



Relion® Protection and Control

# Feeder Protection and Control REF615R DNP3 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 protection relay. The manual should be used in conjunction with the corresponding communication protocol manual.

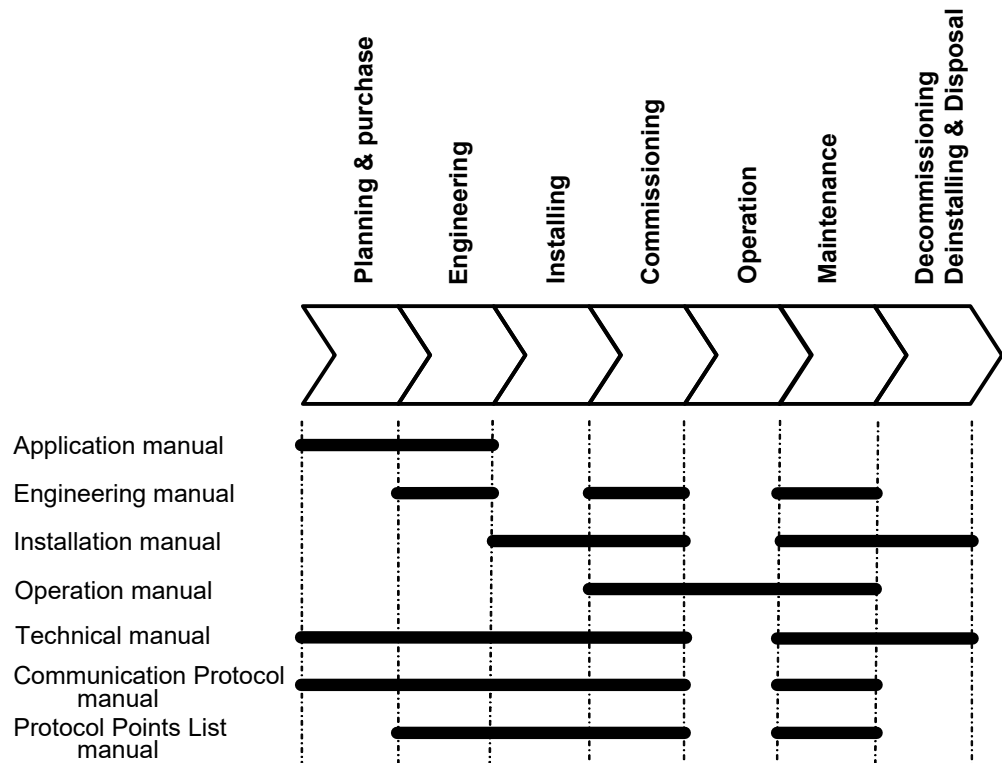
### 1.2              Intended audience

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

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

## 1.3 Product documentation

### 1.3.1 Product documentation set



**Figure 1:** *The intended use of manuals in different life cycles*

The engineering manual contains instructions on how to engineer the protection relays using the different tools in PCM600. The manual provides instructions on how to set up a PCM600 project and insert protection relays 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 protection relay. The manual provides procedures for mechanical and electrical installation. The chapters are organized in chronological order in which the protection relay should be installed.

The operation manual contains instructions on how to operate the protection relay once it has been commissioned. The manual provides instructions for monitoring, controlling and setting the protection relay. 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 protection relay. The manual concentrates on vendor-specific implementations. The point list manual describes the outlook and properties of the data points specific to the protection relay. The manual should be used in conjunction with the corresponding communication protocol manual.

## 1.3.2 Document revision history

Document revision/date	Product version	History
A/11/22/2013	4.0	First release
B/09/22/2016	4.1	Content update



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

## 1.3.3 Related documentation

Name of the document	Document ID
DNP3 Communication Protocol Manual	1MRS240048-IB

## 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 protection relay 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".
- Protection relay 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: REF615R functions, codes and symbols

Function	IEC 61850	ANSI/C37.2	IEC 60617
<b>Protection</b>			
Three-phase non-directional overcurrent protection, low stage, instance 1	PHLPTOC1	51P-1	3I> (1)
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, 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 earth-fault protection, low stage, instance 1	EFLPTOC1	51G	Io> (1)

Function	IEC 61850	ANSI/C37.2	IEC 60617
Non-directional earth-fault protection, low stage, instance 2	EFLPTOC2	51N-1	lo> (2)
Non-directional earth-fault protection, low stage, instance 4	EFLPTOC4	50SEF	lo> (4)
Non-directional earth-fault protection, high stage, instance 1	EFHPTOC1	50G-1	lo>> (1)
Non-directional earth-fault protection, high stage, instance 2	EFHPTOC2	50G-2	lo>> (2)
Non-directional earth-fault protection, high stage, instance 3	EFHPTOC3	50N-1	lo>> (3)
Non-directional earth-fault protection, high stage, instance 4	EFHPTOC4	50N-2	lo>> (4)
Non-directional earth-fault protection, instantaneous stage, instance 1	EFIPTOC1	50G-3	lo>>> (1)
Non-directional earth-fault protection, instantaneous stage, instance 2	EFIPTOC2	50N-3	lo>>> (2)
Directional earth-fault protection, low stage, instance 1	DEFLPDEF1	67/51N	lo> -> (1)
Directional earth-fault protection, high stage, instance 1	DEFHPDEF1	67/50N-1	lo>> -> (1)
Directional earth-fault protection, high stage, instance 2	DEFHPDEF2	67/50N-2	lo>> -> (2)
Three phase directional power protection, instance 1	DPSRDIR1	32P-1	I1-> (1)
Ground directional power protection, instance 1	DNZSRDIR1	32N-1	I2 ->, lo-> (1)
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>
Residual overvoltage protection, instance 1	ROVPTOV1	59G	Uo> (1)
Residual overvoltage protection, instance 2	ROVPTOV2	59N-1	Uo> (2)
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	3Ith>F (1)
Numerical stabilized low impedance restricted earth-fault protection	LREFPNDF1	87LOZREF	dIoLo>
Circuit breaker failure protection, instance 1	CCBRBRF1	50BF-1	3I>/Io>BF (1)
Three-phase inrush detector, instance 1	INRPHAR1	INR-1	3I2f> (1)
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)

Function	IEC 61850	ANSI/C37.2	IEC 60617
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)
<b>Control</b>			
Circuit-breaker control, instance 1	CBXCBR1	52-1	I <-> O CB (1)
Auto-reclosing	DARREC1	79	O -> I
Synchronism and energizing check	SECRSYN1	25	SYNC
<b>Condition Monitoring</b>			
Circuit-breaker condition monitoring, instance 1	SSCBR1	52CM-1	CBCM (1)
Current circuit supervision	CCRDIF1	CCM	MCS 3I
Fuse failure supervision, instance 1	SEQRFUF1	60-1	FUSEF (1)
Cable fault detection	RCFD1	CFD	RCFD
<b>Measurement</b>			
Three-phase current measurement, instance 1	CMMXU1	IA, IB, IC	3I
Sequence current measurement, instance 1	CSMSQI1	I1, I2, I0	I1, I2, I0
Residual current measurement, instance 1	RESCMMXU1	IG	Io
Three-phase voltage measurement, instance 1	VMMXU1	VA, VB, VC	3U
Residual voltage measurement, instance 1	RESVMMXU1	VG	Uo
Sequence voltage measurement, instance 1	VSMSQI1	V1, V2, V0	U1, U2, U0
Single-phase power and energy measurement, instance 1	SPEMMXU1	SP, SE-1	SP, SE
Three-phase power and energy measurement, instance 1	PEMMXU1	P, E-1	P, E
Current total demand distortion, instance 1	CMHAI1	PQI-1	PQM3I
Voltage total harmonic distortion, instance 1	VMHAI1	PQVPH-1	PQM3U
Voltage variation, instance 1	PHQVVR1	PQSS-1	PQ 3U<>
Voltage unbalance, instance 1	VSQVUB1	PQVUB-1	PQMUBU(1)
Load profile	LDPMSTA1	LoadProf	-
Frequency measurement, instance 1	FMMXU1	f	f
<b>Other Function</b>			
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, minute resolution), instance 1	TPMGAPC1	62CLD-2	TPM (1)
Pulse timer (8 pcs), instance 1	PTGAPC1	PT-1	PT (1)
Pulse timer (8 pcs), instance 2	PTGAPC2	PT-2	PT (2)

Function	IEC 61850	ANSI/C37.2	IEC 60617
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)
Set reset (8 pcs), instance 3	SRGAPC3	SR-3	SR (3)
Set reset (8 pcs), instance 4	SRGAPC4	SR-4	SR (4)
Move (8 pcs), instance 1	MVGAPC1	MV-1	MV (1)
Move (8 pcs), instance 2	MVGAPC2	MV-2	MV (2)
Move (8 pcs), instance 3	MVGAPC3	MV-3	MV (3)
Move (8 pcs), instance 4	MVGAPC4	MV-4	MV (4)
Move (8 pcs), instance 5	MVGAPC5	MV-5	MV (5)
Move (8 pcs), instance 6	MVGAPC6	MV-6	MV (6)
Move (8 pcs), instance 7	MVGAPC7	MV-7	MV (7)
Move (8 pcs), instance 8	MVGAPC8	MV-8	MV (8)
Generic control points, instance 1	SPCGGIO1	CNTRL-1	SPC(1)
Generic control points, instance 2	SPCGGIO2	CNTRL-2	SPC(2)
Generic control points, instance 3	SPCGGIO3	CNTRL-3	SPC(3)
Remote Generic control points, instance 1	SPCRGGIO1	RCNTRL-1	SRCR(1)
Local Generic control points, instance 1	SPCLGGIO1	LCNTRL-1	SPCL(1)
Programmable buttons(16 buttons), instance 1	FKEYGGIO1	FKEY	FKEY
Generic Up-Down Counters, instance 1	UDFCNT1	CTR-1	CTR(1)
Generic Up-Down Counters, instance 2	UDFCNT2	CTR-2	CTR(2)
Generic Up-Down Counters, instance 3	UDFCNT3	CTR-3	CTR(3)
Shift register, instance 1	SHFTGAPC1	SHFT-1	SHFT(1)
Shift register, instance 2	SHFTGAPC2	SHFT-2	SHFT(2)
Shift register, instance 3	SHFTGAPC3	SHFT-3	SHFT(3)





## Section 2 DNP3 data mappings

### 2.1 Overview

This document describes the DNP3 data points and structures available in REF615R Ver. 4.1.

The point tables show all the available DNP3 data points in this protection relay. The data objects in the point tables are listed based on the IEC61850 logical node name. Also the default point indexes, class assignments and scaling configurations are shown. The DNP3 points can be freely inserted, removed, reorganized and reconfigured using PCM600.

This list represents the superset of DNP3 points. The actual set of available points is determined by the protection relay's ordercode. A “Yes” in a “No Events” column indicates that no events can be generated for that point regardless of class assignment. A “No” in “Enabled” column indicates that the point is not active. Inactive points can be made active through PCM600.

Since only integer values are supported in DNP analog inputs, to keep two decimals of a floating point analog input (i.e. current, voltage, power), the multiplicative scaling mode is selected with default scale factor 100. For integer analog input, (i.e., counter, multiple state status), the scale factor 0 hints no scaling is taken.

### 2.2 Binary/Analog Inputs

*Table 2: LED Status (LEDGGIO1)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI		299	Class 3 and 0	Yes	Programmable LEDs Status of programmable LED 1	0	LD0.LEDGGIO1.ISCSO1.stVal
AI		300	Class 3 and 0	Yes	Programmable LEDs Status of programmable LED 2	0	LD0.LEDGGIO1.ISCSO2.stVal
AI		301	Class 3 and 0	Yes	Programmable LEDs Status of programmable LED 3	0	LD0.LEDGGIO1.ISCSO3.stVal
AI		302	Class 3 and 0	Yes	Programmable LEDs Status of programmable LED 4	0	LD0.LEDGGIO1.ISCSO4.stVal
AI		303	Class 3 and 0	Yes	Programmable LEDs Status of programmable LED 5	0	LD0.LEDGGIO1.ISCSO5.stVal
AI		304	Class 3 and 0	Yes	Programmable LEDs Status of programmable LED 6	0	LD0.LEDGGIO1.ISCSO6.stVal
AI		305	Class 3 and 0	Yes	Programmable LEDs Status of programmable LED 7	0	LD0.LEDGGIO1.ISCSO7.stVal

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DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI		306	Class 3 and 0	Yes	Programmable LEDs Status of programmable LED 8	0	LD0.LEDGGIO1.ISCSO8.stVal
AI		307	Class 3 and 0	Yes	Programmable LEDs Status of programmable LED 9	0	LD0.LEDGGIO1.ISCSO9.stVal
AI		308	Class 3 and 0	Yes	Programmable LEDs Status of programmable LED 10	0	LD0.LEDGGIO1.ISCSO10.stVal
AI		309	Class 3 and 0	Yes	Programmable LEDs Status of programmable LED 11	0	LD0.LEDGGIO1.ISCSO11.stVal

**Table 3: LED Condition monitoring (LEDPTRC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		49	Class 3 and 0	Yes	Global conditioning Trip phsA		LD0.LEDPTRC1.Op.phsA
BI		50	Class 3 and 0	Yes	Global conditioning Trip phsB		LD0.LEDPTRC1.Op.phsB
BI		51	Class 3 and 0	Yes	Global conditioning Trip phsC		LD0.LEDPTRC1.Op.phsC
BI		55	Class 3 and 0	Yes	Global conditioning Start		LD0.LEDPTRC1.Str.general
BI		176	Class 3 and 0	Yes	Global conditioning Trip general		LD0.LEDPTRC1.Op.general

**Table 4: General Device Information (LPHD1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI		153	Class 2 and 0	Yes	Physical device General state	0	LD0.LPHD1.PhyHealth.stVal
AI		154	Class 2 and 0	Yes	Physical device protection relay warning	0	LD0.LPHD1.PhyHealth1.stVal
AI	Yes	155	Class 0	Yes	Physical device Number of Power ups	0	LD0.LPHD1.NumPwrUp.stVal
AI	Yes	156	Class 0	Yes	Physical device Number of Warm starts	0	LD0.LPHD1.WrmStr.stVal
AI	Yes	157	Class 0	Yes	Physical device Number of watchdog device resets detected	0	LD0.LPHD1.WacTrg.stVal
AI		293	Class 2 and 0	Yes	Physical device protection relay internal fault	0	LD0.LPHD1.PhyHealth2.stVal

**Table 5: General Device Information (LLN0)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	1	Class 0	Yes	Protection LLN0 Settings change		LD0.LLN0.SetChg.stVal
BI	Yes	2	Class 0	Yes	Control LLN0 Local / Remote		CTRL.LLN0.Loc.stVal
BI	Yes	3	Class 0	Yes	Protection LLN0 Setting group 2 is active		LD0.LLN0.Act2SG.stVal
BI	Yes	4	Class 0	Yes	Protection LLN0 Setting group 3 is active		LD0.LLN0.Act3SG.stVal
BI	Yes	229	Class 0	Yes	Protection LLN0 Setting group 1 is active		LD0.LLN0.Act1SG.stVal
BI		240	Class 1 and 0	Yes	Protection LLN0 Settings reservation		LD0.LLN0.SetSeld.stVal
AI		295	Class 2 and 0	Yes	Control LLN0 LR state monitoring for PCM	0	CTRL.LLN0.LocRem.stVal

**Table 6: DNP Setting Group (DNPGGIO1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	867	Class 0	Yes	DNP 3.0 Activate setting group 1		LD0.DNPGGIO1.ActSG1.stVal
BI	Yes	868	Class 0	Yes	DNP 3.0 Activate setting group 2		LD0.DNPGGIO1.ActSG2.stVal
BI	Yes	869	Class 0	Yes	DNP 3.0 Activate setting group 3		LD0.DNPGGIO1.ActSG3.stVal
BI	Yes	870	Class 0	Yes	DNP 3.0 Activate setting group 4		LD0.DNPGGIO1.ActSG4.stVal
BI	Yes	871	Class 0	Yes	DNP 3.0 Activate setting group 5		LD0.DNPGGIO1.ActSG5.stVal
BI	Yes	872	Class 0	Yes	DNP 3.0 Activate setting group 6		LD0.DNPGGIO1.ActSG6.stVal

**Table 7: 51P-1 : Three-phase non-directional overcurrent protection low stage instance 1 (PHLPTOC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		42	Class 3 and 0	Yes	51P-1 Trip		LD0.PHLPTOC1.Op.general
BI		352	Class 1 and 0	Yes	51P1- Trip phsA		LD0.PHLPTOC1.Op.phsA
BI		353	Class 1 and 0	Yes	51P-1 Trip phsB		LD0.PHLPTOC1.Op.phsB
BI		354	Class 1 and 0	Yes	51P-1 Trip phsC		LD0.PHLPTOC1.Op.phsC
BI	Yes	355	Class 0	Yes	51P-1 Enable signal for current multiplier		LD0.PHLPTOC1.InEnaMult.stVal

**Table 8: 50P-1 : Three-phase non-directional overcurrent protection high stage instance 1 (PHHPTOC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		36	Class 3 and 0	Yes	50P-1 Trip		LD0.PHHPTOC1.Op.general
BI		344	Class 1 and 0	Yes	50P-1 Trip phsA		LD0.PHHPTOC1.Op.phsA
BI		345	Class 1 and 0	Yes	50P-1 Trip phsB		LD0.PHHPTOC1.Op.phsB
BI		346	Class 1 and 0	Yes	50P-1 Trip phsC		LD0.PHHPTOC1.Op.phsC
BI	Yes	347	Class 0	Yes	50P-1 Enable signal for current multiplier		LD0.PHHPTOC1.InEnaMult.stVal

**Table 9: 50P-2 : Three-phase non-directional overcurrent protection high stage instance 2 (PHHPTOC2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		38	Class 3 and 0	Yes	50P-2 Trip		LD0.PHHPTOC2.Op.general
BI		348	Class 1 and 0	Yes	50P-2 Trip phsA		LD0.PHHPTOC2.Op.phsA
BI		349	Class 1 and 0	Yes	50P-2 Trip phsB		LD0.PHHPTOC2.Op.phsB
BI		350	Class 1 and 0	Yes	50P-2 Trip phsC		LD0.PHHPTOC2.Op.phsC
BI	Yes	351	Class 0	Yes	50P-2 Enable signal for current multiplier		LD0.PHHPTOC2.InEnaMult.stVal

**Table 10: 50P-3 : Three-phase non-directional overcurrent protection instantaneous stage instance 1 (PHIPTOC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		40	Class 3 and 0	Yes	50P-3 Trip		LD0.PHIPTOC1.Op.general
BI		340	Class 1 and 0	Yes	50P-3 Trip phsA		LD0.PHIPTOC1.Op.phsA

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DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		341	Class 1 and 0	Yes	50P-3 Trip phsB		LD0.PHIPTOC1.Op.phsB
BI		342	Class 1 and 0	Yes	50P-3 Trip phsC		LD0.PHIPTOC1.Op.phsC
BI	Yes	343	Class 0	Yes	50P-3 Enable signal for current multiplier		LD0.PHIPTOC1.InEnaMult.stVal

**Table 11:** *51LT : Three-phase non-directional long time overcurrent protection low stage instance 1 (PHLTPTOC1)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		356	Class 1 and 0	Yes	51LT Trip		LD0.PHLTPTOC1.Op.general
BI		357	Class 1 and 0	Yes	51LT Trip phsA		LD0.PHLTPTOC1.Op.phsA
BI		358	Class 1 and 0	Yes	51LT Trip phsB		LD0.PHLTPTOC1.Op.phsB
BI		359	Class 1 and 0	Yes	51LT Trip phsC		LD0.PHLTPTOC1.Op.phsC

**Table 12:** *67/51P : Three-phase directional overcurrent protection low stage instance 1 (DPHLPTOC1)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		45	Class 3 and 0	Yes	67/51P Trip		LD0.DPHLPTOC1.Op.general
BI		373	Class 1 and 0	Yes	67/51P Trip phsA		LD0.DPHLPTOC1.Op.phsA
BI		374	Class 1 and 0	Yes	67/51P Trip phsB		LD0.DPHLPTOC1.Op.phsB
BI		375	Class 1 and 0	Yes	67/51P Trip phsC		LD0.DPHLPTOC1.Op.phsC

**Table 13:** *67/50P-1 : Three-phase directional overcurrent protection high stage instance 1 (DPHHPTOC1)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		365	Class 1 and 0	Yes	67/50P-1 Trip		LD0.DPHHPTOC1.Op.general
BI		366	Class 1 and 0	Yes	67/50P-1 Trip phsA		LD0.DPHHPTOC1.Op.phsA
BI		367	Class 1 and 0	Yes	67/50P-1 Trip phsB		LD0.DPHHPTOC1.Op.phsB
BI		368	Class 1 and 0	Yes	67/50P-1 Trip phsC		LD0.DPHHPTOC1.Op.phsC

**Table 14:** *67/50P-2 : Three-phase directional overcurrent protection high stage instance 2 (DPHHPTOC2)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		369	Class 1 and 0	Yes	67/50P-2 Trip		LD0.DPHHPTOC2.Op.general
BI		370	Class 1 and 0	Yes	67/50P-2 Trip phsA		LD0.DPHHPTOC2.Op.phsA
BI		371	Class 1 and 0	Yes	67/50P-2 Trip phsB		LD0.DPHHPTOC2.Op.phsB
BI		372	Class 1 and 0	Yes	67/50P-2 Trip phsC		LD0.DPHHPTOC2.Op.phsC

**Table 15:** *51G : Non-directional earth-fault protection low stage instance 1 (EFLPTOC1)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		300	Class 1 and 0	Yes	51G Trip		LD0.EFLPTOC1.Op.general

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	301	Class 0	Yes	51G Enable signal for current multiplier		LD0.EFLPTOC1.InEnaMult.stVal

**Table 16:** 51N-1 : Non-directional earth-fault protection low stage instance 2 (EFLPTOC2)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		43	Class 3 and 0	Yes	51N-1 Trip		LD0.EFLPTOC2.Op.general

**Table 17:** 50SEF : Non-directional earth-fault protection low stage instance 4 (EFLPTOC4)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		142	Class 3 and 0	Yes	50SEF Trip		LD0.EFLPTOC4.Op.general

**Table 18:** 50G-1 : Non-directional earth-fault protection high stage instance 1 (EFHPTOC1)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		298	Class 1 and 0	Yes	50G-1 Trip		LD0.EFHPTOC1.Op.general
BI	Yes	299	Class 0	Yes	50G-1 Enable signal for current multiplier		LD0.EFHPTOC1.InEnaMult.stVal

**Table 19:** 50G-2 : Non-directional earth-fault protection high stage instance 2 (EFHPTOC2)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		302	Class 1 and 0	Yes	50G-2 Trip		LD0.EFHPTOC2.Op.general

**Table 20:** 50N-1 : Non-directional earth-fault protection high stage instance 3 (EFHPTOC3)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		37	Class 3 and 0	Yes	50N-1 Trip		LD0.EFHPTOC3.Op.general

**Table 21:** 50N-2 : Non-directional earth-fault protection high stage instance 4 (EFHPTOC4)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		39	Class 3 and 0	Yes	50N-2 Trip		LD0.EFHPTOC4.Op.general

