GE VERNOVA

MiCOM P40 Agile

P741

MICS
Model Implementation Conformance Statement - IEC 61850 Edition 1

Hardware Version: M
Software Version: 91
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CONTENTS

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
Protection	Protection Elements
Records	Recording Data
System	Global System Data

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
Protection			
	CftCzNPDIF1	PDIF_NEU	P740: Circuitry fault for SEF check zone
	CftCzPPDIF1	PDIF_STR_OP_SEG	P740: Circuitry fault supervision for each phase of the check zone
	CftPhsPDIF1	PDIF_STR_OP_SEG	Differential phase protection: Circuitry fault supervision for each phase of the zone 1

LD	LN Instance	LN Type	Description
	CftPhsPDIF2	PDIF_STR_OP_SEG	Differential phase protection: Circuitry fault supervision for each phase of the zone 2
	CftPhsPDIF3	PDIF_STR_OP_SEG	Differential phase protection: Circuitry fault supervision for each phase of the zone 3
	CftPhsPDIF4	PDIF_STR_OP_SEG	Differential phase protection: Circuitry fault supervision for each phase of the zone 4
	CftPhsPDIF5	PDIF_STR_OP_SEG	Differential phase protection: Circuitry fault supervision for each phase of the zone 5
	CftPhsPDIF6	PDIF_STR_OP_SEG	Differential phase protection: Circuitry fault supervision for each phase of the zone 6
	CftPhsPDIF7	PDIF_STR_OP_SEG	Differential phase protection: Circuitry fault supervision for each phase of the zone 7
	CftPhsPDIF8	PDIF_STR_OP_SEG	Differential phase protection: Circuitry fault supervision for each phase of the zone 8
	CftSefPDIF1	PDIF_NEU	P740: Circuitry fault for SEF zone 1
	CftSefPDIF2	PDIF_NEU	P740: Circuitry fault for SEF zone 2
	CftSefPDIF3	PDIF_NEU	P740: Circuitry fault for SEF zone 3
	CftSefPDIF4	PDIF_NEU	P740: Circuitry fault for SEF zone 4
	CftSefPDIF5	PDIF_NEU	P740: Circuitry fault for SEF zone 5
	CftSefPDIF6	PDIF_NEU	P740: Circuitry fault for SEF zone 6
	CftSefPDIF7	PDIF_NEU	P740: Circuitry fault for SEF zone 7
	CftSefPDIF8	PDIF_NEU	P740: Circuitry fault for SEF zone 8
	FltCzNPDIF1	PDIF_FLT_CZ_SEF	P740: SEF check zone fault
	FltCzPPDIF1	PDIF_OP_SEG_NO_STR	P740: Fault on the check zone for each phase
	LLN0	LLN0_PROT_P741	Protection Logical Device for P741
	LPHD1	LPHD_STANDARD	Physical Device Information
	TrpCupPTRC1	PTRC_CU_TRIP	P740: Central trip zone 1
	TrpCupPTRC2	PTRC_CU_TRIP	P740: Central trip zone 2
	TrpCupPTRC3	PTRC_CU_TRIP	P740: Central trip zone 3
	TrpCupPTRC4	PTRC_CU_TRIP	P740: Central trip zone 4
	TrpCupPTRC5	PTRC_CU_TRIP	P740: Central trip zone 5
	TrpCupPTRC6	PTRC_CU_TRIP	P740: Central trip zone 6
	TrpCupPTRC7	PTRC_CU_TRIP	P740: Central trip zone 7
	TrpCupPTRC8	PTRC_CU_TRIP	P740: Central trip zone 8
	TrpNeuPDIF1	PDIF_TRP_NEU	P740: Trip zone 1 for SEF
	TrpNeuPDIF2	PDIF_TRP_NEU	P740: Trip zone 2 for SEF
	TrpNeuPDIF3	PDIF_TRP_NEU	P740: Trip zone 3 for SEF
	TrpNeuPDIF4	PDIF_TRP_NEU	P740: Trip zone 4 for SEF
	TrpNeuPDIF5	PDIF_TRP_NEU	P740: Trip zone 5 for SEF
	TrpNeuPDIF6	PDIF_TRP_NEU	P740: Trip zone 6 for SEF
	TrpNeuPDIF7	PDIF_TRP_NEU	P740: Trip zone 7 for SEF
	TrpNeuPDIF8	PDIF_TRP_NEU	P740: Trip zone 8 for SEF
	TrpPhsPDIF1	PDIF_STR_SEG_OP_NOSEG	Differential phases protection: Trip zone 1 for the three phases.
	TrpPhsPDIF2	PDIF_STR_SEG_OP_NOSEG	Differential phases protection: Trip zone 2 for the three phases.

