

# MiCOM P547

Phase Comparison Relay

P547/EN MC/A20

Software Version 57

MICS

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# Notes:

# 1 MODEL IMPLEMENTATION CONFORMANCE STATEMENT (MICS)

## 1.1 Introduction

This specification is the Model Implementation Conformance Statement (MICS) and presents the top-level IEC 61850 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 IEC 61850 part 7 series of specifications.

## 1.2 Objective

To provide comprehensive details of the standard data object model elements supported by the device. The MICS is conformant to the devices associated ICD (Substation Configuration Language) file, according to part 6 of the IEC 61850 standards. The layout of the presented tables within this document are conformant to the part 7 series of the IEC 61850 standard specifications with the following exceptions:

- The "Trigger Options" field is not presented
- The "M/O" field is not present as the definitions are as deployed within the model
- An additional column "X" is used to signify Schneider Electric custom attributes

## 1.3 Logical Device Definitions

The MiCOM relay implements an IEC 61850 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 LLN0 Logical Node (for addressing common issues across the Logical Device).

The IEC 61850 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

### 1.3.1 IEC 61850 Logical Device Data Model

The IEC 61850 Logical Device top-level 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).

LD	LN instance	LN type	Description
Control			
	ArcRREC1	RREC_NO_SEG	Auto Reclose
	AscRSYN1	RSYN_DIFCLC	System Checks - Check Sync 1
	AscRSYN2	RSYN_DIFCLC	System Checks - Check Sync 2
	CILO1	CILO_INTERLOCK	Circuit Breaker Interlocking (Pole 1)
	CILO2	CILO_INTERLOCK	Circuit Breaker Interlocking (Pole 2)
	CILO3	CILO_INTERLOCK	Circuit Breaker Interlocking (Pole 3)
	LLN0	LLN0_CONTROL	Controls Logical Device
	LPHD1	LPHD_STANDARD	Physical Device Information
	OstRPSB1	RPSB_OST	Out of Step Tripping (main trip)
	OstRPSB2	RPSB_OST	Out of Step Tripping (predictive trip)
	PsbRPSB1	RPSB_BASIC	Zone 1 Ph/Gnd Power Swing Blocking
	PsbRPSB2	RPSB_BASIC	Zone 2 Ph/Gnd Power Swing Blocking
	PsbRPSB3	RPSB_BASIC	Zone 3 Ph/Gnd Power Swing Blocking
	PsbRPSB4	RPSB_BASIC	Zone 4 Ph/Gnd Power Swing Blocking
	PsbRPSB5	RPSB_BASIC	Zone P Ph/Gnd Power Swing Blocking
	XCBR1	XCBR_BASIC	Circuit Breaker Monitoring (Pole 1)
	XCBR2	XCBR_BASIC	Circuit Breaker Monitoring (Pole 2)
	XCBR3	XCBR_BASIC	Circuit Breaker Monitoring (Pole 3)
Measurements			
	LLN0	LLN0_STANDARD	Measurements Logical Device
	LPHD1	LPHD_STANDARD	Physical Device Information
	PriFouMMXU1	MMXU_FOURIER	Primary Fourier Measurements
	PriMMTR1	MMTR_PRIV	Primary based metering quantities
	PriMSQI1	MSQI_ALL	Primary Sequence Measurements
	PriMSTA1	MSTA_I_W_VAR	Primary Metering Statistics
	PriPhcMMXU1	MMXU_PHS_COMP	Primary Phase Comparison Measurements
	PriRmsMMXU1	MMXU_RMS	Primary RMS Measurements
	PriVcpMSQI1	MSQI_VOLTAGE	Primary Compensated Overvoltage Measurements
	SecFouMMXU1	MMXU_FOURIER	Secondary Fourier Measurements
	SecMMTR1	MMTR_PRIV	Secondary based metering quantities
	SecMSQI1	MSQI_ALL	Secondary Sequence Measurements
	SecMSTA1	MSTA_I_W_VAR	Secondary Metering Statistics
	SecPhcMMXU1	MMXU_PHS_COMP	Secondary Phase Comparison Measurements
	SecRmsMMXU1	MMXU_RMS	Secondary RMS Measurements
	SecVcpMSQI1	MSQI_VOLTAGE	Secondary Compensated Overvoltage Measurements
Protection			
	CbfRBRF1	RBRF_EXTTRIP	CB Fail 1
	CbfRBRF2	RBRF_EXTTRIP	CB Fail 2
	DfpPFRC1	PFRC_NO_SEG	df/dt> 1 Frequency Rate of Change
	DfpPFRC2	PFRC_NO_SEG	df/dt> 2 Frequency Rate of Change
	DfpPFRC3	PFRC_NO_SEG	df/dt> 3 Frequency Rate of Change
	DfpPFRC4	PFRC_NO_SEG	df/dt> 4 Frequency Rate of Change
	DisPDIS1	PDIS_BASIC	Zone 1 Ph/Gnd Distance



LD	LN instance	LN type	Description
	DisPDIS2	PDIS_BASIC	Zone 2 Ph/Gnd Distance
	DisPDIS3	PDIS_BASIC	Zone 3 Ph/Gnd Distance
	DisPDIS4	PDIS_BASIC	Zone 4 Ph/Gnd Distance
	DisPDIS5	PDIS_BASIC	Zone P Ph/Gnd Distance
	DisPSCH1	PSCH_BASIC	Distance Protection Scheme 1
	DisPSCH2	PSCH_BASIC	Distance Protection Scheme 2
	EfdPTOC1	PTOC_NEU	IN1> 1 Earth Fault (Derived)
	EfdPTOC2	PTOC_NEU	IN1> 2 Earth Fault (Derived)
	EfdPTOC3	PTOC_NEU	IN1> 3 Earth Fault (Derived)
	EfdPTOC4	PTOC_NEU	IN1> 4 Earth Fault (Derived)
	FrqPTOF1	PTOF_NO_SEG	F> 1 Overfrequency
	FrqPTOF2	PTOF_NO_SEG	F> 2 Overfrequency
	FrqPTUF1	PTUF_NO_SEG	F< 1 Underfrequency
	FrqPTUF2	PTUF_NO_SEG	F< 2 Underfrequency
	FrqPTUF3	PTUF_NO_SEG	F< 3 Underfrequency
	FrqPTUF4	PTUF_NO_SEG	F< 4 Underfrequency
	LLN0	LLN0_PROT_PHS_COMP	Protection LLNO for Phase Comparison with Distance
	LPHD1	LPHD_STANDARD	Physical Device Information
	NgcPTOC1	PTOC_NO_SEG	I2> 1 Negative Sequence
	NgcPTOC2	PTOC_NO_SEG	I2> 2 Negative Sequence
	NgcPTOC3	PTOC_NO_SEG	I2> 3 Negative Sequence
	NgcPTOC4	PTOC_NO_SEG	I2> 4 Negative Sequence
	OcpPTOC1	PTOC_SEG	I> 1 Overcurrent
	OcpPTOC2	PTOC_SEG	I> 2 Overcurrent
	OcpPTOC3	PTOC_SEG	I> 3 Overcurrent
	OcpPTOC4	PTOC_SEG	I> 4 Overcurrent
	PhcPDIF1	PDIF_PHS_COMP	Phase Comparison
	PTRC1	PTRC_NO_SEG	Protection Trip Conditioning
	SenEftPTOC1	PTOC_NEU	ISEF> 1 Sensitive Earth Fault
	SenEftPTOC2	PTOC_NEU	ISEF> 2 Sensitive Earth Fault
	SenEftPTOC3	PTOC_NEU	ISEF> 3 Sensitive Earth Fault
	SenEftPTOC4	PTOC_NEU	ISEF> 4 Sensitive Earth Fault
	SenRefPDIF1	PDIF_NEU	IREF> 1 Restricted Earth Fault
	SofPSOF1	PSOF_BASIC	Switch onto Fault protection
	ThmPTTR1	PTTR_NO_SEG	Thermal Overload
	TorPSOF1	PSOF_BASIC	Trip on reclose protection
	VtpCmpPTOV1	PTOV_NO_SEG	Compensated V1> 1 Overvoltage
	VtpCmpPTOV2	PTOV_NO_SEG	Compensated V1> 2 Overvoltage
	VtpPhsPTOV1	PTOV_SEG	V> 1 Overvoltage
	VtpPhsPTOV2	PTOV_SEG	V> 2 Overvoltage
	VtpPhsPTUV1	PTUV_SEG	V< 1 Undervoltage
	VtpPhsPTUV2	PTUV_SEG	V< 2 Undervoltage
	VtpResPTOV1	PTOV_NEU	VN> 1 Residual Overvoltage
	VtpResPTOV2	PTOV_NEU	VN> 2 Residual Overvoltage

LD	LN instance	LN type	Description
Records			
	LLN0	LLN0_STANDARD	Records Logical Device
	LPHD1	LPHD_STANDARD	Physical Device Information
	RDRE1	RDRE_BASIC	Disturbance Recorder
	RFLO1	RFLO_BASIC	Fault Locator
System			
	AlmGGIO1	GGIO_ALM_96	Alarms
	FnkGGIO1	GGIO_IND_10	Function Keys
	GosGGIO1	GGIO_IND_32	GOOSE Input Signals
	GosGGIO2	GGIO_IND_32	GOOSE Output Signals
	LedGGIO1	GGIO_IND_18	Red LED Signals
	LedGGIO2	GGIO_IND_18	Green LED Signals
	LLN0	LLN0_SYSTEM	System Logical Device
	LPHD1	LPHD_STANDARD	Physical Device Information
	OptGGIO1	GGIO_IND_24	Opto Inputs
	OrdRunGGIO1	GGIO_IND_32	Uniqueness of control "Order Running" indications for Control operations
	PloGGIO1	GGIO_IND_32_CTRL	Controllable Inputs
	RlyGGIO1	GGIO_IND_32	Output Contacts
	UsrGGIO1	GGIO_IND_DPS_8	User Mapped (PSL) Double Point Status Indications

## 1.4 Logical Node Definitions

The definition tables for each of the Logical Nodes in the top-level data model are presented in the following sub-sections.

