

Easergy MiCOM P445

Fast Multifunction Distance Protection Relay

P445/EN MC/Ld2 - Ed. 2

Software Version	K3
Hardware Suffix	L
IEC61850 Edition	2
Issue Date	03/2021

Model Implementation Conformance Statement (MICS)

Note

The technical manual for this device gives instructions for its installation, commissioning, and operation. However, the manual cannot cover all conceivable circumstances or include detailed information on all topics. In the event of questions or specific problems, do not take any action without proper authorization. Contact the appropriate Schneider Electric technical sales office and request the necessary information.

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**MODEL IMPLEMENTATION
CONFORMANCE STATEMENT
(MICS)**

Date (month/year):	03/2021
Products covered by this chapter:	This chapter covers the specific versions of the MiCOM products listed below. This includes only the following combinations of Software Version and Hardware Suffix.
Hardware suffix:	L
Software version:	K3
Connection diagrams:	This includes a list of the Connection Diagrams for the Products covered by this document. 10P445xx (xx = 01 to 04)

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1 Introduction

This specification is the Model Implementation Conformance Statement (MICS) and presents the top-level IEC61850 data model that has been implemented. The definitions of all used Logical Nodes and their associated Common Data Classes, components and associated enumerated values are also included for completeness.

The reader is expected to be conversant with the terminology presented within the IEC61850 part 6 and part 7 series of specifications.

This document is applicable for P445 with the firmware K3A. The MICS is conformant to the devices associated ICD (Substation Configuration Language) file:

P445_____K3A.ICD, version V3.0, according to part 6 and part 7 of the IEC61850 standards.

2 Logical Devices

The MiCOM relay implements an IEC61850 server that can contain one or more Logical Devices. Each Logical Device contains a data model built from instances of specific Logical Nodes and must consist of at least an instance of the LPHD Logical Node (which is responsible for providing physical device information) and an instance of the LLNO Logical Node (for addressing common issues across the Logical Device).

The IEC61850 data model is contained within the Logical Devices detailed in the table below. All MiCOM devices will name the supported Logical Devices consistently to ensure that data model variables with the same purpose will have the same name within each MiCOM server.

Logical Device	Comment/Usage
Control	Controls Domain
Measurements	Measurements Domain
Protection	Protection Domain
Records	Records Domain
System	System Domain

3 Logical Nodes

The IEC61850 data model consists of instances of Logical Nodes. The data model name for a Logical Node instance is constructed from an optional prefix (known as the wrapper), the Logical Node name, and an instance ID (or suffix).

The presented data model is in an alphabetically sorted order, rather than a logical order, because this is the natural order of the data when presented by a native MMS browser. (Higher level browsers can of course impart any ordering that they desire).

The following table presents a summary of the Logical Node templates used across the Logical Devices within the overall IEC61850 product data model:

LD	LN Instance	LN Type	LN Class	Description
Control				
	ArcRREC1	RREC_NO_SEG	RREC	Auto Reclose
	AscRSYN1	RSYN_DIFCLC_ENH	RSYN	System Checks - Check Sync 1
	AscRSYN2	RSYN_DIFCLC_ENH	RSYN	System Checks - Check Sync 2
	CILO1	CILO_INTERLOCK	CILO	Circuit Breaker Interlocking (Pole 1)
	CILO2	CILO_INTERLOCK	CILO	Circuit Breaker Interlocking (Pole 2)
	CILO3	CILO_INTERLOCK	CILO	Circuit Breaker Interlocking (Pole 3)
	CILO4	CILO_INTERLOCK	CILO	Circuit Breaker Interlocking (3 Pole)
	LLN0	LLN0_CONTROL	LLN0	Controls Logical Device
	LPHD1	LPHD_STANDARD	LPHD	Physical Device Information
	PsbRPSB1	RPSB_BASIC	RPSB	Zone 1 Ph/Gnd Power Swing Blocking
	PsbRPSB2	RPSB_BASIC	RPSB	Zone 2 Ph/Gnd Power Swing Blocking
	PsbRPSB3	RPSB_BASIC	RPSB	Zone 3 Ph/Gnd Power Swing Blocking
	PsbRPSB4	RPSB_BASIC	RPSB	Zone 4 Ph/Gnd Power Swing Blocking
	PsbRPSB5	RPSB_BASIC	RPSB	Zone P Ph/Gnd Power Swing Blocking
	PsbRPSB6	RPSB_BASIC	RPSB	Zone Q Ph/Gnd Power Swing Blocking
	XCBR1	XCBR_BASIC	XCBR	Circuit Breaker Monitoring (Pole 1)
	XCBR2	XCBR_BASIC	XCBR	Circuit Breaker Monitoring (Pole 2)
	XCBR3	XCBR_BASIC	XCBR	Circuit Breaker Monitoring (Pole 3)
	XCBR4	XCBR_BASIC	XCBR	Circuit Breaker Monitoring (3 Pole)
Measurements				
	DlyMMXU1	MMXU_DLY_46	MMXU	Propagation Delay Time Measurements
	LLN0	LLN0_STANDARD	LLN0	Measurements Logical Device
	LPHD1	LPHD_STANDARD	LPHD	Physical Device Information
	PriFouMMXU1	MMXU_FOURIER	MMXU	Primary Fourier Measurements

LD	LN Instance	LN Type	LN Class	Description
	PriMMTR1	MMTR_PRIV	MMTR	Primary based metering quantities
	PriMSQI1	MSQI_ALL	MSQI	Primary Sequence Measurements
	PriMSTA1	MSTA_I_W_VAR	MSTA	Primary Metering Statistics
	PriRmsMMXU1	MMXU_RMS	MMXU	Primary RMS Measurements
	PriSpeMMXU1	MMXU_SPE_55	MMXU	Primary Specific Measurements
	PriVcpMSQI1	MSQI_VOLTAGE	MSQI	Primary Compensated Overvoltage Measurements
	SecFouMMXU1	MMXU_FOURIER	MMXU	Secondary Fourier Measurements
	SecMMTR1	MMTR_PRIV	MMTR	Secondary based metering quantities
	SecMSQI1	MSQI_ALL	MSQI	Secondary Sequence Measurements
	SecMSTA1	MSTA_I_W_VAR	MSTA	Secondary Metering Statistics
	SecRmsMMXU1	MMXU_RMS	MMXU	Secondary RMS Measurements
	SecSpeMMXU1	MMXU_SPE_55	MMXU	Secondary Specific Measurements
	SecVcpMSQI1	MSQI_VOLTAGE	MSQI	Secondary Compensated Overvoltage Measurements
Protection				
	CbfRBRF1	RBRF_EXTTRIP_SEG	RBRF	CB1 Fail 1
	CbfRBRF2	RBRF_EXTTRIP_SEG	RBRF	CB1 Fail 2
	DfpPFRC1	PFRC_NO_SEG	PFRC	df/dt> 1 Frequency Rate of Change
	DfpPFRC2	PFRC_NO_SEG	PFRC	df/dt> 2 Frequency Rate of Change
	DfpPFRC3	PFRC_NO_SEG	PFRC	df/dt> 3 Frequency Rate of Change
	DfpPFRC4	PFRC_NO_SEG	PFRC	df/dt> 4 Frequency Rate of Change
	DisPDIS1	PDIS_BASIC	PDIS	Zone 1 Ph/Gnd Distance
	DisPDIS2	PDIS_BASIC	PDIS	Zone 2 Ph/Gnd Distance
	DisPDIS3	PDIS_BASIC	PDIS	Zone 3 Ph/Gnd Distance
	DisPDIS4	PDIS_BASIC	PDIS	Zone 4 Ph/Gnd Distance
	DisPDIS5	PDIS_BASIC	PDIS	Zone P Ph/Gnd Distance
	DisPDIS6	PDIS_BASIC	PDIS	Zone Q Ph/Gnd Distance
	DisPSCH1	PSCH_BASIC	PSCH	Distance Protection Scheme 1
	DisPSCH2	PSCH_BASIC	PSCH	Distance Protection Scheme 2
	EfdPTOC1	PTOC_NEU	PTOC	IN1> 1 Earth Fault (Derived)
	EfdPTOC2	PTOC_NEU	PTOC	IN1> 2 Earth Fault (Derived)
	EfdPTOC3	PTOC_NEU	PTOC	IN1> 3 Earth Fault (Derived)
	EfdPTOC4	PTOC_NEU	PTOC	IN1> 4 Earth Fault (Derived)
	FrqPTOF1	PTOF_NO_SEG	PTOF	F> 1 Over Frequency
	FrqPTOF2	PTOF_NO_SEG	PTOF	F> 2 Over Frequency
	FrqPTUF1	PTUF_NO_SEG	PTUF	F< 1 Under Frequency
	FrqPTUF2	PTUF_NO_SEG	PTUF	F< 2 Under Frequency

LD	LN Instance	LN Type	LN Class	Description
	FrqPTUF3	PTUF_NO_SEG	PTUF	F< 3 Under Frequency
	FrqPTUF4	PTUF_NO_SEG	PTUF	F< 4 Under Frequency
	LLN0	LLN0_PROT_NO_DIFF	LLN0	Protection LLN0 for non-Differential relays
	LPHD1	LPHD_STANDARD	LPHD	Physical Device Information
	NgcPTOC1	PTOC_NO_SEG	PTOC	I2> 1 Negative Sequence
	NgcPTOC2	PTOC_NO_SEG	PTOC	I2> 2 Negative Sequence
	NgcPTOC3	PTOC_NO_SEG	PTOC	I2> 3 Negative Sequence
	NgcPTOC4	PTOC_NO_SEG	PTOC	I2> 4 Negative Sequence
	OcpPTOC1	PTOC_SEG	PTOC	I> 1 Overcurrent
	OcpPTOC2	PTOC_SEG	PTOC	I> 2 Overcurrent
	OcpPTOC3	PTOC_SEG	PTOC	I> 3 Overcurrent
	OcpPTOC4	PTOC_SEG	PTOC	I> 4 Overcurrent
	PTRC1	PTRC_NO_SEG	PTRC	Protection Trip Conditioning
	SenEftPTOC1	PTOC_NEU	PTOC	ISEF> 1 Sensitive Earth Fault
	SenEftPTOC2	PTOC_NEU	PTOC	ISEF> 2 Sensitive Earth Fault
	SenEftPTOC3	PTOC_NEU	PTOC	ISEF> 3 Sensitive Earth Fault
	SenEftPTOC4	PTOC_NEU	PTOC	ISEF> 4 Sensitive Earth Fault
	SenRefPDIF1	PDIF_NEU	PDIF	IREF> 1 Restricted Earth Fault
	SofPSOF1	PSOF_BASIC	PSOF	Switch onto Fault protection
	ThmPTTR1	PTTR_NO_SEG	PTTR	Thermal Overload
	TorPSOF1	PSOF_BASIC	PSOF	Trip on reclose protection
	VtpCmpPTOV1	PTOV_NO_SEG	PTOV	Compensated V1> 1 Overvoltage
	VtpCmpPTOV2	PTOV_NO_SEG	PTOV	Compensated V1> 2 Overvoltage
	VtpPhsPTOV1	PTOV_SEG	PTOV	V> 1 Overvoltage
	VtpPhsPTOV2	PTOV_SEG	PTOV	V> 2 Overvoltage
	VtpPhsPTUV1	PTUV_SEG	PTUV	V< 1 Undervoltage
	VtpPhsPTUV2	PTUV_SEG	PTUV	V< 2 Undervoltage
	VtpResPTOV1	PTOV_NEU	PTOV	VN> 1 Residual Overvoltage
	VtpResPTOV2	PTOV_NEU	PTOV	VN> 2 Residual Overvoltage
Records				
	LLN0	LLN0_STANDARD	LLN0	Records Logical Device
	LPHD1	LPHD_STANDARD	LPHD	Physical Device Information
	RDRE1	RDRE_BASIC	RDRE	Disturbance Recorder
	RFLO1	RFLO_PRIV_45	RFLO	Fault Record
System				
	AlmCALH1	CALH_ALM	CALH	Group alarm handling 1
	AlmCALH2	CALH_ALM	CALH	Group alarm handling 2
	AlmCALH3	CALH_ALM	CALH	Group alarm handling 3
	AlmCALH4	CALH_ALM	CALH	Group alarm handling 4
	AlmCALH5	CALH_ALM	CALH	Group alarm handling 5
	AlmCALH6	CALH_ALM	CALH	Group alarm handling 6
	AlmCALH7	CALH_ALM	CALH	Group alarm handling 7