LD	LN Instance	LN Type	Description
	TrpPhsPDIF3	PDIF_STR_SEG_OP_NOSEG	Differential phases protection: Trip zone 3 for the three phases.
	TrpPhsPDIF4	PDIF_STR_SEG_OP_NOSEG	Differential phases protection: Trip zone 4 for the three phases.
	TrpPhsPDIF5	PDIF_STR_SEG_OP_NOSEG	Differential phases protection: Trip zone 5 for the three phases.
	TrpPhsPDIF6	PDIF_STR_SEG_OP_NOSEG	Differential phases protection: Trip zone 6 for the three phases.
	TrpPhsPDIF7	PDIF_STR_SEG_OP_NOSEG	Differential phases protection: Trip zone 7 for the three phases.
	TrpPhsPDIF8	PDIF_STR_SEG_OP_NOSEG	Differential phases protection: Trip zone 8 for the three phases.
	TrpPhsRBRF1	RBRF_87BB_TRIP_PHS	P740: Central breaker failure busbar 1
	TrpPhsRBRF2	RBRF_87BB_TRIP_PHS	P740: Central breaker failure busbar 2
	TrpPhsRBRF3	RBRF_87BB_TRIP_PHS	P740: Central breaker failure busbar 3
	TrpPhsRBRF4	RBRF_87BB_TRIP_PHS	P740: Central breaker failure busbar 4
	TrpPhsRBRF5	RBRF_87BB_TRIP_PHS	P740: Central breaker failure busbar 5
	TrpPhsRBRF6	RBRF_87BB_TRIP_PHS	P740: Central breaker failure busbar 6
	TrpPhsRBRF7	RBRF_87BB_TRIP_PHS	P740: Central breaker failure busbar 7
	TrpPhsRBRF8	RBRF_87BB_TRIP_PHS	P740: Central breaker failure busbar 8
Records			
	LLN0	LLN0_STANDARD	Records Logical Device
	LPHD1	LPHD_STANDARD	Physical Device Information
	RDRE1	RDRE_BASIC_CU	Disturbance Recorder
System			
	AlmGGIO1	GGIO_ALM_96	Alarms
	CbfOrdGGIO1	GGIO_IND_16	P740: 50BF order from PU and opto
	FnkGGIO1	GGIO_IND_10	Function Keys
	GosGGIO1	GGIO_IND_64	GOOSE Input Signals
	GosGGIO2	GGIO_IND_32	GOOSE Output Signals
	LckCbfGGIO1	GGIO_IND_8_WD	Breaker Failure protection locked on the CU for each zone
	LckDifGGIO1	GGIO_IND_8_WD	87BB differential protection locked for each zone
	LckNeuGGIO1	GGIO_IND_8	Ext. Blocking of the 87BB earth fault protection
	LckPhsGGIO1	GGIO_IND_8	Ext. Blocking of the 87BB phase protection
	LedGGIO1	GGIO_IND_18	Red LED Signals
	LedGGIO2	GGIO_IND_18	Green LED Signals
	LLN0	LLN0_SYSTEM	System Logical Device (with Ordrun)
	LPHD1	LPHD_STANDARD	Physical Device Information
	NP2LCCH1	LCCH_SYSTEM	Physical communication channel supervision for NP2 (stationbus port and its redundant port).
	OptGGIO1	GGIO_IND_8	P740: Opto Inputs CU
	OptVirGGIO1	GGIO_IND_16_WD	P740: Virtual opto
	OrdRunGGIO1	GGIO_IND_64	Uniqueness of control "Order Running" indications for Control operations
	PloGGIO1	GGIO_SPCSO_32	PSL Control Inputs
	PueAlmGGIO1	GGIO_IND_8_WD	Alarm PU Error for each zone
	PueLckGGIO1	GGIO_IND_8_WD	Locking PU Error for each zone
	RlyGGIO1	GGIO_IND_8	P740: Outputs Contacts CU

