



GE VERNOVA

MiCOM P40 Agile

P345

MICS

Model Implementation Conformance Statement - IEC 61850 Edition 2

Software Version: 91

Publication Reference: P345-MC2-EN-91-1.2



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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 GE Vernova 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
AutoControl	Commands and controls used for Automatic Control
AutoSynChk	Automatically Synchronism Check Control for CB
CBControl	Commands and controls for CB
CtlCB	Control CB
CtlCBFail	CB Fail Control Element
Measurements	Measurements
PloCnt	Programmable Logic Counters
ProtAng	Pole Slip (based on Internal phase angle)
ProtCli	CLI Protection
ProtDif	Differential Protection
ProtDmp	Dead machine
Protection	P345 Protection
ProtEft	Earth Fault Protection
ProtExc	Under Excitation
ProtFfc	Counter based Field Failure
ProtFrq	Frequency Protection
ProtNvd	Residual Voltage Protection
ProtOvCur	Overcurrent Protection
ProtOvThm	Thermal Overload Protection
ProtPow	Pole Slip (based on Sensitive Power)

Logical Device	Comment/Usage
ProtPsz	Pole slip / Out of Step
ProtPwr	Power Protection
ProtRtd	RTD Thermal Protection
ProtRteChgFrq	Frequency Change Ratio Protection
ProtRtrEf	Rotor Earth Fault Protection
ProtRtrThm	Rotor NPS Thermal Protection
ProtSbk	System Backup Protection
ProtSenEF	Sensitive Earth Fault Protection
ProtSenPwr	Sensitive Power Protection
ProtSta	Stator Earth Fault Protection
ProtSvn	VTS/CTS Supervision
ProtVhz	Overflux Protection
ProtVtp	Time-voltage Protection
Records	Records
System	System

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
AutoControl			
	LLN0	LLN0_STANDARD	AutoControl Logical Device
	LPHD1	LPHD_STANDARD	Px40 Physical Device Information
AutoSynChk			
	AscRSYN1	RSYN_DIFCLC_ENH	System Checks - Check Sync 1
	AscRSYN2	RSYN_DIFCLC_ENH	System Checks - Check Sync 2
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for Automatic Synchronism Check Control
CBControl			
	LLN0	LLN0_STANDARD	CBControl Logical Device
	LPHD1	LPHD_STANDARD	Px40 Physical Device Information
CtlCB			
	CBCILO1	CILO_INTERLOCK	Circuit Breaker Interlocking for CB
	CBCSWI1	CSWI_BASIC	Switch Controller for CB
	CBPTRC1	PTRC_GLOBAL	Protection trip for CB Control
	CBXCBR1	XCBR_BASIC	Circuit Breaker Monitoring (Pole 1)
	CBXCBR2	XCBR_BASIC	Circuit Breaker Monitoring (Pole 2)
	CBXCBR3	XCBR_BASIC	Circuit Breaker Monitoring (Pole 3)
	CBXCBR4	XCBR_BASIC	Circuit Breaker Monitoring for 3-pole
	LLN0	LLN0_STANDARD	Logical Device for CB Control
CtlCBFail			
	CbfPTRC18	PTRC_INDIVID_NO_SEG	Protection trip for CB Fail
	CbfRBRF1	RBRF_EXTTRIP	CB Fail 1
	CbfRBRF2	RBRF_EXTTRIP	CB Fail 2
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for CB Fail Control
Measurements			

LD	LN Instance	LN Type	Description
	AfqMMTR1	MMTR_AFQ	Abnormal Frequency Time measurements
	DfpMMXU1	MMXU_DFDT	df/dt
	LLN0	LLN0_STANDARD_MEA	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
	PriAvgMMXU1	MMXU_METER_AV	Primary Average Value of Fixed Measurements
	PriAvgMMXU2	MMXU_METER_AV	Primary Average Value of Rolled Measurements
	PriCsvMMXU1	MMXU_CSV	Primary C/S Measurements
	PriFitMLFR1	MLFR_FAULT_RECORD_1	Measurements during the Latest Fault Record
	PriFitMLFR2	MLFR_FAULT_RECORD_P345	Measurements during the Latest Fault Record (P345)
	PriFouMMXU1	MMXU_FOURIER	Primary Fourier Derived Measurands
	PriHa3MMXU1	MMXU_THIRD_HARMONIC	Primary Third Harmonic Measurements
	PriImpMMXU1	MMXU_Z	Primary impedance measurements
	PriLzdMMXU1	MMXU_GEN_DIFF	Primary Generator Differential measurements
	PriMaxMMXU1	MMXU_METER_MAX	Primary Maximum Value of Measurement
	PriMMTR1	MMTR_PRIV	Primary based metering quantities
	PriMSQI1	MSQI_ALL	Primary Sequence Measurements
	PriMSQI2	MSQI_CT2	Primary Sequence measurements for CT2 (only include seqA)
	PriRmsMMXU1	MMXU_RMS	Primary RMS Measurements
	PriSenMMXU1	MMXU_SENSITIVE	Primary Sensitive power measurements
	PriStaMMXU1	MMXU_STEFI_PRI	Primary Measurements for STEFI function
	PriStdMMXU1	MMXU_BASIC_ALL	Primary Standard Measurements all except P341
	PriStdMMXU2	MMXU_BASIC2	Primary Standard measurements - second CTs
	PriVhzMMXU1	MMXU_VHZ	Primary Volts/Hz Measurements
	RtrLfIMMXU1	MMXU_ROTOR_EF	Rotor EF Measurements
	SecAvgMMXU1	MMXU_METER_AV	Secondary Average Value of Fixed Measurements
	SecAvgMMXU2	MMXU_METER_AV	Secondary Average Value of Rolled Measurements
	SecCsvMMXU1	MMXU_CSV	Secondary C/S Measurements
	SecFouMMXU1	MMXU_FOURIER	Secondary Fourier Derived Measurands
	SecHa3MMXU1	MMXU_THIRD_HARMONIC	Secondary Third Harmonic Measurements
	SecImpMMXU1	MMXU_Z	Secondary impedance measurements
	SecLzdMMXU1	MMXU_GEN_DIFF	Secondary Generator Differential measurements
	SecMaxMMXU1	MMXU_METER_MAX	Secondary Maximum Value of Measurement
	SecMMTR1	MMTR_PRIV	Secondary based metering quantities
	SecMSQI1	MSQI_ALL	Secondary Sequence Measurements
	SecMSQI2	MSQI_CT2	Secondary Sequence measurements for CT2 (only include seqA)

LD	LN Instance	LN Type	Description
	SecRmsMMXU1	MMXU_RMS	Secondary RMS Measurements
	SecSenMMXU1	MMXU_SENSITIVE	Secondary Sensitive power measurements
	SecStaMMXU1	MMXU_STEFL_SEC	Secondary measurements for StEFL function
	SecStdMMXU1	MMXU_BASIC_ALL	Secondary Standard Measurements all except P341
	SecStdMMXU2	MMXU_BASIC2	Secondary Standard measurements - second CTs
	SecVhzMMXU1	MMXU_VHZ	Secondary Volts/Hz Measurements
	ThmMMXU1	MMXU_THM	Thermal Measurements
	XfrDifMMXU1	MMXU_DIFF	Transformer Differential and Harmonic Values
PloCnt			
	CntFCNT1	FCNT_COUNTER	PSL Settable Counter 1
	CntFCNT10	FCNT_COUNTER	PSL Settable Counter 10
	CntFCNT11	FCNT_COUNTER	PSL Settable Counter 11
	CntFCNT12	FCNT_COUNTER	PSL Settable Counter 12
	CntFCNT13	FCNT_COUNTER	PSL Settable Counter 13
	CntFCNT14	FCNT_COUNTER	PSL Settable Counter 14
	CntFCNT15	FCNT_COUNTER	PSL Settable Counter 15
	CntFCNT16	FCNT_COUNTER	PSL Settable Counter 16
	CntFCNT2	FCNT_COUNTER	PSL Settable Counter 2
	CntFCNT3	FCNT_COUNTER	PSL Settable Counter 3
	CntFCNT4	FCNT_COUNTER	PSL Settable Counter 4
	CntFCNT5	FCNT_COUNTER	PSL Settable Counter 5
	CntFCNT6	FCNT_COUNTER	PSL Settable Counter 6
	CntFCNT7	FCNT_COUNTER	PSL Settable Counter 7
	CntFCNT8	FCNT_COUNTER	PSL Settable Counter 8
	CntFCNT9	FCNT_COUNTER	PSL Settable Counter 9
	LLN0	LLN0_STANDARD	Programmable Logic Counters Logical Device
ProtAng			
	AngPDUP1	PDUP_DDB	Pole Slipping Trip (internal phase angle)
	LLN0	LLN0_STANDARD	Logical Device for Pole Slip (based on Internal phase angle)
ProtCli			
	CliSCLI1	SCLI_BASIC	Current Loop Input protection - channel 1
	CliSCLI2	SCLI_BASIC	Current Loop Input protection - channel 2
	CliSCLI3	SCLI_BASIC	Current Loop Input protection - channel 3
	CliSCLI4	SCLI_BASIC	Current Loop Input protection - channel 4
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for CLI Protection
ProtDif			
	DifHzdPDIF1	PDIF_NO_SEG	Differential - High Impedance
	DifIntPDIF1	PDIF_NO_SEG	Differential - Interturn
	DifLzdPDIF1	PDIF_NO_SEG	Differential - Low Impedance
	DifPTRC4	PTRC_INDIVID_NO_SEG	Protection trip for Differential protection
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for Differential Protection
	XfrDifPDIF1	PDIF_NO_SEG	Xformer Differential

