

RELION® 630 SERIES

Power Management PML630/Compact Load-Shedding Solution

IEC 61850 Communication Protocol Manual





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Section 1 Introduction

1.1 This manual

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

1.2 Intended audience

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

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

1.3 Product documentation

1.3.1 Product documentation set

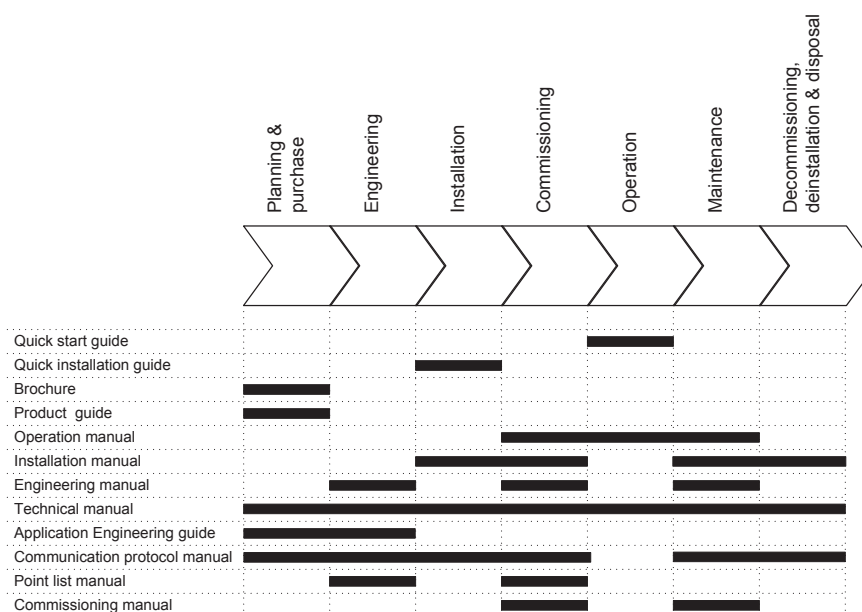


Figure 1: The intended use of documents during the product life cycle



See the 630 series documentation for installation and commissioning manuals. The PML630 documentation set includes only application engineering guide, engineering manual, IEC 61850 communication protocol manual, IEC 61850 point list manual, operation manual and technical manual.

1.3.2 Document revision history

Document revision/date	Product version	History
A/2011-05-04	1.1	First release
B/2011-11-03	1.1.1	Content updated to correspond to the product series version
C/2012-03-29	1.1.2	Content updated to correspond to the product series version
D/2013-10-14	1.2	Content updated to correspond to the product series version
E/2019-08-12	1.2.1	Content updated to correspond to the product series version

1.3.3 Related documentation

Name of the document	Document ID
Application Engineering Guide	1MRS757394
Engineering Manual	1MRS757184
IEC 61850 Point List Manual	1MRS757261
Operation Manual	1MRS757183
Technical Manual	1MRS757256



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

1.4 Symbols and conventions

1.4.1 Symbols



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



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



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

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

1.4.2 Document conventions

A particular convention may not be used in this manual.

- Abbreviations and acronyms are spelled out in the glossary. The glossary also contains definitions of important terms.
- Push button navigation in the LHMI menu structure is presented by using the push button icons.
To navigate between the options, use  and .
- Menu paths are presented in bold.
Select **Main menu/Settings**.
- WHMI menu names are presented in bold.
Click **Information** in the WHMI menu structure.
- LHMI messages are shown in Courier font.
To save the changes in nonvolatile memory, select **Yes** and press .
- Parameter names are shown in italics.
The function can be enabled and disabled with the *Operation* setting.
- The ^ character in front of an input or output signal name in the function block symbol given for a function, indicates that the user can set an own signal name in PCM600.
- The * character after an input or output signal name in the function block symbol given for a function, indicates that the signal must be connected to another function block in the application configuration to achieve a valid application configuration.

1.4.3

Functions, codes and symbols

Table 1: *Functions included in the device*

Functionality	IEC 61850
Generic process I/O	
Single point control (8 signals)	SPC8GGIO ¹⁾
Double point indication	DPGGIO ¹⁾
Single point indication	SPGGIO ¹⁾
Generic measured value	MVGGIO ¹⁾
Event counter	CNTGGIO ¹⁾
Monitoring	
Measured value limit supervision	MVEXP ¹⁾
Station battery supervision	SPVNZBAT ¹⁾
Power management (load-shedding)	
Critical circuit breaker	NCBDCSWI
Contingency based load-shedding core function	LSCACLS
Busbar-wise sheddable loads data	LDMMXU
Busbar-wise load feeders load-shedding command	LSPTRC
Power source	PSCSWI
Subnetwork supervision	SNWRCLS
Network power source	NPMMXU
Table continues on next page	

Functionality	IEC 61850
Information exchange between peer PML630s	PPLSGGIO ²⁾
Disturbance recorder functions	
Analog channels 1-10 (samples)	A1RADR
Analog channel 11-20 (samples)	A2RADR
Analog channel 21-30 (samples)	A3RADR ¹⁾
Analog channel 31-40 (calc. val.)	A4RADR ¹⁾
Binary channel 1-16	B1RBDR
Binary channel 17-32	B2RBDR
Binary channel 33-48	B3RBDR
Binary channel 49-64	B4RBDR ¹⁾
Disturbance recorder	DRRDRE
Multipurpose functions	
Position evaluate	POS_EVAL ¹⁾
Double point indication	DPGGIO ¹⁾
Multipurpose analog protection	MAPGAPC ¹⁾
Station communication (GOOSE)	
Binary receive	GOOSEBINRCV
Double point receive	GOOSEDPRCV
Integer receive	GOOSEINTRCV
Measured value receive	GOOSEMVRCV
Single point receive	GOOSESRCV

- 1) The function is not used by default. However, it is kept enabled in the Application Configuration tool for instantiation in any additional logic other than features offered by the PML630 connectivity package.
- 2) The PPLSGGIO function block is instantiated only when the cPMS - LS Configuration B is selected in the configuration wizard of PML630.

Section 2 Introduction to IEC 61850

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

This manual describes mainly how the IEC 61850 standard is applied in PML630. References and brief descriptions of the IEC 61850 standard are also included. It is assumed that the reader has basic knowledge about the IEC 61850.

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

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

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

- MICS, Modeling Information Conformance Statement, contains the declaration of the used logical node types.
- PICS, Protocol Information Conformance Statement, contains the details and what is supported regarding protocol facilities.
- PIXIT, Protocol Extra Information, contains additional information on how the IEC 61850 is implemented and used.
- TICS, Tissue Information Conformance Statement, contains the supported Tissues, which are handled in the Tissues process as defined by UCA, Utility Communication Architecture forum. The Tissues handling is found in www.tissues.iec61850.com.

The TICS for the 630 Series version 1.2 is also applicable for PML630 (as it is based on 630 Series version 1.2) and, hence, a separate TICS document is not made for the IED.

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

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

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

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

2.1.1

Related documentation to IEC 61850

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

Table 2: *IEC 61850-related documentation*

Document ID	Title
IEC 61850-5 First edition 2003-07 Ref. number: IEC 61850-5:2003(E)	Communication networks and systems in substations - Part 5: Communication requirements for functions and devices models
IEC 61850-6 First edition 2004-03 Ref. number: IEC 61850-6: 2004(E)	Communication networks and systems in substations - Part 6: Configuration description language for communication in electrical substations related to IEDs
IEC 61850-7-1 First edition 2003-07 Ref. number: IEC 61850-7-1: 2003(E)	Communication networks and systems in substations - Part 7-1: Basic communication structure for substations and feeder equipment - Principles and models
IEC 61850-7-2 First edition 2003-05 Ref. number: IEC 61850-7-2: 2003(E)	Communication networks and systems in substations - Part 7-2: Basic communication structure for substations and feeder equipment - Abstract communication service interface (ACSI)
IEC 61850-7-3 First edition 2003-05 Ref. number: IEC 61850-7-3: 2003(E)	Communication networks and systems in substations - Part 7-3: Basic communication structure for substations and feeder equipment - Common data classes
IEC 61850-7-4 First edition 2003-05 Ref. number: IEC 61850-7-4: 2003(E)	Communication networks and systems in substations - Part 7-4: Basic communication structure for substations and feeder equipment - Compatible logical node classes and data classes
IEC 61850-8-1 First edition 2004-05 Ref. number: IEC 61850-8-1: 2004(E)	Communication networks and systems in substations - Part 8-1: Specific Communication Service Mapping (SCSM) - Mappings to MMS (ISO 9506-1 and ISO 9506-2) and to ISO/IEC 8802-3
IEC 61850-10 First edition 2005-05 Ref. number: IEC 61850-10: 2005(E)	Communication networks and systems in substations - Part 10: Conformance testing
IEC 61850 MICS 1MRS757324	PML630 1.2 - IEC 61850 MICS: Modelling implementation conformance statement
IEC 61850 PICS 1MRS757325	IED 630 1.2 - IEC 61850 PICS: Protocol implementation conformance statement
IEC 61850 PIXIT 1MRS757326	IED 630 1.2 - IEC 61850 PIXIT: Protocol implementation extra information
IEC 61850 TICS 1MRS189728	IED 630 1.2 - 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 either PCM600 or IET600 tasks. The IED needs to be configured with PCM600 before the system is configured with IET600.

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

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

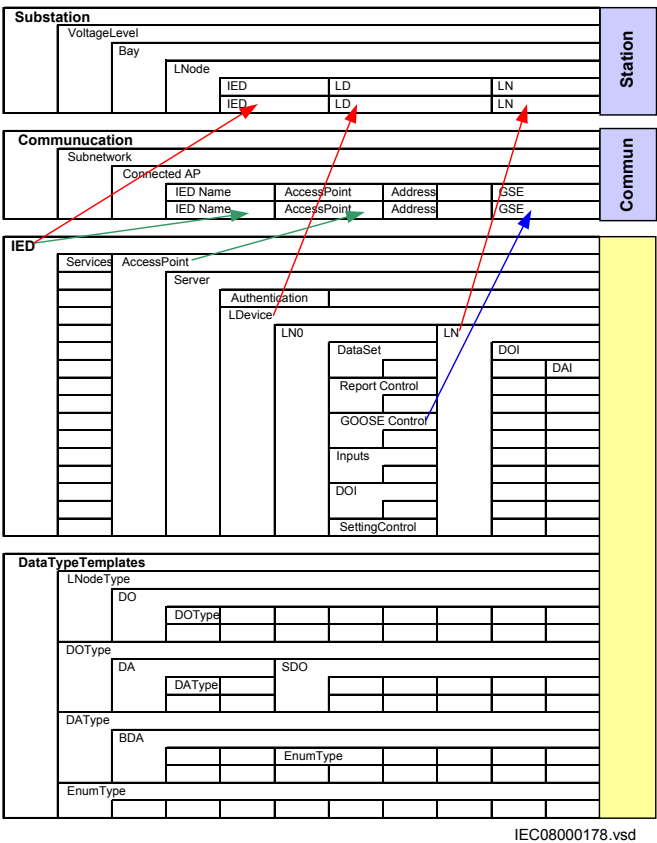


Figure 2: IEC 61850: Principle structure of the SCL XML file

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

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

3.1 The substation section

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

3.2 The communication section

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

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

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

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

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

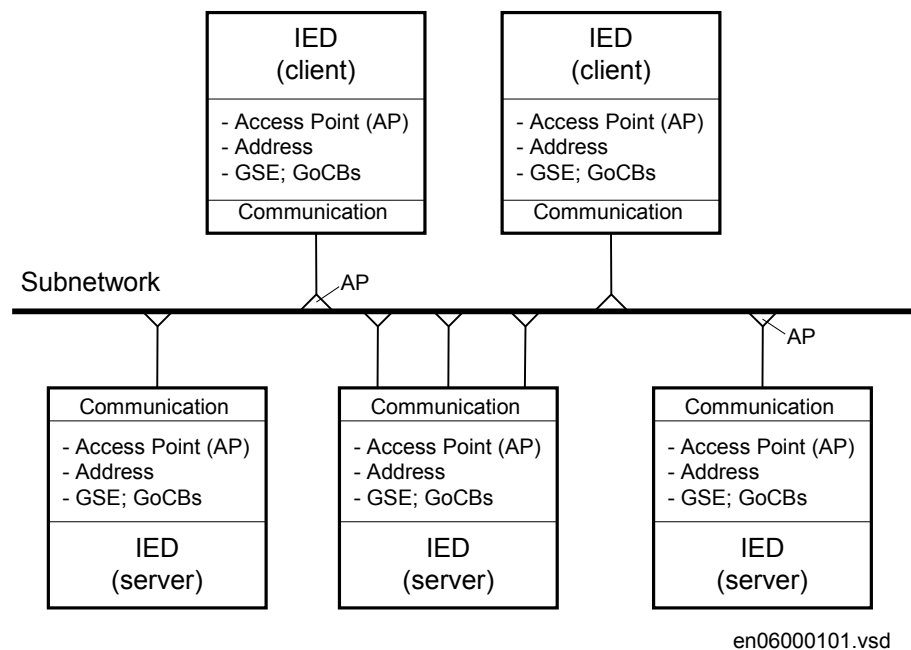


Figure 3: IEC 61850–6: Communication network

Additional information about the server is part of the IED.

3.3 The IED section

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

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

Two basic IED types are used in system configuration.

