



Relion® 615 Series

Feeder Protection and Control REF615 ANSI Modbus Point List Manual



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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

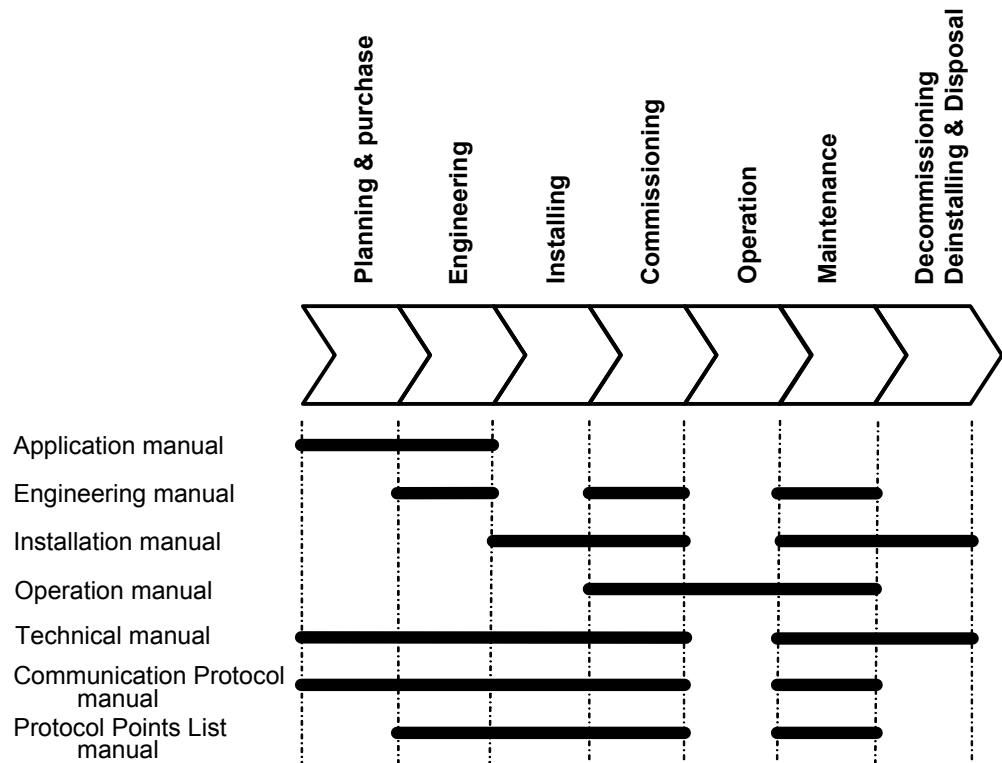


Figure 1: *The intended use of manuals in different lifecycles*

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

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

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

The technical manual contains application and functionality descriptions and lists function blocks, logic diagrams, input and output signals, setting parameters and technical data

sorted per function. The manual can be used as a technical reference during the engineering phase, installation and commissioning phase, and during normal service.

The communication protocol manual describes a communication protocol supported by the IED. The manual concentrates on vendor-specific implementations. The point list manual describes the outlook and properties of the data points specific to the IED. The manual should be used in conjunction with the corresponding communication protocol manual.

1.3.2 Document revision history

Document revision/date	Product version	History
A/12/22/2008	1.1	First release
B/01/20/2010	2.0	Content updated to correspond to the product version
C/12/31/2010	3.0	Content updated to correspond to the product version
B/03/31/2011	4.0	Contents updated for 615 series v4.0 ANSI release



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1.3.3 Related documentation

Name of the document	Document ID
Modbus Communication Protocol Manual	1MAC052634-MB

1.4 Symbols and conventions

1.4.1 Safety indication symbols



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



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






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

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

1.4.2 Manual conventions

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

- Abbreviations and acronyms in this manual are spelled out in the glossary. The glossary also contains definitions of important terms.
- Push button navigation in the LHMI menu structure is presented by using the push button icons, for example:
To navigate between the options, use  and .
- HMI menu paths are presented in bold, for example:
Select **Main menu > Settings**.
- LHMI messages are shown in Courier font, for example:
To save the changes in non-volatile memory, select Yes and press .
- Parameter names are shown in italics, for example:
The function can be enabled and disabled with the *Operation* setting.
- Parameter values are indicated with quotation marks, for example:
The corresponding parameter values are "Enabled" and "Disabled".
- IED input/output messages and monitored data names are shown in Courier font, for example:
When the function picks up, the PICKUP output is set to TRUE.
- Dimensions are provided both in inches and mm. If it is not specifically mentioned then the dimension is in mm.

1.4.3 Functions, codes and symbols

Table 1: *Functions included in standard configurations*

Function	IEC61850	ANSI/C37.2 - 2008	IEC60617
Protection			
Three-phase non-directional overcurrent protection, low stage, instance 1	PHLPTOC1	51P-1	3I> (1)
Three-phase non-directional overcurrent protection, low stage, instance 2	PHLPTOC2	51P-2	3I> (2)
Three-phase non-directional overcurrent protection, high stage, instance 1	PHHPTOC1	50P-1	3I>> (1)
Three-phase non-directional overcurrent protection, high stage, instance 2	PHHPTOC2	50P-2	3I>> (2)
Three-phase non-directional overcurrent protection, high stage, instance 3	PHHPTOC3	50P-4	3I>> (3)
Three-phase non-directional overcurrent protection, high stage, instance 4	PHHPTOC4	50P-5	3I>> (4)

Function	IEC61850	ANSI/C37.2 - 2008	IEC60617
Three-phase non-directional overcurrent protection, instantaneous stage, instance 1	PHIPTOC1	50P-3	3I>>> (1)
Three-phase non-directional long time overcurrent protection, low stage, instance 1	PHLTPTOC1	51LT	3I> (3)
Three-phase directional overcurrent protection, low stage, instance 1	DPHLPDOC1	67/51P	3I> -> (1)
Three-phase directional overcurrent protection, high stage, instance 1	DPHHPDOC1	67/50P-1	3I>> -> (1)
Three-phase directional overcurrent protection, high stage, instance 2	DPHHPDOC2	67/50P-2	3I>> -> (2)
Non-directional ground-fault protection, low stage, instance 1	EFLPTOC1	51G	Io> (1)
Non-directional ground-fault protection, low stage, instance 2	EFLPTOC2	51N-1	Io> (2)
Non-directional ground-fault protection, low stage, instance 3	EFLPTOC3	51N-2	Io> (3)
Non-directional ground-fault protection, low stage, instance 4	EFLPTOC4	50SEF	Io> (4)
Non-directional ground-fault protection, high stage, instance 1	EFHPTOC1	50G-1	Io>> (1)
Non-directional ground-fault protection, high stage, instance 2	EFHPTOC2	50G-2	Io>> (2)
Non-directional ground-fault protection, high stage, instance 3	EFHPTOC3	50N-1	Io>> (3)
Non-directional ground-fault protection, high stage, instance 4	EFHPTOC4	50N-2	Io>> (4)
Non-directional ground-fault protection, high stage, instance 5	EFHPTOC5	50N-4	Io>> (5)
Non-directional ground-fault protection, high stage, instance 6	EFHPTOC6	50N-5	Io>> (6)
Non-directional ground-fault protection, instantaneous stage, instance 1	EFIPTOC1	50G-3	Io>>> (1)
Non-directional ground-fault protection, instantaneous stage, instance 2	EFIPTOC2	50N-3	Io>>> (2)
Directional ground-fault protection, low stage, instance 1	DEFLPDEF1	67/51N	Io> -> (1)
Directional ground-fault protection, high stage, instance 1	DEFHPDEF1	67/50N-1	Io>> -> (1)
Directional ground-fault protection, high stage, instance 2	DEFHPDEF2	67/50N-2	Io>> -> (2)
Three phase directional power protection, instance 1	DPSRDIR1	32P-1	I1-> (1)
Three phase directional power protection, instance 2	DPSRDIR2	32P-2	I1-> (2)
Ground directional power protection, instance 1	DNZSRDIR1	32N-1	I2 ->, Io-> (1)
Ground directional power protection, instance 2	DNZSRDIR2	32N-2	I2 ->, Io-> (2)
Negative-sequence overcurrent protection, instance 1	NSPTOC1	46-1	I2> (1)
Negative-sequence overcurrent protection, instance 2	NSPTOC2	46-2	I2> (2)
Phase discontinuity protection	PDNSPTOC1	46PD	I2/I1>

Function	IEC61850	ANSI/C37.2 - 2008	IEC60617
Residual overvoltage protection, instance 1	ROVPTOV1	59G	Uo> (1)
Residual overvoltage protection, instance 2	ROVPTOV2	59N-1	Uo> (2)
Residual overvoltage protection, instance 3	ROVPTOV3	59N-2	Uo> (3)
Three-phase undervoltage protection, instance 1	PHPTUV1	27-1	3U< (1)
Three-phase undervoltage protection, instance 2	PHPTUV2	27-2	3U< (2)
Three-phase overvoltage protection, instance 1	PHPTOV1	59-1	3U> (1)
Three-phase overvoltage protection, instance 2	PHPTOV2	59-2	3U> (2)
Negative-sequence overvoltage protection, instance 1	NSPTOV1	47-1	U2> (1)
Negative-sequence overvoltage protection, instance 2	NSPTOV2	47-2	U2> (2)
Frequency protection, instance 1	FRPFRQ1	81-1	f>/f<,df/dt (1)
Frequency protection, instance 2	FRPFRQ2	81-2	f>/f<,df/dt (2)
Voltage per hertz protection, instance 1	OEPVPH1	24	U/f> (1)
Three-phase thermal protection for feeders, cables and distribution transformers, Instance 1	T1PTTR1	49F-1	3lth>F (1)
Three-phase thermal protection for feeders, cables and distribution transformers, Instance 2	T1PTTR2	49F-2	3lth>F (2)
Numerical stabilized low impedance restricted ground-fault protection	LREFPNDF1	87LOZREF	dIoLo>
Circuit breaker failure protection, instance 1	CCBRBRF1	50BF-1	3I>/Io>BF (1)
Circuit breaker failure protection, instance 2	CCBRBRF2	50BF-2	3I>/Io>BF (2)
Three-phase inrush detector, instance 1	INRPHAR1	INR-1	3I2f> (1)
Three-phase inrush detector, instance 2	INRPHAR2	INR-2	3I2f> (2)
Master trip, instance 1	TRPPTRC1	86/94-1	Master Trip (1)
Master trip, instance 2	TRPPTRC2	86/94-2	Master Trip (2)
Arc protection, instance 1	ARCSARC1	AFD-1	ARC (1)
Arc protection, instance 2	ARCSARC2	AFD-2	ARC (2)
Arc protection, instance 3	ARCSARC3	AFD-3	ARC (3)
High impedance fault detection	PHIZ1	HIZ	PHIZ1
Load shedding and restoration, instance 1	LSHDPFRQ1	81LSH-1	UFLS/R (1)
Load shedding and restoration, instance 2	LSHDPFRQ2	81LSH-2	UFLS/R (2)
Loss of phase, instance 1	PHPTUC1	37-1	3I< (1)
Loss of phase, instance 2	PHPTUC2	37-2	3I< (2)
Control			

Function	IEC61850	ANSI/C37.2 - 2008	IEC60617
Circuit-breaker control, instance 1	CBXCBR1	52-1	I <-> O CB (1)
Circuit-breaker control, instance 2	CBXCBR2	52-2	I <-> O CB (2)
Auto-reclosing	DARREC1	79	O -> I
Synchronism and energizing check	SECRSYN1	25	SYNC
Condition Monitoring			
Circuit-breaker condition monitoring, instance 1	SSCBR1	52CM-1	CBCM (1)
Circuit-breaker condition monitoring, instance 2	SSCBR2	52CM-2	CBCM (2)
Trip circuit supervision, instance 1	TCSSCBR1	TCM-1	TCS (1)
Trip circuit supervision, instance 2	TCSSCBR2	TCM-2	TCS (2)
Current circuit supervision	CCRDIF1	CCM	MCS 3I
Fuse failure supervision, instance 1	SEQRFUF1	60-1	FUSEF (1)
Fuse failure supervision, instance 2	SEQRFUF2	60-2	FUSEF (2)
Cable fault detection	RCFD1	CFD	RCFD1
Measurement			
Three-phase current measurement, instance 1	CMMXU1	IA, IB, IC	3I
Three-phase current measurement, instance 2	CMMXU2	IA, IB, IC (2)	3I(B)
Sequence current measurement, instance 1	CSMSQI1	I1, I2, I0	I1, I2, I0
Sequence current measurement, instance 2	CSMSQI2	I1, I2, I0 (2)	I1, I2, I0(B)
Residual current measurement, instance 1	RESCMMXU1	IG	Io
Three-phase voltage measurement, instance 1	VMMXU1	VA, VB, VC	3U
Three-phase voltage measurement, instance 2	VMMXU2	VA, VB, VC (2)	3U(B)
Residual voltage measurement	RESVMMXU1	VG	Uo
Sequence voltage measurement, instance 1	VSMSQI1	V1, V2, V0	U1, U2, U0
Sequence voltage measurement, instance 2	VSMSQI2	V1, V2, V0 (2)	U1, U2, U0(B)
Single-phase power and energy measurement, instance 1	SPEMMXU1	SP, SE-1	SP, SE
Single-phase power and energy measurement, instance 2	SPEMMXU2	SP, SE-2	SP, SE(B)
Three-phase power and energy measurement, instance 1	PEMMXU1	P, E-1	P, E
Three-phase power and energy measurement, instance 2	PEMMXU2	P, E-2	P, E(B)
Current total demand distortion, instance 1	CMHAI1	PQI-1	PQM3I
Current total demand distortion, instance 2	CMHAI2	PQI-2	PQM3I(B)
Voltage total harmonic distortion, instance 1	VMHAI1	PQVPH-1	PQM3U
Voltage total harmonic distortion, instance 2	VMHAI2	PQVPH-2	PQM3U(B)

Function	IEC61850	ANSI/C37.2 - 2008	IEC60617
Voltage variation, instance 1	PHQVVR1	PQSS-1	PQ 3U<>
Voltage variation, instance 2	PHQVVR2	PQSS-2	PQ 3U<>(B)
Load profile	LDPMSTA1	LoadProf	-
Frequency measurement	FMMXU1	f	f
Recorder			
Disturbance recorder	RDRE1	DFR	-
Fault recorder	FLTMSTA1	FR	-
Sequence event recorder	SER	SER	-
Other Functions			
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), instance 3	TPGAPC3	TP - 3	TP (3)
Minimum pulse timer (2 pcs), instance 4	TPGAPC4	TP - 4	TP (4)
Minimum pulse timer (2 pcs, second resolution), instance 1	TPSGAPC1	62CLD-1	TPS (1)
Minimum pulse timer (2 pcs, second resolution), instance 2	TPSGAPC2	62CLD-3	TPS (2)
Minimum pulse timer (2 pcs, minute resolution), instance 1	TPMGAPC1	62CLD-2	TPM (1)
Minimum pulse timer (2 pcs, minute resolution), instance 2	TPMGAPC2	62CLD-4	TPM (2)
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)
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)

Section 2 Modbus data mappings

2.1 Overview

This document describes the Modbus data points and structures available in REF615 Ver. 4.0 ANSI.

