Relion® Protection and control

650 series
IEC 61850 Communication Protocol Manual

Document ID: 1MRK 511 242-UEN
Issued: February 2011
Revision: -
Product version: 1.1

Copyright

This document and parts thereof must not be reproduced or copied without written permission from ABB, and the contents thereof must not be imparted to a third party, nor used for any unauthorized purpose.

The software or hardware described in this document is furnished under a license and may be used or disclosed only in accordance with the terms of such license.

Trademarks

ABB and Relion are registered trademarks of ABB Group. All other brand or product names mentioned in this document may be trademarks or registered trademarks of their respective holders.

Warranty

Please inquire about the terms of warranty from your nearest ABB representative.

ABB AB

Substation Automation Products

SE-721 59 Västerås

Sweden

Telephone: +46 (0) 21 32 50 00

Facsimile: +46 (0) 21 14 69 18

http://www.abb.com/substationautomation

Disclaimer

The data, examples and diagrams in this manual are included solely for the concept or product description and are not to be deemed as a statement of guaranteed properties. All persons responsible for applying the equipment addressed in this manual must satisfy themselves that each intended application is suitable and acceptable, including that any applicable safety or other operational requirements are complied with. In particular, any risks in applications where a system failure and/ or product failure would create a risk for harm to property or persons (including but not limited to personal injuries or death) shall be the sole responsibility of the person or entity applying the equipment, and those so responsible are hereby requested to ensure that all measures are taken to exclude or mitigate such risks.

This document has been carefully checked by ABB but deviations cannot be completely ruled out. In case any errors are detected, the reader is kindly requested to notify the manufacturer. Other than under explicit contractual commitments, in no event shall ABB be responsible or liable for any loss or damage resulting from the use of this manual or the application of the equipment.

Conformity

This product complies with the directive of the Council of the European Communities on the approximation of the laws of the Member States relating to electromagnetic compatibility (EMC Directive 2004/108/EC) and concerning electrical equipment for use within specified voltage limits (Low-voltage directive 2006/95/EC). This conformity is the result of tests conducted by ABB in accordance with the product standards EN 50263 and EN 60255-26 for the EMC directive, and with the product standards EN 60255-1 and EN 60255-27 for the low voltage directive. The IED is designed in accordance with the international standards of the IEC 60255 series.

Table of contents

Table of contents

Table of contents

Table of contents

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
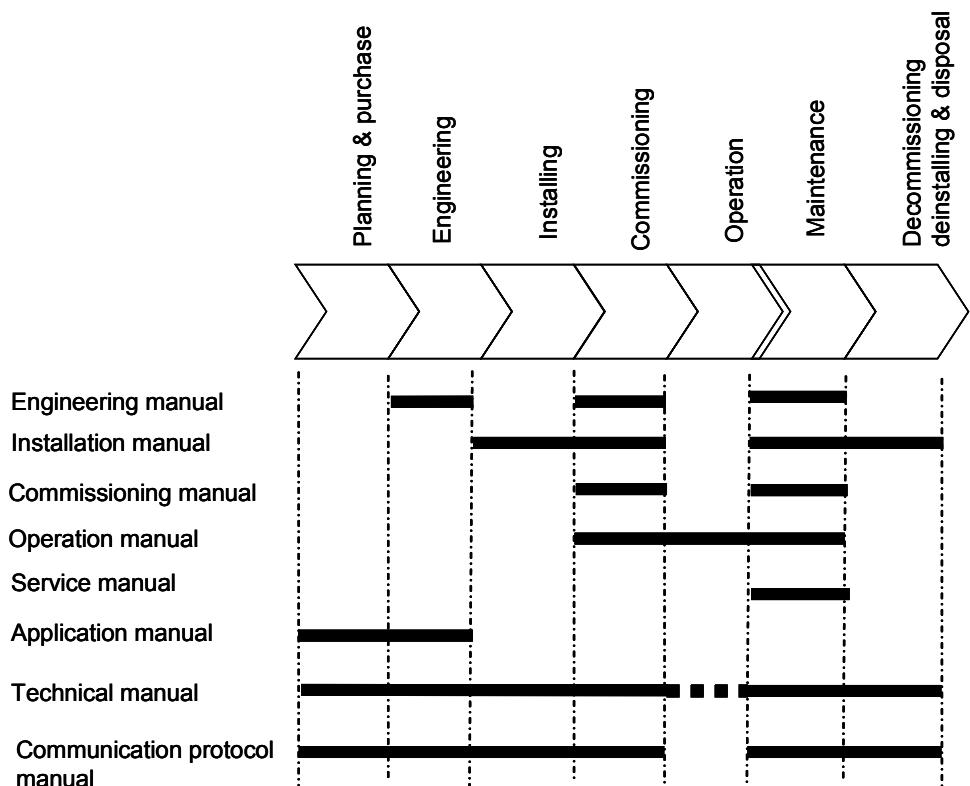
en07000220.vsd

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 60870-5-103, 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
-/February 2011	1.1	First release

1.3.3 Related documents

Documents related to REB650	Identity number
Application manual	1MRK 505 262-UEN
Technical manual	1MRK 505 263-UEN
Commissioning manual	1MRK 505 264-UEN

Table continues on next page

Documents related to REB650	Identity number
Product Guide, configured	1MRK 505 265-BEN
Type test certificate	1MRK 505 265-TEN

Documents related to REL650	Identity number
Application manual	1MRK 506 325-UEN
Technical manual	1MRK 506 326-UEN
Commissioning manual	1MRK 506 327-UEN
Product Guide, configured	1MRK 506 328-BEN
Type test certificate	1MRK 506 328-TEN

Documents related to RET650	Identity number
Application manual	1MRK 504 124-UEN
Technical manual	1MRK 504 125-UEN
Commissioning manual	1MRK 504 126-UEN
Product Guide, configured	1MRK 504 127-BEN
Type test certificate	1MRK 504 127-TEN

Documents related to REC650	Identity number
Application manual	1MRK 511 246-UEN
Technical manual	1MRK 511 247-UEN
Commissioning manual	1MRK 511 248-UEN
Product Guide	1MRK 511 249-BEN
Type test certificate	1MRK 511 249-TEN

Documents related to REG650	Identity number
Application manual	1MRK 502 033-UEN
Technical manual	1MRK 502 034-UEN
Commissioning manual	1MRK 502 035-UEN
Product Guide	1MRK 502 036-BEN
Type test certificate	1MRK 502 036-TEN
Rotor Earth Fault Protection with Injection Unit RXTTE4 and REG670	1MRG001910

Documents related to REQ650	Identity number
Application manual	1MRK 505 266-UEN
Technical manual	1MRK 505 267-UEN
Commissioning manual	1MRK 505 268-UEN
Product Guide	1MRK 505 269-BEN
Type test certificate	1MRK 505 269-TEN

650 series manuals	Identity number
Communication protocol manual, DNP3	1MRK 511 241-UEN
Communication protocol manual, IEC 61850	1MRK 511 242-UEN
Communication protocol manual, IEC 60870-5-103	1MRK 511 243-UEN
Point list manual, DNP3	1MRK 511 244-UEN
Engineering manual	1MRK 511 245-UEN
Operation manual	1MRK 500 093-UEN
Installation manual	1MRK 514 014-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 of important facts and conditions.

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

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

1.4.2 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 the glossary. The glossary also contains definitions of important terms.
- Push button navigation in the LHMI menu structure is presented by using the push button icons, 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 / Function block name	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
HZPDIF	87	1Ph High impedance differential protection
GENPDIF	87G	Generator differential protection
Impedance protection		
ZQDPDIS	21	Five-zone distance protection, quadrilateral characteristic
FDPSPDIS	21	Phase selection with load enchroachment, quadrilateral characteristic
ZMOPDIS	21	Five-zone distance protection, mho characteristic
FMPSPDIS	21	Faulty phase identification with load enchroachment 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
ZGPDIS	21G	Underimpedance protection for generators and transformers
LEXPDIS	40	Loss of excitation
OOSPPAM	13	Out-of-step protection
LEPDIS		Load enchroachment

Table 2:   *Backup protection functions*

IEC 61850 / Function block name	ANSI	Function description
Current protection		
PHPIOC	50	Instantaneous phase overcurrent protection
SPTPIOC	50	Instantaneous phase overcurrent protection
OC4PTOC	51/67	Four-step phase overcurrent protection
OC4SPTOC	51/67	Four-step 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 two-step undercurrent protection
LPTTR	26	Thermal overload protection, one time constant
TRPTTR	49	Thermal overload protection, two time constants
CCRBRF	50BF	Breaker failure protection
CSPRBRF	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
AEGGAPC	50AE	Accidental energizing protection for synchronous generator
NS2PTOC	46I2	Negative-sequence time overcurrent protection for machines
VR2PVOC	51V	Voltage-restrained time overcurrent protection
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
STEFPHIZ	64	100% Stator earth fault protection, 3rd harmonic based
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 / Function block name	ANSI	Function description
Control		
SESRSYN	25	Synchrocheck, energizing check and synchronizing
SMBRREC	79	Autorecloser
STBRREC	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 disconnector
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
APC8		Apparatus control for single bay, max 8 app. (1CB) incl. interlocking
TR8ATCC	90	Automatic voltage control for tap changer, 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
I103CMD		Function commands for IEC60870-5-103
I103IEDCMD		IED commands for IEC60870-5-103
I103USRCMD		Function commands user defined for IEC60870-5-103
I103GENCMD		Function commands generic for IEC60870-5-103
Table continues on next page		

IEC 61850 / Function block name	ANSI	Function description
I103POSCMD		IED commands with position and select for IEC60870-5-103
Secondary system supervision		
CCSRDIF	87	Current circuit supervision
SDDRFUF		Fuse failure supervision
TCSSCBR		Breaker close/trip circuit monitoring
Logic		
SMPPTRC	94	Tripping logic
SPTPTRC	94	Tripping logic
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
FXDSIGN		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

Table continues on next page

IEC 61850 / Function block name	ANSI	Function description
VMMXU		Phase-phase voltage measurement
CMSQI		Current sequence component measurement
VMSQI		Voltage sequence measurement
VNMMXU		Phase-neutral voltage measurement
AISVBAS		Function block for service values presentation of the analog inputs
TM_P_P2		Function block for service value presentation of primary analog inputs 600TRM
AM_P_P4		Function block for service value presentation of primary analog inputs 600AIM
TM_S_P2		Function block for service value presentation of secondary analog inputs 600TRM
AM_S_P4		Function block for service value presentation of secondary analog inputs 600AIM
CNTGGIO		Event counter
DRPRDRE		Disturbance report
AxRADR		Analog input signals
BxRBDR		Binary input signals
SPGGIO		IEC61850 generic communication I/O functions
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
I103MEAS		Measurands for IEC60870-5-103
I103MEASUSR		Measurands user defined signals for IEC60870-5-103
I103AR		Function status auto-recloser for IEC60870-5-103
I103EF		Function status earth-fault for IEC60870-5-103
I103FLTPROT		Function status fault protection for IEC60870-5-103
I103IED		IED status for IEC60870-5-103
I103SUPERV		Supervision status for IEC60870-5-103
I103USRDEF		Status for user defiend signals for IEC60870-5-103
Metering		
PCGGIO		Pulse counter logic
ETPMMTR		Function for energy calculation and demand handling