**Table 22:** 50G-3 : Non-directional earth-fault protection instantaneous stage instance 1 (EFIPTOC1)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		296	Class 1 and 0	Yes	50G-3 Trip		LD0.EFIPTOC1.Op.general
BI	Yes	297	Class 0	Yes	50G-3 Enable signal for current multiplier		LD0.EFIPTOC1.InEnaMult.stVal

**Table 23: 50N-3 : Non-directional earth-fault protection instantaneous stage instance 2 (EFIPTOC2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		41	Class 3 and 0	Yes	50N-3 Trip		LD0.EFIPTOC2.Op.general

**Table 24: 67/51N : Directional earth-fault protection low stage instance 1 (DEFLPTOC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		46	Class 3 and 0	Yes	67/51N Trip		LD0.DEFLPTOC1.Op.general

**Table 25: 67/50N-1 : Directional earth-fault protection high stage instance 1 (DEFHPTOC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		303	Class 1 and 0	Yes	67/50N-1 Trip		LD0.DEFHPTOC1.Op.general

**Table 26: 67/50N-2 : Directional earth-fault protection high stage instance 2 (DEFHPTOC2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		304	Class 1 and 0	Yes	67/50N-2 Trip		LD0.DEFHPTOC2.Op.general

**Table 27: 32P-1 : Three phase directional power protection instance 1 (DPSRDIR1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		72	Class 3 and 0	Yes	32P-1 direction signal		LD0.DPSRDIR1.Dir.general
AI	Yes	288	Class 0	Yes	32P-1 Angle between polarizing and operating quantity	100	LD0.DPSRDIR1.OpChrAng.mag.f

**Table 28: 32N-1 : Ground directional power protection instance 1 (DNZSRDIR1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		73	Class 3 and 0	Yes	32N-1 direction signal		LD0.DNZSRDIR1.Dir.general
AI	Yes	289	Class 0	Yes	32N-1 Angle between operating angle and characteristic angle	100	LD0.DNZSRDIR1.OpChrAng.mag.f

**Table 29: 46-1 : Negative-sequence overcurrent protection instance 1 (NSPTOC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	30	Class 0	Yes	46-1 Block signal for activating the blocking mode		LD0.NSPTOC1.Mod.blockIn
BI		35	Class 3 and 0	Yes	46-1 Trip		LD0.NSPTOC1.Op.general
BI	Yes	393	Class 0	Yes	46-1 Enable signal for current multiplier		LD0.NSPTOC1.InEnaMult.stVal

**Table 30: 46-2 : Negative-sequence overcurrent protection instance 2 (NSPTOC2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		197	Class 3 and 0	Yes	46-2 Trip		LD0.NSPTOC2.Op.general
BI	Yes	224	Class 0	Yes	46-2 Block signal for activating the blocking mode		LD0.NSPTOC2.Mod.blockIn
BI	Yes	394	Class 0	Yes	46-2 Enable signal for current multiplier		LD0.NSPTOC2.InEnaMult.stVal

**Table 31: 46PD : Phase discontinuity protection (PDNSPTOC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		395	Class 1 and 0	Yes	46PD Trip		LD0.PDNSPTOC1.Op.general

**Table 32: 59G : Residual overvoltage protection instance 1 (ROVPTOV1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		151	Class 3 and 0	Yes	59G Pickup		LD0.ROVPTOV1.Str.general
BI		376	Class 1 and 0	Yes	59G Trip		LD0.ROVPTOV1.Op.general

**Table 33: 59N-1 : Residual overvoltage protection instance 2 (ROVPTOV2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		377	Class 1 and 0	Yes	59N-1 Trip		LD0.ROVPTOV2.Op.general

**Table 34: 27-1 : Three-phase undervoltage protection instance 1 (PHPTUV1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		34	Class 3 and 0	Yes	27-1 Trip		LD0.PHPTUV1.Op.general
BI		386	Class 1 and 0	Yes	27-1 Trip phsA		LD0.PHPTUV1.Op.phsA
BI		387	Class 1 and 0	Yes	27-1 Trip phsB		LD0.PHPTUV1.Op.phsB
BI		388	Class 1 and 0	Yes	27-1 Trip phsC		LD0.PHPTUV1.Op.phsC

**Table 35: 27-2 : Three-phase undervoltage protection instance 2 (PHPTUV2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		389	Class 1 and 0	Yes	27-2 Trip		LD0.PHPTUV2.Op.general
BI		390	Class 1 and 0	Yes	27-2 Trip phsA		LD0.PHPTUV2.Op.phsA
BI		391	Class 1 and 0	Yes	27-2 Trip phsB		LD0.PHPTUV2.Op.phsB
BI		392	Class 1 and 0	Yes	27-2 Trip phsC		LD0.PHPTUV2.Op.phsC

**Table 36: 59-1 : Three-phase overvoltage protection instance 1 (PHPTOV1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		44	Class 3 and 0	Yes	59-1 Trip		LD0.PHPTOV1.Op.general
BI		379	Class 1 and 0	Yes	59-1 Trip phsA		LD0.PHPTOV1.Op.phsA
BI		380	Class 1 and 0	Yes	59-1 Trip phsB		LD0.PHPTOV1.Op.phsB
BI		381	Class 1 and 0	Yes	59-1 Trip phsC		LD0.PHPTOV1.Op.phsC

**Table 37: 59-2 : Three-phase overvoltage protection instance 2 (PHPTOV2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		382	Class 1 and 0	Yes	59-2 Trip		LD0.PHPTOV2.Op.general
BI		383	Class 1 and 0	Yes	59-2 Trip phsA		LD0.PHPTOV2.Op.phsA
BI		384	Class 1 and 0	Yes	59-2 Trip phsB		LD0.PHPTOV2.Op.phsB
BI		385	Class 1 and 0	Yes	59-2 Trip phsC		LD0.PHPTOV2.Op.phsC

**Table 38: 47-1 : Negative-sequence overvoltage protection instance 1 (NSPTOV1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		164	Class 3 and 0	Yes	47-1 Trip		LD0.NSPTOV1.Op.general

**Table 39: 47-2 : Negative-sequence overvoltage protection instance 2 (NSPTOV2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		378	Class 1 and 0	Yes	47-2 Trip		LD0.NSPTOV2.Op.general

**Table 40: 81-1 : Frequency protection instance 1 (FRPTRC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	418	Class 0	Yes	81-1 Trip		LD0.FRPTRC1.Op.general
AI	Yes	199	Class 0	Yes	81-1 Pickup duration	100	LD0.FRPTRC1.StrDur.mag.f

**Table 41: 81-1 : Frequency protection instance 1 (FRPTOF1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		122	Class 3 and 0	Yes	81-1 Trip signal for overfrequency		LD0.FRPTOF1.Op.general
AI	Yes	200	Class 0	Yes	81-1 Pickup duration	100	LD0.FRPTOF1.StrDur.mag.f

**Table 42: 81-1 : Frequency protection instance 1 (FRPTUF1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		419	Class 1 and 0	Yes	81-1 Trip signal for underfrequency		LD0.FRPTUF1.Op.general
AI	Yes	201	Class 0	Yes	81-1 Pickup duration	100	LD0.FRPTUF1.StrDur.mag.f



**Table 43: 81-1 : Frequency protection instance 1 (FRPFRC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		420	Class 1 and 0	Yes	81-1 Trip signal for frequency gradient		LD0.FRPFRC1.Op.general
AI	Yes	202	Class 0	Yes	81-1 Pickup duration	100	LD0.FRPFRC1.StrDur.mag.f

**Table 44: 81-2 : Frequency protection instance 2 (FRPTRC2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	421	Class 0	Yes	81-2 Trip		LD0.FRPTRC2.Op.general
AI	Yes	203	Class 0	Yes	81-2 Pickup duration	100	LD0.FRPTRC2.StrDur.mag.f

**Table 45: 81-2 : Frequency protection instance 2 (FRPTOF2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		123	Class 3 and 0	Yes	81-2 Trip signal for overfrequency		LD0.FRPTOF2.Op.general
AI	Yes	204	Class 0	Yes	81-2 Pickup duration	100	LD0.FRPTOF2.StrDur.mag.f

**Table 46: 81-2 : Frequency protection instance 2 (FRPTUF2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		422	Class 1 and 0	Yes	81-2 Trip signal for underfrequency		LD0.FRPTUF2.Op.general
AI	Yes	205	Class 0	Yes	81-2 Pickup duration	100	LD0.FRPTUF2.StrDur.mag.f

**Table 47: 81-2 : Frequency protection instance 2 (FRPFRC2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		423	Class 1 and 0	Yes	81-2 Trip signal for frequency gradient		LD0.FRPFRC2.Op.general
AI	Yes	206	Class 0	Yes	81-2 Pickup duration	100	LD0.FRPFRC2.StrDur.mag.f

**Table 48: 24 : Voltage per hertz protection instance 1 (OEPVPH1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		691	Class 1 and 0	Yes	24 Trip		LD0.OEPVPH1.Op.general

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

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	360	Class 0	Yes	49F-1 Enable Current multiplier		LD0.T1PTTR1.InEnaMult.stVal
BI		361	Class 1 and 0	Yes	49F-1 Thermal Alarm		LD0.T1PTTR1.AlmThm.general
BI		362	Class 1 and 0	Yes	49F-1 Trip		LD0.T1PTTR1.Op.general
AI		196	Class 2 and 0	Yes	49F-1 The calculated temperature of the protected object	100	LD0.T1PTTR1.Tmp.mag.f

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DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI		197	Class 2 and 0	Yes	49F-1 The calculated temperature of the protected object relative to the trip level	100	LD0.T1PTTR1.TmpRI.mag.f
AI	Yes	198	Class 0	Yes	49F-1 The ambient temperature used in the calculation	100	LD0.T1PTTR1.TmpUsed.mag.f

**Table 50:** *87LOZREF : Numerical stabilized low impedance restricted earth-fault protection (LREFPDIF1)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		417	Class 1 and 0	Yes	87LOZREF Trip		LD0.LREFPDIF1.Op.general

**Table 51:** *50BF-1 : Circuit breaker failure protection instance 1 (CCBRBRF1)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	134	Class 0	Yes	50BF-1 CBFP pickup command		LD0.CCBRBRF1.InStr.stVal
BI	Yes	144	Class 0	Yes	50BF-1 CB faulty and unable to trip		LD0.CCBRBRF1.InCBFlt.stVal
BI		145	Class 3 and 0	Yes	50BF-1 Retrip		LD0.CCBRBRF1.OpIn.general
BI		363	Class 1 and 0	Yes	50BF-1 Backup trip		LD0.CCBRBRF1.OpEx.general
BI	Yes	364	Class 0	Yes	50BF-1 CB in closed position		LD0.CCBRBRF1.InPosCls.stVal

**Table 52:** *INR-1 : Three-phase inrush detector instance 1 (INRPHAR1)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		873	Class 3 and 0	Yes	INR-1 Second harmonic based block		LD0.INRPHAR1.Str.general

**Table 53:** *86/94-1 : Master trip instance 1 (TRPPTRC1)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		31	Class 3 and 0	Yes	86/94-1 Trip		LD0.TRPPTRC1.Op.general
BI		242	Class 1 and 0	Yes	86/94-1 General trip output signal		LD0.TRPPTRC1.Tr.general

**Table 54:** *86/94-2 : Master trip instance 2 (TRPPTRC2)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		243	Class 1 and 0	Yes	86/94-2 General trip output signal		LD0.TRPPTRC2.Tr.general
BI		244	Class 1 and 0	Yes	86/94-2 Trip		LD0.TRPPTRC2.Op.general

**Table 55:** *AFD-1 : Arc protection instance 1 (ARCSARC11)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		396	Class 1 and 0	Yes	AFD-1 Fault arc detected=light signal output		LD0.ARCSARC11.FADet.stVal
BI	Yes	397	Class 0	Yes	AFD-1 Remote Fault arc detected		LD0.ARCSARC11.InRemFA.stVal

*Table 56: AFD-1 : Arc protection instance 1 (ARCPTRC11)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		398	Class 1 and 0	Yes	AFD-1 Trip		LD0.ARCPTRC11.Op.general

*Table 57: AFD-2 : Arc protection instance 2 (ARCSARC21)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		399	Class 1 and 0	Yes	AFD-2 Fault arc detected=light signal output		LD0.ARCSARC21.FADet.stVal
BI	Yes	400	Class 0	Yes	AFD-2 Remote Fault arc detected		LD0.ARCSARC21.InRemFA.stVal

*Table 58: AFD-2 : Arc protection instance 2 (ARCPTRC21)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		401	Class 1 and 0	Yes	AFD-2 Trip		LD0.ARCPTRC21.Op.general

*Table 59: AFD-3 : Arc protection instance 3 (ARCSARC31)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		402	Class 1 and 0	Yes	AFD-3 Fault arc detected=light signal output		LD0.ARCSARC31.FADet.stVal
BI	Yes	403	Class 0	Yes	AFD-3 Remote Fault arc detected		LD0.ARCSARC31.InRemFA.stVal

*Table 60: AFD-3 : Arc protection instance 3 (ARCPTRC31)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		404	Class 1 and 0	Yes	AFD-3 Trip		LD0.ARCPTRC31.Op.general

*Table 61: HIZ : High impedance fault detection (PHIZ1)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		699	Class 1 and 0	Yes	HIZ Trip		LD0.PHIZ1.Op.general

*Table 62: 81LSH-1 : Load shedding and restoration instance 1 (LSHDPTRC1)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		47	Class 3 and 0	Yes	81LSH-1 Trip of load shedding		LD0.LSHDPTRC1.Op.general
BI		48	Class 3 and 0	Yes	81LSH-1 Restore signal for load restoring purposes		LD0.LSHDPTRC1.RestLodOp.general
AI	Yes	207	Class 0	Yes	81LSH-1 Pickup duration	100	LD0.LSHDPTRC1.StrDur.mag.f

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**Table 63: 81LSH-1 : Load shedding and restoration instance 1 (LSHDPTUF1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	424	Class 0	Yes	81LSH-1 Trip signal for under frequency		LD0.LSHDPTUF1.Op.general

**Table 64: 81LSH-1 : Load shedding and restoration instance 1 (LSHDPFRC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	425	Class 0	Yes	81LSH-1 Trip signal for high df/dt		LD0.LSHDPFRC1.Op.general

**Table 65: 81LSH-2 : Load shedding and restoration instance 2 (LSHDPTRC2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		124	Class 3 and 0	Yes	81LSH-2 Trip of load shedding		LD0.LSHDPTRC2.Op.general
BI		125	Class 3 and 0	Yes	81LSH-2 Restore signal for load restoring purposes		LD0.LSHDPTRC2.RestLodOp.general
AI	Yes	208	Class 0	Yes	81LSH-2 Pickup duration	100	LD0.LSHDPTRC2.StrDur.mag.f

**Table 66: 81LSH-2 : Load shedding and restoration instance 2 (LSHDPTUF2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	426	Class 0	Yes	81LSH-2 Trip signal for under frequency		LD0.LSHDPTUF2.Op.general

**Table 67: 81LSH-2 : Load shedding and restoration instance 2 (LSHDPFRC2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	427	Class 0	Yes	81LSH-2 Trip signal for high df/dt		LD0.LSHDPFRC2.Op.general

**Table 68: 37-1 : Loss of phase instance 1 (PHPTUC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		683	Class 1 and 0	Yes	37-1 Trip		LD0.PHPTUC1.Op.general
BI		684	Class 1 and 0	Yes	37-1 Trip phase A		LD0.PHPTUC1.Op.phsA
BI		685	Class 1 and 0	Yes	37-1 Trip phase B		LD0.PHPTUC1.Op.phsB
BI		686	Class 1 and 0	Yes	37-1 Trip phase C		LD0.PHPTUC1.Op.phsC

**Table 69: 52-1 : Circuit-breaker control instance 1 (CBCILO1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		11	Class 3 and 0	Yes	52-1 Enables opening		CTRL.CBCILO1.EnaOpn.stVal
BI		12	Class 3 and 0	Yes	52-1 Enables closing		CTRL.CBCILO1.EnaCls.stVal
BI		700	Class 1 and 0	Yes	52-1 Discards ENA_OPEN and ENA_CLOSE interlocking when TRUE		CTRL.CBCILO1.ItlByPss.stVal

**Table 70: 52-1 : Circuit-breaker control instance 1 (CBCSWI1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	28	Class 0	Yes	52-1 Executes the command for open direction		CTRL.CBCSWI1.OpOpn.general
BI	Yes	29	Class 0	Yes	52-1 Executes the command for close direction		CTRL.CBCSWI1.OpCls.general
BI		80	Class 3 and 0	Yes	52-1 Apparatus open position		CTRL.CBCSWI1.PosOpn.stVal
BI		81	Class 3 and 0	Yes	52-1 Apparatus closed position		CTRL.CBCSWI1.PosCls.stVal
BI	Yes	701	Class 0	Yes	52-1 Apparatus position is ok		CTRL.CBCSWI1.PosOk.stVal
BI		702	Class 1 and 0	Yes	52-1 Object selected		CTRL.CBCSWI1.Pos.stSeld
AI		290	Class 2 and 0	Yes	52-1 Apparatus position indication	0	CTRL.CBCSWI1.Pos.stVal

**Table 71: 52-1 : Circuit-breaker control instance 1 (CBXCBR1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		703	Class 1 and 0	Yes	52-1 Blocks opening		CTRL.CBXCBR1.BlkOpn.stVal
BI		704	Class 1 and 0	Yes	52-1 Blocks closing		CTRL.CBXCBR1.BlkCls.stVal

**Table 72: 79 : Auto-reclosing (DARREC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	13	Class 0	Yes	79 Interrupts and inhibits reclosing sequence		LD0.DARREC1.InInhRec.stVal
BI	Yes	27	Class 0	Yes	79 A signal for coordination between the AR and the protection		LD0.DARREC1.ProCrd.stVal
BI		53	Class 3 and 0	Yes	79 Reclosing sequence is in progress		LD0.DARREC1.ActRec.stVal
BI		56	Class 3 and 0	Yes	79 Signal indicating that AR is locked out		LD0.DARREC1.LO.stVal
BI		82	Class 3 and 0	Yes	79 Indicates that the AR is ready for a new sequence		LD0.DARREC1.RdyRec.stVal
BI	Yes	127	Class 0	Yes	79 Level sensitive signal for allowing (high) / not allowing (low) reclosing		LD0.DARREC1.InReClsOn.stVal
BI		130	Class 3 and 0	Yes	79 Autoreclosing allowed		LD0.DARREC1.AROn.stVal
BI		131	Class 3 and 0	Yes	79 Open command for circuit breaker		LD0.DARREC1.OpOpn.general
BI		150	Class 3 and 0	Yes	79 Close (reclose) command for circuit breaker		LD0.DARREC1.Op.general
BI	Yes	265	Class 0	Yes	79 Blocks and holds the reclose shot from the thermal overload		LD0.DARREC1.InBlkThm.stVal
BI		272	Class 1 and 0	Yes	79 Indicates a successful reclosing sequence		LD0.DARREC1.SucRec.stVal
BI		273	Class 1 and 0	Yes	79 Indicates an unsuccessful reclosing sequence		LD0.DARREC1.UnsRec.stVal
BI		274	Class 1 and 0	Yes	79 Reclosing shot in progress activated during dead time		LD0.DARREC1.PrgRec.stVal
BI		275	Class 1 and 0	Yes	79 Indicates an unsuccessful CB closing		LD0.DARREC1.UnsCBCls.stVal
BI		276	Class 1 and 0	Yes	79 Wait for master command		LD0.DARREC1.WtMstr.stVal
BI		277	Class 1 and 0	Yes	79 Reclosing shot in progress shot 1		LD0.DARREC1.PrgRec1.stVal

# Section 2 DNP3 data mappings

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		278	Class 1 and 0	Yes	79 Reclosing shot in progress shot 2		LD0.DARREC1.PrgRec2.stVal
BI		279	Class 1 and 0	Yes	79 Reclosing shot in progress shot 3		LD0.DARREC1.PrgRec3.stVal
BI		280	Class 1 and 0	Yes	79 Reclosing shot in progress shot 4		LD0.DARREC1.PrgRec4.stVal
BI		281	Class 1 and 0	Yes	79 Reclosing shot in progress shot 5		LD0.DARREC1.PrgRec5.stVal
BI		282	Class 1 and 0	Yes	79 Signal indicating that discrimination time is in progress		LD0.DARREC1.PrgDsr.stVal
BI		283	Class 1 and 0	Yes	79 Signal indicating that cut-out time is in progress		LD0.DARREC1.PrgCutOut.stVal
BI		284	Class 1 and 0	Yes	79 Frequent operation counter alarm		LD0.DARREC1.FrqOpAlm.stVal
BI		286	Class 1 and 0	Yes	79 Reclaim time started		LD0.DARREC1.RclTmStr.stVal
BI		287	Class 1 and 0	Yes	79 Indicates CB manual closing during reclosing sequence		LD0.DARREC1.CBManCls.stVal
BI	Yes	288	Class 0	Yes	79 Blocks and resets reclaim time		LD0.DARREC1.InBlkRclTm.stVal
BI	Yes	289	Class 0	Yes	79 AR initialization / blocking signal 1		LD0.DARREC1.InIni1.stVal
BI	Yes	290	Class 0	Yes	79 AR initialization / blocking signal 2		LD0.DARREC1.InIni2.stVal
BI	Yes	291	Class 0	Yes	79 AR initialization / blocking signal 3		LD0.DARREC1.InIni3.stVal
BI	Yes	292	Class 0	Yes	79 AR initialization / blocking signal 4		LD0.DARREC1.InIni4.stVal
BI	Yes	293	Class 0	Yes	79 AR initialization / blocking signal 5		LD0.DARREC1.InIni5.stVal
BI	Yes	294	Class 0	Yes	79 AR initialization / blocking signal 6		LD0.DARREC1.InIni6.stVal
BI	Yes	295	Class 0	Yes	79 Blocks and resets reclose time		LD0.DARREC1.InBlkRecTm.stVal
AI	Yes	147	Class 0	Yes	79 Frequent operation counter	0	LD0.DARREC1.FrqOpCnt.stVal
AI	Yes	148	Class 0	Yes	79 Resetable operation counter shot 1	0	LD0.DARREC1.OpCnt1.stVal
AI	Yes	149	Class 0	Yes	79 Resetable operation counter shot 2	0	LD0.DARREC1.OpCnt2.stVal
AI	Yes	150	Class 0	Yes	79 Resetable operation counter shot 3	0	LD0.DARREC1.OpCnt3.stVal
AI	Yes	151	Class 0	Yes	79 Resetable operation counter shot 4	0	LD0.DARREC1.OpCnt4.stVal
AI		168	Class 2 and 0	Yes	79 AR status signal for IEC61850	0	LD0.DARREC1.AutoRecSt.stVal
AI	Yes	169	Class 0	Yes	79 Resetable operation counter shot 5	0	LD0.DARREC1.OpCnt5.stVal

