

MiCOM P40 Agile

P746

MICS
Model Implementation Conformance Statement - IEC 61850 Edition 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 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
CBControl	P746 CB Control
CtlCB	P746 CtlCB
CtlSw	P746 CtlSW
Measurements	P746 Measurements
ProtBbpDif	P746 Busbar Differential Protection
ProtBbT01	P746 Busbar Protection T01
ProtBbT02	P746 Busbar Protection T02
ProtBbT03	P746 Busbar Protection T03
ProtBbT04	P746 Busbar Protection T04
ProtBbT05	P746 Busbar Protection T05
ProtBbT06	P746 Busbar Protection T06
ProtBbT07	P746 Busbar Protection T07
ProtBbT08	P746 Busbar Protection T08
ProtBbT09	P746 Busbar Protection T09
ProtBbT10	P746 Busbar Protection T10
ProtBbT11	P746 Busbar Protection T11
ProtBbT12	P746 Busbar Protection T12
ProtBbT13	P746 Busbar Protection T13
ProtBbT14	P746 Busbar Protection T14
ProtBbT15	P746 Busbar Protection T15

Logical Device	Comment/Usage
ProtBbT16	P746 Busbar Protection T16
ProtBbT17	P746 Busbar Protection T17
ProtBbT18	P746 Busbar Protection T18
Protection	P746 Protection
Records	P746 Records
System	P746 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
CB Control	LLNO	LLNO_STANDARD	Logical Device for CB Control
	LPHD1	LPHD_STANDARD	Physical Device Information for CB Control
CtlCB	CBXCBR1	XCBR_BASIC	CB1 Control
	CBXCBR10	XCBR_BASIC	CB10 Control
	CBXCBR11	XCBR_BASIC	CB11 Control
	CBXCBR12	XCBR_BASIC	CB12 Control
	CBXCBR13	XCBR_BASIC	CB13 Control
	CBXCBR14	XCBR_BASIC	CB14 Control
	CBXCBR15	XCBR_BASIC	CB15 Control
	CBXCBR16	XCBR_BASIC	CB16 Control
	CBXCBR17	XCBR_BASIC	CB17 Control
	CBXCBR18	XCBR_BASIC	CB18 Control
	CBXCBR2	XCBR_BASIC	CB2 Control
	CBXCBR3	XCBR_BASIC	CB3 Control
	CBXCBR4	XCBR_BASIC	CB4 Control
	CBXCBR5	XCBR_BASIC	CB5 Control
	CBXCBR6	XCBR_BASIC	CB6 Control
	CBXCBR7	XCBR_BASIC	CB7 Control
	CBXCBR8	XCBR_BASIC	CB8 Control
	CBXCBR9	XCBR_BASIC	CB9 Control
		LLNO	LLNO_STANDARD
CtlSw	LLNO	LLNO_STANDARD	LLNO For CtlSw
	Q1Z1XSWI1	XSWI_STANDARD	Disconnector1
	Q1Z1XSWI10	XSWI_STANDARD	Disconnector10
	Q1Z1XSWI11	XSWI_STANDARD	Disconnector11
	Q1Z1XSWI12	XSWI_STANDARD	Disconnector12
	Q1Z1XSWI13	XSWI_STANDARD	Disconnector13
	Q1Z1XSWI14	XSWI_STANDARD	Disconnector14
	Q1Z1XSWI15	XSWI_STANDARD	Disconnector15
	Q1Z1XSWI16	XSWI_STANDARD	Disconnector16
	Q1Z1XSWI17	XSWI_STANDARD	Disconnector17

LD	LN Instance	LN Type	Description
	Q1Z1XSWI18	XSWI_STANDARD	Disconnector18
	Q1Z1XSWI2	XSWI_STANDARD	Disconnector2
	Q1Z1XSWI3	XSWI_STANDARD	Disconnector3
	Q1Z1XSWI4	XSWI_STANDARD	Disconnector4
	Q1Z1XSWI5	XSWI_STANDARD	Disconnector5
	Q1Z1XSWI6	XSWI_STANDARD	Disconnector6
	Q1Z1XSWI7	XSWI_STANDARD	Disconnector7
	Q1Z1XSWI8	XSWI_STANDARD	Disconnector8
	Q1Z1XSWI9	XSWI_STANDARD	Disconnector9
	Q1Z2XSWI19	XSWI_STANDARD	Disconnector19
	Q1Z2XSWI20	XSWI_STANDARD	Disconnector20
	Q1Z2XSWI21	XSWI_STANDARD	Disconnector21
	Q1Z2XSWI22	XSWI_STANDARD	Disconnector22
	Q1Z2XSWI23	XSWI_STANDARD	Disconnector23
	Q1Z2XSWI24	XSWI_STANDARD	Disconnector24
	Q1Z2XSWI25	XSWI_STANDARD	Disconnector25
	Q1Z2XSWI26	XSWI_STANDARD	Disconnector26
	Q1Z2XSWI27	XSWI_STANDARD	Disconnector27
	Q1Z2XSWI28	XSWI_STANDARD	Disconnector28
	Q1Z2XSWI29	XSWI_STANDARD	Disconnector29
	Q1Z2XSWI30	XSWI_STANDARD	Disconnector30
	Q1Z2XSWI31	XSWI_STANDARD	Disconnector31
	Q1Z2XSWI32	XSWI_STANDARD	Disconnector32
	Q1Z2XSWI33	XSWI_STANDARD	Disconnector33
	Q1Z2XSWI34	XSWI_STANDARD	Disconnector34
	Q1Z2XSWI35	XSWI_STANDARD	Disconnector35
	Q1Z2XSWI36	XSWI_STANDARD	Disconnector36
	QBbXSWI37	XSWI_STANDARD	Disconnector37
	QBZ1XSWI38	XSWI_STANDARD	Disconnector38
	QBZ2XSWI39	XSWI_STANDARD	Disconnector39
Measurements			
	LLN0	LLN0_STANDARD	Measurements Logical Device
	LPHD1	LPHD_STANDARD	Physical Device Information
	PriBbpMMXU1	MMXU_IDIFF	Primary Busbar Differential Measurements - Zone 1
	PriBbpMMXU2	MMXU_IDIFF	Primary Busbar Differential Measurements - Zone 2
	PriCznMMXU1	MMXU_IDIFF	Primary Check Zone Differential Measurements - Fundamentals
	PriDvdMMXU1	MMXU_DERIVED_A_6	Primary One-box Measurements
	PriFltMLFR1	MLFR_P746	Measurement during latest fault
	PriFouMMXU1	MMXU_FOURIER	Primary Fourier derived measurements
	PriMsiMMXU1	MMXU_A_6	Primary One-Box Measurements
	PriMsiMMXU2	MMXU_A_18	Primary three-box measurements
	PriRmsMMXU1	MMXU_RMS_PHV	Primary RMS measurements of phase to ground voltage
	PriSeqMSQI1	MSQI_SEQ_6	Primary One-box Sequence Measurements
	SecBbpMMXU1	MMXU_IDIFF	Secondary Busbar Differential Measurements - Zone 1
	SecBbpMMXU2	MMXU_IDIFF	Secondary Busbar Differential Measurements - Zone 2
	SecCznMMXU1	MMXU_IDIFF	Secondary Check Zone Differential Measurements - Fundamentals
	SecDvdMMXU1	MMXU_DERIVED_A_6	Secondary One-box Measurements
	SecFouMMXU1	MMXU_FOURIER	Secondary Fourier derived measurements
	SecMsiMMXU1	MMXU_A_6	Secondary One-Box Measurements

