



Relion® Protection and control

650 series IEC 61850 Communication Protocol Manual



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This product is designed and produced for industrial use.

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Section 1 Introduction

1.1 This manual

The communication protocol manual describes a communication protocol supported by the IED. 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 for communication setup in a substation from an IED 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

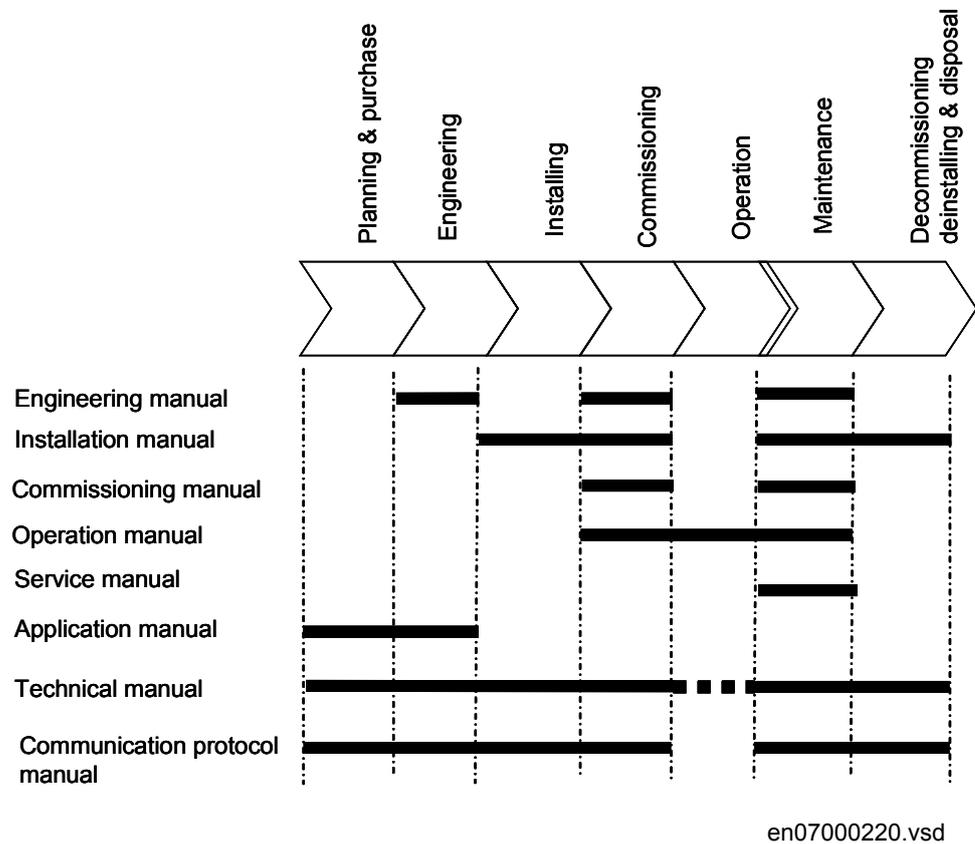


Figure 1: The intended use of manuals in different lifecycles

The engineering manual contains instructions on how to engineer the IEDs using the different tools in PCM600. The manual provides instructions on how to set up a PCM600 project and insert IEDs to the project structure. The manual also recommends a sequence for engineering of protection and control functions, LHMI functions as well as communication engineering for IEC 61850 and DNP3.

The installation manual contains instructions on how to install the IED. The manual provides procedures for mechanical and electrical installation. The chapters are organized in chronological order in which the IED should be installed.

The commissioning manual contains instructions on how to commission the IED. The manual can also be used by system engineers and maintenance personnel for assistance during the testing phase. The manual provides procedures for checking of external circuitry and energizing the IED, parameter setting and configuration as well as verifying settings by secondary injection. The manual describes the process

of testing an IED in a substation which is not in service. The chapters are organized in chronological order in which the IED should be commissioned.

The operation manual contains instructions on how to operate the IED once it has been commissioned. The manual provides instructions for monitoring, controlling and setting the IED. The manual also describes how to identify disturbances and how to view calculated and measured power grid data to determine the cause of a fault.

The service manual contains instructions on how to service and maintain the IED. The manual also provides procedures for de-energizing, de-commissioning and disposal of the IED.

The application manual contains application descriptions and setting guidelines sorted per function. The manual can be used to find out when and for what purpose a typical protection function can be used. The manual can also be used when calculating settings.

The technical manual contains application and functionality descriptions and lists function blocks, logic diagrams, input and output signals, setting parameters and technical data sorted per function. The manual can be used as a technical reference during the engineering phase, installation and commissioning phase, and during normal service.

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

The point list manual describes the outlook and properties of the data points specific to the IED. The manual should be used in conjunction with the corresponding communication protocol manual.



The service manual is not available yet.

1.3.2

Document revision history

Document revision/date	Product series version	History
-/September 2009	1.0	First release

1.3.3

Related documents

Documents related to REC650	Identity number
Commissioning manual	1MRK 511 209-UEN
Technical manual	1MRK 511 204-UEN
Application manual	1MRK 511 203-UEN

Table continues on next page

Documents related to REC650	Identity number
Product Guide, configured	1MRK 511 211-BEN
Type test certificate	1MRK 511 211-TEN

Documents related to REL650	Identity number
Commissioning manual	1MRK 506 307-UEN
Technical manual	1MRK 506 304-UEN
Application manual	1MRK 506 305-UEN
Product Guide, configured	1MRK 506 308-BEN
Type test certificate	1MRK 506 308-TEN

Documents related to RET650	Identity number
Commissioning manual	1MRK 504 109-UEN
Technical manual	1MRK 504 106-UEN
Application manual	1MRK 504 107-UEN
Product Guide, configured	1MRK 504 110-BEN
Type test certificate	1MRK 504 110-TEN

650 series manuals	Identity number
Operation manual	1MRK 500 088-UEN
Communication protocol manual, DNP3	1MRK 511 224-UEN
Communication protocol manual, IEC 61850	1MRK 511 205-UEN
Engineering manual	1MRK 511 206-UEN
Installation manual	1MRK 514 013-UEN
Point list manual, DNP3	1MRK 511 225-UEN

1.4 Symbols and conventions

1.4.1 Safety indication 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 to 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 should be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process performance leading to personal injury or death. Therefore, comply fully with all warning and caution notices.

1.4.2 Manual conventions

Conventions used in IED manuals. A particular convention may not be used in this manual.

- Abbreviations and acronyms in this manual are spelled out in Glossary. Glossary also contains definitions of important terms.
- Push button navigation in the LHMI menu structure is presented by using the push button icons, for example:
To navigate between the options, use  and .
- HMI menu paths are presented in bold, for example:
Select **Main menu/Settings**.
- LHMI messages are shown in Courier font, for example:
To save the changes in non-volatile memory, select Yes and press .
- Parameter names are shown in italics, for example:
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 included in 650 series IEDs

Table 1: *Main protection functions*

IEC 61850	ANSI	Function description
Differential protection		
T2WPDIF	87T	Transformer differential protection, two winding
T3WPDIF	87T	Transformer differential protection, three winding
REFPDIF	87N	Restricted earth fault protection, low impedance
Impedance protection		
ZQDPDIS	21	Five zone distance protection, quadrilateral characteristic
FDPSPDIS	21	Phase selection with load encroachment, quadrilateral characteristic

Table continues on next page

IEC 61850	ANSI	Function description
ZMOPDIS	21	Five zone distance protection, mho characteristic
FMPSPDIS	21	Faulty phase identification with load encroachment for mho
ZDNRDIR	21	Directional impedance quadrilateral and mho
PPLPHIZ		Phase preference logic
ZMRPSB	68	Power swing detection
ZCVPSOF		Automatic switch onto fault logic, voltage and current based

Table 2: Back-up protection functions

IEC 61850	ANSI	Function description
Current protection		
PHPIOC	50	Instantaneous phase overcurrent protection
OC4PTOC	51/67	Four step directional phase overcurrent protection
EFPIOC	50N	Instantaneous residual overcurrent protection
EF4PTOC	51N/67N	Four step directional residual overcurrent protection
SDEPSDE	67N	Sensitive directional residual overcurrent and power protection
UC2PTUC	37	Time delayed 2-step undercurrent protection
LPTTR	26	Thermal overload protection, one time constant
TRPTTR	49	Thermal overload protection, two time constants
CCRBRF	50BF	Breaker failure protection
STBPTOC	50STB	Stub protection
CCRPLD	52PD	Pole discordance protection
BRCPTOC	46	Broken conductor check
GUPPDUP	37	Directional underpower protection
GOPPDOP	32	Directional overpower protection
DNSPTOC	46	Negative sequence based overcurrent function
Voltage protection		
UV2PTUV	27	Two step undervoltage protection
OV2PTOV	59	Two step overvoltage protection
ROV2PTOV	59N	Two step residual overvoltage protection
OEXPVPH	24	Overexcitation protection
LOVPTUV	27	Loss of voltage check
Frequency protection		
SAPTUF	81	Underfrequency function
SAPTOF	81	Overfrequency function
SAPFRC	81	Rate-of-change frequency protection

Table 3: *Control and monitoring functions*

IEC 61850	ANSI	Function description
Control		
SESRSYN	25	Synchrocheck, energizing check, and synchronizing
SMBRREC	79	Autorecloser
SCILO	3	Logical node for interlocking
BB_ES	3	Interlocking for busbar earthing switch
A1A2_BS	3	Interlocking for bus-section breaker
A1A2_DC	3	Interlocking for bus-section disconnecter
ABC_BC	3	Interlocking for bus-coupler bay
BH_CONN	3	Interlocking for 1 1/2 breaker diameter
BH_LINE_A	3	Interlocking for 1 1/2 breaker diameter
BH_LINE_B	3	Interlocking for 1 1/2 breaker diameter
DB_BUS_A	3	Interlocking for double CB bay
DB_BUS_B	3	Interlocking for double CB bay
DB_LINE	3	Interlocking for double CB bay
ABC_LINE	3	Interlocking for line bay
AB_TRAFO	3	Interlocking for transformer bay
SCSWI		Switch controller
SXCBR		Circuit breaker
SXSWI		Circuit switch
POS_EVAL		Evaluation of position indication
SELGGIO		Select release
QCBAY		Bay control
LOCREM		Handling of LR-switch positions
LOCREMCTRL		LHMI control of PSTO
TR1ATCC	90	Automatic voltage control for tapchanger, single control
TR8ATCC	90	Automatic voltage control for tapchanger, parallel control
TCMYLTC	84	Tap changer control and supervision, 6 binary inputs
SLGGIO		Logic Rotating Switch for function selection and LHMI presentation
VSGGIO		Selector mini switch extension
DPGGIO		IEC61850 generic communication I/O functions double point
SPC8GGIO		Single point generic control 8 signals
AUTOBITS		AutomationBits, command function for DNP3.0
Secondary system supervision		
CCSRDIF	87	Current circuit supervision
SDDRFUF		Fuse failure supervision
TCSSCBR		Breaker close/trip circuit monitoring
Logic		
SMPPTRC	94	Tripping logic
Table continues on next page		

IEC 61850	ANSI	Function description
TMAGGIO		Trip matrix logic
OR		Configurable logic blocks, OR
INVERTER		Configurable logic blocks, Inverter
PULSETIMER		Configurable logic blocks, PULSETIMER
GATE		Configurable logic blocks, Controllable gate
XOR		Configurable logic blocks, exclusive OR
LOOPDELAY		Configurable logic blocks, loop delay
TimeSet		Configurable logic blocks, timer
AND		Configurable logic blocks, AND
SRMEMORY		Configurable logic blocks, set-reset memory
RSMEMORY		Configurable logic blocks, reset-set memory
ANDQT		Configurable logic Q/T, ANDQT
ORQT		Configurable logic Q/T, ORQT
INVERTERQT		Configurable logic Q/T, INVERTERQT
XORQT		Configurable logic Q/T, XORQT
SRMEMORYQT		Configurable logic Q/T, set-reset with memory
RSMEMORYQT		Configurable logic Q/T, reset-set with memory
TIMERSETQT		Configurable logic Q/T, settable timer
PULSETIMERQT		Configurable logic Q/T, pulse timer
INVALIDQT		Configurable logic Q/T, INVALIDQT
INDCOMBSPQT		Configurable logic Q/T, single indication signal combining
INDEXTSPQT		Configurable logic Q/T, single indication signal extractor
FSDSIGN		Fixed signal function block
B16I		Boolean 16 to Integer conversion
B16IFCVI		Boolean 16 to integer conversion with logic node representation
IB16A		Integer to Boolean 16 conversion
IB16FCVB		Integer to boolean 16 conversion with logic node representation
Monitoring		
CVMMXN		Measurements
CMMXU		Phase current measurement
VMMXU		Phase-phase voltage measurement
CMSQI		Current sequence component measurement
VMSQI		Voltage sequence measurement
VNMMXU		Phase-neutral voltage measurement
CNTGGIO		Event counter
DRPRDRE		Disturbance report
AxRADR		Analog input signals
BxRBDR		Binary input signals
SPGGIO		IEC61850 generic communication I/O functions
Table continues on next page		

IEC 61850	ANSI	Function description
SP16GGIO		IEC61850 generic communication I/O functions 16 inputs
MVGGIO		IEC61850 generic communication I/O functions
MVEXP		Measured value expander block
LMBRFLO		Fault locator
SPVNZBAT		Station battery supervision
SSIMG	63	Insulation gas monitoring function
SSIML	71	Insulation liquid monitoring function
SSCBR		Circuit breaker condition monitoring
Metering		
PCGGIO		Pulse counter logic
ETPMTR		Function for energy calculation and demand handling

Table 4: *Designed to communicate*

IEC 61850	ANSI	Function description
Station communication		
		IEC61850 communication protocol
		DNP3.0 for TCP/IP communication protocol
GOOSEINTLK RCV		Horizontal communication via GOOSE for interlocking
GOOSEBINR CV		GOOSE binary receive
Scheme communication		
ZCPSCH	85	Scheme communication logic for distance or overcurrent protection
ZCRWPSCH	85	Current reversal and weak-end infeed logic for distance protection
ZCLCPLAL		Local acceleration logic
ECPSCH	85	Scheme communication logic for residual overcurrent protection
ECRWPSCH	85	Current reversal and weak-end infeed logic for residual overcurrent protection

Table 5: *Basic IED functions*

IEC 61850	Function description
Basic functions included in all products	
INTERRSIG	Self supervision with internal event list
	Time synchronization
SETGRP	Setting group handling
ACTVGRP	Parameter setting groups
TESTMODE	Test mode functionality
CHNGLCK	Change lock function
ATHSTAT	Authority status
ATHCHCK	Authority check

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 which needs 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 it is applied in the products of the 650 series IEDs. References and brief descriptions of the IEC 61850 standard are also included. It is assumed that the reader have 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 Communication Architecture forum. The Tissues handling is found in <http://www.tissue.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 650 series.

The communication profile in IEC 61850 uses the MMSstandard, 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 actual used logical node as an 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.

Beside the information about the configuration of the communication facilities, this manual contains the full description of all logical nodes available in the 650 series IED. The information about the logical nodes and their data objects may be used to identify which signals are available for the function 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, as seen in PCM600 and in LHMI.

2.1.1

Related documentation to IEC 61850

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

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 IED 650 series: 1MRK117-421 2009-05-15	IED 650 series 1.0 - IEC 61850 MICS: Modelling Implementation Conformance Statement
IEC 61850 PICS IED 650 series: 1MRK117-422 2009-02-22	IED 650series 1.0 - IEC 61850 PICS: Protocol Implementation Conformance Statement
IEC 61850 PIXIT IED 650 series: 1MRK117-423 2009-05-15	IED 650 series, 1.0 - IEC 61850 PIXIT: Protocol Implementation Extra Information
IEC 61850 TICS IED 650 series: 1MRK117-488 2009-02-30	IED 650 series, 1.0 – IEC 61850 TICS Tissue Implementation Conformance Statement

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 CCT600 tasks. The IED needs to be configured with PCM600 before the system is configured with CCT600.

The IED section contains the logical node types included in the respective IED configuration and the data sets and the control blocks configured by CCT600. The data sets and the control blocks are logically defined as part of the logical nodes (see IEC 61850–7–2 clause 9). CCT600 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.

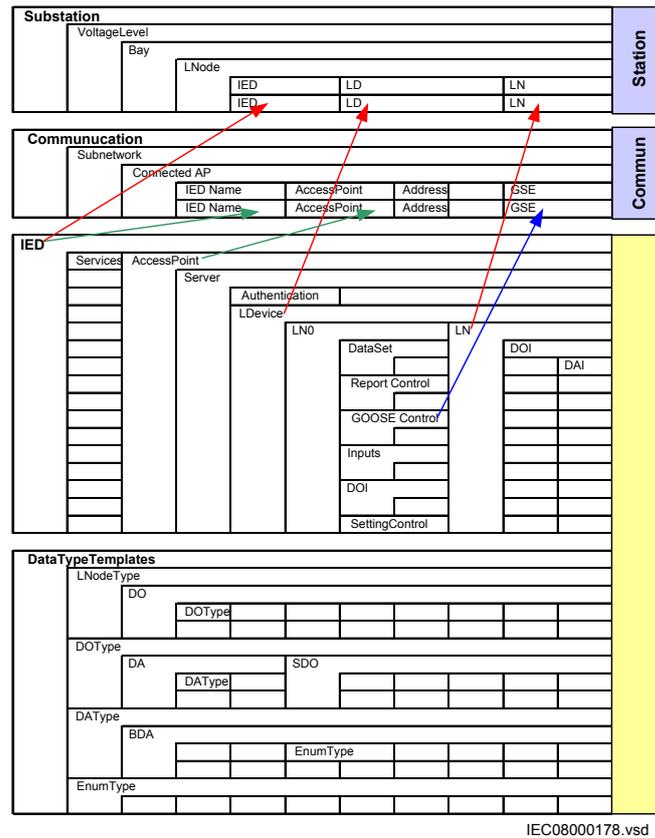


Figure 2: IEC 61850: Principle structure of the SCL XML file

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 SC 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)

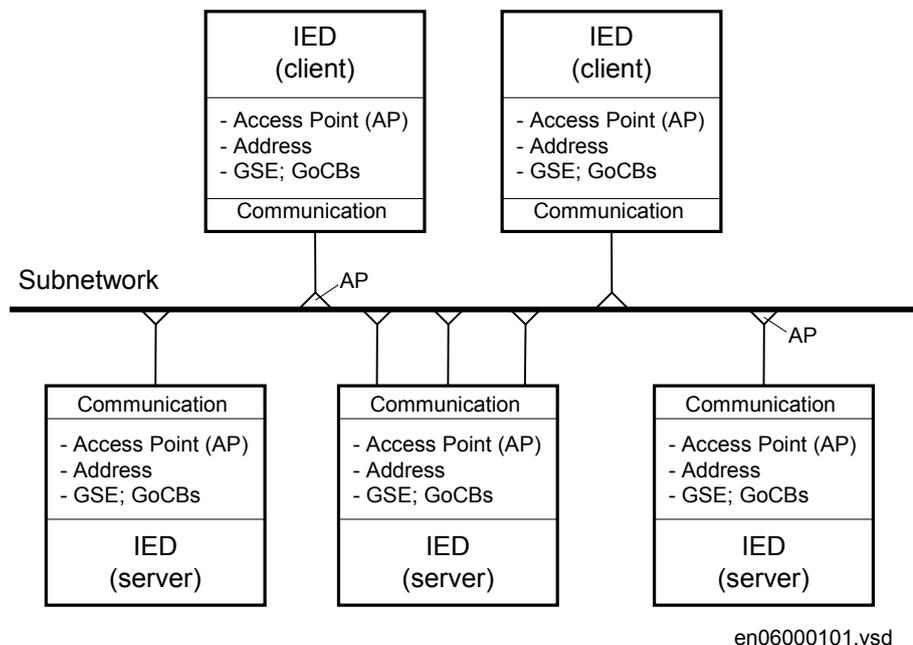


Figure 3: IEC 61850–6: Communication network

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 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.

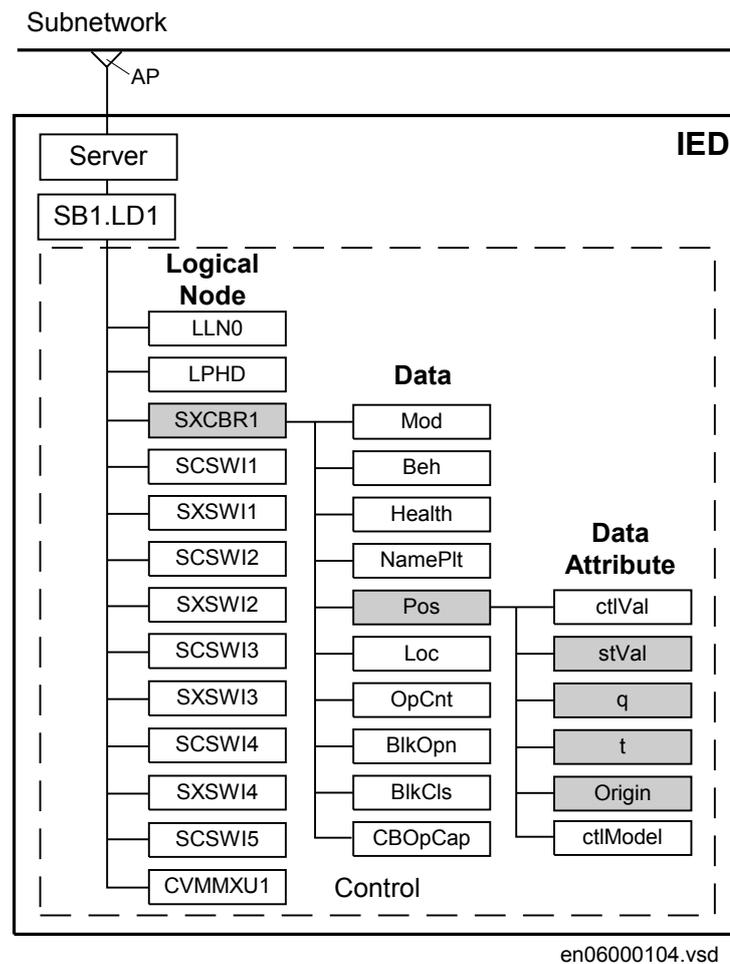


Figure 4: Organization of LDs, LNs, DOs and DAs in an IED

- 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 IED 650 series, 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 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 IED tool, and CCT600 is defined as system 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. The 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.

Do 61850 engineering with PCM600 and CCT600.

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 is also created in the communication section.
- The functionality of the IED is configured by using ACT in PCM600. For each function, the corresponding logical device and logical node(s) is created in the IED section together with its type definition in data type template section
- The above forms the IED capabilities from a communication perspective and will then be included in the file exported from PCM600 as SCD, ICD or CID file

(For top down engineering approach, the steps are included in the CID file of a pre-configured IED)

CCT600:

-
- Open a SCD file or import/merge a SCD, ICD or CID file for the particular IED(s).
 - For each IED, the user defines the datasets, the control blocks for reporting (this means unbuffered/buffered reporting and GOOSE) and the properties for each report control block.
 - If client definitions (like client. ICD) are required in the system configuration, they are merged into CCT600 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.
 - The resulting SCD file is exported from CCT600.

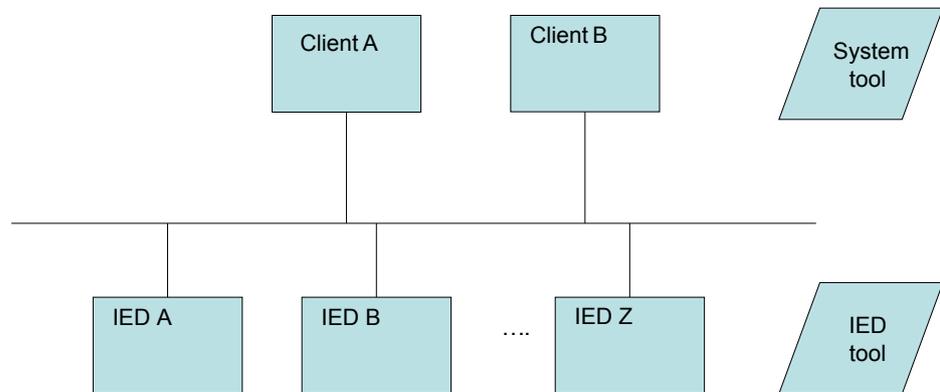
PCM600:

Import the SCD file to PCM600 to receive GOOSE data. For each IED that shall receive 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.



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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 a 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.

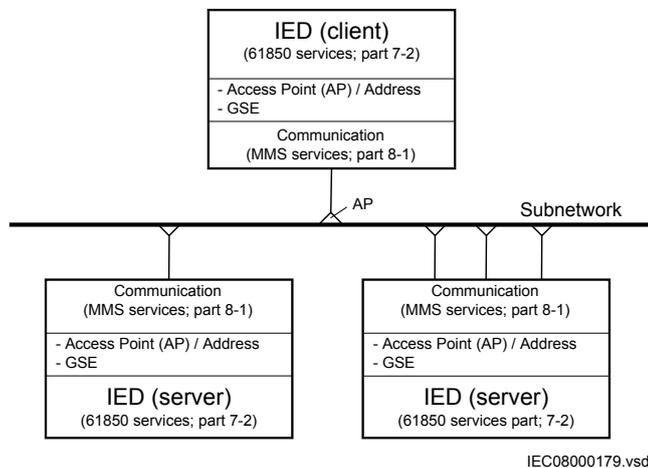
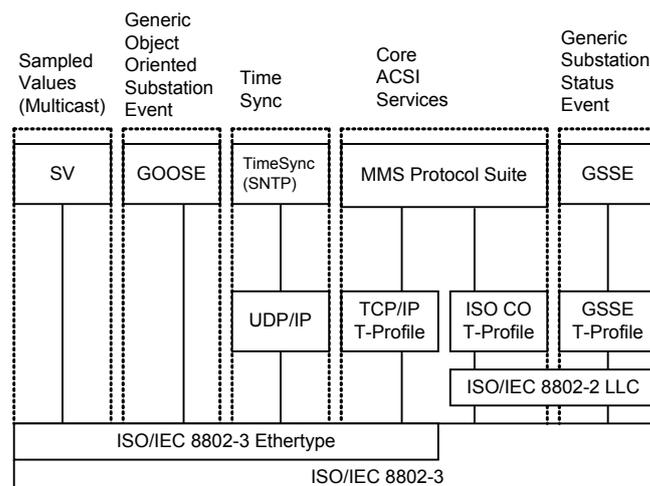


Figure 6: IEC 61850 Protocol: related standards for communication



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

Out of this content, the implementation in the 650 series supports:

- 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 main description about 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 $\text{BufTm} < \text{IntPrd}$. For best efficiency, the BufTm should have IntPrd as common denominator, like $n \cdot \text{BufTm} = \text{IntPrd}$, 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 and double point values together with their quality. On reception of GOOSE message there is one valid signal available for the applications. The valid signal represents all data in the received GOOSE telegram. Invalid means that the correct message is not received within the $1.8 \cdot \text{maxTime}$ parameter for the GOOSE Control Block (as defined in IEC 61850-6). An incorrect message includes $T=\text{true}$, 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 PST. From communication perspective, in IEC61850 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

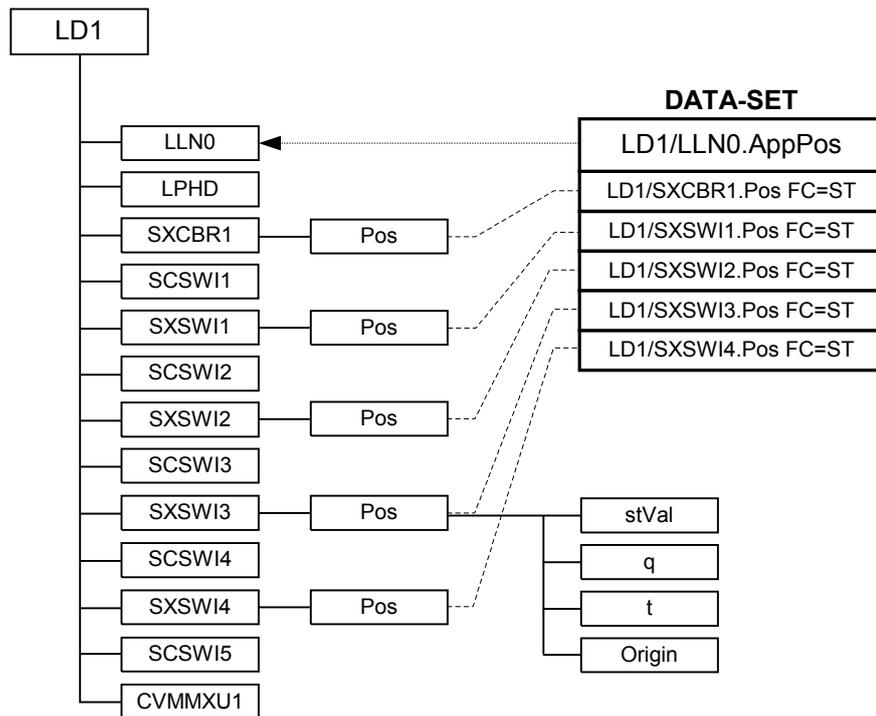
See PIXIT.