Point list table columns

0x addr	Coil (0X) PLC address, base address = 1
AFL-Common SA name	AFL name of the corresponding data signal
Bit addr	Bit (1X and 0X) PLC address, base address = 1
Ctrl bit	Control bit (0..15) within control structure
Ctrl struct	Control structure number
Dc	Data category
DS	Object resides as default in some IEC 61850 data set (Y = yes, N = no)
FD Num	Unique number of the platform SW component
Identification	IED's internal IEC 61850 signal name
Item	Unique number of an data item within the data object
Mode	Control object mode: unsecured or secured
Object	Unique number of a data object within the SW component
Offset	Offset factor, default setting
Reg addr	Modbus register address (3X or 4X). PLC address, base address = 1
Reg.bit addr	Register PLC address (3X and 4X) and bit within register (0..15)
Scale	Scale factor, default setting
Signal name	IEC 61850 signal description
Type	Register type and value interpretation: signed or unsigned
UID	Unique ID combination of FD Num, Object and Item
W	Writable register

2.2 Point list for REF615 v4.0 ANSI

Table 2: System Status Registers

Coil Addr	Register:(Bit) Addr	Dc	Type	Scale	OffSet	Description	IEC61850 Data Attribute Name
	129	0	u16			System Status Register, 1	
	130	0	u16			System Status Register, 2	

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Coil Addr	Register(:Bit) Addr	Dc	Type	Scale	OffSet	Description	IEC61850 Data Attribute Name
	131	0	u16			System Status Register, 3	
	132	0	u16			System Status Register, 4	
	133	0	u16			System Status Register, 5	
	134	0	u16			System Status Register, 6	
	135	0	u16			Device Information	
	..	0	u16				
	225	0	u16				
	245		u16			Parameter Setting Group in Use	

Table 3: Time Stamp of Last Device Reset

Coil Addr	Register(:Bit) Addr	Dc	Type	Scale	OffSet	Description	IEC61850 Data Attribute Name
	226	0	u16			Year(High Byte)/Month(Low Byte)	
	227	0	u16			Day(High Byte)/Hour(Low Byte)	
	228	0	u16			Min(High Byte)/Sec(Low Byte)	
	229	0	u16			MilliSecond	
	230	0	u16			Time Quality	
	231	0	u16			Cause of Reset (1-Power Reset, 2-Watchdog Reset, 3-Warm Reset)	

Table 4: Device Real-Time clock in local Time

Coil Addr	Register(:Bit) Addr	W	Type	Scale	OffSet	Description	IEC61850 Data Attribute Name
	497	x	u16			Real-time struct - Control register(0..2)	
	498	x	u16			Real-time struct - Year (2000-2999)	
	499	x	u16			Real-time struct - Month (1..12)	
	500	x	u16			Real-time struct - Day (1..31)	
	501	x	u16			Real-time struct - Hour (0..23)	
	502	x	u16			Real-time struct - Minute (0..59)	
	503	x	u16			Real-time struct - Seconds (0..59)	
	504	x	u16			Real-time struct - Milliseconds (0..999)	

Table 5: Device Real-Time clock in UTC Time

Coil Addr	Register(:Bit) Addr	W	Type	Scale	OffSet	Description	IEC61850 Data Attribute Name
	516	x	u16			Real-time struct - Control register(0..2)	
	517	x	u16			Real-time struct - Year (2000-2999)	
	518	x	u16			Real-time struct - Month (1..12)	
	519	x	u16			Real-time struct - Day (1..31)	

Coil Addr	Register:(Bit) Addr	W	Type	Scale	OffSet	Description	IEC61850 Data Attribute Name
	520	x	u16			Real-time struct - Hour (0..23)	
	521	x	u16			Real-time struct - Minute (0..59)	
	522	x	u16			Real-time struct - Seconds (0..59)	
	523	x	u16			Real-time struct - Milliseconds (0..999)	

Table 6: Event Records

Coil Addr	Register:(Bit) Addr	W	Type	Scale	OffSet	Description	IEC61850 Data Attribute Name
	1561	x	u16			Number of Events to Read	
	1562	x	u16	1		Event Selection	
	1563		u16	1		Sequence Number	
	1564		u16	1		Number of Unread Records	
	1565		u16	1		Year(High Byte)/Month(Low Byte)	
	1566		u16	1		Day(High Byte)/Hour(Low Byte)	
	1567		u16	1		Min(High Byte)/Sec(Low Byte)	
	1568		u16	1		MilliSecond	
	1569		u16	1		Event Type	
	1570		u16	1		Data Object ID 1 ¹⁾	
	1571		u16	1		Data Object ID 2 ¹⁾	
	1572		u16	1		Event Data Value	
	1573		u16	1		Event Data Value	

1) See Decoding of Data Object ID1 and 1

Decoding of Data Object ID1 and Data Object ID2

The base 4x Modbus address is Data Object ID2/16. Bit offset is the remainder of DataObject ID2/16.

For Instance, Bit 10 in register of 2500 would appear in Data Object ID2 as 0x9C4A = 40010. The base address is $40010/16 = 2500$. The bit is $0.625 \times 16 = 10$.

Data Object ID1 is the most significant 16 bits. If Data Object ID1 is non-zero then a 32 bit number is composed of Data Object ID1 as bits 31-16 and Data Object ID2 are bits 15-0.

Table 7: Fault records

Coil Addr	Register (:Bit) Addr	W	Dc	Type	Scale	Description	IEC61850 Data Attribute Name
	1712	x		u16	1	Fault Record Selection	
	1713			u16	1	Sequence Number	

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Coil Addr	Register (;Bit) Addr	W	Dc	Type	Scale	Description	IEC61850 Data Attribute Name
	1714			u16	1	Number of Unread Records	
	1715			u16	1	Year(High Byte)/Month(Low Byte)	
	1716			u16	1	Day(High Byte)/Hour(Low Byte)	
	1717			u16	1	Min(High Byte)/Sec(Low Byte)	
	1718			u16	1	MilliSecond	
	1719			u16	1	Time Quality	
	1720		100	u16	100	Last Fault: Max Phase A Current Magnitude	LD0.FLTMSTA1.MaxAmpsA.mag.f
	1721		100	u16	100	Last Fault: Max Phase B Current Magnitude	LD0.FLTMSTA1.MaxAmpsB.mag.f
	1722		100	u16	100	Last Fault: Max Phase C Current Magnitude	LD0.FLTMSTA1.MaxAmpsC.mag.f
	1723		100	u16	100	Last Fault: Max Neutral Current Magnitude	LD0.FLTMSTA1.MaxAmpsN.mag.f
	1724		100	u16	100	Last Fault: Phase A Current Magnitude	LD0.FLTMSTA1.AmpsA.mag.f
	1725		100	u16	100	Last Fault: Phase B Current Magnitude	LD0.FLTMSTA1.AmpsB.mag.f
	1726		100	u16	100	Last Fault: Phase C Current Magnitude	LD0.FLTMSTA1.AmpsC.mag.f
	1727		100	u16	100	Last Fault: Neutral Current Magnitude	LD0.FLTMSTA1.AmpsN.mag.f
	1728		100	u16	100	Last Fault: Calculated Residual Current Magnitude	LD0.FLTMSTA1.AmpsNClc.mag.f
	1729		100	u16	100	Last Fault: Negative Sequence Current Mag.	LD0.FLTMSTA1.AmpsNgSeq.mag.f
	1730		100	u16	100	Last Fault: Positive Sequence Current Mag.	LD0.FLTMSTA1.AmpsPsSeq.mag.f
	1731		100	u16	100	Last Fault: Phase A Voltage Magnitude	LD0.FLTMSTA1.VoltsA.mag.f
	1732		100	u16	100	Last Fault: Phase B Voltage Magnitude	LD0.FLTMSTA1.VoltsB.mag.f
	1733		100	u16	100	Last Fault: Phase C Voltage Magnitude	LD0.FLTMSTA1.VoltsC.mag.f
	1734		100	u16	100	Last Fault: Measured Residual Voltage Magnitude	LD0.FLTMSTA1.VoltsN.mag.f
	1735		100	u16	100	Last Fault: Negative Sequence Voltage Magnitude	LD0.FLTMSTA1.VNgSeq.mag.f
	1736		100	u16	100	Last Fault: Positive Sequence Voltage Magnitude	LD0.FLTMSTA1.VPsSeq.mag.f
	1737		100	u16	100	Last Fault: Zero Sequence Voltage Magnitude	LD0.FLTMSTA1.VZroSeq.mag.f
	1738		100	u16	100	Last Fault: Phase AB Voltage Magnitude	LD0.FLTMSTA1.VoltsAB.mag.f
	1739		100	u16	100	Last Fault: Phase BC Voltage Magnitude	LD0.FLTMSTA1.VoltsBC.mag.f

Coil Addr	Register (:Bit) Addr	W	Dc	Type	Scale	Description	IEC61850 Data Attribute Name
	1740		100	u16	100	Last Fault: Phase CA Voltage Magnitude	LD0.FLTMSTA1.VoltsCA.mag.f
	1741		100	u16	100	Maximum phase A current (b)	LD0.FLTMSTA1.MaxAmpsAb.mag.f
	1742		100	u16	100	Maximum phase B current (b)	LD0.FLTMSTA1.MaxAmpsBb.mag.f
	1743		100	u16	100	Maximum phase C current (b)	LD0.FLTMSTA1.MaxAmpsCb.mag.f
	1744		100	u16	100	Maximum residual current (b)	LD0.FLTMSTA1.MaxAmpsNb.mag.f
	1745		100	u16	100	Phase A current (b)	LD0.FLTMSTA1.AmpsAb.mag.f
	1746		100	u16	100	Phase B current (b)	LD0.FLTMSTA1.AmpsBb.mag.f
	1747		100	u16	100	Phase C current (b)	LD0.FLTMSTA1.AmpsCb.mag.f
	1748		100	u16	100	Residual current (b)	LD0.FLTMSTA1.AmpsNb.mag.f
	1749		100	u16	100	Calculated residual current (b)	LD0.FLTMSTA1.AmpsNCIcb.mag.f
	1750		100	u16	100	Negative sequence current (b)	LD0.FLTMSTA1.AmpsNgSeqb.mag.f
	1751		100	u16	100	Positive sequence current (b)	LD0.FLTMSTA1.AmpsPsSeqb.mag.f
	1752		100	u16	100	Phase A voltage (b)	LD0.FLTMSTA1.VoltsAb.mag.f
	1753		100	u16	100	Phase B voltage (b)	LD0.FLTMSTA1.VoltsBb.mag.f
	1754		100	u16	100	Phase C voltage (b)	LD0.FLTMSTA1.VoltsCb.mag.f
	1755		100	u16	100	Residual voltage (b)	LD0.FLTMSTA1.VoltsNb.mag.f
	1756		100	u16	100	Negative sequence voltage (b)	LD0.FLTMSTA1.VNgSeqb.mag.f
	1757		100	u16	100	Positive sequence voltage (b)	LD0.FLTMSTA1.VPsSeqb.mag.f
	1758		100	u16	100	Zero sequence voltage (b)	LD0.FLTMSTA1.VZroSeqb.mag.f
	1759		100	u16	100	Phase A to phase B voltage (b)	LD0.FLTMSTA1.VoltsABb.mag.f
	1760		100	u16	100	Phase B to phase C voltage (b)	LD0.FLTMSTA1.VoltsBCb.mag.f
	1761		100	u16	100	Phase C to phase A voltage (b)	LD0.FLTMSTA1.VoltsCAb.mag.f
	1762		100	u16	100	Maximum differential current phase A	LD0.FLTMSTA1.MxDifACIcA.mag.f
	1763		100	u16	100	Maximum differential current phase B	LD0.FLTMSTA1.MxDifACIcB.mag.f
	1764		100	u16	100	Maximum differential current phase C	LD0.FLTMSTA1.MxDifACIcC.mag.f
	1765		100	u16	100	Differential current phase A	LD0.FLTMSTA1.DifAmpsA.mag.f
	1766		100	u16	100	Differential current phase B	LD0.FLTMSTA1.DifAmpsB.mag.f
	1767		100	u16	100	Differential current phase C	LD0.FLTMSTA1.DifAmpsC.mag.f
	1768		100	u16	100	Differential current residual	LD0.FLTMSTA1.DifAmpsN.mag.f
	1769		100	u16	100	Maximum bias current phase A	LD0.FLTMSTA1.MxRstACIcA.mag.f
	1770		100	u16	100	Maximum bias current phase B	LD0.FLTMSTA1.MxRstACIcB.mag.f
	1771		100	u16	100	Maximum bias current phase C	LD0.FLTMSTA1.MxRstACIcC.mag.f

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Coil Addr	Register (:Bit) Addr	W	Dc	Type	Scale	Description	IEC61850 Data Attribute Name
	1772		100	u16	100	Bias current phase A	LD0.FLTMSTA1.RstAmpsA.mag.f
	1773		100	u16	100	Bias current phase B	LD0.FLTMSTA1.RstAmpsB.mag.f
	1774		100	u16	100	Bias current phase C	LD0.FLTMSTA1.RstAmpsC.mag.f
	1775		100	u16	100	Bias current residual	LD0.FLTMSTA1.RstAmpsN.mag.f
	1776		100	u16	100	Last Fault: I2/I1 Ratio Fault	LD0.FLTMSTA1.PDNS1MxRat.mag.f
	1777		100	u16	100	Last Fault: Max Temperature	LD0.FLTMSTA1.MaxTmpRI.mag.f
	1778		100	u16	100	Last Fault: Fault Record Operation Counter	LD0.FLTMSTA1.OpCnt.stVal
	1779		100	u16	100	Last Fault: Frequency At The Time The Fault Is Cleared	LD0.FLTMSTA1.Hz.mag.f
	1780		100	u16	100	Last Fault: Frequency Gradient At The Time The Fault Is Cleared	LD0.FLTMSTA1.HzS.mag.f
	1781		100	u16	100	Last Fault: Conductance Yo	LD0.FLTMSTA1.CondN.mag.f
	1782		100	u16	100	Last Fault: Susceptance Yo	LD0.FLTMSTA1.SusN.mag.f
	1783		100	u16	100	Last Fault: Max Start Duration Of All Stages During The Fault	LD0.FLTMSTA1.StrDur.mag.f
	1784		100	u16	100	Distance to fault measured in pu	LD0.FLTMSTA1.FitDisKm.mag.f

Table 8: General Device Information (LLN0)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5576	235:0	0					Local / Remote (1- Local; 0-Remote)	CTRL.LLN0.Loc.stVal
5577	235:1	0	Yes					
	244:0	0					Protection LLN0 Settings Reservation	LD0.LLN0.SetSeld.stVal
	244:1	0	Yes					
	245:0	0					Protection LLN0 Settings Change	LD0.LLN0.SetChg.stVal
	245:1	0	Yes					
	236	0		u16	1	0	Local / Remote state	CTRL.LLN0.LocRem.stVal

Table 9: Device Physical Information (LPHD1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
	232	0		u16	1	0	Number Of Power Ups	LD0.LPHD1.NumPwrUp.stVal
	233	0		u16	1	0	Number Of Warm Starts	LD0.LPHD1.WrmStr.stVal
	234	0		u16	1	0	Number Of Watchdog Device Resets	LD0.LPHD1.WacTrg.stVal
	237	0		s16	1	0	General Device State	LD0.LPHD1.PhyHealth.stVal
	238	0		u16	1	0	Physical Sevice Warning	LD0.LPHD1.PhyHealth1.stVal
	239	0		u16	1	0	Internal Fault	LD0.LPHD1.PhyHealth2.stVal

Table 10: LED Condition monitoring (LEDPTRC1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2894	2199:2	0					Global Conditioning Trip (Operate)	LD0.LEDPTRC1.Op.general
2895	2199:3	0	Yes					
3824	2245:8	0					Global Conditioning Phase-A Trip (Operate)	LD0.LEDPTRC1.Op.phsA
3825	2245:9	0	Yes					
3826	2245:10	0					Global Conditioning Phase-B Trip (Operate)	LD0.LEDPTRC1.Op.phsB
3827	2245:11	0	Yes					
3828	2245:12	0					Global Conditioning Phase-C Trip (Operate)	LD0.LEDPTRC1.Op.phsC
3829	2245:13	0	Yes					

