



Relion® 615 series

Transformer Protection and Control RET615

Modbus Point List Manual

Power and productivity
for a better world™

ABB



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Section 1 Introduction

1.1 This manual

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

1.2 Intended audience

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

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

1.3 Product documentation

1.3.1 Product documentation set

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

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

The engineering guide provides information for IEC 61850 engineering of the 615 series protection IEDs with PCM600 and IET600. This guide concentrates especially on the configuration of GOOSE communication with these tools. The guide can be used as a technical reference during the engineering phase, installation and commissioning phase, and during normal service. For more details on tool usage, see the PCM600 documentation.

The engineering manual contains instructions on how to engineer the IEDs using the different tools in PCM600. The manual provides instructions on how to set up a PCM600 project and insert IEDs to the project structure. The manual also

recommends a sequence for engineering of protection and control functions, LHMI functions as well as communication engineering for IEC 61850 and other supported protocols.

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

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

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

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

1.3.2 Document revision history

Document revision/date	Product version	History
A/2009-07-03	2.0	First release
B/2010-06-11	3.0	Content updated to correspond to the product version
C/2012-05-11	4.0	Content updated to correspond to the product 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	1MRS756468

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 in this manual are spelled out in the glossary. The glossary also contains definitions of important terms.
- Push-button navigation in the LHMI menu structure is presented by using the push-button icons.
To navigate between the options, use and .
- HMI menu paths are presented in bold.
Select **Main menu/Settings**.
- LHMI messages are shown in Courier font.
To save the changes in non-volatile 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".
- IED 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

Table 1: RET615 functions, codes and symbols

Function	IEC 61850	IEC 60617	IEC-ANSI
Protection			
Three-phase non-directional overcurrent protection, low stage	PHLPTOC1	3I> (1)	51P-1 (1)
	PHLPTOC2	3I> (2)	51P-1 (2)
Three-phase non-directional overcurrent protection, high stage	PHHPTOC1	3I>> (1)	51P-2 (1)
	PHHPTOC2	3I>> (2)	51P-2 (2)
Three-phase non-directional overcurrent protection, instantaneous stage	PHIPTOC1	3I>>> (1)	50P/51P (1)
	PHIPTOC2	3I>>> (2)	50P/51P (2)
Non-directional earth-fault protection, low stage	EFLPTOC1	Io> (1)	51N-1 (1)
	EFLPTOC2	Io> (2)	51N-1 (2)
Non-directional earth-fault protection, high stage	EFHPTOC1	Io>> (1)	51N-2 (1)
	EFHPTOC2	Io>> (2)	51N-2 (2)
Negative-sequence overcurrent protection	NSPTOC1	I2> (1)	46 (1)
	NSPTOC2	I2> (2)	46 (2)
Residual overvoltage protection	ROVPTOV1	Uo> (1)	59G (1)
	ROVPTOV2	Uo> (2)	59G (2)
Three-phase undervoltage protection	PHPTUV1	3U< (1)	27 (1)
	PHPTUV2	3U< (2)	27 (2)
Three-phase overvoltage protection	PHPTOV1	3U> (1)	59 (1)
	PHPTOV2	3U> (2)	59 (2)
Three-phase thermal overload protection for power transformers, two time constants	T2PTTR1	3Ith>T	49T
Stabilized and instantaneous differential protection for 2W transformers	TR2PTDF1	3dI>T	87T
Numerical stabilized low impedance restricted earth-fault protection	LREFPNDF1	dloLo>	87NL
High impedance based restricted earth-fault protection	HREFPDIF1	dloHi>	87NH
Circuit breaker failure protection	CCBRBRF1	3I>/Io>BF	51BF/51NBF
Master trip	TRPPTRC1	Master Trip (1)	94/86 (1)
	TRPPTRC2	Master Trip (2)	94/86 (2)
Arc protection	ARCSARC1	ARC (1)	50L/50NL (1)
	ARCSARC2	ARC (2)	50L/50NL (2)
	ARCSARC3	ARC (3)	50L/50NL (3)
Table continues on next page			

Function	IEC 61850	IEC 60617	IEC-ANSI
Multi-purpose protection	MAPGAPC1	MAP (1)	MAP (1)
	MAPGAPC2	MAP (2)	MAP (2)
	MAPGAPC3	MAP (3)	MAP (3)
	MAPGAPC4	MAP (4)	MAP (4)
	MAPGAPC5	MAP (5)	MAP (5)
	MAPGAPC6	MAP (6)	MAP (6)
Control			
Circuit-breaker control	CBXCBR1	I <-> O CB	I <-> O CB
Disconnecter control	DCXSWI1	I <-> O DCC (1)	I <-> O DCC (1)
	DCXSWI2	I <-> O DCC (2)	I <-> O DCC (2)
Earthing switch control	ESXSWI1	I <-> O ESC	I <-> O ESC
Disconnecter position indication	DCSXSWI1	I <-> O DC (1)	I <-> O DC (1)
	DCSXSWI2	I <-> O DC (2)	I <-> O DC (2)
	DCSXSWI3	I <-> O DC (3)	I <-> O DC (3)
Earthing switch indication	ESSXSWI1	I <-> O ES (1)	I <-> O ES (1)
	ESSXSWI2	I <-> O ES (2)	I <-> O ES (2)
Tap changer position indication	TPOSSLTC1	TPOS M	84M
Condition monitoring			
Circuit-breaker condition monitoring	SSCBR1	CBCM	CBCM
Trip circuit supervision	TCSSCBR1	TCS (1)	TCM (1)
	TCSSCBR2	TCS (2)	TCM (2)
Fuse failure supervision	SEQRFUF1	FUSEF	60
Runtime counter for machines and devices	MDSOPT1	OPTS	OPTM
Measurement			
Disturbance recorder	RDRE1	-	-
Three-phase current measurement	CMMXU1	3I	3I
	CMMXU2	3I(B)	3I(B)
Sequence current measurement	CSMSQI1	I1, I2, I0	I1, I2, I0
Residual current measurement	RESCMXXU1	Io	In
	RESCMXXU2	Io(B)	In(B)
Three-phase voltage measurement	VMMXU1	3U	3U
Residual voltage measurement	RESVMMXU1	Uo	Vn
Sequence voltage measurement	VSMSQI1	U1, U2, U0	U1, U2, U0
Three-phase power and energy measurement	PEMMXU1	P, E	P, E
RTD/mA measurement	XRGPIO130	X130 (RTD)	X130 (RTD)

Section 2

Modbus data mappings

2.1

Overview

This document describes the Modbus data points and structures available in RET615 Ver.4.0. The point lists describe a superset of all data available through the standard configurations A, B, C, D, E, F, G and H including the optional functionalities. The names of the standard configurations are TE01, TE02, TE03, TE04, TE05, TE06, TE07 and TE08 respectively.

The majority of the Modbus data points are valid for all standard configurations. Some data points are standard configuration or optional application dependent and thus not available in each IED. 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

Table 2: Supported functions in RET615

IEC 61850	TE01	TE02	TE03	TE04	TE05	TE06	TE07	TE08
PHLPTOC1 (HV)	•	•	•	•	•	•	•	•
PHLPTOC2 (LV)	•	•	•	•	•	•	•	•
PHHPTOC1 (HV)	•	•	•	•	•	•	•	•
PHHPTOC2 (LV)	•	•	•	•	•	•	•	•
PHIPTOC1 (HV)	•	•	•	•	•	•	•	•
PHIPTOC2 (LV)	•	•	•	•	•	•	•	•
EFLPTOC1 (HV)	•		•		•		•	
EFLPTOC2 (LV)		•		•		•		•
EFHPTOC1 (HV)	•		•		•		•	
EFHPTOC2 (LV)		•		•		•		•
NSPTOC1 (HV)	•	•	•	•	•	•	•	•
NSPTOC2 (LV)	•	•	•	•	•	•	•	•
ROVPTOV1 (HV)					•	•	•	•
ROVPTOV2 (HV)					•	•	•	•
PHPTUV1 (HV)					•	•	•	•
PHPTUV2 (HV)					•	•	•	•
PHPTOV1 (HV)					•	•	•	•

Table continues on next page

Section 2

Modbus data mappings

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IEC 61850	TE01	TE02	TE03	TE04	TE05	TE06	TE07	TE08
PHPTOV2 (HV)					•	•	•	•
T2PTTR1 (HV)	•	•	•	•	•	•	•	•
TR2PTDF1	•	•	•	•	•	•	•	•
LREFPNDF1 (H/LV)	•	•			•	•		
HREFPDIF1 (H/LV)				•	•		•	•
CCBRBRF1 (HV)	•	•	•	•	•	•	•	•
TRPPTRC1	•	•	•	•	•	•	•	•
TRPPTRC2	•	•	•	•	•	•	•	•
ARCSARC1 (LV)	○	○	○	○	○	○	○	○
ARCSARC2 (LV)	○	○	○	○	○	○	○	○
ARCSARC3 (LV)	○	○	○	○	○	○	○	○
MAPGAPC1	○	○	○	○				
MAPGAPC2	○	○	○	○				
MAPGAPC3	○	○	○	○				
MAPGAPC4	○	○	○	○				
MAPGAPC5	○	○	○	○				
MAPGAPC6	○	○	○	○				
CBXCBR1 (HV)	•	•	•	•	•	•	•	•
DCXSXI1	•	•	•	•	•	•	•	•
DCXSXI2	•	•	•	•	•	•	•	•
ESXSXI1	•	•	•	•	•	•	•	•
DCSXSWI1	•	•	•	•	•	•	•	•
DCSXSWI2	•	•	•	•	•	•	•	•
DCSXSWI3	•	•	•	•	•	•	•	•
ESSXSXI1	•	•	•	•	•	•	•	•
ESSXSXI2	•	•	•	•	•	•	•	•
TPOSSLTC1	•	•	•	•	•	•	•	•
SSCBR1 (HV)	•	•	•	•	•	•	•	•
TCSSCBR1	•	•	•	•	•	•	•	•
TCSSCBR2	•	•	•	•	•	•	•	•
SEQRFUF1					•	•	•	•
MDSOPT1	•	•	•	•	•	•	•	•
RDRE1	•	•	•	•	•	•	•	•
CMMXU1 (HV)	•	•	•	•	•	•	•	•
CMMXU2 (LV)	•	•	•	•	•	•	•	•
CSMSQI1 (HV)	•	•	•	•	•	•	•	•
RESCMMXU1 (HV)	•		•		•		•	
RESCMMXU2 (LV)		•		•		•		•
VMMXU1 (HV)					•	•	•	•