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

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 (FCDA) 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 DataSet, 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 HSI, 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 DataSet. 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. Nobody is perfect and someone in the long chain from the contact up to the NCC may have lost an event. The background cycle can repair it.

- 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 datatype 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 selected DataSet, 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.

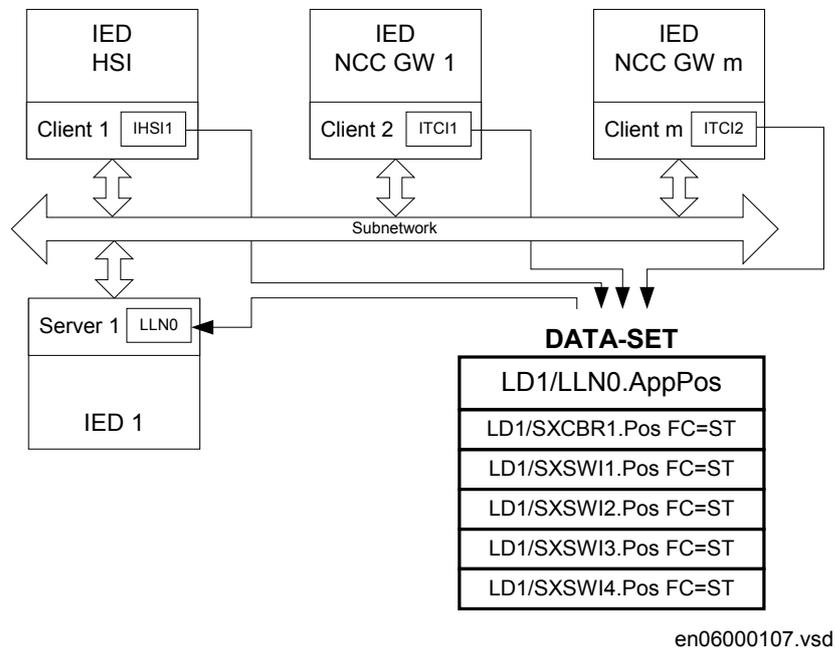


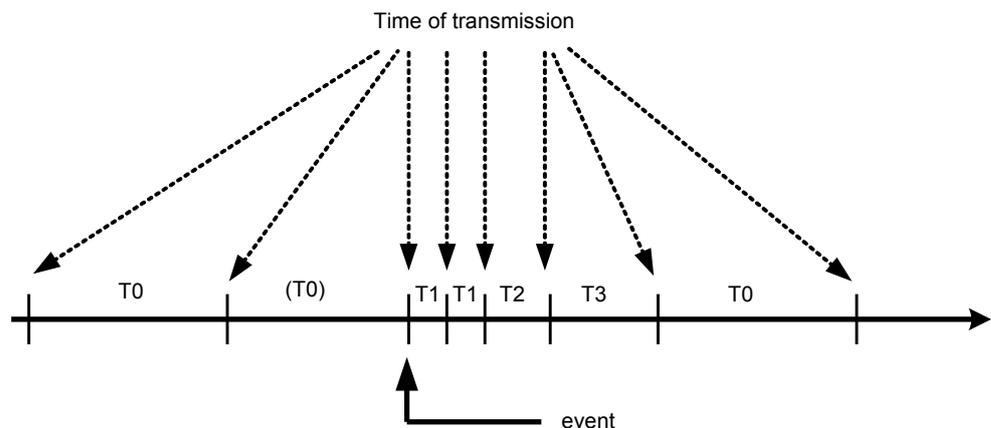
Figure 9: Link BRCB to a client LN

— respond on application level). The return message is not a must. It depends on the application in which way a confirmation may be done.

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 re-transmission 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 re-transmitting the same data (with gradually increasing SqNum and retransmission time).

- 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 re-transmission. 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 650 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 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 send.

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 for example 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-DataSet.

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. Also here it is given has the elements in these classes are defined as:

- Mandatory (M)
- Optional (O)
- Conditional optional (Cxxx)
- In addition, the 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 7-5, 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 650 series products.

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 650 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

7.2.1.1 Automatic voltage control for tapchanger, single control TR1ATCC

LN type	LN prefix	LN class	Function block name
TR1ATCC (revision 1)	TR1	ATCC	TR1ATCC

Table 6: TR1ATCC Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description	
TapChg	a_dBSC	Oper.ctlVal	CO	-	-		Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-		Cmd	Command parameter for IEC61850
		valWTr.posVal	ST	-	-		Mon	Tap position
		valWTr.transInd	ST	-	-		Mon	Tap position change in progress
		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
		q	ST	-	-		Mon	Tap position
		t	ST	-	-		Mon	Tap position
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	Mode status value parameter for 61850
		t	ST	-	-		Mon	Mode status value 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
LTCBik	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

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Section 7 Logical node data model

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
LTCBlk	a_dSPC	Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
Loc	a_dSPS	stVal	ST	-	-	Mon	Local commands selected
		q	ST	-	-	Mon	Local commands selected
		t	ST	-	-	Mon	Local commands selected
HiTapPos	b_dINS	stVal	ST	-	-	Mon	Tap position for maximum voltage
		q	ST	-	-	Mon	Tap position for maximum voltage
		t	ST	-	-	Mon	Tap position for maximum voltage
LoTapPos	b_dINS	stVal	ST	-	-	Mon	Tap position for minimum voltage
		q	ST	-	-	Mon	Tap position for minimum voltage
		t	ST	-	-	Mon	Tap position for minimum voltage
LodA	b_dMV	mag.f	MX	-	-	Mon	Magnitude of measured load current (service value)
		q	MX	-	-	Mon	Magnitude of measured load current (service value)
		t	MX	-	-	Mon	Magnitude of measured load current (service value)
CtlV	b_dMV	mag.f	MX	-	BUSVOLT	Mon	Average of the measured busbar voltage (service value)
		q	MX	-	BUSVOLT	Mon	Average of the measured busbar voltage (service value)
		t	MX	-	BUSVOLT	Mon	Average of the measured busbar voltage (service value)
AutoCtl	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
		stVal	ST	-	AUTO	Mon	Automatic control mode is active
		q	ST	-	AUTO	Mon	Automatic control mode is active
t	ST	-	AUTO	Mon	Automatic control mode is active		
LVA1On	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
LVA1On	v1_dSPC	Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orIdent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctNum	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	Setting LVACnst1 is used (service value)
		q	ST	-	-	Mon	Setting LVACnst1 is used (service value)
		t	ST	-	-	Mon	Setting LVACnst1 is used (service value)
LVA2On	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.ctNum	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	Setting LVACnst2 is used (service value)
		q	ST	-	-	Mon	Setting LVACnst2 is used (service value)
t	ST	-	-	Mon	Setting LVACnst2 is used (service value)		
LVA3On	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.ctNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850

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Logical node data model

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
LVA3On	v1_dSPC	Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	-	Mon	Setting LVAConst3 is used (service value)
		q	ST	-	-	Mon	Setting LVAConst3 is used (service value)
		t	ST	-	-	Mon	Setting LVAConst3 is used (service value)
LVA4On	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
		stVal	ST	-	-	Mon	Setting LVAConst4 is used (service value)
		q	ST	-	-	Mon	Setting LVAConst4 is used (service value)
		t	ST	-	-	Mon	Setting LVAConst4 is used (service value)
LVAReset	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
ForceMast	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850

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DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
ForceMast	v1_dSPC	Oper.origin.orIdent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctfNum	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
HiV	v1_dSPS	stVal	ST	-	UHIGH	Mon	Busbar voltage above the set limit voltBusbMaxLimit
		q	ST	-	UHIGH	Mon	Busbar voltage above the set limit voltBusbMaxLimit
		t	ST	-	UHIGH	Mon	Busbar voltage above the set limit voltBusbMaxLimit
LoV	v1_dSPS	stVal	ST	-	ULOW	Mon	Busbar voltage below the set limit voltBusbMinLimit
		q	ST	-	ULOW	Mon	Busbar voltage below the set limit voltBusbMinLimit
		t	ST	-	ULOW	Mon	Busbar voltage below the set limit voltBusbMinLimit
BlkV	v1_dSPS	stVal	ST	-	UBLK	Mon	Busbar voltage below the set limit voltBusbBlockLimit
		q	ST	-	UBLK	Mon	Busbar voltage below the set limit voltBusbBlockLimit
		t	ST	-	UBLK	Mon	Busbar voltage below the set limit voltBusbBlockLimit
HiWFwd	v1_dSPS	stVal	ST	-	PGTFWD	Mon	Active power above the set limit powerActiveForw
		q	ST	-	PGTFWD	Mon	Active power above the set limit powerActiveForw
		t	ST	-	PGTFWD	Mon	Active power above the set limit powerActiveForw
HiWRv	v1_dSPS	stVal	ST	-	PLTREV	Mon	Active power below the set limit powerActiveRev
		q	ST	-	PLTREV	Mon	Active power below the set limit powerActiveRev
		t	ST	-	PLTREV	Mon	Active power below the set limit powerActiveRev
HiVArFwd	v1_dSPS	stVal	ST	-	QGTFWD	Mon	Reactive power above the set limit powerReactiveForw
		q	ST	-	QGTFWD	Mon	Reactive power above the set limit powerReactiveForw
		t	ST	-	QGTFWD	Mon	Reactive power above the set limit powerReactiveForw
HiVArRv	v1_dSPS	stVal	ST	-	QLTREV	Mon	Reactive power below the set limit powerReactiveRev

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Section 7 Logical node data model

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
HiVArRv	v1_dSPS	q	ST	-	QLTREV	Mon	Reactive power below the set limit powerReactiveRev
		t	ST	-	QLTREV	Mon	Reactive power below the set limit powerReactiveRev
HiABlk	v1_dSPS	stVal	ST	-	IBLK	Mon	One phase current is above the set limit
		q	ST	-	IBLK	Mon	One phase current is above the set limit
		t	ST	-	IBLK	Mon	One phase current is above the set limit
ExLowerBlk	v1_dSPS	stVal	ST	-	-	Mon	External block of lower command activated
		q	ST	-	-	Mon	External block of lower command activated
		t	ST	-	-	Mon	External block of lower command activated
ExRaiseBlk	v1_dSPS	stVal	ST	-	-	Mon	External block of raise command activated
		q	ST	-	-	Mon	External block of raise command activated
		t	ST	-	-	Mon	External block of raise command activated
DayHuntAlm	v1_dSPS	stVal	ST	-	DAYHUNT	Mon	Number of commands within the last 24 hours exceeded maximum level
		q	ST	-	DAYHUNT	Mon	Number of commands within the last 24 hours exceeded maximum level
		t	ST	-	DAYHUNT	Mon	Number of commands within the last 24 hours exceeded maximum level
HrHuntAlm	v1_dSPS	stVal	ST	-	HOURHUNT	Mon	Number of commands within the latest hour exceeded maximum level
		q	ST	-	HOURHUNT	Mon	Number of commands within the latest hour exceeded maximum level
		t	ST	-	HOURHUNT	Mon	Number of commands within the latest hour exceeded maximum level
HuntAlm	v1_dSPS	stVal	ST	-	HUNTING	Mon	Number of commands in opposite direction exceeded maximum level
		q	ST	-	HUNTING	Mon	Number of commands in opposite direction exceeded maximum level
		t	ST	-	HUNTING	Mon	Number of commands in opposite direction exceeded maximum level
TotBlock	v1_dSPS	stVal	ST	-	TOTBLK	Mon	Block of auto and manual commands

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DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
TotBlock	v1_dSPS	q	ST	-	TOTBLK	Mon	Block of auto and manual commands
		t	ST	-	TOTBLK	Mon	Block of auto and manual commands
AutoBlock	v1_dSPS	stVal	ST	-	AUTOBLK	Mon	Block of auto commands
		q	ST	-	AUTOBLK	Mon	Block of auto commands
		t	ST	-	AUTOBLK	Mon	Block of auto commands
LodV	v2_dMV	mag.f	MX	-	ULOAD	Mon	Calculated compensated voltage (service value)
		q	MX	-	ULOAD	Mon	Calculated compensated voltage (service value)
		t	MX	-	ULOAD	Mon	Calculated compensated voltage (service value)
TotW	v2_dMV	mag.f	MX	-	P	Mon	Calculated active power (service value)
		q	MX	-	P	Mon	Calculated active power (service value)
		t	MX	-	P	Mon	Calculated active power (service value)
TotVAr	v2_dMV	mag.f	MX	-	Q	Mon	Calculated reactive power (service value)
		q	MX	-	Q	Mon	Calculated reactive power (service value)
		t	MX	-	Q	Mon	Calculated reactive power (service value)
AverA	v2_dMV	mag.f	MX	-	IPRIM	Mon	Maximum of 3 phase currents (service value)
		q	MX	-	IPRIM	Mon	Maximum of 3 phase currents (service value)
		t	MX	-	IPRIM	Mon	Maximum of 3 phase currents (service value)
AutoRedV	v2_dMV	mag.f	MX	-	-	Mon	Load dependent automatic reduction voltage
		q	MX	-	-	Mon	Load dependent automatic reduction voltage
		t	MX	-	-	Mon	Load dependent automatic reduction voltage
BndCtrSng	v2_dMV	mag.f	MX	-	-	Mon	Voltage setpoint single
		q	MX	-	-	Mon	Voltage setpoint single
		t	MX	-	-	Mon	Voltage setpoint single
BndCtrSet	v2_dMV	mag.f	MX	-	-	Mon	Voltage setpoint set by user
		q	MX	-	-	Mon	Voltage setpoint set by user
		t	MX	-	-	Mon	Voltage setpoint set by user
LVA1V	v2_dMV	mag.f	MX	-	-	Mon	Value 1 for load voltage adjustment

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DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
LVA1V	v2_dMV	q	MX	-	-	Mon	Value 1 for load voltage adjustment
		t	MX	-	-	Mon	Value 1 for load voltage adjustment
LVA2V	v2_dMV	mag.f	MX	-	-	Mon	Value 2 for load voltage adjustment
		q	MX	-	-	Mon	Value 2 for load voltage adjustment
		t	MX	-	-	Mon	Value 2 for load voltage adjustment
LVA3V	v2_dMV	mag.f	MX	-	-	Mon	Value 3 for load voltage adjustment
		q	MX	-	-	Mon	Value 3 for load voltage adjustment
		t	MX	-	-	Mon	Value 3 for load voltage adjustment
LVA4V	v2_dMV	mag.f	MX	-	-	Mon	Value 4 for load voltage adjustment
		q	MX	-	-	Mon	Value 4 for load voltage adjustment
		t	MX	-	-	Mon	Value 4 for load voltage adjustment

7.2.1.2

Automatic voltage control for tapchanger, parallel control TR8ATCC

LN type	LN prefix	LN class	Function block name
TR8ATCC (revision 1)	TR8	ATCC	TR8ATCC

Table 7: TR8ATCC Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
TapChg	a_dBSC	valWTr.posVal	ST	-	-	Mon	Tap position
		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
		valWTr.transInd	ST	-	-	Mon	Tap position change in progress
		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/ Cmd	Description
TapChg	a_dBSC	Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		q	ST	-	-	Mon	Tap position
		t	ST	-	-	Mon	Tap position
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	Mode status value parameter for 61850
t	ST	-	-	Mon	Mode status value 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
LTCBlk	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	Used by CH
		q	ST	-	-	Mon	Used by CH
t	ST	-	-	Mon	Used by CH		
Loc	a_dSPS	stVal	ST	-	-	Mon	Local commands selected
		q	ST	-	-	Mon	Local commands selected
		t	ST	-	-	Mon	Local commands selected
HiTapPos	b_dINS	stVal	ST	-	-	Mon	Tap position for maximum voltage
		q	ST	-	-	Mon	Tap position for maximum voltage
		t	ST	-	-	Mon	Tap position for maximum voltage
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Section 7 Logical node data model

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
LoTapPos	b_dINS	stVal	ST	-	-	Mon	Tap position for minimum voltage
		q	ST	-	-	Mon	Tap position for minimum voltage
		t	ST	-	-	Mon	Tap position for minimum voltage
CircA	b_dMV	mag.f	MX	-	ICIRCUL	Mon	Circulating current
		q	MX	-	ICIRCUL	Mon	Circulating current
		t	MX	-	ICIRCUL	Mon	Circulating current
LodA	b_dMV	mag.f	MX	-	-	Mon	Magnitude of measured load current (service value)
		q	MX	-	-	Mon	Magnitude of measured load current (service value)
		t	MX	-	-	Mon	Magnitude of measured load current (service value)
CtlV	b_dMV	mag.f	MX	-	BUSVOLT	Mon	Average of measured busbar voltage (service value)
		q	MX	-	BUSVOLT	Mon	Average of measured busbar voltage (service value)
		t	MX	-	BUSVOLT	Mon	Average of measured busbar voltage (service value)
ParOp	c_dSPC	stVal	ST	-	PARALLEL	Mon	Transformer operates in parallel mode
		q	ST	-	PARALLEL	Mon	Transformer operates in parallel mode
		t	ST	-	PARALLEL	Mon	Transformer operates in parallel mode
LTCId	v1_dINS	stVal	ST	-	-	Mon	Identity of the transformer
		q	ST	-	-	Mon	Identity of the transformer
		t	ST	-	-	Mon	Identity of the transformer
ParSet	v1_dINS	stVal	ST	-	-	Mon	Setting value for transformer in parallel mode
		q	ST	-	-	Mon	Setting value for transformer in parallel mode
		t	ST	-	-	Mon	Setting value for transformer in parallel mode
AutoCtl	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/ Cmd	Description
AutoCtl	v1_dSPC	Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	AUTO	Mon	Automatic control mode is active
		q	ST	-	AUTO	Mon	Automatic control mode is active
		t	ST	-	AUTO	Mon	Automatic control mode is active
LVA1On	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
		stVal	ST	-	-	Mon	Setting LVACnst1 is used (service value)
		q	ST	-	-	Mon	Setting LVACnst1 is used (service value)
		t	ST	-	-	Mon	Setting LVACnst1 is used (service value)
LVA2On	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
		stVal	ST	-	-	Mon	Setting LVACnst2 is used (service value)
		q	ST	-	-	Mon	Setting LVACnst2 is used (service value)
		t	ST	-	-	Mon	Setting LVACnst2 is used (service value)
LVA3On	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850

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Section 7 Logical node data model

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
LVA3On	v1_dSPC	Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orIdent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctfNum	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	Setting LVAConst3 is used (service value)
		q	ST	-	-	Mon	Setting LVAConst3 is used (service value)
		t	ST	-	-	Mon	Setting LVAConst3 is used (service value)
LVA4On	v1_dSPC	Oper.ctfVal	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.ctfNum	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	Setting LVAConst4 is used (service value)
		q	ST	-	-	Mon	Setting LVAConst4 is used (service value)
t	ST	-	-	Mon	Setting LVAConst4 is used (service value)		
LVAReset	v1_dSPC	Oper.ctfVal	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.ctfNum	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
LVAReset	v1_dSPC	Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
ForceMast	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
		stVal	ST	-	-	Mon	Transformer is forced to be a master
		q	ST	-	-	Mon	Transformer is forced to be a master
		t	ST	-	-	Mon	Transformer is forced to be a master
HiV	v1_dSPS	stVal	ST	-	UHIGH	Mon	Busbar voltage above the set limit voltBusbMaxLimit
		q	ST	-	UHIGH	Mon	Busbar voltage above the set limit voltBusbMaxLimit
		t	ST	-	UHIGH	Mon	Busbar voltage above the set limit voltBusbMaxLimit
LoV	v1_dSPS	stVal	ST	-	ULOW	Mon	Busbar voltage below the set limit voltBusbMinLimit
		q	ST	-	ULOW	Mon	Busbar voltage below the set limit voltBusbMinLimit
		t	ST	-	ULOW	Mon	Busbar voltage below the set limit voltBusbMinLimit
BlkV	v1_dSPS	stVal	ST	-	UBLK	Mon	Busbar voltage below the set limit voltBusbBlockLimit
		q	ST	-	UBLK	Mon	Busbar voltage below the set limit voltBusbBlockLimit
		t	ST	-	UBLK	Mon	Busbar voltage below the set limit voltBusbBlockLimit
AutoSlave	v1_dSPS	stVal	ST	-	-	Mon	Auto slave activated
		q	ST	-	-	Mon	Auto slave activated
		t	ST	-	-	Mon	Auto slave activated
T1ParGr	v1_dSPS	stVal	ST	-	T1PG	Mon	Transformer 1 included in parallel group

Table continues on next page

Section 7 Logical node data model

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
T1ParGr	v1_dSPS	q	ST	-	T1PG	Mon	Transformer 1 included in parallel group
		t	ST	-	T1PG	Mon	Transformer 1 included in parallel group
T2ParGr	v1_dSPS	stVal	ST	-	T2PG	Mon	Transformer 2 included in parallel group
		q	ST	-	T2PG	Mon	Transformer 2 included in parallel group
		t	ST	-	T2PG	Mon	Transformer 2 included in parallel group
T3ParGr	v1_dSPS	stVal	ST	-	T3PG	Mon	Transformer 3 included in parallel group
		q	ST	-	T3PG	Mon	Transformer 3 included in parallel group
		t	ST	-	T3PG	Mon	Transformer 3 included in parallel group
T4ParGr	v1_dSPS	stVal	ST	-	T4PG	Mon	Transformer 4 included in parallel group
		q	ST	-	T4PG	Mon	Transformer 4 included in parallel group
		t	ST	-	T4PG	Mon	Transformer 4 included in parallel group
T1Master	v1_dSPS	stVal	ST	-	-	Mon	Transformer 1 is master
		q	ST	-	-	Mon	Transformer 1 is master
		t	ST	-	-	Mon	Transformer 1 is master
T2Master	v1_dSPS	stVal	ST	-	-	Mon	Transformer 2 is master
		q	ST	-	-	Mon	Transformer 2 is master
		t	ST	-	-	Mon	Transformer 2 is master
T3Master	v1_dSPS	stVal	ST	-	-	Mon	Transformer 3 is master
		q	ST	-	-	Mon	Transformer 3 is master
		t	ST	-	-	Mon	Transformer 3 is master
T4Master	v1_dSPS	stVal	ST	-	-	Mon	Transformer 4 is master
		q	ST	-	-	Mon	Transformer 4 is master
		t	ST	-	-	Mon	Transformer 4 is master
SimTap	v1_dSPS	stVal	ST	-	-	Mon	Simultaneous tapping activated
		q	ST	-	-	Mon	Simultaneous tapping activated
		t	ST	-	-	Mon	Simultaneous tapping activated
CommFlt	v1_dSPS	stVal	ST	-	COMMERR	Mon	Communication error
		q	ST	-	COMMERR	Mon	Communication error
		t	ST	-	COMMERR	Mon	Communication error
HiWFwd	v1_dSPS	stVal	ST	-	PGTFWD	Mon	Active power above the set limit powerActiveForw
		q	ST	-	PGTFWD	Mon	Active power above the set limit powerActiveForw

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
HiWFwd	v1_dSPS	t	ST	-	PGTFWD	Mon	Active power above the set limit powerActiveForw
HiWRv	v1_dSPS	stVal	ST	-	PLTREV	Mon	Active power below the set limit powerActiveRev
		q	ST	-	PLTREV	Mon	Active power below the set limit powerActiveRev
		t	ST	-	PLTREV	Mon	Active power below the set limit powerActiveRev
HiVArFwd	v1_dSPS	stVal	ST	-	QGTFWD	Mon	Reactive power above the set limit powerReactiveForw
		q	ST	-	QGTFWD	Mon	Reactive power above the set limit powerReactiveForw
		t	ST	-	QGTFWD	Mon	Reactive power above the set limit powerReactiveForw
HiVArRv	v1_dSPS	stVal	ST	-	QLTREV	Mon	Reactive power below the set limit powerReactiveRev
		q	ST	-	QLTREV	Mon	Reactive power below the set limit powerReactiveRev
		t	ST	-	QLTREV	Mon	Reactive power below the set limit powerReactiveRev
CircABlk	v1_dSPS	stVal	ST	-	ICIRC	Mon	Block from high circulating current
		q	ST	-	ICIRC	Mon	Block from high circulating current
		t	ST	-	ICIRC	Mon	Block from high circulating current
HiABlk	v1_dSPS	stVal	ST	-	IBLK	Mon	One phase current is above the set limit
		q	ST	-	IBLK	Mon	One phase current is above the set limit
		t	ST	-	IBLK	Mon	One phase current is above the set limit
ExLowerBlk	v1_dSPS	stVal	ST	-	-	Mon	External block of lower command activated
		q	ST	-	-	Mon	External block of lower command activated
		t	ST	-	-	Mon	External block of lower command activated
ExRaiseBlk	v1_dSPS	stVal	ST	-	-	Mon	External block of raise command activated
		q	ST	-	-	Mon	External block of raise command activated
		t	ST	-	-	Mon	External block of raise command activated
Adapt	v1_dSPS	stVal	ST	-	ADAPT	Mon	Transformer is adapting
		q	ST	-	ADAPT	Mon	Transformer is adapting
		t	ST	-	ADAPT	Mon	Transformer is adapting
DayHuntAlm	v1_dSPS	stVal	ST	-	DAYHUNT	Mon	Number of commands within the last 24 hours exceeded maximum level

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Section 7 Logical node data model

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
DayHuntAlm	v1_dSPS	q	ST	-	DAYHUNT	Mon	Number of commands within the last 24 hours exceeded maximum level
		t	ST	-	DAYHUNT	Mon	Number of commands within the last 24 hours exceeded maximum level
HrHuntAlm	v1_dSPS	stVal	ST	-	HOURHUNT	Mon	Number of commands within the latest hour exceeded maximum level
		q	ST	-	HOURHUNT	Mon	Number of commands within the latest hour exceeded maximum level
		t	ST	-	HOURHUNT	Mon	Number of commands within the latest hour exceeded maximum level
HuntAlm	v1_dSPS	stVal	ST	-	HUNTING	Mon	Number of commands in opposite direction exceeded maximum level
		q	ST	-	HUNTING	Mon	Number of commands in opposite direction exceeded maximum level
		t	ST	-	HUNTING	Mon	Number of commands in opposite direction exceeded maximum level
VDif	v1_dSPS	stVal	ST	-	VTALARM	Mon	VT supervision alarm
		q	ST	-	VTALARM	Mon	VT supervision alarm
		t	ST	-	VTALARM	Mon	VT supervision alarm
MSMode	v1_dSPS	stVal	ST	-	-	Mon	Master slave is active
		q	ST	-	-	Mon	Master slave is active
		t	ST	-	-	Mon	Master slave is active
Disc	v1_dSPS	stVal	ST	-	-	Mon	Transformer is disconnected
		q	ST	-	-	Mon	Transformer is disconnected
		t	ST	-	-	Mon	Transformer is disconnected
TotBlock	v1_dSPS	stVal	ST	-	TOTBLK	Mon	Block of auto and manual commands
		q	ST	-	TOTBLK	Mon	Block of auto and manual commands
		t	ST	-	TOTBLK	Mon	Block of auto and manual commands
AutoBlock	v1_dSPS	stVal	ST	-	AUTOBLK	Mon	Block of auto commands
		q	ST	-	AUTOBLK	Mon	Block of auto commands
		t	ST	-	AUTOBLK	Mon	Block of auto commands
DiffPosMF	v1_dSPS	stVal	ST	-	OUTOFPOS	Mon	Difference in tap positions exceeded the set limit
		q	ST	-	OUTOFPOS	Mon	Difference in tap positions exceeded the set limit

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
DiffPosMF	v1_dSPS	t	ST	-	OUTOFPOS	Mon	Difference in tap positions exceeded the set limit
MFFit	v1_dSPS	stVal	ST	-	MFERR	Mon	Number of masters is different from one
		q	ST	-	MFERR	Mon	Number of masters is different from one
		t	ST	-	MFERR	Mon	Number of masters is different from one
BndCtrAct	v2_dMV	mag.f	MX	-	-	Mon	Actual voltage setpoint
		q	MX	-	-	Mon	Actual voltage setpoint
		t	MX	-	-	Mon	Actual voltage setpoint
LodV	v2_dMV	mag.f	MX	-	ULOAD	Mon	Calculated compensated voltage (service value)
		q	MX	-	ULOAD	Mon	Calculated compensated voltage (service value)
		t	MX	-	ULOAD	Mon	Calculated compensated voltage (service value)
TotW	v2_dMV	mag.f	MX	-	P	Mon	Calculated active power (service value)
		q	MX	-	P	Mon	Calculated active power (service value)
		t	MX	-	P	Mon	Calculated active power (service value)
TotVAr	v2_dMV	mag.f	MX	-	Q	Mon	Calculated reactive power (service value)
		q	MX	-	Q	Mon	Calculated reactive power (service value)
		t	MX	-	Q	Mon	Calculated reactive power (service value)
AverA	v2_dMV	mag.f	MX	-	IPRIM	Mon	Maximum of 3 phase currents (service value)
		q	MX	-	IPRIM	Mon	Maximum of 3 phase currents (service value)
		t	MX	-	IPRIM	Mon	Maximum of 3 phase currents (service value)
CCAV	v2_dMV	mag.f	MX	-	CCAVolt	Mon	Circulating current adjusted voltage
		q	MX	-	CCAVolt	Mon	Circulating current adjusted voltage
		t	MX	-	CCAVolt	Mon	Circulating current adjusted voltage
AutoRedV	v2_dMV	mag.f	MX	-	-	Mon	Load dependent automatic reduction voltage
		q	MX	-	-	Mon	Load dependent automatic reduction voltage
		t	MX	-	-	Mon	Load dependent automatic reduction voltage

