

# Easergy MiCOM P342

**Generator Protection Relay**

**P342/EN MC/Rf7**

Software Version B5  
Hardware Suffix L  
IEC61850 Edition 1  
Issue Date 09/2020

**Model Implementation Conformance Statement (MICS)**

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**MODEL IMPLEMENTATION  
CONFORMANCE STATEMENT (MICS)**

Date (month/year):	09/2020
Products covered by this chapter:	This chapter covers the specific versions of the MiCOM products listed below. This includes <b>only</b> the following combinations of Software Version and Hardware Suffix.
Hardware suffix:	L
Software version:	B5
Connection diagrams:	This includes a list of the Connection Diagrams for the Products covered by this document. 10P342xx (xx = 01 to 17)

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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 7 series of specifications.

## **2 Objective**

This document is applicable for P342 with the firmware B5A. The MICS is conformant to the devices associated ICD (Substation Configuration Language) file: P342\_\_\_\_\_B5A.ICD, version V2.1, according to part 6 and part 7 of the IEC61850 standards.

The layouts of the presented tables within this document are conformant to the part 6 and 7 series of the IEC61850 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 MiCOM custom attributes

### 3 Logical Device Definitions

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 LLN0 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	P342 Control
Measurements	P342 Measurements
Protection	P342 Protection
Records	P342 Records
System	P342 System

#### 3.1 IEC61850 logical device data model

The IEC61850 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			
	AscRSYN1	RSYN_DIFCLC	System Checks - Check Sync 1
	AscRSYN2	RSYN_DIFCLC	System Checks - Check Sync 2
	CILO1	CILO_INTERLOCK	XCBR Interlocking
	LLN0	LLN0_CONTROL	LLN0 for control LD
	LPHD1	LPHD_STANDARD	Physical Device Information
	XCBR1	XCBR_BASIC_ALL	Circuit Breaker Monitoring for All Module
Measurements			
	AfqMMTR1	MMTR_AFQ	Abnormal Frequency Time measurements
	DfpMMXU1	MMXU_DFDT	df/dt
	LLN0	LLN0_STANDARD	Measurements Logical Device
	LoIMMTR1	MMTR_LOL	Loss of Life (Transformer) Meter values
	LoIMMXU1	MMXU_LOL	Loss of life (transformer) measurements
	LPHD1	LPHD_STANDARD	Physical Device Information
	PriCsvMMXU1	MMXU_CSV	Primary C/S Measurements
	PriFouMMXU1	MMXU_DERIVED_P342	Primary Fourier Derived Measurands - P342 only
	PriFxdMSTA1	MSTA_STANDARD	Primary Fixed demand measurements

LD	LN Instance	LN Type	Description
	PriHa3MMXU1	MMXU_THIRD_HARMONIC_NO_VN	P341/P342 only third harmonic measurements (no VN)
	PriMMTR1	MMTR_PRIV	Primary based Energy flow metering quantities
	PriPkdMSTA1	MSTA_STANDARD	Primary Peak demand measurements
	PriRmsMMXU1	MMXU_RMS	Primary RMS measurements
	PriRodMSTA1	MSTA_STANDARD	Primary Rolling demand measurements
	PriSenMMXU1	MMXU_SENSITIVE	Primary Sensitive power measurements
	PriSeqMSQI1	MSQI_ALL	Primary Sequence measurements
	PriStdMMXU1	MMXU_STANDARD_ALL	Primary Standard Measurements all except P341
	PriVhzMMXU1	MMXU_VHZ	Primary Volts/Hz Measurements
	RtdGGIO1	GGIO_ANAL_10	RTD temperature measurements
	RtrLfiMMXU1	MMXU_ROTOR_EF	Rotor EF Measurements
	SecCsvMMXU1	MMXU_CSV	Secondary C/S Measurements
	SecFouMMXU1	MMXU_DERIVED_P342	Secondary Fourier Derived Measurands - P342 only
	SecFxdMSTA1	MSTA_STANDARD	Secondary Fixed demand Measurements
	SecHa3MMXU1	MMXU_THIRD_HARMONIC_NO_VN	Secondary P341/P342 only Third Harmonic Measurements
	SecMMTR1	MMTR_PRIV	Secondary based Energy flow metering quantities
	SecPkdMSTA1	MSTA_STANDARD	Secondary Peak Demand measurements
	SecRmsMMXU1	MMXU_RMS	Secondary RMS measurements
	SecRodMSTA1	MSTA_STANDARD	Secondary Rolling Demand measurements
	SecSenMMXU1	MMXU_SENSITIVE	Secondary Sensitive Power measurements
	SecSeqMSQI1	MSQI_ALL	Secondary Sequence measurements
	SecStdMMXU1	MMXU_STANDARD_ALL	Secondary Standard Measurements all except P341
	SecVhzMMXU1	MMXU_VHZ	Secondary Volts/Hz Measurements
	ThmMMXU1	MMXU_THM	Thermal Measurements
Protection			
	CbfRBRF1	RBRF_EXTTRIP	CB Fail 1
	CbfRBRF2	RBRF_EXTTRIP	CB Fail 2
	CliAlmPTUC1	PTUC_NEU	CLIO Input 1 Alarm
	CliAlmPTUC2	PTUC_NEU	CLIO Input 2 Alarm
	CliAlmPTUC3	PTUC_NEU	CLIO Input 3 Alarm
	CliAlmPTUC4	PTUC_NEU	CLIO Input 4 Alarm
	CliRCLI1	RCLI_STANDARD	Current loop input supervision - channel 1

LD	LN Instance	LN Type	Description
	CliRCLI2	RCLI_STANDARD	Current loop input supervision - channel 2
	CliRCLI3	RCLI_STANDARD	Current loop input supervision - channel 3
	CliRCLI4	RCLI_STANDARD	Current loop input supervision - channel 4
	CliTrpPTUC1	PTUC_NEU	Current Loop Input 1 Trip
	CliTrpPTUC2	PTUC_NEU	Current Loop Input 2 Trip
	CliTrpPTUC3	PTUC_NEU	Current Loop Input 3 Trip
	CliTrpPTUC4	PTUC_NEU	Current Loop Input 4 Trip
	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
	EftPTOC1	PTOC_NO_SEG	Earth fault - stage 1
	EftPTOC2	PTOC_NO_SEG	Earth fault - stage 2
	ExcPDUP1	PDUP_STANDARD	Under excitation - stage 1
	ExcPDUP2	PDUP_STANDARD	Under excitation - stage 2
	FrqPTOF1	PTOF_NO_SEG	F> 1 Over Frequency
	FrqPTOF2	PTOF_NO_SEG	F> 2 Over Frequency
	FrqPTUF1	PTUF_NO_SEG	F< 1 Under Frequency
	FrqPTUF2	PTUF_NO_SEG	F< 2 Under Frequency
	FrqPTUF3	PTUF_NO_SEG	F< 3 Under Frequency
	FrqPTUF4	PTUF_NO_SEG	F< 4 Under Frequency
	HotPTTR1	PTTR_HOT_TOP	Hot spot thermal protection
	HotPTTR2	PTTR_HOT_TOP	Hot spot thermal protection
	HotPTTR3	PTTR_HOT_TOP	Hot spot thermal protection
	LLN0	LLN0_P342	LLN0 for P342
	LPHD1	LPHD_STANDARD	Physical Device Information
	NpsPTOC1	PTOC_NEU	NPS overcurrent - stage 1
	NpsPTOC2	PTOC_NEU	NPS overcurrent - stage 2
	NpsPTOC3	PTOC_NEU	NPS overcurrent - stage 3
	NpsPTOC4	PTOC_NEU	NPS overcurrent - stage 4
	NpsPTOV1	PTOV_NEU	NPS Overvoltage
	OcpPTOC1	PTOC_NEU	I>1Phase overcurrent
	OcpPTOC2	PTOC_NEU	I>2 Phase overcurrent
	OcpPTOC3	PTOC_NEU	I>3 Phase overcurrent
	OcpPTOC4	PTOC_NEU	I>4 Phase overcurrent
	PdpPPWR1	PPWR_NORMAL	Power protection (3-phase) stage 1
	PdpPPWR2	PPWR_NORMAL	Power protection (3-phase) stage 2
	PTRC1	PTRC_NO_SEG	Trip Conditioning