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

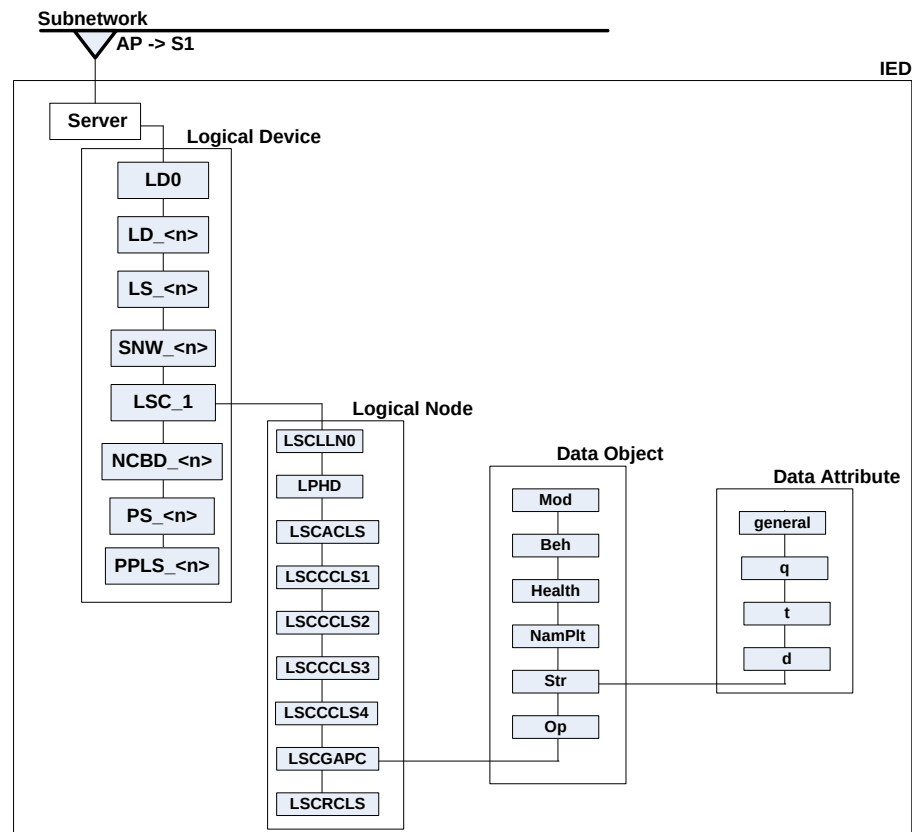


Figure 4: Organisation of LDs, LNs, DOs and DAs in an IED

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

The data objects represent information signals that may be routed to station level IEDs or to other bay IEDs that are communicating with GOOSE. The signal engineering task is to select the requested signals (DOs) and link them to the client IEDs as receiver. The control services are not directly engineered. They are included in the data objects, which handle both directions the command (control) and the response (monitoring). When routing the DO in monitoring direction, the control is also known by the clients.

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

3.4 Tool concept

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

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

3.4.1 IEC 61850 engineering with PCM600 and IET600

PCM600

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

IET600

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

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

3.5 Engineering concept in IEC 61850-6

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

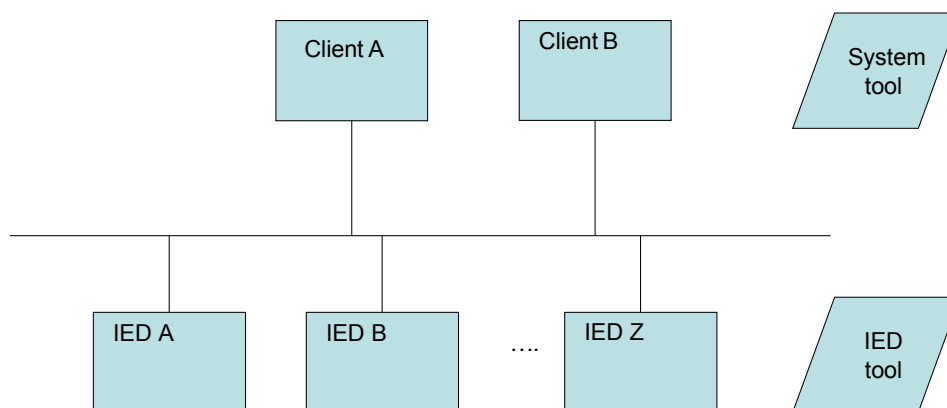


Figure 5: Relation between system and IED tools

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

Section 4 Communication profile

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

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

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

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

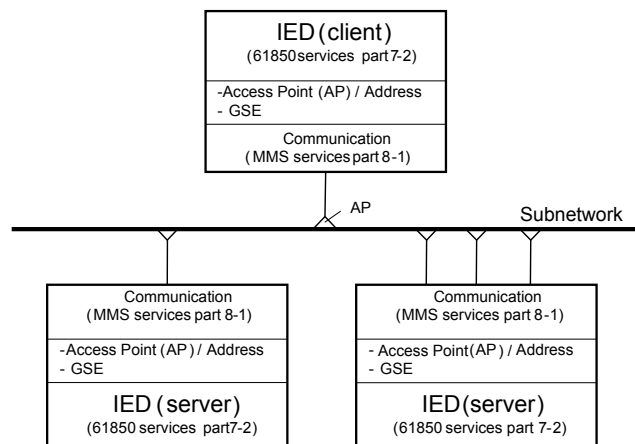


Figure 6: IEC 61850 Protocol: related standards for communication

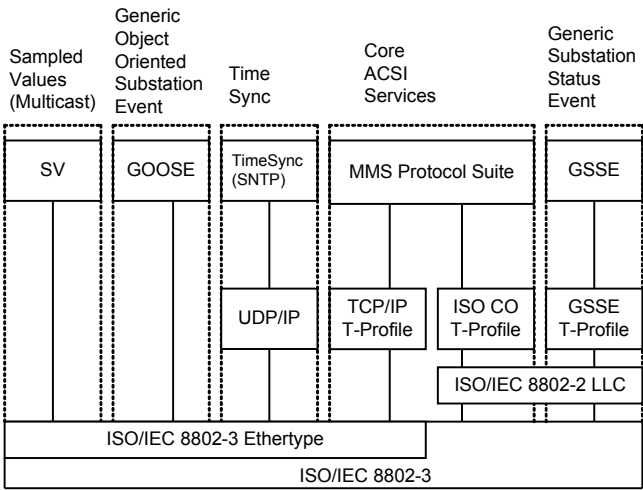


Figure 7: Overview of functionality and profiles according to IEC 61850-8-1

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

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

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

See the PICS and PIXIT for more information.

Section 5 Supported services

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

Report control block

For properties about report control blocks, see PIXIT.

UnBuffered reporting as well as Buffered reporting is supported.



The relation between the parameters BufTm and IntPrd is $\text{BufTm} < \text{IntPrd}$. For best efficiency, the BufTm must have IntPrd as common denominator, like $n \cdot \text{BufTm} = \text{IntPrd}$, n is an arbitrary number.

Generic substation event (GOOSE)

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

When explicit attributes are defined in the data sets, the number of such items in a data set is limited to 300.

The supported data types to be published and received using GOOSE include measurement, single point and double point status information together with their quality. On reception of GOOSE message there is one valid signal available for the applications. The valid signal represents all data in the received GOOSE telegram. Invalid means that the correct message is not received within the $1.8 \cdot \text{maxTime}$ parameter for the GOOSE Control Block (as defined in IEC 61850-6). An incorrect message includes T=true, NeedsCom, wrong order of attributes or any discrepancy in the GOOSE message layout.



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

Control

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

The command model can be changed for some functions by using PCM600 or LHMI. 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 PIXIT.

Time and time synchronization

For properties about time synchronization, see PIXIT and Time synchronization description in the Technical manual and the Application engineering guide.

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.

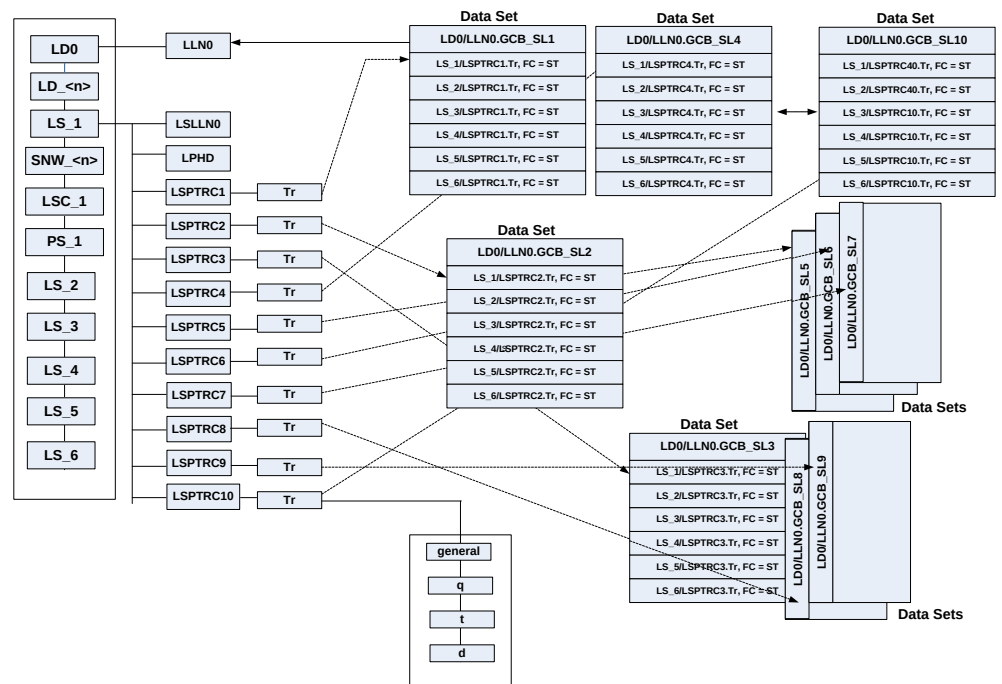


Figure 8: IEC 61850-7-2: Example of a Data set

There are general rules for data set configuration.

- All data objects or their data attributes which are signals in monitoring direction can be selected for a data set.
- Items in a data set are normally added by the DO name and functional constraint. All attributes within the DO with the same functional constraint are included in the data set.
- 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 criteria for reporting are defined in the respective report control block. As the attributes have different trigger options, the most feasible configuration is to include attributes with the same trigger option, but it is also possible to define a number of reporting conditions for one report control block.

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. For the Relion product family, the data sets can be defined in LD0/LLN0.

6.2

Report control block (URCB/BRCB)

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

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

- Buffer time (valid only for BRCB)
 - This parameter describes how long the report should wait for other expected events before it sends the report to the client. When it is known, that additional events are generated as a follow up, it is useful to wait, for example, 500 ms for additional events stored in the report. This feature reduces the number of telegrams transmitted in case of a burst of changes. But on the other side it increases the overall transaction time for events from IED input to presentation on 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 data set. This is done by the attribute Integrity period. This feature can be used as a background cycle to ensure that the process image in all partners is the same. The background cycle can repair a lost event in the chain from the NCC to an IED.
- General interrogation
 - A general interrogation is only done on request from a client. Not all data sets may contain information which is needed for a general update of the client. For example data with T(ransient) = TRUE are not part of a GI. When the BRCB attribute general interrogation is set to TRUE a GI request from the client will be handled. The report handler will transmit all data defined in the data set with their actual values. The IEC 61850 standard defines that all buffered events shall be transmitted first before the GI is started. A running GI shall be stopped and a new GI shall be started, when a new GI request is received while a GI is running.
- Purge buffer (valid only for BRCB)
 - This BRCB attribute can be used by a client to clean the event buffer from old events. The events are discarded on request of the client. This feature can be used to delete old events not transmitted to the client due to stopped communication. After the link is reestablished the client can decide to clean the buffer or to receive the history.

Trigger Options

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

- dchg = data-change
 - The classical trigger. Whenever a process value has changed its value either binary or a measurement a transmission is done. The standard does not define how to detect and inform the logical node.
- qchg = quality change
 - Looking to the possibilities of the quality data attribute type (q) any changes in the quality description will be transmitted.
- dupd = data value update
 - This trigger option give the possibility to define that a transmission should be done on a condition which can be controlled by the application.
- integrity
 - This trigger forces the transmission of all process values defined in the data set when a timer value (the integrity period) expires. It can be used for

example to update a process signal in the background (for example, every 15 minutes).

- general interrogation
 - This trigger is forced by the clients (= station level IED; NCC gateway, station HMI, ...). Normally a GI is asked for, when the client and the server start or restart a session. When the client is able to receive the actual values and when the logical device has scanned all process values at least once, an image of the actual process signal status can be transmitted to the client.