Table continues on next page

Section 7 Logical node data model

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
BndCtrSng	v2_dMV	mag.f	MX	-	-	Mon	Voltage setpoint single
		q	MX	-	-	Mon	Voltage setpoint single
		t	MX	-	-	Mon	Voltage setpoint single
BndCtrPar	v2_dMV	mag.f	MX	-	USETPAR	Mon	Average voltage setpoint used in parallel mode
		q	MX	-	USETPAR	Mon	Average voltage setpoint used in parallel mode
		t	MX	-	USETPAR	Mon	Average voltage setpoint used in parallel mode
BndCtrSet	v2_dMV	mag.f	MX	-	-	Mon	Voltage setpoint set by user
		q	MX	-	-	Mon	Voltage setpoint set by user
		t	MX	-	-	Mon	Voltage setpoint set by user
CircALim	v2_dMV	mag.f	MX	-	-	Mon	Block level of circulating current
		q	MX	-	-	Mon	Block level of circulating current
		t	MX	-	-	Mon	Block level of circulating current
LVA1V	v2_dMV	mag.f	MX	-	-	Mon	Value 1 for load voltage adjustment
		q	MX	-	-	Mon	Value 1 for load voltage adjustment
		t	MX	-	-	Mon	Value 1 for load voltage adjustment
LVA2V	v2_dMV	mag.f	MX	-	-	Mon	Value 2 for load voltage adjustment
		q	MX	-	-	Mon	Value 2 for load voltage adjustment
		t	MX	-	-	Mon	Value 2 for load voltage adjustment
LVA3V	v2_dMV	mag.f	MX	-	-	Mon	Value 3 for load voltage adjustment
		q	MX	-	-	Mon	Value 3 for load voltage adjustment
		t	MX	-	-	Mon	Value 3 for load voltage adjustment
LVA4V	v2_dMV	mag.f	MX	-	-	Mon	Value 4 for load voltage adjustment
		q	MX	-	-	Mon	Value 4 for load voltage adjustment
		t	MX	-	-	Mon	Value 4 for load voltage adjustment
AvBusV	v2_dMV	mag.f	MX	-	-	Mon	Average of measured busbar voltage (service value)
		q	MX	-	-	Mon	Average of measured busbar voltage (service value)
		t	MX	-	-	Mon	Average of measured busbar voltage (service value)

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
CircV	v2_dMV	mag.f	MX	-	-	Mon	Calculated circulating voltage
		q	MX	-	-	Mon	Calculated circulating voltage
		t	MX	-	-	Mon	Calculated circulating voltage

7.3 Logical nodes for control

7.3.1 Bay control CBAY

7.3.1.1 Apparatus control QCBAY

LN type	LN prefix	LN class	Function block name
QCBAY (revision 1)	Q	CBAY	QCBAY

Table 8: QCBAY 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	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
LocSwPos	v1_dINS	stVal	ST	-	-	Mon	Position of the Local/Remote switch
		q	ST	-	-	Mon	Position of the Local/Remote switch
		t	ST	-	-	Mon	Position of the Local/Remote switch
SrcOpPrm	v1_dINS	stVal	ST	-	PSTO	Mon	Value for the operator place allocation
		q	ST	-	PSTO	Mon	Value for the operator place allocation

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
SrcOpPrm	v1_dINS	t	ST	-	PSTO	Mon	Value for the operator place allocation
BlkCmd	v1_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	-	CMD_BLKD	Mon	Function is blocked for commands
		q	ST	-	CMD_BLKD	Mon	Function is blocked for commands
t	ST	-	CMD_BLKD	Mon	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.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	-	UPD_BLKD	Mon	Update of position is blocked
		q	ST	-	UPD_BLKD	Mon	Update of position is blocked
t	ST	-	UPD_BLKD	Mon	Update of position is blocked		
BlkMeas	v1_dSPS	stVal	ST	-	-	Mon	Update of measurand is blocked
		q	ST	-	-	Mon	Update of measurand is blocked
		t	ST	-	-	Mon	Update of measurand is blocked
Loc	v1_dSPS	stVal	ST	-	LOC	Mon	Local operation allowed
		q	ST	-	LOC	Mon	Local operation allowed
		t	ST	-	LOC	Mon	Local operation allowed
Rem	v1_dSPS	stVal	ST	-	REM	Mon	Remote operation allowed
		q	ST	-	REM	Mon	Remote operation allowed
		t	ST	-	REM	Mon	Remote operation allowed

7.3.2 Interlocking CILO

7.3.2.1 Interlocking SCILO

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

Table 9: 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	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
EnaCls	a_dSPS	stVal	ST	-	EN_CLOSE		Mon	Close operation at open or intermediate or bad position is enabled
		q	ST	-	EN_CLOSE		Mon	Close operation at open or intermediate or bad position is enabled
		t	ST	-	EN_CLOSE		Mon	Close operation at open or intermediate or bad position is enabled
EnaOpn	a_dSPS	stVal	ST	-	EN_OPEN		Mon	Open operation at closed or intermediate or bad position is enabled
		q	ST	-	EN_OPEN		Mon	Open operation at closed or intermediate or bad position is enabled
		t	ST	-	EN_OPEN		Mon	Open operation at closed or intermediate or bad position is enabled

7.3.3 Switch controller CSWI

7.3.3.1 Apparatus control SCSWI

LN type	LN prefix	LN class	Function block name
SCSWI (revision 1)	S	CSWI	SCSWI

Table 10: SCSWI Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Pos	a_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
		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		
q	ST	-	POSITION	Mon	Position indication		
t	ST	-	POSITION	Mon	Position indication		
stSeld	ST	-	SELECTED	Mon	Select conditions are fulfilled		
subEna	SV	-	-	-	Substitute enable		

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Pos	a_dDPC	subVal	SV	-	-	-	Substituted double position value
		ctlModel	CF	-	CtlModel	-	Specifies control model type
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	Mode status value parameter for 61850
t	ST	-	-	Mon	Mode status value 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
OpCls	b_dACT	general	ST	T	EXE_CL	Mon	Execute command for close direction
		q	ST	T	EXE_CL	Mon	Execute command for close direction
		t	ST	T	EXE_CL	Mon	Execute command for close direction
OpOpn	b_dACT	general	ST	T	EXE_OP	Mon	Execute command for open direction
		q	ST	T	EXE_OP	Mon	Execute command for open direction
		t	ST	T	EXE_OP	Mon	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.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	-	CMD_BLK	Mon	Commands are blocked
		q	ST	-	CMD_BLK	Mon	Commands are blocked
t	ST	-	CMD_BLK	Mon	Commands are blocked		

7.4 Logical nodes for conversion functions

7.4.1 Integer to Boolean converter FCVB

7.4.1.1 Integer to Boolean 16 conversion with Logic Node representation IB16FCVB

LN type	LN prefix	LN class	Function block name
IB16FCVB (revision 0)	IB16	FCVB	IB16FCVB

Table 11: *IB16FCVB Logical node data*

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Mod	a_dINC	Oper.ctIVal	CO		-	Cmd	Mode parameter
		Oper.origin.orCat	CO		-	Cmd	Mode parameter
		Oper.origin.orIdent	CO		-	Cmd	Mode parameter
		Oper.ctINum	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	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
ISCSO	b_dINC	Oper.ctIVal	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.ctINum	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	Integer to be converted to bit pattern OUT1 to OUT16

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
ISCSO	b_dINC	q	ST		-	Mon	Integer to be converted to bit pattern OUT1 to OUT16
		t	ST		-	Mon	Integer to be converted to bit pattern OUT1 to OUT16
		ctlModel	CF		-	-	Used by CH

7.4.2 Boolean to integer converter FCVI

7.4.2.1 Boolean 16 to Integer conversion with Logic Node representation B16IFCVI

LN type	LN prefix	LN class	Function block name
B16IFCVI (revision 0)	B16I	FCVI	B16IFCVI

Table 12: B16IFCVI 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	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
OutInt	b_dINS	stVal	ST		OUT	Mon	Output value
		q	ST		OUT	Mon	Output value
		t	ST		OUT	Mon	Output value

7.5 Logical nodes for protection functions

7.5.1 Differential protection PDIF

7.5.1.1 Transformer differential protection, two winding T2WPDIF

LN type	LN prefix	LN class	Function block name
T2WPDIF (revision 2)	T2W	PDIF	T2WPDIF

Table 13: T2WPDIF Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Str	a_dACD	general	ST	-	START	Mon	General start signal
		phsA	ST	-	STL1	Mon	Start signal from phase L1
		phsB	ST	-	STL2	Mon	Start signal from phase L2
		phsC	ST	-	STL3	Mon	Start signal from phase L3
		q	ST	-	START	Mon	General start signal
		t	ST	-	START	Mon	General start signal
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	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	TRIP	Mon	General trip signal
		q	ST	T	TRIP	Mon	General trip signal
		t	ST	T	TRIP	Mon	General trip signal
OpRst	v1_dSPS	stVal	ST	-	TRIPRES	Mon	Trip signal from restrained differential protection
		q	ST	-	TRIPRES	Mon	Trip signal from restrained differential protection
		t	ST	-	TRIPRES	Mon	Trip signal from restrained differential protection

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
OpNSSen	v1_dSPS	stVal	ST	-	TRNSSENS	Mon	Trip signal from sensitive negative sequence differential protection
		q	ST	-	TRNSSENS	Mon	Trip signal from sensitive negative sequence differential protection
		t	ST	-	TRNSSENS	Mon	Trip signal from sensitive negative sequence differential protection
OpNSUnRst	v1_dSPS	stVal	ST	-	TRNSUNR	Mon	Trip signal from unrestrained negative sequence differential protection
		q	ST	-	TRNSUNR	Mon	Trip signal from unrestrained negative sequence differential protection
		t	ST	-	TRNSUNR	Mon	Trip signal from unrestrained negative sequence differential protection
OpUnRst	v1_dSPS	stVal	ST	-	TRIPUNRE	Mon	Trip signal from unrestrained differential protection
		q	ST	-	TRIPUNRE	Mon	Trip signal from unrestrained differential protection
		t	ST	-	TRIPUNRE	Mon	Trip signal from unrestrained differential protection
Blk2H	v1_dSPS	stVal	ST	-	BLK2H	Mon	General second harmonic block signal
		q	ST	-	BLK2H	Mon	General second harmonic block signal
		t	ST	-	BLK2H	Mon	General second harmonic block signal
Blk5H	v1_dSPS	stVal	ST	-	BLK5H	Mon	General fifth harmonic block signal
		q	ST	-	BLK5H	Mon	General fifth harmonic block signal
		t	ST	-	BLK5H	Mon	General fifth harmonic block signal
BlkWav	v1_dSPS	stVal	ST	-	BLKWAV	Mon	General block signal from waveform criteria
		q	ST	-	BLKWAV	Mon	General block signal from waveform criteria
		t	ST	-	BLKWAV	Mon	General block signal from waveform criteria
ExFlt	v1_dSPS	stVal	ST	-	-	Mon	Indication that external fault/ disturbance has been detected
		q	ST	-	-	Mon	Indication that external fault/ disturbance has been detected
		t	ST	-	-	Mon	Indication that external fault/ disturbance has been detected
ItrFlt	v1_dSPS	stVal	ST	-	-	Mon	Indication that internal fault has been detected
		q	ST	-	-	Mon	Indication that internal fault has been detected

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
ItrFlt	v1_dSPS	t	ST	-	-	Mon	Indication that internal fault has been detected
DifAlm	v1_dSPS	stVal	ST	-	IDALARM	Mon	General alarm for sustained differential currents
		q	ST	-	IDALARM	Mon	General alarm for sustained differential currents
		t	ST	-	IDALARM	Mon	General alarm for sustained differential currents

7.5.1.2 Transformer differential protection, three winding T3WPDIF

LN type	LN prefix	LN class	Function block name
T3WPDIF (revision 2)	T3W	PDIF	T3WPDIF

Table 14: T3WPDIF Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str	a_dACD	general	ST	-	START	Mon	General start signal
		phsA	ST	-	STL1	Mon	Start signal from phase L1
		phsB	ST	-	STL2	Mon	Start signal from phase L2
		phsC	ST	-	STL3	Mon	Start signal from phase L3
		q	ST	-	START	Mon	General start signal
		t	ST	-	START	Mon	General start signal
Mod	a_dINC	Oper.ctfVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter
		Oper.ctfNum	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	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	TRIP	Mon	General trip signal
		q	ST	T	TRIP	Mon	General trip signal
		t	ST	T	TRIP	Mon	General trip signal

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
OpRst	v1_dSPS	stVal	ST	-	TRIPRES	Mon	Trip signal from restrained differential protection
		q	ST	-	TRIPRES	Mon	Trip signal from restrained differential protection
		t	ST	-	TRIPRES	Mon	Trip signal from restrained differential protection
OpNSSen	v1_dSPS	stVal	ST	-	TRNSSENS	Mon	Trip signal from sensitive negative sequence differential protection
		q	ST	-	TRNSSENS	Mon	Trip signal from sensitive negative sequence differential protection
		t	ST	-	TRNSSENS	Mon	Trip signal from sensitive negative sequence differential protection
OpNSUnRst	v1_dSPS	stVal	ST	-	TRNSUNR	Mon	Trip signal from unrestrained negative sequence differential protection
		q	ST	-	TRNSUNR	Mon	Trip signal from unrestrained negative sequence differential protection
		t	ST	-	TRNSUNR	Mon	Trip signal from unrestrained negative sequence differential protection
OpUnRst	v1_dSPS	stVal	ST	-	TRIPUNRE	Mon	Trip signal from unrestrained differential protection
		q	ST	-	TRIPUNRE	Mon	Trip signal from unrestrained differential protection
		t	ST	-	TRIPUNRE	Mon	Trip signal from unrestrained differential protection
Blk2H	v1_dSPS	stVal	ST	-	BLK2H	Mon	General second harmonic block signal
		q	ST	-	BLK2H	Mon	General second harmonic block signal
		t	ST	-	BLK2H	Mon	General second harmonic block signal
Blk5H	v1_dSPS	stVal	ST	-	BLK5H	Mon	General fifth harmonic block signal
		q	ST	-	BLK5H	Mon	General fifth harmonic block signal
		t	ST	-	BLK5H	Mon	General fifth harmonic block signal
BlkWav	v1_dSPS	stVal	ST	-	BLKWAV	Mon	General block signal from waveform criteria
		q	ST	-	BLKWAV	Mon	General block signal from waveform criteria
		t	ST	-	BLKWAV	Mon	General block signal from waveform criteria
ExFlt	v1_dSPS	stVal	ST	-	-	Mon	Indication that external fault/disturbance has been detected
		q	ST	-	-	Mon	Indication that external fault/disturbance has been detected

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
ExFlt	v1_dSPS	t	ST	-	-	Mon	Indication that external fault/ disturbance has been detected
ItrFlt	v1_dSPS	stVal	ST	-	-	Mon	Indication that internal fault has been detected
		q	ST	-	-	Mon	Indication that internal fault has been detected
		t	ST	-	-	Mon	Indication that internal fault has been detected
DifAlm	v1_dSPS	stVal	ST	-	IDALARM	Mon	General alarm for sustained differential currents
		q	ST	-	IDALARM	Mon	General alarm for sustained differential currents
		t	ST	-	IDALARM	Mon	General alarm for sustained differential currents

7.5.1.3

Restricted earth fault protection, low impedance REFPDIF

LN type	LN prefix	LN class	Function block name
REFPDIF (revision 1)	REF	PDIF	REFPDIF

Table 15: REFPDIF 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	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
Str	b_dACD	general	ST	-	START	Mon	General start signal
		q	ST	-	START	Mon	General start signal
		t	ST	-	START	Mon	General start signal
Op	b_dACT	general	ST	T	TRIP	Mon	General trip signal
		q	ST	T	TRIP	Mon	General trip signal

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Op	b_dACT	t	ST	T	TRIP	Mon	General trip signal
Blk2H	v1_dSPS	stVal	ST	-	BLK2H	Mon	Block due to 2-nd harmonic
		q	ST	-	BLK2H	Mon	Block due to 2-nd harmonic
		t	ST	-	BLK2H	Mon	Block due to 2-nd harmonic
ltrFlt	v1_dSPS	stVal	ST	-	DIROK	Mon	Directional criteria has operated for internal fault
		q	ST	-	DIROK	Mon	Directional criteria has operated for internal fault
		t	ST	-	DIROK	Mon	Directional criteria has operated for internal fault

7.5.2 Distance protection PDIS

7.5.2.1 Five zone distance protection, quadrilateral characteristic ZQDPDIS

LN type	LN prefix	LN class	Function block name
ZQDLLN0 instance 1 (revision 0)	-	LLN0	ZQDPDIS
ZQDPDIS instance 1 (revision 0)	ZQD	PDIS	ZQDPDIS
ZQDPDIS instance 2 (revision 0)	ZQD	PDIS	ZQDPDIS
ZQDPDIS instance 3 (revision 0)	ZQD	PDIS	ZQDPDIS
ZQDPDIS instance 4 (revision 0)	ZQD	PDIS	ZQDPDIS
ZQDPDIS instance 5 (revision 0)	ZQD	PDIS	ZQDPDIS
ZQDPTRC instance 1 (revision 0)	ZQD	PTRC	ZQDPDIS

Table 16: ZQDLLN0 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	Mode status value parameter for 61850
t	ST	-	-	Mon	Mode status value parameter for 61850		

Table continues on next page

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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850

Table 17: ZQDPDIS 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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	STZ1	Mon	Start zone 1
		q	ST	-	STZ1	Mon	Start zone 1
		t	ST	-	STZ1	Mon	Start zone 1
Op	b_dACT	general	ST	T	TRZ1	Mon	Trip zone 1
		q	ST	T	TRZ1	Mon	Trip zone 1
		t	ST	T	TRZ1	Mon	Trip zone 1
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850
StrUnDir	v2_dACD	general	ST	-	STND1	Mon	Non-directional start, issued from any phase or loop,zone 1
		q	ST	-	STND1	Mon	Non-directional start, issued from any phase or loop,zone 1
		t	ST	-	STND1	Mon	Non-directional start, issued from any phase or loop,zone 1

Table 18: ZQDPDIS Logical node data (instance 2)

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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	STZ2	Mon	Start zone 2
		q	ST	-	STZ2	Mon	Start zone 2
		t	ST	-	STZ2	Mon	Start zone 2
Op	b_dACT	general	ST	T	TRZ2	Mon	Trip zone 2
		q	ST	T	TRZ2	Mon	Trip zone 2
		t	ST	T	TRZ2	Mon	Trip zone 2

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850
StrUnDir	v2_dACD	general	ST	-	STND2	Mon	Non-directional start, issued from any phase or loop, zone 2
		q	ST	-	STND2	Mon	Non-directional start, issued from any phase or loop, zone 2
		t	ST	-	STND2	Mon	Non-directional start, issued from any phase or loop, zone 2

Table 19: *ZQDPDIS 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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	STZ3	Mon	Start zone 3
		q	ST	-	STZ3	Mon	Start zone 3
		t	ST	-	STZ3	Mon	Start zone 3
Op	b_dACT	general	ST	T	TRZ3	Mon	Trip zone 3
		q	ST	T	TRZ3	Mon	Trip zone 3
		t	ST	T	TRZ3	Mon	Trip zone 3
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850
StrUnDir	v2_dACD	general	ST	-	STND3	Mon	Non-directional start, issued from any phase or loop,zone 3
		q	ST	-	STND3	Mon	Non-directional start, issued from any phase or loop,zone 3
		t	ST	-	STND3	Mon	Non-directional start, issued from any phase or loop,zone 3

Table 20: *ZQDPDIS Logical node data (instance 4)*

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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	STZ4	Mon	Start zone 4
		q	ST	-	STZ4	Mon	Start zone 4
		t	ST	-	STZ4	Mon	Start zone 4
Op	b_dACT	general	ST	T	TRZ4	Mon	Trip zone 4
		q	ST	T	TRZ4	Mon	Trip zone 4
		t	ST	T	TRZ4	Mon	Trip zone 4
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850
StrUnDir	v2_dACD	general	ST	-	STND4	Mon	Non-directional start, issued from any phase or loop, zone 4
		q	ST	-	STND4	Mon	Non-directional start, issued from any phase or loop, zone 4
		t	ST	-	STND4	Mon	Non-directional start, issued from any phase or loop, zone 4

Table 21: *ZQDPDIS Logical node data (instance 5)*

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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	STZ5	Mon	Start zone 5
		q	ST	-	STZ5	Mon	Start zone 5
		t	ST	-	STZ5	Mon	Start zone 5
Op	b_dACT	general	ST	T	TRZ5	Mon	Trip zone 5
		q	ST	T	TRZ5	Mon	Trip zone 5
		t	ST	T	TRZ5	Mon	Trip zone 5
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
StrUnDir	v2_dACD	general	ST	-	STND5	Mon	Non-directional start, issued from any phase or loop, zone 5
		q	ST	-	STND5	Mon	Non-directional start, issued from any phase or loop, zone 5
		t	ST	-	STND5	Mon	Non-directional start, issued from any phase or loop, zone 5

Table 22: ZQDPTRC 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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	START	Mon	General start signal
		q	ST	-	START	Mon	General start signal
		t	ST	-	START	Mon	General start signal
Op	b_dACT	general	ST	T	TRIP	Mon	General trip signal
		q	ST	T	TRIP	Mon	General trip signal
		t	ST	T	TRIP	Mon	General trip signal
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

7.5.2.2

Phase selection with load encroachment, quadrilateral characteristic FDPSPDIS

LN type	LN prefix	LN class	Function block name
FDPSPDIS (revision 1)	FDPS	PDIS	FDPSPDIS

Table 23: FDPSPDIS 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

Table continues on next page

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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	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value 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
Str	b_dACD	general	ST	-	START	Mon	Start in any phase or loop
		q	ST	-	START	Mon	Start in any phase or loop
		t	ST	-	START	Mon	Start in any phase or loop
Op	b_dACT	general	ST	T	TRIP	Mon	Trip output
		q	ST	T	TRIP	Mon	Trip output
		t	ST	T	TRIP	Mon	Trip output
StrCndZ	v1_dINS	stVal	ST	-	STCNDZI	Mon	Start condition (Z< with LE and/or I> and 3I0 E/F detection)
		q	ST	-	STCNDZI	Mon	Start condition (Z< with LE and/or I> and 3I0 E/F detection)
		t	ST	-	STCNDZI	Mon	Start condition (Z< with LE and/or I> and 3I0 E/F detection)
StrCndA	v1_dINS	stVal	ST	-	STCNDLE	Mon	Start condition (only LE and 3I0 E/F detection)
		q	ST	-	STCNDLE	Mon	Start condition (only LE and 3I0 E/F detection)
		t	ST	-	STCNDLE	Mon	Start condition (only LE and 3I0 E/F detection)
StrFwdPhA	v1_dSPS	stVal	ST	-	STFWL1	Mon	Fault detected in phase L1 - forward direction
		q	ST	-	STFWL1	Mon	Fault detected in phase L1 - forward direction
		t	ST	-	STFWL1	Mon	Fault detected in phase L1 - forward direction
StrFwdPhB	v1_dSPS	stVal	ST	-	STFWL2	Mon	Fault detected in phase L2 - forward direction
		q	ST	-	STFWL2	Mon	Fault detected in phase L2 - forward direction
		t	ST	-	STFWL2	Mon	Fault detected in phase L2 - forward direction
StrFwdPhC	v1_dSPS	stVal	ST	-	STFWL3	Mon	Fault detected in phase L3 - forward direction
		q	ST	-	STFWL3	Mon	Fault detected in phase L3 - forward direction

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
StrFwdPhC	v1_dSPS	t	ST	-	STFWL3	Mon	Fault detected in phase L3 - forward direction
StrFwdGnd	v1_dSPS	stVal	ST	-	STFWPE	Mon	Earth fault detected in forward direction
		q	ST	-	STFWPE	Mon	Earth fault detected in forward direction
		t	ST	-	STFWPE	Mon	Earth fault detected in forward direction
StrRvPhA	v1_dSPS	stVal	ST	-	STRVL1	Mon	Fault detected in phase L1 - reverse direction
		q	ST	-	STRVL1	Mon	Fault detected in phase L1 - reverse direction
		t	ST	-	STRVL1	Mon	Fault detected in phase L1 - reverse direction
StrRvPhB	v1_dSPS	stVal	ST	-	STRVL2	Mon	Fault detected in phase L2 - reverse direction
		q	ST	-	STRVL2	Mon	Fault detected in phase L2 - reverse direction
		t	ST	-	STRVL2	Mon	Fault detected in phase L2 - reverse direction
StrRvPhC	v1_dSPS	stVal	ST	-	STRVL3	Mon	Fault detected in phase L3 - reverse direction
		q	ST	-	STRVL3	Mon	Fault detected in phase L3 - reverse direction
		t	ST	-	STRVL3	Mon	Fault detected in phase L3 - reverse direction
StrRvGnd	v1_dSPS	stVal	ST	-	STRVPE	Mon	Earth fault detected in reverse direction
		q	ST	-	STRVPE	Mon	Earth fault detected in reverse direction
		t	ST	-	STRVPE	Mon	Earth fault detected in reverse direction
StrNDPhA	v1_dSPS	stVal	ST	-	STNDL1	Mon	Non directional start in L1
		q	ST	-	STNDL1	Mon	Non directional start in L1
		t	ST	-	STNDL1	Mon	Non directional start in L1
StrNDPhB	v1_dSPS	stVal	ST	-	STNDL2	Mon	Non directional start in L2
		q	ST	-	STNDL2	Mon	Non directional start in L2
		t	ST	-	STNDL2	Mon	Non directional start in L2
StrNDPhC	v1_dSPS	stVal	ST	-	STNDL3	Mon	Non directional start in L3
		q	ST	-	STNDL3	Mon	Non directional start in L3
		t	ST	-	STNDL3	Mon	Non directional start in L3
StrNDGnd	v1_dSPS	stVal	ST	-	STNDPE	Mon	Non directional start, Phase-Earth
		q	ST	-	STNDPE	Mon	Non directional start, Phase-Earth
		t	ST	-	STNDPE	Mon	Non directional start, Phase-Earth

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str1Ph	v1_dSPS	stVal	ST	-	STFW1PH	Mon	Start in forward direction for single-phase fault
		q	ST	-	STFW1PH	Mon	Start in forward direction for single-phase fault
		t	ST	-	STFW1PH	Mon	Start in forward direction for single-phase fault
Str2Ph	v1_dSPS	stVal	ST	-	STFW2PH	Mon	Start in forward direction for two-phase fault
		q	ST	-	STFW2PH	Mon	Start in forward direction for two-phase fault
		t	ST	-	STFW2PH	Mon	Start in forward direction for two-phase fault
Str3Ph	v1_dSPS	stVal	ST	-	STFW3PH	Mon	Start in forward direction for three-phase fault
		q	ST	-	STFW3PH	Mon	Start in forward direction for three-phase fault
		t	ST	-	STFW3PH	Mon	Start in forward direction for three-phase fault
RelGnd	v1_dSPS	stVal	ST	-	STPE	Mon	Current conditions release of Phase-Earth measuring elements
		q	ST	-	STPE	Mon	Current conditions release of Phase-Earth measuring elements
		t	ST	-	STPE	Mon	Current conditions release of Phase-Earth measuring elements
RelPP	v1_dSPS	stVal	ST	-	STPP	Mon	Current conditions release of Phase-Phase measuring elements
		q	ST	-	STPP	Mon	Current conditions release of Phase-Phase measuring elements
		t	ST	-	STPP	Mon	Current conditions release of Phase-Phase measuring elements

7.5.2.3

Five zone distance protection, mho characteristic ZMOPDIS

LN type	LN prefix	LN class	Function block name
ZMOLLN0 instance 1 (revision 0)	-	LLN0	ZMOPDIS
ZMOPDIS instance 1 (revision 0)	ZMO	PDIS	ZMOPDIS
ZMOPDIS instance 2 (revision 0)	ZMO	PDIS	ZMOPDIS
ZMOPDIS instance 3 (revision 0)	ZMO	PDIS	ZMOPDIS
ZMOPDIS instance 4 (revision 0)	ZMO	PDIS	ZMOPDIS
ZMOPDIS instance 5 (revision 0)	ZMO	PDIS	ZMOPDIS
ZMOPTRC instance 1 (revision 0)	ZMO	PTRC	ZMOPDIS