LD	LN Instance	LN Type	Description
ProtDmp			
	DmpPDMP1	PDMP_NORMAL	Dead machine
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for Dead Machine Protection
Protection			
	LLN0	LLN0_STANDARD	Protection Logical Device with Standard Template
	LPHD1	LPHD_STANDARD	Physical Device Information
ProtEft			
	EftPTOC1	PTOC_NO_SEG	Earth fault - stage 1
	EftPTOC2	PTOC_NO_SEG	Earth fault - stage 2
	EftPTRC3	PTRC_INDIVID_NO_SEG	Protection trip for Earth Fault Protection
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for Earth Fault Protection
ProtExc			
	ExcPDUP1	PDUP_NO_SEG	Under excitation - stage 1
	ExcPDUP2	PDUP_NO_SEG	Under excitation - stage 2
	ExcPTRC5	PTRC_INDIVID_NO_SEG	Protection trip for Under Excitation Protection
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for Under Excitation Protection
ProtFfc			
	FfcPDUP1	PDUP_DDB	Counter based field failure 1 trip
	FfcPDUP2	PDUP_DDB	Counter based field failure 2 trip
	LLN0	LLN0_STANDARD	Logical Device for Counter based field failure protection
ProtFrq			
	FrqPTOF1	PTOF_NO_SEG	F> 1 Overfrequency
	FrqPTOF2	PTOF_NO_SEG	F> 2 Overfrequency
	FrqPTRC10	PTRC_INDIVID_NO_SEG	Protection trip for Frequency Protection
	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_STANDARD_WITH_CTRLMOD	Logical Device for Frequency Protection
	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
ProtNvd			
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for NVD Protection
	VtpResPTOV1	PTOV_NO_SEG	VN> 1 Residual Overvoltage
	VtpResPTOV2	PTOV_NO_SEG	VN> 2 Residual Overvoltage
	VtpResPTOV3	PTOV_NO_SEG	VN> 3 Residual Overvoltage
	VtpResPTOV4	PTOV_NO_SEG	VN> 4 Residual Overvoltage
	VtpResPTOV5	PTOV_NO_SEG	VN> 5 Residual Overvoltage

LD	LN Instance	LN Type	Description
	VtpResPTOV6	PTOV_NO_SEG	VN> 6 Residual Overvoltage
	VtpResPTRC14	PTRC_INDIVID_NO_SEG	Protection trip for NVD protection
ProtOvCur			
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for Overcurrent Protection
	NpsPTOC1	PTOC_NO_SEG	NPS overcurrent - stage 1
	NpsPTOC2	PTOC_NO_SEG	NPS overcurrent - stage 2
	NpsPTOC3	PTOC_NO_SEG	NPS overcurrent - stage 3
	NpsPTOC4	PTOC_NO_SEG	NPS overcurrent - stage 4
	OcpPTOC1	PTOC_NO_SEG	I> 1 Overcurrent
	OcpPTOC2	PTOC_NO_SEG	I> 2 Overcurrent
	OcpPTOC3	PTOC_NO_SEG	I> 3 Overcurrent
	OcpPTOC4	PTOC_NO_SEG	I> 4 Overcurrent
	OcpPTRC7	PTRC_INDIVID_NO_SEG	Protection trip for Overcurrent Protection
ProtOvThm			
	HotPTTR1	PTTR_HOT_TOP	Hot spot thermal protection - stage 1
	HotPTTR2	PTTR_HOT_TOP	Hot spot thermal protection - stage 2
	HotPTTR3	PTTR_HOT_TOP	Hot spot thermal protection - stage 3
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for Thermal Overload Protection
	ThmPTRC20	PTRC_INDIVID_NO_SEG	Protection trip for thermal Overload
	ThmPTTR1	PTTR_NO_SEG	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
ProtPow			
	LLN0	LLN0_STANDARD	Logical Device for Pole Slip (based on sensitive power)
	PowPDUP1	PDUP_DDB	Pole Slipping Trip (sensitive power)
ProtPsz			
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for Pole Slip / Out of Step Protection
	PszPPAM1	PPAM_NO_SEG	Pole Slip/Out of Step - Zone 1
	PszPPAM2	PPAM_NO_SEG	Pole Slip/Out of Step - Zone 2
	PszPTRC22	PTRC_INDIVID_NO_SEG	Protection trip for Pole Slip / Out of Step Protection
ProtPwr			
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logic device for power protection
	NpsPDOP1	PDOP_NO_SEG	Negative Phase Sequence Overpower protection stage 1
	PdpPPWR1	PPWR_NORMAL	Power protection (3-phase) stage 1
	PdpPPWR2	PPWR_NORMAL	Power protection (3-phase) stage 2
	PdpPPWR3	PPWR_NORMAL	Power protection (3-phase) stage 3
	PdpPPWR4	PPWR_NORMAL	Power protection (3-phase) stage 4
	PdpPTRC6	PTRC_INDIVID_NO_SEG	Protection trip for Power Protection
ProtRtd			
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for RTD Protection
	RtdSTMP1	STMP_RTD	RTD channel 1
	RtdSTMP10	STMP_RTD	RTD channel 10
	RtdSTMP2	STMP_RTD	RTD channel 2
	RtdSTMP3	STMP_RTD	RTD channel 3
	RtdSTMP4	STMP_RTD	RTD channel 4

LD	LN Instance	LN Type	Description
	RtdSTMP5	STMP_RTD	RTD channel 5
	RtdSTMP6	STMP_RTD	RTD channel 6
	RtdSTMP7	STMP_RTD	RTD channel 7
	RtdSTMP8	STMP_RTD	RTD channel 8
	RtdSTMP9	STMP_RTD	RTD channel 9
ProtRteChgFrq			
	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
	DfpPTRC8	PTRC_INDIVID_NO_SEG	Protection trip for Frequency Rate Change Protection
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for Frequency Rate Change Protection
ProtRtrEf			
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for Rotor Earth Fault Protection
	RtrLfIPeFI1	PEFI_BASIC	Rotor Earth Fault Protection
ProtRtrThm			
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for Rotor NPS Thermal Protection
	RtpTrpPTTR1	PTTR_NO_SEG	Rotor Thermal - NPS protection
ProtSbk			
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for System Backup Protection
	SbkOcpPTRC15	PTRC_INDIVID_NO_SEG	Protection trip for System Backup Protection
	SbkOcpPVOC1	PVOC_NO_SEG	System backup - voltage overcurrent
	SbkUzpPDIS1	PDIS_SYSTEM	System backup - under impedance stage 1
	SbkUzpPDIS2	PDIS_SYSTEM	System backup - under impedance stage 2
ProtSenEF			
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical device for Sensitive Earth Fault protection
	SenEfIPTRC13	PTRC_INDIVID_NO_SEG	Protection trip for Sensitive Earth Fault
	SenRefPDIF1	PDIF_NO_SEG	IREF> 1 Restricted Earth Fault
	SenSefPSDE1	PSDE_BASIC	ISEF>1 Sensitive Earth fault
ProtSenPwr			
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical device for Sensitive Power protection
	SenPdpPPWR1	PPWR_NORMAL	Sensitive power (Single phase) stage 1
	SenPdpPPWR2	PPWR_NORMAL	Sensitive power (Single phase) stage 2
	SenPdpPPWR3	PPWR_NORMAL	Sensitive power (Single phase) stage 3
	SenPdpPPWR4	PPWR_NORMAL	Sensitive power (Single phase) stage 4
	SenPdpPTRC16	PTRC_INDIVID_NO_SEG	Protection trip for Sensitive Earth Fault
ProtSta			
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for Stator Earth Fault Protection
	StaHa3PTOV1	PTOV_NO_SEG	3rd Harmonic stator over voltage
	StaHa3PTUV1	PTUV_NO_SEG	3rd Harmonic stator under voltage
	StaLfIPeFI1	PEFI_BASIC	STEFi protection - under resistance
	StaLfIPTOC1	PTOC_NO_SEG	STEFi Protection - Overcurrent Stage

LD	LN Instance	LN Type	Description
	StaPTRC17	PTRC_INDIVID_NO_SEG	Protection trip for Stator Earth Fault Protection
ProtSvn			
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for VTS/CTS Supervision
	SvnRVCS1	RVCS_VTS	VTS Supervision
	SvnRVCS2	RVCS_CTS	CTS1 Supervision
	SvnRVCS3	RVCS_CTS	CTS2 Supervision
ProtVhz			
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for Overflux Protection
	VhzPTRC19	PTRC_INDIVID_NO_SEG	Protection trip for Overflux Protection
	VhzPVPH1	PVPH_NO_SEG	Over fluxing - Stage 1
	VhzPVPH2	PVPH_NO_SEG	Over fluxing - Stage 2
	VhzPVPH3	PVPH_NO_SEG	Over fluxing - Stage 3
	VhzPVPH4	PVPH_NO_SEG	Over fluxing - Stage 4
ProtVtp			
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Logical Device for Vtp Protection
	NpsPTOV1	PTOV_NO_SEG	NPS Overvoltage
	VtpPhsPTOV1	PTOV_NO_SEG	V> 1 Overvoltage
	VtpPhsPTOV2	PTOV_NO_SEG	V> 2 Overvoltage
	VtpPhsPTRC12	PTRC_INDIVID_NO_SEG	Protection trip for Vtp Protection
	VtpPhsPTUV1	PTUV_NO_SEG	V< 1 Undervoltage
	VtpPhsPTUV2	PTUV_NO_SEG	V< 2 Undervoltage
	VtpPhsPTUV3	PTUV_NO_SEG	V< 3 Undervoltage
Records			
	LLN0	LLN0_STANDARD	Records Logical Device
	LPHD1	LPHD_STANDARD	Physical Device Information
	RDRE1	RDRE_BASIC	Disturbance Recorder
System			
	AlmGGIO1	GGIO_ALM_96	Alarms
	FnkGGIO1	GGIO_IND_10	Function Keys
	GosGGIO1	GGIO_IND_64	GOOSE Input Signals
	GosGGIO2	GGIO_IND_64	GOOSE Output Signals
	LedGGIO1	GGIO_IND_18	Red LED Signals
	LedGGIO2	GGIO_IND_18	Green LED Signals
	LGOS1	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 1
	LGOS10	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 10
	LGOS11	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 11
	LGOS12	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 12
	LGOS13	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 13
	LGOS14	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 14
	LGOS15	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 15
	LGOS16	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 16
	LGOS17	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 17