The following table presents a summary of the Logical Node templates used across the Logical Devices within the overall IEC 61850 product data model:

LN type	(LN class)	Description	Name space
CILO_INTERLOCK	(CILO)	Control Interlocking	IEC 61850-7-4:2003
GGIO_ALM_96	(GGIO)	Generic Process I/O (w.r.t 96 Alarm Elements)	IEC 61850-7-4:2003
GGIO_IND_10	(GGIO)	Generic Process I/O (w.r.t 10 Indication Elements)	IEC 61850-7-4:2003
GGIO_IND_18	(GGIO)	Generic Process I/O (w.r.t 18 Indication Elements)	IEC 61850-7-4:2003
GGIO_IND_24	(GGIO)	Generic Process I/O (w.r.t 24 Indication Elements)	IEC 61850-7-4:2003
GGIO_IND_32	(GGIO)	Generic Process I/O (w.r.t 32 Indication Elements)	IEC 61850-7-4:2003
GGIO_IND_32_CTRL	(GGIO)	Generic Process I/O (w.r.t 32 Indications Ctrl i/p)	IEC 61850-7-4:2003
GGIO_IND_DPS_8	(GGIO)	Generic Process I/O (w.r.t 8 Dual Point Status Indication Elements)	IEC 61850-7-4:2003
LLN0_STANDARD	(LLN0)	General Logical Node 0	IEC 61850-7-4:2003
LLN0_SYSTEM	(LLN0)	System Logical Node 0	IEC 61850-7-4:2003
LLN0_PROT_PHS_COMP	(LLN0)	Protection LLN0 for Phase Comparison relays	IEC 61850-7-4:2003
LLN0_CONTROL	(LLN0)	Control Domain Logical Node 0	IEC 61850-7-4:2003
LPHD_STANDARD	(LPHD)	Px40 Physical Device Information	IEC 61850-7-4:2003
MMTR_PRIV	(MMTR)	Metering	IEC 61850-7-4:2003
MMXU_FOURIER	(MMXU)	Standard Measurements (w.r.t Fourier Values)	IEC 61850-7-4:2003
MMXU_PHS_COMP	(MMXU)	Standard Measurements (w.r.t Phase Comparison)	IEC 61850-7-4:2003
MMXU_RMS	(MMXU)	Standard Measurements (w.r.t RMS values)	IEC 61850-7-4:2003
MSQI_ALL	(MSQI)	Sequence and imbalance (w.r.t Pos, Neq, Zero)	IEC 61850-7-4:2003
MSQI_VOLTAGE	(MSQI)	Sequence and imbalance (w.r.t Pos, Neq, Zero Voltage only)	IEC 61850-7-4:2003
MSTA_I_W_VAR	(MSTA)	Metering Statistics (w.r.t Current, Real + Reactive Power - Average + Max values)	IEC 61850-7-4:2003
PDIF_PHS_COMP	(PDIF)	Differential (Phase Comparison)	IEC 61850-7-4:2003
PDIF_NEU	(PDIF)	Differential (w.r.t Neutral)	IEC 61850-7-4:2003
PDIS_BASIC	(PDIS)	Distance (w.r.t Mandatory Attributes only)	IEC 61850-7-4:2003
PFRC_NO_SEG	(PFRC)	Rate of change of frequency (w.r.t No Phase Segregation)	IEC 61850-7-4:2003
PSCH_BASIC	(PSCH)	Protection Scheme (w.r.t Mandatory Attributes only)	IEC 61850-7-4:2003
PSOF_BASIC	(PSOF)	Switch-onto-Fault Protection	Schneider Electric-SII:PCS-Px40
PTOC_NEU	(PTOC)	Timed Overcurrent (w.r.t Neutral)	IEC 61850-7-4:2003

LN type	(LN class)	Description	Name space
PTOC_NO_SEG	(PTOC)	Timed Overcurrent (w.r.t No Phase Segregation)	IEC 61850-7-4:2003
PTOC_SEG	(PTOC)	Timed Overcurrent (w.r.t Phase Segregation)	IEC 61850-7-4:2003
PTOF_NO_SEG	(PTOF)	Overfrequency (w.r.t No Phase Segregation)	IEC 61850-7-4:2003
PTOV_SEG	(PTOV)	Overvoltage (w.r.t Phase Segregation)	IEC 61850-7-4:2003
PTOV_NEU	(PTOV)	Overvoltage (w.r.t Neutral)	IEC 61850-7-4:2003
PTOV_NO_SEG	(PTOV)	Overvoltage (w.r.t No Phase Segregation)	IEC 61850-7-4:2003
PTRC_NO_SEG	(PTRC)	Protection trip conditioning (w.r.t No Phase Segregation)	IEC 61850-7-4:2003
PTTR_NO_SEG	(PTTR)	Thermal Overload (w.r.t No Phase Segregation)	IEC 61850-7-4:2003
PTUF_NO_SEG	(PTUF)	Underfrequency (w.r.t No Phase Segregation)	IEC 61850-7-4:2003
PTUV_SEG	(PTUV)	Undervoltage (w.r.t Phase Segregation)	IEC 61850-7-4:2003
RBRF_EXTTRIP	(RBRF)	Breaker Failure (w.r.t External Tripping)	IEC 61850-7-4:2003
RDRE_BASIC	(RDRE)	Disturbance Recorder function (w.r.t Mandatory Attributes only)	IEC 61850-7-4:2003
RFLO_BASIC	(RFLO)	Fault Locator (w.r.t Mandatory Attributes only)	IEC 61850-7-4:2003
RPSB_BASIC	(RPSB)	Power swing detection/blocking (w.r.t Mandatory Attributes only)	IEC 61850-7-4:2003
RPSB_OST	(RPSB)	Power Swing Blocking (w.r.t. Out of Step Tripping)	IEC 61850-7-4:2003
RREC_NO_SEG	(RREC)	Autoreclosing (w.r.t No Phase Segregation)	IEC 61850-7-4:2003
RSYN_DIFCLC	(RSYN)	Synchronism-check / Synchronizing (w.r.t Calculated Differential Measurements)	IEC 61850-7-4:2003
XCBR_BASIC	(XCBR)	Circuit Breaker (w.r.t Mandatory Attributes only)	IEC 61850-7-4:2003

#### 1.4.1 Logical Node: **CILO\_INTERLOCK**

**Description:** Control Interlocking

**LN class:** CILO

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
EnaOpn	SPS_WD	Enable OPEN Commands		
EnaCls	SPS_WD	Enable CLOSE Commands		

#### 1.4.2 Logical Node: **GGIO\_ALM\_96**

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

**LN class:** GGIO

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		

Attribute	Attr. type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Alm1	SPS_D	General single alarm		
Alm2	SPS_D	General single alarm		
Alm3	SPS_D	General single alarm		
Alm4	SPS_D	General single alarm		
Alm5	SPS_D	General single alarm		
Alm6	SPS_D	General single alarm		
Alm7	SPS_D	General single alarm		
Alm8	SPS_D	General single alarm		
Alm9	SPS_D	General single alarm		
Alm10	SPS_D	General single alarm		
Alm11	SPS_D	General single alarm		
Alm12	SPS_D	General single alarm		
Alm13	SPS_D	General single alarm		
Alm14	SPS_D	General single alarm		
Alm15	SPS_D	General single alarm		
Alm16	SPS_D	General single alarm		
Alm17	SPS_D	General single alarm		
Alm18	SPS_D	General single alarm		
Alm19	SPS_D	General single alarm		
Alm20	SPS_D	General single alarm		
Alm21	SPS_D	General single alarm		
Alm22	SPS_D	General single alarm		
Alm23	SPS_D	General single alarm		
Alm24	SPS_D	General single alarm		
Alm25	SPS_D	General single alarm		
Alm26	SPS_D	General single alarm		
Alm27	SPS_D	General single alarm		
Alm28	SPS_D	General single alarm		
Alm29	SPS_D	General single alarm		
Alm30	SPS_D	General single alarm		
Alm31	SPS_D	General single alarm		
Alm32	SPS_D	General single alarm		
Alm33	SPS_D	General single alarm		
Alm34	SPS_D	General single alarm		
Alm35	SPS_D	General single alarm		
Alm36	SPS_D	General single alarm		
Alm37	SPS_D	General single alarm		
Alm38	SPS_D	General single alarm		
Alm39	SPS_D	General single alarm		
Alm40	SPS_D	General single alarm		
Alm41	SPS_D	General single alarm		
Alm42	SPS_D	General single alarm		
Alm43	SPS_D	General single alarm		

