RELION® PRODUCT FAMILY

Grid Automation
REC615 and RER615
Modbus Point List Manual

Document ID: 1MRS758979
Issued: 2019-05-31
Revision: B
Product version: 2.0.3

Copyright

Trademarks

Warranty

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

www.abb.com/relion

Disclaimer

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

This product has been designed to be connected and communicate data and information via a network interface which should be connected to a secure network. It is the sole responsibility of the person or entity responsible for network administration to ensure a secure connection to the network and to take the necessary measures (such as, but not limited to, installation of firewalls, application of authentication measures, encryption of data, installation of anti virus programs, etc.) to protect the product and the network, its system and interface included, against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information. ABB is not liable for any such damages and/or losses.

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

Conformity

This product complies with the directive of the Council of the European Communities on the approximation of the laws of the Member States relating to electromagnetic compatibility (EMC Directive 2014/30/EU) and concerning electrical equipment for use within specified voltage limits (Low-voltage directive 2014/35/EU). This conformity is the result of tests conducted by ABB in accordance with the product standard EN 60255-26 for the EMC directive, and with the product standards EN 60255-1 and EN 60255-27 for the low voltage directive. The product is designed in accordance with the international standards of the IEC 60255 series.

Table of contents

Table of contents

Table of contents

Table of contents

Section 1 Introduction

1.1 This manual

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

1.2 Intended audience

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

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

1.3 Product documentation

1.3.1 Product documentation set

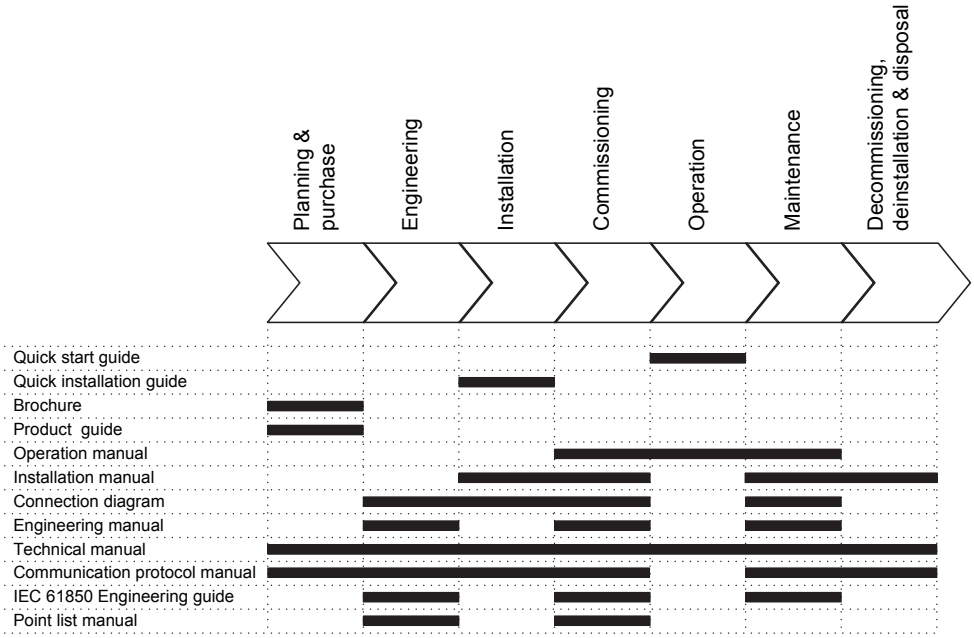

Figure 1: The intended use of documents during the product life cycle

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

1.3.2 Document revision history

Document revision/date	Product version	History
A/2018-08-31	2.0	First release
B/2019-05-31	2.0.3	Content updated to correspond to the product series version

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

1.3.3 Related documentation

Name of the document	Document ID
Modbus Communication Protocol Manual	1MRS758758

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.
- The example figures illustrate the IEC display variant.
- Menu paths are presented in bold.
  Select **Main menu/Settings**.
- 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.
- Parameter values are indicated with quotation marks.
  The corresponding parameter values are "On" and "Off".
- Input/output messages and monitored data names are shown in Courier font.
  When the function starts, the `START` output is set to TRUE.

1.4.3 Functions, codes and symbols

All available functions are listed in the table. All of them may not be applicable to all products.

Table 1: Functions included in the relays

Function	IEC 61850	IEC 60617	IEC-ANSI
Protection			
Three-phase non-directional overcurrent protection, low stage, instance 1	PHLPTOC1	3I> (1)	51P-1 (1)
	FPHLPTOC1	F3I> (1)	F51P-1 (1)
Three-phase non-directional overcurrent protection, high stage, instance 1	PHHPTOC1	3I>> (1)	51P-2 (1)
Three-phase non-directional overcurrent protection, instantaneous stage, instance 1	PHIPTOC1	3I>>> (1)	50P/51P (1)
Three-phase non-directional overcurrent protection, instantaneous stage, instance 2	PHIPTOC2	3I>>> (2)	50P/51P (2)
Three-phase directional overcurrent protection, low stage, instance 1	DPHLPDOC1	3I> -> (1)	67-1 (1)
	FDPHLPDOC1	F3I> -> (1)	F67-1 (1)
Three-phase directional overcurrent protection, low stage, instance 2	DPHLPDOC2	3I> -> (2)	67-1 (2)
	FDPHLPDOC2	F3I> -> (2)	F67-1 (2)
Three-phase directional overcurrent protection, low stage, instance 3	DPHLPDOC3	3I> -> (3)	67-1 (3)
Three-phase directional overcurrent protection, low stage, instance 4	DPHLPDOC4	3I> -> (4)	67-1 (4)
Three-phase directional overcurrent protection, high stage, instance 1	DPHHPDOC1	3I>> -> (1)	67-2 (1)
Three-phase directional overcurrent protection, high stage, instance 2	DPHHPDOC2	3I>> -> (2)	67-2 (2)
Three-phase directional overcurrent protection, high stage, instance 3	DPHHPDOC3	3I>> -> (3)	67-2 (3)
Three-phase directional overcurrent protection, high stage, instance 4	DPHHPDOC4	3I>> -> (4)	67-2 (4)
Non-directional earth-fault protection, low stage, instance 1	EFLPTOC1	Io> (1)	51N-1 (1)
	FEFLPTOC1	FIo> (1)	F51N-1 (1)
Non-directional earth-fault protection, high stage, instance 1	EFHPTOC1	Io>> (1)	51N-2 (1)
Non-directional earth-fault protection, instantaneous stage, instance 1	EFIPTOC1	Io>>> (1)	50N/51N (1)
Directional earth-fault protection, low stage, instance 1	DEFLPDEF1	Io> -> (1)	67N-1 (1)
	FDEFLPDEF1	FIo> -> (1)	F67N-1 (1)
Directional earth-fault protection, low stage, instance 2	DEFLPDEF2	Io> -> (2)	67N-1 (2)
	FDEFLPDEF2	FIo> -> (2)	F67N-1 (2)
Directional earth-fault protection, low stage, instance 3	DEFLPDEF3	Io> -> (3)	67N-1 (3)

Table continues on next page

Function	IEC 61850	IEC 60617	IEC-ANSI
Directional earth-fault protection, low stage, instance 4	DEFLPDEF4	Io> -> (4)	67N-1 (4)
Directional earth-fault protection, high stage, instance 1	DEFHPDEF1	Io>> -> (1)	67N-2 (1)
Directional earth-fault protection, high stage, instance 2	DEFHPDEF2	Io>> -> (2)	67N-2 (2)
Directional earth-fault protection, high stage, instance 3	DEFHPDEF3	Io>> -> (3)	67N-2 (3)
Directional earth-fault protection, high stage, instance 4	DEFHPDEF4	Io>> -> (4)	67N-2 (4)
Transient / intermittent earth-fault protection, instance 1	INTRPTEF1	Io> -> IEF (1)	67NIEF (1)
Admittance-based earth-fault protection, instance 1	EFPADM1	Yo> -> (1)	21YN (1)
Admittance-based earth-fault protection, instance 2	EFPADM2	Yo> -> (2)	21YN (2)
Admittance-based earth-fault protection, instance 3	EFPADM3	Yo> -> (3)	21YN (3)
Wattmetric-based earth-fault protection, instance 1	WPWDE1	Po> -> (1)	32N (1)
Wattmetric-based earth-fault protection, instance 2	WPWDE2	Po> -> (2)	32N (2)
Wattmetric-based earth-fault protection, instance 3	WPWDE3	Po> -> (3)	32N (3)
Harmonics-based earth-fault protection, instance 1	HAEFPTOC1	Io>HA (1)	51NHA (1)
Multifrequency admittance-based earth-fault protection, instance 1	MFADPSDE1	Io> -> Y (1)	67YN (1)
Multifrequency admittance-based earth-fault protection, instance 2	MFADPSDE2	Io> -> Y (2)	67YN (2)
Negative-sequence overcurrent protection, instance 1	NSPTOC1	I2> (1)	46 (1)
Negative-sequence overcurrent protection, instance 2	NSPTOC2	I2> (2)	46 (2)
Phase discontinuity protection, instance 1	PDNSPTOC1	I2/I1> (1)	46PD (1)
Residual overvoltage protection, instance 1	ROVPTOV1	Uo> (1)	59G (1)
Residual overvoltage protection, instance 2	ROVPTOV2	Uo> (2)	59G (2)
Three-phase undervoltage protection, instance 1	PHPTUV1	3U< (1)	27 (1)
Three-phase undervoltage protection, instance 2	PHPTUV2	3U< (2)	27 (2)
Three-phase undervoltage protection, instance 3	PHPTUV3	3U< (3)	27 (3)
Three-phase overvoltage protection, instance 1	PHPTOV1	3U> (1)	59 (1)

Table continues on next page

Function	IEC 61850	IEC 60617	IEC-ANSI
Three-phase overvoltage protection, instance 2	PHPTOV2	3U> (2)	59 (2)
Three-phase overvoltage protection, instance 3	PHPTOV3	3U> (3)	59 (3)
Positive-sequence undervoltage protection, instance 1	PSPTUV1	U1< (1)	47U+ (1)
Negative-sequence overvoltage protection, instance 1	NSPTOV1	U2> (1)	47O- (1)
Loss of phase (undercurrent), instance 1	PHPTUC1	3I< (1)	37 (1)
Loss of phase (undercurrent), instance 2	PHPTUC2	3I< (2)	37 (2)
Frequency protection, instance 1	FRPFRQ1	f>/f<,df/dt (1)	81 (1)
Frequency protection, instance 2	FRPFRQ2	f>/f<,df/dt (2)	81 (2)
Three-phase thermal protection for feeders, cables and distribution transformers, instance 1	T1PTTR1	3Ith>F (1)	49F (1)
Circuit breaker failure protection, instance 1	CCBRBRF1	3I>/Io>BF (1)	51BF/51NBF (1)
Circuit breaker failure protection, instance 2	CCBRBRF2	3I>/Io>BF (2)	51BF/51NBF (2)
Three-phase inrush detector, instance 1	INRPHAR1	3I2f> (1)	68 (1)
Master trip, instance 1	TRPPTRC1	Master Trip (1)	94/86 (1)
Master trip, instance 2	TRPPTRC2	Master Trip (2)	94/86 (2)
Multipurpose protection, instance 1	MAPGAPC1	MAP (1)	MAP (1)
Multipurpose protection, instance 2	MAPGAPC2	MAP (2)	MAP (2)
Multipurpose protection, instance 3	MAPGAPC3	MAP (3)	MAP (3)
Multipurpose protection, instance 4	MAPGAPC4	MAP (4)	MAP (4)
Multipurpose protection, instance 5	MAPGAPC5	MAP (5)	MAP (5)
Multipurpose protection, instance 6	MAPGAPC6	MAP (6)	MAP (6)
Load-shedding and restoration, instance 1	LSHDPFRQ1	UFLS/R (1)	81LSH (1)
Load-shedding and restoration, instance 2	LSHDPFRQ2	UFLS/R (2)	81LSH (2)
Fault locator, instance 1	SCEFRFLO1	FLOC (1)	21FL (1)
Three-phase power directional element, instance 1	DPSRDIR1	I1-> (1)	32P (1)
Three-phase power directional element, instance 2	DPSRDIR2	I1-> (2)	32P (2)
Power quality			
Current total demand distortion, instance 1	CMHAI1	PQM3I (1)	PQM3I (1)
Voltage total harmonic distortion, instance 1	VMHAI1	PQM3U (1)	PQM3V (1)
Voltage variation, instance 1	PHQVVR1	PQMU (1)	PQMV (1)

Table continues on next page

Function	IEC 61850	IEC 60617	IEC-ANSI
Voltage unbalance, instance 1	VSQVUB1	PQUUB (1)	PQVUB (1)
Control			
Circuit-breaker control, instance 1	CBXCBR1	I <-> O CB (1)	I <-> O CB (1)
Circuit-breaker control, instance 2	CBXCBR2	I <-> O CB (2)	I <-> O CB (2)
Disconnector control, instance 1	DCXSWI1	I <-> O DCC (1)	I <-> O DCC (1)
Disconnector control, instance 2	DCXSWI2	I <-> O DCC (2)	I <-> O DCC (2)
Disconnector control, instance 3	DCXSWI3	I <-> O DCC (3)	I <-> O DCC (3)
Disconnector control, instance 4	DCXSWI4	I <-> O DCC (4)	I <-> O DCC (4)
Disconnector control, instance 5	DCXSWI5	I <-> O DCC (5)	I <-> O DCC (5)
Disconnector control, instance 6	DCXSWI6	I <-> O DCC (6)	I <-> O DCC (6)
Disconnector control, instance 7	DCXSWI7	I <-> O DCC (7)	I <-> O DCC (7)
Disconnector control, instance 8	DCXSWI8	I <-> O DCC (8)	I <-> O DCC (8)
Disconnector position indication, instance 1	DCSXSWI1	I <-> O DC (1)	I <-> O DC (1)
Disconnector position indication, instance 2	DCSXSWI2	I <-> O DC (2)	I <-> O DC (2)
Earthing switch indication, instance 1	ESSXSWI1	I <-> O ES (1)	I <-> O ES (1)
Earthing switch indication, instance 2	ESSXSWI2	I <-> O ES (2)	I <-> O ES (2)
Earthing switch indication, instance 3	ESSXSWI3	I <-> O ES (3)	I <-> O ES (3)
Earthing switch indication, instance 4	ESSXSWI4	I <-> O ES (4)	I <-> O ES (4)
Earthing switch indication, instance 5	ESSXSWI5	I <-> O ES (5)	I <-> O ES (5)
Earthing switch indication, instance 6	ESSXSWI6	I <-> O ES (6)	I <-> O ES (6)
Earthing switch indication, instance 7	ESSXSWI7	I <-> O ES (7)	I <-> O ES (7)
Earthing switch indication, instance 8	ESSXSWI8	I <-> O ES (8)	I <-> O ES (8)
Autoreclosing, instance 1	DARREC1	O -> I (1)	79 (1)
Autoreclosing, instance 2	DARREC2	O -> I (2)	79 (2)
Synchronism and energizing check, instance 1	SECRSYN1	SYNC (1)	25 (1)
Automatic transfer switch, instance 1	ATSABTC1	ATSABTC1	ATSABTC1
Condition monitoring			
Circuit-breaker condition monitoring, instance 1	SSCBR1	CBCM (1)	CBCM (1)
Circuit-breaker condition monitoring, instance 2	SSCBR2	CBCM (2)	CBCM (2)
Trip circuit supervision, instance 1	TCSSCBR1	TCS (1)	TCM (1)
Trip circuit supervision, instance 2	TCSSCBR2	TCS (2)	TCM (2)
Fuse failure supervision, instance 1	SEQSPVC1	FUSEF (1)	60 (1)
Fuse failure supervision, instance 2	SEQSPVC2	FUSEF (1)	60 (1)
Runtime counter for machines and devices, instance 1	MDSOPT1	OPTS (1)	OPTM (1)
Voltage presence, instance 1	PHSVPR1	PHSVPR(1)	PHSVPR(1)
Voltage presence, instance 2	PHSVPR2	PHSVPR(2)	PHSVPR(2)

Table continues on next page

Function	IEC 61850	IEC 60617	IEC-ANSI
Measurement			
Three-phase current measurement, instance 1	CMMXU1	3I (1)	3I (1)
Three-phase current measurement, instance 2	CMMXU2	3I (2)	3I (2)
Sequence current measurement, instance 1	CSMSQI1	I1, I2, I0 (1)	I1, I2, I0 (1)
Sequence current measurement, instance 2	CSMSQI2	I1, I2, I0 (2)	I1, I2, I0 (2)
Residual current measurement, instance 1	RESCMMXU1	Io (1)	In (1)
Three-phase voltage measurement, instance 1	VMMXU1	3U (1)	3V (1)
Three-phase voltage measurement, instance 2	VMMXU2	3U (2)	3V (2)
Residual voltage measurement, instance 1	RESVMMXU1	Uo (1)	Vn (1)
Sequence voltage measurement, instance 1	VSMSQI1	U1, U2, U0 (1)	V1, V2, V0 (1)
Sequence voltage measurement, instance 2	VSMSQI2	U1, U2, U0 (2)	V1, V2, V0 (2)
Three-phase power and energy measurement, instance 1	PEMMXU1	P, E (1)	P, E (1)
Three-phase power and energy measurement, instance 2	PEMMXU2	P, E (2)	P, E (2)
Single-phase power and energy measurement, instance 1	SPEMMXU1	SP, SE (1)	SP, SE (1)
Single-phase power and energy measurement, instance 2	SPEMMXU2	SP, SE (2)	SP, SE (2)
Frequency measurement, instance 1	FMMXU1	f (1)	f (1)
Frequency measurement, instance 2	FMMXU2	f (2)	f (2)
Load profile record, instance 1	LDPRLRC1	LOADPROF (1)	LOADPROF (1)
Other			
Minimum pulse timer (2 pcs), instance 1	TPGAPC1	TP (1)	TP (1)
Minimum pulse timer (2 pcs), instance 2	TPGAPC2	TP (2)	TP (2)
Minimum pulse timer (2 pcs, second resolution), instance 1	TPSGAPC1	TPS (1)	TPS (1)
Minimum pulse timer (2 pcs, minute resolution), instance 1	TPMGAPC1	TPM (1)	TPM (1)
Pulse timer (8 pcs), instance 1	PTGAPC1	PT (1)	PT (1)
Pulse timer (8 pcs), instance 2	PTGAPC2	PT (2)	PT (2)
Time delay off (8 pcs), instance 1	TOFGAPC1	TOF (1)	TOF (1)
Time delay off (8 pcs), instance 2	TOFGAPC2	TOF (2)	TOF (2)
Time delay on (8 pcs), instance 1	TONGAPC1	TON (1)	TON (1)

Table continues on next page

Function	IEC 61850	IEC 60617	IEC-ANSI
Time delay on (8 pcs), instance 2	TONGAPC2	TON (2)	TON (2)
Set-reset (8 pcs), instance 1	SRGAPC1	SR (1)	SR (1)
Set-reset (8 pcs), instance 2	SRGAPC2	SR (2)	SR (2)
Move (8 pcs), instance 1	MVGAPC1	MV (1)	MV (1)
Move (8 pcs), instance 2	MVGAPC2	MV (2)	MV (2)
Move (8 pcs), instance 3	MVGAPC3	MV (3)	MV (3)
Move (8 pcs), instance 4	MVGAPC4	MV (4)	MV (4)
Move (8 pcs), instance 5	MVGAPC5	MV (5)	MV (5)
Move (8 pcs), instance 6	MVGAPC6	MV (6)	MV (6)
Move (8 pcs), instance 7	MVGAPC7	MV (7)	MV (7)
Move (8 pcs), instance 8	MVGAPC8	MV (8)	MV (8)
Generic control point (16 pcs), instance 1	SPCGAPC1	SPC (1)	SPC (1)
Generic control point (16 pcs), instance 2	SPCGAPC2	SPC (2)	SPC (2)
Remote generic control points, instance 1	SPCRGAPC1	SPCR (1)	SPCR (1)
Local generic control points, instance 1	SPCLGAPC1	SPCL (1)	SPCL (1)
Generic up-down counters, instance 1	UDFCNT1	UDCNT (1)	UDCNT (1)
Generic up-down counters, instance 2	UDFCNT2	UDCNT (2)	UDCNT (2)
Generic up-down counters, instance 3	UDFCNT3	UDCNT (3)	UDCNT (3)
Analog value scaling, instance 1	SCA4GAPC1	SCA4 (1)	SCA4 (1)
Analog value scaling, instance 2	SCA4GAPC2	SCA4 (2)	SCA4 (2)
Analog value scaling, instance 3	SCA4GAPC3	SCA4 (3)	SCA4 (3)
Analog value scaling, instance 4	SCA4GAPC4	SCA4 (4)	SCA4 (4)
Analog value scaling, instance 5	SCA4GAPC5	SCA4 (5)	SCA4 (5)
Analog value scaling, instance 6	SCA4GAPC6	SCA4 (6)	SCA4 (6)
Analog value scaling, instance 7	SCA4GAPC7	SCA4 (7)	SCA4 (7)
Analog value scaling, instance 8	SCA4GAPC8	SCA4 (8)	SCA4 (8)
Analog value scaling, instance 9	SCA4GAPC9	SCA4 (9)	SCA4 (9)
Analog value scaling, instance 10	SCA4GAPC10	SCA4 (10)	SCA4 (10)
Analog value scaling, instance 11	SCA4GAPC11	SCA4 (11)	SCA4 (11)
Analog value scaling, instance 12	SCA4GAPC12	SCA4 (12)	SCA4 (12)
Integer value move, instance 1	MVI4GAPC1	MVI4 (1)	MVI4 (1)
Integer value move, instance 2	MVI4GAPC2	MVI4 (2)	MVI4 (2)
Daily timer function, instance 1	DTMGAPC1	DTMGAPC1	DTMGAPC1
Daily timer function, instance 2	DTMGAPC2	DTMGAPC2	DTMGAPC2
Programmable buttons (4 buttons)	FKEY4GGIO1	FKEY4GGIO1	FKEY4GGIO1

Table continues on next page

Function	IEC 61850	IEC 60617	IEC-ANSI
Logging functions			
Disturbance recorder	RDRE1	DR (1)	DFR (1)
Fault record	FLTRFRC1	FAULTREC (1)	FAULTREC (1)

Section 2 Modbus data mappings

2.1 Overview

This document describes the Modbus data points and structures available in the protection relay. The point lists describe a superset of all data available through the standard configuration/s including the optional functionalities.

The majority of the Modbus data points are valid for all standard configurations. Some data points are standard configuration-dependent or optional application-dependent and thus not available in each protection relay. The unavailable, that means, unused, data points always return value 0 when they are read. The configuration-dependent and optional data do not overlap.

2.2 Supported functions

2.2.1 Supported functions in REC615

Table 2: Supported functions

Function	IEC 61850	A	B	C	E	F	G	H
		CE01	CE02	CE03	CE04	CE05	CE06	CE07
Protection								
Three-phase non-directional overcurrent protection, low stage	PHLPTOC	(1)	(1)	(1)	(1)			
	FPHLPTOC	(1)	(1)	(1)	(1)			
Three-phase non-directional overcurrent protection, high stage	PHHPTOC	(1)	(1)	(1)	(1)			
Three-phase non-directional overcurrent protection, instantaneous stage	PHIPTOC	1	1	1	1	1	2[14)]	2[14)]
Three-phase directional overcurrent protection, low stage	DPHLPDOC	(2)	(2)	(2)	(2)	2[1)]	4[1)2)3)]	4[1)2)3)]
	FDPHLPDOC	(2)	(2)	(2)	(2)			
Three-phase directional overcurrent protection, high stage	DPHHPDOC	(1)	(1)	(1)	(1)	2[1)]	4[1)2)3)]	4[1)2)3)]
Non-directional earth-fault protection, low stage	EFLPTOC	(1)	(1)	(1)	(1)[4)]			
	FEFLPTOC	(1)	(1)	(1)	(1)[4)]			
Non-directional earth-fault protection, high stage	EFHPTOC	(1)	(1)	(1)	(1)[4)]			
Non-directional earth-fault protection, instantaneous stage	EFIPTOC	1	1	1	1[4)]	1	1	1

Table continues on next page

Function	IEC 61850	A	B	C	E	F	G	H
		CE01	CE02	CE03	CE04	CE05	CE06	CE07
Directional earth-fault protection, low stage	DEFLPDEF	(2)[5]	(2)[5]	(2)[5]	(2)[4][5]	2[1]	4[1][2][3][6][7][8]	4[1][2][3][6][7][8]
	FDEFLPDEF	(2)[5]	(2)[5]	(2)[5]	(2)[4][5]			
Directional earth-fault protection, high stage	DEFHPDEF	(1)[5]	(1)[5]	(1)[5]	(1)[4][5]	2[1]	4[1][2][3][6][7][8]	4[1][2][3][6][7][8]
Transient / intermittent earth-fault protection	INTRPTEF	(1)[5]	(1)[5]	(1)[5]	(1)[4][5]			
Admittance-based earth-fault protection[5]	EFPADM	(3)[5]	(3)[5]	(3)[5]	(3)[4][5]			
Wattmetric-based earth-fault protection[5]	WPWDE	(3)[5]	(3)[5]	(3)[5]	(3)[4][5]			
Harmonics-based earth-fault protection[5]	HAEFPTOC	(1)	(1)	(1)	(1)[4]			
Multifrequency admittance-based earth-fault protection	MFADPSDE	(1)[5]	(1)[5]	(1)[5]	(1)[4][5]	1[1]	2[1][9][10][11]	2[1][9][10][11]
Negative-sequence overcurrent protection	NSPTOC	2	2	2	2			
Phase discontinuity protection	PDNSPTOC	1	1	1	1	1	1	1
Residual overvoltage protection	ROVPTOV	(1)[5]	(2)[9][10]	(1)[5]	(2)[9][10]	1[1]	2[1][9][10]	2[1][9][10]
Three-phase undervoltage protection	PHPTUV	(3)	(3)[12]	(3)	(3)[12]	1[1]	2[1][13]	2[1][13]
Three-phase overvoltage protection	PHPTOV	(3)	(3)[12]	(3)	(3)[12]	1[1]	2[1][13]	2[1][13]
Positive-sequence undervoltage protection	PSPTUV	(1)	(1)	(1)	(1)			
Negative-sequence overvoltage protection	NSPTOV	(1)	(1)	(1)	(1)			
Loss of phase (undercurrent)	PHPTUC						2[14]	2[14]
Frequency protection	FRPFRQ	(2)	(2)	(2)	(2)	1[1]	2[1][13]	2[1][13]
Three-phase thermal protection for feeders, cables and distribution transformers	T1PTTR	1	1	1	1	1	1	1
Circuit breaker failure protection	CCBRBRF	2	2	2	2[4]	1	2[11][14]	2[11][14]
Three-phase inrush detector	INRPHAR	1	1	1	1	1	1	1
Master trip	TRPPTRC	2	2	2	2	2	2	2
Multipurpose protection[15]	MAPGAPC	6	6	6	6	2	2	2
Load-shedding and restoration	LSHDPFRQ	(1)	(1)	(1)	(1)	1[1]	2[1][13]	2[1][13]
Fault locator	SCEFRFLO	(1)	(1)	(1)	(1)	1[1]	1[1]	1[1]
Three-phase power directional element	DPSRDIR	1	1	1	1	1	2	2
Power quality								
Current total demand distortion	CMHAI	(1)	(1)	(1)	(1)			
Voltage total harmonic distortion	VMHAI	(1)	(1)	(1)	(1)			
Voltage variation	PHQVVR	(1)	(1)	(1)	(1)			
Voltage unbalance	VSQVUB	(1)	(1)	(1)	(1)			
Control								
Circuit-breaker control	CBXCBR	2	2	2	2	1	2	2
Disconnector control	DCXSWI	8	8	8	8	4	8	8
Disconnector position indication	DCSXSWI	2	2	2	2	1	2	2

