oper.T	CO	-	-	Cmd	Special block command value
		Oper.Test	CO	-	-	Cmd	Special block command value
		Oper.Check	CO	-	-	Cmd	Special block command value
		stVal	ST	-	UPD_BLKD	Mon	The update of position indication is blocked
		q	ST	-	UPD_BLKD	Mon	Quality: The update of position indication is blocked
		t	ST	-	UPD_BLKD	Mon	Timestamp: The update of position indication is blocked

## 7.10.2 Switch XSWI

LN type	LN prefix	LN class	Function block name
DAXSWI (revision 0)	DA	XSWI	DAXSWI

Table 190: DAXSWI Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
BlkCls	a_dSPC	Oper.ctlVal	CO	-	-	Cmd	Special block command value
		Oper.origin.orCat	CO	-	-	Cmd	Special block command value
		Oper.origin.orIdent	CO	-	-	Cmd	Special block command value
		Oper.ctlNum	CO	-	-	Cmd	Special block command value
		Oper.T	CO	-	-	Cmd	Special block command value
		Oper.Test	CO	-	-	Cmd	Special block command value
		Oper.Check	CO	-	-	Cmd	Special block command value
		stVal	ST	-	CL_BLKD	Mon	Indication that the function is blocked for close commands
		q	ST	-	CL_BLKD	Mon	Quality: Indication that the function is blocked for close commands
		t	ST	-	CL_BLKD	Mon	Timestamp: Indication that the function is blocked for close commands
BlkOpn	a_dSPC	Oper.ctlVal	CO	-	-	Cmd	Special block command value
		Oper.origin.orCat	CO	-	-	Cmd	Special block command value
		Oper.origin.orIdent	CO	-	-	Cmd	Special block command value
		Oper.ctlNum	CO	-	-	Cmd	Special block command value

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
BlkOpn	a_dSPC	Oper.T	CO	-	-	Cmd	Special block command value
		Oper.Test	CO	-	-	Cmd	Special block command value
		Oper.Check	CO	-	-	Cmd	Special block command value
		stVal	ST	-	OP_BLKD	Mon	Indication that the function is blocked for open commands
		q	ST	-	OP_BLKD	Mon	Quality: Indication that the function is blocked for open commands
		t	ST	-	OP_BLKD	Mon	Timestamp: Indication that the function is blocked for open commands
Loc	a_dSPS	stVal	ST	-	-	Mon	Indication that the function is local mode (process level)
		q	ST	-	-	Mon	Quality: Indication that the function is local mode (process level)
		t	ST	-	-	Mon	Timestamp: Indication that the function is local mode (process level)
OpCnt	b_dINS	stVal	ST	-	CNT_VAL	Mon	The value of the operation counter
		q	ST	-	CNT_VAL	Mon	Quality: The value of the operation counter
		t	ST	-	CNT_VAL	Mon	Timestamp: The value of the operation counter
Pos	c_dDPC	stVal	ST	-	POSITION	Mon	Apparatus position indication
		q	ST	-	POSITION	Mon	Quality: Apparatus position indication
		t	ST	-	POSITION	Mon	Timestamp: Apparatus position indication
		subEna	SV	-	-	-	Substitute enable
		subVal	SV	-	-	-	Substituted double position value
SwOpCap	f_dINS	stVal	ST	-	-	Mon	Switch operating capability 1 = None, 2 = O, 3 = C, 4 = O & C
		q	ST	-	-	Mon	Quality: Switch operating capability 1 = None, 2 = O, 3 = C, 4 = O & C
		t	ST	-	-	Mon	Timestamp: Switch operating capability 1 = None, 2 = O, 3 = C, 4 = O & C
SwTyp	g_dINS	stVal	ST	-	-	Mon	1=LoadBreak,2=Disconnector,3=EarthSw,4=HighSpeedEarthSw
		q	ST	-	-	Mon	Quality: 1=LoadBreak,2=Disconnector,3=EarthSw,4=HighSpeedEarthSw
		t	ST	-	-	Mon	Timestamp: 1=LoadBreak,2=Disconnector,3=EarthSw,4=HighSpeedEarthSw
BlkUpd	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Special block command value
		Oper.origin.orCat	CO	-	-	Cmd	Special block command value