LD	LN Instance	LN Type	LN Class	Description
	AlmCALH8	CALH_ALM	CALH	Group alarm handling 8
	AlmGGIO1	GGIO_ALM_96	GGIO	Alarms
	GosGGIO1	GGIO_IND_32_INREF	GGIO	GOOSE Input Signals for edition 2
	GosGGIO2	GGIO_IND_32	GGIO	GOOSE Output Signals
	ImfInpGGIO1	GGIO_IND_8	GGIO	InterMiCOM Fibre Inputs Status (CH1)
	ImfInpGGIO2	GGIO_IND_8	GGIO	InterMiCOM Fibre Inputs Status (CH2)
	ImfOutGGIO1	GGIO_IND_8	GGIO	InterMiCOM Fibre Outputs Status (CH1)
	ImfOutGGIO2	GGIO_IND_8	GGIO	InterMiCOM Fibre Outputs Status (CH2)
	LedGGIO1	GGIO_IND_8	GGIO	LED (8) Signals
	LinkGGIO1	GGIO_IND_6	GGIO	Link Status
	LLN0	LLN0_SYSTEM	LLN0	System Logical Device
	LocLTIM1	LTIM_LOCAL	LTIM	Time management
	LPHD1	LPHD_SYSTEM	LPHD	Px40 physical device information in system
	OptGGIO1	GGIO_IND_16	GGIO	Opto node for 16 inputs only
	OrdRunGGIO1	GGIO_IND_32_INREF	GGIO	Uniqueness of control "Order Running" indications for control operations for edition 2
	PloGAPC1	GAPC_IND_32_CTRL	GAPC	Control input process control signals
	PloGGIO1	GGIO_IND_16	GGIO	Settable Control Input Status
	RlyGGIO1	GGIO_IND_16	GGIO	Output (16) Contacts
	SynLTMS1	LTMS_SYNC	LTMS	Time master supervision
	TVTR1	TVTR_P40	TVTR	Voltage transformer
	UsrGGIO1	GGIO_IND_DPS_8	GGIO	User Mapped (PSL) Double Point Status Indications
	UsrGGIO2	GGIO_IND_4	GGIO	User Mapped (PSL) Single Point Status Indications

The definition tables for each of the Logical Nodes in the top-level data model are presented in the following sub-sections and the column "T" means transient attribute.

3.1 LN: CALH_ALM

Description: Alarm handling
LN Class: CALH

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
GrAlm	SPS_D	Group alarm		C	

3.2 LN: CILO_INTERLOCK

Description: Control Interlocking
LN Class: CILO

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
EnaOpn	SPS_WD	Enable OPEN Commands		M	
EnaCls	SPS_WD	Enable CLOSE Commands		M	

3.3 LN: GAPC_IND_32_CTRL

Description: Generic automatic process control

LN Class: GAPC

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
SPCSO1	SPC_CONTROL	Single point controllable status output 1		O	
SPCSO2	SPC_CONTROL	Single point controllable status output 2		O	
SPCSO3	SPC_CONTROL	Single point controllable status output 3		O	
SPCSO4	SPC_CONTROL	Single point controllable status output 4		O	
SPCSO5	SPC_CONTROL	Single point controllable status output 5		O	
SPCSO6	SPC_CONTROL	Single point controllable status output 6		O	
SPCSO7	SPC_CONTROL	Single point controllable status output 7		O	
SPCSO8	SPC_CONTROL	Single point controllable status output 8		O	
SPCSO9	SPC_CONTROL	Single point controllable status output 9		O	
SPCSO10	SPC_CONTROL	Single point controllable status output 10		O	
SPCSO11	SPC_CONTROL	Single point controllable status output 11		O	
SPCSO12	SPC_CONTROL	Single point controllable status output 12		O	
SPCSO13	SPC_CONTROL	Single point controllable status output 13		O	
SPCSO14	SPC_CONTROL	Single point controllable status output 14		O	
SPCSO15	SPC_CONTROL	Single point controllable status output 15		O	
SPCSO16	SPC_CONTROL	Single point controllable status output 16		O	
SPCSO17	SPC_CONTROL	Single point controllable status output 17		O	

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
SPCSO18	SPC_CONTROL	Single point controllable status output 18		O	
SPCSO19	SPC_CONTROL	Single point controllable status output 19		O	
SPCSO20	SPC_CONTROL	Single point controllable status output 20		O	
SPCSO21	SPC_CONTROL	Single point controllable status output 21		O	
SPCSO22	SPC_CONTROL	Single point controllable status output 22		O	
SPCSO23	SPC_CONTROL	Single point controllable status output 23		O	
SPCSO24	SPC_CONTROL	Single point controllable status output 24		O	
SPCSO25	SPC_CONTROL	Single point controllable status output 25		O	
SPCSO26	SPC_CONTROL	Single point controllable status output 26		O	
SPCSO27	SPC_CONTROL	Single point controllable status output 27		O	
SPCSO28	SPC_CONTROL	Single point controllable status output 28		O	
SPCSO29	SPC_CONTROL	Single point controllable status output 29		O	
SPCSO30	SPC_CONTROL	Single point controllable status output 30		O	
SPCSO31	SPC_CONTROL	Single point controllable status output 31		O	
SPCSO32	SPC_CONTROL	Single point controllable status output 32		O	

3.4 LN: GGIO_ALM_96

Description: Generic Process I/O (w.r.t 96 Alarm Elements)

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Alm1	SPS_D	General single alarm		O	
Alm2	SPS_D	General single alarm		O	
Alm3	SPS_D	General single alarm		O	
Alm4	SPS_D	General single alarm		O	
Alm5	SPS_D	General single alarm		O	
Alm6	SPS_D	General single alarm		O	
Alm7	SPS_D	General single alarm		O	
Alm8	SPS_D	General single alarm		O	
Alm9	SPS_D	General single alarm		O	
Alm10	SPS_D	General single alarm		O	

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
Alm11	SPS_D	General single alarm		O	
Alm12	SPS_D	General single alarm		O	
Alm13	SPS_D	General single alarm		O	
Alm14	SPS_D	General single alarm		O	
Alm15	SPS_D	General single alarm		O	
Alm16	SPS_D	General single alarm		O	
Alm17	SPS_D	General single alarm		O	
Alm18	SPS_D	General single alarm		O	
Alm19	SPS_D	General single alarm		O	
Alm20	SPS_D	General single alarm		O	
Alm21	SPS_D	General single alarm		O	
Alm22	SPS_D	General single alarm		O	
Alm23	SPS_D	General single alarm		O	
Alm24	SPS_D	General single alarm		O	
Alm25	SPS_D	General single alarm		O	
Alm26	SPS_D	General single alarm		O	
Alm27	SPS_D	General single alarm		O	
Alm28	SPS_D	General single alarm		O	
Alm29	SPS_D	General single alarm		O	
Alm30	SPS_D	General single alarm		O	
Alm31	SPS_D	General single alarm		O	
Alm32	SPS_D	General single alarm		O	
Alm33	SPS_D	General single alarm		O	
Alm34	SPS_D	General single alarm		O	
Alm35	SPS_D	General single alarm		O	
Alm36	SPS_D	General single alarm		O	
Alm37	SPS_D	General single alarm		O	
Alm38	SPS_D	General single alarm		O	
Alm39	SPS_D	General single alarm		O	
Alm40	SPS_D	General single alarm		O	
Alm41	SPS_D	General single alarm		O	
Alm42	SPS_D	General single alarm		O	
Alm43	SPS_D	General single alarm		O	
Alm44	SPS_D	General single alarm		O	
Alm45	SPS_D	General single alarm		O	
Alm46	SPS_D	General single alarm		O	
Alm47	SPS_D	General single alarm		O	
Alm48	SPS_D	General single alarm		O	
Alm49	SPS_D	General single alarm		O	
Alm50	SPS_D	General single alarm		O	
Alm51	SPS_D	General single alarm		O	
Alm52	SPS_D	General single alarm		O	
Alm53	SPS_D	General single alarm		O	
Alm54	SPS_D	General single alarm		O	

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
Alm55	SPS_D	General single alarm		O	
Alm56	SPS_D	General single alarm		O	
Alm57	SPS_D	General single alarm		O	
Alm58	SPS_D	General single alarm		O	
Alm59	SPS_D	General single alarm		O	
Alm60	SPS_D	General single alarm		O	
Alm61	SPS_D	General single alarm		O	
Alm62	SPS_D	General single alarm		O	
Alm63	SPS_D	General single alarm		O	
Alm64	SPS_D	General single alarm		O	
Alm65	SPS_D	General single alarm		O	
Alm66	SPS_D	General single alarm		O	
Alm67	SPS_D	General single alarm		O	
Alm68	SPS_D	General single alarm		O	
Alm69	SPS_D	General single alarm		O	
Alm70	SPS_D	General single alarm		O	
Alm71	SPS_D	General single alarm		O	
Alm72	SPS_D	General single alarm		O	
Alm73	SPS_D	General single alarm		O	
Alm74	SPS_D	General single alarm		O	
Alm75	SPS_D	General single alarm		O	
Alm76	SPS_D	General single alarm		O	
Alm77	SPS_D	General single alarm		O	
Alm78	SPS_D	General single alarm		O	
Alm79	SPS_D	General single alarm		O	
Alm80	SPS_D	General single alarm		O	
Alm81	SPS_D	General single alarm		O	
Alm82	SPS_D	General single alarm		O	
Alm83	SPS_D	General single alarm		O	
Alm84	SPS_D	General single alarm		O	
Alm85	SPS_D	General single alarm		O	
Alm86	SPS_D	General single alarm		O	
Alm87	SPS_D	General single alarm		O	
Alm88	SPS_D	General single alarm		O	
Alm89	SPS_D	General single alarm		O	
Alm90	SPS_D	General single alarm		O	
Alm91	SPS_D	General single alarm		O	
Alm92	SPS_D	General single alarm		O	
Alm93	SPS_D	General single alarm		O	
Alm94	SPS_D	General single alarm		O	
Alm95	SPS_D	General single alarm		O	
Alm96	SPS_D	General single alarm		O	

3.5

LN: GGIO_IND_16

Description: Generic process I/O (w.r.t. 16 indications)

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Ind1	SPS_D	General Indication		O	
Ind2	SPS_D	General Indication		O	
Ind3	SPS_D	General Indication		O	
Ind4	SPS_D	General Indication		O	
Ind5	SPS_D	General Indication		O	
Ind6	SPS_D	General Indication		O	
Ind7	SPS_D	General Indication		O	
Ind8	SPS_D	General Indication		O	
Ind9	SPS_D	General Indication		O	
Ind10	SPS_D	General Indication		O	
Ind11	SPS_D	General Indication		O	
Ind12	SPS_D	General Indication		O	
Ind13	SPS_D	General Indication		O	
Ind14	SPS_D	General Indication		O	
Ind15	SPS_D	General Indication		O	
Ind16	SPS_D	General Indication		O	