Attribute	Attr. type	Explanation	T	X
Alm44	SPS_D	General single alarm		
Alm45	SPS_D	General single alarm		
Alm46	SPS_D	General single alarm		
Alm47	SPS_D	General single alarm		
Alm48	SPS_D	General single alarm		
Alm49	SPS_D	General single alarm		
Alm50	SPS_D	General single alarm		
Alm51	SPS_D	General single alarm		
Alm52	SPS_D	General single alarm		
Alm53	SPS_D	General single alarm		
Alm54	SPS_D	General single alarm		
Alm55	SPS_D	General single alarm		
Alm56	SPS_D	General single alarm		
Alm57	SPS_D	General single alarm		
Alm58	SPS_D	General single alarm		
Alm59	SPS_D	General single alarm		
Alm60	SPS_D	General single alarm		
Alm61	SPS_D	General single alarm		
Alm62	SPS_D	General single alarm		
Alm63	SPS_D	General single alarm		
Alm64	SPS_D	General single alarm		
Alm65	SPS_D	General single alarm		
Alm66	SPS_D	General single alarm		
Alm67	SPS_D	General single alarm		
Alm68	SPS_D	General single alarm		
Alm69	SPS_D	General single alarm		
Alm70	SPS_D	General single alarm		
Alm71	SPS_D	General single alarm		
Alm72	SPS_D	General single alarm		
Alm73	SPS_D	General single alarm		
Alm74	SPS_D	General single alarm		
Alm75	SPS_D	General single alarm		
Alm76	SPS_D	General single alarm		
Alm77	SPS_D	General single alarm		
Alm78	SPS_D	General single alarm		
Alm79	SPS_D	General single alarm		
Alm80	SPS_D	General single alarm		
Alm81	SPS_D	General single alarm		
Alm82	SPS_D	General single alarm		
Alm83	SPS_D	General single alarm		
Alm84	SPS_D	General single alarm		
Alm85	SPS_D	General single alarm		
Alm86	SPS_D	General single alarm		
Alm87	SPS_D	General single alarm		

Attribute	Attr. type	Explanation	T	X
Alm88	SPS_D	General single alarm		
Alm89	SPS_D	General single alarm		
Alm90	SPS_D	General single alarm		
Alm91	SPS_D	General single alarm		
Alm92	SPS_D	General single alarm		
Alm93	SPS_D	General single alarm		
Alm94	SPS_D	General single alarm		
Alm95	SPS_D	General single alarm		
Alm96	SPS_D	General single alarm		

### 1.4.3

**Logical Node:** **GGIO\_IND\_10**

**Description:** Generic Process I/O (w.r.t 10 Indication Elements)

**LN class:** GGIO

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Ind1	SPS_D	General Indication		
Ind2	SPS_D	General Indication		
Ind3	SPS_D	General Indication		
Ind4	SPS_D	General Indication		
Ind5	SPS_D	General Indication		
Ind6	SPS_D	General Indication		
Ind7	SPS_D	General Indication		
Ind8	SPS_D	General Indication		
Ind9	SPS_D	General Indication		
Ind10	SPS_D	General Indication		

### 1.4.4

**Logical Node:** **GGIO\_IND\_18**

**Description:** Generic Process I/O (w.r.t 18 Indication Elements)

**LN class:** GGIO

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Ind1	SPS_D	General Indication		
Ind2	SPS_D	General Indication		
Ind3	SPS_D	General Indication		
Ind4	SPS_D	General Indication		
Ind5	SPS_D	General Indication		
Ind6	SPS_D	General Indication		

Attribute	Attr. type	Explanation	T	X
Ind7	SPS_D	General Indication		
Ind8	SPS_D	General Indication		
Ind9	SPS_D	General Indication		
Ind10	SPS_D	General Indication		
Ind11	SPS_D	General Indication		
Ind12	SPS_D	General Indication		
Ind13	SPS_D	General Indication		
Ind14	SPS_D	General Indication		
Ind15	SPS_D	General Indication		
Ind16	SPS_D	General Indication		
Ind17	SPS_D	General Indication		
Ind18	SPS_D	General Indication		

1.4.5

**Logical Node: GGIO\_IND\_24**

**Description:** Generic Process I/O (w.r.t 24 Indication Elements)

**LN class:** GGIO

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Ind1	SPS_D	General Indication		
Ind2	SPS_D	General Indication		
Ind3	SPS_D	General Indication		
Ind4	SPS_D	General Indication		
Ind5	SPS_D	General Indication		
Ind6	SPS_D	General Indication		
Ind7	SPS_D	General Indication		
Ind8	SPS_D	General Indication		
Ind9	SPS_D	General Indication		
Ind10	SPS_D	General Indication		
Ind11	SPS_D	General Indication		
Ind12	SPS_D	General Indication		
Ind13	SPS_D	General Indication		
Ind14	SPS_D	General Indication		
Ind15	SPS_D	General Indication		
Ind16	SPS_D	General Indication		
Ind17	SPS_D	General Indication		
Ind18	SPS_D	General Indication		
Ind19	SPS_D	General Indication		
Ind20	SPS_D	General Indication		
Ind21	SPS_D	General Indication		
Ind22	SPS_D	General Indication		
Ind23	SPS_D	General Indication		



Attribute	Attr. type	Explanation	T	X
Ind24	SPS_D	General Indication		

## 1.4.6

**Logical Node:** GGIO\_IND\_32

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

**LN class:** GGIO

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Ind1	SPS_D	General Indication		
Ind2	SPS_D	General Indication		
Ind3	SPS_D	General Indication		
Ind4	SPS_D	General Indication		
Ind5	SPS_D	General Indication		
Ind6	SPS_D	General Indication		
Ind7	SPS_D	General Indication		
Ind8	SPS_D	General Indication		
Ind9	SPS_D	General Indication		
Ind10	SPS_D	General Indication		
Ind11	SPS_D	General Indication		
Ind12	SPS_D	General Indication		
Ind13	SPS_D	General Indication		
Ind14	SPS_D	General Indication		
Ind15	SPS_D	General Indication		
Ind16	SPS_D	General Indication		
Ind17	SPS_D	General Indication		
Ind18	SPS_D	General Indication		
Ind19	SPS_D	General Indication		
Ind20	SPS_D	General Indication		
Ind21	SPS_D	General Indication		
Ind22	SPS_D	General Indication		
Ind23	SPS_D	General Indication		
Ind24	SPS_D	General Indication		
Ind25	SPS_D	General Indication		
Ind26	SPS_D	General Indication		
Ind27	SPS_D	General Indication		
Ind28	SPS_D	General Indication		
Ind29	SPS_D	General Indication		
Ind30	SPS_D	General Indication		
Ind31	SPS_D	General Indication		
Ind32	SPS_D	General Indication		

1.4.7

**Logical Node:** GGIO\_IND\_32\_CTRL

**Description:** Generic Process I/O (w.r.t 32 Indications Ctrl i/p)

**LN class:** GGIO

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
SPCSO1	SPC_CONTROL	Single point controllable status output		
SPCSO2	SPC_CONTROL	Single point controllable status output		
SPCSO3	SPC_CONTROL	Single point controllable status output		
SPCSO4	SPC_CONTROL	Single point controllable status output		
SPCSO5	SPC_CONTROL	Single point controllable status output		
SPCSO6	SPC_CONTROL	Single point controllable status output		
SPCSO7	SPC_CONTROL	Single point controllable status output		
SPCSO8	SPC_CONTROL	Single point controllable status output		
SPCSO9	SPC_CONTROL	Single point controllable status output		
SPCSO10	SPC_CONTROL	Single point controllable status output		
SPCSO11	SPC_CONTROL	Single point controllable status output		
SPCSO12	SPC_CONTROL	Single point controllable status output		
SPCSO13	SPC_CONTROL	Single point controllable status output		
SPCSO14	SPC_CONTROL	Single point controllable status output		
SPCSO15	SPC_CONTROL	Single point controllable status output		
SPCSO16	SPC_CONTROL	Single point controllable status output		
SPCSO17	SPC_CONTROL	Single point controllable status output		
SPCSO18	SPC_CONTROL	Single point controllable status output		
SPCSO19	SPC_CONTROL	Single point controllable status output		
SPCSO20	SPC_CONTROL	Single point controllable status output		
SPCSO21	SPC_CONTROL	Single point controllable status output		
SPCSO22	SPC_CONTROL	Single point controllable status output		
SPCSO23	SPC_CONTROL	Single point controllable status output		
SPCSO24	SPC_CONTROL	Single point controllable status output		
SPCSO25	SPC_CONTROL	Single point controllable status output		
SPCSO26	SPC_CONTROL	Single point controllable status output		
SPCSO27	SPC_CONTROL	Single point controllable status output		
SPCSO28	SPC_CONTROL	Single point controllable status output		
SPCSO29	SPC_CONTROL	Single point controllable status output		
SPCSO30	SPC_CONTROL	Single point controllable status output		
SPCSO31	SPC_CONTROL	Single point controllable status output		
SPCSO32	SPC_CONTROL	Single point controllable status output		