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
BlkUpd	v1_dSPC	Oper.origin.orlent	CO	-	-	Cmd	Special block command value
		Oper.ctlNum	CO	-	-	Cmd	Special block command value
		Oper.T	CO	-	-	Cmd	Special block command value
		Oper.Test	CO	-	-	Cmd	Special block command value
		Oper.Check	CO	-	-	Cmd	Special block command value
		stVal	ST	-	UPD_BLKD	Mon	The update of position indication is blocked
		q	ST	-	UPD_BLKD	Mon	Quality: The update of position indication is blocked
		t	ST	-	UPD_BLKD	Mon	Timestamp: The update of position indication is blocked

## 7.11 Logical nodes for further power system equipment

### 7.11.1 Battery ZBAT

LN type	LN prefix	LN class	Function block name
SPVNZBAT (revision 0)	SPVN	ZBAT	SPVNZBAT

Table 191: SPVNZBAT Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orlent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
BatHi	a_dSPS	stVal	ST	-	ST_UHIGH	Mon	Start signal when battery voltage exceeds upper limit
		q	ST	-	ST_UHIGH	Mon	Quality: Start signal when battery voltage exceeds upper limit
		t	ST	-	ST_UHIGH	Mon	Timestamp: Start signal when battery voltage exceeds upper limit
BatLo	a_dSPS	stVal	ST	-	ST_ULOW	Mon	Start signal when battery voltage drops below lower limit
		q	ST	-	ST_ULOW	Mon	Quality: Start signal when battery voltage drops below lower limit
		t	ST	-	ST_ULOW	Mon	Timestamp: Start signal when battery voltage drops below lower limit
Vol	b_dMV	mag.f	MX	-	U_BATT	Mon	Service value of the battery terminal voltage
		q	MX	-	U_BATT	Mon	Quality: Service value of the battery terminal voltage
		t	MX	-	U_BATT	Mon	Timestamp: Service value of the battery terminal voltage
OpBatLo	v1_dSPS	stVal	ST	-	AL_ULOW	Mon	Alarm when voltage has been below lower limit for a set time
		q	ST	-	AL_ULOW	Mon	Quality: Alarm when voltage has been below lower limit for a set time
		t	ST	-	AL_ULOW	Mon	Timestamp: Alarm when voltage has been below lower limit for a set time
OpBatHi	v1_dSPS	stVal	ST	-	AL_UHIGH	Mon	Alarm when voltage has exceeded higher limit for a set time
		q	ST	-	AL_UHIGH	Mon	Quality: Alarm when voltage has exceeded higher limit for a set time
		t	ST	-	AL_UHIGH	Mon	Timestamp: Alarm when voltage has exceeded higher limit for a set time

## 7.12 Logical nodes for power quality events

### 7.12.1 Voltage variation QVVR

LN type	LN prefix	LN class	Function block name
PHQVVR instance 1 (revision 0)	PH	QVVR	PHQVVR
QVV1MSTA instance 1 (revision 0)	QVV1	MSTA	PHQVVR
QVVMSTA instance 2 (revision 0)	QVV	MSTA	PHQVVR
QVVMSTA instance 3 (revision 0)	QVV	MSTA	PHQVVR
RSLLN0 instance 1 (revision 0)	-	LLN0	PHQVVR