Table continues on next page

Function	IEC 61850	A	B	C	E	F	G	H
		CE01	CE02	CE03	CE04	CE05	CE06	CE07
Earthing switch indication	ESSXSWI	8	8	8	8	4	8	8
Autoreclosing	DARREC	(1)	(1)	(1)	(1)	1[1)]	2[1)]	2[1)]
Synchronism and energizing check	SECRSYN		1		1	1		
Automatic transfer switch	ATSABTC	(1)	(1)	(1)	(1)	1[1)]	1[1)]	1[1)]
Condition monitoring								
Circuit-breaker condition monitoring	SSCBR	2	2	2	2	1	2[14)]	2[14)]
Trip circuit supervision	TCSSCBR	2	2	2	2	2	2	2
Fuse failure supervision	SEQSPVC	1	1	1	1	1	2[13)14)]	2[13)14)]
Runtime counter for machines and devices	MDSOPT	1	1	1	1			
Voltage presence	PHSVPR	1	2[13)]	1	2[13)]	1	2[13)]	2[13)]
Measurement								
Three-phase current measurement	CMMXU	1	1	1	1	1	2[14)]	2[14)]
Sequence current measurement	CSMSQI	1	1	1	1	1	2[14)]	2[14)]
Residual current measurement	RESCMMXU	1	1	1		1	1	1
Three-phase voltage measurement	VMMXU	1	2[13)]	1	2[13)]	2[13)]	2[13)]	2[13)]
Residual voltage measurement	RESVMMXU					1		
Sequence voltage measurement	VSMSQI	1	2[13)]	1	2[13)]		2[13)]	2[13)]
Three-phase power and energy measurement	PEMMXU	1	1	1	1	1	2[13)14)]	2[13)14)]
Single-phase power and energy measurement	SPEMMXU	1	1	1	1	1	2[13)14)]	2[13)14)]
Frequency measurement	FMMXU	1	2[13)]	1	2[13)]	1	2[13)]	2[13)]
Load profile record	LDPRLRC	1	1	1	1	1	1	1
Other								
Minimum pulse timer (2 pcs)	TPGAPC	2	2	2	2	2	2	2
Minimum pulse timer (2 pcs, second resolution)	TPSGAPC	1	1	1	1	1	1	1
Minimum pulse timer (2 pcs, minute resolution)	TPMGAPC	1	1	1	1	1	1	1
Pulse timer (8 pcs)	PTGAPC	2	2	2	2	2	2	2
Time delay off (8 pcs)	TOFGAPC	2	2	2	2	2	2	2
Time delay on (8 pcs)	TONGAPC	2	2	2	2	2	2	2
Set-reset (8 pcs)	SRGAPC	2	2	2	2	2	2	2
Move (8 pcs)	MVGAPC	8	8	8	8	8	8	8
Generic control point (16 pcs)	SPCGAPC	2	2	2	2	2	2	2
Remote generic control points	SPCRGAPC	1	1	1	1	1	1	1
Local generic control points	SPCLGAPC	1	1	1	1	1	1	1
Generic up-down counters	UDFCNT	3	3	3	3	3	3	3
Analog value scaling	SCA4GAPC	12	12	12	12	12	12	12
Integer value move	MVI4GAPC	2	2	2	2	2	2	2
Daily timer function	DTMGAPC	2	2	2	2	2	2	2
Programmable buttons (4 buttons)	FKEY4GGIO	1	1	1	1	1	1	1

Table continues on next page

Function	IEC 61850	A	B	C	E	F	G	H
		CE01	CE02	CE03	CE04	CE05	CE06	CE07
Logging functions								
Disturbance recorder	RDRE	1	1	1	1	1	1	1
Fault record	FLTRFRC	1	1	1	1	1	1	1
1, 2, ... = number of included instances () = optional								

1) Specific functional package to be selected for functional package 1 (G,H), 2 (C,D) and 3 (D)
2) Voltage group B always used with the third and fourth instances
3) Current group B always used with the third and fourth instances
4) Io calculated is always used
5) Uo calculated is always used
6) Uo calculated is always used with the first and second instances
7) UoB calculated is always used with the third and fourth instances
8) IoB calculated is always used with the third and fourth instances
9) Uo calculated is always used with the first instance
10) UoB calculated is always used with the second instance
11) IoB calculated is always used with the second instance
12) Voltage group B always used with the third instance
13) Voltage group B always used with the second instance
14) Current group B always used with the second instance
15) UoB calculated is always used

2.2.2 Supported functions in RER615

Table 3: Supported functions

Function	IEC 61850	IEC 60617	IEC-ANSI	A	D	E
				RE01	RE02	RE03
Protection						
Three-phase non-directional overcurrent protection, low stage	PHLPTOC	3I>	51P-1	(1)	(1)	(1)
	FPHLPTOC	F3I>	F51P-1	(1)	(1)	(1)
Three-phase non-directional overcurrent protection, high stage	PHHPTOC	3I>>	51P-2	(1)	(1)	(1)
Three-phase non-directional overcurrent protection, instantaneous stage	PHIPTOC	3I>>>	50P/51P	1	1	1
Three-phase directional overcurrent protection, low stage	DPHLPDOC	3I> ->	67-1	(2)	(2)	(2)
	FDPHLPDOC	F3I> ->	F67-1	(2)	(2)	(2)
Three-phase directional overcurrent protection, high stage	DPHHPDOC	3I>> ->	67-2	(1)	(1)	(1)
Non-directional earth-fault protection, low stage	EFLPTOC	Io>	51N-1	(1)	(1)	(1)[1)]
	FEFLPTOC	FIo>	F51N-1	(1)	(1)	(1)[1)]
Non-directional earth-fault protection, high stage	EFHPTOC	Io>>	51N-2	(1)	(1)	(1)[1)]
Non-directional earth-fault protection, instantaneous stage	EFIPTOC	Io>>>	50N/51N	1	1	1[1)]
Directional earth-fault protection, low stage	DEFLPDEF	Io> ->	67N-1	(2)[2)]	(2)[2)]	(2)[1)2)]
	FDEFLPDEF	FIo> ->	F67N-1	(2)[2)]	(2)[2)]	(2)[1)2)]
Directional earth-fault protection, high stage	DEFHPDEF	Io>> ->	67N-2	(1)[2)]	(1)[2)]	(1)[1)2)]

Table continues on next page

Function	IEC 61850	IEC 60617	IEC-ANSI	A	D	E
				RE01	RE02	RE03
Transient / intermittent earth-fault protection	INTRPTEF	Io> -> IEF	67NIEF	(1)[2)]	(1)[2)]	(1)[1)2)]
Admittance-based earth-fault protection	EFPADM	Yo> ->	21YN	(3)[2)]	(3)[2)]	(3)[1)2)]
Wattmetric-based earth-fault protection	WPWDE	Po> ->	32N	(3)[2)]	(3)[2)]	(3)[1)2)]
Harmonics-based earth-fault protection	HAEFPTOC	Io>HA	51NHA	(1)	(1)	(1)[1)]
Multifrequency admittance-based earth-fault protection	MFADPSDE	Io> -> Y	67YN	(1)[2)]	(1)[2)]	(1)[1)2)]
Negative-sequence overcurrent protection	NSPTOC	I2>	46	2	2	2
Phase discontinuity protection	PDNSPTOC	I2/I1>	46PD	1	1	1
Residual overvoltage protection	ROVPTOV	Uo>	59G	(1)[2)]	(2)[3)4)]	(2)[3)4)]
Three-phase undervoltage protection	PHPTUV	3U<	27	(3)	(3)[5)]	(3)[5)]
Three-phase overvoltage protection	PHPTOV	3U>	59	(3)	(3)[5)]	(3)[5)]
Positive-sequence undervoltage protection	PSPTUV	U1<	47U+	(1)	(1)	(1)
Negative-sequence overvoltage protection	NSPTOV	U2>	47O-	(1)	(1)	(1)
Frequency protection	FRPFRQ	f>/f<,df/dt	81	(2)	(2)	(2)
Three-phase thermal protection for feeders, cables and distribution transformers	T1PTTR	3Ith>F	49F	1	1	1
Circuit breaker failure protection	CCBRBRF	3I>/Io>BF	51BF/51NBF	2	2	2[1)]
Three-phase inrush detector	INRPHAR	3I2f>	68	1	1	1
Master trip	TRPPTRC	Master Trip	94/86	2	2	2
Multipurpose protection	MAPGAPC	MAP	MAP	6	6	6
Load-shedding and restoration	LSHDPFRQ	UFLS/R	81LSH	(1)	(1)	(1)
Fault locator	SCEFRFLO	FLOC	21FL	(1)	(1)	(1)
Three-phase power directional element	DPSRDIR	I1->	32P	1	1	1
Power quality						
Current total demand distortion	CMHAI	PQM3I	PQM3I	(1)	(1)	(1)
Voltage total harmonic distortion	VMHAI	PQM3U	PQM3V	(1)	(1)	(1)
Voltage variation	PHQVVR	PQMU	PQMV	(1)	(1)	(1)
Voltage unbalance	VSQVUB	PQUUB	PQVUB	(1)	(1)	(1)
Control						
Circuit-breaker control	CBXCBR	I <-> O CB	I <-> O CB	2	2	2
Disconnector control	DCXSWI	I <-> O DCC	I <-> O DCC	8	8	8
Disconnector position indication	DCSXSWI	I <-> O DC	I <-> O DC	2	2	2
Earthing switch indication	ESSXSWI	I <-> O ES	I <-> O ES	8	8	8
Autoreclosing	DARREC	O -> I	79	1	1	1
Synchronism and energizing check	SECRSYN	SYNC	25		1	1
Automatic transfer switch	ATSABTC	ATSABTC1	ATSABTC1	(1)	(1)	(1)
Condition monitoring						
Circuit-breaker condition monitoring	SSCBR	CBCM	CBCM	2	2	2
Trip circuit supervision	TCSSCBR	TCS	TCM	2	2	2

Table continues on next page

Function	IEC 61850	IEC 60617	IEC-ANSI	A	D	E
				RE01	RE02	RE03
Fuse failure supervision	SEQSPVC	FUSEF	60	1	1	1
Runtime counter for machines and devices	MDSOPT	OPTS	OPTM	1	1	1
Voltage presence	PHSVPR	PHSVPR	PHSVPR	1	2[6)]	2[6)]
Measurement						
Three-phase current measurement	CMMXU	3I	3I	1	1	1
Sequence current measurement	CSMSQI	I1, I2, I0	I1, I2, I0	1	1	1
Residual current measurement	RESCMMXU	Io	In	1	1	
Three-phase voltage measurement	VMMXU	3U	3V	1	2[6)]	2[6)]
Sequence voltage measurement	VSMSQI	U1, U2, U0	V1, V2, V0	1	2[6)]	2[6)]
Three-phase power and energy measurement	PEMMXU	P, E	P, E	1	1	1
Single-phase power and energy measurement	SPEMMXU	SP, SE	SP, SE	1	1	1
Frequency measurement	FMMXU	f	f	1	2[6)]	2[6)]
Load profile record	LDPRLRC	LOADPROF	LOADPROF	1	1	1
Other						
Minimum pulse timer (2 pcs)	TPGAPC	TP	TP	2	2	2
Minimum pulse timer (2 pcs, second resolution)	TPSGAPC	TPS	TPS	1	1	1
Minimum pulse timer (2 pcs, minute resolution)	TPMGAPC	TPM	TPM	1	1	1
Pulse timer (8 pcs)	PTGAPC	PT	PT	2	2	2
Time delay off (8 pcs)	TOFGAPC	TOF	TOF	2	2	2
Time delay on (8 pcs)	TONGAPC	TON	TON	2	2	2
Set-reset (8 pcs)	SRGAPC	SR	SR	2	2	2
Move (8 pcs)	MVGAPC	MV	MV	8	8	8
Generic control point (16 pcs)	SPCGAPC	SPC	SPC	2	2	2
Remote generic control points	SPCRGAPC	SPCR	SPCR	1	1	1
Local generic control points	SPCLGAPC	SPCL	SPCL	1	1	1
Generic up-down counters	UDFCNT	UDCNT	UDCNT	3	3	3
Analog value scaling	SCA4GAPC	SCA4	SCA4	12	12	12
Integer value move	MVI4GAPC	MVI4	MVI4	2	2	2
Daily timer function	DTMGAPC	DTMGAPC1	DTMGAPC1	2	2	2
Programmable buttons (4 buttons)	FKEY4GGIO	FKEY4GGIO 1	FKEY4GGIO 1	1	1	1
Logging functions						
Disturbance recorder	RDRE	DR	DFR	1	1	1
Fault record	FLTRFRC	FAULTREC	FAULTREC	1	1	1
1, 2, ... = number of included instances () = optional						

1) Io calculated is always used
2) Uo calculated is always used
3) Uo calculated is always used with the first instance
4) UoB calculated is always used with the second instance
5) Voltage group B is always used with the third instance
6) Voltage group B is always used with the second instance

2.3 Indications

Table 4: Explanations of the indications table columns

Column name	Description
BitA	Default 0X and 1X bit address for the data.
RegA	Default 3X and 4X register.bit (00-15) address for the data.
IEC 61850 name	Original IED data object identification. Described in the IEC 61850 format as Logical Device.Logical Node and thereafter .Data Object.Data Attribute. Logical Node is the same as the application function block name.
SA name	The signal may have a defined label that is visible, for example, in the Application Configuration tool in PCM600.
Description	Short description of the signal. See the technical manual for more information.
Value	Meaning of the value states.

2.3.1 Common data 1

Table 5: Common data 1

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.LLN0			
2720	170.00	.Loc.stVal	-	Remote/Local state	0/1=Rem/Loc
2721	170.01	.LocKeyHMI.stVal.Station	-	Station state	1=Station
		DR.RDRE1			
2722	170.02	.RcdMade.stVal	-	DR recording made	1=Made
2723	170.03	.mcd			

2.3.2 LD0.ATSABTC1 Automatic transfer switch (1)

Table 6: LD0.ATSABTC1 Automatic transfer switch (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.ATSABTC1			
4016	251.00	.OpOpn1.general	OPEN_CB1	CB open cmd for bus 1	1=Open cmd
4017	251.01	.mcd			
4018	251.02	.OpCls1.general	CLOSE_CB1	CB close cmd for bus 1	1=Close cmd
4019	251.03	.mcd			
4020	251.04	.OpOpn2.general	OPEN_CB2	CB open cmd for bus 2	1=Open cmd
4021	251.05	.mcd			
4022	251.06	.OpCls2.general	CLOSE_CB2	CB close cmd for bus 2	1=Close cmd
4023	251.07	.mcd			
4024	251.08	.TrnBlkAlm.stVal	BLKD_AL	ATS blocked alarm	1=Blocked

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
4025	251.09	.mcd			
4026	251.10	.PrgAuto.stVal	INPRO	ATS in progress	1=In progress
4027	251.11	.mcd			

2.3.3 CTRL.CBCILO1 Circuit breaker enable signals (1)

Table 7: CTRL.CBCILO1 Circuit breaker enable signals (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.CBCILO1			
2824	176.08	.EnaOpn.stVal	ENA_OPEN	Open enabled	1=Enabled
2825	176.09	.EnaCls.stVal	ENA_CLOSE	Close enabled	1=Enabled

2.3.4 CTRL.CBCSWI1 Circuit breaker (1) mom. position

Table 8: CTRL.CBCSWI1 Circuit breaker (1) mom. position

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.CBCSWI1	POSITION		
2804	175.04	.Pos.stVal.Close	-	Close bit	1=Close
2805	175.05	.Pos.stVal.Open	-	Open bit	1=Open
2806	175.06	.Pos.stVal.Fault	-	Fault bit	1=Pos(00/11)
2834	177.02	.SynItlByps.stVal	ITL_BYPASS	Interlock bypass	1=Bypass
2835	177.03	.mcd			

2.3.5 CTRL.CBCSWI1 Circuit breaker (1) mom+mcd position

Table 9: CTRL.CBCSWI1 Circuit breaker (1) mom+mcd position

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.CBCSWI1	POSITION		
2816	176.00	.Pos.stVal.Close		Close bit	1=Close
2817	176.01	.mcd			
2818	176.02	.Pos.stVal.Open		Open bit	1=Open
2819	176.03	.mcd			
2820	176.04	< reserved >			
2821	176.05	< reserved >			
2822	176.06	.Pos.stSeld	SELECTED	CB selected for control	1=Selected
2823	176.07	.mcd			

2.3.6 CTRL.CBXCBR1 Circuit-breaker control (1)

Table 10: CTRL.CBXCBR1 Circuit-breaker control (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.CBXCBR1			
2836	177.04	.BlkOpn.stVal	BLK_OPEN	Open blocked	1=Blocked
2837	177.05	.mcd			
2838	177.06	.BlkCls.stVal	BLK_CLOSE	Close blocked	1=Blocked
2839	177.07	.mcd			

2.3.7 LD0.CMHAI1 Current total demand distortion (1)

Table 11: LD0.CMHAI1 Current total demand distortion (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.CMHAI1			
3316	207.04	.Alm.stVal	ALARM		1=Alarm
3317	207.05	.mcd			

2.3.8 LD0.CMMXU1 Three-phase current measurement (1)

Table 12: LD0.CMMXU1 Three-phase current measurement (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.CMMXU1			
2752	172.00	.HiAlm.stVal	HIGH_ALARM	High alarm	1=Alarm
2753	172.01	.mcd			
2754	172.02	.HiWrn.stVal	HIGH_WARN	High warning	1=Warning
2755	172.03	.mcd			
2756	172.04	.LoWrn.stVal	LOW_WARN	Low warning	1=Warning
2757	172.05	.mcd			
2758	172.06	.LoAlm.stVal	LOW_ALARM	Low alarm	1=Alarm
2759	172.07	.mcd			

2.3.9 LD0.DARREC1 Autoreclosing state (1)

Table 13: LD0.DARREC1 Autoreclosing state (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DARREC1			
2724	170.04	.AutoRecOn.stVal	AR_ON	AutoRecloser state	0/1=Off/On
2725	170.05	.mcd			

2.3.10 LD0.DARREC1 Autoreclosing (1)

Table 14: LD0.DARREC1 Autoreclosing (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DARREC1			
3040	190.00	.PrgRec.stVal	INPRO	AR in progess	1=In progress
3041	190.01	.mcd			
3042	190.02	.PrgRec1.stVal	INPRO_1	1st shot in progess	1=In progress
3043	190.03	.mcd			
3044	190.04	.PrgRec2.stVal	INPRO_2	2nd shot in progess	1=In progress
3045	190.05	.mcd			
3046	190.06	.PrgRec3.stVal	INPRO_3	3rd shot in progess	1=In progress
3047	190.07	.mcd			
3048	190.08	.PrgRec4.stVal	INPRO_4	4th shot in progess	1=In progress
3049	190.09	.mcd			
3050	190.10	.PrgRec5.stVal	INPRO_5	5th shot in progess	1=In progress
3051	190.11	.mcd			
3052	190.12	.SucRec.stVal	SUC_RECL	Successful AR	1=Success
3053	190.13	.mcd			
3054	190.14	.UnsRec.stVal	UNSUC_RECL	Unsuccessful AR	1=Unsuccess
3055	190.15	.mcd			
3056	191.00	< reserved >			
3057	191.01	< reserved >			
3058	191.02	< reserved >			
3059	191.03	< reserved >			
3060	191.04	.LO.stVal	LOCKED	Lockout status	1=Lockout
3061	191.05	.mcd			
3062	191.06	.RdyRec.stVal	READY	Reclose ready	1=Ready
3063	191.07	.mcd			
3064	191.08	.ActRec.stVal	ACTIVE	Reclose active	1=Active
3065	191.09	.mcd			
3066	191.10	.PrgDsr.stVal	DISCR_INPRO	Discr.time in progress	1=In progress
3067	191.11	.mcd			
3068	191.12	.PrgCutOut.stVal	CUTOUT_INPRO	Cutout time in progress	1=In progress
3069	191.13	.mcd			
3070	191.14	.FrqOpAlm.stVal	FRQ_OP_ALM	Frequent op. Alarm	1=Alarm
3071	191.15	.mcd			
3072	192.00	.RclTmStr.stVal		Reclaim time started	
3073	192.01	.mcd			
3074	192.02	.ProCrd.stVal		Protection coordination	1=In progress

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
3075	192.03	.mcd			
3076	192.04	.CBManCls.stVal	MAN_CB_CL	CB manually closed	1=CB closed
3077	192.05	.mcd			
3078	192.06	.OpCls.general	CLOSE_CB	Operate (close XCBR)	1=Close CB
3079	192.07	.mcd			
3080	192.08	.OpOpn.general	OPEN_CB	Operate (open XCBR)	1=Open CB
3081	192.09	.mcd			
3082	192.10	.UnsCBCls.stVal	UNSUC_CB	CB closing failed	1=Failed
3083	192.11	.mcd			
3084	192.12	.WtMstr.stVal	CMD_WAIT	Master signal to follower	1=Signal
3085	192.13	.mcd			

2.3.11 CTRL.DCXSWI1 Disconnector control (1)

Table 15: CTRL.DCXSWI1 Disconnector control (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.DCXSWI1	POSITION		
3472	217.00	.Pos.stVal.Close	-	Close bit	1=Close
3473	217.01	.Pos.stVal.Open	-	Open bit	1=Open
3474	217.02	.Pos.stVal.Fault	-	Fault bit	1=Pos(00/11)
3475	217.03	.Pos.stSeld	-	Control selected	1=Selected
		CTRL.DCCILO1			
3476	217.04	.EnaOpn.stVal	ENA_OPEN	Open enabled	1=Enabled
3477	217.05	.EnaCls.stVal	ENA_CLOSE	Close enabled	1=Enabled
		CTRL.DCXSWI1			
3478	217.06	.BlkOpn.stVal	BLK_OPEN	Open blocked	1=Blocked
3479	217.07	.mcd			
3480	217.08	.BlkCls.stVal	BLK_CLOSE	Close blocked	1=Blocked
3481	217.09	.mcd			
		CTRL.DCCILO1			
3482	217.10	.ItlByps.stVal	ITL_BYPASS	Interlock bypass	1=Bypass
3483	217.11	.mcd			

2.3.12 CTRL.DCXSWI2 Disconnector control (2)

Table 16: CTRL.DCXSWI2 Disconnector control (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.DCXSWI2	POSITION		
3484	217.12	.Pos.stVal.Close	-	Close bit	1=Close
3485	217.13	.Pos.stVal.Open	-	Open bit	1=Open
3486	217.14	.Pos.stVal.Fault	-	Fault bit	1=Pos(00/11)
3487	217.15	.Pos.stSeld	-	Control selected	1=Selected
		CTRL.DCCILO2			
3488	218.00	.EnaOpn.stVal	ENA_OPEN	Open enabled	1=Enabled
3489	218.01	.EnaCls.stVal	ENA_CLOSE	Close enabled	1=Enabled
		CTRL.DCXSWI2			
3490	218.02	.BlkOpn.stVal	BLK_OPEN	Open blocked	1=Blocked
3491	218.03	.mcd			
3492	218.04	.BlkCls.stVal	BLK_CLOSE	Close blocked	1=Blocked
3493	218.05	.mcd			
		CTRL.DCCILO2			
3494	218.06	.ItlByps.stVal	ITL_BYPASS	Interlock bypass	1=Bypass
3495	218.07	.mcd			

2.3.13 CTRL.DCXSWI3 Disconnector control (3)

Table 17: CTRL.DCXSWI3 Disconnector control (3)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.DCCSWI3			
3440	215.00	.Pos.stVal.Close	POSITION	Close bit	1=Close
3441	215.01	.Pos.stVal.Open		Open bit	1=Open
3442	215.02	.Pos.stVal.Fault		Fault bit	1= Pos is 11 or 00
3443	215.03	.Pos.stSeld		Control selected	1=Selected
		CTRL.DCCILO3			
3444	215.04	.EnaOpn.stVal	ENA_OPEN	Open enabled	1=Enabled
3445	215.05	.EnaCls.stVal	ENA_CLOSE	Close enabled	1=Enabled
		CTRL.DCXSWI3			
3446	215.06	.BlkOpn.stVal	BLK_OPEN	Open blocked	1=Blocked
3447	215.07	.mcd			
3448	215.08	.BlkCls.stVal	BLK_CLOSE	Close blocked	1=Blocked
3449	215.09	.mcd			
		CTRL.DCCILO3			
3450	215.10	.ItlByps.stVal	ITL_BYPASS	Interlock bypass	1=Bypassed
3451	215.11	.mcd			

2.3.14 CTRL.DCXSWI4 Disconnector control (4)

Table 18: CTRL.DCXSWI4 Disconnector control (4)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.DCCSWI4			
3452	215.12	.Pos.stVal.Close	POSITION	Close bit	1=Close
3453	215.13	.Pos.stVal.Open		Open bit	1=Open
3454	215.14	.Pos.stVal.Fault		Fault bit	1= Pos is 11 or 00
3455	215.15	.Pos.stSeld		Control selected	1=Selected
		CTRL.DCCILO4			
3456	216.00	.EnaOpn.stVal	ENA_OPEN	Open enabled	1=Enabled
3457	216.01	.EnaCls.stVal	ENA_CLOSE	Close enabled	1=Enabled
		CTRL.DCXSWI4			
3458	216.02	.BlkOpn.stVal	BLK_OPEN	Open blocked	1=Blocked
3459	216.03	.mcd			
3460	216.04	.BlkCls.stVal	BLK_CLOSE	Close blocked	1=Blocked
3461	216.05	.mcd			
		CTRL.DCCILO4			
3462	216.06	.ItlByps.stVal	ITL_BYPASS	Interlock bypass	1=Bypassed
3463	216.07	.mcd			

2.3.15 CTRL.DCXSWI5 Disconnector control (5)

Table 19: CTRL.DCXSWI5 Disconnector control (5)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.DCCSWI5			
3392	212.00	.Pos.stVal.Close	POSITION	Close bit	1=Close
3393	212.01	.Pos.stVal.Open		Open bit	1=Open
3394	212.02	.Pos.stVal.Fault		Fault bit	1= Pos is 11 or 00
3395	212.03	.Pos.stSeld		Control selected	1=Selected
		CTRL.DCCILO5			
3396	212.04	.EnaOpn.stVal	ENA_OPEN	Open enabled	1=Enabled
3397	212.05	.EnaCls.stVal	ENA_CLOSE	Close enabled	1=Enabled
		CTRL.DCXSWI5			
3398	212.06	.BlkOpn.stVal	BLK_OPEN	Open blocked	1=Blocked
3399	212.07	.mcd			
3400	212.08	.BlkCls.stVal	BLK_CLOSE	Close blocked	1=Blocked
3401	212.09	.mcd			
		CTRL.DCCILO5			
3402	212.10	.ItlByps.stVal	ITL_BYPASS	Interlock bypass	1=Bypassed
3403	212.11	.mcd			