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

Link BRCB to a client LN

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

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

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

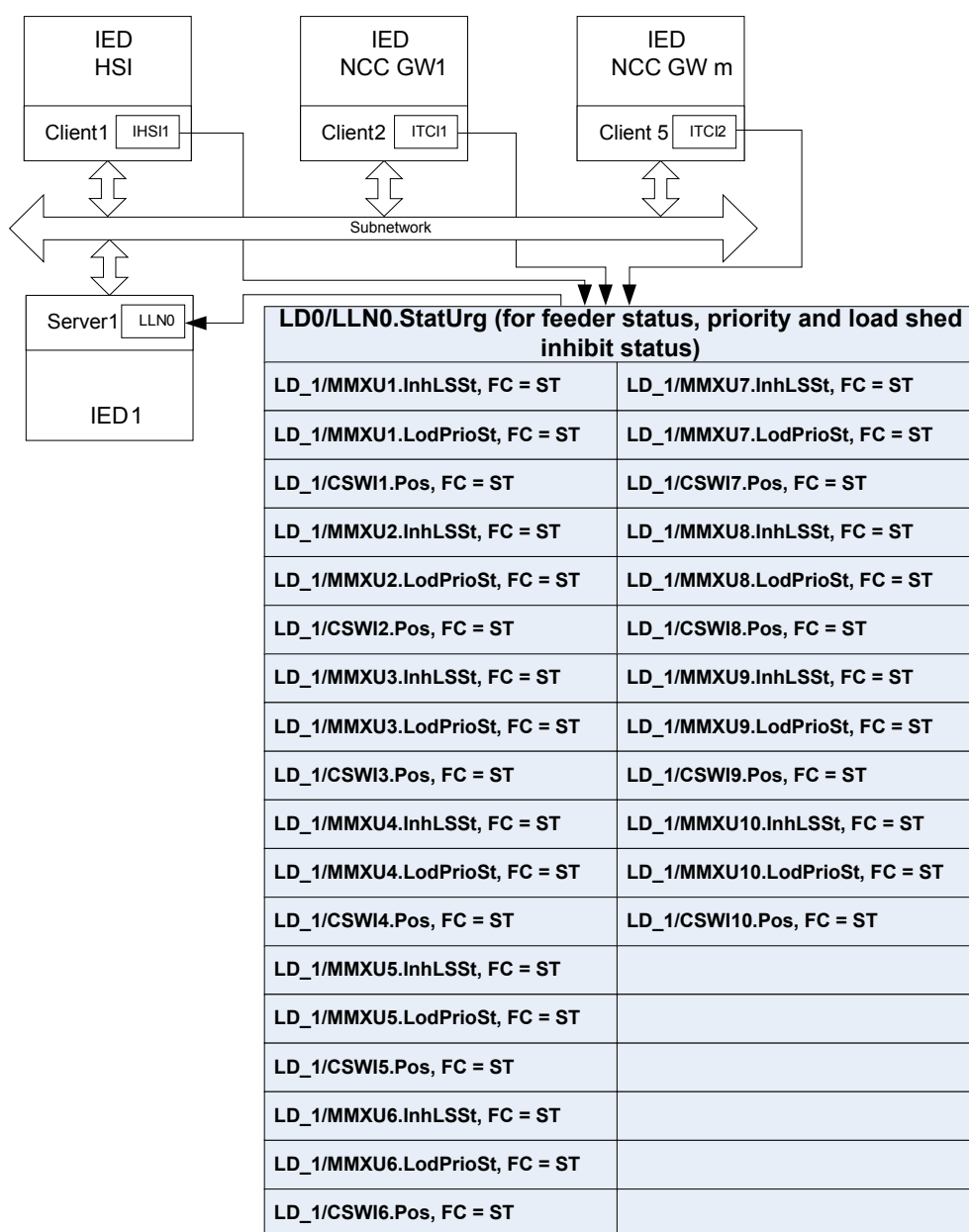


Figure 9: Link BRCB to a client LN

6.3 GOOSE Control Blocks (GoCB)

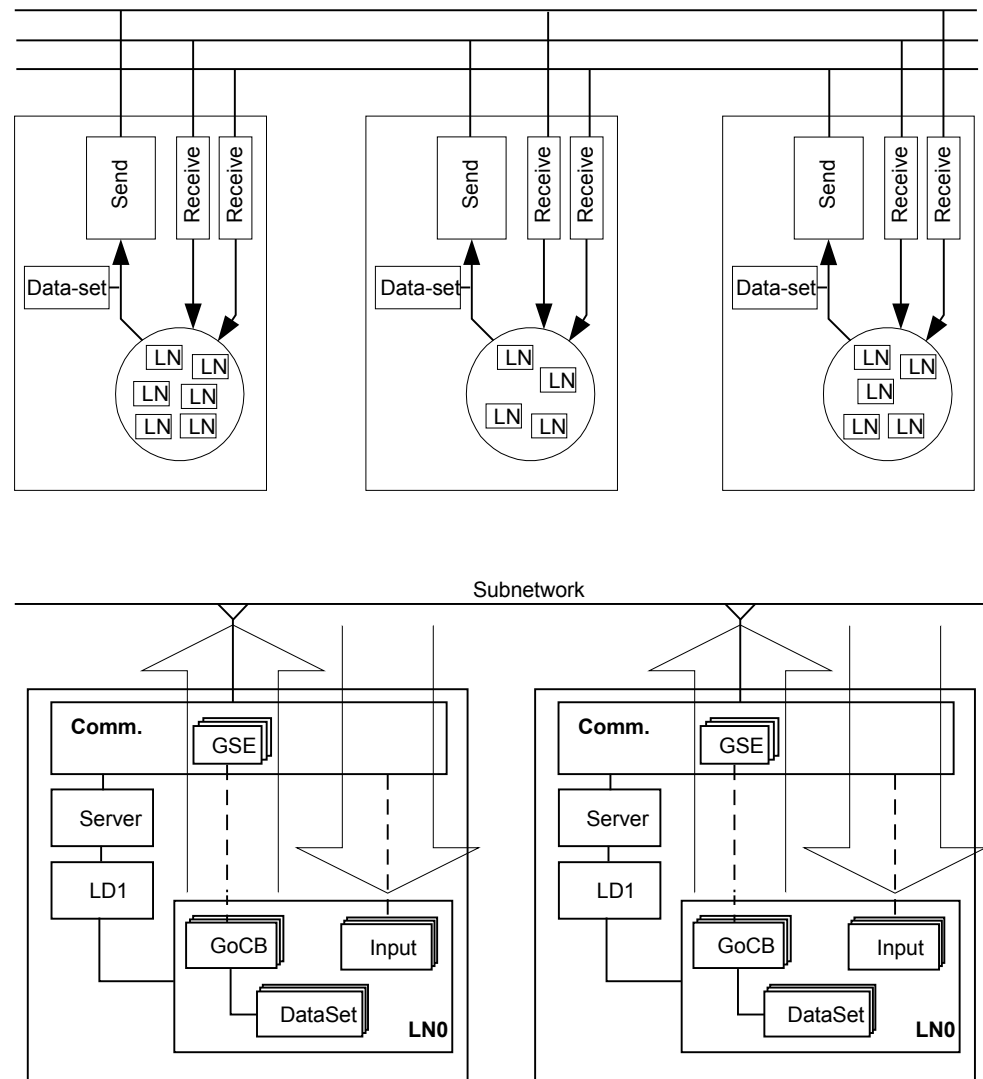


Figure 10: IEC 61850: Principle operation of GOOSE messages

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

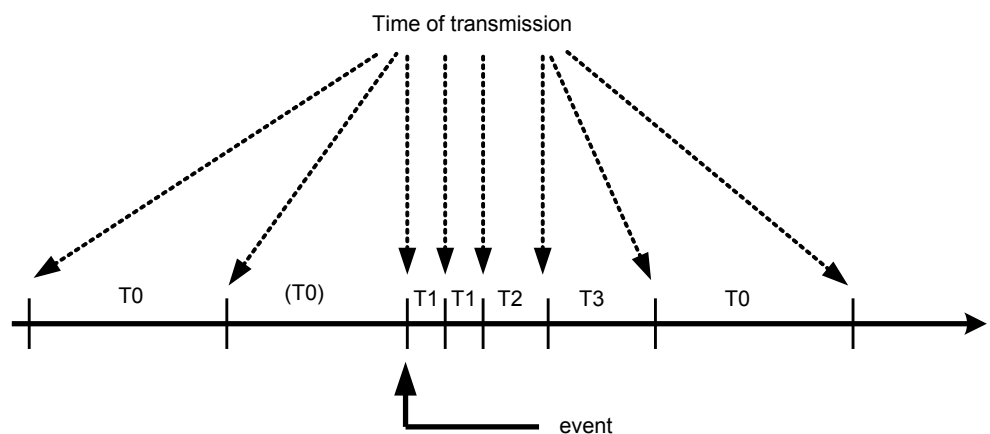


Figure 11: Transmission time for events

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 630 series, to which PML630 belongs, the detection time is $1.8 \times \text{timeAllowedToLive}$ to cope with possible transmission delays.

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

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

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

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

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

A GoCB has to be defined per GOOSE-DataSet.

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

Link GoCB to an IED

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

Section 7 Logical node data model

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

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

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

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

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

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

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

7.1 Common data objects in each logical node

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

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

Mode

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

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

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

Behaviour

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

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

Health

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

NamePlt

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

7.2 Logical nodes for control

7.2.1 IEC61850 generic communication I/O functions DPGGIO

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

Table 3: 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
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
DPCSO	b_dDPC	stVal	ST	-	POSITION	Mon	Double point indication
		q	ST	-	POSITION	Mon	Double point indication
		t	ST	-	POSITION	Mon	Double point indication

7.3 Logical node for monitoring

7.3.1 Station battery supervision SPVNZBAT

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

Table 4: *SPVNZBAT Logical node data*

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
BatHi	a_dSPS	stVal	ST	-	ST_UHIGH	Mon	Start signal when battery voltage exceeds upper limit

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
BatHi	a_dSPS	q	ST	-	ST_UHIGH	Mon	Start signal when battery voltage exceeds upper limit
		t	ST	-	ST_UHIGH	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	-	U_BATT	Mon	Service value of the battery terminal voltage
		q	MX	-	U_BATT	Mon	Service value of the battery terminal voltage
		t	MX	-	U_BATT	Mon	Service value of the battery terminal voltage
OpBatLo	v1_dSPS	stVal	ST	-	AL_ULOW	Mon	Alarm when voltage has been below lower limit for a set time
		q	ST	-	AL_ULOW	Mon	Alarm when voltage has been below lower limit for a set time
		t	ST	-	AL_ULOW	Mon	Alarm when voltage has been below lower limit for a set time
OpBatHi	v1_dSPS	stVal	ST	-	AL_UHIGH	Mon	Alarm when voltage has exceeded higher limit for a set time
		q	ST	-	AL_UHIGH	Mon	Alarm when voltage has exceeded higher limit for a set time
		t	ST	-	AL_UHIGH	Mon	Alarm when voltage has exceeded higher limit for a set time

7.3.2 IEC61850 generic communication I/O functions MVGGIO

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

Table 5: MVGGIO Logical node data

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter
		Oper.T	CO	-	-	Cmd	Mode parameter
		Oper.Test	CO	-	-	Cmd	Mode parameter
		Oper.Check	CO	-	-	Cmd	Mode parameter
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
AnIn	a_dMV	rangeC.hhLim.f	CF	-	MV hhLim	-	High High limit
		rangeC.hLim.f	CF	-	MV hLim	-	High limit
		rangeC.lLim.f	CF	-	MV lLim	-	Low limit
		rangeC.lLim.f	CF	-	MV lLim	-	Low Low limit
		rangeC.max.f	CF	-	MV max	-	Maximum value
		rangeC.min.f	CF	-	MV min	-	Minimum value
		mag.f	MX	-	VALUE	Mon	Magnitude of deadband value
		subMag.f	SV	-	-	-	Substituted value
		range	MX	-	RANGE	Mon	Range
		q	MX	-	VALUE	Mon	Magnitude of deadband value
		t	MX	-	VALUE	Mon	Magnitude of deadband value
		subEna	SV	-	-	-	Enable substitution
		db	CF	-	MV db	-	Cycl: Report interval (s), Db: In % of range, Int Db: In %s
		zeroDb	CF	-	MV zeroDb	-	Zero point clamping in 0,001% of range

7.3.3 IEC61850 generic communication I/O functions SPGGIO

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

Table 6: *SPGGIO Logical node data (instance 0)*

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

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
Ind	c_dSPS	stVal	ST	-	OUT	Mon	Output status
		q	ST	-	OUT	Mon	Output status
		t	ST	-	OUT	Mon	Output status

7.3.4 Multipurpose analog protection MAPGAPC

LN type	LN prefix	LN class	Function block name
MAPGAPC (revision 0)	MAP	GAPC	MAPGAPC

Table 7: *MAPGAPC Logical node data*

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

7.3.5 Event counter CNTGGIO

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

Table 8: *CNTGGIO Logical node data*

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
		stVal	ST	-	-	Mon	Mode status parameter for 61850
		q	ST	-	-	Mon	Mode status parameter for 61850
		t	ST	-	-	Mon	Mode status parameter for 61850
Beh	a_dINS	stVal	ST	-	Beh	Mon	Behaviour parameter for 61850
		q	ST	-	Beh	Mon	Behaviour parameter for 61850
		t	ST	-	Beh	Mon	Behaviour parameter for 61850
Cnt1	v1_dBCR	actVal	ST	-	VALUE1	Mon	Output of counter 1
		q	ST	-	VALUE1	Mon	Output of counter 1
		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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
RsCnt	v1_dSPC	Oper.ctlVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orIdent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctlNum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850

7.4 Logical node for power management

7.4.1 Input interface function for power source data PSCSWI

LN type	LN prefix	LN class	Function block name
PSACLS instance 1 (revision 0)	PS	ACLS	PSCSWI
PSCSWI instance 1 (revision 0)	PS	CSWI	PSCSWI
PSLLN0 instance 1 (revision 0)	-	LLN0	PSCSWI
PSMMTR instance 1 (revision 0)	PS	MMTR	PSCSWI
PSMMXU instance 1 (revision 0)	PS	MMXU	PSCSWI
PSPTOC instance 1 (revision 0)	PS	PTOC	PSCSWI