Table 192: PHQVVR Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
RsCnt	a_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orIdent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	-	Mon	Counter reset signal status
		q	ST	-	-	Mon	Quality: Counter reset signal status
		t	ST	-	-	Mon	Timestamp: Counter reset signal status
DipOpCnt	b_dINS	stVal	ST	-	DIPCNT	Mon	Counter for detected voltage dips
		q	ST	-	DIPCNT	Mon	Quality: Counter for detected voltage dips
		t	ST	-	DIPCNT	Mon	Timestamp: Counter for detected voltage dips
SwlOpCnt	b_dINS	stVal	ST	-	SWELLCNT	Mon	Counter for detected voltage swells
		q	ST	-	SWELLCNT	Mon	Quality: Counter for detected voltage swells
		t	ST	-	SWELLCNT	Mon	Timestamp: Counter for detected voltage swells
IntrOpCnt	b_dINS	stVal	ST	-	INTCNT	Mon	Counter for detected voltage interruptions
		q	ST	-	INTCNT	Mon	Quality: Counter for detected voltage interruptions
		t	ST	-	INTCNT	Mon	Timestamp: Counter for detected voltage interruptions
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
DipStr	d_dSPS	stVal	ST	-	DIPST	Mon	Voltage dip active
		q	ST	-	DIPST	Mon	Quality: Voltage dip active
		t	ST	-	DIPST	Mon	Timestamp: Voltage dip active
SwlStr	d_dSPS	stVal	ST	-	SWELLST	Mon	Voltage swell active
		q	ST	-	SWELLST	Mon	Quality: Voltage swell active
		t	ST	-	SWELLST	Mon	Timestamp: Voltage swell active
IntrStr	d_dSPS	stVal	ST	-	INTST	Mon	Voltage interruption active
		q	ST	-	INTST	Mon	Quality: Voltage interruption active
		t	ST	-	INTST	Mon	Timestamp: Voltage interruption active
DipOp	d_dSPS	stVal	ST	-	DIPOPR	Mon	Voltage dip detected
		q	ST	-	DIPOPR	Mon	Quality: Voltage dip detected
		t	ST	-	DIPOPR	Mon	Timestamp: Voltage dip detected
SwlOp	d_dSPS	stVal	ST	-	SWELLOPR	Mon	Voltage swell detected
		q	ST	-	SWELLOPR	Mon	Quality: Voltage swell detected
		t	ST	-	SWELLOPR	Mon	Timestamp: Voltage swell detected
IntrOp	d_dSPS	stVal	ST	-	INTOPR	Mon	Voltage interruption detected
		q	ST	-	INTOPR	Mon	Quality: Voltage interruption detected
		t	ST	-	INTOPR	Mon	Timestamp: Voltage interruption detected
DipSwlOp	d_dSPS	stVal	ST	-	DIPSWELLOPR	Mon	Concurrent voltage dip and voltage swell detected
		q	ST	-	DIPSWELLOPR	Mon	Quality: Concurrent voltage dip and voltage swell detected
		t	ST	-	DIPSWELLOPR	Mon	Timestamp: Concurrent voltage dip and voltage swell detected
VarStr1	d_dSPS	stVal	ST	-	ST_A	Mon	Voltage variation present on phase A
		q	ST	-	ST_A	Mon	Quality: Voltage variation present on phase A
		t	ST	-	ST_A	Mon	Timestamp: Voltage variation present on phase A
VarStr2	d_dSPS	stVal	ST	-	ST_B	Mon	Voltage variation present on phase B
		q	ST	-	ST_B	Mon	Quality: Voltage variation present on phase B
		t	ST	-	ST_B	Mon	Timestamp: Voltage variation present on phase B
VarStr3	d_dSPS	stVal	ST	-	ST_C	Mon	Voltage variation present on phase C
		q	ST	-	ST_C	Mon	Quality: Voltage variation present on phase C
		t	ST	-	ST_C	Mon	Timestamp: Voltage variation present on phase C

**Table 193:** *PHQVVR Logical node data (instance 1)*

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
VVaTm1	v2_dMV	mag.f	MX	-	1 Varn Dur PhA	Mon	Record data of bank 1 for phase A variation duration
		q	MX	-	1 Varn Dur PhA	Mon	Quality: Record data of bank 1 for phase A variation duration
		t	MX	-	1 Varn Dur PhA	Mon	Timestamp: Record data of bank 1 for phase A variation duration
VVaTm2	v2_dMV	mag.f	MX	-	1 Varn Dur PhB	Mon	Record data of bank 1 for phase B variation duration
		q	MX	-	1 Varn Dur PhB	Mon	Quality: Record data of bank 1 for phase B variation duration
		t	MX	-	1 Varn Dur PhB	Mon	Timestamp: Record data of bank 1 for phase B variation duration
VVaTm3	v2_dMV	mag.f	MX	-	1 Varn Dur PhC	Mon	Record data of bank 1 for phase C variation duration
		q	MX	-	1 Varn Dur PhC	Mon	Quality: Record data of bank 1 for phase C variation duration
		t	MX	-	1 Varn Dur PhC	Mon	Timestamp: Record data of bank 1 for phase C variation duration
VVa1	v2_dMV	mag.f	MX	-	1 Varn V PhA	Mon	Record data of bank 1 for phase A voltage magnitude
		q	MX	-	1 Varn V PhA	Mon	Quality: Record data of bank 1 for phase A voltage magnitude
		t	MX	-	1 Varn V PhA	Mon	Timestamp: Record data of bank 1 for phase A voltage magnitude
VVa2	v2_dMV	mag.f	MX	-	1 Varn V PhB	Mon	Record data of bank 1 for phase B voltage magnitude
		q	MX	-	1 Varn V PhB	Mon	Quality: Record data of bank 1 for phase B voltage magnitude
		t	MX	-	1 Varn V PhB	Mon	Timestamp: Record data of bank 1 for phase B voltage magnitude
VVa3	v2_dMV	mag.f	MX	-	1 Varn V PhC	Mon	Record data of bank 1 for phase C voltage magnitude
		q	MX	-	1 Varn V PhC	Mon	Quality: Record data of bank 1 for phase C voltage magnitude
		t	MX	-	1 Varn V PhC	Mon	Timestamp: Record data of bank 1 for phase C voltage magnitude