**Table 73: 25 : Synchronism and energizing check (SECRSYN1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	136	Class 0	Yes	25 Blocking signal of the synchro check and voltage check function		LD0.SECRSYN1.Mod.blockIn
BI	Yes	137	Class 0	Yes	25 Request to bypass synchronism check and voltage check		LD0.SECRSYN1.ByPss.stVal
BI	Yes	148	Class 0	Yes	25 Systems in synchronism		LD0.SECRSYN1.Rel.stVal
BI	Yes	193	Class 0	Yes	25 Live Line Live Bus		LD0.SECRSYN1.LLLBInd.stVal
BI	Yes	194	Class 0	Yes	25 Dead Line Live Bus		LD0.SECRSYN1.DLLBInd.stVal
BI	Yes	195	Class 0	Yes	25 Live Line Dead Bus		LD0.SECRSYN1.LLDBInd.stVal
BI	Yes	196	Class 0	Yes	25 Dead Line Dead Bus		LD0.SECRSYN1.DLDBInd.stVal
BI	Yes	428	Class 0	Yes	25 Voltage difference out of limit for synchronizing		LD0.SECRSYN1.VInd.stVal

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	429	Class 0	Yes	25 Phase angle difference out of limit for synchronizing		LD0.SECRSYN1.AngInd.stVal
BI	Yes	430	Class 0	Yes	25 Frequency difference out of limit for synchronizing		LD0.SECRSYN1.HzInd.stVal
BI		431	Class 1 and 0	Yes	25 Synchronizing in progress		LD0.SECRSYN1.SynPrg.stVal
BI		432	Class 1 and 0	Yes	25 CB closing failed		LD0.SECRSYN1.FailSyn.stVal
AI	Yes	209	Class 0	Yes	25 Calculated voltage amplitude difference	100	LD0.SECRSYN1.DifVClc.mag.f
AI	Yes	210	Class 0	Yes	25 Calculated voltage frequency difference	100	LD0.SECRSYN1.DifHzClc.mag.f
AI	Yes	211	Class 0	Yes	25 Calculated voltage phase angle difference	100	LD0.SECRSYN1.DifAngClc.mag.f

Table 74: 52CM-1 : Circuit-breaker condition monitoring instance 1 (SSCBR1)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	16	Class 0	Yes	52CM-1 Recloser Spring Charged Input 1		LD0.SSCBR1.InSprCha.stVal
BI		57	Class 3 and 0	Yes	52CM-1 CB open travel time exceeded set value		LD0.SSCBR1.OpnAlm.stVal
BI		61	Class 3 and 0	Yes	52CM-1 Accumulated currents power (lyt) exceeded alarm limit		LD0.SSCBR1.APwrAlm.stVal
BI		62	Class 3 and 0	Yes	52CM-1 Number of CB operations exceeds alarm limit		LD0.SSCBR1.OpNumAlm.stVal
BI	Yes	245	Class 0	Yes	52CM-1 CB spring charging started input		LD0.SSCBR1.InSprChStr.stVal
BI	Yes	246	Class 0	Yes	52CM-1 Binary pressure alarm input		LD0.SSCBR1.InPresAlm.stVal
BI	Yes	247	Class 0	Yes	52CM-1 Binary pressure input for lockout indication		LD0.SSCBR1.InPresLO.stVal
BI	Yes	248	Class 0	Yes	52CM-1 Signal for open position of apparatus from I/O		LD0.SSCBR1.InPosOpn.stVal
BI	Yes	249	Class 0	Yes	52CM-1 Signal for closeposition of apparatus from I/O		LD0.SSCBR1.InPosCls.stVal
BI		250	Class 1 and 0	Yes	52CM-1 CB close travel time exceeded set value		LD0.SSCBR1.ClsAlm.stVal
BI		251	Class 1 and 0	Yes	52CM-1 Spring charging time has crossed the set value		LD0.SSCBR1.SprChaAlm.stVal
BI		252	Class 1 and 0	Yes	52CM-1 Number of CB operations exceeds lockout limit		LD0.SSCBR1.OpNumLO.stVal
BI		253	Class 1 and 0	Yes	52CM-1 CB 'not tripped for long time' alarm		LD0.SSCBR1.LonTmAlm.stVal
BI		254	Class 1 and 0	Yes	52CM-1 Pressure below alarm level		LD0.SSCBR1.PresAlm.stVal
BI		255	Class 1 and 0	Yes	52CM-1 Pressure below lockout level		LD0.SSCBR1.PresLO.stVal
BI	Yes	256	Class 0	Yes	52CM-1 CB is in open position		LD0.SSCBR1.PosOpn.stVal
BI	Yes	257	Class 0	Yes	52CM-1 CB is in invalid position (not positively open or closed)		LD0.SSCBR1.PosIvd.stVal
BI	Yes	258	Class 0	Yes	52CM-1 CB is in closed position		LD0.SSCBR1.PosCls.stVal

## Section 2 DNP3 data mappings

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		263	Class 1 and 0	Yes	52CM-1 Accumulated currents power (lyt) exceeded lockout limit		LD0.SSCBR1.APwrLO.stVal
BI		264	Class 1 and 0	Yes	52CM-1 Remaining life of CB exceeded alarm limit		LD0.SSCBR1.CBLifAlm.stVal
AI	Yes	146	Class 0	Yes	52CM-1 Number of CB operation cycle	0	LD0.SSCBR1.OpCnt.stVal
AI	Yes	158	Class 0	Yes	52CM-1 The number of days CB has been inactive	0	LD0.SSCBR1.InaTmdCnt.stVal
AI	Yes	159	Class 0	Yes	52CM-1 Travel time of the CB during opening operation	100	LD0.SSCBR1.TmmsOpn.mag.f
AI	Yes	160	Class 0	Yes	52CM-1 Travel time of the CB during closing operation	100	LD0.SSCBR1.TmmsCls.mag.f
AI	Yes	161	Class 0	Yes	52CM-1 The charging time of the CB spring	100	LD0.SSCBR1.TmsSprCha.mag.f
AI	Yes	162	Class 0	Yes	52CM-1 CB Remaining life phase A	0	LD0.SSCBR1.RmnLifPhA.stVal
AI	Yes	163	Class 0	Yes	52CM-1 CB Remaining life phase B	0	LD0.SSCBR1.RmnLifPhB.stVal
AI	Yes	164	Class 0	Yes	52CM-1 CB Remaining life phase C	0	LD0.SSCBR1.RmnLifPhC.stVal
AI	Yes	165	Class 0	Yes	52CM-1 Accumulated currents power (lyt) phase A	100	LD0.SSCBR1.AccAPwrPhA.mag.f
AI	Yes	166	Class 0	Yes	52CM-1 Accumulated currents power (lyt) phase B	100	LD0.SSCBR1.AccAPwrPhB.mag.f
AI	Yes	167	Class 0	Yes	52CM-1 Accumulated currents power (lyt) phase C	100	LD0.SSCBR1.AccAPwrPhC.mag.f

**Table 75: CCM : Current circuit supervision (CCRDIF1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		406	Class 1 and 0	Yes	CCM Fail output		LD0.CCRDIF1.Op.general
BI		407	Class 1 and 0	Yes	CCM Alarm output		LD0.CCRDIF1.Alm.stVal

**Table 76: 60-1 : Fuse failure supervision instance 1 (SEQRFUF1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		60	Class 3 and 0	Yes	60-1 General pickup of function		LD0.SEQRFUF1.Str.general
BI		408	Class 1 and 0	Yes	60-1 Three-phase pickup of function		LD0.SEQRFUF1.Str3Ph.general

**Table 77: CFD : Cable fault detection (RCFD1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		409	Class 1 and 0	Yes	CFD Trip		LD0.RCFD1.Op.general

**Table 78: IA IB IC : Three-phase current measurement instance 1 (CMMXU1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		121	Class 3 and 0	Yes	IA IB IC High alarm		LD0.CMMXU1.HiAlm.stVal



DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		325	Class 1 and 0	Yes	IA IB IC High warning		LD0.CMMXU1.HiWrn.stVal
BI		326	Class 1 and 0	Yes	IA IB IC Low warning		LD0.CMMXU1.LoWrn.stVal
BI		327	Class 1 and 0	Yes	IA IB IC Low alarm		LD0.CMMXU1.LoAlm.stVal
AI	Yes	0	Class 0	Yes	IA IB IC IA Amplitude magnitude of instantaneous value	100	LD0.CMMXU1.A.phsA.instCVal.mag.f
AI	Yes	1	Class 0	Yes	IA IB IC IA Angle of instantaneous value	100	LD0.CMMXU1.A.phsA.instCVal.ang.f
AI	Yes	2	Class 0	Yes	IA IB IC IB Amplitude magnitude of instantaneous value	100	LD0.CMMXU1.A.phsB.instCVal.mag.f
AI	Yes	3	Class 0	Yes	IA IB IC IB Angle of instantaneous value	100	LD0.CMMXU1.A.phsB.instCVal.ang.f
AI	Yes	4	Class 0	Yes	IA IB IC IC Amplitude magnitude of instantaneous value	100	LD0.CMMXU1.A.phsC.instCVal.mag.f
AI	Yes	5	Class 0	Yes	IA IB IC IC Angle of instantaneous value	100	LD0.CMMXU1.A.phsC.instCVal.ang.f
AI		170	Class 2 and 0	Yes	IA IB IC IA Amplitude magnitude of reported value	100	LD0.CMMXU1.A.phsA.cVal.mag.f
AI		171	Class 2 and 0	Yes	IA IB IC IB Amplitude magnitude of reported value	100	LD0.CMMXU1.A.phsB.cVal.mag.f
AI		172	Class 2 and 0	Yes	IA IB IC IC Amplitude magnitude of reported value	100	LD0.CMMXU1.A.phsC.cVal.mag.f

Table 79: IA IB IC : Three-phase current measurement instance 1 (CMSTA1)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	43	Class 0	Yes	IA IB IC Demand value of IA current	100	LD0.CMSTA1.AvAmpsA.mag.f
AI	Yes	44	Class 0	Yes	IA IB IC Demand value of IB current	100	LD0.CMSTA1.AvAmpsB.mag.f
AI	Yes	45	Class 0	Yes	IA IB IC Demand value of IC current	100	LD0.CMSTA1.AvAmpsC.mag.f
AI	Yes	173	Class 0	Yes	IA IB IC Maximum demand for Phase A	100	LD0.CMSTA1.MaxAmpsA.mag.f
AI	Yes	174	Class 0	Yes	IA IB IC Maximum demand for Phase B	100	LD0.CMSTA1.MaxAmpsB.mag.f
AI	Yes	175	Class 0	Yes	IA IB IC Maximum demand for Phase C	100	LD0.CMSTA1.MaxAmpsC.mag.f

Table 80: I1 I2 I0 : Sequence current measurement instance 1 (CSMSQ11)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	31	Class 0	Yes	I1 I2 I0 Zero sequence current amplitude instantaneous value	100	LD0.CSMSQ11.SeqA.c3.instCVal.mag.f
AI	Yes	32	Class 0	Yes	I1 I2 I0 Zero sequence current angle instantaneous value	100	LD0.CSMSQ11.SeqA.c3.instCVal.ang.f
AI	Yes	33	Class 0	Yes	I1 I2 I0 Positive sequence current amplitude instantaneous value	100	LD0.CSMSQ11.SeqA.c1.instCVal.mag.f
AI	Yes	34	Class 0	Yes	I1 I2 I0 Positive sequence current angle	100	LD0.CSMSQ11.SeqA.c1.instCVal.ang.f
AI	Yes	35	Class 0	Yes	I1 I2 I0 Negative sequence current amplitude instantaneous value	100	LD0.CSMSQ11.SeqA.c2.instCVal.mag.f

## Section 2 DNP3 data mappings

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	36	Class 0	Yes	I1 I2 I0 Negative sequence current angle	100	LD0.CSMSQ11.SeqA.c2.instCVal.ang.f
AI	Yes	180	Class 0	Yes	I1 I2 I0 Positive sequence current amplitude reported value	100	LD0.CSMSQ11.SeqA.c1.cVal.mag.f
AI	Yes	181	Class 0	Yes	I1 I2 I0 Negative sequence current amplitude reported value	100	LD0.CSMSQ11.SeqA.c2.cVal.mag.f
AI	Yes	184	Class 0	Yes	I1 I2 I0 Zero sequence current amplitude reported value	100	LD0.CSMSQ11.SeqA.c3.cVal.mag.f

**Table 81:** IG : Residual current measurement instance 1 (RESCMMXU1)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		329	Class 1 and 0	Yes	IG High alarm		LD0.RESCMMXU1.HiAlm.stVal
BI		330	Class 1 and 0	Yes	IG High warning		LD0.RESCMMXU1.HiWrn.stVal
AI	Yes	6	Class 0	Yes	IG Ground current Amplitude magnitude of instantaneous value	100	LD0.RESCMMXU1.A.res.instCVal.mag.f
AI	Yes	7	Class 0	Yes	IG Ground current Angle of instantaneous value	100	LD0.RESCMMXU1.A.res.instCVal.ang.f
AI		176	Class 2 and 0	Yes	IG Ground current Amplitude magnitude of reported value	100	LD0.RESCMMXU1.A.res.cVal.mag.f

**Table 82:** IG : Residual current measurement instance 1 (RESCMSTA1)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	46	Class 0	Yes	IG Demand value of residual current	100	LD0.RESCMSTA1.AvAmps.mag.f
AI	Yes	318	Class 0	Yes	IG Maximum demand for residual current	100	LD0.RESCMSTA1.MaxAmps.mag.f
AI	Yes	319	Class 0	Yes	IG Minimum demand for residual current	100	LD0.RESCMSTA1.MinAmps.mag.f

**Table 83:** VA VB VC : Three-phase voltage measurement instance 1 (VMMXU1)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		333	Class 1 and 0	Yes	VA VB VC High alarm		LD0.VMMXU1.HiAlm.stVal
BI		334	Class 1 and 0	Yes	VA VB VC High warning		LD0.VMMXU1.HiWrn.stVal
BI		335	Class 1 and 0	Yes	VA VB VC Low warning		LD0.VMMXU1.LoWrn.stVal
BI		336	Class 1 and 0	Yes	VA VB VC Low alarm		LD0.VMMXU1.LoAlm.stVal
AI	Yes	9	Class 0	Yes	VA VB VC VA Amplitude magnitude of instantaneous value	100	LD0.VMMXU1.PhV.phsA.cVal.mag.f
AI	Yes	10	Class 0	Yes	VA VB VC VA angle	100	LD0.VMMXU1.PhV.phsA.cVal.ang.f
AI	Yes	11	Class 0	Yes	VA VB VC VB Amplitude magnitude of instantaneous value	100	LD0.VMMXU1.PhV.phsB.cVal.mag.f
AI	Yes	12	Class 0	Yes	VA VB VC VB angle	100	LD0.VMMXU1.PhV.phsB.cVal.ang.f

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	13	Class 0	Yes	VA VB VC VC Amplitude magnitude of instantaneous value	100	LD0.VMMXU1.PhV.phsC.cVal.mag.f
AI	Yes	14	Class 0	Yes	VA VB VC VC angle	100	LD0.VMMXU1.PhV.phsC.cVal.ang.f
AI	Yes	90	Class 0	Yes	VA VB VC VAB Amplitude magnitude of instantaneous value	100	LD0.VMMXU1.PPV.phsAB.instCVal.mag.f
AI	Yes	91	Class 0	Yes	VA VB VC VAB angle	100	LD0.VMMXU1.PPV.phsAB.instCVal.ang.f
AI	Yes	92	Class 0	Yes	VA VB VC VBC Amplitude magnitude of instantaneous value	100	LD0.VMMXU1.PPV.phsBC.instCVal.mag.f
AI	Yes	93	Class 0	Yes	VA VB VC VBC angle	100	LD0.VMMXU1.PPV.phsBC.instCVal.ang.f
AI	Yes	94	Class 0	Yes	VA VB VC VCA Amplitude magnitude of instantaneous value	100	LD0.VMMXU1.PPV.phsCA.instCVal.mag.f
AI	Yes	95	Class 0	Yes	VA VB VC VCA angle	100	LD0.VMMXU1.PPV.phsCA.instCVal.ang.f
AI		177	Class 2 and 0	Yes	VA VB VC VAB Amplitude magnitude of reported value	100	LD0.VMMXU1.PPV.phsAB.cVal.mag.f
AI		178	Class 2 and 0	Yes	VA VB VC VBC Amplitude magnitude of reported value	100	LD0.VMMXU1.PPV.phsBC.cVal.mag.f
AI		179	Class 2 and 0	Yes	VA VB VC VCA Amplitude magnitude of reported value	100	LD0.VMMXU1.PPV.phsCA.cVal.mag.f

Table 84: VG : Residual voltage measurement instance 1 (RESVMMXU1)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		331	Class 1 and 0	Yes	VG High alarm		LD0.RESVMMXU1.HiAlm.stVal
BI		332	Class 1 and 0	Yes	VG High warning		LD0.RESVMMXU1.HiWrn.stVal
AI	Yes	134	Class 0	Yes	VG voltage amplitude instantaneous value	100	LD0.RESVMMXU1.PhV.res.instCVal.mag.f
AI	Yes	135	Class 0	Yes	VG voltage angle instantaneous value	100	LD0.RESVMMXU1.PhV.res.instCVal.ang.f

Table 85: V1 V2 V0 : Sequence voltage measurement instance 1 (VSMSQI1)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	37	Class 0	Yes	V1 V2 V0 Positive sequence voltage amplitude instantaneous value	100	LD0.VSMSQI1.SeqV.c1.instCVal.mag.f
AI	Yes	38	Class 0	Yes	V1 V2 V0 Positive sequence voltage angle	100	LD0.VSMSQI1.SeqV.c1.instCVal.ang.f
AI	Yes	39	Class 0	Yes	V1 V2 V0 Negative sequence voltage amplitude instantaneous value	100	LD0.VSMSQI1.SeqV.c2.instCVal.mag.f
AI	Yes	40	Class 0	Yes	V1 V2 V0 Negative sequence voltage angle	100	LD0.VSMSQI1.SeqV.c2.instCVal.ang.f
AI	Yes	136	Class 0	Yes	V1 V2 V0 Zero sequence voltage amplitude instantaneous value	100	LD0.VSMSQI1.SeqV.c3.instCVal.mag.f
AI	Yes	137	Class 0	Yes	V1 V2 V0 Zero sequence voltage angle instantaneous value	100	LD0.VSMSQI1.SeqV.c3.instCVal.ang.f

## Section 2 DNP3 data mappings

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	182	Class 0	Yes	V1 V2 V0 Positive sequence voltage amplitude reported value	100	LD0.VSMSQI1.SeqV.c1.cVal.mag.f
AI	Yes	183	Class 0	Yes	V1 V2 V0 Negative sequence voltage amplitude reported value	100	LD0.VSMSQI1.SeqV.c2.cVal.mag.f

**Table 86: SP SE-1 : Single-phase power and energy measurement instance 1 (SPEMMXU1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	15	Class 0	Yes	SP SE-1 Active power magnitude of instantaneous value Phase A	100	LD0.SPEMMXU1.W.phsA.instCVal.mag.f
AI	Yes	16	Class 0	Yes	SP SE-1 Active power magnitude of instantaneous value Phase B	100	LD0.SPEMMXU1.W.phsB.instCVal.mag.f
AI	Yes	17	Class 0	Yes	SP SE-1 Active power magnitude of instantaneous value Phase C	100	LD0.SPEMMXU1.W.phsC.instCVal.mag.f
AI	Yes	19	Class 0	Yes	SP SE-1 Reactive power magnitude of instantaneous value Phase A	100	LD0.SPEMMXU1.VAr.phsA.instCVal.mag.f
AI	Yes	20	Class 0	Yes	SP SE-1 Reactive power magnitude of instantaneous value Phase B	100	LD0.SPEMMXU1.VAr.phsB.instCVal.mag.f
AI	Yes	21	Class 0	Yes	SP SE-1 Reactive power magnitude of instantaneous value Phase C	100	LD0.SPEMMXU1.VAr.phsC.instCVal.mag.f
AI		47	Class 3 and 0	Yes	SP SE-1 Active power magnitude of reported value Phase A	100	LD0.SPEMMXU1.W.phsA.cVal.mag.f
AI		48	Class 3 and 0	Yes	SP SE-1 Active power magnitude of reported value Phase B	100	LD0.SPEMMXU1.W.phsB.cVal.mag.f
AI		49	Class 3 and 0	Yes	SP SE-1 Active power magnitude of reported value Phase C	100	LD0.SPEMMXU1.W.phsC.cVal.mag.f
AI		51	Class 3 and 0	Yes	SP SE-1 Reactive power magnitude of reported value Phase A	100	LD0.SPEMMXU1.VAr.phsA.cVal.mag.f
AI		52	Class 3 and 0	Yes	SP SE-1 Reactive power magnitude of reported value Phase B	100	LD0.SPEMMXU1.VAr.phsB.cVal.mag.f
AI		53	Class 3 and 0	Yes	SP SE-1 Reactive power magnitude of reported value Phase C	100	LD0.SPEMMXU1.VAr.phsC.cVal.mag.f
AI		282	Class 2 and 0	Yes	SP SE-1 Apparent power magnitude of reported value Phase A	100	LD0.SPEMMXU1.VA.phsA.cVal.mag.f
AI		283	Class 2 and 0	Yes	SP SE-1 Apparent power magnitude of reported value Phase B	100	LD0.SPEMMXU1.VA.phsB.cVal.mag.f
AI		284	Class 2 and 0	Yes	SP SE-1 Apparent power magnitude of reported value Phase C	100	LD0.SPEMMXU1.VA.phsC.cVal.mag.f

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI		285	Class 2 and 0	Yes	SP SE-1 Power factor magnitude of reported value Phase A	100	LD0.SPEMMXU1.PF.phsA.cVal.mag.f
AI		286	Class 2 and 0	Yes	SP SE-1 Power factor magnitude of reported value Phase B	100	LD0.SPEMMXU1.PF.phsB.cVal.mag.f
AI		287	Class 2 and 0	Yes	SP SE-1 Power factor magnitude of reported value Phase C	100	LD0.SPEMMXU1.PF.phsC.cVal.mag.f

**Table 87: ISP SE-1 : Single-phase power and energy measurement instance 1 (SPEMMTR1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	23	Class 0	Yes	SP SE-1 Accumulated forward active energy value Phase A	0	LD0.SPEMMTR1.DmdWhA.actVal
AI	Yes	24	Class 0	Yes	SP SE-1 Accumulated forward active energy value Phase B	0	LD0.SPEMMTR1.DmdWhB.actVal
AI	Yes	25	Class 0	Yes	SP SE-1 Accumulated forward active energy value Phase C	0	LD0.SPEMMTR1.DmdWhC.actVal
AI	Yes	27	Class 0	Yes	SP SE-1 Accumulated forward reactive energy value Phase A	0	LD0.SPEMMTR1.DmdVArhA.actVal
AI	Yes	28	Class 0	Yes	SP SE-1 Accumulated forward reactive energy value Phase B	0	LD0.SPEMMTR1.DmdVArhB.actVal
AI	Yes	29	Class 0	Yes	SP SE-1 Accumulated forward reactive energy value Phase C	0	LD0.SPEMMTR1.DmdVArhC.actVal
AI	Yes	310	Class 0	Yes	SP SE-1 Accumulated reverse active energy value Phase A	0	LD0.SPEMMTR1.SupWhA.actVal
AI	Yes	311	Class 0	Yes	SP SE-1 Accumulated reverse active energy value Phase B	0	LD0.SPEMMTR1.SupWhB.actVal
AI	Yes	312	Class 0	Yes	SP SE-1 Accumulated reverse active energy value Phase C	0	LD0.SPEMMTR1.SupWhC.actVal
AI	Yes	314	Class 0	Yes	SP SE-1 Accumulated reverse reactive energy value Phase A	0	LD0.SPEMMTR1.SupVArhA.actVal
AI	Yes	315	Class 0	Yes	SP SE-1 Accumulated reverse reactive energy value Phase B	0	LD0.SPEMMTR1.SupVArhB.actVal
AI	Yes	316	Class 0	Yes	SP SE-1 Accumulated reverse reactive energy value Phase C	0	LD0.SPEMMTR1.SupVArhC.actVal