Table 24: ZMOLLN0 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	Mode status value parameter for 61850
t	ST	-	-		Mon	Mode status value 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

Table 25: ZMOPDIS 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	Behaviour parameter for 61850
		t	ST	-	Beh		Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	STZ1		Mon	Start zone 1
		q	ST	-	STZ1		Mon	Start zone 1
		t	ST	-	STZ1		Mon	Start zone 1
Op	b_dACT	general	ST	T	TRZ1		Mon	Trip zone 1
		q	ST	T	TRZ1		Mon	Trip zone 1
		t	ST	T	TRZ1		Mon	Trip zone 1
Mod	c_dINC	stVal	ST	-	-		Mon	Mode status value parameter for 61850
		q	ST	-	-		Mon	Mode status value parameter for 61850
		t	ST	-	-		Mon	Mode status value parameter for 61850

Table 26: *ZMOPDIS Logical node data (instance 2)*

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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	STZ2	Mon	Start zone 2
		q	ST	-	STZ2	Mon	Start zone 2
		t	ST	-	STZ2	Mon	Start zone 2
Op	b_dACT	general	ST	T	TRZ2	Mon	Trip zone 2
		q	ST	T	TRZ2	Mon	Trip zone 2
		t	ST	T	TRZ2	Mon	Trip zone 2
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

Table 27: *ZMOPDIS 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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	STZ3	Mon	Start zone 3
		q	ST	-	STZ3	Mon	Start zone 3
		t	ST	-	STZ3	Mon	Start zone 3
Op	b_dACT	general	ST	T	TRZ3	Mon	Trip zone 3
		q	ST	T	TRZ3	Mon	Trip zone 3
		t	ST	T	TRZ3	Mon	Trip zone 3
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

Table 28: *ZMOPDIS Logical node data (instance 4)*

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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	STZ4	Mon	Start zone 4
		q	ST	-	STZ4	Mon	Start zone 4
		t	ST	-	STZ4	Mon	Start zone 4
Op	b_dACT	general	ST	T	TRZ4	Mon	Trip zone 4
		q	ST	T	TRZ4	Mon	Trip zone 4
		t	ST	T	TRZ4	Mon	Trip zone 4
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

Table 29: *ZMOPDIS Logical node data (instance 5)*

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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	STZ5	Mon	Start zone 5
		q	ST	-	STZ5	Mon	Start zone 5
		t	ST	-	STZ5	Mon	Start zone 5
Op	b_dACT	general	ST	T	TRZ5	Mon	Trip zone 5
		q	ST	T	TRZ5	Mon	Trip zone 5
		t	ST	T	TRZ5	Mon	Trip zone 5
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

Table 30: ZMOPTRC 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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	START	Mon	Start general
		q	ST	-	START	Mon	Start general
		t	ST	-	START	Mon	Start general
Op	b_dACT	general	ST	T	TRIP	Mon	Trip general
		q	ST	T	TRIP	Mon	Trip general
		t	ST	T	TRIP	Mon	Trip general
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

7.5.2.4 Faulty phase identification with load encroachment for mho FMPSPDIS

LN type	LN prefix	LN class	Function block name
FMPSPDIS (revision 1)	FMPS	PDIS	FMPSPDIS

Table 31: FMPSPDIS Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Op	a_dACT	general	ST	T	START	Mon	General start signal
		phsA	ST	T	STL1	Mon	Fault detected in phase L1
		phsB	ST	T	STL2	Mon	Fault detected in phase L2
		phsC	ST	T	STL3	Mon	Fault detected in phase L3
		q	ST	T	START	Mon	General start signal
		t	ST	T	START	Mon	General start signal
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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Mod	a_dINC	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
Str	e_dACD	general	ST	-	START	Mon	General start signal
		phsA	ST	-	STL1	Mon	Fault detected in phase L1
		phsB	ST	-	STL2	Mon	Fault detected in phase L2
		phsC	ST	-	STL3	Mon	Fault detected in phase L3
		neut	ST	-	STPE	Mon	Earth fault detected
		q	ST	-	START	Mon	General start signal
		t	ST	-	START	Mon	General start signal

7.5.3 Directional overpower PDOP

7.5.3.1 Directional Over-power protection GOPPDOP

LN type	LN prefix	LN class	Function block name
GOPPDOP (revision 1)	GOP	PDOP	GOPPDOP

Table 32: GOPPDOP 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	Mode status value parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Behaviour parameter for 61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Beh	a_dINS	t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	START	Mon	General start signal
		q	ST	-	START	Mon	General start signal
		t	ST	-	START	Mon	General start signal
Op	b_dACT	general	ST	T	TRIP	Mon	General trip signal
		q	ST	T	TRIP	Mon	General trip signal
		t	ST	T	TRIP	Mon	General trip signal
OpZ1	v1_dSPS	stVal	ST	-	TRIP1	Mon	Trip signal from stage 1
		q	ST	-	TRIP1	Mon	Trip signal from stage 1
		t	ST	-	TRIP1	Mon	Trip signal from stage 1
OpZ2	v1_dSPS	stVal	ST	-	TRIP2	Mon	Trip signal from stage 2
		q	ST	-	TRIP2	Mon	Trip signal from stage 2
		t	ST	-	TRIP2	Mon	Trip signal from stage 2
StrZ1	v1_dSPS	stVal	ST	-	START1	Mon	Start signal from stage 1
		q	ST	-	START1	Mon	Start signal from stage 1
		t	ST	-	START1	Mon	Start signal from stage 1
StrZ2	v1_dSPS	stVal	ST	-	START2	Mon	Start signal from stage 2
		q	ST	-	START2	Mon	Start signal from stage 2
		t	ST	-	START2	Mon	Start signal from stage 2
MW	v2_dMV	mag.f	MX	-	P	Mon	Active Power
		q	MX	-	P	Mon	Active Power
		t	MX	-	P	Mon	Active Power
MVAr	v2_dMV	mag.f	MX	-	Q	Mon	Reactive power
		q	MX	-	Q	Mon	Reactive power
		t	MX	-	Q	Mon	Reactive power

7.5.4 Directional underpower PDUP

7.5.4.1 Directional Under-power protection GUPPDUP

LN type	LN prefix	LN class	Function block name
GUPPDUP (revision 1)	GUP	PDUP	GUPPDUP

Table 33: GUPPDUP 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	Mode status value parameter for 61850
t	ST	-	-		Mon	Mode status value 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
Str	b_dACD	general	ST	-	START		Mon	General start signal
		q	ST	-	START		Mon	General start signal
		t	ST	-	START		Mon	General start signal
Op	b_dACT	general	ST	T	TRIP		Mon	General trip signal
		q	ST	T	TRIP		Mon	General trip signal
		t	ST	T	TRIP		Mon	General trip signal
OpZ1	v1_dSPS	stVal	ST	-	TRIP1		Mon	Trip signal from stage 1
		q	ST	-	TRIP1		Mon	Trip signal from stage 1
		t	ST	-	TRIP1		Mon	Trip signal from stage 1
OpZ2	v1_dSPS	stVal	ST	-	TRIP2		Mon	Trip signal from stage 2
		q	ST	-	TRIP2		Mon	Trip signal from stage 2
		t	ST	-	TRIP2		Mon	Trip signal from stage 2
StrZ1	v1_dSPS	stVal	ST	-	START1		Mon	Start signal from stage 1
		q	ST	-	START1		Mon	Start signal from stage 1
		t	ST	-	START1		Mon	Start signal from stage 1
StrZ2	v1_dSPS	stVal	ST	-	START2		Mon	Start signal from stage 2
		q	ST	-	START2		Mon	Start signal from stage 2
		t	ST	-	START2		Mon	Start signal from stage 2
MW	v2_dMV	mag.f	MX	-	P		Mon	Active Power
		q	MX	-	P		Mon	Active Power
		t	MX	-	P		Mon	Active Power

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
MVAr	v2_dMV	mag.f	MX	-	Q	Mon	Reactive power
		q	MX	-	Q	Mon	Reactive power
		t	MX	-	Q	Mon	Reactive power

7.5.5 Rate of change of frequency PFRC

7.5.5.1 Rate-of-change frequency function SAPFRC

LN type	LN prefix	LN class	Function block name
SAPFRC (revision 1)	SA	PFRC	SAPFRC

Table 34: SAPFRC 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	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
Str	b_dACD	general	ST	-	START	Mon	Start/pick-up signal for frequency gradient
		q	ST	-	START	Mon	Start/pick-up signal for frequency gradient
		t	ST	-	START	Mon	Start/pick-up signal for frequency gradient
Op	b_dACT	general	ST	T	TRIP	Mon	Operate/trip signal for frequency gradient
		q	ST	T	TRIP	Mon	Operate/trip signal for frequency gradient
		t	ST	T	TRIP	Mon	Operate/trip signal for frequency gradient
BlkLoMg	v1_dSPS	stVal	ST	-	BLKDMAGN	Mon	Blocking indication due to low amplitude

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
BlkLoMg	v1_dSPS	q	ST	-	BLKDMAGN	Mon	Blocking indication due to low amplitude
		t	ST	-	BLKDMAGN	Mon	Blocking indication due to low amplitude
RestLd	v1_dSPS	stVal	ST	-	RESTORE	Mon	Restore signal for load restoring purposes
		q	ST	-	RESTORE	Mon	Restore signal for load restoring purposes
		t	ST	-	RESTORE	Mon	Restore signal for load restoring purposes

7.5.6 Instantaneous overcurrent PIOC

7.5.6.1 Instantaneous phase overcurrent protection PHPIOC

LN type	LN prefix	LN class	Function block name
PHPIOC (revision 1)	PH	PIOC	PHPIOC

Table 35: PHPIOC 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	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	TRIP	Mon	General trip signal
		q	ST	T	TRIP	Mon	General trip signal
		t	ST	T	TRIP	Mon	General trip signal

7.5.6.2 Instantaneous residual overcurrent protection EFPIOC

LN type	LN prefix	LN class	Function block name
EFPIOC (revision 1)	EF	PIOC	EFPIOC

Table 36: EFPIOC 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	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	TRIP		Mon	Trip signal
		q	ST	T	TRIP		Mon	Trip signal
		t	ST	T	TRIP		Mon	Trip signal

7.5.7 Local acceleration logic PLAL

7.5.7.1 Local acceleration logic ZCLCPLAL

LN type	LN prefix	LN class	Function block name
ZCLCPLAL (revision 1)	ZCLC	PLAL	ZCLCPLAL

Table 37: ZCLCPLAL 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

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	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
OpLosLod	v2_dACT	general	ST	-	TRLL	Mon	Trip by loss of load
		q	ST	-	TRLL	Mon	Trip by loss of load
		t	ST	-	TRLL	Mon	Trip by loss of load
OpZnExd	v2_dACT	general	ST	-	TRZE	Mon	Trip by zone extension
		q	ST	-	TRZE	Mon	Trip by zone extension
		t	ST	-	TRZE	Mon	Trip by zone extension

7.5.8 Protection scheme PSCH

7.5.8.1 Scheme communication logic for distance or overcurrent protection ZCPSCH

LN type	LN prefix	LN class	Function block name
ZCPSCH (revision 1)	ZC	PSCH	ZCPSCH

Table 38: ZCPSCH 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	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Beh	a_dINS	q	ST	-	Beh	Mon	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
LosOfGrd	a_dSPS	stVal	ST	-	LCG	Mon	Loss of carrier guard signal
		q	ST	-	LCG	Mon	Loss of carrier guard signal
		t	ST	-	LCG	Mon	Loss of carrier guard signal
ProRx	a_dSPS	stVal	ST	T	-	Mon	Carrier signal received or missing carrier guard signal
		q	ST	T	-	Mon	Carrier signal received or missing carrier guard signal
		t	ST	T	-	Mon	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	Teleprotection signal transmitted for a forward fault
		t	ST	T	-	Mon	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	Carrier Send signal
		t	ST	-	CS	Mon	Carrier Send signal
CarRx	b_dACT	general	ST	-	CRL	Mon	Carrier signal received or missing carrier guard signal
		q	ST	-	CRL	Mon	Carrier signal received or missing carrier guard signal
		t	ST	-	CRL	Mon	Carrier signal received or missing carrier guard signal
Op	b_dACT	general	ST	T	TRIP	Mon	Trip output
		q	ST	T	TRIP	Mon	Trip output
		t	ST	T	TRIP	Mon	Trip output

7.5.8.2

Current reversal and weak-end infeed logic for distance protection ZCRWPSCH

LN type	LN prefix	LN class	Function block name
ZCRWPSCH (revision 2)	ZCRW	PSCH	ZCRWPSCH

Table 39: ZCRWPSCH Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Op	a_dACT	general	ST	T	TRWEI	Mon	Trip of WEI logic
		phsA	ST	T	-	Mon	Trip of WEI logic in phase L1
		phsB	ST	T	-	Mon	Trip of WEI logic in phase L2
		phsC	ST	T	-	Mon	Trip of WEI logic in phase L3
		q	ST	T	TRWEI	Mon	Trip of WEI logic
		t	ST	T	TRWEI	Mon	Trip 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	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
ProRx	a_dSPS	stVal	ST	T	-	Mon	POR Carrier signal received from remote end
		q	ST	T	-	Mon	POR Carrier signal received from remote end
		t	ST	T	-	Mon	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	Carrier send by WEI logic
		t	ST	T	ECHO	Mon	Carrier send by WEI logic
Str	b_dACD	general	ST	-	ECHO	Mon	Carrier send by WEI logic
		q	ST	-	ECHO	Mon	Carrier send by WEI logic
		t	ST	-	ECHO	Mon	Carrier send by WEI logic
Echo	b_dACT	general	ST	-	ECHO	Mon	Carrier send by WEI logic
		q	ST	-	ECHO	Mon	Carrier send by WEI logic
		t	ST	-	ECHO	Mon	Carrier send by WEI logic
RvABIk	b_dACT	general	ST	-	IRVL	Mon	Operation of current reversal logic
		q	ST	-	IRVL	Mon	Operation of current reversal logic
		t	ST	-	IRVL	Mon	Operation of current reversal logic

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
WeiOp	b_dACT	general	ST	-	TRWEI	Mon	Trip of WEI logic
		q	ST	-	TRWEI	Mon	Trip of WEI logic
		t	ST	-	TRWEI	Mon	Trip of WEI logic

7.5.8.3 Scheme communication logic for residual overcurrent protection ECPSCH

LN type	LN prefix	LN class	Function block name
ECPSCH (revision 1)	EC	PSCH	ECPSCH

Table 40: ECPSCH 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	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
ProRx	a_dSPS	stVal	ST	T	-	Mon	Teleprotection signal received for a forward fault
		q	ST	T	-	Mon	Teleprotection signal received for a forward fault
		t	ST	T	-	Mon	Teleprotection signal received for a forward fault
ProTx	a_dSPS	stVal	ST	T	-	Mon	Teleprotection signal transmitted for a forward fault
		q	ST	T	-	Mon	Teleprotection signal transmitted for a forward fault
		t	ST	T	-	Mon	Teleprotection signal transmitted for a forward fault
LosOfGrd	a_dSPS	stVal	ST	-	LCG	Mon	loss of carrier guard signal
		q	ST	-	LCG	Mon	loss of carrier guard signal
		t	ST	-	LCG	Mon	loss of carrier guard signal

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
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	Carrier Send by Communication Scheme Logic
		t	ST	-	CS	Mon	Carrier Send by Communication Scheme Logic
Op	b_dACT	general	ST	T	TRIP	Mon	Trip by Communication Scheme Logic
		q	ST	T	TRIP	Mon	Trip by Communication Scheme Logic
		t	ST	T	TRIP	Mon	Trip by Communication Scheme Logic
CarRx	b_dACT	general	ST	-	CRL	Mon	Carrier Receive from Communication Scheme Logic
		q	ST	-	CRL	Mon	Carrier Receive from Communication Scheme Logic
		t	ST	-	CRL	Mon	Carrier Receive from Communication Scheme Logic

7.5.8.4

Current reversal and weak-end infeed logic for residual overcurrent protection ECRWPSCH

LN type	LN prefix	LN class	Function block name
ECRWPSCH (revision 2)	ECRW	PSCH	ECRWPSCH

Table 41: ECRWPSCH 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	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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Beh	a_dINS	t	ST	-	Beh	Mon	Behaviour parameter for 61850
ProRx	a_dSPS	stVal	ST	T	CR	Mon	POR Carrier signal received from remote end
		q	ST	T	CR	Mon	POR Carrier signal received from remote end
		t	ST	T	CR	Mon	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	Carrier send by WEI logic
		t	ST	T	ECHO	Mon	Carrier send by WEI logic
Str	b_dACD	general	ST	-	ECHO	Mon	Carrier send by WEI logic
		q	ST	-	ECHO	Mon	Carrier send by WEI logic
		t	ST	-	ECHO	Mon	Carrier send by WEI logic
RvABlk	b_dACT	general	ST	-	IRVL	Mon	Operation of current reversal logic
		q	ST	-	IRVL	Mon	Operation of current reversal logic
		t	ST	-	IRVL	Mon	Operation of current reversal logic
Echo	b_dACT	general	ST	-	ECHO	Mon	Carrier send by WEI logic
		q	ST	-	ECHO	Mon	Carrier send by WEI logic
		t	ST	-	ECHO	Mon	Carrier send by WEI logic
WeiOp	b_dACT	general	ST	-	TRWEI	Mon	Trip of WEI logic
		q	ST	-	TRWEI	Mon	Trip of WEI logic
		t	ST	-	TRWEI	Mon	Trip of WEI logic

7.5.9 Sensitive directional earthfault PSDE

7.5.9.1 Sensitive Directional residual over current and power protection SDEPSDE

LN type	LN prefix	LN class	Function block name
SDEPSDE (revision 1)	SDE	PSDE	SDEPSDE

Table 42: SDEPSDE Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Mod	a_dINC	Oper.ctfVal	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.ctfNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	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.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	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
Str	b_dACD	general	ST	-	START	Mon	General start signal
		dirGeneral	ST	-	STDIR	Mon	Direction of fault
		q	ST	-	START	Mon	General start signal
		t	ST	-	START	Mon	General start signal
Op	b_dACT	general	ST	T	TRIP	Mon	General trip signal
		q	ST	T	TRIP	Mon	General trip signal
		t	ST	T	TRIP	Mon	General trip signal
OpResA	v1_dSPS	stVal	ST	-	TRNDIN	Mon	Trip of non-directional residual overcurrent
		q	ST	-	TRNDIN	Mon	Trip of non-directional residual overcurrent
		t	ST	-	TRNDIN	Mon	Trip of non-directional residual overcurrent
OpResV	v1_dSPS	stVal	ST	-	TRUN	Mon	Trip of non-directional residual overvoltage
		q	ST	-	TRUN	Mon	Trip of non-directional residual overvoltage
		t	ST	-	TRUN	Mon	Trip of non-directional residual overvoltage
StrResA	v1_dSPS	stVal	ST	-	STNDIN	Mon	Start of non directional residual overcurrent
		q	ST	-	STNDIN	Mon	Start of non directional residual overcurrent
		t	ST	-	STNDIN	Mon	Start of non directional residual overcurrent
StrResV	v1_dSPS	stVal	ST	-	STUN	Mon	Start of non directional residual overvoltage
		q	ST	-	STUN	Mon	Start of non directional residual overvoltage
		t	ST	-	STUN	Mon	Start of non directional residual overvoltage
StrDirResA	v1_dSPS	stVal	ST	-	STDIRIN	Mon	Start of the directional residual overcurrent function
		q	ST	-	STDIRIN	Mon	Start of the directional residual overcurrent function
		t	ST	-	STDIRIN	Mon	Start of the directional residual overcurrent function

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
OpDirResA	v1_dSPS	stVal	ST	-	TRDIRIN	Mon	Trip of the directional residual overcurrent
		q	ST	-	TRDIRIN	Mon	Trip of the directional residual overcurrent
		t	ST	-	TRDIRIN	Mon	Trip of the directional residual overcurrent
AngAV	v2_dMV	mag.f	MX	-	ANG FI-RCA	Mon	Angle between 3U0 and 3I0 minus RCA (Fi-RCA)
		q	MX	-	ANG FI-RCA	Mon	Angle between 3U0 and 3I0 minus RCA (Fi-RCA)
		t	MX	-	ANG FI-RCA	Mon	Angle between 3U0 and 3I0 minus RCA (Fi-RCA)
ResA	v2_dMV	mag.f	MX	-	IN	Mon	Measured magnitude of the residual current 3I0
		q	MX	-	IN	Mon	Measured magnitude of the residual current 3I0
		t	MX	-	IN	Mon	Measured magnitude of the residual current 3I0
ResV	v2_dMV	mag.f	MX	-	UN	Mon	Measured magnitude of the residual voltage 3U0
		q	MX	-	UN	Mon	Measured magnitude of the residual voltage 3U0
		t	MX	-	UN	Mon	Measured magnitude of the residual voltage 3U0
ResP	v2_dMV	mag.f	MX	-	SN	Mon	Measured magnitude of residual power 3I03U0cos(Fi-RCA)
		q	MX	-	SN	Mon	Measured magnitude of residual power 3I03U0cos(Fi-RCA)
		t	MX	-	SN	Mon	Measured magnitude of residual power 3I03U0cos(Fi-RCA)

7.5.10 Switch onto fault logic PSOF

7.5.10.1 Automatic switch onto fault logic, voltage and current based ZCVPSOF

LN type	LN prefix	LN class	Function block name
ZCVPSOF (revision 2)	ZCV	PSOF	ZCVPSOF

Table 43: ZCVPSOF 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

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
		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	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	-	TRIP	Mon	Trip output
		q	ST	-	TRIP	Mon	Trip output
		t	ST	-	TRIP	Mon	Trip output

7.5.11 Time over current PTOC

7.5.11.1 Four step residual overcurrent protection EF4PTOC

LN type	LN prefix	LN class	Function block name
EF4LLN0 instance 1 (revision 2)	-	LLN0	EF4PTOC
EF4PTRC instance 1 (revision 2)	EF4	PTRC	EF4PTOC
EF4RDIR instance 1 (revision 2)	EF4	RDIR	EF4PTOC
GEN4PHAR instance 1 (revision 2)	EF4	PHAR	EF4PTOC
PH1PTOC instance 1 (revision 2)	EF4	PTOC	EF4PTOC
PH1PTOC instance 2 (revision 2)	EF4	PTOC	EF4PTOC
PH1PTOC instance 3 (revision 2)	EF4	PTOC	EF4PTOC
PH1PTOC instance 4 (revision 2)	EF4	PTOC	EF4PTOC

Table 44: EF4LLN0 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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Mod	a_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value 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

Table 45: *EF4PTRC 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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	START	Mon	General start signal
		q	ST	-	START	Mon	General start signal
		t	ST	-	START	Mon	General start signal
Op	b_dACT	general	ST	T	TRIP	Mon	General trip signal
		q	ST	T	TRIP	Mon	General trip signal
		t	ST	T	TRIP	Mon	General trip signal
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

Table 46: *EF4RDIR 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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Dir	b_dACD	general	ST	-	-	Mon	Fault direction coded as integer
		q	ST	-	-	Mon	Fault direction coded as integer
		t	ST	-	-	Mon	Fault direction coded as integer

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

Table 47: GEN4PHAR 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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	2NDHARMD	Mon	2nd harmonic block signal
		q	ST	-	2NDHARMD	Mon	2nd harmonic block signal
		t	ST	-	2NDHARMD	Mon	2nd harmonic block signal
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

Table 48: PH1PTOC 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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	STIN1	Mon	Start signal step 1
		q	ST	-	STIN1	Mon	Start signal step 1
		t	ST	-	STIN1	Mon	Start signal step 1
Op	b_dACT	general	ST	T	TRIN1	Mon	Trip signal from step 1
		q	ST	T	TRIN1	Mon	Trip signal from step 1
		t	ST	T	TRIN1	Mon	Trip signal from step 1
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

Table 49: *PH1PTOC Logical node data (instance 2)*

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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	STIN2	Mon	Start signal step 2
		q	ST	-	STIN2	Mon	Start signal step 2
		t	ST	-	STIN2	Mon	Start signal step 2
Op	b_dACT	general	ST	T	TRIN2	Mon	Trip signal from step 2
		q	ST	T	TRIN2	Mon	Trip signal from step 2
		t	ST	T	TRIN2	Mon	Trip signal from step 2
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

Table 50: *PH1PTOC 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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	STIN3	Mon	Start signal step 3
		q	ST	-	STIN3	Mon	Start signal step 3
		t	ST	-	STIN3	Mon	Start signal step 3
Op	b_dACT	general	ST	T	TRIN3	Mon	Trip signal from step 3
		q	ST	T	TRIN3	Mon	Trip signal from step 3
		t	ST	T	TRIN3	Mon	Trip signal from step 3
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

Table 51: *PH1PTOC Logical node data (instance 4)*

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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	STIN4	Mon	Start signal step 4
		q	ST	-	STIN4	Mon	Start signal step 4
		t	ST	-	STIN4	Mon	Start signal step 4
Op	b_dACT	general	ST	T	TRIN4	Mon	Trip signal from step 4
		q	ST	T	TRIN4	Mon	Trip signal from step 4
		t	ST	T	TRIN4	Mon	Trip signal from step 4
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

7.5.11.2

Four step phase overcurrent protection OC4PTOC

LN type	LN prefix	LN class	Function block name
GEN4PHAR instance 1 (revision 2)	OC4	PHAR	OC4PTOC
OC4LLN0 instance 1 (revision 1)	-	LLN0	OC4PTOC
PH3PTOC instance 1 (revision 1)	OC4	PTOC	OC4PTOC
PH3PTOC instance 2 (revision 1)	OC4	PTOC	OC4PTOC
PH3PTOC instance 3 (revision 1)	OC4	PTOC	OC4PTOC
PH3PTOC instance 4 (revision 1)	OC4	PTOC	OC4PTOC
PH3PTRC instance 1 (revision 1)	OC4	PTRC	OC4PTOC

Table 52: *GEN4PHAR 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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	-	Mon	Block from second harmonic detection
		q	ST	-	-	Mon	Block from second harmonic detection
		t	ST	-	-	Mon	Block from second harmonic detection

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850

Table 53: OC4LLN0 Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Mod	a_dINC	Oper.ctfVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter
		Oper.ctfNum	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	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

Table 54: PH3PTOC 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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	ST1	Mon	Start signal from step 1
		q	ST	-	ST1	Mon	Start signal from step 1
		t	ST	-	ST1	Mon	Start signal from step 1
Op	b_dACT	general	ST	T	TR1	Mon	Trip signal from step 1
		q	ST	T	TR1	Mon	Trip signal from step 1
		t	ST	T	TR1	Mon	Trip signal from step 1
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850

Table 55: *PH3PTOC Logical node data (instance 2)*

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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	ST2	Mon	Start signal from step 2
		q	ST	-	ST2	Mon	Start signal from step 2
		t	ST	-	ST2	Mon	Start signal from step 2
Op	b_dACT	general	ST	T	TR2	Mon	Trip signal from step 2
		q	ST	T	TR2	Mon	Trip signal from step 2
		t	ST	T	TR2	Mon	Trip signal from step 2
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850

Table 56: *PH3PTOC 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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	ST3	Mon	Start signal from step 3
		q	ST	-	ST3	Mon	Start signal from step 3
		t	ST	-	ST3	Mon	Start signal from step 3
Op	b_dACT	general	ST	T	TR3	Mon	Trip signal from step 3
		q	ST	T	TR3	Mon	Trip signal from step 3
		t	ST	T	TR3	Mon	Trip signal from step 3
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850

Table 57: *PH3PTOC Logical node data (instance 4)*

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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	ST4	Mon	Start signal from step 4
		q	ST	-	ST4	Mon	Start signal from step 4

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str	b_dACD	t	ST	-	ST4	Mon	Start signal from step 4
Op	b_dACT	general	ST	T	TR4	Mon	Trip signal from step 4
		q	ST	T	TR4	Mon	Trip signal from step 4
		t	ST	T	TR4	Mon	Trip signal from step 4
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850

Table 58: PH3PTRC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str	a_dACD	general	ST	-	START	Mon	General start signal
		phsA	ST	-	STL1	Mon	Start signal from phase L1
		dirPhsA	ST	-	DIRL1	Mon	Direction for phase L1
		phsB	ST	-	STL2	Mon	Start signal from phase L2
		dirPhsB	ST	-	DIRL2	Mon	Direction for phase L2
		phsC	ST	-	STL3	Mon	Start signal from phase L3
		dirPhsC	ST	-	DIRL3	Mon	Direction for phase L3
		q	ST	-	START	Mon	General start signal
		t	ST	-	START	Mon	General start signal
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	TRIP	Mon	General trip signal
		q	ST	T	TRIP	Mon	General trip signal
		t	ST	T	TRIP	Mon	General trip signal
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850