Table continues on next page

IEC 61850	TE01	TE02	TE03	TE04	TE05	TE06	TE07	TE08
RESVMMXU1 (HV)					•	•	•	•
VSMSQI1 (HV)					•	•	•	•
PEMMXU1 (HV)					•	•	•	•
XRGGIO130	o	o	o	o				
• = available in the device variant, o = optionally available in the device variant								

2.3 Point list for RET615 Ver.4.0 TE01-08

2.3.1 Indications

Table 3: Explanations of the indications table columns

Column name	Description
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 ACT.
Description	Short description of the signal. See the application function block documentation for more details.
Value	Meaning of the value states.

2.3.1.1 CommonData1

Table 4: CommonData1

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	.LocRem.stVal.Station	-	Station state	1=Station
		DR.RDRE1			
2722	170.02	.RcdMade.stVal	-	DR recording made	1=Made
2723	170.03	.mcd			
		LD0.LLN0			
2726	170.06	.SetSel.stVal		Settings reserved	1=Reserved
2727	170.07	.mcd			
2728	170.08	.SetChg.stVal		Settings changed	1=Changed
2729	170.09	.mcd			

2.3.1.2 LD0.DARREC1 AR state

Table 5: LD0.DARREC1 AR state

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

2.3.1.3 LD0.LEDPTRC1 Global conditioning

Table 6: LD0.LEDPTRC1 Global conditioning

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			

2.3.1.4 LD0.TRPPTRC1 Protection trip conditioning (1)

Table 7: LD0.TRPPTRC1 Protection trip conditioning (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			

2.3.1.5 LD0.TRPPTRC2 Protection trip conditioning (2)

Table 8: LD0.TRPPTRC2 Protection trip conditioning (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			

2.3.1.6

LD0.CMMXU1 Phase current limit supervision (1)

Table 9: LD0.CMMXU1 Phase current limit supervision (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			

2.3.1.7

LD0.RESCMMXU1 Residual current limit supervision (1)

Table 10: LD0.RESCMMXU1 Residual current limit supervision (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			

2.3.1.8

LD0.RESVMMXU1 Residual voltage limit supervision (1)

Table 11: LD0.RESVMMXU1 Residual voltage limit supervision (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.RESVMMXU1			
3048	190.08	.HiAlm.stVal	HIGH_ALARM	High alarm	1=Alarm
3049	190.09	.mcd			
3050	190.10	.HiWrn.stVal	HIGH_WARN	High warning	1=Warning
3051	190.11	.mcd			

2.3.1.9 LD0.RESCMMXU2 Residual voltage limit supervision (2)

Table 12: LD0.RESCMMXU2 Residual voltage limit supervision (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.RESCMMXU2			
2764	172.12	.HiAlm.stVal	HIGH_ALARM	High alarm	1=Alarm
2765	172.13	.mcd			
2766	172.14	.HiWrn.stVal	HIGH_WARN	High warning	1=Warning
2767	172.15	.mcd			

2.3.1.10 LD0.LEDGGIO1 Indication LED states

Table 13: LD0.LEDGGIO1 Indication LED states

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.LEDGGIO1			
2768	173.00	.SPCSO1.stVal	-	LED 1 state	0/1=Off/On
2769	173.01	.SPCSO2.stVal	-	LED 2 state	0/1=Off/On
2770	173.02	.SPCSO3.stVal	-	LED 3 state	0/1=Off/On
2771	173.03	.SPCSO4.stVal	-	LED 4 state	0/1=Off/On
2772	173.04	.SPCSO5.stVal	-	LED 5 state	0/1=Off/On
2773	173.05	.SPCSO6.stVal	-	LED 6 state	0/1=Off/On
2774	173.06	.SPCSO7.stVal	-	LED 7 state	0/1=Off/On
2775	173.07	.SPCSO8.stVal	-	LED 8 state	0/1=Off/On
2776	173.08	.SPCSO9.stVal	-	LED 9 state	0/1=Off/On
2777	173.09	.SPCSO10.stVal	-	LED 10 state	0/1=Off/On
2778	173.10	.SPCSO11.stVal	-	LED 11 state	0/1=Off/On
2779	173.11	< reserved >			0

2.3.1.11 LD0.TCSSCBR1 Trip circuit supervision (1)

Table 14: LD0.TCSSCBR1 Trip circuit supervision (1)

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

2.3.1.12

LD0.TCSSCBR2 Trip circuit supervision (2)

Table 15: LD0.TCSSCBR2 Trip circuit supervision (2)

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

2.3.1.13

LD0.VMMXU1 Phase voltage limit supervision (1)

Table 16: LD0.VMMXU1 Phase voltage limit supervision (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.VMMXU1			
3040	190.00	.HiAlm.stVal	HIGH_ALARM	High alarm	1=Alarm
3041	190.01	.mcd			
3042	190.02	.HiWrn.stVal	HIGH_WARN	High warning	1=Warning
3043	190.03	.mcd			
3044	190.04	.LoWrn.stVal	LOW_WARN	Low warning	1=Warning
3045	190.05	.mcd			
3046	190.06	.LoAlm.stVal	LOW_ALARM	Low alarm	1=Alarm
3047	190.07	.mcd			

2.3.1.14

LD0.CMMXU2 Phase current limit supervision (2)

Table 17: LD0.CMMXU2 Phase current limit supervision (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.CMMXU2			
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			

2.3.1.15 CTRL.DCSXSWI1 Disconnector 1 mom position

Table 18: CTRL.DCSXSWI1 Disconnector 1 mom position

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.DCSXSWI1	POSITION		
2792	174.08	.Pos.stVal.Close	-	Close bit	1=Close
2793	174.09	.Pos.stVal.Open	-	Open bit	1=Open
2794	174.10	.Pos.stVal.Fault	-	Fault bit	1=Pos(00/11)

2.3.1.16 CTRL.DCSXSWI2 Disconnector 2 mom position

Table 19: CTRL.DCSXSWI2 Disconnector 2 mom position

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.DCSXSWI2	POSITION		
2795	174.11	.Pos.stVal.Close	-	Close bit	1=Close
2796	174.12	.Pos.stVal.Open	-	Open bit	1=Open
2797	174.13	.Pos.stVal.Fault	-	Fault bit	1=Pos(00/11)

2.3.1.17 CTRL.DCSXSWI3 Disconnector 3 mom position

Table 20: CTRL.DCSXSWI3 Disconnector 3 mom position

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.DCSXSWI3	POSITION		
2798	174.14	.Pos.stVal.Close	-	Close bit	1=Close
2799	174.15	.Pos.stVal.Open	-	Open bit	1=Open
2800	175.00	.Pos.stVal.Fault	-	Fault bit	1=Pos(00/11)

2.3.1.18 CTRL.ESSXSWI1 Earth switch 1 mom position

Table 21: CTRL.ESSXSWI1 Earth switch 1 mom position

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)

2.3.1.19 CTRL.CBCSWI1 Circuit breaker 1 mom position
Table 22: *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)

2.3.1.20 CTRL.ESSXSWI2 Earth switch 2 mom position
Table 23: *CTRL.ESSXSWI2 Earth switch 2 mom position*

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)

2.3.1.21 CTRL.CBCSWI1 Circuit breaker 1 mom+mcd position
Table 24: *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			

2.3.1.22 CTRL.CBCILO1 Circuit breaker 1 enable signals
Table 25: *CTRL.CBCILO1 Circuit breaker 1 enable signals*

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

2.3.1.23 CTRL.CCBRBRF1 Circuit breaker 1 failure protection

Table 26: CTRL.CCBRBRF1 Circuit breaker 1 failure protection

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.CCBRBRF1			
2828	176.12	.Str.general	CB_FAULT_AL	Timer running	1=Running
2829	176.13	.mcd			
2830	176.14	.OpEx.general	TRBU	Fail, external trip	1=Ext.trip
2831	176.15	.mcd			
2832	177.00	.OpIn.general	TRRET	Internal re-trip	1=Re-trip
2833	177.01	.mcd			

2.3.1.24 CTRL.CBXCBR1 Circuit breaker 1 blocking signals

Table 27: CTRL.CBXCBR1 Circuit breaker 1 blocking signals

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			
2840	177.08	.ItlByPss.stVal	ITL_BYPASS	Interlock bypass	1=Bypass
2841	177.09	.mcd			

2.3.1.25 LD0.SSCBR1 Circuit breaker 1 condition monitoring

Table 28: LD0.SSCBR1 Circuit breaker 1 condition monitoring

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	.ClzAlm.stVal	TRV_T_CL_ALM	Clz travel time alarm	1=Alarm
2850	178.02	.SprChaAlm.stVal	SPR_CHR_ALM	Spring charge alarm	1=Alarm
2851	178.03	.OpNumAlm.stVal	OPR_ALM	CB operations alarm	1=Alarm
2852	178.04	.OpNumLO.stVal	OPR_LO	CB operations lockout	1=Lockout
2853	178.05	.LonTmAlm.stVal	MON_ALM	CB inactive alarm	1=Alarm
2854	178.06	.PresAlm.stVal	PRES_ALM	Low pressure alarm	1=Alarm
2855	178.07	.PresLO.stVal	PRES_LO	Low pressure lockout	1=Lockout
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	.CBLifAlm.stVal	CB_LIFE_ALM	CB lifetime alarm	1=Alarm