**Table 88: P E-1 : Three-phase power and energy measurement instance 1 (PEMMXU1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	18	Class 0	Yes	P E-1 Active power magnitude of instantaneous value	100	LD0.PEMMXU1.TotW.instMag.f
AI	Yes	22	Class 0	Yes	P E-1 Total Reactive Power	100	LD0.PEMMXU1.TotVAr.instMag.f
AI	Yes	42	Class 0	Yes	P E-1 Average Power factor	100	LD0.PEMMXU1.TotPF.instMag.f
AI		50	Class 3 and 0	Yes	P E-1 Active power magnitude of reported value	100	LD0.PEMMXU1.TotW.mag.f

## Section 2 DNP3 data mappings

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI		54	Class 1 and 0	Yes	P E-1 Reactive power magnitude of reported value	100	LD0.PEMMXU1.TotVAr.mag.f
AI	Yes	129	Class 0	Yes	P E-1 Total Apparent Power	100	LD0.PEMMXU1.TotVA.instMag.f

**Table 89: P E-1 : Three-phase power and energy measurement instance 1 (PEMMTR1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	26	Class 0	Yes	P E-1 Total accumulated forward active energy value	0	LD0.PEMMTR1.DmdWh.actVal
AI	Yes	30	Class 0	Yes	P E-1 Total accumulated forward reactive energy value	0	LD0.PEMMTR1.DmdVArh.actVal
AI	Yes	313	Class 0	Yes	P E-1 Total accumulated reverse active energy value	0	LD0.PEMMTR1.SupWh.actVal
AI	Yes	317	Class 0	Yes	P E-1 Total accumulated reverse reactive energy value	0	LD0.PEMMTR1.SupVArh.actVal

**Table 90: PQI-1 : Current total demand distortion instance 1 (CMHAI1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		688	Class 1 and 0	Yes	PQI-1 Alarm signal for TDD		LD0.CMHAI1.Alm.stVal
AI	Yes	212	Class 0	Yes	PQI-1 3 second mean value of TDD for phase A	100	LD0.CMHAI1.TddA.phsA.cVal.mag.f
AI	Yes	213	Class 0	Yes	PQI-1 3 second mean value of TDD for phase B	100	LD0.CMHAI1.TddA.phsB.cVal.mag.f
AI	Yes	214	Class 0	Yes	PQI-1 3 second mean value of TDD for phase C	100	LD0.CMHAI1.TddA.phsC.cVal.mag.f
AI	Yes	215	Class 0	Yes	PQI-1 Demand value for TDD for phase A	100	LD0.CMHAI1.DmdTddA.phsA.cVal.mag.f
AI	Yes	216	Class 0	Yes	PQI-1 Demand value for TDD for phase B	100	LD0.CMHAI1.DmdTddA.phsB.cVal.mag.f
AI	Yes	217	Class 0	Yes	PQI-1 Demand value for TDD for phase C	100	LD0.CMHAI1.DmdTddA.phsC.cVal.mag.f
AI	Yes	218	Class 0	Yes	PQI-1 Maximum demand TDD for phase A	100	LD0.CMHAI1.MaxDmdTddA.phsA.cVal.mag.f
AI	Yes	219	Class 0	Yes	PQI-1 Maximum demand TDD for phase B	100	LD0.CMHAI1.MaxDmdTddA.phsB.cVal.mag.f
AI	Yes	220	Class 0	Yes	PQI-1 Maximum demand TDD for phase C	100	LD0.CMHAI1.MaxDmdTddA.phsC.cVal.mag.f

**Table 91: PQVPH-1 : Voltage total harmonic distortion instance 1 (VMHAI1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		690	Class 1 and 0	Yes	PQVPH-1 Alarm signal for THD		LD0.VMHAI1.Alm.stVal
AI	Yes	221	Class 0	Yes	PQVPH-1 3 second mean value of THD for phase A	100	LD0.VMHAI1.ThdPhV.phsA.cVal.mag.f

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	222	Class 0	Yes	PQVPH-1 3 second mean value of THD for phase B	100	LD0.VMHAI1.ThdPhV.phsB.cVal.mag.f
AI	Yes	223	Class 0	Yes	PQVPH-1 3 second mean value of THD for phase C	100	LD0.VMHAI1.ThdPhV.phsC.cVal.mag.f
AI	Yes	224	Class 0	Yes	PQVPH-1 Demand value for THD for phase A	100	LD0.VMHAI1.DmdThdPhV.phsA.cVal.mag.f
AI	Yes	225	Class 0	Yes	PQVPH-1 Demand value for THD for phase B	100	LD0.VMHAI1.DmdThdPhV.phsB.cVal.mag.f
AI	Yes	226	Class 0	Yes	PQVPH-1 Demand value for THD for phase C	100	LD0.VMHAI1.DmdThdPhV.phsC.cVal.mag.f
AI	Yes	227	Class 0	Yes	PQVPH-1 Maximum demand TDD for phase A	100	LD0.VMHAI1.MaxDmdThdV.phsA.cVal.mag.f
AI	Yes	228	Class 0	Yes	PQVPH-1 Maximum demand TDD for phase B	100	LD0.VMHAI1.MaxDmdThdV.phsB.cVal.mag.f
AI	Yes	229	Class 0	Yes	PQVPH-1 Maximum demand TDD for phase C	100	LD0.VMHAI1.MaxDmdThdV.phsC.cVal.mag.f

Table 92: 1PQSS-1 : Voltage variation instance 1 (PH1QVVR1)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		692	Class 1 and 0	Yes	PQSS-1 Voltage swell detected		LD0.PH1QVVR1.SwOp.stVal
BI		693	Class 1 and 0	Yes	PQSS-1 Voltage dip detected		LD0.PH1QVVR1.DipOp.stVal
BI		694	Class 1 and 0	Yes	PQSS-1 Voltage interruption detected		LD0.PH1QVVR1.IntrOp.stVal
BI		696	Class 1 and 0	Yes	PQSS-1 Voltage variation present		LD0.PH1QVVR1.VarStrGen.stVal
BI		720	Class 1 and 0	Yes	PQSS-1 Maximum duration detected		LD0.PH1QVVR1.VarEnd.stVal
AI	Yes	230	Class 0	Yes	PQSS-1 Voltage Variation Magnitude of the last completed event	100	LD0.PH1QVVR1.VVa.mag.f
AI	Yes	231	Class 0	Yes	PQSS-1 Voltage Variation Duration of the last completed event	100	LD0.PH1QVVR1.VVaTm.mag.f
AI	Yes	232	Class 0	Yes	PQSS-1 Current magnitude Ph A preceding variation	100	LD0.PH1QVVR1.APreVa.mag.f
AI	Yes	233	Class 0	Yes	PQSS-1 Instantaneous swell operation counter	0	LD0.PH1QVVR1.SwInstCnt.stVal
AI	Yes	234	Class 0	Yes	PQSS-1 Momentary swell operation counter	0	LD0.PH1QVVR1.SwMomCnt.stVal
AI	Yes	235	Class 0	Yes	PQSS-1 Temporary swell operation counter	0	LD0.PH1QVVR1.SwTmpCnt.stVal
AI	Yes	236	Class 0	Yes	PQSS-1 Maximum duration swell operation counter	0	LD0.PH1QVVR1.SwMaxCnt.stVal
AI	Yes	237	Class 0	Yes	PQSS-1 Instantaneous dip operation counter	0	LD0.PH1QVVR1.DipInstCnt.stVal
AI	Yes	238	Class 0	Yes	PQSS-1 Temporary dip operation counter	0	LD0.PH1QVVR1.DipTmpCnt.stVal

## Section 2 DNP3 data mappings

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	239	Class 0	Yes	PQSS-1 Momentary dip operation counter	0	LD0.PH1QVVR1.DipMomCnt.stVal
AI	Yes	240	Class 0	Yes	PQSS-1 Maximum duration dip operation counter	0	LD0.PH1QVVR1.DipMaxCnt.stVal
AI	Yes	241	Class 0	Yes	PQSS-1 Momentary interruption operation counter	0	LD0.PH1QVVR1.IntrMomCnt.stVal
AI	Yes	242	Class 0	Yes	PQSS-1 Temporary interruption operation counter	0	LD0.PH1QVVR1.IntrTmpCnt.stVal
AI	Yes	243	Class 0	Yes	PQSS-1 Sustained interruption operation counter	0	LD0.PH1QVVR1.IntrSstCnt.stVal
AI	Yes	244	Class 0	Yes	PQSS-1 Maximum duration interruption operation counter	0	LD0.PH1QVVR1.IntrMaxCnt.stVal

**Table 93: PQSS-1 : Voltage variation instance 1 (PH2QVVR1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	246	Class 0	Yes	PQSS-1 Voltage Variation Magnitude of the last completed event	100	LD0.PH2QVVR1.VVa.mag.f
AI	Yes	247	Class 0	Yes	PQSS-1 Voltage Variation Duration of the last completed event	100	LD0.PH2QVVR1.VVaTm.mag.f
AI	Yes	248	Class 0	Yes	PQSS-1 Current magnitude Phase B preceding variation	100	LD0.PH2QVVR1.APreVa.mag.f

**Table 94: PQSS-1 : Voltage variation instance 1 (PH3QVVR1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	249	Class 0	Yes	PQSS-1 Voltage Variation Magnitude of the last completed event	100	LD0.PH3QVVR1.VVa.mag.f
AI	Yes	250	Class 0	Yes	PQSS-1 Voltage Variation Duration of the last completed event	100	LD0.PH3QVVR1.VVaTm.mag.f
AI	Yes	251	Class 0	Yes	PQSS-1 Current magnitude Ph C preceding variation	100	LD0.PH3QVVR1.APreVa.mag.f

**Table 95: PQSS-1 : Voltage variation instance 1 (QVV1MSTA1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	252	Class 0	Yes	PQSS-1 Variation type	0	LD0.QVV1MSTA1.VVaTyp.stVal
AI	Yes	253	Class 0	Yes	PQSS-1 Variation magnitude Phase A	100	LD0.QVV1MSTA1.VVaA.mag.f
AI	Yes	254	Class 0	Yes	PQSS-1 Variation magnitude Phase B	100	LD0.QVV1MSTA1.VVaB.mag.f
AI	Yes	255	Class 0	Yes	PQSS-1 Variation magnitude Phase C	100	LD0.QVV1MSTA1.VVaC.mag.f
AI	Yes	256	Class 0	Yes	PQSS-1 Variation duration Phase A	100	LD0.QVV1MSTA1.VVaTmA.mag.f
AI	Yes	257	Class 0	Yes	PQSS-1 Variation duration Phase B	100	LD0.QVV1MSTA1.VVaTmB.mag.f
AI	Yes	258	Class 0	Yes	PQSS-1 Variation duration Phase C	100	LD0.QVV1MSTA1.VVaTmC.mag.f



DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	259	Class 0	Yes	PQSS-1 Current magnitude Phase A preceding variation	100	LD0.QVV1MSTA1.APreVaA.mag.f
AI	Yes	260	Class 0	Yes	PQSS-1 Current magnitude Phase B preceding variation	100	LD0.QVV1MSTA1.APreVaB.mag.f
AI	Yes	261	Class 0	Yes	PQSS-1 Current magnitude Phase C preceding variation	100	LD0.QVV1MSTA1.APreVaC.mag.f

Table 96: PQSS-1 : Voltage variation instance 1 (QVV2MSTA1)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	262	Class 0	Yes	PQSS-1 Variation type	0	LD0.QVV2MSTA1.VVaTyp.stVal
AI	Yes	263	Class 0	Yes	PQSS-1 Variation magnitude Phase A	100	LD0.QVV2MSTA1.VVaA.mag.f
AI	Yes	264	Class 0	Yes	PQSS-1 Variation magnitude Phase B	100	LD0.QVV2MSTA1.VVaB.mag.f
AI	Yes	265	Class 0	Yes	PQSS-1 Variation magnitude Phase C	100	LD0.QVV2MSTA1.VVaC.mag.f
AI	Yes	266	Class 0	Yes	PQSS-1 Variation duration Phase A	100	LD0.QVV2MSTA1.VVaTmA.mag.f
AI	Yes	267	Class 0	Yes	PQSS-1 Variation duration Phase B	100	LD0.QVV2MSTA1.VVaTmB.mag.f
AI	Yes	268	Class 0	Yes	PQSS-1 Variation duration Phase C	100	LD0.QVV2MSTA1.VVaTmC.mag.f
AI	Yes	269	Class 0	Yes	PQSS-1 Current magnitude Phase A preceding variation	100	LD0.QVV2MSTA1.APreVaA.mag.f
AI	Yes	270	Class 0	Yes	PQSS-1 Current magnitude Phase B preceding variation	100	LD0.QVV2MSTA1.APreVaB.mag.f
AI	Yes	271	Class 0	Yes	PQSS-1 Current magnitude Phase C preceding variation	100	LD0.QVV2MSTA1.APreVaC.mag.f

Table 97: PQSS-1 : Voltage variation instance 1 (QVV3MSTA1)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	272	Class 0	Yes	PQSS-1 Variation type	0	LD0.QVV3MSTA1.VVaTyp.stVal
AI	Yes	273	Class 0	Yes	PQSS-1 Variation magnitude Phase A	100	LD0.QVV3MSTA1.VVaA.mag.f
AI	Yes	274	Class 0	Yes	PQSS-1 Variation magnitude Phase B	100	LD0.QVV3MSTA1.VVaB.mag.f
AI	Yes	275	Class 0	Yes	PQSS-1 Variation magnitude Phase C	100	LD0.QVV3MSTA1.VVaC.mag.f
AI	Yes	276	Class 0	Yes	PQSS-1 Variation duration Phase A	100	LD0.QVV3MSTA1.VVaTmA.mag.f
AI	Yes	277	Class 0	Yes	PQSS-1 Variation duration Phase B	100	LD0.QVV3MSTA1.VVaTmB.mag.f
AI	Yes	278	Class 0	Yes	PQSS-1 Variation duration Phase C	100	LD0.QVV3MSTA1.VVaTmC.mag.f
AI	Yes	279	Class 0	Yes	PQSS-1 Current magnitude Phase A preceding variation	100	LD0.QVV3MSTA1.APreVaA.mag.f
AI	Yes	280	Class 0	Yes	PQSS-1 Current magnitude Phase B preceding variation	100	LD0.QVV3MSTA1.APreVaB.mag.f
AI	Yes	281	Class 0	Yes	PQSS-1 Current magnitude Phase C preceding variation	100	LD0.QVV3MSTA1.APreVaC.mag.f

**Table 98: PQVUB-1 : Voltage unbalance instance 1 (VSQVUB1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		433	Class 1 and 0	Yes	PQVUB-1 Alarm active when percentile unbalance exceeds the limit		LD0.VSQVUB1.HiPctVUnb.stVal
BI	Yes	434	Class 0	Yes	PQVUB-1 Observation period is active		LD0.VSQVUB1.ObsPerAct.stVal
BI		435	Class 1 and 0	Yes	PQVUB-1 Alarm active when 3 sec voltage unbalance exceeds the limit		LD0.VSQVUB1.VarStr.stVal

**Table 99: LoadProf : Load profile (LDPMSTA1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		712	Class 1 and 0	Yes	LDPMSTA1 Recording memory warning status		LD0.LDPMSTA1.MemWrn.stVal
BI		713	Class 1 and 0	Yes	LDPMSTA1 Recording memory alarm status		LD0.LDPMSTA1.MemAlm.stVal

**Table 100: f : Frequency measurement instance 1 (FMMXU1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI	Yes	41	Class 0	Yes	f Frequency instantaneous value	100	LD0.FMMXU1.Hz.instMag.f

**Table 101: TP (1) : Minimum pulse timer (2 pcs) instance 1 (TPGAPC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	413	Class 0	Yes	TP-1 Output 2 status		LD0.TPGAPC1.Op.general
BI	Yes	874	Class 0	Yes	TP-1 Output 1 status		LD0.TPGAPC1.Str.general

**Table 102: TP (2) : Minimum pulse timer (2 pcs) instance 2 (TPGAPC2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	414	Class 0	Yes	TP-2 Output 2 status		LD0.TPGAPC2.Op.general
BI	Yes	875	Class 0	Yes	TP-2 Output 1 status		LD0.TPGAPC2.Str.general

**Table 103: TP (3) : Minimum pulse timer (2 pcs) instance 3 (TPGAPC3)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	415	Class 0	Yes	TP-3 Output 2 status		LD0.TPGAPC3.Op.general
BI	Yes	876	Class 0	Yes	TP-3 Output 1 status		LD0.TPGAPC3.Str.general

**Table 104: TP (4) : Minimum pulse timer (2 pcs) instance 4 (TPGAPC4)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	416	Class 0	Yes	TP-4 Output 2 status		LD0.TPGAPC4.Op.general
BI	Yes	877	Class 0	Yes	TP-4 Output 1 status		LD0.TPGAPC4.Str.general

**Table 105: 62CLD-1 : Minimum pulse timer (2 pcs second resolution) instance 1 (TPSGAPC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	716	Class 0	Yes	62CLD-1 Output 1 status		LD0.TPSGAPC1.Str.general
BI	Yes	879	Class 0	Yes	62CLD-1 Output 2 status		LD0.TPSGAPC1.Op.general

**Table 106: 62CLD-2 : Minimum pulse timer (2 pcs minute resolution) instance 1 (TPMGAPC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	717	Class 0	Yes	62CLD-2 Output 1 status		LD0.TPMGAPC1.Str.general
BI	Yes	878	Class 0	Yes	62CLD-2 Output 2 status		LD0.TPMGAPC1.Op.general

**Table 107: PT-1 : Pulse timer (8 pcs) instance 1 (PTGAPC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	650	Class 0	Yes	PT-1 Input 1 status		LD0.PTGAPC1.In1.stVal
BI	Yes	651	Class 0	Yes	PT-1 Input 2 status		LD0.PTGAPC1.In2.stVal
BI	Yes	652	Class 0	Yes	PT-1 Input 3 status		LD0.PTGAPC1.In3.stVal
BI	Yes	653	Class 0	Yes	PT-1 Input 4 status		LD0.PTGAPC1.In4.stVal
BI	Yes	654	Class 0	Yes	PT-1 Input 5 status		LD0.PTGAPC1.In5.stVal
BI	Yes	655	Class 0	Yes	PT-1 Input 6 status		LD0.PTGAPC1.In6.stVal
BI	Yes	656	Class 0	Yes	PT-1 Input 7 status		LD0.PTGAPC1.In7.stVal
BI	Yes	657	Class 0	Yes	PT-1 Input 8 status		LD0.PTGAPC1.In8.stVal
BI	Yes	658	Class 0	Yes	PT-1 Output 1 status		LD0.PTGAPC1.Q1.stVal
BI	Yes	659	Class 0	Yes	PT-1 Output 2 status		LD0.PTGAPC1.Q2.stVal
BI	Yes	660	Class 0	Yes	PT-1 Output 3 status		LD0.PTGAPC1.Q3.stVal
BI	Yes	661	Class 0	Yes	PT-1 Output 4 status		LD0.PTGAPC1.Q4.stVal
BI	Yes	662	Class 0	Yes	PT-1 Output 5 status		LD0.PTGAPC1.Q5.stVal
BI	Yes	663	Class 0	Yes	PT-1 Output 6 status		LD0.PTGAPC1.Q6.stVal
BI	Yes	664	Class 0	Yes	PT-1 Output 7 status		LD0.PTGAPC1.Q7.stVal
BI	Yes	665	Class 0	Yes	PT-1 Output 8 status		LD0.PTGAPC1.Q8.stVal

**Table 108: PT-2 : Pulse timer (8 pcs) instance 2 (PTGAPC2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	666	Class 0	Yes	PT-2 Input 1 status		LD0.PTGAPC2.In1.stVal
BI	Yes	667	Class 0	Yes	PT-2 Input 2 status		LD0.PTGAPC2.In2.stVal
BI	Yes	668	Class 0	Yes	PT-2 Input 3 status		LD0.PTGAPC2.In3.stVal
BI	Yes	669	Class 0	Yes	PT-2 Input 4 status		LD0.PTGAPC2.In4.stVal
BI	Yes	670	Class 0	Yes	PT-2 Input 5 status		LD0.PTGAPC2.In5.stVal
BI	Yes	671	Class 0	Yes	PT-2 Input 6 status		LD0.PTGAPC2.In6.stVal
BI	Yes	672	Class 0	Yes	PT-2 Input 7 status		LD0.PTGAPC2.In7.stVal

## Section 2 DNP3 data mappings

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	673	Class 0	Yes	PT-2 Input 8 status		LD0.PTGAPC2.In8.stVal
BI	Yes	674	Class 0	Yes	PT-2 Output 1 status		LD0.PTGAPC2.Q1.stVal
BI	Yes	675	Class 0	Yes	PT-2 Output 2 status		LD0.PTGAPC2.Q2.stVal
BI	Yes	676	Class 0	Yes	PT-2 Output 3 status		LD0.PTGAPC2.Q3.stVal
BI	Yes	677	Class 0	Yes	PT-2 Output 4 status		LD0.PTGAPC2.Q4.stVal
BI	Yes	678	Class 0	Yes	PT-2 Output 5 status		LD0.PTGAPC2.Q5.stVal
BI	Yes	679	Class 0	Yes	PT-2 Output 6 status		LD0.PTGAPC2.Q6.stVal
BI	Yes	680	Class 0	Yes	PT-2 Output 7 status		LD0.PTGAPC2.Q7.stVal
BI	Yes	681	Class 0	Yes	PT-2 Output 8 status		LD0.PTGAPC2.Q8.stVal