LD	LN Instance	LN Type	Description
	SecMsiMMXU2	MMXU_A_18	Secondary Measured Values for Three-box Measurements
	SecRmsMMXU1	MMXU_RMS_PHV	Secondary RMS measurements of phase to ground voltage
	SecSeqMSQI1	MSQI_SEQ_6	Primary One-box Sequence Measurements
ProtBbpDif			
	BbpZonPDIF1	PDIF_NEU_SEG	Differential Protection - Zone1
	BbpZonPDIF2	PDIF_NEU_SEG	Differential Protection - Zone2
	BpPTRC1	PTRC_NO_SEG	Trip Conditioning
	CznPDIF1	PDIF_NEU_SEG_NO_STR	Check Zone Differential Protection
	LLN0	LLN0_STANDARD_WITH_CTRLMOD	Differential LLN0 With Control
ProtBbt01			
	BbpT01PDIF1	PDIF_BBP	Busbar Protection T01
	BbpT01PTRC1	PTRC_OP	Busbar T01 PTRC
	CbfT01RBRF1	RBRF_STANDARD	CB Fail - T1
	DznT01PTOC1	PTOC_OP	Dead zone overcurrent protection T01
	EfdT01PTOC1	PTOC_NEU	Derived Earth Fault T01 - Stage 1
	EfdT01PTOC2	PTOC_NEU	Derived Earth Fault T01 - Stage 2
	LLN0	LLN0_STANDARD	LLN0
	OcpT01PTOC1	PTOC_OP	Overcurrent Protection T01 - Stage 1
	OcpT01PTOC2	PTOC_OP	Overcurrent Protection T01 - Stage 2
ProtBbt02			
	BbpT02PDIF1	PDIF_BBP	Busbar Protection T02
	BbpT02PTRC1	PTRC_OP	Busbar T02 PTRC
	CbfT02RBRF1	RBRF_STANDARD	CB Fail - T02
	DznT02PTOC1	PTOC_OP	Dead zone overcurrent protection T02
	EfdT02PTOC1	PTOC_NEU	Derived Earth Fault T02 - Stage 1
	EfdT02PTOC2	PTOC_NEU	Derived Earth Fault T02 - Stage 2
	LLN0	LLN0_STANDARD	LLN0
	OcpT02PTOC1	PTOC_OP	Overcurrent Protection T02 - Stage 1
	OcpT02PTOC2	PTOC_OP	Overcurrent Protection T02 - Stage 2
ProtBbt03			
	BbpT03PDIF1	PDIF_BBP	Busbar Protection T3
	BbpT03PTRC1	PTRC_OP	Busbar T03 PTRC
	CbfT03RBRF1	RBRF_STANDARD	CB Fail - T3
	DznT03PTOC1	PTOC_OP	Dead zone overcurrent protection T03
	EfdT03PTOC1	PTOC_NEU	Derived Earth Fault T03 - Stage 1
	EfdT03PTOC2	PTOC_NEU	Derived Earth Fault T03 - Stage 2
	LLN0	LLN0_STANDARD	LLN0
	OcpT03PTOC1	PTOC_OP	Overcurrent Protection T03 - Stage 1
	OcpT03PTOC2	PTOC_OP	Overcurrent Protection T03 - Stage 2
ProtBbt04			
	BbpT04PDIF1	PDIF_BBP	Busbar Protection T4
	BbpT04PTRC1	PTRC_OP	Busbar T04 PTRC
	CbfT04RBRF1	RBRF_STANDARD	CB Fail - T4
	DznT04PTOC1	PTOC_OP	Dead zone overcurrent protection T04
	EfdT04PTOC1	PTOC_NEU	Derived Earth Fault T04 - Stage 1
	EfdT04PTOC2	PTOC_NEU	Derived Earth Fault T04 - Stage 2
	LLN0	LLN0_STANDARD	LLN0
	OcpT04PTOC1	PTOC_OP	Overcurrent Protection T04 - Stage 1
	OcpT04PTOC2	PTOC_OP	Overcurrent Protection T04 - Stage 2
ProtBbt05			

LD	LN Instance	LN Type	Description
	BbpT05PDIF1	PDIF_BBP	Busbar Protection T5
	BbpT05PTRC1	PTRC_OP	Busbar T05 PTRC
	CbfT05RBRF1	RBRF_STANDARD	CB Fail - T5
	DznT05PTOC1	PTOC_OP	Dead zone overcurrent protection T05
	EfdT05PTOC1	PTOC_NEU	Derived Earth Fault T05 - Stage 1
	EfdT05PTOC2	PTOC_NEU	Derived Earth Fault T04 - Stage 2
	LLN0	LLN0_STANDARD	LLN0
	OcpT05PTOC1	PTOC_OP	Overcurrent Protection T05 - Stage 1
	OcpT05PTOC2	PTOC_OP	Overcurrent Protection T05 - Stage 2
ProtBbT06			
	BbpT06PDIF1	PDIF_BBP	Busbar Protection T6
	BbpT06PTRC1	PTRC_OP	Busbar T06 PTRC
	CbfT06RBRF1	RBRF_STANDARD	CB Fail - T6
	DznT06PTOC1	PTOC_OP	Dead zone overcurrent protection T06
	EfdT06PTOC1	PTOC_NEU	Derived Earth Fault T06 - Stage 1
	EfdT06PTOC2	PTOC_NEU	Derived Earth Fault T06 - Stage 2
	LLN0	LLN0_STANDARD	LLN0
	OcpT06PTOC1	PTOC_OP	Overcurrent Protection T06 - Stage 1
	OcpT06PTOC2	PTOC_OP	Overcurrent Protection T06 - Stage 2
ProtBbT07			
	BbpT07PDIF1	PDIF_BBP	Busbar Protection T7
	BbpT07PTRC1	PTRC_OP	Busbar T07 PTRC
	CbfT07RBRF1	RBRF_STANDARD	CB Fail - T7
	DznT07PTOC1	PTOC_OP	Dead zone overcurrent protection T07
	LLN0	LLN0_STANDARD	LLN0
	OcpT07PTOC1	PTOC_OP	Overcurrent Protection T07 - Stage 1
	OcpT07PTOC2	PTOC_OP	Overcurrent Protection T07 - Stage 2
ProtBbT08			
	BbpT08PDIF1	PDIF_BBP	Busbar Protection T8
	BbpT08PTRC1	PTRC_OP	Busbar T08 PTRC
	CbfT08RBRF1	RBRF_STANDARD	CB Fail - T8
	DznT08PTOC1	PTOC_OP	Dead zone overcurrent protection T08
	LLN0	LLN0_STANDARD	LLN0
	OcpT08PTOC1	PTOC_OP	Overcurrent Protection T08 - Stage 1
	OcpT08PTOC2	PTOC_OP	Overcurrent Protection T08 - Stage 2
ProtBbT09			
	BbpT09PDIF1	PDIF_BBP	Busbar Protection T9
	BbpT09PTRC1	PTRC_OP	Busbar T09 PTRC
	CbfT09RBRF1	RBRF_STANDARD	CB Fail - T9
	DznT09PTOC1	PTOC_OP	Dead zone overcurrent protection T09
	LLN0	LLN0_STANDARD	LLN0
	OcpT09PTOC1	PTOC_OP	Overcurrent Protection T09 - Stage 1
	OcpT09PTOC2	PTOC_OP	Overcurrent Protection T09 - Stage 2
ProtBbT10			
	BbpT10PDIF1	PDIF_BBP	Busbar Protection T10
	BbpT10PTRC1	PTRC_OP	Busbar T10 PTRC
	CbfT10RBRF1	RBRF_STANDARD	CB Fail - T10
	DznT10PTOC1	PTOC_OP	Dead zone overcurrent protection T10
	LLN0	LLN0_STANDARD	LLN0
	OcpT10PTOC1	PTOC_OP	Overcurrent Protection T10 - Stage 1