LD	LN Instance	LN Type	Description
	RlyVirGGIO1	GGIO_IND_16_WD	P740: Virtual relay
	TrpManGGIO1	GGIO_IND_8_WD	P740: Manual trip order

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
GGIO_IND_10	(GGIO)	Generic Process I/O (w.r.t 10 Indication Elements)	IEC 61850-7-4:2003
GGIO_IND_16	(GGIO)	Generic Process I/O	IEC 61850-7-4:2003
GGIO_IND_16_WD	(GGIO)	Generic Process I/O	IEC 61850-7-4:2003
GGIO_IND_18	(GGIO)	Generic Process I/O (w.r.t 18 Indication Elements)	IEC 61850-7-4:2003
GGIO_IND_32	(GGIO)	Generic Process I/O (w.r.t 32 Indication Elements)	IEC 61850-7-4:2003
GGIO_IND_64	(GGIO)	Generic Process I/O (w.r.t 64 Indication Elements)	IEC 61850-7-4:2003
GGIO_IND_8	(GGIO)	Generic Process I/O	IEC 61850-7-4:2003
GGIO_IND_8_WD	(GGIO)	Generic Process I/O	IEC 61850-7-4:2003
GGIO_SPCSO_32	(GGIO)	Generic Process I/O (w.r.t 32 Controllable Elements)	IEC 61850-7-4:2003
GGIO_ALM_96	(GGIO)	Generic Process I/O (w.r.t 96 Alarm Elements)	IEC 61850-7-4:2003
LCCH_SYSTEM	(LCCH)	Physical Communication Channel Supervision	IEC 61850-7-4:2007
LLN0_STANDARD	(LLN0)	General Logical Node 0	IEC 61850-7-4:2003
LLN0_SYSTEM	(LLN0)	Logical Node 0 (with Ordrun, SyncSt, LEDRs)	IEC 61850-7-4:2003
LLN0_PROT_P741	(LLN0)	Protection Domain Logical Node 0 for P741	IEC 61850-7-4:2003
LPHD_STANDARD	(LPHD)	Px40 Physical Device Information	IEC 61850-7-4:2003
PDIF_FLT_CZ_SEF	(PDIF)	Differential	IEC 61850-7-4:2003
PDIF_NEU	(PDIF)	Differential (w.r.t Neutral)	IEC 61850-7-4:2003
PDIF_OP_SEG_NO_STR	(PDIF)	Differential	IEC 61850-7-4:2003
PDIF_STR_OP_SEG	(PDIF)	Differential	IEC 61850-7-4:2003
PDIF_STR_SEG_OP_NOSEG	(PDIF)	Differential	IEC 61850-7-4:2003
PDIF_TRP_NEU	(PDIF)	Differential	IEC 61850-7-4:2003
PTRC_CU_TRIP	(PTRC)	Protection Trip Conditioning	IEC 61850-7-4:2003
RBRF_87BB_TRIP_PHS	(RBRF)	Breaker Failure	IEC 61850-7-4:2003
RDRE_BASIC_CU	(RDRE)	Disturbance Recorder Function	IEC 61850-7-4:2003