2.3.16 CTRL.DCXSWI6 Disconnector control (6)

Table 20: CTRL.DCXSWI6 Disconnector control (6)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.DCCSWI6			
4160	260.00	.Pos.stVal.Close	POSITION	Close bit	1=Close
4161	260.01	.Pos.stVal.Open		Open bit	1=Open
4162	260.02	.Pos.stVal.Fault		Fault bit	1= Pos is 11 or 00
4163	260.03	.Pos.stSeld		Control selected	1=Selected
		CTRL.DCCILO6			
4164	260.04	.EnaOpn.stVal	ENA_OPEN	Open enabled	1=Enabled
4165	260.05	.EnaCls.stVal	ENA_CLOSE	Close enabled	1=Enabled
		CTRL.DCXSWI6			
4166	260.06	.BlkOpn.stVal	BLK_OPEN	Open blocked	1=Blocked
4167	260.07	.mcd			
4168	260.08	.BlkCls.stVal	BLK_CLOSE	Close blocked	1=Blocked
4169	260.09	.mcd			
		CTRL.DCCILO6			
4170	260.10	.ItlByps.stVal	ITL_BYPASS	Interlock bypass	1=Bypassed
4171	260.11	.mcd			

2.3.17 CTRL.DCXSWI7 Disconnector control (7)

Table 21: CTRL.DCXSWI7 Disconnector control (7)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.DCCSWI7			
4172	260.12	.Pos.stVal.Close	POSITION	Close bit	1=Close
4173	260.13	.Pos.stVal.Open		Open bit	1=Open
4174	260.14	.Pos.stVal.Fault		Fault bit	1= Pos is 11 or 00
4175	260.15	.Pos.stSeld		Control selected	1=Selected
		CTRL.DCCILO7			
4176	261.00	.EnaOpn.stVal	ENA_OPEN	Open enabled	1=Enabled
4177	261.01	.EnaCls.stVal	ENA_CLOSE	Close enabled	1=Enabled
		CTRL.DCXSWI7			
4178	261.02	.BlkOpn.stVal	BLK_OPEN	Open blocked	1=Blocked
4179	261.03	.mcd			
4180	261.04	.BlkCls.stVal	BLK_CLOSE	Close blocked	1=Blocked
4181	261.05	.mcd			
		CTRL.DCCILO7			
4182	261.06	.ItlByps.stVal	ITL_BYPASS	Interlock bypass	1=Bypassed
4183	261.07	.mcd			

2.3.18 CTRL.DCXSWI8 Disconnector control (8)

Table 22: CTRL.DCXSWI8 Disconnector control (8)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.DCCSWI8			
4184	261.08	.Pos.stVal.Close	POSITION	Close bit	1=Close
4185	261.09	.Pos.stVal.Open		Open bit	1=Open
4186	261.10	.Pos.stVal.Fault		Fault bit	1= Pos is 11 or 00
4187	261.11	.Pos.stSeld		Control selected	1=Selected
		CTRL.DCCILO8			
4188	261.12	.EnaOpn.stVal	ENA_OPEN	Open enabled	1=Enabled
4189	261.13	.EnaCls.stVal	ENA_CLOSE	Close enabled	1=Enabled
		CTRL.DCXSWI8			
4190	261.14	.BlkOpn.stVal	BLK_OPEN	Open blocked	1=Blocked
4191	261.15	.mcd			
4192	262.00	.BlkCls.stVal	BLK_CLOSE	Close blocked	1=Blocked
4193	262.01	.mcd			
		CTRL.DCCILO8			
4194	262.02	.ItlByps.stVal	ITL_BYPASS	Interlock bypass	1=Bypassed
4195	262.03	.mcd			

2.3.19 LD0.DEFHPDEF1 Directional earth-fault protection, high stage (1)

Table 23: LD0.DEFHPDEF1 Directional earth-fault protection, high stage (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DEFHPTOC1			
2928	183.00	.Str.general	START	Stage start	1=Start
2929	183.01	.mcd			
2930	183.02	.Op.general	OPERATE	Stage operate	1=Operate
2931	183.03	.mcd			

2.3.20 LD0.DEFHPDEF2 Directional earth-fault protection, high stage (2)

Table 24: LD0.DEFHPDEF2 Directional earth-fault protection, high stage (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DEFHPTOC2			
-	-	.Str.general	START	General start	1=Start
-	-	.mcd			
-	-	.Op.general	OPERATE	General operate	1=Operate
-	-	.mcd			

2.3.21 LD0.DEFHPDEF3 Directional earth-fault protection, high stage (3)

Table 25: LD0.DEFHPDEF3 Directional earth-fault protection, high stage (3)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DEFHPTOC3			
-	-	.Str.general	START	General start	1=Start
-	-	.mcd			
-	-	.Op.general	OPERATE	General operate	1=Operate
-	-	.mcd			

2.3.22 LD0.DEFHPDEF4 Directional earth-fault protection, high stage (4)

Table 26: LD0.DEFHPDEF4 Directional earth-fault protection, high stage (4)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DEFHPTOC4			
-	-	.Str.general	START	General start	1=Start
-	-	.mcd			
-	-	.Op.general	OPERATE	General operate	1=Operate
-	-	.mcd			

2.3.23 LD0.DEFLPDEF1 Directional earth-fault protection, low stage (1)

Table 27: LD0.DEFLPDEF1 Directional earth-fault protection, low stage (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DEFLPTOC1			
2920	182.08	.Str.general	START	Stage start	1=Start
2921	182.09	.mcd			
2922	182.10	.Op.general	OPERATE	Stage operate	1=Operate
2923	182.11	.mcd			

2.3.24 LD0.DEFLPDEF2 Directional earth-fault protection, low stage (2)

Table 28: LD0.DEFLPDEF2 Directional earth-fault protection, low stage (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DEFLPTOC2			
2924	182.12	.Str.general	START	Stage start	1=Start
2925	182.13	.mcd			
2926	182.14	.Op.general	OPERATE	Stage operate	1=Operate
2927	182.15	.mcd			

2.3.25 LD0.DEFLPDEF3 Directional earth-fault protection, low stage (3)

Table 29: LD0.DEFLPDEF3 Directional earth-fault protection, low stage (3)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DEFLPTOC3			
-	-	.Str.general	START	General start	1=Start
-	-	.mcd			
-	-	.Op.general	OPERATE	General operate	1=Operate
-	-	.mcd			

2.3.26 LD0.DEFLPDEF4 Directional earth-fault protection, low stage (4)

Table 30: LD0.DEFLPDEF4 Directional earth-fault protection, low stage (4)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DEFLPTOC4			
-	-	.Str.general	START	General start	1=Start
-	-	.mcd			
-	-	.Op.general	OPERATE	General operate	1=Operate
-	-	.mcd			

2.3.27 LD0.DPHHPDOC1 Three-phase directional overcurrent protection, high stage (1)

Table 31: LD0.DPHHPDOC1 Three-phase directional overcurrent protection, high stage (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DPHHPTOC1			
3026	189.02	.Str.general	START	General start	1=Start
3027	189.03	.mcd			
3028	189.04	.Str.phsA		Phs A start	1=Start
3029	189.05	.mcd			
3030	189.06	.Str.phsB		Phs B start	1=Start
3031	189.07	.mcd			
3032	189.08	.Str.phsC		Phs C start	1=Start
3033	189.09	.mcd			
3034	189.10	.Op.general	OPERATE	General operate	1=Operate
3035	189.11	.mcd			

2.3.28 LD0.DPHHPDOC2 Three-phase directional overcurrent protection, high stage (2)

Table 32: LD0.DPHHPDOC2 Three-phase directional overcurrent protection, high stage (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DPHHPTOC2			
-	-	.Str.general	START	General start	1=Start
-	-	.mcd			
-	-	.Str.phsA		phsA start	1=Start
-	-	.mcd			
-	-	.Str.phsB		phsB start	1=Start
-	-	.mcd			

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
-	-	.Str.phsC		phsC start	1=Start
-	-	.mcd			
-	-	.Op.general	OPERATE	General operate	1=Operate
-	-	.mcd			

2.3.29 LD0.DPHHPDOC3 Three-phase directional overcurrent protection, high stage (3)

Table 33: LD0.DPHHPDOC3 Three-phase directional overcurrent protection, high stage (3)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DPHHPTOC3			
-	-	.Str.general	START	General start	1=Start
-	-	.mcd			
-	-	.Str.phsA		phsA start	1=Start
-	-	.mcd			
-	-	.Str.phsB		phsB start	1=Start
-	-	.mcd			
-	-	.Str.phsC		phsC start	1=Start
-	-	.mcd			
-	-	.Op.general	OPERATE	General operate	1=Operate
-	-	.mcd			

2.3.30 LD0.DPHHPDOC4 Three-phase directional overcurrent protection, high stage (4)

Table 34: LD0.DPHHPDOC4 Three-phase directional overcurrent protection, high stage (4)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DPHHPTOC4			
-	-	.Str.general	START	General start	1=Start
-	-	.mcd			
-	-	.Str.phsA		phsA start	1=Start
-	-	.mcd			
-	-	.Str.phsB		phsB start	1=Start
-	-	.mcd			
-	-	.Str.phsC		phsC start	1=Start
-	-	.mcd			
-	-	.Op.general	OPERATE	General operate	1=Operate
-	-	.mcd			

2.3.31 LD0.DPHLPDOC1 Three-phase directional overcurrent protection, low stage (1)

Table 35: LD0.DPHLPDOC1 Three-phase directional overcurrent protection, low stage (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DPHLPTOC1			
3006	187.14	.Str.general	START	General start	1=Start
3007	187.15	.mcd			
3008	188.00	.Str.phsA		Phs A start	1=Start
3009	188.01	.mcd			
3010	188.02	.Str.phsB		Phs B start	1=Start
3011	188.03	.mcd			
3012	188.04	.Str.phsC		Phs C start	1=Start
3013	188.05	.mcd			
3014	188.06	.Op.general	OPERATE	General operate	1=Operate
3015	188.07	.mcd			

2.3.32 LD0.DPHLPDOC2 Three-phase directional overcurrent protection, low stage (2)

Table 36: LD0.DPHLPDOC2 Three-phase directional overcurrent protection, low stage (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DPHLPTOC2			
3016	188.08	.Str.general	START	General start	1=Start
3017	188.09	.mcd			
3018	188.10	.Str.phsA		Phs A start	1=Start
3019	188.11	.mcd			
3020	188.12	.Str.phsB		Phs B start	1=Start
3021	188.13	.mcd			
3022	188.14	.Str.phsC		Phs C start	1=Start
3023	188.15	.mcd			
3024	189.00	.Op.general	OPERATE	General operate	1=Operate
3025	189.01	.mcd			

2.3.33 LD0.DPHLPDOC3 Three-phase directional overcurrent protection, low stage (3)

Table 37: LD0.DPHLPDOC3 Three-phase directional overcurrent protection, low stage (3)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DPHLPTOC3			
-	-	.Str.general	START	General start	1=Start
-	-	.mcd			
-	-	.Str.phsA		phsA start	1=Start
-	-	.mcd			
-	-	.Str.phsB		phsB start	1=Start
-	-	.mcd			
-	-	.Str.phsC		phsC start	1=Start
-	-	.mcd			
-	-	.Op.general	OPERATE	General operate	1=Operate
-	-	.mcd			

2.3.34 LD0.DPHLPDOC4 Three-phase directional overcurrent protection, low stage (4)

Table 38: LD0.DPHLPDOC4 Three-phase directional overcurrent protection, low stage (4)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DPHLPTOC4			
-	-	.Str.general	START	General start	1=Start
-	-	.mcd			
-	-	.Str.phsA		phsA start	1=Start
-	-	.mcd			
-	-	.Str.phsB		phsB start	1=Start
-	-	.mcd			
-	-	.Str.phsC		phsC start	1=Start
-	-	.mcd			
-	-	.Op.general	OPERATE	General operate	1=Operate
-	-	.mcd			

2.3.35 LD0.DPSRDIR1 Directional positive seq power (1)

Table 39: LD0.DPSRDIR1 Directional positive seq power (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DPSRDIR1			
-	-	.Dir.general	RELEASE	Dir criteria satisified	1=Release
-	-	.mcd			

2.3.36 LD0.DPSRDIR2 Directional positive seq power (2)

Table 40: LD0.DPSRDIR2 Directional positive seq power (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DPSRDIR1			
-	-	.Dir.general	RELEASE	Dir criteria satisified	1=Release
-	-	.mcd			

2.3.37 LD0.DTMGAPC1 Daily timer function (1)

Table 41: LD0.DTMGAPC1 Daily timer function (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DTMGAPC1			
-	-	.Op.general	-	Output status	1=On
-	-	.mcd			

2.3.38 LD0.DTMGAPC2 Daily timer function (2)

Table 42: LD0.DTMGAPC2 Daily timer function (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.DTMGAPC2			
-	-	.Op.general	-	Output status	1=On
-	-	.mcd			

2.3.39 CTRL.ESSXSWI1 Earthing switch indication (1)

Table 43: CTRL.ESSXSWI1 Earthing switch indication (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.ESSXSWI1	POSITION		
2801	175.01	.Pos.stVal.Close	-	Close bit	1=Close
2802	175.02	.Pos.stVal.Open	-	Open bit	1=Open
2803	175.03	.Pos.stVal.Fault	-	Fault bit	1=Pos(00/11)

2.3.40 CTRL.ESSXSWI2 Earthing switch indication (2)

Table 44: CTRL.ESSXSWI2 Earthing switch indication (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.ESSXSWI2	POSITION		
2807	175.07	.Pos.stVal.Close	-	Close bit	1=Close
2808	175.08	.Pos.stVal.Open	-	Open bit	1=Open
2809	175.09	.Pos.stVal.Fault	-	Fault bit	1=Pos(00/11)

2.3.41 CTRL.ESSXSWI3 Earthing switch indication (3)

Table 45: CTRL.ESSXSWI3 Earthing switch indication (3)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.ESSXSWI3	POSITION		
3411	213.03	.Pos.stVal.Close	-	Close bit	1=Close
3412	213.04	.Pos.stVal.Open	-	Open bit	1=Open
3413	213.05	.Pos.stVal.Fault	-	Fault bit	1=Pos(00/11)

2.3.42 CTRL.ESSXSWI4 Earthing switch indication (4)

Table 46: CTRL.ESSXSWI4 Earthing switch indication (4)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.ESSXSWI4	POSITION		
3414	213.06	.Pos.stVal.Close	-	Close bit	1=Close
3415	213.07	.Pos.stVal.Open	-	Open bit	1=Open
3416	213.08	.Pos.stVal.Fault	-	Fault bit	1=Pos(00/11)

2.3.43 CTRL.ESSXSWI5 Earthing switch indication (5)

Table 47: CTRL.ESSXSWI5 Earthing switch indication (5)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.ESSXSWI5	POSITION		
3417	213.09	.Pos.stVal.Close	-	Close bit	1=Close
3418	213.10	.Pos.stVal.Open	-	Open bit	1=Open
3419	213.11	.Pos.stVal.Fault	-	Fault bit	1=Pos(00/11)

2.3.44 CTRL.ESSXSWI6 Earthing switch indication (6)

Table 48: CTRL.ESSXSWI6 Earthing switch indication (6)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.ESSXSWI6	POSITION		
3420	213.12	.Pos.stVal.Close		Close bit	1=Close
3421	213.13	.Pos.stVal.Open		Open bit	1=Open
3422	213.14	.Pos.stVal.Fault		Fault bit	1=Pos(00/11)

2.3.45 CTRL.ESSXSWI7 Earthing switch indication (7)

Table 49: CTRL.ESSXSWI7 Earthing switch indication (7)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.ESSXSWI7	POSITION		
3423	213.5	.Pos.stVal.Close		Close bit	1=Close
3424	214.00	.Pos.stVal.Open		Open bit	1=Open
3425	214.01	.Pos.stVal.Fault		Fault bit	1=Pos(00/11)

2.3.46 CTRL.ESSXSWI8 Earthing switch indication (8)

Table 50: CTRL.ESSXSWI8 Earthing switch indication (8)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.ESSXSWI8	POSITION		
3426	214.02	.Pos.stVal.Close		Close bit	1=Close
3427	214.03	.Pos.stVal.Open		Open bit	1=Open
3428	214.04	.Pos.stVal.Fault		Fault bit	1=Pos(00/11)

2.3.47 LD0.EFHPTOC1 Non-directional earth-fault protection, high stage (1)

Table 51: LD0.EFHPTOC1 Non-directional earth-fault protection, high stage (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.EFHPTOC1			
2940	183.12	.Str.general	START	Stage start	1=Start
2941	183.13	.mcd			
2942	183.14	.Op.general	OPERATE	Stage operate	1=Operate
2943	183.15	.mcd			

2.3.48 LD0.EFIPTOC1 Non-directional earth-fault protection, instantaneous stage (1)

Table 52: LD0.EFIPTOC1 Non-directional earth-fault protection, instantaneous stage (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.EFIPTOC1			
2944	184.00	.Str.general	START	Stage start	1=Start
2945	184.01	.mcd			
2946	184.02	.Op.general	OPERATE	Stage operate	1=Operate
2947	184.03	.mcd			

2.3.49 LD0.EFLPTOC1 Non-directional earth-fault protection, low stage (1)

Table 53: LD0.EFLPTOC1 Non-directional earth-fault protection, low stage (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.EFLPTOC1			
2932	183.04	.Str.general	START	Stage start	1=Start
2933	183.05	.mcd			
2934	183.06	.Op.general	OPERATE	Stage operate	1=Operate
2935	183.07	.mcd			

2.3.50 LD0.EFPADM1 Admittance-based earth-fault protection (1)

Table 54: LD0.EFPADM1 Admittance-based earth-fault protection (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.EFPADM1			
2840	177.08	.Str.general	START	Stage start	1=Start
2841	177.09	.mcd			
2842	177.10	.Op.general	OPERATE	Stage operate	1=Operate
2843	177.11	.mcd			

2.3.51 LD0.EFPADM2 Admittance-based earth-fault protection (2)

Table 55: LD0.EFPADM2 Admittance-based earth-fault protection (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.EFPADM2			
2844	177.12	.Str.general	START	Stage start	1=Start
2845	177.13	.mcd			
2846	177.14	.Op.general	OPERATE	Stage operate	1=Operate
2847	177.15	.mcd			

2.3.52 LD0.EFPADM3 Admittance-based earth-fault protection (3)

Table 56: LD0.EFPADM3 Admittance-based earth-fault protection (3)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.EFPADM3			
2860	178.12	.Str.general	START	Stage start	1=Start
2861	178.13	.mcd			
2862	178.14	.Op.general	OPERATE	Stage operate	1=Operate
2863	178.15	.mcd			

2.3.53 LD0.FDEFLPDEF1 Directional earth-fault protection, low stage (1)

Table 57: LD0.FDEFLPDEF1 Directional earth-fault protection, low stage (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.FDEFLPTOC1			
2920	182.08	.Str.general	START	Stage start	1=Start
2921	182.09	.mcd			
2922	182.10	.Op.general	OPERATE	Stage operate	1=Operate
2923	182.11	.mcd			

2.3.54 LD0.FDEFLPDEF2 Directional earth-fault protection, low stage (2)

Table 58: LD0.FDEFLPDEF2 Directional earth-fault protection, low stage (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.FDEFLPTOC2			
2924	182.12	.Str.general	START	Stage start	1=Start
2925	182.13	.mcd			
2926	182.14	.Op.general	OPERATE	Stage operate	1=Operate
2927	182.15	.mcd			

2.3.55 LD0.FDPHLPDOC1 Three-phase directional overcurrent protection, low stage (1)

Table 59: LD0.FDPHLPDOC1 Three-phase directional overcurrent protection, low stage (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.FDPHLPTOC1			
3006	187.14	.Str.general	START	General start	1=Start
3007	187.15	.mcd			
3008	188.00	.Str.phsA		phsA start	1=Start
3009	188.01	.mcd			
3010	188.02	.Str.phsB		phsB start	1=Start
3011	188.03	.mcd			
3012	188.04	.Str.phsC		phsC start	1=Start
3013	188.05	.mcd			
3014	188.06	.Op.general	OPERATE	General operate	1=Operate
3015	188.07	.mcd			

2.3.56 LD0.FEFLPTOC1 Non-directional earth-fault protection, low stage (1)

Table 60: LD0.FEFLPTOC1 Non-directional earth-fault protection, low stage (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.FEFLPTOC1			
2932	183.04	.Str.general	START	Stage start	1=Start
2933	183.05	.mcd			
2934	183.06	.Opr.general	OPERATE	Stage operate	1=Operate
2935	183.07	.mcd			

2.3.57 LD0.FPHLPTOC1 Three-phase non-directional overcurrent protection, low stage (1)

Table 61: LD0.FPHLPTOC1 Three-phase non-directional overcurrent protection, low stage (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.FPHLPTOC1			
2880	180.00	.Str.general	START	General start	1=Start
2881	180.01	.mcd			
2882	180.02	.Str.phsA		phsA start	1=Start
2883	180.03	.mcd			
2884	180.04	.Str.phsB		phsB start	1=Start
2885	180.05	.mcd			
2886	180.06	.Str.phsC		phsC start	1=Start
2887	180.07	.mcd			
2888	180.08	.Op.general	OPERATE	General operate	1=Operate
2889	180.09	.mcd			

2.3.58 LD0.FPDHLPDOC2 Three-phase directional overcurrent protection, low stage (2)

Table 62: LD0.FPDHLPDOC2 Three-phase directional overcurrent protection, low stage (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.FDPHLPTOC2			
3016	188.08	.Str.general	START	General start	1=Start
3017	188.09	.mcd			
3018	188.10	.Str.phsA		phsA start	1=Start
3019	188.11	.mcd			
3020	188.12	.Str.phsB		phsB start	1=Start
3021	188.13	.mcd			
3022	188.14	.Str.phsC		phsC start	1=Start
3023	188.15	.mcd			
3024	189.00	.Op.general	OPERATE	General operate	1=Operate
3025	189.01	.mcd			

2.3.59 LD0.FRPFRQ1 Frequency protection (1)

Table 63: LD0.FRPFRQ1 Frequency protection (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.FRPTRC1			
4000	250.00	.Str.general	START	Stage 1 start	1=Start
4001	250.01	.mcd			
		LD0.FRPTOF1		Overfrequency	
4002	250.02	.Op.general	OPR_OFRQ	Operate	1=Operate
4003	250.03	.mcd			
		LD0.FRPTUF1		Underfrequency	
4004	250.04	.Op.general	OPR_UFRQ	Operate	1=Operate
4005	250.05	.mcd			
		LD0.FRPFRC1		Frequency gradient	
4006	250.06	.Op.general	OPR_FRG	Operate	1=Operate
4007	250.07	.mcd			

2.3.60 LD0.FRPFRQ2 Frequency protection (2)

Table 64: LD0.FRPFRQ2 Frequency protection (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.FRPTRC2			
4008	250.08	.Str.general	START	Stage 2 start	1=Start
4009	250.09	.mcd			
		LD0.FRPTOF2		Overfrequency	
4010	250.10	.Op.general	OPR_OFRQ	Operate	1=Operate
4011	250.11	.mcd			
		LD0.FRPTUF2		Underfrequency	
4012	250.12	.Op.general	OPR_UFRQ	Operate	1=Operate
4013	250.13	.mcd			
		LD0.FRPFRC2		Frequency gradient	
4014	250.14	.Op.general	OPR_FRG	Operate	1=Operate
4015	250.15	.mcd			

2.3.61 LD0.GSELPRT1 Goose supervision (1)

Table 65: LD0.GSELPRT1 Goose supervision (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.GSELPRT1			
-	-	.Alm.stVal	ALARM	Goose alarm	1=Alarm
-	-	.mcd			

2.3.62 LD0.HAEFPTOC1 Harmonics-based earth-fault protection (1)

Table 66: LD0.HAEFPTOC1 Harmonics-based earth-fault protection (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.HAEFPTOC1			
3312	207.00	.Str.general	START	Stage start	1=Start
3313	207.01	.mcd			
3314	207.02	.Op.general	OPERATE	Stage operate	1=Operate
3315	207.03	.mcd			

2.3.63 LD0.IL1TCTR1 Three-phase CT supervision (1)

Table 67: LD0.IL1TCTR1 Three-phase CT supervision (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.IL1TCTR1			
		.Alm.stVal	ALARM	Alarm	1=Alarm
		.mcd			
		.Wrn.stVal	WARNING	Warning	1=Warning
		.mcd			

2.3.64 LD0.IL1TCTR2 Three-phase CT supervision (2)

Table 68: LD0.IL1TCTR2 Three-phase CT supervision (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.IL1TCTR2			
		.Alm.stVal	ALARM	Alarm	1=Alarm
		.mcd			
		.Wrn.stVal	WARNING	Warning	1=Warning
		.mcd			

2.3.65 LD0.INRPHAR1 Three-phase inrush detector (1)

Table 69: LD0.INRPHAR1 Three-phase inrush detector (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.INRPHAR1			
2964	185.04	.Str.general	BLK2H	General start	1=Start
2965	185.05	.mcd			
2966	185.06	.Str.phsA		Phs A start	1=Start

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
2967	185.07	.mcd			
2968	185.08	.Str.phsB		Phs B start	1=Start
2969	185.09	.mcd			
2970	185.10	.Str.phsC		Phs C start	1=Start
2971	185.11	.mcd			

2.3.66 LD0.INTRPTEF1 Transient / intermittent earth-fault protection (1)

Table 70: LD0.INTRPTEF1 Transient / intermittent earth-fault protection (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.INTRPTEF1			
3176	198.08	.Str.general	START	General Start	1=Start
3177	198.09	.mcd			
3178	198.10	.Op.general	OPERATE	General Operate	2=Operate
3179	198.11	.mcd			

2.3.67 LD0.LEDGGIO1 Indication LED states OFF/ColorX

These LED indication points interpret the case when an indication signal is wired to either the OK or ALARM input of the LED function block. The default color for ALARM is red and green for OK. Colors can, however, be reconfigured with a setting parameter.

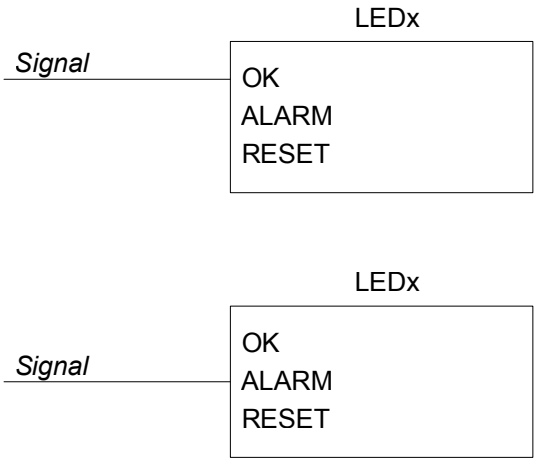

Figure 2: Signal wired to either OK or Alarm input

Table 71: LD0.LEDGGIO1 Indication LED states OFF/ColorX

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.LEDGGIO1			
2768	173.00	.LEDSt1.stVal	-	LED 1 state	0/1=Off/Color
2769	173.01	.LEDSt2.stVal	-	LED 2 state	0/1=Off/Color
2770	173.02	.LEDSt3.stVal	-	LED 3 state	0/1=Off/Color
2771	173.03	.LEDSt4.stVal	-	LED 4 state	0/1=Off/Color
2772	173.04	.LEDSt5.stVal	-	LED 5 state	0/1=Off/Color
2773	173.05	.LEDSt6.stVal	-	LED 6 state	0/1=Off/Color
2774	173.06	.LEDSt7.stVal	-	LED 7 state	0/1=Off/Color
2775	173.07	.LEDSt8.stVal	-	LED 8 state	0/1=Off/Color
2776	173.08	.LEDSt9.stVal	-	LED 9 state	0/1=Off/Color
2777	173.09	.LEDSt10.stVal	-	LED 10 state	0/1=Off/Color
2778	173.10	.LEDSt11.stVal	-	LED 11 state	0/1=Off/Color
2779	173.11	<reserved>			0

2.3.68 LD0.LEDGGIO1 Indication LED states Color1/Color2

These LED indication points interpret the case when a signal is wired to both the OK and ALARM inputs, but inverted to the other. This means that the LED toggles between red and green colors. The default color for ALARM is red and green for OK. Colors can, however, be reconfigured with a setting parameter.