LD	LN Instance	LN Type	Description
	RtdPTTR1	PTTR_NO_SEG	RTD channel 1
	RtdPTTR10	PTTR_NO_SEG	RTD channe 10
	RtdPTTR2	PTTR_NO_SEG	RTD channel 2
	RtdPTTR3	PTTR_NO_SEG	RTD channe 3
	RtdPTTR4	PTTR_NO_SEG	RTD channe 4
	RtdPTTR5	PTTR_NO_SEG	RTD channe 5
	RtdPTTR6	PTTR_NO_SEG	RTD channe 6
	RtdPTTR7	PTTR_NO_SEG	RTD channe 7
	RtdPTTR8	PTTR_NO_SEG	RTD channe 8
	RtdPTTR9	PTTR_NO_SEG	RTD channe 9
	RtdRTTR1	RTTR_STANDARD	RTD Supervision
	RtdRTTR10	RTTR_STANDARD	RTD Supervision
	RtdRTTR2	RTTR_STANDARD	RTD Supervision
	RtdRTTR3	RTTR_STANDARD	RTD Supervision
	RtdRTTR4	RTTR_STANDARD	RTD Supervision
	RtdRTTR5	RTTR_STANDARD	RTD Supervision
	RtdRTTR6	RTTR_STANDARD	RTD Supervision
	RtdRTTR7	RTTR_STANDARD	RTD Supervision
	RtdRTTR8	RTTR_STANDARD	RTD Supervision
	RtdRTTR9	RTTR_STANDARD	RTD Supervision
	RtpTrpPTTR1	PTTR_NO_SEG_PRIV	Rotor thermal - NPS trip
	RtrLfiPEFI1	PEFI_NEU_UR	Rotor Earth Fault Stage 1 Alarm
	RtrLfiPEFI2	PEFI_NEU_UR	Rotor Earth Fault Stage 2 Trip
	SbkOcpPVOC1	PVOC_STANDARD	System backup - voltage overcurrent
	SbkUzpPDIS1	PDIS_SYSTEM	system backup - under impedance stage 1
	SbkUzpPDIS2	PDIS_SYSTEM	system backup - under impedance stage 2
	SenPdpPPWR1	PPWR_NORMAL	Sensitive power (Single phase) stage 1
	SenPdpPPWR2	PPWR_NORMAL	Sensitive power (Single phase) stage 2
	SenRefPDIF1	PDIF_NEU	IREF> 1 Restricted Earth Fault
	SenSefPTOC1	PTOC_NO_SEG	ISEF>1 Protection
	SvnRVCS1	RVCS_STANDARD_NO_CT2	Supervision without CTS2.
	TafPTAF1	PTAF_NO_SEG	Turbine Abnormal Frequency - Channel 1
	TafPTAF2	PTAF_NO_SEG	Turbine Abnormal Frequency - Channel 2
	TafPTAF3	PTAF_NO_SEG	Turbine Abnormal Frequency - Channel 3
	TafPTAF4	PTAF_NO_SEG	Turbine Abnormal Frequency - Channel 4
	TafPTAF5	PTAF_NO_SEG	Turbine Abnormal Frequency - Channel 5
	TafPTAF6	PTAF_NO_SEG	Turbine Abnormal Frequency - Channel 6

LD	LN Instance	LN Type	Description
	ThmPTTR1	PTTR_NO_SEG_PRIV	Thermal Overload
	TopPTTR1	PTTR_HOT_TOP	Top Oil Thermal Overload stage 1
	TopPTTR2	PTTR_HOT_TOP	Top Oil Thermal Overload stage 2
	TopPTTR3	PTTR_HOT_TOP	Top Oil Thermal Overload stage 3
	VhzPVPH1	PVPH_STANDARD	Over fluxing
	VhzPVPH2	PVPH_STANDARD	Over fluxing
	VhzPVPH3	PVPH_STANDARD	Over fluxing
	VhzPVPH4	PVPH_STANDARD	Over fluxing
	VtpPhsPTOV1	PTOV_NO_SEG	Phase Overvoltage - stage 1
	VtpPhsPTOV2	PTOV_NO_SEG	Phase Overvoltage - stage 2
	VtpPhsPTUV1	PTUV_NO_SEG	Phase Undervoltage - Stage 1
	VtpPhsPTUV2	PTUV_NO_SEG	Phase Undervoltage - Stage 2
	VtpResPTOV1	PTOV_NO_SEG	Residual Over Voltage - stage 1
	VtpResPTOV2	PTOV_NO_SEG	Residual Over Voltage - stage 2
	VtpResPTOV3	PTOV_NO_SEG	Residual Over Voltage - stage 3
	VtpResPTOV4	PTOV_NO_SEG	Residual Over Voltage - stage 4
Records			
	LLN0	LLN0_STANDARD	Records Logical Device
	LPHD1	LPHD_STANDARD	Physical Device Information
	RDRE1	RDRE_BASIC	Disturbance Recorder
	RFLO1	RFLO_P342	Fault Record
System			
	AlmGGIO1	GGIO_ALM_96	Alarms
	AlmGGIO2	GGIO_ALM_32	32 User Alarm Status
	GosGGIO1	GGIO_IND_128	GOOSE Input Signals with 128 for edition1
	GosGGIO2	GGIO_IND_64	GOOSE Output Signals(with 64 indications)
	LedGGIO1	GGIO_IND_8	8 programmable LEDS
	LLN0	LLN0_SYSTEM	Sys Logical Device
	LPHD1	LPHD_STANDARD	Physical Device Information
	OptGGIO1	GGIO_IND_24	Opto Inputs (24 off)
	OrdRunGGIO1	GGIO_IND_64	(64 off)Uniqueness of control "Order Running" indications for Control operations
	PlGGIO1	GGIO_IND_32_CTRL	Controllable Inputs
	RlyGGIO1	GGIO_IND_24	Output Contacts (24 off)

## 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 IEC61850 product data model:

LN Type	(LN Class)	Description	Name Space	
CILO_INTERLOCK	(CILO)	Control Interlocking	IEC 61850-7-4:2003	
GGIO_ALM_32	(GGIO)	Generic Process I/O (w.r.t 32 Alarm Elements)	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_ANAL_10	(GGIO)	Generic process I/O w.r.t. 10 analogue inputs	IEC 61850-7-4:2003	
GGIO_IND_128	(GGIO)	Generic process I/O(w.r.t 128 Indication Elements)	IEC 61850-7-4:2003	
GGIO_IND_24	(GGIO)	Generic process I/O	IEC 61850-7-4:2003	
GGIO_IND_32_CTRL	(GGIO)	Generic process I/O	IEC 61850-7-4:2003	
GGIO_IND_64	(GGIO)	Generic process I/O(w.r.t 64 Indication Elements)	IEC 61850-7-4:2003	
GGIO_IND_8	(GGIO)	Generic Process I/O (w.r.t 8 Indication Elements)	IEC 61850-7-4:2003	
LLN0_CONTROL	(LLN0)	Control Domain Logical Node 0	IEC 61850-7-4:2003	
LLN0_P342	(LLN0)	Logical Node 0	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	
LPHD_STANDARD	(LPHD)	Px40 Physical Device Information	IEC 61850-7-4:2003	
MMTR_PRIV	(MMTR)	Metering	IEC 61850-7-4:2003	
MMTR_AFQ	(MMTR)	Metering	IEC 61850-7-4:2003	
MMTR_LOL	(MMTR)	Metering	IEC 61850-7-4:2003	
MMXU_CSV	(MMXU)	Measurements for C/S	IEC 61850-7-4:2003	
MMXU_DERIVED_P342	(MMXU)	Standard measurements (w.r.t P342)	IEC 61850-7-4:2003	
MMXU_DFDT	(MMXU)	Standard measurements(for dfdt only)	SCHNEIDER-ELECTRIC-	
SII:PCS-Px40MMXU_LOL	(MMXU)	Loss-of-life (Transformer) measurements	IEC 61850-7-4:2003	
MMXU_RMS	(MMXU)	Measurements (RMS values)	IEC 61850-7-4:2003	
MMXU_ROTOR_EF	(MMXU)	Measurements for Rotor E/F	SCHNEIDER-ELECTRIC-	