1.4.1 LOGICAL NODE: GGIO_ALM_96

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

LN Class: GGIO

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

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

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

1.4.2 LOGICAL NODE: GGIO_IND_10

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

LN Class: GGIO

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

1.4.3 LOGICAL NODE: GGIO_IND_16

Description: Generic Process I/O

LN Class: GGIO

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

1.4.4 LOGICAL NODE: GGIO_IND_16_WD

Description: Generic Process I/O

LN Class: GGIO

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

1.4.5 LOGICAL NODE: GGIO_IND_18

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

LN Class: GGIO

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

Attribute	Attr. Type	Explanation	T	X
Ind17	SPS_D	General indication (binary input)		
Ind18	SPS_D	General indication (binary input)		

1.4.6 LOGICAL NODE: GGIO_IND_32

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

LN Class: GGIO

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

1.4.7 LOGICAL NODE: GGIO_IND_64

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

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Ind1	SPS_D	General indication (binary input)		
Ind2	SPS_D	General indication (binary input)		
Ind3	SPS_D	General indication (binary input)		
Ind4	SPS_D	General indication (binary input)		
Ind5	SPS_D	General indication (binary input)		
Ind6	SPS_D	General indication (binary input)		
Ind7	SPS_D	General indication (binary input)		
Ind8	SPS_D	General indication (binary input)		
Ind9	SPS_D	General indication (binary input)		
Ind10	SPS_D	General indication (binary input)		
Ind11	SPS_D	General indication (binary input)		
Ind12	SPS_D	General indication (binary input)		
Ind13	SPS_D	General indication (binary input)		
Ind14	SPS_D	General indication (binary input)		
Ind15	SPS_D	General indication (binary input)		
Ind16	SPS_D	General indication (binary input)		
Ind17	SPS_D	General indication (binary input)		
Ind18	SPS_D	General indication (binary input)		
Ind19	SPS_D	General indication (binary input)		
Ind20	SPS_D	General indication (binary input)		
Ind21	SPS_D	General indication (binary input)		
Ind22	SPS_D	General indication (binary input)		
Ind23	SPS_D	General indication (binary input)		
Ind24	SPS_D	General indication (binary input)		
Ind25	SPS_D	General indication (binary input)		
Ind26	SPS_D	General indication (binary input)		
Ind27	SPS_D	General indication (binary input)		
Ind28	SPS_D	General indication (binary input)		
Ind29	SPS_D	General indication (binary input)		
Ind30	SPS_D	General indication (binary input)		
Ind31	SPS_D	General indication (binary input)		
Ind32	SPS_D	General indication (binary input)		
Ind33	SPS_D	General indication (binary input)		
Ind34	SPS_D	General indication (binary input)		
Ind35	SPS_D	General indication (binary input)		
Ind36	SPS_D	General indication (binary input)		
Ind37	SPS_D	General indication (binary input)		
Ind38	SPS_D	General indication (binary input)		
Ind39	SPS_D	General indication (binary input)		
Ind40	SPS_D	General indication (binary input)		
Ind41	SPS_D	General indication (binary input)		
Ind42	SPS_D	General indication (binary input)		

Attribute	Attr. Type	Explanation	T	X
Ind43	SPS_D	General indication (binary input)		
Ind44	SPS_D	General indication (binary input)		
Ind45	SPS_D	General indication (binary input)		
Ind46	SPS_D	General indication (binary input)		
Ind47	SPS_D	General indication (binary input)		
Ind48	SPS_D	General indication (binary input)		
Ind49	SPS_D	General indication (binary input)		
Ind50	SPS_D	General indication (binary input)		
Ind51	SPS_D	General indication (binary input)		
Ind52	SPS_D	General indication (binary input)		
Ind53	SPS_D	General indication (binary input)		
Ind54	SPS_D	General indication (binary input)		
Ind55	SPS_D	General indication (binary input)		
Ind56	SPS_D	General indication (binary input)		
Ind57	SPS_D	General indication (binary input)		
Ind58	SPS_D	General indication (binary input)		
Ind59	SPS_D	General indication (binary input)		
Ind60	SPS_D	General indication (binary input)		
Ind61	SPS_D	General indication (binary input)		
Ind62	SPS_D	General indication (binary input)		
Ind63	SPS_D	General indication (binary input)		
Ind64	SPS_D	General indication (binary input)		