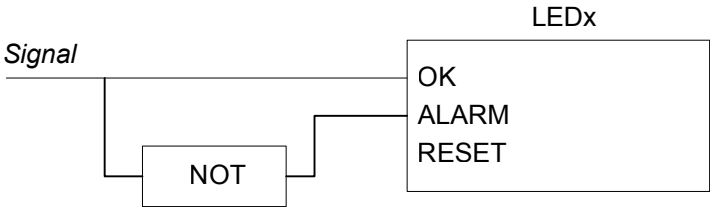

Figure 3: Signal wired to both OK and ALARM inputs – inverted to the other

If the OK and ALARM inputs are wired to separate indication signals, the LED will have three legal states and cannot be expressed with one bit only. In this case, it is possible to combine this LED bit interpretation with the corresponding value from the other LED state interpretation.

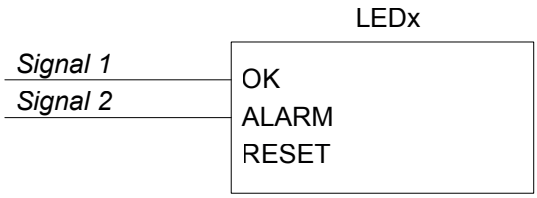

Figure 4: Separate signals wired to OK and ALARM inputs

Table 72: LD0.LEDGGIO1 Indication LED states Color1/Color2

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.LEDGGIO1			
3520	220.00	.LEDSt1.stVal	-	LED 1 state	0/1=Color1/2
3521	220.01	.LEDSt2.stVal	-	LED 2 state	0/1=Color1/2
3522	220.02	.LEDSt3.stVal	-	LED 3 state	0/1=Color1/2
3523	220.03	.LEDSt4.stVal	-	LED 4 state	0/1=Color1/2
3524	220.04	.LEDSt5.stVal	-	LED 5 state	0/1=Color1/2
3525	220.05	.LEDSt6.stVal	-	LED 6 state	0/1=Color1/2
3526	220.06	.LEDSt7.stVal	-	LED 7 state	0/1=Color1/2
3527	220.07	.LEDSt8.stVal	-	LED 8 state	0/1=Color1/2
3528	220.08	.LEDSt9.stVal	-	LED 9 state	0/1=Color1/2
3529	220.09	.LEDSt10.stVal	-	LED 10 state	0/1=Color1/2
3530	220.10	.LEDSt11.stVal	-	LED 11 state	0/1=Color1/2
3531	220.11	<reserved>			0

2.3.69 LD0.LEDPTRC1 Global conditioning (1)

Table 73: LD0.LEDPTRC1 Global conditioning (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.LEDPTRC1			
2736	171.00	.Str.general	-	Global start	1=Start
2737	171.01	.mcd			
2738	171.02	.Op.general	-	Global operate	1=Operate
2739	171.03	.mcd			

2.3.70 LD0.LSHDPFRQ1 Load-shedding and restoration (1)

Table 74: LD0.LSHDPFRQ1 Load-shedding and restoration (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.LSHDPTRC1			
3888	243.00	.Str.general	START	General start	1=Start
3889	243.01	.mcd			
3890	243.02	.Op.general	OPERATE	General operate	1=Operate
3891	243.03	.mcd			
		LD0.LSHDPTOF1			
3892	243.04	.Str.general	ST_REST	Start of restore	1=Start
3893	243.05	.mcd			
3894	243.06	.Op.general	RESTORE	Restore the load	1=Restore
3895	243.07	.mcd			

2.3.71 LD0.LSHDPFRQ2 Load-shedding (2)

Table 75: LD0.LSHDPFRQ2 Load-shedding (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.LSHDPTRC2			
-	-	.Str.general	START	General start	1=Start
-	-	.mcd			
-	-	.Op.general	OPERATE	General operate	1=Operate
-	-	.mcd			
		LD0.LSHDPTOF2			
-	-	.Str.general	ST_REST	Start of restore	1=Start
-	-	.mcd			
-	-	.Op.general	RESTORE	Restore the load	1=Restore
-	-	.mcd			

2.3.72 LD0.MAPGAPC1 Multipurpose protection (1)

Table 76: LD0.MAPGAPC1 Multipurpose protection (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MAPGAPC1			
3696	231.00	.Str.general	START	Stage start	1 = Start
3697	231.01	.mcd			
3698	231.02	.Op.general	OPERATE	Stage operate	1 = Operate
3699	231.03	.mcd			

2.3.73 LD0.MAPGAPC2 Multipurpose protection (2)

Table 77: LD0.MAPGAPC2 Multipurpose protection (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MAPGAPC2			
3700	231.04	.Str.general	START	Stage start	1 = Start
3701	231.05	.mcd			
3702	231.06	.Op.general	OPERATE	Stage operate	1 = Operate
3703	231.07	.mcd			

2.3.74 LD0.MAPGAPC3 Multipurpose analog protection function (3)

Table 78: LD0.MAPGAPC3 Multipurpose analog protection function (3)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MAPGAPC3			
3704	231.08	.Str.general	START	Stage start	1 = Start
3705	231.09	.mcd			
3706	231.10	.Op.general	OPERATE	Stage operate	1 = Operate
3707	231.11	.mcd			

2.3.75 LD0.MAPGAPC4 Multipurpose analog protection function (4)

Table 79: LD0.MAPGAPC4 Multipurpose analog protection function (4)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MAPGAPC4			
3708	231.12	.Str.general	START	Start	1 = Start
3709	231.13	.mcd			
3710	231.14	.Op.general	OPERATE	Operate	1 = Operate
3711	231.15	.mcd			

2.3.76 LD0.MAPGAPC5 Multipurpose analog protection function (5)

Table 80: LD0.MAPGAPC5 Multipurpose analog protection function (5)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MAPGAPC5			
3712	232.00	.Str.general	START	Stage start	1 = Start
3713	232.01	.mcd			
3714	232.02	.Op.general	OPERATE	Stage operate	1 = Operate
3715	232.03	.mcd			

2.3.77 LD0.MAPGAPC6 Multipurpose analog protection function (6)

Table 81: LD0.MAPGAPC6 Multipurpose analog protection function (6)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MAPGAPC6			
3716	232.04	.Str.general	START	Stage start	1 = Start
3717	232.05	.mcd			
3718	232.06	.Op.general	OPERATE	Stage operate	1 = Operate
3719	232.07	.mcd			

2.3.78 LD0.MDSOPT1 Runtime counter for machines and devices (1)

Since the register size is 16 bits, the value saturates at 65535 hours (approximately 7.5 years). Alternatively, a 32-bit user-definable register can be made of this data to cover the whole 300 000 hours (34 years) range. The value can also, for example, be rescaled to show “total operation days” instead by changing the scale factor from 1 to 1/24 = 0.0417.

Table 82: LD0.MDSOPT1 Runtime counter for machines and devices (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MDSOPT1			
3308	205.12	OpTmWrn.stVal	WARNING	Op. time warning	1=Warning
3309	205.13	.mcd			
3310	205.14	OpTmAlm.stVal	ALARM	Op. time alarm	1=Alarm
3311	205.15	.mcd			

2.3.79 LD0.MFADPSDE1 Multifrequency admittance-based earth-fault protection (1)

Table 83: LD0.MFADPSDE1 Multifrequency admittance-based earth-fault protection (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MFADPSDE1			
-	-	.Str.general	START	General start	1=Start
-	-	.mcd			
-	-	.Op.general	OPERATE	General operate	1=Operate
-	-	.mcd			

2.3.80 LD0.MFADPSDE2 Multifrequency admittance-based earth-fault protection (2)

Table 84: LD0.MFADPSDE2 Multifrequency admittance-based earth-fault protection (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MFADPSDE2			
-	-	.Str.general	START	General start	1=Start
-	-	.mcd			
-	-	.Op.general	OPERATE	General operate	1=Operate
-	-	.mcd			

2.3.81 LD0.MVGAPC1 Move (8 pcs) (1)

Table 85: LD0.MVGAPC1 Move (8 pcs) (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MVGAPC1			
3536	221.00	.SPCSO1.stVal		Input 1	0/1=Off/On
3537	221.01	.mcd			
3538	221.02	.SPCSO2.stVal		Input 2	0/1=Off/On
3539	221.03	.mcd			
3540	221.04	.SPCSO3.stVal		Input 3	0/1=Off/On
3541	221.05	.mcd			
3542	221.06	.SPCSO4.stVal		Input 4	0/1=Off/On
3543	221.07	.mcd			
3544	221.08	.SPCSO5.stVal		Input 5	0/1=Off/On
3545	221.09	.mcd			
3546	221.10	.SPCSO6.stVal		Input 6	0/1=Off/On
3547	221.11	.mcd			
3548	221.12	.SPCSO7.stVal		Input 7	0/1=Off/On

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
3549	221.13	.mcd			
3550	221.14	.SPCSO8.stVal		Input 8	0/1=Off/On
3551	221.15	.mcd			

2.3.82 LD0.MVGAPC2 Move (8 pcs) (2)

Table 86: LD0.MVGAPC2 Move (8 pcs) (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MVGAPC2			
3552	222.00	.SPCSO1.stVal		Input 1	0/1=Off/On
3553	222.01	.mcd			
3554	222.02	.SPCSO2.stVal		Input 2	0/1=Off/On
3555	222.03	.mcd			
3556	222.04	.SPCSO3.stVal		Input 3	0/1=Off/On
3557	222.05	.mcd			
3558	222.06	.SPCSO4.stVal		Input 4	0/1=Off/On
3559	222.07	.mcd			
3560	222.08	.SPCSO5.stVal		Input 5	0/1=Off/On
3561	222.09	.mcd			
3562	222.10	.SPCSO6.stVal		Input 6	0/1=Off/On
3563	222.11	.mcd			
3564	222.12	.SPCSO7.stVal		Input 7	0/1=Off/On
3565	222.13	.mcd			
3566	222.14	.SPCSO8.stVal		Input 8	0/1=Off/On
3567	222.15	.mcd			

2.3.83 LD0.MVGAPC3 Move (8 pcs) (3)

Table 87: LD0.MVGAPC3 Move (8 pcs) (3)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MVGAPC3			
3568	223.00	.Q1.stVal		Input 1	0/1=Off/On
3569	223.01	.mcd			
3570	223.02	.Q2.stVal		Input 2	0/1=Off/On
3571	223.03	.mcd			
3572	223.04	.Q3.stVal		Input 3	0/1=Off/On
3573	223.05	.mcd			
3574	223.06	.Q4.stVal		Input 4	0/1=Off/On
3575	223.07	.mcd			

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
3576	223.08	.Q5.stVal		Input 5	0/1=Off/On
3577	223.09	.mcd			
3578	223.10	.Q6.stVal		Input 6	0/1=Off/On
3579	223.11	.mcd			
3580	223.12	.Q7.stVal		Input 7	0/1=Off/On
3581	223.13	.mcd			
3582	223.14	.Q8.stVal		Input 8	0/1=Off/On
3583	223.15	.mcd			

2.3.84 LD0.MVGAPC4 Move (8 pcs) (4)

Table 88: LD0.MVGAPC4 Move (8 pcs) (4)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MVGAPC4			
3584	224.00	.Q1.stVal		Input 1	0/1=Off/On
3585	224.01	.mcd			
3586	224.02	.Q2.stVal		Input 2	0/1=Off/On
3587	224.03	.mcd			
3588	224.04	.Q3.stVal		Input 3	0/1=Off/On
3589	224.05	.mcd			
3590	224.06	.Q4.stVal		Input 4	0/1=Off/On
3591	224.07	.mcd			
3592	224.08	.Q5.stVal		Input 5	0/1=Off/On
3593	224.09	.mcd			
3594	224.10	.Q6.stVal		Input 6	0/1=Off/On
3595	224.11	.mcd			
3596	224.12	.Q7.stVal		Input 7	0/1=Off/On
3597	224.13	.mcd			
3598	224.14	.Q8.stVal		Input 8	0/1=Off/On
3599	224.15	.mcd			

2.3.85 LD0.MVGAPC5 Move (8 pcs) (5)

Table 89: LD0.MVGAPC5 Move (8 pcs) (5)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MVGAPC5			
3664	229.00	.Q1.stVal	-	Input 1	0/1=Off/On
3665	229.01	.mcd			
3666	229.02	.Q2.stVal	-	Input 2	0/1=Off/On

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
3667	229.03	.mcd			
3668	229.04	.Q3.stVal	-	Input 3	0/1=Off/On
3669	229.05	.mcd			
3670	229.06	.Q4.stVal	-	Input 4	0/1=Off/On
3671	229.07	.mcd			
3672	229.08	.Q5.stVal	-	Input 5	0/1=Off/On
3673	229.09	.mcd			
3674	229.10	.Q6.stVal	-	Input 6	0/1=Off/On
3675	229.11	.mcd			
3676	229.12	.Q7.stVal	-	Input 7	0/1=Off/On
3677	229.13	.mcd			
3678	229.14	.Q8.stVal	-	Input 8	0/1=Off/On
3679	229.15	.mcd			

2.3.86 LD0.MVGAPC6 Move (8 pcs) (6)

Table 90: LD0.MVGAPC6 Move (8 pcs) (6)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MVGAPC6			
3680	230.00	.Q1.stVal	-	Input 1	0/1=Off/On
3681	230.01	.mcd			
3682	230.02	.Q2.stVal	-	Input 2	0/1=Off/On
3683	230.03	.mcd			
3684	230.04	.Q3.stVal	-	Input 3	0/1=Off/On
3685	230.05	.mcd			
3686	230.06	.Q4.stVal	-	Input 4	0/1=Off/On
3687	230.07	.mcd			
3688	230.08	.Q5.stVal	-	Input 5	0/1=Off/On
3689	230.09	.mcd			
3690	230.10	.Q6.stVal	-	Input 6	0/1=Off/On
3691	230.11	.mcd			
3692	230.12	.Q7.stVal	-	Input 7	0/1=Off/On
3693	230.13	.mcd			
3694	230.14	.Q8.stVal	-	Input 8	0/1=Off/On
3695	230.15	.mcd			

2.3.87 LD0.MVGAPC7 Move (8 pcs) (7)

Table 91: LD0.MVGAPC7 Move (8 pcs) (7)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MVGAPC7			
3720	232.08	.Q1.stVal	-	Input 1	0/1=Off/On
3721	232.09	.mcd			
3722	232.10	.Q2.stVal	-	Input 2	0/1=Off/On
3723	232.11	.mcd			
3724	232.12	.Q3.stVal	-	Input 3	0/1=Off/On
3725	232.13	.mcd			
3726	232.14	.Q4.stVal	-	Input 4	0/1=Off/On
3727	232.15	.mcd			
3728	233.00	.Q5.stVal	-	Input 5	0/1=Off/On
3729	233.01	.mcd			
3730	233.02	.Q6.stVal	-	Input 6	0/1=Off/On
3731	233.03	.mcd			
3732	233.04	.Q7.stVal	-	Input 7	0/1=Off/On
3733	233.05	.mcd			
3734	233.06	.Q8.stVal	-	Input 8	0/1=Off/On
3735	233.07	.mcd			

2.3.88 LD0.MVGAPC8 Move (8 pcs) (8)

Table 92: LD0.MVGAPC8 Move (8 pcs) (8)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MVGAPC8			
3736	233.08	.Q1.stVal	-	Input 1	0/1=Off/On
3737	233.09	.mcd			
3738	233.10	.Q2.stVal	-	Input 2	0/1=Off/On
3739	233.11	.mcd			
3740	233.12	.Q3.stVal	-	Input 3	0/1=Off/On
3741	233.13	.mcd			
3742	233.14	.Q4.stVal	-	Input 4	0/1=Off/On
3743	233.15	.mcd			
3744	234.00	.Q5.stVal	-	Input 5	0/1=Off/On
3745	234.01	.mcd			
3746	234.02	.Q6.stVal	-	Input 6	0/1=Off/On
3747	234.03	.mcd			
3748	234.04	.Q7.stVal	-	Input 7	0/1=Off/On

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
3749	234.05	.mcd			
3750	234.06	.Q8.stVal	-	Input 8	0/1=Off/On
3751	234.07	.mcd			

2.3.89 LD0.NSPTOC1 Negative-sequence overcurrent protection (1)

Table 93: LD0.NSPTOC1 Negative-sequence overcurrent protection (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.NSPTOC1			
2956	184.12	.Str.general	START	Stage start	1=Start
2957	184.13	.mcd			
2958	184.14	.Op.general	OPERATE	Stage operate	1=Operate
2959	184.15	.mcd			

2.3.90 LD0.NSPTOC2 Negative-sequence overcurrent protection (2)

Table 94: LD0.NSPTOC2 Negative-sequence overcurrent protection (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.NSPTOC2			
2960	185.00	.Str.general	START	Stage start	1=Start
2961	185.01	.mcd			
2962	185.02	.Op.general	OPERATE	Stage operate	1=Operate
2963	185.03	.mcd			

2.3.91 LD0.NSPTOV1 Negative-sequence overvoltage protection (1)

Table 95: LD0.NSPTOV1 Negative-sequence overvoltage protection (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.NSPTOV1			
3128	195.08	.Str.general	START	General start	1=Start
3129	195.09	.mcd			
3136	196.00	.Op.general	OPERATE	General operate	1=Operate
3137	196.01	.mcd			

2.3.92 LD0.PDNSPTOC1 Phase discontinuity protection (1)

Table 96: LD0.PDNSPTOC1 Phase discontinuity protection (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PDNSPTOC1			
2952	184.08	.Str.general	START	Stage start	1=Start
2953	184.09	.mcd			
2954	184.10	.Op.general	OPERATE	Stage operate	1=Operate
2955	184.11	.mcd			

2.3.93 LD0.PHQVVR1 Voltage variation (1)

Table 97: LD0.PHQVVR1 Voltage variation (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PH1QVVR1			
3328	208.00	.VarStrGen.stVal	-	Variation event detected	1=Detected
3329	208.01	.mcd			
3330	208.02	.VarEnd.stVal	-	Variation event ended	1=Ended
3331	208.03	.mcd			
3332	208.04	.SwlOp.stVal	-	Swell event detected	1=Detected
3333	208.05	.mcd			
3334	208.06	.DipOp.stVal	-	Dip event detected	1=Detected
3335	208.07	.mcd			
3336	208.08	.IntrOp.stVal	-	Interruption event detected	1=Detected
3337	208.09	.mcd			

2.3.94 LD0.PHHPTOC1 Three-phase non-directional overcurrent protection, high stage (1)

Table 98: LD0.PHHPTOC1 Three-phase non-directional overcurrent protection, high stage (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PHHPTOC1			
2890	180.10	.Str.general	START	General start	1=Start
2891	180.11	.mcd			
2892	180.12	.Str.phsA		Phs A start	1=Start
2893	180.13	.mcd			
2894	180.14	.Str.phsB		Phs B start	1=Start
2895	180.15	.mcd			
2896	181.00	.Str.phsC		Phs C start	1=Start

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
2897	181.01	.mcd			
2898	181.02	.Op.general	OPERATE	General operate	1=Operate
2899	181.03	.mcd			

2.3.95 LD0.PHIPTOC1 Three-phase non-directional overcurrent protection, instantaneous stage (1)

Table 99: LD0.PHIPTOC1 Three-phase non-directional overcurrent protection, instantaneous stage (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PHIPTOC1			
2910	181.14	.Str.general	START	General start	1=Start
2911	181.15	.mcd			
2912	182.00	.Str.phsA		Phs A start	1=Start
2913	182.01	.mcd			
2914	182.02	.Str.phsB		Phs B start	1=Start
2915	182.03	.mcd			
2916	182.04	.Str.phsC		Phs C start	1=Start
2917	182.05	.mcd			
2918	182.06	.Op.general	OPERATE	General operate	1=Operate
2919	182.07	.mcd			

2.3.96 LD0.PHIPTOC2 Phase overcurrent protection, instantaneous stage (2)

Table 100: LD0.PHIPTOC2 Phase overcurrent protection, instantaneous stage (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PHIPTOC2			
-	-	.Str.general	START	General start	1=Start
-	-	.mcd			
-	-	.Str.phsA		phsA start	1=Start
-	-	.mcd			
-	-	.Str.phsB		phsB start	1=Start
-	-	.mcd			
-	-	.Str.phsC		phsC start	1=Start
-	-	.mcd			
-	-	.Op.general	OPERATE	General operate	1=Operate
-	-	.mcd			

2.3.97 LD0.PHLPTOC1 Three-phase non-directional overcurrent protection, low stage (1)

Table 101: LD0.PHLPTOC1 Three-phase non-directional overcurrent protection, low stage (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PHLPTOC1			
2880	180.00	.Str.general	START	General start	1=Start
2881	180.01	.mcd			
2882	180.02	.Str.phsA		Phs A start	1=Start
2883	180.03	.mcd			
2884	180.04	.Str.phsB		Phs B start	1=Start
2885	180.05	.mcd			
2886	180.06	.Str.phsC		Phs C start	1=Start
2887	180.07	.mcd			
2888	180.08	.Op.general	OPERATE	General operate	1=Operate
2889	180.09	.mcd			

2.3.98 LD0.PHPTOV1 Three-phase overvoltage protection (1)

Table 102: LD0.PHPTOV1 Three-phase overvoltage protection (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PHPTOV1			
3088	193.00	.Str.general	START	General start	1=Start
3089	193.01	.mcd			
3090	193.02	.Str.phsA		Phs A start	1=Start
3091	193.03	.mcd			
3092	193.04	.Str.phsB		Phs B start	1=Start
3093	193.05	.mcd			
3094	193.06	.Str.phsC		Phs C start	1=Start
3095	193.07	.mcd			
3096	193.08	.Op.general	OPERATE	General operate	1=Operate
3097	193.09	.mcd			

2.3.99 LD0.PHPTOV2 Three-phase overvoltage protection (2)

Table 103: LD0.PHPTOV2 Three-phase overvoltage protection (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PHPTOV2			
3098	193.10	.Str.general	START	General start	1=Start
3099	193.11	.mcd			

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
3100	193.12	.Str.phsA		Phs A start	1=Start
3101	193.13	.mcd			
3102	193.14	.Str.phsB		Phs B start	1=Start
3103	193.15	.mcd			
3104	194.00	.Str.phsC		Phs C start	1=Start
3105	194.01	.mcd			
3106	194.02	.Op.general	OPERATE	General operate	1=Operate
3107	194.03	.mcd			

2.3.100 LD0.PHPTOV3 Three-phase overvoltage protection (3)

Table 104: LD0.PHPTOV3 Three-phase overvoltage protection (3)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PHPTOV3			
3108	194.04	.Str.general	START	General start	1=Start
3109	194.05	.mcd			
3110	194.06	.Str.phsA		Phs A start	1=Start
3111	194.07	.mcd			
3112	194.08	.Str.phsB		Phs B start	1=Start
3113	194.09	.mcd			
3114	194.10	.Str.phsC		Phs C start	1=Start
3115	194.11	.mcd			
3116	194.12	.Op.general	OPERATE	General operate	1=Operate
3117	194.13	.mcd			

2.3.101 LD0.PHPTUC1 Phase undercurrent protection (1)

Table 105: LD0.PHPTUC1 Phase undercurrent protection (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PHPTUC1			
		.Str.general	START	General start	1=Start
		.mcd			
		.Str.phsA		phsA start	1=Start
		.mcd			
		.Str.phsB		phsB start	1=Start
		.mcd			
		.Str.phsC		phsC start	1=Start
		.mcd			
		.Op.general	OPERATE	General operate	1=Operate

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
		.mcd			
		.Op.phsA		phsA operate	1=Operate
		.mcd			
		.Op.phsB		phsB operate	1=Operate
		.mcd			
		.Op.phsC		phsC operate	1=Operate
		.mcd			

2.3.102 LD0.PHPTUC2 Phase undercurrent protection (2)

Table 106: LD0.PHPTUC2 Phase undercurrent protection (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PHPTUC2			
		.Str.general	START	General start	1=Start
		.mcd			
		.Str.phsA		phsA start	1=Start
		.mcd			
		.Str.phsB		phsB start	1=Start
		.mcd			
		.Str.phsC		phsC start	1=Start
		.mcd			
		.Op.general	OPERATE	General operate	1=Operate
		.mcd			
		.Op.phsA		phsA operate	1=Operate
		.mcd			
		.Op.phsB		phsB operate	1=Operate
		.mcd			
		.Op.phsC		phsC operate	1=Operate
		.mcd			

2.3.103 LD0.PHPTUV1 Three-phase undervoltage protection (1)

Table 107: LD0.PHPTUV1 Three-phase undervoltage protection (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PHPTUV1			
3138	196.02	.Str.general	START	General start	1=Start
3139	196.03	.mcd			
3140	196.04	.Str.phsA		Phs A start	1=Start
3141	196.05	.mcd			

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
3142	196.06	.Str.phsB		Phs B start	1=Start
3143	196.07	.mcd			
3144	196.08	.Str.phsC		Phs C start	1=Start
3145	196.09	.mcd			
3146	196.10	.Op.general	OPERATE	General operate	1=Operate
3147	196.11	.mcd			

2.3.104 LD0.PHPTUV2 Three-phase undervoltage protection (2)

Table 108: LD0.PHPTUV2 Three-phase undervoltage protection (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PHPTUV2			
3148	196.12	.Str.general	START	General start	1=Start
3149	196.13	.mcd			
3150	196.14	.Str.phsA		Phs A start	1=Start
3151	196.15	.mcd			
3152	197.00	.Str.phsB		Phs B start	1=Start
3153	197.01	.mcd			
3154	197.02	.Str.phsC		Phs C start	1=Start
3155	197.03	.mcd			
3156	197.04	.Op.general	OPERATE	General operate	1=Operate
3157	197.05	.mcd			

2.3.105 LD0.PHPTUV3 Three-phase undervoltage protection (3)

Table 109: LD0.PHPTUV3 Three-phase undervoltage protection (3)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PHPTUV3			
3158	197.06	.Str.general	START	General start	1=Start
3159	197.07	.mcd			
3160	197.08	.Str.phsA		Phs A start	1=Start
3161	197.09	.mcd			
3162	197.10	.Str.phsB		Phs B start	1=Start
3163	197.11	.mcd			
3164	197.12	.Str.phsC		Phs C start	1=Start
3165	197.13	.mcd			
3166	197.14	.Op.general	OPERATE	General operate	1=Operate
3167	197.15	.mcd			

2.3.106 LD0.PSPTUV1 Positive-sequence undervoltage protection (1)

Table 110: LD0.PSPTUV1 Positive-sequence undervoltage protection (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PSPTUV1			
3118	194.14	.Str.general	START	General start	1=Start
3119	194.15	.mcd			
3126	195.06	.Op.general	OPERATE	General operate	1=Operate
3127	195.07	.mcd			