7.5.11.3

Stub protection STBPTOC

LN type	LN prefix	LN class	Function block name
STBPTOC (revision 1)	STB	PTOC	STBPTOC

Table 59: *STBPTOC 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	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
Str	b_dACD	general	ST	-	START		Mon	General start signal
		q	ST	-	START		Mon	General start signal
		t	ST	-	START		Mon	General start signal
Op	b_dACT	general	ST	T	TRIP		Mon	General trip signal
		q	ST	T	TRIP		Mon	General trip signal
		t	ST	T	TRIP		Mon	General trip signal

7.5.11.4

Broken conductor check BRCPTOC

LN type	LN prefix	LN class	Function block name
BRCPTOC (revision 1)	BRC	PTOC	BRCPTOC

Table 60: *BRCPTOC 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	Mode status 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	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
Str	b_dACD	general	ST	-	START	Mon	Start signal of the protection logic
		q	ST	-	START	Mon	Start signal of the protection logic
		t	ST	-	START	Mon	Start signal of the protection logic
Op	b_dACT	general	ST	T	TRIP	Mon	Operate signal of the protection logic
		q	ST	T	TRIP	Mon	Operate signal of the protection logic
		t	ST	T	TRIP	Mon	Operate signal of the protection logic
StrDur	v2_dMV	mag.f	MX	-	-	Mon	Start duration in percents of the total operating time
		q	MX	-	-	Mon	Start duration in percents of the total operating time
		t	MX	-	-	Mon	Start duration in percents of the total operating time

7.5.11.5

Negative sequence based overcurrent function DNSPTOC

LN type	LN prefix	LN class	Function block name
NSDLLN0 instance 1 (revision 2)	-	LLN0	DNSPTOC
PH1PTOC instance 1 (revision 2)	NSD	PTOC	DNSPTOC
PH1PTOC instance 2 (revision 2)	NSD	PTOC	DNSPTOC
PH1PTRC instance 1 (revision 1)	NSD	PTRC	DNSPTOC

Table 61: NSDLLN0 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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Mod	a_dINC	q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value 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

Table 62: PH1PTOC 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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	STOC1	Mon	Start signal from step 1 (OC1)
		dirGeneral	ST	-	DIROC1	Mon	Directional mode of step 1 (non-directional, forward, reverse)
		q	ST	-	STOC1	Mon	Start signal from step 1 (OC1)
		t	ST	-	STOC1	Mon	Start signal from step 1 (OC1)
Op	b_dACT	general	ST	T	TROC1	Mon	Trip signal from step 1 (OC1)
		q	ST	T	TROC1	Mon	Trip signal from step 1 (OC1)
		t	ST	T	TROC1	Mon	Trip signal from step 1 (OC1)
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

Table 63: PH1PTOC Logical node data (instance 2)

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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	STOC2	Mon	Start signal from step 2 (OC2)
		dirGeneral	ST	-	DIROC2	Mon	Directional mode of step 2 (non-directional, forward, reverse)
		q	ST	-	STOC2	Mon	Start signal from step 2 (OC2)
		t	ST	-	STOC2	Mon	Start signal from step 2 (OC2)
Op	b_dACT	general	ST	T	TROC2	Mon	Trip signal from step 2 (OC2)

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Op	b_dACT	q	ST	T	TROC2	Mon	Trip signal from step 2 (OC2)
		t	ST	T	TROC2	Mon	Trip signal from step 2 (OC2)
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

Table 64: PH1PTRC 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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	START	Mon	General start signal
		q	ST	-	START	Mon	General start signal
		t	ST	-	START	Mon	General start signal
Op	b_dACT	general	ST	T	TRIP	Mon	General trip signal
		q	ST	T	TRIP	Mon	General trip signal
		t	ST	T	TRIP	Mon	General trip signal
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

7.5.12 Overfrequency PTOF

7.5.12.1 Overfrequency function SAPTOF

LN type	LN prefix	LN class	Function block name
SAPTOF (revision 1)	SA	PTOF	SAPTOF

Table 65: SAPTOF 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	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
Str	b_dACD	general	ST	-	START		Mon	General start signal
		q	ST	-	START		Mon	General start signal
		t	ST	-	START		Mon	General start signal
Op	b_dACT	general	ST	T	TRIP		Mon	General trip signal
		q	ST	T	TRIP		Mon	General trip signal
		t	ST	T	TRIP		Mon	General trip signal
BlkLoMg	v1_dSPS	stVal	ST	-	BLKDMAGN		Mon	Measurement blocked due to low amplitude
		q	ST	-	BLKDMAGN		Mon	Measurement blocked due to low amplitude
		t	ST	-	BLKDMAGN		Mon	Measurement blocked due to low amplitude

7.5.13 Overvoltage PTOV

7.5.13.1 Two step overvoltage protection OV2PTOV

LN type	LN prefix	LN class	Function block name
GEN2LLN0 instance 1 (revision 1)	-	LLN0	OV2PTOV
OV2PTOV instance 1 (revision 1)	OV2	PTOV	OV2PTOV
OV2PTOV instance 2 (revision 1)	OV2	PTOV	OV2PTOV
PH3PTRC instance 1 (revision 1)	OV2	PTRC	OV2PTOV

Table 66: GEN2LLN0 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
		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	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

Table 67: OV2PTOV Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str	a_dACD	general	ST	-	ST1	Mon	Start signal from step 1
		phsA	ST	-	ST1L1	Mon	Start signal from step 1 phase L1
		phsB	ST	-	ST1L2	Mon	Start signal from step 1 phase L2
		phsC	ST	-	ST1L3	Mon	Start signal from step 1 phase L3
		q	ST	-	ST1	Mon	Start signal from step 1
		t	ST	-	ST1	Mon	Start signal from step 1
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	TR1	Mon	Trip signal from step 1
		q	ST	T	TR1	Mon	Trip signal from step 1
		t	ST	T	TR1	Mon	Trip signal from step 1
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850

Table 68: *OV2PTOV Logical node data (instance 2)*

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str	a_dACD	general	ST	-	ST2	Mon	Start signal from step 2
		phsA	ST	-	-	Mon	Start signal from step 2 phase L1
		phsB	ST	-	-	Mon	Start signal from step 2 phase L2
		phsC	ST	-	-	Mon	Start signal from step 2 phase L3
		q	ST	-	ST2	Mon	Start signal from step 2
		t	ST	-	ST2	Mon	Start signal from step 2
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	TR2	Mon	Trip signal from step 2
		q	ST	T	TR2	Mon	Trip signal from step 2
		t	ST	T	TR2	Mon	Trip signal from step 2
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850

Table 69: *PH3PTRC Logical node data (instance 1)*

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str	a_dACD	general	ST	-	START	Mon	General start signal
		q	ST	-	START	Mon	General start signal
		t	ST	-	START	Mon	General start signal
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	TRIP	Mon	General trip signal
		q	ST	T	TRIP	Mon	General trip signal
		t	ST	T	TRIP	Mon	General trip signal
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850

7.5.13.2

Two step residual overvoltage protection ROV2PTOV

LN type	LN prefix	LN class	Function block name
GEN2LLN0 instance 1 (revision 1)	-	LLN0	ROV2PTOV
PH1PTRC instance 1 (revision 1)	ROV2	PTRC	ROV2PTOV
ROV2PTOV instance 1 (revision 1)	ROV2	PTOV	ROV2PTOV

ROV2PTOV instance 2 (revision 1)	ROV2	PTOV	ROV2PTOV
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Table 70: GEN2LLN0 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
		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	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

Table 71: PH1PTRC 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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	START	Mon	General start signal
		q	ST	-	START	Mon	General start signal
		t	ST	-	START	Mon	General start signal
Op	b_dACT	general	ST	T	TRIP	Mon	General trip signal
		q	ST	T	TRIP	Mon	General trip signal
		t	ST	T	TRIP	Mon	General trip signal
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850

Table 72: *ROV2PTOV 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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	ST1	Mon	Start signal from step 1
		q	ST	-	ST1	Mon	Start signal from step 1
		t	ST	-	ST1	Mon	Start signal from step 1
Op	b_dACT	general	ST	T	TR1	Mon	Trip signal from step 1
		q	ST	T	TR1	Mon	Trip signal from step 1
		t	ST	T	TR1	Mon	Trip signal from step 1
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850

Table 73: *ROV2PTOV Logical node data (instance 2)*

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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	ST2	Mon	Start signal from step 2
		q	ST	-	ST2	Mon	Start signal from step 2
		t	ST	-	ST2	Mon	Start signal from step 2
Op	b_dACT	general	ST	T	TR2	Mon	Trip signal from step 2
		q	ST	T	TR2	Mon	Trip signal from step 2
		t	ST	T	TR2	Mon	Trip signal from step 2
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850

7.5.14 Protection trip conditioning PTRC

7.5.14.1 Tripping logic SMPPTRC

LN type	LN prefix	LN class	Function block name
SMPPTRC (revision 1)	SMP	PTRC	SMPPTRC

Table 74: SMPPTRC 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	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	TRIP	Mon	General trip signal
		q	ST	T	TRIP	Mon	General trip signal
		t	ST	T	TRIP	Mon	General trip signal
LORs	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
ClsLO	v1_dSPS	stVal	ST	-	CLKKOUT	Mon	Circuit breaker lockout output (set until reset)
		q	ST	-	CLKKOUT	Mon	Circuit breaker lockout output (set until reset)
		t	ST	-	CLKKOUT	Mon	Circuit breaker lockout output (set until reset)

7.5.15 Thermal overload PTTR

7.5.15.1 Thermal overload protection, one time constant LPTTR

LN type	LN prefix	LN class	Function block name
LPTTR (revision 2)	L	PTTR	LPTTR

Table 75: *LPTTR 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	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
AlmThm	a_dSPS	stVal	ST	-	ALARM		Mon	Alarm signal
		q	ST	-	ALARM		Mon	Alarm signal
		t	ST	-	ALARM		Mon	Alarm signal
Str	b_dACD	general	ST	-	START		Mon	General start signal
		q	ST	-	START		Mon	General start signal
		t	ST	-	START		Mon	General start signal
Op	b_dACT	general	ST	T	TRIP		Mon	General trip signal
		q	ST	T	TRIP		Mon	General trip signal
		t	ST	T	TRIP		Mon	General trip signal
Tmp	b_dMV	mag.f	MX	-	TEMP		Mon	Calculated temperature of the device
		q	MX	-	TEMP		Mon	Calculated temperature of the device
		t	MX	-	TEMP		Mon	Calculated temperature of the device
TmpRI	b_dMV	mag.f	MX	-	TERMLOAD		Mon	Temperature relative to operate temperature
		q	MX	-	TERMLOAD		Mon	Temperature relative to operate temperature

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
TmpRI	b_dMV	t	MX	-	TERMLOAD	Mon	Temperature relative to operate temperature
BlkRecSt	v1_dSPS	stVal	ST	-	LOCKOUT	Mon	Lockout signal
		q	ST	-	LOCKOUT	Mon	Lockout signal
		t	ST	-	LOCKOUT	Mon	Lockout signal
SenFit	v1_dSPS	stVal	ST	-	-	Mon	Error signal from the temperature sensor
		q	ST	-	-	Mon	Error signal from the temperature sensor
		t	ST	-	-	Mon	Error signal from the temperature sensor
TmmOp	v2_dMV	mag.f	MX	-	TTRIP	Mon	Estimated time to trip (in min)
		q	MX	-	TTRIP	Mon	Estimated time to trip (in min)
		t	MX	-	TTRIP	Mon	Estimated time to trip (in min)
TmmRsLO	v2_dMV	mag.f	MX	-	TENRECL	Mon	Estimated time to reset of lockout (in min)
		q	MX	-	TENRECL	Mon	Estimated time to reset of lockout (in min)
		t	MX	-	TENRECL	Mon	Estimated time to reset of lockout (in min)
TmpAmb	v2_dMV	mag.f	MX	-	TEMPAMB	Mon	Ambient temperature used in the calculations
		q	MX	-	TEMPAMB	Mon	Ambient temperature used in the calculations
		t	MX	-	TEMPAMB	Mon	Ambient temperature used in the calculations

7.5.15.2

Thermal overload protection, two time constants TRPTTR

LN type	LN prefix	LN class	Function block name
TRPTTR (revision 2)	TR	PTTR	TRPTTR

Table 76: TRPTTR 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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Mod	a_dINC	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
AlmThm	a_dSPS	stVal	ST	-	ALARM1	Mon	First level alarm signal
		q	ST	-	ALARM1	Mon	First level alarm signal
		t	ST	-	ALARM1	Mon	First level alarm signal
Str	b_dACD	general	ST	-	START	Mon	Start signal
		q	ST	-	START	Mon	Start signal
		t	ST	-	START	Mon	Start signal
Op	b_dACT	general	ST	T	TRIP	Mon	Trip Signal
		q	ST	T	TRIP	Mon	Trip Signal
		t	ST	T	TRIP	Mon	Trip Signal
AlmThm2	v1_dSPS	stVal	ST	-	ALARM2	Mon	Second level alarm signal
		q	ST	-	ALARM2	Mon	Second level alarm signal
		t	ST	-	ALARM2	Mon	Second level alarm signal
Wrn	v1_dSPS	stVal	ST	-	WARNING	Mon	Trip within set warning time
		q	ST	-	WARNING	Mon	Trip within set warning time
		t	ST	-	WARNING	Mon	Trip within set warning time
TmmOp	v2_dMV	mag.f	MX	-	TTRIP	Mon	Estimated time to trip (in min)
		q	MX	-	TTRIP	Mon	Estimated time to trip (in min)
		t	MX	-	TTRIP	Mon	Estimated time to trip (in min)
TmmRsLO	v2_dMV	mag.f	MX	-	TRESLO	Mon	Estimated time to reset of the function (in min)
		q	MX	-	TRESLO	Mon	Estimated time to reset of the function (in min)
		t	MX	-	TRESLO	Mon	Estimated time to reset of the function (in min)
AClcPct	v2_dMV	mag.f	MX	-	I-MEASUR	Mon	Current measured by the function in % of the rated current
		q	MX	-	I-MEASUR	Mon	Current measured by the function in % of the rated current
		t	MX	-	I-MEASUR	Mon	Current measured by the function in % of the rated current
TmpPct	v2_dMV	mag.f	MX	-	HEATCONT	Mon	Percentage of the heat content of the transformer
		q	MX	-	HEATCONT	Mon	Percentage of the heat content of the transformer
		t	MX	-	HEATCONT	Mon	Percentage of the heat content of the transformer

7.5.16 Time undercurrent PTUC

7.5.16.1 Time delayed 2-step undercurrent protection UC2PTUC

LN type	LN prefix	LN class	Function block name
PH3PTRC instance 1 (revision 1)	UC2	PTRC	UC2PTUC
PH3PTUC instance 1 (revision 0)	UC2	PTUC	UC2PTUC
PH3PTUC instance 2 (revision 0)	UC2	PTUC	UC2PTUC
UC2LLN0 instance 1 (revision 0)	-	LLN0	UC2PTUC

Table 77: PH3PTRC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str	a_dACD	general	ST	-	START	Mon	General start signal
		dirGeneral	ST	-	-	Mon	Output for reporting the direction during start
		phsA	ST	-	-	Mon	Start signal for step 1 in L1
		phsB	ST	-	-	Mon	Start signal for step 1 in L2
		phsC	ST	-	-	Mon	Start signal for step 1 in L3
		q	ST	-	START	Mon	General start signal
		t	ST	-	START	Mon	General start signal
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	TRIP	Mon	General trip signal
		q	ST	T	TRIP	Mon	General trip signal
		t	ST	T	TRIP	Mon	General trip signal
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

Table 78: PH3PTUC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str	a_dACD	general	ST	-	ST1	Mon	Start of step 1
		phsA	ST	-	-	Mon	Start signal for step 1 in L1
		phsB	ST	-	-	Mon	Start signal for step 1 in L2
		phsC	ST	-	-	Mon	Start signal for step 1 in L3

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str	a_dACD	q	ST	-	ST1	Mon	Start of step 1
		t	ST	-	ST1	Mon	Start of step 1
Op	a_dACT	general	ST	T	TR1	Mon	Operate signal for step 1
		phsA	ST	T	-	Mon	Operate signal for step 1 in L1
		phsB	ST	T	-	Mon	Operate signal for step 1 in L2
		phsC	ST	T	-	Mon	Operate signal for step 1 in L3
		q	ST	T	TR1	Mon	Operate signal for step 1
		t	ST	T	TR1	Mon	Operate signal for step 1
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
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

Table 79: PH3PTUC Logical node data (instance 2)

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str	a_dACD	general	ST	-	ST2	Mon	Start of step 2
		phsA	ST	-	-	Mon	Start signal for step 2 in L1
		phsB	ST	-	-	Mon	Start signal for step 2 in L2
		phsC	ST	-	-	Mon	Start signal for step 2 in L3
		q	ST	-	ST2	Mon	Start of step 2
		t	ST	-	ST2	Mon	Start of step 2
Op	a_dACT	general	ST	T	TR2	Mon	Operate signal for step 2
		phsA	ST	T	-	Mon	Operate signal for step 2 in L1
		phsB	ST	T	-	Mon	Operate signal for step 2 in L2
		phsC	ST	T	-	Mon	Operate signal for step 2 in L3
		q	ST	T	TR2	Mon	Operate signal for step 2
		t	ST	T	TR2	Mon	Operate signal for step 2
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
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

Table 80: UC2LLN0 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	Mode status value parameter for 61850
t	ST	-	-	Mon	Mode status value 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

7.5.17 Undervoltage PTUV

7.5.17.1 Two step undervoltage protection UV2PTUV

LN type	LN prefix	LN class	Function block name
GEN2LLN0 instance 1 (revision 1)	-	LLN0	UV2PTUV
PH3PTRC instance 1 (revision 1)	UV2	PTRC	UV2PTUV
UV2PTUV instance 1 (revision 1)	UV2	PTUV	UV2PTUV
UV2PTUV instance 2 (revision 1)	UV2	PTUV	UV2PTUV

Table 81: GEN2LLN0 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
		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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Mod	a_dINC	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

Table 82: PH3PTRC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str	a_dACD	general	ST	-	START	Mon	General start signal
		phsA	ST	-	ST1L1	Mon	Start signal from step 1 phase L1
		phsB	ST	-	ST1L2	Mon	Start signal from step 1 phase L2
		phsC	ST	-	ST1L3	Mon	Start signal from step 1 phase L3
		q	ST	-	START	Mon	General start signal
		t	ST	-	START	Mon	General start signal
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	TRIP	Mon	General trip signal
		q	ST	T	TRIP	Mon	General trip signal
		t	ST	T	TRIP	Mon	General trip signal
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850

Table 83: UV2PTUV Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str	a_dACD	general	ST	-	ST1	Mon	Start signal from step 1
		phsA	ST	-	ST1L1	Mon	Start signal from step 1 phase L1
		phsB	ST	-	ST1L2	Mon	Start signal from step 1 phase L2
		phsC	ST	-	ST1L3	Mon	Start signal from step 1 phase L3
		q	ST	-	ST1	Mon	Start signal from step 1
		t	ST	-	ST1	Mon	Start signal from step 1
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	TR1	Mon	Trip signal from step 1

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Op	b_dACT	q	ST	T	TR1	Mon	Trip signal from step 1
		t	ST	T	TR1	Mon	Trip signal from step 1
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850

Table 84: UV2PTUV Logical node data (instance 2)

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str	a_dACD	general	ST	-	ST2	Mon	Start signal from step 2
		phsA	ST	-	-	Mon	Start signal from step 2 phase L1
		phsB	ST	-	-	Mon	Start signal from step 2 phase L2
		phsC	ST	-	-	Mon	Start signal from step 2 phase L3
		q	ST	-	ST2	Mon	Start signal from step 2
		t	ST	-	ST2	Mon	Start signal from step 2
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	TR2	Mon	Trip signal from step 2
		q	ST	T	TR2	Mon	Trip signal from step 2
		t	ST	T	TR2	Mon	Trip signal from step 2
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850

7.5.17.2 Loss of voltage check LOVPTUV

LN type	LN prefix	LN class	Function block name
LOVPTUV (revision 1)	LOV	PTUV	LOVPTUV

Table 85: LOVPTUV 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

Table continues on next page

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	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
Str	b_dACD	general	ST	-	START	Mon	Start signal
		q	ST	-	START	Mon	Start signal
		t	ST	-	START	Mon	Start signal
Op	b_dACT	general	ST	T	TRIP	Mon	Trip signal
		q	ST	T	TRIP	Mon	Trip signal
		t	ST	T	TRIP	Mon	Trip signal

7.5.18 Underfrequency PTUF

7.5.18.1 Underfrequency function SAPTUF

LN type	LN prefix	LN class	Function block name
SAPTUF (revision 1)	SA	PTUF	SAPTUF

Table 86: *SAPTUF 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	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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str	b_dACD	general	ST	-	START	Mon	General start signal
		q	ST	-	START	Mon	General start signal
		t	ST	-	START	Mon	General start signal
Op	b_dACT	general	ST	T	TRIP	Mon	General trip signal
		q	ST	T	TRIP	Mon	General trip signal
		t	ST	T	TRIP	Mon	General trip signal
BlkLoMg	v1_dSPS	stVal	ST	-	BLKDMAGN	Mon	Measurement blocked due to low voltage amplitude
		q	ST	-	BLKDMAGN	Mon	Measurement blocked due to low voltage amplitude
		t	ST	-	BLKDMAGN	Mon	Measurement blocked due to low voltage amplitude
RstLd	v1_dSPS	stVal	ST	-	RESTORE	Mon	Restore signal for load restoring purposes
		q	ST	-	RESTORE	Mon	Restore signal for load restoring purposes
		t	ST	-	RESTORE	Mon	Restore signal for load restoring purposes

7.5.19 Volts per Hz PVPH

7.5.19.1 Overexcitation protection OEXPVPH

LN type	LN prefix	LN class	Function block name
OEXPVPH (revision 1)	OEX	PVPH	OEXPVPH

Table 87: OEXPVPH 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	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

Table continues on next page

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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Str	b_dACD	general	ST	-	START	Mon	General start signal
		q	ST	-	START	Mon	General start signal
		t	ST	-	START	Mon	General start signal
Op	b_dACT	general	ST	T	TRIP	Mon	General trip signal
		q	ST	T	TRIP	Mon	General trip signal
		t	ST	T	TRIP	Mon	General trip signal
Alm	v1_dSPS	stVal	ST	-	ALARM	Mon	Overexcitation alarm signal
		q	ST	-	ALARM	Mon	Overexcitation alarm signal
		t	ST	-	ALARM	Mon	Overexcitation alarm signal

7.6 System logical nodes

7.6.1 Physical device information LPHD

7.6.1.1 Production Information PRODINF

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

Table 88: LPHD Logical node data

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

7.7 Logical nodes for protection related functions

7.7.1 Breaker failure RBRF

7.7.1.1 Breaker failure protection CCRBRF

LN type	LN prefix	LN class	Function block name
CCRBRF (revision 1)	CC	RBRF	CCRBRF

Table 89: CCRBRF 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	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
OpEx	b_dACT	general	ST	T	TRBU	Mon	Back-up trip by breaker failure protection function
		q	ST	T	TRBU	Mon	Back-up trip by breaker failure protection function
		t	ST	T	TRBU	Mon	Back-up trip by breaker failure protection function
OpIn	b_dACT	general	ST	T	TRRET	Mon	Retrip by breaker failure protection function
		q	ST	T	TRRET	Mon	Retrip by breaker failure protection function
		t	ST	T	TRRET	Mon	Retrip by breaker failure protection function

7.7.2 Differential supervision RDIF

7.7.2.1 Current circuit supervison CCSRDIF

LN type	LN prefix	LN class	Function block name
CCSRDIF (revision 1)	CCS	RDIF	CCSRDIF

Table 90: CCSRDIF 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

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
		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	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
Alm	a_dSPS	stVal	ST	-	ALARM	Mon	Alarm for current circuit failure
		q	ST	-	ALARM	Mon	Alarm for current circuit failure
		t	ST	-	ALARM	Mon	Alarm for current circuit failure
Op	b_dACT	general	ST	-	FAIL	Mon	Detection of current circuit failure
		q	ST	-	FAIL	Mon	Detection of current circuit failure
		t	ST	-	FAIL	Mon	Detection of current circuit failure

7.7.3 Disturbance recorder RDRE

7.7.3.1 Disturbance report DRPRDRE

LN type	LN prefix	LN class	Function block name
DRPRDRE (revision 0)	DRP	RDRE	DRPRDRE

Table 91: DRPRDRE 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	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Beh	a_dINS	q	ST	-	Beh	Mon	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
RcdMade	a_dSPS	stVal	ST	-	RECMAD	Mon	Disturbance recording made
		q	ST	-	RECMAD	Mon	Disturbance recording made
		t	ST	-	RECMAD	Mon	Disturbance recording made
FltNum	b_dINS	stVal	ST	-	FaultNumber	Mon	Disturbance fault number
		q	ST	-	FaultNumber	Mon	Disturbance fault number
		t	ST	-	FaultNumber	Mon	Disturbance fault number

7.7.4 Fault locator RFLO

7.7.4.1 Fault locator LMBRFLO

LN type	LN prefix	LN class	Function block name
LMBRFLO (revision 1)	LMB	RFLO	LMBRFLO

Table 92: LMBRFLO Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Mod	a_dINC	Oper.ctfVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter
		Oper.ctfNum	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	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
FltZ	b_dCMV	cVal.mag.f	MX	-	FLTDISTX	Mon	Reactive distance to fault
		q	MX	-	FLTDISTX	Mon	Reactive distance to fault
		t	MX	-	FLTDISTX	Mon	Reactive distance to fault
FltDiskm	b_dMV	mag.f	MX	-	FltDistLngUnit	Mon	Distance to fault in line length unit
		q	MX	-	FltDistLngUnit	Mon	Distance to fault in line length unit
		t	MX	-	FltDistLngUnit	Mon	Distance to fault in line length unit

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
FitLoop	e_dINS	stVal	ST	-	FaultLoop	Mon	Fault loop
		q	ST	-	FaultLoop	Mon	Fault loop
		t	ST	-	FaultLoop	Mon	Fault loop
ClcFit	v1_dSPS	stVal	ST	-	CALCMADE	Mon	Fault calculation made
		q	ST	-	CALCMADE	Mon	Fault calculation made
		t	ST	-	CALCMADE	Mon	Fault calculation made
FitDisRI	v2_dMV	mag.f	MX	-	FaultDistRelat	Mon	Distance to fault, relative
		q	MX	-	FaultDistRelat	Mon	Distance to fault, relative
		t	MX	-	FaultDistRelat	Mon	Distance to fault, relative

7.7.5 Fuse failure supervision RFUF

7.7.5.1 Fuse failure supervision SDDRFUF

LN type	LN prefix	LN class	Function block name
SDDRFUF (revision 1)	SDD	RFUF	SDDRFUF

Table 93: SDDRFUF 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	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
Str	b_dACD	general	ST	-	BLKU	Mon	General start of function
		q	ST	-	BLKU	Mon	General start of function
		t	ST	-	BLKU	Mon	General start of function
Str3Ph	v2_dACD	general	ST	-	3PH	Mon	Three-phase start of function
		q	ST	-	3PH	Mon	Three-phase start of function

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str3Ph	v2_dACD	t	ST	-	3PH	Mon	Three-phase start of function
StrRst	v2_dACD	general	ST	-	BLKZ	Mon	Start of current and voltage controlled function
		q	ST	-	BLKZ	Mon	Start of current and voltage controlled function
		t	ST	-	BLKZ	Mon	Start of current and voltage controlled function

7.7.6 Pole discordance protection RPLD

7.7.6.1 Pole discordance protection CCRPLD

LN type	LN prefix	LN class	Function block name
CCRPLD (revision 1)	CC	RPLD	CCRPLD

Table 94: CCRPLD 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	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
Str	b_dACD	general	ST	-	START	Mon	Trip condition TRUE, waiting for time delay
		q	ST	-	START	Mon	Trip condition TRUE, waiting for time delay
		t	ST	-	START	Mon	Trip condition TRUE, waiting for time delay
Op	b_dACT	general	ST	T	TRIP	Mon	Trip signal to CB
		q	ST	T	TRIP	Mon	Trip signal to CB
		t	ST	T	TRIP	Mon	Trip signal to CB

7.7.7 Power swing detection RPSB

7.7.7.1 Power swing detection ZMRPSB

LN type	LN prefix	LN class	Function block name
ZMRPSB (revision 2)	ZM	RPSB	ZMRPSB