LD	LN Instance	LN Type	Description
	LGOS18	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 18
	LGOS19	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 19
	LGOS2	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 2
	LGOS20	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 20
	LGOS21	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 21
	LGOS22	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 22
	LGOS23	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 23
	LGOS24	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 24
	LGOS25	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 25
	LGOS26	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 26
	LGOS27	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 27
	LGOS28	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 28
	LGOS29	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 29
	LGOS3	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 3
	LGOS30	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 30
	LGOS31	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 31
	LGOS32	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 32
	LGOS33	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 33
	LGOS34	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 34
	LGOS35	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 35
	LGOS36	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 36
	LGOS37	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 37
	LGOS38	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 38
	LGOS39	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 39
	LGOS4	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 4
	LGOS40	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 40
	LGOS41	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 41
	LGOS42	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 42

LD	LN Instance	LN Type	Description
	LGOS43	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 43
	LGOS44	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 44
	LGOS45	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 45
	LGOS46	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 46
	LGOS47	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 47
	LGOS48	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 48
	LGOS49	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 49
	LGOS5	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 5
	LGOS50	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 50
	LGOS51	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 51
	LGOS52	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 52
	LGOS53	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 53
	LGOS54	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 54
	LGOS55	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 55
	LGOS56	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 56
	LGOS57	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 57
	LGOS58	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 58
	LGOS59	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 59
	LGOS6	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 6
	LGOS60	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 60
	LGOS61	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 61
	LGOS62	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 62
	LGOS63	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 63
	LGOS64	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 64
	LGOS7	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 7
	LGOS8	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 8
	LGOS9	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 9
	LLN0	LLN0_SYSTEM	System Logical Device

LD	LN Instance	LN Type	Description
	LPHD1	LPHD_SYSTEM	Physical Device Information for System Logical Device
	OptGGIO1	GGIO_IND_32	Opto (32) Inputs
	OrdRunGGIO1	GGIO_IND_64	Uniqueness of control "Order Running" indications for Control operations
	PloGGIO1	GGIO_IND_32_CTRL	Controllable Inputs
	RlyGGIO1	GGIO_IND_32	Output Contacts

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 61850-7-4:2007B
CSWI_BASIC	(CSWI)	Switch controller	IEC 61850-7-4:2007B
FCNT_COUNTER	(FCNT)	Counter	IEC 61850-7-4:2007B
GGIO_IND_64	(GGIO)	Generic Process I/O (w.r.t 64 Indication Elements)	IEC 61850-7-4:2007B
GGIO_ALM_96	(GGIO)	Generic Process I/O (w.r.t 96 Alarm Elements)	IEC 61850-7-4:2007B
GGIO_IND_10	(GGIO)	Generic Process I/O (w.r.t 10 Indication Elements)	IEC 61850-7-4:2007B
GGIO_IND_18	(GGIO)	Generic Process I/O (w.r.t 18 Indication Elements)	IEC 61850-7-4:2007B
GGIO_IND_32	(GGIO)	Generic Process I/O (w.r.t 32 Indication Elements)	IEC 61850-7-4:2007B
GGIO_IND_32_CTRL	(GGIO)	Generic process I/O (w.r.t 32 Indications Ctrl i/p)	IEC 61850-7-4:2007B
LGOS_SYSTEM	(LGOS)	Monitoring of GOOSE messages	IEC 61850-7-4:2007B
LLN0_STANDARD_MEA	(LLN0)	Measurements Logical Node 0	IEC 61850-7-4:2007B
LLN0_STANDARD_WITH_CTRLMOD	(LLN0)	Logical Node 0	IEC 61850-7-4:2007B
LLN0_SYSTEM	(LLN0)	System Logical Node 0	IEC 61850-7-4:2007B
LLN0_STANDARD	(LLN0)	General Logical Node 0	IEC 61850-7-4:2007B
LPHD_STANDARD	(LPHD)	Px40 Physical Device Information	IEC 61850-7-4:2007B
LPHD_SYSTEM	(LPHD)	Px40 Physical Device Information (used for Logical Device System only)	IEC 61850-7-4:2007B
MLFR_FAULT_RECORD_P345	(MLFR)	Measurements of Fault Record	GE-SII:Px40:2013A
MLFR_FAULT_RECORD_1	(MLFR)	Measurements of Fault Record	GE-SII:Px40:2013A
MMTR_PRIV	(MMTR)	Metering	IEC 61850-7-4:2007B

LN Type	(LN Class)	Description	Name Space
MMTR_AFQ	(MMTR)	Metering	IEC 61850-7-4:2007B
MMTR_LOL	(MMTR)	Metering	IEC 61850-7-4:2007B
MMXU_FOURIER	(MMXU)	Standard Measurements (w.r.t Fourier Values)	IEC 61850-7-4:2007B
MMXU_STEFI_PRI	(MMXU)	Measurements for Stator Earth Fault	IEC 61850-7-4:2007B
MMXU_SENSITIVE	(MMXU)	Standard measurements	IEC 61850-7-4:2007B
MMXU_ROTOR_EF	(MMXU)	Measurements for Rotor E/F	IEC 61850-7-4:2007B
MMXU_RMS	(MMXU)	Standard Measurements (w.r.t RMS Values)	IEC 61850-7-4:2007B
MMXU_METER_MAX	(MMXU)	Standard measurements (w.r.t Current, Real + Reactive Power - Max values)	IEC 61850-7-4:2007B
MMXU_METER_AV	(MMXU)	Metering Statistics (w.r.t Current, Real + Reactive Power - Average values)	IEC 61850-7-4:2007B
MMXU_GEN_DIFF	(MMXU)	Differential measurements	IEC 61850-7-4:2007B
MMXU_DIFF	(MMXU)	Standard measurements	IEC 61850-7-4:2007B
MMXU_DFDT	(MMXU)	Standard measurements (for dfdt only)	IEC 61850-7-4:2007B
MMXU_CSV	(MMXU)	Measurements for C/S	IEC 61850-7-4:2007B
MMXU_BASIC2	(MMXU)	Standard measurements	IEC 61850-7-4:2007B
MMXU_BASIC_ALL	(MMXU)	Standard measurements	IEC 61850-7-4:2007B
MMXU_THM	(MMXU)	Standard measurements	IEC 61850-7-4:2007B
MMXU_LOL	(MMXU)	Loss-of-life (Transformer) measurements	IEC 61850-7-4:2007B
MMXU_STEFI_SEC	(MMXU)	Measurements for Stator Earth Fault	IEC 61850-7-4:2007B
MMXU_VHZ	(MMXU)	Measurements (w.r.t Volts Per Hz)	IEC 61850-7-4:2007B
MMXU_Z	(MMXU)	Standard measurements	IEC 61850-7-4:2007B
MMXU_THIRD_HARMONIC	(MMXU)	Measurements (w.r.t 3rd Harmonic)	IEC 61850-7-4:2007B
MSQI_ALL	(MSQI)	Sequence and imbalance (w.r.t Pos, Neg, Zero)	IEC 61850-7-4:2007B
MSQI_CT2	(MSQI)	Sequence and imbalance	IEC 61850-7-4:2007B
PDIF_NO_SEG	(PDIF)	Differential	IEC 61850-7-4:2007B
PDIS_SYSTEM	(PDIS)	Distance	IEC 61850-7-4:2007B
PDMP_NORMAL	(PDMP)	Combined Overcurrent/Undervoltage protection (Dead Machine)	GE-SII:Px40:2013A
PDOP_NO_SEG	(PDOP)	Overpower protection	IEC 61850-7-4:2007B

LN Type	(LN Class)	Description	Name Space
PDUP_NO_SEG	(PDUP)	Underpower protection	IEC 61850-7-4:2007B
PDUP_DDB	(PDUP)	Underpower protection, for DDB	IEC 61850-7-4:2007B
PEFI_BASIC	(PEFI)	Earth Fault Injection protection	GE-SII:Px40:2013A
PFRC_NO_SEG	(PFRC)	Rate of change of frequency (w.r.t No Phase Segregation)	IEC 61850-7-4:2007B
PPAM_NO_SEG	(PPAM)	model "out-of-step" protection of generators	IEC 61850-7-4:2007B
PPWR_NORMAL	(PPWR)	Power Protection	GE-SII:Px40:2013A
PSDE_BASIC	(PSDE)	Sensitive directional earth fault	IEC 61850-7-4:2007B
PTAF_NO_SEG	(PTAF)	Turbine Abnormal Frequency Protection	GE-SII:Px40:2013A
PTOC_NO_SEG	(PTOC)	Timed Overcurrent (w.r.t No Phase Segregation)	IEC 61850-7-4:2007B
PTOF_NO_SEG	(PTOF)	Overfrequency (w.r.t No Phase Segregation)	IEC 61850-7-4:2007B
PTOV_NO_SEG	(PTOV)	Overvoltage (w.r.t No Phase Segregation)	IEC 61850-7-4:2007B
PTRC_GLOBAL	(PTRC)	Protection trip for global protection conditioning	IEC 61850-7-4:2007B
PTRC_INDIVID_NO_SEG	(PTRC)	Protection trip for individual protection conditioning	IEC 61850-7-4:2007B
PTTR_HOT_TOP	(PTTR)	Thermal overload	IEC 61850-7-4:2007B
PTTR_NO_SEG	(PTTR)	Thermal overload (w.r.t No Phase Segregation)	IEC 61850-7-4:2007B
PTUF_NO_SEG	(PTUF)	Underfrequency (w.r.t No Phase Segregation)	IEC 61850-7-4:2007B
PTUV_NO_SEG	(PTUV)	Undervoltage	IEC 61850-7-4:2007B
PVOC_NO_SEG	(PVOC)	Voltage controlled time overcurrent	IEC 61850-7-4:2007B
PVPH_NO_SEG	(PVPH)	Volts per Hz protection	IEC 61850-7-4:2007B
RBRF_EXTTRIP	(RBRF)	Breaker Failure (w.r.t External Tripping)	IEC 61850-7-4:2007B
RDRE_BASIC	(RDRE)	Disturbance Recorder function (w.r.t Mandatory Attributes only)	IEC 61850-7-4:2007B
RSYN_DIFCLC_ENH	(RSYN)	Synchronism-check/Synchronising (w.r.t Calculated Differential Measurements)	IEC 61850-7-4:2007B
RVCS_CTS	(RVCS)	CTS monitoring and report	GE-SII:Px40:2013A
RVCS_VTS	(RVCS)	VTS monitoring and report	GE-SII:Px40:2013A
SCLI_BASIC	(SCLI)	Current loop monitoring and reporting	GE-SII:Px40:2013A
STMP_RTD	(STMP)	Temperature supervision.	IEC 61850-7-4:2007B
XCBR_BASIC	(XCBR)	Circuit Breaker (w.r.t Mandatory Attributes Only)	IEC 61850-7-4:2007B