Table 4: *Designed to communicate*

IEC 61850 / Function block name	ANSI	Function description
Station communication		
IEC61850-8-1		IEC61850 communication protocol
DNPGEN CH1TCP CH2TCP CH3TCP CH4TCP MST1TCP MST2TCP MST3TCP MST4TCP		DNP3.0 for TCP/IP communication protocol
DNPFREC		DNP3.0 fault records for TCP/IP communication protocol
IED61870-5-103		IEC60870-5-103 serial communication via COM02
GOOSEINTLKRCV		Horizontal communication via GOOSE for interlocking
GOOSEBINRCV		GOOSE binary receive
GOOSEVCTRCONF		GOOSE VCTR configuration for send and receive
VCTRSEND		Voltage control sending block for GOOSE
GOOSEVCTRRCV		Voltage control receiving block for GOOSE
ETHFRNT ETHLAN1 GATEWAY		Ethernet configuration of front port, LAN1 port and gateway
GOOSEDPRCV		GOOSE function block to receive a double point value
GOOSEINTRCV		GOOSE function block to receive an integer value
GOOSEMVRCV		GOOSE function block to receive a measurand value
GOOSESPRCV		GOOSE function block to receive a single point value
Scheme communication		
ZCPSCH	85	Scheme communication logic for distance or overcurrent protection
ZCRWPSCH	85	Current reversal and weak end infeed logic for distance protection
ZCWSPSCH	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 block name	Function description
Basic functions included in all products	
INTERRSIG	Self-supervision with internal event list
SELFSUPEVLST	Self-supervision with internal event list
TIMESYNCHGEN	Time synchronization
SNTP	Time synchronization
Table continues on next page	

IEC 61850 / Function block name	Function description
DTSBEGIN	Time synchronization
DTSEND	Time synchronization
TIMEZONE	Time synchronization
IRIG-B	Time synchronization
SETGRPS	Setting group handling
ACTVGRP	Parameter setting groups
TESTMODE	Test mode functionality
CHNGLCK	Change lock function
ATHSTAT	Authority status
ATHCHCK	Authority check
TERMINALID	IED identifiers
PRODINF	Product information
PRIMVAL	Primary system values
SMAI_20_1 - SMAI_20_12	Signal Matrix for analog inputs
3PHSUM	Summation block 3 phase
GBASVAL	Global base values for settings
DOSFRNT	Denial of service, frame rate control for front port
DOSLAN1	Denial of service, frame rate control for LAN1 port
DOSSCKT	Denial of service, socket flow control

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 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 MMS standard, which uses Ethernet and TCP/IP to handle the information transport within the substation.

The data modelling uses the concept of logical nodes to identify the published information for communication. The standard defines a set of logical nodes, each representing a communication view of a process function with a number of data objects. The standard cannot cover all possible information that is given, for example, by a protection function of vendor A or vendor B or for the variants of a protection function given by the process part which is protected. For example, a transformer differential - or line differential protection, because the standard defines only a differential protection. Therefore, it is possible to adapt the logical node, which is defined in the standard, as a logical node class. The standard defines methods to describe the 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 1MRG003128	650 series 1.1 - IEC 61850 MICS: Modelling implementation conformance statement
IEC 61850 PICS 1MRG003399	650 series 1.1 - IEC 61850 PICS: Protocol implementation conformance statement
IEC 61850 PIXIT 1MRG003379	650 series 1.1 - IEC 61850 PIXIT: Protocol implementation extra information
IEC 61850 TICS 1MRG003378	650 series 1.1 – 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.

IEC08000178.vsd
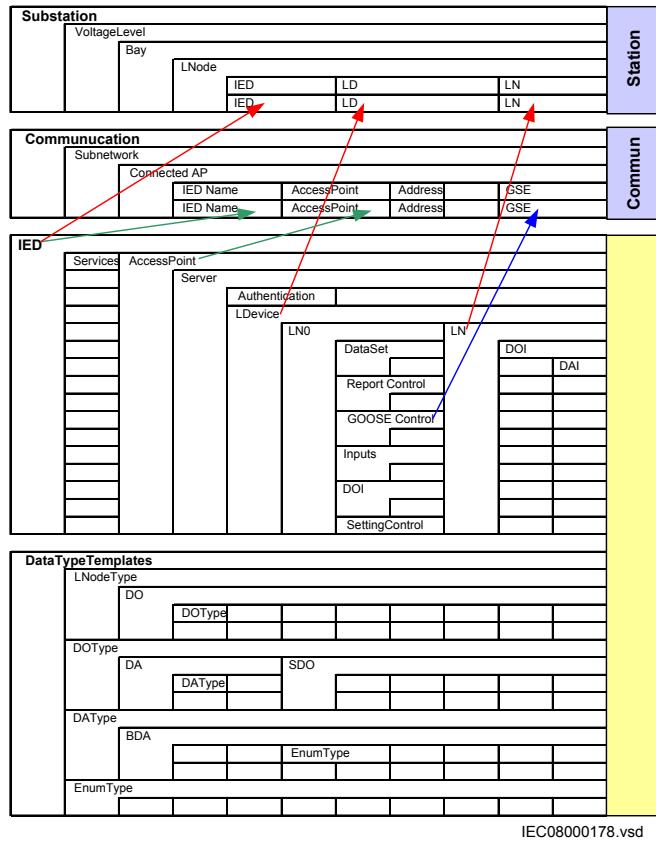
Figure 2:   IEC 61850: Principle structure of the SCL XML file

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)

en06000101.vsd
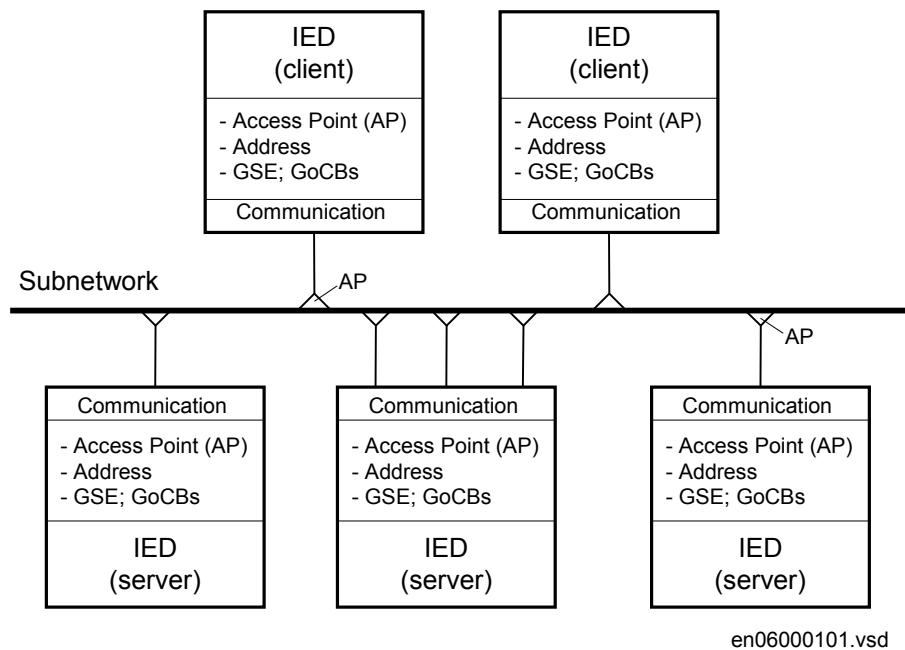
Figure 3:   *IEC 61850–6: Communication network*

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.
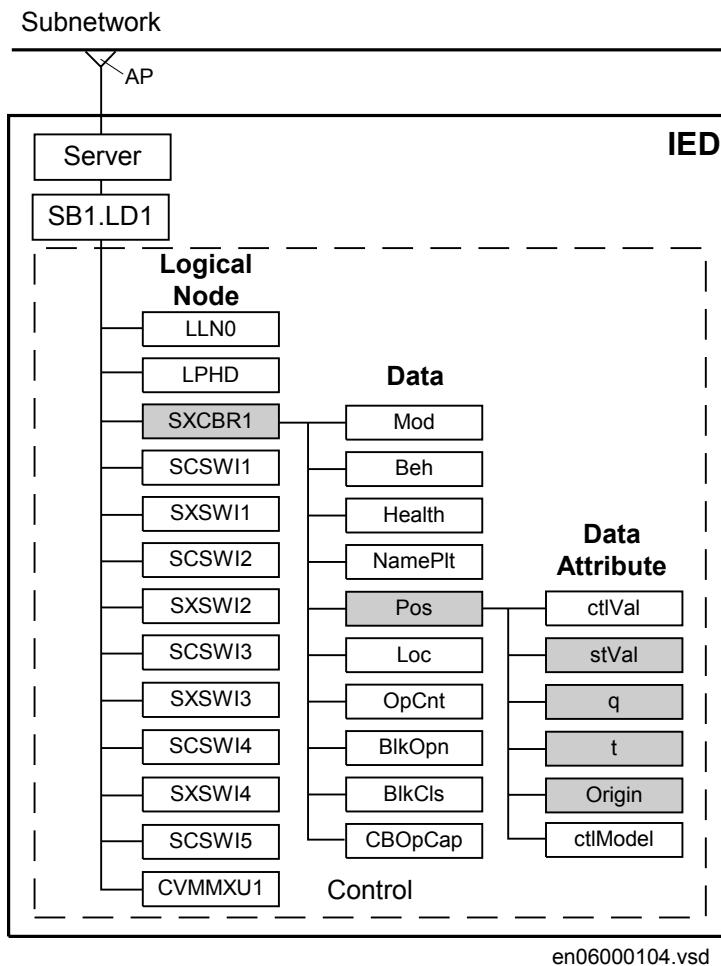
en06000104.vsd

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.