LD	LN Instance	LN Type	Description
	OcpT10PTOC2	PTOC_OP	Overcurrent Protection T10 - Stage 2
ProtBbT11			
	BbpT11PDIF1	PDIF_BBP	Busbar Protection T11
	BbpT11PTRC1	PTRC_OP	Busbar T11 PTRC
	CbfT11RBRF1	RBRF_STANDARD	CB Fail - T11
	DznT11PTOC1	PTOC_OP	Dead zone overcurrent protection T11
	LLN0	LLN0_STANDARD	LLN0
	OcpT11PTOC1	PTOC_OP	Overcurrent Protection T11 - Stage 1
	OcpT11PTOC2	PTOC_OP	Overcurrent Protection T11 - Stage 2
ProtBbT12			
	BbpT12PDIF1	PDIF_BBP	Busbar Protection T12
	BbpT12PTRC1	PTRC_OP	Busbar T12 PTRC
	CbfT12RBRF1	RBRF_STANDARD	CB Fail - T12
	DznT12PTOC1	PTOC_OP	Dead zone overcurrent protection T12
	LLN0	LLN0_STANDARD	LLN0
	OcpT12PTOC1	PTOC_OP	Overcurrent Protection T12 - Stage 1
	OcpT12PTOC2	PTOC_OP	Overcurrent Protection T12 - Stage 2
ProtBbT13			
	BbpT13PDIF1	PDIF_BBP	Busbar Protection T13
	BbpT13PTRC1	PTRC_OP	Busbar T13 PTRC
	CbfT13RBRF1	RBRF_STANDARD	CB Fail - T13
	DznT13PTOC1	PTOC_OP	Dead zone overcurrent protection T13
	LLN0	LLN0_STANDARD	LLN0
	OcpT13PTOC1	PTOC_OP	Overcurrent Protection T13 - Stage 1
	OcpT13PTOC2	PTOC_OP	Overcurrent Protection T13 - Stage 2
ProtBbT14			
	BbpT14PDIF1	PDIF_BBP	Busbar Protection T14
	BbpT14PTRC1	PTRC_OP	Busbar T14 PTRC
	CbfT14RBRF1	RBRF_STANDARD	CB Fail - T14
	DznT14PTOC1	PTOC_OP	Dead zone overcurrent protection T14
	LLN0	LLN0_STANDARD	LLN0
	OcpT14PTOC1	PTOC_OP	Overcurrent Protection T14 - Stage 1
	OcpT14PTOC2	PTOC_OP	Overcurrent Protection T14 - Stage 2
ProtBbT15			
	BbpT15PDIF1	PDIF_BBP	Busbar Protection T15
	BbpT15PTRC1	PTRC_OP	Busbar T15 PTRC
	CbfT15RBRF1	RBRF_STANDARD	CB Fail - T15
	DznT15PTOC1	PTOC_OP	Dead zone overcurrent protection T15
	LLN0	LLN0_STANDARD	LLN0
	OcpT15PTOC1	PTOC_OP	Overcurrent Protection T15 - Stage 1
	OcpT15PTOC2	PTOC_OP	Overcurrent Protection T15 - Stage 2
ProtBbT16			
	BbpT16PDIF1	PDIF_BBP	Busbar Protection T16
	BbpT16PTRC1	PTRC_OP	Busbar T16 PTRC
	CbfT16RBRF1	RBRF_STANDARD	CB Fail - T16
	DznT16PTOC1	PTOC_OP	Dead zone overcurrent protection T16
	LLN0	LLN0_STANDARD	LLN0
	OcpT16PTOC1	PTOC_OP	Overcurrent Protection T16 - Stage 1
	OcpT16PTOC2	PTOC_OP	Overcurrent Protection T16 - Stage 2
ProtBbT17			

LD	LN Instance	LN Type	Description
	BbpT17PDIF1	PDIF_BBP	Busbar Protection T17
	BbpT17PTRC1	PTRC_OP	Busbar T17 PTRC
	Cbft17RBRF1	RBRF_STANDARD	CB Fail - T17
	DznT17PTOC1	PTOC_OP	Dead zone overcurrent protection T17
	LLN0	LLN0_STANDARD	LLN0
	OcpT17PTOC1	PTOC_OP	Overcurrent Protection T17 - Stage 1
	OcpT17PTOC2	PTOC_OP	Overcurrent Protection T17 - Stage 2
ProtBbT18			
	BbpT18PDIF1	PDIF_BBP	Busbar Protection T18
	BbpT18PTRC1	PTRC_OP	Busbar T18 PTRC
	Cbft18RBRF1	RBRF_STANDARD	CB Fail - T18
	DznT18PTOC1	PTOC_OP	Dead zone overcurrent protection T18
	LLN0	LLN0_STANDARD	LLN0
	OcpT18PTOC1	PTOC_OP	Overcurrent Protection T18 - Stage 1
	OcpT18PTOC2	PTOC_OP	Overcurrent Protection T18 - Stage 2
Protection			
	LLN0	LLN0_STANDARD	Logical Device for Protection
	LPHD1	LPHD_STANDARD	Physical Device Information
	PTRC1	PTRC_NO_SEG	Trip Conditioning
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_128	GOOSE Input signals
	GosGGIO2	GGIO_IND_128	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
	LGOS100	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 100
	LGOS101	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 101
	LGOS102	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 102
	LGOS103	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 103
	LGOS104	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 104
	LGOS105	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 105
	LGOS106	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 106
	LGOS107	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 107
	LGOS108	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 108
	LGOS109	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 109
	LGOS11	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 11
	LGOS110	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 110
	LGOS111	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 111
	LGOS112	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 112
	LGOS113	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 113
	LGOS114	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 114
	LGOS115	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 115
	LGOS116	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 116