1.4.1 LOGICAL NODE: CILO_INTERLOCK

Description: Control Interlocking

LN Class: CILO

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
EnaOpn	SPS_WD	Enable OPEN Commands		
EnaCls	SPS_WD	Enable CLOSE Commands		

1.4.2 LOGICAL NODE: CSWI_BASIC

Description: Switch controller

LN Class: CSWI

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
Loc	SPS_WD	Local control behaviour		
OpOpn	ACT_NO_SEG	Operation "open switch"	T	
OpCls	ACT_NO_SEG	Operation "close switch"	T	
OpCntRs	INC_MOD_STD	Resettable operation counter		
Pos	DPC_CONTROL	Switch, general		

1.4.3 LOGICAL NODE: FCNT_COUNTER

Description: Counter

LN Class: FCNT

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
CntVal	BCR_PRIV	Counter		
RsCnt	SPC_CTRL_PRIV	Counter Reset		X

1.4.4 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
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
Alm01	SPS_D	General single alarm		
Alm02	SPS_D	General single alarm		
Alm03	SPS_D	General single alarm		

Attribute	Attr. Type	Explanation	T	X
Alm04	SPS_D	General single alarm		
Alm05	SPS_D	General single alarm		
Alm06	SPS_D	General single alarm		
Alm07	SPS_D	General single alarm		
Alm08	SPS_D	General single alarm		
Alm09	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		
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		

Attribute	Attr. Type	Explanation	T	X
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		

1.4.5 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
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Ind01	SPS_D	General Indication		
Mod	ENC_MOD_THREE_STATUS	Mode		
Ind02	SPS_D	General Indication		
Ind03	SPS_D	General Indication		
Ind04	SPS_D	General Indication		
Ind05	SPS_D	General Indication		
Ind06	SPS_D	General Indication		
Ind07	SPS_D	General Indication		
Ind08	SPS_D	General Indication		
Ind09	SPS_D	General Indication		
Ind10	SPS_D	General Indication		

1.4.6 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
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
Ind01	SPS_D	General Indication		
Ind02	SPS_D	General Indication		
Ind03	SPS_D	General Indication		
Ind04	SPS_D	General Indication		
Ind05	SPS_D	General Indication		
Ind06	SPS_D	General Indication		
Ind07	SPS_D	General Indication		
Ind08	SPS_D	General Indication		
Ind09	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		

1.4.7 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
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Ind01	SPS_D	General Indication		
Mod	ENC_MOD_THREE_STATUS	Mode		
Ind02	SPS_D	General Indication		
Ind03	SPS_D	General Indication		
Ind04	SPS_D	General Indication		
Ind05	SPS_D	General Indication		
Ind06	SPS_D	General Indication		
Ind07	SPS_D	General Indication		
Ind08	SPS_D	General Indication		
Ind09	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		

1.4.8 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
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
SPCS001	SPC_CONTROL	Single point controllable status output		

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_MOD_THREE_STATUS	Mode		
SPCSO02	SPC_CONTROL	Single point controllable status output		
SPCSO03	SPC_CONTROL	Single point controllable status output		
SPCSO04	SPC_CONTROL	Single point controllable status output		
SPCSO05	SPC_CONTROL	Single point controllable status output		
SPCSO06	SPC_CONTROL	Single point controllable status output		
SPCSO07	SPC_CONTROL	Single point controllable status output		
SPCSO08	SPC_CONTROL	Single point controllable status output		
SPCSO09	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		

1.4.9 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
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
Ind01	SPS_D	General indication		
Ind02	SPS_D	General indication		
Ind03	SPS_D	General indication		
Ind04	SPS_D	General indication		
Ind05	SPS_D	General indication		
Ind06	SPS_D	General indication		
Ind07	SPS_D	General indication		
Ind08	SPS_D	General indication		

Attribute	Attr. Type	Explanation	T	X
Ind09	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		
Ind33	SPS_D	General indication		
Ind34	SPS_D	General indication		
Ind35	SPS_D	General indication		
Ind36	SPS_D	General indication		
Ind37	SPS_D	General indication		
Ind38	SPS_D	General indication		
Ind39	SPS_D	General indication		
Ind40	SPS_D	General indication		
Ind41	SPS_D	General indication		
Ind42	SPS_D	General indication		
Ind43	SPS_D	General indication		
Ind44	SPS_D	General indication		
Ind45	SPS_D	General indication		
Ind46	SPS_D	General indication		
Ind47	SPS_D	General indication		
Ind48	SPS_D	General indication		
Ind49	SPS_D	General indication		
Ind50	SPS_D	General indication		
Ind51	SPS_D	General indication		
Ind52	SPS_D	General indication		
Ind53	SPS_D	General indication		
Ind54	SPS_D	General indication		
Ind55	SPS_D	General indication		
Ind56	SPS_D	General indication		
Ind57	SPS_D	General indication		
Ind58	SPS_D	General indication		
Ind59	SPS_D	General indication		

Attribute	Attr. Type	Explanation	T	X
Ind60	SPS_D	General indication		
Ind61	SPS_D	General indication		
Ind62	SPS_D	General indication		
Ind63	SPS_D	General indication		
Ind64	SPS_D	General indication		

1.4.10 LOGICAL NODE: LGOS_SYSTEM

Description: Monitoring of GOOSE messages

LN Class: LGOS

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
SimSt	SPS_WD	Status showing that really Sim messages are received and accepted		
St	SPS_WD	Status of the subscription (True = active, False = not active)		
GoCBRef	ORG_SRC_REF	Reference to the subscribed GOOSE control block		
OoSEqGo	SPS_WD_PRIV	Out of Order GOOSE indication		X

1.4.11 LOGICAL NODE: LLN0_STANDARD

Description: General Logical Node 0

LN Class: LLN0

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LLN0	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
GrRef	ORG_SRC_REF	Reference to a higher level logical device		

1.4.12 LOGICAL NODE: LLN0_STANDARD_MEA

Description: Measurements Logical Node 0

LN Class: LLN0

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LLN0_MEA	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
GrRef	ORG_SRC_REF	Reference to a higher level logical device		

1.4.13 LOGICAL NODE: LLN0_STANDARD_WITH_CTRLMOD

Description: Logical Node 0

LN Class: LLN0

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LLNO	Name Plate		
Beh	ENS_BEH_FOUR_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_CTRL_LD_MOD_2	Mode		
GrRef	ORG_SRC_REF	Reference to a higher level logical device		

1.4.14 LOGICAL NODE: LLN0_SYSTEM

Description: System Logical Node 0

LN Class: LLN0

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LLNO	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_CTRL_LD_MOD	Mode		
LEDRs	SPC_CONTROL	LED reset	T	
OrdRun	SPS_WD_PRIV	Indicate IED is operating a Control Object		X
SyncSt	SPS_WD_PRIV	Indicate time synchronisation in the IED is active/inactive		X

1.4.15 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	ENS_HEALTH	Physical device health		
Proxy	SPS_D	Indicates if this LN is a proxy		
PwrUp	SPS_D	Power up detected		

1.4.16 LOGICAL NODE: LPHD_SYSTEM

Description: Physical Device Information

LN Class: LPHD

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

1.4.17 LOGICAL NODE: MLFR_FAULT_RECORD_1

Description: Measurements of Fault Record

LN Class: MLFR

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN_PRIV	Name Plate		
Beh	ENS_BEH_THREE_STATUS_DN	Behaviour		
Health	ENS_HEALTH_DN	Health		
Mod	ENC_MOD_THREE_STATUS_DN	Mode		
Hz	MV_FLOAT_D_PRIV	Fault system frequency		X
FltDur	MV_FLOAT_D_PRIV	Fault duration time		X
CBOpTim	MV_FLOAT_D_PRIV	CB operate time		X
RlyTrTim	MV_FLOAT_D_PRIV	Relay trip time		X
A1Flt	WYE_SEG_D_PRIV	CT1 Fault Current		X
PPVFlt	DEL_SEG_D_PRIV	Fault phase to phase voltage		X
PhVFlt	WYE_SEG_D_PRIV	Fault Voltage		X
VN1Flt	MV_FLOAT_D_PRIV	Fault Measured Neutral Voltage 1		X
VNFlt	MV_FLOAT_D_PRIV	Fault Derived Neutral Voltage		X
NeutA1Flt	MV_FLOAT_D_PRIV	Fault Measured Neutral Current		X
ISefFlt	MV_FLOAT_D_PRIV	Fault Sensitive Earth Fault Current		X
SeqI2Flt	MV_FLOAT_D_PRIV	Fault Negative Sequence Current		X
SeqV2Flt	MV_FLOAT_D_PRIV	Fault Negative Sequence Voltage		X
TotWFlt	MV_FLOAT_D_PRIV	Fault Total Active Power		X
TotVArFlt	MV_FLOAT_D_PRIV	Fault Total Reactive Power		X
SenTotWFlt	MV_FLOAT_D_PRIV	Fault Total Active Sensitive Power		X
SenTotVArFlt	MV_FLOAT_D_PRIV	Fault Total Reactive Sensitive Power		X
DfDtFlt	MV_FLOAT_D_PRIV	Fault Df/dt		X
Cli1Flt	MV_FLOAT_D_PRIV	CL1 Input		X
Cli2Flt	MV_FLOAT_D_PRIV	CL2 Input		X
Cli3Flt	MV_FLOAT_D_PRIV	CL3 Input		X
Cli4Flt	MV_FLOAT_D_PRIV	CL4 Input		X