Table 9: *PSACLS 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
Op	b_dACT	general	ST	T	SLOWLS_OPR	Mon	Slow load-shed trigger from the power source
		q	ST	T	SLOWLS_OPR	Mon	Slow load-shed trigger from the power source
		t	ST	T	SLOWLS_OPR	Mon	Slow load-shed trigger from the power source
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	c_dINC	q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850
Str	d_dACD	general	ST	-	-	Mon	Slow load-shed start of the source
		q	ST	-	-	Mon	Slow load-shed start of the source
		t	ST	-	-	Mon	Slow load-shed start of the source
SLSModSt	v1_dINS	stVal	ST	-	SLOWLS_MODE	Mon	Enable or disable signal for curr and demand-based load shed
		q	ST	-	SLOWLS_MODE	Mon	Enable or disable signal for curr and demand-based load shed
		t	ST	-	SLOWLS_MODE	Mon	Enable or disable signal for curr and demand-based load shed
LSTrgInh	v1_dSPS	stVal	ST	-	-	Mon	Load-shed trigger inhibit status of the source
		q	ST	-	-	Mon	Load-shed trigger inhibit status of the source
		t	ST	-	-	Mon	Load-shed trigger inhibit status of the source
SetChg	v1_dSPS	stVal	ST	-	B_SET_CHANGE	Mon	One or many basic settings changed
		q	ST	-	B_SET_CHANGE	Mon	One or many basic settings changed
		t	ST	-	B_SET_CHANGE	Mon	One or many basic settings changed
BlkOvSt	v1_dSPS	stVal	ST	-	BLK_BYPASS	Mon	Block is bypassed
		q	ST	-	BLK_BYPASS	Mon	Block is bypassed
		t	ST	-	BLK_BYPASS	Mon	Block is bypassed
SLSTrgInh	v1_dSPS	stVal	ST	-	-	Mon	Slow load-shed trigger inhibit status of the source
		q	ST	-	-	Mon	Slow load-shed trigger inhibit status of the source
		t	ST	-	-	Mon	Slow load-shed trigger inhibit status of the source

Table 10: PSCSWI 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
Pos	b_dDPC	stVal	ST	-	CB_COMPS_POS	Mon	Circuit-breaker position of the power source
		q	ST	-	CB_COMPS_POS	Mon	Circuit-breaker position of the power source

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Pos	b_dDPC	t	ST	-	CB_COMPS_POS	Mon	Circuit-breaker position of the power source
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 11: PSLN0 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 12: PSMATR 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
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
TmmDmdPer	v1_dINS	stVal	ST	-	-	Mon	Time interval setting for demand calculation

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
TmmDmdPer	v1_dINS	q	ST	-	-	Mon	Time interval setting for demand calculation
		t	ST	-	-	Mon	Time interval setting for demand calculation
Rs	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	Demand reset of the source
		q	ST	-	-	Mon	Demand reset of the source
		t	ST	-	-	Mon	Demand reset of the source
Alm	v1_dSPS	stVal	ST	-	MAX_DMD_ALM	Mon	Max demand operate alarm for the power source
		q	ST	-	MAX_DMD_ALM	Mon	Max demand operate alarm for the power source
		t	ST	-	MAX_DMD_ALM	Mon	Max demand operate alarm for the power source
WhDmd	v2_dMV	mag.f	MX	-	PERIODIC_KWH	Mon	Periodic energy at demand interval of the power source
		q	MX	-	PERIODIC_KWH	Mon	Periodic energy at demand interval of the power source
		t	MX	-	PERIODIC_KWH	Mon	Periodic energy at demand interval of the power source

Table 13: PSMXU 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
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

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Section 7

Logical node data model

1MRS757260 E

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
GovModVal	v1_dINS	stVal	ST	-	GOV_MODE	Mon	Governor mode of the generator
		q	ST	-	GOV_MODE	Mon	Governor mode of the generator
		t	ST	-	GOV_MODE	Mon	Governor mode of the generator
EnaFactSL	v1_dSPS	stVal	ST	-	-	Mon	Enable or disable load shed due to the amount of overload
		q	ST	-	-	Mon	Enable or disable load shed due to the amount of overload
		t	ST	-	-	Mon	Enable or disable load shed due to the amount of overload
BlkLS	v1_dSPS	stVal	ST	-	FLS_BLOCK	Mon	Fast load-shed block from the power source
		q	ST	-	FLS_BLOCK	Mon	Fast load-shed block from the power source
		t	ST	-	FLS_BLOCK	Mon	Fast load-shed block from the power source
LSTrg	v1_dSPS	stVal	ST	-	FLS_TRIGGER	Mon	Fast load-shed trigger from the power source
		q	ST	-	FLS_TRIGGER	Mon	Fast load-shed trigger from the power source
		t	ST	-	FLS_TRIGGER	Mon	Fast load-shed trigger from the power source
SLSMaxPwr	v2_dMV	mag.f	MX	-	-	Mon	Available power of source with slow load trigger
		q	MX	-	-	Mon	Available power of source with slow load trigger
		t	MX	-	-	Mon	Available power of source with slow load trigger
AvaPwr	v2_dMV	mag.f	MX	-	AVA_POWER	Mon	Available power of the power source
		q	MX	-	AVA_POWER	Mon	Available power of the power source
		t	MX	-	AVA_POWER	Mon	Available power of the power source
MaxDmdLS	v2_dMV	mag.f	MX	-	-	Mon	Maximum demand setting value of the source
		q	MX	-	-	Mon	Maximum demand setting value of the source
		t	MX	-	-	Mon	Maximum demand setting value of the source
DmdPwr	v2_dMV	mag.f	MX	-	AVG_DEMAND	Mon	Average demand over set interval of the power source
		q	MX	-	AVG_DEMAND	Mon	Average demand over set interval of the power source
		t	MX	-	AVG_DEMAND	Mon	Average demand over set interval of power the source
AvaPwrPct	v2_dMV	mag.f	MX	-	-	Mon	Available power on percentage of the active power
Table continues on next page							

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
AvaPwrPct	v2_dMV	q	MX	-	-	Mon	Available power on percentage of the active power
		t	MX	-	-	Mon	Available power on percentage of the active power
OvLodPwr	v2_dMV	mag.f	MX	-	OVLOD_AMOUNT	Mon	Overload amount during slow load trigger
		q	MX	-	OVLOD_AMOUNT	Mon	Overload amount during slow load trigger
		t	MX	-	OVLOD_AMOUNT	Mon	Overload amount during slow load trigger
TotW	v2_dMV	mag.f	MX	-	ACTIVE_POWER	Mon	Active power of the power source
		q	MX	-	ACTIVE_POWER	Mon	Active power of the power source
		t	MX	-	ACTIVE_POWER	Mon	Active power of the power source

Table 14: PSPTOC 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
Op	b_dACT	general	ST	-	OC_OPR	Mon	Overcurrent operate status of the power source
		q	ST	-	OC_OPR	Mon	Overcurrent operate status of the power source
		t	ST	-	OC_OPR	Mon	Overcurrent operate status of the power source
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
Str	d_dACD	general	ST	-	OC_STR	Mon	Overcurrent start of the power source
		q	ST	-	OC_STR	Mon	Overcurrent start of the power source
		t	ST	-	OC_STR	Mon	Overcurrent start of the power source
Rs	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
Rs	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	Overcurrent reset of the source
		q	ST	-	-	Mon	Overcurrent reset of the source
		t	ST	-	-	Mon	Over current reset of the source
OvLodTm	v2_dMV	mag.f	MX	-	ELAPSE_TIME	Mon	Elapse time after the overcurrent start
		q	MX	-	ELAPSE_TIME	Mon	Elapse time after the overcurrent start
		t	MX	-	ELAPSE_TIME	Mon	Elapse time after the overcurrent start
MaxA	v2_dMV	mag.f	MX	-	MAX_CURRENT	Mon	Maximum of the three phase current of the power source
		q	MX	-	MAX_CURRENT	Mon	Maximum of three phase current of power source
		t	MX	-	MAX_CURRENT	Mon	Maximum of the three phase current of the power source
TotOvLodTm	v2_dMV	mag.f	MX	-	OC_TIME	Mon	Time required for the overcurrent operate
		q	MX	-	OC_TIME	Mon	Time required for the overcurrent operate
		t	MX	-	OC_TIME	Mon	Time required for the overcurrent operate
SetMaxA	v2_dMV	mag.f	MX	-	PICKUP	Mon	Pick-up value for the overcurrent start of the power source
		q	MX	-	PICKUP	Mon	Pick-up value for the overcurrent start of the power source
		t	MX	-	PICKUP	Mon	Pick-up value for the overcurrent start of the power source

7.4.2 Input interface function for sheddable load data LDMMXU

LN type	LN prefix	LN class	Function block name
LDCSWI instance 1 (revision 2)	LD	CSWI	LDMMXU
LDCSWI instance 2 (revision 2)	LD	CSWI	LDMMXU
LDCSWI instance 3 (revision 2)	LD	CSWI	LDMMXU
LDCSWI instance 4 (revision 2)	LD	CSWI	LDMMXU
LDCSWI instance 5 (revision 2)	LD	CSWI	LDMMXU
LDCSWI instance 6 (revision 2)	LD	CSWI	LDMMXU
LDCSWI instance 7 (revision 2)	LD	CSWI	LDMMXU
LDCSWI instance 8 (revision 2)	LD	CSWI	LDMMXU

LDCSWI instance 9 (revision 2)	LD	CSWI	LDMMXU
LDCSWI instance 10 (revision 2)	LD	CSWI	LDMMXU
LDGGIO instance 1 (revision 1)	LD	GGIO	LDMMXU
LDLLN0 instance 1 (revision 1)	-	LLN0	LDMMXU
LDMMXU instance 1 (revision 2)	LD	MMXU	LDMMXU
LDMMXU instance 2 (revision 2)	LD	MMXU	LDMMXU
LDMMXU instance 3 (revision 2)	LD	MMXU	LDMMXU
LDMMXU instance 4 (revision 2)	LD	MMXU	LDMMXU
LDMMXU instance 5 (revision 2)	LD	MMXU	LDMMXU
LDMMXU instance 6 (revision 2)	LD	MMXU	LDMMXU
LDMMXU instance 7 (revision 2)	LD	MMXU	LDMMXU
LDMMXU instance 8 (revision 2)	LD	MMXU	LDMMXU
LDMMXU instance 9 (revision 2)	LD	MMXU	LDMMXU
LDMMXU instance 10 (revision 2)	LD	MMXU	LDMMXU

Table 15: *LDCSWI 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
Pos	b_dDPC	stVal	ST	-	L1_CB_COMPS	Mon	Circuit-breaker position of the sheddable load1
		q	ST	-	L1_CB_COMPS	Mon	Circuit-breaker position of the sheddable load1
		t	ST	-	L1_CB_COMPS	Mon	Circuit-breaker position of the sheddable load1
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 16: *LDCSWI 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
Pos	b_dDPC	stVal	ST	-	L2_CB_COMPS	Mon	Circuit-breaker position of the sheddable load2

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Pos	b_dDPC	q	ST	-	L2_CB_COMPS	Mon	Circuit-breaker position of the sheddable load2
		t	ST	-	L2_CB_COMPS	Mon	Circuit-breaker position of the sheddable load2
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 17: *LDCSWI 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
Pos	b_dDPC	stVal	ST	-	L3_CB_COMPS	Mon	Circuit-breaker position of the sheddable load3
		q	ST	-	L3_CB_COMPS	Mon	Circuit-breaker position of the sheddable load3
		t	ST	-	L3_CB_COMPS	Mon	Circuit-breaker position of the sheddable load3
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 18: *LDCSWI 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
Pos	b_dDPC	stVal	ST	-	L4_CB_COMPS	Mon	Circuit-breaker position of the sheddable load4
		q	ST	-	L4_CB_COMPS	Mon	Circuit-breaker position of the sheddable load4
		t	ST	-	L4_CB_COMPS	Mon	Circuit-breaker position of the sheddable load4

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 19: LDCSWI 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
Pos	b_dDPC	stVal	ST	-	L5_CB_COMPS	Mon	Circuit-breaker position of the sheddable load5
		q	ST	-	L5_CB_COMPS	Mon	Circuit-breaker position of the sheddable load5
		t	ST	-	L5_CB_COMPS	Mon	Circuit-breaker position of the sheddable load5
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 20: LDCSWI Logical node data (instance 6)

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
Pos	b_dDPC	stVal	ST	-	L6_CB_COMPS	Mon	Circuit-breaker position of the sheddable load6
		q	ST	-	L6_CB_COMPS	Mon	Circuit-breaker position of the sheddable load6
		t	ST	-	L6_CB_COMPS	Mon	Circuit-breaker position of the sheddable load6
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 21: *LDCSWI Logical node data (instance 7)*

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
Pos	b_dDPC	stVal	ST	-	L7_CB_COMPS	Mon	Circuit-breaker position of the sheddable load7
		q	ST	-	L7_CB_COMPS	Mon	Circuit-breaker position of the sheddable load7
		t	ST	-	L7_CB_COMPS	Mon	Circuit-breaker position of the sheddable load7
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 22: *LDCSWI Logical node data (instance 8)*