3.6

LN: GGIO_IND_32

Description: Generic Process I/O (w.r.t 32 Indication Elements)

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Ind1	SPS_D	General Indication		O	
Ind2	SPS_D	General Indication		O	
Ind3	SPS_D	General Indication		O	
Ind4	SPS_D	General Indication		O	
Ind5	SPS_D	General Indication		O	
Ind6	SPS_D	General Indication		O	
Ind7	SPS_D	General Indication		O	
Ind8	SPS_D	General Indication		O	
Ind9	SPS_D	General Indication		O	
Ind10	SPS_D	General Indication		O	
Ind11	SPS_D	General Indication		O	
Ind12	SPS_D	General Indication		O	
Ind13	SPS_D	General Indication		O	
Ind14	SPS_D	General Indication		O	
Ind15	SPS_D	General Indication		O	

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
Ind16	SPS_D	General Indication		O	
Ind17	SPS_D	General Indication		O	
Ind18	SPS_D	General Indication		O	
Ind19	SPS_D	General Indication		O	
Ind20	SPS_D	General Indication		O	
Ind21	SPS_D	General Indication		O	
Ind22	SPS_D	General Indication		O	
Ind23	SPS_D	General Indication		O	
Ind24	SPS_D	General Indication		O	
Ind25	SPS_D	General Indication		O	
Ind26	SPS_D	General Indication		O	
Ind27	SPS_D	General Indication		O	
Ind28	SPS_D	General Indication		O	
Ind29	SPS_D	General Indication		O	
Ind30	SPS_D	General Indication		O	
Ind31	SPS_D	General Indication		O	
Ind32	SPS_D	General Indication		O	

3.7 LN: GGIO_IND_32_INREF

Description: Generic process I/O

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
InRef1	ORG_SRC	General input reference		O	
Ind1	SPS_D	General indication (binary input)		O	
InRef2	ORG_SRC	General input reference		O	
Ind2	SPS_D	General indication (binary input)		O	
InRef3	ORG_SRC	General input reference		O	
Ind3	SPS_D	General indication (binary input)		O	
InRef4	ORG_SRC	General input reference		O	
Ind4	SPS_D	General indication (binary input)		O	
InRef5	ORG_SRC	General input reference		O	
Ind5	SPS_D	General indication (binary input)		O	
InRef6	ORG_SRC	General input reference		O	
Ind6	SPS_D	General indication (binary input)		O	
InRef7	ORG_SRC	General input reference		O	
Ind7	SPS_D	General indication (binary input)		O	
InRef8	ORG_SRC	General input reference		O	
Ind8	SPS_D	General indication (binary input)		O	
InRef9	ORG_SRC	General input reference		O	
Ind9	SPS_D	General indication (binary input)		O	
InRef10	ORG_SRC	General input reference		O	

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
Ind10	SPS_D	General indication (binary input)		O	
InRef11	ORG_SRC	General input reference		O	
Ind11	SPS_D	General indication (binary input)		O	
InRef12	ORG_SRC	General input reference		O	
Ind12	SPS_D	General indication (binary input)		O	
InRef13	ORG_SRC	General input reference		O	
Ind13	SPS_D	General indication (binary input)		O	
InRef14	ORG_SRC	General input reference		O	
Ind14	SPS_D	General indication (binary input)		O	
InRef15	ORG_SRC	General input reference		O	
Ind15	SPS_D	General indication (binary input)		O	
InRef16	ORG_SRC	General input reference		O	
Ind16	SPS_D	General indication (binary input)		O	
InRef17	ORG_SRC	General input reference		O	
Ind17	SPS_D	General indication (binary input)		O	
InRef18	ORG_SRC	General input reference		O	
Ind18	SPS_D	General indication (binary input)		O	
InRef19	ORG_SRC	General input reference		O	
Ind19	SPS_D	General indication (binary input)		O	
InRef20	ORG_SRC	General input reference		O	
Ind20	SPS_D	General indication (binary input)		O	
InRef21	ORG_SRC	General input reference		O	
Ind21	SPS_D	General indication (binary input)		O	
InRef22	ORG_SRC	General input reference		O	
Ind22	SPS_D	General indication (binary input)		O	
InRef23	ORG_SRC	General input reference		O	
Ind23	SPS_D	General indication (binary input)		O	
InRef24	ORG_SRC	General input reference		O	
Ind24	SPS_D	General indication (binary input)		O	
InRef25	ORG_SRC	General input reference		O	
Ind25	SPS_D	General indication (binary input)		O	
InRef26	ORG_SRC	General input reference		O	
Ind26	SPS_D	General indication (binary input)		O	
InRef27	ORG_SRC	General input reference		O	
Ind27	SPS_D	General indication (binary input)		O	
InRef28	ORG_SRC	General input reference		O	
Ind28	SPS_D	General indication (binary input)		O	
InRef29	ORG_SRC	General input reference		O	
Ind29	SPS_D	General indication (binary input)		O	
InRef30	ORG_SRC	General input reference		O	
Ind30	SPS_D	General indication (binary input)		O	
InRef31	ORG_SRC	General input reference		O	
Ind31	SPS_D	General indication (binary input)		O	
InRef32	ORG_SRC	General input reference		O	

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
Ind32	SPS_D	General indication (binary input)		O	

3.8 LN: GGIO_IND_4

Description: Generic process I/O

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Ind1	SPS_D	General indication (binary input)		O	
Ind2	SPS_D	General indication (binary input)		O	
Ind3	SPS_D	General indication (binary input)		O	
Ind4	SPS_D	General indication (binary input)		O	

3.9 LN: GGIO_IND_6

Description: Generic process I/O

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Ind1	SPS_D	General indication (binary input)		O	
Ind2	SPS_D	General indication (binary input)		O	
Ind3	SPS_D	General indication (binary input)		O	
Ind4	SPS_D	General indication (binary input)		O	
Ind5	SPS_D	General indication (binary input)		O	
Ind6	SPS_D	General indication (binary input)		O	

3.10 LN: GGIO_IND_8

Description: Generic process I/O (w.r.t 8 Indication Elements)

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Ind1	SPS_D	General Indication		O	
Ind2	SPS_D	General Indication		O	
Ind3	SPS_D	General Indication		O	
Ind4	SPS_D	General Indication		O	
Ind5	SPS_D	General Indication		O	
Ind6	SPS_D	General Indication		O	
Ind7	SPS_D	General Indication		O	

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
Ind8	SPS_D	General Indication		O	

3.11 LN: GGIO_IND_DPS_8

Description: Generic process I/O (w.r.t 8 Dual Point Status Indication Elements)

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
DPCSO1	DPC_STATUS_D	Double Point Status		O	
DPCSO2	DPC_STATUS_D	Double Point Status		O	
DPCSO3	DPC_STATUS_D	Double Point Status		O	
DPCSO4	DPC_STATUS_D	Double Point Status		O	
DPCSO5	DPC_STATUS_D	Double Point Status		O	
DPCSO6	DPC_STATUS_D	Double Point Status		O	
DPCSO7	DPC_STATUS_D	Double Point Status		O	
DPCSO8	DPC_STATUS_D	Double Point Status		O	

3.12 LN: LLN0_CONTROL

Description: Control Domain Logical Node 0

LN Class: LLN0

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LLNO	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
AscBeh	ENS_BEH_D_PRIV	Check Synchronisation		E	
AscMod	ENC_CTRL_D_PRIV	Check Synchronisation		E	
ArcBeh	ENS_BEH_D_PRIV	Auto-Reclose		E	
ArcMod	ENC_CTRL_D_PRIV	Auto-Reclose		E	
PsbBeh	ENS_BEH_D_PRIV	Power Swing Blocking		E	
PsbMod	ENC_CTRL_D_PRIV	Power Swing Blocking		E	

3.13 LN: LLN0_PROT_NO_DIFF

Description: Protection LLN0 for non_Differential relays

LN Class: LLN0

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LLNO	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
CbfBeh	ENS_BEH_D_PRIV	CB Fail Behaviour		E	
CbfMod	ENC_CTRL_D_PRIV	CB Fail Mode		E	
DfpBeh	ENS_BEH_D_PRIV	df/dt Behaviour		E	

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
DfpMod	ENC_CTRL_D_PRIV	df/dt Mode		E	
DisBeh	ENS_BEH_D_PRIV	Distance Behaviour		E	
DisMod	ENC_CTRL_D_PRIV	Distance Mode		E	
EfdBeh	ENS_BEH_D_PRIV	Earth Fault 1 (Derived) Behaviour		E	
EfdMod	ENC_CTRL_D_PRIV	Earth Fault 1 (Derived) Mode		E	
FrqBeh	ENS_BEH_D_PRIV	Overfrequency/Underfrequency Behaviour		E	
FrqMod	ENC_CTRL_D_PRIV	Overfrequency/Underfrequency Mode		E	
NgcBeh	ENS_BEH_D_PRIV	Negative Sequence Behaviour		E	
NgcMod	ENC_CTRL_D_PRIV	Negative Sequence Mode		E	
NvdBeh	ENS_BEH_D_PRIV	Residual Overvoltage NVD Behaviour		E	
NvdMod	ENC_CTRL_D_PRIV	Residual Overvoltage NVD Mode		E	
OcpBeh	ENS_BEH_D_PRIV	Overcurrent Behaviour		E	
OcpMod	ENC_CTRL_D_PRIV	Overcurrent Mode		E	
SefBeh	ENS_BEH_D_PRIV	SEF Behaviour		E	
SefMod	ENC_CTRL_D_PRIV	SEF Mode		E	
ThmBeh	ENS_BEH_D_PRIV	Thermal Overload Behaviour		E	
ThmMod	ENC_CTRL_D_PRIV	Thermal Overload Mode		E	
VtpBeh	ENS_BEH_D_PRIV	Overvoltage/Undervoltage Behaviour		E	
VtpMod	ENC_CTRL_D_PRIV	Overvoltage/Undervoltage Mode		E	

3.14 LN: LLN0_STANDARD

Description: General Logical Node 0

LN Class: LLN0

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LLNO	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	

3.15 LN: LLN0_SYSTEM

Description: System Logical Node 0

LN Class: LLN0

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LLNO	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
LEDRs	SPC_CONTROL	LED reset	T	O	
OrdRun	SPS_WD_PRIV	Indicate IED is operating a Control Object		E	
SyncSt	SPS_WD_PRIV	Indicate time synchronisation in the IED is active/inactive		E	

3.16 LN: LPHD_STANDARD

Description: Px40 Physical Device Information

LN Class: LPHD

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
PhyNam	DPL_STANDARD	Physical device name plate		M	
PhyHealth	ENS_HEALTH	Physical device health		M	
Proxy	SPS_D	Indicates if this LN is a proxy		M	
PwrUp	SPS_D	Power up detected		O	

3.17 LN: LPHD_SYSTEM

Description: Physical device information

LN Class: LPHD

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
PhyNam	DPL_STANDARD	Physical device name plate		M	
PhyHealth	ENS_HEALTH	Physical device health		M	
Proxy	SPS_D	Indicates if this LN is a proxy		M	
PwrUp	SPS_D	Power up detected		O	
Sim	SPC_CONTROL	Receive simulated GOOSE or simulated SV		O	