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
AMagPhA	v2_dMV	mag.f	MX	-	1 Varn A PhA	Mon	Record data of bank 1 for phase A current magnitude
		q	MX	-	1 Varn A PhA	Mon	Quality: Record data of bank 1 for phase A current magnitude
		t	MX	-	1 Varn A PhA	Mon	Timestamp: Record data of bank 1 for phase A current magnitude
AMagPhB	v2_dMV	mag.f	MX	-	1 Varn A PhB	Mon	Record data of bank 1 for phase B current magnitude
		q	MX	-	1 Varn A PhB	Mon	Quality: Record data of bank 1 for phase B current magnitude
		t	MX	-	1 Varn A PhB	Mon	Timestamp: Record data of bank 1 for phase B current magnitude
AMagPhC	v2_dMV	mag.f	MX	-	1 Varn A PhC	Mon	Record data of bank 1 for phase C current magnitude
		q	MX	-	1 Varn A PhC	Mon	Quality: Record data of bank 1 for phase C current magnitude
		t	MX	-	1 Varn A PhC	Mon	Timestamp: Record data of bank 1 for phase C current magnitude
VVaTyp	v7_dINS	stVal	ST	-	1 Variation type	Mon	Record data of bank 1 for variation type
		q	ST	-	1 Variation type	Mon	Quality: Record data of bank 1 for variation type
		t	ST	-	1 Variation type	Mon	Timestamp: Record data of bank 1 for variation type

Table 194: PHQVVR Logical node data (instance 2)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
VVaTm1	v2_dMV	mag.f	MX	-	2 Varn Dur PhA	Mon	Record data of bank 2 for phase A variation duration
		q	MX	-	2 Varn Dur PhA	Mon	Quality: Record data of bank 2 for phase A variation duration
		t	MX	-	2 Varn Dur PhA	Mon	Timestamp: Record data of bank 2 for phase A variation duration
VVaTm2	v2_dMV	mag.f	MX	-	2 Varn Dur PhB	Mon	Record data of bank 2 for phase B variation duration

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
VVaTm2	v2_dMV	q	MX	-	2 Varn Dur PhB	Mon	Quality: Record data of bank 2 for phase B variation duration
		t	MX	-	2 Varn Dur PhB	Mon	Timestamp: Record data of bank 2 for phase B variation duration
VVaTm3	v2_dMV	mag.f	MX	-	2 Varn Dur PhC	Mon	Record data of bank 2 for phase C variation duration
		q	MX	-	2 Varn Dur PhC	Mon	Quality: Record data of bank 2 for phase C variation duration
		t	MX	-	2 Varn Dur PhC	Mon	Timestamp: Record data of bank 2 for phase C variation duration
VVa1	v2_dMV	mag.f	MX	-	2 Varn V PhA	Mon	Record data of bank 2 for phase A voltage magnitude
		q	MX	-	2 Varn V PhA	Mon	Quality: Record data of bank 2 for phase A voltage magnitude
		t	MX	-	2 Varn V PhA	Mon	Timestamp: Record data of bank 2 for phase A voltage magnitude
VVa2	v2_dMV	mag.f	MX	-	2 Varn V PhB	Mon	Record data of bank 2 for phase B voltage magnitude
		q	MX	-	2 Varn V PhB	Mon	Quality: Record data of bank 2 for phase B voltage magnitude
		t	MX	-	2 Varn V PhB	Mon	Timestamp: Record data of bank 2 for phase B voltage magnitude
VVa3	v2_dMV	mag.f	MX	-	2 Varn V PhC	Mon	Record data of bank 2 for phase C voltage magnitude
		q	MX	-	2 Varn V PhC	Mon	Quality: Record data of bank 2 for phase C voltage magnitude
		t	MX	-	2 Varn V PhC	Mon	Timestamp: Record data of bank 2 for phase C voltage magnitude
AMagPhA	v2_dMV	mag.f	MX	-	2 Varn A PhA	Mon	Record data of bank 2 for phase A current magnitude
		q	MX	-	2 Varn A PhA	Mon	Quality: Record data of bank 2 for phase A current magnitude
		t	MX	-	2 Varn A PhA	Mon	Timestamp: Record data of bank 2 for phase A current magnitude
AMagPhB	v2_dMV	mag.f	MX	-	2 Varn A PhB	Mon	Record data of bank 2 for phase B current magnitude
		q	MX	-	2 Varn A PhB	Mon	Quality: Record data of bank 2 for phase B current magnitude
		t	MX	-	2 Varn A PhB	Mon	Timestamp: Record data of bank 2 for phase B current magnitude
AMagPhC	v2_dMV	mag.f	MX	-	2 Varn A PhC	Mon	Record data of bank 2 for phase C current magnitude
		q	MX	-	2 Varn A PhC	Mon	Quality: Record data of bank 2 for phase C current magnitude
		t	MX	-	2 Varn A PhC	Mon	Timestamp: Record data of bank 2 for phase C current magnitude