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
Pos	b_dDPC	stVal	ST	-	L8_CB_COMPS	Mon	Circuit-breaker position of the sheddable load8
		q	ST	-	L8_CB_COMPS	Mon	Circuit-breaker position of the sheddable load8
		t	ST	-	L8_CB_COMPS	Mon	Circuit-breaker position of the sheddable load8
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 23: *LDCSWI Logical node data (instance 9)*

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
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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Pos	b_dDPC	stVal	ST	-	L9_CB_COMPS	Mon	Circuit-breaker position of the sheddable load9
		q	ST	-	L9_CB_COMPS	Mon	Circuit-breaker position of the sheddable load9
		t	ST	-	L9_CB_COMPS	Mon	Circuit-breaker position of the sheddable load9
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 24: LDCSWI Logical node data (instance 10)

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
Pos	b_dDPC	stVal	ST	-	L10_CB_COMPS	Mon	Circuit-breaker position of the sheddable load10
		q	ST	-	L10_CB_COMPS	Mon	Circuit-breaker position of the sheddable load10
		t	ST	-	L10_CB_COMPS	Mon	Circuit-breaker position of the sheddable load10
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 25: LDGGIO 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
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
SetChg	v1_dSPS	stVal	ST	-	B_SET_CHANGE	Mon	One or many basic settings changed
		q	ST	-	B_SET_CHANGE	Mon	One or many basic settings changed
		t	ST	-	B_SET_CHANGE	Mon	One or many basic settings changed

Table 26: *LDLLN0 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.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: *LDMMXU 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
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
TotW	c_dMV	mag.f	MX	-	L1_POWER	Mon	Active power of the sheddable load1
		q	MX	-	L1_POWER	Mon	Active power of the sheddable load1

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
TotW	c_dMV	t	MX	-	L1_POWER	Mon	Active power of the sheddable load1
LodPrioSt	v1_dINS	stVal	ST	-	L1_SHED_PRIO	Mon	Shed priority of the sheddable load1
		q	ST	-	L1_SHED_PRIO	Mon	Shed priority of the sheddable load1
		t	ST	-	L1_SHED_PRIO	Mon	Shed priority of the sheddable load1
InhLSSt	v1_dINS	stVal	ST	-	L1_INHIBIT	Mon	Load shedding inhibit status of the sheddable load1
		q	ST	-	L1_INHIBIT	Mon	Load shedding inhibit status of the sheddable load1
		t	ST	-	L1_INHIBIT	Mon	Load shedding inhibit status of the sheddable load1

Table 28: LDMMXU 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
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
TotW	c_dMV	mag.f	MX	-	L2_POWER	Mon	Active power of the sheddable load2
		q	MX	-	L2_POWER	Mon	Active power of the sheddable load2
		t	MX	-	L2_POWER	Mon	Active power of the sheddable load2
LodPrioSt	v1_dINS	stVal	ST	-	L2_SHED_PRIO	Mon	Shed priority of the sheddable load2
		q	ST	-	L2_SHED_PRIO	Mon	Shed priority of the sheddable load2
		t	ST	-	L2_SHED_PRIO	Mon	Shed priority of the sheddable load2
InhLSSt	v1_dINS	stVal	ST	-	L2_INHIBIT	Mon	Load shedding inhibit status of the sheddable load2
		q	ST	-	L2_INHIBIT	Mon	Load shedding inhibit status of the sheddable load2
		t	ST	-	L2_INHIBIT	Mon	Load shedding inhibit status of the sheddable load2

Table 29: *LDMMXU 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
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
TotW	c_dMV	mag.f	MX	-	L3_POWER	Mon	Active power of the sheddable load3
		q	MX	-	L3_POWER	Mon	Active power of the sheddable load3
		t	MX	-	L3_POWER	Mon	Active power of the sheddable load3
LodPrioSt	v1_dINS	stVal	ST	-	L3_SHED_PRIO	Mon	Shed priority of the sheddable load3
		q	ST	-	L3_SHED_PRIO	Mon	Shed priority of the sheddable load3
		t	ST	-	L3_SHED_PRIO	Mon	Shed priority of the sheddable load3
InhLSSt	v1_dINS	stVal	ST	-	L3_INHIBIT	Mon	Load shedding inhibit status of the sheddable load3
		q	ST	-	L3_INHIBIT	Mon	Load shedding inhibit status of the sheddable load3
		t	ST	-	L3_INHIBIT	Mon	Load shedding inhibit status of the sheddable load3

Table 30: *LDMMXU 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
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
TotW	c_dMV	mag.f	MX	-	L4_POWER	Mon	Active power of the sheddable load4
		q	MX	-	L4_POWER	Mon	Active power of the sheddable load4

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
TotW	c_dMV	t	MX	-	L4_POWER	Mon	Active power of the sheddable load4
LodPrioSt	v1_dINS	stVal	ST	-	L4_SHED_PRIO	Mon	Shed priority of the sheddable load4
		q	ST	-	L4_SHED_PRIO	Mon	Shed priority of the sheddable load4
		t	ST	-	L4_SHED_PRIO	Mon	Shed priority of the sheddable load4
InhLSSt	v1_dINS	stVal	ST	-	L4_INHIBIT	Mon	Load shedding inhibit status of the sheddable load4
		q	ST	-	L4_INHIBIT	Mon	Load shedding inhibit status of the sheddable load4
		t	ST	-	L4_INHIBIT	Mon	Load shedding inhibit status of the sheddable load4

Table 31: LDMMXU 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
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
TotW	c_dMV	mag.f	MX	-	L5_POWER	Mon	Active power of the sheddable load5
		q	MX	-	L5_POWER	Mon	Active power of the sheddable load5
		t	MX	-	L5_POWER	Mon	Active power of the sheddable load5
LodPrioSt	v1_dINS	stVal	ST	-	L5_SHED_PRIO	Mon	Shed priority of the sheddable load5
		q	ST	-	L5_SHED_PRIO	Mon	Shed priority of the sheddable load5
		t	ST	-	L5_SHED_PRIO	Mon	Shed priority of the sheddable load5
InhLSSt	v1_dINS	stVal	ST	-	L5_INHIBIT	Mon	Load shedding inhibit status of the sheddable load5
		q	ST	-	L5_INHIBIT	Mon	Load shedding inhibit status of the sheddable load5
		t	ST	-	L5_INHIBIT	Mon	Load shedding inhibit status of the sheddable load5

Table 32: *LDMMXU Logical node data (instance 6)*

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
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
TotW	c_dMV	mag.f	MX	-	L6_POWER	Mon	Active power of the sheddable load6
		q	MX	-	L6_POWER	Mon	Active power of the sheddable load6
		t	MX	-	L6_POWER	Mon	Active power of the sheddable load6
LodPrioSt	v1_dINS	stVal	ST	-	L6_SHED_PRIO	Mon	Shed priority of the sheddable load6
		q	ST	-	L6_SHED_PRIO	Mon	Shed priority of the sheddable load6
		t	ST	-	L6_SHED_PRIO	Mon	Shed priority of the sheddable load6
InhLSSt	v1_dINS	stVal	ST	-	L6_INHIBIT	Mon	Load shedding inhibit status of the sheddable load6
		q	ST	-	L6_INHIBIT	Mon	Load shedding inhibit status of the sheddable load6
		t	ST	-	L6_INHIBIT	Mon	Load shedding inhibit status of the sheddable load6

Table 33: *LDMMXU Logical node data (instance 7)*

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
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
TotW	c_dMV	mag.f	MX	-	L7_POWER	Mon	Active power of the sheddable load7
		q	MX	-	L7_POWER	Mon	Active power of the sheddable load7

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
TotW	c_dMV	t	MX	-	L7_POWER	Mon	Active power of the sheddable load7
LodPrioSt	v1_dINS	stVal	ST	-	L7_SHED_PRIO	Mon	Shed priority of the sheddable load7
		q	ST	-	L7_SHED_PRIO	Mon	Shed priority of the sheddable load7
		t	ST	-	L7_SHED_PRIO	Mon	Shed priority of the sheddable load7
InhLSSt	v1_dINS	stVal	ST	-	L7_INHIBIT	Mon	Load shedding inhibit status of the sheddable load7
		q	ST	-	L7_INHIBIT	Mon	Load shedding inhibit status of the sheddable load7
		t	ST	-	L7_INHIBIT	Mon	Load shedding inhibit status of the sheddable load7

Table 34: LDMMXU Logical node data (instance 8)

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
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
TotW	c_dMV	mag.f	MX	-	L8_POWER	Mon	Active power of the sheddable load8
		q	MX	-	L8_POWER	Mon	Active power of the sheddable load8
		t	MX	-	L8_POWER	Mon	Active power of the sheddable load8
LodPrioSt	v1_dINS	stVal	ST	-	L8_SHED_PRIO	Mon	Shed priority of the sheddable load8
		q	ST	-	L8_SHED_PRIO	Mon	Shed priority of the sheddable load8
		t	ST	-	L8_SHED_PRIO	Mon	Shed priority of the sheddable load8
InhLSSt	v1_dINS	stVal	ST	-	L8_INHIBIT	Mon	Load shedding inhibit status of the sheddable load8
		q	ST	-	L8_INHIBIT	Mon	Load shedding inhibit status of the sheddable load8
		t	ST	-	L8_INHIBIT	Mon	Load shedding inhibit status of the sheddable load8

Table 35: *LDMMXU Logical node data (instance 9)*

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
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
TotW	c_dMV	mag.f	MX	-	L9_POWER	Mon	Active power of the sheddable load9
		q	MX	-	L9_POWER	Mon	Active power of the sheddable load9
		t	MX	-	L9_POWER	Mon	Active power of the sheddable load9
LodPrioSt	v1_dINS	stVal	ST	-	L9_SHED_PRIO	Mon	Shed priority of the sheddable load9
		q	ST	-	L9_SHED_PRIO	Mon	Shed priority of the sheddable load9
		t	ST	-	L9_SHED_PRIO	Mon	Shed priority of the sheddable load9
InhLSSt	v1_dINS	stVal	ST	-	L9_INHIBIT	Mon	Load shedding inhibit status of the sheddable load9
		q	ST	-	L9_INHIBIT	Mon	Load shedding inhibit status of the sheddable load9
		t	ST	-	L9_INHIBIT	Mon	Load shedding inhibit status of the sheddable load9

Table 36: *LDMMXU Logical node data (instance 10)*

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
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
TotW	c_dMV	mag.f	MX	-	L10_POWER	Mon	Active power of the sheddable load10
		q	MX	-	L10_POWER	Mon	Active power of the sheddable load10

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
TotW	c_dMV	t	MX	-	L10_POWER	Mon	Active power of the sheddable load10
LodPrioSt	v1_dINS	stVal	ST	-	L10_SHED_PRIO	Mon	Shed priority of the sheddable load10
		q	ST	-	L10_SHED_PRIO	Mon	Shed priority of the sheddable load10
		t	ST	-	L10_SHED_PRIO	Mon	Shed priority of the sheddable load10
InhLSSt	v1_dINS	stVal	ST	-	L10_INHIBIT	Mon	Load shedding inhibit status of the sheddable load10
		q	ST	-	L10_INHIBIT	Mon	Load shedding inhibit status of the sheddable load10
		t	ST	-	L10_INHIBIT	Mon	Load shedding inhibit status of the sheddable load10

7.4.3 Input interface function for network circuit breaker data NCBDCSWI

LN type	LN prefix	LN class	Function block name
NCBDCSWI instance 1 (revision 1)	NCBD	CSWI	NCBDCSWI
NCBDLLN0 instance 1 (revision 1)	-	LLN0	NCBDCSWI
NCBDMMXU instance 1 (revision 1)	NCBD	MMXU	NCBDCSWI

Table 37: *NCBDCSWI 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
Pos	b_dDPC	stVal	ST	-	CB_COMPS_POS	Mon	Circuit-breaker position of the network CB
		q	ST	-	CB_COMPS_POS	Mon	Circuit-breaker position of the network CB
		t	ST	-	CB_COMPS_POS	Mon	Circuit-breaker position of the network CB
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
VirCBEna	v1_dSPS	stVal	ST	-	VIRTUAL_CB	Mon	Virtual CB configuration is selected

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
VirCBEna	v1_dSPS	q	ST	-	VIRTUAL_CB	Mon	Virtual CB configuration is selected
		t	ST	-	VIRTUAL_CB	Mon	Virtual CB configuration is selected
SetChg	v1_dSPS	stVal	ST	-	B_SET_CHANGE	Mon	One or many basic settings change
		q	ST	-	B_SET_CHANGE	Mon	One or many basic settings change
		t	ST	-	B_SET_CHANGE	Mon	One or many basic settings change
BlkOvSt	v1_dSPS	stVal	ST	-	BLK_BYPASS	Mon	Block is bypassed
		q	ST	-	BLK_BYPASS	Mon	Block is bypassed
		t	ST	-	BLK_BYPASS	Mon	Block is bypassed
BlkLS	v1_dSPS	stVal	ST	-	FLS_BLOCK	Mon	Fast load-shed block from the network CB
		q	ST	-	FLS_BLOCK	Mon	Fast load-shed block from the network CB
		t	ST	-	FLS_BLOCK	Mon	Fast load-shed block from the network CB
LSTrg	v1_dSPS	stVal	ST	-	FLS_TRIGGER	Mon	Fast load-shed trigger from the network CB
		q	ST	-	FLS_TRIGGER	Mon	Fast load-shed trigger from the network CB
		t	ST	-	FLS_TRIGGER	Mon	Fast load-shed trigger from the network CB

Table 38: NCBDLLN0 Logical node data (instance 1)