Table 11: LED Status (LEDGGIO1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5020	2476:0	0					Led 1 On	LD0.LEDGGIO1.SPSCO1.stVal
5021	2476:1	0	Yes					
5022	2476:2	0					Led 2 On	LD0.LEDGGIO1.SPSCO2.stVal
5023	2476:3	0	Yes					
5024	2476:4	0					Led 3 On	LD0.LEDGGIO1.SPSCO3.stVal
5025	2476:5	0	Yes					
5026	2476:6	0					Led 4 On	LD0.LEDGGIO1.SPSCO4.stVal
5027	2476:7	0	Yes					
5028	2476:8	0					Led 5 On	LD0.LEDGGIO1.SPSCO5.stVal
5029	2476:9	0	Yes					
5030	2476:10	0					Led 6 On	LD0.LEDGGIO1.SPSCO6.stVal
5031	2476:11	0	Yes					
5032	2476:12	0					Led 7 On	LD0.LEDGGIO1.SPSCO7.stVal
5033	2476:13	0	Yes					
5034	2476:14	0					Led 8 On	LD0.LEDGGIO1.SPSCO8.stVal
5035	2476:15	0	Yes					
5036	2477:0	0					Led 9 On	LD0.LEDGGIO1.SPSCO9.stVal
5037	2477:1	0	Yes					
5038	2477:2	0					Led 10 On	LD0.LEDGGIO1.SPSCO10.stVal
5039	2477:3	0	Yes					
5040	2477:4	0					Led 11 On	LD0.LEDGGIO1.SPSCO11.stVal
5041	2477:5	0	Yes					

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Table 12: X100-Binary Inputs/Outputs (XGGIO100)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2148	2162:0	2					X100-Output 1 PSM	LD0.XGGIO100.SPCSO1.stVal
2149	2162:1	2	Yes					
2150	2162:2	2					X100-Output 2 PSM	LD0.XGGIO100.SPCSO2.stVal
2151	2162:3	2	Yes					
2152	2162:4	2					X100-Output 3 PSM	LD0.XGGIO100.SPCSO3.stVal
2153	2162:5	2	Yes					
2154	2162:6	2					X100-Output 4 PSM	LD0.XGGIO100.SPCSO4.stVal
2155	2162:7	2	Yes					
2156	2162:8	2					X100-Output 5 PSM	LD0.XGGIO100.SPCSO5.stVal
2157	2162:9	2	Yes					
2158	2162:10	2					X100-Output 6 PSM	LD0.XGGIO100.SPCSO6.stVal
2159	2162:11	2	Yes					

Table 13: X110-Binary Inputs/Outputs (XGGIO110)

Coil Addr	Input Addr (1x)	Register (:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2132			2					X110-Output 1 BIO	LD0.XGGIO110.SPCSO1.stVal
2133			2	Yes					
2134			2					X110-Output 2 BIO	LD0.XGGIO110.SPCSO2.stVal
2135			2	Yes					
2136			2					X110-Output 3 BIO	LD0.XGGIO110.SPCSO3.stVal
2137			2	Yes					
2138			2					X110-Output 4 BIO	LD0.XGGIO110.SPCSO4.stVal
2139			2	Yes					
	2164	2320:0	1					X110-Input 1 BIO	LD0.XGGIO110.Ind1.stVal
	2165	2320:1	1	Yes					
	2166	2320:2	1					X110-Input 2 BIO	LD0.XGGIO110.Ind2.stVal
	2167	2320:3	1	Yes					
	2168	2320:4	1					X110-Input 3 BIO	LD0.XGGIO110.Ind3.stVal
	2169	2320:5	1	Yes					
	2170	2320:6	1					X110-Input 4 BIO	LD0.XGGIO110.Ind4.stVal
	2171	2320:7	1	Yes					
	2172	2320:8	1					X110-Input 5 BIO	LD0.XGGIO110.Ind5.stVal
	2173	2320:9	1	Yes					
	2174	2320:10	1					X110-Input 6 BIO	LD0.XGGIO110.Ind6.stVal
	2175	2320:11	1	Yes					
	2176	2320:12	1					X110-Input 7 BIO	LD0.XGGIO110.Ind7.stVal
	2177	2320:13	1	Yes					
	2178	2320:14	1					X110-Input 8 BIO	LD0.XGGIO110.Ind8.stVal
	2179	2320:15	1	Yes					

Table 14: X130-Binary Inputs/Outputs (XGGIO130)

Coil Addr	Input Addr (1x)	Register (:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2100			2					X130-Output 1	LD0.XGGIO130.SPCS01.stVal
2101			2	Yes					
2102			2					X130-Output 2	LD0.XGGIO130.SPCS02.stVal
2103			2	Yes					
2104			2					X130-Output 3	LD0.XGGIO130.SPCS03.stVal
2105			2	Yes					
	2100	2316:0	1					X130-Input 1	LD0.XGGIO130.Ind1.stVal
	2101	2316:1	1	Yes					
	2102	2316:2	1					X130-Input 2	LD0.XGGIO130.Ind2.stVal
	2103	2316:3	1	Yes					
	2104	2316:4	1					X130-Input 3	LD0.XGGIO130.Ind3.stVal
	2105	2316:5	1	Yes					
	2106	2316:6	1					X130-Input 4	LD0.XGGIO130.Ind4.stVal
	2107	2316:7	1	Yes					
	2108	2316:8	1					X130-Input 5	LD0.XGGIO130.Ind5.stVal
	2109	2316:9	1	Yes					
	2110	2316:10	1					X130-Input 6	LD0.XGGIO130.Ind6.stVal
	2111	2316:11	1	Yes					

Table 15: 51P-1:Three-phase non-directional overcurrent protection-low stage-instance 1 (PHLPTOC1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2230	2167:0	0					51P-1 Trip (Operate)	LD0.PHLPTOC1.Op.general
2231	2167:1	0	Yes					
3400	2224:0	0					51P-1 Phase A Trip (Operate)	LD0.PHLPTOC1.Op.phsA
3401	2224:1	0	Yes					
3402	2224:2	0					51P-1 Phase B Trip (Operate)	LD0.PHLPTOC1.Op.phsB
3403	2224:3	0	Yes					
3404	2224:4	0					51P-1 Phase C Trip (Operate)	LD0.PHLPTOC1.Op.phsC
3405	2224:5	0	Yes					
	2326:0	0					51P-1 Enable Signal For Current Multiplier	LD0.PHLPTOC1.InEnaMult.stVal
	2326:1	0	Yes					

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Table 16: 51P-2:Three-phase non-directional overcurrent protection-low stage-instance 2 (PHLPTOC2)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2836	2195:8	0					51P-2 Trip (Operate)	LD0.PHLPTOC2.Op.general
2837	2195:9	0	Yes					
3532	2232:4	0					51P-2 Phase A Trip (Operate)	LD0.PHLPTOC2.Op.phsA
3533	2232:5	0	Yes					
3534	2232:6	0					51P-2 Phase B Trip (Operate)	LD0.PHLPTOC2.Op.phsB
3535	2232:7	0	Yes					
3536	2232:8	0					51P-2 Phase C Trip (Operate)	LD0.PHLPTOC2.Op.phsC
3537	2232:9	0	Yes					

Table 17: 50P-1:Three-phase non-directional overcurrent protection-high stage-instance 1 (PHHPTOC1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2232	2167:2	0					50P-1 Trip (Operate)	LD0.PHHPTOC1.Op.general
2233	2167:3	0	Yes					
3406	2224:6	0					50P-1 Phase A Trip (Operate)	LD0.PHHPTOC1.Op.phsA
3407	2224:7	0	Yes					
3408	2224:8	0					50P-1 Phase B Trip (Operate)	LD0.PHHPTOC1.Op.phsB
3409	2224:9	0	Yes					
3410	2224:10	0					50P-1 Phase C Trip (Operate)	LD0.PHHPTOC1.Op.phsC
3411	2224:11	0	Yes					
	2326:2	0					50P-1 Enable Signal For Current Multiplier	LD0.PHHPTOC1.InEnaMult.stVal
	2326:3	0	Yes					

Table 18: 50P-2:Three-phase non-directional overcurrent protection-high stage-instance 2 (PHHPTOC2)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2234	2167:4	0					50P-2 Trip (Operate)	LD0.PHHPTOC2.Op.general
2235	2167:5	0	Yes					
3412	2224:12	0					50P-2 Phase A Trip (Operate)	LD0.PHHPTOC2.Op.phsA
3413	2224:13	0	Yes					
3414	2224:14	0					50P-2 Phase B Trip (Operate)	LD0.PHHPTOC2.Op.phsB
3415	2224:15	0	Yes					
3416	2225:0	0					50P-2 Phase C Trip (Operate)	LD0.PHHPTOC2.Op.phsC
3417	2225:1	0	Yes					
	2326:4	0					50P-2 Enable Signal For Current Multiplier	LD0.PHHPTOC2.InEnaMult.stVal
	2326:5	0	Yes					

Table 19: 50P-4:Three-phase non-directional overcurrent protection-high stage-instance 3 (PHHPTOC3)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2838	2195:10	0					50P-4 Trip (Operate)	LD0.PHHPTOC3.Op.general
2839	2195:11	0	Yes					
3538	2232:10	0					50P-4 Phase A Trip (Operate)	LD0.PHHPTOC3.Op.phsA
3539	2232:11	0	Yes					
3540	2232:12	0					50P-4 Phase B Trip (Operate)	LD0.PHHPTOC3.Op.phsB
3541	2232:13	0	Yes					
3542	2232:14	0					50P-4 Phase C Trip (Operate)	LD0.PHHPTOC3.Op.phsC
3543	2232:15	0	Yes					

Table 20: 50P-5:Three-phase non-directional overcurrent protection-high stage-instance 4 (PHHPTOC4)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2840	2195:12	0					50P-5 Trip (Operate)	LD0.PHHPTOC4.Op.general
2841	2195:13	0	Yes					
3544	2233:0	0					50P-5 Phase A Trip (Operate)	LD0.PHHPTOC4.Op.phsA
3545	2233:1	0	Yes					
3546	2233:2	0					50P-5 Phase B Trip (Operate)	LD0.PHHPTOC4.Op.phsB
3547	2233:3	0	Yes					
3548	2233:4	0					50P-5 Phase C Trip (Operate)	LD0.PHHPTOC4.Op.phsC
3549	2233:5	0	Yes					

Table 21: 50P-3:Three-phase non-directional overcurrent protection-instantaneous stage-instance 1 (PHIPTOC1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2236	2167:6	0					50P-3 Trip (Operate)	LD0.PHIPTOC1.Op.general
2237	2167:7	0	Yes					
3418	2225:2	0					50P-3 Phase A Trip (Operate)	LD0.PHIPTOC1.Op.phsA
3419	2225:3	0	Yes					
3420	2225:4	0					50P-3 Phase B Trip (Operate)	LD0.PHIPTOC1.Op.phsB
3421	2225:5	0	Yes					
3422	2225:6	0					50P-3 Phase C Trip (Operate)	LD0.PHIPTOC1.Op.phsC
3423	2225:7	0	Yes					
	2326:6	0					50P-3 Enable Signal For Current Multiplier	LD0.PHIPTOC1.InEnaMult.stVal
	2326:7	0	Yes					

Table 22: *51LT:Three-phase non-directional long time overcurrent protection-low stage-instance 1 (PHLTPTOC1)*

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2594	2184:0	0					51LT Trip (Operate)	LD0.PHLTPTOC1.Op.general
2595	2184:1	0	Yes					
3514	2231:2	0					51LT Phase A Trip (Operate)	LD0.PHLTPTOC1.Op.phsA
3515	2231:3	0	Yes					
3516	2231:4	0					51LT Phase B Trip (Operate)	LD0.PHLTPTOC1.Op.phsB
3517	2231:5	0	Yes					
3518	2231:6	0					51LT Phase C Trip (Operate)	LD0.PHLTPTOC1.Op.phsC
3519	2231:7	0	Yes					

Table 23: *67/51P:Three-phase directional overcurrent protection-low stage-instance 1 (DPHLPTOC1)*

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2270	2169:8	0					67/51P Trip (Operate)	LD0.DPHLPTOC1.Op.general
2271	2169:9	0	Yes					
3460	2227:12	0					67/51P Phase A Trip (Operate)	LD0.DPHLPTOC1.Op.phsA
3461	2227:13	0	Yes					
3462	2227:14	0					67/51P Phase B Trip (Operate)	LD0.DPHLPTOC1.Op.phsB
3463	2227:15	0	Yes					
3464	2228:0	0					67/51P Phase C Trip (Operate)	LD0.DPHLPTOC1.Op.phsC
3465	2228:1	0	Yes					

Table 24: *67/50P-1:Three-phase directional overcurrent protection-high stage-instance 1 (DPHHPTOC1)*

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2274	2169:12	0					67/50P-1 Trip (Operate)	LD0.DPHHPTOC1.Op.general
2275	2169:13	0	Yes					
3472	2228:8	0					67/50P-1 Phase A Trip (Operate)	LD0.DPHHPTOC1.Op.phsA
3473	2228:9	0	Yes					
3474	2228:10	0					67/50P-1 Phase B Trip (Operate)	LD0.DPHHPTOC1.Op.phsB
3475	2228:11	0	Yes					
3476	2228:12	0					67/50P-1 Phase C Trip (Operate)	LD0.DPHHPTOC1.Op.phsC
3477	2228:13	0	Yes					

Table 25: 67/50P-2:Three-phase directional overcurrent protection-high stage-instance 2 (DPHHPTOC2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2346	2174:4	0					67/50P-2 Trip (Operate)	LD0.DPHHPTOC2.Op.general
2347	2174:5	0	Yes					
3580	2235:4	0					67/50P-2 Phase A Trip (Operate)	LD0.DPHHPTOC2.Op.phsA
3581	2235:5	0	Yes					
3582	2235:6	0					67/50P-2 Phase B Trip (Operate)	LD0.DPHHPTOC2.Op.phsB
3583	2235:7	0	Yes					
3584	2235:8	0					67/50P-2 Phase C Trip (Operate)	LD0.DPHHPTOC2.Op.phsC
3585	2235:9	0	Yes					

Table 26: 51G:Non-directional ground-fault protection-low stage-instance 1 (EFLPTOC1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2246	2168:0	0					51G Trip (Operate)	LD0.EFLPTOC1.Op.general
2247	2168:1	0	Yes					
	2326:8	0					51G Enable Current Multiplier	LD0.EFLPTOC1.InEnaMult.stVal
	2326:9	0	Yes					

Table 27: 51N-1:Non-directional ground-fault protection-low stage-instance 2 (EFLPTOC2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2238	2167:8	0					51N-1 Trip (Operate)	LD0.EFLPTOC2.Op.general
2239	2167:9	0	Yes					

Table 28: 51N-2:Non-directional ground-fault protection-low stage-instance 3 (EFLPTOC3)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2602	2184:8	0					51N-2 Trip (Operate)	LD0.EFLPTOC3.Op.general
2603	2184:9	0	Yes					

Table 29: 50SEF:Non-directional ground-fault protection-low stage-instance 4 (EFLPTOC4)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2622	2185:12	0					50SEF Trip (Operate)	LD0.EFLPTOC4.Op.general
2623	2185:13	0	Yes					

Table 30: 50G-1:Non-directional ground-fault protection-high stage-instance 1 (EFHPTOC1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2248	2168:2	0					50G-1 Trip (Operate)	LD0.EFHPTOC1.Op.general
2249	2168:3	0	Yes					
	2326:10	0					50G-1 Enable Current Multiplier	LD0.EFHPTOC1.InEnaMult.stVal
	2326:11	0	Yes					

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Table 31: 50G-2:Non-directional ground-fault protection-high stage-instance 2 (EFHPTOC2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2250	2168:4	0					50G-2 Trip (Operate)	LD0.EFHPTOC2.Op.general
2251	2168:5	0	Yes					

Table 32: 50N-1:Non-directional ground-fault protection-high stage-instance 3 (EFHPTOC3)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2240	2167:10	0					50N-1 Trip (Operate)	LD0.EFHPTOC3.Op.general
2241	2167:11	0	Yes					

Table 33: 50N-2:Non-directional ground-fault protection-high stage-instance 4 (EFHPTOC4)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2242	2167:12	0					50N-2 Trip (Operate)	LD0.EFHPTOC4.Op.general
2243	2167:13	0	Yes					

Table 34: 50N-4:Non-directional ground-fault protection-high stage-instance 5 (EFHPTOC5)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2296	2171:2	0					50N-4 Trip (Operate)	LD0.EFHPTOC5.Op.general
2297	2171:3	0	Yes					