1.4.8 LOGICAL NODE: GGIO_IND_8

Description: Generic Process I/O

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Ind1	SPS_D	General indication (binary input)		
Ind2	SPS_D	General indication (binary input)		
Ind3	SPS_D	General indication (binary input)		
Ind4	SPS_D	General indication (binary input)		
Ind5	SPS_D	General indication (binary input)		
Ind6	SPS_D	General indication (binary input)		
Ind7	SPS_D	General indication (binary input)		
Ind8	SPS_D	General indication (binary input)		

1.4.9 LOGICAL NODE: GGIO_IND_8_WD

Description: Generic Process I/O

LN Class: GGIO

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

Attribute	Attr. Type	Explanation	T	X
Ind1	SPS_WD	General indication (binary input)		
Ind2	SPS_WD	General indication (binary input)		
Ind3	SPS_WD	General indication (binary input)		
Ind4	SPS_WD	General indication (binary input)		
Ind5	SPS_WD	General indication (binary input)		
Ind6	SPS_WD	General indication (binary input)		
Ind7	SPS_WD	General indication (binary input)		
Ind8	SPS_WD	General indication (binary input)		

1.4.10 LOGICAL NODE: GGIO_SPCSO_32

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

LN Class: GGIO

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

1.4.11 LOGICAL NODE: LCCH_SYSTEM

Description: Physical Communication Channel Supervision

LN Class: LCCH

Attribute	Attr. Type	Explanation	T	X
Beh	INS_HEALTH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_ED2_LN	Name Plate		
ChLiv	SPS_D	Physical channel status: True, if channel receives telegrams within a specified time interval.		
RedChLiv	SPS_D	Physical channel status of redundant channel		

1.4.12 LOGICAL NODE: LLN0_PROT_P741

Description: Protection Domain Logical Node 0 for P741

LN Class: LLN0

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LLN0	Name Plate		
PhsDifMod	INC_MODE_PRIVATE	Phases differential protection Mode		X
PhsDifBeh	INS_BEH_PRIVATE	Phases differential protection Behaviour		X
NeuDifMod	INC_MODE_PRIVATE	Neutral differential protection Mode		X
NeuDifBeh	INS_BEH_PRIVATE	Neutral differential protection Behaviour		X
PhsCftMod	INC_MODE_PRIVATE	Circuitry fault protection Mode		X
PhsCftBeh	INS_BEH_PRIVATE	Circuitry fault protection Behaviour		X
NeuCftMod	INC_MODE_PRIVATE	Neutral circuitry fault protection Mode		X
NeuCftBeh	INS_BEH_PRIVATE	Neutral circuitry fault protection Behaviour		X
BFMod	INC_MODE_PRIVATE	Breaker failure Mode		X
BFBeh	INS_BEH_PRIVATE	Breaker failure Behaviour		X

1.4.13 LOGICAL NODE: LLN0_STANDARD

Description: General Logical Node 0

LN Class: LLN0

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LLN0	Name Plate		

1.4.14 LOGICAL NODE: LLN0_SYSTEM

Description: Logical Node 0 (with Ordrun, SyncSt, LEDRs)

LN Class: LLN0

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

Attribute	Attr. Type	Explanation	T	X
Health	INS_HEALTH	Health		
NamPlt	LPL_LLN0	Name Plate		
LEDRs	SPC_CONTROL	LED reset	T	
OrdRun	SPS_WD_NS	Order Running		X
SyncSt	SPS_WD_NS	IED time synchronisation state		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	INS_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: PDIF_FLT_CZ_SEF

Description: Differential

LN Class: PDIF

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Op	ACT_NEU	Operate	T	
DifAClc	WYE_NEU	Differential current		
RstA	WYE_NEU	Restraint current		
CftBeh	INS_BEH_PRIVATE	Behaviour		X
PueBeh	INS_BEH_PRIVATE	Behaviour		X