LD	LN Instance	LN Type	Description
	LGOS117	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 117
	LGOS118	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 118
	LGOS119	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 119
	LGOS12	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 12
	LGOS120	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 120
	LGOS121	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 121
	LGOS122	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 122
	LGOS123	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 123
	LGOS124	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 124
	LGOS125	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 125
	LGOS126	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 126
	LGOS127	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 127
	LGOS128	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 128
	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
	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
	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

LD	LN Instance	LN Type	Description
	LGOS92	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 92
	LGOS93	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 93
	LGOS94	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 94
	LGOS95	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 95
	LGOS96	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 96
	LGOS97	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 97
	LGOS98	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 98
	LGOS99	LGOS_SYSTEM	Monitoring of GOOSE Messages for External Publisher 99
	LLN0	LLN0_SYSTEM	System Logical Device
	LPHD1	LPHD_SYSTEM	Physical Device Information for System
	OptGGIO1	GGIO_IND_40	Opto Inputs (40 off)
	OrdRunGGIO1	GGIO_IND_64	Uniqueness of control "Order Running" indications for control operations
	PloGGIO1	GGIO_IND_32_CTRL	Controllable Inputs
	RlyGGIO1	GGIO_IND_24	Output Contacts (24 off)

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_64	(GGIO)	Generic Process I/O(w.r.t 64 Indication Elements)	IEC 61850-7-4:2007
GGIO_IND_10	(GGIO)	Generic Process I/O (w.r.t 10 Indication Elements)	IEC 61850-7-4:2007
GGIO_IND_128	(GGIO)	Generic process I/O	IEC 61850-7-4:2007
GGIO_IND_18	(GGIO)	Generic Process I/O (w.r.t 18 Indication Elements)	IEC 61850-7-4:2007
GGIO_IND_24	(GGIO)	Generic process I/O	IEC 61850-7-4:2007
GGIO_IND_32_CTRL	(GGIO)	Generic process I/O (w.r.t 32 Indications Ctrl i/p)	IEC 61850-7-4:2007
GGIO_IND_40	(GGIO)	Generic process I/O	IEC 61850-7-4:2007
GGIO_ALM_96	(GGIO)	Generic Process I/O (w.r.t 96 Alarm Elements)	IEC 61850-7-4:2007
LGOS_SYSTEM	(LGOS)	Monitoring of GOOSE messages	IEC 61850-7-4:2007
LLN0_STANDARD_WITH_CTRLMOD	(LLN0)	Logical Node 0	IEC 61850-7-4:2007
LLN0_SYSTEM	(LLN0)	Logical Node 0	IEC 61850-7-4:2007
LLN0_STANDARD	(LLN0)	General Logical Node 0	IEC 61850-7-4:2007
LPHD_STANDARD	(LPHD)	Px40 Physical Device Information	IEC 61850-7-4:2007
LPHD_SYSTEM	(LPHD)	Px40 Physical Device Information(used for Logical Device System only)	IEC 61850-7-4:2007
MLFR_P746	(MLFR)	Measurements of Fault Record	GE-SII:Px40:2013A
MMXU_DERIVED_A_6	(MMXU)	Standard measurements	IEC 61850-7-4:2007
MMXU_A_18	(MMXU)	Standard measurements	IEC 61850-7-4:2007
MMXU_FOURIER	(MMXU)	Fourier standard measurements	IEC 61850-7-4:2007
MMXU_IDIFF	(MMXU)	Differential Measurements for P746	IEC 61850-7-4:2007
MMXU_RMS_PHV	(MMXU)	RMS measurements	IEC 61850-7-4:2007
MMXU_A_6	(MMXU)	Standard measurements	IEC 61850-7-4:2007
MSQI_SEQ_6	(MSQI)	Sequence and imbalance	IEC 61850-7-4:2007
PDIF_NEU_SEG	(PDIF)	Differential	IEC 61850-7-4:2007
PDIF_NEU_SEG_NO_STR	(PDIF)	Differential	IEC 61850-7-4:2007
PDIF_BBP	(PDIF)	Differential	IEC 61850-7-4:2007
PTOC_OP	(PTOC)	Timed Overcurrent	IEC 61850-7-4:2007

LN Type	(LN Class)	Description	Name Space
PTOC_NEU	(PTOC)	Timed Overcurrent (w.r.t Neutral)	IEC 61850-7-4:2007
PTRC_NO_SEG	(PTRC)	Protection trip conditioning (w.r.t No Phase Segregation)	IEC 61850-7-4:2007
PTRC_OP	(PTRC)	Protection trip conditioning	IEC 61850-7-4:2007
RBRF_STANDARD	(RBRF)	Breaker Failure	IEC 61850-7-4:2007
RDRE_BASIC	(RDRE)	Disturbance Recorder function (w.r.t Mandatory Attributes only)	IEC 61850-7-4:2007
XCBR_BASIC	(XCBR)	Circuit Breaker (w.r.t Mandatory Attributes Only)	IEC 61850-7-4:2007
XSWI_STANDARD	(XSWI)	Circuit Switch	IEC 61850-7-4:2007

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
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		
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		

Attribute	Attr. Type	Explanation	T	X
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		
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		

Attribute	Attr. Type	Explanation	T	X
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
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 (binary input)		
Ind02	SPS_D	General indication (binary input)		
Ind03	SPS_D	General indication (binary input)		
Ind04	SPS_D	General indication (binary input)		
Ind05	SPS_D	General indication (binary input)		
Ind06	SPS_D	General indication (binary input)		
Ind07	SPS_D	General indication (binary input)		
Ind08	SPS_D	General indication (binary input)		
Ind09	SPS_D	General indication (binary input)		
Ind10	SPS_D	General indication (binary input)		

1.4.3 LOGICAL NODE: GGIO_IND_128

Description: Generic process I/O

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
Mod	INC_MOD	Mode		
Ind001	SPS_D	General indication (binary input)		
Ind002	SPS_D	General indication (binary input)		
Ind003	SPS_D	General indication (binary input)		
Ind004	SPS_D	General indication (binary input)		
Ind005	SPS_D	General indication (binary input)		
Ind006	SPS_D	General indication (binary input)		