2.3.1.26 LD0.LEDPTRC1 Global conditioning - phase information

Table 29: LD0.LEDPTRC1 Global conditioning - phase information

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.LEDPTRC1			
2864	179.00	.Str.phsA		Start phsA	1=Start
2865	179.01	.mcd			
2866	179.02	.Str.phsB		Start phsB	1=Start
2867	179.03	.mcd			
2868	179.04	.Str.phsC		Start phsC	1=Start
2869	179.05	.mcd			
2870	179.06	.Op.phsA		Operate phsA	1=Operate
2871	179.07	.mcd			
2872	179.08	.Op.phsB		Operate phsB	1=Operate
2873	179.09	.mcd			
2874	179.10	.Op.phsC		Operate phsC	1=Operate
2875	179.11	.mcd			

2.3.1.27 LD0.MDSOPT1 Generic operation time supervision

Table 30: LD0.MDSOPT1 Generic operation time supervision

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MDSOPT1			
2748	171.12	.OpTmWrn.stVal		Accum.op.time Warn.	1=Warning
2749	171.13	.mcd			
2750	171.14	.OpTmAlm.stVal		Accum.op.time Alarm	1=Alarm
2751	171.15	.mcd			

2.3.1.28 LD0.PHLPTOC1 Phase overcurrent protection, low stage (1)

Table 31: LD0.PHLPTOC1 Phase 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		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

Table continues on next page

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BitA	RegA	IEC 61850 name	SA name	Description	Values
2887	180.07	.mcd			
2888	180.08	.Op.general	OPERATE	General operate	1=Operate
2889	180.09	.mcd			

2.3.1.29 LD0.PHHPTOC1 Phase overcurrent protection, high stage (1)

Table 32: LD0.PHHPTOC1 Phase 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		phsA start	1=Start
2893	180.13	.mcd			
2894	180.14	.Str.phsB		phsB start	1=Start
2895	180.15	.mcd			
2896	181.00	.Str.phsC		phsC start	1=Start
2897	181.01	.mcd			
2898	181.02	.Op.general	OPERATE	General operate	1=Operate
2899	181.03	.mcd			

2.3.1.30 LD0.PHHPTOC2 Phase overcurrent protection, high stage (2)

Table 33: LD0.PHHPTOC2 Phase overcurrent protection, high stage (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PHHPTOC2			
2920	182.08	.Str.general	START	General start	1=Start
2921	182.09	.mcd			
2922	182.10	.Str.phsA		phsA start	1=Start
2923	182.11	.mcd			
2924	182.12	.Str.phsB		phsB start	1=Start
2925	182.13	.mcd			
2926	182.14	.Str.phsC		phsC start	1=Start
2927	182.15	.mcd			
2928	183.00	.Op.general	OPERATE	General operate	1=Operate
2929	183.01	.mcd			

2.3.1.31

LD0.PHIPTOC1 Phase overcurrent protection, instantaneous stage (1)

Table 34: LD0.PHIPTOC1 Phase overcurrent protection, instantaneous stage (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PHIPTOC1			
2900	181.04	.Str.general	START	General start	1=Start
2901	181.05	.mcd			
2902	181.06	.Str.phsA		phsA start	1=Start
2903	181.07	.mcd			
2904	181.08	.Str.phsB		phsB start	1=Start
2905	181.09	.mcd			
2906	181.10	.Str.phsC		phsC start	1=Start
2907	181.11	.mcd			
2908	181.12	.Op.general	OPERATE	General operate	1=Operate
2909	181.13	.mcd			

2.3.1.32

LD0.PHLPTOC2 Phase overcurrent protection, low stage (2)

Table 35: LD0.PHLPTOC2 Phase overcurrent protection, low stage (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PHLPTOC2			
2910	181.14	.Str.general	START	General start	1=Start
2911	181.15	.mcd			
2912	182.00	.Str.phsA		phsA start	1=Start
2913	182.01	.mcd			
2914	182.02	.Str.phsB		phsB start	1=Start
2915	182.03	.mcd			
2916	182.04	.Str.phsC		phsC start	1=Start
2917	182.05	.mcd			
2918	182.06	.Op.general	OPERATE	General operate	1=Operate
2919	182.07	.mcd			

2.3.1.33

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

Table 36: LD0.PHIPTOC2 Phase overcurrent protection, instantaneous stage (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.PHIPTOC2			
2930	183.02	.Str.general	START	General start	1=Start
2931	183.03	.mcd			
2932	183.04	.Str.phsA		phsA start	1=Start

Table continues on next page

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BitA	RegA	IEC 61850 name	SA name	Description	Values
2933	183.05	.mcd			
2934	183.06	.Str.phsB		phsB start	1=Start
2935	183.07	.mcd			
2936	183.08	.Str.phsC		phsC start	1=Start
2937	183.09	.mcd			
2938	183.10	.Op.general	OPERATE	General operate	1=Operate
2939	183.11	.mcd			

2.3.1.34

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

Table 37: LD0.EFLPTOC1 Non-directional earth-fault protection - low stage (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.EFLPTOC1			
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			

2.3.1.35

LD0.EFLPTOC2 Non-directional earth-fault protection - low stage (2)

Table 38: LD0.EFLPTOC2 Non-directional earth-fault protection - low stage (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.EFLPTOC2			
2948	184.04	.Str.general	START	Stage start	1=Start
2949	184.05	.mcd			
2950	184.06	.Op.general	OPERATE	Stage operate	1=Operate
2951	184.07	.mcd			

2.3.1.36

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

Table 39: LD0.EFHPTOC1 Non-directional earth-fault protection - high stage (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.EFHPTOC1			
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			

2.3.1.37 Non-directional earth-fault protection - high stage (2)
Table 40: Non-directional earth-fault protection - high stage (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.EFHPTOC2			
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			

2.3.1.38 LD0.LREFPDIF1 Low-impedance restricted earth-fault protection (1)
Table 41: LD0.LREFPDIF1 Low-impedance restricted earth-fault protection (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.LREFPDIF1			
2964	185.04	.Str.general	START	Stage start	1=Start
2965	185.05	.mcd			
2966	185.06	.Op.general	OPERATE	Stage operate	1=Operate
2967	185.07	.mcd			

2.3.1.39 LD0.HREFPDIF1 High-impedance restricted earth-fault protection (1)
Table 42: LD0.HREFPDIF1 High-impedance restricted earth-fault protection (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.HREFPDIF1			
2968	185.08	.Str.general	START	Stage start	1=Start
2969	185.09	.mcd			
2970	185.10	.Op.general	OPERATE	Stage operate	1=Operate
2971	185.11	.mcd			

2.3.1.40 LD0.NSPTOC1 Negative-sequence overcurrent protection, stage 1
Table 43: LD0.NSPTOC1 Negative-sequence overcurrent protection, stage 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			

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LD0.NSPTOC2 Negative-sequence overcurrent protection, stage 2

Table 44: LD0.NSPTOC2 Negative-sequence overcurrent protection, stage 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			

2.3.1.42

LD0.T2PTTR1 Thermal overload protection (1)

Table 45: LD0.T2PTTR1 Thermal overload protection (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.T2PTTR1			
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			

2.3.1.43

LD0.ARCSARC1 Fault arc protection, stage 1

Table 46: LD0.ARCSARC1 Fault arc protection, stage 1

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.ARCSARC11			
2978	186.02	.FADet.stVal	ARC_FLT_DET	Arc detected	1=Detected
2979	186.03	.mcd			
		LD0.ARCPTRC11			
2982	186.06	.Op.general	OPERATE	Stage operate	1=Operate
2983	186.07	.mcd			

2.3.1.44

LD0.ARCSARC2 Fault arc protection, stage 2

Table 47: LD0.ARCSARC2 Fault arc protection, stage 2

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.ARCSARC21			
2984	186.08	.FADet.stVal	ARC_FLT_DET	Arc detected	1=Detected
2985	186.09	.mcd			

Table continues on next page

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.ARCPTRC21			
2988	186.12	.Op.general	OPERATE	Stage operate	1=Operate
2989	186.13	.mcd			

2.3.1.45 LD0.ARCSARC3 Fault arc protection, stage 3

Table 48: LD0.ARCSARC3 Fault arc protection, stage 3

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.ARCSARC31			
2990	186.14	.FADet.stVal	ARC_FLT_DET	Arc detected	1=Detected
2991	186.15	.mcd			
		LD0.ARCPTRC31			
2994	187.02	.Op.general	OPERATE	Stage operate	1=Operate
2995	187.03	.mcd			

2.3.1.46 LD0.SEQRFUF1 Fuse failure protection

Table 49: LD0.SEQRFUF1 Fuse failure protection

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.SEQRFUF1			
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			

2.3.1.47 LD0.TR2PTDF1 Transformer differential protection

Table 50: LD0.TR2PTDF1 Transformer differential protection

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.TR2PTDF1			
3000	187.08	.Op.general	OPERATE	General operate	1=Operate
3001	187.09	.mcd			
3002	187.10	.Op.phsA		phsA operate	1=Operate
3003	187.11	.mcd			
3004	187.12	.Op.phsB		phsB operate	1=Operate
3005	187.13	.mcd			
3006	187.14	.Op.phsC		phsC operate	1=Operate
3007	187.15	.mcd			
3008	188.00	.Blk2HSt.general	BLKD2H	2nd harmonic res block.	1=Blocking
3009	188.01	.mcd			