1.4.17 LOGICAL NODE: PDIF_NEU

Description: Differential (w.r.t Neutral)

LN Class: PDIF

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_NEU	Start		
Op	ACT_NEU	Operate	T	
DifAClc	WYE_NEU	Differential current		
RstA	WYE_NEU	Restraint current		

1.4.18 LOGICAL NODE: PDIF_OP_SEG_NO_STR

Description: Differential

LN Class: PDIF

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Op	ACT_SEG	Operate	T	
DifAClc	WYE_SEG	Differential current		
RstA	WYE_SEG	Restraint current		
CftBeh	INS_BEH_PRIVATE	Circuitry fault blocked information		X
PueBeh	INS_BEH_PRIVATE	PU error blocked information		X

1.4.19 LOGICAL NODE: PDIF_STR_OP_SEG

Description: Differential

LN Class: PDIF

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_SEG	Start		
Op	ACT_SEG	Operate	T	
DifAClc	WYE_SEG	Differential current		
RstA	WYE_SEG	Restraint current		

1.4.20 LOGICAL NODE: PDIF_STR_SEG_OP_NOSEG

Description: Differential

LN Class: PDIF

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_SEG	Start		
Op	ACT_NO_SEG	Operate	T	
DifAClc	WYE_SEG	Differential current		
RstA	WYE_SEG	Restraint current		
CftBeh	INS_BEH_PRIVATE	Circuitry Fault Blocking		X
PueBeh	INS_BEH_PRIVATE	PU error blocking		X
CzBeh	INS_BEH_PRIVATE	Check zone confirmation		X

1.4.21 LOGICAL NODE: PDIF_TRP_NEU

Description: Differential

LN Class: PDIF

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Str	ACD_NEU	Start		
Op	ACT_NO_SEG	Operate	T	
DifAClc	WYE_NEU	Differential current		
RstA	WYE_NEU	Restraint current		
CftBeh	INS_BEH_PRIVATE	Circuitry fault Behaviour		X
PueBeh	INS_BEH_PRIVATE	PU Error blocking		X
CzBeh	INS_BEH_PRIVATE	Check zone status		X

1.4.22 LOGICAL NODE: PTRC_CU_TRIP

Description: Protection Trip Conditioning

LN Class: PTRC

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

1.4.23 LOGICAL NODE: RBRF_87BB_TRIP_PHS

Description: Breaker Failure

LN Class: RBRF

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

1.4.24 LOGICAL NODE: RDRE_BASIC_CU

Description: Disturbance Recorder Function

LN Class: RDRE

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

Attribute	Attr. Type	Explanation	T	X
RcdMade	SPS_WD	Recording made		
FltNum	INS_BASIC	Fault number		

1.5 COMMON DATA CLASS DEFINITIONS

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

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

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

1.5.1 COMMON DATA CLASS: ACD_NEU

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

CDC Class: ACD

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

1.5.2 COMMON DATA CLASS: ACD_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)	
phsA	BOOLEAN	ST		Trip or start event of Phase A has happened	
dirPhsA	ENUMERATED8 (MMS Type: INT8)	ST	dir	Phase A direction (unknown, forward or backward)	
phsB	BOOLEAN	ST		Trip or start event of Phase B has happened	
dirPhsB	ENUMERATED8 (MMS Type: INT8)	ST	dir	Phase B direction (unknown, forward or backward)	
phsC	BOOLEAN	ST		Trip or start event of Phase C has happened	
dirPhsC	ENUMERATED8 (MMS Type: INT8)	ST	dir	Phase C direction (unknown, forward or backward)	
q	Quality	ST		Quality of the protection activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection activation information	

1.5.3 COMMON DATA CLASS: ACT_NEU

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

CDC Class: ACT

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

1.5.4 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	

1.5.5 COMMON DATA CLASS: ACT_SEG

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

CDC Class: ACT

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

Attribute	Type	FC	Enumeration	Comment	X
q	Quality	ST		Quality of the protection activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection activation information	