IEC 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 unbufffered/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.
- Logical nodes, which are not related to the conducting equipment, must be included in the bay level in the substation section.
- The resulting SCD file is exported from 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.
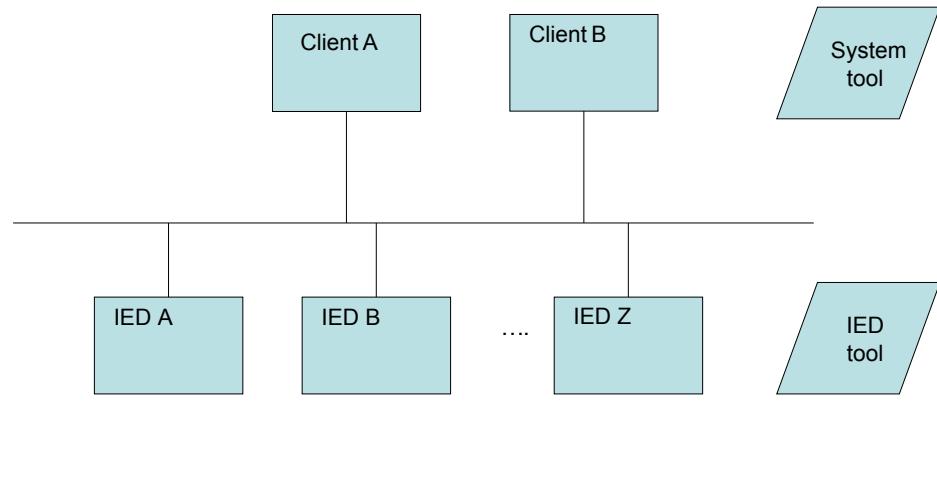
IEC09000151-1-en.vsd

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.
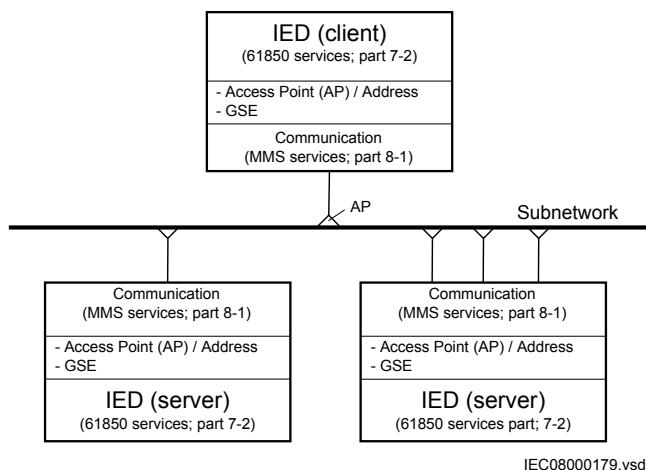
Figure 6:   *IEC 61850 Protocol: related standards for communication*
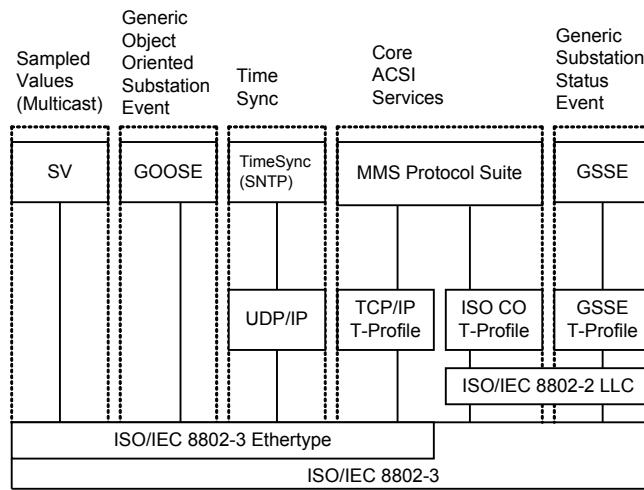
IEC09000153-1-en.vsd

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 BufTm < IntPrd. For best efficiency, the BufTm should have IntPrd as common denominator, like n*BufTm = IntPrd, n is an arbitrary number.

Generic substation event (GOOSE)

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

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

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

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

When publishing a measured value, the user must take care which measured value data attributes are added to a data set. If the measured value is event-handled (like in the case of MMXU functions), then one can add that value directly to the data set. If the value is not event-handled, (like in the case of Synchrocheck function), it is recommended to connect the value desired to be published to a MVGGIO function block (in ACT) and then use the measured value given by the MVGGIO.

Example of functions that have event-handled measured values (can be added directly to the data set).

- 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
- MVGGIO - IEC61850 generic communication I/ O functions

Example of functions that have event-handled measured values, but they cannot be added directly to the data set (need to be connected to a MVGGIO function block).

- PCGGIO - Pulse Counter
- ETPMMTR - Function for energy calculation and demand handling
- LMBRFLO - Fault Locator
- SESRSYN - Synchrocheck, energizing check, and synchronizing
- SSCBR - Circuit breaker condition monitoring
- SSIMG - Insulation liquid monitoring function
- SSIML - Circuit breaker condition monitoring
- VR2PVOC - Voltage-restrained time overcurrent protection
- DNSPTOC - Negative sequence based overcurrent function

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.
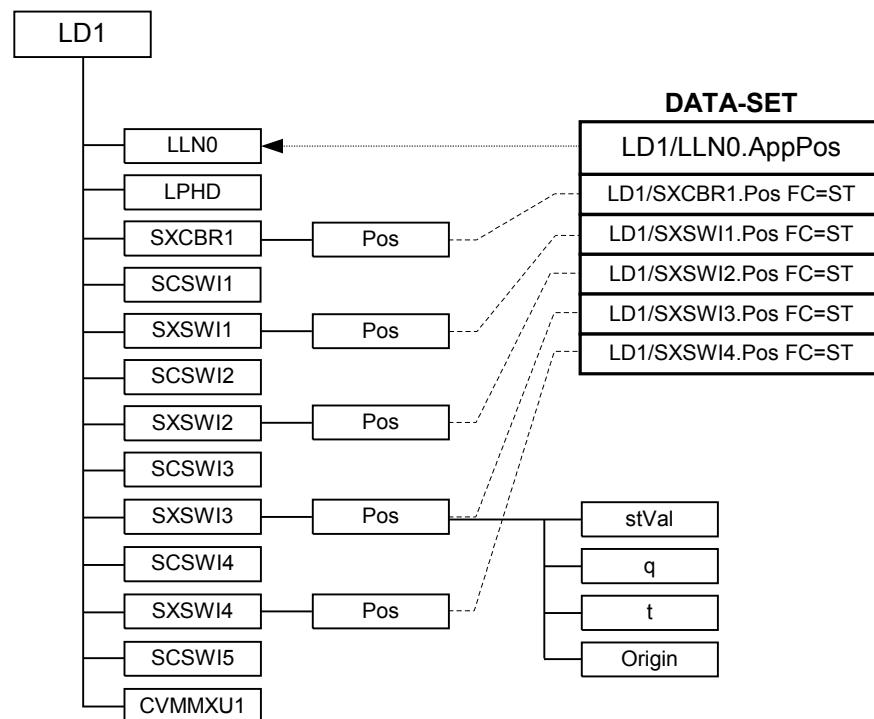
Figure 8:   *IEC 61850–7–2: Example of a data set*

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 (FCDAs is included in the SCL file in the IED section in the Logical device subsection. As specified in IEC 61850–7–2 clause 9, the data sets are part of a logical node. They are most likely included in the LLN0.

6.2 Report control block (URCB/BRCB)

To be able to transmit the signals configured in a 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.
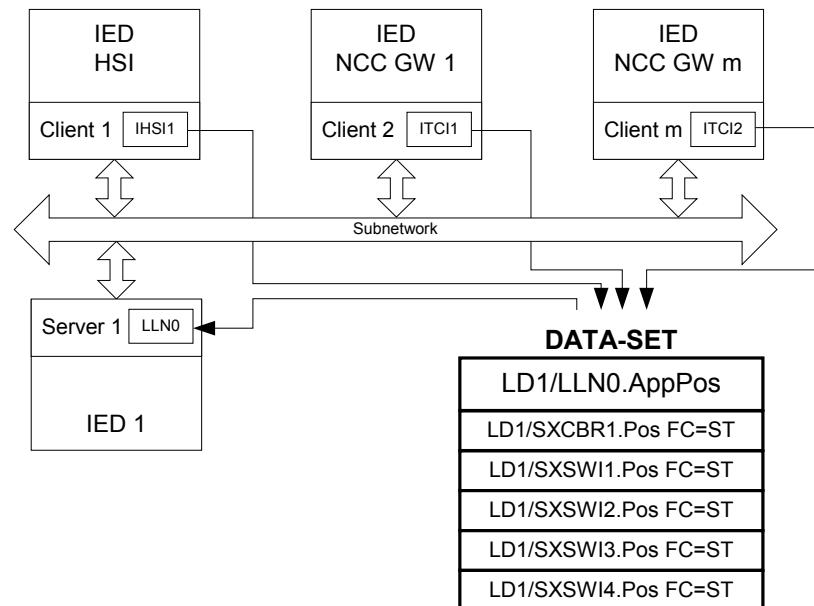
en06000107.vsd