3.18 LN: LTIM_LOCAL

Description: Time management

LN Class: LTIM

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
TmDT	SPS_D	Indicating if for this location daylight saving time is in effect now		M	
TmOfsTmm	ING_BASIC	Offset of local time from UTC in minutes		M	
TmUseDT	SPG_BASIC	Flag indicating if this location is using daylight saving time		M	

3.19 LN: LTMS_SYNC

Description: Time master supervision (with time source only)

LN Class: LTMS

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
TmSrc	VSS_BASIC	Current time source		M	

3.20 LN: MMTR_PRIV

Description: Metering

LN Class: MMTR

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
SupWh	BCR_PRIV	Real energy supply (Energy flow towards bus bar)		O	
SupVArh	BCR_PRIV	Reactive energy supply (Energy flow towards bus bar)		O	
DmdWh	BCR_PRIV	Real energy demand (Energy flow from bus bar)		O	
DmdVArh	BCR_PRIV	Reactive energy demand (Energy flow from bus bar)		O	
MTRRs	SPC_CTRL_PRIV	Reset Energy Meters		E	

3.21 LN: MMXU_DLY_46

Description: Standard measurements

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
PgDlyCh1	MV_FLOAT_D_NS	Propagation Delay Ch1		E	
PgDlyCh2	MV_FLOAT_D_NS	Propagation Delay Ch2		E	

3.22 LN: MMXU_FOURIER

Description: Standard Measurements (w.r.t Fourier Values)

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
TotW	MV_FLOAT	Total active power (Total P)		O	
TotVAr	MV_FLOAT	Total reactive power (Total Q)		O	
TotVA	MV_FLOAT	Total apparent power (Total S)		O	
TotPF	MV_FLOAT	Average power factor (Total PF)		O	
Hz	MV_FLOAT	Frequency		O	
PPV	DEL_SEG_ANG	Phase to Phase voltages		O	
PhV	WYE_SEG_ANG_D	Phase to Ground voltages		O	
Ase1	WYE_SEG_RES_D_NS	Phase currents (Fourier Magnitudes)		O	
Ase2	WYE_RES_ANG_D_NS	Phase currents (ISEF Magnitude)		O	
Ase3	WYE_RES_ANG_D_NS	Phase currents (Mutual Magnitude)		O	
W	WYE_SEG	Phase active power (P)		O	
VAr	WYE_SEG	Phase reactive power (Q)		O	
VA	WYE_SEG	Phase apparent power (S)		O	

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
PF	WYE_SEG	Phase power factor		O	
Vx	WYE_RES_ANG_D_NS	C/S Voltage		E	

3.23 LN: MMXU_RMS

Description: Standard Measurements (w.r.t RMS Values)
LN Class: MMXU

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
PhV	WYE_SEG_D	Phase to Ground voltages		O	
A	WYE_SEG_D	Phase currents		O	

3.24 LN: MMXU_SPE_55

Description: Specific measurements
LN Class: MMXU

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
DfDt	MV_FLOAT_D_NS	df/dt		E	

3.25 LN: MSQI_ALL

Description: Sequence and imbalance (w.r.t Pos, Neq, Zero)
LN Class: MSQI

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
SeqA	SEQ_MAG_ANG	Positive, Negative and Zero sequence current		C	
SeqV	SEQ_MAG_ANG	Positive, Negative and Zero sequence voltage		C	

3.26 LN: MSQI_VOLTAGE

Description: Sequence and imbalance (w.r.t Pos, Neq, Zero Voltage Only)
LN Class: MSQI

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
SeqV	SEQ_MAG_ANG	Positive, Negative and Zero sequence voltage		C	

3.27 LN: MSTA_I_W_VAR

Description: Metering Statistics (w.r.t Current, Real + Reactive Power - Average + Max values)

LN Class: MSTA

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN_PRIV	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
AvAmpsse1	MV_FLOAT_D	Average current		O	
AvAmpsse2	MV_FLOAT_D	Average current		O	
AvAmpsse3	MV_FLOAT_D	Average current		O	
AvAmpsse4	MV_FLOAT_D	Average current		O	
AvAmpsse5	MV_FLOAT_D	Average current		O	
AvAmpsse6	MV_FLOAT_D	Average current		O	
MaxAmpsse1	MV_FLOAT_D	Maximum current		O	
MaxAmpsse2	MV_FLOAT_D	Maximum current		O	
MaxAmpsse3	MV_FLOAT_D	Maximum current		O	
AvWse1	MV_FLOAT_D	Average real power		O	
AvWse2	MV_FLOAT_D	Average real power		O	
MaxW	MV_FLOAT_D	Maximum real power		O	
AvVArse1	MV_FLOAT_D	Average reactive power		O	
AvVArse2	MV_FLOAT_D	Average reactive power		O	
MaxVAr	MV_FLOAT_D	Maximum reactive power		O	

3.28 LN: PDIF_NEU

Description: Differential (w.r.t Neutral)

LN Class: PDIF

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Op	ACT_NEU	Operate	T	M	

3.29 LN: PDIS_BASIC

Description: Distance (w.r.t Mandatory Attributes only)

LN Class: PDIS

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
Str	ACD_SEG_NEU	Start		M	
Op	ACT_SEG_NEU	Operate	T	M	

3.30 LN: PFRC_NO_SEG**Description:** Rate of change of frequency (w.r.t No Phase Segregation)

LN Class: PFRC

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Str	ACD_NO_SEG	Start		M	
Op	ACT_NO_SEG	Operate	T	M	

3.31 LN: PSCH_BASIC**Description:** Protection Scheme (w.r.t Mandatory Attributes only)

LN Class: PSCH

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Op	ACT_SEG_NEU	Operate	T	M	
CarRx	ACT_NO_SEG_NS	Carrier received after unblock logic		E	
LosOfGrd	SPS_WD_NS	Loss of guard		E	
ProRx	SPS_WD_NS	Teleprotection signal received	T	E	
ProTx	SPS_WD_NS	Teleprotection signal transmitted	T	E	
Str	ACD_NO_SEG	Carrier Send		E	
WeiOp	ACT_SEG_NS	Operate signal from weak end infeed function		E	

3.32 LN: PSOF_BASIC**Description:** Switch-onto-Fault Protection

LN Class: PSOF

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN_PRIV_NS	Name Plate		C	
Beh	ENS_BEH_NS	Behaviour		M	
Health	ENS_HEALTH_NS	Health		C	
Mod	ENC_MOD_NS	Mode		C	
Str	ACD_NO_SEG_NS	Start		M	
Op	ACT_NO_SEG_NS	Operate	T	M	

3.33 LN: PTOC_NEU**Description:** Timed Overcurrent (w.r.t Neutral)

LN Class: PTOC

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Str	ACD_NEU	Start		M	
Op	ACT_NEU	Operate	T	M	

3.34 LN: PTOC_NO_SEG

Description: Timed Overcurrent (w.r.t No Phase Segregation)

LN Class: PTOC

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Str	ACD_NO_SEG	Start		M	
Op	ACT_NO_SEG	Operate	T	M	

3.35 LN: PTOC_SEG

Description: Timed Overcurrent (w.r.t Phase Segregation)

LN Class: PTOC

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Str	ACD_SEG	Start		M	
Op	ACT_SEG	Operate	T	M	

3.36 LN: PTOF_NO_SEG

Description: Over frequency (w.r.t No Phase Segregation)

LN Class: PTOF

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Str	ACD_NO_SEG	Start		M	
Op	ACT_NO_SEG	Operate	T	M	

3.37 LN: PTOV_NEU

Description: Overvoltage (w.r.t Neutral)

LN Class: PTOV

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Str	ACD_NEU	Start		M	
Op	ACT_NEU	Operate	T	O	

3.38 LN: PTOV_NO_SEG

Description: Overvoltage (w.r.t No Phase Segregation)

LN Class: PTOV

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Str	ACD_NO_SEG	Start		M	
Op	ACT_NO_SEG	Operate	T	O	

3.39 LN: PTOV_SEG

Description: Overvoltage (w.r.t Phase Segregation)

LN Class: PTOV

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Str	ACD_SEG	Start		M	
Op	ACT_SEG	Operate	T	O	

3.40 LN: PTRC_NO_SEG

Description: Protection trip conditioning (w.r.t No Phase Segregation)

LN Class: PTRC

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Tr	ACT_SEG	Trip		C	
Str	ACD_NO_SEG	Sum of all starts of all connected Logical Nodes		O	

3.41 LN: PTTR_NO_SEG

Description: Thermal overload (w.r.t No Phase Segregation)

LN Class: PTTR

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Op	ACT_NO_SEG	Operate	T	M	
AlmThm	SPS_NO_SEG	Thermal alarm		O	
Amp	MV_FLOAT	Current for thermal load model		O	
TmpRI	MV_FLOAT	Relation between temperature and maximum temperature		O	
MTRRs	SPC_CTRL_PRIV	Reset Thermal State		E	

3.42 LN: PTUF_NO_SEG

Description: Under frequency (w.r.t No Phase Segregation)

LN Class: PTUF

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Str	ACD_NO_SEG	Start		M	
Op	ACT_NO_SEG	Operate	T	M	

3.43 LN: PTUV_SEG

Description: Undervoltage (w.r.t Phase Segregation)

LN Class: PTUV

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Str	ACD_SEG	Start		M	
Op	ACT_SEG	Operate	T	M	

3.44 LN: RBRF_EXTTRIP_SEG

Description: Breaker Failure (w.r.t External Tripping + Phase)

LN Class: RBRF

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
OpEx	ACT_SEG	Breaker failure trip	T	C	

3.45 LN: RDRE_BASIC

Description: Disturbance Recorder function (w.r.t Mandatory Attributes only)

LN Class: RDRE

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
RcdMade	SPS_WD	Recording made		M	
FltNum	INS_BASIC	Fault number		M	
GrifltNum	INS_BASIC	Grid fault number		O	

3.46

LN: RFLO_PRIV_45

Description: Fault Record for P445

LN Class: RFLO

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
FltResTU	INS_D_NS	Fault Stats Reset Time (in s) Upper Bits		E	
FltResTL	INS_D_NS	Fault Stats Reset Time (in s) Lower Bits		E	
FltResTms	INS_D_NS	Fault Stats Reset Time (in ms)		E	
FltPhs	INS_D_NS	Fault phase		E	
FltSt1U	INS_D_NS	Fault start element 1 upper bits		E	
FltSt1L	INS_D_NS	Fault start element 1 lower bits		E	
FltSt2U	INS_D_NS	Fault start element 2 upper bits		E	
FltSt2L	INS_D_NS	Fault start element 2 lower bits		E	
FltSt3U	INS_D_NS	Fault start element 3 upper bits		E	
FltSt3L	INS_D_NS	Fault start element 3 lower bits		E	
FltOp1U	INS_D_NS	Fault trip element 1 upper bits		E	
FltOp2U	INS_D_NS	Fault trip element 2 upper bits		E	
FltOp1L	INS_D_NS	Fault trip element 1 lower bits		E	
FltOp2L	INS_D_NS	Fault trip element 2 lower bits		E	
FltOp3U	INS_D_NS	Fault trip element 3 upper bits		E	
FltOp3L	INS_D_NS	Fault trip element 3 lower bits		E	
FltAlm1U	INS_D_NS	Fault alarm 1 upper bits		E	
FltAlm1L	INS_D_NS	Fault alarm 1 lower bits		E	
FltTU	INS_D_NS	Fault time upper bits		E	
FltTL	INS_D_NS	Fault time lower bits		E	
FltTms	INS_D_NS	Fault time ms		E	
FltNum	INS_D_NS	Number of Fault Records		E	
ActiveSG	INS_D_NS	Fault Record Active Group		E	
FltHz	MV_FLOAT_FAULT	Fault Frequency		E	
FltDur	MV_FLOAT_FAULT	Fault Duration		E	
CBOpTm	MV_FLOAT_FAULT	CB Operation Time		E	
RlyOpTm	MV_FLOAT_FAULT	Relay Operation time		E	
FltDiskm	MV_FLOAT_NDB	Fault Distance in km		O	