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
VVaTyp	v7_dINS	stVal	ST	-	2 Variation type	Mon	Record data of bank 2 for variation type
		q	ST	-	2 Variation type	Mon	Quality: Record data of bank 2 for variation type
		t	ST	-	2 Variation type	Mon	Timestamp: Record data of bank 2 for variation type

Table 195: PHQVVR Logical node data (instance 3)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
VVaTm1	v2_dMV	mag.f	MX	-	3 Varn Dur PhA	Mon	Record data of bank 3 for phase A variation duration
		q	MX	-	3 Varn Dur PhA	Mon	Quality: Record data of bank 3 for phase A variation duration
		t	MX	-	3 Varn Dur PhA	Mon	Timestamp: Record data of bank 3 for phase A variation duration
VVaTm2	v2_dMV	mag.f	MX	-	3 Varn Dur PhB	Mon	Record data of bank 3 for phase B variation duration
		q	MX	-	3 Varn Dur PhB	Mon	Quality: Record data of bank 3 for phase B variation duration
		t	MX	-	3 Varn Dur PhB	Mon	Timestamp: Record data of bank 3 for phase B variation duration
VVaTm3	v2_dMV	mag.f	MX	-	3 Varn Dur PhC	Mon	Record data of bank 3 for phase C variation duration
		q	MX	-	3 Varn Dur PhC	Mon	Quality: Record data of bank 3 for phase C variation duration
		t	MX	-	3 Varn Dur PhC	Mon	Timestamp: Record data of bank 3 for phase C variation duration
VVa1	v2_dMV	mag.f	MX	-	3 Varn V PhA	Mon	Record data of bank 3 for phase A voltage magnitude
		q	MX	-	3 Varn V PhA	Mon	Quality: Record data of bank 3 for phase A voltage magnitude
		t	MX	-	3 Varn V PhA	Mon	Timestamp: Record data of bank 3 for phase A voltage magnitude
VVa2	v2_dMV	mag.f	MX	-	3 Varn V PhB	Mon	Record data of bank 3 for phase B voltage magnitude

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
VVa2	v2_dMV	q	MX	-	3 Varn V PhB	Mon	Quality: Record data of bank 3 for phase B voltage magnitude
		t	MX	-	3 Varn V PhB	Mon	Timestamp: Record data of bank 3 for phase B voltage magnitude
VVa3	v2_dMV	mag.f	MX	-	3 Varn V PhC	Mon	Record data of bank 3 for phase C voltage magnitude
		q	MX	-	3 Varn V PhC	Mon	Quality: Record data of bank 3 for phase C voltage magnitude
		t	MX	-	3 Varn V PhC	Mon	Timestamp: Record data of bank 3 for phase C voltage magnitude
AMagPhA	v2_dMV	mag.f	MX	-	3 Varn A PhA	Mon	Record data of bank 3 for phase A current magnitude
		q	MX	-	3 Varn A PhA	Mon	Quality: Record data of bank 3 for phase A current magnitude
		t	MX	-	3 Varn A PhA	Mon	Timestamp: Record data of bank 3 for phase A current magnitude
AMagPhB	v2_dMV	mag.f	MX	-	3 Varn A PhB	Mon	Record data of bank 3 for phase B current magnitude
		q	MX	-	3 Varn A PhB	Mon	Quality: Record data of bank 3 for phase B current magnitude
		t	MX	-	3 Varn A PhB	Mon	Timestamp: Record data of bank 3 for phase B current magnitude
AMagPhC	v2_dMV	mag.f	MX	-	3 Varn A PhC	Mon	Record data of bank 3 for phase C current magnitude
		q	MX	-	3 Varn A PhC	Mon	Quality: Record data of bank 3 for phase C current magnitude
		t	MX	-	3 Varn A PhC	Mon	Timestamp: Record data of bank 3 for phase C current magnitude
VVaTyp	v7_dINS	stVal	ST	-	3 Variation type	Mon	Record data of bank 3 for variation type
		q	ST	-	3 Variation type	Mon	Quality: Record data of bank 3 for variation type
		t	ST	-	3 Variation type	Mon	Timestamp: Record data of bank 3 for variation type