1.4.18 LOGICAL NODE: MLFR_FAULT_RECORD_P345

Description: Measurements of Fault Record

LN Class: MLFR

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN_PRIV	Name Plate		
Beh	ENS_BEH_THREE_STATUS_DN	Behaviour		
Health	ENS_HEALTH_DN	Health		
Mod	ENC_MOD_THREE_STATUS_DN	Mode		
A2Flt	WYE_SEG_D_PRIV	CT2 Fault Current		X
ADifFlt	WYE_SEG_D_PRIV	Fault Generator Differential Current		X
ADifPUFlt	WYE_SEG_D_PRIV	Fault Transformer Differential Per Unit Differential Current		X
VN2Flt	MV_FLOAT_D_PRIV	Fault Measured Neutral Voltage 2		X
IRefDiffFlt	MV_FLOAT_D_PRIV	Fault Restricted Earth Fault Differential Current		X
IRefBiasFlt	MV_FLOAT_D_PRIV	Fault Restricted Earth Fault Bias Current		X
Rtd01Flt	MV_FLOAT_D_PRIV	RTD 1		X
Rtd02Flt	MV_FLOAT_D_PRIV	RTD 2		X

Attribute	Attr. Type	Explanation	T	X
Rtd03Flt	MV_FLOAT_D_PRIV	RTD 3		X
Rtd04Flt	MV_FLOAT_D_PRIV	RTD 4		X
Rtd05Flt	MV_FLOAT_D_PRIV	RTD 5		X
Rtd06Flt	MV_FLOAT_D_PRIV	RTD 6		X
Rtd07Flt	MV_FLOAT_D_PRIV	RTD 7		X
Rtd08Flt	MV_FLOAT_D_PRIV	RTD 8		X
Rtd09Flt	MV_FLOAT_D_PRIV	RTD 9		X
Rtd10Flt	MV_FLOAT_D_PRIV	RTD 10		X
AStaFlt	MV_FLOAT_D_PRIV	Fault Stator Earth Fault 20 Hz current.		X
RPriFlt	MV_FLOAT_D_PRIV	Fault Stator Earth Fault Primary Resistance		X
RtrRFlt	MV_FLOAT_D_PRIV	Fault Rotor Earth Fault Primary Resistance (from connected current loop input)		X

1.4.19 MMTR_AFQ

Description: Metering

LN Class: MMTR

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
FBnd1Tm	INS_BASIC_PRIV	Frequency Band 1 Time		X
FBnd2Tm	INS_BASIC_PRIV	Frequency Band 2 Time		X
FBnd3Tm	INS_BASIC_PRIV	Frequency Band 3 Time		X
FBnd4Tm	INS_BASIC_PRIV	Frequency Band 4 Time		X
FBnd5Tm	INS_BASIC_PRIV	Frequency Band 5 Time		X
FBnd6Tm	INS_BASIC_PRIV	Frequency Band 6 Time		X

1.4.20 LOGICAL NODE: MMTR_LOL

Description: Metering

LN Class: MMTR

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
LOLSts	MV_FLOAT_PRIV	Loss of Life Status		X
LOLRate	MV_FLOAT_PRIV	Loss of Life Rate		X
LOLLres	MV_FLOAT_PRIV	Loss of Life LRes		X
FAALres	MV_FLOAT_PRIV	Loss of Life FAA LRes		X
MTRRs	SPC_CTRL_PRIV	Reset LOL		X

1.4.21 LOGICAL NODE: MMTR_PRIV

Description: Metering

LN Class: MMTR

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
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

1.4.22 LOGICAL NODE: MMXU_BASIC_ALL

Description: Standard Measurements

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
RelDifA	MV_FLOAT_PRIV	IREF Diff		X
RelBiasA	MV_FLOAT_PRIV	IREF Bias		X
VN	WYE_NEU_ANG_D_PRIV	VN Measured quantities		X

1.4.23 LOGICAL NODE: MMXU_BASIC2

Description: Standard Measurements

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
Ct2A	WYE_SEG_ANG_PRIV	CT2 Current		X
VN2	WYE_NEU_ANG_D_PRIV	VN2 Measured quantities		X

1.4.24 LOGICAL NODE: MMXU_CSV

Description: Measurements for C/S

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
CSVolMag	MV_FLOAT_D_PRIV	Check Sync Voltage Magnitude		X
CSVolAng	MV_FLOAT_D_PRIV_NO_DB	Check Sync Voltage Angle		X

1.4.25 LOGICAL NODE: MMXU_DFDT

Description: Standard Measurements (for dfdt only)

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
Dfdt	MV_FLOAT_PRIV	df/dt		X

1.4.26 LOGICAL NODE: MMXU_DIFF

Description: Standard Measurements

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
IDiff	WYE_SEG_D_PRIV	Current Diff		X
IBias	WYE_SEG_D_PRIV	Current Bias		X
IDiff2nd	WYE_SEG_D_PRIV	Second Harmonic Diff		X
IDiff5th	WYE_SEG_D_PRIV	Fifth Harmonic Diff		X

1.4.27 LOGICAL NODE: MMXU_FOURIER

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

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
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)		

Attribute	Attr. Type	Explanation	T	X
Hz	MV_FLOAT	Frequency		
PPV	DEL_SEG_ANG	Phase to Phase voltages		
PhV	WYE_SEG_ANG	Phase to Ground voltages		
A	WYE_SEG_ANG	Phase currents		
NeutA1	WYE_NEU_ANG_D_PRIV	IN Measured		
NeutA2	WYE_RES_MAG_D_PRIV	In-1 derived		
NeutA3	WYE_RES_MAG_D_PRIV	In-2 derived		
W	WYE_SEG	Phase active power (P)		
VA	WYE_SEG	Phase reactive power (Q)		
PF	WYE_SEG	Phase apparent power (S)		
NPSpwr	MV_FLOAT_PRIV	NPS Power S2		X
VN	WYE_RES_ANG_D_PRIV	VN Derived Magnitude Angle		

1.4.28 LOGICAL NODE: MMXU_GEN_DIFF

Description: Differential Measurements

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
OpARem	WYE_SEG_PRIV	Remote current		X
OpBiasRem	WYE_SEG_PRIV	Remote Bias		X
IREFDif	MV_FLOAT_PRIV	IREF Diff		X
IREFBias	MV_FLOAT_PRIV	IREF Bias		X

1.4.29 LOGICAL NODE: MMXU_LOL

Description: Loss-of-life (Transformer) Measurements

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
LOL	MV_FLOAT_PRIV	Loss of Life Aging Factor		X

1.4.30 LOGICAL NODE: MMXU_METER_AV

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

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
ClcExp	SPS_WD	Calculation period expired	T	

Attribute	Attr. Type	Explanation	T	X
ClcMth	ENG_SET_WD_CLCMTH	Calculation method of statistical data objects		
ClcMod	ENG_SET_WD_CLCMOD	Calculation mode		
ClcIntvTyp	ENG_SET_WD_CLCINTVTYP	Calculation interval type		
ClcIntvPer	ING_SET_WD	number of units to consider to calculate the calculation interval duration		
AvWPhs	MV_FLOAT_D	Arithmetic average of the magnitude of active power of the 3 phases		
AvVArPhs	MV_FLOAT_D	Arithmetic average of the magnitude of reactive power of the 3 phases		
AvAPhsA	MV_FLOAT_D_PRIV	Arithmetic average of the magnitude of Ia current		X
AvAPhsB	MV_FLOAT_D_PRIV	Arithmetic average of the magnitude of Ib current		X
AvAPhsC	MV_FLOAT_D_PRIV	Arithmetic average of the magnitude of Ic current		X

1.4.31 LOGICAL NODE: MMXU_METER_MAX

Description: Standard Measurements (w.r.t Current, Real + Reactive Power - Max values)

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
ClcExp	SPS_WD	Calculation period expired	T	
ClcMth	ENG_SET_WD_CLCMTH	Calculation method of statistical data objects		
ClcMod	ENG_SET_WD_CLCMOD	Calculation mode		
MaxWPhs	MV_FLOAT_D	Maximum magnitude of active power of the 3 phases		
MaxVArPhs	MV_FLOAT_D	Maximum magnitude of reactive power of the 3 phases		
MaxAPhsA	MV_FLOAT_D_PRIV	Maximum magnitude of Ia current		X
MaxAPhsB	MV_FLOAT_D_PRIV	Maximum magnitude of Ib current		X
MaxAPhsC	MV_FLOAT_D_PRIV	Maximum magnitude of Ic current		X

1.4.32 LOGICAL NODE: MMXU_RMS

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

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
PhV	WYE_SEG_D	Phase to Ground voltages		
A	WYE_SEG_D	Phase currents		

1.4.33 LOGICAL NODE: MMXU_ROTOR_EF

Description: Measurements for Rotor E/F

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
R	MV_FLOAT_PRIV	64R Fault Resistance		X
CLI	MV_FLOAT_PRIV	Current Loop Input Current		X

1.4.34 LOGICAL NODE: MMXU_SENSITIVE

Description: Standard Measurements

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
TotW	MV_FLOAT	Total active power (Total P)		
TotVAr	MV_FLOAT	Total reactive power (Total Q)		
TotPF	MV_FLOAT	Average power factor (Total PF)		
Asen1	CMV_MAG_ANG_FLOAT_PRIV	Sensitive current 1		X
Asen2	CMV_MAG_ANG_FLOAT_PRIV	Sensitive current 2		X

1.4.35 LOGICAL NODE: MMXU_STEFI_PRI

Description: Measurements for Stator Earth Fault

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
V	MV_FLOAT_PRIV	V Magnitude		X
Rpri	MV_FLOAT_PRIV	Primary R		X
I	MV_FLOAT_PRIV	I Magnitude		X
IAng	MV_FLOAT_PRIV_NO_DB	I Angle		X

1.4.36 LOGICAL NODE: MMXU_STEFI_SEC

Description: Measurements for Stator Earth Fault

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		

Attribute	Attr. Type	Explanation	T	X
V	MV_FLOAT_PRIV	V Magnitude		X
Rsec	MV_FLOAT_PRIV	Secondary R		X
I	MV_FLOAT_PRIV	I Magnitude		X
IAng	MV_FLOAT_PRIV_NO_DB	I Angle		X

1.4.37 LOGICAL NODE: MMXU_THIRD_HARMONIC

Description: Measurements (w.r.t 3rd Harmonic)

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
VN	MV_FLOAT_PRIV	VN 3rd Harmonic		X

1.4.38 LOGICAL NODE: MMXU_THM

Description: Standard Measurements

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
HotT	MV_FLOAT_PRIV	Hot Spot Temperature		X
TopT	MV_FLOAT_PRIV	Top Oil Temperature		X
AmbT	MV_FLOAT_PRIV	Ambient Temperature		X
TopPreleft	MV_FLOAT_PRIV	Top Oil Pretrip Left		X