Figure 9:   Link BRCB to a client LN

6.3 GOOSE Control Blocks (GoCB)
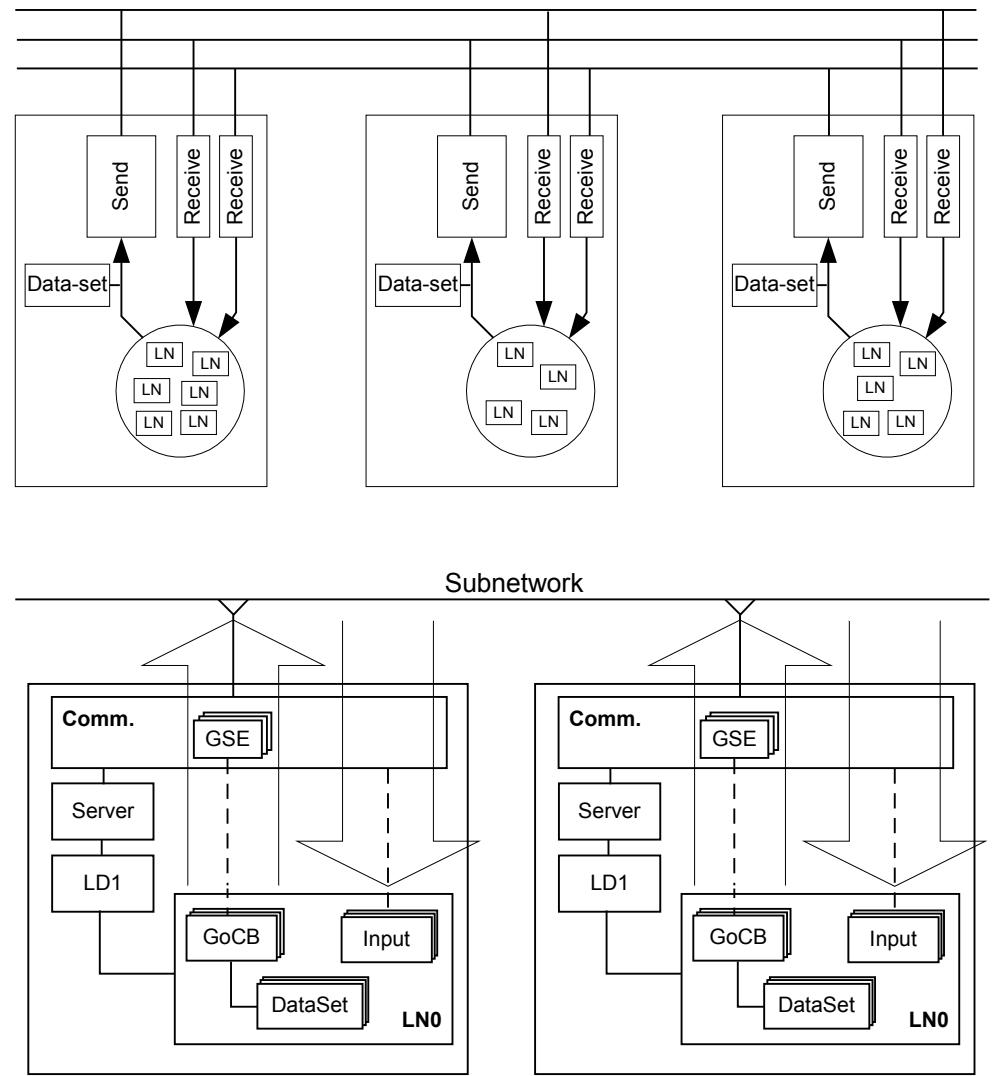
en06000109.vsd

Figure 10:   *IEC 61850: Principle operation of GOOSE messages*

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

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

— respond on application level). The 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
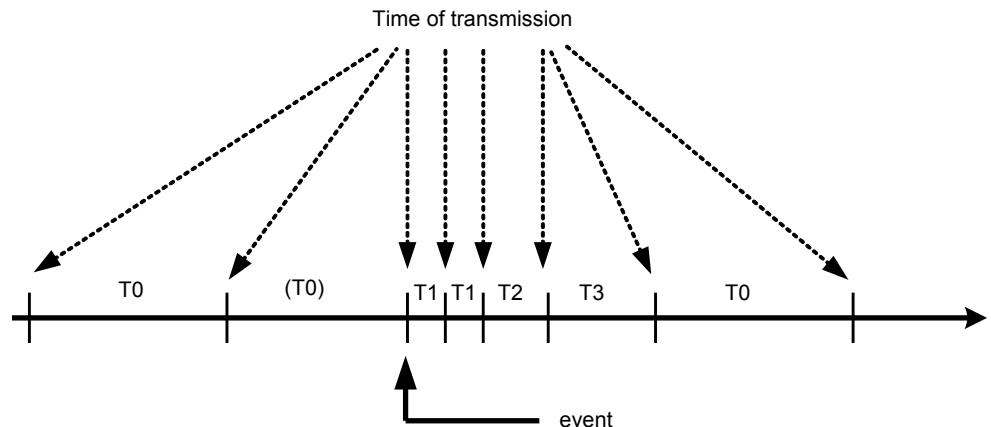
IEC09000152-1-en.vsd

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 sent.

A GOOSE message is forced to be transmitted when a trigger change is detected for a data attribute. All members of the data set are copied in the send buffer with their actual value and the message is sent. The subscribers, who knows the address of this GOOSE message, receives the telegram. The GOOSE message includes 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, parallel control TR8ATCC

LN type	LN prefix	LN class	Function block name
TR8ATCC (revision 3)	TR8	ATCC	TR8ATCC

Table 6:   TR8ATCC 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
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
BlkV	a_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
HiTapPos	b_dINS	stVal	ST	-	-	Mon	Tap position for maximum voltage
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
HiTapPos	b_dINS	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
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)
TapChg	c_dBSC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		valWTr.posVal	ST	-	-	Mon	Tap position
		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
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		q	ST	-	-	Mon	Tap position
		t	ST	-	-	Mon	Tap position
TotW	c_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)
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
TotVAr	c_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)
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
		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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
LVA1On	v1_dSPC	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 LVAConst1 is used (service value)
		q	ST	-	-	Mon	Setting LVAConst1 is used (service value)
		t	ST	-	-	Mon	Setting LVAConst1 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 LVAConst2 is used (service value)
		q	ST	-	-	Mon	Setting LVAConst2 is used (service value)
		t	ST	-	-	Mon	Setting LVAConst2 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.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 LVAConst3 is used (service value)

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
LVA3On	v1_dSPC	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
		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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
ForceMast	v1_dSPC	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
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
		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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
T4ParGr	v1_dSPS	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
		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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
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
		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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
HuntAlm	v1_dSPS	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
		t	ST	-	OUTOFPOS	Mon	Difference in tap positions exceeded the set limit
MFFlt	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
LodAlm	V10_dMV	mag.f	MX	-	ATCCOUT	Mon	Group connection to YLTCIN
		q	MX	-	ATCCOUT	Mon	Group connection to YLTCIN
		t	MX	-	ATCCOUT	Mon	Group connection to YLTCIN
LodARe	V11_dMV	mag.f	MX	-	ATCCOUT	Mon	Group connection to YLTCIN
		q	MX	-	ATCCOUT	Mon	Group connection to YLTCIN
		t	MX	-	ATCCOUT	Mon	Group connection to YLTCIN
BusV	V12_dMV	mag.f	MX	-	ATCCOUT	Mon	Group connection to YLTCIN
		q	MX	-	ATCCOUT	Mon	Group connection to YLTCIN
		t	MX	-	ATCCOUT	Mon	Group connection to YLTCIN
SetV	V13_dMV	mag.f	MX	-	ATCCOUT	Mon	Group connection to YLTCIN
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
SetV	V13_dMV	q	MX	-	ATCCOUT	Mon	Group connection to YLTCIN
		t	MX	-	ATCCOUT	Mon	Group connection to YLTCIN
PosRel	V14_dMV	mag.f	MX	-	ATCCOUT	Mon	Group connection to YLTCIN
		q	MX	-	ATCCOUT	Mon	Group connection to YLTCIN
		t	MX	-	ATCCOUT	Mon	Group connection to YLTCIN
X2	V15_dMV	mag.f	MX	-	ATCCOUT	Mon	Group connection to YLTCIN
		q	MX	-	ATCCOUT	Mon	Group connection to YLTCIN
		t	MX	-	ATCCOUT	Mon	Group connection to YLTCIN
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)
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
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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
BndCtrSet	v2_dMV	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)
CircV	v2_dMV	mag.f	MX	-	-	Mon	Calculated circulating voltage
		q	MX	-	-	Mon	Calculated circulating voltage
		t	MX	-	-	Mon	Calculated circulating voltage
VCTRStatus	V6_dINS	stVal	ST	-	ATCCOUT	Mon	Group connection to YLTCIN
		q	ST	-	ATCCOUT	Mon	Group connection to YLTCIN
		t	ST	-	ATCCOUT	Mon	Group connection to YLTCIN

7.2.1.2   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 7:   *TCMYLTC 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
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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
OpCnt	b_dINS	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
		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
CLRs	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
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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
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
		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
CLCnt	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

7.3 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 (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
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
		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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
BlkUpd	v1_dSPC	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 (instance 0)

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
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 (instance 1)

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.orIdent	CO	-	-	Cmd	Command parameter for IEC61850
		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
Pos	a_dDPC	Cancel.origin.orIdent	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
		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

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
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 (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
ISCSO	b_dINC	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	Integer to be converted to bit pattern OUT1 to OUT16
		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 (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
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 (instance 0)*

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
Table continues on next page							

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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
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
		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 (instance 0)

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
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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
OpNSUnRst	v1_dSPS	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
		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 (instance 0)

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
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
ItrFlt	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

7.5.1.4   Generator differential protection GENPDIF

LN type	LN prefix	LN class	Function block name
GENPDIF (revision 1)	GEN	PDIF	GENPDIF

Table 16:   *GENPDIF Logical node data (instance 1)*

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str	aACD	general	ST	-	START	Mon	Common start signal from any phase
		phsA	ST	-	-	Mon	Start signal from phase L1
		phsB	ST	-	-	Mon	Start signal from phase L2
		phsC	ST	-	-	Mon	Start signal from phase L3
		q	ST	-	START	Mon	Common start signal from any phase
		t	ST	-	START	Mon	Common start signal from any phase
Mod	aINC	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	aINS	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	bACT	general	ST	T	TRIP	Mon	General, common trip signal
		q	ST	T	TRIP	Mon	General, common trip signal
		t	ST	T	TRIP	Mon	General, common trip signal
OpnCTVal	v1INS	stVal	ST	-	-	Mon	Open CT side : 1 -> Terminal side, 2 -> Neutral side
		q	ST	-	-	Mon	Open CT side : 1 -> Terminal side, 2 -> Neutral side
		t	ST	-	-	Mon	Open CT side : 1 -> Terminal side, 2 -> Neutral side
OpnCTIn	v1INS	stVal	ST	-	-	Mon	Open CT on Input : 1 for input 1, 2 for input 2
		q	ST	-	-	Mon	Open CT on Input : 1 for input 1, 2 for input 2
		t	ST	-	-	Mon	Open CT on Input : 1 for input 1, 2 for input 2
OpnCTPh	v1INS	stVal	ST	-	-	Mon	Open CT in Phase : 1 for L1, 2 for L2, 3 for L3
		q	ST	-	-	Mon	Open CT in Phase : 1 for L1, 2 for L2, 3 for L3
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
OpnCTPh	v1INS	t	ST	-	-	Mon	Open CT in Phase : 1 for L1, 2 for L2, 3 for L3
OpRst	v1SPS	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
OpUnRst	v1SPS	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
OpNSUnRst	v1SPS	stVal	ST	-	TRNSUNR	Mon	Trip signal from unrestr. neg. seq. diff. protection
		q	ST	-	TRNSUNR	Mon	Trip signal from unrestr. neg. seq. diff. protection
		t	ST	-	TRNSUNR	Mon	Trip signal from unrestr. neg. seq. diff. protection
OpNSSen	v1SPS	stVal	ST	-	TRNSSENS	Mon	Trip signal from sensitive neg. seq. diff. protection
		q	ST	-	TRNSSENS	Mon	Trip signal from sensitive neg. seq. diff. protection
		t	ST	-	TRNSSENS	Mon	Trip signal from sensitive neg. seq. diff. protection
ItrFlt	v1SPS	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
ExFlt	v1SPS	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
BlkH	v1SPS	stVal	ST	-	BLKH	Mon	Common harmonic block signal
		q	ST	-	BLKH	Mon	Common harmonic block signal
		t	ST	-	BLKH	Mon	Common harmonic block signal
BlkHPhA	v1SPS	stVal	ST	-	-	Mon	Harmonic block signal, phase L1
		q	ST	-	-	Mon	Harmonic block signal, phase L1
		t	ST	-	-	Mon	Harmonic block signal, phase L1
BlkHPhB	v1SPS	stVal	ST	-	-	Mon	Harmonic block signal, phase L2
		q	ST	-	-	Mon	Harmonic block signal, phase L2

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
BlkHPhB	v1SPS	t	ST	-	-	Mon	Harmonic block signal, phase L2
BlkHPhC	v1SPS	stVal	ST	-	-	Mon	Harmonic block signal, phase L3
		q	ST	-	-	Mon	Harmonic block signal, phase L3
		t	ST	-	-	Mon	Harmonic block signal, phase L3
OpnCT	v1SPS	stVal	ST	-	OPENCT	Mon	An open CT was detected
		q	ST	-	OPENCT	Mon	An open CT was detected
		t	ST	-	OPENCT	Mon	An open CT was detected
OpnCTAlm	v1SPS	stVal	ST	-	OPENCTAL	Mon	Open CT Alarm output signal. Issued after a delay ...
		q	ST	-	OPENCTAL	Mon	Open CT Alarm output signal. Issued after a delay ...
		t	ST	-	OPENCTAL	Mon	Open CT Alarm output signal. Issued after a delay ...
DifANS	v2MV	mag.f	MX	-	IDNSMAG	Mon	Negative Sequence Differential current; in primary Amperes
		q	MX	-	IDNSMAG	Mon	Negative Sequence Differential current; in primary Amperes
		t	MX	-	IDNSMAG	Mon	Negative Sequence Differential current; in primary Amperes
RstMaxA	v2MV	mag.f	MX	-	IBIAS	Mon	Magnitude of the common Bias current; in primary Amperes
		q	MX	-	IBIAS	Mon	Magnitude of the common Bias current; in primary Amperes
		t	MX	-	IBIAS	Mon	Magnitude of the common Bias current; in primary Amperes