Table 35: 50N-5:Non-directional ground-fault protection-high stage-instance 6 (EFHPTOC6)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2624	2185:14	0					50N-5 Trip (Operate)	LD0.EFHPTOC6.Op.general
2625	2185:15	0	Yes					

Table 36: 50G-3:Non-directional ground-fault protection-instantaneous stage-instance 1 (EFIPTOC1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2252	2168:6	0					50G-3 Trip (Operate)	LD0.EFIPTOC1.Op.general
2253	2168:7	0	Yes					
	2326:12	0					50G-3 Enable Current Multiplier	LD0.EFIPTOC1.InEnaMult.stVal
	2326:13	0	Yes					

Table 37: 50N-3:Non-directional ground-fault protection-instantaneous stage-instance 2 (EFIPTOC2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2244	2167:14	0					50N-3 Trip (Operate)	LD0.EFIPTOC2.Op.general
2245	2167:15	0	Yes					

Table 38: 67/51N:Directional ground-fault protection-low stage-instance 1 (DEFLPTOC1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2278	2170:0	0					67/51N Trip (Operate)	LD0.DEFLPTOC1.Op.general
2279	2170:1	0	Yes					

Table 39: 67/50N-1:Directional ground-fault protection-high stage-instance 1 (DEFHPTOC1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2276	2169:14	0					67/50N-1 Trip (Operate)	LD0.DEFHPTOC1.Op.general
2277	2169:15	0	Yes					

Table 40: 67/50N-2:Directional ground-fault protection-high stage-instance 2 (DEFHPTOC2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2286	2170:8	0					67/50N-2 Trip (Operate)	LD0.DEFHPTOC2.Op.general
2287	2170:9	0	Yes					

Table 41: 32P-1:Three phase directional power protection-instance 1 (DPSRDIR1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2934	2201:10	0					32P-1 Direction Trip (Operate)	LD0.DPSRDIR1.Dir.general
2935	2201:11	0	Yes					
	866	6		s16	100	0	32P-1 Angle Between Operating And Polarizing Quantity	LD0.DPSRDIR1.OpChrAng.mag.f

Table 42: 32P-2:Three phase directional power protection-instance 2 (DPSRDIR2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2940	2202:0	0					32P-2 Direction Trip (Operate)	LD0.DPSRDIR2.Dir.general
2941	2202:1	0	Yes					
	869	6		s16	100	0	32P-2 Angle Between Operating And Polarizing Quantity	LD0.DPSRDIR2.OpChrAng.mag.f

Table 43: 32N-1:Ground directional power protection-instance 1 (DNZSRDIR1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2936	2201:12	0					32N-1 Direction Trip (Operate)	LD0.DNZSRDIR1.Dir.general
2937	2201:13	0	Yes					
	867	6		u16	100	0	32N-1 Angle Between Operating And Polarizing Quantity	LD0.DNZSRDIR1.OpChrAng.mag.f

Table 44: 32N-2:Ground directional power protection-instance 2 (DNZSRDIR2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2938	2201:14	0					32N-2 Direction Trip (Operate)	LD0.DNZSRDIR2.Dir.general
2939	2201:15	0	Yes					
	870	6		u16	100	0	32N-2 Angle Between Operating And Polarizing Quantity	LD0.DNZSRDIR2.OpChrAng.mag.f

Table 45: 46-1:Negative-sequence overcurrent protection-instance 1 (NSPTOC1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2256	2168:10	0					46-1 Trip (Operate)	LD0.NSPTOC1.Op.general
2257	2168:11	0	Yes					
	2326:14	0					46-1 Enable Signal For Current Multiplier	LD0.NSPTOC1.InEnaMult.stVal
	2326:15	0	Yes					

Table 46: 46-2:Negative-sequence overcurrent protection-instance 2 (NSPTOC2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2258	2168:12	0					46-2 Trip (Operate)	LD0.NSPTOC2.Op.general
2259	2168:13	0	Yes					
	2327:0	0					46-2 Enable Signal For Current Multiplier	LD0.NSPTOC2.InEnaMult.stVal
	2327:1	0	Yes					

Table 47: 46PD:Phase discontinuity protection (PDNSPTOC1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2254	2168:8	0					46PD Trip (Operate)	LD0.PDNSPTOC1.Op.general
2255	2168:9	0	Yes					

Table 48: 59G :Residual overvoltage protection-instance 1 (ROVPTOV1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2308	2171:14	0					59G Trip (Operate)	LD0.ROVPTOV1.Op.general
2309	2171:15	0	Yes					

Table 49: 59N-1:Residual overvoltage protection-instance 2 (ROVPTOV2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
3146	2210:12	0					59N-1 Trip (Operate)	LD0.ROVPTOV2.Op.general
3147	2210:13	0	Yes					

Table 50: 59N-2:Residual overvoltage protection-instance 3 (ROVPTOV3)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2348	2174:6	0					59N-2 Trip (Operate)	LD0.ROVPTOV3.Op.general
2349	2174:7	0	Yes					

Table 51: 27-1:Three-phase undervoltage protection-instance 1 (PHPTUV1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2292	2170:14	0					27-1 Trip (Operate)	LD0.PHPTUV1.Op.general
2293	2170:15	0	Yes					
3478	2228:14	0					27-1 Phase A Trip (Operate)	LD0.PHPTUV1.Op.phsA
3479	2228:15	0	Yes					
3480	2229:0	0					27-1 Phase B Trip (Operate)	LD0.PHPTUV1.Op.phsB
3481	2229:1	0	Yes					
3482	2229:2	0					27-1 Phase C Trip (Operate)	LD0.PHPTUV1.Op.phsC
3483	2229:3	0	Yes					

Table 52: 27-2:Three-phase undervoltage protection-instance 2 (PHPTUV2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2294	2171:0	0					27-2 Trip (Operate)	LD0.PHPTUV2.Op.general
2295	2171:1	0	Yes					
3484	2229:4	0					27-2 Phase A Trip (Operate)	LD0.PHPTUV2.Op.phsA
3485	2229:5	0	Yes					
3486	2229:6	0					27-2 Phase B Trip (Operate)	LD0.PHPTUV2.Op.phsB
3487	2229:7	0	Yes					
3488	2229:8	0					27-2 Phase C Trip (Operate)	LD0.PHPTUV2.Op.phsC
3489	2229:9	0	Yes					

Table 53: 59-1:Three-phase overvoltage protection-instance 1 (PHPTOV1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2298	2171:4	0					59-1 Trip (Operate)	LD0.PHPTOV1.Op.general
2299	2171:5	0	Yes					
3490	2229:10	0					59-1 Phase A Trip (Operate)	LD0.PHPTOV1.Op.phsA
3491	2229:11	0	Yes					
3492	2229:12	0					59-1 Phase B Trip (Operate)	LD0.PHPTOV1.Op.phsB
3493	2229:13	0	Yes					
3494	2229:14	0					59-1 Phase C Trip (Operate)	LD0.PHPTOV1.Op.phsC
3495	2229:15	0	Yes					

Table 54: 59-2:Three-phase overvoltage protection-instance 2 (PHPTOV2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2300	2171:6	0					59-2 Trip (Operate)	LD0.PHPTOV2.Op.general
2301	2171:7	0	Yes					
3496	2230:0	0					59-2 Phase A Trip (Operate)	LD0.PHPTOV2.Op.phsA
3497	2230:1	0	Yes					
3498	2230:2	0					59-2 Phase B Trip (Operate)	LD0.PHPTOV2.Op.phsB
3499	2230:3	0	Yes					
3500	2230:4	0					59-2 Phase C Trip (Operate)	LD0.PHPTOV2.Op.phsC
3501	2230:5	0	Yes					

Table 55: 47-1:Negative-sequence overvoltage protection-instance 1 (NSPTOV1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2342	2174:0	0					47-1 Trip (Operate)	LD0.NSPTOV1.Op.general
2343	2174:1	0	Yes					

Table 56: 47-2:Negative-sequence overvoltage protection-instance 2 (NSPTOV2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
3152	2211:2	0					47-2 Trip (Operate)	LD0.NSPTOV2.Op.general
3153	2211:3	0	Yes					

Table 57: 81-1:Frequency protection-instance 1 (FRPTRC1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
3154	2211:4	0					81-1 Frequency Trip (Operate)	LD0.FRPTRC1.Op.general
3155	2211:5	0	Yes					
	841	6		u16	100	0	81-1 Ratio Of Pickup (Start) Time / Trip (Operate) Time Instance 1	LD0.FRPTRC1.StrDur.mag.f

Table 58: 81-1:Frequency protection-instance 1 (FRPTOF1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
3158	2211:8	0					81-1 Over-Frequency Trip (Operate)	LD0.FRPTOF1.Op.general
3159	2211:9	0	Yes					
	843	6		u16	100	0	81-1 Ratio Of Pickup (Start) Time / Trip (Operate) Time Overfrequency Instance 1	LD0.FRPTOF1.StrDur.mag.f

Table 59: 81-1:Frequency protection-instance 1 (FRPTUF1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
3162	2211:12	0					81-1 Under-Frequency Trip (Operate)	LD0.FRPTUF1.Op.general
3163	2211:13	0	Yes					
	845	6		u16	100	0	81-1 Ratio Of Pickup (Start) Time / Trip (Operate) Time Underfrequency Instance 1	LD0.FRPTUF1.StrDur.mag.f

Table 60: 81-1:Frequency protection-instance 1 (FRPFRC1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
3166	2212:0	0					81-1 Frequency Gradient Trip (Operate)	LD0.FRPFRC1.Op.general
3167	2212:1	0	Yes					
	847	6		u16	100	0	81-1 Ratio Of Pickup (Start) Time / Trip (Operate) Time Frequency Gradient Instance 1	LD0.FRPFRC1.StrDur.mag.f

Table 61: 81-2:Frequency protection-instance 2 (FRPTRC2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
3156	2211:6	0					81-2 Frequency Trip (Operate)	LD0.FRPTRC2.Op.general
3157	2211:7	0	Yes					
	842	6		u16	100	0	81-2 Ratio Of Pickup (Start) Time / Trip (Operate) Time Instance 2	LD0.FRPTRC2.StrDur.mag.f

Table 62: 81-2:Frequency protection-instance 2 (FRPTOF2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
3160	2211:10	0					81-2 Over-Frequency Trip (Operate)	LD0.FRPTOF2.Op.general
3161	2211:11	0	Yes					
	844	6		u16	100	0	81-2 Ratio Of Pickup (Start) Time / Trip (Operate) Time Overfrequency Instance 2	LD0.FRPTOF2.StrDur.mag.f

Table 63: 81-2:Frequency protection-instance 2 (FRPTUF2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
3164	2211:14	0					81-2 Under-Frequency Trip (Operate)	LD0.FRPTUF2.Op.general
3165	2211:15	0	Yes					
	846	6		u16	100	0	81-2 Ratio Of Pickup (Start) Time / Trip (Operate) Time Underfrequency Instance 2	LD0.FRPTUF2.StrDur.mag.f

Table 64: 81-2:Frequency protection-instance 2 (FRPFRC2)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
3168	2212:2	0					81-2 Frequency Gradient Trip (Operate)	LD0.FRPFRC2.Op.general
3169	2212:3	0	Yes					
	848	6		u16	100	0	81-2 Ratio Of Pickup (Start) Time / Trip (Operate) Time Frequency Gradient Instance 2	LD0.FRPFRC2.StrDur.mag.f

Table 65: 24:Voltage per hertz protection-instance 1 (OEPVPH1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
3224	2215:10	0					24 Trip (Operate)	LD0.OEPVPH1.Op.general
3225	2215:11	0	Yes					

Table 66: 49F-1:Three-phase thermal protection for feeders-cables and distribution transformers-Instance 1 (T1PTTR1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2598	2184:4	0					49F-1 Trip (Operate)	LD0.T1PTTR1.Op.general
2599	2184:5	0	Yes					
5510	2505:4	0					49F-1 Thermal Alarm	LD0.T1PTTR1.AlmThm.general
5511	2505:5	0	Yes					
	2327:2	0					49F-1 Enable Multiplier For Reference Setting	LD0.T1PTTR1.InEnaMult.stVal
	2327:3	0	Yes					
	787	6		u16	100	0	49F-1 Temp	LD0.T1PTTR1.Tmp.mag.f
	788	6		u16	100	0	49F-1 Temp_RI	LD0.T1PTTR1.TmpRI.mag.f
	789	6		u16	100	0	49F-1 Ambient Temperature Used In The Calculation	LD0.T1PTTR1.TmpUsed.mag.f

Table 67: 49F-2:Three-phase thermal protection for feeders-cables and distribution transformers-Instance 2 (T1PTTR2)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2626	2186:0	0					49F-2 Trip (Operate)	LD0.T1PTTR2.Op.general
2627	2186:1	0	Yes					
6616	3038:8	0					49F-2 Thermal Alarm	LD0.T1PTTR2.AlmThm.general
6617	3038:9	0	Yes					
	2327:4	0					49F-2 Enable Multiplier For Reference Setting	LD0.T1PTTR2.InEnaMult.stVal
	2327:5	0	Yes					
	874	6		u16	100	0	49F-2 Temp	LD0.T1PTTR2.Tmp.mag.f
	875	6		u16	100	0	49F-2 Temp_RI	LD0.T1PTTR2.TmpRI.mag.f
	876	6		u16	100	0	49F-2 The Ambient Temperature Used In The Calculation	LD0.T1PTTR2.TmpUsed.mag.f

Table 68: 87LOZREF:Numerical stabilized low impedance restricted ground-fault protection (LREFPDIF1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2890	2198:14	0					87LOZREF Trip (Operate)	LD0.LREFPDIF1.Op.general
2891	2198:15	0	Yes					

Table 69: 50BF-1:Circuit breaker failure protection-instance 1 (CCBRBRF1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2310	2172:0	0					50BF-1 Recloser External Operation Failure 1	LD0.CCBRBRF1.OpEx.general
2311	2172:1	0	Yes					
2312	2172:2	0					50BF-1 Recloser Retrip (Internal Trip) 1	LD0.CCBRBRF1.OpIn.general
2313	2172:3	0	Yes					
5526	2506:4	0					50BF-1 Recloser Close Position 1	LD0.CCBRBRF1.InPosCls.stVal
5527	2506:5	0	Yes					
5528	2506:6	0					50BF-1 Recloser Faulty And Unable To Trip 1	LD0.CCBRBRF1.InCBFlt.stVal
5529	2506:7	0	Yes					
5532	2506:10	0					50BF-1 Recloser Trip Start 1	LD0.CCBRBRF1.InStr.stVal
5533	2506:11	0	Yes					

Table 70: 50BF-2:Circuit breaker failure protection-instance 2 (CCBRBRF2)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
6548	3034:4	0					50BF-2 Recloser Faulty And Unable To Trip 2	LD0.CCBRBRF2.InCBFlt.stVal
6549	3034:5	0	Yes					
6550	3034:6	0					50BF-2 Recloser Close Position 2	LD0.CCBRBRF2.InPosCls.stVal
6551	3034:7	0	Yes					
6552	3034:8	0					50BF-2 Recloser Trip Start 2	LD0.CCBRBRF2.InStr.stVal
6553	3034:9	0	Yes					
6554	3034:10	0					50BF-2 Recloser External Operation Failure 2	LD0.CCBRBRF2.OpEx.general
6555	3034:11	0	Yes					
6556	3034:12	0					50BF-2 Recloser Retrip (Internal Trip) 2	LD0.CCBRBRF2.OpIn.general
6557	3034:13	0	Yes					

Table 71: 86/94-1:Master trip-instance 1 (TRPPTRC1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2896	2199:4	0					86/94-1 Master Trip Operate Input 1	LD0.TRPPTRC1.Op.general
2897	2199:5	0	Yes					
2898	2199:6	0					86/94-1 Master Trip General Output 1	LD0.TRPPTRC1.Tr.general
2899	2199:7	0	Yes					