1.4.8

**Logical Node:** 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	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
DPCSO1	DPC_STATUS_D	Double Point Status		
DPCSO2	DPC_STATUS_D	Double Point Status		
DPCSO3	DPC_STATUS_D	Double Point Status		
DPCSO4	DPC_STATUS_D	Double Point Status		
DPCSO5	DPC_STATUS_D	Double Point Status		
DPCSO6	DPC_STATUS_D	Double Point Status		
DPCSO7	DPC_STATUS_D	Double Point Status		
DPCSO8	DPC_STATUS_D	Double Point Status		

## 1.4.9

**Logical Node:** LLN0\_CONTROL**Description:** Control Domain Logical Node 0**LN class:** LLN0

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LLNO	Name Plate		
AscMod	INC_CTRL_D_PRIV	Check Synchronization		X
AscBeh	INS_BEH_D_PRIV	Check Synchronization		X
ArcMod	INC_CTRL_D_PRIV	Auto-Reclose		X
ArcBeh	INS_BEH_D_PRIV	Auto-Reclose		X
PsbMod	INC_CTRL_D_PRIV	Power Swing Blocking		X
PsbBeh	INS_BEH_D_PRIV	Power Swing Blocking		X

## 1.4.10

**Logical Node:** LLN0\_PROT\_PHS\_COMP**Description:** Protection LLN0 for Phase Comparison relays**LN class:** LLN0

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LLNO	Name Plate		
DisMod	INC_CTRL_D_PRIV	Distance Mode		X
DisBeh	INS_BEH_D_PRIV	Distance Behavior		X
PhcMod	INC_CTRL_D_PRIV	Phase Comparison Mode		X
PhcBeh	INS_BEH_D_PRIV	Phase Comparison Behavior		X
OcpMod	INC_CTRL_D_PRIV	Overcurrent Mode		X
OcpBeh	INS_BEH_D_PRIV	Overcurrent Behavior		X
NgcMod	INC_CTRL_D_PRIV	Negative Sequence Mode		X

Attribute	Attr. type	Explanation	T	X
NgcBeh	INS_BEH_D_PRIV	Negative Sequence Behavior		X
EfdMod	INC_CTRL_D_PRIV	Earth Fault 1 (Derived) Mode		X
EfdBeh	INS_BEH_D_PRIV	Earth Fault 1 (Derived) Behavior		X
SefMod	INC_CTRL_D_PRIV	SEF Mode		X
SefBeh	INS_BEH_D_PRIV	SEF Behavior		X
VtpMod	INC_CTRL_D_PRIV	Overvoltage/Undervoltage Mode		X
VtpBeh	INS_BEH_D_PRIV	Overvoltage/Undervoltage Behavior		X
NvdMod	INC_CTRL_D_PRIV	Residual Overvoltage NVD Mode		X
NvdBeh	INS_BEH_D_PRIV	Residual Overvoltage NVD Behavior		X
FrqMod	INC_CTRL_D_PRIV	Overfrequency/Underfrequency Mode		X
FrqBeh	INS_BEH_D_PRIV	Overfrequency/Underfrequency Behavior		X
DfpMod	INC_CTRL_D_PRIV	df/dt Mode		X
DfpBeh	INS_BEH_D_PRIV	df/dt behavior		X
ThmMod	INC_CTRL_D_PRIV	Thermal Overload Mode		X
ThmBeh	INS_BEH_D_PRIV	Thermal Overload Behavior		X
CbfMod	INC_CTRL_D_PRIV	CB Fail Mode		X
CbfBeh	INS_BEH_D_PRIV	CB Fail Behavior		X

**1.4.11****Logical Node: LLN0\_STANDARD****Description:** General Logical Node 0**LN class:** LLN0

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LLNO	Name Plate		

**1.4.12****Logical Node: LLN0\_SYSTEM****Description:** System Logical Node 0**LN class:** LLN0

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LLNO	Name Plate		
OrdRun	SPS_WD_PRIV	Indicate IED is operating a Control Object		X
SyncSt	SPS_WD_PRIV	Indicate time synchronization in the IED is active/inactive		X
LEDs	SPC_CONTROL	LED reset	T	

**1.4.13****Logical Node: LPHD\_STANDARD****Description:** Px40 Physical Device Information**LN class:** LPHD

Attribute	Attr. type	Explanation	T	X
PhyNam	DPL_STANDARD	Physical device name plate		
PhyHealth	INS_HEALTH	Physical device health		
Proxy	SPS_D	Indicates if this LN is a proxy		
PwrUp	SPS_D	Power up detected		

## 1.4.14

**Logical Node: MMTR\_PRIV****Description:** Metering**LN class:** MMTR

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
TotWh	BCR_PRIV	Net real energy since last reset		
TotVArh	BCR_PRIV	Net reactive energy since last reset		
SupWh	BCR_PRIV	Real energy supply (Energy flow towards bus bar)		
SupVArh	BCR_PRIV	Reactive energy supply (Energy flow towards bus bar)		
DmdWh	BCR_PRIV	Real energy demand (Energy flow from bus bar)		
DmdVArh	BCR_PRIV	Reactive energy demand (Energy flow from bus bar)		
MTRRs	SPC_CTRL_PRIV	Reset Energy Meters		X

## 1.4.15

**Logical Node: MMXU\_FOURIER****Description:** Standard Measurements (w.r.t Fourier values)**LN class:** MMXU

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
TotW	MV_FLOAT	Total active power (Total P)		
TotVAr	MV_FLOAT	Total reactive power (Total Q)		
TotVA	MV_FLOAT	Total apparent power (Total S)		
TotPF	MV_FLOAT	Average power factor (Total PF)		
Hz	MV_FLOAT	Frequency		
PPV	DEL_SEG_ANG	Phase to Phase voltages		
PhV	WYE_SEG_ANG_D	Phase to Ground voltages		
A1	WYE_SEG_RES_D	Phase currents (Fourier Magnitudes)		
A2	WYE_RES_ANG_D	Phase currents (ISEF Magnitude)		
A3	WYE_RES_ANG_D	Phase currents (Mutual Magnitude)		
W	WYE_SEG	Phase active power (P)		
VAr	WYE_SEG	Phase reactive power (Q)		
VA	WYE_SEG	Phase apparent power (S)		
PF	WYE_SEG	Phase power factor		

**1.4.16 Logical Node: MMXU\_PHS\_COMP****Description:** Standard Measurements (w.r.t Phase Comparison)**LN class:** MMXU

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
A	WYE_SEG_ANG_D	Phase currents		

**1.4.17 Logical Node: MMXU\_RMS****Description:** Standard Measurements (w.r.t RMS values)**LN class:** MMXU

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
PhV	WYE_SEG_D	Phase to Ground voltages		
A	WYE_SEG_D	Phase currents		

**1.4.18 Logical Node: MSQI\_ALL****Description:** Sequence and imbalance (w.r.t Pos, Neq, Zero)**LN class:** MSQI

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
SeqA	SEQ_MAG_ANG	Positive, Negative and Zero sequence current		
SeqV	SEQ_MAG_ANG	Positive, Negative and Zero sequence voltage		

**1.4.19 Logical Node: MSQI\_VOLTAGE****Description:** Sequence and imbalance (w.r.t Pos, Neq, Zero Voltage only)**LN class:** MSQI

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
SeqV	SEQ_MAG_ANG	Positive, Negative and Zero sequence voltage		

## 1.4.20

**Logical Node: 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	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
AvAmps1	MV_FLOAT_D	Average current		
AvAmps2	MV_FLOAT_D	Average current		
AvAmps3	MV_FLOAT_D	Average current		
AvAmps4	MV_FLOAT_D	Average current		
AvAmps5	MV_FLOAT_D	Average current		
AvAmps6	MV_FLOAT_D	Average current		
MaxAmps1	MV_FLOAT_D	Maximum current		
MaxAmps2	MV_FLOAT_D	Maximum current		
MaxAmps3	MV_FLOAT_D	Maximum current		
AvW1	MV_FLOAT_D	Average real power		
AvW2	MV_FLOAT_D	Average real power		
MaxW	MV_FLOAT_D	Maximum real power		
AvVAr1	MV_FLOAT_D	Average reactive power		
AvVAr2	MV_FLOAT_D	Average reactive power		
MaxVAr	MV_FLOAT_D	Maximum reactive power		

## 1.4.21

**Logical Node: PDIF\_NEU**

**Description:** Differential (w.r.t Neutral)

**LN class:** PDIF

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Op	ACT_NEU	Operate	T	

## 1.4.22

**Logical Node: PDIF\_PHS\_COMP**

**Description:** Differential (Phase Comparison)

**LN class:** PDIF

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Op	ACT_SEG	Operate	T	

## 1.4.23

**Logical Node: PDIS\_BASIC****Description:** Distance (w.r.t Mandatory Attributes only)**LN class:** PDIS

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_SEG_NEU	Start		
Op	ACT_SEG_NEU	Operate	T	

## 1.4.24

**Logical Node: PFRC\_NO\_SEG****Description:** Rate of Change of Frequency (w.r.t No Phase Segregation)**LN class:** PFRC