LN Type	(LN Class)	Description	Name Space	
SII:PCS-Px40MMXU_SENSITIVE	(MMXU)	Sensitive measurements	IEC 61850-7-4:2003	
MMXU_STANDARD_ALL	(MMXU)	Standard measurements	IEC 61850-7-4:2003	
MMXU_THIRD_HARMON	(MMXU)	Measurements (w.r.t 3rd Harmonic, no VN for P341/P342)	IEC 61850-7-4:2003	
IC_NO_VNMMXU_THM	(MMXU)	Standard measurements	IEC 61850-7-4:2003	
MMXU_VHZ	(MMXU)	Measurements(w.r.t.Volts Per Hz)	SCHNEIDER-ELECTRIC-	
SII:PCS-Px40MSQI_ALL	(MSQI)	Sequence and imbalance (w.r.t Pos, Neg, Zero)	IEC 61850-7-4:2003	
MSTA_STANDARD	(MSTA)	Standard measurements (w.r.t Fourier Derived Values)	IEC 61850-7-4:2003	
PDIF_NEU	(PDIF)	Differential (w.r.t Neutral)	IEC 61850-7-4:2003	
PDIS_SYSTEM	(PDIS)	Distance	IEC 61850-7-4:2003	
PDUP_STANDARD	(PDUP)	Under power protection	IEC 61850-7-4:2003	
PEFI_NEU_UR	(PEFI)	Earth Fault Injection protection - under resistance	SCHNEIDER-ELECTRIC-	
SII:PCS-Px40PFRC_NO_SEG	(PFRC)	Rate of change of frequency (w.r.t No Phase Segregation)	IEC 61850-7-4:2003	
PPWR_NORMAL	(PPWR)	Power Protection with Pole Dead Inhibit	SCHNEIDER-ELECTRIC-	
SII:PCS-Px40PTAF_NO_SEG	(PTAF)	Turbine Abnormal Frequency Protection	SCHNEIDER-ELECTRIC-	
SII:PCS-Px40PTOC_NEU	(PTOC)	Timed Overcurrent (w.r.t Neutral)	IEC 61850-7-4:2003	
PTOC_NO_SEG	(PTOC)	Timed Overcurrent (w.r.t No Phase Segregation)	IEC 61850-7-4:2003	
PTOF_NO_SEG	(PTOF)	Over frequency (w.r.t No 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 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_HOT_TOP	(PTTR)	Thermal overload	IEC 61850-7-4:2003	
PTTR_NO_SEG	(PTTR)	Thermal overload (w.r.t No Phase Segregation)	IEC 61850-7-4:2003	
PTTR_NO_SEG_PRIV	(PTTR)	Thermal overload for Thermal State and NPS Thermal(w.r.t No Phase Segregation)	IEC 61850-7-4:2003	
PTUC_NEU	(PTUC)	Models timed under-current protection	IEC 61850-7-2:2003	
PTUF_NO_SEG	(PTUF)	Under frequency (w.r.t No Phase Segregation)	IEC 61850-7-4:2003	

LN Type	(LN Class)	Description	Name Space	
PTUV_NO_SEG	(PTUV)	Undervoltage (w.r.t No Phase Segregation)	SCHNEIDER-ELECTRIC-	
SII:PCS-Px40PVOC_STANDARD	(PVOC)	Voltage controlled time overcurrent	IEC 61850-7-4:2003	
PVPH_STANDARD	(PVPH)	Volts per Hz protection	IEC 61850-7-4:2003	
RBRF_EXTTRIP	(RBRF)	Breaker Failure (w.r.t External Tripping)	IEC 61850-7-4:2003	
RCLI_STANDARD	(RCLI)	Current loop monitoring and reporting	SCHNEIDER-ELECTRIC-	
SII:PCS-Px40RDRE_BASIC	(RDRE)	Disturbance Recorder function (w.r.t Mandatory Attributes only)	IEC 61850-7-4:2003	
RFLO_P342	(RFLO)	Fault locator for P342	IEC 61850-7-4:2003	
RSYN_DIFCLC	(RSYN)	Synchronism-check / Synchronising (w.r.t Calculated Differential Measurements)	IEC 61850-7-4:2003	
RTTR_STANDARD	(RTTR)	Temperature monitoring and reporting	SCHNEIDER-ELECTRIC-	
SII:PCS-Px40RVCS_STANDARD_NO_	(RVCS)	VTS/CTS monitoring and report	SCHNEIDER-ELECTRIC-	
CT2	SII:PCS-Px40XCBR_BASIC_ALL	(XCBR)	Circuit Breaker (w.r.t Mandatory Attributes Only)	IEC 61850-7-4:2003

#### 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	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
EnaOpn	SPS_WD	Enable OPEN Commands		
EnaCls	SPS_WD	Enable CLOSE Commands		

#### 4.2 Logical Node: GGIO\_ALM\_32

Description: Generic Process I/O (w.r.t 32 Alarm Elements)  
LN Class: GGIO

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
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		

Attribute	Attr. Type	Explanation	T	X
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		

**4.3 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	Behaviour		
Health	INS_HEALTH	Health		
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		

Attribute	Attr. Type	Explanation	T	X
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		
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		

Attribute	Attr. Type	Explanation	T	X
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		
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		

**4.4 Logical Node: GGIO\_ANAL\_10**

Description: Generic process I/O w.r.t. 10 analogue inputs  
LN Class: GGIO

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
AnIn1	MV_FLOAT_D	Analogue input point 1		
AnIn2	MV_FLOAT_D	Analogue input point 2		
AnIn3	MV_FLOAT_D	Analogue input point 3		
AnIn4	MV_FLOAT_D	Analogue input point 4		
AnIn5	MV_FLOAT_D	Analogue input point 5		
AnIn6	MV_FLOAT_D	Analogue input point 6		
AnIn7	MV_FLOAT_D	Analogue input point 7		
AnIn8	MV_FLOAT_D	Analogue input point 8		
AnIn9	MV_FLOAT_D	Analogue input point 9		
AnIn10	MV_FLOAT_D	Analogue input point 10		

**4.5 Logical Node: GGIO\_IND\_128**

Description: Generic process I/O(w.r.t 128 Indication Elements)  
LN Class: GGIO

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Ind1	SPS_D	General indication (binary input)		
Ind2	SPS_D	General indication (binary input)		
Ind3	SPS_D	General indication (binary input)		
Ind4	SPS_D	General indication (binary input)		
Ind5	SPS_D	General indication (binary input)		
Ind6	SPS_D	General indication (binary input)		
Ind7	SPS_D	General indication (binary input)		
Ind8	SPS_D	General indication (binary input)		
Ind9	SPS_D	General indication (binary input)		
Ind10	SPS_D	General indication (binary input)		
Ind11	SPS_D	General indication (binary input)		
Ind12	SPS_D	General indication (binary input)		
Ind13	SPS_D	General indication (binary input)		
Ind14	SPS_D	General indication (binary input)		
Ind15	SPS_D	General indication (binary input)		
Ind16	SPS_D	General indication (binary input)		
Ind17	SPS_D	General indication (binary input)		
Ind18	SPS_D	General indication (binary input)		