7.5.1.5   1 Ph High impedance differential protection HZPDIF

LN type	LN prefix	LN class	Function block name
HZPDIF (revision 1)	HZ	PDIF	HZPDIF

Table 17:   *HZPDIF 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
Op	b_dACT	general	ST	T	TRIP	Mon	Trip signal
		q	ST	T	TRIP	Mon	Trip signal
		t	ST	T	TRIP	Mon	Trip signal
ImpAlm	v1_dSPS	stVal	ST	-	ALARM	Mon	Alarm signal
		q	ST	-	ALARM	Mon	Alarm signal
		t	ST	-	ALARM	Mon	Alarm signal

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 18: *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
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 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 19: 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 20: 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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Op	b_dACT	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
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 21:   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 22:   *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 23:   *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 24:   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 enchroachment, quadrilateral characteristic FDPSPDIS

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

Table 25:   FDPSPDIS Logical node data (instance 0)

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 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 26: *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 27: *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 28:   *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 29:   *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 30: *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 31: *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 32:   *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 enchroachment for mho FMPSPDIS

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

Table 33:   *FMPSPDIS Logical node data (instance 1)*

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

7.5.2.5 Underimpedance protection for generator and transformer ZGPDIS

LN type	LN prefix	LN class	Function block name
ZGLLN0 instance 1 (revision 0)	-	LLN0	ZGPDIS
ZGPDIS instance 1 (revision 0)	ZG	PDIS	ZGPDIS
ZGPDIS instance 2 (revision 0)	ZG	PDIS	ZGPDIS
ZGPDIS instance 3 (revision 0)	ZG	PDIS	ZGPDIS
ZGPDIS instance 4 (revision 0)	ZG	PDIS	ZGPDIS
ZGPDIS instance 5 (revision 0)	ZG	PDIS	ZGPDIS
ZGPTRC instance 1 (revision 0)	ZG	PTRC	ZGPDIS

Table 34:   *ZGLLN0 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
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 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 35:   ZGPDIS 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 36:   ZGPDIS 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

Table 37:　　　ZGPDIS 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 38:　　　ZGPTRC 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	-	TRIP	Mon	Trip general
		q	ST	-	TRIP	Mon	Trip general
		t	ST	-	TRIP	Mon	Trip general
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

7.5.2.6   Loss of exectation LEXPDIS

LN type	LN prefix	LN class	Function block name
LEXPDIS (revision 1)	LEX	PDIS	LEXPDIS

Table 39:   *LEXPDIS 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
Str	b_dACD	general	ST	-	START	Mon	Common start signal
		q	ST	-	START	Mon	Common start signal
		t	ST	-	START	Mon	Common start signal
Op	b_dACT	general	ST	T	TRIP	Mon	Common trip signal
		q	ST	T	TRIP	Mon	Common trip signal
		t	ST	T	TRIP	Mon	Common trip signal
OpZ1	v1_dSPS	stVal	ST	-	TRZ1	Mon	Trip signal from impedance zone Z1
		q	ST	-	TRZ1	Mon	Trip signal from impedance zone Z1
		t	ST	-	TRZ1	Mon	Trip signal from impedance zone Z1
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
OpZ2	v1_dSPS	stVal	ST	-	TRZ2	Mon	Trip signal from impedance zone Z2
		q	ST	-	TRZ2	Mon	Trip signal from impedance zone Z2
		t	ST	-	TRZ2	Mon	Trip signal from impedance zone Z2
StrZ1	v1_dSPS	stVal	ST	-	STZ1	Mon	Start signal from impedance zone Z1
		q	ST	-	STZ1	Mon	Start signal from impedance zone Z1
		t	ST	-	STZ1	Mon	Start signal from impedance zone Z1
StrZ2	v1_dSPS	stVal	ST	-	STZ2	Mon	Start signal from impedance zone Z2
		q	ST	-	STZ2	Mon	Start signal from impedance zone Z2
		t	ST	-	STZ2	Mon	Start signal from impedance zone Z2
PriRis	v2_dMV	mag.f	MX	-	ROHM	Mon	Resistance in Primary Ohms
		q	MX	-	ROHM	Mon	Resistance in Primary Ohms
		t	MX	-	ROHM	Mon	Resistance in Primary Ohms
PriReact	v2_dMV	mag.f	MX	-	XOHM	Mon	Reactance in Primary Ohms
		q	MX	-	XOHM	Mon	Reactance in Primary Ohms
		t	MX	-	XOHM	Mon	Reactance in Primary Ohms

7.5.2.7 Faulty phase identification with load enchroachment for mho LEPDIS

LN type	LN prefix	LN class	Function block name
LEPDIS (revision 0)	LE	PDIS	LEPDIS

Table 40: LEPDIS Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Op	a_dACT	general	ST	T	-	Mon	General start signal
		phsA	ST	T	-	Mon	Fault detected in phase L1
		phsB	ST	T	-	Mon	Fault detected in phase L2
		phsC	ST	T	-	Mon	Fault detected in phase L3
		q	ST	T	-	Mon	General start signal
		t	ST	T	-	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
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
Str	e_dACD	general	ST	-	-	Mon	General start signal
		phsA	ST	-	-	Mon	Fault detected in phase L1
		phsB	ST	-	-	Mon	Fault detected in phase L2
		phsC	ST	-	-	Mon	Fault detected in phase L3
		neut	ST	-	-	Mon	Earth fault detected
		q	ST	-	-	Mon	General start signal
		t	ST	-	-	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 41:   GOPPDOP 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
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 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
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 42:   GUPPDUP 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
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

7.5.5 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 43: SAPFRC Logical node data (instance 0)

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
		q	ST	-	BLKDMAGN	Mon	Blocking indication due to low amplitude
		t	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
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 44: PHPIOC Logical node data (instance 0)

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 45:   *EFPIOC Logical node data (instance 0)*

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 46:   *ZCLCPLAL Logical node data (instance 0)*

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
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
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 47:   *ZCPSCH Logical node data (instance 0)*

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
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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
ProRx	a_dSPS	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 48:   *ZCRWPSCH Logical node data (instance 0)*

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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Mod	a_dINC	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
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
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 49:   ECPSCH Logical node data (instance 0)

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
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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
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 50:   ECRWPSCH Logical node data (instance 0)

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	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
Table continues on next page							

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

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

Table 51:   *SDEPSDE 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 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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Str	b_dACD	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
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)
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
AngAV	v2_dMV	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 52:   ZCVPSOF 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
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
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)	GEN4	PHAR	EF4PTOC
PH1PTOC instance 1 (revision 2)	PH1	PTOC	EF4PTOC
PH1PTOC instance 2 (revision 2)	PH1	PTOC	EF4PTOC
PH1PTOC instance 3 (revision 2)	PH1	PTOC	EF4PTOC
PH1PTOC instance 4 (revision 2)	PH1	PTOC	EF4PTOC

Table 53: 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
		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 54:   *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 55:   *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
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 56:   *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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str	b_dACD	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 57:   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 58:   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
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 59:   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 60:   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
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

7.5.11.2 Four step phase overcurrent protection OC4PTOC

LN type	LN prefix	LN class	Function block name
GEN4PHAR instance 1 (revision 2)	GEN4	PHAR	OC4PTOC
OC4LLN0 instance 1 (revision 1)	-	LLN0	OC4PTOC
PH3PTOC instance 1 (revision 1)	PH3	PTOC	OC4PTOC
PH3PTOC instance 2 (revision 1)	PH3	PTOC	OC4PTOC
PH3PTOC instance 3 (revision 1)	PH3	PTOC	OC4PTOC
PH3PTOC instance 4 (revision 1)	PH3	PTOC	OC4PTOC
PH3PTRC instance 1 (revision 1)	PH3	PTRC	OC4PTOC

Table 61:   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
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 62:   OC4LLN0 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
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

Table 63: 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 64: 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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Op	b_dACT	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 65:   *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 66:   *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
		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 67:   *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 68:   *STBPTOC Logical node data (instance 0)*

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
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

7.5.11.4   Broken conductor check BRCPTOC

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

Table 69:   BRCPTOC Logical node data (instance 0)

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 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
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	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)	PH1	PTOC	DNSPTOC
PH1PTOC instance 2 (revision 2)	PH1	PTOC	DNSPTOC
PH1PTRC instance 1 (revision 1)	PH1	PTRC	DNSPTOC

Table 70:   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
		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 71:   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 72:   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)
		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 73:   *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

7.5.11.6   Negativ sequence time overcurrent protection for machines NS2PTOC

LN type	LN prefix	LN class	Function block name
NS2LLN0 instance 1 (revision 1)	-	LLN0	NS2PTOC
NS2PTOC instance 1 (revision 1)	NS2	PTOC	NS2PTOC
NS2PTOC instance 2 (revision 1)	NS2	PTOC	NS2PTOC
NS2PTRC instance 1 (revision 1)	NS2	PTRC	NS2PTOC

Table 74:   *NS2LLN0 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
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 signal
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Alm	a_dSPS	q	ST	-	ALARM	Mon	Alarm signal
		t	ST	-	ALARM	Mon	Alarm signal
NSCurr	v2_dMV	mag.f	MX	-	NSCURR	Mon	Negative sequence current in primary amps
		q	MX	-	NSCURR	Mon	Negative sequence current in primary amps
		t	MX	-	NSCURR	Mon	Negative sequence current in primary amps

Table 75:   NS2PTOC 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 for step 1
		q	ST	-	ST1	Mon	Start signal for step 1
		t	ST	-	ST1	Mon	Start signal for step 1
Op	b_dACT	general	ST	T	TR1	Mon	Trip signal for step 1
		q	ST	T	TR1	Mon	Trip signal for step 1
		t	ST	T	TR1	Mon	Trip signal for 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 76:   NS2PTOC 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 for step 2
		q	ST	-	ST2	Mon	Start signal for step 2
		t	ST	-	ST2	Mon	Start signal for step 2
Op	b_dACT	general	ST	T	TR2	Mon	Trip signal for step 2
		q	ST	T	TR2	Mon	Trip signal for step 2
		t	ST	T	TR2	Mon	Trip signal for 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 77:   *NS2PTRC 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	Common start signal
		q	ST	-	START	Mon	Common start signal
		t	ST	-	START	Mon	Common start signal
Op	b_dACT	general	ST	T	TRIP	Mon	Common trip signal
		q	ST	T	TRIP	Mon	Common trip signal
		t	ST	T	TRIP	Mon	Common 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