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
FltDismi	MV_FLOAT_FAULT	Fault Distance in Miles		E	
FltZ	CMV_MAG	Fault impedance		M	
FltLoc	MV_FLOAT_FAULT	Fault Location in Percentage		E	
ARSeqCnt	INS_D_NS	AR Sequence Count		E	
PreFltA	WYE_SEG_ANG_D_NDB	PreFault Phase Current		E	
PreFltIN	WYE_RES_ANG_D_NS_	Prefault current IN		E	
NDBPreFltPhV	WYE_SEG_ANG_D_NDB	Prefault phase to ground voltage		E	
PreFltVN	WYE_RES_ANG_D_NS_	Prefault voltage VN		E	
NDBFltA	WYE_SEG_ANG_D_NDB	Postfault Phase Current		E	
FltIN	WYE_RES_ANG_D_NS_	Postfault current IN		E	
NDBFltPhV	WYE_SEG_ANG_D_NDB	Postfault Phase to Ground Voltage		E	
FltVN	WYE_RES_ANG_D_NS_	PostFault voltage VN		E	
NDBFltV1Rem	WYE_RES_ANG_D_NS_	Latest Fault Rem V1		E	

NDBLN: RPSB_BASIC

Description: Power swing detection/blocking (w.r.t Mandatory Attributes only)

LN Class: RPSB

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
Str	ACD_NO_SEG	Start (Power Swing Detected)		C	
BlkZn	SPS_WD	Blocking of correlated PDIS zone		C	

3.47 LN: RREC_NO_SEG

Description: Autoreclosing (w.r.t No Phase Segregation)

LN Class: RREC

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
OpCls	ACT_NO_SEG	Operate (used here to provide close to XCBR)	T	M	
AutoRecSt	ENS_AR_STATE	Auto reclosing status		M	

3.48 LN: RSYN_DIFCLC_ENH

Description: Synchronism-check / Synchronising (w.r.t Calculated Differential Measurements)

LN Class: RSYN

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
Rel	SPS_WD	Release		M	
VInd	SPS_WD	Voltage difference indicator		O	
AngInd	SPS_WD	Angle difference indicator		O	
HzInd	SPS_WD	Frequency difference indicator		O	
DifVClc	MV_FLOAT	Calculated difference in voltage		O	
DifHzClc	MV_FLOAT	Calculated difference in frequency		O	
DifAngClc	MV_FLOAT	Calculated difference of phase angle		O	

3.49 LN: TVTR_P40

Description: Voltage transformer

LN Class: TVTR

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
FuFail	SPS_WD	TVTR fuse failure		O	

3.50 LN: XCBR_BASIC

Description: Circuit Breaker (w.r.t Mandatory Attributes Only)

LN Class: XCBR

Attribute	Attr. Type	Explanation	T	M/O/E	Remarks
NamPlt	LPL_LN	Name Plate		C	
Beh	ENS_BEH	Behaviour		M	
Health	ENS_HEALTH	Health		C	
Mod	ENC_MOD	Mode		C	
EEHealth	ENS_HEALTH	External equipment health		O	
Loc	SPS_WD	Local operation		M	
OpCnt	INS_BASIC	Operation counter		M	
CBOpCap	ENS_CB_OPCAP	Circuit Breaker operating capability		O	
Pos	DPC_CONTROL	Switch position		M	
BlkOpn	SPC_STATUS	Block opening		M	
BlkCls	SPC_STATUS	Block closing		M	
Lock	SPC_CTRL_PRIV	Prevention, i.e Lock, Trip/Close operations of the Circuit Breaker over IEC61850		E	
SumSwARs	BCR_PRIV	Sum of switched amperes, resetable		O	

4 Common Data Classes

The definition tables for each of the Common Data Classes used in the Logical Node definitions are presented in the following sub-sections.

4.1 CDC: ACD_NEU

Description: Directional Protection Activation Information (w.r.t Neutral)
CDC Class: ACD

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
general	BOOLEAN	ST	dchg	--	Trip or start has happened	M
dirGeneral	ENUMERATED8	ST	dchg	FaultDirectionKind	General direction (unknown, forward, backward or both)	M
neut	BOOLEAN	ST	dchg	--	Trip or start event with earth current has happened	GC_2
dirNeut	ENUMERATED8	ST	dchg	FaultDirectionKind	Earth current direction (unknown, forward or backward)	GC_2
q	Quality	ST	qchg	--	Quality of the protection activation information	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state of protection activation information	M

4.2 CDC: ACD_NO_SEG

Description: Directional Protection Activation Information (w,r,t No Phase Segregation)
CDC Class: ACD

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
general	BOOLEAN	ST	dchg	--	Trip or start has happened	M
dirGeneral	ENUMERATED8	ST	dchg	FaultDirectionKind	General direction (unknown, forward, backward or both)	M
q	Quality	ST	qchg	--	Quality of the protection activation information	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state of protection activation information	M

4.3 CDC: ACD_NO_SEG_NS

Description: ACD_NO_SEG with namespace DO dataNs
CDC Class: ACD

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
general	BOOLEAN	ST	dchg	--	Trip or start has happened	M
dirGeneral	ENUMERATED8	ST	dchg	FaultDirectionKind	General direction (unknown, forward, backward or both)	M

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
q	Quality	ST	qchg	--	Quality of the protection activation information	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state of protection activation information	M
dataNs	VISIBLE_STRING255	EX	--	--	Data name space	AC_DLN_M

4.4 CDC: ACD_SEG

Description: Directional Protection Activation Information (w.r.t Phase Segregation)
CDC Class: ACD

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
general	BOOLEAN	ST	dchg	--	Trip or start has happened	M
dirGeneral	ENUMERATED8	ST	dchg	FaultDirectionKind	General direction (unknown, forward, backward or both)	M
phsA	BOOLEAN	ST	dchg	--	Trip or start event of Phase A has happened	GC_2
dirPhsA	ENUMERATED8	ST	dchg	FaultDirectionKind	Phase A direction (unknown, forward or backward)	GC_2
phsB	BOOLEAN	ST	dchg	--	Trip or start event of Phase B has happened	GC_2
dirPhsB	ENUMERATED8	ST	dchg	FaultDirectionKind	Phase B direction (unknown, forward or backward)	GC_2
phsC	BOOLEAN	ST	dchg	--	Trip or start event of Phase C has happened	GC_2
dirPhsC	ENUMERATED8	ST	dchg	FaultDirectionKind	Phase C direction (unknown, forward or backward)	GC_2
q	Quality	ST	qchg	--	Quality of the protection activation information	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state of protection activation information	M

4.5 CDC: ACD_SEG_NEU

Description: Directional Protection Activation Information (w.r.t Phase Segregation + Neutral)
CDC Class: ACD

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
general	BOOLEAN	ST	dchg	--	Trip or start has happened	M
dirGeneral	ENUMERATED8	ST	dchg	FaultDirectionKind	General direction (unknown, forward, backward or both)	M
phsA	BOOLEAN	ST	dchg	--	Trip or start event of Phase A has happened	GC_2

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
dirPhsA	ENUMERATED8	ST	dchg	FaultDirectionKind	Phase A direction (unknown, forward or backward)	GC_2
phsB	BOOLEAN	ST	dchg	--	Trip or start event of Phase B has happened	GC_2
dirPhsB	ENUMERATED8	ST	dchg	FaultDirectionKind	Phase B direction (unknown, forward or backward)	GC_2
phsC	BOOLEAN	ST	dchg	--	Trip or start event of Phase C has happened	GC_2
dirPhsC	ENUMERATED8	ST	dchg	FaultDirectionKind	Phase C direction (unknown, forward or backward)	GC_2
neut	BOOLEAN	ST	dchg	--	Trip or start event with earth current has happened	GC_2
dirNeut	ENUMERATED8	ST	dchg	FaultDirectionKind	Earth current direction (unknown, forward or backward)	GC_2
q	Quality	ST	qchg	--	Quality of the protection activation information	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state of protection activation information	M

4.6 CDC: ACT_NEU

Description: Protection Activation Information (w.r.t Neutral)
 CDC Class: ACT

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
general	BOOLEAN	ST	dchg	--	Trip or start has happened	M
neut	BOOLEAN	ST	dchg	--	Trip or start event with earth current has happened	O
q	Quality	ST	qchg	--	Quality of the protection activation information	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state of protection activation information	M

4.7 CDC: ACT_NO_SEG

Description: Protection Activation Information (w.r.t No Phase Segregation)
 CDC Class: ACT

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
general	BOOLEAN	ST	dchg	--	Trip or start has happened	M
q	Quality	ST	qchg	--	Quality of the protection activation information	M

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
t	TimeStamp	ST	--	--	Timestamp of the last change in state of protection activation information	M

4.8 CDC: ACT_NO_SEG_NS

Description: ACT_NO_SEG with namespace DO dataNs

CDC Class: ACT

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
general	BOOLEAN	ST	dchg	--	Trip or start has happened	M
q	Quality	ST	qchg	--	Quality of the protection activation information	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state of protection activation information	M
dataNs	VISIBLE_STRING255	EX	--	--	Data name space	AC_DLN_M

4.9 CDC: ACT_SEG

Description: Protection Activation Information (w.r.t Phase Segregation)

CDC Class: ACT

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
general	BOOLEAN	ST	dchg	--	Trip or start has happened	M
phsA	BOOLEAN	ST	dchg	--	Trip or start event of Phase A has happened	O
phsB	BOOLEAN	ST	dchg	--	Trip or start event of Phase B has happened	O
phsC	BOOLEAN	ST	dchg	--	Trip or start event of Phase C has happened	O
q	Quality	ST	qchg	--	Quality of the protection activation information	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state of protection activation information	M

4.10 CDC: ACT_SEG_NEU

Description: Protection Activation Information (w.r.t Phase Segregation + Neutral)

CDC Class: ACT

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
general	BOOLEAN	ST	dchg	--	Trip or start has happened	M
phsA	BOOLEAN	ST	dchg	--	Trip or start event of Phase A has happened	O
phsB	BOOLEAN	ST	dchg	--	Trip or start event of Phase B has happened	O
phsC	BOOLEAN	ST	dchg	--	Trip or start event of Phase C has happened	O

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
neut	BOOLEAN	ST	dchg	--	Trip or start event with earth current has happened	O
q	Quality	ST	qchg	--	Quality of the protection activation information	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state of protection activation information	M

4.11 CDC: ACT_SEG_NS

Description: Protection Activation Information
 CDC Class: ACT

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
general	BOOLEAN	ST	dchg	--	Trip or start has happened	M
phsA	BOOLEAN	ST	dchg	--	Trip or start event of Phase A has happened	O
phsB	BOOLEAN	ST	dchg	--	Trip or start event of Phase B has happened	O
phsC	BOOLEAN	ST	dchg	--	Trip or start event of Phase C has happened	O
q	Quality	ST	qchg	--	Quality of the protection activation information	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state of protection activation information	M
dataNs	VISIBLE_STRING255	EX	--	--	Data name space	AC_DLN_M