Attribute	Attr. Type	Explanation	T	X
Ind007	SPS_D	General indication (binary input)		
Ind008	SPS_D	General indication (binary input)		
Ind009	SPS_D	General indication (binary input)		
Ind010	SPS_D	General indication (binary input)		
Ind011	SPS_D	General indication (binary input)		
Ind012	SPS_D	General indication (binary input)		
Ind013	SPS_D	General indication (binary input)		
Ind014	SPS_D	General indication (binary input)		
Ind015	SPS_D	General indication (binary input)		
Ind016	SPS_D	General indication (binary input)		
Ind017	SPS_D	General indication (binary input)		
Ind018	SPS_D	General indication (binary input)		
Ind019	SPS_D	General indication (binary input)		
Ind020	SPS_D	General indication (binary input)		
Ind021	SPS_D	General indication (binary input)		
Ind022	SPS_D	General indication (binary input)		
Ind023	SPS_D	General indication (binary input)		
Ind024	SPS_D	General indication (binary input)		
Ind025	SPS_D	General indication (binary input)		
Ind026	SPS_D	General indication (binary input)		
Ind027	SPS_D	General indication (binary input)		
Ind028	SPS_D	General indication (binary input)		
Ind029	SPS_D	General indication (binary input)		
Ind030	SPS_D	General indication (binary input)		
Ind031	SPS_D	General indication (binary input)		
Ind032	SPS_D	General indication (binary input)		
Ind033	SPS_D	General indication (binary input)		
Ind034	SPS_D	General indication (binary input)		
Ind035	SPS_D	General indication (binary input)		
Ind036	SPS_D	General indication (binary input)		
Ind037	SPS_D	General indication (binary input)		
Ind038	SPS_D	General indication (binary input)		
Ind039	SPS_D	General indication (binary input)		
Ind040	SPS_D	General indication (binary input)		
Ind041	SPS_D	General indication (binary input)		
Ind042	SPS_D	General indication (binary input)		
Ind043	SPS_D	General indication (binary input)		
Ind044	SPS_D	General indication (binary input)		
Ind045	SPS_D	General indication (binary input)		
Ind046	SPS_D	General indication (binary input)		
Ind047	SPS_D	General indication (binary input)		
Ind048	SPS_D	General indication (binary input)		
Ind049	SPS_D	General indication (binary input)		
Ind050	SPS_D	General indication (binary input)		
Ind051	SPS_D	General indication (binary input)		
Ind052	SPS_D	General indication (binary input)		
Ind053	SPS_D	General indication (binary input)		
Ind054	SPS_D	General indication (binary input)		
Ind055	SPS_D	General indication (binary input)		
Ind056	SPS_D	General indication (binary input)		

Attribute	Attr. Type	Explanation	T	X
Ind057	SPS_D	General indication (binary input)		
Ind058	SPS_D	General indication (binary input)		
Ind059	SPS_D	General indication (binary input)		
Ind060	SPS_D	General indication (binary input)		
Ind061	SPS_D	General indication (binary input)		
Ind062	SPS_D	General indication(binary input)		
Ind063	SPS_D	General indication(binary input)		
Ind064	SPS_D	General indication(binary input)		
Ind065	SPS_D	General indication(binary input)		
Ind066	SPS_D	General indication(binary input)		
Ind067	SPS_D	General indication(binary input)		
Ind068	SPS_D	General indication(binary input)		
Ind069	SPS_D	General indication(binary input)		
Ind070	SPS_D	General indication(binary input)		
Ind071	SPS_D	General indication(binary input)		
Ind072	SPS_D	General indication(binary input)		
Ind073	SPS_D	General indication(binary input)		
Ind074	SPS_D	General indication(binary input)		
Ind075	SPS_D	General indication(binary input)		
Ind076	SPS_D	General indication(binary input)		
Ind077	SPS_D	General indication(binary input)		
Ind078	SPS_D	General indication(binary input)		
Ind079	SPS_D	General indication(binary input)		
Ind080	SPS_D	General indication(binary input)		
Ind081	SPS_D	General indication(binary input)		
Ind082	SPS_D	General indication(binary input)		
Ind083	SPS_D	General indication(binary input)		
Ind084	SPS_D	General indication(binary input)		
Ind085	SPS_D	General indication(binary input)		
Ind086	SPS_D	General indication(binary input)		
Ind087	SPS_D	General indication(binary input)		
Ind088	SPS_D	General indication(binary input)		
Ind089	SPS_D	General indication(binary input)		
Ind090	SPS_D	General indication(binary input)		
Ind091	SPS_D	General indication(binary input)		
Ind092	SPS_D	General indication(binary input)		
Ind093	SPS_D	General indication(binary input)		
Ind094	SPS_D	General indication(binary input)		
Ind095	SPS_D	General indication(binary input)		
Ind096	SPS_D	General indication(binary input)		
Ind097	SPS_D	General indication(binary input)		
Ind098	SPS_D	General indication(binary input)		
Ind099	SPS_D	General indication(binary input)		
Ind100	SPS_D	General indication(binary input)		
Ind101	SPS_D	General indication(binary input)		
Ind102	SPS_D	General indication(binary input)		
Ind103	SPS_D	General indication(binary input)		
Ind104	SPS_D	General indication(binary input)		
Ind105	SPS_D	General indication(binary input)		
Ind106	SPS_D	General indication(binary input)		

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

1.4.4 LOGICAL NODE: GGIO_IND_18

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

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	X
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 (binary input)		
Ind02	SPS_D	General indication (binary input)		
Ind03	SPS_D	General indication (binary input)		
Ind04	SPS_D	General indication (binary input)		
Ind05	SPS_D	General indication (binary input)		
Ind06	SPS_D	General indication (binary input)		
Ind07	SPS_D	General indication (binary input)		
Ind08	SPS_D	General indication (binary input)		
Ind09	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)		

1.4.5 LOGICAL NODE: GGIO_IND_24

Description: Generic process I/O

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		
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		

1.4.6 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		
Mod	ENC_MOD_THREE_STATUS	Mode		
SPCS001	SPC_CONTROL	Single point controllable status output		
SPCS002	SPC_CONTROL	Single point controllable status output		
SPCS003	SPC_CONTROL	Single point controllable status output		
SPCS004	SPC_CONTROL	Single point controllable status output		
SPCS005	SPC_CONTROL	Single point controllable status output		
SPCS006	SPC_CONTROL	Single point controllable status output		
SPCS007	SPC_CONTROL	Single point controllable status output		