2.3.107 LD0.PHSVPR1 Voltage presence (1)

Table 111: LD0.PHSVPR1 Voltage presence (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PHSVPR1			
3960	247.08	.VLiv.stVal	U_LIVE	High voltage presence	1=High voltage
3961	247.09	.mcd			
3962	247.10	.VLivPhsA.stVal	U_A_AB_LIVE	High phsA or phsAB voltage	1=High voltage
3963	247.11	.mcd			
3964	247.12	.VLivPhsB.stVal	U_B_BC_LIVE	High phsB or phsBC voltage	1=High voltage
3965	247.13	.mcd			
3966	247.14	.VLivPhsC.stVal	U_C_CA_LIVE	High phsC or phsCA voltage	1=High voltage
3967	247.15	.mcd			
3968	248.00	.VDea.stVal	U_DEAD	Low voltage presence	1=Low voltage
3969	248.01	.mcd			
3970	248.02	.VDeaPhsA.stVal	U_A_AB_DEAD	Low phsA or phsAB voltage	1=Low voltage
3971	248.03	.mcd			
3972	248.04	.VDeaPhsB.stVal	U_B_BC_DEAD	Low phsB or phsBC voltage	1=Low voltage
3973	248.05	.mcd			
3974	248.06	.VDeaPhsC.stVal	U_C_CA_DEAD	Low phsC or phsCA voltage	1=Low voltage
3975	248.07	.mcd			

2.3.108 LD0.PHSVPR2 Voltage presence (2)

Table 112: LD0.PHSVPR2 Voltage presence (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PHSVPR2			
3976	248.08	.VLiv.stVal	U_LIVE	High voltage presence	1=High voltage
3977	248.09	.mcd			

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
3978	248.10	.VLivPhsA.stVal	U_A_AB_LIVE	High phsA or phsAB voltage	1=High voltage
3979	248.11	.mcd			
3980	248.12	.VLivPhsB.stVal	U_B_BC_LIVE	High phsB or phsBC voltage	1=High voltage
3981	248.13	.mcd			
3982	248.14	.VLivPhsC.stVal	U_C_CA_LIVE	High phsC or phsCA voltage	1=High voltage
3983	248.15	.mcd			
3988	249.04	.VDea.stVal	U_DEAD	Low voltage presence	1=Low voltage
3989	249.05	.mcd			
3990	249.06	.VDeaPhsA.stVal	U_A_AB_DEAD	Low phsA or phsAB voltage	1=Low voltage
3991	249.07	.mcd			
3992	249.08	.VDeaPhsB.stVal	U_B_BC_DEAD	Low phsB or phsBC voltage	1=Low voltage
3993	249.09	.mcd			
3994	249.10	.VDeaPhsC.stVal	U_C_CA_DEAD	Low phsC or phsCA voltage	1=Low voltage
3995	249.11	.mcd			

2.3.109 LD0.RESCMMXU1 Residual current measurement (1)

Table 113: LD0.RESCMMXU1 Residual current measurement (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.RESCMMXU1			
2760	172.08	.HiAlm.stVal	HIGH_ALARM	High alarm	1=Alarm
2761	172.09	.mcd			
2762	172.10	.HiWrn.stVal	HIGH_WARN	High warning	1=Warning
2763	172.11	.mcd			

2.3.110 LD0.RESTCTR1 Residual CT supervision (1)

Table 114: LD0.RESTCTR1 Residual CT supervision (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.RESTCTR1			
		.Alm.stVal	ALARM	Alarm	1=Alarm
		.mcd			
		.Wrn.stVal	WARNING	Warning	1=Warning
		.mcd			

2.3.111 LD0.RESVMMXU1 Residual voltage limit supervision (1)

Table 115: LD0.RESVMMXU1 Residual voltage limit supervision (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.RESVMMXU1			
-	-	.HiAlm.stVal	HIGH_ALARM	High alarm	1=Alarm
-	-	.mcd			
-	-	.HiWarn.stVal	HIGH_WARNING	High warning	1=Warning
-	-	.mcd			

2.3.112 LD0.ROVPTOV1 Residual overvoltage protection (1)

Table 116: LD0.ROVPTOV1 Residual overvoltage protection (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.ROVPTOV1			
3168	198.00	.Str.general	START	General start	1=Start
3169	198.01	.mcd			
3170	198.02	.Op.general	OPERATE	General operate	1=Operate
3171	198.03	.mcd			

2.3.113 LD0.ROVPTOV2 Residual overvoltage protection (2)

Table 117: LD0.ROVPTOV2 Residual overvoltage protection (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.ROVPTOV2			
3172	198.04	.Str.general	START	General start	1=Start
3173	198.05	.mcd			
3174	198.06	.Op.general	OPERATE	General operate	1=Operate
3175	198.07	.mcd			

2.3.114 LD0.SCEFRFLO1 Fault locator (1)

Table 118: LD0.SCEFRFLO1 Fault locator (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.SCEFRFLO1			
		.Alm.stVal	ALARM	Fault locator alarm	1=Alarm
		.mcd			
		.TrgSt.stVal	TRIGG	Distance calculation trig	1=Triggered
		.mcd			

2.3.115 LD0.SECRSYN1 Synchronism and energizing check (1)

Table 119: LD0.SECRSYN1 Synchronism and energizing check (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.SECRSYN1			
3882	242.10	.SynPrg	SYNC_INPRO	Synch. in progress	1=In progress
3883	242.11	.mcd			
3884	242.12	.FailCmd	CMD_FAIL_AL	Close request fail	1=Failed
3885	242.13	.mcd			
3886	242.14	.FailSyn	CL_FAIL_AL	Close cmd fail	1=Failed
3887	242.15	.mcd			

2.3.116 LD0.SEQSPVC1 Fuse failure supervision (1)

Table 120: LD0.SEQSPVC1 Fuse failure supervision (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.SEQSPVC1			
2996	187.04	.Str.general	FUSEF_U	Start	1=Start
2997	187.05	.mcd			
2998	187.06	.Str3Ph.general	FUSEF_3PH	3-phase start	1=Start
2999	187.07	.mcd			

2.3.117 LD0.SSCBR1 Circuit-breaker condition monitoring (1)

Table 121: LD0.SSCBR1 Circuit-breaker condition monitoring (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.SSCBR1			
2848	178.00	.OpnAlm.stVal	TRV_T_OP_ALM	Opn travel time alarm	1=Alarm
2849	178.01	.ClsAlm.stVal	TRV_T_CL_ALM	Cls travel time alarm	1=Alarm
		LD0.SSOPM1			
2850	178.02	.SprChaAlm.stVal	SPR_CHR_ALM	Spring charge alarm	1=Alarm
		LD0.SSCBR1			
2851	178.03	.OpCntAlm.stVal	OPR_ALM	CB operations alarm	1=Alarm
2852	178.04	.OpCntLO.stVal	OPR_LO	CB operations lockout	1=Lockout
2853	178.05	.LonTmAlm.stVal	MON_ALM	CB inactive alarm	1=Alarm
		LD0.SSIGM1			
2854	178.06	.InsAlm.stVal	PRES_ALM	Low pressure alarm	1=Alarm
2855	178.07	.InsBlk.stVal	PRES_LO	Low pressure lockout	1=Lockout
		LD0.SSCBR1			

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
2856	178.08	.APwrAlm.stVal	IPOW_ALM	Lyt alarm	1=Alarm
2857	178.09	.APwrLO.stVal	IPOW_LO	Lyt lockout	1=Lockout
2858	178.10	.RmnNumOpAlm.stVal	CB_LIFE_ALM	CB lifetime alarm	1=Alarm

2.3.118 LD0.SSCBR2 Circuit-breaker condition monitoring (2)

Table 122: LD0.SSCBR2 Circuit-breaker condition monitoring (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.SSCBR2			
3776	236.00	.OpnAlm.stVal	TRV_T_OP_ALM	Opn travel time alarm	1=Alarm
3777	236.01	.ClsAlm.stVal	TRV_T_CL_ALM	Cls travel time alarm	1=Alarm
3778	236.02	.SprChaAlm.stVal	SPR_CHR_ALM	Spring charge alarm	1=Alarm
3779	236.03	.OpNumAlm.stVal	OPR_ALM	CB operations alarm	1=Alarm
3780	236.04	.OpNumLO.stVal	OPR_LO	CB operations lockout	1=Lockout
3781	236.05	.LonTmAlm.stVal	MON_ALM	CB inactive alarm	1=Alarm
3782	236.06	.PresAlm.stVal	PRES_ALM	Low pressure alarm	1=Alarm
3783	236.07	.PresLO.stVal	PRES_LO	Low pressure lockout	1=Lockout
3784	236.08	.APwrAlm.stVal	IPOW_ALM	Lyt alarm	1=Alarm
3785	236.09	.APwrLO.stVal	IPOW_LO	Lyt lockout	1=Lockout
3786	236.10	.CBLifAlm.stVal	CB_LIFE_ALM	CB lifetime alarm	1=Alarm

2.3.119 LD0.SPCGAPC1 Generic control point (16 pcs) (1)

Table 123: LD0.SPCGAPC1 Generic control point (16 pcs) (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.SPCGAPC1			
3600	225.00	.SPCS01.stVal		Ouput state 1	0/1=Off/On
3601	225.01	.mcd			
3602	225.02	.SPCS02.stVal		Ouput state 2	0/1=Off/On
3603	225.03	.mcd			
3604	225.04	.SPCS03.stVal		Ouput state 3	0/1=Off/On
3605	225.05	.mcd			
3606	225.06	.SPCS04.stVal		Ouput state 4	0/1=Off/On
3607	225.07	.mcd			
3608	225.08	.SPCS05.stVal		Ouput state 5	0/1=Off/On
3609	225.09	.mcd			
3610	225.10	.SPCS06.stVal		Ouput state 6	0/1=Off/On
3611	225.11	.mcd			
3612	225.12	.SPCS07.stVal		Ouput state 7	0/1=Off/On

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
3613	225.13	.mcd			
3614	225.14	.SPCS08.stVal		Ouput state 8	0/1=Off/On
3615	225.15	.mcd			
3616	226.00	.SPCS09.stVal		Ouput state 9	0/1=Off/On
3617	226.01	.mcd			
3618	226.02	.SPCS10.stVal		Ouput state 10	0/1=Off/On
3619	226.03	.mcd			
3620	226.04	.SPCS11.stVal		Ouput state 11	0/1=Off/On
3621	226.05	.mcd			
3622	226.06	.SPCS12.stVal		Ouput state 12	0/1=Off/On
3623	226.07	.mcd			
3624	226.08	.SPCS13.stVal		Ouput state 13	0/1=Off/On
3625	226.09	.mcd			
3626	226.10	.SPCS14.stVal		Ouput state 14	0/1=Off/On
3627	226.11	.mcd			
3628	226.12	.SPCS15.stVal		Ouput state 15	0/1=Off/On
3629	226.13	.mcd			
3630	226.14	.SPCS16.stVal		Ouput state 16	0/1=Off/On
3631	226.15	.mcd			

2.3.120 LD0.SPCGAPC2 Generic control point (16 pcs) (2)

Table 124: LD0.SPCGAPC2 Generic control point (16 pcs) (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.SPCGAPC2			
3632	227.00	.SPCS01.stVal		Ouput state 1	0/1=Off/On
3633	227.01	.mcd			
3634	227.02	.SPCS02.stVal		Ouput state 2	0/1=Off/On
3635	227.03	.mcd			
3636	227.04	.SPCS03.stVal		Ouput state 3	0/1=Off/On
3637	227.05	.mcd			
3638	227.06	.SPCS04.stVal		Ouput state 4	0/1=Off/On
3639	227.07	.mcd			
3640	227.08	.SPCS05.stVal		Ouput state 5	0/1=Off/On
3641	227.09	.mcd			
3642	227.10	.SPCS06.stVal		Ouput state 6	0/1=Off/On
3643	227.11	.mcd			
3644	227.12	.SPCS07.stVal		Ouput state 7	0/1=Off/On
3645	227.13	.mcd			

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
3646	227.14	.SPCS08.stVal		Ouput state 8	0/1=Off/On
3647	227.15	.mcd			
3648	228.00	.SPCS09.stVal		Ouput state 9	0/1=Off/On
3649	228.01	.mcd			
3650	228.02	.SPCS10.stVal		Ouput state 10	0/1=Off/On
3651	228.03	.mcd			
3652	228.04	.SPCS11.stVal		Ouput state 11	0/1=Off/On
3653	228.05	.mcd			
3654	228.06	.SPCS12.stVal		Ouput state 12	0/1=Off/On
3655	228.07	.mcd			
3656	228.08	.SPCS13.stVal		Ouput state 13	0/1=Off/On
3657	228.09	.mcd			
3658	228.10	.SPCS14.stVal		Ouput state 14	0/1=Off/On
3659	228.11	.mcd			
3660	228.12	.SPCS15.stVal		Ouput state 15	0/1=Off/On
3661	228.13	.mcd			
3662	228.14	.SPCS16.stVal		Ouput state 16	0/1=Off/On
3663	228.15	.mcd			

2.3.121 LD0.SPCLGAPC1 Local generic control points (1)

Table 125: LD0.SPCLGAPC1 Local generic control points (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.SPCLGAPC1			
4048	253.00	.SPCS01.stVal		Ouput state 1	0/1=Off/On
4049	253.01	.mcd			
4050	253.02	.SPCS02.stVal		Ouput state 2	0/1=Off/On
4051	253.03	.mcd			
4052	253.04	.SPCS03.stVal		Ouput state 3	0/1=Off/On
4053	253.05	.mcd			
4054	253.06	.SPCS04.stVal		Ouput state 4	0/1=Off/On
4055	253.07	.mcd			
4056	253.08	.SPCS05.stVal		Ouput state 5	0/1=Off/On
4057	253.09	.mcd			
4058	253.10	.SPCS06.stVal		Ouput state 6	0/1=Off/On
4059	253.11	.mcd			
4060	253.12	.SPCS07.stVal		Ouput state 7	0/1=Off/On
4061	253.13	.mcd			
4062	253.14	.SPCS08.stVal		Ouput state 8	0/1=Off/On

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
4063	253.15	.mcd			
4064	254.00	.SPCS09.stVal		Ouput state 9	0/1=Off/On
4065	254.01	.mcd			
4066	254.02	.SPCS10.stVal		Ouput state 10	0/1=Off/On
4067	254.03	.mcd			
4068	254.04	.SPCS11.stVal		Ouput state 11	0/1=Off/On
4069	254.05	.mcd			
4070	254.06	.SPCS12.stVal		Ouput state 12	0/1=Off/On
4071	254.07	.mcd			
4072	254.08	.SPCS13.stVal		Ouput state 13	0/1=Off/On
4073	254.09	.mcd			
4074	254.10	.SPCS14.stVal		Ouput state 14	0/1=Off/On
4075	254.11	.mcd			
4076	254.12	.SPCS15.stVal		Ouput state 15	0/1=Off/On
4077	254.13	.mcd			
4078	254.14	.SPCS16.stVal		Ouput state 16	0/1=Off/On
4079	254.15	.mcd			

2.3.122 LD0.SPCRGAPC1 Remote generic control points (1)

Table 126: LD0.SPCRGAPC1 Remote generic control points (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.SPCRGAPC1			
4080	255.00	.SPCS01.stVal		Ouput state 1	0/1=Off/On
4081	255.01	.mcd			
4082	255.02	.SPCS02.stVal		Ouput state 2	0/1=Off/On
4083	255.03	.mcd			
4084	255.04	.SPCS03.stVal		Ouput state 3	0/1=Off/On
4085	255.05	.mcd			
4086	255.06	.SPCS04.stVal		Ouput state 4	0/1=Off/On
4087	255.07	.mcd			
4088	255.08	.SPCS05.stVal		Ouput state 5	0/1=Off/On
4089	255.09	.mcd			
4090	255.10	.SPCS06.stVal		Ouput state 6	0/1=Off/On
4091	255.11	.mcd			
4092	255.12	.SPCS07.stVal		Ouput state 7	0/1=Off/On
4093	255.13	.mcd			
4094	255.14	.SPCS08.stVal		Ouput state 8	0/1=Off/On
4095	255.15	.mcd			

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
4096	256.00	.SPCS09.stVal		Ouput state 9	0/1=Off/On
4097	256.01	.mcd			
4098	256.02	.SPCS10.stVal		Ouput state 10	0/1=Off/On
4099	256.03	.mcd			
4100	256.04	.SPCS11.stVal		Ouput state 11	0/1=Off/On
4101	256.05	.mcd			
4102	256.06	.SPCS12.stVal		Ouput state 12	0/1=Off/On
4103	256.07	.mcd			
4104	256.08	.SPCS13.stVal		Ouput state 13	0/1=Off/On
4105	256.09	.mcd			
4106	256.10	.SPCS14.stVal		Ouput state 14	0/1=Off/On
4107	256.11	.mcd			
4108	256.12	.SPCS15.stVal		Ouput state 15	0/1=Off/On
4109	256.13	.mcd			
4110	256.14	.SPCS16.stVal		Ouput state 16	0/1=Off/On
4111	256.15	.mcd			

2.3.123 LD0.T1PTTR1 Three-phase thermal protection for feeders, cables and distribution transformers (1)

Table 127: LD0.T1PTTR1 Three-phase thermal protection for feeders, cables and distribution transformers (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.T1PTTR1			
2972	185.12	.Str.general	START	General start	1=Start
2973	185.13	.mcd			
2974	185.14	.AlmThm.general	ALARM	Thermal alarm	1=Alarm
2975	185.15	.mcd			
2976	186.00	.Op.general	OPERATE	General operate	1=Operate
2977	186.01	.mcd			

2.3.124 LD0.TRPPTRC1 Master trip (1)

Table 128: LD0.TRPPTRC1 Master trip (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.TRPPTRC1			
2740	171.04	.Op.general	-	Op. input signal	1=Operate
2741	171.05	.mcd			
2742	171.06	.Tr.general	-	Trip output signal	1=Trip
2743	171.07	.mcd			

2.3.125 LD0.TRPPTRC2 Master trip (2)

Table 129: LD0.TRPPTRC2 Master trip (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.TRPPTRC2			
2744	171.08	.Op.general	-	Op. input signal	1=Operate
2745	171.09	.mcd			
2746	171.10	.Tr.general	-	Trip output signal	1=Trip
2747	171.11	.mcd			

2.3.126 LD0.TCSSCBR1 Trip circuit supervision (1)

Table 130: LD0.TCSSCBR1 Trip circuit supervision (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.TCSSCBR1			
2780	173.12	.CircAlm.stVal	ALARM	Supervision alarm	1=Alarm
2781	173.13	.mcd			

2.3.127 LD0.TCSSCBR2 Trip circuit supervision (2)

Table 131: LD0.TCSSCBR2 Trip circuit supervision (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.TCSSCBR2			
2782	173.14	.CircAlm.stVal	ALARM	Supervision alarm	1=Alarm
2783	173.15	.mcd			

2.3.128 LD0.ULTVTR1 Three-phase VT supervision (1)

Table 132: LD0.ULTVTR1 Three-phase VT supervision (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.UL1TVTR1			
		.Alm.stVal	ALARM	Alarm	1=Alarm
		.mcd			
		.Wrn.stVal	WARNING	Warning	1=Warning
		.mcd			

2.3.129 LD0.ULTVTR2 Three-phase VT supervision (2)

Table 133: LD0.ULTVTR2 Three-phase VT supervision (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.UL1TVTR2			
		.Alm.stVal	ALARM	Alarm	1=Alarm
		.mcd			
		.Wrn.stVal	WARNING	Warning	1=Warning
		.mcd			

2.3.130 LD0.VMHAI1 Voltage total harmonic distortion (1)

Table 134: LD0.VMHAI1 Voltage total harmonic distortion (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.VMHAI1			
3318	207.06	.Alm.stVal	ALARM		1=Alarm
3319	207.07	.mcd			

2.3.131 LD0.VMMXU1 Three-phase voltage measurement (1)

Table 135: LD0.VMMXU1 Three-phase voltage measurement (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.VMMXU1			
2784	174.00	.HiAlm.stVal	HIGH_ALARM	High alarm	1=Alarm
2785	174.01	.mcd			
2786	174.02	.HiWrn.stVal	HIGH_WARN	High warning	1=Warning
2787	174.03	.mcd			
2788	174.04	.LoWrn.stVal	LOW_WARN	Low warning	1=Warning
2789	174.05	.mcd			
2790	174.06	.LoAlm.stVal	LOW_ALARM	Low alarm	1=Alarm
2791	174.07	.mcd			

2.3.132 LD0.VMMXU2 Three-phase voltage measurement (2)

Table 136: LD0.VMMXU2 Three-phase voltage measurement (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.VMMXU2			
3360	210.00	.HiAlm.stVal	HIGH_ALARM	High alarm	1=Alarm
3361	210.01	.mcd			

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
3362	210.02	.HiWrn.stVal	HIGH_WARN	High warning	1=Warning
3363	210.03	.mcd			
3364	210.04	.LoWrn.stVal	LOW_WARN	Low warning	1=Warning
3365	210.05	.mcd			
3366	210.06	.LoAlm.stVal	LOW_ALARM	Low alarm	1=Alarm
3367	210.07	.mcd			

2.3.133 LD0.VSQVUB1 Voltage unbalance (1)

Table 137: LD0.VSQVUB1 Voltage unbalance (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.VSQVUB1			
3984	249.00	.VarStr.stVal		Start of the event	1=Start
3985	249.01	.mcd			
3986	249.02	.HiPctVUnb.stVal		Unbalance limit exceed	1=Alarm
3987	249.03	.mcd			

2.3.134 LD0.WPWDE1 Wattmetric-based earth-fault protection (1)

Table 138: LD0.WPWDE1 Wattmetric-based earth-fault protection (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.WPSDE1			
3296	206.00	.Str.general	START	Stage start	1=Start
3297	206.01	.mcd			
3298	206.02	.Op.general	OPERATE	Stage operate	1=Operate
3299	206.03	.mcd			

2.3.135 LD0.WPWDE2 Wattmetric-based earth-fault protection (2)

Table 139: LD0.WPWDE2 Wattmetric-based earth-fault protection (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.WPSDE2			
3300	206.04	.Str.general	START	Stage start	1=Start
3301	206.05	.mcd			
3302	206.06	.Op.general	OPERATE	Stage operate	1=Operate
3303	206.07	.mcd			

2.3.136 LD0.WPWDE3 Wattmetric-based earth-fault protection (3)

Table 140: LD0.WPWDE3 Wattmetric-based earth-fault protection (3)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.WPSDE3			
3304	206.08	.Str.general	START	Stage start	1=Start
3305	206.09	.mcd			
3306	206.10	.Op.general	OPERATE	Stage operate	1=Operate
3307	206.11	.mcd			

2.3.137 LD0.XAGGIO130 Physical I/O states (AIM card XA130)

Table 141: LD0.XAGGIO130 Physical I/O states (AIM card XA130)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.XAGGIO130			
3280	205.00	.Ind1.stVal		XA130-Input 1 State	0/1=Off/On
3281	205.01	.mcd			
3282	205.02	.Ind2.stVal		XA130-Input 2 State	0/1=Off/On
3283	205.03	.mcd			
3284	205.04	.Ind3.stVal		XA130-Input 3 State	0/1=Off/On
3285	205.05	.mcd			
3286	205.06	.Ind4.stVal		XA130-Input 4 State	0/1=Off/On
3287	205.07	.mcd			

2.3.138 LD0.XARGGIO130 RTD inputs (1)

Table 142: LD0.XARGGIO130 RTD inputs (1)

BitA	RegA	IED 61850 name	SA name	Description	Values
		LD0.XARGGIO130			
-	-	.Wrn1.stVal	-	Warning	1=Warning
-	-	.mcd			
-	-	.Alm.stVal	-	Alarm	1=Alarm
-	-	.mcd			

2.3.139 LD0.XGGIO130 Physical I/O states (BIO card X130)

Table 143: LD0.XGGIO130 Physical I/O states (BIO card X130)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.XGGIO130			
3184	199.00	.Ind1.stVal		X130-Input 1 State	0/1=Off/On
3185	199.01	.mcd			
3186	199.02	.Ind2.stVal		X130-Input 2 State	0/1=Off/On
3187	199.03	.mcd			
3188	199.04	.Ind3.stVal		X130-Input 3 State	0/1=Off/On
3189	199.05	.mcd			
3190	199.06	.Ind4.stVal		X130-Input 4 State	0/1=Off/On
3191	199.07	.mcd			
3192	199.08	.Ind5.stVal		X130-Input 5 State	0/1=Off/On
3193	199.09	.mcd			
3194	199.10	.Ind6.stVal		X130-Input 6 State	0/1=Off/On
3195	199.11	.mcd			
3264	204.00	.SPCSO1.stVal		X130-Output 1 State	0/1=Off/On
3265	204.01	.mcd			
3266	204.02	.SPCSO2.stVal		X130-Output 2 State	0/1=Off/On
3267	204.03	.mcd			
3268	204.04	.SPCSO3.stVal		X130-Output 3 State	0/1=Off/On
3269	204.05	.mcd			

2.3.140 LD0.XGGIO120 Physical I/O states (AIM card X120)

Table 144: LD0.XGGIO120 Physical I/O states (AIM card X120)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.XGGIO120			
3200	200.00	.Ind1.stVal		X120-Input 1 State	0/1=Off/On
3201	200.01	.mcd			
3202	200.02	.Ind2.stVal		X120-Input 2 State	0/1=Off/On
3203	200.03	.mcd			
3204	200.04	.Ind3.stVal		X120-Input 3 State	0/1=Off/On
3205	200.05	.mcd			
3206	200.06	.Ind4.stVal		X120-Input 4 State	0/1=Off/On
3207	200.07	.mcd			

2.3.141 LD0.XGGIO110 Physical I/O states (BIO card X110)

Table 145: LD0.XGGIO110 Physical I/O states (BIO card X110)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.XGGIO110			
3216	201.00	.Ind1.stVal		X110-Input 1 State	0/1=Off/On
3217	201.01	.mcd			
3218	201.02	.Ind2.stVal		X110-Input 2 State	0/1=Off/On
3219	201.03	.mcd			
3220	201.04	.Ind3.stVal		X110-Input 3 State	0/1=Off/On
3221	201.05	.mcd			
3222	201.06	.Ind4.stVal		X110-Input 4 State	0/1=Off/On
3223	201.07	.mcd			
3224	201.08	.Ind5.stVal		X110-Input 5 State	0/1=Off/On
3225	201.09	.mcd			
3226	201.10	.Ind6.stVal		X110-Input 6 State	0/1=Off/On
3227	201.11	.mcd			
3228	201.12	.Ind7.stVal		X110-Input 7 State	0/1=Off/On
3229	201.13	.mcd			
3230	201.14	.Ind8.stVal		X110-Input 8 State	0/1=Off/On
3231	201.15	.mcd			
3232	202.00	.SPCSO1.stVal		X110-Output 1 State	0/1=Off/On
3233	202.01	.mcd			
3234	202.02	.SPCSO2.stVal		X110-Output 2 State	0/1=Off/On
3235	202.03	.mcd			
3236	202.04	.SPCSO3.stVal		X110-Output 3 State	0/1=Off/On
3237	202.05	.mcd			
3238	202.06	.SPCSO4.stVal		X110-Output 4 State	0/1=Off/On
3239	202.07	.mcd			

2.3.142 LD0.XGGIO100 Physical I/O states (PSM card X100)

Table 146: LD0.XGGIO100 Physical I/O states (PSM card X100)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.XGGIO100			
3248	203.00	.SPCSO1.stVal		X100-Output 1 State	0/1=Off/On
3249	203.01	.mcd			
3250	203.02	.SPCSO2.stVal		X100-Output 2 State	0/1=Off/On
3251	203.03	.mcd			
3252	203.04	.SPCSO3.stVal		X100-Output 3 State	0/1=Off/On

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
3253	203.05	.mcd			
3254	203.06	.SPCSO4.stVal		X100-Output 4 State	0/1=Off/On
3255	203.07	.mcd			
3256	203.08	.SPCSO5.stVal		X100-Output 5 State	0/1=Off/On
3257	203.09	.mcd			
3258	203.10	.SPCSO6.stVal		X100-Output 6 State	0/1=Off/On
3259	203.11	.mcd			

2.4 Registers

Table 147: Explanations of columns in register tables

Column name	Description
RegA	Default 3X and 4X register address for the data.
Type	Type of the register. The alternatives are u16, u32 (unsigned 16 and 32 bits integer) or i16, i32 (signed 16 and 32 bit integer).
Scale	Scale factor as default. Also, an adjustable offset value exists that is set to 0 by default.
IEC 61850 name	Original IED data object identification. Described in the IEC 61850 format as Logical Device.Logical Node and thereafter .Data Object.Data Attribute. Logical Node is the same as the application function block name.
SA name	The signal may have a defined label that is visible, for example, in the Application Configuration tool in PCM600.
Description	Short description of the signal. See the technical manual for more information. Also, if a register is writable, it is stated here.
Values	The value range of the original IEC 61850 value, that is, before scaling.