Table 196: PHQVVR Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Mod	a_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Rs	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	-	Mon	Status of register reset signal
		q	ST	-	-	Mon	Quality: Status of register reset signal
		t	ST	-	-	Mon	Timestamp: Status of register reset signal

#### 7.12.2

#### Voltage unbalance variation QVUB

LN type	LN prefix	LN class	Function block name
QVU1MSTA instance 1 (revision 0)	QVU1	MSTA	VSQVUB
QVUMSTA instance 2 (revision 0)	QVU	MSTA	VSQVUB
QVUMSTA instance 3 (revision 0)	QVU	MSTA	VSQVUB
RSLLN0 instance 1 (revision 0)	-	LLN0	VSQVUB
VSQVUB instance 1 (revision 0)	VS	QVUB	VSQVUB

**Table 197:** VSQVUB Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
HiMnlmbVal	v2_dMV	mag.f	MX	-	1 AL_UNB_VAL	Mon	Record data of bank1 for maximum 3 sec voltage unbalance
		q	MX	-	1 AL_UNB_VAL	Mon	Quality: Record data of bank1 for maximum 3 sec voltage unbalance
		t	MX	-	1 AL_UNB_VAL	Mon	Timestamp: Record data of bank1 for maximum 3 sec voltage unbalance

**Table 198:** VSQVUB Logical node data (instance 2)

DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
HiMnlmbVal	v2_dMV	mag.f	MX	-	2 AL_UNB_VAL	Mon	Record data of bank2 for maximum 3 sec voltage unbalance
		q	MX	-	2 AL_UNB_VAL	Mon	Quality: Record data of bank2 for maximum 3 sec voltage unbalance
		t	MX	-	2 AL_UNB_VAL	Mon	Timestamp: Record data of bank2 for maximum 3 sec voltage unbalance

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### Logical node data model

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**Table 199:** VSQVUB Logical node data (instance 3)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
HiMnImbVal	v2_dMV	mag.f	MX	-	3 AL_UNB_VAL	Mon	Record data of bank3 for maximum 3 sec voltage unbalance
		q	MX	-	3 AL_UNB_VAL	Mon	Quality: Record data of bank3 for maximum 3 sec voltage unbalance
		t	MX	-	3 AL_UNB_VAL	Mon	Timestamp: Record data of bank3 for maximum 3 sec voltage unbalance

**Table 200:** VSQVUB Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orldent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Rs	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Rs	v1_dSPC	Oper.origin.orldent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	-	Mon	Reset status for IEC61850 mapping
		q	ST	-	-	Mon	Quality: Reset status for IEC61850 mapping
		t	ST	-	-	Mon	Timestamp: Reset status for IEC61850 mapping

**Table 201:** VSQVUB Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Quality: Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Timestamp: Behaviour parameter for 61850
Vlmb3sMn	b_dMV	mag.f	MX	-	3S_MN_UNB	Mon	Sliding 3 second mean value of voltage unbalance
		q	MX	-	3S_MN_UNB	Mon	Quality: Sliding 3 second mean value of voltage unbalance
		t	MX	-	3S_MN_UNB	Mon	Timestamp: Sliding 3 second mean value of voltage unbalance
Vlmb10mMn	b_dMV	mag.f	MX	-	10MIN_MN_UNB	Mon	Sliding 10 minutes mean value of voltage unbalance
		q	MX	-	10MIN_MN_UNB	Mon	Quality: Sliding 10 minutes mean value of voltage unbalance
		t	MX	-	10MIN_MN_UNB	Mon	Timestamp: Sliding 10 minutes mean value of voltage unbalance
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Quality: Mode status value parameter for 61850
		t	ST	-	-	Mon	Timestamp: Mode status value parameter for 61850
Str	d_dACD	general	ST	-	MN_UNB_AL	Mon	Alarm active when 3 sec voltage unbalance exceeds the limit