Attribute	Attr. Type	Explanation	T	X
SPCS008	SPC_CONTROL	Single point controllable status output		
SPCS009	SPC_CONTROL	Single point controllable status output		
SPCS010	SPC_CONTROL	Single point controllable status output		
SPCS011	SPC_CONTROL	Single point controllable status output		
SPCS012	SPC_CONTROL	Single point controllable status output		
SPCS013	SPC_CONTROL	Single point controllable status output		
SPCS014	SPC_CONTROL	Single point controllable status output		
SPCS015	SPC_CONTROL	Single point controllable status output		
SPCS016	SPC_CONTROL	Single point controllable status output		
SPCS017	SPC_CONTROL	Single point controllable status output		
SPCS018	SPC_CONTROL	Single point controllable status output		
SPCS019	SPC_CONTROL	Single point controllable status output		
SPCS020	SPC_CONTROL	Single point controllable status output		
SPCS021	SPC_CONTROL	Single point controllable status output		
SPCS022	SPC_CONTROL	Single point controllable status output		
SPCS023	SPC_CONTROL	Single point controllable status output		
SPCS024	SPC_CONTROL	Single point controllable status output		
SPCS025	SPC_CONTROL	Single point controllable status output		
SPCS026	SPC_CONTROL	Single point controllable status output		
SPCS027	SPC_CONTROL	Single point controllable status output		
SPCS028	SPC_CONTROL	Single point controllable status output		
SPCS029	SPC_CONTROL	Single point controllable status output		
SPCS030	SPC_CONTROL	Single point controllable status output		
SPCS031	SPC_CONTROL	Single point controllable status output		
SPCS032	SPC_CONTROL	Single point controllable status output		

1.4.7 LOGICAL NODE: GGIO_IND_40

Description: Generic process I/O

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 (binary input)		
Ind02	SPS_D	General indication (binary input)		
Ind03	SPS_D	General indication (binary input)		
Ind04	SPS_D	General indication (binary input)		
Ind05	SPS_D	General indication (binary input)		
Ind06	SPS_D	General indication (binary input)		
Ind07	SPS_D	General indication (binary input)		
Ind08	SPS_D	General indication (binary input)		
Ind09	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)		

Attribute	Attr. Type	Explanation	T	X
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)		

1.4.8 LOGICAL NODE: GGIO_IND_64

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

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	X
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 (binary input)		
Ind02	SPS_D	General indication (binary input)		
Ind03	SPS_D	General indication (binary input)		
Ind04	SPS_D	General indication (binary input)		
Ind05	SPS_D	General indication (binary input)		
Ind06	SPS_D	General indication (binary input)		
Ind07	SPS_D	General indication (binary input)		
Ind08	SPS_D	General indication (binary input)		
Ind09	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)		

Attribute	Attr. Type	Explanation	T	X
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)		
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)		

1.4.9 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		
St	SPS_WD	Status of the subscription (True = active, False=not active)		
SimSt	SPS_WD	Status showing that really Sim messages are received and accepted		
GoCBRef	ORG_SRC_REF	Reference to the subscribed GOOSE control block		
OoSeqGo	SPS_WD_PRIV	Out of order GOOSE indication		X

1.4.10 LOGICAL NODE: LLN0_STANDARD

Description: General 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_MOD_THREE_STATUS	Mode		
GrRef	ORG_SRC_REF	Reference to a higher level logical device		

1.4.11 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	Mode		
GrRef	ORG_SRC_REF	Reference to a higher level logical device		

1.4.12 LOGICAL NODE: LLN0_SYSTEM

Description: 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_IED_MOD	Mode		
LEDs	SPC_CONTROL	LED reset	T	
OrdRun	SPS_WD_PRIV	Order Running(IEC61850 phase 2.0 and 2.1)		X
SyncSt	SPS_WD_PRIV	Time Synchronisation Indication(IEC61850 phase 2.0 and 2.1)		X

1.4.13 LOGICAL NODE: LPHD_STANDARD

Description: Px40 Physical Device Information

LN Class: LPHD

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

1.4.14 LOGICAL NODE: LPHD_SYSTEM

Description: Px40 Physical Device Information(used for Logical Device System only)

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		

1.4.15 LOGICAL NODE: MLFR_P746

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_BEH_THREE_STATUS_DN	Health		
Mod	ENC_MOD_THREE_STATUS_DN	Mode		
Hz	MV_FLOAT_D_PRIV	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
T01A1Flt	WYE_SEG_NS	IA-1, IB-1 & IC-1 Magnitudes		X
T02A2Flt	WYE_SEG_NS	IA-2, IB-2 & IC-2 Magnitudes		X
T03A3Flt	WYE_SEG_NS	IA-3, IB-3 & IC-3 Magnitudes		X
T05A5Flt	WYE_SEG_NS	IA-5, IB-5 & IC-5 Magnitudes		X
T04A4Flt	WYE_SEG_NS	IA-4, IB-4 & IC-4 Magnitudes		X
T06A6Flt	WYE_SEG_NS	IA-6, IB-6 & IC-6 Magnitude		X
T01Amp1Flt	MV_FLOAT_D_PRIV	IX-1 Magnitude		X
T02Amp2Flt	MV_FLOAT_D_PRIV	IX-2 Magnitude		X
T03Amp3Flt	MV_FLOAT_D_PRIV	IX-3 Magnitude		X
T04Amp4Flt	MV_FLOAT_D_PRIV	IX-4 Magnitude		X
T05Amp5Flt	MV_FLOAT_D_PRIV	IX-5 Magnitude		X
T06Amp6Flt	MV_FLOAT_D_PRIV	IX-6 Magnitude		X
T07Amp7Flt	MV_FLOAT_D_PRIV	IX-7 Magnitude		X
T08Amp8Flt	MV_FLOAT_D_PRIV	IX-8 Magnitude		X
T09Amp9Flt	MV_FLOAT_D_PRIV	IX-9 Magnitude		X
T10Amp10Flt	MV_FLOAT_D_PRIV	IX-10 Magnitude		X

Attribute	Attr. Type	Explanation	T	X
T11Amp11Flt	MV_FLOAT_D_PRIV	IX-11 Magnitude		X
T12Amp12Flt	MV_FLOAT_D_PRIV	IX-12 Magnitude		X
T13Amp13Flt	MV_FLOAT_D_PRIV	IX-13 Magnitude		X
T14Amp14Flt	MV_FLOAT_D_PRIV	IX-14 Magnitude		X
T15Amp15Flt	MV_FLOAT_D_PRIV	IX-15 Magnitude		X
T16Amp16Flt	MV_FLOAT_D_PRIV	IX-16 Magnitude		X
T17Amp17Flt	MV_FLOAT_D_PRIV	IX-17 Magnitude		X
T18Amp18Flt	MV_FLOAT_D_PRIV	IX-18 Magnitude		X
PhVFlt	WYE_SEG_D_NS	VAN, VBN, VCN Magnitudes		X
V1Flt	MV_FLOAT_D_PRIV	V1 Magnitude		X
V2Flt	MV_FLOAT_D_PRIV	V2 Magnitude		X
NeutVnFlt	MV_FLOAT_D_PRIV	VN Derived Mag		X
PPVFlt	DEL_SEG_D_NS	VAB, VBC & VCA Magnitudes		X
Z1ADifFlt	WYE_SEG_D_NS	Z1 Differential Current IA, IB & IC		X
Z1ABiasFlt	WYE_SEG_D_NS	Z1 Bias Current IA, IB & IC		X
Z2ADifFlt	WYE_SEG_D_NS	Z2 Differential Current IA, IB & IC		X
Z2ABiasFlt	WYE_SEG_D_NS	Z2 Bias Current IA, IB & IC		X
CZADifFlt	WYE_SEG_D_NS	Check Zone Diff IA, IB & IC Measurements		X
CZABiasFlt	WYE_SEG_D_NS	Check Channel Bias Current IA, IB & IC		X