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Table 72: 86/94-2:Master trip-instance 2 (TRPPTRC2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2900	2199:8	0					86/94-2 Master Trip Operate Input 2	LD0.TRPPTRC2.Op.general
2901	2199:9	0	Yes					
2902	2199:10	0					86/94-2 Master Trip General Output 2	LD0.TRPPTRC2.Tr.general
2903	2199:11	0	Yes					

Table 73: AFD-1:Arc protection-instance 1 (ARCSARC11)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2320	2172:10	0					AFD-1 Fault Arc Detected 1	LD0.ARCSARC11.FADet.stVal
2321	2172:11	0	Yes					
2326	2173:0	0					AFD-1 Remote Fault Arc Detected 1	LD0.ARCSARC11.InRemFA.stVal
2327	2173:1	0	Yes					

Table 74: AFD-1:Arc protection-instance 1 (ARCPTRC11)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2314	2172:4	0					AFD-1 Arc Detected Trip (Operate) 1	LD0.ARCPTRC11.Op.general
2315	2172:5	0	Yes					

Table 75: AFD-2:Arc protection-instance 2 (ARCSARC21)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2322	2172:12	0					AFD-2 Fault Arc Detected 2	LD0.ARCSARC21.FADet.stVal
2323	2172:13	0	Yes					
2328	2173:2	0					AFD-2 Remote Fault Arc Detected 2	LD0.ARCSARC21.InRemFA.stVal
2329	2173:3	0	Yes					

Table 76: AFD-2:Arc protection-instance 2 (ARCPTRC21)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2316	2172:6	0					AFD-2 Arc Detected Trip (Operate) 2	LD0.ARCPTRC21.Op.general
2317	2172:7	0	Yes					

Table 77: AFD-3:Arc protection-instance 3 (ARCSARC31)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2324	2172:14	0					AFD-3 Fault Arc Detected 3	LD0.ARCSARC31.FADet.stVal
2325	2172:15	0	Yes					
2330	2173:4	0					AFD-3 Remote Fault Arc Detected 3	LD0.ARCSARC31.InRemFA.stVal
2331	2173:5	0	Yes					

Table 78: AFD-3:Arc protection-instance 3 (ARCPTRC31)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2318	2172:8	0					AFD-3 Arc Detected Trip (Operate) 3	LD0.ARCPTRC31.Op.general
2319	2172:9	0	Yes					

Table 79: HIZ:High impedance fault detection (PHIZ1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2604	2184:10	0					HIZ Downed Conductor Trip (Operate)	LD0.PHIZ1.Op.general
2605	2184:11	0	Yes					

Table 80: 81LSH-1:Load shedding and restoration-instance 1 (LSHDPTRC1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
3170	2212:4	0					81LSH-1 Load Shedding Trip - 1	LD0.LSHDPTRC1.Op.general
3171	2212:5	0	Yes					
3172	2212:6	0					81LSH-1 LSH Restore Signal For Load Restoring Purposes - 1	LD0.LSHDPTRC1.RestLodOp.g eneral
3173	2212:7	0	Yes					
	849	6		u16	100	0	81LSH-1 Ratio Of Pickup (Start) / Trip (Operate) Time Frequency Gradient 1	LD0.LSHDPTRC1.StrDur.mag.f

Table 81: 81LSH-1:Load shedding and restoration-instance 1 (LSHDPTUF1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
3178	2212:12	0					81LSH-1 Trip (Operate) Underfrequency	LD0.LSHDPTUF1.Op.general
3179	2212:13	0	Yes					

Table 82: 81LSH-1:Load shedding and restoration-instance 1 (LSHDPFRC1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
3182	2213:0	0					81LSH-1 Trip (Operate) Frequency Gradient	LD0.LSHDPFRC1.Op.general
3183	2213:1	0	Yes					

Table 83: 81LSH-2:Load shedding and restoration-instance 2 (LSHDPTRC2)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
3174	2212:8	0					81LSH-2 Load Shedding Trip - 2	LD0.LSHDPTRC2.Op.general
3175	2212:9	0	Yes					
3176	2212:10	0					81LSH-2 Restore Signal For Load Restoring Purposes - 2	LD0.LSHDPTRC2.RestLodOp.g eneral
3177	2212:11	0	Yes					
	850	6		u16	100	0	81LSH-2 Ratio Of Start / Trip (Operate) Time Frequency Gradient 2	LD0.LSHDPTRC2.StrDur.mag.f

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Table 84: 81LSH-2:Load shedding and restoration-instance 2 (LSHDPTUF2)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
3180		0					81LSH-2 Trip (Operate) Underfrequency	LD0.LSHDPTUF2.Op.general
3181		0	Yes					
	2212:14	0					81LSH-2 Trip (Operate) Underfrequency	LD0.LSHDPTUF2.Op.general
	2212:15	0	Yes					

Table 85: 81LSH-2:Load shedding and restoration-instance 2 (LSHDPFRC2)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
3184	2213:2	0					81LSH-2 Trip (Operate) Frequency Gradient	LD0.LSHDPFRC2.Op.general
3185	2213:3	0	Yes					

Table 86: 37-1:Loss of phase-instance 1 (PHPTUC1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2950	2202:10	0					37-1 Trip (Operate)	LD0.PHPTUC1.Op.general
2951	2202:11	0	Yes					
3586	2235:10	0					37-1 Phase-A Trip (Operate)	LD0.PHPTUC1.Op.phsA
3587	2235:11	0	Yes					
3588	2235:12	0					37-1 Phase-B Trip (Operate)	LD0.PHPTUC1.Op.phsB
3589	2235:13	0	Yes					
3590	2235:14	0					37-1 Phase-C Trip (Operate)	LD0.PHPTUC1.Op.phsC
3591	2235:15	0	Yes					

Table 87: 37-2:Loss of phase-instance 2 (PHPTUC2)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2954	2202:14	0					37-2 Trip (Operate)	LD0.PHPTUC2.Op.general
2955	2202:15	0	Yes					
3598	2236:6	0					37-2 Phase-A Trip (Operate)	LD0.PHPTUC2.Op.phsA
3599	2236:7	0	Yes					
3600	2236:8	0					37-2 Phase-B Trip (Operate)	LD0.PHPTUC2.Op.phsB
3601	2236:9	0	Yes					
3602	2236:10	0					37-2 Phase-C Trip (Operate)	LD0.PHPTUC2.Op.phsC
3603	2236:11	0	Yes					

Table 88: 52-1:Circuit-breaker control-instance 1 (CBCILO1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5442	2501:0	0					52-1 Breaker Interlock Enable Open 1	CTRL.CBCILO1.EnaOpn.stVal
5443	2501:1	0	Yes					
5444	2501:2	0					52-1 Breaker Interlock Enable Close 1	CTRL.CBCILO1.EnaCls.stVal
5445	2501:3	0	Yes					
5472	2502:14	0					52-1 Breaker Interlock Bypass 1	CTRL.CBCILO1.ItlByPss.stVal
5473	2502:15	0	Yes					

Table 89: 52-1:Circuit-breaker control-instance 1 (CBCSW1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5110	2481:0	0					52-1 Breaker Switch Position Open	CTRL.CBCSW1.Pos.stVal
5111	2481:1	0	Yes					
5112	2481:2	0					52-1 Breaker Switch Position Closed	CTRL.CBCSW1.Pos.stVal
5113	2481:3	0	Yes					
5114	2481:4	0					52-1 Breaker Switch Position valid	CTRL.CBCSW1.Pos.stVal
5115	2481:5	0	Yes					

Table 90: 52-1:Circuit-breaker control-instance 1 (CBXCBR1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5150	2490:0	0					52-1 Breaker Block Open	CTRL.CBXCBR1.BlkOpn.stVal
5151	2490:1	0	Yes					
5152	2490:2	0					52-1 Breaker Block Close	CTRL.CBXCBR1.BlkCls.stVal
5153	2490:3	0	Yes					

Table 91: 52-2:Circuit-breaker control-instance 2 (CBCILO2)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
6558	3034:14	0					52-2 Breaker Interlock Enable Open 2	CTRL.CBCILO2.EnaOpn.stVal
6559	3034:15	0	Yes					
6560	3035:0	0					52-2 Breaker Interlock Enable Close 2	CTRL.CBCILO2.EnaCls.stVal
6561	3035:1	0	Yes					
6562	3035:2	0					52-2 Breaker Interlock Bypass 2	CTRL.CBCILO2.ItlByPss.stVal
6563	3035:3	0	Yes					

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Table 92: 52-2:Circuit-breaker control-instance 2 (CBCSWI2)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5140		0					52-2 Breaker Switch Position Open. Default - LOW: Change for - 1;3.	CTRL.CBCSWI2.Pos.stVal
5141		0	Yes					
5142		0					52-2 Breaker Switch Position Closed Default - LOW: Change for - 2;3	CTRL.CBCSWI2.Pos.stVal
5143		0	Yes					
5144		0					52-2 Breaker Switch Position valid. Default - LOW: Change for - 1;2	CTRL.CBCSWI2.Pos.stVal
5145		0	Yes					

Table 93: 52-2:Circuit-breaker control-instance 2 (CBXCBR2)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5154	2490:4	0					52-2 Breaker Block Open	CTRL.CBXCBR2.BlkOpn.stVal
5155	2490:5	0	Yes					
5156	2490:6	0					52-2 Breaker Block Close	CTRL.CBXCBR2.BlkCls.stVal
5157	2490:7	0	Yes					

Table 94: 79:Auto-reclosing (DARREC1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2876	2198:0	0					79 Trip (Operate) (Open Command To XCBR)	LD0.DARREC1.OpOpn.general
2877	2198:1	0	Yes					
2878	2198:2	0					79 Trip (Operate) (Close Command To XCBR)	LD0.DARREC1.Op.general
2879	2198:3	0	Yes					
	811	4		u16	1	0	79 Auto Reclosing Status	LD0.DARREC1.AutoRecSt.stVal
	2002	4		u16	1	0	79 Operation Counter (1st Shot)	LD0.DARREC1.OpCnt1.stVal
	2003	4		u16	1	0	79 Operation Counter (2nd Shot)	LD0.DARREC1.OpCnt2.stVal
	2004	4		u16	1	0	79 Operation Counter (3rd Shot)	LD0.DARREC1.OpCnt3.stVal
	2005	4		u16	1	0	79 Operation Counter (4th Shot)	LD0.DARREC1.OpCnt4.stVal
	2006	4		u16	1	0	79 Operation Counter (5th Shot)	LD0.DARREC1.OpCnt5.stVal
	2038	4		u16	1	0	79 Frequent Operation Counter	LD0.DARREC1.FrqOpCnt.stVal

Table 95: 25:Synchronism and energizing check (SECRSYN1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5562	2508:8	0					25 Voltage Difference Indicator	LD0.SECRSYN1.VInd.stVal
5563	2508:9	0	Yes					
5564	2508:10	0					25 Angle Difference Indicator	LD0.SECRSYN1.AngInd.stVal
5565	2508:11	0	Yes					
5566	2508:12	0					25 Frequency Difference Indicator	LD0.SECRSYN1.HzInd.stVal
5567	2508:13	0	Yes					
5568	2508:14	0					25 Synchronising In Progress	LD0.SECRSYN1.SynPrg.stVal
5569	2508:15	0	Yes					
5570	2509:0	0					25 Recloser Closing Failed	LD0.SECRSYN1.FailSyn.stVal
5571	2509:1	0	Yes					
	838	6		u16	100	0	25 Calculated Vdiff	LD0.SECRSYN1.DifVClc.mag.f
	839	6		u16	100	0	25 Calculated Fdiff	LD0.SECRSYN1.DifHzClc.mag.f
	840	6		u16	100	0	25 Calculated Angle Diff	LD0.SECRSYN1.DifAngClc.mag.f

Table 96: 52CM-1:Circuit-breaker condition monitoring-instance 1 (SSCBR1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5410	2499:0	0					52CM-1 Recloser Open Travel Time Exceeded Set Value 1	LD0.SSCBR1.OpnAlm.stVal
5411	2499:1	0	Yes					
5412	2499:2	0					52CM-1 Recloser Close Travel Time Exceeded Set Value 1	LD0.SSCBR1.ClsAlm.stVal
5413	2499:3	0	Yes					
5418	2499:8	0					52CM-1 Spring Charging Time Has Crossed The Set Value 1	LD0.SSCBR1.SprChaAlm.stVal
5419	2499:9	0	Yes					
5420	2499:10	0					52CM-1 Number Of Recloser Operations Exceeds Alarm Limit 1	LD0.SSCBR1.OpNumAlm.stVal
5421	2499:11	0	Yes					
5422	2499:12	0					52CM-1 Number Of Recloser Operations Exceeds Lockout Limit 1	LD0.SSCBR1.OpNumLO.stVal
5423	2499:13	0	Yes					
5424	2499:14	0					52CM-1 Accumulated Currents Power (Iyt) Exceeded Alarm Limit 1	LD0.SSCBR1.APwrAlm.stVal
5425	2499:15	0	Yes					
5426	2500:0	0					52CM-1 Accumulated Currents Power (Iyt) Exceeded Lockout Limit 1	LD0.SSCBR1.APwrLO.stVal
5427	2500:1	0	Yes					
5428	2500:2	0					52CM-1 Remaining Life Of Recloser Exceeded Alarm Limit 1	LD0.SSCBR1.CBLifAlm.stVal
5429	2500:3	0	Yes					

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Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5430	2500:4	0					52CM-1 Recloser Not Operated For Long Time Alarm 1	LD0.SSCBR1.LonTmAlm.stVal
5431	2500:5	0	Yes					
5432	2500:6	0					52CM-1 Pressure Below Alarm Level 1	LD0.SSCBR1.PresAlm.stVal
5433	2500:7	0	Yes					
5434	2500:8	0					52CM-1 Pressure Below Lockout Level 1	LD0.SSCBR1.PresLO.stVal
5435	2500:9	0	Yes					
5436	2500:10	0					52CM-1 Recloser Position Is Open 1	LD0.SSCBR1.PosOpn.stVal
5437	2500:11	0	Yes					
5438	2500:12	0					52CM-1 Invalid Position 1	LD0.SSCBR1.PosIvd.stVal
5439	2500:13	0	Yes					
5440	2500:14	0					52CM-1 Recloser Position Is Closed 1	LD0.SSCBR1.PosCls.stVal
5441	2500:15	0	Yes					
5534	2506:12	0					52CM-1 Recloser Spring Charging Started Input 1	LD0.SSCBR1.InSprChStr.stVal
5535	2506:13	0	Yes					
5536	2506:14	0					52CM-1 Recloser Spring Charged Input 1	LD0.SSCBR1.InSprCha.stVal
5537	2506:15	0	Yes					
5538	2507:0	0					52CM-1 Binary Pressure Input For Alarm 1	LD0.SSCBR1.InPresAlm.stVal
5539	2507:1	0	Yes					
5540	2507:2	0					52CM-1 Binary Pressure Input For Lockout Indication 1	LD0.SSCBR1.InPresLO.stVal
5541	2507:3	0	Yes					
5542	2507:4	0					52CM-1 Posopen 1	LD0.SSCBR1.InPosOpn.stVal
5543	2507:5	0	Yes					
5544	2507:6	0					52CM-1 Posclose 1	LD0.SSCBR1.InPosCls.stVal
5545	2507:7	0	Yes					
	834	6		u16	100	0	52CM-1 Travel Time Of The Recloser During Opening Operation 1	LD0.SSCBR1.TmmsOpn.mag.f
	835	6		u16	100	0	52CM-1 Travel Time Of The Recloser During Closing Operation 1	LD0.SSCBR1.TmmsCls.mag.f
	836	6		u16	100	0	52CM-1 The Charging Time Of The Recloser Spring 1	LD0.SSCBR1.TmsSprCha.mag.f
	2010	5		s32	1	0	52CM-1 Phase A Accumulated Currents Power (lyt) 1	LD0.SSCBR1.AccAPwrPhA.mag.f
	2011	5						
	2012	5		s32	1	0	52CM-1 Phase B Accumulated Currents Power (lyt) 1	LD0.SSCBR1.AccAPwrPhB.mag.f
	2013	5						