Attribute	Attr. Type	Explanation	T	X
Ind19	SPS_D	General indication (binary input)		
Ind20	SPS_D	General indication (binary input)		
Ind21	SPS_D	General indication (binary input)		
Ind22	SPS_D	General indication (binary input)		
Ind23	SPS_D	General indication (binary input)		
Ind24	SPS_D	General indication (binary input)		
Ind25	SPS_D	General indication (binary input)		
Ind26	SPS_D	General indication (binary input)		
Ind27	SPS_D	General indication (binary input)		
Ind28	SPS_D	General indication (binary input)		
Ind29	SPS_D	General indication (binary input)		
Ind30	SPS_D	General indication (binary input)		
Ind31	SPS_D	General indication (binary input)		
Ind32	SPS_D	General indication (binary input)		
Ind33	SPS_D	General indication (binary input)		
Ind34	SPS_D	General indication (binary input)		
Ind35	SPS_D	General indication (binary input)		
Ind36	SPS_D	General indication (binary input)		
Ind37	SPS_D	General indication (binary input)		
Ind38	SPS_D	General indication (binary input)		
Ind39	SPS_D	General indication (binary input)		
Ind40	SPS_D	General indication (binary input)		
Ind41	SPS_D	General indication (binary input)		
Ind42	SPS_D	General indication (binary input)		
Ind43	SPS_D	General indication (binary input)		
Ind44	SPS_D	General indication (binary input)		
Ind45	SPS_D	General indication (binary input)		
Ind46	SPS_D	General indication (binary input)		
Ind47	SPS_D	General indication (binary input)		
Ind48	SPS_D	General indication (binary input)		
Ind49	SPS_D	General indication (binary input)		
Ind50	SPS_D	General indication (binary input)		
Ind51	SPS_D	General indication (binary input)		
Ind52	SPS_D	General indication (binary input)		
Ind53	SPS_D	General indication (binary input)		
Ind54	SPS_D	General indication (binary input)		
Ind55	SPS_D	General indication (binary input)		
Ind56	SPS_D	General indication (binary input)		
Ind57	SPS_D	General indication (binary input)		
Ind58	SPS_D	General indication (binary input)		
Ind59	SPS_D	General indication (binary input)		
Ind60	SPS_D	General indication (binary input)		
Ind61	SPS_D	General indication (binary input)		
Ind62	SPS_D	General indication (binary input)		

Attribute	Attr. Type	Explanation	T	X
Ind63	SPS_D	General indication (binary input)		
Ind64	SPS_D	General indication (binary input)		
Ind65	SPS_D	General indication (binary input)		
Ind66	SPS_D	General indication (binary input)		
Ind67	SPS_D	General indication (binary input)		
Ind68	SPS_D	General indication (binary input)		
Ind69	SPS_D	General indication (binary input)		
Ind70	SPS_D	General indication (binary input)		
Ind71	SPS_D	General indication (binary input)		
Ind72	SPS_D	General indication (binary input)		
Ind73	SPS_D	General indication (binary input)		
Ind74	SPS_D	General indication (binary input)		
Ind75	SPS_D	General indication (binary input)		
Ind76	SPS_D	General indication (binary input)		
Ind77	SPS_D	General indication (binary input)		
Ind78	SPS_D	General indication (binary input)		
Ind79	SPS_D	General indication (binary input)		
Ind80	SPS_D	General indication (binary input)		
Ind81	SPS_D	General indication (binary input)		
Ind82	SPS_D	General indication (binary input)		
Ind83	SPS_D	General indication (binary input)		
Ind84	SPS_D	General indication (binary input)		
Ind85	SPS_D	General indication (binary input)		
Ind86	SPS_D	General indication (binary input)		
Ind87	SPS_D	General indication (binary input)		
Ind88	SPS_D	General indication (binary input)		
Ind89	SPS_D	General indication (binary input)		
Ind90	SPS_D	General indication (binary input)		
Ind91	SPS_D	General indication (binary input)		
Ind92	SPS_D	General indication (binary input)		
Ind93	SPS_D	General indication (binary input)		
Ind94	SPS_D	General indication (binary input)		
Ind95	SPS_D	General indication (binary input)		
Ind96	SPS_D	General indication (binary input)		
Ind97	SPS_D	General indication (binary input)		
Ind98	SPS_D	General indication (binary input)		
Ind99	SPS_D	General indication (binary input)		
Ind100	SPS_D	General indication (binary input)		
Ind101	SPS_D	General indication (binary input)		
Ind102	SPS_D	General indication (binary input)		
Ind103	SPS_D	General indication (binary input)		
Ind104	SPS_D	General indication (binary input)		
Ind105	SPS_D	General indication (binary input)		
Ind106	SPS_D	General indication (binary input)		



Attribute	Attr. Type	Explanation	T	X
Ind107	SPS_D	General indication (binary input)		
Ind108	SPS_D	General indication (binary input)		
Ind109	SPS_D	General indication (binary input)		
Ind110	SPS_D	General indication (binary input)		
Ind111	SPS_D	General indication (binary input)		
Ind112	SPS_D	General indication (binary input)		
Ind113	SPS_D	General indication (binary input)		
Ind114	SPS_D	General indication (binary input)		
Ind115	SPS_D	General indication (binary input)		
Ind116	SPS_D	General indication (binary input)		
Ind117	SPS_D	General indication (binary input)		
Ind118	SPS_D	General indication (binary input)		
Ind119	SPS_D	General indication (binary input)		
Ind120	SPS_D	General indication (binary input)		
Ind121	SPS_D	General indication (binary input)		
Ind122	SPS_D	General indication (binary input)		
Ind123	SPS_D	General indication (binary input)		
Ind124	SPS_D	General indication (binary input)		
Ind125	SPS_D	General indication (binary input)		
Ind126	SPS_D	General indication (binary input)		
Ind127	SPS_D	General indication (binary input)		
Ind128	SPS_D	General indication (binary input)		

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

Description: Generic process I/O

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
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		

Attribute	Attr. Type	Explanation	T	X
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		

#### 4.7 Logical Node: GGIO\_IND\_32\_CTRL

Description: Generic process I/O

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
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		

Attribute	Attr. Type	Explanation	T	X
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		

**4.8 Logical Node: GGIO\_IND\_64**

Description: Generic process I/O(w.r.t 64 Indication Elements)

LN Class: GGIO

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

Attribute	Attr. Type	Explanation	T	X
Ind31	SPS_D	General indication (binary input)		
Ind32	SPS_D	General indication (binary input)		
Ind33	SPS_D	General indication (binary input)		
Ind34	SPS_D	General indication (binary input)		
Ind35	SPS_D	General indication (binary input)		
Ind36	SPS_D	General indication (binary input)		
Ind37	SPS_D	General indication (binary input)		
Ind38	SPS_D	General indication (binary input)		
Ind39	SPS_D	General indication (binary input)		
Ind40	SPS_D	General indication (binary input)		
Ind41	SPS_D	General indication (binary input)		
Ind42	SPS_D	General indication (binary input)		
Ind43	SPS_D	General indication (binary input)		
Ind44	SPS_D	General indication (binary input)		
Ind45	SPS_D	General indication (binary input)		
Ind46	SPS_D	General indication (binary input)		
Ind47	SPS_D	General indication (binary input)		
Ind48	SPS_D	General indication (binary input)		
Ind49	SPS_D	General indication (binary input)		
Ind50	SPS_D	General indication (binary input)		
Ind51	SPS_D	General indication (binary input)		
Ind52	SPS_D	General indication (binary input)		
Ind53	SPS_D	General indication (binary input)		
Ind54	SPS_D	General indication (binary input)		
Ind55	SPS_D	General indication (binary input)		
Ind56	SPS_D	General indication (binary input)		
Ind57	SPS_D	General indication (binary input)		
Ind58	SPS_D	General indication (binary input)		
Ind59	SPS_D	General indication (binary input)		
Ind60	SPS_D	General indication (binary input)		
Ind61	SPS_D	General indication (binary input)		
Ind62	SPS_D	General indication (binary input)		
Ind63	SPS_D	General indication (binary input)		
Ind64	SPS_D	General indication (binary input)		

**4.9 Logical Node: GGIO\_IND\_8**

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

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Ind1	SPS_D	General indication (binary input)		
Ind2	SPS_D	General indication (binary input)		

Attribute	Attr. Type	Explanation	T	X
Ind3	SPS_D	General indication (binary input)		
Ind4	SPS_D	General indication (binary input)		
Ind5	SPS_D	General indication (binary input)		
Ind6	SPS_D	General indication (binary input)		
Ind7	SPS_D	General indication (binary input)		
Ind8	SPS_D	General indication (binary input)		