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

Table 39: *NCBDMMXU 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
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
TotW	c_dMV	mag.f	MX	-	CB_POWER	Mon	Active power of network CB
		q	MX	-	CB_POWER	Mon	Active power of network CB
		t	MX	-	CB_POWER	Mon	Active power of network CB

7.4.4 Input interface function for network power data NPMXMU

LN type	LN prefix	LN class	Function block name
NPMXMU (revision 0)	NP	MMXU	NPMXMU

Table 40: *NPMXMU Logical node data*

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Mod	a_dINC	Oper.ctlVal	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orCat	CO	-	-	Cmd	Mode parameter for 61850
		Oper.origin.orIdent	CO	-	-	Cmd	Mode parameter for 61850
		Oper.ctlNum	CO	-	-	Cmd	Mode parameter for 61850
		Oper.T	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Test	CO	-	-	Cmd	Mode parameter for 61850
		Oper.Check	CO	-	-	Cmd	Mode parameter for 61850
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
AvaPwrSrc1	v2_dMV	mag.f	MX	-	AVA_POW_SRC1	Mon	Available power of power source1
		q	MX	-	AVA_POW_SRC1	Mon	Available power of power source1
		t	MX	-	AVA_POW_SRC1	Mon	Available power of power source1
AvaPwrSrc2	v2_dMV	mag.f	MX	-	AVA_POW_SRC2	Mon	Available power of power source2
		q	MX	-	AVA_POW_SRC2	Mon	Available power of power source2
		t	MX	-	AVA_POW_SRC2	Mon	Available power of power source2
TotWSrc1	v2_dMV	mag.f	MX	-	ACT_POW_SRC1	Mon	Active power of source 1

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
TotWSrc1	v2_dMV	q	MX	-	ACT_POW_SRC1	Mon	Active power of source1
		t	MX	-	ACT_POW_SRC1	Mon	Active power of source1
TotWSrc2	v2_dMV	mag.f	MX	-	ACT_POW_SRC2	Mon	Active power of power source2
		q	MX	-	ACT_POW_SRC2	Mon	Active power of power source2
		t	MX	-	ACT_POW_SRC2	Mon	Active power of power source2

7.4.5 Contingency based fast load-shed function LSCACLS

LN type	LN prefix	LN class	Function block name
LSCACLS instance 1 (revision 1)	LSC	ACLS	LSCACLS
LSCCCLS instance 1 (revision 1)	LSC	CCLS	LSCACLS
LSCCCLS instance 2 (revision 1)	LSC	CCLS	LSCACLS
LSCCCLS instance 3 (revision 1)	LSC	CCLS	LSCACLS
LSCCCLS instance 4 (revision 1)	LSC	CCLS	LSCACLS
LSCGAPC instance 1 (revision 1)	LSC	GAPC	LSCACLS
LSCGAPC instance 2 (revision 1)	LSC	GAPC	LSCACLS
LSCLLN0 instance 1 (revision 1)	-	LLN0	LSCACLS
LSCRCLS instance 1 (revision 1)	LSC	RCLS	LSCACLS

Table 41: LSCACLS 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
Ntw1Rs	a_dSPC	Oper.ctIVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orIdent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctINum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	-	Mon	Sub network1 is reset
		q	ST	-	-	Mon	Sub network1 is reset

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Ntw1Rs	a_dSPC	t	ST	-	-	Mon	Sub network1 is reset
Ntw2Rs	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	Sub network2 is reset
		q	ST	-	-	Mon	Sub network2 is reset
		t	ST	-	-	Mon	Sub network2 is reset
Ntw3Rs	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	Sub network3 is reset
		q	ST	-	-	Mon	Sub network3 is reset
		t	ST	-	-	Mon	Sub network3 is reset
Ntw4Rs	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

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Ntw4Rs	a_dSPC	Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	-	Mon	Sub network4 is reset
		q	ST	-	-	Mon	Sub network4 is reset
		t	ST	-	-	Mon	Sub network4 is reset
StrCntRs	a_dSPC	Oper.ctIVal	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.origin.orIdent	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.ctINum	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	-	-	Cmd	Command parameter for IEC61850
		Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	-	Mon	Counter reset command active
		q	ST	-	-	Mon	Counter reset command active
Rs	a_dSPC	t	ST	-	-	Mon	Counter reset command active
		Oper.ctIVal	CO	T	-	Cmd	Command parameter for IEC61850
		Oper.origin.orCat	CO	T	-	Cmd	Command parameter for IEC61850
		Oper.origin.orIdent	CO	T	-	Cmd	Command parameter for IEC61850
		Oper.ctINum	CO	T	-	Cmd	Command parameter for IEC61850
		Oper.T	CO	T	-	Cmd	Command parameter for IEC61850
		Oper.Test	CO	T	-	Cmd	Command parameter for IEC61850
Op	b_dACT	Oper.Check	CO	T	-	Cmd	Command parameter for IEC61850
		general	ST	T	FLS_OPERATE	Mon	Fast load-shed operate
		q	ST	T	FLS_OPERATE	Mon	Fast load-shed operate
Mod	c_dINC	t	ST	T	FLS_OPERATE	Mon	Fast load-shed operate
		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
Str	d_dACD	general	ST	-	FLS_START	Mon	Fast load-shed start
		q	ST	-	FLS_START	Mon	Fast load-shed start
		t	ST	-	FLS_START	Mon	Fast load-shed start

Table 42: *LSCCCLS 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
ManLSCmd	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	Manual load-shed trigger for subnetwork1 active
		q	ST	-	-	Mon	Manual load-shed trigger for subnetwork1 active
		t	ST	-	-	Mon	Manual load-shed trigger for subnetwork1 active
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 43: *LSCCCLS 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

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
ManLSCmd	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	Manual load-shed trigger for subnetwork2 active
		q	ST	-	-	Mon	Manual load-shed trigger for subnetwork2 active
		t	ST	-	-	Mon	Manual load-shed trigger for subnetwork2 active
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 44: *LSCCCLS 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
ManLSCmd	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

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
ManLSCmd	a_dSPC	Oper.Check	CO	-	-	Cmd	Command parameter for IEC61850
		stVal	ST	-	-	Mon	Manual load-shed trigger for subnetwork3 active
		q	ST	-	-	Mon	Manual load-shed trigger for subnetwork3 active
		t	ST	-	-	Mon	Manual load-shed trigger for subnetwork3 active
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 45: *LSCCCLS 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
ManLSCmd	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	Manual load-shed trigger for subnetwork4 active
		q	ST	-	-	Mon	Manual load-shed trigger for subnetwork4 active
		t	ST	-	-	Mon	Manual load-shed trigger for subnetwork4 active
Mod	c_dINC	stVal	ST	-	-	Mon	Mode status value parameter for 61850
		q	ST	-	-	Mon	Mode status value parameter for 61850
		t	ST	-	-	Mon	Mode status value parameter for 61850

Table 46: *LSCGAPC 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
Op	b_dACT	general	ST	T	LS_OPERATE	Mon	Load-shed operate
		q	ST	T	LS_OPERATE	Mon	Load-shed operate
		t	ST	T	LS_OPERATE	Mon	Load-shed operate
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
Str	d_dACD	general	ST	-	LS_START	Mon	Load-shed start
		q	ST	-	LS_START	Mon	Load-shed start
		t	ST	-	LS_START	Mon	Load-shed start

Table 47: *LSCGAPC 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
Op	b_dACT	general	ST	T	SLS_OPERATE	Mon	Slow load-shed operate
		q	ST	T	SLS_OPERATE	Mon	Slow load-shed operate
		t	ST	T	SLS_OPERATE	Mon	Slow load-shed operate
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
Str	d_dACD	general	ST	-	SLS_START	Mon	Slow load-shed start
		q	ST	-	SLS_START	Mon	Slow load-shed start
		t	ST	-	SLS_START	Mon	Slow load-shed start

Table 48: *LSCLLNO 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 49: *LSCRCLS 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
FLSCnt	b_dINS	stVal	ST	-	FLS_COUNTER	Mon	Counter for number of fast load-shed triggers generated
		q	ST	-	FLS_COUNTER	Mon	Counter for number of fast load-shed triggers generated
		t	ST	-	FLS_COUNTER	Mon	Counter for number of fast load-shed triggers generated
NtwNumCB1	b_dINS	stVal	ST	-	CB12_SN_NO	Mon	Subnetwork number of the network CB12
		q	ST	-	CB12_SN_NO	Mon	Subnetwork number of the network CB12
		t	ST	-	CB12_SN_NO	Mon	Subnetwork number of the network CB12
NtwNumCB2	b_dINS	stVal	ST	-	CB13_SN_NO	Mon	Subnetwork number of the network CB13
		q	ST	-	CB13_SN_NO	Mon	Subnetwork number of the network CB13
		t	ST	-	CB13_SN_NO	Mon	Subnetwork number of the network CB13
NtwNumCB3	b_dINS	stVal	ST	-	CB14_SN_NO	Mon	Subnetwork number of the network CB14

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
NtwNumCB3	b_dINS	q	ST	-	CB14_SN_NO	Mon	Subnetwork number of the network CB14
		t	ST	-	CB14_SN_NO	Mon	Subnetwork number of the network CB14
NtwNumCB4	b_dINS	stVal	ST	-	CB15_SN_NO	Mon	Subnetwork number of the network CB15
		q	ST	-	CB15_SN_NO	Mon	Subnetwork number of the network CB15
		t	ST	-	CB15_SN_NO	Mon	Subnetwork number of the network CB15
NtwNumCB5	b_dINS	stVal	ST	-	CB16_SN_NO	Mon	Subnetwork number of the network CB16
		q	ST	-	CB16_SN_NO	Mon	Subnetwork number of the network CB16
		t	ST	-	CB16_SN_NO	Mon	Subnetwork number of the network CB16
NtwNumCB6	b_dINS	stVal	ST	-	CB23_SN_NO	Mon	Subnetwork number of the network CB23
		q	ST	-	CB23_SN_NO	Mon	Subnetwork number of the network CB23
		t	ST	-	CB23_SN_NO	Mon	Subnetwork number of the network CB23
NtwNumCB7	b_dINS	stVal	ST	-	CB24_SN_NO	Mon	Subnetwork number of the network CB24
		q	ST	-	CB24_SN_NO	Mon	Subnetwork number of the network CB24
		t	ST	-	CB24_SN_NO	Mon	Subnetwork number of the network CB24
NtwNumCB8	b_dINS	stVal	ST	-	CB25_SN_NO	Mon	Subnetwork number of the network CB25
		q	ST	-	CB25_SN_NO	Mon	Subnetwork number of the network CB25
		t	ST	-	CB25_SN_NO	Mon	Subnetwork number of the network CB25
NtwNumCB9	b_dINS	stVal	ST	-	CB26_SN_NO	Mon	Subnetwork number of the network CB26
		q	ST	-	CB26_SN_NO	Mon	Subnetwork number of the network CB26
		t	ST	-	CB26_SN_NO	Mon	Subnetwork number of the network CB26
NtwNumCB10	b_dINS	stVal	ST	-	CB34_SN_NO	Mon	Subnetwork number of the network CB34
		q	ST	-	CB34_SN_NO	Mon	Subnetwork number of the network CB34
		t	ST	-	CB34_SN_NO	Mon	Subnetwork number of the network CB34
NtwNumCB11	b_dINS	stVal	ST	-	CB35_SN_NO	Mon	Subnetwork number of the network CB35
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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
NtwNumCB11	b_dINS	q	ST	-	CB35_SN_NO	Mon	Subnetwork number of the network CB35
		t	ST	-	CB35_SN_NO	Mon	Subnetwork number of the network CB35
NtwNumCB12	b_dINS	stVal	ST	-	CB36_SN_NO	Mon	Subnetwork number of the network CB36
		q	ST	-	CB36_SN_NO	Mon	Subnetwork number of the network CB36
		t	ST	-	CB36_SN_NO	Mon	Subnetwork number of the network CB36
NtwNumCB13	b_dINS	stVal	ST	-	CB45_SN_NO	Mon	Subnetwork number of the network CB45
		q	ST	-	CB45_SN_NO	Mon	Subnetwork number of the network CB45
		t	ST	-	CB45_SN_NO	Mon	Subnetwork number of the network CB45
NtwNumCB14	b_dINS	stVal	ST	-	CB46_SN_NO	Mon	Subnetwork number of the network CB46
		q	ST	-	CB46_SN_NO	Mon	Subnetwork number of the network CB46
		t	ST	-	CB46_SN_NO	Mon	Subnetwork number of the network CB46
NtwNumCB15	b_dINS	stVal	ST	-	CB56_SN_NO	Mon	Subnetwork number of the network CB56
		q	ST	-	CB56_SN_NO	Mon	Subnetwork number of the network CB56
		t	ST	-	CB56_SN_NO	Mon	Subnetwork number of the network CB56
NtwNumSrc1	b_dINS	stVal	ST	-	SRC1_SN_NO	Mon	Subnetwork number of source1
		q	ST	-	SRC1_SN_NO	Mon	Subnetwork number of source1
		t	ST	-	SRC1_SN_NO	Mon	Subnetwork number of source1
NtwNumSrc2	b_dINS	stVal	ST	-	SRC2_SN_NO	Mon	Subnetwork number of source2
		q	ST	-	SRC2_SN_NO	Mon	Subnetwork number of source2
		t	ST	-	SRC2_SN_NO	Mon	Subnetwork number of source2
NtwNumSrc3	b_dINS	stVal	ST	-	SRC3_SN_NO	Mon	Subnetwork number of source3
		q	ST	-	SRC3_SN_NO	Mon	Subnetwork number of source3
		t	ST	-	SRC3_SN_NO	Mon	Subnetwork number of source3
NtwNumSrc4	b_dINS	stVal	ST	-	SRC4_SN_NO	Mon	Subnetwork number of source4
		q	ST	-	SRC4_SN_NO	Mon	Subnetwork number of source4
		t	ST	-	SRC4_SN_NO	Mon	Subnetwork number of source4
NtwNumSrc5	b_dINS	stVal	ST	-	SRC5_SN_NO	Mon	Subnetwork number of source5
		q	ST	-	SRC5_SN_NO	Mon	Subnetwork number of source5
		t	ST	-	SRC5_SN_NO	Mon	Subnetwork number of source5
NtwNumSrc6	b_dINS	stVal	ST	-	SRC6_SN_NO	Mon	Subnetwork number of source6
Table continues on next page							