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

## 1.4.25

**Logical Node: PSCH\_BASIC****Description:** Protection Scheme (w.r.t Mandatory Attributes only)**LN class:** PSCH

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
ProTx	SPS_WD	Teleprotection signal transmitted	T	
ProRx	SPS_WD	Teleprotection signal received	T	
Str	ACD_NO_SEG	Carrier Send		
Op	ACT_SEG_NEU	Operate	T	
CarRx	ACT_NO_SEG	Carrier received after unblock logic		
LosOfGrd	SPS_WD	Loss of guard		
WeiOp	ACT_SEG	Operate signal from weak end infeed function		

## 1.4.26

**Logical Node: PSOF\_BASIC****Description:** Switch-onto-Fault Protection**LN class:** PSOF

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		



Attribute	Attr. type	Explanation	T	X
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN_PRIV	Name Plate		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

**1.4.27****Logical Node: PTOC\_NEU****Description:** Timed Overcurrent (w.r.t Neutral)**LN class:** PTOC

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_NEU	Start		
Op	ACT_NEU	Operate	T	

**1.4.28****Logical Node: PTOC\_NO\_SEG****Description:** Timed Overcurrent (w.r.t No Phase Segregation)**LN class:** PTOC

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

**1.4.29****Logical Node: PTOC\_SEG****Description:** Timed Overcurrent (w.r.t Phase Segregation)**LN class:** PTOC

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_SEG	Start		
Op	ACT_SEG	Operate	T	

**1.4.30****Logical Node: PTOF\_NO\_SEG****Description:** Overfrequency (w.r.t No Phase Segregation)**LN class:** PTOF

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

**1.4.31****Logical Node: PTOV\_NEU****Description:** Overvoltage (w.r.t Neutral)**LN class:** PTOV

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_NEU	Start		
Op	ACT_NEU	Operate	T	

**1.4.32****Logical Node: PTOV\_NO\_SEG****Description:** Overvoltage (w.r.t No Phase Segregation)**LN class:** PTOV

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

**1.4.33****Logical Node: PTOV\_SEG****Description:** Overvoltage (w.r.t Phase Segregation)**LN class:** PTOV

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_SEG	Start		
Op	ACT_SEG	Operate	T	

**1.4.34****Logical Node: PTRC\_NO\_SEG****Description:** Protection trip conditioning (w.r.t No Phase Segregation)**LN class:** PTRC

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Tr	ACT_NO_SEG	Trip		
Str	ACD_NO_SEG	Sum of all starts of all connected Logical Nodes		

**1.4.35****Logical Node: PTTR\_NO\_SEG****Description:** Thermal Overload (w.r.t No Phase Segregation)**LN class:** PTTR

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Amp	MV_FLOAT	Current for thermal load model		
TmpRI	MV_FLOAT	Relation between temperature and maximum temperature		
Op	ACT_NO_SEG	Operate	T	
AlmThm	ACT_NO_SEG	Thermal alarm	T	
MTRRs	SPC_CTRL_PRIV	Reset Thermal State		X

**1.4.36****Logical Node: PTUF\_NO\_SEG****Description:** Underfrequency (w.r.t No Phase Segregation)**LN class:** PTUF

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

**1.4.37****Logical Node: PTUV\_SEG****Description:** Undervoltage (w.r.t Phase Segregation)**LN class:** PTUV

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_SEG	Start		
Op	ACT_SEG	Operate	T	

## 1.4.38

**Logical Node: RBRF\_EXTTRIP****Description:** Breaker Failure (w.r.t External Tripping)**LN class:** RBRF

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
OpEx	ACT_NO_SEG	Breaker failure trip ("External trip")	T	

## 1.4.39

**Logical Node: RDRE\_BASIC****Description:** Disturbance Recorder function (w.r.t Mandatory Attributes only)**LN class:** RDRE

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
RcdMade	SPS_WD	Recording made		
FltNum	INS_BASIC	Fault number		

## 1.4.40

**Logical Node: RFLO\_BASIC****Description:** Fault Locator (w.r.t Mandatory Attributes only)**LN class:** RFLO

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
FltZ	CMV_MAG_FLOAT	Fault impedance		
FltDiskm	MV_FLOAT	Fault distance in km		

## 1.4.41

**Logical Node: RPSB\_BASIC****Description:** Power swing detection/blocking (w.r.t Mandatory Attributes only)**LN class:** RPSB

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_NO_SEG	Start (Power Swing Detected)		
BlkZn	SPS_WD	Blocking of correlated PDIS zone		

1.4.42

**Logical Node: RPSB\_OST**

**Description:** Power Swing Blocking (w.r.t. Out of Step Tripping)

**LN class:** RPSB

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Op	ACT_NO_SEG	Operate (Out of step Tripping)		

1.4.43

**Logical Node: RREC\_NO\_SEG**

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

**LN class:** RREC

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Op	ACT_NO_SEG	Operate (used here to provide close to XCBR)	T	
AutoRecSt	INS_AR_STATE	Auto reclosing status		

1.4.44

**Logical Node: RSYN\_DIFCLC**

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

**LN class:** RSYN

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Rel	SPS_WD	Release		
DifHzClc	MV_FLOAT	Calculated difference in frequency		
DifAngClc	MV_FLOAT	Calculated difference of phase angle		

1.4.45

**Logical Node: XCBR\_BASIC**

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

**LN class:** XCBR

Attribute	Attr. type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behavior		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Loc	SPS_WD	Local operation		
EEHealth	INS_HEALTH	External equipment health		

Attribute	Attr. type	Explanation	T	X
OpCnt	INS_BASIC	Operation counter		
Pos	DPC_CONTROL	Switch position		
BlkOpn	SPC_STATUS	Block opening		
BlkCls	SPC_STATUS	Block closing		
CBOPCap	INS_HEALTH	Circuit Breaker operating capability		
Lock	SPC_CTRL_PRIV	Prevention, i.e. Lock, Trip/Close operations of the Circuit Breaker over IEC 61850		X

## 1.5 Common Data Class Definitions

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

From an application point-of-view the data attributes of a Common Data Class are classified according to their specific use. The characterization of data attributes, and the services that they support/provide, will be through the use of 'Functional Constraints'. The Functional Constraints are specified by the table below:

FC name	Semantic	Source definition
BR	Buffered reports	IEC 61850-7-2
CF	Configuration	IEC 61850-7-2
CO	Control	IEC 61850-7-2
DC	Description	IEC 61850-7-2
EX	Extended Definition	IEC 61850-7-2
GO	GOOSE Control	IEC 61850-7-2
GS	GSSE Control (UCA2 GOOSE)	IEC 61850-7-2
LG	Logging	IEC 61850-7-2
MS	Multicast sampled value control	IEC 61850-7-2
MX	Measurands (Analogue values)	IEC 61850-7-2
RP	Unbuffered reports	IEC 61850-7-2
SE	Setting Group Editable	IEC 61850-7-2
SG	Setting Group	IEC 61850-7-2
SP	Set Point	IEC 61850-7-2
ST	Status Information	IEC 61850-7-2
SV	Substitution values	IEC 61850-7-2
US	Unicast sampled value control	IEC 61850-7-2
XX	Data attribute service parameters	IEC 61850-7-2

### 1.5.1 Common Data Class: ACD\_NEU

**Description:** Directional Protection Activation Information (w.r.t Neutral)

**CDC class:** ACD

Attribute	Type	FC	Enumeration	Comment	X
general	BOOLEAN	ST		Trip or start has happened	
dirGeneral	ENUMERATED8 (MMS Type: INT8)	ST	dir	General direction (unknown, forward, backward or both)	
neut	BOOLEAN	ST		Trip or start event with earth current has happened	
dirNeut	ENUMERATED8 (MMS Type: INT8)	ST	dir	Earth current direction (unknown, forward or backward)	
q	Quality	ST		Quality of the protection activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection activation information	

**1.5.2 Common Data Class: ACD\_NO\_SEG**

**Description:** Directional Protection Activation Information (w.r.t No Phase Segregation)

**CDC class:** ACD

Attribute	Type	FC	Enumeration	Comment	X
general	BOOLEAN	ST		Trip or start has happened	
dirGeneral	ENUMERATED8 (MMS Type: INT8)	ST	dir	General direction (unknown, forward, backward or both)	
q	Quality	ST		Quality of the protection activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection activation information	

**1.5.3 Common Data Class: ACD\_SEG**

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

**CDC class:** ACD

Attribute	Type	FC	Enumeration	Comment	X
general	BOOLEAN	ST		Trip or start has happened	
dirGeneral	ENUMERATED8 (MMS Type: INT8)	ST	dir	General direction (unknown, forward, backward or both)	
phsA	BOOLEAN	ST		Trip or start event of Phase A has happened	
dirPhsA	ENUMERATED8 (MMS Type: INT8)	ST	dir	Phase A direction (unknown, forward or backward)	
phsB	BOOLEAN	ST		Trip or start event of Phase B has happened	
dirPhsB	ENUMERATED8 (MMS Type: INT8)	ST	dir	Phase B direction (unknown, forward or backward)	
phsC	BOOLEAN	ST		Trip or start event of Phase C has happened	
dirPhsC	ENUMERATED8 (MMS Type: INT8)	ST	dir	Phase C direction (unknown, forward or backward)	
q	Quality	ST		Quality of the protection activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection activation information	