**4.10 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	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LLNO	Name Plate		
AscMod	INC_CTRL_PRIV	Check Synchronisation		X
AscBeh	INS_BEH_D_PRIV	Check Synchronisation		X

**4.11 Logical Node: LLN0\_P342**

Description: Logical Node 0

LN Class: LLN0

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LLNO	Name Plate		
CbfMod	INC_CTRL_PRIV	CB Fail Mode		X
CbfBeh	INS_BEH_D_PRIV	Circuit Breaker Fail Behaviour		X
CliMod	INC_CTRL_PRIV	CLIO Inputs Mode		X
CliBeh	INS_BEH_D_PRIV	CLIO Inputs Behaviour		X
DfpMod	INC_CTRL_PRIV	df/dt Mode		X
DfpBeh	INS_BEH_D_PRIV	df/dt Behaviour		X
EftMod	INC_CTRL_PRIV	Earth Fault 1 (Measured) Mode		X
EftBeh	INS_BEH_D_PRIV	Earth Fault 1 (Measured) Behaviour		X
FrqMod	INC_CTRL_PRIV	Overfrequency/Underfrequency Mode		X
FrqBeh	INS_BEH_D_PRIV	Overfrequency/Underfrequency Behaviour		X
NpsMod	INC_CTRL_PRIV	NPS Thermal Mode		X
NpsBeh	INS_BEH_D_PRIV	NPS Thermal Behaviour		X
NvdMod	INC_CTRL_PRIV	Residual Overvoltage NVD Mode		X
NvdBeh	INS_BEH_D_PRIV	Residual Overvoltage NVD Behaviour		X
OcpMod	INC_CTRL_PRIV	Overcurrent Mode		X
OcpBeh	INS_BEH_D_PRIV	Overcurrent Behaviour		X
PdpMod	INC_CTRL_PRIV	Power Protection Mode		X
PdpBeh	INS_BEH_D_PRIV	Power Protection Behaviour		X
RtdMod	INC_CTRL_PRIV	RTD Inputs Mode		X

Attribute	Attr. Type	Explanation	T	X
RtdBeh	INS_BEH_D_PRIV	RTD Inputs Behaviour		X
RtrMod	INC_CTRL_PRIV	Rotor Earth Fault Mode		X
RtrBeh	INS_BEH_D_PRIV	Rotor Earth Fault Behaviour		X
SbkMod	INC_CTRL_PRIV	System Backup Mode		X
SbkBeh	INS_BEH_D_PRIV	System backup Behaviour		X
SvnMod	INC_CTRL_PRIV	Supervision Mode		X
SvnBeh	INS_BEH_D_PRIV	Supervision Behaviour		X
ThmMod	INC_CTRL_PRIV	Thermal Overload Mode		X
ThmBeh	INS_BEH_D_PRIV	Thermal Overload Behaviour		X
UxpMod	INC_CTRL_PRIV	Field Failure Mode		X
UxpBeh	INS_BEH_D_PRIV	Field Failure Behaviour		X
VhzMod	INC_CTRL_PRIV	Volts/Hz Mode		X
VhzBeh	INS_BEH_D_PRIV	Volts per Hz Behaviour		X
VtpMod	INC_CTRL_PRIV	Overvoltage/Undervoltage Mode		X
VtpBeh	INS_BEH_D_PRIV	Overvoltage/Undervoltage Behaviour		X

#### 4.12 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	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LLNO	Name Plate		

#### 4.13 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	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LLNO	Name Plate		
LEDRs	SPC_CONTROL	LED reset	T	
OrdRun	SPS_WD_NS	Indicate the IED is operating a control object (Order Running)		X
SyncSt	SPS_WD_NS	Indicate time synchronisation in the IED is active or inactive		X

#### 4.14 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		

Attribute	Attr. Type	Explanation	T	X
PwrUp	SPS_D	Power up detected		

**4.15 Logical Node: MMTR\_AFQ**

Description: Metering  
LN Class: MMTR

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
FBnd1Tm	INS_NO_TIME_NS	Frequency Band 1 Time		X
FBnd2Tm	INS_NO_TIME_NS	Frequency Band 2 Time		X
FBnd3Tm	INS_NO_TIME_NS	Frequency Band 3 Time		X
FBnd4Tm	INS_NO_TIME_NS	Frequency Band 4 Time		X
FBnd5Tm	INS_NO_TIME_NS	Frequency Band 5 Time		X
FBnd6Tm	INS_NO_TIME_NS	Frequency Band 6 Time		X

**4.16 Logical Node: MMTR\_LOL**

Description: Metering  
LN Class: MMTR

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
LOLLres	MV_FLOAT_NS	Loss of Life LRes		X
LOLRate	MV_FLOAT_NS	Loss of Life Rate		X
LOLSts	MV_FLOAT_NS	Loss of Life Status		X
FAALres	MV_FLOAT_NS	Loss of Life FAA LRes		X
MTRRs	SPC_CTRL_PRIV	Reset LOL		X

**4.17 Logical Node: MMTR\_PRIV**

Description: Metering  
LN Class: MMTR

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
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 Measurements		X

**4.18 Logical Node: MMXU\_CSV**

Description: Measurements for C/S  
LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
CSVol	WYE_RES_ANG_D_NS	C/S Voltage		X

**4.19 Logical Node: MMXU\_DERIVED\_P342**

Description: Standard measurements (w.r.t P342)  
LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Hz	MV_FLOAT	Frequency		
PPV	DEL_SEG	Phase-Phase Magnitudes		
A	WYE_SEG	Currents		
A1	WYE_SEG_PHASEA	IN Measured		
A2	WYE_RES_MAG_D	IN-1 Derived		
W	WYE_SEG	A,B,C phase watts		
VA	WYE_SEG	A,B,C phase VA		
PF	WYE_SEG	Power Factor		
AngPPV	DEL_SEG_NS	Phase-Phase Angles		
AngA	WYE_SEG_NS	Currents Angles		
AngV	WYE_SEG_NS	VN Derived angle		
AvgPF	MV_FLOAT_NS	3 Phase power factor		
AvgWatts	MV_FLOAT_NS	3-phase average watts		
AvgVA	MV_FLOAT_NS	3-phase average VA		
AvgVArS	MV_FLOAT_NS	3-phase average VArS		
NPSPwr	MV_FLOAT_NS	NPS Power S2		
V	WYE_SEG_NS	Voltages		
VArS	WYE_SEG_NS	A,B,C phase VArS		
VN	WYE_RES_ANG_D_NS	VN Derived Magnitude Angle		

**4.20 Logical Node: MMXU\_DFDT**

Description: Standard measurements(for dfdt only)  
LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		



Attribute	Attr. Type	Explanation	T	X
Dfdt	MV_FLOAT_NS	df/dt		X

**4.21 Logical Node: MMXU\_LOL**

Description: Loss-of-life (Transformer) measurements

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
FAA	MV_FLOAT_NS	Loss of Life FAA		X
LOL	MV_FLOAT_NS	Loss of Life Aging Factor		X

**4.22 Logical Node: MMXU\_RMS**

Description: Measurements (RMS values)

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
PhV	WYE_SEG	Phase to Ground voltages		
A	WYE_SEG	RMS Current		

**4.23 Logical Node: MMXU\_ROTOR\_EF**

Description: Measurements for Rotor E/F

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
R	MV_FLOAT_NS	64R Fault Resistance		X
CLI	MV_FLOAT_NS	Current Loop Input Current		X

**4.24 Logical Node: MMXU\_SENSITIVE**

Description: Sensitive measurements

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
A	WYE_SEG_PHASEA	Current Sensitive		
PwrAng	MV_FLOAT_NS	Power angle		X

Attribute	Attr. Type	Explanation	T	X
W	WYE_RES_MAG	watts		
VArs	MV_FLOAT_NS	VArs		X

**4.25 Logical Node: MMXU\_STANDARD\_ALL**

Description: Standard measurements  
LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
RelDifA	MV_FLOAT_NS	IREF Diff		X
RelBiasA	MV_FLOAT_NS	IREF Bias		X
VN	WYE_RES_ANG_D_NS	VN Measured quantities		X