7.5.12   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 78:   *SAPTOF 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
Str	b_dACD	general	ST	-	START	Mon	General start signal
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str	b_dACD	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)	PH3	PTRC	OV2PTOV

Table 79: 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 80:   *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 81:   *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 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
		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)	PH1	PTRC	ROV2PTOV
ROV2PTOV instance 1 (revision 1)	ROV2	PTOV	ROV2PTOV
ROV2PTOV instance 2 (revision 1)	ROV2	PTOV	ROV2PTOV

Table 83: 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 84:   *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 85:   *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 86:   *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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str	b_dACD	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 87: SMPPTRC Logical node data (instance 0)

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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
LORs	v1_dSPC	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	-	CLLKOUT	Mon	Circuit breaker lockout output (set until reset)
		q	ST	-	CLLKOUT	Mon	Circuit breaker lockout output (set until reset)
		t	ST	-	CLLKOUT	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 5)	L	PTTR	LPTTR

Table 88:   LPTTR Logical node data (instance 0)

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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
AlmThm	a_dSPS	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
TmpRl	b_dMV	mag.f	MX	-	TERMLOAD	Mon	Temperature relative to operate temperature
		q	MX	-	TERMLOAD	Mon	Temperature relative to operate temperature
		t	MX	-	TERMLOAD	Mon	Temperature relative to operate temperature
TmmOp	v1_dINS	stVal	ST	-	TTRIP	Mon	Estimated time to trip (in min)
		q	ST	-	TTRIP	Mon	Estimated time to trip (in min)
		t	ST	-	TTRIP	Mon	Estimated time to trip (in min)
TmmRsLO	v1_dINS	stVal	ST	-	TENRECL	Mon	Estimated time to reset of lockout (in min)
		q	ST	-	TENRECL	Mon	Estimated time to reset of lockout (in min)
		t	ST	-	TENRECL	Mon	Estimated time to reset of lockout (in min)
BlkRecSt	v1_dSPS	stVal	ST	-	LOCKOUT	Mon	Lockout signal
		q	ST	-	LOCKOUT	Mon	Lockout signal
		t	ST	-	LOCKOUT	Mon	Lockout signal
SenFlt	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
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 89: TRPTTR Logical node data (instance 0)

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	-	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)

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
TmmRsLO	v2_dMV	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)	PH3	PTRC	UC2PTUC
PH3PTUC instance 1 (revision 0)	PH3	PTUC	UC2PTUC
PH3PTUC instance 2 (revision 0)	PH3	PTUC	UC2PTUC
UC2LLN0 instance 1 (revision 0)	-	LLN0	UC2PTUC

Table 90:   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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Op	b_dACT	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 91:   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
		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 92:   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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Str	a_dACD	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 93: 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)	PH3	PTRC	UV2PTUV
UV2PTUV instance 1 (revision 1)	UV2	PTUV	UV2PTUV
UV2PTUV instance 2 (revision 1)	UV2	PTUV	UV2PTUV

Table 94: 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 95: 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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Op	b_dACT	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 96:   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
		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 97:   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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Op	b_dACT	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 98:   *LOVPTUV 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 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 99:   SAPTUF 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
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 3)	OEX	PVPH	OEXPVPH

Table 100: *OEXPVPH 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 parameter for 61850
		q	ST	-	-	Mon	Mode parameter for 61850
		t	ST	-	-	Mon	Mode 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
ExtAlm	v1_dSPS	stVal	ST	-	ALARM	Mon	Overexcitation alarm signal
		q	ST	-	ALARM	Mon	Overexcitation alarm signal
		t	ST	-	ALARM	Mon	Overexcitation alarm signal
VHzRat	v2_dMV	mag.f	MX	-	VPERHZ	Mon	Voltage to frequency ratio in per-unit
		q	MX	-	VPERHZ	Mon	Voltage to frequency ratio in per-unit
		t	MX	-	VPERHZ	Mon	Voltage to frequency ratio in per-unit

7.5.20 Multipurpose analog protection GAPC

7.5.20.1 Accidental energizing protection for synchronous generator AEGGAPC

LN type	LN prefix	LN class	Function block name
AEGGAPC (revision 2)	AEG	GAPC	AEGGAPC

Table 101:   AEGGAPC 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
Str	b_dACD	general	ST	-	START	Mon	Start signal from accidental energizing protection
		q	ST	-	START	Mon	Start signal from accidental energizing protection
		t	ST	-	START	Mon	Start signal from accidental energizing protection
Op	b_dACT	general	ST	T	TRIP	Mon	Trip signal from accidental energizing protection
		q	ST	T	TRIP	Mon	Trip signal from accidental energizing protection
		t	ST	T	TRIP	Mon	Trip signal from accidental energizing protection
Armed	v1_dSPS	stVal	ST	-	ARMED	Mon	True when accidental energizing protection is armed
		q	ST	-	ARMED	Mon	True when accidental energizing protection is armed
		t	ST	-	ARMED	Mon	True when accidental energizing protection is armed

7.5.21 Out-of-step protection PPAM

7.5.21.1 Out-of-step protection OOSPPAM

LN type	LN prefix	LN class	Function block name
OOSPPAM (revision 0)	OOS	PPAM	OOSPPAM

Table 102: *OOSPPAM 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
Str	b_dACD	general	ST	-	START	Mon	Set when measured impedance enters lens characteristic
		q	ST	-	START	Mon	Set when measured impedance enters lens characteristic
		t	ST	-	START	Mon	Set when measured impedance enters lens characteristic
Op	b_dACT	general	ST	T	TRIP	Mon	Common trip, issued when either zone 1 or zone 2 give trip
		q	ST	T	TRIP	Mon	Common trip, issued when either zone 1 or zone 2 give trip
		t	ST	T	TRIP	Mon	Common trip, issued when either zone 1 or zone 2 give trip
N1SlpDet	v1_dSPS	stVal	ST	-	TRIPZ1	Mon	Zone 1 trip
		q	ST	-	TRIPZ1	Mon	Zone 1 trip
		t	ST	-	TRIPZ1	Mon	Zone 1 trip
N2SlpDet	v1_dSPS	stVal	ST	-	TRIPZ2	Mon	Zone 2 trip
		q	ST	-	TRIPZ2	Mon	Zone 2 trip
		t	ST	-	TRIPZ2	Mon	Zone 2 trip

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Gen	v1_dSPS	stVal	ST	-	GENMODE	Mon	Generator rotates faster than the system during pole slip
		q	ST	-	GENMODE	Mon	Generator rotates faster than the system during pole slip
		t	ST	-	GENMODE	Mon	Generator rotates faster than the system during pole slip
Mot	v1_dSPS	stVal	ST	-	MOTMODE	Mon	Generator rotates slower than the system during pole slip
		q	ST	-	MOTMODE	Mon	Generator rotates slower than the system during pole slip
		t	ST	-	MOTMODE	Mon	Generator rotates slower than the system during pole slip

7.5.22 Earth fault protection PHIZ

7.5.22.1 100% stator earth fault protection, 3rd harmonic based STEFPHIZ

LN type	LN prefix	LN class	Function block name
STEFPHIZ (revision 2)	STEF	PHIZ	STEFPHIZ

Table 103:   STEFPHIZ 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 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	Main, common start signal
		q	ST	-	START	Mon	Main, common start signal
		t	ST	-	START	Mon	Main, common start signal
Op	b_dACT	general	ST	T	TRIP	Mon	Main, common trip command
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Op	b_dACT	q	ST	T	TRIP	Mon	Main, common trip command
		t	ST	T	TRIP	Mon	Main, common trip command
Op3rdH	v1_dSPS	stVal	ST	-	TRIP3H	Mon	Trip by one of two 3rd harmonic voltage-based prot.
		q	ST	-	TRIP3H	Mon	Trip by one of two 3rd harmonic voltage-based prot.
		t	ST	-	TRIP3H	Mon	Trip by one of two 3rd harmonic voltage-based prot.
OpUN	v1_dSPS	stVal	ST	-	TRIPUN	Mon	Trip by fund. freq. neutral over-voltage protection
		q	ST	-	TRIPUN	Mon	Trip by fund. freq. neutral over-voltage protection
		t	ST	-	TRIPUN	Mon	Trip by fund. freq. neutral over-voltage protection
Str3rdH	v1_dSPS	stVal	ST	-	START3H	Mon	Start by one of two 3rd harmonic voltage-based prot.
		q	ST	-	START3H	Mon	Start by one of two 3rd harmonic voltage-based prot.
		t	ST	-	START3H	Mon	Start by one of two 3rd harmonic voltage-based prot.
StrUN	v1_dSPS	stVal	ST	-	STARTUN	Mon	Start signal by fund. freq. neutral over-voltage prot.
		q	ST	-	STARTUN	Mon	Start signal by fund. freq. neutral over-voltage prot.
		t	ST	-	STARTUN	Mon	Start signal by fund. freq. neutral over-voltage prot.
VT3rdH	v2_dMV	mag.f	MX	-	UT3	Mon	Mag. of 3rd harm. voltage at generator terminal side
		q	MX	-	UT3	Mon	Mag. of 3rd harm. voltage at generator terminal side
		t	MX	-	UT3	Mon	Mag. of 3rd harm. voltage at generator terminal side
VN3rdH	v2_dMV	mag.f	MX	-	UN3	Mon	Mag. of 3rd harm. voltage at generator neutral side
		q	MX	-	UN3	Mon	Mag. of 3rd harm. voltage at generator neutral side
		t	MX	-	UN3	Mon	Mag. of 3rd harm. voltage at generator neutral side
E3	v2_dMV	mag.f	MX	-	E3	Mon	Total induced stator 3rd harmonic voltage
		q	MX	-	E3	Mon	Total induced stator 3rd harmonic voltage
		t	MX	-	E3	Mon	Total induced stator 3rd harmonic voltage
VDif3rdH	v2_dMV	mag.f	MX	-	DU3	Mon	Diff. between 3rd harm. volt. at both sides of gen.
		q	MX	-	DU3	Mon	Diff. between 3rd harm. volt. at both sides of gen.
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
VDif3rdH	v2_dMV	t	MX	-	DU3	Mon	Diff. between 3rd harm. volt. at both sides of gen.
VBias3rdH	v2_dMV	mag.f	MX	-	BU3	Mon	Bias voltage, a part of UN3
		q	MX	-	BU3	Mon	Bias voltage, a part of UN3
		t	MX	-	BU3	Mon	Bias voltage, a part of UN3
UN	v2_dMV	mag.f	MX	-	UN	Mon	Fund. frequency voltage at generator neutral
		q	MX	-	UN	Mon	Fund. frequency voltage at generator neutral
		t	MX	-	UN	Mon	Fund. frequency voltage at generator neutral
VolAngClc	v2_dMV	mag.f	MX	-	ANGLE	Mon	Angle between 3rd harmonic votage phasors
		q	MX	-	ANGLE	Mon	Angle between 3rd harmonic votage phasors
		t	MX	-	ANGLE	Mon	Angle between 3rd harmonic votage phasors