**Table 109: TOF-1 : Time delay off (8 pcs) instance 1 (TOFGAPC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	617	Class 0	Yes	TOF-1 Input 1 status		LD0.TOFGAPC1.In1.stVal
BI	Yes	618	Class 0	Yes	TOF-1 Input 2 status		LD0.TOFGAPC1.In2.stVal
BI	Yes	619	Class 0	Yes	TOF-1 Input 3 status		LD0.TOFGAPC1.In3.stVal
BI	Yes	620	Class 0	Yes	TOF-1 Input 4 status		LD0.TOFGAPC1.In4.stVal
BI	Yes	621	Class 0	Yes	TOF-1 Input 5 status		LD0.TOFGAPC1.In5.stVal
BI	Yes	622	Class 0	Yes	TOF-1 Input 6 status		LD0.TOFGAPC1.In6.stVal
BI	Yes	623	Class 0	Yes	TOF-1 Input 7 status		LD0.TOFGAPC1.In7.stVal
BI	Yes	624	Class 0	Yes	TOF-1 Input 8 status		LD0.TOFGAPC1.In8.stVal
BI	Yes	625	Class 0	Yes	TOF-1 Output 1 status		LD0.TOFGAPC1.Q1.stVal
BI	Yes	626	Class 0	Yes	TOF-1 Output 2 status		LD0.TOFGAPC1.Q2.stVal
BI	Yes	627	Class 0	Yes	TOF-1 Output 3 status		LD0.TOFGAPC1.Q3.stVal
BI	Yes	628	Class 0	Yes	TOF-1 Output 4 status		LD0.TOFGAPC1.Q4.stVal
BI	Yes	629	Class 0	Yes	TOF-1 Output 5 status		LD0.TOFGAPC1.Q5.stVal
BI	Yes	630	Class 0	Yes	TOF-1 Output 6 status		LD0.TOFGAPC1.Q6.stVal
BI	Yes	631	Class 0	Yes	TOF-1 Output 7 status		LD0.TOFGAPC1.Q7.stVal
BI	Yes	632	Class 0	Yes	TOF-1 Output 8 status		LD0.TOFGAPC1.Q8.stVal

**Table 110: TOF-2 : Time delay off (8 pcs) instance 2 (TOFGAPC2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	634	Class 0	Yes	TOF-2 Input 1 status		LD0.TOFGAPC2.In1.stVal
BI	Yes	635	Class 0	Yes	TOF-2 Input 2 status		LD0.TOFGAPC2.In2.stVal
BI	Yes	636	Class 0	Yes	TOF-2 Input 3 status		LD0.TOFGAPC2.In3.stVal
BI	Yes	637	Class 0	Yes	TOF-2 Input 4 status		LD0.TOFGAPC2.In4.stVal
BI	Yes	638	Class 0	Yes	TOF-2 Input 5 status		LD0.TOFGAPC2.In5.stVal
BI	Yes	639	Class 0	Yes	TOF-2 Input 6 status		LD0.TOFGAPC2.In6.stVal
BI	Yes	640	Class 0	Yes	TOF-2 Input 7 status		LD0.TOFGAPC2.In7.stVal

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	641	Class 0	Yes	TOF-2 Input 8 status		LD0.TOFGAPC2.In8.stVal
BI	Yes	642	Class 0	Yes	TOF-2 Output 1 status		LD0.TOFGAPC2.Q1.stVal
BI	Yes	643	Class 0	Yes	TOF-2 Output 2 status		LD0.TOFGAPC2.Q2.stVal
BI	Yes	644	Class 0	Yes	TOF-2 Output 3 status		LD0.TOFGAPC2.Q3.stVal
BI	Yes	645	Class 0	Yes	TOF-2 Output 4 status		LD0.TOFGAPC2.Q4.stVal
BI	Yes	646	Class 0	Yes	TOF-2 Output 5 status		LD0.TOFGAPC2.Q5.stVal
BI	Yes	647	Class 0	Yes	TOF-2 Output 6 status		LD0.TOFGAPC2.Q6.stVal
BI	Yes	648	Class 0	Yes	TOF-2 Output 7 status		LD0.TOFGAPC2.Q7.stVal
BI	Yes	649	Class 0	Yes	TOF-2 Output 8 status		LD0.TOFGAPC2.Q8.stVal

Table 111: TON -1 : Time delay on (8 pcs) instance 1 (TONGAPC1)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	583	Class 0	Yes	TON-1 Input 1		LD0.TONGAPC1.In1.stVal
BI	Yes	584	Class 0	Yes	TON-1 Input 2		LD0.TONGAPC1.In2.stVal
BI	Yes	585	Class 0	Yes	TON-1 Input 3		LD0.TONGAPC1.In3.stVal
BI	Yes	586	Class 0	Yes	TON-1 Input 4		LD0.TONGAPC1.In4.stVal
BI	Yes	587	Class 0	Yes	TON-1 Input 5		LD0.TONGAPC1.In5.stVal
BI	Yes	588	Class 0	Yes	TON-1 Input 6		LD0.TONGAPC1.In6.stVal
BI	Yes	589	Class 0	Yes	TON-1 Input 7		LD0.TONGAPC1.In7.stVal
BI	Yes	590	Class 0	Yes	TON-1 Input 8		LD0.TONGAPC1.In8.stVal
BI	Yes	591	Class 0	Yes	TON-1 Output 1		LD0.TONGAPC1.Q1.stVal
BI	Yes	592	Class 0	Yes	TON-1 Output 2		LD0.TONGAPC1.Q2.stVal
BI	Yes	593	Class 0	Yes	TON-1 Output 3		LD0.TONGAPC1.Q3.stVal
BI	Yes	594	Class 0	Yes	TON-1 Output 4		LD0.TONGAPC1.Q4.stVal
BI	Yes	595	Class 0	Yes	TON-1 Output 5		LD0.TONGAPC1.Q5.stVal
BI	Yes	596	Class 0	Yes	TON-1 Output 6		LD0.TONGAPC1.Q6.stVal
BI	Yes	597	Class 0	Yes	TON-1 Output 7		LD0.TONGAPC1.Q7.stVal
BI	Yes	598	Class 0	Yes	TON-1 Output 8		LD0.TONGAPC1.Q8.stVal

Table 112: TON -2 : Time delay on (8 pcs) instance 2 (TONGAPC2)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	600	Class 0	Yes	TON-2 Input 1		LD0.TONGAPC2.In1.stVal
BI	Yes	601	Class 0	Yes	TON-2 Input 2		LD0.TONGAPC2.In2.stVal
BI	Yes	602	Class 0	Yes	TON-2 Input 3		LD0.TONGAPC2.In3.stVal
BI	Yes	603	Class 0	Yes	TON-2 Input 4		LD0.TONGAPC2.In4.stVal
BI	Yes	604	Class 0	Yes	TON-2 Input 5		LD0.TONGAPC2.In5.stVal
BI	Yes	605	Class 0	Yes	TON-2 Input 6		LD0.TONGAPC2.In6.stVal
BI	Yes	606	Class 0	Yes	TON-2 Input 7		LD0.TONGAPC2.In7.stVal

## Section 2 DNP3 data mappings

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	607	Class 0	Yes	TON-2 Input 8		LD0.TONGAPC2.In8.stVal
BI	Yes	608	Class 0	Yes	TON-2 Output 1		LD0.TONGAPC2.Q1.stVal
BI	Yes	609	Class 0	Yes	TON-2 Output 2		LD0.TONGAPC2.Q2.stVal
BI	Yes	610	Class 0	Yes	TON-2 Output 3		LD0.TONGAPC2.Q3.stVal
BI	Yes	611	Class 0	Yes	TON-2 Output 4		LD0.TONGAPC2.Q4.stVal
BI	Yes	612	Class 0	Yes	TON-2 Output 5		LD0.TONGAPC2.Q5.stVal
BI	Yes	613	Class 0	Yes	TON-2 Output 6		LD0.TONGAPC2.Q6.stVal
BI	Yes	614	Class 0	Yes	TON-2 Output 7		LD0.TONGAPC2.Q7.stVal
BI	Yes	615	Class 0	Yes	TON-2 Output 8		LD0.TONGAPC2.Q8.stVal

**Table 113: SR-1 : Set reset (8 pcs) instance 1 (SRGAPC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	152	Class 0	Yes	SR-1 Q1 status		LD0.SRGAPC1.Q1.stVal
BI	Yes	153	Class 0	Yes	SR-1 Q2 status		LD0.SRGAPC1.Q2.stVal
BI	Yes	154	Class 0	Yes	SR-1 Q3 status		LD0.SRGAPC1.Q3.stVal
BI	Yes	155	Class 0	Yes	SR-1 Q4 status		LD0.SRGAPC1.Q4.stVal
BI	Yes	156	Class 0	Yes	SR-1 Q5 status		LD0.SRGAPC1.Q5.stVal
BI	Yes	157	Class 0	Yes	SR-1 Q6 status		LD0.SRGAPC1.Q6.stVal
BI	Yes	158	Class 0	Yes	SR-1 Q7 status		LD0.SRGAPC1.Q7.stVal
BI	Yes	159	Class 0	Yes	SR-1 Q8 status		LD0.SRGAPC1.Q8.stVal
BI	Yes	199	Class 0	Yes	SR-1 Set Q1 output when set		LD0.SRGAPC1.Set1.stVal
BI	Yes	200	Class 0	Yes	SR-1 Set Q2 output when set		LD0.SRGAPC1.Set2.stVal
BI	Yes	201	Class 0	Yes	SR-1 Set Q3 output when set		LD0.SRGAPC1.Set3.stVal
BI	Yes	202	Class 0	Yes	SR-1 Set Q4 output when set		LD0.SRGAPC1.Set4.stVal
BI	Yes	203	Class 0	Yes	SR-1 Set Q5 output when set		LD0.SRGAPC1.Set5.stVal
BI	Yes	204	Class 0	Yes	SR-1 Set Q6 output when set		LD0.SRGAPC1.Set6.stVal
BI	Yes	205	Class 0	Yes	SR-1 Set Q7 output when set		LD0.SRGAPC1.Set7.stVal
BI	Yes	206	Class 0	Yes	SR-1 Set Q8 output when set		LD0.SRGAPC1.Set8.stVal
BI	Yes	207	Class 0	Yes	SR-1 Resets Q1 output when set		LD0.SRGAPC1.Rs1.stVal
BI	Yes	208	Class 0	Yes	SR-1 Resets Q2 output when set		LD0.SRGAPC1.Rs2.stVal
BI	Yes	209	Class 0	Yes	SR-1 Resets Q3 output when set		LD0.SRGAPC1.Rs3.stVal
BI	Yes	210	Class 0	Yes	SR-1 Resets Q4 output when set		LD0.SRGAPC1.Rs4.stVal
BI	Yes	211	Class 0	Yes	SR-1 Resets Q5 output when set		LD0.SRGAPC1.Rs5.stVal
BI	Yes	212	Class 0	Yes	SR-1 Resets Q6 output when set		LD0.SRGAPC1.Rs6.stVal
BI	Yes	213	Class 0	Yes	SR-1 Resets Q7 output when set		LD0.SRGAPC1.Rs7.stVal
BI	Yes	214	Class 0	Yes	SR-1 Resets Q8 output when set		LD0.SRGAPC1.Rs8.stVal

Table 114: SR-2 : Set reset (8 pcs) instance 2 (SRGAPC2)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	510	Class 0	Yes	SR-2 Q1 status		LD0.SRGAPC2.Q1.stVal
BI	Yes	511	Class 0	Yes	SR-2 Q2 status		LD0.SRGAPC2.Q2.stVal
BI	Yes	512	Class 0	Yes	SR-2 Q3 status		LD0.SRGAPC2.Q3.stVal
BI	Yes	513	Class 0	Yes	SR-2 Q4 status		LD0.SRGAPC2.Q4.stVal
BI	Yes	514	Class 0	Yes	SR-2 Q5 status		LD0.SRGAPC2.Q5.stVal
BI	Yes	515	Class 0	Yes	SR-2 Q6 status		LD0.SRGAPC2.Q6.stVal
BI	Yes	516	Class 0	Yes	SR-2 Q7 status		LD0.SRGAPC2.Q7.stVal
BI	Yes	517	Class 0	Yes	SR-2 Q8 status		LD0.SRGAPC2.Q8.stVal
BI	Yes	518	Class 0	Yes	SR-2 Set Q1 output when set		LD0.SRGAPC2.Set1.stVal
BI	Yes	519	Class 0	Yes	SR-2 Set Q2 output when set		LD0.SRGAPC2.Set2.stVal
BI	Yes	520	Class 0	Yes	SR-2 Set Q3 output when set		LD0.SRGAPC2.Set3.stVal
BI	Yes	521	Class 0	Yes	SR-2 Set Q4 output when set		LD0.SRGAPC2.Set4.stVal
BI	Yes	522	Class 0	Yes	SR-2 Set Q5 output when set		LD0.SRGAPC2.Set5.stVal
BI	Yes	523	Class 0	Yes	SR-2 Set Q6 output when set		LD0.SRGAPC2.Set6.stVal
BI	Yes	524	Class 0	Yes	SR-2 Set Q7 output when set		LD0.SRGAPC2.Set7.stVal
BI	Yes	525	Class 0	Yes	SR-2 Set Q8 output when set		LD0.SRGAPC2.Set8.stVal
BI	Yes	526	Class 0	Yes	SR-2 Resets Q1 output when set		LD0.SRGAPC2.Rs1.stVal
BI	Yes	527	Class 0	Yes	SR-2 Resets Q2 output when set		LD0.SRGAPC2.Rs2.stVal
BI	Yes	528	Class 0	Yes	SR-2 Resets Q3 output when set		LD0.SRGAPC2.Rs3.stVal
BI	Yes	529	Class 0	Yes	SR-2 Resets Q4 output when set		LD0.SRGAPC2.Rs4.stVal
BI	Yes	530	Class 0	Yes	SR-2 Resets Q5 output when set		LD0.SRGAPC2.Rs5.stVal
BI	Yes	531	Class 0	Yes	SR-2 Resets Q6 output when set		LD0.SRGAPC2.Rs6.stVal
BI	Yes	532	Class 0	Yes	SR-2 Resets Q7 output when set		LD0.SRGAPC2.Rs7.stVal
BI	Yes	533	Class 0	Yes	SR-2 Resets Q8 output when set		LD0.SRGAPC2.Rs8.stVal

Table 115: SR-3 : Set reset (8 pcs) instance 3 (SRGAPC3)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	534	Class 0	Yes	SR-3 Q1 status		LD0.SRGAPC3.Q1.stVal
BI	Yes	535	Class 0	Yes	SR-3 Q2 status		LD0.SRGAPC3.Q2.stVal
BI	Yes	536	Class 0	Yes	SR-3 Q3 status		LD0.SRGAPC3.Q3.stVal
BI	Yes	537	Class 0	Yes	SR-3 Q4 status		LD0.SRGAPC3.Q4.stVal
BI	Yes	538	Class 0	Yes	SR-3 Q5 status		LD0.SRGAPC3.Q5.stVal
BI	Yes	539	Class 0	Yes	SR-3 Q6 status		LD0.SRGAPC3.Q6.stVal
BI	Yes	540	Class 0	Yes	SR-3 Q7 status		LD0.SRGAPC3.Q7.stVal
BI	Yes	541	Class 0	Yes	SR-3 Q8 status		LD0.SRGAPC3.Q8.stVal
BI	Yes	542	Class 0	Yes	SR-3 Set Q1 output when set		LD0.SRGAPC3.Set1.stVal
BI	Yes	543	Class 0	Yes	SR-3 Set Q2 output when set		LD0.SRGAPC3.Set2.stVal
BI	Yes	544	Class 0	Yes	SR-3 Set Q3 output when set		LD0.SRGAPC3.Set3.stVal

## Section 2 DNP3 data mappings

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	545	Class 0	Yes	SR-3 Set Q4 output when set		LD0.SRGAPC3.Set4.stVal
BI	Yes	546	Class 0	Yes	SR-3 Set Q5 output when set		LD0.SRGAPC3.Set5.stVal
BI	Yes	547	Class 0	Yes	SR-3 Set Q6 output when set		LD0.SRGAPC3.Set6.stVal
BI	Yes	548	Class 0	Yes	SR-3 Set Q7 output when set		LD0.SRGAPC3.Set7.stVal
BI	Yes	549	Class 0	Yes	SR-3 Set Q8 output when set		LD0.SRGAPC3.Set8.stVal
BI	Yes	550	Class 0	Yes	SR-3 Resets Q1 output when set		LD0.SRGAPC3.Rs1.stVal
BI	Yes	551	Class 0	Yes	SR-3 Resets Q2 output when set		LD0.SRGAPC3.Rs2.stVal
BI	Yes	552	Class 0	Yes	SR-3 Resets Q3 output when set		LD0.SRGAPC3.Rs3.stVal
BI	Yes	553	Class 0	Yes	SR-3 Resets Q4 output when set		LD0.SRGAPC3.Rs4.stVal
BI	Yes	554	Class 0	Yes	SR-3 Resets Q5 output when set		LD0.SRGAPC3.Rs5.stVal
BI	Yes	555	Class 0	Yes	SR-3 Resets Q6 output when set		LD0.SRGAPC3.Rs6.stVal
BI	Yes	556	Class 0	Yes	SR-3 Resets Q7 output when set		LD0.SRGAPC3.Rs7.stVal
BI	Yes	557	Class 0	Yes	SR-3 Resets Q8 output when set		LD0.SRGAPC3.Rs8.stVal

**Table 116: SR-4 : Set reset (8 pcs) instance 4 (SRGAPC4)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	558	Class 0	Yes	SR-4 Q1 status		LD0.SRGAPC4.Q1.stVal
BI	Yes	559	Class 0	Yes	SR-4 Q2 status		LD0.SRGAPC4.Q2.stVal
BI	Yes	560	Class 0	Yes	SR-4 Q3 status		LD0.SRGAPC4.Q3.stVal
BI	Yes	561	Class 0	Yes	SR-4 Q4 status		LD0.SRGAPC4.Q4.stVal
BI	Yes	562	Class 0	Yes	SR-4 Q5 status		LD0.SRGAPC4.Q5.stVal
BI	Yes	563	Class 0	Yes	SR-4 Q6 status		LD0.SRGAPC4.Q6.stVal
BI	Yes	564	Class 0	Yes	SR-4 Q7 status		LD0.SRGAPC4.Q7.stVal
BI	Yes	565	Class 0	Yes	SR-4 Q8 status		LD0.SRGAPC4.Q8.stVal
BI	Yes	566	Class 0	Yes	SR-4 Set Q1 output when set		LD0.SRGAPC4.Set1.stVal
BI	Yes	567	Class 0	Yes	SR-4 Set Q2 output when set		LD0.SRGAPC4.Set2.stVal
BI	Yes	568	Class 0	Yes	SR-4 Set Q3 output when set		LD0.SRGAPC4.Set3.stVal
BI	Yes	569	Class 0	Yes	SR-4 Set Q4 output when set		LD0.SRGAPC4.Set4.stVal
BI	Yes	570	Class 0	Yes	SR-4 Set Q5 output when set		LD0.SRGAPC4.Set5.stVal
BI	Yes	571	Class 0	Yes	SR-4 Set Q6 output when set		LD0.SRGAPC4.Set6.stVal
BI	Yes	572	Class 0	Yes	SR-4 Set Q7 output when set		LD0.SRGAPC4.Set7.stVal
BI	Yes	573	Class 0	Yes	SR-4 Set Q8 output when set		LD0.SRGAPC4.Set8.stVal
BI	Yes	574	Class 0	Yes	SR-4 Resets Q1 output when set		LD0.SRGAPC4.Rs1.stVal
BI	Yes	575	Class 0	Yes	SR-4 Resets Q2 output when set		LD0.SRGAPC4.Rs2.stVal
BI	Yes	576	Class 0	Yes	SR-4 Resets Q3 output when set		LD0.SRGAPC4.Rs3.stVal
BI	Yes	577	Class 0	Yes	SR-4 Resets Q4 output when set		LD0.SRGAPC4.Rs4.stVal
BI	Yes	578	Class 0	Yes	SR-4 Resets Q5 output when set		LD0.SRGAPC4.Rs5.stVal
BI	Yes	579	Class 0	Yes	SR-4 Resets Q6 output when set		LD0.SRGAPC4.Rs6.stVal



DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	580	Class 0	Yes	SR-4 Resets Q7 output when set		LD0.SRGAPC4.Rs7.stVal
BI	Yes	581	Class 0	Yes	SR-4 Resets Q8 output when set		LD0.SRGAPC4.Rs8.stVal

*Table 117: MV-1: Move (8 pcs) instance 1 (MVGAPC1)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		443	Class 1 and 0	Yes	MV-1 Q1 status		LD0.MVGAPC1.Q1.stVal
BI		444	Class 1 and 0	Yes	MV-1 Q2 status		LD0.MVGAPC1.Q2.stVal
BI		445	Class 1 and 0	Yes	MV-1 Q3 status		LD0.MVGAPC1.Q3.stVal
BI		446	Class 1 and 0	Yes	MV-1 Q4 status		LD0.MVGAPC1.Q4.stVal
BI		447	Class 1 and 0	Yes	MV-1 Q5 status		LD0.MVGAPC1.Q5.stVal
BI		448	Class 1 and 0	Yes	MV-1 Q6 status		LD0.MVGAPC1.Q6.stVal
BI		449	Class 1 and 0	Yes	MV-1 Q7 status		LD0.MVGAPC1.Q7.stVal
BI		450	Class 1 and 0	Yes	MV-1 Q8 status		LD0.MVGAPC1.Q8.stVal

*Table 118: MV-2: Move (8 pcs) instance 2 (MVGAPC2)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		452	Class 1 and 0	Yes	MV-2 Q1 status		LD0.MVGAPC2.Q1.stVal
BI		453	Class 1 and 0	Yes	MV-2 Q2 status		LD0.MVGAPC2.Q2.stVal
BI		454	Class 1 and 0	Yes	MV-2 Q3 status		LD0.MVGAPC2.Q3.stVal
BI		455	Class 1 and 0	Yes	MV-2 Q4 status		LD0.MVGAPC2.Q4.stVal
BI		456	Class 1 and 0	Yes	MV-2 Q5 status		LD0.MVGAPC2.Q5.stVal
BI		457	Class 1 and 0	Yes	MV-2 Q6 status		LD0.MVGAPC2.Q6.stVal
BI		458	Class 1 and 0	Yes	MV-2 Q7 status		LD0.MVGAPC2.Q7.stVal
BI		459	Class 1 and 0	Yes	MV-2 Q8 status		LD0.MVGAPC2.Q8.stVal

*Table 119: MV-3: Move (8 pcs) instance 3 (MVGAPC3)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		460	Class 1 and 0	Yes	MV-3 Q1 status		LD0.MVGAPC3.Q1.stVal
BI		461	Class 1 and 0	Yes	MV-3 Q2 status		LD0.MVGAPC3.Q2.stVal
BI		462	Class 1 and 0	Yes	MV-3 Q3 status		LD0.MVGAPC3.Q3.stVal
BI		463	Class 1 and 0	Yes	MV-3 Q4 status		LD0.MVGAPC3.Q4.stVal
BI		464	Class 1 and 0	Yes	MV-3 Q5 status		LD0.MVGAPC3.Q5.stVal
BI		465	Class 1 and 0	Yes	MV-3 Q6 status		LD0.MVGAPC3.Q6.stVal
BI		466	Class 1 and 0	Yes	MV-3 Q7 status		LD0.MVGAPC3.Q7.stVal
BI		467	Class 1 and 0	Yes	MV-3 Q8 status		LD0.MVGAPC3.Q8.stVal