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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
NtwNumSrc6	b_dINS	q	ST	-	SRC6_SN_NO	Mon	Subnetwork number of source6
		t	ST	-	SRC6_SN_NO	Mon	Subnetwork number of source6
NtwNumSrc7	b_dINS	stVal	ST	-	SRC7_SN_NO	Mon	Subnetwork number of source7
		q	ST	-	SRC7_SN_NO	Mon	Subnetwork number of source7
		t	ST	-	SRC7_SN_NO	Mon	Subnetwork number of source7
NtwNumSrc8	b_dINS	stVal	ST	-	SRC8_SN_NO	Mon	Subnetwork number of source8
		q	ST	-	SRC8_SN_NO	Mon	Subnetwork number of source8
		t	ST	-	SRC8_SN_NO	Mon	Subnetwork number of source8
NtwNumBB1	b_dINS	stVal	ST	-	BB1_SN_NO	Mon	Subnetwork number of busbar1
		q	ST	-	BB1_SN_NO	Mon	Subnetwork number of busbar1
		t	ST	-	BB1_SN_NO	Mon	Subnetwork number of busbar1
NtwNumBB2	b_dINS	stVal	ST	-	BB2_SN_NO	Mon	Subnetwork number of busbar2
		q	ST	-	BB2_SN_NO	Mon	Subnetwork number of busbar2
		t	ST	-	BB2_SN_NO	Mon	Subnetwork number of busbar2
NtwNumBB3	b_dINS	stVal	ST	-	BB3_SN_NO	Mon	Subnetwork number of busbar3
		q	ST	-	BB3_SN_NO	Mon	Subnetwork number of busbar3
		t	ST	-	BB3_SN_NO	Mon	Subnetwork number of busbar3
NtwNumBB4	b_dINS	stVal	ST	-	BB4_SN_NO	Mon	Sub network number of busbar4
		q	ST	-	BB4_SN_NO	Mon	Sub network number of busbar4
		t	ST	-	BB4_SN_NO	Mon	Sub network number of busbar4
NtwNumBB5	b_dINS	stVal	ST	-	BB5_SN_NO	Mon	Subnetwork number of busbar5
		q	ST	-	BB5_SN_NO	Mon	Subnetwork number of busbar5
		t	ST	-	BB5_SN_NO	Mon	Subnetwork number of busbar5
NtwNumBB6	b_dINS	stVal	ST	-	BB6_SN_NO	Mon	Subnetwork number of busbar6
		q	ST	-	BB6_SN_NO	Mon	Subnetwork number of busbar6
		t	ST	-	BB6_SN_NO	Mon	Subnetwork number of busbar6
ManLSBeh	b_dINS	stVal	ST	-	MAN_LS_BEH	Mon	Manual load-shed behaviour
		q	ST	-	MAN_LS_BEH	Mon	Manual load-shed behaviour
		t	ST	-	MAN_LS_BEH	Mon	Manual load-shed behaviour
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
SetChg	c_dSPS	stVal	ST	-	B_SET_CHANGE	Mon	One or many basic settings changed
		q	ST	-	B_SET_CHANGE	Mon	One or many basic settings changed
		t	ST	-	B_SET_CHANGE	Mon	One or many basic settings changed

7.4.6 Sheddable load trip command LSPTRC

LN type	LN prefix	LN class	Function block name
LSLLN0 instance 1 (revision 0)	-	LLN0	LSPTRC
LSPTRC instance 1 (revision 2)	LS	PTRC	LSPTRC
LSPTRC instance 2 (revision 2)	LS	PTRC	LSPTRC
LSPTRC instance 3 (revision 2)	LS	PTRC	LSPTRC
LSPTRC instance 4 (revision 2)	LS	PTRC	LSPTRC
LSPTRC instance 5 (revision 2)	LS	PTRC	LSPTRC
LSPTRC instance 6 (revision 2)	LS	PTRC	LSPTRC
LSPTRC instance 7 (revision 2)	LS	PTRC	LSPTRC
LSPTRC instance 8 (revision 2)	LS	PTRC	LSPTRC
LSPTRC instance 9 (revision 2)	LS	PTRC	LSPTRC
LSPTRC instance 10 (revision 2)	LS	PTRC	LSPTRC

Table 50: *LSLLN0 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 51: *LSPTRC 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

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Tr	b_dACT	general	ST	-	OPR_SL1	Mon	Operate command for the sheddable load1
		q	ST	-	OPR_SL1	Mon	Operate command for the sheddable load1
		t	ST	-	OPR_SL1	Mon	Operate command for the sheddable load1
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 52: *LSPTRC 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
Tr	b_dACT	general	ST	-	OPR_SL2	Mon	Operate command for the sheddable load2
		q	ST	-	OPR_SL2	Mon	Operate command for the sheddable load2
		t	ST	-	OPR_SL2	Mon	Operate command for the sheddable load2
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 53: *LSPTRC 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
Tr	b_dACT	general	ST	-	OPR_SL3	Mon	Operate command for the sheddable load3
		q	ST	-	OPR_SL3	Mon	Operate command for the sheddable load3
		t	ST	-	OPR_SL3	Mon	Operate command for the sheddable load3

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 54: *LSPTRC 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
Tr	b_dACT	general	ST	-	OPR_SL4	Mon	Operate command for the sheddable load4
		q	ST	-	OPR_SL4	Mon	Operate command for the sheddable load4
		t	ST	-	OPR_SL4	Mon	Operate command for the sheddable load4
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: *LSPTRC 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
Tr	b_dACT	general	ST	-	OPR_SL5	Mon	Operate command for the sheddable load5
		q	ST	-	OPR_SL5	Mon	Operate command for the sheddable load5
		t	ST	-	OPR_SL5	Mon	Operate command for the sheddable load5
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: *LSPTRC Logical node data (instance 6)*

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
Tr	b_dACT	general	ST	-	OPR_SL6	Mon	Operate command for the sheddable load6
		q	ST	-	OPR_SL6	Mon	Operate command for the sheddable load6
		t	ST	-	OPR_SL6	Mon	Operate command for the sheddable load6
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: *LSPTRC Logical node data (instance 7)*

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
Tr	b_dACT	general	ST	-	OPR_SL7	Mon	Operate command for the sheddable load7
		q	ST	-	OPR_SL7	Mon	Operate command for the sheddable load7
		t	ST	-	OPR_SL7	Mon	Operate command for the sheddable load7
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: *LSPTRC Logical node data (instance 8)*

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
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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
Tr	b_dACT	general	ST	-	OPR_SL8	Mon	Operate command for the sheddable load8
		q	ST	-	OPR_SL8	Mon	Operate command for the sheddable load8
		t	ST	-	OPR_SL8	Mon	Operate command for the sheddable load8
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: LSPTRC Logical node data (instance 9)

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
Tr	b_dACT	general	ST	-	OPR_SL9	Mon	Operate command for the sheddable load9
		q	ST	-	OPR_SL9	Mon	Operate command for the sheddable load9
		t	ST	-	OPR_SL9	Mon	Operate command for the sheddable load9
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: LSPTRC Logical node data (instance 10)

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
Tr	b_dACT	general	ST	-	OPR_SL10	Mon	Operate command for the sheddable load10
		q	ST	-	OPR_SL10	Mon	Operate command for the sheddable load10
		t	ST	-	OPR_SL10	Mon	Operate command for the sheddable load10

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

7.4.7 Output interface function for sub network data SNWRCLS

LN type	LN prefix	LN class	Function block name
SNWARCLS instance 1 (revision 1)	SNWA	RCLS	SNWRCLS
SNWLLN0 instance 1 (revision 1)	-	LLN0	SNWRCLS
SNWLRCLS instance 1 (revision 1)	SNWL	RCLS	SNWRCLS

Table 61: *SNWARCLS 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
ManPrioSet	b_dINS	stVal	ST	-	MAN_SHD_PRIO	Mon	Manual load-shed priority settings
		q	ST	-	MAN_SHD_PRIO	Mon	Manual load-shed priority settings
		t	ST	-	MAN_SHD_PRIO	Mon	Manual load-shed priority settings
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
ALodPrio1	c_dMV	mag.f	MX	-	CUM_LOD_PR1	Mon	Cumulative load priority 1
		q	MX	-	CUM_LOD_PR1	Mon	Cumulative load priority 1
		t	MX	-	CUM_LOD_PR1	Mon	Cumulative load priority 1
ALodPrio10	c_dMV	mag.f	MX	-	CUM_LOD_PR10	Mon	Cumulative load priority 10
		q	MX	-	CUM_LOD_PR10	Mon	Cumulative load priority 10
		t	MX	-	CUM_LOD_PR10	Mon	Cumulative load priority 10
ALodPrio11	c_dMV	mag.f	MX	-	CUM_LOD_PR11	Mon	Cumulative load priority 11
		q	MX	-	CUM_LOD_PR11	Mon	Cumulative load priority 11
		t	MX	-	CUM_LOD_PR11	Mon	Cumulative load priority 11
ALodPrio12	c_dMV	mag.f	MX	-	CUM_LOD_PR12	Mon	Cumulative load priority 12
		q	MX	-	CUM_LOD_PR12	Mon	Cumulative load priority 12

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
ALodPrio12	c_dMV	t	MX	-	CUM_LOD_PR12	Mon	Cumulative load priority 12
ALodPrio13	c_dMV	mag.f	MX	-	CUM_LOD_PR13	Mon	Cumulative load priority 13
		q	MX	-	CUM_LOD_PR13	Mon	Cumulative load priority 13
		t	MX	-	CUM_LOD_PR13	Mon	Cumulative load priority 13
ALodPrio14	c_dMV	mag.f	MX	-	CUM_LOD_PR14	Mon	Cumulative load priority 14
		q	MX	-	CUM_LOD_PR14	Mon	Cumulative load priority 14
		t	MX	-	CUM_LOD_PR14	Mon	Cumulative load priority 14
ALodPrio15	c_dMV	mag.f	MX	-	CUM_LOD_PR15	Mon	Cumulative load priority 15
		q	MX	-	CUM_LOD_PR15	Mon	Cumulative load priority 15
		t	MX	-	CUM_LOD_PR15	Mon	Cumulative load priority 15
ALodPrio16	c_dMV	mag.f	MX	-	CUM_LOD_PR16	Mon	Cumulative load priority 16
		q	MX	-	CUM_LOD_PR16	Mon	Cumulative load priority 16
		t	MX	-	CUM_LOD_PR16	Mon	Cumulative load priority 16
ALodPrio17	c_dMV	mag.f	MX	-	CUM_LOD_PR17	Mon	Cumulative load priority 17
		q	MX	-	CUM_LOD_PR17	Mon	Cumulative load priority 17
		t	MX	-	CUM_LOD_PR17	Mon	Cumulative load priority 17
ALodPrio18	c_dMV	mag.f	MX	-	CUM_LOD_PR18	Mon	Cumulative load priority 18
		q	MX	-	CUM_LOD_PR18	Mon	Cumulative load priority 18
		t	MX	-	CUM_LOD_PR18	Mon	Cumulative load priority 18
ALodPrio19	c_dMV	mag.f	MX	-	CUM_LOD_PR19	Mon	Cumulative load priority 19
		q	MX	-	CUM_LOD_PR19	Mon	Cumulative load priority 19
		t	MX	-	CUM_LOD_PR19	Mon	Cumulative load priority 19
ALodPrio2	c_dMV	mag.f	MX	-	CUM_LOD_PR2	Mon	Cumulative load priority 2
		q	MX	-	CUM_LOD_PR2	Mon	Cumulative load priority 2
		t	MX	-	CUM_LOD_PR2	Mon	Cumulative load priority 2
ALodPrio3	c_dMV	mag.f	MX	-	CUM_LOD_PR3	Mon	Cumulative load priority 3
		q	MX	-	CUM_LOD_PR3	Mon	Cumulative load priority 3
		t	MX	-	CUM_LOD_PR3	Mon	Cumulative load priority 3
ALodPrio4	c_dMV	mag.f	MX	-	CUM_LOD_PR4	Mon	Cumulative load priority 4
		q	MX	-	CUM_LOD_PR4	Mon	Cumulative load priority 4
		t	MX	-	CUM_LOD_PR4	Mon	Cumulative load priority 4
ALodPrio5	c_dMV	mag.f	MX	-	CUM_LOD_PR5	Mon	Cumulative load priority 5
		q	MX	-	CUM_LOD_PR5	Mon	Cumulative load priority 5
		t	MX	-	CUM_LOD_PR5	Mon	Cumulative load priority 5
ALodPrio6	c_dMV	mag.f	MX	-	CUM_LOD_PR6	Mon	Cumulative load priority 6
		q	MX	-	CUM_LOD_PR6	Mon	Cumulative load priority 6
		t	MX	-	CUM_LOD_PR6	Mon	Cumulative load priority 6
ALodPrio7	c_dMV	mag.f	MX	-	CUM_LOD_PR7	Mon	Cumulative load priority 7
		q	MX	-	CUM_LOD_PR7	Mon	Cumulative load priority 7