2.4.1 User-definable registers [Alt.1], visible on 3x and 4x

Table 148: User-definable registers [Alt.1], visible on 3x and 4x

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
(0)	Reg				< not mappable - not visible >	
1	Reg				User register 1	
2	Reg				User register 2	
3	:				:	
:	:				:	
:	:				:	
127	Reg				User register 127	

2.4.2 User-definable bits [Alt.2], visible on 0x,1x,3x and 4x

Table 149: User-definable bits [Alt.2], visible on 0x,1x,3x and 4x

BitA	Type	Scale	IEC 61850 name	SA name	Description	Values
(0)	Bit				< not mappable - not visible >	
1	Bit				Usr reg 1.Bit 01	
2	Bit				Usr reg 1.Bit 02	
3	Bit				Usr reg 1.Bit 03	
:	:				:	
:	:				:	
15	Bit				Usr reg 1.Bit 15	
16	Bit				Usr reg 2.Bit 00	
17	Bit				Usr reg 2.Bit 01	
:	:				:	
:	:				:	
2046	Bit				Usr reg 127.Bit 14	
2047	Bit				Usr reg 127.Bit 15	

2.4.3 SSR1 System status register (1) device health

Table 150: SSR1 System status register (1) device health

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
128.00	Bit				Device global error	1=Error
128.01	Bit				Device global warning	1=Warning
128.02	Bit				< reserved >	0
128.03	Bit				< reserved >	0
128.04	Bit				< reserved >	0
128.05	Bit				< reserved >	0
128.06	Bit				< reserved >	0
128.07	Bit				< reserved >	0
128.08	Bit				< reserved >	0
128.09	Bit				< reserved >	0
128.10	Bit				< reserved >	0
128.11	Bit				< reserved >	0
128.12	Bit				< reserved >	0
128.13	Bit				< reserved >	0
128.14	Bit				< reserved >	0
128.15	Bit				< reserved >	0

2.4.4 SSR2 System status register (2) protection relay's mode and state

Table 151: SSR2 System status register (2) protection relay's mode and state

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
129.00	Bit				Device test mode	1=Test mode
129.01	Bit				< reserved >	0
129.02	Bit				Remote/Local state	0/1=Rem/Loc
					Active setting group	SG=1...6
129.03	Bit				- bit 0	
129.04	Bit				- bit 1	
129.05	Bit				- bit 2	
129.06	Bit				Protection relay's timesynch failure	1=Failure
129.07	Bit				< reserved >	0
129.08	Bit				Last reset cause a	1=Cold start
129.09	Bit				Last reset cause b	1=Watchdog
129.10	Bit				Last reset cause c	1=Warm start
129.11	Bit				< reserved >	0
129.12	Bit				< reserved >	0
129.13	Bit				< reserved >	0
129.14	Bit				< reserved >	0
129.15	Bit				< reserved >	0

2.4.5 SSR3 System status register (3) data available 1 (client-dependent)

Table 152: SSR3 System status register (3) data available 1 (client-dependent)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
130.00	Bit				Unread event records available	1=Available
130.01	Bit				Unread fault records available	1=Available
130.02	Bit				< reserved >	0
130.03	Bit				< reserved >	0
130.04	Bit				Any momentary bit updated	1=Updated
130.05	Bit				Any mcd bit set	1=Set
130.06	Bit				Device restart bit	1=IED restart
130.07	Bit				< reserved >	0
130.08	Bit				Event record selected	1=Selected
130.09	Bit				Fault record selected	1=Selected
130.10	Bit				< reserved >	0

Table continues on next page

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
130.11	Bit				< reserved >	0
130.12	Bit				< reserved >	0
130.13	Bit				< reserved >	0
130.14	Bit				< reserved >	0
130.15	Bit				< reserved >	0

2.4.6 SSR4 System status register (4) data available 2 (client-dependent, user-definable)

Table 153: SSR4 System status register (4) data available 2 (client-dependent, user-definable)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
131.00	Bit				Data category 1 has changed	1=Changed
131.01	Bit				Data category 2 has changed	1=Changed
131.02	Bit				Data category 3 has changed	1=Changed
131.03	Bit				Data category 4 has changed	1=Changed
131.04	Bit				Data category 5 has changed	1=Changed
131.05	Bit				Data category 6 has changed	1=Changed
131.06	Bit				Data category 7 has changed	1=Changed
131.07	Bit				Data category 8 has changed	1=Changed
131.08	Bit				Data category 9 has changed	1=Changed
131.09	Bit				Data category 10 has changed	1=Changed
131.10	Bit				Data category 11 has changed	1=Changed
131.11	Bit				Data category 12 has changed	1=Changed
131.12	Bit				Data category 13 has changed	1=Changed
131.13	Bit				Data category 14 has changed	1=Changed
131.14	Bit				Data category 15 has changed	1=Changed
131.15	Bit				Data category 16 has changed	1=Changed

2.4.7 SSR5 System status register (5) device alive register

Table 154: SSR5 System status register (5) device alive register

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
132	u16	1			Device alive counter	0...65535

2.4.8 SSR6 System status register (6) control command status (client-dependent)

Table 155: SSR6 System status register (6) control command status (client-dependent)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
					Last cmd result code	1)
133.00	Bit				- bit 0	
133.01	Bit				- bit 1	
133.02	Bit				- bit 2	
133.03	Bit				- bit 3	
133.04	Bit				- bit 4	
133.05	Bit				- bit 5	
133.06	Bit				- bit 6	
133.07	Bit				- bit 7	
					Response Type	1)
133.08	Bit				- bit 0	
133.09	Bit				- bit 1	
					Command state	1)
133.10	Bit				- bit 0	
133.11	Bit				- bit 1	
					Cmd sequence number	0...15
133.12	Bit				- bit 0	
133.13	Bit				- bit 1	
133.14	Bit				- bit 2	
133.15	Bit				- bit 3	

1) See the technical manual.

2.4.9 Indication bits mirrored in registers

The pre-mapped indication bit data has been mapped from indication bit address 2720 onwards. The bit data is mirrored in registers starting from register address 170 onwards.

Table 156: Indication bits mirrored in registers

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
170.00	Bit				Indication bit 2720 (0x1700)	
170.01	Bit				Indication bit 2721 (0x1701)	
:	:				:	
170.14	Bit				Indication bit 2734 (0x170E)	
170.15	Bit				Indication bit 2735 (0x170F)	
171.00	Bit				Indication bit 2736 (0x1710)	
:	:				:	

2.4.10 CTRL.CBCSWI1 Circuit breaker operation counter (1)

Table 157: CTRL.CBCSWI1 Circuit breaker operation counter (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			CTRL.CBCSWI1			
2027	u16	1	.OpCntRs.stVal	Operation counter	Operation counter	0…65535

2.4.11 LD0.CMHAI1 Current total demand distortion (1)

Table 158: LD0.CMHAI1 Current total demand distortion (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.CMHAI1		3-second mean value:	
2150	u16	100	.TddA.phsA.cVal.mag	3SMHTDD_A	- phsA	0...500.00 [%]
2151	u16	100	.TddA.phsB.cVal.mag	3SMHTDD_B	- phsB	0...500.00 [%]
2152	u16	100	.TddA.phsC.cVal.mag	3SMHTDD_C	- phsC	0...500.00 [%]
					Demand value:	
2153	u16	100	.DmdTddA.phsA.cVal.mag	DMD_TDD_A	- phsA	0...500.00 [%]
2154	u16	100	.DmdTddA.phsB.cVal.mag	DMD_TDD_B	- phsB	0...500.00 [%]
2155	u16	100	.DmdTddA.phsC.cVal.mag	DMD_TDD_C	- phsC	0...500.00 [%]
					Max demand value:	
2156	u16	100	.MaxDmdTddA.phsA.cVal.mag	-	- phsA	0...500.00 [%]
2157	u16	100	.MaxDmdTddA.phsB.cVal.mag	-	- phsB	0...500.00 [%]
2158	u16	100	.MaxDmdTddA.phsC.cVal.mag	-	- phsC	0...500.00 [%]

2.4.12 LD0.CMMXU1 Three-phase current measurement (1)

Table 159: LD0.CMMXU1 Three-phase current measurement (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.CMMXU1		Phase current (1)	
138	u16	1000	.A.phsA.instCVal.mag	I_INST_A	Phs A amplitude	0.00...40.0 [xIn]
139	u16	1000	.A.phsB.instCVal.mag	I_INST_B	Phs B amplitude	0.00...40.0 [xIn]
140	u16	1000	.A.phsC.instCVal.mag	I_INST_C	Phs C amplitude	0.00...40.0 [xIn]

2.4.13 LD0.CSMSQI1 Sequence current measurement (1)

Table 160: LD0.CSMSQI1 Sequence current measurement (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.CSMSQI1		Sequence of currents	
143	u16	1000	.SeqA.c1.instCVal.mag	I1_INST	Positive amplitude	0.00...40.0 [xIn]
144	u16	1000	.SeqA.c2.instCVal.mag	I2_INST	Negative amplitude	0.00...40.0 [xIn]
145	u16	1000	.SeqA.c2.instCVal.mag	I3_INST	Zero amplitude	0.00...40.0 [xIn]

2.4.14 LD0.DARREC1 Autoreclosing values (1)

Table 161: LD0.DARREC1 Autoreclosing values (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.DARREC1			
135	i16	1	.AutoRecSt.stVal	STATUS	AR state	-2...4[1)]
136	u16	1	.ShotPntr.stVal	SHOT_PTR	AR shot pointer value	0...6
137	u16	1	.OpCntRs.stVal	COUNTER	AR operation counter	0...65535

1) See the technical manual.

2.4.15 LD0.DARREC1 Autoreclosing counters (1)

Table 162: LD0.DARREC1 Autoreclosing counters (1)

RegA	Typw	Scale	IEC 61850 name	SA name	Description	Values
			LD0.DARREC1			
2031	u16	1	.RecCnt1.stVal	CNT_SHOT1	AR 1st shot counter	0…65535
2032	u16	1	.RecCnt2.stVal	CNT_SHOT2	AR 2nd shot counter	0…65535
2033	u16	1	.RecCnt3.stVal	CNT_SHOT3	AR 3rd shot counter	0…65535
2034	u16	1	.RecCnt4.stVal	CNT_SHOT4	AR 4th shot counter	0…65535
2035	u16	1	.RecCnt5.stVal	CNT_SHOT5	AR 5th shot counter	0…65535
2036	u16	1	.FrqOpCnt.stVal	FRQ_OPR_CNT	AP freq. op. counter	0…65535

2.4.16 LD0.FMMXU1 Frequency measurement (1)

Table 163: LD0.FMMXU1 Frequency measurement (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.FMMXU1			
168	u16	100	.Hz.mag	F_DB	Frequency	35.00...75.00 [Hz]

2.4.17 LD0.FMMXU2 Frequency measurement (2)

Table 164: LD0.FMMXU2 Frequency measurement (2)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.FMMXU1			
-	u16	100	.Hz.mag	F_DB	Frequency	35.00...75.00

2.4.18 LD0.MDSOPT1 Runtime counter for machines and devices (1)

Since the register size is 16 bits, the value saturates at 65535 hours (approximately 7.5 years). Alternatively, a 32-bit user-definable register can be made of this data to cover the whole 300 000 hours (34 years) range. The value can also, for example, be rescaled to show “total operation days” instead by changing the scale factor from 1 to 1/24 = 0.0417.

Table 165: LD0.MDSOPT1 Runtime counter for machines and devices (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
2048	u16	1	.stVal	OPR_TIME	Operating hours	0…299999 [hours]

2.4.19 LD0.MVI4GAPC1 Integer value move (1)

Table 166: LD0.MVI4GAPC1 Integer value move (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.MVI4GAPC1			
1201	i32	1	.ISCS01.stVal	OUT1	- Integer value 1 (high)	-/ +2147483647
1202					- (low word)	
1203	i32	1	.ISCS02.stVal	OUT2	- Integer value 2 (high)	-/ +2147483647
1204					- (low word)	
1205	i32	1	.ISCS03.stVal	OUT3	- Integer value 3 (high)	-/ +2147483647
1206					- (low word)	
1207	i32	1	.ISCS04.stVal	OUT4	- Integer value 4 (high)	-/ +2147483647
1208					- (low word)	

2.4.20 LD0.MVI4GAPC2 Integer value move (2)

Table 167: LD0.MVI4GAPC2 Integer value move (2)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.MVI4GAPC2			
1209	i32	1	.ISCS01.stVal	OUT1	- Integer value 1 (high)	-/ +2147483647
1210					- (low word)	
1211	i32	1	.ISCS02.stVal	OUT2	- Integer value 2 (high)	-/ +2147483647
1212					- (low word)	
1213	i32	1	.ISCS03.stVal	OUT3	- Integer value 3 (high)	-/ +2147483647
1214					- (low word)	
1215	i32	1	.ISCS04.stVal	OUT4	- Integer value 4 (high)	-/ +2147483647
1216					- (low word)	

2.4.21 LD0.PEMMXU1 Three-phase power and energy measurement (1)

Table 168: LD0.PEMMXU1 Three-phase power and energy measurement (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.PEMMXU1			
161	i32	1	.TotW.instMag	P_INST	Total active power P (high)	-/+ 999,999
162			.TotW.instMag		(low word)	
163	i32	1	.TotVAr.instMag	Q_INST	Total reactive power Q (high)	-/+ 999,999
164			.TotVAr.instMag		(low word)	
165	i32	1	.TotVA.instMag	S_INST	Total apparent power S (high)	-/+ 999,999
166			.TotVA.instMag		(low word)	
167	i16	1000	.TotPF.instMag	PF_INST	Average power factor	-1...1

2.4.22 LD0.PEMMXU2 Three-phase power and energy measurements (2)

Table 169: LD0.PEMMXU2 Three-phase power and energy measurements (2)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.PEMMXU2			
-	i32	1	.TotW.instMag	P_INST	Total active power P	-999999...999999 kW
-						

Table continues on next page

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
-	i32	1	.TotVAr.instMag	Q_INST	Total reactive power Q	-999999...999999 kVAr
-						
-	i32	1	.TotVA.instMag	S_INST	Total apparent power S	-999999...999999 kVA
-						
-	i16	1000	.TotPF.instMag	PF_INST	Power factor	-1…1
			LD0.PEAVMMXU2			
-	i32	1	.TotW.mag		Demand active power P	-999999...999999 kW
-						
-	i32	1	.TotVAr.mag		Demand reactive power Q	-999999...999999 kVAr
-						
-	i32	1	.TotVA.mag		Demand apparent power S	-999999...999999 kVA
-						
-	i16	1000	.TotPF.mag		Average power factor	-1…1
			LD0.PEMAMMXU2			
-	i32	1	.TotW.mag		Max active power P	-999999...999999 kW
-						
-	i32	1	.TotVAr.mag		Max reactive power Q	-999999...999999 kVAr
-						
-	i32	1	.TotVA.mag		Max apparent power S	-999999...999999 kVA
-						
			LD0.PEMIMMXU2			
-	i32	1	.TotW.mag		Min active power P	-999999...999999 kW
-						
-	i32	1	.TotVAr.mag		Min reactive power Q	-999999...999999 kVAr
-						
-	i32	1	.TotVA.mag		Min apparent power S	-999999...999999 kVA
-						
			LD0.PEMMTR2			
-	u32	1	.SupWh.actVal		Reverse active energy	0…1E10 kWh
-						
-	u32	1	.SupVArh.actVal		Reverse reactive energy	0…1E10 kVArh
-						

Table continues on next page

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
-	u32	1	.DmdWh.actVal		Forward active energy	0…1E10 kWh
-						
-	u32	1	.DmdVArh.actVal		Forward reactive energy	0…1E10 kVArh
-						

2.4.23 LD0.PHQVVR1 Voltage variation (1)

Table 170: LD0.PHQVVR1 Voltage variation (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.PH1QVVR1		Voltage swell	
2200	u32	1	.SwlInstCnt.stVal	INSTSWELLCNT	- Inst counter (high)	0…
2201					- (Low word)	2147483647
2202	u32	1	.SwlMomCnt.stVal	MOMSWELLCNT	- Mom counter (high)	0…
2203					- (Low word)	2147483647
2204	u32	1	.SwlTmpCnt.stVal	TEMPSWELLCNT	- Temp counter (high)	0…
2205					- (Low word)	2147483647
2206	u32	1	.SwlMaxCnt.stVal	MAXDURSWELLCNT	- Max. duration.counter (high)	0…
2207					- (Low word)	2147483647
					Voltage dip	
2208	u32	1	.DipInstCnt.stVal	INSTDIPCNT	- Inst counter (high)	0…
2209					- (Low word)	2147483647
2210	u32	1	.DipMomCnt.stVal	MOMDIPCNT	- Mom counter (high)	0…
2211					- (Low word)	2147483647
2212	u32	1	.DipTmpCnt.stVal	TEMPDIPCNT	- Temp counter (high)	0…
2213					- (Low word)	2147483647
2214	u32	1	.DipMaxCnt.stVal	MAXDURDIPCNT	- Max. duration counter (high)	0…
2215					- (Low word)	2147483647
					Voltage interrupts	
2216	u32	1	.IntrMomCnt.stVal	MOMINTCNT	- Mom counter (high)	0…
2217					- (Low word)	2147483647
2218	u32	1	.IntrTmpCnt.stVal	TEMPINTCNT	- Temp counter (high)	0…
2219					- (Low word)	2147483647
2220	u32	1	.IntrSstCnt.stVal	SUSTINTCNT	- Sustain counter (high)	0…
2221					- (Low word)	2147483647
2222	u32	1	.IntrMaxCnt.stVal	MAXDURINTCNT	- Max. duration counter (high)	0…
2223					- (Low word)	

2.4.24 LD0.RESCMMXU1 Residual current measurement (1)

Table 171: LD0.RESCMMXU1 Residual current measurement (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.RESCMMXU1		Residual current (1)	
141	u16	1000	.A.res.instCVal.mag	I0_INST	- amplitude	0.00...40.0 [xIn]

2.4.25 LD0.RESVMMXU1 Residual voltage measurement (1)

Table 172: LD0.RESVMMXU1 Residual voltage measurement (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.RESVMMXU1			
-	u16	1000	.A.res.instCVal.mag	U0_INST	- amplitude	0.00...4.00 [xUn]
			LD0.RVAVMMXU1			
-	u16	1000	.A.res.cVal.mag		- average amplitude	0.00...4.00 [xUn]
			LD0.RVMAMMXU1			
-	u16	1000	.A.res.cVal.mag		- max amplitude	0.00...4.00 [xUn]
			LD0.RVMIMMXU1			
-	u16	1000	.A.res.cVal.mag		- min amplitude	0.00...4.00 [xUn]

2.4.26 LD0.SECRSYN1 Synchronism and energizing check (1)

Table 173: LD0.SECRSYN1 Synchronism and energizing check (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.SECRSYN1			
169	u16	1	.EnSt.stVal	ENERG_STATE	Energ. state of line and bus	0...4[1)]

1) See the technical manual.

2.4.27 LD0.SCA4GAPC1 Analog value scaling (1)

Table 174: LD0.SCA4GAPC1 Analog value scaling (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.SCA4GAPC1			
1101	i16	1000	.AnOut1.mag	AO1_VALUE	Analog value 1	-/+10000.00
1102	i16	1000	.AnOut2.mag	AO2_VALUE	Analog value 2	-/+10000.00
1103	i16	1000	.AnOut3.mag	AO3_VALUE	Analog value 3	-/+10000.00
1104	i16	1000	.AnOut4.mag	AO4_VALUE	Analog value 4	-/+10000.00

2.4.28 LD0.SCA4GAPC2 Analog value scaling (2)

Table 175: LD0.SCA4GAPC2 Analog value scaling (2)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.SCA4GAPC2			
1105	i16	1000	.AnOut1.mag	AO1_VALUE	Analog value 1	-/+10000.00
1106	i16	1000	.AnOut2.mag	AO2_VALUE	Analog value 2	-/+10000.00
1107	i16	1000	.AnOut3.mag	AO3_VALUE	Analog value 3	-/+10000.00
1108	i16	1000	.AnOut4.mag	AO4_VALUE	Analog value 4	-/+10000.00

2.4.29 LD0.SCA4GAPC3 Analog value scaling (3)

Table 176: LD0.SCA4GAPC3 Analog value scaling (3)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.SCA4GAPC3			
1109	i16	1000	.AnOut1.mag	AO1_VALUE	Analog value 1	-/+10000.00
1110	i16	1000	.AnOut2.mag	AO2_VALUE	Analog value 2	-/+10000.00
1111	i16	1000	.AnOut3.mag	AO3_VALUE	Analog value 3	-/+10000.00
1112	i16	1000	.AnOut4.mag	AO4_VALUE	Analog value 4	-/+10000.00

2.4.30 LD0.SCA4GAPC4 Analog value scaling (4)

Table 177: LD0.SCA4GAPC4 Analog value scaling (4)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.SCA4GAPC4			
1113	i16	1000	.AnOut1.mag	AO1_VALUE	Analog value 1	-/+10000.00
1114	i16	1000	.AnOut2.mag	AO2_VALUE	Analog value 2	-/+10000.00
1115	i16	1000	.AnOut3.mag	AO3_VALUE	Analog value 3	-/+10000.00
1116	i16	1000	.AnOut4.mag	AO4_VALUE	Analog value 4	-/+10000.00

2.4.31 LD0.SCA4GAPC5 Analog value scaling (5)

Table 178: LD0.SCA4GAPC5 Analog value scaling (5)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.SCA4GAPC5			
1117	i16	1000	.AnOut1.mag	AO1_VALUE	Analog value 1	-/+10000.00
1118	i16	1000	.AnOut2.mag	AO2_VALUE	Analog value 2	-/+10000.00
1119	i16	1000	.AnOut3.mag	AO3_VALUE	Analog value 3	-/+10000.00
1120	i16	1000	.AnOut4.mag	AO4_VALUE	Analog value 4	-/+10000.00

2.4.32 LD0.SCA4GAPC6 Analog value scaling (6)

Table 179: LD0.SCA4GAPC6 Analog value scaling (6)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.SCA4GAPC6			
1121	i16	1000	.AnOut1.mag	AO1_VALUE	Analog value 1	-/+10000.00
1122	i16	1000	.AnOut2.mag	AO2_VALUE	Analog value 2	-/+10000.00
1123	i16	1000	.AnOut3.mag	AO3_VALUE	Analog value 3	-/+10000.00
1124	i16	1000	.AnOut4.mag	AO4_VALUE	Analog value 4	-/+10000.00

2.4.33 LD0.SCA4GAPC7 Analog value scaling (7)

Table 180: LD0.SCA4GAPC7 Analog value scaling (7)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.SCA4GAPC7			
1125	i16	1000	.AnOut1.mag	AO1_VALUE	Analog value 1	-10000… 10000
1126	i16	1000	.AnOut2.mag	AO2_VALUE	Analog value 2	-10000… 10000
1127	i16	1000	.AnOut3.mag	AO3_VALUE	Analog value 3	-10000… 10000
1128	i16	1000	.AnOut4.mag	AO4_VALUE	Analog value 4	-10000… 10000

2.4.34 LD0.SCA4GAPC8 Analog value scaling (8)

Table 181: LD0.SCA4GAPC8 Analog value scaling (8)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.SCA4GAPC8			
1129	i16	1000	.AnOut1.mag	AO1_VALUE	Analog value 1	-10000… 10000
1130	i16	1000	.AnOut2.mag	AO2_VALUE	Analog value 2	-10000… 10000
1131	i16	1000	.AnOut3.mag	AO3_VALUE	Analog value 3	-10000… 10000
1132	i16	1000	.AnOut4.mag	AO4_VALUE	Analog value 4	-10000… 10000

2.4.35 LD0.SCA4GAPC9 Analog value scaling (9)

Table 182: LD0.SCA4GAPC9 Analog value scaling (9)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.SCA4GAPC9			
1133	i16	1000	.AnOut1.mag	AO1_VALUE	Analog value 1	-10000… 10000
1134	i16	1000	.AnOut2.mag	AO2_VALUE	Analog value 2	-10000… 10000
1135	i16	1000	.AnOut3.mag	AO3_VALUE	Analog value 3	-10000… 10000
1136	i16	1000	.AnOut4.mag	AO4_VALUE	Analog value 4	-10000… 10000

2.4.36 LD0.SCA4GAPC10 Analog value scaling (10)

Table 183: LD0.SCA4GAPC10 Analog value scaling (10)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.SCA4GAPC10			
1137	i16	1000	.AnOut1.mag	AO1_VALUE	Analog value 1	-10000… 10000
1138	i16	1000	.AnOut2.mag	AO2_VALUE	Analog value 2	-10000… 10000
1139	i16	1000	.AnOut3.mag	AO3_VALUE	Analog value 3	-10000… 10000
1140	i16	1000	.AnOut4.mag	AO4_VALUE	Analog value 4	-10000… 10000

2.4.37 LD0.SCA4GAPC11 Analog value scaling (11)

Table 184: LD0.SCA4GAPC11 Analog value scaling (11)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.SCA4GAPC11			
1141	i16	1000	.AnOut1.mag	AO1_VALUE	Analog value 1	-10000… 10000
1142	i16	1000	.AnOut2.mag	AO2_VALUE	Analog value 2	-10000… 10000
1143	i16	1000	.AnOut3.mag	AO3_VALUE	Analog value 3	-10000… 10000
1144	i16	1000	.AnOut4.mag	AO4_VALUE	Analog value 4	-10000… 10000

2.4.38 LD0.SCA4GAPC12 Analog value scaling (12)

Table 185: LD0.SCA4GAPC12 Analog value scaling (12)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.SCA4GAPC12			
1145	i16	1000	.AnOut1.mag	AO1_VALUE	Analog value 1	-10000… 10000
1146	i16	1000	.AnOut2.mag	AO2_VALUE	Analog value 2	-10000… 10000
1147	i16	1000	.AnOut3.mag	AO3_VALUE	Analog value 3	-10000… 10000
1148	i16	1000	.AnOut4.mag	AO4_VALUE	Analog value 4	-10000… 10000