**Table 120: MV-4 : Move (8 pcs) instance 4 (MVGAPC4)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		468	Class 1 and 0	Yes	MV-4 Q1 status		LD0.MVGAPC4.Q1.stVal
BI		469	Class 1 and 0	Yes	MV-4 Q2 status		LD0.MVGAPC4.Q2.stVal
BI		470	Class 1 and 0	Yes	MV-4 Q3 status		LD0.MVGAPC4.Q3.stVal
BI		471	Class 1 and 0	Yes	MV-4 Q4 status		LD0.MVGAPC4.Q4.stVal
BI		472	Class 1 and 0	Yes	MV-4 Q5 status		LD0.MVGAPC4.Q5.stVal
BI		473	Class 1 and 0	Yes	MV-4 Q6 status		LD0.MVGAPC4.Q6.stVal
BI		474	Class 1 and 0	Yes	MV-4 Q7 status		LD0.MVGAPC4.Q7.stVal
BI		475	Class 1 and 0	Yes	MV-4 Q8 status		LD0.MVGAPC4.Q8.stVal

**Table 121: MV-5 : Move (8 pcs) instance 5 (MVGAPC5)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		476	Class 1 and 0	Yes	MV-5 Q1 status		LD0.MVGAPC5.Q1.stVal
BI		477	Class 1 and 0	Yes	MV-5 Q2 status		LD0.MVGAPC5.Q2.stVal
BI		478	Class 1 and 0	Yes	MV-5 Q3 status		LD0.MVGAPC5.Q3.stVal
BI		479	Class 1 and 0	Yes	MV-5 Q4 status		LD0.MVGAPC5.Q4.stVal
BI		480	Class 1 and 0	Yes	MV-5 Q5 status		LD0.MVGAPC5.Q5.stVal
BI		481	Class 1 and 0	Yes	MV-5 Q6 status		LD0.MVGAPC5.Q6.stVal
BI		482	Class 1 and 0	Yes	MV-5 Q7 status		LD0.MVGAPC5.Q7.stVal
BI		483	Class 1 and 0	Yes	MV-5 Q8 status		LD0.MVGAPC5.Q8.stVal

**Table 122: MV-6 : Move (8 pcs) instance 6 (MVGAPC6)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		484	Class 1 and 0	Yes	MV-6 Q1 status		LD0.MVGAPC6.Q1.stVal
BI		485	Class 1 and 0	Yes	MV-6 Q2 status		LD0.MVGAPC6.Q2.stVal
BI		486	Class 1 and 0	Yes	MV-6 Q3 status		LD0.MVGAPC6.Q3.stVal
BI		487	Class 1 and 0	Yes	MV-6 Q4 status		LD0.MVGAPC6.Q4.stVal
BI		488	Class 1 and 0	Yes	MV-6 Q5 status		LD0.MVGAPC6.Q5.stVal
BI		489	Class 1 and 0	Yes	MV-6 Q6 status		LD0.MVGAPC6.Q6.stVal
BI		490	Class 1 and 0	Yes	MV-6 Q7 status		LD0.MVGAPC6.Q7.stVal
BI		491	Class 1 and 0	Yes	MV-6 Q8 status		LD0.MVGAPC6.Q8.stVal

**Table 123: MV-7 : Move (8 pcs) instance 7 (MVGAPC7)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		492	Class 1 and 0	Yes	MV-7 Q1 status		LD0.MVGAPC7.Q1.stVal
BI		493	Class 1 and 0	Yes	MV-7 Q2 status		LD0.MVGAPC7.Q2.stVal
BI		494	Class 1 and 0	Yes	MV-7 Q3 status		LD0.MVGAPC7.Q3.stVal

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		495	Class 1 and 0	Yes	MV-7 Q4 status		LD0.MVGAPC7.Q4.stVal
BI		496	Class 1 and 0	Yes	MV-7 Q5 status		LD0.MVGAPC7.Q5.stVal
BI		497	Class 1 and 0	Yes	MV-7 Q6 status		LD0.MVGAPC7.Q6.stVal
BI		498	Class 1 and 0	Yes	MV-7 Q7 status		LD0.MVGAPC7.Q7.stVal
BI		499	Class 1 and 0	Yes	MV-7 Q8 status		LD0.MVGAPC7.Q8.stVal

Table 124: MV-8 : Move (8 pcs) instance 8 (MVGAPC8)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		52	Class 3 and 0	Yes	TCFA - Trip Coil Failure Alarm Energized		LD0.MVGAPC8.Q1.stVal
BI		126	Class 3 and 0	Yes	CLTA - Cold Load Timer Alarm Energized		LD0.MVGAPC8.Q2.stVal
BI		32	Class 3 and 0	Yes	CLOSE - Output Contact Energized		LD0.MVGAPC8.Q3.stVal
BI		503	Class 1 and 0	Yes	MV-8 Q4 status		LD0.MVGAPC8.Q4.stVal
BI		504	Class 1 and 0	Yes	MV-8 Q5 status		LD0.MVGAPC8.Q5.stVal
BI		505	Class 1 and 0	Yes	MV-8 Q6 status		LD0.MVGAPC8.Q6.stVal
BI		506	Class 1 and 0	Yes	MV-8 Q7 status		LD0.MVGAPC8.Q7.stVal
BI		507	Class 1 and 0	Yes	MV-8 Q8 status		LD0.MVGAPC8.Q8.stVal

Table 125: CNTRL-1 : Generic control points instance 1 (SPCGGIO1)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		170	Class 3 and 0	Yes	CNTRL-1 Output 1 status		LD0.SPCGGIO1.SPCS01.stVal
BI		171	Class 3 and 0	Yes	CNTRL-1 Output 2 status		LD0.SPCGGIO1.SPCS02.stVal
BI		172	Class 3 and 0	Yes	CNTRL-1 Output 3 status		LD0.SPCGGIO1.SPCS03.stVal
BI		173	Class 3 and 0	Yes	CNTRL-1 Output 4 status		LD0.SPCGGIO1.SPCS04.stVal
BI		174	Class 3 and 0	Yes	CNTRL-1 Output 5 status		LD0.SPCGGIO1.SPCS05.stVal
BI		175	Class 3 and 0	Yes	CNTRL-1 Output 6 status		LD0.SPCGGIO1.SPCS06.stVal
BI		721	Class 1 and 0	Yes	CNTRL-1 Output 7 status		LD0.SPCGGIO1.SPCS07.stVal
BI		722	Class 1 and 0	Yes	CNTRL-1 Output 8 status		LD0.SPCGGIO1.SPCS08.stVal
BI		723	Class 1 and 0	Yes	CNTRL-1 Output 9 status		LD0.SPCGGIO1.SPCS09.stVal
BI		724	Class 1 and 0	Yes	CNTRL-1 Output 10 status		LD0.SPCGGIO1.SPCS10.stVal
BI		725	Class 1 and 0	Yes	CNTRL-1 Output 11 status		LD0.SPCGGIO1.SPCS11.stVal
BI		726	Class 1 and 0	Yes	CNTRL-1 Output 12 status		LD0.SPCGGIO1.SPCS12.stVal
BI		727	Class 1 and 0	Yes	CNTRL-1 Output 13 status		LD0.SPCGGIO1.SPCS13.stVal
BI		728	Class 1 and 0	Yes	CNTRL-1 Output 14 status		LD0.SPCGGIO1.SPCS14.stVal
BI		729	Class 1 and 0	Yes	CNTRL-1 Output 15 status		LD0.SPCGGIO1.SPCS15.stVal
BI		730	Class 1 and 0	Yes	CNTRL-1 Output 16 status		LD0.SPCGGIO1.SPCS16.stVal

**Table 126: CNTRL-2 : Generic control points instance 2 (SPCGGIO2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		731	Class 1 and 0	Yes	CNTRL-2 Output 1 status		LD0.SPCGGIO2.SPSCO1.stVal
BI		732	Class 1 and 0	Yes	CNTRL-2 Output 2 status		LD0.SPCGGIO2.SPSCO2.stVal
BI		733	Class 1 and 0	Yes	CNTRL-2 Output 3 status		LD0.SPCGGIO2.SPSCO3.stVal
BI		734	Class 1 and 0	Yes	CNTRL-2 Output 4 status		LD0.SPCGGIO2.SPSCO4.stVal
BI		735	Class 1 and 0	Yes	CNTRL-2 Output 5 status		LD0.SPCGGIO2.SPSCO5.stVal
BI		736	Class 1 and 0	Yes	CNTRL-2 Output 6 status		LD0.SPCGGIO2.SPSCO6.stVal
BI		737	Class 1 and 0	Yes	CNTRL-2 Output 7 status		LD0.SPCGGIO2.SPSCO7.stVal
BI		738	Class 1 and 0	Yes	CNTRL-2 Output 8 status		LD0.SPCGGIO2.SPSCO8.stVal
BI		739	Class 1 and 0	Yes	CNTRL-2 Output 9 status		LD0.SPCGGIO2.SPSCO9.stVal
BI		740	Class 1 and 0	Yes	CNTRL-2 Output 10 status		LD0.SPCGGIO2.SPSCO10.stVal
BI		741	Class 1 and 0	Yes	CNTRL-2 Output 11 status		LD0.SPCGGIO2.SPSCO11.stVal
BI		742	Class 1 and 0	Yes	CNTRL-2 Output 12 status		LD0.SPCGGIO2.SPSCO12.stVal
BI		743	Class 1 and 0	Yes	CNTRL-2 Output 13 status		LD0.SPCGGIO2.SPSCO13.stVal
BI		744	Class 1 and 0	Yes	CNTRL-2 Output 14 status		LD0.SPCGGIO2.SPSCO14.stVal
BI		745	Class 1 and 0	Yes	CNTRL-2 Output 15 status		LD0.SPCGGIO2.SPSCO15.stVal
BI		746	Class 1 and 0	Yes	CNTRL-2 Output 16 status		LD0.SPCGGIO2.SPSCO16.stVal

**Table 127: CNTRL-3 : Generic control points instance 3 (SPCGGIO3)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		747	Class 1 and 0	Yes	CNTRL-3 Output 1 status		LD0.SPCGGIO3.SPSCO1.stVal
BI		748	Class 1 and 0	Yes	CNTRL-3 Output 2 status		LD0.SPCGGIO3.SPSCO2.stVal
BI		749	Class 1 and 0	Yes	CNTRL-3 Output 3 status		LD0.SPCGGIO3.SPSCO3.stVal
BI		750	Class 1 and 0	Yes	CNTRL-3 Output 4 status		LD0.SPCGGIO3.SPSCO4.stVal
BI		751	Class 1 and 0	Yes	CNTRL-3 Output 5 status		LD0.SPCGGIO3.SPSCO5.stVal
BI		752	Class 1 and 0	Yes	CNTRL-3 Output 6 status		LD0.SPCGGIO3.SPSCO6.stVal
BI		753	Class 1 and 0	Yes	CNTRL-3 Output 7 status		LD0.SPCGGIO3.SPSCO7.stVal
BI		754	Class 1 and 0	Yes	CNTRL-3 Output 8 status		LD0.SPCGGIO3.SPSCO8.stVal
BI		755	Class 1 and 0	Yes	CNTRL-3 Output 9 status		LD0.SPCGGIO3.SPSCO9.stVal
BI		756	Class 1 and 0	Yes	CNTRL-3 Output 10 status		LD0.SPCGGIO3.SPSCO10.stVal
BI		757	Class 1 and 0	Yes	CNTRL-3 Output 11 status		LD0.SPCGGIO3.SPSCO11.stVal
BI		758	Class 1 and 0	Yes	CNTRL-3 Output 12 status		LD0.SPCGGIO3.SPSCO12.stVal
BI		759	Class 1 and 0	Yes	CNTRL-3 Output 13 status		LD0.SPCGGIO3.SPSCO13.stVal
BI		760	Class 1 and 0	Yes	CNTRL-3 Output 14 status		LD0.SPCGGIO3.SPSCO14.stVal
BI		761	Class 1 and 0	Yes	CNTRL-3 Output 15 status		LD0.SPCGGIO3.SPSCO15.stVal
BI		762	Class 1 and 0	Yes	CNTRL-3 Output 16 status		LD0.SPCGGIO3.SPSCO16.stVal

Table 128: RCNTRL-1 : Remote Generic control points instance 1 (SPCRGGIO1)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		763	Class 1 and 0	Yes	RCNTRL-1 Output 1 status		LD0.SPCRGGIO1.SPSCO1.stVal
BI		764	Class 1 and 0	Yes	RCNTRL-1 Output 2 status		LD0.SPCRGGIO1.SPSCO2.stVal
BI		765	Class 1 and 0	Yes	RCNTRL-1 Output 3 status		LD0.SPCRGGIO1.SPSCO3.stVal
BI		766	Class 1 and 0	Yes	RCNTRL-1 Output 4 status		LD0.SPCRGGIO1.SPSCO4.stVal
BI		767	Class 1 and 0	Yes	RCNTRL-1 Output 5 status		LD0.SPCRGGIO1.SPSCO5.stVal
BI		768	Class 1 and 0	Yes	RCNTRL-1 Output 6 status		LD0.SPCRGGIO1.SPSCO6.stVal
BI		769	Class 1 and 0	Yes	RCNTRL-1 Output 7 status		LD0.SPCRGGIO1.SPSCO7.stVal
BI		770	Class 1 and 0	Yes	RCNTRL-1 Output 8 status		LD0.SPCRGGIO1.SPSCO8.stVal
BI		771	Class 1 and 0	Yes	RCNTRL-1 Output 9 status		LD0.SPCRGGIO1.SPSCO9.stVal
BI		772	Class 1 and 0	Yes	RCNTRL-1 Output 10 status		LD0.SPCRGGIO1.SPSCO10.stVal
BI		773	Class 1 and 0	Yes	RCNTRL-1 Output 11 status		LD0.SPCRGGIO1.SPSCO11.stVal
BI		774	Class 1 and 0	Yes	RCNTRL-1 Output 12 status		LD0.SPCRGGIO1.SPSCO12.stVal
BI		775	Class 1 and 0	Yes	RCNTRL-1 Output 13 status		LD0.SPCRGGIO1.SPSCO13.stVal
BI		776	Class 1 and 0	Yes	RCNTRL-1 Output 14 status		LD0.SPCRGGIO1.SPSCO14.stVal
BI		777	Class 1 and 0	Yes	RCNTRL-1 Output 15 status		LD0.SPCRGGIO1.SPSCO15.stVal
BI		778	Class 1 and 0	Yes	RCNTRL-1 Output 16 status		LD0.SPCRGGIO1.SPSCO16.stVal

Table 129: LCNTRL-1 : Local Generic control points instance 1 (SPCLGGIO1)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		779	Class 1 and 0	Yes	LCNTRL-1 Output 1 status		LD0.SPCLGGIO1.SPSCO1.stVal
BI		780	Class 1 and 0	Yes	LCNTRL-1 Output 2 status		LD0.SPCLGGIO1.SPSCO2.stVal
BI		781	Class 1 and 0	Yes	LCNTRL-1 Output 3 status		LD0.SPCLGGIO1.SPSCO3.stVal
BI		782	Class 1 and 0	Yes	LCNTRL-1 Output 4 status		LD0.SPCLGGIO1.SPSCO4.stVal
BI		783	Class 1 and 0	Yes	LCNTRL-1 Output 5 status		LD0.SPCLGGIO1.SPSCO5.stVal
BI		784	Class 1 and 0	Yes	LCNTRL-1 Output 6 status		LD0.SPCLGGIO1.SPSCO6.stVal
BI		785	Class 1 and 0	Yes	LCNTRL-1 Output 7 status		LD0.SPCLGGIO1.SPSCO7.stVal
BI		786	Class 1 and 0	Yes	LCNTRL-1 Output 8 status		LD0.SPCLGGIO1.SPSCO8.stVal
BI		787	Class 1 and 0	Yes	LCNTRL-1 Output 9 status		LD0.SPCLGGIO1.SPSCO9.stVal
BI		788	Class 1 and 0	Yes	LCNTRL-1 Output 10 status		LD0.SPCLGGIO1.SPSCO10.stVal
BI		789	Class 1 and 0	Yes	LCNTRL-1 Output 11 status		LD0.SPCLGGIO1.SPSCO11.stVal
BI		790	Class 1 and 0	Yes	LCNTRL-1 Output 12 status		LD0.SPCLGGIO1.SPSCO12.stVal
BI		791	Class 1 and 0	Yes	LCNTRL-1 Output 13 status		LD0.SPCLGGIO1.SPSCO13.stVal
BI		792	Class 1 and 0	Yes	LCNTRL-1 Output 14 status		LD0.SPCLGGIO1.SPSCO14.stVal
BI		793	Class 1 and 0	Yes	LCNTRL-1 Output 15 status		LD0.SPCLGGIO1.SPSCO15.stVal
BI		794	Class 1 and 0	Yes	LCNTRL-1 Output 16 status		LD0.SPCLGGIO1.SPSCO16.stVal

**Table 130: FKEY : Programmable buttons(16 buttons) instance 1 (FKEYGGIO1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		795	Class 1 and 0	Yes	FKEY KEY 1		LD0.FKEYGGIO1.Ind1.stVal
BI		796	Class 1 and 0	Yes	FKEY KEY 2		LD0.FKEYGGIO1.Ind2.stVal
BI		797	Class 1 and 0	Yes	FKEY KEY 3		LD0.FKEYGGIO1.Ind3.stVal
BI		798	Class 1 and 0	Yes	FKEY KEY 4		LD0.FKEYGGIO1.Ind4.stVal
BI		799	Class 1 and 0	Yes	FKEY KEY 5		LD0.FKEYGGIO1.Ind5.stVal
BI		800	Class 1 and 0	Yes	FKEY KEY 6		LD0.FKEYGGIO1.Ind6.stVal
BI		801	Class 1 and 0	Yes	FKEY KEY 7		LD0.FKEYGGIO1.Ind7.stVal
BI		802	Class 1 and 0	Yes	FKEY KEY 8		LD0.FKEYGGIO1.Ind8.stVal
BI		803	Class 1 and 0	Yes	FKEY KEY 9		LD0.FKEYGGIO1.Ind9.stVal
BI		804	Class 1 and 0	Yes	FKEY KEY 10		LD0.FKEYGGIO1.Ind10.stVal
BI		805	Class 1 and 0	Yes	FKEY KEY 11		LD0.FKEYGGIO1.Ind11.stVal
BI		806	Class 1 and 0	Yes	FKEY KEY 12		LD0.FKEYGGIO1.Ind12.stVal
BI		807	Class 1 and 0	Yes	FKEY KEY 13		LD0.FKEYGGIO1.Ind13.stVal
BI		808	Class 1 and 0	Yes	FKEY KEY 14		LD0.FKEYGGIO1.Ind14.stVal
BI		809	Class 1 and 0	Yes	FKEY KEY 15		LD0.FKEYGGIO1.Ind15.stVal
BI		810	Class 1 and 0	Yes	FKEY KEY 16		LD0.FKEYGGIO1.Ind16.stVal
BI	Yes	811	Class 0	Yes	FKEY LED 1		LD0.FKEYGGIO1.SPCSO1.stVal
BI	Yes	812	Class 0	Yes	FKEY LED 2		LD0.FKEYGGIO1.SPCSO2.stVal
BI	Yes	813	Class 0	Yes	FKEY LED 3		LD0.FKEYGGIO1.SPCSO3.stVal
BI	Yes	814	Class 0	Yes	FKEY LED 4		LD0.FKEYGGIO1.SPCSO4.stVal
BI	Yes	815	Class 0	Yes	FKEY LED 5		LD0.FKEYGGIO1.SPCSO5.stVal
BI	Yes	816	Class 0	Yes	FKEY LED 6		LD0.FKEYGGIO1.SPCSO6.stVal
BI	Yes	817	Class 0	Yes	FKEY LED 7		LD0.FKEYGGIO1.SPCSO7.stVal
BI	Yes	818	Class 0	Yes	FKEY LED 8		LD0.FKEYGGIO1.SPCSO8.stVal
BI	Yes	819	Class 0	Yes	FKEY LED 9		LD0.FKEYGGIO1.SPCSO9.stVal
BI	Yes	820	Class 0	Yes	FKEY LED 10		LD0.FKEYGGIO1.SPCSO10.stVal
BI	Yes	821	Class 0	Yes	FKEY LED 11		LD0.FKEYGGIO1.SPCSO11.stVal
BI	Yes	822	Class 0	Yes	FKEY LED 12		LD0.FKEYGGIO1.SPCSO12.stVal
BI	Yes	823	Class 0	Yes	FKEY LED 13		LD0.FKEYGGIO1.SPCSO13.stVal
BI	Yes	824	Class 0	Yes	FKEY LED 14		LD0.FKEYGGIO1.SPCSO14.stVal
BI	Yes	825	Class 0	Yes	FKEY LED 15		LD0.FKEYGGIO1.SPCSO15.stVal
BI	Yes	826	Class 0	Yes	FKEY LED 16		LD0.FKEYGGIO1.SPCSO16.stVal

**Table 131: CTR-1 : Generic Up-Down Counters instance 1 (UDFCNT1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	436	Class 0	Yes	CTR-1 Status of the down counting		LD0.UDFCNT1.DnCntSt.stVal
BI	Yes	437	Class 0	Yes	CTR-1 Status of the up counting		LD0.UDFCNT1.UpCntSt.stVal

**Table 132: CTR-2 : Generic Up-Down Counters instance 2 (UDFCNT2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	438	Class 0	Yes	CTR-2 Status of the down counting		LD0.UDFCNT2.DnCntSt.stVal
BI	Yes	439	Class 0	Yes	CTR-2 Status of the up counting		LD0.UDFCNT2.UpCntSt.stVal

**Table 133: CTR-3 : Generic Up-Down Counters instance 3 (UDFCNT3)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	440	Class 0	Yes	CTR-3 Status of the down counting		LD0.UDFCNT3.DnCntSt.stVal
BI	Yes	441	Class 0	Yes	CTR-3 Status of the up counting		LD0.UDFCNT3.UpCntSt.stVal

**Table 134: SHFT-1 : Shift register instance 1 (SHFTGAPC1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	839	Class 0	Yes	SHFT-1 Hold present output		LD0.SHFTGAPC1.HldOut.stVal
BI		840	Class 1 and 0	Yes	SHFT-1 Status of output 1		LD0.SHFTGAPC1.SPCSO1.stVal
BI		841	Class 1 and 0	Yes	SHFT-1 Status of output 2		LD0.SHFTGAPC1.SPCSO2.stVal
BI		842	Class 1 and 0	Yes	SHFT-1 Status of output 3		LD0.SHFTGAPC1.SPCSO3.stVal
BI		843	Class 1 and 0	Yes	SHFT-1 Status of output 4		LD0.SHFTGAPC1.SPCSO4.stVal
BI		844	Class 1 and 0	Yes	SHFT-1 Status of output 5		LD0.SHFTGAPC1.SPCSO5.stVal
BI		845	Class 1 and 0	Yes	SHFT-1 Status of output 6		LD0.SHFTGAPC1.SPCSO6.stVal
BI		846	Class 1 and 0	Yes	SHFT-1 Status of output 7		LD0.SHFTGAPC1.SPCSO7.stVal
BI		847	Class 1 and 0	Yes	SHFT-1 Status of output 8		LD0.SHFTGAPC1.SPCSO8.stVal
AI	Yes	296	Class 0	Yes	SHFT-1 Present output position	0	LD0.SHFTGAPC1.ActOutPos.stVal