4.12 CDC: BCR_PRIV

Description: Binary Counter Reading
 CDC Class: BCR

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
actVal	INT64	ST	dchg	--	Binary counter status represented as an integer	M
q	Quality	ST	qchg	--	Quality of counter value	M
t	TimeStamp	ST	--	--	Time of last counter change	M
pulsQty	FLOAT32	CF	dchg	--	Magnitude of the counted value 'per count' (value = actVal x pulsQty)	M

4.13 CDC: CMV_MAG

Description: Complex Measured value
 CDC Class: CMV

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
cVal	Vector_Magnitude_Float	MX	dchg,dupd	--	Deadbanded complex measured vector. Updated to the current value of instCVal when the value has changed according to the configuration parameter db.	M
q	Quality	MX	qchg	--	Quality of the measurement value	M
t	TimeStamp	MX	--	--	Time deadbanded magnitude last exceeded its db configuration parameter	M
units	Unit_Multiplier	CF	dchg	--	Unit of the attribute representing the data	O
db	INT32U	CF	dchg	--	Measurement deadband	O
rangeC	RangeConfig_DeadBand	CF	dchg	--	Measurement range configuration attributes	GC_CON

4.14 CDC: CMV_MAG_ANG_FLOAT

Description: Complex Measured value (w.r.t Floating Point Magnitude and Angle)

CDC Class: CMV

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
cVal	Vector_MagnitudeAngle_Float	MX	dchg,dupd	--	Deadbanded complex measured vector. Updated to the current value of instCVal when the value has changed according to the configuration parameter db.	M
q	Quality	MX	qchg	--	Quality of the measurement value	M
t	TimeStamp	MX	--	--	Time deadbanded magnitude last exceeded its db configuration parameter	M
units	Unit_No_Multiplier	CF	dchg	--	Unit of the attribute representing the data	O
db	INT32U	CF	dchg	--	Measurement deadband	O
rangeC	RangeConfig_DeadBand	CF	dchg	--	Measurement range configuration attributes	GC_CON

4.15 CDC: CMV_MAG_ANG_NDB

Description: Complex Measured value

CDC Class: CMV

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
cVal	Vector_MagnitudeAngle_Float	MX	dchg,dupd	--	Deadbanded complex measured vector. Updated to the current value of instCVal when the value has changed according to the configuration parameter db.	M
q	Quality	MX	qchg	--	Quality of the measurement value	M
t	TimeStamp	MX	--	--	Time deadbanded magnitude last exceeded its db configuration parameter	M
units	Unit_Multiplier	CF	dchg	--	Unit of the attribute representing the data	O
db	INT32U	CF	dchg	--	Measurement deadband	O
rangeC	RangeConfig_DeadBand	CF	dchg	--	Measurement range configuration attributes	GC_CON

4.16 CDC: CMV_MAG_FLOAT

Description: Complex Measured value (w.r.t Floating Point Magnitude)

CDC Class: CMV

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
cVal	Vector_Magnitude_Float	MX	dchg,dupd	--	Deadbanded complex measured vector. Updated to the current value of instCVal when the value has changed according to the configuration parameter db.	M
q	Quality	MX	qchg	--	Quality of the measurement value	M
t	TimeStamp	MX	--	--	Time deadbanded magnitude last exceeded its db configuration parameter	M
units	Unit_No_Multiplier	CF	dchg	--	Unit of the attribute representing the data	O
db	INT32U	CF	dchg	--	Measurement deadband	O
rangeC	RangeConfig_DeadBand	CF	dchg	--	Measurement range configuration attributes	GC_CON

4.17 CDC: DEL_SEG_ANG

Description: Phase to phase measurements for a 3-Phase system (w.r.t Phase Segregation + Angle)

CDC Class: DEL

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
phsAB	CMV_MAG_ANG_FLOAT	--	--	--	Measurement values for Phase A to Phase B	GC_1

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
phsBC	CMV_MAG_ANG_FLOAT	--	--	--	Measurement values for Phase B to Phase C	GC_1
phsCA	CMV_MAG_ANG_FLOAT	--	--	--	Measurement values for Phase C to Phase A	GC_1

4.18 CDC: DPC_CONTROL

Description: Controllable Double Point
CDC Class: DPC

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
origin	Originator	ST	--	--	Originator of the last change of the controllable data	AC_CO_O
stVal	Dbpos	ST	dchg	--	Status value of the data (Intermediate state, Off, On or Bad-state)	M
q	Quality	ST	qchg	--	Quality of the status value	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state of status value	M
stSeld	BOOLEAN	ST	dchg	--	The controllable data is in the status "Selected"	O
ctlModel	ENUMERATED8	CF	dchg	CtlModelKind	Control model (Corresponding to the behaviour of the data)	M
sboTimeout	INT32U	CF	dchg	--	Select Before Operate timeout period (in milliseconds)	AC_CO_O
ctlVal	BOOLEAN	CO	--	--	Control value (Off - FALSE, On - TRUE)	AC_CO_M

4.19 CDC: DPC_STATUS_D

Description: Controllable Double Point (with description)
CDC Class: DPC

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
stVal	Dbpos	ST	dchg	--	Status value of the data (Intermediate state, Off, On or Bad-state)	M
q	Quality	ST	qchg	--	Quality of the status value	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state of status value	M
ctlModel	ENUMERATED8	CF	dchg	CtlModelKind	Control model (Corresponding to the behaviour of the data)	M
d	VISIBLE_STRING255	DC	--	--	Description of the status element	O

4.20 CDC: DPL_STANDARD

Description: Standard Device Name Plate

CDC Class: DPL

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
vendor	VISIBLE_STRING255	DC	--	--	Name of the vendor	M
hwRev	VISIBLE_STRING255	DC	--	--	Hardware revision	O
swRev	VISIBLE_STRING255	DC	--	--	Software revision	O
serNum	VISIBLE_STRING255	DC	--	--	Serial Number	O
model	VISIBLE_STRING255	DC	--	--	Model Number	O
location	VISIBLE_STRING255	DC	--	--	Physical location of device	O

4.21 CDC: ENC_CTRL_D_PRIV

Description: Controllable enumerated status (with NameSpace and description)
 CDC Class: ENC

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
origin	Originator	ST	--	--	Originator of the last change of the controllable data	AC_CO_O
stVal	ENUMERATED8	ST	dchg	ModKind	Status value of the data	M
q	Quality	ST	qchg	--	Quality of the status value	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state of status value	M
stSeld	BOOLEAN	ST	dchg	--	The controllable data is in the status "selected".	O
ctlModel	ENUMERATED8	CF	dchg	CtlModelKind	Control model (Corresponding to the behaviour of the data)	M
d	VISIBLE_STRING255	DC	--	--	Description of the status element	O
dataNs	VISIBLE_STRING255	EX	--	--	Data name space	AC_DLN_M
ctlVal	ENUMERATED8	CO	--	--	Control value	AC_CO_M

4.22 CDC: ENC_MOD

Description: Controllable enumerated status (w.r.t Mode)
 CDC Class: ENC

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
stVal	ENUMERATED8	ST	dchg	ModKind	Status value of the data.	M
q	Quality	ST	qchg	--	Quality of the status value	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state	M
ctlModel	ENUMERATED8	CF	dchg	CtlModelKind	Specifies the control model[status-only,direct-with-normal-security,sbo-with-normal-security,direct-with-enhanced-security,sbo-with-enhanced-security].	M

4.23 CDC: ENC_MOD_NS

Description: Controllable enumerated status

CDC Class: ENC

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
stVal	ENUMERATED8	ST	dchg	ModKind	Status value of the data.	M
q	Quality	ST	qchg	--	Quality of the status value	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state	M
ctlModel	ENUMERATED8	CF	dchg	CtlModelKind	Specifies the control model[status-only,direct-with-normal-security,sbo-with-normal-security,direct-with-enhanced-security,sbo-with-enhanced-security].	M
dataNs	VISIBLE_STRING255	EX	--	--	Data name space.	AC_DLN_M

4.24 CDC: ENS_AR_STATE

Description: Enumerated status (w.r.t Auto Reclose Status)

CDC Class: ENS

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
stVal	ENUMERATED8	ST	dchg,dupd	AutoRecStKind	Status value of the data.	M
q	Quality	ST	qchg	--	Quality of the status value	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state	M

4.25 CDC: ENS_BEH

Description: Enumerated status (w.r.t Behaviour)

CDC Class: ENS

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
stVal	ENUMERATED8	ST	dchg,dupd	BehKind	Status value of the data.	M
q	Quality	ST	qchg	--	Quality of the status value	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state	M

4.26 CDC: ENS_BEH_D_PRIV

Description: Enumerated status (w.r.t Behaviour, with Description (Private DO))

CDC Class: ENS

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
stVal	ENUMERATED8	ST	dchg,dupd	BehKind	Status value of the data.	M
q	Quality	ST	qchg	--	Quality of the status value	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state	M
d	VISIBLE_STRING255	DC	--	--	Textual description of the data.	O
dataNs	VISIBLE_STRING255	EX	--	--	Data name space	AC_DLN_M

4.27 CDC: ENS_BEH_NS

Description: Enumerated status

CDC Class: ENS

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
stVal	ENUMERATED8	ST	dchg, dupd	BehKind	Status value of the data.	M
q	Quality	ST	qchg	--	Quality of the status value	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state	M
dataNs	VISIBLE_STRING255	EX	--	--	Data name space.	AC_DLN_M

4.28 CDC: ENS_CB_OPCAP

Description: Enumerated status (w.r.t. Circuit Breaker Operating Capacity)

CDC Class: ENS

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
stVal	ENUMERATED8	ST	dchg, dupd	CBOpCapKind	Status value of the data.	M
q	Quality	ST	qchg	--	Quality of the status value	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state	M

4.29 CDC: ENS_HEALTH

Description: Enumerated status (w.r.t health)

CDC Class: ENS

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
stVal	ENUMERATED8	ST	dchg,dupd	HealthKind	Status value of the data.	M
q	Quality	ST	qchg	--	Quality of the status value	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state	M

4.30 CDC: ENS_HEALTH_NS

Description: Enumerated status

CDC Class: ENS

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
stVal	ENUMERATED8	ST	dchg, dupd	HealthKind	Status value of the data.	M
q	Quality	ST	qchg	--	Quality of the status value	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state	M
dataNs	VISIBLE_STRING255	EX	--	--	Data name space.	AC_DLN_M

4.31 CDC: ING_BASIC

Description: Integer Status Setting

CDC Class: ING

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
setVal	INT32	SP	dchg	--	Setting value	AC_NSQ_M

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
d	VISIBLE_STRING255	DC	--	--	Description of the status element	O

4.32 CDC: INS_BASIC

Description: Integer Status (w.r.t Mandatory Options Only)
CDC Class: INS

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
stVal	INT32	ST	dchg,dupd	--	The element status	M
q	Quality	ST	qchg	--	The quality of the status value	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state	M

4.33 CDC: INS_D_NS

Description: Integer Status
CDC Class: INS

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
stVal	INT32	ST	dchg,dupd	--	The element status	M
q	Quality	ST	qchg	--	The quality of the status value	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state	M
d	VISIBLE_STRING255	DC	--	--	Description of the status element	O
dataNs	VISIBLE_STRING255	EX	--	--	Data name space	AC_DLN_M

4.34 CDC: LPL_LLNO

Description: Logical Node 0 Name Plate
CDC Class: LPL

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
vendor	VISIBLE_STRING255	DC	--	--	Name of the vendor	M
swRev	VISIBLE_STRING255	DC	--	--	Software revision	M
d	VISIBLE_STRING255	DC	--	--	Description	O
configRev	VISIBLE_STRING255	DC	--	--	Uniquely identifies the configuration of a local device instance	AC_LN0_M
ldNs	VISIBLE_STRING255	EX	--	--	Logical Device name space	AC_LN0_EX