1.4.39 LOGICAL NODE: MMXU_VHZ

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

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
VHz	MV_FLOAT_PRIV	Volts/Hz		X

1.4.40 LOGICAL NODE: MMXU_Z

Description: Standard Measurements

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_MOD_THREE_STATUS	Mode		
Z	WYE_Z_D	Phase impedance		

1.4.41 LOGICAL NODE: MSQI_ALL

Description: Sequence and Imbalance (w.r.t Pos, Neg, Zero)

LN Class: MSQI

Attribute	Attr. Type	Explanation	T	X
NamPit	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
SeqA	SEQ_MAG_ANG	Positive, Negative and Zero sequence current		
SeqV	SEQ_MAG_ANG	Positive, Negative and Zero sequence voltage		

1.4.42 LOGICAL NODE: MSQI_CT2

Description: Sequence and Imbalance

LN Class: MSQI

Attribute	Attr. Type	Explanation	T	X
NamPit	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
SeqA	SEQ_MAG_ANG	Positive, Negative and Zero sequence current		

1.4.43 LOGICAL NODE: PDIF_NO_SEG

Description: Differential

LN Class: PDIF

Attribute	Attr. Type	Explanation	T	X
NamPit	LPL_LN	Name Plate		
Beh	ENS_BEH_FOUR_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_TWO_STATUS	Mode		
Op	ACT_NO_SEG	Operate	T	

1.4.44 LOGICAL NODE: PDIS_SYSTEM

Description: Distance

LN Class: PDIS

Attribute	Attr. Type	Explanation	T	X
NamPit	LPL_LN	Name Plate		
Beh	ENS_BEH_FOUR_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_TWO_STATUS	Mode		
Str	ACD_NO_SEG	Start		

Attribute	Attr. Type	Explanation	T	X
Op	ACT_NO_SEG	Operate	T	

1.4.45 LOGICAL NODE: PDMP_NORMAL

Description: Combined Overcurrent/Undervoltage Protection (Dead Machine)

LN Class: PDMP

Attribute	Attr. Type	Explanation	T	X
NamPit	LPL_LN_PRIV	Name Plate		
Beh	ENS_BEH_FOUR_STATUS_DN	Behaviour		
Health	ENS_HEALTH_DN	Health		
Mod	ENC_MOD_TWO_STATUS_DN	Mode		
Op	ACT_NO_SEG_DN	Operate	T	

1.4.46 LOGICAL NODE: PDOP_NO_SEG

Description: Overpower Protection

LN Class: PDOP

Attribute	Attr. Type	Explanation	T	X
NamPit	LPL_LN	Name Plate		
Beh	ENS_BEH_FOUR_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_TWO_STATUS	Mode		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

1.4.47 LOGICAL NODE: PDUP_DDB

Description: Under Power Protection, for DDB

LN Class: PDUP

Attribute	Attr. Type	Explanation	T	X
NamPit	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

1.4.48 LOGICAL NODE: PDUP_NO_SEG

Description: Under Power Protection

LN Class: PDUP

Attribute	Attr. Type	Explanation	T	X
NamPit	LPL_LN	Name Plate		
Beh	ENS_BEH_FOUR_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_TWO_STATUS	Mode		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

1.4.49 LOGICAL NODE: PEFI_BASIC

Description: Earth Fault Injection Protection

LN Class: PEFI

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN_PRIV	Name Plate		
Beh	ENS_BEH_FOUR_STATUS_DN	Behaviour		
Health	ENS_HEALTH_DN	Health		
Mod	ENC_MOD_TWO_STATUS_DN	Mode		
StrAlm1	SPS_D_PRIV	Alarm Start		
Alm1	SPS_D_PRIV	Alarm		
StrTrip1	SPS_D_PRIV	Trip Start		
Trip1	SPS_D_PRIV	Trip		

1.4.50 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
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_FOUR_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_TWO_STATUS	Mode		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

1.4.51 LOGICAL NODE: PPAM_NO_SEG

Description: Model "Out-of-Step" Protection of Generators

LN Class: PPAM

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_FOUR_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_TWO_STATUS	Mode		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

1.4.52 LOGICAL NODE: PPWR_NORMAL

Description: Power Protection

LN Class: PPWR

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN_PRIV	Name Plate		
Beh	ENS_BEH_FOUR_STATUS_DN	Behaviour		
Health	ENS_HEALTH_DN	Health		
Mod	ENC_MOD_TWO_STATUS_DN	Mode		
Str	ACD_NO_SEG_DN	Start		
Op	ACT_NO_SEG_DN	Operate	T	
PwrFunSel	ENS_PWR_FN_MOD_PRIV	Power Function Mode status		

1.4.53 LOGICAL NODE: PSDE_BASIC

Description: Sensitive Directional Earth Fault

LN Class: PSDE

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_FOUR_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_TWO_STATUS	Mode		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

1.4.54 LOGICAL NODE: PTAF_NO_SEG

Description: Turbine Abnormal Frequency Protection

LN Class: PTAF

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_FOUR_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_TWO_STATUS	Mode		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

1.4.55 LOGICAL NODE: PTOC_NO_SEG

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

LN Class: PTOC

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_FOUR_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_TWO_STATUS	Mode		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

1.4.56 LOGICAL NODE: PTOF_NO_SEG

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

LN Class: PTOF

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_FOUR_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_TWO_STATUS	Mode		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

1.4.57 LOGICAL NODE: PTOV_NO_SEG

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

LN Class: PTOV

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_FOUR_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_TWO_STATUS	Mode		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

1.4.58 LOGICAL NODE: PTRC_GLOBAL

Description: Protection Trip for Global Protection Conditioning

LN Class: PTRC

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
Tr	ACT_NO_SEG	Trip		
Op	ACT_NO_SEG	Operate (combination of subscribed Op from protection functions)		
Str	ACD_NO_SEG	Sum of all starts of all connected Logical Nodes		

1.4.59 LOGICAL NODE: PTRC_INDIVID_NO_SEG

Description: Protection Trip for Individual Protection Conditioning

LN Class: PTRC

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
Op	ACT_NO_SEG	Operate (combination of subscribed Op from protection functions)		
Str	ACD_NO_SEG	Sum of all starts of all connected Logical Nodes		

1.4.60 LOGICAL NODE: PTTR_HOT_TOP

Description: Thermal Overload

LN Class: PTTR

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_FOUR_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_TWO_STATUS	Mode		
Str	ACD_NO_SEG	Start		

Attribute	Attr. Type	Explanation	T	X
Op	ACT_NO_SEG	Operate	T	
MTRRs	SPC_CTRL_PRIV	Reset thermal state		X

1.4.61 LOGICAL NODE: PTTR_NO_SEG

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

LN Class: PTTR

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

1.4.62 LOGICAL NODE: PTUF_NO_SEG

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

LN Class: PTUF

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_FOUR_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_TWO_STATUS	Mode		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

1.4.63 LOGICAL NODE: PTUV_NO_SEG

Description: Undervoltage

LN Class: PTUV

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_FOUR_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_TWO_STATUS	Mode		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

1.4.64 LOGICAL NODE: PVOC_NO_SEG

Description: Voltage Controlled Time Overcurrent

LN Class: PVOC

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_FOUR_STATUS	Behaviour		
Health	ENS_HEALTH	Health		

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_MOD_TWO_STATUS	Mode		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

1.4.65 LOGICAL NODE: PVPH_NO_SEG

Description: Volts Per Hz Protection

LN Class: PVPH

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_FOUR_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_TWO_STATUS	Mode		
Str	ACD_NO_SEG	Start		
Op	ACT_NO_SEG	Operate	T	

1.4.66 LOGICAL NODE: RBRF_EXTTRIP

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

LN Class: RBRF

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_FOUR_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_TWO_STATUS	Mode		
OpEx	ACT_NO_SEG	Breaker failure trip ("External trip")	T	

1.4.67 LOGICAL NODE: RDRE_BASIC

Description: Disturbance Recorder Function (w.r.t Mandatory Attributes Only)

LN Class: RDRE

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
RcdMade	SPS_WD	Recording made		
FltNum	INS_BASIC	Fault number		

1.4.68 LOGICAL NODE: RSYN_DIFCLC_ENH

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

LN Class: RSYN

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
Rel	SPS_WD	Release		

Attribute	Attr. Type	Explanation	T	X
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		

1.4.69 LOGICAL NODE: RVCS_CTS

Description: CTS Monitoring and Report

LN Class: RVCS

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN_PRIV	Name Plate		
Beh	ENS_BEH_FOUR_STATUS_DN	Behaviour		
Health	ENS_HEALTH_DN	Health		
Mod	ENC_MOD_TWO_STATUS_DN	Mode		
CTSBik	SPS_D_PRIV	CTS block status		X

1.4.70 LOGICAL NODE: RVCS_VTS

Description: VTS Monitoring and Report

LN Class: RVCS

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN_PRIV	Name Plate		
Beh	ENS_BEH_FOUR_STATUS_DN	Behaviour		
Health	ENS_HEALTH_DN	Health		
Mod	ENC_MOD_TWO_STATUS_DN	Mode		
SlwVTSBik	SPS_D_PRIV	slow VTS block status		X
FstVTSBik	SPS_D_PRIV	fast VTS block status		X

1.4.71 LOGICAL NODE: SCLI_BASIC

Description: Current Loop Monitoring and Reporting

LN Class: SCLI

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN_PRIV	Name Plate		
Beh	ENS_BEH_FOUR_STATUS_DN	Behaviour		
Health	ENS_HEALTH_DN	Health		
Mod	ENC_MOD_TWO_STATUS_DN	Mode		
ClAlmSel	ENS_FN_STA_CLI_PRIV	Current Loop Alarm function current mode		X
StrAlm1	SPS_D_PRIV	Current Loop Input Alarm start		X
Alm1	SPS_D_PRIV	Current Loop Input Alarm		
ClITripSel	ENS_FN_STA_CLI_PRIV	Current Loop Trip function current mode		X
StrTrip1	SPS_D_PRIV	Current loop input trip start		X
Trip1	SPS_D_PRIV	Current loop input trip		X
Ind1	SPS_D_PRIV	Current loop supervision undercurrent fail alarm		
BlkInd1	SPS_D_PRIV	Block Current Loop input protection		X
AnIn1	MV_FLOAT_D_PRIV	Current loop input measured value		