1.4.16 LOGICAL NODE: MMXU_A_18

Description: Standard measurements

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
Mod	INC_MOD	Mode		
T2	WYE_SEG_ANONYMOUS	Single anonymous phase terminal 2		
T1	WYE_SEG_ANONYMOUS	Single anonymous phase terminal 1		
T3	WYE_SEG_ANONYMOUS	Single anonymous phase terminal 3		
T4	WYE_SEG_ANONYMOUS	Single anonymous phase terminal 4		
T5	WYE_SEG_ANONYMOUS	Single anonymous phase terminal 5		
T6	WYE_SEG_ANONYMOUS	Single anonymous phase terminal 6		
T7	WYE_SEG_ANONYMOUS	Single anonymous phase terminal 7		
T8	WYE_SEG_ANONYMOUS	Single anonymous phase terminal 8		
T9	WYE_SEG_ANONYMOUS	Single anonymous phase terminal 9		
T10	WYE_SEG_ANONYMOUS	Single anonymous phase terminal 10		
T11	WYE_SEG_ANONYMOUS	Single anonymous phase terminal 11		
T12	WYE_SEG_ANONYMOUS	Single anonymous phase terminal 12		
T13	WYE_SEG_ANONYMOUS	Single anonymous phase terminal 13		
T14	WYE_SEG_ANONYMOUS	Single anonymous phase terminal 14		
T15	WYE_SEG_ANONYMOUS	Single anonymous phase terminal 15		
T16	WYE_SEG_ANONYMOUS	Single anonymous phase terminal 16		
T17	WYE_SEG_ANONYMOUS	Single anonymous phase terminal 17		
T18	WYE_SEG_ANONYMOUS	Single anonymous phase terminal 18		

1.4.17 LOGICAL NODE: MMXU_A_6

Description: Standard measurements

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
Mod	INC_MOD	Mode		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
T1	WYE_SEG_ANG	Single anonymous phase terminal 1		
T2	WYE_SEG_ANG	Single anonymous phase terminal 2		
T3	WYE_SEG_ANG	Single anonymous phase terminal 3		
T4	WYE_SEG_ANG	Single anonymous phase terminal 4		
T5	WYE_SEG_ANG	Single anonymous phase terminal 5		
T6	WYE_SEG_ANG	Single anonymous phase terminal 6		

1.4.18 LOGICAL NODE: MMXU_DERIVED_A_6

Description: Standard measurements

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	INS_BEH	Behaviour		
Health	INS_HEALTH	Health		
Mod	INC_MOD	Mode		
T1	WYE_SEG_ANONYMOUS	Phase currents, derived - T1		
T2	WYE_SEG_ANONYMOUS	Phase currents, derived - T2		
T3	WYE_SEG_ANONYMOUS	Phase currents, derived - T3		
T4	WYE_SEG_ANONYMOUS	Phase currents, derived - T4		
T5	WYE_SEG_ANONYMOUS	Phase currents, derived - T5		
T6	WYE_SEG_ANONYMOUS	Phase currents, derived - T6		

1.4.19 LOGICAL NODE: MMXU_FOURIER

Description: Fourier 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		
Hz	MV_FLOAT_D	Frequency		
PPV	DEL_SEG	Phase to Phase voltages		
PhV	WYE_SEG	Phase to Ground voltages		
V0	MV_FLOAT_NS	V0 Magnitude		
V1	MV_FLOAT_NS	V1 Magnitude		
V2	MV_FLOAT_NS	V2 Magnitude		
Vx	WYE_RES_MAG_D_NS	Vx		
VNd	WYE_RES_MAG_D_NS	VNd		

1.4.20 LOGICAL NODE: MMXU_IDIFF

Description: Differential Measurements for P746

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	INS_BEH	Behaviour		
Mod	INC_MOD	Mode		
Health	INS_HEALTH	Health		
ABias	WYE_SEG_NS	Phase currents (IBias)		X
ADiff	WYE_SEG_NS	Phase currents (IDiff)		X

1.4.21 LOGICAL NODE: MMXU_RMS_PHV

Description: RMS 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		
PhV	WYE_SEG_NS	Phase to Ground voltages		

1.4.22 LOGICAL NODE: MSQI_SEQ_6

Description: Sequence and imbalance

LN Class: MSQI

Attribute	Attr. Type	Explanation	T	X
Health	INS_HEALTH	Health		
NamPlt	LPL_LN	Name Plate		
Beh	INS_BEH	Behaviour		
Mod	INC_MOD	Mode		
SeqA1	SEQ_MAG	Positive, Negative and Zero sequence current for T1		
SeqA2	SEQ_MAG	Positive, Negative and Zero sequence current for T2		
SeqA3	SEQ_MAG	Positive, Negative and Zero sequence current for T3		
SeqA4	SEQ_MAG	Positive, Negative and Zero sequence current for T4		
SeqA5	SEQ_MAG	Positive, Negative and Zero sequence current for T5		
SeqA6	SEQ_MAG	Positive, Negative and Zero sequence current for T6		

1.4.23 LOGICAL NODE: PDIF_BBP

Description: Differential

LN Class: PDIF

Attribute	Attr. Type	Explanation	T	X
Beh	INS_BEH	Behaviour		
NamPlt	LPL_LN	Name Plate		
Mod	INC_MOD	Mode		
Health	INS_HEALTH	Health		
Op	ACT_NO_SEG	Operate Busbar Differential on this Terminal	T	

1.4.24 LOGICAL NODE: PDIF_NEU_SEG

Description: Differential

LN Class: PDIF

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_SEG	Start		
Op	ACT_SEG	Operate	T	

1.4.25 LOGICAL NODE: PDIF_NEU_SEG_NO_STR

Description: Differential

LN Class: PDIF

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		
Op	ACT_SEG	Operate	T	

1.4.26 LOGICAL NODE: PTOC_NEU

Description: Timed Overcurrent (w.r.t Neutral)