1.5.6 COMMON DATA CLASS: 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	M		Deadbanded complex measured vector. Updated to the current value of instCVal when the value has changed according to the configuration parameter db	
Xq	Quality	M		Quality of the measurement value	
Xt	TimeStamp	M		Time deadbanded magnitude last exceeded its db configuration parameter	
Xunits	Unit_Multiplier	CF		Unit of the attribute representing the data	
db	INT32U	CF		Measurement deadband	
rangeC	RangeC	CF		Measurement range configuration attributes	

1.5.7 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	

1.5.8 COMMON DATA CLASS: INC_MOD

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

CDC Class: INC

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

1.5.9 COMMON DATA CLASS: INC_MODE_PRIVATE

Description: Controllable Integer Status

CDC Class: INC

Attribute	Type	FC	Enumeration	Comment	X
stVal	INT32 (MMS Type: INT8)	ST	Mod	Status value of the data	
q	Quality	ST		Quality of the status value	
t	TimeStamp	ST		Timestamp of the last change in state of status value	
ctlModel	ENUMERATED8 (MMS Type: INT8)	CF	ctlModel	Control model (Corresponding to the behaviour of the data)	
dataNs	VISIBLE_STRING255	EX		Data name space	

1.5.10 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	

1.5.11 COMMON DATA CLASS: INS_BEH

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

CDC Class: INS

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

1.5.12 COMMON DATA CLASS: INS_BEH_PRIVATE

Description: Integer Status

CDC Class: INS

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

1.5.13 COMMON DATA CLASS: INS_HEALTH

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

CDC Class: INS

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

1.5.14 COMMON DATA CLASS: LPL_ED2_LN

Description: 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	
lnNs	VISIBLE_STRING255	EX		Logical Node name space	

1.5.15 COMMON DATA CLASS: LPL_LLN0

Description: Logical Node 0 Name Plate

CDC Class: LPL

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

1.5.16 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	

1.5.17 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)	
cdcName	VISIBLE_STRING255	EX		Name of the Common Data Class	

1.5.18 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	

1.5.19 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	

1.5.20 COMMON DATA CLASS: SPS_WD_NS

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

CDC Class: SPS

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

1.5.21 COMMON DATA CLASS: WYE_NEU

Description: Phase to Ground Measurements (w.r.t Neutral)

CDC Class: WYE

Attribute	Type	FC	Enumeration	Comment	X
neut	CMV_MAG_FLOAT	--		Measurement values for neutral input	

1.5.22 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	

1.6 COMMON DATA ATTRIBUTE TYPE DEFINITIONS

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

1.6.1 COMPONENT: ANALOGUEVALUE_FLOAT

Comment: General Analogue Value (w.r.t Floating Point Value)

Parent Type: AnalogueValue

Attribute	Type	Enumeration	Comment	X
f	FLOAT32		Floating point value	

1.6.2 COMPONENT: ORIGINATOR

Comment: Originator of the Last Change of Data Attribute Representing the Value of a Controllable Data Object

Parent Type:

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

1.6.3 COMPONENT: RANGEC

Comment: Measurement Range Configuration

Parent Type: RangeConfig

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

1.6.4 COMPONENT: UNIT_MULTIPLIER

Comment: SI Unit Definitions

Parent Type: Unit

Attribute	Type	Enumeration	Comment	X
SIUnit	ENUMERATED8 (MMS Type: INT8)	SIUnit	SI Unit	
multiplier	ENUMERATED16 (MMS Type: INT8)	multiplier	Multiplier value, the default of which is 0 (i.e. multiplier = 1)	

1.6.5 COMPONENT: VECTOR_MAGNITUDE_FLOAT

Comment: Complex Vector (w.r.t Floating Point Magnitude Value)

Parent Type: Vector

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

1.7 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: Additional Cause Diagnosis