Table 95: ZMRPSB 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	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
BlkZn	a_dSPS	stVal	ST	-	START		Mon	Power swing detected
		q	ST	-	START		Mon	Power swing detected
		t	ST	-	START		Mon	Power swing detected
Str	b_dACD	general	ST	-	START		Mon	Power swing detected
		q	ST	-	START		Mon	Power swing detected
		t	ST	-	START		Mon	Power swing detected
ZOuter	v1_dSPS	stVal	ST	-	ZOUT		Mon	Measured impedance within outer impedance boundary
		q	ST	-	ZOUT		Mon	Measured impedance within outer impedance boundary
		t	ST	-	ZOUT		Mon	Measured impedance within outer impedance boundary
ZInner	v1_dSPS	stVal	ST	-	ZIN		Mon	Measured impedance within inner impedance boundary
		q	ST	-	ZIN		Mon	Measured impedance within inner impedance boundary
		t	ST	-	ZIN		Mon	Measured impedance within inner impedance boundary

7.7.8 Autoreclosing RREC

7.7.8.1 Autorecloser SMBRREC

LN type	LN prefix	LN class	Function block name
SMBRREC (revision 2)	SMB	RREC	SMBRREC

Table 96: SMBRREC Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Mod	a_dINC	Oper.ctfVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter
		Oper.ctfNum	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	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	CLOSECB	Mon	Closing command for CB
		q	ST	T	CLOSECB	Mon	Closing command for CB
		t	ST	T	CLOSECB	Mon	Closing command for CB
BlkRec	c_dSPC	stVal	ST	-	BLOCKED	Mon	AR is in blocked state
		q	ST	-	BLOCKED	Mon	AR is in blocked state
		t	ST	-	BLOCKED	Mon	AR is in blocked state
AutoRecSt	d_dINS	stVal	ST	-	-	Mon	AR status; 1=Ready; 2=InProgress; 3=Successful
		q	ST	-	-	Mon	AR status; 1=Ready; 2=InProgress; 3=Successful
		t	ST	-	-	Mon	AR status; 1=Ready; 2=InProgress; 3=Successful
Rec31Cnt	v1_dINS	stVal	ST	-	COUNT3P1	Mon	Counting the number of three-phase reclosing shot 1
		q	ST	-	COUNT3P1	Mon	Counting the number of three-phase reclosing shot 1
		t	ST	-	COUNT3P1	Mon	Counting the number of three-phase reclosing shot 1
Rec32Cnt	v1_dINS	stVal	ST	-	COUNT3P2	Mon	Counting the number of three-phase reclosing shot 2

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Rec32Cnt	v1_dINS	q	ST	-	COUNT3P2	Mon	Counting the number of three-phase reclosing shot 2
		t	ST	-	COUNT3P2	Mon	Counting the number of three-phase reclosing shot 2
Rec33Cnt	v1_dINS	stVal	ST	-	COUNT3P3	Mon	Counting the number of three-phase reclosing shot 3
		q	ST	-	COUNT3P3	Mon	Counting the number of three-phase reclosing shot 3
		t	ST	-	COUNT3P3	Mon	Counting the number of three-phase reclosing shot 3
Rec34Cnt	v1_dINS	stVal	ST	-	COUNT3P4	Mon	Counting the number of three-phase reclosing shot 4
		q	ST	-	COUNT3P4	Mon	Counting the number of three-phase reclosing shot 4
		t	ST	-	COUNT3P4	Mon	Counting the number of three-phase reclosing shot 4
Rec35Cnt	v1_dINS	stVal	ST	-	COUNT3P5	Mon	Counting the number of three-phase reclosing shot 5
		q	ST	-	COUNT3P5	Mon	Counting the number of three-phase reclosing shot 5
		t	ST	-	COUNT3P5	Mon	Counting the number of three-phase reclosing shot 5
TotRecCnt	v1_dINS	stVal	ST	-	COUNTAR	Mon	Counting total number of reclosing shots
		q	ST	-	COUNTAR	Mon	Counting total number of reclosing shots
		t	ST	-	COUNTAR	Mon	Counting total number of reclosing shots
OpRs	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
EnaRec	v1_dSPS	stVal	ST	-	SETON	Mon	AR operation is switched on
		q	ST	-	SETON	Mon	AR operation is switched on
		t	ST	-	SETON	Mon	AR operation is switched on
RdyRec	v1_dSPS	stVal	ST	-	READY	Mon	Indicates that AR is ready for a new sequence

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DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
RdyRec	v1_dSPS	q	ST	-	READY	Mon	Indicates that AR is ready for a new sequence
		t	ST	-	READY	Mon	Indicates that AR is ready for a new sequence
ActRec	v1_dSPS	stVal	ST	-	ACTIVE	Mon	Reclosing sequence in progress
		q	ST	-	ACTIVE	Mon	Reclosing sequence in progress
		t	ST	-	ACTIVE	Mon	Reclosing sequence in progress
SucRec	v1_dSPS	stVal	ST	-	SUCCL	Mon	Activated if CB closes during the time tUnsucCl
		q	ST	-	SUCCL	Mon	Activated if CB closes during the time tUnsucCl
		t	ST	-	SUCCL	Mon	Activated if CB closes during the time tUnsucCl
UnsRec	v1_dSPS	stVal	ST	-	UNSUCCL	Mon	Reclosing unsuccessful, signal resets after the reclaim time
		q	ST	-	UNSUCCL	Mon	Reclosing unsuccessful, signal resets after the reclaim time
		t	ST	-	UNSUCCL	Mon	Reclosing unsuccessful, signal resets after the reclaim time
PrgRec	v1_dSPS	stVal	ST	-	INPROGR	Mon	Reclosing shot in progress, activated during open time
		q	ST	-	INPROGR	Mon	Reclosing shot in progress, activated during open time
		t	ST	-	INPROGR	Mon	Reclosing shot in progress, activated during open time
PrgRec31	v1_dSPS	stVal	ST	-	3PT1	Mon	Three-phase reclosing in progress, shot 1
		q	ST	-	3PT1	Mon	Three-phase reclosing in progress, shot 1
		t	ST	-	3PT1	Mon	Three-phase reclosing in progress, shot 1
PrgRec32	v1_dSPS	stVal	ST	-	3PT2	Mon	Three-phase reclosing in progress, shot 2
		q	ST	-	3PT2	Mon	Three-phase reclosing in progress, shot 2
		t	ST	-	3PT2	Mon	Three-phase reclosing in progress, shot 2
PrgRec33	v1_dSPS	stVal	ST	-	3PT3	Mon	Three-phase reclosing in progress, shot 3
		q	ST	-	3PT3	Mon	Three-phase reclosing in progress, shot 3
		t	ST	-	3PT3	Mon	Three-phase reclosing in progress, shot 3
PrgRec34	v1_dSPS	stVal	ST	-	3PT4	Mon	Three-phase reclosing in progress, shot 4
		q	ST	-	3PT4	Mon	Three-phase reclosing in progress, shot 4

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DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
PrgRec34	v1_dSPS	t	ST	-	3PT4	Mon	Three-phase reclosing in progress, shot 4
PrgRec35	v1_dSPS	stVal	ST	-	3PT5	Mon	Three-phase reclosing in progress, shot 5
		q	ST	-	3PT5	Mon	Three-phase reclosing in progress, shot 5
		t	ST	-	3PT5	Mon	Three-phase reclosing in progress, shot 5
WtMst	v1_dSPS	stVal	ST	-	WFMASTER	Mon	Signal to Slave issued by Master for sequential reclosing
		q	ST	-	WFMASTER	Mon	Signal to Slave issued by Master for sequential reclosing
		t	ST	-	WFMASTER	Mon	Signal to Slave issued by Master for sequential reclosing

7.7.9 Synchronising RSYN

7.7.9.1 Synchrocheck, energizing check, and synchronizing SESRSYN

LN type	LN prefix	LN class	Function block name
AUT1RSYN instance 1 (revision 1)	SES	RSYN	SESRSYN
MAN1RSYN instance 2 (revision 1)	SES	RSYN	SESRSYN
RSY1LLN0 instance 1 (revision 1)	-	LLN0	SESRSYN
SYNRSYN instance 3 (revision 1)	SES	RSYN	SESRSYN

Table 97: *AUT1RSYN 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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Rel	a_dSPS	stVal	ST	-	-	Mon	Automatic release
		q	ST	-	-	Mon	Automatic release
		t	ST	-	-	Mon	Automatic release
AngInd	a_dSPS	stVal	ST	-	PHDIFFA	Mon	Phase angle difference out of limit for Auto operation
		q	ST	-	PHDIFFA	Mon	Phase angle difference out of limit for Auto operation
		t	ST	-	PHDIFFA	Mon	Phase angle difference out of limit for Auto operation
HlzInd	a_dSPS	stVal	ST	-	FRDIFFA	Mon	Frequency difference out of limit for Auto operation

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DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
HzInd	a_dSPS	q	ST	-	FRDIFFA	Mon	Frequency difference out of limit for Auto operation
		t	ST	-	FRDIFFA	Mon	Frequency difference out of limit for Auto operation
DifAngClc	b_dMV	mag.f	MX	-	PHDIFFME	Mon	Calculated difference of phase angle
		q	MX	-	PHDIFFME	Mon	Calculated difference of phase angle
		t	MX	-	PHDIFFME	Mon	Calculated difference of phase angle
DifHzClc	b_dMV	mag.f	MX	-	FRDIFFME	Mon	Calculated difference in frequency
		q	MX	-	FRDIFFME	Mon	Calculated difference in frequency
		t	MX	-	FRDIFFME	Mon	Calculated difference in frequency
DifVClc	b_dMV	mag.f	MX	-	UDIFFME	Mon	Calculated difference in voltage
		q	MX	-	UDIFFME	Mon	Calculated difference in voltage
		t	MX	-	UDIFFME	Mon	Calculated difference in voltage
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850
EnOK	v1_dSPS	stVal	ST	-	AUTOENOK	Mon	Automatic energizing check OK
		q	ST	-	AUTOENOK	Mon	Automatic energizing check OK
		t	ST	-	AUTOENOK	Mon	Automatic energizing check OK
TestSCOK	v1_dSPS	stVal	ST	-	TSTAUTSY	Mon	Auto synchro check OK test output
		q	ST	-	TSTAUTSY	Mon	Auto synchro check OK test output
		t	ST	-	TSTAUTSY	Mon	Auto synchro check OK test output

Table 98: *MAN1RSYN Logical node data (instance 2)*

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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Rel	a_dSPS	stVal	ST	-	-	Mon	Manual release
		q	ST	-	-	Mon	Manual release
		t	ST	-	-	Mon	Manual release
AngInd	a_dSPS	stVal	ST	-	PHDIFFM	Mon	Phase angle difference out of limit for Manual Operation
		q	ST	-	PHDIFFM	Mon	Phase angle difference out of limit for Manual Operation
		t	ST	-	PHDIFFM	Mon	Phase angle difference out of limit for Manual Operation

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
HzInd	a_dSPS	stVal	ST	-	FRDIFFM	Mon	Frequency difference out of limit for Manual operation
		q	ST	-	FRDIFFM	Mon	Frequency difference out of limit for Manual operation
		t	ST	-	FRDIFFM	Mon	Frequency difference out of limit for Manual operation
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850
EnOK	v1_dSPS	stVal	ST	-	MANENOK	Mon	Manual energizing check OK
		q	ST	-	MANENOK	Mon	Manual energizing check OK
		t	ST	-	MANENOK	Mon	Manual energizing check OK
TestSCOK	v1_dSPS	stVal	ST	-	TSTMANSY	Mon	Manual synchro check OK test output
		q	ST	-	TSTMANSY	Mon	Manual synchro check OK test output
		t	ST	-	TSTMANSY	Mon	Manual synchro check OK test output

Table 99: RSY1LLN0 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
		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	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
Bus1Sel	v1_dSPS	stVal	ST	-	B1SEL	Mon	Bus1 selected
		q	ST	-	B1SEL	Mon	Bus1 selected
		t	ST	-	B1SEL	Mon	Bus1 selected
Bus2Sel	v1_dSPS	stVal	ST	-	B2SEL	Mon	Bus2 selected
		q	ST	-	B2SEL	Mon	Bus2 selected
		t	ST	-	B2SEL	Mon	Bus2 selected

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Lin1Sel	v1_dSPS	stVal	ST	-	LNSEL	Mon	Line selected
		q	ST	-	LNSEL	Mon	Line selected
		t	ST	-	LNSEL	Mon	Line selected
SelFuFail	v1_dSPS	stVal	ST	-	USELFAIL	Mon	Selected voltage transformer fuse failed
		q	ST	-	USELFAIL	Mon	Selected voltage transformer fuse failed
		t	ST	-	USELFAIL	Mon	Selected voltage transformer fuse failed
TestEnOK	v1_dSPS	stVal	ST	-	TSTENOK	Mon	Energizing check OK test output
		q	ST	-	TSTENOK	Mon	Energizing check OK test output
		t	ST	-	TSTENOK	Mon	Energizing check OK test output
VHiAlm	v1_dSPS	stVal	ST	-	UOKSC	Mon	Voltage amplitudes above set limits
		q	ST	-	UOKSC	Mon	Voltage amplitudes above set limits
		t	ST	-	UOKSC	Mon	Voltage amplitudes above set limits
Lin2Sel	v1_dSPS	stVal	ST	-	-	Mon	Line2 selected
		q	ST	-	-	Mon	Line2 selected
		t	ST	-	-	Mon	Line2 selected

Table 100: SYNRSYN 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	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Rel	a_dSPS	stVal	ST	-	SYNOK	Mon	Synchronizing OK output
		q	ST	-	SYNOK	Mon	Synchronizing OK output
		t	ST	-	SYNOK	Mon	Synchronizing OK output
SynPrg	a_dSPS	stVal	ST	-	SYNPROGR	Mon	Synchronizing in progress
		q	ST	-	SYNPROGR	Mon	Synchronizing in progress
		t	ST	-	SYNPROGR	Mon	Synchronizing in progress
Op	b_dACT	q	ST	-	SYNOK	Mon	Synchronizing OK output
		t	ST	-	SYNOK	Mon	Synchronizing OK output
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850
FailSyn	v1_dSPS	stVal	ST	-	SYNFAIL	Mon	Synchronizing failed
		q	ST	-	SYNFAIL	Mon	Synchronizing failed

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
FailSyn	v1_dSPS	t	ST	-	SYNFAIL	Mon	Synchronizing failed
TestSynOK	v1_dSPS	stVal	ST	-	TSTSYNOK	Mon	Synchronizing OK test output
		q	ST	-	TSTSYNOK	Mon	Synchronizing OK test output
		t	ST	-	TSTSYNOK	Mon	Synchronizing OK test output
HzIndSyn	v1_dSPS	stVal	ST	-	FRDIFSYN	Mon	Frequency difference out of limit for synchronizing
		q	ST	-	FRDIFSYN	Mon	Frequency difference out of limit for synchronizing
		t	ST	-	FRDIFSYN	Mon	Frequency difference out of limit for synchronizing
HzRCIndSyn	v1_dSPS	stVal	ST	-	FRDERIVA	Mon	Frequency derivative out of limit for synchronizing
		q	ST	-	FRDERIVA	Mon	Frequency derivative out of limit for synchronizing
		t	ST	-	FRDERIVA	Mon	Frequency derivative out of limit for synchronizing

7.8 Logical nodes for generic references

7.8.1 Generic process I/O GGIO

7.8.1.1 Apparatus control SELGGIO

LN type	LN prefix	LN class	Function block name
SELGGIO (revision 1)	SEL	GGIO	SELGGIO

Table 101: *SELGGIO 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	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Beh	a_dINS	q	ST	-	Beh	Mon	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Rel	a_dSPS	stVal	ST	-	RESERVED	Mon	Reserved indication from bay/ apparatus
		q	ST	-	RESERVED	Mon	Reserved indication from bay/ apparatus
		t	ST	-	RESERVED	Mon	Reserved indication from bay/ apparatus

7.8.1.2

Logic Rotating Switch for function selection and LHMI presentation SLGGIO

LN type	LN prefix	LN class	Function block name
SLGGIO (revision 2)	SL	GGIO	SLGGIO

Table 102: SLGGIO 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	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
IntIn	b_dINS	stVal	ST	-	SWPOSN	Mon	Switch position as integer value
		q	ST	-	SWPOSN	Mon	Switch position as integer value
		t	ST	-	SWPOSN	Mon	Switch position as integer value
SwPosC1	v1_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.orIdent	CO	-	-	Cmd	Command parameter for IEC61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
SwPosC1	v1_dISC	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	Position
		t	ST	-	-	Mon	Position
		ctlModel	CF	-	-	-	Used by CH
		sboTimeout	CF	-	-	-	Used by CH
		sboClass	CF	-	-	-	Used by CH
SPCCO	v2_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
		ctlModel	CF	-	-	-	Used by CH
		sboTimeout	CF	-	-	-	Used by CH
sboClass	CF	-	-	-	Used by CH		

7.8.1.3

Selector mini switch VSGGIO

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

Table 103: VSGGIO 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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Mod	a_dINC	Oper.ctINum	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	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
DPCSO	d_dDPC	Cancel.ctIVal	CO	-	-	Cmd	Command parameter for IEC61850
		Cancel.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctIVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.ctIVal	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.origin.orIdent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orIdent	CO	-	-	Cmd	Command parameter for IEC61850
		Cancel.origin.orIdent	CO	-	-	Cmd	Command parameter for IEC61850
		Cancel.ctINum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctINum	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.ctINum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Cancel.T	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.T	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Cancel.Test	CO	-	-	Cmd	Command parameter for IEC61850
Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850		

Table continues on next page

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

7.8.1.4 IEC61850 generic communication I/O functions DPGGIO

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

Table 104: DPGGIO 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	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
DPCSO	b_dDPC	stVal	ST	-	POSITION	Mon	Double point indication
		q	ST	-	POSITION	Mon	Double point indication
		t	ST	-	POSITION	Mon	Double point indication

7.8.1.5 Single Point Generic Control 8 signals SPC8GGIO

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

Table 105: *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.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	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
SPCSO1	v2_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	-	OUT1		Mon	Output 1
		q	ST	-	OUT1		Mon	Output 1
		t	ST	-	OUT1		Mon	Output 1
SPCSO2	v2_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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
SPCSO2	v2_dSPC	Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	OUT2	Mon	Output2
		q	ST	-	OUT2	Mon	Output2
		t	ST	-	OUT2	Mon	Output2
SPCSO3	v2_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	-	OUT3	Mon	Output3
		q	ST	-	OUT3	Mon	Output3
t	ST	-	OUT3	Mon	Output3		
SPCSO4	v2_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	-	OUT4	Mon	Output4
		q	ST	-	OUT4	Mon	Output4
t	ST	-	OUT4	Mon	Output4		
SPCSO5	v2_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

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Logical node data model

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
SPCSO5	v2_dSPC	Oper.ctIINum	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	Output5
		t	ST	-	OUT5	Mon	Output5
SPCSO6	v2_dSPC	Oper.ctIVal	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.ctIINum	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	-	OUT6	Mon	Output6
		q	ST	-	OUT6	Mon	Output6
		t	ST	-	OUT6	Mon	Output6
SPCSO7	v2_dSPC	Oper.ctIVal	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.ctIINum	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	Output7
		t	ST	-	OUT7	Mon	Output7

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
SPCSO8	v2_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	-	OUT8	Mon	Output8
		q	ST	-	OUT8	Mon	Output8
t	ST	-	OUT8	Mon	Output8		

7.8.1.6

Event counter CNTGGIO

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

Table 106: CNTGGIO 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	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
Cnt1	v1_dBCR	actVal	ST	-	VALUE1	Mon	Output of counter 1
		q	ST	-	VALUE1	Mon	Output of counter 1

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Cnt1	v1_dBCR	t	ST	-	VALUE1	Mon	Output of counter 1
Cnt2	v1_dBCR	actVal	ST	-	VALUE2	Mon	Output of counter 2
		q	ST	-	VALUE2	Mon	Output of counter 2
		t	ST	-	VALUE2	Mon	Output of counter 2
Cnt3	v1_dBCR	actVal	ST	-	VALUE3	Mon	Output of counter 3
		q	ST	-	VALUE3	Mon	Output of counter 3
		t	ST	-	VALUE3	Mon	Output of counter 3
Cnt4	v1_dBCR	actVal	ST	-	VALUE4	Mon	Output of counter 4
		q	ST	-	VALUE4	Mon	Output of counter 4
		t	ST	-	VALUE4	Mon	Output of counter 4
Cnt5	v1_dBCR	actVal	ST	-	VALUE5	Mon	Output of counter 5
		q	ST	-	VALUE5	Mon	Output of counter 5
		t	ST	-	VALUE5	Mon	Output of counter 5
Cnt6	v1_dBCR	actVal	ST	-	VALUE6	Mon	Output of counter 6
		q	ST	-	VALUE6	Mon	Output of counter 6
		t	ST	-	VALUE6	Mon	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.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

7.8.1.7

IEC61850 generic communication I/O functions SPGGIO

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

Table 107: *SPGGIO 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	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
Ind	c_dSPS	stVal	ST	-	OUT	Mon	Output status
		q	ST	-	OUT	Mon	Output status
		t	ST	-	OUT	Mon	Output status

7.8.1.8**IEC61850 generic communication I/O functions 16 inputs SP16GGIO**

LN type	LN prefix	LN class	Function block name
SP16GGIO (revision 1)	SP16	GGIO	SP16GGIO

Table 108: *SP16GGIO 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	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

Table continues on next page

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DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Beh	a_dINS	t	ST	-	Beh	Mon	Behaviour parameter for 61850
Ind	c_dSPS	stVal	ST	-	OUT1	Mon	Output 1 status
		q	ST	-	OUT1	Mon	Output 1 status
		t	ST	-	OUT1	Mon	Output 1 status
Ind2	v1_dSPS	stVal	ST	-	OUT2	Mon	Output 2 status
		q	ST	-	OUT2	Mon	Output 2 status
		t	ST	-	OUT2	Mon	Output 2 status
Ind3	v1_dSPS	stVal	ST	-	OUT3	Mon	Output 3 status
		q	ST	-	OUT3	Mon	Output 3 status
		t	ST	-	OUT3	Mon	Output 3 status
Ind4	v1_dSPS	stVal	ST	-	OUT4	Mon	Output 4 status
		q	ST	-	OUT4	Mon	Output 4 status
		t	ST	-	OUT4	Mon	Output 4 status
Ind5	v1_dSPS	stVal	ST	-	OUT5	Mon	Output 5 status
		q	ST	-	OUT5	Mon	Output 5 status
		t	ST	-	OUT5	Mon	Output 5 status
Ind6	v1_dSPS	stVal	ST	-	OUT6	Mon	Output 6 status
		q	ST	-	OUT6	Mon	Output 6 status
		t	ST	-	OUT6	Mon	Output 6 status
Ind7	v1_dSPS	stVal	ST	-	OUT7	Mon	Output 7 status
		q	ST	-	OUT7	Mon	Output 7 status
		t	ST	-	OUT7	Mon	Output 7 status
Ind8	v1_dSPS	stVal	ST	-	OUT8	Mon	Output 8 status
		q	ST	-	OUT8	Mon	Output 8 status
		t	ST	-	OUT8	Mon	Output 8 status
Ind9	v1_dSPS	stVal	ST	-	OUT9	Mon	Output 9 status
		q	ST	-	OUT9	Mon	Output 9 status
		t	ST	-	OUT9	Mon	Output 9 status
Ind10	v1_dSPS	stVal	ST	-	OUT10	Mon	Output 10 status
		q	ST	-	OUT10	Mon	Output 10 status
		t	ST	-	OUT10	Mon	Output 10 status
Ind11	v1_dSPS	stVal	ST	-	OUT11	Mon	Output 11 status
		q	ST	-	OUT11	Mon	Output 11 status
		t	ST	-	OUT11	Mon	Output 11 status
Ind12	v1_dSPS	stVal	ST	-	OUT12	Mon	Output 12 status
		q	ST	-	OUT12	Mon	Output 12 status
		t	ST	-	OUT12	Mon	Output 12 status
Ind13	v1_dSPS	stVal	ST	-	OUT13	Mon	Output 13 status
		q	ST	-	OUT13	Mon	Output 13 status

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Ind13	v1_dSPS	t	ST	-	OUT13	Mon	Output 13 status
Ind14	v1_dSPS	stVal	ST	-	OUT14	Mon	Output 14 status
		q	ST	-	OUT14	Mon	Output 14 status
		t	ST	-	OUT14	Mon	Output 14 status
Ind15	v1_dSPS	stVal	ST	-	OUT15	Mon	Output 15 status
		q	ST	-	OUT15	Mon	Output 15 status
		t	ST	-	OUT15	Mon	Output 15 status
Ind16	v1_dSPS	stVal	ST	-	OUT16	Mon	Output 16 status
		q	ST	-	OUT16	Mon	Output 16 status
		t	ST	-	OUT16	Mon	Output 16 status
GrInd	v1_dSPS	stVal	ST	-	OUTOR	Mon	Output status logic OR gate for input 1 to 16
		q	ST	-	OUTOR	Mon	Output status logic OR gate for input 1 to 16
		t	ST	-	OUTOR	Mon	Output status logic OR gate for input 1 to 16

7.8.1.9

IEC61850 generic communication I/O functions MVGGIO

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

Table 109: MVGGIO 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	Mode status parameter for 61850
t	ST	-	-	Mon	Mode status parameter for 61850		
AnIn	a_dMV	rangeC.hhLim.f	CF	-	MV hhLim	-	High High limit
		rangeC.hLim.f	CF	-	MV hLim	-	High limit
		rangeC.lLim.f	CF	-	MV lLim	-	Low limit
		rangeC.lLim.f	CF	-	MV lLim	-	Low Low limit

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
AnIn	a_dMV	rangeC.max.f	CF	-	MV max	-	Maximum value
		rangeC.min.f	CF	-	MV min	-	Minimum value
		mag.f	MX	-	VALUE	Mon	Magnitude of deadband value
		subMag.f	SV	-	-	-	Substituted value
		range	MX	-	RANGE	Mon	Range
		q	MX	-	VALUE	Mon	Magnitude of deadband value
		t	MX	-	VALUE	Mon	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

7.8.1.10

Pulse counter PCGGIO

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

Table 110: PCGGIO 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	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
AnIn	b_dMV	mag.f	MX	-	SCAL_VAL	Mon	Scaled value with time and status information
		q	MX	-	SCAL_VAL	Mon	Scaled value with time and status information
		t	MX	-	SCAL_VAL	Mon	Scaled value with time and status information

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
ValUpd	v1_dSPS	stVal	ST	-	NEW_VAL	Mon	A new pulse counter value is generated
		q	ST	-	NEW_VAL	Mon	A new pulse counter value is generated
		t	ST	-	NEW_VAL	Mon	A new pulse counter value is generated
IcpCyc	v1_dSPS	stVal	ST	-	RESTART	Mon	The reported value does not comprise a complete integration cycle
		q	ST	-	RESTART	Mon	The reported value does not comprise a complete integration cycle
		t	ST	-	RESTART	Mon	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	Actual pulse counter value
		t	ST	-	CNT_VAL	Mon	Actual pulse counter value

7.8.1.11 Trip matrix logic TMAGGIO

LN type	LN prefix	LN class	Function block name
TMAGGIO (revision 1)	TMA	GGIO	TMAGGIO

Table 111: *TMAGGIO 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	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
Out1	v1_dSPS	stVal	ST	-	OUTPUT1	Mon	OR function between inputs 1 to 16

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Out1	v1_dSPS	q	ST	-	OUTPUT1	Mon	OR function between inputs 1 to 16
		t	ST	-	OUTPUT1	Mon	OR function between inputs 1 to 16
Out2	v1_dSPS	stVal	ST	-	OUTPUT2	Mon	OR function between inputs 17 to 32
		q	ST	-	OUTPUT2	Mon	OR function between inputs 17 to 32
		t	ST	-	OUTPUT2	Mon	OR function between inputs 17 to 32
Out3	v1_dSPS	stVal	ST	-	OUTPUT3	Mon	OR function between inputs 1 to 32
		q	ST	-	OUTPUT3	Mon	OR function between inputs 1 to 32
		t	ST	-	OUTPUT3	Mon	OR function between inputs 1 to 32

7.9 Logical nodes for metering and measurement

7.9.1 Metering MMTR

7.9.1.1 Function for energy calculation and demand handling ETPMMTR

LN type	LN prefix	LN class	Function block name
ETPMTR (revision 1)	ETP	MMTR	ETPMTR

Table 112: ETPMMTR 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	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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
SupRs	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
MaxDmdRs	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	-	ACCST	Mon	Start of accumulating energy values
		q	ST	-	ACCST	Mon	Start of accumulating energy values
		t	ST	-	ACCST	Mon	Start of accumulating energy values
WhFwdAlm	v1_dSPS	stVal	ST	-	EAFALM	Mon	Alarm for active forward energy exceed limit in set interval
		q	ST	-	EAFALM	Mon	Alarm for active forward energy exceed limit in set interval
		t	ST	-	EAFALM	Mon	Alarm for active forward energy exceed limit in set interval
WhRvAlm	v1_dSPS	stVal	ST	-	EARALM	Mon	Alarm for active reverse energy exceed limit in set interval
		q	ST	-	EARALM	Mon	Alarm for active reverse energy exceed limit in set interval
		t	ST	-	EARALM	Mon	Alarm for active reverse energy exceed limit in set interval
VARhFwdAlm	v1_dSPS	stVal	ST	-	ERFALM	Mon	Alarm for reactive forward energy exceed limit in set interval
Table continues on next page							