4.35 CDC: LPL_LN

Description: Standard Logical Node Name Plate
CDC Class: LPL

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
vendor	VISIBLE_STRING255	DC	--	--	Name of the vendor	M

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
swRev	VISIBLE_STRING255	DC	--	--	Software revision	M
d	VISIBLE_STRING255	DC	--	--	Description	O

4.36 CDC: LPL_LN_PRIV

Description: Logical Node Name Plate (w.r.t Schneider-Electric Extended)

CDC Class: LPL

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
vendor	VISIBLE_STRING255	DC	--	--	Name of the vendor	M
swRev	VISIBLE_STRING255	DC	--	--	Software revision	M
d	VISIBLE_STRING255	DC	--	--	Description	O
lnNs	VISIBLE_STRING255	EX	--	--	Logical Node name space	AC_DLD_M

4.37 CDC: LPL_LN_PRIV_NS

Description: Logical Node Name Plate for Propriety LN

CDC Class: LPL

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
vendor	VISIBLE_STRING255	DC	--	--	Name of the vendor	M
swRev	VISIBLE_STRING255	DC	--	--	Software revision	M
d	VISIBLE_STRING255	DC	--	--	Description	O
lnNs	VISIBLE_STRING255	EX	--	--	Logical Node name space	AC_DLD_M
dataNs	VISIBLE_STRING255	EX	--	--	Data name space	AC_DLN_M

4.38 CDC: MV_FLOAT

Description: Measured value (w.r.t. Floating Point value)

CDC Class: MV

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
mag	AnalogueValue_Float	MX	dchg,dupd	--	Deadbanded magnitude of the instantaneous value of a measured value or harmonic value. Updated to the current value of instMag when the value has changed according to	M
the configuration parameter db.q	Quality	MX	qchg	--	Quality of the measurement value	M
t	TimeStamp	MX	--	--	Time deadbanded magnitude last exceeded its db configuration parameter	M
units	Unit_Multiplier	CF	dchg	--	Unit of the attribute representing the data	O
db	INT32U	CF	dchg	--	Measurement deadband	O
rangeC	RangeConfig_DeadBand	CF	dchg	--	Measurement range configuration attributes	GC_CON

4.39 CDC: MV_FLOAT_D

Description: Measured value (w.r.t Floating Point Value with Description)
CDC Class: MV

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
mag	AnalogueValue_Float	MX	dchg,dupd	--	Deadbanded magnitude of the instantaneous value of a measured value or harmonic value. Updated to the current value of instMag when the value has changed according to	M
the configuration parameter db.q	Quality	MX	qchg	--	Quality of the measurement value	M
t	TimeStamp	MX	--	--	Time deadbanded magnitude last exceeded its db configuration parameter	M
units	Unit_Multiplier	CF	dchg	--	Unit of the attribute representing the data	O
db	INT32U	CF	dchg	--	Measurement deadband	O
rangeC	RangeConfig_DeadBand	CF	dchg	--	Measurement range configuration attributes	GC_CON
d	VISIBLE_STRING255	DC	--	--	Description of the status element	O

4.40 CDC: MV_FLOAT_D_NS

Description: Measured value
CDC Class: MV

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
mag	AnalogueValue_Float	MX	dchg,dupd	--	Deadbanded magnitude of the instantaneous value of a measured value or harmonic value. Updated to the current value of instMag when the value has changed according to	M
the configuration parameter db.q	Quality	MX	qchg	--	Quality of the measurement value	M
t	TimeStamp	MX	--	--	Time deadbanded magnitude last exceeded its db configuration parameter	M
units	Unit_Multiplier	CF	dchg	--	Unit of the attribute representing the data	O
db	INT32U	CF	dchg	--	Measurement deadband	O
rangeC	RangeConfig_DeadBand	CF	dchg	--	Measurement range configuration attributes	GC_CON
d	VISIBLE_STRING255	DC	--	--	Description of the status element	O
dataNs	VISIBLE_STRING255	EX	--	--	Data name space	AC_DLN_M

4.41 CDC: MV_FLOAT_FAULT

Description: Measured value
CDC Class: MV

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
mag	AnalogueValue_Float	MX	dchg,dupd	--	Deadbanded magnitude of the instantaneous value of a measured value or harmonic value. Updated to the current value of instMag when the value has changed according to	M
the configuration parameter db.q	Quality	MX	qchg	--	Quality of the measurement value	M
t	TimeStamp	MX	--	--	Time deadbanded magnitude last exceeded its db configuration parameter	M
units	Unit	CF	dchg	--	Unit of the attribute representing the data	O
db	INT32U	CF	dchg	--	Measurement deadband	O
rangeC	RangeConfig_DeadBand	CF	dchg	--	Measurement range configuration attributes	GC_CON
d	VISIBLE_STRING255	DC	--	--	Description of the status element	O
dataNs	VISIBLE_STRING255	EX	--	--	Data name space	AC_DLN_M

4.42 CDC: MV_FLOAT_NDB

Description: Measured value
CDC Class: MV

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
mag	AnalogueValue_Float	MX	dchg,dupd	--	Deadbanded magnitude of the instantaneous value of a measured value or harmonic value. Updated to the current value of instMag when the value has changed according to	M
the configuration parameter db.q	Quality	MX	qchg	--	Quality of the measurement value	M
t	TimeStamp	MX	--	--	Time deadbanded magnitude last exceeded its db configuration parameter	M
units	Unit_Multiplier	CF	dchg	--	Unit of the attribute representing the data	O
db	INT32U	CF	dchg	--	Measurement deadband	O
rangeC	RangeConfig_DeadBand	CF	dchg	--	Measurement range configuration attributes	GC_CON

4.43 CDC: ORG_SRC

Description: Object reference setting
CDC Class: ORG

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
setSrcRef	ObjectReference	SP	dchg	--	The value of the object reference setting.	M
setSrcCB	ObjectReference	SP	dchg	--	The value of the object reference to the control block	O

4.44 CDC: SEQ_MAG_ANG

Description: Sequence components of a measurement value (w.r.t Magnitudes + Angles)
CDC Class: SEQ

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
c1	CMV_MAG_ANG_FLOAT	--	--	--	Sequence component 1 (For semantic meaning see seqT)	M
c2	CMV_MAG_ANG_FLOAT	--	--	--	Sequence component 2 (For semantic meaning see seqT)	M
c3	CMV_MAG_ANG_FLOAT	--	--	--	Sequence component 3 (For semantic meaning see seqT)	M
seqT	ENUMERATED8	MX	--	SequenceKind	Sequence quantity measurement type (Pos-Neg-Zero or Dir-Quad-Zero)	M

4.45 CDC: SPC_CONTROL

Description: Controllable Single Point
CDC Class: SPC

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
origin	Originator	ST	--	--	Originator of the last change of the controllable data	AC_CO_O
stVal	BOOLEAN	ST	dchg	--	Status value of the data	AC_ST
q	Quality	ST	qchg	--	Quality of the status value	AC_ST
t	TimeStamp	ST	--	--	Timestamp of the last change in state of status value	AC_ST
stSeld	BOOLEAN	ST	dchg	--	The controllable data is in the status "Selected"	O
ctlModel	ENUMERATED8	CF	dchg	CtlModelKind	Control model (Corresponding to the behaviour of the data)	M
sboTimeout	INT32U	CF	dchg	--	Select Before Operate timeout period (in milliseconds)	AC_CO_O
d	VISIBLE_STRING255	DC	--	--	Description of the status element	O

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
ctlVal	BOOLEAN	CO	--	--	Control value (Off - FALSE, On - TRUE)	AC_CO_M

4.46 CDC: SPC_CTRL_PRIV

Description: Controllable Single Point (With Namespace)
 CDC Class: SPC

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
origin	Originator	ST	--	--	Originator of the last change of the controllable data	AC_CO_O
stVal	BOOLEAN	ST	dchg	--	Status value of the data	AC_ST
q	Quality	ST	qchg	--	Quality of the status value	AC_ST
t	TimeStamp	ST	--	--	Timestamp of the last change in state of status value	AC_ST
stSeld	BOOLEAN	ST	dchg	--	The controllable data is in the status "Selected"	O
ctlModel	ENUMERATED8	CF	dchg	CtlModelKind	Control model (Corresponding to the behaviour of the data)	M
sboTimeout	INT32U	CF	dchg	--	Select Before Operate timeout period (in milliseconds)	AC_CO_O
dataNs	VISIBLE_STRING255	EX	--	--	Data name space	AC_DLN_M
ctlVal	BOOLEAN	CO	--	--	Control value (Off - FALSE, On - TRUE)	AC_CO_M

4.47 CDC: SPC_STATUS

Description: Controllable Single Point (w.r.t Status Only)
 CDC Class: SPC

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
stVal	BOOLEAN	ST	dchg	--	Status value of the data	AC_ST
q	Quality	ST	qchg	--	Quality of the status value	AC_ST
t	TimeStamp	ST	--	--	Timestamp of the last change in state of status value	AC_ST
ctlModel	ENUMERATED8	CF	dchg	CtlModelKind	Control model (Corresponding to the behaviour of the data)	M

4.48 CDC: SPG_BASIC

Description: Single Point Setting
 CDC Class: SPG

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
setVal	BOOLEAN	SP	dchg	--	Setting value (Off - FALSE, On - TRUE)	AC_NSQ_M

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
d	VISIBLE_STRING255	DC	--	--	Description of the status element	O

4.49 CDC: SPS_D

Description: Standard Single Point Status (with Description)
CDC Class: SPS

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
stVal	BOOLEAN	ST	dchg	--	The element status (TRUE or FALSE)	M
q	Quality	ST	qchg	--	The quality of the status value	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state	M
d	VISIBLE_STRING255	DC	--	--	Description of the status element	O

4.50 CDC: SPS_NO_SEG

Description: Single Point Status(w.r.t No Phase Segregation)
CDC Class: SPS

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
stVal	BOOLEAN	ST	dchg	--	The element status (TRUE or FALSE)	M
q	Quality	ST	qchg	--	The quality of the status value	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state	M

4.51 CDC: SPS_WD

Description: Single Point Status (without Description)
CDC Class: SPS

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
stVal	BOOLEAN	ST	dchg	--	The element status (TRUE or FALSE)	M
q	Quality	ST	qchg	--	The quality of the status value	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state	M

4.52 CDC: SPS_WD_NS

Description: Single Point Status (without Description, with namespace)
CDC Class: SPS

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
stVal	BOOLEAN	ST	dchg	--	The element status (TRUE or FALSE)	M
q	Quality	ST	qchg	--	The quality of the status value	M

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
t	TimeStamp	ST	--	--	Timestamp of the last change in state	M
dataNs	VISIBLE_STRING255	EX	--	--	Data name space	AC_DLN_M

4.53 CDC: SPS_WD_PRIV

Description: Single Point Status(without Description with Name Space)
 CDC Class: SPS

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
stVal	BOOLEAN	ST	dchg	--	The element status (TRUE or FALSE)	M
q	Quality	ST	qchg	--	The quality of the status value	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state	M
dataNs	VISIBLE_STRING255	EX	--	--	Data name space	AC_DLN_M

4.54 CDC: VSS_BASIC

Description: Visible string status
 CDC Class: VSS

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
stVal	VISIBLE_STRING255	ST	dchg	--	Status value of the data.	M
q	Quality	ST	qchg	--	Quality of the status value	M
t	TimeStamp	ST	--	--	Timestamp of the last change in state	M