**4.26 Logical Node: MMXU\_THIRD\_HARMONIC\_NO\_VN**

Description: Measurements (w.r.t 3rd Harmonic, no VN for P341/P342)  
LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		

**4.27 Logical Node: MMXU\_THM**

Description: Standard measurements  
LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
HotT	MV_FLOAT_NS	Hot Spot Temperature		X
TopT	MV_FLOAT_NS	Top Oil Temperature		X
AmbT	MV_FLOAT_NS	Ambient Temperature		X
TopPreleft	MV_FLOAT_NS	Top Oil Pretrip Left		X

**4.28 Logical Node: MMXU\_VHZ**

Description: Measurements(w.r.t.Volts Per Hz)  
LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		

Attribute	Attr. Type	Explanation	T	X
VHz	MV_FLOAT_NS	Volts/Hz		X

**4.29 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	Behaviour		
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		

**4.30 Logical Node: MSTA\_STANDARD**

Description: Standard measurements (w.r.t Fourier Derived Values)

LN Class: MSTA

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
TotRtPwr	MV_FLOAT_NS	Total reactive power (Total Q)		X
TotPwr	MV_FLOAT_NS	Total active power (Total P)		X
PhApPwr	WYE_SEG_NS	Phase apparent power (S)		X

**4.31 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	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Op	ACT_NO_SEG	Operate	T	

**4.32 Logical Node: PDIS\_SYSTEM**

Description: Distance

LN Class: PDIS

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

**4.33 Logical Node: PDUP\_STANDARD**

Description: Under power protection  
LN Class: PDUP

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

**4.34 Logical Node: PEFI\_NEU\_UR**

Description: Earth Fault Injection protection - under resistance  
LN Class: PEFI

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN_P	Name Plate		
Str	ACD_NO_SEG_NS	Start		
Op	ACT_NO_SEG_NS	Operate (Trip)		
ResStrVal	ASG_FLOAT_NS	Under-resistance start value		

**4.35 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	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

**4.36 Logical Node: PPWR\_NORMAL**

Description: Power Protection with Pole Dead Inhibit  
LN Class: PPWR

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN_P	Name Plate		
Str	ACD_NO_SEG_NS	Start		
Op	ACT_NO_SEG_NS	Trip	T	

**4.37 Logical Node: PTAF\_NO\_SEG**

Description: Turbine Abnormal Frequency Protection  
LN Class: PTAF

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN_P	Name Plate		
Str	ACD_NO_SEG_NS	Start		
Op	ACT_NO_SEG_NS	Trip	T	

**4.38 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	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

**4.39 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	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

**4.40 Logical Node: PTOF\_NO\_SEG**

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

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

**4.41 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	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

#### 4.42 Logical Node: PTOV\_NO\_SEG

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

LN Class: PTOV

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

#### 4.43 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	Behaviour		
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		

#### 4.44 Logical Node: PTTR\_HOT\_TOP

Description: Thermal overload

LN Class: PTTR

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	
MTRRs	SPC_CTRL_PRIV	Reset thermal state		X

#### 4.45 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	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Op	ACT_NO_SEG	Operate	T	
MTRRs	SPC_CTRL_PRIV	Reset thermal state		X

**4.46 Logical Node: PTTR\_NO\_SEG\_PRIV**

Description: Thermal overload for Thermal State and NPS Thermal(w.r.t No Phase Segregation)

LN Class: PTTR

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
TmpRI	MV_FLOAT	Relation between temperature and maximum temperature		
Op	ACT_NO_SEG	Operate	T	
AlmThm	SPS_WD	Thermal alarm	T	
MTRRs	SPC_CTRL_PRIV	Reset Thermal State		X

**4.47 Logical Node: PTUC\_NEU**

Description: Models timed under-current protection

LN Class: PTUC

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_NO_SEG	Started		
Op	ACT_NO_SEG	Operate	T	
ModOvA	SPS_WD_NS	Overcurrent Mode Indication		X

**4.48 Logical Node: PTUF\_NO\_SEG**

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

LN Class: PTUF

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

**4.49 Logical Node: PTUV\_NO\_SEG**

Description: Undervoltage (w.r.t No Phase Segregation)  
LN Class: PTUV

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

**4.50 Logical Node: PVOC\_STANDARD**

Description: Voltage controlled time overcurrent  
LN Class: PVOC

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

**4.51 Logical Node: PVPH\_STANDARD**

Description: Volts per Hz protection  
LN Class: PVPH

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

**4.52 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	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
OpEx	ACT_NO_SEG	Breaker failure trip ("External trip")	T	

**4.53 Logical Node: RCLI\_STANDARD**

Description: Current loop monitoring and reporting  
LN Class: RCLI



Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN_P	Name Plate		
Val	MV_FLOAT_NS	current loop input measured value		
Blk	SPS_WD_NS	Block (TRUE = current loop blocked)		
Min	ASG_FLOAT_NS	Minimum input of current loop		
Max	ASG_FLOAT_NS	Maximum input of current loop		

**4.54 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	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
RcdMade	SPS_WD	Recording made		
FltNum	INS_BASIC	Fault number		

**4.55 Logical Node: RFLO\_P342**

Description: Fault locator for P342  
 LN Class: RFLO

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
FltZ	CMV_FLOAT_FAULT	Fault impedance		
FltDiskm	MV_FLOAT_FAULT_ND	Fault distance in km		
FltNum	INS_D	Fault record number		X
FltPhs	INS_D_NS	Fault phase		X
FltSt1U	INS_D_NS	Fault start element 1 up		X
FltSt1L	INS_D_NS	Fault start element 1 low		X
FltSt2U	INS_D_NS	Fault start element 2 up		X
FltSt2L	INS_D_NS	Fault start element 2 low		X
FltSt3U	INS_D_NS	Fault start element 3 up		X
FltSt3L	INS_D_NS	Fault start element 3 low		X
FltSt4U	INS_D_NS	Fault start element 4 up		X
FltSt4L	INS_D_NS	Fault start element 4 low		X
FltOp1U	INS_D_NS	Fault trip element 1 up		X
FltOp1L	INS_D_NS	Fault trip element 1 low		X
FltOp2U	INS_D_NS	Fault trip element 2 up		X
FltOp2L	INS_D_NS	Fault trip element 2 low		X
FltOp3U	INS_D_NS	Fault trip element 3 up		X

Attribute	Attr. Type	Explanation	T	X
FltOp3L	INS_D_NS	Fault trip element 3 low		X
FltOp4U	INS_D_NS	Fault trip element 4 up		X
FltOp4L	INS_D_NS	Fault trip element 4 low		X
FltAlm1U	INS_D_NS	Fault alarm 1 up		X
FltAlm1L	INS_D_NS	Fault alarm 1 low		X
FltAlm2U	INS_D_NS	Fault alarm 2 up		X
FltAlm2L	INS_D_NS	Fault alarm 2 low		X
FltTU	INS_D_NS	Fault time up		X
FltTL	INS_D_NS	Fault time low		X
FltTms	INS_D_NS	Fault time ms		X
ActiveSG	INS_D_NS	Fault record Active group		X
FltFreq	MV_FLOAT_FAULT	Fault frequency		X
FltDur	MV_FLOAT_FAULT	Fault duration		X
CBOPtm	MV_FLOAT_FAULT	Fault CB Operation time		X
RlyOpTm	MV_FLOAT_FAULT	Fault relay trip time		X
FltA1	WYE_SEG_FAULT	Fault record phase current-CT1		X
FltPPV	DEL_SEG_FAULT	Fault record phase to phase voltage		X
FltPhV	WYE_SEG_FAULT	Fault record phase to ground voltage		X
FltVNMeas	MV_FLOAT_FAULT	Fault voltage VN measured		X
FltVNDer	MV_FLOAT_FAULT	Fault voltage VN Derived		X
FltINDer	MV_FLOAT_FAULT	Fault current IN Derived		X
FltISen	MV_FLOAT_FAULT	Fault sentive current		X
IREFDiff	MV_FLOAT_FAULT	Fault REF IDiff		X
IREFBias	MV_FLOAT_FAULT	Fault REF Ibias		X
FltI2	MV_FLOAT_FAULT	Fault current I2		X
FltV2	MV_FLOAT_FAULT	Fault voltage V2		X
FltWatts	MV_FLOAT_FAULT	Fault 3 Phase Watts		X
FltVARS	MV_FLOAT_FAULT	Fault 3 Phase VARs		X
FltPF	MV_FLOAT_FAULT	Fault 3 Phase power factor		X
RTD1	MV_FLOAT_FAULT	Fault RTD1		X
RTD2	MV_FLOAT_FAULT	Fault RTD2		X
RTD3	MV_FLOAT_FAULT	Fault RTD3		X
RTD4	MV_FLOAT_FAULT	Fault RTD4		X
RTD5	MV_FLOAT_FAULT	Fault RTD5		X
RTD6	MV_FLOAT_FAULT	Fault RTD6		X
RTD7	MV_FLOAT_FAULT	Fault RTD7		X
RTD8	MV_FLOAT_FAULT	Fault RTD8		X
RTD9	MV_FLOAT_FAULT	Fault RTD9		X
RTD10	MV_FLOAT_FAULT	Fault RTD10		X
FltDfdt	MV_FLOAT_FAULT	Fault dfdt		X
FltCLIO1	MV_FLOAT_FAULT	Fault CLIO1		X
FltCLIO2	MV_FLOAT_FAULT	Fault CLIO2		X
FltCLIO3	MV_FLOAT_FAULT	Fault CLIO3		X
FltCLIO4	MV_FLOAT_FAULT	Fault CLIO4		X