7.5.23　Voltage-restrained time overcurrent PVOC

7.5.23.1　Voltage restrained overcurrent function VR2PVOC

LN type	LN prefix	LN class	Function block name
PH1PTRC instance 1 (revision 1)	PH1	PTRC	VR2PVOC
PH1PTUV instance 1 (revision 0)	PH1	PTUV	VR2PVOC
VR2LLN0 instance 1 (revision 0)	-	LLN0	VR2PVOC
VR2PVOC instance 1 (revision 0)	VR2	PVOC	VR2PVOC

Table 104:　　*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
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 105:   PH1PTUV 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	-	STUV	Mon	Start signal from undervoltage function
		q	ST	-	STUV	Mon	Start signal from undervoltage function
		t	ST	-	STUV	Mon	Start signal from undervoltage function
Op	b_dACT	general	ST	T	TRUV	Mon	Trip signal from undervoltage function
		q	ST	T	TRUV	Mon	Trip signal from undervoltage function
		t	ST	T	TRUV	Mon	Trip signal from undervoltage function
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 106:   VR2LLN0 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 107:   *VR2PVOC 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	-	STOC	Mon	Start signal from voltage restraint overcurrent stage
		q	ST	-	STOC	Mon	Start signal from voltage restraint overcurrent stage
		t	ST	-	STOC	Mon	Start signal from voltage restraint overcurrent stage
Op	b_dACT	general	ST	T	TROC	Mon	Trip signal from voltage restraint overcurrent stage
		q	ST	T	TROC	Mon	Trip signal from voltage restraint overcurrent stage
		t	ST	T	TROC	Mon	Trip signal from voltage restraint overcurrent stage
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

7.6   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 108:   *LPHD Logical node data (instance 1)*

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
PhyNam	a_dDPL	swRev	DC	-	-	-	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 109:   *CCRBRF Logical node data (instance 0)*

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

7.7.1.2 Breaker failure protection CSPRBRF

LN type	LN prefix	LN class	Function block name
CSPRBRF (revision 0)	CSP	RBRF	CSPRBRF

Table 110:   CSPRBRF Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
OpIn	a_dACT	general	ST	T	TRRET	Mon	Retrip
		phsA	ST	T	TRRETL1	Mon	Retrip of phase L1
		phsB	ST	T	TRRETL2	Mon	Retrip of phase L2
		phsC	ST	T	TRRETL3	Mon	Retrip of phase L3
		q	ST	T	TRRET	Mon	Retrip
		t	ST	T	TRRET	Mon	Retrip
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
		q	ST	T	TRBU	Mon	Back-up trip
		t	ST	T	TRBU	Mon	Back-up trip

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 111:   CCSRDIF Logical node data (instance 0)

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
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 112: DRPRDRE 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 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
RcdMade	a_dSPS	stVal	ST	-	RECMADE	Mon	Disturbance recording made
		q	ST	-	RECMADE	Mon	Disturbance recording made
		t	ST	-	RECMADE	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 113: LMBRFLO Logical node data (instance 0)

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
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
FltLoop	e_dINS	stVal	ST	-	FaultLoop	Mon	Fault loop
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
FltLoop	e_dINS	q	ST	-	FaultLoop	Mon	Fault loop
		t	ST	-	FaultLoop	Mon	Fault loop
ClcFlt	v1_dSPS	stVal	ST	-	CALCMADE	Mon	Fault calculation made
		q	ST	-	CALCMADE	Mon	Fault calculation made
		t	ST	-	CALCMADE	Mon	Fault calculation made
FltDisRl	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 114: SDDRFUF Logical node data (instance 0)

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
		t	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
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 115: CCRPLD Logical node data (instance 0)

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 116:   *ZMRPSB 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
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 117: *SMBRREC Logical node data (instance 0)*

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	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

Table continues on next page

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

Table continues on next page

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

7.7.8.2   Autorecloser STBRREC

LN type	LN prefix	LN class	Function block name
STBRREC (revision 0)	STB	RREC	STBRREC

Table 118:   STBRREC Logical node data (instance 0)

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	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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
BlkRec	c_dSPC	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
		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
Rec1PhCnt	v1_dINS	stVal	ST	-	COUNT1P	Mon	Counting the number of single-phase reclosing shots
		q	ST	-	COUNT1P	Mon	Counting the number of single-phase reclosing shots

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Rec1PhCnt	v1_dINS	t	ST	-	COUNT1P	Mon	Counting the number of single-phase 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
		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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
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
		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
PrgRec11	v1_dSPS	stVal	ST	-	1PT1	Mon	Single-phase reclosing in progress, shot 1
		q	ST	-	1PT1	Mon	Single-phase reclosing in progress, shot 1
		t	ST	-	1PT1	Mon	Single-phase reclosing in progress, shot 1
Prp3PhOp	v1_dSPS	stVal	ST	-	PREP3P	Mon	Prepare three-phase trip, control of the next trip operation
		q	ST	-	PREP3P	Mon	Prepare three-phase trip, control of the next trip operation
		t	ST	-	PREP3P	Mon	Prepare three-phase trip, control of the next trip operation

Section 7
Logical node data model

1MRK 511 242-UEN -

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)	AUT1	RSYN	SESRSYN
MAN1RSYN instance 2 (revision 1)	MAN1	RSYN	SESRSYN
RSY1LLN0 instance 1 (revision 1)	-	LLN0	SESRSYN
SYNRSYN instance 3 (revision 4)	SYN	RSYN	SESRSYN

Table 119:   *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
HzInd	a_dSPS	stVal	ST	-	FRDIFFA	Mon	Frequency difference out of limit for Auto operation
		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

Table continues on next page

158

650 series
Communication Protocol Manual

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Mod	c_dINC	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 120:   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
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 121: 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
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 122:   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
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
		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 123:   *SELGGIO 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 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
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 124:   *SLGGIO 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
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
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
		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 125: VSGGIO 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
DPCSO	d_dDPC	Cancel.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Cancel.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		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.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.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		SBOw.ctlNum	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	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
		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 126:   DPGGIO Logical node data (instance 0)

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
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 127:   SPC8GGIO 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 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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
SPCSO1	v2_dSPC	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
		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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
SPCSO4	v2_dSPC	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
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	OUT5	Mon	Output5
		q	ST	-	OUT5	Mon	Output5
		t	ST	-	OUT5	Mon	Output5
SPCSO6	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	-	OUT6	Mon	Output6
		q	ST	-	OUT6	Mon	Output6
		t	ST	-	OUT6	Mon	Output6
SPCSO7	v2_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
SPCSO7	v2_dSPC	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	-	OUT7	Mon	Output7
		q	ST	-	OUT7	Mon	Output7
		t	ST	-	OUT7	Mon	Output7
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 128:   CNTGGIO Logical node data (instance 0)

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
		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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
RsCnt	v1_dSPC	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 129: SPGGIO Logical node data (instance 0)

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 130: SP16GGIO 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
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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Ind9	v1_dSPS	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
		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 131:   *MVGGIO Logical node data (instance 0)*

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 multiplied with the base prefix (multiplication factor)
		rangeC.hLim.f	CF	-	MV hLim	-	High limit multiplied with the base prefix (multiplication factor)
		rangeC.lLim.f	CF	-	MV lLim	-	Low limit multiplied with the base prefix (multiplication factor)
		rangeC.llLim.f	CF	-	MV llLim	-	Low Low limit multiplied with the base prefix (multiplication factor)
		rangeC.max.f	CF	-	MV max	-	Maximum value multiplied with the base prefix (multiplication factor)
		rangeC.min.f	CF	-	MV min	-	Minimum value multiplied with the base prefix (multiplication factor)
		mag.f	MX	-	VALUE	Mon	Magnitude of deadband value
		subMag.f	SV	-	-	-	Substituted value
		range	MX	-	RANGE	Mon	Range
		q	MX	-	VALUE	Mon	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 132:   *PCGGIO Logical node data (instance 0)*

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
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 133:   *TMAGGIO 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
Out1	v1_dSPS	stVal	ST	-	OUTPUT1	Mon	OR function betweeen inputs 1 to 16
		q	ST	-	OUTPUT1	Mon	OR function betweeen inputs 1 to 16
		t	ST	-	OUTPUT1	Mon	OR function betweeen 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
ETPMMTR (revision 1)	ETP	MMTR	ETPMMTR

Table 134:   *ETPMMTR 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 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
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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
StrAcc	v1_dSPS	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
		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
VArsAccFwd	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
VArsAccRev	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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
WsAccRev	v2_dMV	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
		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 phase 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 135: CVMMXN 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
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
		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
		rangeC.llLim.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	-	IDbRepInt	-	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.llLim.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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Hz	a_dMV	subEna	SV	-	-	-	Enable substitution
		db	CF	-	FrDbRepInt	-	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.llLim.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
		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	-	PFDbRepInt	-	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.llLim.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	Calcuated 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	-	UDbRepInt	-	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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
VolAmp	a_dMV	rangeC.hLim.f	CF	-	SHiLim	-	High limit in % of SBase
		rangeC.lLim.f	CF	-	SLowLim	-	Low limit in % of SBase
		rangeC.llLim.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	-	SDbRepInt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		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.llLim.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	-	QDbRepInt	-	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.llLim.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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
Watt	a_dMV	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	-	PDbRepInt	-	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
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 136: *CMMXU Logical node data (instance 0)*

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
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
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.llLim.f	CF	-	ILLowLowLim	-	Low Low limit (physical value)
		rangeC.llLim.f	CF	-	ILLowLowLim	-	Low Low limit (physical value)
		rangeC.llLim.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	-	ILDbRepInt	-	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
A	a_dWYE	db	CF	-	ILDbRepInt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	ILDbRepInt	-	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 137:   VMMXU Logical node data (instance 1)

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.llLim.f	CF	-	ULLowLowLim	-	Low Low limit (physical value)
		rangeC.llLim.f	CF	-	ULLowLowLim	-	Low Low limit (physical value)
		rangeC.llLim.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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
PPV	a_dDEL	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	-	ULDbRepInt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	ULDbRepInt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	ULDbRepInt	-	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 138: VNMMXU 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 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
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.llLim.f	CF	-	ULowLowLim	-	Low Low limit (physical value)
		rangeC.llLim.f	CF	-	ULowLowLim	-	Low Low limit (physical value)
		rangeC.llLim.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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
PhV	a_dWYE	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
		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	-	UDbRepInt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	UDbRepInt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	UDbRepInt	-	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 139:   CMSQI 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 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
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.llLim.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.llLim.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.llLim.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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
SeqA	a_dSEQ	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
		db	CF	-	I2DbRepInt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	3I0DbRepInt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	I1DbRepInt	-	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 140:   VMSQI 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 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
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
		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.llLim.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.llLim.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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
SeqV	a_dSEQ	db	CF	-	U2DbRepInt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	3U0DbRepInt	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		db	CF	-	U1DbRepInt	-	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 141:   TCSSCBR Logical node data (instance 0)

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
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 142:   SSCBR Logical node data (instance 0)