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2.3.1.48 LD0.PHPTOV1 Phase overvoltage protection (1)

Table 51: LD0.PHPTOV1 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		phsA start	1=Start
3091	193.03	.mcd			
3092	193.04	.Str.phsB		phsB start	1=Start
3093	193.05	.mcd			
3094	193.06	.Str.phsC		phsC start	1=Start
3095	193.07	.mcd			
3096	193.08	.Op.general	OPERATE	General operate	1=Operate
3097	193.09	.mcd			

2.3.1.49 LD0.PHPTOV2 Phase overvoltage protection (2)

Table 52: LD0.PHPTOV2 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			
3100	193.12	.Str.phsA		phsA start	1=Start
3101	193.13	.mcd			
3102	193.14	.Str.phsB		phsB start	1=Start
3103	193.15	.mcd			
3104	194.00	.Str.phsC		phsC start	1=Start
3105	194.01	.mcd			
3106	194.02	.Op.general	OPERATE	General operate	1=Operate
3107	194.03	.mcd			

2.3.1.50 LD0.PHPTUV1 Phase undervoltage protection (1)

Table 53: LD0.PHPTUV1 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		phsA start	1=Start
Table continues on next page					

BitA	RegA	IEC 61850 name	SA name	Description	Values
3141	196.05	.mcd			
3142	196.06	.Str.phsB		phsB start	1=Start
3143	196.07	.mcd			
3144	196.08	.Str.phsC		phsC start	1=Start
3145	196.09	.mcd			
3146	196.10	.Op.general	OPERATE	General operate	1=Operate
3147	196.11	.mcd			

2.3.1.51 LD0.PHPTUV2 Phase undervoltage protection (2)

Table 54: LD0.PHPTUV2 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		phsA start	1=Start
3151	196.15	.mcd			
3152	197.00	.Str.phsB		phsB start	1=Start
3153	197.01	.mcd			
3154	197.02	.Str.phsC		phsC start	1=Start
3155	197.03	.mcd			
3156	197.04	.Op.general	OPERATE	General operate	1=Operate
3157	197.05	.mcd			

2.3.1.52 LD0.ROVPTOV1 Residual overvoltage protection (1)

Table 55: 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			

2.3.1.53 LD0.ROVPTOV2 Residual overvoltage protection (2)

Table 56: 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			

2.3.1.54 LD0.MAPGAPC1 Multipurpose analog protection function (1)

Table 57: LD0.MAPGAPC1 Multipurpose analog protection function (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MAPGAPC1			
3016	188.08	.Op.general	OPERATE	Stage operate	1 = Operate
3017	188.09	.mcd			
3018	188.10	.Str.general	START	Stage start	1 = Start
3019	188.11	.mcd			

2.3.1.55 LD0.MAPGAPC2 Multipurpose analog protection function (2)

Table 58: LD0.MAPGAPC2 Multipurpose analog protection function (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MAPGAPC2			
3020	188.12	.Op.general	OPERATE	Stage operate	1 = Operate
3021	188.13	.mcd			
3022	188.14	.Str.general	START	Stage start	1 = Start
3023	188.15	.mcd			

2.3.1.56 LD0.MAPGAPC3 Multipurpose analog protection function (3)

Table 59: LD0.MAPGAPC3 Multipurpose analog protection function (3)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MAPGAPC3			
3024	189.00	.Op.general	OPERATE	Stage operate	1 = Operate
3025	189.01	.mcd			
3026	189.02	.Str.general	START	Stage start	1 = Start
3027	189.03	.mcd			

2.3.1.57 LD0.MAPGAPC4 Multipurpose analog protection function (4)

Table 60: LD0.MAPGAPC4 Multipurpose analog protection function (4)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MAPGAPC4			
3028	189.04	.Op.general	OPERATE	Stage operate	1 = Operate
3029	189.05	.mcd			
3030	189.06	.Str.general	START	Stage start	1 = Start
3031	189.07	.mcd			

2.3.1.58 LD0.MAPGAPC5 Multipurpose analog protection function (5)

Table 61: LD0.MAPGAPC5 Multipurpose analog protection function (5)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MAPGAPC5			
3036	189.12	.Op.general	OPERATE	Stage operate	1 = Operate
3037	189.13	.mcd			
3038	189.14	.Str.general	START	Stage start	1 = Start
3039	189.15	.mcd			

2.3.1.59 LD0.MAPGAPC6 Multipurpose analog protection function (6)

Table 62: LD0.MAPGAPC6 Multipurpose analog protection function (6)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MAPGAPC6			
3012	188.04	.Op.general	OPERATE	Stage operate	1 = Operate
3013	188.05	.mcd			
3014	188.06	.Str.general	START	Stage start	1 = Start
3015	188.07	.mcd			

2.3.1.60 LD0.XRGGIO130 Alarm/warning

Table 63: LD0.XRGGIO130 Alarm/warning

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.XRGGIO130			
3032	189.08	.Alm.stVal	-	XRGGIO130 Alarm	1=Alarm
3033	189.09	.mcd			
3034	189.10	.Wrn.stVal	-	XRGGIO130 Warning	1=Warning
3035	189.11	.mcd			

2.3.1.61

CTRL.DCXSWI1 Controllable discon. 1 mom position data

Table 64: CTRL.DCXSWI1 Controllable discon. 1 mom position data

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.DCCIL01			
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			
3482	217.10	.ItlByPss.stVal	ITL_BYPASS	Interlock bypass	1=Bypass
3483	217.11	.mcd			

2.3.1.62

CTRL.DCXSWI2 Controllable discon. 2 mom position data

Table 65: CTRL.DCXSWI2 Controllable discon. 2 mom position data

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.DCCIL02			
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			
3494	218.06	.ItlByPss.stVal	ITL_BYPASS	Interlock bypass	1=Bypass
3495	218.07	.mcd			

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CTRL.ESXSWI1 Controllable earth switch 1 mom position

Table 66: CTRL.ESXSWI1 Controllable earth switch 1 mom position

BitA	RegA	IEC 61850 name	SA name	Description	Values
		CTRL.ESXSWI1	POSITION		
3496	218.08	.Pos.stVal.Close	-	Close bit	1=Close
3497	218.09	.Pos.stVal.Open	-	Open bit	1=Open
3498	218.10	.Pos.stVal.Fault	-	Fault bit	1=Pos(00/11)
3499	218.11	.Pos.stSelD	-	Control selected	1=Selected
		CTRL.ESCILO1			
3500	218.12	.EnaOpn.stVal	ENA_OPEN	Open enabled	1=Enabled
3501	218.13	.EnaCls.stVal	ENA_CLOSE	Close enabled	1=Enabled
		CTRL.ESXSWI1			
3502	218.14	.BlkOpn.stVal	BLK_OPEN	Open blocked	1=Blocked
3503	218.15	.mcd			
3504	219.00	.BlkCls.stVal	BLK_CLOSE	Close blocked	1=Blocked
3505	219.01	.mcd			
3506	219.02	.ItlByPss.stVal	ITL_BYPASS	Interlock bypass	1=Bypass
3507	219.03	.mcd			

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

Table 67: 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

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BitA	RegA	IEC 61850 name	SA name	Description	Values
3267	204.03	.mcd			
3268	204.04	.SPCSO3.stVal		X130-Output 3 State	0/1=Off/On
3269	204.05	.mcd			

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

Table 68: 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			

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

Table 69: 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
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			

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

Table 70: LD0.XAGGIO130 Physical I/O states (AIM card XA130)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.XAGGIO130			
3264	204.00	.Ind1.stVal		XA130-Input 1 State	0/1=Off/On
3265	204.01	.mcd			
3266	204.02	.Ind2.stVal		XA130-Input 2 State	0/1=Off/On
3267	204.03	.mcd			
3268	204.04	.Ind3.stVal		XA130-Input 3 State	0/1=Off/On
3269	204.05	.mcd			
3270	204.06	.Ind4.stVal		XA130-Input 4 State	0/1=Off/On
3271	204.07	.mcd			

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LD0.MVGAPC1 Multipurpose binary inputs (1)

Table 71: LD0.MVGAPC1 Multipurpose binary inputs (1)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MVGAPC1			
3536	221.00	.Q1.stVal		Input 1	0/1=Off/On
3537	221.01	.mcd			
3538	221.02	.Q2.stVal		Input 2	0/1=Off/On

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BitA	RegA	IEC 61850 name	SA name	Description	Values
3539	221.03	.mcd			
3540	221.04	.Q3.stVal		Input 3	0/1=Off/On
3541	221.05	.mcd			
3542	221.06	.Q4.stVal		Input 4	0/1=Off/On
3543	221.07	.mcd			
3544	221.08	.Q5.stVal		Input 5	0/1=Off/On
3545	221.09	.mcd			
3546	221.10	.Q6.stVal		Input 6	0/1=Off/On
3547	221.11	.mcd			
3548	221.12	.Q7.stVal		Input 7	0/1=Off/On
3549	221.13	.mcd			
3550	221.14	.Q8.stVal		Input 8	0/1=Off/On
3551	221.15	.mcd			

2.3.1.69 LD0.MVGAPC2 Multipurpose binary inputs (2)

Table 72: LD0.MVGAPC2 Multipurpose binary inputs (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.MVGAPC2			
3552	222.00	.Q1.stVal		Input 1	0/1=Off/On
3553	222.01	.mcd			
3554	222.02	.Q2.stVal		Input 2	0/1=Off/On
3555	222.03	.mcd			
3556	222.04	.Q3.stVal		Input 3	0/1=Off/On
3557	222.05	.mcd			
3558	222.06	.Q4.stVal		Input 4	0/1=Off/On
3559	222.07	.mcd			
3560	222.08	.Q5.stVal		Input 5	0/1=Off/On
3561	222.09	.mcd			
3562	222.10	.Q6.stVal		Input 6	0/1=Off/On
3563	222.11	.mcd			
3564	222.12	.Q7.stVal		Input 7	0/1=Off/On
3565	222.13	.mcd			
3566	222.14	.Q8.stVal		Input 8	0/1=Off/On
3567	222.15	.mcd			

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LD0.SPCGGIO2 Multipurpose binary output states (2)

Table 73: LD0.SPCGGIO2 Multipurpose binary output states (2)

BitA	RegA	IEC 61850 name	SA name	Description	Values
		LD0.SPCGGIO2			
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			
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			

2.3.2 Registers

Table 74: Explanations of the registers table columns

Column name	Description
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 ACT.
Description	Short description of the signal. See the application function block documentation for more details.
Values	The value range of the original IEC 61850 value, that is, before scaling.