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DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
VArhFwdAlm	v1_dSPS	q	ST	-	ERFALM	Mon	Alarm for reactive forward energy exceed limit in set interval
		t	ST	-	ERFALM	Mon	Alarm for reactive forward energy exceed limit in set interval
VArhRvAlm	v1_dSPS	stVal	ST	-	ERRALM	Mon	Alarm for reactive reverse energy exceed limit in set interval
		q	ST	-	ERRALM	Mon	Alarm for reactive reverse energy exceed limit in set interval
		t	ST	-	ERRALM	Mon	Alarm for reactive reverse energy exceed limit in set interval
VArAccFwd	v2_dMV	mag.f	MX	-	ERFACC	Mon	Accumulated forward reactive energy value
		q	MX	-	ERFACC	Mon	Accumulated forward reactive energy value
		t	MX	-	ERFACC	Mon	Accumulated forward reactive energy value
VArAccRev	v2_dMV	mag.f	MX	-	ERRACC	Mon	Accumulated reverse reactive energy value
		q	MX	-	ERRACC	Mon	Accumulated reverse reactive energy value
		t	MX	-	ERRACC	Mon	Accumulated reverse reactive energy value
WsAccFwd	v2_dMV	mag.f	MX	-	EAFACC	Mon	Accumulated forward active energy value
		q	MX	-	EAFACC	Mon	Accumulated forward active energy value
		t	MX	-	EAFACC	Mon	Accumulated forward active energy value
WsAccRev	v2_dMV	mag.f	MX	-	EARACC	Mon	Accumulated reverse active energy value
		q	MX	-	EARACC	Mon	Accumulated reverse active energy value
		t	MX	-	EARACC	Mon	Accumulated reverse active energy value
MaxVArFwdD	v2_dMV	mag.f	MX	-	MAXPRFD	Mon	Maximum forward reactive power demand value for set interval
		q	MX	-	MAXPRFD	Mon	Maximum forward reactive power demand value for set interval
		t	MX	-	MAXPRFD	Mon	Maximum forward reactive power demand value for set interval
MaxVArRvDm	v2_dMV	mag.f	MX	-	MAXPRRD	Mon	Maximum reactive power demand value in reverse direction
		q	MX	-	MAXPRRD	Mon	Maximum reactive power demand value in reverse direction
		t	MX	-	MAXPRRD	Mon	Maximum reactive power demand value in reverse direction
MaxWFwdDmd	v2_dMV	mag.f	MX	-	MAXPAFD	Mon	Maximum forward active power demand value for set interval

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
MaxWFwdDmd	v2_dMV	q	MX	-	MAXPAFD	Mon	Maximum forward active power demand value for set interval
		t	MX	-	MAXPAFD	Mon	Maximum forward active power demand value for set interval
MaxWRvDmd	v2_dMV	mag.f	MX	-	MAXPARD	Mon	Maximum reverse active power demand value for set interval
		q	MX	-	MAXPARD	Mon	Maximum reverse active power demand value for set interval
		t	MX	-	MAXPARD	Mon	Maximum reverse active power demand value for set interval

7.9.2 Non phased related measurement MMXN

7.9.2.1 Measurements CVMMXN

LN type	LN prefix	LN class	Function block name
CVMMXN (revision 0)	CV	MMXN	CVMMXN

Table 113: CVMMXN 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	Mode status parameter for 61850
t	ST	-	-	Mon	Mode status parameter for 61850		
Beh	a_dINS	stVal	ST	-	-	Mon	Function execute even when no connections is done
		q	ST	-	-	Mon	Function execute even when no connections is done
		t	ST	-	-	Mon	Function execute even when no connections is done
Amp	a_dMV	mag.f	MX	-	I	Mon	Calculated current magnitude of deadband value
		rangeC.hhLim.f	CF	-	IHiHiLim	-	High High limit in % of IBase
		rangeC.hLim.f	CF	-	IHiLim	-	High limit in % of IBase
		rangeC.lLim.f	CF	-	ILowLim	-	Low limit in % of IBase

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DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Amp	a_dMV	rangeC.lLim.f	CF	-	ILowLowLim	-	Low Low limit in % of IBase
		rangeC.max.f	CF	-	IMax	-	Maximum value in % of IBase
		rangeC.min.f	CF	-	IMin	-	Minimum value in % of IBase
		subMag.f	SV	-	-	-	Substituted value
		range	MX	-	I_RANGE	Mon	Calculated current range
		q	MX	-	I	Mon	Calculated current magnitude of deadband value
		t	MX	-	I	Mon	Calculated current magnitude of deadband value
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	IDbReplnt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	IZeroDb	-	Zero point clamping
Hz	a_dMV	mag.f	MX	-	F	Mon	System frequency magnitude of deadband value
		rangeC.hhLim.f	CF	-	FrHiHiLim	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	FrHiLim	-	High limit (physical value)
		rangeC.lLim.f	CF	-	FrLowLim	-	Low limit (physical value)
		rangeC.lLim.f	CF	-	FrLowLowLim	-	Low Low limit (physical value)
		rangeC.max.f	CF	-	FrMax	-	Maximum value
		rangeC.min.f	CF	-	FrMin	-	Minimum value
		subMag.f	SV	-	-	-	Substituted value
		range	MX	-	F_RANGE	Mon	System frequency range
		q	MX	-	F	Mon	System frequency magnitude of deadband value
		t	MX	-	F	Mon	System frequency magnitude of deadband value
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	FrDbReplnt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	FrZeroDb	-	Zero point clamping
PwrFact	a_dMV	rangeC.hhLim.f	CF	-	PFHiHiLim	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	PFHiLim	-	High limit (physical value)
		rangeC.lLim.f	CF	-	PFLowLim	-	Low limit (physical value)
		rangeC.lLim.f	CF	-	PFLowLowLim	-	Low Low limit (physical value)
		rangeC.max.f	CF	-	PFMax	-	Maximum value
		rangeC.min.f	CF	-	PFMin	-	Minimum value
		mag.f	MX	-	PF	Mon	Power factor magnitude of deadband value
		subMag.f	SV	-	-	-	Substituted value
		range	MX	-	PF_RANGE	Mon	Power factor range
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
PwrFact	a_dMV	q	MX	-	PF	Mon	Power factor magnitude of deadband value
		t	MX	-	PF	Mon	Power factor magnitude of deadband value
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	PFDbReplnt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	PFZeroDb	-	Zero point clamping
Vol	a_dMV	rangeC.hhLim.f	CF	-	UHiHiLim	-	High High limit in % of UBase
		rangeC.hLim.f	CF	-	UHiLim	-	High limit in % of UBase
		rangeC.lLim.f	CF	-	ULowLim	-	Low limit in % of UBase
		rangeC.lLim.f	CF	-	ULowLowLim	-	Low Low limit in % of UBase
		rangeC.max.f	CF	-	UMax	-	Maximum value in % of UBase
		rangeC.min.f	CF	-	UMin	-	Minimum value in % of UBase
		subMag.f	SV	-	-	-	Substituted value
		mag.f	MX	-	U	Mon	Calculated voltage magnitude of deadband value
		range	MX	-	U_RANGE	Mon	Calculated voltage range
		q	MX	-	U	Mon	Calculated voltage magnitude of deadband value
		t	MX	-	U	Mon	Calculated voltage magnitude of deadband value
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	UDbReplnt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
zeroDb	CF	-	UZeroDb	-	Zero point clamping		
VolAmp	a_dMV	mag.f	MX	-	S	Mon	Apparent power magnitude of deadband value
		rangeC.hhLim.f	CF	-	SHiHiLim	-	High High limit in % of SBase
		rangeC.hLim.f	CF	-	SHiLim	-	High limit in % of SBase
		rangeC.lLim.f	CF	-	SLowLim	-	Low limit in % of SBase
		rangeC.lLim.f	CF	-	SLowLowLim	-	Low Low limit in % of SBase
		rangeC.max.f	CF	-	SMax	-	Maximum value in % of SBase
		rangeC.min.f	CF	-	SMin	-	Minimum value in % of SBase
		subMag.f	SV	-	-	-	Substituted value
		range	MX	-	S_RANGE	Mon	Apparent power range
		q	MX	-	S	Mon	Apparent power magnitude of deadband value
		t	MX	-	S	Mon	Apparent power magnitude of deadband value
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	SDbReplnt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s

Table continues on next page

Section 7

Logical node data model

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
VolAmp	a_dMV	zeroDb	CF	-	SZeroDb	-	Zero point clamping in 0,001% of range
VolAmpr	a_dMV	rangeC.hhLim.f	CF	-	QHiHiLim	-	High High limit in % of SBase
		rangeC.hLim.f	CF	-	QHiLim	-	High limit in % of SBase
		rangeC.lLim.f	CF	-	QLowLim	-	Low limit in % of SBase
		rangeC.lLim.f	CF	-	QLowLowLim	-	Low Low limit in % of SBase
		rangeC.max.f	CF	-	QMax	-	Maximum value in % of SBase
		rangeC.min.f	CF	-	QMin	-	Minimum value in % of SBase
		mag.f	MX	-	Q	Mon	Reactive power magnitude of deadband value
		subMag.f	SV	-	-	-	Substituted value
		range	MX	-	Q_RANGE	Mon	Reactive power range
		q	MX	-	Q	Mon	Reactive power magnitude of deadband value
		t	MX	-	Q	Mon	Reactive power magnitude of deadband value
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	QDbReplnt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	QZeroDb	-	Zero point clamping
Watt	a_dMV	mag.f	MX	-	P	Mon	Active power magnitude of deadband value
		rangeC.hhLim.f	CF	-	PHiHiLim	-	High High limit in % of SBase
		rangeC.hLim.f	CF	-	PHiLim	-	High limit in % of SBase
		rangeC.lLim.f	CF	-	PLowLim	-	Low limit in % of SBase
		rangeC.lLim.f	CF	-	PLowLowLim	-	Low Low limit in % of SBase
		rangeC.max.f	CF	-	PMax	-	Maximum value in % of SBase
		rangeC.min.f	CF	-	PMin	-	Minimum value in % of SBase
		subMag.f	SV	-	-	-	Substituted value
		range	MX	-	P_RANGE	Mon	Active power range
		q	MX	-	P	Mon	Active power magnitude of deadband value
		t	MX	-	P	Mon	Active power magnitude of deadband value
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	PDbReplnt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	PZeroDb	-	Zero point clamping
ALd	v1_dSPS	stVal	ST	-	ILEAD	Mon	Current is leading voltage
		q	ST	-	ILEAD	Mon	Current is leading voltage
		t	ST	-	ILEAD	Mon	Current is leading voltage

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
ALg	v1_dSPS	stVal	ST	-	ILAG	Mon	Current is lagging voltage
		q	ST	-	ILAG	Mon	Current is lagging voltage
		t	ST	-	ILAG	Mon	Current is lagging voltage

7.9.3 Measurement MMXU

7.9.3.1 Phase current measurement CMMXU

LN type	LN prefix	LN class	Function block name
CMMXU (revision 1)	C	MMXU	CMMXU

Table 114: CMMXU 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	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
A	a_dWYE	rangeC.hhLim.f	CF	-	ILHiHiLim	-	High High limit (physical value)
		rangeC.hhLim.f	CF	-	ILHiHiLim	-	High High limit (physical value)
		rangeC.hhLim.f	CF	-	ILHiHiLim	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	ILHiLim	-	High limit (physical value)
		rangeC.hLim.f	CF	-	ILHiLim	-	High limit (physical value)
		rangeC.hLim.f	CF	-	ILHiLim	-	High limit (physical value)
		rangeC.lLim.f	CF	-	ILLowLim	-	Low limit (physical value)
		rangeC.lLim.f	CF	-	ILLowLim	-	Low limit (physical value)
		rangeC.lLim.f	CF	-	ILLowLim	-	Low limit (physical value)
		rangeC.lLim.f	CF	-	ILLowLowLim	-	Low Low limit (physical value)
rangeC.lLim.f	CF	-	ILLowLowLim	-	Low Low limit (physical value)		

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
A	a_dWYE	rangeC.IILim.f	CF	-	ILLowLowLim	-	Low Low limit (physical value)
		rangeC.min.f	CF	-	ILMin	-	Minimum value
		rangeC.min.f	CF	-	ILMin	-	Minimum value
		rangeC.min.f	CF	-	ILMin	-	Minimum value
		rangeC.max.f	CF	-	ILMax	-	Maximum value
		rangeC.max.f	CF	-	ILMax	-	Maximum value
		rangeC.max.f	CF	-	ILMax	-	Maximum value
		cVal.mag.f	MX	-	IL1	Mon	IL1 Amplitude
		cVal.mag.f	MX	-	IL2	Mon	IL2 Amplitude
		cVal.mag.f	MX	-	IL3	Mon	IL3 Amplitude
		subCVal.mag.f	SV	-	-	-	Substituted value
		subCVal.mag.f	SV	-	-	-	Substituted value
		subCVal.mag.f	SV	-	-	-	Substituted value
		range	MX	-	IL3RANG	Mon	IL3 Amplitude range
		range	MX	-	IL1RANG	Mon	IL1 Amplitude range
		range	MX	-	IL2RANG	Mon	IL2 Amplitude range
		q	MX	-	IL3	Mon	IL3 Amplitude
		q	MX	-	IL2	Mon	IL2 Amplitude
		q	MX	-	IL1	Mon	IL1 Amplitude
		t	MX	-	IL1	Mon	IL1 Amplitude
		t	MX	-	IL2	Mon	IL2 Amplitude
		t	MX	-	IL3	Mon	IL3 Amplitude
		subEna	SV	-	-	-	Enable substitution
		subEna	SV	-	-	-	Enable substitution
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	ILDbReplnt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	ILDbReplnt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	ILDbReplnt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	ILZeroDb	-	Zero point clamping
		zeroDb	CF	-	ILZeroDb	-	Zero point clamping
zeroDb	CF	-	ILZeroDb	-	Zero point clamping		

7.9.3.2

Phase-phase voltage measurement VMMXU

LN type	LN prefix	LN class	Function block name
VMMXU (revision 1)	V	MMXU	VMMXU

Table 115: *VMMXU Logical node data*

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
PPV	a_dDEL	rangeC.hhLim.f	CF	-	ULHiHiLim	-	High High limit (physical value)
		rangeC.hhLim.f	CF	-	ULHiHiLim	-	High High limit (physical value)
		rangeC.hhLim.f	CF	-	ULHiHiLim	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	ULHiLim	-	High limit (physical value)
		rangeC.hLim.f	CF	-	ULHiLim	-	High limit (physical value)
		rangeC.hLim.f	CF	-	ULHiLim	-	High limit (physical value)
		rangeC.lLim.f	CF	-	ULLowLim	-	Low limit (physical value)
		rangeC.lLim.f	CF	-	ULLowLim	-	Low limit (physical value)
		rangeC.lLim.f	CF	-	ULLowLim	-	Low limit (physical value)
		rangeC.lLim.f	CF	-	ULLowLowLim	-	Low Low limit (physical value)
		rangeC.lLim.f	CF	-	ULLowLowLim	-	Low Low limit (physical value)
		rangeC.lLim.f	CF	-	ULLowLowLim	-	Low Low limit (physical value)
		rangeC.min.f	CF	-	ULMin	-	Minimum value
		rangeC.min.f	CF	-	ULMin	-	Minimum value
		rangeC.min.f	CF	-	ULMin	-	Minimum value
		rangeC.max.f	CF	-	ULMax	-	Maximum value
		rangeC.max.f	CF	-	ULMax	-	Maximum value
		rangeC.max.f	CF	-	ULMax	-	Maximum value
		cVal.mag.f	MX	-	UL12	Mon	UL12 Amplitude
		cVal.mag.f	MX	-	UL23	Mon	UL23 Amplitude
		cVal.mag.f	MX	-	UL31	Mon	UL31 Amplitude
		subCVal.mag.f	SV	-	-	-	Substituted value
		subCVal.mag.f	SV	-	-	-	Substituted value
		subCVal.mag.f	SV	-	-	-	Substituted value
		range	MX	-	UL31RANG	Mon	UL31Amplitude range
		range	MX	-	UL12RANG	Mon	UL12 Amplitude range
		range	MX	-	UL23RANG	Mon	UL23 Amplitude range
		q	MX	-	UL31	Mon	UL31 Amplitude
		q	MX	-	UL23	Mon	UL23 Amplitude
		q	MX	-	UL12	Mon	UL12 Amplitude
		t	MX	-	UL12	Mon	UL12 Amplitude
		t	MX	-	UL23	Mon	UL23 Amplitude
		t	MX	-	UL31	Mon	UL31 Amplitude
		subEna	SV	-	-	-	Enable substitution
subEna	SV	-	-	-	Enable substitution		
subEna	SV	-	-	-	Enable substitution		
db	CF	-	ULDbReplnt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s		

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
PPV	a_dDEL	db	CF	-	ULDbReplnt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	ULDbReplnt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	ULZeroDb	-	Zero point clamping
		zeroDb	CF	-	ULZeroDb	-	Zero point clamping
		zeroDb	CF	-	ULZeroDb	-	Zero point clamping
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	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

7.9.3.3

Phase-neutral voltage measurement VNMMXU

LN type	LN prefix	LN class	Function block name
VNMMXU (revision 1)	VN	MMXU	VNMMXU

Table 116: VNMMXU 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	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850

Table continues on next page

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	Behaviour parameter for 61850	
		t	ST	-	Beh	Mon	Behaviour parameter for 61850	
PhV	a_dWYE	cVal.mag.f	MX	-	UL1	Mon	UL1 Amplitude, magnitude of reported value	
		cVal.mag.f	MX	-	UL2	Mon	UL2 Amplitude, magnitude of reported value	
		cVal.mag.f	MX	-	UL3	Mon	UL3 Amplitude, magnitude of reported value	
		subCVal.mag.f	SV	-	-	-	-	Substituted value
		subCVal.mag.f	SV	-	-	-	-	Substituted value
		rangeC.hhLim.f	CF	-	UHiHiLim	-	-	High High limit (physical value)
		rangeC.hhLim.f	CF	-	UHiHiLim	-	-	High High limit (physical value)
		rangeC.hhLim.f	CF	-	UHiHiLim	-	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	UHiLim	-	-	High limit (physical value)
		rangeC.hLim.f	CF	-	UHiLim	-	-	High limit (physical value)
		rangeC.hLim.f	CF	-	UHiLim	-	-	High limit (physical value)
		rangeC.lLim.f	CF	-	ULowLim	-	-	Low limit (physical value)
		rangeC.lLim.f	CF	-	ULowLim	-	-	Low limit (physical value)
		rangeC.lLim.f	CF	-	ULowLim	-	-	Low limit (physical value)
		rangeC.lLim.f	CF	-	ULowLowLim	-	-	Low Low limit (physical value)
		rangeC.lLim.f	CF	-	ULowLowLim	-	-	Low Low limit (physical value)
		rangeC.lLim.f	CF	-	ULowLowLim	-	-	Low Low limit (physical value)
		rangeC.min.f	CF	-	UMin	-	-	Minimum value
		rangeC.min.f	CF	-	UMin	-	-	Minimum value
		rangeC.min.f	CF	-	UMin	-	-	Minimum value
		rangeC.max.f	CF	-	UMax	-	-	Maximum value
		rangeC.max.f	CF	-	UMax	-	-	Maximum value
		rangeC.max.f	CF	-	UMax	-	-	Maximum value
		subCVal.mag.f	SV	-	-	-	-	Substituted value
		range	MX	-	UL3RANG	Mon	UL3 Amplitude range	
		range	MX	-	UL1RANG	Mon	UL1 Amplitude range	
		range	MX	-	UL2RANG	Mon	UL2 Amplitude range	
		q	MX	-	UL3	Mon	UL3 Amplitude, magnitude of reported value	
		q	MX	-	UL2	Mon	UL2 Amplitude, magnitude of reported value	
		q	MX	-	UL1	Mon	UL1 Amplitude, magnitude of reported value	
		t	MX	-	UL1	Mon	UL1 Amplitude, magnitude of reported value	

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description	
PhV	a_dWYE	t	MX	-	UL2	Mon	UL2 Amplitude, magnitude of reported value	
		t	MX	-	UL3	Mon	UL3 Amplitude, magnitude of reported value	
		subEna	SV	-	-	-	-	Enable substitution
		subEna	SV	-	-	-	-	Enable substitution
		subEna	SV	-	-	-	-	Enable substitution
		db	CF	-	UDbReplnt	-	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	UDbReplnt	-	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	UDbReplnt	-	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	UZeroDb	-	-	Zero point clamping in 0,001% of range
		zeroDb	CF	-	UZeroDb	-	-	Zero point clamping in 0,001% of range
zeroDb	CF	-	UZeroDb	-	-	Zero point clamping in 0,001% of range		

7.9.4 Sequence and imbalance MSQI

7.9.4.1 Current sequence component measurement CMSQI

LN type	LN prefix	LN class	Function block name
CMSQI (revision 2)	C	MSQI	CMSQI

Table 117: CMSQI 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	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description	
Beh	a_dINS	q	ST	-	Beh	Mon	Behaviour parameter for 61850	
		t	ST	-	Beh	Mon	Behaviour parameter for 61850	
SeqA	a_dSEQ	cVal.mag.f	MX	-	3I0	Mon	3I0 Amplitude	
		cVal.mag.f	MX	-	I1	Mon	I1 Amplitude	
		cVal.mag.f	MX	-	I2	Mon	I2 Amplitude	
		rangeC.hhLim.f	CF	-	3I0HiHiLim	-	High High limit (physical value)	
		rangeC.hLim.f	CF	-	3I0HiLim	-	High limit (physical value)	
		rangeC.lLim.f	CF	-	3I0LowLim	-	Low limit (physical value)	
		rangeC.lLim.f	CF	-	3I0LowLowLim	-	Low Low limit (physical value)	
		rangeC.min.f	CF	-	3I0Min	-	Minimum value	
		rangeC.max.f	CF	-	3I0Max	-	Maximum value	
		subCVal.mag.f	SV	-	-	-	-	Substituted value
		rangeC.hhLim.f	CF	-	I1HiHiLim	-	High High limit (physical value)	
		rangeC.hLim.f	CF	-	I1HiLim	-	High limit (physical value)	
		rangeC.lLim.f	CF	-	I1LowLim	-	Low limit (physical value)	
		rangeC.lLim.f	CF	-	I1LowLowLim	-	Low Low limit (physical value)	
		rangeC.min.f	CF	-	I1Min	-	Minimum value	
		rangeC.max.f	CF	-	I1Max	-	Maximum value	
		rangeC.hhLim.f	CF	-	I2HiHiLim	-	High High limit (physical value)	
		rangeC.hLim.f	CF	-	I2HiLim	-	High limit (physical value)	
		rangeC.lLim.f	CF	-	I2LowLim	-	Low limit (physical value)	
		rangeC.lLim.f	CF	-	I2LowLowLim	-	Low Low limit (physical value)	
		rangeC.min.f	CF	-	I2Min	-	Minimum value	
		rangeC.max.f	CF	-	I2Max	-	Maximum value	
		subCVal.mag.f	SV	-	-	-	-	Substituted value
		subCVal.mag.f	SV	-	-	-	-	Substituted value
		range	MX	-	I2RANG	Mon	I2 Amplitude range	
		range	MX	-	3I0RANG	Mon	3I0 Amplitude range	
		range	MX	-	I1RANG	Mon	I1Amplitude range	
		q	MX	-	I2	Mon	I2 Amplitude	
		q	MX	-	I1	Mon	I1 Amplitude	
		q	MX	-	3I0	Mon	3I0 Amplitude	
		t	MX	-	3I0	Mon	3I0 Amplitude	
		t	MX	-	I1	Mon	I1 Amplitude	
		t	MX	-	I2	Mon	I2 Amplitude	
subEna	SV	-	-	-	-	Enable substitution		
subEna	SV	-	-	-	-	Enable substitution		
subEna	SV	-	-	-	-	Enable substitution		

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
SeqA	a_dSEQ	db	CF	-	I2DbReplnt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	3I0DbReplnt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	I1DbReplnt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	I1ZeroDb	-	Zero point clamping
		zeroDb	CF	-	3I0ZeroDb	-	Zero point clamping
		zeroDb	CF	-	I2ZeroDb	-	Zero point clamping

7.9.4.2 Voltage sequence measurement VMSQI

LN type	LN prefix	LN class	Function block name
VMSQI (revision 2)	V	MSQI	VMSQI

Table 118: VMSQI 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	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
SeqV	a_dSEQ	cVal.mag.f	MX	-	3U0	Mon	3U0 Amplitude
		cVal.mag.f	MX	-	U1	Mon	U1 Amplitude
		cVal.mag.f	MX	-	U2	Mon	U2 Amplitude
		rangeC.hhLim.f	CF	-	3U0HiHiLim	-	High High limit (physical value)
		rangeC.hLim.f	CF	-	3U0HiLim	-	High limit (physical value)
		rangeC.lLim.f	CF	-	3U0LowLim	-	Low limit (physical value)
		rangeC.lllim.f	CF	-	3U0LowLowLim	-	Low Low limit (physical value)
		rangeC.min.f	CF	-	3U0Min	-	Minimum value

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description	
SeqV	a_dSEQ	rangeC.max.f	CF	-	3U0Max	-	Maximum value	
		subCVal.mag.f	SV	-	-	-	Substituted value	
		rangeC.hhLim.f	CF	-	U1HiHiLim	-	High High limit (physical value)	
		rangeC.hLim.f	CF	-	U1HiLim	-	High limit (physical value)	
		rangeC.lLim.f	CF	-	U1LowLim	-	Low limit (physical value)	
		rangeC.lLim.f	CF	-	U1LowLowLim	-	Low Low limit (physical value)	
		rangeC.min.f	CF	-	U1Min	-	Minimum value	
		rangeC.max.f	CF	-	U1Max	-	Maximum value	
		rangeC.hhLim.f	CF	-	U2HiHiLim	-	High High limit (physical value)	
		rangeC.hLim.f	CF	-	U2HiLim	-	High limit (physical value)	
		rangeC.lLim.f	CF	-	U2LowLim	-	Low limit (physical value)	
		rangeC.lLim.f	CF	-	U2LowLowLim	-	Low Low limit (physical value)	
		rangeC.min.f	CF	-	U2Min	-	Minimum value	
		rangeC.max.f	CF	-	U2Max	-	Maximum value	
		subCVal.mag.f	SV	-	-	-	-	Substituted value
		subCVal.mag.f	SV	-	-	-	-	Substituted value
		range	MX	-	U2RANG	Mon	U2 Amplitude range	
		range	MX	-	3U0RANG	Mon	3U0 Amplitude range	
		range	MX	-	U1RANG	Mon	U1 Amplitude range	
		q	MX	-	U2	Mon	U2 Amplitude	
		q	MX	-	U1	Mon	U1 Amplitude	
		q	MX	-	3U0	Mon	3U0 Amplitude	
		t	MX	-	3U0	Mon	3U0 Amplitude	
		t	MX	-	U1	Mon	U1 Amplitude	
		t	MX	-	U2	Mon	U2 Amplitude	
		subEna	SV	-	-	-	-	Enable substitution
		subEna	SV	-	-	-	-	Enable substitution
		subEna	SV	-	-	-	-	Enable substitution
		db	CF	-	U2DbReplnt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s	
		db	CF	-	3U0DbReplnt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s	
db	CF	-	U1DbReplnt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s			
zeroDb	CF	-	U1ZeroDb	-	Zero point clamping			
zeroDb	CF	-	3U0ZeroDb	-	Zero point clamping			
zeroDb	CF	-	U2ZeroDb	-	Zero point clamping			

7.10 Logical nodes for sensors and monitoring

7.10.1 Circuit breaker monitoring SCBR

7.10.1.1 Breaker close/trip circuit monitoring TCSSCBR

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

Table 119: *TCSSCBR Logical node data*

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description	
Mod	a_dINC	Oper.ctfVal	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.ctfNum	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	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
TrCctAlm	a_dSPS	stVal	ST	-	ALARM		Mon	Trip circuit fault indication
		q	ST	-	ALARM		Mon	Trip circuit fault indication
		t	ST	-	ALARM		Mon	Trip circuit fault indication