Attribute	Attr. Type	Explanation	T	X
Flt64SCI	MV_FLOAT_FAULT	Fault 64R CL Input		X
Flt64SRF	MV_FLOAT_FAULT	Fault 64R R Fault		X
FltSenP	MV_FLOAT_FAULT	Fault phase sentive power		X
FltIpeak1	WYE_SEG_FAULT	Fault phase current Ipeak for CT1		X
FltI2t1	WYE_SEG_FAULT	Fault phase I2t for CT1		X

**4.56 Logical Node: RSYN\_DIFCLC**

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

LN Class: RSYN

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Rel	SPS_WD	Release		
VInd	SPS_WD	Voltage difference indicator		
AngInd	SPS_WD	Angle difference indicator		
HzInd	SPS_WD	Frequency difference indicator		
DifVClc	MV_FLOAT	Calculated difference in voltage		
DifHzClc	MV_FLOAT	Calculated difference in frequency		
DifAngClc	MV_FLOAT	Calculated difference of phase angle		

**4.57 Logical Node: RTTR\_STANDARD**

Description: Temperature monitoring and reporting

LN Class: RTTR

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN_P	Name Plate		
DataErr	SPS_D_NS	data error		X
OpnCct	SPS_D_NS	open circuit		X
ShrtCct	SPS_D_NS	short circuit		X
HWErr	SPS_D_NS	hardware error		X

**4.58 Logical Node: RVCS\_STANDARD\_NO\_CT2**

Description: VTS/CTS monitoring and report

LN Class: RVCS

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN_P	Name Plate		
SlwVTSBik	SPS_D	slow VTS block status		

Attribute	Attr. Type	Explanation	T	X
FstVTSBlk	SPS_D	fast VTS block status		
CTSBk	SPS_D	CTS block status		

**4.59 Logical Node: XCBR\_BASIC\_ALL**

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	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Loc	SPS_WD	Local operation		
EEHealth	INS_HEALTH	External equipment health		
OpCnt	INS_BASIC	Operation counter		
Pos	DPC_STATUS_CTRL	Switch position		
BlkOpn	SPC_STATUS	Block opening		
BlkCls	SPC_STATUS	Block closing		
CBOpCap	INS_CB_OPCAP	Circuit Breaker operating capability		
Lock	SPC_CTRL_PRIV	Prevention, i.e. Lock, Trip/Close Operation of Circuit Breaker over IEC61850		X

## 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	IEC61850-7-2
CF	Configuration	IEC61850-7-2
CO	Control	IEC61850-7-2
DC	Description	IEC61850-7-2
EX	Extended Definition	IEC61850-7-2
GO	GOOSE Control	IEC61850-7-2
GS	GSSE Control (UCA2 GOOSE)	IEC61850-7-2
LG	Logging	IEC61850-7-2
MS	Multicast sampled value control	IEC61850-7-2
MX	Measurands (Analogue values)	IEC61850-7-2
RP	Unbuffered reports	IEC61850-7-2
SE	Setting Group Editable	IEC61850-7-2
SG	Setting Group	IEC61850-7-2
SP	Set Point	IEC61850-7-2
ST	Status Information	IEC61850-7-2
SV	Substitution Values	IEC61850-7-2
US	Unicast sampled value control	IEC61850-7-2
XX	Data attribute service parameters	IEC61850-7-2

### 5.1 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	

### 5.2 Common Data Class: ACD\_NO\_SEG\_NS

Description: ACD\_NO\_SEG with namespace DO dataNs  
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	

Attribute	Type	FC	Enumeration	Comment	X
t	TimeStamp	ST		Timestamp of the last change in state of protection activation information	
dataNs	VISIBLE_STRING255	EX		Data name space	

**5.3 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	

**5.4 Common Data Class: ACT\_NO\_SEG\_NS**

Description: ACT\_NO\_SEG with namespace DO dataNs

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	
dataNs	VISIBLE_STRING255	EX		Data name space	

**5.5 Common Data Class: ASG\_FLOAT\_NS**

Description: Analogue Setting

CDC Class: ASG

Attribute	Type	FC	Enumeration	Comment	X
setMag	AnalogueValue_Float	SP		Setting value	
units	Unit_multiplier	CF		Units of the attribute representing the data	
d	VISIBLE_STRING255	DC		Description of the status element	
dataNs	VISIBLE_STRING255	EX		Data name space	

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

Description: Binary Counter Reading

CDC Class: BCR

Attribute	Type	FC	Enumeration	Comment	X
actVal	INT32	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)	

**5.7 Common Data Class: CMV\_FLOAT\_FAULT**

Description: Complex Measured value

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	

### 5.8 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	
rangeC	RangeConfig_Deadband	CF		Measurement range configuration attributes	

### 5.9 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	

### 5.10 Common Data Class: DEL\_SEG

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

CDC Class: DEL

Attribute	Type	FC	Enumeration	Comment	X
phsAB	CMV_MAG_FLOAT	--		Measurement values for Phase A to Phase B	
phsBC	CMV_MAG_FLOAT	--		Measurement values for Phase B to Phase C	
phsCA	CMV_MAG_FLOAT	--		Measurement values for Phase C to Phase A	

**5.11 Common Data Class: DEL\_SEG\_FAULT**

Description: Phase to phase measurements for a 3-Phase system  
 CDC Class: DEL

Attribute	Type	FC	Enumeration	Comment	X
phsAB	CMV_FLOAT_FAULT	--		Measurement values for Phase A to Phase B	
phsBC	CMV_FLOAT_FAULT	--		Measurement values for Phase B to Phase C	
phsCA	CMV_FLOAT_FAULT	--		Measurement values for Phase C to Phase A	
d	VISIBLE_STRING255	DC		Description of the status element	
dataNs	VISIBLE_STRING255	EX		Data name space	

**5.12 Common Data Class: DEL\_SEG\_NS**

Description: DEL\_SEG with namespace DO dataNs  
 CDC Class: DEL

Attribute	Type	FC	Enumeration	Comment	X
phsAB	CMV_MAG_FLOAT	--		Measurement values for Phase A to Phase B	
phsBC	CMV_MAG_FLOAT	--		Measurement values for Phase B to Phase C	
phsCA	CMV_MAG_FLOAT	--		Measurement values for Phase C to Phase A	
dataNs	VISIBLE_STRING255	EX		Data name space	

**5.13 Common Data Class: DPC\_STATUS\_CTRL**

Description: Controllable Double Point (w.r.t Status Only)  
 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	Dbpos	ST		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 behaviour of the data)	
sboTimeout	INT32U	CF		Select Before Operate timeout period (in milliseconds)	
cdcNs	VISIBLE_STRING255	EX		Common Data Class name space	
cdcName	VISIBLE_STRING255	EX		Name of the Common Data Class	