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

Table 75: User definable registers [Alt.1], visible on 3x and 4x

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
(0)	Reg				< not mappable- not visible >	Obs PLC addr.
1	Reg				User Register 1	
2	Reg				User Register 2	
3	:				:	
:	:				:	
:	:				:	
127	Reg				User Register 127	

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

Table 76: User definable bits [Alt.2], visible on 0x,1x,3x and 4x

BitA	Typ	Scale	IEC 61580 name	SA name	Description	Values
(0)	Bit				< not mappable - not visible >	Obs PLC addr.
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	

Table continues on next page

BitA	Typ	Scale	IEC 61580 name	SA name	Description	Values
:	:				:	
:	:				:	
2046	Bit				Usr Reg 127.Bit 14	
2047	Bit				Usr Reg 127.Bit 15	

2.3.2.3 SSR1 System status register 1 - device health

Table 77: *SSR1 System status register 1 - device health*

RegA	Typ	Scale	IEC 61580 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

2.3.2.4 SSR2 System status register 2 - IED mode and state

Table 78: *SSR2 System status register 2 - IED mode and state*

RegA	Typ	Scale	IEC 61580 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				IED timesynch failure	1=Failure
129.07	Bit				< reserved >	0

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RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
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

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

Table 79: *SSR3 System status register 3 - data available 1 (client-dependent)*

RegA	Typ	Scale	IEC 61580 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
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

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

Table 80: *SSR4 System status register 4 - data available 2 (client-dependent - user-definable)*

RegA	Typ	Scale	IEC 61580 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

Table continues on next page

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
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

2.3.2.7 SSR5 System status register 5 - device alive register

Table 81: *SSR5 System status register 5 - device alive register*

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
132	u16	1			Device alive counter	0..65535

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

Table 82: *SSR6 System status register 6 - control command status (client-dependent)*

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
					Last cmd result code	See doc.
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	See doc.
133.08	Bit				- bit 0	
133.09	Bit				- bit 1	
					Command state	See doc.
133.10	Bit				- bit 0	
133.11	Bit				- bit 1	

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RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
					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	

2.3.2.9 LD0.CMMXU1 Phase current measurements (1)

Table 83: LD0.CMMXU1 Phase current measurements (1)

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.CMMXU1		Phase current (1)	
138	u16	1000	.A.phsA.instCVal.mag	I_INST_A	- phsA amplitude	0.00..40.0 [xIn]
139	u16	1000	.A.phsB.instCVal.mag	I_INST_B	- phsB amplitude	0.00..40.0 [xIn]
140	u16	1000	.A.phsC.instCVal.mag	I_INST_C	- phsC amplitude	0.00..40.0 [xIn]

2.3.2.10 LD0.RESCMMXU1 Residual current measurement (1)

Table 84: LD0.RESCMMXU1 Residual current measurement (1)

RegA	Typ	Scale	IEC 61580 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]

2.3.2.11 LD0.CMMXU2 Phase current measurements (2)

Table 85: LD0.CMMXU2 Phase current measurements (2)

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.CMMXU2		Phase current (2)	
152	u16	1000	.A.phsA.instCVal.mag	I_INST_A	- phsA amplitude	0.00..40.0 [xIn]
153	u16	1000	.A.phsB.instCVal.mag	I_INST_B	- phsB amplitude	0.00..40.0 [xIn]
154	u16	1000	.A.phsC.instCVal.mag	I_INST_C	- phsC amplitude	0.00..40.0 [xIn]

2.3.2.12 LD0.RESCMMXU1 Residual current measurement (2)

Table 86: LD0.RESCMMXU1 Residual current measurement (2)

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.RESCMMXU2		Residual current (2)	
155	u16	1000	.A.res.instCVal.mag	I0_INST	- amplitude	0.00..40.0 [xIn]

2.3.2.13 LD0.RESVMMXU1 Residual voltage measurement (1)

Table 87: LD0.RESVMMXU1 Residual voltage measurement (1)

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.RESVMMXU1		Residual voltage (1)	
137	u16	1000	.A.res.instCVal.mag	U0_INST	- amplitude	0.00..4.00 [xUn]

2.3.2.14 LD0.CMSQI1 Sequence of current measurements (1)

Table 88: LD0.CMSQI1 Sequence of current measurements (1)

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.CMSQI1		Sequence of currents	
142	u16	1000	.SeqA.c1.instCVal.mag	I1_INST	- positive amplitude	0.00..40.0 [xIn]
143	u16	1000	.SeqA.c2.instCVal.mag	I2_INST	- negative amplitude	0.00..40.0 [xIn]
144	u16	1000	.SeqA.c2.instCVal.mag	I3_INST	- zero amplitude	0.00..40.0 [xIn]

2.3.2.15 LD0.T2PTTR1 Thermal protection values (2)

Table 89: LD0.T2PTTR1 Thermal protection values (2)

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.T2PTTR1			
146	i16	1	.Tmp.mag	TEMP	Object temperature	-100.0...9999.9 [C]
147	u16	1	.TmpRI.mag	TEMP_RL	Relative temperature	0.00...99.99 [C]
2068	u16	1	.TmsOp.stVal	THERMLEV_ST	Est. time to operate	0...60000 [s]
2069	u16	1	.TmsRecEna.stVal	THERMLEV_END	Est. time to deactivate block	0...60000 [s]

2.3.2.16 LD0.VMMXU1 Voltage measurements (1)

Table 90: LD0.VMMXU1 Voltage measurements (1)

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.VMMXU1		Phase-ground voltage (1)	
134	u16	1000	.phV.phsA.cVal.mag	U_DB_A	- phsA amplitude	0.00..4.00 [xUn]
135	u16	1000	.phV.phsB.cVal.mag	U_DB_B	- phsB amplitude	0.00..4.00 [xUn]
136	u16	1000	.phV.phsC.cVal.mag	U_DB_C	- phsC amplitude	0.00..4.00 [xUn]
:			LD0.VMMXU1		Phase-phase voltage (1)	
160	u16	1000	.PPV.phsAB.cVal.mag	U_DB_AB	- phsAB amplitude	0.00..4.00 [xUn]
161	u16	1000	.PPV.phsBC.cVal.mag	U_DB_BC	- phsBC amplitude	0.00..4.00 [xUn]
162	u16	1000	.PPV.phsCA.cVal.mag	U_DB_CA	- phsCA amplitude	0.00..4.00 [xUn]

2.3.2.17 LD0.VMSQI1 Sequence of voltage measurements (1)

Table 91: LD0.VMSQI1 Sequence of voltage measurements (1)

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.VMSQI1		Sequence of voltages	
148	u16	1000	.SeqA.c1.instCVal.mag	U1_INST	- positive amplitude	0.00..4.00 [xUn]
149	u16	1000	.SeqA.c2.instCVal.mag	U2_INST	- negative amplitude	0.00..4.00 [xUn]
150	u16	1000	.SeqA.c2.instCVal.mag	U3_INST	- zero amplitude	0.00..4.00 [xUn]

2.3.2.18 LD0.PEMMXU1 Three-phase power measurements

Table 92: LD0.PEMMXU1 Three-phase power measurements

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.PEMMXU1			
163	i32	1	.TotW.instMag	P_INST	Total active power P (high)	-/+ 999,999
164			.TotW.instMag		(low word)	
165	i32	1	.TotVAr.instMag	Q_INST	Total reactive power Q (high)	-/+ 999,999
166			.TotVAr.instMag		(low word)	
167	i32	1	.TotVA.instMag	S_INST	Total apparent power S (high)	-/+ 999,999
168			.TotVA.instMag		(low word)	
169	i16	1000	.TotPF.instMag	PF_INST	Average power factor	-1..1

2.3.2.19 LD0.TPOSSLTC1 Tap changer position

Table 93: LD0.TPOSSLTC1 Tap changer position

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.TPOSSLTC1			
151	i16	1	.TapPos.mag	TAP_POS	Tap changer position	-64..63

2.3.2.20 Indication bits mirrored in registers

Table 94: Indication bits mirrored in registers

RegA	Typ	Scale	IEC 61580 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)	

2.3.2.21 LD0.PEMSTA1 Power measurement demand values (1)

Table 95: LD0.PEMSTA1 Power measurement demand values (1)

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.PEMSTA1		Demand	
1939	i32	1	.AvW.mag		- Active power P (high)	-/+ 999,999
1940					- (low word)	
1941	i32	1	.AvVAr.mag		- Reactive power Q (high)	-/+ 999,999
1942					- (low word)	
1943	i32	1	.AvVA.mag		- Apparent power S (high)	-/+ 999,999
1944					- (low word)	
1945	i16	1000	.AvPF.mag		- Power factor	-1..1
1946					< reserved >	0
					Max values:	
1947	i32	1	.MaxW.mag		- Active power P (high)	-/+ 999,999
1948					- (low word)	
1949	i32	1	.MaxVAr.mag		- Reactive power Q (high)	-/+ 999,999
1950					- (low word)	
1951	i32	1	.MaxVA.mag		- Apparent power S (high)	-/+ 999,999
1952					- (low word)	
1953					< reserved >	0