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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
RsAccAPwr	v1_dSPC	Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
RsSprChaTm	v1_dSPC	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
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 (Iyt),exceeded alarm limit
		q	ST	-	IACCALM	Mon	Accumulated currents power (Iyt),exceeded alarm limit
		t	ST	-	IACCALM	Mon	Accumulated currents power (Iyt),exceeded alarm limit
APwrLO	v1_dSPS	stVal	ST	-	IACCLOAL	Mon	Accumulated currents power (Iyt),exceeded lockout limit
		q	ST	-	IACCLOAL	Mon	Accumulated currents power (Iyt),exceeded lockout limit
		t	ST	-	IACCLOAL	Mon	Accumulated currents power (Iyt),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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
SprChaAlm	v1_dSPS	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
PosIvd	v1_dSPS	stVal	ST	-	CBINVPOS	Mon	CB is in intermediate position
		q	ST	-	CBINVPOS	Mon	CB is in intermediate position
		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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
AccAPwrPhC	v2_dMV	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
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 143:   *SSIMG 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 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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
InsAlm	a_dSPS	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
		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 144:　　　SSIML 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 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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
LORs	v1_dSPC	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

7.11 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 145: *SXCBR 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
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
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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
CBOpCap	h_dINS	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
		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

7.11.2 Switch XSWI

7.11.2.1 Apparatus control SXSWI

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

Table 146:   *SXSWI 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

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
BlkCls	a_dSPC	Oper.ctlVal	CO	-	-	Cmd	Special block command value
		Oper.origin.orCat	CO	-	-	Cmd	Special block command value
		Oper.origin.orIdent	CO	-	-	Cmd	Special block command value
		Oper.ctlNum	CO	-	-	Cmd	Special block command value
		Oper.T	CO	-	-	Cmd	Special block command value
		Oper.Test	CO	-	-	Cmd	Special block command value
		Oper.Check	CO	-	-	Cmd	Special block command value
		stVal	ST	-	CL_BLKD	Mon	Indication that the function is blocked for close commands
		q	ST	-	CL_BLKD	Mon	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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
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
SwTyp	g_dINS	stVal	ST	-	-	Mon	1=LoadBreak,2=Disconnector, 3=EarthSw, 4=HighSpeedEarthSw
		q	ST	-	-	Mon	1=LoadBreak,2=Disconnector, 3=EarthSw, 4=HighSpeedEarthSw
		t	ST	-	-	Mon	1=LoadBreak,2=Disconnector, 3=EarthSw, 4=HighSpeedEarthSw
BlkUpd	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Special block command value
		Oper.origin.orCat	CO	-	-	Cmd	Special block command value
		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 147: TCMYLTC 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
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
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
HiTapPos	v1_dINS	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
		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
CLRs	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
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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
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
		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
CLCnt	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 148:   SPVNZBAT Logical node data (instance 0)

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
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

7.14 Logical nodes for station communication

7.14.1 Interlock receive - INTLKRCV

7.14.1.1 Horizontal communication via GOOSE for interlocking GOOSEINTLKRCV

LN type	LN prefix	LN class	Function block name
INTGREC instance 1 (revision 0)	INT	GREC	GOOSEINTLKRCV

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

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
TagApp1	a_dDPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
		q	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagApp2	a_dDPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagApp3	a_dDPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagApp4	a_dDPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagApp5	a_dDPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagApp6	a_dDPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagApp7	a_dDPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagApp8	a_dDPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagApp9	a_dDPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagApp10	a_dDPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagApp11	a_dDPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagApp12	a_dDPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagApp13	a_dDPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagApp14	a_dDPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
TagApp15	a_dDPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagReservR	a_dSPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagReservG	a_dSPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping

7.14.2   Binary Receive - BINRCV

7.14.2.1   Goose binary receive GOOSEBINRCV

LN type	LN prefix	LN class	Function block name
BINGREC instance 1 (revision 0)	BIN	GREC	GOOSEBINRCV

Table 150:   BINGREC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
TagBinOut1	a_dSPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
		q	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagBinOut2	a_dSPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
		q	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagBinOut3	a_dSPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagBinOut4	a_dSPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagBinOut5	a_dSPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagBinOut6	a_dSPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagBinOut7	a_dSPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagBinOut8	a_dSPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagBinOut9	a_dSPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagBinOu10	a_dSPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagBinOu11	a_dSPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagBinOu12	a_dSPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
TagBinOu13	a_dSPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagBinOu14	a_dSPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagBinOu15	a_dSPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
TagBinOu16	a_dSPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping

7.14.3 VCTR Receive - VCTRRCV

7.14.3.1 Voltage control receiving block for GOOSE GOOSEVCTRRCV

LN type	LN prefix	LN class	Function block name
VCTRGREC instance 1 (revision 0)	VCTR	GREC	GOOSEVCTRRCV

Table 151:   VCTRGREC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
In_LodAIm	V10_dMV	mag.f	MX	-	-	Mon	Imaginary part of load current (horizontal communication)
		q	MX	-	-	Mon	Imaginary part of load current (horizontal communication)
		t	MX	-	-	Mon	Imaginary part of load current (horizontal communication)
In_LodARe	V11_dMV	mag.f	MX	-	-	Mon	Real part of load current (horizontal communication)
		q	MX	-	-	Mon	Real part of load current (horizontal communication)
		t	MX	-	-	Mon	Real part of load current (horizontal communication)
In_BusV	V12_dMV	mag.f	MX	-	-	Mon	Busbar voltage (horizontal communication)
		q	MX	-	-	Mon	Busbar voltage (horizontal communication)
		t	MX	-	-	Mon	Busbar voltage (horizontal communication)
In_SetV	V13_dMV	mag.f	MX	-	-	Mon	Voltage setpoint (horizontal communication)
		q	MX	-	-	Mon	Voltage setpoint (horizontal communication)
		t	MX	-	-	Mon	Voltage setpoint (horizontal communication)
In_PosRel	V14_dMV	mag.f	MX	-	-	Mon	Relative tap position (horizontal communication)
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
In_PosRel	V14_dMV	q	MX	-	-	Mon	Relative tap position (horizontal communication)
		t	MX	-	-	Mon	Relative tap position (horizontal communication)
In_X2	V15_dMV	mag.f	MX	-	-	Mon	Transformer reactance secondary side (horizontal communication)
		q	MX	-	-	Mon	Transformer reactance secondary side (horizontal communication)
		t	MX	-	-	Mon	Transformer reactance secondary side (horizontal communication)
In_status	V6_dINS	stVal	ST	-	-	Mon	VCTR Control word (horizontal communication)
		q	ST	-	-	Mon	VCTR Control word (horizontal communication)
		t	ST	-	-	Mon	VCTR Control word (horizontal communication)

7.14.4 Double point Receive (DP) - DPRCV

7.14.4.1 GOOSE function block to receive a double point value GOOSEDPRCV

LN type	LN prefix	LN class	Function block name
DPGREC instance 1 (revision 0)	DP	GREC	GOOSEDPRCV

Table 152: *DPGREC Logical node data (instance 1)*

DO name	DO type	DA name	FC	T	Signal	Mon/ Cmd	Description
TagDPOut	a_dDPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
		q	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping

7.14.5 Integer Receive - INTRCV

7.14.5.1 GOOSE function block to receive an integer value GOOSEINTRCV

LN type	LN prefix	LN class	Function block name
INTSGREC instance 1 (revision 0)	INTS	GREC	GOOSEINTRCV

Table 153:   INTSGREC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
TagIntOut	I_dINS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
		q	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping

7.14.6   Measured Value Receive - MVRCV

7.14.6.1   GOOSE function block to receive a measurand value GOOSEMVRCV

LN type	LN prefix	LN class	Function block name
MVGREC instance 1 (revision 0)	MV	GREC	GOOSEMVRCV

Table 154:   MVGREC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
TagMVOut	a_dMV	mag.f	MX	-	-	Mon	Internal parameter tag to handle 61850 mapping
		q	MX	-	-	Mon	Internal parameter tag to handle 61850 mapping

7.14.7   Single Point Receive (SP) - SPRCV

7.14.7.1   GOOSE function block to receive a single point value GOOSESPRCV

LN type	LN prefix	LN class	Function block name
BINSGREC instance 1 (revision 0)	BINS	GREC	GOOSESPRCV

Table 155:   BINSGREC Logical node data (instance 1)

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
TagBinOut	a_dSPS	stVal	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping
		q	ST	-	-	Mon	Internal parameter tag to handle 61850 mapping

Section 8 Glossary

AC	Alternating current
ACT	Application configuration tool within PCM600
A/D converter	Analog-to-digital converter
ADBS	Amplitude deadband supervision
AI	Analog input
ANSI	American National Standards Institute
AR	Autoreclosing
ASCT	Auxiliary summation current transformer
ASD	Adaptive signal detection
AWG	American Wire Gauge standard
BI	Binary input
BOS	Binary outputs status
BR	External bistable relay
BS	British Standards
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 megapulses per second
CMT	Communication Management tool in PCM600
CO cycle	Close-open cycle
Codirectional	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, two of which are used for transmitting data in both directions and two for transmitting clock signals

CPU	Central processor unit	
CR	Carrier receive	
CRC	Cyclic redundancy check	
CROB	Control relay output block	
CS	Carrier send	
CT	Current transformer	
CVT	Capacitive voltage transformer	
DAR	Delayed autoreclosing	
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	
DFC	Data flow control	
DFT	Discrete Fourier transform	
DHCP	Dynamic Host Configuration Protocol	
DIP-switch	Small switch mounted on a printed circuit board	
DI	Digital input	
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	Electromagnetic compatibility	
EMF	(Electric Motive Force)	
EMI	Electromagnetic interference	
EnFP	End fault protection	
EPA	Enhanced performance architecture	
ESD	Electrostatic discharge	
FCB	Flow control bit; Frame count bit	

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 autoreclosing
HV	High-voltage
HVDC	High-voltage direct current
IDBS	Integrating deadband 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 (Electromotive 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 has 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 reassembly 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 failure 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 overreaching when the impedance presented to it is smaller than the

apparent impedance to the fault applied to the balance point, that is, 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
POR	Permissive overreach
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
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
SBO	Select-before-operate
SC	Switch or push button to close
SCS	Station control system
SCADA	Supervision, control and data acquisition
SCT	System configuration tool according to standard IEC 61850
SDU	Service data unit

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
UMT	User management tool
Underreach	A term used to describe how the relay behaves during a fault condition. For example, a distance relay is underreaching when the impedance presented to it is greater than the apparent impedance to the fault applied to the balance point, that is, 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 is 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$_O$	Three times zero-sequence current. Often referred to as the residual or the earth-fault current
3U$_O$	Three times the zero sequence voltage. Often referred to as the residual voltage or the neutral point voltage

Contact us

ABB AB
Substation Automation Products
SE-721 59 Västerås, Sweden
Phone   +46 (0) 21 32 50 00
Fax   +46 (0) 21 14 69 18

www.abb.com/substationautomation

Power and productivity
for a better world™

ABB