**1.5.4 Common Data Class: ACD\_SEG\_NEU**

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

**CDC class:** ACD

Attribute	Type	FC	Enumeration	Comment	X
general	BOOLEAN	ST		Trip or start has happened	
dirGeneral	ENUMERATED8 (MMS Type: INT8)	ST	dir	General direction (unknown, forward, backward or both)	
phsA	BOOLEAN	ST		Trip or start event of Phase A has happened	



Attribute	Type	FC	Enumeration	Comment	X
dirPhsA	ENUMERATED8 (MMS Type: INT8)	ST	dir	Phase A direction (unknown, forward or backward)	
phsB	BOOLEAN	ST		Trip or start event of Phase B has happened	
dirPhsB	ENUMERATED8 (MMS Type: INT8)	ST	dir	Phase B direction (unknown, forward or backward)	
phsC	BOOLEAN	ST		Trip or start event of Phase C has happened	
dirPhsC	ENUMERATED8 (MMS Type: INT8)	ST	dir	Phase C direction (unknown, forward or backward)	
neut	BOOLEAN	ST		Trip or start event with earth current has happened	
dirNeut	ENUMERATED8 (MMS Type: INT8)	ST	dir	Earth current direction (unknown, forward or backward)	
q	Quality	ST		Quality of the protection activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection activation information	

**1.5.5****Common Data Class: ACT\_NEU****Description:** Protection Activation Information (w.r.t Neutral)**CDC class:** ACT

Attribute	Type	FC	Enumeration	Comment	X
general	BOOLEAN	ST		Trip or start has happened	
neut	BOOLEAN	ST		Trip or start event with earth current has happened	
q	Quality	ST		Quality of the protection activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection activation information	

**1.5.6****Common Data Class: ACT\_NO\_SEG****Description:** Protection Activation Information (w.r.t No Phase Segregation)**CDC class:** ACT

Attribute	Type	FC	Enumeration	Comment	X
general	BOOLEAN	ST		Trip or start has happened	
q	Quality	ST		Quality of the protection activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection activation information	

**1.5.7****Common Data Class: ACT\_SEG****Description:** Protection Activation Information (w.r.t Phase Segregation)**CDC class:** ACT

Attribute	Type	FC	Enumeration	Comment	X
general	BOOLEAN	ST		Trip or start has happened	
phsA	BOOLEAN	ST		Trip or start event of Phase A has happened	

Attribute	Type	FC	Enumeration	Comment	X
phsB	BOOLEAN	ST		Trip or start event of Phase B has happened	
phsC	BOOLEAN	ST		Trip or start event of Phase C has happened	
q	Quality	ST		Quality of the protection activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection activation information	

**1.5.8 Common Data Class: ACT\_SEG\_NEU**

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

**CDC class:** ACT

Attribute	Type	FC	Enumeration	Comment	X
general	BOOLEAN	ST		Trip or start has happened	
phsA	BOOLEAN	ST		Trip or start event of Phase A has happened	
phsB	BOOLEAN	ST		Trip or start event of Phase B has happened	
phsC	BOOLEAN	ST		Trip or start event of Phase C has happened	
neut	BOOLEAN	ST		Trip or start event with earth current has happened	
q	Quality	ST		Quality of the protection activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection activation information	

**1.5.9 Common Data Class: BCR\_PRIV**

**Description:** Binary Counter Reading

**CDC class:** BCR

Attribute	Type	FC	Enumeration	Comment	X
actVal	INT128	ST		Binary counter status represented as an integer	
q	Quality	ST		Quality of counter value	
t	TimeStamp	ST		Time of last counter change	
pulsQty	FLOAT32	CF		Magnitude of the counted value 'per count' (value = actVal x pulsQty)	

**1.5.10 Common Data Class: CMV\_MAG\_ANG\_FLOAT**

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

**CDC class:** CMV

Attribute	Type	FC	Enumeration	Comment	X
cVal	Vector_MagnitudeAngle_Float	MX		Deadbanded complex measured vector. Updated to the current value of instCVal when the value has changed according to the configuration parameter db.	
q	Quality	MX		Quality of the measurement value	
t	TimeStamp	MX		Time deadbanded magnitude last exceeded its db configuration parameter	
units	Unit_Multiplier	CF		Unit of the attribute representing the data	
db	INT32U	CF		Measurement deadband	

Attribute	Type	FC	Enumeration	Comment	X
rangeC	RangeConfig_DeadBand	CF		Measurement range configuration attributes	

## 1.5.11

**Common Data Class: CMV\_MAG\_FLOAT****Description:** Complex Measured value (w.r.t Floating Point Magnitude)**CDC class:** CMV

Attribute	Type	FC	Enumeration	Comment	X
cVal	Vector_Magnitude_Float	MX		Deadbanded complex measured vector. Updated to the current value of instCVal when the value has changed according to the configuration parameter db.	
q	Quality	MX		Quality of the measurement value	
t	TimeStamp	MX		Time deadbanded magnitude last exceeded its db configuration parameter	
units	Unit_Multiplier	CF		Unit of the attribute representing the data	
db	INT32U	CF		Measurement deadband	
rangeC	RangeConfig_DeadBand	CF		Measurement range configuration attributes	

## 1.5.12

**Common Data Class: 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	Enumeration	Comment	X
phsAB	CMV_MAG_ANG_FLOAT	--		Measurement values for Phase A to Phase B	
phsBC	CMV_MAG_ANG_FLOAT	--		Measurement values for Phase B to Phase C	
phsCA	CMV_MAG_ANG_FLOAT	--		Measurement values for Phase C to Phase A	

## 1.5.13

**Common Data Class: DPC\_CONTROL****Description:** Controllable Double Point**CDC class:** DPC

Attribute	Type	FC	Enumeration	Comment	X
ctlVal	BOOLEAN	CO		Control value (Off - FALSE, On - TRUE)	
origin	Originator	ST		Originator of the last change of the controllable data	
stVal	CODED_ENUM (MMS Type: _BSTR2)	ST	Dbpos	Status value of the data (Intermediate state, Off, On or Bad-state)	
q	Quality	ST		Quality of the status value	
t	TimeStamp	ST		Timestamp of the last change in state of status value	

Attribute	Type	FC	Enumeration	Comment	X
ctlModel	ENUMERATED8 (MMS Type: INT8)	CF	ctlModel	Control model (Corresponding to the behavior of the data)	
sboTimeout	INT32U	CF		Select Before Operate timeout period (in milliseconds)	

## 1.5.14

**Common Data Class: DPC\_STATUS\_D****Description:** Controllable Double Point (with description)**CDC class:** DPC

Attribute	Type	FC	Enumeration	Comment	X
stVal	CODED_ENUM (MMS Type: _BSTR2)	ST	Dbpos	Status value of the data (Intermediate state, Off, On or Bad-state)	
q	Quality	ST		Quality of the status value	
t	TimeStamp	ST		Timestamp of the last change in state of status value	
ctlModel	ENUMERATED8 (MMS Type: INT8)	CF	ctlModel	Control model (Corresponding to the behavior of the data)	
d	VISIBLE_STRING255	DC		Description of the status element	

## 1.5.15

**Common Data Class: DPL\_STANDARD****Description:** Standard Device Name Plate**CDC class:** DPL

Attribute	Type	FC	Enumeration	Comment	X
vendor	VISIBLE_STRING255	DC		Name of the vendor	
hwRev	VISIBLE_STRING255	DC		Hardware revision	
swRev	VISIBLE_STRING255	DC		Software revision	
serNum	VISIBLE_STRING255	DC		Serial Number	
model	VISIBLE_STRING255	DC		Model Number	
location	VISIBLE_STRING255	DC		Physical location of device	

## 1.5.16

**Common Data Class: INC\_CTRL\_D\_PRIV****Description:** Controllable Integer Status (with NameSpace and description)**CDC class:** INC

Attribute	Type	FC	Enumeration	Comment	X
ctlVal	INT32	CO		Control value	
origin	Originator	ST		Originator of the last change of the controllable data	
stVal	INT32	ST		Status value of the data	
q	Quality	ST		Quality of the status value	
t	TimeStamp	ST		Timestamp of the last change in state of status value	
ctlModel	ENUMERATED8 (MMS Type: INT8)	CF	ctlModel	Control model (Corresponding to the behavior of the data)	
d	VISIBLE_STRING255	DC		Description of the status element	
dataNs	VISIBLE_STRING255	EX		Data name space	

## 1.5.17

**Common Data Class: INC\_MOD****Description:** Controllable Integer Status (w.r.t Mode)**CDC class:** INC

Attribute	Type	FC	Enumeration	Comment	X
stVal	INT32 (MMS Type: INT8)	ST	Mod	Status value of the data	
q	Quality	ST		Quality of the status value	
t	TimeStamp	ST		Timestamp of the last change in state of status value	
ctlModel	ENUMERATED8 (MMS Type: INT8)	CF	ctlModel	Control model (Corresponding to the behavior of the data)	