2.3.2.22

LD0.VMSTA1 Voltage demand values (1)

Table 96: LD0.VMSTA1 Voltage demand values (1)

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.VMSTA1		Demand phase-to-ground	
1954	u16	1000	.AvVPhsA.mag	U_DMD_A	- phsA amplitude	0..4.0 [xUn]
1955	u16	1000	.AvVPhsB.mag	U_DMD_B	- phsB amplitude	0..4.0 [xUn]
1956	u16	1000	.AvVPhsC.mag	U_DMD_C	- phsC amplitude	0..4.0 [xUn]
					Demand phase-to-phase	
1957	u16	1000	.AvVPhsAB.mag	U_DMD_AB	- phsAB amplitude	0..4.0 [xUn]
1958	u16	1000	.AvVPhsBC.mag	U_DMD_BC	- phsBC amplitude	0..4.0 [xUn]
1959	u16	1000	.AvVPhsCA.mag	U_DMD_CA	- phsCA amplitude	0..4.0 [xUn]
					Update time stamp	See doc.
1960	u16	-			- Year - month	
1961	u16	-			- Day - hour	
1962	u16	-			- Minute - second	
1963	u16	-			- Milliseconds	
1964	u16	-			- Time quality	

2.3.2.23

LD0.RESCMSTA2 Residual current demand value (2)

Table 97: LD0.RESCMSTA2 Residual current demand value (2)

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.RESCMSTA2		Demand value	
1965	u16	1000	.AvAmps.mag	I_DMD_RES	- residual amplitude	0.00..40.0 [xIn]
					Update time stamp	See doc.
1966	u16	-			- Year - month	
1967	u16	-			- Day - hour	
1968	u16	-			- Minute - second	
1969	u16	-			- Milliseconds	
1970	u16	-			- Time quality	
1971	u16	1000	.MaxAmps.mag	Max demand Io	- Max Io demand	0.00..40.0 [xIn]
					Update time stamp	See doc.
1972	u16	-			- Year - month	
1973	u16	-			- Day - hour	
1974	u16	-			- Minute - second	
1975	u16	-			- Milliseconds	
1976	u16	-			- Time quality	

2.3.2.24

LD0.RESVMSTA1 Residual voltage demand value (1)

Table 98: LD0.RESVMSTA1 Residual voltage demand value (1)

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.RESVMSTA1		Demand value	
1977	u16	1000	.AvVolts.mag	U_DMD_RES	- residual amplitude	0.00..4.0 [xUn]
					Update time stamp	See doc.
1978	u16	-			- Year - month	
1979	u16	-			- Day - hour	
1980	u16	-			- Minute - second	
1981	u16	-			- Milliseconds	
1982	u16	-			- Time quality	
1983	u16	1000	.MaxVolts.mag	Max demand Uo	- Max Uo demand	0.00..4.0 [xUn]
					Update time stamp	See doc.
1984	u16	-			- Year - month	
1985	u16	-			- Day - hour	
1986	u16	-			- Minute - second	
1987	u16	-			- Milliseconds	
1988	u16	-			- Time quality	

2.3.2.25

LD0.RESCMSTA1 Residual current demand value (1)

Table 99: LD0.RESCMSTA1 Residual current demand value (1)

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.RESCMSTA1		Demand value	
1989	u16	1000	.AvAmps.mag	I_DMD_RES	- residual amplitude	0.00..40.0 [xIn]
					Update time stamp	See doc.
1990	u16	-			- Year - month	
1991	u16	-			- Day - hour	
1992	u16	-			- Minute - second	
1993	u16	-			- Milliseconds	
1994	u16	-			- Time quality	
1995	u16	1000	.MaxAmps.mag	Max demand Io	- Max Io demand	0.00..40.0 [xIn]
					Update time stamp	See doc.
1996	u16	-			- Year - month	
1997	u16	-			- Day - hour	

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RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
1998	u16	-			- Minute - second	
1999	u16	-			- Milliseconds	
2000	u16	-			- Time quality	

2.3.2.26 LD0.CMSTA1 Phase current demand values (1)

Table 100: LD0.CMSTA1 Phase current demand values (1)

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.CMSTA1		Demand value	
2001	u16	1000	.AvAmpsA.mag	I_DMD_A	- phsA amplitude	0.00..40.0 [xIn]
2002	u16	1000	.AvAmpsB.mag	I_DMD_B	- phsB amplitude	0.00..40.0 [xIn]
2003	u16	1000	.AvAmpsC.mag	I_DMD_C	- phsC amplitude	0.00..40.0 [xIn]
					Update time stamp	See doc.
2004	u16	-			- Year - month	
2005	u16	-			- Day - hour	
2006	u16	-			- Minute - second	
2007	u16	-			- Milliseconds	
2008	u16	-			- Time quality	
2009	u16	1000	.MaxAmpsA.mag	Max demand IL1	- Max phsA demand	0.00..40.0 [xIn]
					Update time stamp	See doc.
2010	u16	-			- Year - month	
2011	u16	-			- Day - hour	
2012	u16	-			- Minute - second	
2013	u16	-			- Milliseconds	
2014	u16	-			- Time quality	
2015	u16	1000	.MaxAmpsB.mag	Max demand IL2	- Max phsB demand	0.00..40.0 [xIn]
					Update time stamp	See doc.
2016	u16	-			- Year - month	
2017	u16	-			- Day - hour	
2018	u16	-			- Minute - second	
2019	u16	-			- Milliseconds	
2020	u16	-			- Time quality	
2021	u16	1000	.MaxAmpsC.mag	Max demand IL3	- Max phsC demand	0.00..40.0 [xIn]

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RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
					Update time stamp	see doc.
2022	u16	-			- Year - month	
2023	u16	-			- Day - hour	
2024	u16	-			- Minute - second	
2025	u16	-			- Milliseconds	
2026	u16	-			- Time quality	

2.3.2.27 LD0.CMSTA2 Phase current demand values (2)

Table 101: LD0.CMSTA2 Phase current demand values (2)

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.CMSTA2		Demand value	
2027	u16	1000	.AvAmpsA.mag	I_DMD_A	- phsA amplitude	0.00..40.0 [xIn]
2028	u16	1000	.AvAmpsB.mag	I_DMD_B	- phsB amplitude	0.00..40.0 [xIn]
2029	u16	1000	.AvAmpsC.mag	I_DMD_C	- phsC amplitude	0.00..40.0 [xIn]
					Update time stamp	See doc.
2030	u16	-			- Year - month	
2031	u16	-			- Day - hour	
2032	u16	-			- Minute - second	
2033	u16	-			- Milliseconds	
2034	u16	-			- Time quality	
2035	u16	1000	.MaxAmpsA.mag	Max demand IL1	- Max phsA demand	0.00..40.0 [xIn]
					Update time stamp	See doc.
2036	u16	-			- Year - month	
2037	u16	-			- Day - hour	
2038	u16	-			- Minute - second	
2039	u16	-			- Milliseconds	
2040	u16	-			- Time quality	
2041	u16	1000	.MaxAmpsB.mag	Max demand IL2	- Max phsB demand	0.00..40.0 [xIn]
					Update time stamp	See doc.
2042	u16	-			- Year - month	
2043	u16	-			- Day - hour	
2044	u16	-			- Minute - second	
2045	u16	-			- Milliseconds	

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RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
2046	u16	-			- Time quality	
2047	u16	1000	.MaxAmpsC.mag	Max demand IL3	- Max phsC demand	0.00..40.0 [xIn]
					Update time stamp	see doc.
2048	u16	-			- Year - month	
2049	u16	-			- Day - hour	
2050	u16	-			- Minute - second	
2051	u16	-			- Milliseconds	
2052	u16	-			- Time quality	

2.3.2.28 CTRL.CBCSWI1 Circuit breaker operation counter (1)

Table 102: *CTRL.CBCSWI1 Circuit breaker operation counter (1)*

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			CTRL.CBCSWI1			
2053	u16	1	.OpCntRs.stVal	Operation counter	Operation counter	0...65535

2.3.2.29 LD0.ARCSARCx1 Fault arc counters

Table 103: *LD0.ARCSARCx1 Fault arc counters*

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.ARCSARC11			
2054	u16	1	.FACntRs.stVal		Fault arc 1 counter	0...65535
			LD0.ARCSARC21			
2055	u16	1	.FACntRs.stVal		Fault arc 2 counter	0...65535
			LD0.ARCSARC31			
2056	u16	1	.FACntRs.stVal		Fault arc 3 counter	0...65535

2.3.2.30 LD0.XRGGIO130 RTD input values

Table 104: *LD0.XRGGIO130 RTD input values*

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.XRGGIO130			
2091	i16	1	.AnIn1.mag	AI_VAL1	RTD input 1 in ohms	-/+ 10000.00
2092	i16	1	.AnIn2.mag	AI_VAL2	RTD input 2 in ohms	-/+ 10000.00
2093	i16	1	.AnIn3.mag	AI_VAL3	RTD input 3 in ohms	-/+ 10000.00
2094	i16	1	.AnIn4.mag	AI_VAL4	RTD input 4 in ohms	-/+ 10000.00
2095	i16	1	.AnIn5.mag	AI_VAL5	RTD input 5 in ohms	-/+ 10000.00