**Table 135: SHFT-2 : Shift register instance 2 (SHFTGAPC2)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	848	Class 0	Yes	SHFT-2 Hold present output		LD0.SHFTGAPC2.HldOut.stVal
BI		849	Class 1 and 0	Yes	SHFT-2 Status of output 1		LD0.SHFTGAPC2.SPCSO1.stVal
BI		850	Class 1 and 0	Yes	SHFT-2 Status of output 2		LD0.SHFTGAPC2.SPCSO2.stVal
BI		851	Class 1 and 0	Yes	SHFT-2 Status of output 3		LD0.SHFTGAPC2.SPCSO3.stVal
BI		852	Class 1 and 0	Yes	SHFT-2 Status of output 4		LD0.SHFTGAPC2.SPCSO4.stVal
BI		853	Class 1 and 0	Yes	SHFT-2 Status of output 5		LD0.SHFTGAPC2.SPCSO5.stVal
BI		854	Class 1 and 0	Yes	SHFT-2 Status of output 6		LD0.SHFTGAPC2.SPCSO6.stVal
BI		855	Class 1 and 0	Yes	SHFT-2 Status of output 7		LD0.SHFTGAPC2.SPCSO7.stVal
BI		856	Class 1 and 0	Yes	SHFT-2 Status of output 8		LD0.SHFTGAPC2.SPCSO8.stVal
AI	Yes	297	Class 0	Yes	SHFT-2 Present output position	0	LD0.SHFTGAPC2.ActOutPos.stVal

**Table 136: SHFT-3 : Shift register instance 3(SHFTGAPC3)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	857	Class 0	Yes	SHFT-3 Hold present output		LD0.SHFTGAPC3.HldOut.stVal
BI		858	Class 1 and 0	Yes	SHFT-3 Status of output 1		LD0.SHFTGAPC3.SPCSO1.stVal
BI		859	Class 1 and 0	Yes	SHFT-3 Status of output 2		LD0.SHFTGAPC3.SPCSO2.stVal
BI		860	Class 1 and 0	Yes	SHFT-3 Status of output 3		LD0.SHFTGAPC3.SPCSO3.stVal
BI		861	Class 1 and 0	Yes	SHFT-3 Status of output 4		LD0.SHFTGAPC3.SPCSO4.stVal
BI		862	Class 1 and 0	Yes	SHFT-3 Status of output 5		LD0.SHFTGAPC3.SPCSO5.stVal
BI		863	Class 1 and 0	Yes	SHFT-3 Status of output 6		LD0.SHFTGAPC3.SPCSO6.stVal
BI		864	Class 1 and 0	Yes	SHFT-3 Status of output 7		LD0.SHFTGAPC3.SPCSO7.stVal
BI		865	Class 1 and 0	Yes	SHFT-3 Status of output 8		LD0.SHFTGAPC3.SPCSO8.stVal
AI	Yes	298	Class 0	Yes	SHFT-3 Present output position	0	LD0.SHFTGAPC3.ActOutPos.stVal

**Table 137: DFR : Disturbance recorder (RDRE1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	26	Class 0	Yes	Disturbance recorder Trig recording		DR.RDRE1.RcdTrg.stVal
BI		706	Class 1 and 0	Yes	Disturbance recorder Recording made		DR.RDRE1.RcdMade.stVal
AI	Yes	291	Class 0	Yes	Disturbance recorder Number of recordings in the memory	0	DR.RDRE1.FltNum.stVal
A1	Yes	292	Class 0	Yes	Disturbance recorder How much recording memory is currently used	0	DR.RDRE1.MemUsed.stVal

**Table 138: FR : Fault recorder (FLTMSTA1)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI		55	Class 1 and 0	Yes	FLTMSTA1 Protection function	0	LD0.FLTMSTA1.ProFcn.stVal
AI		57	Class 1 and 0	Yes	FLTMSTA1 Active setting group	0	LD0.FLTMSTA1.ActSG.stVal
AI		58	Class 1 and 0	Yes	FLTMSTA1 Fault record number	0	LD0.FLTMSTA1.OpCnt.stVal
AI		59	Class 1 and 0	Yes	FLTMSTA1 Phase A current	100	LD0.FLTMSTA1.AmpsA.mag.f
AI		60	Class 1 and 0	Yes	FLTMSTA1 Phase B current	100	LD0.FLTMSTA1.AmpsB.mag.f
AI		61	Class 1 and 0	Yes	FLTMSTA1 Phase C current	100	LD0.FLTMSTA1.AmpsC.mag.f
AI		62	Class 1 and 0	Yes	FLTMSTA1 Residual current	100	LD0.FLTMSTA1.AmpsN.mag.f
AI		68	Class 1 and 0	Yes	FLTMSTA1 Positive sequence current	100	LD0.FLTMSTA1.AmpsPsSeq.mag.f
AI		69	Class 1 and 0	Yes	FLTMSTA1 Negative sequence current	100	LD0.FLTMSTA1.AmpsNgSeq.mag.f
AI		73	Class 1 and 0	Yes	FLTMSTA1 Phase A voltage	100	LD0.FLTMSTA1.VoltsA.mag.f
AI		74	Class 1 and 0	Yes	FLTMSTA1 Phase B voltage	100	LD0.FLTMSTA1.VoltsB.mag.f
AI		75	Class 1 and 0	Yes	FLTMSTA1 Phase C voltage	100	LD0.FLTMSTA1.VoltsC.mag.f
AI		76	Class 1 and 0	Yes	FLTMSTA1 Phase A to phase B voltage	100	LD0.FLTMSTA1.VoltsAB.mag.f
AI		77	Class 1 and 0	Yes	FLTMSTA1 Phase B to phase C voltage	100	LD0.FLTMSTA1.VoltsBC.mag.f



DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
AI		78	Class 1 and 0	Yes	FLTMSTA1 Phase C to phase A voltage	100	LD0.FLTMSTA1.VoltsCA.mag.f
AI		79	Class 1 and 0	Yes	FLTMSTA1 Positive sequence voltage	100	LD0.FLTMSTA1.VPsSeq.mag.f
AI		80	Class 1 and 0	Yes	FLTMSTA1 Negative sequence voltage	100	LD0.FLTMSTA1.VNgSeq.mag.f
AI		83	Class 1 and 0	Yes	FLTMSTA1 Distance to fault measured in pu	100	LD0.FLTMSTA1.FltDisKm.mag.f
AI		84	Class 1 and 0	Yes	FLTMSTA1 Fault resistance	100	LD0.FLTMSTA1.FltZ.cVal.mag.f
AI		86	Class 1 and 0	Yes	FLTMSTA1 Trip time	100	LD0.FLTMSTA1.OpTm.mag.f
AI		185	Class 2 and 0	Yes	FLTMSTA1 Maximum pickup duration of all stages during the fault	100	LD0.FLTMSTA1.StrDur.mag.f
AI		186	Class 2 and 0	Yes	FLTMSTA1 Maximum phase A current	100	LD0.FLTMSTA1.MaxAmpsA.mag.f
AI		187	Class 2 and 0	Yes	FLTMSTA1 Maximum phase B current	100	LD0.FLTMSTA1.MaxAmpsB.mag.f
AI		188	Class 2 and 0	Yes	FLTMSTA1 Maximum phase C current	100	LD0.FLTMSTA1.MaxAmpsC.mag.f
AI		189	Class 2 and 0	Yes	FLTMSTA1 Maximum residual current	100	LD0.FLTMSTA1.MaxAmpsN.mag.f
AI		190	Class 2 and 0	Yes	FLTMSTA1 Calculated residual current	100	LD0.FLTMSTA1.AmpsNCic.mag.f
AI		191	Class 2 and 0	Yes	FLTMSTA1 Residual voltage	100	LD0.FLTMSTA1.VoltsN.mag.f
AI		192	Class 2 and 0	Yes	FLTMSTA1 Zero sequence voltage	100	LD0.FLTMSTA1.VZroSeq.mag.f
AI		193	Class 2 and 0	Yes	FLTMSTA1 46PD ratio I2/I1	100	LD0.FLTMSTA1.PDNS1MxRat.mag.f
AI		194	Class 2 and 0	Yes	FLTMSTA1 Frequency	100	LD0.FLTMSTA1.Hz.mag.f
AI		195	Class 2 and 0	Yes	FLTMSTA1 Frequency gradient	100	LD0.FLTMSTA1.HzS.mag.f
AI		294	Class 2 and 0	Yes	FLTMSTA1 49 calculated temperature of the protected object relative to the trip level	100	LD0.FLTMSTA1.MaxTmpRI.mag.f

Table 139: FLO : Fault location (DRFLO1)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI	Yes	682	Class 0	Yes	FLO Relay Trip		LD0.DRFLO1.Tr.general
AI	Yes	138	Class 0	Yes	FLO Fault Distance	100	LD0.DRFLO1.FltDisKm.mag.f
AI	Yes	320	Class 0	Yes	FLO Loop Reactance	0	LD0.DRFLO1.FltLoopX.mag.f
AI	Yes	321	Class 0	Yes	FLO FaultResistance	0	LD0.DRFLO1.FltZ.mag.f

Table 140: XUGGIO100 : PSM (X100) card (present in combination with standard BO card) (XUGGIO100)

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		313	Class 1 and 0	Yes	Trip Contact Status (X100-PSM Connectors 29c-30nc-30no)		LD0.XUGGIO100.SPSCO1.stVal
BI		315	Class 1 and 0	Yes	Output 3 Contact Status (X100-PSM Connectors 23-24)		LD0.XUGGIO100.SPSCO3.stVal
BI		316	Class 1 and 0	Yes	Output 4 Contact Status (X100-PSM Connectors 21-22)		LD0.XUGGIO100.SPSCO4.stVal

## Section 2 DNP3 data mappings

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		317	Class 1 and 0	Yes	Output 5 Contact Status (X100-PSM Connectors 19-20)		LD0.XUGGIO100.SPCSO5.stVal
BI		318	Class 1 and 0	Yes	Output 6 Contact Status (X100-PSM Connectors 17-18)		LD0.XUGGIO100.SPCSO6.stVal

**Table 141: XBUGGIO100 : PSM (X100) card (present in combination with HSO card) (XBUGGIO100)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		319	Class 1 and 0	Yes	Output 1 Contact Status (X100-PSM Connectors 27-28)		LD0.XBUGGIO100.SPCSO1.stVal
BI		320	Class 1 and 0	Yes	Output 2 Contact Status (X100-PSM Connectors 25-26)		LD0.XBUGGIO100.SPCSO2.stVal
BI		321	Class 1 and 0	Yes	Output 3 Contact Status (X100-PSM Connectors 23-24)		LD0.XBUGGIO100.SPCSO3.stVal
BI		322	Class 1 and 0	Yes	Trip Contact Status (X100-PSM Connectors 29c-30nc-30no)		LD0.XBUGGIO100.SPCSO4.stVal

**Table 142: XUGGIO110: BIO (X110) standard BO card (XUGGIO110)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		83	Class 3 and 0	Yes	Input 1 Input Closed (X110-BIO Connectors 4-3c)		LD0.XUGGIO110.lnd1.stVal
BI		84	Class 3 and 0	Yes	Input 2 Input Closed (X110-BIO Connectors 5-3c)		LD0.XUGGIO110.lnd2.stVal
BI		85	Class 3 and 0	Yes	Input 3 Input Closed (X110-BIO Connectors 6-3c)		LD0.XUGGIO110.lnd3.stVal
BI		86	Class 3 and 0	Yes	Input 4 Input Closed (X110-BIO Connectors 7-3c)		LD0.XUGGIO110.lnd4.stVal
BI		87	Class 3 and 0	Yes	Input 5 Input Closed (X110-BIO Connectors 8-3c)		LD0.XUGGIO110.lnd5.stVal
BI		88	Class 3 and 0	Yes	Input 6 Input Closed (X110-BIO Connectors 9-3c)		LD0.XUGGIO110.lnd6.stVal
BI		89	Class 3 and 0	Yes	Input 7 Input Closed (X110-BIO Connectors 10-11c)		LD0.XUGGIO110.lnd7.stVal
BI		90	Class 3 and 0	Yes	Input 8 Input Closed (X110-BIO Connectors 12-13c)		LD0.XUGGIO110.lnd8.stVal
BI		309	Class 1 and 0	Yes	Output 1 Contact Status (X110-BIO Connectors 27c-28no-28nc)		LD0.XUGGIO110.SPCSO1.stVal
BI		310	Class 1 and 0	Yes	Output 2 Contact Status (X110-BIO Connectors 25c-26no-26nc)		LD0.XUGGIO110.SPCSO2.stVal

**Table 143: XBUGGIO110: BIO (X110) HSO card (XBUGGIO110)**

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		306	Class 1 and 0	Yes	Output 4 Contact Status (X110-BIO-H Connectors 21-22)		LD0.XBUGGIO110.SPCSO4.stVal

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		307	Class 1 and 0	Yes	Output 5 Contact Status (X110-BIO-H Connectors 19-20)		LD0.XBUGGIO110.SPCSO5.stVal
BI		308	Class 1 and 0	Yes	Output 6 Contact Status (X110-BIO-H Connectors 17-18)		LD0.XBUGGIO110.SPCSO6.stVal
BI		827	Class 1 and 0	Yes	Input 1 Input Closed (X110-BIO-H Connectors 4-3c)		LD0.XBUGGIO110.Ind1.stVal
BI		828	Class 1 and 0	Yes	Input 2 Input Closed (X110-BIO-H Connectors 5-3c)		LD0.XBUGGIO110.Ind2.stVal
BI		829	Class 1 and 0	Yes	Input 3 Input Closed (X110-BIO-H Connectors 6-3c)		LD0.XBUGGIO110.Ind3.stVal
BI		830	Class 1 and 0	Yes	Input 4 Input Closed (X110-BIO-H Connectors 7-3c)		LD0.XBUGGIO110.Ind4.stVal
BI		831	Class 1 and 0	Yes	Input 5 Input Closed (X110-BIO-H Connectors 8-3c)		LD0.XBUGGIO110.Ind5.stVal
BI		832	Class 1 and 0	Yes	Input 6 Input Closed (X110-BIO-H Connectors 9-3c)		LD0.XBUGGIO110.Ind6.stVal
BI		833	Class 1 and 0	Yes	Input 7 Input Closed (X110-BIO-H Connectors 10-11c)		LD0.XBUGGIO110.Ind7.stVal
BI		834	Class 1 and 0	Yes	Input 8 Input Closed (X110-BIO-H Connectors 12-13c)		LD0.XBUGGIO110.Ind8.stVal

*Table 144: XAUGGIO130 : AIM (X130) 5VT with 4 BI (XAUGGIO130)*

DNP Object Type	No Event	Point Index	DNP Class	Enabled	Description	Scale Factor	IEC61850 Data Attribute Name
BI		836	Class 1 and 0	Yes	Input 9 Input Closed (X130-AIM Connectors 39-40)		LD0.XAUGGIO130.Ind9.stVal
BI		837	Class 1 and 0	Yes	Input 10 Input Closed (X130-AIM Connectors 41-42)		LD0.XAUGGIO130.Ind10.stVal
BI		838	Class 1 and 0	Yes	Input 11 Input Closed (X130-AIM Connectors 43-44)		LD0.XAUGGIO130.Ind11.stVal

## 2.3 DNP Binary Outputs

Table 145: DNP Binary Outputs

DNP Object Type	Point Index	Enabled	Description	IEC61850 Data Attribute Name
BO	0	Yes	Trip Contact operate test (X100-PSM Connectors 29c-30nc-30no)	LD0.XUGGIO100.SPCSO1.Oper.ctlVal
BO	2	Yes	Output 1 Contact operate test (X110-BIO Connectors 27c-28nc-28no)	LD0.XUGGIO110.SPCSO1.Oper.ctlVal
BO	3	Yes	Output 2 Contact operate test (X110-BIO Connectors 25c-26nc-26no)	LD0.XUGGIO110.SPCSO2.Oper.ctlVal
BO	4	Yes	Output 3 Contact operate test (X100-PSM Connectors 23-24)	LD0.XUGGIO100.SPCSO3.Oper.ctlVal
BO	5	Yes	Output 4 Contact operate test (X100-PSM Connectors 21-22)	LD0.XUGGIO100.SPCSO4.Oper.ctlVal
BO	6	Yes	Output 5 Contact operate test (X100-PSM Connectors 19-20)	LD0.XUGGIO100.SPCSO5.Oper.ctlVal
BO	7	Yes	Output 6 Contact operate test (X100-PSM Connectors 17-18)	LD0.XUGGIO100.SPCSO6.Oper.ctlVal
BO	10	Yes	Trip operate command	LD0.SPCRGGIO1.SPCSO10.Oper.ctlVal
BO	11	Yes	Close operate command	LD0.SPCRGGIO1.SPCSO11.Oper.ctlVal
BO	12	Yes	Protection LLN0 Clear indication LEDs and texts	LD0.LLN0.LEDRs1.Oper.ctlVal
BO	13	Yes	IA IB IC CMMXU1 demands	LD0.CMSTA1.RecRs.Oper.ctlVal
BO	14	Yes	ULO1 Output Energize (43A-RCNTRL-1 Output 1)	LD0.SPCRGGIO1.SPCSO1.Oper.ctlVal
BO	15	Yes	ULO2 Output Energize (RCNTRL-1 Output 2)	LD0.SPCRGGIO1.SPCSO2.Oper.ctlVal
BO	16	Yes	ULO3 Output Energize (RCNTRL-1 Output 3)	LD0.SPCRGGIO1.SPCSO3.Oper.ctlVal
BO	17	Yes	ULO4 Output Energize (RCNTRL-1 Output 4)	LD0.SPCRGGIO1.SPCSO4.Oper.ctlVal
BO	18	Yes	ULO5 Output Energize (RCNTRL-1 Output 5)	LD0.SPCRGGIO1.SPCSO5.Oper.ctlVal
BO	19	Yes	ULO6 Output Energize (RCNTRL-1 Output 6)	LD0.SPCRGGIO1.SPCSO6.Oper.ctlVal
BO	20	Yes	ULO7 Output Energize (RCNTRL-1 Output 7)	LD0.SPCRGGIO1.SPCSO7.Oper.ctlVal
BO	21	Yes	ULO8 Output Energize (RCNTRL-1 Output 8)	LD0.SPCRGGIO1.SPCSO8.Oper.ctlVal
BO	22	Yes	ULO9 Output Energize (RCNTRL-1 Output 9)	LD0.SPCRGGIO1.SPCSO9.Oper.ctlVal
BO	24	Yes	Trip Operate Command	LD0.SPCRGGIO1.SPCSO12.Oper.ctlVal
BO	25	Yes	Close Operate Command	LD0.SPCRGGIO1.SPCSO13.Oper.ctlVal
BO	138	Yes	CNTRL-1 Trig output 1	LD0.SPCGGIO1.SPCSO1.Oper.ctlVal
BO	139	Yes	CNTRL-1 Trig output 2	LD0.SPCGGIO1.SPCSO2.Oper.ctlVal
BO	140	Yes	CNTRL-1 Trig output 3	LD0.SPCGGIO1.SPCSO3.Oper.ctlVal
BO	141	Yes	CNTRL-1 Trig output 4	LD0.SPCGGIO1.SPCSO4.Oper.ctlVal
BO	142	Yes	CNTRL-1 Trig output 5	LD0.SPCGGIO1.SPCSO5.Oper.ctlVal
BO	143	Yes	CNTRL-1 Trig output 6	LD0.SPCGGIO1.SPCSO6.Oper.ctlVal
BO	151	Yes	CNTRL-1 Trig output 8	LD0.SPCGGIO1.SPCSO8.Oper.ctlVal
BO	153	Yes	Protection LLN0 Clear alarm LEDs	LD0.LLN0.LEDRs2.Oper.ctlVal
BO	154	Yes	Physical device Reset of protection relay	LD0.LPHD1.RsDev.Oper.ctlVal
BO	155	Yes	52CM-1 Resets accumulation energy	LD0.SSCBR1.RsAccAPwr.Oper.ctlVal
BO	156	Yes	52CM-1 Reset CB remaining life and operation counter	LD0.SSCBR1.RsCBWear.Oper.ctlVal
BO	157	Yes	52CM-1 Reset CB closing and opening travel times	LD0.SSCBR1.RsTrvTm.Oper.ctlVal

DNP Object Type	Point Index	Enabled	Description	IEC61850 Data Attribute Name
BO	158	Yes	52CM-1 Reset the charging time of the CB spring	LD0.SSCBR1.RsSprChaTm.Oper.ctlVal
BO	159	Yes	79 79 reset to initial condition	LD0.DARREC1.RsRec.Oper.ctlVal
BO	160	Yes	79 79 all counters reset	LD0.DARREC1.RsCnt.Oper.ctlVal
BO	161	Yes	Output 4 Contact operate test (X110-BIO-H Connectors 21-22)	LD0.XBUGGIO110.SPCSO4.Oper.ctlVal
BO	162	Yes	Output 5 Contact operate test (X110-BIO-H Connectors 19-20)	LD0.XBUGGIO110.SPCSO5.Oper.ctlVal
BO	163	Yes	Output 6 Contact operate test (X110-BIO-H Connectors 17-18)	LD0.XBUGGIO110.SPCSO6.Oper.ctlVal
BO	164	Yes	P E-1 Reset of accumulated energy reading	LD0.PEMMTR1.SupDmdRs.Oper.ctlVal
BO	165	Yes	FLTMSTA1 Reset fault records	LD0.FLTMSTA1.RecRs.Oper.ctlVal
BO	166	Yes	LDPMSTA1 Reset load profile record	LD0.LDPMSTA1.RecRs.Oper.ctlVal
BO	167	Yes	PQI-1 CMHAI1 max.demands reset	LD0.CMHAI1.RecRs.Oper.ctlVal
BO	168	Yes	PQVPH-1 VMHAI1 max.demands reset	LD0.VMHAI1.RecRs.Oper.ctlVal
BO	169	Yes	PQSS-1 Counters reset	LD0.PH1QVVR1.RsCnt.Oper.ctlVal
BO	170	Yes	PQSS-1 Recorded data reset	LD0.PH1QVVR1.RecRs.Oper.ctlVal
BO	171	Yes	SP SE-1 Reset of accumulated energy reading	LD0.SPEMTR1.SupDmdRs.Oper.ctlVal
BO	172	Yes	Disturbance recorder Manual trigger for the disturbance recorder	DR.RDRE1.RcdTrg.Oper.ctlVal
BO	173	Yes	Disturbance recorder Clear all DFR recordings in the memory	DR.RDRE1.MemClr.Oper.ctlVal
BO	174	Yes	Protection LLN0 Reset all power quality data	LD0.LLN0.PQRs.Oper.ctlVal
BO	175	Yes	86/94-1 Reset 86/94-1 lockout and latch	LD0.TRPPTRC1.LORs.Oper.ctlVal
BO	176	Yes	86/94-1 Reset latched trip	LD0.TRPPTRC1.TrRs.Oper.ctlVal
BO	177	Yes	86/94-2 Reset 86/94-2 lockout and latch	LD0.TRPPTRC2.LORs.Oper.ctlVal
BO	178	Yes	86/94-2 Reset latched trip	LD0.TRPPTRC2.TrRs.Oper.ctlVal
BO	179	Yes	49F-1 Reset 49F temperature	LD0.T1PTTR1.RsTmp.Oper.ctlVal
BO	180	Yes	CFD CFD Reset	LD0.RCFD1.Rst.Oper.ctlVal
BO	181	Yes	CNTRL-1 Trig output 7	LD0.SPCGGIO1.SPCSO7.Oper.ctlVal
BO	182	Yes	Output 1 Contact operate test (X100-PSM Connectors 27-28)	LD0.XBUGGIO100.SPCSO1.Oper.ctlVal
BO	183	Yes	Output 2 Contact operate test (X100-PSM Connectors 25-26)	LD0.XBUGGIO100.SPCSO2.Oper.ctlVal
BO	184	Yes	Output 3 Contact operate test (X100-PSM Connectors 23-24)	LD0.XBUGGIO100.SPCSO3.Oper.ctlVal
BO	185	Yes	Trip Contact operate test (X100-PSM Connectors 29c-30nc-30no)	LD0.XBUGGIO100.SPCSO4.Oper.ctlVal
BO	188	Yes	SR-3 Resets Q1 output when set	LD0.SRGAPC3.Rs1.Oper.ctlVal
BO	189	Yes	SR-3 Resets Q2 output when set	LD0.SRGAPC3.Rs2.Oper.ctlVal
BO	190	Yes	SR-3 Resets Q3 output when set	LD0.SRGAPC3.Rs3.Oper.ctlVal
BO	191	Yes	SR-3 Resets Q4 output when set	LD0.SRGAPC3.Rs4.Oper.ctlVal
BO	192	Yes	SR-3 Resets Q5 output when set	LD0.SRGAPC3.Rs5.Oper.ctlVal
BO	193	Yes	SR-3 Resets Q6 output when set	LD0.SRGAPC3.Rs6.Oper.ctlVal
BO	194	Yes	SR-3 Resets Q7 output when set	LD0.SRGAPC3.Rs7.Oper.ctlVal
BO	195	Yes	SR-3 Resets Q8 output when set	LD0.SRGAPC3.Rs8.Oper.ctlVal
BO	196	Yes	SR-4 Resets Q1 output when set	LD0.SRGAPC4.Rs1.Oper.ctlVal
BO	197	Yes	SR-4 Resets Q2 output when set	LD0.SRGAPC4.Rs2.Oper.ctlVal