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
	2014	5		s32	1	0	52CM-1 Phase C Accumulated Currents Power (Iyt) 1	LD0.SSCBR1.AccAPwrPhC.mag.f
	2015	5						
	2016	0		u16	1	0	52CM-1 Phase A Recloser Monitoring Remaining Life 1	LD0.SSCBR1.RmnLifPhA.stVal
	2018	0		u16	1	0	52CM-1 Phase B Recloser Monitoring Remaining Life 1	LD0.SSCBR1.RmnLifPhB.stVal
	2020	0		u16	1	0	52CM-1 Phase C Recloser Monitoring Remaining Life 1	LD0.SSCBR1.RmnLifPhC.stVal
	2022	4		u16	1	0	52CM-1 The Number Of Days Recloser Has Been Inactive 1	LD0.SSCBR1.InaTmdCnt.stVal

Table 97: 52CM-2:Circuit-breaker condition monitoring-instance 2 (SSCBR2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
6564	3035:4	0					52CM-2 Recloser Open Travel Time Exceeded Set Value 2	LD0.SSCBR2.OpnAlm.stVal
6565	3035:5	0	Yes					
6566	3035:6	0					52CM-2 Recloser Close Travel Time Exceeded Set Value 2	LD0.SSCBR2.ClsAlm.stVal
6567	3035:7	0	Yes					
6572	3035:12	0					52CM-2 Spring Charging Time Has Crossed The Set Value 2	LD0.SSCBR2.SprChaAlm.stVal
6573	3035:13	0	Yes					
6574	3035:14	0					52CM-2 Number Of Recloser Operations Exceeds Alarm Limit 2	LD0.SSCBR2.OpNumAlm.stVal
6575	3035:15	0	Yes					
6576	3036:0	0					52CM-2 Number Of Recloser Operations Exceeds Lockout Limit 2	LD0.SSCBR2.OpNumLO.stVal
6577	3036:1	0	Yes					
6578	3036:2	0					52CM-2 Accumulated Currents Power (Iyt) Exceeded Alarm Limit 2	LD0.SSCBR2.APwrAlm.stVal
6579	3036:3	0	Yes					
6580	3036:4	0					52CM-2 Accumulated Currents Power (Iyt) Exceeded Lockout Limit 2	LD0.SSCBR2.APwrLO.stVal
6581	3036:5	0	Yes					
6582	3036:6	0					52CM-2 Remaining Life Of Recloser Exceeded Alarm Limit 2	LD0.SSCBR2.CBLifAlm.stVal
6583	3036:7	0	Yes					
6584	3036:8	0					52CM-2 Recloser Not Operated For Long Time Alarm 2	LD0.SSCBR2.LonTmAlm.stVal
6585	3036:9	0	Yes					
6586	3036:10	0					52CM-2 Pressure Below Alarm Level 2	LD0.SSCBR2.PresAlm.stVal
6587	3036:11	0	Yes					

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Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
6588	3036:12	0					52CM-2 Pressure Below Lockout Level 2	LD0.SSCBR2.PresLO.stVal
6589	3036:13	0	Yes					
6590	3036:14	0					52CM-2 Recloser Position Is Open 2	LD0.SSCBR2.PosOpn.stVal
6591	3036:15	0	Yes					
6592	3037:0	0					52CM-2 Invalid Position 2	LD0.SSCBR2.PosIvd.stVal
6593	3037:1	0	Yes					
6594	3037:2	0					52CM-2 Recloser Position Is Closed 2	LD0.SSCBR2.PosCls.stVal
6595	3037:3	0	Yes					
6596	3037:4	0					52CM-2 Recloser Spring Charging Started Input 2	LD0.SSCBR2.InSprChStr.stVal
6597	3037:5	0	Yes					
6598	3037:6	0					52CM-2 Recloser Spring Charged Input 2	LD0.SSCBR2.InSprCha.stVal
6599	3037:7	0	Yes					
6600	3037:8	0					52CM-2 Binary Pressure Input For Alarm 2	LD0.SSCBR2.InPresAlm.stVal
6601	3037:9	0	Yes					
6602	3037:10	0					52CM-2 Binary Pressure Input For Lockout Indication 2	LD0.SSCBR2.InPresLO.stVal
6603	3037:11	0	Yes					
6604	3037:12	0					52CM-2 Posopen 2	LD0.SSCBR2.InPosOpn.stVal
6605	3037:13	0	Yes					
6606	3037:14	0					52CM-2 Posclose 2	LD0.SSCBR2.InPosCls.stVal
6607	3037:15	0	Yes					
	871	6		u16	100	0	52CM-2 Travel Time Of The Recloser During Opening Operation 2	LD0.SSCBR2.TmmsOpn.mag.f
	872	6		u16	100	0	52CM-2 Travel Time Of The Recloser During Closing Operation 2	LD0.SSCBR2.TmmsCls.mag.f
	873	6		u16	100	0	52CM-2 The Charging Time Of The Recloser Spring 2	LD0.SSCBR2.TmsSprCha.mag.f
	2135	5		s32	1	0	52CM-2 Phase A Accumulated Currents Power (Iyt) 2	LD0.SSCBR2.AccAPwrPhA.mag.f
	2136	5						
	2137	5		s32	1	0	52CM-2 Phase B Accumulated Currents Power (Iyt) 2	LD0.SSCBR2.AccAPwrPhB.mag.f
	2138	5						
	2139	5		s32	1	0	52CM-2 Phase C Accumulated Currents Power (Iyt) 2	LD0.SSCBR2.AccAPwrPhC.mag.f
	2140	5						
	2141	0		u16	1	0	52CM-2 Phase A Recloser Monitoring Remaining Life 2	LD0.SSCBR2.RmnLifPhA.stVal

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
	2143	0		u16	1	0	52CM-2 Phase B Recloser Monitoring Remaining Life 2	LD0.SSCBR2.RmnLifPhB.stVal
	2145	0		u16	1	0	52CM-2 Phase C Recloser Monitoring Remaining Life 2	LD0.SSCBR2.RmnLifPhC.stVal

Table 98: TCM-1: Trip circuit supervision-instance 1 (TCSSCBR1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5474	2503:0	0					TCM-1 Trip Circuit Supervision Alarm 1	LD0.TCSSCBR1.CirAlm.stVal
5475	2503:1	0	Yes					

Table 99: TCM-2: Trip circuit supervision-instance 2 (TCSSCBR2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5476	2503:2	0					TCM-2 Trip Circuit Supervision Alarm 2	LD0.TCSSCBR2.CirAlm.stVal
5477	2503:3	0	Yes					

Table 100: CCM: Current circuit supervision (CCRDIF1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5478	2503:4	0					CCM Current Circuit Supervision Trip (Operate)	LD0.CCRDIF1.Op.general
5479	2503:5	0	Yes					
5480	2503:6	0					CCM Current Circuit Supervision Alarm	LD0.CCRDIF1.Alm.stVal
5481	2503:7	0	Yes					

Table 101: CFD: Cable fault detection (RCFD1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2920	2200:12	0					CFD Cable Fault Detection Trip (Operate)	LD0.RCFD1.Op.general
2921	2200:13	0	Yes					
3574	2234:14	0					CFD Cable Fault Detection Phase A Trip (Operate)	LD0.RCFD1.Op.phsA
3575	2234:15	0	Yes					
3576	2235:0	0					CFD Cable Fault Detection Phase B Trip (Operate)	LD0.RCFD1.Op.phsB
3577	2235:1	0	Yes					
3578	2235:2	0					CFD Cable Fault Detection Phase C Trip (Operate)	LD0.RCFD1.Op.phsC
3579	2235:3	0	Yes					

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Table 102: IA-IB-IC (1):Three-phase current measurement-instance 1 (CMMXU1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5446	2501:4	0					IA IB IC (1) High Alarm	LD0.CMMXU1.HiAlm.stVal
5447	2501:5	0	Yes					
5448	2501:6	0					IA IB IC (1) High Warning	LD0.CMMXU1.HiWrn.stVal
5449	2501:7	0	Yes					
5450	2501:8	0					IA IB IC (1) Low Warning	LD0.CMMXU1.LoWrn.stVal
5451	2501:9	0	Yes					
5452	2501:10	0					IA IB IC (1) Low Alarm	LD0.CMMXU1.LoAlm.stVal
5453	2501:11	0	Yes					
	536	6		u32	100	0	IA IB IC (1) Phase A Mag (RMS)	LD0.CMMXU1.A.phsA.instCVal.mag.f
	537	6						
	538	6		u32	100	0	IA IB IC (1) Phase B Mag (RMS)	LD0.CMMXU1.A.phsB.instCVal.mag.f
	539	6						
	540	6		u32	100	0	IA IB IC (1) Phase C Mag (RMS)	LD0.CMMXU1.A.phsC.instCVal.mag.f
	541	6						

Table 103: IA-IB-IC (1):Three-phase current measurement-instance 1 (CMSTA1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
	899	5		u32	100	0	IA IB IC (1) Phase A Average Demand	LD0.CMSTA1.AvAmpsA.mag.f
	900	5						
	901	5		u32	100	0	IA IB IC (1) Phase B Average Demand	LD0.CMSTA1.AvAmpsB.mag.f
	902	5						
	903	5		u32	100	0	IA IB IC (1) Phase C Average Demand	LD0.CMSTA1.AvAmpsC.mag.f
	904	5						
	1000	5		u32	100	0	IA IB IC (1) Phase A Maximum Demand	LD0.CMSTA1.MaxAmpsA.mag.f
	1001	5						
	1002						IA IB IC (1) Phase A Maximum Demand Timestamp Year(High Byte)/Month(Low Byte)	
	1003						Day(High Byte)/Hour(Low Byte)	
	1004						Min(High Byte)/Sec(Low Byte)	
	1005						MilliSecond	
	1006						Time Quality	
	1010	5		u32	100	0	IA IB IC (1) Phase B Maximum Demand	LD0.CMSTA1.MaxAmpsB.mag.f
	1011	5						

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
	1012						IA IB IC (1) Phase B Maximum Demand Timestamp Year(High Byte)/Month(Low Byte)	
	1013						Day(High Byte)/Hour(Low Byte)	
	1014						Min(High Byte)/Sec(Low Byte)	
	1015						MilliSecond	
	1016						Time Quality	
	1020	5		u32	100	0	IA IB IC (1) Phase C Maximum Demand	LD0.CMSTA1.MaxAmpsC.mag.f
	1021	5						
	1022						IA IB IC (1) Phase B Maximum Demand Timestamp Year(High Byte)/Month(Low Byte)	
	1023						Day(High Byte)/Hour(Low Byte)	
	1024						Min(High Byte)/Sec(Low Byte)	
	1025						MilliSecond	
	1026						Time Quality	

Table 104: IA-IB-IC (2):Three-phase current measurement-instance 2 (CMMXU2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5486	2503:12	0					IA IB IC (2) High Alarm	LD0.CMMXU2.HiAlm.stVal
5487	2503:13	0	Yes					
5488	2503:14	0					IA IB IC (2) High Warning	LD0.CMMXU2.HiWrn.stVal
5489	2503:15	0	Yes					
5490	2504:0	0					IA IB IC (2) Low Warning	LD0.CMMXU2.LoWrn.stVal
5491	2504:1	0	Yes					
5492	2504:2	0					IA IB IC (2) Low Alarm	LD0.CMMXU2.LoAlm.stVal
5493	2504:3	0	Yes					
	548	6		u32	100	0	IA IB IC (2) Phase A Mag (RMS)	LD0.CMMXU2.A.phsA.instCVal.mag.f
	549	6						
	550	6		u32	100	0	IA IB IC (2) Phase B Mag (RMS)	LD0.CMMXU2.A.phsB.instCVal.mag.f
	551	6						
	552	6		u32	100	0	IA IB IC (2) Phase C Mag (RMS)	LD0.CMMXU2.A.phsC.instCVal.mag.f
	553	6						

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Table 105: IA-IB-IC (2):Three-phase current measurement-instance 2 (CMSTA2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
	907	5		u32	100	0	IA IB IC (2) Phase A Average Demand	LD0.CMSTA2.AvAmpsA.mag.f
	908	5						
	909	5		u32	100	0	IA IB IC (2) Phase B Average Demand	LD0.CMSTA2.AvAmpsB.mag.f
	910	5						
	911	5		u32	100	0	IA IB IC (2) Phase C Average Demand	LD0.CMSTA2.AvAmpsC.mag.f
	912	5						
	1120	5		u32	100	0	IA IB IC (2) Phase A Maximum Demand	LD0.CMSTA2.MaxAmpsA.mag.f
	1121	5						
	1122						IA IB IC (2) Phase A Maximum Demand Timestamp Year(High Byte)/Month(Low Byte)	
	1123						Day(High Byte)/Hour(Low Byte)	
	1124						Min(High Byte)/Sec(Low Byte)	
	1125						MilliSecond	
	1126						Time Quality	
	1130	5		u32	100	0	IA IB IC (2) Phase B Maximum Demand	LD0.CMSTA2.MaxAmpsB.mag.f
	1131	5						
	1132						IA IB IC (2) Phase B Maximum Demand Timestamp Year(High Byte)/Month(Low Byte)	
	1133						Day(High Byte)/Hour(Low Byte)	
	1134						Min(High Byte)/Sec(Low Byte)	
	1135						MilliSecond	
	1136						Time Quality	
	1140	5		u32	100	0	IA IB IC (2) Phase C Maximum Demand	LD0.CMSTA2.MaxAmpsC.mag.f
	1141	5						
	1142						IA IB IC (2) Phase C Maximum Demand Timestamp Year(High Byte)/Month(Low Byte)	
	1143						Day(High Byte)/Hour(Low Byte)	
	1144						Min(High Byte)/Sec(Low Byte)	
	1145						MilliSecond	
	1146						Time Quality	

Table 106: I1-I2-I0:Sequence current measurement-instance 1 (CSMSQI1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
	614	6		u32	100	0	I1-I2-I0 (1) Positive Sequence Mag (RMS)	LD0.CSMSQI1.SeqA.c1.instCVal.mag.f
	615	6						
	616	6		u32	100	0	I1-I2-I0 (1) Negative Sequence Mag (RMS)	LD0.CSMSQI1.SeqA.c2.instCVal.mag.f
	617	6						
	618	6		u32	100	0	I1-I2-I0 (1) Zero Sequence Mag (RMS)	LD0.CSMSQI1.SeqA.c3.instCVal.mag.f
	619	6						

Table 107: I1-I2-I0 (2):Sequence current measurement-instance 2 (CSMSQI2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
	623	6		u32	100	0	I1-I2-I0 (2) Positive Sequence Mag (RMS)	LD0.CSMSQI2.SeqA.c1.instCVal.mag.f
	624	6						
	625	6		u32	100	0	I1-I2-I0 (2) Negative Sequence Mag (RMS)	LD0.CSMSQI2.SeqA.c2.instCVal.mag.f
	626	6						
	627	6		u32	100	0	I1-I2-I0 (2) Zero Sequence Mag (RMS)	LD0.CSMSQI2.SeqA.c3.instCVal.mag.f
	628	6						

Table 108: IG:Residual current measurement-instance 1 (RESCMMXU1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5454	2501:12	0					IG High Trip (Operate)	LD0.RESCMMXU1.HiAlm.stVal
5455	2501:13	0	Yes					
5456	2501:14	0					IG High Warning	LD0.RESCMMXU1.HiWrn.stVal
5457	2501:15	0	Yes					
	542	6		u16	100	0	IG-Mag (RMS) 1	LD0.RESCMMXU1.A.res.instCVal.mag.f

Table 109: VA-VB-VC (1):Three-phase voltage measurement-instance 1 (VMMXU1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5460	2502:2	0					VA VB VC (1) High Trip (Operate)	LD0.VMMXU1.HiAlm.stVal
5461	2502:3	0	Yes					
5462	2502:4	0					VA VB VC (1) High Warning	LD0.VMMXU1.HiWrn.stVal
5463	2502:5	0	Yes					
5464	2502:6	0					VA VB VC (1) Low Warning	LD0.VMMXU1.LoWrn.stVal
5465	2502:7	0	Yes					
5466	2502:8	0					VA VB VC (1) Low Trip (Operate)	LD0.VMMXU1.LoAlm.stVal
5467	2502:9	0	Yes					