## 1.5.18

**Common Data Class: INS\_AR\_STATE****Description:** Integer Status (w.r.t Auto Reclose Status)**CDC class:** INS

Attribute	Type	FC	Enumeration	Comment	X
stVal	INT32 (MMS Type: INT8)	ST	AutoRecSt	The element status	
q	Quality	ST		The quality of the status value	
t	TimeStamp	ST		Timestamp of the last change in state	

## 1.5.19

**Common Data Class: INS\_BASIC****Description:** Integer Status (w.r.t Mandatory Options only)**CDC class:** INS

Attribute	Type	FC	Enumeration	Comment	X
stVal	INT32	ST		The element status	
q	Quality	ST		The quality of the status value	
t	TimeStamp	ST		Timestamp of the last change in state	

## 1.5.20

**Common Data Class: INS\_BEH****Description:** Integer Status (w.r.t Behavior)**CDC class:** INS

Attribute	Type	FC	Enumeration	Comment	X
stVal	INT32 (MMS Type: INT8)	ST	Beh	The element status	
q	Quality	ST		The quality of the status value	
t	TimeStamp	ST		Timestamp of the last change in state	

## 1.5.21

**Common Data Class: INS\_BEH\_D\_PRIV****Description:** Integer Status (w.r.t Behavior, with Description (Private DO))**CDC class:** INS

Attribute	Type	FC	Enumeration	Comment	X
stVal	INT32 (MMS Type: INT8)	ST	Beh	The element status	
q	Quality	ST		The quality of the status value	
t	TimeStamp	ST		Timestamp of the last change in state	
d	VISIBLE_STRING255	DC		Description of the status element	
dataNs	VISIBLE_STRING255	EX		Data name space	

## 1.5.22

**Common Data Class: INS\_HEALTH****Description:** Integer Status (w.r.t health)**CDC class:** INS

Attribute	Type	FC	Enumeration	Comment	X
stVal	INT32 (MMS Type: INT8)	ST	Health	The element status	
q	Quality	ST		The quality of the status value	
t	TimeStamp	ST		Timestamp of the last change in state	

## 1.5.23

**Common Data Class: LPL\_LLNO****Description:** Logical Node 0 Name Plate**CDC class:** LPL

Attribute	Type	FC	Enumeration	Comment	X
vendor	VISIBLE_STRING255	DC		Name of the vendor	
swRev	VISIBLE_STRING255	DC		Software revision	
d	VISIBLE_STRING255	DC		Description	
configRev	VISIBLE_STRING255	DC		Uniquely identifies the configuration of a local device instance	
ldNs	VISIBLE_STRING255	EX		Logical Device name space	

## 1.5.24

**Common Data Class: LPL\_LN****Description:** Standard Logical Node Name Plate**CDC class:** LPL

Attribute	Type	FC	Enumeration	Comment	X
vendor	VISIBLE_STRING255	DC		Name of the vendor	
swRev	VISIBLE_STRING255	DC		Software revision	
d	VISIBLE_STRING255	DC		Description	

## 1.5.25

**Common Data Class: LPL\_LN\_PRIV****Description:** Logical Node Name Plate (w.r.t Schneider Electric Extended)**CDC class:** LPL

Attribute	Type	FC	Enumeration	Comment	X
vendor	VISIBLE_STRING255	DC		Name of the vendor	
swRev	VISIBLE_STRING255	DC		Software revision	
d	VISIBLE_STRING255	DC		Description	

Attribute	Type	FC	Enumeration	Comment	X
InNs	VISIBLE_STRING255	EX		Logical Node name space	

**1.5.26****Common Data Class: MV\_FLOAT****Description:** Measured value (w.r.t. Floating Point value)**CDC class:** MV

Attribute	Type	FC	Enumeration	Comment	X
mag	AnalogueValue_Float	MX		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 the configuration parameter db.	
q	Quality	MX		Quality of the measurement value	
t	TimeStamp	MX		Time deadbanded magnitude last exceeded its db configuration parameter	
units	Unit_Multiplier	CF		Unit of the attribute representing the data	
db	INT32U	CF		Measurement deadband	
rangeC	RangeConfig_DeadBand	CF		Measurement range configuration attributes	

**1.5.27****Common Data Class: MV\_FLOAT\_D****Description:** Measured value (w.r.t Floating Point Value with Description)**CDC class:** MV

Attribute	Type	FC	Enumeration	Comment	X
mag	AnalogueValue_Float	MX		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 the configuration parameter db.	
q	Quality	MX		Quality of the measurement value	
t	TimeStamp	MX		Time deadbanded magnitude last exceeded its db configuration parameter	
units	Unit_Multiplier	CF		Unit of the attribute representing the data	
db	INT32U	CF		Measurement deadband	
rangeC	RangeConfig_DeadBand	CF		Measurement range configuration attributes	
d	VISIBLE_STRING255	DC		Description of the status element	

**1.5.28****Common Data Class: SEQ\_MAG\_ANG****Description:** Sequence components of a measurement value (w.r.t Magnitudes + Angles)**CDC class:** SEQ

Attribute	Type	FC	Enumeration	Comment	X
c1	CMV_MAG_ANG_FLOAT	--		Sequence component 1 (For semantic meaning see seqT)	
c2	CMV_MAG_ANG_FLOAT	--		Sequence component 2 (For semantic meaning see seqT)	
c3	CMV_MAG_ANG_FLOAT	--		Sequence component 3 (For semantic meaning see seqT)	
seqT	ENUMERATED8 (MMS Type: INT8)	MX	seqT	Sequence quantity measurement type (Pos-Neg-Zero or Dir-Quad-Zero)	

## 1.5.29

**Common Data Class: SPC\_CONTROL****Description:** Controllable Single Point**CDC class:** SPC

Attribute	Type	FC	Enumeration	Comment	X
ctlVal	BOOLEAN	CO		Control value (Off - FALSE, On - TRUE)	
origin	Originator	ST		Originator of the last change of the controllable data	
stVal	BOOLEAN	ST		Status value of the data	
q	Quality	ST		Quality of the status value	
t	TimeStamp	ST		Timestamp of the last change in state of status value	
ctlModel	ENUMERATED8 (MMS Type: INT8)	CF	ctlModel	Control model (Corresponding to the behavior of the data)	
sboTimeout	INT32U	CF		Select Before Operate timeout period (in milliseconds)	

## 1.5.30

**Common Data Class: SPC\_CTRL\_PRIV****Description:** Controllable Single Point (With Namespace)**CDC class:** SPC

Attribute	Type	FC	Enumeration	Comment	X
ctlVal	BOOLEAN	CO		Control value (Off - FALSE, On - TRUE)	
origin	Originator	ST		Originator of the last change of the controllable data	
ctlModel	ENUMERATED8 (MMS Type: INT8)	CF	ctlModel	Control model (Corresponding to the behavior of the data)	
stVal	BOOLEAN	ST		Status value of the data	
q	Quality	ST		Quality of the status value	
t	TimeStamp	ST		Timestamp of the last change in state of status value	
sboTimeout	INT32U	CF		Select Before Operate timeout period (in milliseconds)	
dataNs	VISIBLE_STRING255	EX		Data name space	

## 1.5.31

**Common Data Class: SPC\_STATUS****Description:** Controllable Single Point (w.r.t Status only)**CDC class:** SPC



Attribute	Type	FC	Enumeration	Comment	X
stVal	BOOLEAN	ST		Status value of the data	
q	Quality	ST		Quality of the status value	
t	TimeStamp	ST		Timestamp of the last change in state of status value	
ctlModel	ENUMERATED8 (MMS Type: INT8)	CF	ctlModel	Control model (Corresponding to the behavior of the data)	

### 1.5.32 Common Data Class: SPS\_D

**Description:** Standard Single Point Status (with Description)

**CDC class:** SPS

Attribute	Type	FC	Enumeration	Comment	X
stVal	BOOLEAN	ST		The element status (TRUE or FALSE)	
q	Quality	ST		The quality of the status value	
t	TimeStamp	ST		Timestamp of the last change in state	
d	VISIBLE_STRING255	DC		Description of the status element	

### 1.5.33 Common Data Class: SPS\_WD

**Description:** Single Point Status (without Description)

**CDC class:** SPS

Attribute	Type	FC	Enumeration	Comment	X
stVal	BOOLEAN	ST		The element status (TRUE or FALSE)	
q	Quality	ST		The quality of the status value	
t	TimeStamp	ST		Timestamp of the last change in state	

### 1.5.34 Common Data Class: SPS\_WD\_PRIV

**Description:** Single Point Status (without Description with Name Space)

**CDC class:** SPS

Attribute	Type	FC	Enumeration	Comment	X
stVal	BOOLEAN	ST		The element status (TRUE or FALSE)	
q	Quality	ST		The quality of the status value	
t	TimeStamp	ST		Timestamp of the last change in state	
dataNs	VISIBLE_STRING255	EX		Data name space	

### 1.5.35 Common Data Class: WYE\_RES\_ANG\_D

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

**CDC class:** WYE

Attribute	Type	FC	Enumeration	Comment	X
res	CMV_MAG_ANG_FLOAT	--		Measurement values for the residual system current	