2.4.39 LD0.SPEMMXU1 Single-phase power and energy measurement (1)

Table 186: LD0.SPEMMXU1 Single-phase power and energy measurement (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.SPEMMXU1			
-	i32	1	.W.phsA.instCVal.mag		Total active power P -phsA	-999999...99 9999 kW
-						
-	i32	1	.W.phsB.instCVal.mag		Total active power P -phsB	-999999...99 9999 kW
-						
-	i32	1	.W.phsC.instCVal.mag		Total active power P -phsC	-999999...99 9999 kW
-						
-	i32	1	.VAr.phsA.instCVal.mag.f		Total reactive power Q -phsA	-999999...99 9999 kVAr
-						
-	i32	1	.VAr.phsB.instCVal.mag.f		Total reactive power Q -phsB	-999999...99 9999 kVAr
-						
-	i32	1	.VAr.phsC.instCVal.mag.f		Total reactive power Q -phsC	-999999...99 9999 kVAr
-						
-	i32	1	.VA.phsA.instCVal.mag.f		Total apparent power S -phsA	-999999...99 9999 kVA
-						
-	i32	1	.VA.phsB.instCVal.mag.f		Total apparent power S -phsB	-999999...99 9999 kVA
-						

Table continues on next page

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
-	i32	1	.VA.phsC.instCVal.mag.f		Total apparent power S -phsC	-999999...99 9999 kVA
-						
-	i16	1	.PF.phsA.instCVal.mag		Power factor -phsA	-1…1
-	i16	1	.PF.phsB.instCVal.mag		Power factor -phsB	-1…1
-	i16	1	.PF.phsC.instCVal.mag		Power factor -phsC	-1…1
			LD0.SPEMMTR1			
-	u32	1	.DmdVArhA.actVal		Forward reactive energy -phsA	0…1E10 kVArh
-						
-	u32	1	.DmdVArhB.actVal		Forward reactive energy -phsB	0…1E10 kVArh
-						
-	u32	1	.DmdVArhC.actVal		Forward reactive energy -phsC	0…1E10 kVArh
-						
-	u32	1	.DmdWhA.actVal		Forward active energy -phsA	0…1E10 kWh
-						
-	u32	1	.DmdWhB.actVal		Forward active energy -phsB	0…1E10 kWh
-						
-	u32	1	.DmdWhC.actVal		Forward active energy -phsC	0…1E10 kWh
-						
-	u32	1	.SupVArhA.actVal		Reverse reactive energy -phs A	0…1E10 kVArh
-						
-	u32	1	.SupVArhB.actVal		Reverse reactive energy -phs B	0…1E10 kVArh
-						
-	u32	1	.SupVArhC.actVal		Reverse reactive energy -phs C	0…1E10 kVArh
-						
-	u32	1	.SupWhA.actVal		Reverse active energy -phsA	0…1E10 kWh
-						
-	u32	1	.SupWhB.actVal		Reverse active energy -phsB	0…1E10 kWh
-						
-	u32	1	.SupWhC.actVal		Reverse active energy -phsC	0…1E10 kWh
-						

2.4.40 LD0.SPEMMXU2 Single-phase power and energy measurement (2)

Table 187: LD0.SPEMMXU2 Single-phase power and energy measurement (2)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.SPEMMXU2			
-	i32	1	.W.phsA.instCVal.mag		Total active power P -phsA	-999999...999999 kW
-						
-	i32	1	.W.phsB.instCVal.mag		Total active power P -phsB	-999999...999999 kW
-						
-	i32	1	.W.phsC.instCVal.mag		Total active power P -phsC	-999999...999999 kW
-						
-	i32	1	.VAr.phsA.instCVal.mag.f		Total reactive power Q -phsA	-999999...999999 kVAr
-						
-	i32	1	.VAr.phsB.instCVal.mag.f		Total reactive power Q -phsB	-999999...999999 kVAr
-						
-	i32	1	.VAr.phsC.instCVal.mag.f		Total reactive power Q -phsC	-999999...999999 kVAr
-						
-	i32	1	.VA.phsA.instCVal.mag.f		Total apparent power S -phsA	-999999...999999 kVA
-						
-	i32	1	.VA.phsB.instCVal.mag.f		Total apparent power S -phsB	-999999...999999 kVA
-						
-	i32	1	.VA.phsC.instCVal.mag.f		Total apparent power S -phsC	-999999...999999 kVA
-						
-	i16	1	.PF.phsA.instCVal.mag		Power factor -phsA	-1…1
-	i16	1	.PF.phsB.instCVal.mag		Power factor -phsB	-1…1
-	i16	1	.PF.phsC.instCVal.mag		Power factor -phsC	-1…1
			LD0.SPEMMTR2			
-	u32	1	.DmdVArhA.actVal		Forward reactive energy -phsA	0…1E10 kVArh
-						
-	u32	1	.DmdVArhB.actVal		Forward reactive energy -phsB	0…1E10 kVArh
-						
-	u32	1	.DmdVArhC.actVal		Forward reactive energy -phsC	0…1E10 kVArh

Table continues on next page

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
-						
-	u32	1	.DmdWhA.actVal		Forward active energy -phsA	0…1E10 kWh
-						
-	u32	1	.DmdWhB.actVal		Forward active energy -phsB	0…1E10 kWh
-						
-	u32	1	.DmdWhC.actVal		Forward active energy -phsC	0…1E10 kWh
-						
-	u32	1	.SupVArhA.actVal		Reverse reactive energy -phs A	0…1E10 kVArh
-						
-	u32	1	.SupVArhB.actVal		Reverse reactive energy -phs B	0…1E10 kVArh
-						
-	u32	1	.SupVArhC.actVal		Reverse reactive energy -phs C	0…1E10 kVArh
-						
-	u32	1	.SupWhA.actVal		Reverse active energy -phsA	0…1E10 kWh
-						
-	u32	1	.SupWhB.actVal		Reverse active energy -phsB	0…1E10 kWh
-						
-	u32	1	.SupWhC.actVal		Reverse active energy -phsC	0…1E10 kWh
-						

2.4.41 LD0.SSCBR1 Circuit-breaker condition monitoring (1)

Table 188: LD0.SSCBR1 Circuit-breaker condition monitoring (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.SSCBR1			
2060	u16	1	.InaTmdCnt.stVal	INA_DAYS	CB inactive days	0...65535
2061	u16	1	.OpTmOpn.mag	T_TRV_OP	Open travel time	0...60000 [ms]
2062	u16	1	.OpTmCls.mag	T_TRV_CL	Close travel time	0...60000 [ms]
			LD0.SSOPM1			
2063	u16	100	.TmsSprCha.mag	T_SPR_CHR	Spring charge time	0.00…99.99 [s]
			LD0.SPH1SCBR1			
2064	i16	1	.RmnNumOp.stVal	CB_LIFE_A	Remain.life phs A	-/+ 9999
			LD0.SPH2SCBR1			
2065	i16	1	.RmnNumOp.stVal	CB_LIFE_B	Remain.life phs B	-/+ 9999
			LD0.SPH3SCBR1			

Table continues on next page

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
2066	i16	1	.RmnNumOp.stVal	CB_LIFE_C	Remain.life phs C	-/+ 9999
			LD0.SPH1SCBR1			
2067	u16	1	.AccmAPwr.mag	IPOW_A	Iyt phs A	0...1E6
			LD0.SPH2SCBR1			
2068	u16	1	.AccmAPwr.mag	IPOW_B	Iyt phs B	0...1E6
			LD0.SPH3SCBR1			
2069	u16	1	.AccmAPwr.mag	IPOW_C	Iyt phs C	0...1E6

2.4.42 LD0.SSCBR2 Circuit-breaker condition monitoring (2)

Table 189: LD0.SSCBR2 Circuit-breaker condition monitoring (2)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.SSCBR2			
2110	u16	1	.InaTmdCnt.stVal	INA_DAYS	CB inactive days	0...65535
2111	u16	1	.TmmsOpn.mag	T_TRV_OP	Open travel time	0...60000 [ms]
2112	u16	1	.TmmsCls.mag	T_TRV_CL	Close travel time	0...60000 [ms]
2113	u16	100	.TmsSprCha.mag	T_SPR_CHR	Spring charge time	0.00...99.99 [s]
2114	i16	1	.RmnLifPhA.mag	CB_LIFE_A	Remain.life phsA	-/+9999
2115	i16	1	.RmnLifPhB.mag	CB_LIFE_B	Remain.life phsB	-/+9999
2116	i16	1	.RmnLifPhC.mag	CB_LIFE_C	Remain.life phsC	-/+9999
2117	u16	1	.AccAPwrPhA.mag	IPOW_A	Iyt phsA	0...1E6
2118	u16	1	.AccAPwrPhB.mag	IPOW_B	Iyt phsB	0...1E6
2119	u16	1	.AccAPwrPhC.mag	IPOW_C	Iyt phsC	0...1E6

2.4.43 LD0.T1PTTR1 Three-phase thermal protection for feeders, cables and distribution transformers (1)

Table 190: LD0.T1PTTR1 Three-phase thermal protection for feeders, cables and distribution transformers (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.T1PTTR1			
146	i16	1	.Tmp.mag	TEMP	Object temperature	-100.0… 9999.9 [C]
147	u16	1	.TmpRl.mag	TEMP_RL	Relative temperature	0.00…99.99 [C]
148	i16	1	.TmpUsed.mag	TEMP_AMB	Ambient temperature	-99…999.99 [C]
149	u16	1	.OpTm.stVal	T_OPERATE	Time to operate	0…60000 [s]
150	u16	1	.BlkThmRsTm.stVal	T_ENA_CLOSE	Time to deactivate block	0…60000 [s]

2.4.44 LD0.VMHAI1 Voltage total harmonic distortion (1)

Table 191: LD0.VMHAI1 Voltage total harmonic distortion (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.VMHAI1		3-second mean value	
2170	u16	100	.ThdPhV.phsA.cVal.mag	3SMHTHD_A	- Phs A	0...500.00 [%]
2171	u16	100	.ThdPhV.phsB.cVal.mag	3SMHTDD_B	- Phs B	0...500.00 [%]
2172	u16	100	.ThdPhV.phsC.cVal.mag	3SMHTDD_C	- Phs C	0...500.00 [%]
					Demand value:	
2173	u16	100	.DmdThdPhV.phsA.cVal.mag	DMD_TDD_A	- Phs A	0...500.00 [%]
2174	u16	100	.DmdThdPhV.phsB.cVal.mag	DMD_TDD_B	- Phs B	0...500.00 [%]
2175	u16	100	.DmdThdPhV.phsC.cVal.mag	DMD_TDD_C	- Phs C	0...500.00 [%]
					Max demand value	
2176	u16	100	.MaxDmdThdV.phsA.cVal.mag	-	- Phs A	0...500.00 [%]
2177	u16	100	.MaxDmdThdV.phsB.cVal.mag	-	- Phs B	0...500.00 [%]
2178	u16	100	.MaxDmdThdV.phsC.cVal.mag	-	- Phs C	0...500.00 [%]

2.4.45 LD0.VMMXU1 Three-phase voltage measurement (1)

Table 192: LD0.VMMXU1 Three-phase voltage measurement (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.VMMXU1		Phase-ground voltage (1)	
152	u16	1000	.phV.phsA.cVal.mag	U_DB_A	- Phs A amplitude	0.00...4.00 [xUn]
153	u16	1000	.phV.phsB.cVal.mag	U_DB_B	- Phs B amplitude	0.00...4.00 [xUn]
154	u16	1000	.phV.phsC.cVal.mag	U_DB_C	- Phs C amplitude	0.00...4.00 [xUn]
			LD0.VMMXU1		Phase-phase voltage (1)	
155	u16	1000	.PPV.phsAB.cVal.mag	U_DB_AB	- Phs AB amplitude	0.00...4.00 [xUn]
156	u16	1000	.PPV.phsBC.cVal.mag	U_DB_BC	- Phs BC amplitude	0.00...4.00 [xUn]
157	u16	1000	.PPV.phsCA.cVal.mag	U_DB_CA	- Phs CA amplitude	0.00...4.00 [xUn]

2.4.46 LD0.VMMXU2 Three-phase voltage measurement (2)

Table 193: LD0.VMMXU2 Three-phase voltage measurement (2)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.VMMXU2			
1001	u16	1000	.PhV.phsA.cVal.mag	U_DB_A	- phsA amplitude	0.00...4.00 [xUn]
1002	u16	1000	.PhV.phsB.cVal.mag	U_DB_B	- phsB amplitude	0.00...4.00 [xUn]
1003	u16	1000	.PhV.phsC.cVal.mag	U_DB_C	- phsC amplitude	0.00...4.00 [xUn]
1004	u16	1000	.PPV.phsAB.instCVal.mag	U_DB_AB	- phsAB amplitude	0.00...4.00 [xUn]
1005	u16	1000	.PPV.phsBC.instCVal.mag	U_DB_BC	- phsBC amplitude	0.00...4.00 [xUn]
1006	u16	1000	.PPV.phsCA.instCVal.mag	U_DB_CA	- phsCA amplitude	0.00...4.00 [xUn]
			LD0.VAVMMXU2			
1928	u16	1	.PhV.phsA.cVal.mag		- phsA average amplitude	0.00...4.00 [xUn]
1929	u16	1	.PhV.phsB.cVal.mag		- phsB average amplitude	0.00...4.00 [xUn]
1930	u16	1	.PhV.phsC.cVal.mag		- phsC average amplitude	0.00...4.00 [xUn]
1931	u16	1	.PPV.phsAB.cVal.mag		- phsAB average amplitude	0.00...4.00 [xUn]
1932	u16	1	.PPV.phsBC.cVal.mag		- phsBC average amplitude	0.00...4.00 [xUn]
1933	u16	1	.PPV.phsCA.cVal.mag		- phsCA average amplitude	0.00...4.00 [xUn]

2.4.47 LD0.VSMSQI1 Sequence voltage measurement (1)

Table 194: LD0.VSMSQI1 Sequence voltage measurement (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.VSMSQI1		Sequence of voltages	
158	u16	1000	.SeqA.c1.instCVal.mag	U1_INST	- Positive amplitude	0.00...4.00 [xUn]
159	u16	1000	.SeqA.c2.instCVal.mag	U2_INST	- Negative amplitude	0.00...4.00 [xUn]
160	u16	1000	.SeqA.c2.instCVal.mag	U3_INST	- Zero amplitude	0.00...4.00 [xUn]

2.4.48 LD0.VSMSQI2 Sequence voltage measurement (2)

Table 195: LD0.VSMSQI2 Sequence voltage measurement (2)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.VSMSQI2		Sequence of voltages	
1007	u16	1000	.SeqA.c1.instCVal.mag	U1_INST	- positive amplitude	0.00...4.00 [xUn]
1008	u16	1000	.SeqB.c2.instCVal.mag	U2_INST	- negative amplitude	0.00...4.00 [xUn]
1009	u16	1000	.SeqC.c2.instCVal.mag	U3_INST	- zero amplitude	0.00...4.00 [xUn]

2.4.49 System diagnostic values

Table 196: System diagnostic values

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.LDEV1			
2050	u16	1	.DevWrn.stVal	Warning	Last warning code	1)
2051	u16	1	.DevFail.stVal	Internal fault	Last internal fault code	1)
			DR.RDRE1			
2052	u16	1	.FltNum.stVal		Num. of DR recordings	0...N
2053	u16	1	.MemUsed.stVal		DR memory used	0...100 [%]
			LD0.LPHD1			
2054	u16	1	.NumPwrUp.stVal		Num. of cold starts	0...65535
2055	u16	1	.WrmStr.stVal		Num. of warm starts	0...65535
2056	u16	1	.WacTrg.stVal		Num. of watchdog resets	0...65535
			LD0.LDEV1			
2057	u16	1	.ChgAckCnt.stVal		Num. of conf. changes	0...65535
			LD0.LLN0			
	u16	1	.ParChgCnt.stVal		Num. of setting changes	0…65535

1) See the technical manual.

2.4.50 Control structure 1

Table 197: Control structure 1

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
8001					Execute register	1
8002					Password reg 1	acc to setting
8003					Password reg 2	acc to setting
8004					Control register	< single bit >
8005					Confirm register	< single bit >

2.4.51 Control structure 2

Table 198: Control structure 2

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
8006					Execute register	1
8007					Password reg 1	acc to setting
8008					Password reg 2	acc to setting
8009					Control register	< single bit >
8010					Confirm register	< single bit >

2.4.52 Control structure 3

Table 199: Control structure 3

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
8011					Execute register	1
8012					Password reg 1	acc to setting
8013					Password reg 2	acc to setting
8014					Control register	< single bit >
8015					Confirm register	< single bit >

2.4.53 Control structure 4

Table 200: Control structure 4

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
8016					Execute register	1
8017					Password reg 1	acc to setting
8018					Password reg 2	acc to setting
8019					Control register	< single bit >
8020					Confirm register	< single bit >

2.4.54 Control structure 5

Table 201: Control structure 5

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
8021					Execute register	1
8022					Password reg 1	acc to setting
8023					Password reg 2	acc to setting
8024					Control register	< single bit >
8025					Confirm register	< single bit >

2.4.55 Control structure 6

Table 202: Control structure 6

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
8026					Execute register	1
8027					Password reg 1	acc to setting
8028					Password reg 2	acc to setting
8029					Control register	< single bit >
8030					Confirm register	< single bit >

2.4.56 Control structure 7

Table 203: Control structure 7

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
8031					Execute register	1
8032					Password reg 1	acc to setting
8033					Password reg 2	acc to setting
8034					Control register	< single bit >
8035					Confirm register	< single bit >

2.4.57 Control structure 8

Table 204: Control structure 8

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
8036					Execute register	1
8037					Password reg 1	acc to setting
8038					Password reg 2	acc to setting
8039					Control register	< single bit >
8040					Confirm register	< single bit >

2.4.58 Device ID string

Table 205: Device ID string

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
9000	u16				ASCII coded string	1)
...						
9120	u16					

1) See the technical manual.

2.4.59 Protection relay's real-time clock (in local time mode) - read and write (synchronize)

Table 206: Protection relay's real-time clock (in local time mode) - read and write (synchronize)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
9201					Control register	0...2[1)]
9202					Year	2000...2999
9203					Month	1...12
9204					Day	1...31
9205					Hour	0...23
9206					Minute	0...59
9207					Second	0...59
9208					Millisecond	0…999

1) See the technical manual.

2.4.60 Protection relay's real-time clock (in UTC time mode) - read and write (synchronize)

Table 207: Protection relay's real-time clock (in UTC time mode) - read and write (synchronize)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
9211					Control register	0...2[1)]
9212					Year	2000...2999
9213					Month	1...12
9214					Day	1...31
9215					Hour	0...23
9216					Minute	0...59
9217					Second	0...59
9218					Millisecond	0…999

1) See the technical manual.

2.4.61 Active parameter setting group - read and write

Table 208: Active parameter setting group - read and write

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
9231	u16	1			Active setting group	1...6

2.4.62 Event record structure

Table 209: Event record structure

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
					Selection write:	
9250	u16	1			- Num of multiple records	1...10
9251	i16	1			- Read selection	-499…3
					Record 1 data to read:	
9252	u16	1			- Record sequence num	1...9999
9253	u16	1			- Unread records left	0...499
					Timestamp of record	
9254	u16	1			- Year, Month	Year/Month
9255	u16	1			- Day, Hour	Day/Hour
9256	u16	1			- Minute, Second	Min/Sec
9257	u16	1			- Millisecond	Millisecond
9258	u16	1			Event identification	1)
9259	u16	1			Data object ID1	1)
9260	u16	1			Data object ID2	1)
9261	u16	1			Event data value 1	1)
9262	u16	1			Event data value 2	1)
					Record 2 data to read:	If selected
9263	u16	1			- Record sequence num	1..9999
9264	u16	1			- Unread records left	0..499
					Timestamp of record	
9265	u16	1			- Year, Month	Year/Month
9266	u16	1			- Day, Hour	Day/Hour
9267	u16	1			- Minute, Second	Min/Sec
9268	u16	1			- Millisecond	Millisecond
9269	u16	1			Event identification	1)
9270	u16	1			Data object ID1	1)
9271	u16	1			Data object ID2	1)
9272	u16	1			Event data value 1	1)
9273	u16	1			Event data value 2	1)
					Record 3 data to read:	If selected
9274	u16	1			- Record sequence num	1...9999
9275	u16	1			- Unread records left	0...499
					Timestamp of record	

Table continues on next page

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
9276	u16	1			- Year, Month	Year/Month
9277	u16	1			- Day, Hour	Day/Hour
9278	u16	1			- Minute, Second	Min/Sec
9279	u16	1			- Millisecond	Millisecond
9280	u16	1			Event identification	1)
9281	u16	1			Data object ID1	1)
9282	u16	1			Data object ID2	1)
9283	u16	1			Event data value 1	1)
9284	u16	1			Event data value 2	1)
					Record 4 data to read:	If selected
9285	u16	1			- Record sequence num	1...9999
9286	u16	1			- Unread records left	0...499
					Timestamp of record	
9287	u16	1			- Year, Month	Year/Month
9288	u16	1			- Day, Hour	Day/Hour
9289	u16	1			- Minute, Second	Min/Sec
9290	u16	1			- Millisecond	Millisecond
9291	u16	1			Event identification	1)
9292	u16	1			Data object ID1	1)
9293	u16	1			Data object ID2	1)
9294	u16	1			Event data value 1	1)
9295	u16	1			Event data value 2	1)
					Record 5 data to read:	If selected
9296	u16	1			- Record sequence num	1...9999
9297	u16	1			- Unread records left	0...499
					Timestamp of record	
9298	u16	1			- Year, Month	Year/Month
9299	u16	1			- Day, Hour	Day/Hour
9300	u16	1			- Minute, Second	Min/Sec
9301	u16	1			- Millisecond	Millisecond
9302	u16	1			Event identification	1)
9303	u16	1			Data object ID1	1)
9304	u16	1			Data object ID2	1)
9305	u16	1			Event data value 1	1)
9306	u16	1			Event data value 2	1)

Table continues on next page

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
					Record 6 data to read:	If selected
9307	u16	1			- Record sequence num	1...9999
9308	u16	1			- Unread records left	0...499
					Timestamp of record	
9309	u16	1			- Year, Month	Year/Month
9310	u16	1			- Day, Hour	Day/Hour
9311	u16	1			- Minute, Second	Min/Sec
9312	u16	1			- Millisecond	Millisecond
9313	u16	1			Event identification	1)
9314	u16	1			Data object ID1	1)
9315	u16	1			Data object ID2	1)
9316	u16	1			Event data value 1	1)
9317	u16	1			Event data value 2	1)
					Record 7 data to read:	If selected
9318	u16	1			- Record sequence num	1...9999
9319	u16	1			- Unread records left	0...499
					Timestamp of record	
9320	u16	1			- Year, Month	Year/Month
9321	u16	1			- Day, Hour	Day/Hour
9322	u16	1			- Minute, Second	Min/Sec
9323	u16	1			- Millisecond	Millisecond
9324	u16	1			Event identification	1)
9325	u16	1			Data object ID1	1)
9326	u16	1			Data object ID2	1)
9327	u16	1			Event data value 1	1)
9328	u16	1			Event data value 2	1)
					Record 8 data to read:	If selected
9329	u16	1			- Record sequence num	1...9999
9330	u16	1			- Unread records left	0...499
					Timestamp of record	
9331	u16	1			- Year, Month	Year/Month
9332	u16	1			- Day, Hour	Day/Hour
9333	u16	1			- Minute, Second	Min/Sec
9334	u16	1			- Millisecond	Millisecond
9335	u16	1			Event identification	1)
9336	u16	1			Data object ID1	1)

Table continues on next page

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
9337	u16	1			Data object ID2	1)
9338	u16	1			Event data value 1	1)
9339	u16	1			Event data value 2	1)
					Record 9 data to read:	If selected
9340	u16	1			- Record sequence num	1...9999
9341	u16	1			- Unread records left	0...499
					Timestamp of record	
9342	u16	1			- Year, Month	Year/Month
9343	u16	1			- Day, Hour	Day/Hour
9344	u16	1			- Minute, Second	Min/Sec
9345	u16	1			- Millisecond	Millisecond
9346	u16	1			Event identification	1)
9347	u16	1			Data object ID1	1)
9348	u16	1			Data object ID2	1)
9349	u16	1			Event data value 1	1)
9350	u16	1			Event data value 2	1)
					Record 10 data to read:	If selected
9351	u16	1			- Record sequence num	1...9999
9352	u16	1			- Unread records left	0...499
					Timestamp of record	
9353	u16	1			- Year, Month	Year/Month
9354	u16	1			- Day, Hour	Day/Hour
9355	u16	1			- Minute, Second	Min/Sec
9356	u16	1			- Millisecond	Millisecond
9357	u16	1			Event identification	1)
9358	u16	1			Data object ID1	1)
9359	u16	1			Data object ID2	1)
9360	u16	1			Event data value 1	1)
9361	u16	1			Event data value 2	1)

1) See the technical manual.

2.4.63 Fault record structure header

Table 210: Fault record structure header

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
					Selection write:	
9401	u16				- Read selection	-99...3
					Record data header:	
9402	u16				- Record sequence num	0...65535
9403	u16				- Unread records left	0...99
					Timestamp of record:	
9404	u16				- Year, month	Year/Month
9405	u16				- Day, hour	Day/Hour
9406	u16				- Minute, second	Min/Sec
9407	u16				- Millisecond	Millisecond
9408	u16				- Timestamp quality	1)
			LD0.FLTMSTA1			
9409	u16	100	.StrDur.mag		- Start duration	0...100.00 [%]
9410	u16	1	.ActSG.stVal		- Active setting group	1...6
9411	u16	100	.FltDiskm.mag		- Fault distance	0...9999.99 [pu]
9412	u16				< reserved >	0
9413	u16				< reserved >	0
9414	u16				< reserved >	0
9415	u16				< reserved >	0
9416	u16				< reserved >	0
9417	u16				< reserved >	0
9418	u16				< reserved >	0
9419	u16				< reserved >	0
9420	u16				< reserved >	0
9421	u16				< reserved >	0

1) See the technical manual.