1.4.72 LOGICAL NODE: STMP_RTD

Description: Temperature Supervision

LN Class: STMP

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_FOUR_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_TWO_STATUS	Mode		
Tmp	MV_FLOAT_D	Temperature		
DataErr	SPS_D_PRIV	Data Error		
OcErr	SPS_D_PRIV	Open circuit		
ScErr	SPS_D_PRIV	Short circuit		
HWErr	SPS_D_PRIV	Hardware Error		
Alm	SPS_D	Temperature Alarm		
Trip	SPS_D	Temperature Trip		
RsRtd	SPC_CTRL_PRIV	Reset RTD Flags		

1.4.73 LOGICAL NODE: XCBR_BASIC

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

LN Class: XCBR

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	ENS_BEH_THREE_STATUS	Behaviour		
Health	ENS_HEALTH	Health		
Mod	ENC_MOD_THREE_STATUS	Mode		
EEHealth	ENS_HEALTH	External equipment health		
Loc	SPS_WD	Local operation		
OpCnt	INS_BASIC	Operation counter		
CBOpCap	ENS_CBCAP	Circuit Breaker operating capability		
SumSwARs	BCR_PRIV	Sum of switched amperes, resettable		
Pos	DPC_STATUS	Switch position		
BlkOpn	SPC_STATUS	Block opening		
BlkCls	SPC_STATUS	Block closing		

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
BL	Blocking	IEC61850-7-2-2010
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

FC Name	Semantic	Source Definition
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
OR	Operate received	IEC61850-7-2-2010
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
SR	Service response	IEC61850-7-2-2010
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

1.5.1 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	

1.5.2 COMMON DATA CLASS: ACD_NO_SEG_DN

Description: Directional Protection Activation Information (w.r.t No Phase Segregation, with dataNs used for the standard DO in the extended LN)

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	
dataNs	VISIBLE_STRING255	EX		Data name space	

1.5.3 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	

1.5.4 COMMON DATA CLASS: ACT_NO_SEG_DN

Description: Protection Activation Information (w.r.t No Phase Segregation, with dataNs used for the standard DO in the extended LN)

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	

1.5.5 COMMON DATA CLASS: BCR_PRIV

Description: Binary Counter Reading

CDC Class: BCR

Attribute	Type	FC	Enumeration	Comment	X
actVal	INT64	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)	

1.5.6 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	

1.5.7 COMMON DATA CLASS: CMV_MAG_ANG_FLOAT_PRIV

Description: Complex Measured Value (used for extended DO)

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	
dataNs	VISIBLE_STRING255	EX		Data name space	

1.5.8 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	

1.5.9 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	

1.5.10 COMMON DATA CLASS: DEL_SEG_D_PRIV

Description: Phase to Phase Measurements for a 3-Phase System

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

1.5.11 COMMON DATA CLASS: DPC_CTRL

Description: Controllable Double Point (for CSWI.pos)

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	
ctlModel	ENUMERATED8 (MMS Type: INT8)	CF	ctlModel	Control model (Corresponding to the behaviour of the data)	

Attribute	Type	FC	Enumeration	Comment	X
sboTimeout	INT32U	CF		Select Before Operate timeout period (in milliseconds)	

1.5.12 COMMON DATA CLASS: DPC_STATUS

Description: Controllable Double Point (w.r.t Status Only)

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 behaviour of the data)	

1.5.13 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	

1.5.14 COMMON DATA CLASS: ENC_CTRL_LD_MOD

Description: Controllable Enumerated Status

CDC Class: ENC

Attribute	Type	FC	Enumeration	Comment	X
ctlVal	ENUMERATED32 (MMS Type: INT8)	CO	Mod_3	Control value	
origin	Originator	ST		Originator of the last change of the controllable data	
stVal	ENUMERATED32 (MMS Type: INT8)	ST	Mod_3	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)	
d	VISIBLE_STRING255	DC		Description of the status element	

1.5.15 COMMON DATA CLASS: ENC_CTRL_LD_MOD_2

Description: Controllable Enumerated Status (includes three status, used for child LD.LLN0)

CDC Class: ENC

Attribute	Type	FC	Enumeration	Comment	X
ctlVal	ENUMERATED32 (MMS Type: INT8)	CO	Mod_2	Control value	
origin	Originator	ST		Originator of the last change of the controllable data	

Attribute	Type	FC	Enumeration	Comment	X
stVal	ENUMERATED32 (MMS Type: INT8)	ST	Mod_2	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)	
d	VISIBLE_STRING255	DC		Description of the status element	

1.5.16 COMMON DATA CLASS: ENC_MOD_THREE_STATUS

Description: Controllable Enumerated Mode Status (with 3 status)

CDC Class: ENC

Attribute	Type	FC	Enumeration	Comment	X
stVal	ENUMERATED32 (MMS Type: INT8)	ST	Mod_3	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)	

1.5.17 COMMON DATA CLASS: ENC_MOD_THREE_STATUS_DN

Description: Controllable Enumerated Status (with 3 status and dataNs used for the Mod in the extended LN)

CDC Class: ENC

Attribute	Type	FC	Enumeration	Comment	X
stVal	ENUMERATED32 (MMS Type: INT8)	ST	Mod_3	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)	
dataNs	VISIBLE_STRING255	EX		Data name space	

1.5.18 COMMON DATA CLASS: ENC_MOD_TWO_STATUS

Description: Controllable Enumerated Status

CDC Class: ENC

Attribute	Type	FC	Enumeration	Comment	X
stVal	ENUMERATED32 (MMS Type: INT8)	ST	Mod_2	Status value of the mode used for LN which have two status	
q	Quality	ST		Quality of the status value	
t	TimeStamp	ST		Timestamp of the last change in state of status value	
stVal	ENUMERATED32 (MMS Type: INT8)	ST	Mod_2	Status value of the mode used for LN which have two status	
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)	

1.5.19 COMMON DATA CLASS: ENC_MOD_TWO_STATUS_DN

Description: Controllable Enumerated Status (with 2 status and dataNs used for the Mod in the extended LN)

CDC Class: ENC

Attribute	Type	FC	Enumeration	Comment	X
stVal	ENUMERATED32 (MMS Type: INT8)	ST	Mod_2	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)	
dataNs	VISIBLE_STRING255	EX		Data name space	

1.5.20 COMMON DATA CLASS: ENG_SET_WD_CLCINTVTYP

Description: Enumerated Status Setting (for ClcIntvTyp)

CDC Class: ENG

Attribute	Type	FC	Enumeration	Comment	X
setVal	ENUMERATED8 (MMS Type: INT8)	SP	ClcIntvTyp	Setting value	

1.5.21 COMMON DATA CLASS: ENG_SET_WD_CLCMOD

Description: Enumerated Status Setting (for ClcMod)

CDC Class: ENG

Attribute	Type	FC	Enumeration	Comment	X
setVal	ENUMERATED8 (MMS Type: INT8)	SP	ClcMod	Setting value	

1.5.22 COMMON DATA CLASS: ENG_SET_WD_CLCMTH

Description: Enumerated Status Setting (for ClcMth)

CDC Class: ENG

Attribute	Type	FC	Enumeration	Comment	X
setVal	ENUMERATED8 (MMS Type: INT8)	SP	ClcMth	Setting value	

1.5.23 COMMON DATA CLASS: ENS_BEH_FOUR_STATUS

Description: Enumerated Behaviour Status (with 4 status)

CDC Class: ENS

Attribute	Type	FC	Enumeration	Comment	X
stVal	ENUMERATED8 (MMS Type: INT8)	ST	Beh_4	The element status	
q	Quality	ST		The quality of the status value	
t	TimeStamp	ST		Timestamp of the last change in state	

1.5.24 COMMON DATA CLASS: ENS_BEH_FOUR_STATUS_DN

Description: Enumerated Status

CDC Class: ENS

Attribute	Type	FC	Enumeration	Comment	X
stVal	ENUMERATED8 (MMS Type: INT8)	ST	Beh_4	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	

1.5.25 COMMON DATA CLASS: ENS_BEH_THREE_STATUS

Description: Enumerated Behaviour Status (with 3 status)

CDC Class: ENS

Attribute	Type	FC	Enumeration	Comment	X
stVal	ENUMERATED8 (MMS Type: INT8)	ST	Beh_3	The element status	
q	Quality	ST		The quality of the status value	
t	TimeStamp	ST		Timestamp of the last change in state	

1.5.26 COMMON DATA CLASS: ENS_BEH_THREE_STATUS_DN

Description: Enumerated Status (with 3 status and dataNs)

CDC Class: ENS

Attribute	Type	FC	Enumeration	Comment	X
stVal	ENUMERATED8 (MMS Type: INT8)	ST	Beh_3	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	

1.5.27 COMMON DATA CLASS: ENS_CBCAP

Description: Enumerated Status (w.r.t CB operating capability)

CDC Class: ENS

Attribute	Type	FC	Enumeration	Comment	X
stVal	ENUMERATED8 (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	

1.5.28 COMMON DATA CLASS: ENS_FN_STA_CLI_PRIV

Description: Enumerated Status (w.r.t Current Loop Input functionality status)

CDC Class: ENS

Attribute	Type	FC	Enumeration	Comment	X
stVal	ENUMERATED8 (MMS Type: INT8)	ST	FnStatCLI	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	

Attribute	Type	FC	Enumeration	Comment	X
dataNs	VISIBLE_STRING255	EX		Data name space	

1.5.29 COMMON DATA CLASS: ENS_HEALTH

Description: Enumerated Status

CDC Class: ENS

Attribute	Type	FC	Enumeration	Comment	X
stVal	ENUMERATED8 (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	

1.5.30 COMMON DATA CLASS: ENS_HEALTH_DN

Description: Enumerated Status (with dataNs)

CDC Class: ENS

Attribute	Type	FC	Enumeration	Comment	X
stVal	ENUMERATED8 (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	
dataNs	VISIBLE_STRING255	EX		Data name space	