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Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
	590	6		u16	100	0	VA VB VC (1) Phase A Mag	LD0.VMMXU1.PhV.phsA.cVal.mag.f
	591	6		u16	100	0	VA VB VC (1) Phase B Mag	LD0.VMMXU1.PhV.phsB.cVal.mag.f
	592	6		u16	100	0	VA VB VC (1) Phase C Mag	LD0.VMMXU1.PhV.phsC.cVal.mag.f
	596	6		u16	100	0	VA VB VC (1) Phase AB Mag (RMS)	LD0.VMMXU1.PPV.phsAB.instCVal.mag.f
	597	6		u16	100	0	VA VB VC (1) Phase BC Mag (RMS)	LD0.VMMXU1.PPV.phsBC.instCVal.mag.f
	598	6		u16	100	0	VA VB VC (1) Phase CA Mag (RMS)	LD0.VMMXU1.PPV.phsCA.instCVal.mag.f

Table 110: VA-VB-VC (2):Three-phase voltage measurement-instance 2 (VMMXU2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5498	2504:8	0					VA VB VC (2) High Trip (Operate)	LD0.VMMXU2.HiAlm.stVal
5499	2504:9	0	Yes					
5500	2504:10	0					VA VB VC (2) High Warning	LD0.VMMXU2.HiWrn.stVal
5501	2504:11	0	Yes					
5502	2504:12	0					VA VB VC (2) Low Warning	LD0.VMMXU2.LoWrn.stVal
5503	2504:13	0	Yes					
5504	2504:14	0					VA VB VC (2) Low Trip (Operate)	LD0.VMMXU2.LoAlm.stVal
5505	2504:15	0	Yes					
	602	6		u16	100	0	VA VB VC (2) Phase A Mag	LD0.VMMXU2.PhV.phsA.cVal.mag.f
	603	6		u16	100	0	VA VB VC (2) Phase B Mag	LD0.VMMXU2.PhV.phsB.cVal.mag.f
	604	6		u16	100	0	VA VB VC (2) Phase C Mag	LD0.VMMXU2.PhV.phsC.cVal.mag.f
	608	6		u16	100	0	VA VB VC (2) Phase AB Mag (RMS)	LD0.VMMXU2.PPV.phsAB.instCVal.mag.f
	609	6		u16	100	0	VA VB VC (2) Phase BC Mag (RMS)	LD0.VMMXU2.PPV.phsBC.instCVal.mag.f
	610	6		u16	100	0	VA VB VC (2) Phase CA Mag (RMS)	LD0.VMMXU2.PPV.phsCA.instCVal.mag.f

Table 111: VG:Residual voltage measurement-instance 1 (RESVMMXU1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5468	2502:10	0					VG High Alarm	LD0.RESVMMXU1.HiAlm.stVal
5469	2502:11	0	Yes					
5470	2502:12	0					VG High Warning	LD0.RESVMMXU1.HiWrn.stVal
5471	2502:13	0	Yes					
	662	6		u16	100	0	VG Mag (RMS)	LD0.RESVMMXU1.PhV.res.instCVal.mag.f

Table 112: V1-V2-V0 (1):Sequence voltage measurement-instance 1 (VSMSQI1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
	650	6		u16	100	0	V1 V2 V0 (1) Positive Sequence Mag (RMS)	LD0.VSMSQI1.SeqV.c1.instCVal.mag.f
	651	6		u16	100	0	V1 V2 V0 (1) Negative Sequence Mag (RMS)	LD0.VSMSQI1.SeqV.c2.instCVal.mag.f
	652	6		u16	100	0	V1 V2 V0 (1) Zero Sequence Mag (RMS)	LD0.VSMSQI1.SeqV.c3.instCVal.mag.f

Table 113: V1-V2-V0 (2):Sequence voltage measurement-instance 2 (VSMSQI2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
	656	6		u16	100	0	V1 V2 V0 (2) Positive Sequence Mag (RMS)	LD0.VSMSQI2.SeqV.c1.instCVal.mag.f
	657	6		u16	100	0	V1 V2 V0 (2) Negative Sequence Mag (RMS)	LD0.VSMSQI2.SeqV.c2.instCVal.mag.f
	658	6		u16	100	0	V1 V2 V0 (2) Zero Sequence Mag (RMS)	LD0.VSMSQI2.SeqV.c3.instCVal.mag.f

Table 114: SP-SE-1:Single-phase power and energy measurement-instance 1 (SPEMMXU1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
	668	6		s32	100	0	SP SE-1 Phase A Active Power 1	LD0.SPEMMXU1.W.phsA.cVal.mag.f
	669	6						
	670	6		s32	100	0	SP SE-1 Phase B Active Power 1	LD0.SPEMMXU1.W.phsB.cVal.mag.f
	671	6						
	672	6		s32	100	0	SP SE-1 Phase C Active Power 1	LD0.SPEMMXU1.W.phsC.cVal.mag.f
	673	6						
	676	6		s32	100	0	SP SE-1 Phase A Reactive Power 1	LD0.SPEMMXU1.VAr.phsA.cVal.mag.f
	677	6						
	678	6		s32	100	0	SP SE-1 Phase B Reactive Power 1	LD0.SPEMMXU1.VAr.phsB.cVal.mag.f
	679	6						
	680	6		s32	100	0	SP SE-1 Phase C Reactive Power 1	LD0.SPEMMXU1.VAr.phsC.cVal.mag.f
	681	6						
	704	6		s32	100	0	SP SE-1 Phase A Apparent Power 1	LD0.SPEMMXU1.VA.phsA.cVal.mag.f
	705	6						
	706	6		s32	100	0	SP SE-1 Phase B Apparent Power 1	LD0.SPEMMXU1.VA.phsB.cVal.mag.f
	707	6						
	708	6		s32	100	0	SP SE-1 Phase C Apparent Power 1	LD0.SPEMMXU1.VA.phsC.cVal.mag.f
	709	6						

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Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
	716	6		s16	100	0	SP SE-1 Average A Power Factor 1	LD0.SPEMMXU1.PF.phsA.cVal.mag.f
	717	6		s16	100	0	SP SE-1 Average B Power Factor 1	LD0.SPEMMXU1.PF.phsB.cVal.mag.f
	718	6		s16	100	0	SP SE-1 Average C Power Factor 1	LD0.SPEMMXU1.PF.phsC.cVal.mag.f

Table 115: SP-SE-2:Single-phase power and energy measurement-instance 2 (SPEMMXU2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
	686	6		s32	100	0	SP SE-2 Phase A Active Power 2	LD0.SPEMMXU2.W.phsA.cVal.mag.f
	687	6						
	688	6		s32	100	0	SP SE-2 Phase B Active Power 2	LD0.SPEMMXU2.W.phsB.cVal.mag.f
	689	6						
	690	6		s32	100	0	SP SE-2 Phase C Active Power 2	LD0.SPEMMXU2.W.phsC.cVal.mag.f
	691	6						
	694	6		s32	100	0	SP SE-2 Phase A Reactive Power 2	LD0.SPEMMXU2.VAr.phsA.cVal.mag.f
	695	6						
	696	6		s32	100	0	SP SE-2 Phase B Reactive Power 2	LD0.SPEMMXU2.VAr.phsB.cVal.mag.f
	697	6						
	698	6		s32	100	0	SP SE-2 Phase C Reactive Power 2	LD0.SPEMMXU2.VAr.phsC.cVal.mag.f
	699	6						
	710	6		s32	100	0	SP SE-2 Phase A Apparent Power 2	LD0.SPEMMXU2.VA.phsA.cVal.mag.f
	711	6						
	712	6		s32	100	0	SP SE-2 Phase B Apparent Power 2	LD0.SPEMMXU2.VA.phsB.cVal.mag.f
	713	6						
	714	6		s32	100	0	SP SE-2 Phase C Apparent Power 2	LD0.SPEMMXU2.VA.phsC.cVal.mag.f
	715	6						
	719	6		s16	100	0	SP SE-2 Average A Power Factor 2	LD0.SPEMMXU2.PF.phsA.cVal.mag.f
	720	6		s16	100	0	SP SE-2 Average B Power Factor 2	LD0.SPEMMXU2.PF.phsB.cVal.mag.f
	721	6		s16	100	0	SP SE-2 Average C Power Factor 2	LD0.SPEMMXU2.PF.phsC.cVal.mag.f

Table 116: P-E-1:Three-phase power and energy measurement-instance 1 (PEMMXU1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
	674	6		s32	100	0	P E-1 Total Active Power 1	LD0.PEMMXU1.TotW.instMag.f
	675	6						
	682	6		s32	100	0	P E-1 Total Reactive Power 1	LD0.PEMMXU1.TotVAr.instMag.f
	683	6						
	684	6		s32	100	0	P E-1 Total Apparent Power 1	LD0.PEMMXU1.TotVA.instMag.f
	685	6						
	774	6		s16	100	0	P E-1 Average Power Factor 1	LD0.PEMMXU1.TotPF.instMag.f

Table 117: P-E-2:Three-phase power and energy measurement-instance 2 (PEMMXU2)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
	692	6		s32	100	0	P E-2 Total Active Power 2	LD0.PEMMXU2.TotW.instMag.f
	693	6						
	700	6		s32	100	0	P E-2 Total Reactive Power 2	LD0.PEMMXU2.TotVAr.instMag.f
	701	6						
	702	6		s32	100	0	P E-2 Total Apparent Power 2	LD0.PEMMXU2.TotVA.instMag.f
	703	6						
	783	6		s16	100	0	P E-2 Average Power Factor 2	LD0.PEMMXU2.TotPF.instMag.f

Table 118: PQI-1:Current total demand distortion-instance 1 (CMHAI1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
6324	3020:4	0					PQI-1 Current Harmonic Distortion Alarm 1	LD0.CMHAI1.Alm.stVal
6325	3020:5	0	Yes					
	3500	6		u16	100	0	PQI-1 Phase A Current Harmonic Distortion 1	LD0.CMHAI1.TddA.phsA.cVal.mag.f
	3501	6		u16	100	0	PQI-1 Phase B Current Harmonic Distortion 1	LD0.CMHAI1.TddA.phsB.cVal.mag.f
	3502	6		u16	100	0	PQI-1 Phase C Current Harmonic Distortion 1	LD0.CMHAI1.TddA.phsC.cVal.mag.f
	3512	6		u16	100	0	PQI-1 Phase A Current Harmonic Demand Distortion 1	LD0.CMHAI1.DmdTddA.phsA.cVal.mag.f
	3513	6		u16	100	0	PQI-1 Phase B Current Harmonic Demand Distortion 1	LD0.CMHAI1.DmdTddA.phsB.cVal.mag.f
	3514	6		u16	100	0	PQI-1 Phase C Current Harmonic Demand Distortion 1	LD0.CMHAI1.DmdTddA.phsC.cVal.mag.f
	3518	6		u16	100	0	PQI-1 Phase A Max Current Harmonic Demand Distortion 1	LD0.CMHAI1.MaxDmdTddA.phsA.cVal.mag.f
	3519	6		u16	100	0	PQI-1 Phase B Max Current Harmonic Demand Distortion 1	LD0.CMHAI1.MaxDmdTddA.phsB.cVal.mag.f
	3520	6		u16	100	0	PQI-1 Phase C Max Current Harmonic Demand Distortion 1	LD0.CMHAI1.MaxDmdTddA.phsC.cVal.mag.f

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Table 119: PQI-2:Current total demand distortion-instance 2 (CMHAI2)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
6326	3020:6	0					PQI-2 Current Harmonic Distortion Alarm 2	LD0.CMHAI2.Alm.stVal
6327	3020:7	0	Yes					
	3503	6		u16	100	0	PQI-2 Phase A Current Harmonic Distortion 2	LD0.CMHAI2.TddA.phsA.cVal.mag.f
	3504	6		u16	100	0	PQI-2 Phase B Current Harmonic Distortion 2	LD0.CMHAI2.TddA.phsB.cVal.mag.f
	3505	6		u16	100	0	PQI-2 Phase C Current Harmonic Distortion 2	LD0.CMHAI2.TddA.phsC.cVal.mag.f
	3515	6		u16	100	0	PQI-2 Phase A Current Harmonic Demand Distortion 2	LD0.CMHAI2.DmdTddA.phsA.cVal.mag.f
	3516	6		u16	100	0	PQI-2 Phase B Current Harmonic Demand Distortion 2	LD0.CMHAI2.DmdTddA.phsB.cVal.mag.f
	3517	6		u16	100	0	PQI-2 Phase C Current Harmonic Demand Distortion 2	LD0.CMHAI2.DmdTddA.phsC.cVal.mag.f
	3521	6		u16	100	0	PQI-2 Phase A Max Current Harmonic Demand Distortion 2	LD0.CMHAI2.MaxDmdTddA.phsA.cVal.mag.f
	3522	6		u16	100	0	PQI-2 Phase B Max Current Harmonic Demand Distortion 2	LD0.CMHAI2.MaxDmdTddA.phsB.cVal.mag.f
	3523	6		u16	100	0	PQI-2 Phase C Max Current Harmonic Demand Distortion 2	LD0.CMHAI2.MaxDmdTddA.phsC.cVal.mag.f

Table 120: PQVPH-1:Voltage total harmonic distortion-instance 1 (VMHAI1)

Coil Addr	Register:(Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
6328	3020:8	0					PQVPH-1 Voltage Harmonic Distortion Alarm 1	LD0.VMHAI1.Alm.stVal
6329	3020:9	0	Yes					
	3506	6		u16	100	0	PQVPH-1 Phase A Voltage Harmonic Distortion 1	LD0.VMHAI1.ThdPhV.phsA.cVal.mag.f
	3507	6		u16	100	0	PQVPH-1 Phase B Voltage Harmonic Distortion 1	LD0.VMHAI1.ThdPhV.phsB.cVal.mag.f
	3508	6		u16	100	0	PQVPH-1 Phase C Voltage Harmonic Distortion 1	LD0.VMHAI1.ThdPhV.phsC.cVal.mag.f
	3524	6		u16	100	0	PQVPH-1 Phase A Voltage Harmonic Demand Distortion 1	LD0.VMHAI1.DmdThdPhV.phsA.cVal.mag.f
	3525	6		u16	100	0	PQVPH-1 Phase B Voltage Harmonic Demand Distortion 1	LD0.VMHAI1.DmdThdPhV.phsB.cVal.mag.f
	3526	6		u16	100	0	PQVPH-1 Phase C Voltage Harmonic Demand Distortion 1	LD0.VMHAI1.DmdThdPhV.phsC.cVal.mag.f
	3530	6		u16	100	0	PQVPH-1 Phase A Max Voltage Harmonic Demand Distortion 1	LD0.VMHAI1.MaxDmdThdV.phsA.cVal.mag.f
	3531	6		u16	100	0	PQVPH-1 Phase B Max Voltage Harmonic Demand Distortion 1	LD0.VMHAI1.MaxDmdThdV.phsB.cVal.mag.f
	3532	6		u16	100	0	PQVPH-1 Phase C Max Voltage Harmonic Demand Distortion 1	LD0.VMHAI1.MaxDmdThdV.phsC.cVal.mag.f