Attribute	Type	FC	Enumeration	Comment	X
d	VISIBLE_STRING255	DC		Description of the status element	

1.5.36

**Common Data Class: WYE\_SEG**

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

**CDC class:** WYE

Attribute	Type	FC	Enumeration	Comment	X
phsA	CMV_MAG_FLOAT	--		Measurement values for Phase A	
phsB	CMV_MAG_FLOAT	--		Measurement values for Phase B	
phsC	CMV_MAG_FLOAT	--		Measurement values for Phase C	

1.5.37

**Common Data Class: WYE\_SEG\_ANG\_D**

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

**CDC class:** WYE

Attribute	Type	FC	Enumeration	Comment	X
phsA	CMV_MAG_ANG_FLOAT	--		Measurement values for Phase A	
phsB	CMV_MAG_ANG_FLOAT	--		Measurement values for Phase B	
phsC	CMV_MAG_ANG_FLOAT	--		Measurement values for Phase C	
d	VISIBLE_STRING255	DC		Description of the status element	

1.5.38

**Common Data Class: WYE\_SEG\_D**

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

**CDC class:** WYE

Attribute	Type	FC	Enumeration	Comment	X
phsA	CMV_MAG_FLOAT	--		Measurement values for Phase A	
phsB	CMV_MAG_FLOAT	--		Measurement values for Phase B	
phsC	CMV_MAG_FLOAT	--		Measurement values for Phase C	
d	VISIBLE_STRING255	DC		Description of the status element	

1.5.39

**Common Data Class: WYE\_SEG\_RES\_D**

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

**CDC class:** WYE

Attribute	Type	FC	Enumeration	Comment	X
phsA	CMV_MAG_ANG_FLOAT	--		Measurement values for Phase A	
phsB	CMV_MAG_ANG_FLOAT	--		Measurement values for Phase B	
phsC	CMV_MAG_ANG_FLOAT	--		Measurement values for Phase C	
neut	CMV_MAG_ANG_FLOAT	--		Measurement values for neutral input	
d	VISIBLE_STRING255	DC		Description of the status element	

## 1.6 Common Data Attribute Type Definitions

Common data attribute types, known herein as components, are defined for use in the Common Data Classes defined in the sections above.

### 1.6.1 Component: AnalogueValue\_Float

**Comment:** General analogue value (w.r.t Floating Point value)

**Parent type:** AnalogueValue

Attribute	Type	Enumeration	Comment	X
f	FLOAT32		Floating point value	

### 1.6.2 Component: Originator

**Comment:** Originator of the last change of data attribute representing the value of a controllable data object

**Parent type:**

Attribute	Type	Enumeration	Comment	X
orIdent	OCTET_STRING64		Originator identification (Null value indicates unknown or not reported)	
orCat	ENUMERATED8 (MMS Type: INT8)	orCategory	Originator category (Not-supported, bay-control, station-control, remote-control, automatic-bay, automatic-station, automatic-remote, maintenance or process)	

### 1.6.3 Component: RangeConfig\_DeadBand

**Comment:** Measurement range configuration

**Parent type:** RangeConfig

Attribute	Type	Enumeration	Comment	X
min	AnalogueValue_Float		Minimum process measurement for which values of i and f are considered within limits	
max	AnalogueValue_Float		Maximum process measurement for which values of i and f are considered within limits	
lLim	AnalogueValue_Float		Low Low range limit	
lLim	AnalogueValue_Float		Low range limit	
hLim	AnalogueValue_Float		High range limit	
hhLim	AnalogueValue_Float		High High range limit	

### 1.6.4 Component: Unit\_Multiplier

**Comment:** SI Unit definitions

**Parent type:** Unit

Attribute	Type	Enumeration	Comment	X
SIUnit	ENUMERATED8 (MMS Type: INT8)	SIUnit	SI Unit	
multiplier	ENUMERATED8 (MMS Type: INT8)	multiplier	Multiplier value, the default of which is 0 (i.e. multiplier = 1)	

**1.6.5****Component: Vector\_Magnitude\_Float****Comment:** Complex vector (w.r.t Floating Point Magnitude value)**Parent type:** Vector

Attribute	Type	Enumeration	Comment	X
mag	AnalogueValue_Float		The magnitude of the complex value	

**1.6.6****Component: Vector\_MagnitudeAngle\_Float****Comment:** Complex vector (w.r.t Floating Point Magnitude and Angle values)**Parent type:** Vector

Attribute	Type	Enumeration	Comment	X
mag	AnalogueValue_Float		The magnitude of the complex value	
ang	AnalogueValue_Float		The angle of the complex value (the unit is degrees)	

## 1.7 Enumerated Type Definitions

The following sub-sections specify the enumerations that are associated to some Common Data Class attributes. The definition of the enumerations are according to IEC 61850-7-3 and IEC 61850-7-4 unless otherwise stated.

### 1.7.1 Enumerated Type: AddCause

**Description:** AddCause

Ordinal	Semantic
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

### 1.7.2 Enumerated Type: AutoRecSt

**Description:** Auto-Reclose Status

Ordinal	Semantic
1	Ready
2	InProgress
3	Successful
4	Unsuccessful

### 1.7.3 Enumerated Type: Beh

**Description:** Behavior

Ordinal	Semantic
1	on
2	blocked
3	test
4	test/blocked

Ordinal	Semantic
5	off

#### 1.7.4 Enumerated Type: Bypass

Description: Bypass

Ordinal	Semantic
0	locking-bypass
1	mode-bypass
2	automation-bypass
3	uniqueness-bypass
4	select-bypass
5	status-bypass

#### 1.7.5 Enumerated Type: ctlModel

Description: Control Model

Ordinal	Semantic
0	status-only
1	direct-with-normal-security
2	sbo-with-normal-security
3	direct-with-enhanced-security
4	sbo-with-enhanced-security

#### 1.7.6 Enumerated Type: Dbpos

Description: Switch positions

Ordinal	Semantic
0	intermediate
1	off
2	on
3	bad

#### 1.7.7 Enumerated Type: dir

Description: Direction

Ordinal	Semantic
0	unknown
1	forward
2	backward
3	both

#### 1.7.8 Enumerated Type: Health

Description: Health

Ordinal	Semantic
1	Ok
2	Warning
3	Alarm

**1.7.9 Enumerated Type: Mod****Description:** Mode

Ordinal	Semantic
1	on
2	blocked
3	test
4	test/blocked
5	off

**1.7.10 Enumerated Type: multiplier****Description:** Exponents of the multiplier value in base 10.

Ordinal	Semantic	Ordinal	Semantic
-24	y	1	da
-21	z	2	h
-18	a	3	k
-15	f	6	M
-12	p	9	G
-9	n	12	T
-6	$\mu$	15	P
-3	m	18	E
-2	c	21	Z
-1	d	24	Y
0			

**1.7.11 Enumerated Type: orCategory****Description:** orCategory

Ordinal	Semantic
0	not-supported
1	bay-control
2	station-control
3	remote-control
4	automatic-bay
5	automatic-station
6	automatic-remote
7	maintenance
8	process

**1.7.12 Enumerated Type: seqT****Description:** Sequence Measurement Type

Ordinal	Semantic
0	pos-neg-zero
1	dir-quad-zero



## 1.7.13

**Enumerated Type: SIUnit****Description:** SI Units derived from ISO/IEC 1000

Ordinal	Semantic
-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
-3	Hz/s
-2	%
-1	pu
1	none
2	m
3	kg
4	s
5	A
6	K
7	mol
8	cd
9	deg
10	rad
11	sr
21	Gy
22	q
23	°C
24	Sv
25	F
26	C
27	S
28	H
29	V
30	ohm

Ordinal	Semantic
31	J
32	N
33	Hz
34	lx
35	Lm
36	Wb
37	T
38	W
39	Pa
41	m <sup>2</sup>
42	m <sup>3</sup>
43	m/s
44	m/s <sup>2</sup>
45	m <sup>3</sup> /s
46	m/m <sup>3</sup>
47	M
48	kg/m <sup>3</sup>
49	m <sup>2</sup> /s
50	W/m K
51	J/K
52	ppm
53	1/s
54	rad/s
61	VA
62	Watts
63	VAr
64	phi
65	cos(phi)
66	Vs
67	V <sup>2</sup>
68	As
69	A <sup>2</sup>
70	A <sup>2</sup> t
71	VAh
72	Wh
73	VArh
74	V/Hz

## 1.8 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)
EntryTime	Btime6	8.1 Section 8.1.3.7
ENUMERATED16	Short	16 bit enumerated value
ENUMERATED8	Byte	8 bit enumerated value
FLOAT32	Float	32 bit floating point value
FLOAT64	Double	64 bit floating point value
INT128	Int64	128 bit signed integer 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
INT8	Byte	8 bit signed integer value
INT8U	Ubyte	8 bit unsigned integer value
OCTET_STRING6	Ostring6	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	IEC 61850 Quality
TimeStamp	Uttime	IEC 61850 Time stamp
UNICODE_STRING255	UTF8Vstring255	255 character string (16 bits per unicode character)
UTC_TM	Uttime	UTC Timestamp
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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**Publication: P547/EN MC/6' %**

Publisher: Schneider Electric

June 2011