7.10.1.2 Circuit breaker condition monitoring SSCBR

LN type	LN prefix	LN class	Function block name
SSCBR (revision 0)	S	SCBR	SSCBR

Table 120: SSCR 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	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
InaTmdCnt	v1_dINS	stVal	ST	-	NOOPRDAY		Mon	The number of days CB has been inactive
		q	ST	-	NOOPRDAY		Mon	The number of days CB has been inactive
		t	ST	-	NOOPRDAY		Mon	The number of days CB has been inactive
RmnLifPhA	v1_dINS	stVal	ST	-	CBLIFEL1		Mon	CB Remaining life phase L1
		q	ST	-	CBLIFEL1		Mon	CB Remaining life phase L1
		t	ST	-	CBLIFEL1		Mon	CB Remaining life phase L1
RmnLifPhB	v1_dINS	stVal	ST	-	CBLIFEL2		Mon	CB Remaining life phase L2
		q	ST	-	CBLIFEL2		Mon	CB Remaining life phase L2
		t	ST	-	CBLIFEL2		Mon	CB Remaining life phase L2
RmnLifPhC	v1_dINS	stVal	ST	-	CBLIFEL3		Mon	CB Remaining life phase L3
		q	ST	-	CBLIFEL3		Mon	CB Remaining life phase L3
		t	ST	-	CBLIFEL3		Mon	CB Remaining life phase L3
RsAccAPwr	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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
RsCBWear	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
RsTrvTm	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
RsSprChaTm	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
OpnAlm	v1_dSPS	stVal	ST	-	TRVTOAL	Mon	CB open travel time exceeded set value
		q	ST	-	TRVTOAL	Mon	CB open travel time exceeded set value
		t	ST	-	TRVTOAL	Mon	CB open travel time exceeded set value

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
ClsAlm	v1_dSPS	stVal	ST	-	TRVTCAL	Mon	CB close travel time exceeded set value
		q	ST	-	TRVTCAL	Mon	CB close travel time exceeded set value
		t	ST	-	TRVTCAL	Mon	CB close travel time exceeded set value
OpNumAlm	v1_dSPS	stVal	ST	-	OPRALM	Mon	Number of CB operations exceeds alarm limit
		q	ST	-	OPRALM	Mon	Number of CB operations exceeds alarm limit
		t	ST	-	OPRALM	Mon	Number of CB operations exceeds alarm limit
OpNumLO	v1_dSPS	stVal	ST	-	OPRLOALM	Mon	Number of CB operations exceeds lockout limit
		q	ST	-	OPRLOALM	Mon	Number of CB operations exceeds lockout limit
		t	ST	-	OPRLOALM	Mon	Number of CB operations exceeds lockout limit
APwrAlm	v1_dSPS	stVal	ST	-	IACCALM	Mon	Accumulated currents power (lyt),exceeded alarm limit
		q	ST	-	IACCALM	Mon	Accumulated currents power (lyt),exceeded alarm limit
		t	ST	-	IACCALM	Mon	Accumulated currents power (lyt),exceeded alarm limit
APwrLO	v1_dSPS	stVal	ST	-	IACCLOAL	Mon	Accumulated currents power (lyt),exceeded lockout limit
		q	ST	-	IACCLOAL	Mon	Accumulated currents power (lyt),exceeded lockout limit
		t	ST	-	IACCLOAL	Mon	Accumulated currents power (lyt),exceeded lockout limit
LonTmAlm	v1_dSPS	stVal	ST	-	NOOPRALM	Mon	CB 'not operated for long time' alarm
		q	ST	-	NOOPRALM	Mon	CB 'not operated for long time' alarm
		t	ST	-	NOOPRALM	Mon	CB 'not operated for long time' alarm
SprChaAlm	v1_dSPS	stVal	ST	-	SPRCHRAL	Mon	Spring charging time has crossed the set value
		q	ST	-	SPRCHRAL	Mon	Spring charging time has crossed the set value
		t	ST	-	SPRCHRAL	Mon	Spring charging time has crossed the set value
PosOpn	v1_dSPS	stVal	ST	-	CBOPEN	Mon	CB is in open position
		q	ST	-	CBOPEN	Mon	CB is in open position
		t	ST	-	CBOPEN	Mon	CB is in open position
Poslvd	v1_dSPS	stVal	ST	-	CBINVPOS	Mon	CB is in intermediate position
		q	ST	-	CBINVPOS	Mon	CB is in intermediate position

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DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Poslvd	v1_dSPS	t	ST	-	CBINVPOS	Mon	CB is in intermediate position
PosCls	v1_dSPS	stVal	ST	-	CBCLOSED	Mon	CB is in closed position
		q	ST	-	CBCLOSED	Mon	CB is in closed position
		t	ST	-	CBCLOSED	Mon	CB is in closed position
CBLifAlm	v1_dSPS	stVal	ST	-	CBLIFEAL	Mon	Remaining life of CB exceeded alarm limit
		q	ST	-	CBLIFEAL	Mon	Remaining life of CB exceeded alarm limit
		t	ST	-	CBLIFEAL	Mon	Remaining life of CB exceeded alarm limit
PresLO	v1_dSPS	stVal	ST	-	PRESLO	Mon	Pressure below lockout level
		q	ST	-	PRESLO	Mon	Pressure below lockout level
		t	ST	-	PRESLO	Mon	Pressure below lockout level
TmmsCls	v2_dMV	mag.f	MX	-	CBCLTRVT	Mon	Travel time of the CB during closing operation
		q	MX	-	CBCLTRVT	Mon	Travel time of the CB during closing operation
		t	MX	-	CBCLTRVT	Mon	Travel time of the CB during closing operation
TmmsOpn	v2_dMV	mag.f	MX	-	CBOTRVT	Mon	Travel time of the CB during opening operation
		q	MX	-	CBOTRVT	Mon	Travel time of the CB during opening operation
		t	MX	-	CBOTRVT	Mon	Travel time of the CB during opening operation
TmsSprCha	v2_dMV	mag.f	MX	-	SPRCHRT	Mon	The charging time of the CB spring
		q	MX	-	SPRCHRT	Mon	The charging time of the CB spring
		t	MX	-	SPRCHRT	Mon	The charging time of the CB spring
AccAPwrPhB	v2_dMV	mag.f	MX	-	IACCL2	Mon	Accumulated currents power (Iyt), phase L2
		q	MX	-	IACCL2	Mon	Accumulated currents power (Iyt), phase L2
		t	MX	-	IACCL2	Mon	Accumulated currents power (Iyt), phase L2
AccAPwrPhC	v2_dMV	mag.f	MX	-	IACCL3	Mon	Accumulated currents power (Iyt), phase L3
		q	MX	-	IACCL3	Mon	Accumulated currents power (Iyt), phase L3
		t	MX	-	IACCL3	Mon	Accumulated currents power (Iyt), phase L3
AccAPwrPhA	v2_dMV	mag.f	MX	-	IACCL1	Mon	Accumulated currents power (Iyt), phase L1
		q	MX	-	IACCL1	Mon	Accumulated currents power (Iyt), phase L1
		t	MX	-	IACCL1	Mon	Accumulated currents power (Iyt), phase L1

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
PresAlm	v3_dSPS	stVal	ST	-	PRESALM	Mon	Pressure below alarm level
		q	ST	-	PRESALM	Mon	Pressure below alarm level
		t	ST	-	PRESALM	Mon	Pressure below alarm level
OpCnt	v5_dINS	stVal	ST	-	NO_OPR	Mon	Number of CB operation cycle
		q	ST	-	NO_OPR	Mon	Number of CB operation cycle
		t	ST	-	NO_OPR	Mon	Number of CB operation cycle

7.10.2 Insulation medium supervision (gas) SIMG

7.10.2.1 Insulation gas monitoring function SSIMG

LN type	LN prefix	LN class	Function block name
SSIMG (revision 0)	S	SIMG	SSIMG

Table 121: *SSIMG 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	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
InsAlm	a_dSPS	stVal	ST	-	PRES_LO	Mon	Pressure below lockout level
		q	ST	-	PRES_LO	Mon	Pressure below lockout level
		t	ST	-	PRES_LO	Mon	Pressure below lockout level
PresAlm	a_dSPS	stVal	ST	-	PRES_ALM	Mon	Pressure below alarm level
		q	ST	-	PRES_ALM	Mon	Pressure below alarm level
		t	ST	-	PRES_ALM	Mon	Pressure below alarm level
TmpAlm	a_dSPS	stVal	ST	-	TEMP_ALM	Mon	Temperature above alarm level
		q	ST	-	TEMP_ALM	Mon	Temperature above alarm level

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
TmpAlm	a_dSPS	t	ST	-	TEMP_ALM	Mon	Temperature above alarm level
Pres	b_dMV	mag.f	MX	-	PRESSURE	Mon	Pressure service value
		q	MX	-	PRESSURE	Mon	Pressure service value
		t	MX	-	PRESSURE	Mon	Pressure service value
Tmp	b_dMV	mag.f	MX	-	TEMP	Mon	Temperature of the insulation medium
		q	MX	-	TEMP	Mon	Temperature of the insulation medium
		t	MX	-	TEMP	Mon	Temperature of the insulation medium
LORs	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
TmpLO	v1_dSPS	stVal	ST	-	TEMP_LO	Mon	Temperature above lockout level
		q	ST	-	TEMP_LO	Mon	Temperature above lockout level
		t	ST	-	TEMP_LO	Mon	Temperature above lockout level

7.10.3 Insulation medium supervision (liquid) SIML

7.10.3.1 Insulation liquid monitoring function SSIML

LN type	LN prefix	LN class	Function block name
SSIML (revision 0)	S	SIML	SSIML

Table 122: SSIML 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

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 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	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
InsAlm	a_dSPS	stVal	ST	-	LVL_LO	Mon	Level below lockout level
		q	ST	-	LVL_LO	Mon	Level below lockout level
		t	ST	-	LVL_LO	Mon	Level below lockout level
PresAlm	a_dSPS	stVal	ST	-	LVL_ALM	Mon	Level below alarm level
		q	ST	-	LVL_ALM	Mon	Level below alarm level
		t	ST	-	LVL_ALM	Mon	Level below alarm level
TmpAlm	a_dSPS	stVal	ST	-	TEMP_ALM	Mon	Temperature above alarm level
		q	ST	-	TEMP_ALM	Mon	Temperature above alarm level
		t	ST	-	TEMP_ALM	Mon	Temperature above alarm level
Pres	b_dMV	mag.f	MX	-	LEVEL	Mon	Level service value
		q	MX	-	LEVEL	Mon	Level service value
		t	MX	-	LEVEL	Mon	Level service value
Tmp	b_dMV	mag.f	MX	-	TEMP	Mon	Temperature of the insulation medium
		q	MX	-	TEMP	Mon	Temperature of the insulation medium
		t	MX	-	TEMP	Mon	Temperature of the insulation medium
LORs	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

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DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
TmpLo	v1_dSPS	stVal	ST	-	TEMP_LO	Mon	Temperature above lockout level
		q	ST	-	TEMP_LO	Mon	Temperature above lockout level
		t	ST	-	TEMP_LO	Mon	Temperature above lockout level

7.11 Logical nodes for switchgear

7.11.1 Circuit breaker XCBR

7.11.1.1 Apparatus control SXCBR

LN type	LN prefix	LN class	Function block name
SXCBR (revision 1)	S	XCBR	SXCBR

Table 123: SXCBR 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	Mode status value 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
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

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DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
BlkCls	a_dSPC	stVal	ST	-	CL_BLKD	Mon	Indication that the function is blocked for close commands
		q	ST	-	CL_BLKD	Mon	Indication that the function is blocked for close commands
		t	ST	-	CL_BLKD	Mon	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
		q	ST	-	OP_BLKD	Mon	Indication that the function is blocked for open commands
t	ST	-	OP_BLKD	Mon	Indication that the function is blocked for open commands		
Loc	a_dSPS	stVal	ST	-	-	Mon	Indication that the function is in local mode (process level)
		q	ST	-	-	Mon	Indication that the function is in local mode (process level)
		t	ST	-	-	Mon	Indication that the function is in local mode (process level)
OpCnt	b_dINS	stVal	ST	-	CNT_VAL	Mon	Operation counter value
		q	ST	-	CNT_VAL	Mon	Operation counter value
		t	ST	-	CNT_VAL	Mon	Operation counter value
Pos	c_dDPC	stVal	ST	-	POSITION	Mon	Apparatus position indication
		q	ST	-	POSITION	Mon	Apparatus position indication
		t	ST	-	POSITION	Mon	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	Breaker operating capability 1 = None, 2 = O, 3 = CO, 4 = OCO, 5 = COCO, 6+ = More
		t	ST	-	-	Mon	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.orIdent	CO	-	-	Cmd	Special block command value

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
BlkUpd	v1_dSPC	Oper.ctINum	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 indication is blocked
		q	ST	-	UPD_BLKD	Mon	Update of position indication is blocked
		t	ST	-	UPD_BLKD	Mon	Update of position indication is blocked

7.11.2 Switch XSWI

7.11.2.1 Apparatus control SXSXI

LN type	LN prefix	LN class	Function block name
SXSXI (revision 1)	S	XSWI	SXSXI

Table 124: SXSXI 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.ctINum	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	Mode status value parameter for 61850
t	ST	-	-	Mon	Mode status value 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
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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
BlkCls	a_dSPC	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	Indication that the function is blocked for close commands
		t	ST	-	CL_BLKD	Mon	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
		q	ST	-	OP_BLKD	Mon	Indication that the function is blocked for open commands
t	ST	-	OP_BLKD	Mon	Indication that the function is blocked for open commands		
Loc	a_dSPS	stVal	ST	-	-	Mon	Indication that the function is in local mode (process level)
		q	ST	-	-	Mon	Indication that the function is in local mode (process level)
		t	ST	-	-	Mon	Indication that the function is in local mode (process level)
OpCnt	b_dINS	stVal	ST	-	CNT_VAL	Mon	Operation counter value
		q	ST	-	CNT_VAL	Mon	Operation counter value
		t	ST	-	CNT_VAL	Mon	Operation counter value
Pos	c_dDPC	stVal	ST	-	POSITION	Mon	Apparatus position indication
		q	ST	-	POSITION	Mon	Apparatus position indication
		t	ST	-	POSITION	Mon	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	Switch operating capability 1 = None, 2 = O, 3 = C, 4 = O & C
		t	ST	-	-	Mon	Switch operating capability 1 = None, 2 = O, 3 = C, 4 = O & C

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
SwTyp	g_dINS	stVal	ST	-	-	Mon	1=LoadBreak,2=Disconnecter, 3=EarthSw, 4=HighSpeedEarthSw
		q	ST	-	-	Mon	1=LoadBreak,2=Disconnecter, 3=EarthSw, 4=HighSpeedEarthSw
		t	ST	-	-	Mon	1=LoadBreak,2=Disconnecter, 3=EarthSw, 4=HighSpeedEarthSw
BlkUpd	v1_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	-	UPD_BLKD	Mon	Update of position indication is blocked
		q	ST	-	UPD_BLKD	Mon	Update of position indication is blocked
t	ST	-	UPD_BLKD	Mon	Update of position indication is blocked		

7.12 Logical nodes for power transformers

7.12.1 Tap changer YLTC

7.12.1.1 Tap changer control and supervision, 6 binary inputs TCMYLTC

LN type	LN prefix	LN class	Function block name
TCMYLTC (revision 1)	TCM	YLTC	TCMYLTC

Table 125: TCMYLTC 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

Table continues on next page

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	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value 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
EndPosR	a_dSPS	stVal	ST	-	HIPOSAL	Mon	Alarm for tap in the highest volt position
		q	ST	-	HIPOSAL	Mon	Alarm for tap in the highest volt position
		t	ST	-	HIPOSAL	Mon	Alarm for tap in the highest volt position
EndPosL	a_dSPS	stVal	ST	-	LOPOSAL	Mon	Alarm for tap in the lowest volt position
		q	ST	-	LOPOSAL	Mon	Alarm for tap in the lowest volt position
		t	ST	-	LOPOSAL	Mon	Alarm for tap in the lowest volt position
TapChg	b_dBSC	valWTr.posVal	ST	-	TCPOS	Mon	Integer value corresponding to actual tap position
		valWTr.transInd	ST	-	-	Mon	Tap position change in progress
		q	ST	-	TCPOS	Mon	Integer value corresponding to actual tap position
		t	ST	-	TCPOS	Mon	Integer value corresponding to actual tap position
OpCnt	b_dINS	stVal	ST	-	CNT_VAL	Mon	Number of operations on tap changer
		q	ST	-	CNT_VAL	Mon	Number of operations on tap changer
		t	ST	-	CNT_VAL	Mon	Number of operations on tap changer
HiTapPos	v1_dINS	stVal	ST	-	-	Mon	Tap position for the highest voltage
		q	ST	-	-	Mon	Tap position for the highest voltage
		t	ST	-	-	Mon	Tap position for the highest voltage
LoTapPos	v1_dINS	stVal	ST	-	-	Mon	Tap position for the lowest voltage
		q	ST	-	-	Mon	Tap position for the lowest voltage
		t	ST	-	-	Mon	Tap position for the lowest voltage
OpRs	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850

Table continues on next page

Section 7 Logical node data model

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
OpRs	v1_dSPC	Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orIdent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctINum	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
CLRs	v1_dSPC	Oper.ctIVal	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.ctINum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
CmdFlt	v1_dSPS	stVal	ST	-	CMDERRAL	Mon	Alarm for a command without an expected position change
		q	ST	-	CMDERRAL	Mon	Alarm for a command without an expected position change
		t	ST	-	CMDERRAL	Mon	Alarm for a command without an expected position change
ConvFlt	v1_dSPS	stVal	ST	-	CONVERR	Mon	General tap position conversion error
		q	ST	-	CONVERR	Mon	General tap position conversion error
		t	ST	-	CONVERR	Mon	General tap position conversion error
InvPosChg	v1_dSPS	stVal	ST	-	INVALPOS	Mon	Last position change was an invalid change
		q	ST	-	INVALPOS	Mon	Last position change was an invalid change
		t	ST	-	INVALPOS	Mon	Last position change was an invalid change
TapChgFlt	v1_dSPS	stVal	ST	-	TCERRAL	Mon	Alarm for none or illegal tap position change
		q	ST	-	TCERRAL	Mon	Alarm for none or illegal tap position change
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
TapChgFlt	v1_dSPS	t	ST	-	TCERRAL	Mon	Alarm for none or illegal tap position change
TapPosFlt	v1_dSPS	stVal	ST	-	POSERRAL	Mon	Alarm that indicates a problem with the position indication
		q	ST	-	POSERRAL	Mon	Alarm that indicates a problem with the position indication
		t	ST	-	POSERRAL	Mon	Alarm that indicates a problem with the position indication
CLCcnt	v2_dMV	mag.f	MX	-	CLCNT_VAL	Mon	Remaining number of operations at rated load
		q	MX	-	CLCNT_VAL	Mon	Remaining number of operations at rated load
		t	MX	-	CLCNT_VAL	Mon	Remaining number of operations at rated load

7.13 Logical nodes for further power system equipment

7.13.1 Battery ZBAT

7.13.1.1 Station battery supervision SPVNZBAT

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

Table 126: *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.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	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

Table continues on next page

Section 7 Logical node data model

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
BatHi	a_dSPS	stVal	ST	-	ST_UHI	Mon	Start signal when battery voltage exceeds upper limit
		q	ST	-	ST_UHI	Mon	Start signal when battery voltage exceeds upper limit
		t	ST	-	ST_UHI	Mon	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	Start signal when battery voltage drops below lower limit
		t	ST	-	ST_ULOW	Mon	Start signal when battery voltage drops below lower limit
Vol	b_dMV	mag.f	MX	-	BATTVOLT	Mon	Service value of the battery terminal voltage
		q	MX	-	BATTVOLT	Mon	Service value of the battery terminal voltage
		t	MX	-	BATTVOLT	Mon	Service value of the battery terminal voltage
OpBatLo	v1_dSPS	stVal	ST	-	AL_ULOW	Mon	Alarm when voltage has been below low limit for a set time
		q	ST	-	AL_ULOW	Mon	Alarm when voltage has been below low limit for a set time
		t	ST	-	AL_ULOW	Mon	Alarm when voltage has been below low limit for a set time
OpBatHi	v1_dSPS	stVal	ST	-	AL_UHI	Mon	Alarm when voltage has exceeded high limit for a set time
		q	ST	-	AL_UHI	Mon	Alarm when voltage has exceeded high limit for a set time
		t	ST	-	AL_UHI	Mon	Alarm when voltage has exceeded high limit for a set time

Section 8 Glossary

AC	Alternating current
ACT	Application configuration tool within PCM600
A/D converter	Analog to digital converter
ADBS	Amplitude dead-band supervision
ANSI	American National Standards Institute
AR	Autoreclosing
ASCT	Auxiliary summation current transformer
ASD	Adaptive signal detection
AWG	American Wire Gauge standard
BR	External bi-stable relay
BS	British standard
CAN	Controller Area Network. ISO standard (ISO 11898) for serial communication
CB	Circuit breaker
CCITT	Consultative Committee for International Telegraph and Telephony. A United Nations sponsored standards body within the International Telecommunications Union.
CCVT	Capacitive Coupled Voltage Transformer
Class C	Protection Current Transformer class as per IEEE/ ANSI
CMPPS	Combined mega pulses per second
CO cycle	Close-open cycle
Co-directional	Way of transmitting G.703 over a balanced line. Involves two twisted pairs making it possible to transmit information in both directions
COMTRADE	Standard format according to IEC 60255-24
Contra-directional	Way of transmitting G.703 over a balanced line. Involves four twisted pairs of which two are used for transmitting data in both directions, and two pairs for transmitting clock signals
CPU	Central processor unit
CR	Carrier receive
CRC	Cyclic redundancy check
CS	Carrier send

CT	Current transformer
CVT	Capacitive voltage transformer
DAR	Delayed auto-reclosing
DARPA	Defense Advanced Research Projects Agency (The US developer of the TCP/IP protocol etc.)
DBDL	Dead bus dead line
DBLL	Dead bus live line
DC	Direct current
DFT	Discrete Fourier transform
DIP-switch	Small switch mounted on a printed circuit board
DLLB	Dead line live bus
DNP	Distributed Network Protocol as per IEEE/ANSI Std. 1379-2000
DR	Disturbance recorder
DRAM	Dynamic random access memory
DRH	Disturbance report handler
DSP	Digital signal processor
DTT	Direct transfer trip scheme
EHV network	Extra high voltage network
EIA	Electronic Industries Association
EMC	Electro magnetic compatibility
EMF	Electro motive force
EMI	Electro magnetic interference
EnFP	End fault protection
ESD	Electrostatic discharge
FOX 20	Modular 20 channel telecommunication system for speech, data and protection signals
FOX 512/515	Access multiplexer
FOX 6Plus	Compact, time-division multiplexer for the transmission of up to seven duplex channels of digital data over optical fibers
G.703	Electrical and functional description for digital lines used by local telephone companies. Can be transported over balanced and unbalanced lines
GCM	Communication interface module with carrier of GPS receiver module
GDE	Graphical display editor within PCM600

GI	General interrogation command
GIS	Gas insulated switchgear
GOOSE	Generic object oriented substation event
GPS	Global positioning system
HDLC protocol	High level data link control, protocol based on the HDLC standard
HFBR connector type	Plastic fiber connector
HMI	Human machine interface
HSAR	High speed auto reclosing
HV	High voltage
HVDC	High voltage direct current
IDBS	Integrating dead band supervision
IEC	International Electrical Committee
IEC 60044-6	IEC Standard, Instrument transformers – Part 6: Requirements for protective current transformers for transient performance
IEC 61850	Substation Automation communication standard
IEEE	Institute of Electrical and Electronics Engineers
IEEE 802.12	A network technology standard that provides 100 Mbits/s on twisted-pair or optical fiber cable
IEEE P1386.1	PCI Mezzanine card (PMC) standard for local bus modules. References the CMC (IEEE P1386, also known as Common mezzanine card) standard for the mechanics and the PCI specifications from the PCI SIG (Special Interest Group) for the electrical EMF Electro Motive Force.
IED	Intelligent electronic device
I-GIS	Intelligent gas insulated switchgear
Instance	When several occurrences of the same function are available in the IED they are referred to as instances of that function. One instance of a function is identical to another of the same kind but will have a different number in the IED user interfaces. The word instance is sometimes defined as an item of information that is representative of a type. In the same way an instance of a function in the IED is representative of a type of function.
IP	1. Internet protocol. The network layer for the TCP/IP protocol suite widely used on Ethernet networks. IP is a connectionless, best-effort packet switching protocol. It

	provides packet routing, fragmentation and re-assembly through the data link layer.
	2. Ingression protection according to IEC standard
IP 20	Ingression protection, according to IEC standard, level 20
IP 40	Ingression protection, according to IEC standard, level 40
IP 54	Ingression protection, according to IEC standard, level 54
IRF	Internal fail signal
IRIG-B:	InterRange Instrumentation Group Time code format B, standard 200
ITU	International Telecommunications Union
LAN	Local area network
LIB 520	High voltage software module
LCD	Liquid crystal display
LDD	Local detection device
LED	Light emitting diode
MCB	Miniature circuit breaker
MCM	Mezzanine carrier module
MVB	Multifunction vehicle bus. Standardized serial bus originally developed for use in trains.
NCC	National Control Centre
OCO cycle	Open-close-open cycle
OCP	Overcurrent protection
OLTC	On load tap changer
OV	Over voltage
Overreach	A term used to describe how the relay behaves during a fault condition. For example a distance relay is over-reaching when the impedance presented to it is smaller than the apparent impedance to the fault applied to the balance point, i.e. the set reach. The relay “sees” the fault but perhaps it should not have seen it.
PCI	Peripheral component interconnect, a local data bus
PCM	Pulse code modulation
PCM600	Protection and control IED manager
PC-MIP	Mezzanine card standard
PISA	Process interface for sensors & actuators
PMC	PCI Mezzanine card
POTT	Permissive overreach transfer trip

Process bus	Bus or LAN used at the process level, that is, in near proximity to the measured and/or controlled components
PSM	Power supply module
PST	Parameter setting tool within PCM600
PT ratio	Potential transformer or voltage transformer ratio
PUTT	Permissive underreach transfer trip
RASC	Synchrocheck relay, COMBIFLEX
RCA	Relay characteristic angle
REVAL	Evaluation software
RFPP	Resistance for phase-to-phase faults
RFPE	Resistance for phase-to-earth faults
RISC	Reduced instruction set computer
RMS value	Root mean square value
RS422	A balanced serial interface for the transmission of digital data in point-to-point connections
RS485	Serial link according to EIA standard RS485
RTC	Real time clock
RTU	Remote terminal unit
SA	Substation Automation
SC	Switch or push-button to close
SCS	Station control system
SCT	System configuration tool according to standard IEC 61850
SMA connector	Subminiature version A, A threaded connector with constant impedance.
SMT	Signal matrix tool within PCM600
SMS	Station monitoring system
SNTP	Simple network time protocol – is used to synchronize computer clocks on local area networks. This reduces the requirement to have accurate hardware clocks in every embedded system in a network. Each embedded node can instead synchronize with a remote clock, providing the required accuracy.
SRY	Switch for CB ready condition
ST	Switch or push-button to trip
Starpoint	Neutral point of transformer or generator
SVC	Static VAr compensation
TC	Trip coil

TCS	Trip circuit supervision
TCP	Transmission control protocol. The most common transport layer protocol used on Ethernet and the Internet.
TCP/IP	Transmission control protocol over Internet Protocol. The de facto standard Ethernet protocols incorporated into 4.2BSD Unix. TCP/IP was developed by DARPA for internet working and encompasses both network layer and transport layer protocols. While TCP and IP specify two protocols at specific protocol layers, TCP/IP is often used to refer to the entire US Department of Defense protocol suite based upon these, including Telnet, FTP, UDP and RDP.
TNC connector	Threaded Neill Concelman, A threaded constant impedance version of a BNC connector
TPZ, TPY, TPX, TPS	Current transformer class according to IEC
Underreach	A term used to describe how the relay behaves during a fault condition. For example a distance relay is under-reaching when the impedance presented to it is greater than the apparent impedance to the fault applied to the balance point, i.e. the set reach. The relay does not "see" the fault but perhaps it should have seen it. See also Overreach.
U/I-PISA	Process interface components that deliver measured voltage and current values
UTC	Coordinated universal time. A coordinated time scale, maintained by the Bureau International des Poids et Mesures (BIPM), which forms the basis of a coordinated dissemination of standard frequencies and time signals. UTC is derived from International Atomic Time (TAI) by the addition of a whole number of "leap seconds" to synchronize it with Universal Time 1 (UT1), thus allowing for the eccentricity of the Earth's orbit, the rotational axis tilt (23.5 degrees), but still showing the Earth's irregular rotation, on which UT1 is based. The Coordinated Universal Time is expressed using a 24-hour clock and uses the Gregorian calendar. It is used for aeroplane and ship navigation, where it also sometimes known by the military name, "Zulu time". "Zulu" in the phonetic alphabet stands for "Z" which stands for longitude zero.
UV	Undervoltage
WEI	Weak end infeed logic
VT	Voltage transformer
X.21	A digital signalling interface primarily used for telecom equipment

$3I_0$	Three times zero-sequence current. Often referred to as the residual or the earth-fault current
$3U_0$	Three times the zero sequence voltage. Often referred to as the residual voltage or the neutral point voltage

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