2.4.64 Fault record

Table 211: Fault record

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.FLTRFRC1			
9409			.OpCnt.stVal		Fault record number	0...999999
9410						
9411			.ProFcn.stVal		Protection function	Code
Table continues on next page						

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
9412			.Hz.mag.f		Frequency	
9413			.StrDur.mag.f		Start duration	0.00...100.00 [%]
9414			.StrOpTm.mag.f		Operate time	0...999999.999 [s]
9415						
9416			.PhReact.mag.f		Fault reactance	0.00...10000000.00 [ohm]
9417						
9418			.FltDiskm.mag.f		Fault distance	0.00...3000.00 pu
9419						
9420			.ActSetGr.stVal		Active setting group	1…6
9421			.ShotPntr.stVal		AR Shot pointer	1…5
9422[1)]			.Max50DifAA.mag.f		Max diff current IL1	0.000...80.000 pu
9423[1)]			.Max50DifAB.mag.f		Max diff current IL2	0.000...80.000 pu
9424[1)]			.Max50DifAC.mag.f		Max diff current IL3	0.000...80.000 pu
9425[1)]			.Max50RstAA.mag.f		Max bias current IL1	0.000… 50.000 pu
9426[1)]			.Max50RstAB.mag.f		Max bias current IL2	0.000… 50.000 pu
9427[1)]			.Max50RstAC.mag.f		Max bias current IL3	0.000… 50.000 pu
9428[1)]			.DifAPhsA.mag.f		Diff current IL1	0.000...80.000 pu
9429[1)]			.DifAPhsB.mag.f		Diff current IL2	0.000...80.000 pu
9430[1)]			.DifAPhsC.mag.f		Diff current IL3	0.000...80.000 pu
9431[1)]			.RstAPhsA.mag.f		Bias current IL1	0.000… 50.000 pu
9432[1)]			.RstAPhsB.mag.f		Bias current IL2	0.000… 50.000 pu
9433[1)]			.RstAPhsC.mag.f		Bias current IL3	0.000… 50.000 pu
9434[1)]			.DifARes.mag.f		Diff current Io	0.000...80.000 pu
9435[1)]			.RstARes.mag.f		Bias current Io	0.000… 50.000 pu
9436			.Max50APhsA1.mag.f		Maximum phase A current 1	0.000...50.000 [xIn]
9437			.Max50APhsB1.mag.f		Maximum phase B current 1	0.000...50.000 [xIn]
9438			.Max50APhsC1.mag.f		Maximum phase C current 1	0.000...50.000 [xIn]

Table continues on next page

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
9439			.Max50ARes1.mag.f		Maximum residual current 1	0.000...50.000 [xIn]
9440			.APhsA1.mag.f		Phase A current 1	0.000...50.000 [xIn]
9441			.APhsB1.mag.f		Phase B current 1	0.000...50.000 [xIn]
9442			.APhsC1.mag.f		Phase C current 1	0.000...50.000 [xIn]
9443			.ARes1.mag.f		Residual current 1	0.000...50.000 [xIn]
9444			.AResClc1.mag.f		Calculated residual current 1	0.000...50.000 [xIn]
9445			.APsSeq1.mag.f		Positive sequence current 1	0.000...50.000 [xIn]
9446			.ANgSeq1.mag.f		Negtive sequence current 1	0.000...50.000 [xIn]
9447			.PhVPhsA1.mag.f		Phase A voltage 1	0.000...4.000 [xUn]
9448			.PhVPhsB1.mag.f		Phase B voltage 1	0.000...4.000 [xUn]
9449			.PhVPhsC1.mag.f		Phase C voltage 1	0.000...4.000 [xUn]
9450			.PPVPhsAB1.mag.f		Phase A-B voltage 1	0.000...4.000 [xUn]
9451			.PPVPhsBC1.mag.f		Phase B-C voltage 1	0.000...4.000 [xUn]
9452			.PPVPhsCA1.mag.f		Phase C-A voltage 1	0.000...4.000 [xUn]
9453			.VRes1.mag.f		Residual voltage 1	0.000...4.000 [xUn]
9454			.VZro1.mag.f		Zero sequence voltage 1	0.000...4.000 [xUn]
9455			.VPsSeq1.mag.f		Positive sequence voltage 1	0.000...4.000 [xUn]
9456			.VNgSeq1.mag.f		Negative sequence voltage 1	0.000...4.000 [xUn]
9457			.MaxTmpRl.mag.f		PTTR thermal level	0.00...99.99
9458			.AMaxNgPs.mag.f		PDNSPTOC1 ratio I2/I1	0.00...999.99 [%]
9459			.HzRteChg.mag.f		Frequency gradient	-10.00...10.00 [Hz/s]
9460			.CondNeut.mag.f		Conductance Yo	-1000.00...1000.00 [mS]
9461			.SusNeut.mag.f		Susceptance Yo	-1000.00...1000.00 [mS]
9462			.PPLoopRis.mag.f		Fault loop resistance	-1000.00...1000.00 [ohm]
9463			.PPLoopReact.mag.f		Fault loop reactance	-1000.00...1000.00 [ohm]

Table continues on next page

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
9464			.CBClrTm.mag.f		Breaker clear time	0.000...3.000 [s]
9465			.Max50APhsA2.mag.f		Maximum phase A current 2	0.000...50.000 [xIn]
9466			.Max50APhsB2.mag.f		Maximum phase B current 2	0.000...50.000 [xIn]
9467			.Max50APhsC2.mag.f		Maximum phase C current 2	0.000...50.000 [xIn]
9468			.Max50ARes2.mag.f		Maximum residual current 2	0.000...50.000 [xIn]
9469			.APhsA2.mag.f		Phase A current 2	0.000...50.000 [xIn]
9470			.APhsB2.mag.f		Phase B current 2	0.000...50.000 [xIn]
9471			.APhsC2.mag.f		Phase C current 2	0.000...50.000 [xIn]
9472			.ARes2.mag.f		Residual current 2	0.000...50.000 [xIn]
9473			.AResClc2.mag.f		Calculated residual current 2	0.000...50.000 [xIn]
9474			.APsSeq2.mag.f		Positive sequence current 2	0.000...50.000 [xIn]
9475			.ANgSeq2.mag.f		Negtive sequence current 2	0.000...50.000 [xIn]
9476[1)]			.PhVPhsA2.mag.f		Phase A voltage 2	0.000...4.000 [xUn]
9477[1)]			.PhVPhsB2.mag.f		Phase B voltage 2	0.000...4.000 [xUn]
9478[1)]			.PhVPhsC2.mag.f		Phase C voltage 2	0.000...4.000 [xUn]
9479[1)]			.PPVPhsAB2.mag.f		Phase A-B voltage 2	0.000...4.000 [xUn]
9480[1)]			.PPVPhsBC2.mag.f		Phase B-C voltage 2	0.000...4.000 [xUn]
9481[1)]			.PPVPhsCA2.mag.f		Phase C-A voltage 2	0.000...4.000 [xUn]
9482[1)]			.VRes2.mag.f		Residual voltage 2	0.000...4.000 [xUn]
9483[1)]			.VZro2.mag.f		Zero sequence voltage 2	0.000...4.000 [xUn]
9484[1)]			.VPsSeq2.mag.f		Positive sequence voltage 2	0.000...4.000 [xUn]
9485[1)]			.VNgSeq2.mag.f		Negative sequence voltage 2	0.000...4.000 [xUn]
9486			.DifANAngVN1.mag.f		Angle Uo - Io (1)	-180.00...180.00 [deg]
9487			.DifAAAngVBC1.mag.f		Angle U23 - IL1 (1)	-180.00...180.00 [deg]

Table continues on next page

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
9488			.DifABAngVCA1.mag.f		Angle U31 - IL2 (1)	-180.00...180.00 [deg]
9489			.DifACAngVAB1.mag.f		Angle U12 - IL3 (1)	-180.00...180.00 [deg]
9490			.DifANAngVN2.mag.f		Angle Uo - Io (2)	-180.00...180.00 [deg]
9491			.DifAAAngVBC2.mag.f		Angle U23 - IL1 (2)	-180.00...180.00 [deg]
9492			.DifABAngVCA2.mag.f		Angle U31 - IL2 (2)	-180.00...180.00 [deg]
9493			.DifACAngVAB2.mag.f		Angle U12 - IL3 (2)	-180.00...180.00 [deg]
9494[1)]			.Max50APhsA3.mag.f		Maximum phase A current 3	0.000...50.000 [xIn]
9495[1)]			.Max50APhsB3.mag.f		Maximum phase B current 3	0.000...50.000 [xIn]
9496[1)]			.Max50APhsC3.mag.f		Maximum phase C current 3	0.000...50.000 [xIn]
9497[1)]			.Max50ARes3.mag.f		Maximum residual current 3	0.000...50.000 [xIn]
9498[1)]			.APhsA3.mag.f		Phase A current 3	0.000...50.000 [xIn]
9499[1)]			.APhsB3.mag.f		Phase B current 3	0.000...50.000 [xIn]
9500[1)]			.APhsC3.mag.f		Phase C current 3	0.000...50.000 [xIn]
9501[1)]			.ARes3.mag.f		Residual current 3	0.000...50.000 [xIn]
9502[1)]			.AResClc3.mag.f		Calculated residual current 3	0.000...50.000 [xIn]
9503[1)]			.APsSeq3.mag.f		Positive sequence current 3	0.000...50.000 [xIn]
9504[1)]			.ANgSeq3.mag.f		Negtive sequence current 3	0.000...50.000 [xIn]
9505			.FltPtR.mag.f		Fault resistance	0.00...100000.00 [ohm]

1) Not relevant in these devices

2.4.65 LD0.FLO1RFRC1 Fault locator registrations (1)

Table 212: LD0.FLO1RFRC1 Fault locator registrations (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.FLO1RFRC1			
	u16	1	.FltDiskm.mag	FLT_DISTANCE	Fault distance in pu	0…3000.0000 [pu]
	u16	1	.FltLoop.stVal	FAULT_LOOP	Fault impedance loop	0…7

Table continues on next page

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
	u16	1	.FltPtR.mag	RF	Fault point resistance	0.0...1000000.0 [ohm]
	u16	1	.FltR.mag	RFLOOP	Fault loop resistance	0.0...1000000.0 [ohm]
	u16	1	.FltX.mag	RXLOOP	Fault loop reactance	0.0...1000000.0 [ohm]
	u16	1	.PhReact.mag	XFPHASE	Fault phase reactance	0.0...1000000.0 [ohm]
	u16	1	.RatFltALod.mag	IFLT_PER_ILD	Fault to load current ratio	0...60000.00
	u16	1	.EqDisLod.mag	S_CALC	Est. load distance	0.00...1.00
	u16	1	.PhGndCapac.mag	XC0F_CALC	Est. PhE capacitive reactance	0.0...1000000.0 [ohm]
	u16	1	.FltDisQ.stVal	FLT_DIST_Q	Fault distance quality	0…511

2.4.66 LD0.XARGGIO130 RTD inputs (1)

Table 213: LD0.XARGGIO130 RTD inputs (1)

RegA	Type	Scale	IEC 61850 name	SA name	Description	Values
			LD0.XARGGIO130			
-	i16	1	.AnIn1.instMag		- RTD input 1	-10000.0...10000.0
-	i16	1	.AnIn2.instMag		- RTD input 2	-10000.0...10000.0
-	i16	1	.AnIn3.instMag		- RTD input 3	-10000.0...10000.0

2.5 Controls

Table 214: Explanations of the controls table columns

Column name	Description
0xA	Coil (0X) address for control value.
CS	Control structure and bit within the structure for control value.
IEC 61850 name	Original IED data object identification. Described in the IEC 61850 format as Logical Device.Logical Node and thereafter .Data Object.Data Attribute. Logical Node is the same as the application function block name.
SA name	The signal may have a defined label that is visible, for example, in the Application Configuration tool in PCM600.
Description	Short description of the signal. See the technical manual for more information.
Value	Meaning of the written value.

2.5.1 Reset, acknowledge and trigger points

Table 215: Reset, acknowledge and trigger points

0xA	CS	IEC 61850 name	SA name	Description	Values
		LD0.LLN0			
2060	2.00	.IndLEDRs.Oper.ctlVal		Reset indications and LEDs	1=Reset
2061	2.01	.ProgLEDRs.Oper.ctlVal		Reset Alarm LEDs	1=Reset
		LD0.PEMMXU1			
2062	2.02	.RcdRs.Oper.ctlVal		Reset Power max demands	1=Reset
		LD0.DARREC1			
2063	2.03	.RecRs.Oper.ctlVal		Reset reclosing	1=Reset
2064	2.04	.CntRs.Oper.ctlVal		Reset reclosing counters	1=Reset
		LD0.SSCBR1			
2065	2.05	.RsAccmAPwr.Oper.ctlVal		Reset CB accum. energy	1=Reset
2066	2.06	.RsCBWear.Oper.ctlVal		Reset CB wear data	1=Reset
		DR.RDRE1			
2067	2.07	.RcdTrg.Oper.ctlVal		Trig DR recording	1=Trig
2068	2.08	.MemClr.Oper.ctlVal		Clear DR memory	1=Clear
		LD0.CMMXU1			
2069	2.09	.RcdRs.Oper.ctlVal		Reset Max current1 demands	1=Reset
		LD0.PEMMTR1			
2070	2.10	.SupDmdRs.Oper.ctlVal		Reset energy values	1=Reset
		LD0.SCCBR1			
2071	2.11	.RsTrvTm.Oper.ctlVal		Reset CB travel time	1=Reset
2072	2.12	.RsSprChaTm.Oper.ctlVal		Reset CB spring charge time	1=Reset
		LD0.RESCMMXU1			
2073	2.13	.RcdRs.Oper.ctlVal		Reset Io (1) max demands	1=Reset
		LD0.RESVMMXU1			
2074	2.14	.RcdRs.Oper.ctlVal		Reset Uo (1) max demands	1=Reset

2.5.2 LD0.LDEV1 Protection relay's warm reset (1)

Table 216: LD0.LDEV1 Protection relay's warm reset (1)

0xA	CS	IEC 61850 name	SA name	Description	Values
		LD0.LDEV1			
2080	3.00	.WrmStrCmd.Oper.ctlVal		Warm reboot of protection relay	1=Reboot

2.5.3 CTRL.CBCSWI1 Circuit breaker control (1)

Table 217: CTRL.CBCSWI1 Circuit breaker control (1)

0xA	CS	IEC 61850 name	SA name	Description	Values
		CTRL.CBCSWI1			
2048	1.00	.Pos.Oper.ctlVal		Select open	1=Select
2049	1.01	.Pos.Oper.ctlVal		Select close	1=Select
2050	1.02	.Pos.Oper.ctlVal		Cancel selection	1=Cancel
2051	1.03	.Pos.Oper.ctlVal		Execute selection	1=Execute
2052	1.04	.Pos.Oper.ctlVal		Direct open	1=Open
2053	1.05	.Pos.Oper.ctlVal		Direct close	1=Close

2.5.4 CTRL.DCXSWI1 Disconnector control (1)

Table 218: CTRL.DCXSWI1 Disconnector control (1)

0xA	CS	IEC 61850 name	SA name	Description	Values
		CTRL.DCCSWI1			
2144	7.00	.Pos.Oper.ctlVal		Select open	1=Select
2145	7.01	.Pos.Oper.ctlVal		Select close	1=Select
2146	7.02	.Pos.Oper.ctlVal		Cancel selection	1=Cancel
2147	7.03	.Pos.Oper.ctlVal		Execute selection	1=Execute
2148	7.04	.Pos.Oper.ctlVal		Direct open	1=Open
2149	7.05	.Pos.Oper.ctlVal		Direct close	1=Close

2.5.5 CTRL.DCXSWI2 Disconnector control (2)

Table 219: CTRL.DCXSWI2 Disconnector control (2)

0xA	CS	IEC 61850 name	SA name	Description	Values
		CTRL.DCCSWI2			
2150	7.06	.Pos.Oper.ctlVal		Select open	1=Select
2151	7.07	.Pos.Oper.ctlVal		Select close	1=Select
2152	7.08	.Pos.Oper.ctlVal		Cancel selection	1=Cancel
2153	7.09	.Pos.Oper.ctlVal		Execute selection	1=Execute
2154	7.10	.Pos.Oper.ctlVal		Direct open	1=Open
2155	7.11	.Pos.Oper.ctlVal		Direct close	1=Close

2.5.6 CTRL.DCXSWI3 Disconnector control (3)

Table 220: CTRL.DCXSWI3 Disconnector control (3)

0xA	CS	IEC 61850 name	SA name	Description	Values
		CTRL.DCCSWI3			
2300	-	.Pos.Oper.ctlVal		Select open	1=Select
2301	-	.Pos.Oper.ctlVal		Select close	1=Select
2302	-	.Pos.Oper.ctlVal		Cancel selection	1=Cancel
2303	-	.Pos.Oper.ctlVal		Execute selection	1=Execute
2304	-	.Pos.Oper.ctlVal		Direct open	1=Open
2305	-	.Pos.Oper.ctlVal		Direct close	1=Close

2.5.7 CTRL.DCXSWI4 Disconnector control (4)

Table 221: CTRL.DCXSWI4 Disconnector control (4)

0xA	CS	IEC 61850 name	SA name	Description	Values
		CTRL.DCCSWI4			
2306	-	.Pos.Oper.ctlVal		Select open	1=Select
2307	-	.Pos.Oper.ctlVal		Select close	1=Select
2308	-	.Pos.Oper.ctlVal		Cancel selection	1=Cancel
2309	-	.Pos.Oper.ctlVal		Execute selection	1=Execute
2310	-	.Pos.Oper.ctlVal		Direct open	1=Open
2311	-	.Pos.Oper.ctlVal		Direct close	1=Close

2.5.8 CTRL.DCXSWI5 Disconnector control (5)

Table 222: CTRL.DCXSWI5 Disconnector control (5)

0xA	CS	IEC 61850 name	SA name	Description	Values
		CTRL.DCCSWI5			
2324	-	.Pos.Oper.ctlVal		Select open	1=Select
2325	-	.Pos.Oper.ctlVal		Select close	1=Select
2326	-	.Pos.Oper.ctlVal		Cancel selection	1=Cancel
2327	-	.Pos.Oper.ctlVal		Execute selection	1=Execute
2328	-	.Pos.Oper.ctlVal		Direct open	1=Open
2329	-	.Pos.Oper.ctlVal		Direct close	1=Close

2.5.9 CTRL.DCXSWI6 Disconnector control (6)

Table 223: CTRL.DCXSWI6 Disconnector control (6)

0xA	CS	IEC 61850 name	SA name	Description	Value
		CTRL.DCCSWI6			
2330		.Pos.Oper.ctlVal	-	Select open	1=Select
2331		.Pos.Oper.ctlVal	-	Select close	1=Select
2332		.Pos.Oper.ctlVal	-	Cancel selection	1=Cancel
2333		.Pos.Oper.ctlVal	-	Execute selection	1=Execute
2334		.Pos.Oper.ctlVal	-	Direct open	1=Open
2335		.Pos.Oper.ctlVal	-	Direct close	1=Close

2.5.10 CTRL.DCXSWI7 Disconnector control (7)

Table 224: CTRL.DCXSWI7 Disconnector control (7)

0xA	CS	IEC 61850 name	SA name	Description	Value
		CTRL.DCCSWI7			
2336		.Pos.Oper.ctlVal	-	Select open	1=Select
2337		.Pos.Oper.ctlVal	-	Select close	1=Select
2338		.Pos.Oper.ctlVal	-	Cancel selection	1=Cancel
2339		.Pos.Oper.ctlVal	-	Execute selection	1=Execute
2340		.Pos.Oper.ctlVal	-	Direct open	1=Open
2341		.Pos.Oper.ctlVal	-	Direct close	1=Close

2.5.11 CTRL.DCXSWI8 Disconnector control (8)

Table 225: CTRL.DCXSWI8 Disconnector control (8)

0xA	CS	IEC 61850 name	SA name	Description	Value
		CTRL.DCCSWI8			
2342		.Pos.Oper.ctlVal	-	Select open	1=Select
2343		.Pos.Oper.ctlVal	-	Select close	1=Select
2344		.Pos.Oper.ctlVal	-	Cancel selection	1=Cancel
2345		.Pos.Oper.ctlVal	-	Execute selection	1=Execute
2346		.Pos.Oper.ctlVal	-	Direct open	1=Open
2347		.Pos.Oper.ctlVal	-	Direct close	1=Close

2.5.12 LD0.SSCBR2 Circuit-breaker condition monitoring (2)

Table 226: LD0.SSCBR2 Circuit-breaker condition monitoring (2)

0xA	CS	IEC 61850 name	SA name	Description	Values
		LD0.SSCBR2			
2370	-	.RsAccAPwr.Oper.ctlVal		Reset CB accum. energy	1=Reset
2371	-	.RsCBWear.Oper.ctlVal		Reset CB wear data	1=Reset
2372	-	.RsTrvTm.Oper.ctlVal		Reset CB travel time	1=Reset
2373	-	.RsSprChaTm.Oper.ctlVal		Reset CB spring charge time	1=Reset

2.5.13 LD0.SRGAPC1 Set-reset (8 pcs) (1)

Table 227: LD0.SRGAPC1 Set-reset (8 pcs) (1)

0xA	CS	IEC 61850 name	SA name	Description	Values
		LD0.SRGAPC1			
2096	4.00	.Rs1.Oper.ctlVal		Reset flip-flop 1	1=Reset
2097	4.01	.Rs2.Oper.ctlVal		Reset flip-flop 2	1=Reset
2098	4.02	.Rs3.Oper.ctlVal		Reset flip-flop 3	1=Reset
2099	4.03	.Rs4.Oper.ctlVal		Reset flip-flop 4	1=Reset
2100	4.04	.Rs5.Oper.ctlVal		Reset flip-flop 5	1=Reset
2101	4.05	.Rs6.Oper.ctlVal		Reset flip-flop 6	1=Reset
2102	4.06	.Rs7.Oper.ctlVal		Reset flip-flop 7	1=Reset
2103	4.07	.Rs8.Oper.ctlVal		Reset flip-flop 8	1=Reset

2.5.14 LD0.SRGAPC2 Set-reset (8 pcs) (2)

Table 228: LD0.SRGAPC2 Set-reset (8 pcs) (2)

0xA	CS	IEC 61850 name	SA name	Description	Values
		LD0.SRGAPC2			
2104	4.08	.Rs1.Oper.ctlVal		Reset flip-flop 1	1=Reset
2105	4.09	.Rs2.Oper.ctlVal		Reset flip-flop 2	1=Reset
2106	4.10	.Rs3.Oper.ctlVal		Reset flip-flop 3	1=Reset
2107	4.11	.Rs4.Oper.ctlVal		Reset flip-flop 4	1=Reset
2108	4.12	.Rs5.Oper.ctlVal		Reset flip-flop 5	1=Reset
2109	4.13	.Rs6.Oper.ctlVal		Reset flip-flop 6	1=Reset
2110	4.14	.Rs7.Oper.ctlVal		Reset flip-flop 7	1=Reset
2111	4.15	.Rs8.Oper.ctlVal		Reset flip-flop 8	1=Reset

2.5.15 LD0.SPCGAPC1 Generic control point (16 pcs) (1)

The binary outputs can be configured either as pulse- or persistent-type outputs. Pulse-type outputs are triggered with the write value "1". Persistent-type outputs can be written with both values "1" and "0". The setting mode "toggled" for local operation corresponds to "persistent" for remote operation.

Table 229: LD0.SPCGAPC1 Generic control point (16 pcs) (1)

0xA	CS	IEC 61850 name	SA name	Description	Values
		LD0.SPCGAPC1			
2112	5.00	.SPCS01.ctlVal		Output 1 control	0/1=Off/On
2113	5.01	.SPCS02.ctlVal		Output 2 control	0/1=Off/On
2114	5.02	.SPCS03.ctlVal		Output 3 control	0/1=Off/On
2115	5.03	.SPCS04.ctlVal		Output 4 control	0/1=Off/On
2116	5.04	.SPCS05.ctlVal		Output 5 control	0/1=Off/On
2117	5.05	.SPCS06.ctlVal		Output 6 control	0/1=Off/On
2118	5.06	.SPCS07.ctlVal		Output 7 control	0/1=Off/On
2119	5.07	.SPCS08.ctlVal		Output 8 control	0/1=Off/On
2120	5.08	.SPCS09.ctlVal		Output 9 control	0/1=Off/On
2121	5.09	.SPCS10.ctlVal		Output 10 control	0/1=Off/On
2122	5.10	.SPCS11.ctlVal		Output 11 control	0/1=Off/On
2123	5.11	.SPCS12.ctlVal		Output 12 control	0/1=Off/On
2124	5.12	.SPCS13.ctlVal		Output 13 control	0/1=Off/On
2125	5.13	.SPCS14.ctlVal		Output 14 control	0/1=Off/On
2126	5.14	.SPCS15.ctlVal		Output 15 control	0/1=Off/On
2127	5.15	.SPCS16.ctlVal		Output 16 control	0/1=Off/On

2.5.16 LD0.SPCGAPC2 Generic control point (16 pcs) (2)

The binary outputs can be configured either as pulse- or persistent-type outputs. Pulse-type outputs are triggered with the write value "1". Persistent-type outputs can be written with both values "1" and "0". The setting mode "toggled" for local operation corresponds to "persistent" for remote operation.

Table 230: LD0.SPCGAPC2 Generic control point (16 pcs) (2)

0xA	CS	IEC 61850 name	SA name	Description	Values
		LD0.SPCGAPC2			
2128	6.00	.SPCS01.ctlVal		Output 1 control	0/1=Off/On
2129	6.01	.SPCS02.ctlVal		Output 2 control	0/1=Off/On
2130	6.02	.SPCS03.ctlVal		Output 3 control	0/1=Off/On
2131	6.03	.SPCS04.ctlVal		Output 4 control	0/1=Off/On
2132	6.04	.SPCS05.ctlVal		Output 5 control	0/1=Off/On

Table continues on next page

0xA	CS	IEC 61850 name	SA name	Description	Values
2133	6.05	.SPCS06.ctlVal		Output 6 control	0/1=Off/On
2134	6.06	.SPCS07.ctlVal		Output 7 control	0/1=Off/On
2135	6.07	.SPCS08.ctlVal		Output 8 control	0/1=Off/On
2136	6.08	.SPCS09.ctlVal		Output 9 control	0/1=Off/On
2137	6.09	.SPCS10.ctlVal		Output 10 control	0/1=Off/On
2138	6.10	.SPCS11.ctlVal		Output 11 control	0/1=Off/On
2139	6.11	.SPCS12.ctlVal		Output 12 control	0/1=Off/On
2140	6.12	.SPCS13.ctlVal		Output 13 control	0/1=Off/On
2141	6.13	.SPCS14.ctlVal		Output 14 control	0/1=Off/On
2142	6.14	.SPCS15.ctlVal		Output 15 control	0/1=Off/On
2143	6.15	.SPCS16.ctlVal		Output 16 control	0/1=Off/On

2.5.17 LD0.SPCRGAPC1 Remote generic control points (1)

The binary outputs may be configured either as pulse- or persistent-type outputs. Pulse-type outputs are triggered with the write value "1". Persistent-type outputs can be written with both the value "1" and "0". The persistent type is the same as the toggled mode on the LHMI and WHMI.

Table 231: LD0.SPCRGAPC1 Remote generic control points (1)

0xA	CS	IEC 61850 name	SA name	Description	Values
		LD0.SPCRGAPC1			
2416	-	.SPCS01.ctlVal		Output 1 control	0/1=Off/On
2417	-	.SPCS02.ctlVal		Output 2 control	0/1=Off/On
2418	-	.SPCS03.ctlVal		Output 3 control	0/1=Off/On
2419	-	.SPCS04.ctlVal		Output 4 control	0/1=Off/On
2420	-	.SPCS05.ctlVal		Output 5 control	0/1=Off/On
2421	-	.SPCS06.ctlVal		Output 6 control	0/1=Off/On
2422	-	.SPCS07.ctlVal		Output 7 control	0/1=Off/On
2423	-	.SPCS08.ctlVal		Output 8 control	0/1=Off/On
2424	-	.SPCS09.ctlVal		Output 9 control	0/1=Off/On
2425	-	.SPCS10.ctlVal		Output 10 control	0/1=Off/On
2426	-	.SPCS11.ctlVal		Output 11 control	0/1=Off/On
2427	-	.SPCS12.ctlVal		Output 12 control	0/1=Off/On
2428	-	.SPCS13.ctlVal		Output 13 control	0/1=Off/On
2429	-	.SPCS14.ctlVal		Output 14 control	0/1=Off/On
2430	-	.SPCS15.ctlVal		Output 15 control	0/1=Off/On
2431	-	.SPCS16.ctlVal		Output 16 control	0/1=Off/On

Section 3 Glossary

EMC	Electromagnetic compatibility
IEC	International Electrotechnical Commission
IEC 61850	International standard for substation communication and modeling
IED	Intelligent electronic device
LED	Light-emitting diode
LHMI	Local human-machine interface
Modbus	A serial communication protocol developed by the Modicon company in 1979. Originally used for communication in PLCs and RTU devices.
PCM600	Protection and Control IED Manager

ABB Distribution Solutions
Distribution Automation
P.O. Box 699
FI-65101 VAASA, Finland
Phone +358 10 22 11

www.abb.com/mediumvoltage
www.abb.com/relion

1MRS758979 B