4.55 CDC: WYE_RES_ANG_D_NS

Description: Phase to ground measurements for a 3-Phase system (w.r.t Residual + Description + Angle)
 CDC Class: WYE

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
res	CMV_MAG_ANG_FLOAT	--	--	--	Measurement values for the residual system current	GC_1
d	VISIBLE_STRING255	DC	--	--	Description of the status element	O
dataNs	VISIBLE_STRING255	EX	--	--	Data name space	AC_DLN_M

4.56 CDC: WYE_RES_ANG_D_NS_NDB

Description: Phase to ground measurements for a 3-Phase system
 CDC Class: WYE

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
res	CMV_MAG_ANG_NDB	--	--	--	Measurement values for the residual system current	GC_1
d	VISIBLE_STRING255	DC	--	--	Description of the status element	O
dataNs	VISIBLE_STRING255	EX	--	--	Data name space	AC_DLN_M

4.57 CDC: WYE_SEG

Description: Phase to ground measurements for a 3-Phase system (w.r.t Phase Seggregation)

CDC Class: WYE

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
phsA	CMV_MAG_FLOAT	--	--	--	Measurement values for Phase A	GC_1
phsB	CMV_MAG_FLOAT	--	--	--	Measurement values for Phase B	GC_1
phsC	CMV_MAG_FLOAT	--	--	--	Measurement values for Phase C	GC_1

4.58 CDC: WYE_SEG_ANG_D

Description: Phase to ground measurements for a 3-Phase system

CDC Class: WYE

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
phsA	CMV_MAG_ANG_FLOAT	--	--	--	Measurement values for Phase A	GC_1
phsB	CMV_MAG_ANG_FLOAT	--	--	--	Measurement values for Phase B	GC_1
phsC	CMV_MAG_ANG_FLOAT	--	--	--	Measurement values for Phase C	GC_1
d	VISIBLE_STRING255	DC	--	--	Description of the status element	O

4.59 CDC: WYE_SEG_ANG_D_NDB

Description: Phase to ground measurements for a 3-Phase system

CDC Class: WYE

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
phsA	CMV_MAG_ANG_NDB	--	--	--	Measurement values for Phase A	GC_1
phsB	CMV_MAG_ANG_NDB	--	--	--	Measurement values for Phase B	GC_1
phsC	CMV_MAG_ANG_NDB	--	--	--	Measurement values for Phase C	GC_1
d	VISIBLE_STRING255	DC	--	--	Description of the status element	O
dataNs	VISIBLE_STRING255	EX	--	--	Data name space	AC_DLN_M

4.60 CDC: WYE_SEG_D

Description: Phase to ground measurements for a 3-Phase system (w.r.t Phase Seggregation + Description)

CDC Class: WYE

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
phsA	CMV_MAG_FLOAT	--	--	--	Measurement values for Phase A	GC_1

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
phsB	CMV_MAG_FLOAT	--	--	--	Measurement values for Phase B	GC_1
phsC	CMV_MAG_FLOAT	--	--	--	Measurement values for Phase C	GC_1
d	VISIBLE_STRING255	DC	--	--	Description of the status element	O

4.61 CDC: WYE_SEG_RES_D_NS

Description: Phase to ground measurements for a 3-Phase system (w.r.t Phase Segregation + Residual + Description)

CDC Class: WYE

Attribute	Type	FC	TrgOp	Value/Value Range	Comment	M/O/E
phsA	CMV_MAG_ANG_FLOAT	--	--	--	Measurement values for Phase A	GC_1
phsB	CMV_MAG_ANG_FLOAT	--	--	--	Measurement values for Phase B	GC_1
phsC	CMV_MAG_ANG_FLOAT	--	--	--	Measurement values for Phase C	GC_1
neut	CMV_MAG_ANG_FLOAT	--	--	--	Measurement values for neutral input	GC_1
d	VISIBLE_STRING255	DC	--	--	Description of the status element	O
dataNs	VISIBLE_STRING255	EX	--	--	Data name space	AC_DLN_M

5 Enumerated Types

The following sub-sections specify the enumerations that are associated to some Common Data Class attributes. The definition of the enumerations are according to IEC61850-7-3 and IEC61850-7-4 unless otherwise stated.

5.1 Enumerated type: AddCause

Description: AddCause

Value	Description	Remarks
0	Unknown	
1	Not-supported	
2	Blocked-by-switching-hierarchy	
3	Select-failed	
4	Invalid-position	
5	Position-reached	
6	Parameter-change-in-execution	
7	Step-limit	
8	Blocked-by-Mode	
9	Blocked-by-process	
10	Blocked-by-interlocking	
11	Blocked-by-synchrocheck	
12	Command-already-in-execution	
13	Blocked-by-health	
14	1-of-n-control	
15	Abortion-by-cancel	
16	Time-limit-over	
17	Abortion-by-trip	
18	Object-not-selected	
19	Object-already-selected	
20	No-access-authority	
21	Ended-with-overshoot	
22	Abortion-due-to-deviation	
23	Abortion-by-communication-loss	
24	Blocked-by-command	
25	None	
26	Inconsistent-parameters	
27	Locked-by-other-client	

5.2 Enumerated type: AutoRecStKind

Description: Auto-Reclose Status

Value	Description	Remarks
1	Ready	
2	InProgress	
3	Successful	
4	WaitingForTrip	
5	TripFromProtection	

Value	Description	Remarks
6	FaultDisappeared	
7	WaitToComplete	
8	CBclosed	
9	CycleUnsuccessful	
10	Unsuccessful	
11	Aborted	

5.3 Enumerated type: BehKind

Description: Behaviour

Value	Description	Remarks
1	on	
2	blocked	
3	test	
4	test/blocked	
5	off	

5.4 Enumerated type: CBOpCapKind

Description: Circuit Breaker Operating Capacity

Value	Description	Remarks
1	None	
2	Open	
3	Close-Open	
4	Open-Close-Open	
5	Close-Open-Close-Open	
6	Open-Close-Open-Close-Open	
7	more	

5.5 Enumerated type: CtlModelKind

Description: Control Model

Value	Description	Remarks
0	status-only	
1	direct-with-normal-security	
2	sbo-with-normal-security	
3	direct-with-enhanced-security	
4	sbo-with-enhanced-security	

5.6 Enumerated type: FaultDirectionKind

Description: Direction

Value	Description	Remarks
0	unknown	
1	forward	
2	backward	
3	both	

5.7 Enumerated type: HealthKind

Description: Health

Value	Description	Remarks
1	Ok	
2	Warning	
3	Alarm	

5.8 Enumerated type: ModKind

Description: Mode

Value	Description	Remarks
1	on	
2	blocked	
3	test	
4	test/blocked	
5	off	

5.9 Enumerated type: MultiplierKind

Description: Exponents of the multiplier value in base 10.

Value	Description	Remarks
-24	y	
-21	z	
-18	a	
-15	f	
-12	p	
-9	n	
-6	μ	
-3	m	
-2	c	
-1	d	
0		
1	da	
2	h	
3	k	
6	M	
9	G	
12	T	
15	P	
18	E	
21	Z	
24	Y	

5.10 Enumerated type: OriginatorCategoryKind

Description: orCategory

Value	Description	Remarks
0	not-supported	

Value	Description	Remarks
1	bay-control	
2	station-control	
3	remote-control	
4	automatic-bay	
5	automatic-station	
6	automatic-remote	
7	maintenance	
8	process	

5.11 Enumerated type: SequenceKind

Description: Sequence Measurement Type

Value	Description	Remarks
0	pos-neg-zero	
1	dir-quad-zero	

5.12 Enumerated type: SIUnitKind

Description: SI Units derived from ISO/IEC 1000

Value	Description	Remarks
-16	years	
-15	months	
-14	weeks	
-13	V/s	
-12	mins	
-11	hours	
-10	days	
-9	°F	
-8	ratio	
-7	miles	
-6	inches	
-5	feet	
-4	df/dt	
-2	%	
-1	pu	
1		
2	m	
3	kg	
4	s	
5	A	
6	K	
7	mol	
8	cd	
9	deg	
10	rad	
11	sr	
21	Gy	

Value	Description	Remarks
22	Bq	
23	°C	
24	Sv	
25	F	
26	C	
27	S	
28	H	
29	V	
30	ohm	
31	J	
32	N	
33	Hz	
34	lx	
35	Lm	
36	Wb	
37	T	
38	W	
39	Pa	
41	m ²	
42	m ³	
43	m/s	
44	m/s ²	
45	m ³ /s	
46	m/m ³	
47	M	
48	kg/m ³	
49	m ² /s	
50	W/m K	
51	J/K	
52	ppm	
53	1/s	
54	rad/s	
55	W/m ²	
56	J/m ²	
57	S/m	
58	K/s	
59	Pa/s	
60	J/kg K	
61	VA	
62	Watts	
63	VAr	
64	phi	
65	cos(phi)	
66	Vs	

Value	Description	Remarks
67	V ²	
68	As	
69	A ²	
70	A ² t	
71	VAh	
72	Wh	
73	VArh	
74	V/Hz	
75	Hz/s	
76	char	
77	char/s	
78	kgm ²	
79	dB	
80	J/Wh	
81	W/s	
82	l/s	
83	dBm	

6 MMS Data-Type Conversions

The following table shows the relationships between the Part 7 and Part 8-1 data types. The definitions presented above use Part 7 data types, however these are subject to 'translation' when exposed over an MMS (Part 8-1) interface:

Part 7 Type	MMS Type	Part 7 Description
BOOLEAN	Bool	Logical TRUE/FALSE value
BSTR16	Bstring16	Bit-string -16 bits
BVstring13	BVstring13	Variable bit string (upto 13 bits)
Check	BVstring2	Control Object check flags
CODED_ENUM	Byte	Coded enumeration
CODED_ENUM2	Byte	Coded enumeration (2)
Currency	Vstring3	3-character currency
Dbpos	Bstring2	Switch positions
EntryTime	Btime6	8.1 Section 8.1.3.7
ENUMERATED16	Short	16 bit enumerated value
ENUMERATED32	Long	32 bit enumerated value
ENUMERATED8	Byte	8 bit enumerated value
FLOAT32	Float	32 bit floating point value
FLOAT64	Double	64 bit floating point value
INT16	Short	16 bit signed integer value
INT16U	Ushort	16 bit unsigned integer value
INT24U	Ulong	24 bit unsigned integer value
INT32	Long	32 bit signed integer value
INT32U	Ulong	32 bit unsigned integer value
INT64	Int64	64 bit signed integer value
INT8	Byte	8 bit signed integer value
INT8U	Ubyte	8 bit unsigned integer value
ObjectReference	Vstring129	Object Reference
OCTET_STRING6	OVstring6	6 character string (8 bits per character)
OCTET_STRING64	OVstring64	64 character string (8 bits per character)
OCTET_STRING8	OVstring8	8 character string (8 bits per character)
Quality	BVstring13	IEC61850 Quality
TimeStamp	Utctime	IEC61850 Time stamp
UNICODE_STRING255	UTF8Vstring255	255 character string (16 bits per unicode character)
UTC_TM	Utctime	UTC Timestamp
VISIBLE_STRING129	Vstring129	129 character string
VISIBLE_STRING255	Vstring255	255 character string
VISIBLE_STRING64	Vstring64	64 character string
VISIBLE_STRING65	Vstring65	65 character string
VISIBLE_STRING97	Vstring97	97 character string



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