Table continues on next page

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
2096	i16	1	.AnIn6.mag	AI_VAL6	RTD input 6 in ohms	-/+ 10000.00
2097	i16	1	.AnIn7.mag	AI_VAL7	RTD input 7 in ohms	-/+ 10000.00
2098	i16	1	.AnIn8.mag	AI_VAL8	RTD input 8 in ohms	-/+ 10000.00

2.3.2.31 LD0.PEMMTR1 Three-phase energy measurements

Table 105: LD0.PEMMTR1 Three-phase energy measurements

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.PEMMTR1			
2100	u32	1	.SupWh.actVal		Reverse active energy (high)	0..1E10 [kWh]
2101			.SupWh.actVal		(low word)	
2102	u32	1	.SupVArh.actVal		Reverse reactive energy (high)	0..1E10 [kVAr]
2103			.SupVArh.actVal		(low word)	
2104	u32	1	.DemWh.actVal		Forward active energy (high)	0..1E10 [kWh]
2105			.DemWh.actVal		(low word)	
2106	u32	1	.DemVArh.actVal		Forward reactive energy (high)	0..1E10 [kVAr]
2107			.DemVArh.actVal		(low word)	

2.3.2.32 System diagnostic values

Table 106: System diagnostic values

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.LPHD1			
2060	u16	1	.PhyHealth1.stVal	Warning	Last warning code	see doc.
2061	u16	1	.PhyHealth2.stVal	Internal fault	Last internal fault code	see doc.
			DR.RDRE1			
2062	u16	1	.FltNum.stVal		Num.of DR recordings	0..N
2063	u16	1	.MemUsed.stVal		DR memory used	0..100 [%]
			LD0.LPHD1			
2064	u16	1	.NumPwrUp.stVal		Num of cold starts	0..65535
2065	u16	1	.WrmStr.stVal		Num of warm starts	0..65535
2066	u16	1	.WacTrg.stVal		Num of watchdog resets	0..65535
2067	u16	1	.NumCmpChg.stVal		Num of conf. changes	0..65535

2.3.2.33

LD0.SSCBR1 Circuit-breaker condition monitoring values

Table 107: LD0.SSCBR1 Circuit-breaker condition monitoring values

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.SSCBR1			
2070	u16	1	.InaTmdCnt.stVal	INA_DAYS	CB inactive days	0..65535
2071	u16	1	.TmmsOpn.mag	T_TRV_OP	Open travel time	0..60000 [ms]
2072	u16	1	.TmmsClz.mag	T_TRV_CL	Close travel time	0..60000 [ms]
2073	u16	100	.TmsSprCha.mag	T_SPR_CHR	Spring charge time	0.00...99.99 [s]
2074	i16	1	.RmnLifPhA.stVal	CB_LIFE_A	Remain.life phsA	-/+ 9999
2075	i16	1	.RmnLifPhB.stVal	CB_LIFE_B	Remain.life phsB	-/+ 9999
2076	i16	1	.RmnLifPhC.stVal	CB_LIFE_C	Remain.life phsC	-/+ 9999
2077	u16	1	.AccAPwrPhA.mag	IPOW_A	lyt phsA	0..1E6
2078	u16	1	.AccAPwrPhB.mag	IPOW_B	lyt phsB	0..1E6
2079	u16	1	.AccAPwrPhC.mag	IPOW_C	lyt phsC	0..1E6

2.3.2.34

LD0.TR2PTDF1 Transformer-differential and bias current values (background polled)

Table 108: LD0.TR2PTDF1 Transformer-differential and bias current values (background polled)

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
			LD0.TR2PDIF1		Differential current	
2080	u16	1000	.DifAClC.phsA.mag		-phsA magnitude	0..40.00 [xIn]
2081	u16	1000	.DifAClC.phsB.mag		-phsB magnitude	0..40.00 [xIn]
2082	u16	1000	.DifAClC.phsC.mag		-phsC magnitude	0..40.00 [xIn]
			LD0.TR2PDIF1		Bias current	
2083	u16	1000	.RstA.phsA.mag		-phsA magnitude	0..40.00 [xIn]
2084	u16	1000	.RstA.phsB.mag		-phsB magnitude	0..40.00 [xIn]
2085	u16	1000	RstA.phsC.mag		-phsC magnitude	0..40.00 [xIn]

2.3.2.35

Control structure 1

Table 109: Control structure 1

RegA	Typ	Scale	IEC 61580 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 >

2.3.2.36 Control structure 2

Table 110: Control structure 2

RegA	Typ	Scale	IEC 61580 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 >

2.3.2.37 Control structure 3

Table 111: Control structure 3

RegA	Typ	Scale	IEC 61580 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 >

2.3.2.38 Control structure 4

Table 112: Control structure 4

RegA	Typ	Scale	IEC 61580 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 >

2.3.2.39 Control structure 5

Table 113: Control structure 5

RegA	Typ	Scale	IEC 61580 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 >

2.3.2.40 Control structure 6

Table 114: Control structure 6

RegA	Typ	Scale	IEC 61580 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 >

2.3.2.41 Control structure 7

Table 115: Control structure 7

RegA	Typ	Scale	IEC 61580 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 >

2.3.2.42 Control structure 8

Table 116: Control structure 8

RegA	Typ	Scale	IEC 61580 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 >

2.3.2.43 Device ID string

Table 117: Device ID string

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
9000	u16				ASCII coded string	see doc.
...						
9120	u16					

2.3.2.44

IED Real-time clock (in local time mode) - read and write (synchronize)

Table 118: IED Real-time clock (in local time mode) - read and write (synchronize)

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
9201					Control register	0..2 (see doc.)
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

2.3.2.45

IED real-time clock (in UTC time mode) - read and write (synchronize)

Table 119: IED real-time clock (in UTC time mode) - read and write (synchronize)

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
9211					Control register	0..2 (see doc.)
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

2.3.2.46

Time and reason for latest IED reset

Table 120: Time and reason for latest IED reset

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
9221	u16	1			Year	2000..2999
9222	u16	1			Month	1..12
9223	u16	1			Day	1..31
9224	u16	1			Hour	0..23
9225	u16	1			Minute	0..59
9226	u16	1			Second	0..59
9227	u16	1			Millisecond	0...999
9228	u16	1			Reset reason	

Table continues on next page

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RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
9228.0	Bit				- bit 0	1=Cold start
9228.1	Bit				- bit 1	1=Watchdog
9228.2	Bit				- bit 2	1=Warm start

2.3.2.47 Active parameter setting group - read and write

Table 121: Active parameter setting group - read and write

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
9231	u16	1			Active setting group	1..6

2.3.2.48 Event record structure

Table 122: Event record structure

RegA	Typ	Scale	IEC 61580 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	see doc.
9259	u16	1			Data object ID1	see doc.
9260	u16	1			Data object ID2	see doc.
9261	u16	1			Event data value 1	see doc.
9262	u16	1			Event data value 2	see doc.
					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

Table continues on next page

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
9268	u16	1			- Millisecond	Millisecond
9269	u16	1			Event identification	see doc.
9270	u16	1			Data object ID1	see doc.
9271	u16	1			Data object ID2	see doc.
9272	u16	1			Event data value 1	see doc.
9273	u16	1			Event data value 2	see doc.
					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	
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	see doc.
9281	u16	1			Data object ID1	see doc.
9282	u16	1			Data object ID2	see doc.
9283	u16	1			Event data value 1	see doc.
9284	u16	1			Event data value 2	see doc.
					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	see doc.
9292	u16	1			Data object ID1	see doc.
9293	u16	1			Data object ID2	see doc.
9294	u16	1			Event data value 1	see doc.
9295	u16	1			Event data value 2	see doc.
					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	

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RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
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	see doc.
9303	u16	1			Data object ID1	see doc.
9304	u16	1			Data object ID2	see doc.
9305	u16	1			Event data value 1	see doc.
9306	u16	1			Event data value 2	see doc.
					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	see doc.
9314	u16	1			Data object ID1	see doc.
9315	u16	1			Data object ID2	see doc.
9316	u16	1			Event data value 1	see doc.
9317	u16	1			Event data value 2	see doc.
					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	see doc.
9325	u16	1			Data object ID1	see doc.
9326	u16	1			Data object ID2	see doc.
9327	u16	1			Event data value 1	see doc.
9328	u16	1			Event data value 2	see doc.
					Record 8 data to read:	If selected

Table continues on next page

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
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	see doc.
9336	u16	1			Data object ID1	see doc.
9337	u16	1			Data object ID2	see doc.
9338	u16	1			Event data value 1	see doc.
9339	u16	1			Event data value 2	see doc.
					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	see doc.
9347	u16	1			Data object ID1	see doc.
9348	u16	1			Data object ID2	see doc.
9349	u16	1			Event data value 1	see doc.
9350	u16	1			Event data value 2	see doc.
					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	see doc.
9358	u16	1			Data object ID1	see doc.

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RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
9359	u16	1			Data object ID2	see doc.
9360	u16	1			Event data value 1	see doc.
9361	u16	1			Event data value 2	see doc.