Ordinal	Semantic
0	Unknown
1	Not-supported
2	Blocked-by-switching-hierarchy
3	Select-failed
4	Invalid-position
5	Position-reached
6	Parameter-change-in-execution
7	Step-limit
8	Blocked-by-Mode
9	Blocked-by-process
10	Blocked-by-interlocking
11	Blocked-by-synchrocheck
12	Command-already-in-execution
13	Blocked-by-health
14	1-of-n-control
15	Abortion-by-cancel
16	Time-limit-over
17	Abortion-by-trip
18	Object-not-selected

1.7.2 ENUMERATED TYPE: BEH

Description: Behaviour

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

1.7.3 ENUMERATED TYPE: BYPASS

Description: Cause of Bypass

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

1.7.4 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

1.7.5 ENUMERATED TYPE: DIR

Description: Direction

Ordinal	Semantic
0	unknown
1	forward
2	backward
3	both

1.7.6 ENUMERATED TYPE: HEALTH

Description: Health

Ordinal	Semantic
1	Ok
2	Warning
3	Alarm

1.7.7 ENUMERATED TYPE: MOD

Description: Mode

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

1.7.8 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

1.7.9 ENUMERATED TYPE: ORCATEGORY

Description: Control Mode and Place Mode

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

1.7.10 ENUMERATED TYPE: SIUNIT

Description: SI Units Derived from ISO/IEC 1000

Ordinal	Semantic
1	
2	m
3	kg
4	s
5	A
6	K
7	mol
8	cd

Ordinal	Semantic
9	deg
10	rad
11	sr
21	Gy
22	q
23	°C
24	Sv
25	F
26	C
27	S
28	H
29	V
30	ohm
31	J
32	N
33	Hz
34	lx
35	Lm
36	Wb
37	T
38	W
39	Pa
41	m²
42	m³
43	m/s
44	m/s²
45	m³/s
46	m/m³
47	M
48	kg/m³
49	m²/s
50	W/m K
51	J/K
52	ppm
53	1/s
54	rad/s
61	VA
62	Watts
63	VAr
64	phi
65	cos(phi)
66	Vs
67	V²
68	As
69	A²
70	A²t
71	VAh
72	Wh
73	VArh
74	V/Hz

1.8 MMS DATA-TYPE CONVERSIONS

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

Part 7 Type	MMS Type	Part 7 Description
BOOLEAN	Bool	Logical TRUE/FALSE value
BSTR16	Bstring16	Bit string 16
BVstring13	BVstring13	Variable bit string (up to 13 bits)
Check	BVstring2	Control Object check flags
CODED_ENUM	Byte	Coded enumeration
CODED_ENUM2	Byte	Coded enumeration (2)
EntryTime	Btime6	8.1 Section 8.1.3.7
ENUMERATED16	Short	16 bit enumerated value
ENUMERATED8	Byte	8 bit enumerated value
FLOAT32	Float	32 bit floating point value
FLOAT64	Double	64 bit floating point value
INT128	Int64	128 bit signed integer value
INT16	Short	16 bit signed integer value
INT16U	Ushort	16 bit unsigned integer value
INT24U	Ulong	24 bit unsigned integer value
INT32	Long	32 bit signed integer value
INT32U	Ulong	32 bit unsigned integer value
INT8	Byte	8 bit signed integer value
INT8U	Ubyte	8 bit unsigned integer value
OCTET_STRING6	Ostring6	6 character string (8 bits per character)
OCTET_STRING64	OVstring64	64 character string (8 bits per character)
OCTET_STRING8	OVstring8	8 character string (8 bits per character)
Quality	BVstring13	IEC61850 Quality
TimeStamp	Utctime	IEC61850 Time stamp
UNICODE_STRING255	UTF8Vstring255	255 character string (16 bits per unicode character)
UTC_TM	Utctime	UTC Timestamp
VISIBLE_STRING255	Vstring255	255 character string
VISIBLE_STRING64	Vstring64	64 character string
VISIBLE_STRING65	Vstring65	65 character string
VISIBLE_STRING97	Vstring97	97 character string