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### Logical node data model

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DO name	DO type	DA name	FC	T	Signal	Mon/C md	Description
Str	d_dACD	q	ST	-	MN_UNB_AL	Mon	Quality: Alarm active when 3 sec voltage unbalance exceeds the limit
		t	ST	-	MN_UNB_AL	Mon	Timestamp: Alarm active when 3 sec voltage unbalance exceeds the limit
HiMnImbVal	v2_dMV	mag.f	MX	-	AL_UNB_VAL	Mon	Maximum 3 sec sliding mean voltage unbalance measured
		q	MX	-	AL_UNB_VAL	Mon	Quality: Maximum 3 sec sliding mean voltage unbalance measured
		t	MX	-	AL_UNB_VAL	Mon	Timestamp: Maximum 3 sec sliding mean voltage unbalance measured

## Section 8      Glossary

<b>ACSI</b>	Abstract communication service interface
<b>Beh</b>	Behavior
<b>BRCB</b>	Report control block
<b>CID</b>	Configured IED description
<b>DA</b>	Data attribute
<b>Data attribute</b>	Defines the name, format, range of possible values and representation of values while being communicated
<b>Data object</b>	Also known as DO. Part of a logical node object representing specific information, for example status or measurement. From an object-oriented point of view, a data object is an instance of a class data object. DOs are normally used as transaction objects; that is, they are data structures.
<b>Data set</b>	The content basis for reporting and logging containing references to the data and data attribute values
<b>DO</b>	Data object
<b>DTT</b>	Data type template section in SCL
<b>EMC</b>	Electromagnetic compatibility
<b>Ethernet</b>	A standard for connecting a family of frame-based computer networking technologies into a LAN
<b>FC</b>	Functional constraint
<b>FCDA</b>	Functional constraint data attribute
<b>GI</b>	General interrogation
<b>GoCB</b>	GOOSE control block
<b>GOOSE</b>	Generic Object-Oriented Substation Event
<b>GSE</b>	Generic substation event
<b>HMI</b>	Human-machine interface
<b>ICD</b>	IED capability description
<b>IEC</b>	International Electrotechnical Commission
<b>IEC 61850</b>	International standard for substation communication and modeling
<b>IEC 61850-8-1</b>	A communication protocol based on the IEC 61850 standard series
<b>IED</b>	Intelligent electronic device

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<b>IET600</b>	Integrated Engineering Toolbox
<b>ISO</b>	International Standard Organization
<b>LD</b>	Logical device
<b>LD0</b>	Logical device zero (0)
<b>LHMI</b>	Local human-machine interface
<b>LLN0</b>	Logical node zero (0)
<b>LN</b>	Logical node
<b>Logical device</b>	Also known as LD. Representation of a group of functions. Each function is defined as a logical node. A physical device has one or several LDs.
<b>Logical node</b>	Also known as LN. The smallest part of a function that exchanges data. An LN is an object defined by its data and methods.
<b>MICS</b>	Model implementation conformance statement
<b>MMS</b>	1. Manufacturing message specification 2. Metering management system
<b>NCC</b>	Network control center
<b>PCM600</b>	Protection and Control IED Manager
<b>PICS</b>	Protocol implementation conformance statement
<b>PIXIT</b>	Protocol implementation extra information for testing
<b>PST</b>	Parameter Setting tool in PCM600
<b>SBO</b>	Select-before-operate
<b>SCD</b>	Substation configuration description
<b>SCL</b>	XML-based substation description configuration language defined by IEC 61850
<b>SMT</b>	Signal Matrix tool in PCM600
<b>SNTP</b>	Simple Network Time Protocol
<b>ST</b>	Connector type for glass fiber cable
<b>stVal</b>	Status value
<b>TCP/IP</b>	Transmission Control Protocol/Internet Protocol
<b>WHMI</b>	Web human-machine interface
<b>XML</b>	Extensible markup language







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