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
ALodPrio7	c_dMV	t	MX	-	CUM_LOD_PR7	Mon	Cumulative load priority 7
ALodPrio8	c_dMV	mag.f	MX	-	CUM_LOD_PR8	Mon	Cumulative load priority 8
		q	MX	-	CUM_LOD_PR8	Mon	Cumulative load priority 8
		t	MX	-	CUM_LOD_PR8	Mon	Cumulative load priority 8
ALodPrio9	c_dMV	mag.f	MX	-	CUM_LOD_PR9	Mon	Cumulative load priority 9
		q	MX	-	CUM_LOD_PR9	Mon	Cumulative load priority 9
		t	MX	-	CUM_LOD_PR9	Mon	Cumulative load priority 9

Table 62: SNWLLN0 Logical node data (instance 1)

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

Table 63: SNWLRCLS 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
LSOpSt	b_dINS	stVal	ST	-	LS_OPR_STS	Mon	Load shed operated status
		q	ST	-	LS_OPR_STS	Mon	Load shed operated status
		t	ST	-	LS_OPR_STS	Mon	Load shed operated status
LSPrioRcd1	b_dINS	stVal	ST	-	SHD_PRIO_RC1	Mon	Record-1 subnetwork shed priority
		q	ST	-	SHD_PRIO_RC1	Mon	Record-1 subnetwork shed priority
		t	ST	-	SHD_PRIO_RC1	Mon	Record-1 subnetwork shed priority

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
LSPrioRcd2	b_dINS	stVal	ST	-	SHD_PRIO_RC2	Mon	Record-2 subnetwork shed priority
		q	ST	-	SHD_PRIO_RC2	Mon	Record-2 subnetwork shed priority
		t	ST	-	SHD_PRIO_RC2	Mon	Record-2 subnetwork shed priority
LSPrioRcd3	b_dINS	stVal	ST	-	SHD_PRIO_RC3	Mon	Record-3 subnetwork shed priority
		q	ST	-	SHD_PRIO_RC3	Mon	Record-3 subnetwork shed priority
		t	ST	-	SHD_PRIO_RC3	Mon	Record-3 subnetwork shed priority
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
NtwTotLoad	c_dMV	mag.f	MX	-	RUNNING_LOAD	Mon	Total load
		q	MX	-	RUNNING_LOAD	Mon	Total load
		t	MX	-	RUNNING_LOAD	Mon	Total load
NtwLodInhM	c_dMV	mag.f	MX	-	LOD_INH_OPR	Mon	Amount of the load inhibited by the operator
		q	MX	-	LOD_INH_OPR	Mon	Amount of the load inhibited by the operator
		t	MX	-	LOD_INH_OPR	Mon	Amount of the load inhibited by the operator
NtwLodInhS	c_dMV	mag.f	MX	-	LOD_INH_SYS	Mon	Amount of the load inhibited by the system
		q	MX	-	LOD_INH_SYS	Mon	Amount of the load inhibited by the system
		t	MX	-	LOD_INH_SYS	Mon	Amount of the load inhibited by the system
NtwLodMm	c_dMV	mag.f	MX	-	LOD_MISMATCH	Mon	Total load mismatch
		q	MX	-	LOD_MISMATCH	Mon	Total load mismatch
		t	MX	-	LOD_MISMATCH	Mon	Total load mismatch
NtwMustLS	c_dMV	mag.f	MX	-	MUST_SHD_LOD	Mon	Must be load shed
		q	MX	-	MUST_SHD_LOD	Mon	Must be load shed
		t	MX	-	MUST_SHD_LOD	Mon	Must be load shed
NtwPwrImb	c_dMV	mag.f	MX	-	POWER_BAL	Mon	Power balance in the subnetwork
		q	MX	-	POWER_BAL	Mon	Power balance in the subnetwork
		t	MX	-	POWER_BAL	Mon	Power balance in the subnetwork
NtwPwrDiff	c_dMV	mag.f	MX	-	DIF_MUST_ACT	Mon	Difference between the must be load shed and the actual load shed
		q	MX	-	DIF_MUST_ACT	Mon	Difference between the must be load shed and the actual load shed
		t	MX	-	DIF_MUST_ACT	Mon	Difference between the must be load shed and the actual load shed
NtwShdLod	c_dMV	mag.f	MX	-	SHDABL_LOAD	Mon	Total sheddable load
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DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
NtwShdLod	c_dMV	q	MX	-	SHDABL_LOAD	Mon	Total sheddable load
		t	MX	-	SHDABL_LOAD	Mon	Total sheddable load
NtwAvaPwr	c_dMV	mag.f	MX	-	AVA_POWER	Mon	Total available power
		q	MX	-	AVA_POWER	Mon	Total available power
		t	MX	-	AVA_POWER	Mon	Total available power
ManLSPwr	c_dMV	mag.f	MX	-	MAN_SHD_POW	Mon	Manual load-shed power settings
		q	MX	-	MAN_SHD_POW	Mon	Manual load-shed power settings
		t	MX	-	MAN_SHD_POW	Mon	Manual load-shed power settings
EffPwrImb	c_dMV	mag.f	MX	-	EFF_POW_BAL	Mon	Effective power balance in the subnetwork
		q	MX	-	EFF_POW_BAL	Mon	Effective power balance in the subnetwork
		t	MX	-	EFF_POW_BAL	Mon	Effective power balance in the subnetwork
NtwALodShd	c_dMV	mag.f	MX	-	ACT_SHD_LOD	Mon	Actual shed load
		q	MX	-	ACT_SHD_LOD	Mon	Actual shed load
		t	MX	-	ACT_SHD_LOD	Mon	Actual shed load
LsOp	c_dSPS	stVal	ST	-	LS_OPERATE	Mon	Load-shed operate
		q	ST	-	LS_OPERATE	Mon	Load-shed operate
		t	ST	-	LS_OPERATE	Mon	Load-shed operate
LSBlkSt	c_dSPS	stVal	ST	-	LS_BLOCK	Mon	Load-shed block
		q	ST	-	LS_BLOCK	Mon	Load-shed block
		t	ST	-	LS_BLOCK	Mon	Load-shed block
NtwActSt	c_dSPS	stVal	ST	-	SN_ACTIVE	Mon	Subnetwork active status
		q	ST	-	SN_ACTIVE	Mon	Subnetwork active status
		t	ST	-	SN_ACTIVE	Mon	Subnetwork active status
SlwLSBlkSt	c_dSPS	stVal	ST	-	SLS_TRG_INH	Mon	Slow load-shed trigger inhibit
		q	ST	-	SLS_TRG_INH	Mon	Slow load-shed trigger inhibit
		t	ST	-	SLS_TRG_INH	Mon	Slow load-shed trigger inhibit
NtwEnaSt	c_dSPS	stVal	ST	-	DISABLE_LS	Mon	Load shed disable
		q	ST	-	DISABLE_LS	Mon	Load shed disable
		t	ST	-	DISABLE_LS	Mon	Load shed disable
NgPwrBalSt	c_dSPS	stVal	ST	-	NEG_POW_BAL	Mon	Negative power balance status
		q	ST	-	NEG_POW_BAL	Mon	Negative power balance status
		t	ST	-	NEG_POW_BAL	Mon	Negative power balance status

7.4.8 Output interface function for peer network data PPLSGGIO

LN type	LN prefix	LN class	Function block name
PPLSLLN0 instance 1 (revision 0)	-	LLN0	PPLSGGIO

PPLSGGIO instance 1 (revision 0)	PPLS	GGIO	PPLSGGIO
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Table 64: *PPLSLLN0 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.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 65: *PPLSGGIO 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
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
NtwLSGrInt	v1_dINS	stVal	ST	-	LS_DATA	Mon	Load-shed data error for adjacent electrical area
		q	ST	-	LS_DATA	Mon	Load-shed data error for adjacent electrical area
		t	ST	-	LS_DATA	Mon	Load-shed data error for adjacent electrical area
SigErr	v1_dSPS	stVal	ST	-	LS_DATA_ER	Mon	Load-shed data error for adjacent electrical area
		q	ST	-	LS_DATA_ER	Mon	Load-shed data error for adjacent electrical area

Table continues on next page

DO name	DO type	DA name	FC	T	Signal	Mon/Cmd	Description
SigErr	v1_dSPS	t	ST	-	LS_DATA_ER	Mon	Load-shed data error for adjacent electrical area
RxCBSt	v1_dSPS	stVal	ST	-	PEER_CB_STS	Mon	CB status of the adjacent electrical area
		q	ST	-	PEER_CB_STS	Mon	CB status of the adjacent electrical area
		t	ST	-	PEER_CB_STS	Mon	CB status of the adjacent electrical area
RxSigErr	v1_dSPS	stVal	ST	-	PEER_DATA_ER	Mon	Data error of the adjacent electrical area
		q	ST	-	PEER_DATA_ER	Mon	Data error of the adjacent electrical area
		t	ST	-	PEER_DATA_ER	Mon	Data error of the adjacent electrical area
RxCBBlk	v1_dSPS	stVal	ST	-	PEER_SRC_BLK	Mon	Connectivity and CB block status of the adjacent electrical area
		q	ST	-	PEER_SRC_BLK	Mon	Connectivity and CB block status of the adjacent electrical area
		t	ST	-	PEER_SRC_BLK	Mon	Connectivity and CB block status of the adjacent electrical area
RxNtwBlk	v1_dSPS	stVal	ST	-	PEER_SN_BLK	Mon	Subnetwork LS block status of the adjacent electrical area
		q	ST	-	PEER_SN_BLK	Mon	Subnetwork LS block status of the adjacent electrical area
		t	ST	-	PEER_SN_BLK	Mon	Subnetwork LS block status of the adjacent electrical area
RxSpRsvPwr	v2_dMV	mag.f	MX	-	PEER_SP_RSV	Mon	Spinning reserve of the adjacent electrical area
		q	MX	-	PEER_SP_RSV	Mon	Spinning reserve of the adjacent electrical area
		t	MX	-	PEER_SP_RSV	Mon	Spinning reserve of the adjacent electrical area
RxLSPwr	v2_dMV	mag.f	MX	-	PEER_MUST_LS	Mon	Must shed power extended from the adjacent electrical area
		q	MX	-	PEER_MUST_LS	Mon	Must shed power extended from the adjacent electrical area
		t	MX	-	PEER_MUST_LS	Mon	Must shed power extended from the adjacent electrical area

7.5 Logical node for disturbance recorder function

7.5.1 Disturbance report DRRDRE

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

Table 66: *DRRDRE Logical node data*

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

7.6 Load-shedding power management function blocks

The table Function block and logical device instances describes the relationship between the load-shedding power management function blocks and the logical devices in the IEC 61850 structure. Also mentioned are the maximum number of possible instances of the function blocks, which depend on the power network configuration. These function blocks are automatically instantiated in the ACT of PCM600 by the IED Connectivity package (Configuration Wizard feature).

Table 67: *Function block and logical device instances*

Function block name	Maximum number of instances	Associated logical device and instance number	Description
PSCSWI	8	PSCSWI_<instance number, based on the number of power sources>	For power source breaker index number, see the application engineering guide.
LDMMXU	6	LD_<1...6>	Instance number depends on the number of load busbars.
NCBDCSWI	15	NCBD_<instance number, based on network circuit breaker index>	For network circuit breaker index number, see the application engineering guide.
NPMMXU	1	NP_1	–
LSCACLS	1	LSC_1	–
LSPTRC	6	LS_<1...6>	Instance number depends on the number of load busbars.
SNWLRCLS	4	SNW_<1...4>	Instance number depends on the maximum number of subnetworks (the number of busbars with power sources).
PPLSGGIO	2	PPLS_<1...2>	Instance number depends on the adjacent network area connectivity with the Grid1 and Grid2 power sources.

Section 8 Glossary

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

IEC 61850-8-1	A communication protocol based on the IEC 61850 standard series
IED	Intelligent electronic device
IET600	Integrated Engineering Toolbox
ISO	International Standard Organization
LD	Logical device
LD0	Logical device zero (0)
LHMI	Local human-machine interface
LLN0	Logical node zero (0)
LN	Logical node
Logical device	Also known as LD. Representation of a group of functions. Each function is defined as a logical node. A physical device has one or several LDs.
Logical node	Also known as LN. The smallest part of a function that exchanges data. An LN is an object defined by its data and methods.
MICS	Model implementation conformance statement
MMS	1. Manufacturing message specification 2. Metering management system
NCC	Network control center
PCM600	Protection and Control IED Manager
PICS	Protocol implementation conformance statement
PIXIT	Protocol implementation extra information for testing
SCD	Substation configuration description
SCL	XML-based substation description configuration language defined by IEC 61850
SMT	Signal Matrix tool in PCM600
SNTP	Simple Network Time Protocol
ST	Connector type for glass fiber cable
stVal	Status value
TCP/IP	Transmission Control Protocol/Internet Protocol
WHMI	Web human-machine interface
XML	Extensible markup language



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