2.3.2.49 Fault record structure header

Table 123: Fault record structure header

RegA	Typ	Scale	IEC 61580 name	SA name	Description	Values
					Selection write:	
9401	i16	1			- Read selection	-99...3
					Record data header:	
9402	u16	1			- Record sequence num	0..65535
9403	u16	1			- Unread records left	0..99
					Timestamp of record	
9404	u16	1			- Year, month	Year/Month
9405	u16	1			- Day, hour	Day/Hour
9406	u16	1			- Minute, second	Min/Sec
9407	u16	1			- Millisecond	Millisecond
9408	u16	1			- Timestamp quality	see doc.
			LD0.FLTMSTA1		Fault record data	
9409	u32	1	.OpCnt.stVal		- Fault record number (high)	0..999999
9410					- (low word)	
9411	i16	1	.ProFnc.stVal		- Protection function	-32768..32767
9412	u16	100	.StrDur.mag		- Start duration	0..100.00 [%]
9413	u32	1000	.OpTm.mag		- Operate time [ms] (high)	0..999999.999
9414					- (low word)	
9415	u16	1	.ActSG.stVal		- Active setting group	1..6
9416	u16	1	.ShotPntr.stVal		- AR shot pointer value	0..7
9417	u16				< reserved >	0
9418	u16				< reserved >	0
9419	u16				< reserved >	0
9420	u16				< reserved >	0
9421	u16				< reserved >	0

2.3.2.50 Fault record data

Table 124: *Fault record data*

RegA	Typ	Scale	IEC 61580 name	SA name	Description	
			LD0.FLTMSTA1			
9422	u16	1000	.MaxAmpsA.mag		Max phsA current	0..50.0 [xIn]
9423	u16	1000	.MaxAmpsB.mag		Max phsB current	0..50.0 [xIn]
9424	u16	1000	.MaxAmpsC.mag		Max phsC current	0..50.0 [xIn]
9425	u16	1000	.MaxAmpsN.mag		Max residual current	0..50.0 [xIn]
9426	u16	1000	.AmpsA.mag		PhsA current	0..50.0 [xIn]
9427	u16	1000	.AmpsB.mag		PhsB current	0..50.0 [xIn]
9428	u16	1000	.AmpsC.mag		PhsC current	0..50.0 [xIn]
9429	u16	1000	.AmpsN.mag		Residual current	0..50.0 [xIn]
9430	u16	1000	.AmpsNClc.mag		Residual current (calc)	0..50.0 [xIn]
9431	u16	1000	.AmpsPsSeq.mag		Positive seq. current	0..50.0 [xIn]
9432	u16	1000	.AmpsNgSeq.mag		Negative seq. current	0..50.0 [xIn]
9433	u16	100	.MxDifAClcA.mag		Max phsA diff. current	0..80.00 [pu]
9434	u16	100	.MxDifAClcB.mag		Max phsB diff. current	0..80.00 [pu]
9435	u16	100	.MxDifAClcC.mag		Max phsC diff. current	0..80.00 [pu]
9436	u16	100	.MxRstAClcA.mag		Max phsA bias current	0..50.00 [pu]
9437	u16	100	.MxRstAClcB.mag		Max phsB bias current	0..50.00 [pu]
9438	u16	100	.MxRstAClcC.mag		Max phsC bias current	0..50.00 [pu]
9439	u16	100	.DifAmpsA.mag		PhsA diff. current	0..80.00 [pu]
9440	u16	100	.DifAmpsB.mag		PhsB diff. current	0..80.00 [pu]
9441	u16	100	.DifAmpsC.mag		PhsC diff. current	0..80.00 [pu]
9442	u16	100	.RstAmpsA.mag		PhsA bias current	0..50.00 [pu]
9443	u16	100	.RstAmpsB.mag		PhsB bias current	0..50.00 [pu]
9444	u16	100	.RstAmpsC.mag		PhsC bias current	0..50.00 [pu]
9445	u16	1000	.VoltsA.mag		PhsA voltage	0..4.00 [xUn]
9446	u16	1000	.VoltsB.mag		PhsB voltage	0..4.00 [xUn]
9447	u16	1000	.VoltsC.mag		PhsC voltage	0..4.00 [xUn]
9448	u16	1000	.VoltsAB.mag		PhsAB voltage	0..4.00 [xUn]
9449	u16	1000	.VoltsBC.mag		PhsBC voltage	0..4.00 [xUn]
9450	u16	1000	.VoltsCA.mag		PhsCA voltage	0..4.00 [xUn]
9451	u16	1000	.VoltsN.mag		Residual voltage	0..4.00 [xUn]
9452	u16	1000	.VZroSeq.mag		Zero seq. voltage	0..4.00 [xUn]
9453	u16	1000	.VPsSeq.mag		Positive seq. voltage	0..4.00 [xUn]
9454	u16	1000	.VNgSeq.mag		Negative seq. voltage	0..4.00 [xUn]
9455	i16	10	.DifAngN.mag		Uo-lo angle	-/+ 180.0 [Deg]

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RegA	Typ	Scale	IEC 61580 name	SA name	Description	
9456	i16	10	.DifAngBC.mag		PhsB-C angle	-/+ 180.0 [Deg]
9457	i16	10	.DifAngCA.mag		PhsC-A angle	-/+ 180.0 [Deg]
9458	i16	10	.DifAngAB.mag		PhsA-B angle	-/+ 180.0 [Deg]
9459	u16	100	.MaxTmpRI.mag		Relative temperature	0..99.99

2.3.3 Controls

Table 125: Explanations of the controls table columns

Column name	Description
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 ACT.
Description	Short description of the signal. See the application function block documentation for more details.
Value	Meaning of the written value.

2.3.3.1 CTRL.CBCSWI1 Circuit breaker (1) control

Table 126: CTRL.CBCSWI1 Circuit breaker (1) control

0xA	CS	IEC 61580 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

2.3.3.2 Reset, acknowledge and trigger points (C)

Table 127: Reset, acknowledge and trigger points (C)

0xA	CS	IEC 61580 name	SA name	Description	Values
		LD0.LLN0			
2060	2.00	.LEDRs1.Oper.ctlVal		Reset indications and LEDs	1=Reset
2061	2.01	.LEDRs2.Oper.ctlVal		Reset alarm LEDs	1=Reset
		LD0.PEMSTA1			
2062	2.02	.RecRs.Oper.ctlVal		Reset power max demands	1=Reset

Table continues on next page

0xA	CS	IEC 61580 name	SA name	Description	Values
2063	2.03	< reserved >			
2064	2.04	< reserved >			
		LD0.SSCBR1			
2065	2.05	.RsAccAPwr.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.CMSTA1			
2069	2.09	.RecRs.Oper.ctlVal		Reset max current1 demands	1=Reset
		LD0.PEMMXU1			
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.RESCMSTA1			
2073	2.13	.RecRs.Oper.ctlVal		Reset Io (1) max demands	1=Reset
		LD0.RESVMSTA1			
2074	2.14	.RecRs.Oper.ctlVal		Reset Uo (1) max demands	1=Reset
		LD0.CMSTA2			
2075	2.15	.RecRs.Oper.ctlVal		Reset max current2 demands	1=Reset
		LD0.RESCMSTA2			
2076	3.14	.RecRs.Oper.ctlVal		Reset Io (2) max demands	1=Reset

2.3.3.3 LD0.LPHD1 IED warm reset

Table 128: LD0.LPHD1 IED warm reset

0xA	CS	IEC 61580 name	SA name	Description	Values
		LD0.LPHD1			
2080	3.00	.RsDev.Oper.ctlVal		Warm reboot of IED	1=Reboot

2.3.3.4 LD0.SRGAPC1 Reset SRGAPC1 generic flip-flops

Table 129: LD0.SRGAPC1 Reset SRGAPC1 generic flip-flops

0xA	CS	IEC 61580 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

Table continues on next page

0xA	CS	IEC 61580 name	SA name	Description	Values
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

2.3.3.5 LD0.SRGAPC2 Reset SRGAPC2 generic flip-flops

Table 130: LD0.SRGAPC2 Reset SRGAPC2 generic flip-flops

0xA	CS	IEC 61580 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

2.3.3.6 LD0.SPCGGIO1 Multipurpose binary outputs (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 "1" and "0" values. The persistent type is the same as the toggled mode on LHMI and WHMI.

Table 131: LD0.SPCGGIO1 Multipurpose binary outputs (1)

0xA	CS	IEC 61580 name	SA name	Description	Values
		LD0.SPCGGIO1			
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

Table continues on next page

0xA	CS	IEC 61580 name	SA name	Description	Values
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

2.3.3.7

LD0.SPCGGIO2 Multipurpose binary outputs (2)

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 "1" and "0" values. The persistent type is the same as the toggled mode on LHMI and WHMI.

Table 132: LD0.SPCGGIO2 Multipurpose binary outputs (2)

0xA	CS	IEC 61580 name	SA name	Description	Values
		LD0.SPCGGIO2			
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
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

2.3.3.8 CTRL.DCCSWI1 Disconnector (1) control

Table 133: CTRL.DCCSWI1 Disconnector (1) control

0xA	CS	IEC 61580 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

2.3.3.9 CTRL.DCCSWI2 Disconnector (2) control

Table 134: CTRL.DCCSWI2 Disconnector (2) control

0xA	CS	IEC 61580 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

2.3.3.10 CTRL.ESCSWI1 Earth switch (1) control

Table 135: CTRL.ESCSWI1 Earth switch (1) control

0xA	CS	IEC 61580 name	SA name	Description	Values
		CTRL.ESCSWI1			
2054	1.06	.Pos.Oper.ctlVal		Select open	1=Select
2055	1.07	.Pos.Oper.ctlVal		Select close	1=Select
2056	1.08	.Pos.Oper.ctlVal		Cancel selection	1=Cancel
2057	1.09	.Pos.Oper.ctlVal		Execute selection	1=Execute
2058	1.10	.Pos.Oper.ctlVal		Direct open	1=Open
2059	1.11	.Pos.Oper.ctlVal		Direct close	1=Close

Section 3 Glossary

615 series	Series of numerical IEDs for low-end protection and supervision applications of utility substations, and industrial switchgear and equipment
EMC	Electromagnetic compatibility
HMI	Human-machine interface
IEC	International Electrotechnical Commission
IEC 61850	International standard for substation communication and modeling
IED	Intelligent electronic device
IET600	Integrated Engineering Toolbox in PCM600
LHMI	Local human-machine interface
PCM600	Protection and Control IED Manager

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