**5.14 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	



Attribute	Type	FC	Enumeration	Comment	X
location	VISIBLE_STRING255	DC		Physical location of device	

### 5.15 Common Data Class: INC\_CTRL\_PRIV

Description: Controllable Integer Status

CDC Class: INC

Attribute	Type	FC	Enumeration	Comment	X
ctlVal	INT32	CO		Control value	
stVal	INT32 (MMS Type: INT8)	ST	Beh	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 behaviour of the data)	
d	VISIBLE_STRING255	DC		Description of the status element	
cdcNs	VISIBLE_STRING255	EX		Common Data Class name space	
cdcName	VISIBLE_STRING255	EX		Name of the Common Data Class	
dataNs	VISIBLE_STRING255	EX		Data name space	

### 5.16 Common Data Class: INC\_MOD

Description: Controllable Integer Status (w.r.t Mode)

CDC Class: INC

Attribute	Type	FC	Enumeration	Comment	X
stVal	ENUMERATED8 (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 behaviour of the data)	

### 5.17 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	

### 5.18 Common Data Class: INS\_BEH

Description: Integer Status (w.r.t Behaviour)

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	

**5.19 Common Data Class: INS\_BEH\_D\_PRIV**

Description: Integer Status (w.r.t Behaviour, 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	

**5.20 Common Data Class: INS\_CB\_OPCAP**

Description: Integer Status(w.r.t CB Operating capability)  
 CDC Class: INS

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

**5.21 Common Data Class: INS\_D**

Description: Integer Status  
 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	
d	VISIBLE_STRING255	DC		Description of the status element	

**5.22 Common Data Class: INS\_D\_NS**

Description: Integer Status  
 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	
d	VISIBLE_STRING255	DC		Description of the status element	
dataNs	VISIBLE_STRING255	EX		Data name space	

**5.23 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	

**5.24 Common Data Class: INS\_NO\_TIME\_NS**

Description: Integer Status with no timestamp but with dataNs

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	
dataNs	VISIBLE_STRING255	EX		Data name space	

**5.25 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	

**5.26 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	

**5.27 Common Data Class: LPL\_LN\_P**

Description: Logical Node Name Plate for Propriety LN

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	
lnNs	VISIBLE_STRING255	EX		Logical Node name space	

**5.28 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	

Attribute	Type	FC	Enumeration	Comment	X
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	

**5.29 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	

**5.30 Common Data Class: MV\_FLOAT\_FAULT**

Description: Measured 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	
d	VISIBLE_STRING255	DC		Description of the status element	
dataNs	VISIBLE_STRING255	EX		Data name space	

**5.31 Common Data Class: MV\_FLOAT\_FAULT\_ND**

Description: Measured 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	

Attribute	Type	FC	Enumeration	Comment	X
t	TimeStamp	MX		Time deadbanded magnitude last exceeded its db configuration parameter	
units	Unit_multiplier	CF		Unit of the attribute representing the data	

### 5.32 Common Data Class: MV\_FLOAT\_NS

Description: MV\_FLOAT with dataNs for extra Dos

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	
dataNs	VISIBLE_STRING255	EX		Data name space	

### 5.33 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)	

### 5.34 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 behaviour of the data)	
sboTimeout	INT32U	CF		Select Before Operate timeout period (in milliseconds)	

Attribute	Type	FC	Enumeration	Comment	X
d	VISIBLE_STRING255	DC		Description of the status element	
cdcNs	VISIBLE_STRING255	EX		Common Data Class name space	
cdcName	VISIBLE_STRING255	EX		Name of the Common Data Class	

**5.35 Common Data Class: SPC\_CTRL\_PRIV**

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 behaviour of the data)	
sboTimeout	INT32U	CF		Select Before Operate timeout period (in milliseconds)	
cdcNs	VISIBLE_STRING255	EX		Common Data Class name space	
cdcName	VISIBLE_STRING255	EX		Name of the Common Data Class	
dataNs	VISIBLE_STRING255	EX		Data name space	

**5.36 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 behaviour of the data)	

**5.37 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	

**5.38 Common Data Class: SPS\_D\_NS**

Description: Single Point Status  
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	
dataNs	VISIBLE_STRING255	EX		Data name space	

### 5.39 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	

### 5.40 Common Data Class: SPS\_WD\_NS

Description: Single Point Status (without Description, with namespace)

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	

### 5.41 Common Data Class: 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	Enumeration	Comment	X
res	CMV_MAG_ANG_FLOAT	--		Measurement values for the residual system current	
d	VISIBLE_STRING255	DC		Description of the status element	
dataNs	VISIBLE_STRING255	EX		Data name space	

### 5.42 Common Data Class: WYE\_RES\_MAG

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

CDC Class: WYE

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

### 5.43 Common Data Class: WYE\_RES\_MAG\_D

Description: Phase to ground measurements for a 1-Phase system, magnitude only

CDC Class: WYE

Attribute	Type	FC	Enumeration	Comment	X
res	CMV_MAG_FLOAT	--		Measurement values for the residual system current	
d	VISIBLE_STRING255	DC		Description of the status element	

**5.44 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	

**5.45 Common Data Class: WYE\_SEG\_FAULT**

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

CDC Class: WYE

Attribute	Type	FC	Enumeration	Comment	X
phsA	CMV_FLOAT_FAULT	--		Measurement values for Phase A	
phsB	CMV_FLOAT_FAULT	--		Measurement values for Phase B	
phsC	CMV_FLOAT_FAULT	--		Measurement values for Phase C	
d	VISIBLE_STRING255	DC		Description of the status element	
dataNs	VISIBLE_STRING255	EX		Data name space	

**5.46 Common Data Class: WYE\_SEG\_NS**

Description: WYE\_SEG with dataNs DO

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	
dataNs	VISIBLE_STRING255	EX		Data name space	

**5.47 Common Data Class: WYE\_SEG\_PHASEA**

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	



## 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.

### 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	

### 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)	

### 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	

### 6.4 Component: Unit\_multiplier

Comment: SI Unit definitions

Parent Type: Unit

Attribute	Type	Enumeration	Comment	X
SIUnit	ENUMERATED16 (MMS Type: INT8)	SIUnit	SI Unit	
multiplier	ENUMERATED16 (MMS Type: INT8)	multiplier	Multiplier value, the default of which is 0 (i.e. multiplier = 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	

**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)	

## 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 IEC61850-7-3 and IEC61850-7-4 unless otherwise stated.

### 7.1 Enumerated type: AddCause

Description: Add Cause

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

### 7.2 Enumerated type: Beh

Description: Behaviour

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

### 7.3 Enumerated type: Bypass

Description:

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

Ordinal	Semantic
5	status-bypass

**7.4 Enumerated type: CBOpCap**

Description: CB Operating Capability

Ordinal	Semantic
1	None
2	Open
3	Close-Open
4	Open-Close-Open
5	Close-Open-Close-Open

**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

**7.6 Enumerated type: dir**

Description: Direction

Ordinal	Semantic
0	unknown
1	forward
2	backward
3	both

**7.7 Enumerated type: Health**

Description: Health

Ordinal	Semantic
1	Ok
2	Warning
3	Alarm

**7.8 Enumerated type: Mod**

Description: Mode

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

**7.9 Enumerated type: multiplier**

Description: Exponents of the multiplier value in base 10.

Ordinal	Semantic
-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

**7.10 Enumerated type: orCategory**

Description: or Category

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

**7.11 Enumerated type: seqT**

Description: Sequence Measurement Type

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

**7.12 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
31	J
32	N
33	Hz
34	lx
35	Lm
36	Wb
37	T

Ordinal	Semantic
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

## 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
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)
Dbpos	Bstring2	Switch positions
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
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
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	IEC61850 Quality
TimeStamp	Utctime	IEC61850 Time stamp
UNICODE_STRING255	UTF8Vstring255	255 character string (16 bits per unicode character)
UTC_TM	Utctime	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



# *Notes:*





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