## Section 2 DNP3 data mappings

DNP Object Type	Point Index	Enabled	Description	IEC61850 Data Attribute Name
BO	198	Yes	SR-4 Resets Q3 output when set	LD0.SRGAPC4.Rs3.Oper.ctlVal
BO	199	Yes	SR-4 Resets Q4 output when set	LD0.SRGAPC4.Rs4.Oper.ctlVal
BO	200	Yes	SR-4 Resets Q5 output when set	LD0.SRGAPC4.Rs5.Oper.ctlVal
BO	201	Yes	SR-4 Resets Q6 output when set	LD0.SRGAPC4.Rs6.Oper.ctlVal
BO	202	Yes	SR-4 Resets Q7 output when set	LD0.SRGAPC4.Rs7.Oper.ctlVal
BO	203	Yes	SR-4 Resets Q8 output when set	LD0.SRGAPC4.Rs8.Oper.ctlVal
BO	204	Yes	CNTRL-1 Trig output 9	LD0.SPCGGIO1.SPCSO9.Oper.ctlVal
BO	205	Yes	CNTRL-1 Trig output 10	LD0.SPCGGIO1.SPCSO10.Oper.ctlVal
BO	206	Yes	CNTRL-1 Trig output 11	LD0.SPCGGIO1.SPCSO11.Oper.ctlVal
BO	207	Yes	CNTRL-1 Trig output 12	LD0.SPCGGIO1.SPCSO12.Oper.ctlVal
BO	208	Yes	CNTRL-1 Trig output 13	LD0.SPCGGIO1.SPCSO13.Oper.ctlVal
BO	209	Yes	CNTRL-1 Trig output 14	LD0.SPCGGIO1.SPCSO14.Oper.ctlVal
BO	210	Yes	CNTRL-1 Trig output 15	LD0.SPCGGIO1.SPCSO15.Oper.ctlVal
BO	211	Yes	CNTRL-1 Trig output 16	LD0.SPCGGIO1.SPCSO16.Oper.ctlVal
BO	212	Yes	CNTRL-2 Trig output 1	LD0.SPCGGIO2.SPCSO1.Oper.ctlVal
BO	213	Yes	CNTRL-2 Trig output 2	LD0.SPCGGIO2.SPCSO2.Oper.ctlVal
BO	214	Yes	CNTRL-2 Trig output 3	LD0.SPCGGIO2.SPCSO3.Oper.ctlVal
BO	215	Yes	CNTRL-2 Trig output 4	LD0.SPCGGIO2.SPCSO4.Oper.ctlVal
BO	216	Yes	CNTRL-2 Trig output 5	LD0.SPCGGIO2.SPCSO5.Oper.ctlVal
BO	217	Yes	CNTRL-2 Trig output 6	LD0.SPCGGIO2.SPCSO6.Oper.ctlVal
BO	218	Yes	CNTRL-2 Trig output 7	LD0.SPCGGIO2.SPCSO7.Oper.ctlVal
BO	219	Yes	CNTRL-2 Trig output 8	LD0.SPCGGIO2.SPCSO8.Oper.ctlVal
BO	220	Yes	CNTRL-2 Trig output 9	LD0.SPCGGIO2.SPCSO9.Oper.ctlVal
BO	221	Yes	CNTRL-2 Trig output 10	LD0.SPCGGIO2.SPCSO10.Oper.ctlVal
BO	222	Yes	CNTRL-2 Trig output 11	LD0.SPCGGIO2.SPCSO11.Oper.ctlVal
BO	223	Yes	CNTRL-2 Trig output 12	LD0.SPCGGIO2.SPCSO12.Oper.ctlVal
BO	224	Yes	CNTRL-2 Trig output 13	LD0.SPCGGIO2.SPCSO13.Oper.ctlVal
BO	225	Yes	CNTRL-2 Trig output 14	LD0.SPCGGIO2.SPCSO14.Oper.ctlVal
BO	226	Yes	CNTRL-2 Trig output 15	LD0.SPCGGIO2.SPCSO15.Oper.ctlVal
BO	227	Yes	CNTRL-2 Trig output 16	LD0.SPCGGIO2.SPCSO16.Oper.ctlVal
BO	228	Yes	CNTRL-3 Trig output 1	LD0.SPCGGIO3.SPCSO1.Oper.ctlVal
BO	229	Yes	CNTRL-3 Trig output 2	LD0.SPCGGIO3.SPCSO2.Oper.ctlVal
BO	230	Yes	CNTRL-3 Trig output 3	LD0.SPCGGIO3.SPCSO3.Oper.ctlVal
BO	231	Yes	CNTRL-3 Trig output 4	LD0.SPCGGIO3.SPCSO4.Oper.ctlVal
BO	232	Yes	CNTRL-3 Trig output 5	LD0.SPCGGIO3.SPCSO5.Oper.ctlVal
BO	233	Yes	CNTRL-3 Trig output 6	LD0.SPCGGIO3.SPCSO6.Oper.ctlVal
BO	234	Yes	CNTRL-3 Trig output 7	LD0.SPCGGIO3.SPCSO7.Oper.ctlVal
BO	235	Yes	CNTRL-3 Trig output 8	LD0.SPCGGIO3.SPCSO8.Oper.ctlVal
BO	236	Yes	CNTRL-3 Trig output 9	LD0.SPCGGIO3.SPCSO9.Oper.ctlVal
BO	237	Yes	CNTRL-3 Trig output 10	LD0.SPCGGIO3.SPCSO10.Oper.ctlVal

DNP Object Type	Point Index	Enabled	Description	IEC61850 Data Attribute Name
BO	238	Yes	CNTRL-3 Trig output 11	LD0.SPCGGIO3.SPCSO11.Oper.ctlVal
BO	239	Yes	CNTRL-3 Trig output 12	LD0.SPCGGIO3.SPCSO12.Oper.ctlVal
BO	240	Yes	CNTRL-3 Trig output 13	LD0.SPCGGIO3.SPCSO13.Oper.ctlVal
BO	241	Yes	CNTRL-3 Trig output 14	LD0.SPCGGIO3.SPCSO14.Oper.ctlVal
BO	242	Yes	CNTRL-3 Trig output 15	LD0.SPCGGIO3.SPCSO15.Oper.ctlVal
BO	243	Yes	CNTRL-3 Trig output 16	LD0.SPCGGIO3.SPCSO16.Oper.ctlVal
BO	257	Yes	RCNTRL-1 Output 14	LD0.SPCRGGIO1.SPCSO14.Oper.ctlVal
BO	258	Yes	RCNTRL-1 Output 15	LD0.SPCRGGIO1.SPCSO15.Oper.ctlVal
BO	259	Yes	RCNTRL-1 Output 16	LD0.SPCRGGIO1.SPCSO16.Oper.ctlVal
BO	260	Yes	CTR-1 Loads the counter to preset value	LD0.UDFCNT1.LodCnt.Oper.ctlVal
BO	261	Yes	CTR-1 Resets counter value	LD0.UDFCNT1.RsCnt.Oper.ctlVal
BO	262	Yes	CTR-2 Loads the counter to preset value	LD0.UDFCNT2.LodCnt.Oper.ctlVal
BO	263	Yes	CTR-2 Resets counter value	LD0.UDFCNT2.RsCnt.Oper.ctlVal
BO	264	Yes	CTR-3 Loads the counter to preset value	LD0.UDFCNT3.LodCnt.Oper.ctlVal
BO	265	Yes	CTR-3 Resets counter value	LD0.UDFCNT3.RsCnt.Oper.ctlVal
BO	266	Yes	DNP 3.0 Activate setting group 1	LD0.DNPGGIO1.ActSG1.Oper.ctlVal
BO	267	Yes	DNP 3.0 Activate setting group 2	LD0.DNPGGIO1.ActSG2.Oper.ctlVal
BO	268	Yes	DNP 3.0 Activate setting group 3	LD0.DNPGGIO1.ActSG3.Oper.ctlVal
BO	269	Yes	DNP 3.0 Activate setting group 4	LD0.DNPGGIO1.ActSG4.Oper.ctlVal
BO	270	Yes	DNP 3.0 Activate setting group 5	LD0.DNPGGIO1.ActSG5.Oper.ctlVal
BO	271	Yes	DNP 3.0 Activate setting group 6	LD0.DNPGGIO1.ActSG6.Oper.ctlVal
BO	272	Yes	Reset metering minimum and maximum recorded data	LD0.LLN0.MtrRecRs.Oper.ctlVal





## Section 3      DNP3 protocol implementation

### 3.1              DNP3 device profile

The following table provides a device profile document in the standard format defined in the DNP3 Subset Definitions Document. While it is referred to in the DNP3 Subset Definitions as a document, it is in fact a table, and only a component of a total interoperability guide. The table, in combination with the Implementation table and the point list tables provides a complete configuration/interoperability guide for communicating with a device.

**Table 146: Device profile document**

DNP3 device profile document	
Vendor name:	ABB Inc.
Device name:	REF615R
Highest DNP level supported: For requests: Level 2+ For responses: Level 2+	Device function: <input type="radio"/> Master <input checked="" type="radio"/> Slave
<p>Notable objects, functions, and/or qualifiers supported in addition to the highest DNP levels supported (the complete list is described in the attached table): For static (non-change-event) object requests, request qualifier codes 07 and 08 (limited quantity), and 17 and 28 (index) are supported. Static object requests sent with qualifiers 07, or 08, will be responded with qualifiers 00 or 01. 16-bit and 32-bit Analog Change Events with Time may be requested.</p>	
Maximum data link frame size (octets): Transmitted: 292 Received: 292	Maximum application fragment size (octets): Transmitted: Configurable (256...2048) Received: 2048
Maximum data link re-tries: <input type="radio"/> None <input type="radio"/> Fixed <input checked="" type="radio"/> Configurable (0...65535)	Maximum application layer re-tries: <input checked="" type="radio"/> None <input type="radio"/> Configurable
Requires data link layer confirmation: <input type="radio"/> Never <input type="radio"/> Always <input type="radio"/> Sometimes <input checked="" type="radio"/> Configurable as: "Never", "Only for multi-frame messages", or "Always"	
Requires application layer confirmation: <input type="radio"/> Never <input type="radio"/> Always <input type="radio"/> When reporting event data (slave devices only) <input type="radio"/> When sending multi-fragment responses (slave devices only) <input type="radio"/> Sometimes <input checked="" type="radio"/> Configurable as: "Only when reporting event data", or "When reporting event data or multi-fragment messages"	
Timeouts while waiting for:	
Data link confirm:	<input type="radio"/> None <input type="radio"/> Fixed at ____ <input type="radio"/> Variable <input checked="" type="radio"/> Configurable
Complete appl. fragment:	<input checked="" type="radio"/> None <input type="radio"/> Fixed at ____ <input type="radio"/> Variable <input type="radio"/> Configurable
Application confirm:	<input type="radio"/> None <input type="radio"/> Fixed at ____ <input type="radio"/> Variable <input checked="" type="radio"/> Configurable
Complete appl. response:	<input checked="" type="radio"/> None <input type="radio"/> Fixed at ____ <input type="radio"/> Variable <input type="radio"/> Configurable
Others:	Select/Operate Arm Timeout, not configurable; fixed at 10s, regardless of select timeout in the HMI. Need time interval, configurable Unsolicited notification delay, configurable Unsolicited response retry delay, configurable Unsolicited offline Interval, configurable
Sends/Executes Control Operations:	

DNP3 device profile document								
WRITE binary outputs	<input checked="" type="radio"/>	Never	<input type="radio"/>	Always	<input type="radio"/>	Sometimes	<input type="radio"/>	Configurable
SELECT/OPERATE	<input type="radio"/>	Never	<input type="radio"/>	Always	<input type="radio"/>	Sometimes	<input checked="" type="radio"/>	Configurable
DIRECT OPERATE	<input type="radio"/>	Never	<input type="radio"/>	Always	<input type="radio"/>	Sometimes	<input checked="" type="radio"/>	Configurable
DIRECT OPERATE - NO ACK	<input type="radio"/>	Never	<input type="radio"/>	Always	<input type="radio"/>	Sometimes	<input checked="" type="radio"/>	Configurable
Count > 1 (Count > 1 is accepted but ignored)	<input checked="" type="radio"/>	Never	<input type="radio"/>	Always	<input type="radio"/>	Sometimes	<input type="radio"/>	Configurable
Pulse on	<input type="radio"/>	Never	<input checked="" type="radio"/>	Always	<input type="radio"/>	Sometimes	<input type="radio"/>	Configurable
Pulse off	<input checked="" type="radio"/>	Never	<input type="radio"/>	Always	<input type="radio"/>	Sometimes	<input type="radio"/>	Configurable
Latch on	<input type="radio"/>	Never	<input checked="" type="radio"/>	Always	<input type="radio"/>	Sometimes	<input type="radio"/>	Configurable
Latch off	<input type="radio"/>	Never	<input checked="" type="radio"/>	Always	<input type="radio"/>	Sometimes	<input type="radio"/>	Configurable
Queue	<input checked="" type="radio"/>	Never	<input type="radio"/>	Always	<input type="radio"/>	Sometimes	<input type="radio"/>	Configurable
Clear queue	<input checked="" type="radio"/>	Never	<input type="radio"/>	Always	<input type="radio"/>	Sometimes	<input type="radio"/>	Configurable
The circuit breaker control model is configurable for either direct or SBO mode in the circuit breaker settings. If the operation mode does not match the CROB, the returned CROB status is hardware error (4). All other control points may be controlled by either direct or SBO controls.								
Reports binary input change events when no specific variation requested:				Reports time-tagged binary input change events when no specific variation requested:				
<input type="radio"/> Never <input type="radio"/> Only when time-tagged <input type="radio"/> Only non-time-tagged <input checked="" type="radio"/> Configurable to send one or the other				<input type="radio"/> Never <input type="radio"/> Binary input change with time <input type="radio"/> Binary input change with relative time <input checked="" type="radio"/> Configurable				
Sends unsolicited responses:				Sends static data in unsolicited responses:				
<input type="radio"/> Never <input checked="" type="radio"/> Configurable <input type="radio"/> Only certain objects <input type="radio"/> Sometimes (attach explanation) <input checked="" type="radio"/> ENABLE/DISABLE UNSOLICITED function codes supported				<input checked="" type="radio"/> Never <input type="radio"/> When device restarts <input type="radio"/> When status flags change  No other options are permitted.				
Default counter object/variation:				Counters roll over at:				
<input checked="" type="radio"/> No counters reported <input type="radio"/> Configurable <input type="radio"/> Default object Default variation: <input type="radio"/> Point-by-point list attached				<input checked="" type="radio"/> No counters reported <input type="radio"/> Configurable (attach explanation) <input type="radio"/> 16 bits <input type="radio"/> 32 bits <input type="radio"/> Other value: _____ <input type="radio"/> Point-by-point list attached				
Sends multi-fragment responses:								
<input checked="" type="radio"/> Yes <input type="radio"/> No								

DNP3 device profile document			
○ Configurable			
Sequential file transfer support:			
Append file mode	○ Yes	● No	
Custom status code strings	○ Yes	● No	
Permissions field	○ Yes	● No	
File events assigned to class	○ Yes	● No	
File events send immediately	○ Yes	● No	
Multiple blocks in a fragment	○ Yes	● No	
Max number of files open	0		
● = Selected, ○ = Not selected			

## 3.2 DNP3 implementation table

The following table identifies which object variations, function codes, and qualifiers the protection relay supports in both request messages and response messages. For static (non-change-event) objects, requests sent with qualifiers 00, 01, 06, 07, or 08, will be responded with qualifiers 00 or 01. Requests sent with qualifiers 17 or 28 will be responded with qualifiers 17 or 28. For change-event objects, qualifiers 17 or 28 are always responded.

Table 147: Implementation table

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object number	Variation number	Description	Function codes (dec)	Qualifier codes (hex)	Function codes (dec)	Qualifier codes (hex)
1	0	Binary input – any variation	1 (read) 22 (assign class)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 28 (index)		
1	1 (default) <sup>1</sup>	Binary input	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index) <sup>2</sup>
1	2	Binary input with status	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
2	0	Binary input change – any variation	1 (read)	06 (no range, or all) 07, 08 (limited qty)		
2	1	Binary input change without time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol. resp)	17, 28 (index)
2	2	Binary input change with time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol. resp)	17, 28 (index)
2	3	Binary input change with relative time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol. resp)	17, 28 (index)

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
10	0	Binary output status – any variation	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 28 (index)		
10	1	Binary output	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
12	1	Control relay output block	3 (select) 4 (operate) 5 (direct op) 6 (dir. op, noack)	17, 28 (index)	129 (response)	echo of request
30	0	Analog input – any variation	1 (read) 22 (assign class)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 28 (index)		
30	1	32-bit analog input	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
30	2 (default)	16-bit analog input	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
30	3	32-bit analog input without flag	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
30	4	16-bit analog input without flag	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
32	0	Analog change event – any variation	1 (read)	06 (no range, or all) 07, 08 (limited qty)		
32	1	32-bit analog change event without time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol. resp)	17, 28 (index)
32	2	16-bit analog change event without time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol. resp)	17, 28 (index)
32	3	32-bit analog change event with time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol. resp)	17, 28 (index)
32	4 (default)	16-bit analog change event with time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol. resp)	17, 28 (index)
50	0	Time and date				

# Section 3

## DNP3 protocol implementation

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
50	1 (default)	Time and date	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07 (limited qty = 1l) 08 (limited qty)	129 (response)	00, 01 (start-stop) 17, 28 (index)
			2 (write)	07 (limited qty = 1l)		
50	3	Time and date last recorded time	2 (write)	07 (limited qty)		
51	1	Time and date CTO			129 (response) 130 (unsol. resp)	07 (limited qty) (qty = 1)
51	2	Unsynchroni- zed time and date CTO			129 (response) 130 (unsol. resp)	07 (limited qty) (qty = 1)
52	2	Time delay fine			129 (response)	07 (limited qty) (qty = 1)
60	0	Not defined				
60	1	Class 0 data	1 (read)	06 (no range, or all)		
60	2	Class 1 data	1 (read)	06 (no range, or all)		
			20 (enbl. unsol.) 21 (dab. unsol.) 22 (assign class)	07, 08 (limited qty) 06 (no range, or all)		
60	3	Class 2 data	1 (read)	06 (no range, or all) 07, 08 (limited qty)		
			20 (enbl. unsol.) 21 (dab. unsol.) 22 (assign class)	06 (no range, or all)		
60	4	Class 3 data	1 (read)	06 (no range, or all) 07, 08 (limited qty)		
			20 (enbl. unsol.) 21 (dab. unsol.) 22 (assign class)	06 (no range, or all)		
80	1	Internal indications	1 (read)	00, 01 (start-stop)		
			2 (write) <sup>3</sup>	00 (start-stop) index=7		
No object (function code only)			13 (cold restart)		4	
No object (function code only)			14 (warm restart)			
No object (function code only)			23 (delay meas.)			
No object (function code only)			24 (record current time)			

1. A default variation refers to the variation responded when variation 0 is requested and/or in class 0, 1, 2, or 3 scans. Default variations are configurable; however, default settings for the configuration parameters are indicated in the table above.
2. For static (non-change-event) objects, qualifiers 17 or 28 are only responded when a request is sent with qualifiers 17 or 28, respectively. Otherwise, static object requests sent with qualifiers 00, 01, 06, 07, or 08, will be responded with qualifiers 00 or 01. (For change-event objects, qualifiers 17 or 28 are always responded.)
3. Writes of internal indications are only supported for index 7 (Restart IIN1-7)
4. Cold and warm restarts return an application layer acknowledge, but no restart action is taken.

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## Section 4      Glossary

<b>AIM</b>	Analog input module
<b>ANSI</b>	American National Standards Institute
<b>AR</b>	Autoreclosing
<b>BIO</b>	Binary input and output
<b>CB</b>	Circuit breaker
<b>CBB</b>	Cycle building block
<b>CBFP</b>	Circuit-breaker failure protection
<b>CROB</b>	Control relay output block
<b>CTO</b>	Common time of occurrence. The time and date CTO object is an information object that represents the absolute time of day.
<b>CTRL</b>	Control logical device
<b>DFR</b>	Digital fault recorder
<b>DNP3</b>	A distributed network protocol originally developed by Westronic. The DNP3 Users Group has the ownership of the protocol and assumes responsibility for its evolution.
<b>DR</b>	Disturbance recorder
<b>EMC</b>	Electromagnetic compatibility
<b>HMI</b>	Human-machine interface
<b>IEC 61850</b>	International standard for substation communication and modelling
<b>Protection relay</b>	Intelligent electronic device
<b>LD0</b>	Logical device zero (0)
<b>LED</b>	Light-emitting diode
<b>LHMI</b>	Local human-machine interface
<b>LLN0</b>	Logical node zero (0)
<b>PCM600</b>	Protection and Control Protection Relay Manager
<b>PhsA</b>	Phase A
<b>PhsB</b>	Phase B
<b>PhsC</b>	Phase C

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<b>PSM</b>	Power supply module
<b>SBO</b>	Select-before-operate
<b>stVal</b>	Status value
<b>Val</b>	Value





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