1.5.31 COMMON DATA CLASS: ENS_PWR_FN_MOD_PRIV

Description: Enumerated Status (w.r.t to Power Stage Mode Function Status)

CDC Class: ENS

Attribute	Type	FC	Enumeration	Comment	X
stVal	ENUMERATED8 (MMS Type: INT8)	ST	PwrFnMode	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	

1.5.32 COMMON DATA CLASS: INC_MOD_STD

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

CDC Class: INC

Attribute	Type	FC	Enumeration	Comment	X
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 behaviour of the data)	

1.5.33 COMMON DATA CLASS: ING_SET_WD

Description: Integer Status Setting

CDC Class: ING

Attribute	Type	FC	Enumeration	Comment	X
setVal	INT32	SP		Setting value	

1.5.34 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	

1.5.35 COMMON DATA CLASS: INS_BASIC_PRIV

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

1.5.36 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	
IdNs	VISIBLE_STRING255	EX		Logical Device name space	

1.5.37 COMMON DATA CLASS: LPL_LLNO_MEA

Description: Measurements 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	
configRev	VISIBLE_STRING255	DC		Uniquely identifies the configuration of a local device instance	
IdNs	VISIBLE_STRING255	EX		Logical Device name space	

1.5.38 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	

1.5.39 COMMON DATA CLASS: LPL_LN_PRIV

Description: Logical Node Name Plate (w.r.t GE Grid Solutions 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	
lnNs	VISIBLE_STRING255	EX		Logical Node name space	
dataNs	VISIBLE_STRING255	EX		Data name space	

1.5.40 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	

1.5.41 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	

1.5.42 COMMON DATA CLASS: MV_FLOAT_D_PRIV

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	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	
dataNs	VISIBLE_STRING255	EX		Data name space	

1.5.43 COMMON DATA CLASS: MV_FLOAT_D_PRIV_NO_DB

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

1.5.44 COMMON DATA CLASS: MV_FLOAT_PRIV

Description: Measured Value (used for extended DO)

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	

1.5.45 COMMON DATA CLASS: MV_FLOAT_PRIV_NO_DB

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	
dataNs	VISIBLE_STRING255	EX		Data name space	

1.5.46 COMMON DATA CLASS: ORG_SRC_REF

Description: Object Reference Settings

CDC Class: ORG

Attribute	Type	FC	Enumeration	Comment	X
setSrcRef	ObjectReference	SP		The value of the object reference setting	

1.5.47 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)	

1.5.48 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)	

1.5.49 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	
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)	
dataNs	VISIBLE_STRING255	EX		Data name space	

1.5.50 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)	

1.5.51 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	

1.5.52 COMMON DATA CLASS: SPS_D_PRIV

Description: Single Point Status (with 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	
d	VISIBLE_STRING255	DC		Description of the status element	
dataNs	VISIBLE_STRING255	EX		Data name space	

1.5.53 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	

1.5.54 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	

1.5.55 COMMON DATA CLASS: WYE_NEU_ANG_D_PRIV

Description: Phase to Ground Measurements for a 3-Phase System

CDC Class: WYE

Attribute	Type	FC	Enumeration	Comment	X
neut	CMV_MAG_ANG_FLOAT	--		Measurement values for neutral input	
d	VISIBLE_STRING255	DC		Description of the status element	
dataNs	VISIBLE_STRING255	EX		Data name space	

1.5.56 COMMON DATA CLASS: WYE_RES_ANG_D_PRIV

Description: Phase to Ground Measurements for a 3-Phase System

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	

1.5.57 COMMON DATA CLASS: WYE_RES_MAG_D_PRIV

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

1.5.58 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	

1.5.59 COMMON DATA CLASS: WYE_SEG_ANG

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	

1.5.60 COMMON DATA CLASS: WYE_SEG_ANG_PRIV

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	
dataNs	VISIBLE_STRING255	EX		Data name space	

1.5.61 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	

1.5.62 COMMON DATA CLASS: WYE_SEG_D_PRIV

Description: Phase to Ground Measurements for a 3-Phase System (w.r.t Phase Segregation + Description, use for private data)

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	
dataNs	VISIBLE_STRING255	EX		Data name space	

1.5.63 COMMON DATA CLASS: WYE_SEG_PRIV

Description: Phase to Ground Measurements for a 3-Phase System

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	

1.5.64 COMMON DATA CLASS: WYE_Z_D

Description: Phase to Ground Measurements for a 3-Phase System

CDC Class: WYE

Attribute	Type	FC	Enumeration	Comment	X
phsA	CMV_MAG_FLOAT	--		Measurement values for Phase A	
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
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)	
orIdent	OCTET_STRING64		Originator identification (Null value indicates unknown or not reported)	

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	
hhLim	AnalogueValue_Float		High High range limit	
hLim	AnalogueValue_Float		High range limit	
lLim	AnalogueValue_Float		Low range limit	
max	AnalogueValue_Float		Maximum process measurement for which values of i and f are considered within limits	
llLim	AnalogueValue_Float		Low Low range limit	

1.6.4 COMPONENT: UNIT

Comment: SI Unit Definitions

Parent Type:

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

1.6.5 COMPONENT: UNIT_MULTIPLIER

Comment: SI Unit Definitions

Parent Type: Unit

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

1.6.6 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	

1.6.7 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
19	Object-already-selected
20	No-access-authority
21	Ended-with-overshoot
22	Abortion-due-to-deviation
23	Abortion-by-communication-loss
24	Blocked-by-command
25	None
26	Inconsistent-parameters
27	Locked-by-other-client

1.7.2 ENUMERATED TYPE: BEH_3

Description: Behaviour Including 3 States

Ordinal	Semantic
1	on
3	test
4	test/blocked

1.7.3 ENUMERATED TYPE: BEH_4

Description: Behaviour Including 4 States

Ordinal	Semantic
1	on
3	test

Ordinal	Semantic
4	test/blocked
5	off

1.7.4 ENUMERATED TYPE: CBOPCAP

Description: CB Operating Capability

Ordinal	Semantic
1	None
2	Open
4	Open-Close-Open
5	Close-Open-Close-Open
6	Open-Close-Open-Close-Open
7	more

1.7.5 ENUMERATED TYPE: CLCINTVTYP

Description: Calculation Interval Type

Ordinal	Semantic
1	MS
2	PER_CYCLE
3	CYCLE
4	DAY
5	WEEK
6	MONTH
7	YEAR
8	EXTERNAL

1.7.6 ENUMERATED TYPE: CLCMOD

Description: Calculation Mode

Ordinal	Semantic
1	TOTAL
2	PERIOD
3	SLIDING

1.7.7 ENUMERATED TYPE: CLCMTH

Description: Calculation Method of Statistical Data Objects

Ordinal	Semantic
1	UNSPECIFIED
2	TRUE_RMS
3	PEAK_FUNDAMENTAL
4	RMS_FUNDAMENTAL
5	MIN
6	MAX
7	AVG
8	SDV
9	PREDICTION
10	RATE

1.7.8 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

1.7.9 ENUMERATED TYPE: DBPOS

Description: Switch Positions

Ordinal	Semantic
0	intermediate
1	off
2	on
3	bad

1.7.10 ENUMERATED TYPE: DIR

Description: Direction

Ordinal	Semantic
0	unknown
1	forward
2	backward
3	both

1.7.11 ENUMERATED TYPE: FNSTATCLI

Description: The Status of Current Loop Input Protection Functionality

Ordinal	Semantic
0	Under
1	Over

1.7.12 ENUMERATED TYPE: HEALTH

Description: Health

Ordinal	Semantic
1	Ok
2	Warning
3	Alarm

1.7.13 ENUMERATED TYPE: MOD_2

Description: Mode Including 2 States

Ordinal	Semantic
1	on
5	off

1.7.14 ENUMERATED TYPE: MOD_3

Description: Mode Including 3 States

Ordinal	Semantic
1	on
3	test
4	test/blocked

1.7.15 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

1.7.16 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

1.7.17 ENUMERATED TYPE: PWRFNMODE

Description: The Status of Power Protection Stage Mode Functionality

Ordinal	Semantic
0	Disabled
1	Under
2	Over

1.7.18 ENUMERATED TYPE: SEQT

Description: Sequence Measurement Type

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

1.7.19 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	
2	m
3	kg
4	s
5	A
6	K
7	mol
8	cd
9	deg
10	rad
11	sr
21	Gy
22	Bq
23	°C
24	Sv
25	F
26	C

Ordinal	Semantic
27	S
28	H
29	V
30	ohm
31	J
32	N
33	Hz
34	lx
35	Lm
36	Wb
37	T
38	W
39	Pa
41	m ²
42	m ³
43	m/s
44	m/s ²
45	m ³ /s
46	m/m ³
47	M
48	kg/m ³
49	m ² /s
50	W/m K
51	J/K
52	ppm
53	1/s
54	rad/s
55	W/m ²
56	J/m ²
57	S/m
58	K/s
59	Pa/s
60	J/kg K
61	VA
62	Watts
63	VAr
64	phi
65	cos(phi)
66	Vs
67	V ²
68	As
69	A ²
70	A ² t
71	VAh
72	Wh
73	VArh
74	V/Hz
75	Hz/s
76	char
77	char/s
78	kgm ²

Ordinal	Semantic
79	dB
80	J/Wh
81	W/s
82	l/s
83	dBm
84	h
85	min

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
ENUMERATED32	Long	32 bit enumerated value
ENUMERATED8	Byte	8 bit enumerated value
FLOAT32	Float	32 bit floating point value
FLOAT64	Double	64 bit floating point value
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
INT64	Int64	64 bit signed integer value
INT8	Byte	8 bit signed integer value
INT8U	Ubyte	8 bit unsigned integer value
ObjectReference	Vstring129	Object Reference (129 character string)
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	Utime	IEC61850 Time stamp
UNICODE_STRING255	UTF8Vstring255	255 character string (16 bits per unicode character)
UTC_TM	Utime	UTC Timestamp
VISIBLE_STRING129	Vstring129	129 character string
VISIBLE_STRING255	Vstring255	255 character string
VISIBLE_STRING64	Vstring64	64 character string
VISIBLE_STRING65	Vstring65	65 character string
VISIBLE_STRING97	Vstring97	97 character string



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