Table 121: PQVPH-2:Voltage total harmonic distortion-instance 2 (VMHAI2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
6330	3020:10	0					PQVPH-2 Voltage Harmonic Distortion Alarm 2	LD0.VMHAI2.Alm.stVal
6331	3020:11	0	Yes					
	3509	6		u16	100	0	PQVPH-2 Phase A Voltage Harmonic Distortion 2	LD0.VMHAI2.ThdPhV.phsA.cVal.mag.f
	3510	6		u16	100	0	PQVPH-2 Phase B Voltage Harmonic Distortion 2	LD0.VMHAI2.ThdPhV.phsB.cVal.mag.f
	3511	6		u16	100	0	PQVPH-2 Phase C Voltage Harmonic Distortion 2	LD0.VMHAI2.ThdPhV.phsC.cVal.mag.f
	3527	6		u16	100	0	PQVPH-2 Phase A Voltage Harmonic Demand Distortion 2	LD0.VMHAI2.DmdThdPhV.phsA.cVal.mag.f
	3528	6		u16	100	0	PQVPH-2 Phase B Voltage Harmonic Demand Distortion 2	LD0.VMHAI2.DmdThdPhV.phsB.cVal.mag.f
	3529	6		u16	100	0	PQVPH-2 Phase C Voltage Harmonic Demand Distortion 2	LD0.VMHAI2.DmdThdPhV.phsC.cVal.mag.f
	3533	6		u16	100	0	PQVPH-2 Phase A Max Voltage Harmonic Demand Distortion 2	LD0.VMHAI2.MaxDmdThdV.phsA.cVal.mag.f
	3534	6		u16	100	0	PQVPH-2 Phase B Max Voltage Harmonic Demand Distortion 2	LD0.VMHAI2.MaxDmdThdV.phsB.cVal.mag.f
	3535	6		u16	100	0	PQVPH-2 Phase C Max Voltage Harmonic Demand Distortion 2	LD0.VMHAI2.MaxDmdThdV.phsC.cVal.mag.f

Table 122: LoadProf:Load profile (LDPMSTA1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5572	2509:2	0					Load Profile Memory Warning	LD0.LDPMSTA1.MemWrn.stVal
5573	2509:3	0	Yes					
5574	2509:4	0					Load Profile Memory Alarm	LD0.LDPMSTA1.MemAlm.stVal
5575	2509:5	0	Yes					

Table 123: RTD:2 RTD +1 mA (XARGGIO130)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
6608	3038:0	0					X130 (AIM+RTD) Alarm	LD0.XARGGIO130.Alm.stVal
6609	3038:1	0	Yes					
6610	3038:2	0					X130 (AIM+RTD) Warning	LD0.XARGGIO130.Wrn.stVal
6611	3038:3	0	Yes					
	814	6		u32	100	0	X130 (AIM+RTD) Analogue input 1	LD0.XARGGIO130.AnIn1.mag.f
	815	6						
	816	6		u32	100	0	X130 (AIM+RTD) Analogue input 2	LD0.XARGGIO130.AnIn2.mag.f
	817	6						
	818	6		u32	100	0	X130 (AIM+RTD) Analogue input 3	LD0.XARGGIO130.AnIn3.mag.f
	819	6						

Table 124: RTD:6 RTD + 2 mA measurement (XRGGIO130)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
6612	3038:4	0					X130 (RTD) Alarm	LD0.XRGGIO130.Alm.stVal
6613	3038:5	0	Yes					
6614	3038:6	0					X130 (RTD) Warning	LD0.XRGGIO130.Wrn.stVal
6615	3038:7	0	Yes					
	804	6		u32	100	0	X130 (RTD) Analogue input 8	LD0.XRGGIO130.AnIn8.mag.f
	805	6						
	820	6		u32	100	0	X130 (RTD) Analogue input 1	LD0.XRGGIO130.AnIn1.mag.f
	821	6						
	822	6		u32	100	0	X130 (RTD) Analogue input 2	LD0.XRGGIO130.AnIn2.mag.f
	823	6						
	824	6		u32	100	0	X130 (RTD) Analogue input 3	LD0.XRGGIO130.AnIn3.mag.f
	825	6						
	826	6		u32	100	0	X130 (RTD) Analogue input 4	LD0.XRGGIO130.AnIn4.mag.f
	827	6						
	828	6		u32	100	0	X130 (RTD) Analogue input 5	LD0.XRGGIO130.AnIn5.mag.f
	829	6						
	830	6		u32	100	0	X130 (RTD) Analogue input 6	LD0.XRGGIO130.AnIn6.mag.f
	831	6						
	832	6		u32	100	0	X130 (RTD) Analogue input 7	LD0.XRGGIO130.AnIn7.mag.f
	833	6						

Table 125: f:Frequency measurement-instance 1 (FMMXU1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
	786	6		u16	100	0	Frequency	LD0.FMMXU1.Hz.instMag.f

Table 126: TP - 1:Minimum pulse timer (2 pcs)-instance 1 (TPGAPC1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2942	2202:2	0					TP - 1 In2/Out2	LD0.TPGAPC1.Op.general
2943	2202:3	0	Yes					

Table 127: TP - 2:Minimum pulse timer (2 pcs)-instance 2 (TPGAPC2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2944	2202:4	0					TP - 2 In2/Out2	LD0.TPGAPC2.Op.general
2945	2202:5	0	Yes					

Table 128: TP - 3:Minimum pulse timer (2 pcs)-instance 3 (TPGAPC3)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2946	2202:6	0					TP - 3 In2/Out2	LD0.TPGAPC3.Op.general
2947	2202:7	0	Yes					

Table 129: TP - 4:Minimum pulse timer (2 pcs)-instance 4 (TPGAPC4)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2948	2202:8	0					TP - 4 In2/Out2	LD0.TPGAPC4.Op.general
2949	2202:9	0	Yes					

Table 130: 62CLD-1:Minimum pulse timer (2 pcs-second resolution)-instance 1 (TPSGAPC1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2880	2198:4	0					62CLD-1 IN1/OUT1	LD0.TPSGAPC1.Str.general
2881	2198:5	0	Yes					

Table 131: 62CLD-3:Minimum pulse timer (2 pcs-second resolution)-instance 2 (TPSGAPC2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2924	2201:0	0					62CLD-3 IN1/OUT1	LD0.TPSGAPC2.Str.general
2925	2201:1	0	Yes					

Table 132: 62CLD-2:Minimum pulse timer (2 pcs-minute resolution)-instance 1 (TPMGAPC1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2882	2198:6	0					62CLD-2 IN1/OUT1	LD0.TPMGAPC1.Str.general
2883	2198:7	0	Yes					

Table 133: 62CLD-4:Minimum pulse timer (2 pcs-minute resolution)-instance 2 (TPMGAPC2)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2926	2201:2	0					62CLD-4 IN1/OUT1	LD0.TPMGAPC2.Str.general
2927	2201:3	0	Yes					

Table 134: DFR:Disturbance recorder (RDRE1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
5458	2502:0	0					DFR Disturbance Recording Made	DR.RDRE1.RcdMade.stVal
5459	2502:1	0	Yes					
	241	0		u16	1	0	DFR Recording Memory Used %	DR.RDRE1.MemUsed.stVal
	2108	0		u16	1	0	DFR Number Of Recordings	DR.RDRE1.FltNum.stVal

Table 135: FLO:Fault location (DRFLO1)

Coil Addr	Register(:Bit) Addr	Dc	MCD	Type	Scale	Offset	Description	IEC61850 Data Attribute Name
2932	2201:8	0					FLO Disturbance Record Captured With Fault Locator Info	LD0.DRFLO1.Tr.general
2933	2201:9	0	Yes					
	862	6		u16	100	0	FLO Distance To Fault Measured In Km/Miles	LD0.DRFLO1.FltDisKm.mag.f

Section 2 Modbus data mappings

Table 136: Control Structures

Control Structure	Control Register Addr	Control bit number	Description	IEC61850 Data Attribute Name
1	2513		Control Structure 1 Execute Register	
	2514		Control Structure 1 Password 1	
	2515		Control Structure 1 Password 2	
	2516	0	Turn Off Trip LEDs	LD0.LLN0.LEDRs1.Oper.ctlVal
	2516	1	Turn Off Alarm Indication LEDs	LD0.LLN0.LEDRs2.Oper.ctlVal
	2516	2	52-1 Select Open Breaker 1	CTRL.CBCSWI1.Pos.Oper.ctlVal
	2516	3	52-1 Select Close Breaker 1	CTRL.CBCSWI1.Pos.Oper.ctlVal
	2516	4	52-1 Cancel Select Breaker 1	CTRL.CBCSWI1.Pos.Oper.ctlVal
	2516	5	52-1 Trip (Operate) Select Breaker 1	CTRL.CBCSWI1.Pos.Oper.ctlVal
	2516	6	52-1 Direct Open Breaker 1	CTRL.CBCSWI1.Pos.Oper.ctlVal
	2516	7	52-1 Direct Close Breaker 1	CTRL.CBCSWI1.Pos.Oper.ctlVal
	2516	8	52-2 Select Open Breaker 2	CTRL.CBCSWI2.Pos.Oper.ctlVal
	2516	9	52-2 Select Close Breaker 2	CTRL.CBCSWI2.Pos.Oper.ctlVal
	2516	10	52-2 Cancel Select Breaker 2	CTRL.CBCSWI2.Pos.Oper.ctlVal
	2516	11	52-2 Trip (Operate) Select Breaker 2	CTRL.CBCSWI2.Pos.Oper.ctlVal
	2516	12	52-2 Direct Open Breaker 2	CTRL.CBCSWI2.Pos.Oper.ctlVal
	2516	13	52-2 Direct Close Breaker 2	CTRL.CBCSWI2.Pos.Oper.ctlVal
	2516	14	Clear Power Quality Data	LD0.LLN0.PQRs.Oper.ctlVal
2516	15	Reserved		
2517			Control Structure 1 Confirmation Register	
2	2518		Control Structure 2 Execute Register	
	2519		Control Structure 2 Password 1	
	2520		Control Structure 2 Password 2	
	2521	0	FLO Reset Fault Record Counter	LD0.FLTMSTA1.RecRs.Oper.ctlVal
	2521	1	DFR Trigger Disturbance Recording	DR.RDRE1.RcdTrg.Oper.ctlVal
	2521	2	DFR Clear Disturbance Records	DR.RDRE1.MemClr.Oper.ctlVal
	2521	3	79 Reset Recloser	LD0.DARREC1.RsRec.Oper.ctlVal
	2521	4	79 Reset Recloser Operation Counter	LD0.DARREC1.RsCnt.Oper.ctlVal
	2521	5	Clear Current Demand Metering Source 1	LD0.CMSTA1.RecRs.Oper.ctlVal
	2521	6	52CM-1 Reset Breaker Accumulated Power	LD0.SSCBR1.RsAccAPwr.Oper.ctlVal
	2521	7	52CM-1 Reset Breaker remaining life	LD0.SSCBR1.RsCBWear.Oper.ctlVal
	2521	8	86/94-1 Clear Lockout Master Trip1	LD0.TRPPTRC1.LORs.Oper.ctlVal
	2521	9	86/94-1 Clear Master Trip1	LD0.TRPPTRC1.TrRs.Oper.ctlVal
	2521	10	86/94-2 Clear Lockout Master Trip2	LD0.TRPPTRC2.LORs.Oper.ctlVal
	2521	11	86/94-2 Clear Master Trip2	LD0.TRPPTRC2.TrRs.Oper.ctlVal
	2521	12	49F-1 Clear Temperature measurement	LD0.T1PTTR1.RsTmp.Oper.ctlVal

Control Structure	Control Register Addr	Control bit number	Description	IEC61850 Data Attribute Name
2	2521	13	Reserved	
	2521	14	49F-2Clear Temperature measurement	LD0.T1PTTR2.RsTmp.Oper.ctlVal
	2521	15	Reserved	
	2522		Control Structure 2 Confirmation Register	
3	2523		Control Structure 3 Execute Register	
	2524		Control Structure 3 Password 1	
	2525		Control Structure 3 Password 2	
	2526	0	52CM-1 Reset Breaker Tavel Time	LD0.SSCBR1.RsTrvTm.Oper.ctlVal
	2526	1	52CM-1 Reset Breaker Spring Charging time	LD0.SSCBR1.RsSprChaTm.Oper.ctlVal
	2526	2	P E-1 Reset Three Phase Power Meter	LD0.PEMMTR1.SuDmdRs.Oper.ctlVal
	2526	3	Reset Device	LD0.LPHD1.RsDev.Oper.ctlVal
	2526	4	Reserved	
	2526	5	Reserved	
	2526	6	Clear Current Demand Metering Source 1	LD0.CMSTA2.RecRs.Oper.ctlVal
	2526	7	Clear Load Profile Recordings	LD0.LDPMSTA1.RecRs.Oper.ctlVal
	2526	8	PQI-1 Reset Current Demand Distortion Records	LD0.CMHAI1.RecRs.Oper.ctlVal
	2526	9	PQI-2 Reset Current Demand Distortion Records	LD0.CMHAI2.RecRs.Oper.ctlVal
	2526	10	PQVPH-1 Reset Voltage Harmonic Distortion Records	LD0.VMHAI1.RecRs.Oper.ctlVal
	2526	11	PQVPH-2 Reset Voltage Harmonic Distortion Records	LD0.VMHAI2.RecRs.Oper.ctlVal
	2526	12	PQSS-1 Reset Voltage Variation Counter	LD0.PH1QVVR1.RsCnt.Oper.ctlVal
	2526	13	PQSS-1 Reset Voltage Variation Records	LD0.PH1QVVR1.RecRs.Oper.ctlVal
2526	14	PQSS-2 Reset Voltage Variation Counter	LD0.PH1QVVR2.RsCnt.Oper.ctlVal	
2526	15	PQSS-2 Reset Voltage Variation Records	LD0.PH1QVVR2.RecRs.Oper.ctlVal	
2527		Control Structure 3 Confirmation Register		
4	2528		Control Structure 4 Execute Register	
	2529		Control Structure 4 Password 1	
	2530		Control Structure 4 Password 2	
	2531	8	P E-2 Reset Three Phase Power Meter	LD0.PEMMTR2.SuDmdRs.Oper.ctlVal
	2531	9	SP SE-1 Reset Three Phase Power Meter	LD0.SPEMMTR1.SuDmdRs.Oper.ctlVal
	2531	10	P E-2 Reset Three Phase Power Meter	LD0.SPEMMTR2.SuDmdRs.Oper.ctlVal
	2531	11	52CM-2 Reset Breaker Accumulated Power	LD0.SSCBR2.RsAccAPwr.Oper.ctlVal
	2531	12	52CM-2 Reset Breaker remaining life	LD0.SSCBR2.RsCBWear.Oper.ctlVal
	2531	13	52CM-2 Reset Breaker Tavel Time	LD0.SSCBR2.RsTrvTm.Oper.ctlVal
	2531	14	52CM-2 Reset Breaker Spring Charging time	LD0.SSCBR2.RsSprChaTm.Oper.ctlVal
	2531	15	Reserved	

Section 2 Modbus data mappings

Control Structure	Control Register Addr	Control bit number	Description	IEC61850 Data Attribute Name
4	2532		Control Structure 4 Confirmation Register	
8	2548		Control Structure 8 Execute Register	
	2549		Control Structure 8 Password 1	
	2550		Control Structure 8 Password 2	
	2551	8	Reserved	
	2551	9	Reserved	
	2551	10	CFD Reset	LD0.RCFD1.Rst.Oper.ctlVal
	2551	11	Reserved	
	2551	12	Reserved	
	2552		Control Structure 8 Confirmation Register	

Section 3 Glossary

AFL	Application function block library
ANSI	American National Standards Institute
AR	Autoreclosing
CB	Circuit breaker
CT	Current transformer
CTRL	Control logical device
DFR	Digital fault recorder
DNP3	A distributed network protocol originally developed by Westronic. The DNP3 Users Group has the ownership of the protocol and assumes responsibility for its evolution.
DR	Disturbance recorder
EMC	Electromagnetic compatibility
HMI	Human-machine interface
I/O	Input/output
ID	Identifier or identification
IEC 61850	International standard for substation communication and modelling
IED	Intelligent electronic device
LD0	Logical device zero (0)
LED	Light-emitting diode
LHMI	Local human-machine interface
LLN0	Logical node zero (0)
MCD	Momentary change detect
Modbus	A serial communication protocol developed by the Modicon company in 1979. Originally used for communication in PLCs and RTU devices.
MOM	Momentary position
PCM600	Protection and Control IED Manager
PLC	Programmable logic controller
SBO	Select-before-operate

stVal	Status value
SW	Software
UTC	Coordinated universal time
Val	Value

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