LN Class: PTOC

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	

1.4.27 LOGICAL NODE: PTOC_OP

Description: Timed Overcurrent

LN Class: PTOC

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

1.4.28 LOGICAL NODE: PTRC_NO_SEG

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

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		
Str	ACD_NO_SEG	Sum of all starts of all connected Logical Nodes		

1.4.29 LOGICAL NODE: PTRC_OP

Description: Protection trip 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_SEG_NEU	Operate (combination of subscribed Op from protection functions)		
Str	ACD_SEG_NEU	Sum of all starts of all connected Logical Nodes		

1.4.30 LOGICAL NODE: RBRF_STANDARD

Description: Breaker Failure

LN Class: RBRF

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_LN	Name Plate		
Beh	INS_BEH	Behaviour		
Mod	INC_MOD	Mode		
Health	INS_HEALTH	Health		
OpEx	ACT_NO_SEG	Breaker failure trip (External Trip)		
OpIn	ACT_NO_SEG	Operate, retrip (Internal Trip)		

1.4.31 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		

1.4.32 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		
EEHealth	ENS_HEALTH	External equipment health		
Mod	ENC_MOD_THREE_STATUS	Mode		
Loc	SPS_WD	Local operation		
OpCnt	INS_BASIC	Operation counter		
CBOPcap	ENS_CBCAP	Circuit Breaker operating capability		
Pos	DPC_STATUS	Switch position		
BlkOpn	SPC_STATUS	Block opening		
BlkCls	SPC_STATUS	Block closing		

1.4.33 LOGICAL NODE: XSWI_STANDARD

Description: Circuit Switch

LN Class: XSWI

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 control behaviour		
OpCnt	INS_BASIC	Operation counter		
SwTyp	ENS_SWTYPE	Switch type		
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
GS	GSSE Control (UCA2 GOOSE)	IEC61850-7-2

FC Name	Semantic	Source Definition
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_SEG

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

CDC Class: ACD

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

1.5.3 COMMON DATA CLASS: ACD_SEG_NEU

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

CDC Class: ACD

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

1.5.4 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	
q	Quality	ST		Quality of the protection activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection activation information	

1.5.6 COMMON DATA CLASS: ACT_SEG_NEU

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

CDC Class: ACT

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

1.5.7 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.	
rangeC	RangeConfig_Deadband	CF		Measurement range configuration attributes	
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	
dbAng	INT32U	CF		Deadband for angles	

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

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

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	

1.5.10 COMMON DATA CLASS: DEL_SEG_D_NS

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_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)	

1.5.12 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	

1.5.13 COMMON DATA CLASS: ENC_CTRL_IED_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	

1.5.14 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_2	Control value	
origin	Originator	ST		Originator of the last change of the controllable data	
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	

1.5.15 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)	

1.5.16 COMMON DATA CLASS: ENC_MOD_THREE_STATUS_DN

Description: Controllable enumerated 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)	
dataNs	VISIBLE_STRING255	EX		Data name space	

1.5.17 COMMON DATA CLASS: ENS_BEH_FOUR_STATUS

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	

1.5.18 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	

1.5.19 COMMON DATA CLASS: ENS_BEH_THREE_STATUS_DN

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

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	

1.5.20 COMMON DATA CLASS: ENS_CBCAP

Description: Enumerated status

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	

1.5.21 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	

1.5.22 COMMON DATA CLASS: ENS_SWTYPE

Description: Enumerated status

CDC Class: ENS

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

1.5.23 COMMON DATA CLASS: INC_MOD

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

CDC Class: INC

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

1.5.24 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	

1.5.25 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	

1.5.26 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	

1.5.27 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	

Attribute	Type	FC	Enumeration	Comment	X
configRev	VISIBLE_STRING255	DC		Uniquely identifies the configuration of a local device instance	
ldNs	VISIBLE_STRING255	EX		Logical Device name space	

1.5.28 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	

1.5.29 COMMON DATA CLASS: LPL_LN_PRIV

Description: Logical Node Name Plate (w.r.t 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	

1.5.30 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	

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

1.5.32 COMMON DATA CLASS: MV_FLOAT_NS

Description: MV_FLOAT with dataNs for extra DOs

CDC Class: MV

Attribute	Type	FC	Enumeration	Comment	X
mag	AnalogueValue_Float	MX		Deadbanded magnitude of the instantaneous value of a measured value or harmonic value. Updated to the current value of instMag when the value has changed according to the configuration parameter db.	
q	Quality	MX		Quality of the measurement value	
t	TimeStamp	MX		Time deadbanded magnitude last exceeded its db configuration parameter	
units	Unit_Multiplier	CF		Unit of the attribute representing the data	
db	INT32U	CF		Measurement deadband	
rangeC	RangeConfig_Deadband	CF		Measurement range configuration attributes	
dataNs	VISIBLE_STRING255	EX		Data name space	

1.5.33 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	

1.5.34 COMMON DATA CLASS: SEQ_MAG

Description: Sequence components of a measurement value

CDC Class: SEQ

Attribute	Type	FC	Enumeration	Comment	X
pos	CMV_MAG_FLOAT	--		Sequence component 1 (For semantic meaning see seqT)	
neg	CMV_MAG_FLOAT	--		Sequence component 2 (For semantic meaning see seqT)	
zero	CMV_MAG_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)	

1.5.35 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)	

1.5.36 COMMON DATA CLASS: SPC_STATUS

Description: Controllable Single Point (w.r.t Status only)

CDC Class: SPC

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

1.5.37 COMMON DATA CLASS: SPS_D

Description: Standard Single Point Status (with Description)

CDC Class: SPS

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

1.5.38 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	

1.5.39 COMMON DATA CLASS: SPS_WD_PRIV

Description: Single Point Status

CDC Class: SPS

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

1.5.40 COMMON DATA CLASS: WYE_RES_MAG_D_NS

Description: Phase to ground measurements for a 1-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	

1.5.41 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	

1.5.42 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	

1.5.43 COMMON DATA CLASS: WYE_SEG_ANONYMOUS

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	
dataNs	VISIBLE_STRING255	EX		Data name space	

1.5.44 COMMON DATA CLASS: WYE_SEG_D_NS

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

1.5.45 COMMON DATA CLASS: WYE_SEG_NS

Description: WYE_SEG with dataNs DO

CDC Class: WYE

Attribute	Type	FC	Enumeration	Comment	X
phsA	CMV_MAG_FLOAT	--		Measurement values for Phase A	
phsB	CMV_MAG_FLOAT	--		Measurement values for Phase B	
phsC	CMV_MAG_FLOAT	--		Measurement values for Phase C	
dataNs	VISIBLE_STRING255	EX		Data name space	

1.6 COMMON DATA ATTRIBUTE TYPE DEFINITIONS

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

1.6.1 COMPONENT: ANALOGUEVALUE_FLOAT

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

Parent Type: AnalogueValue

Attribute	Type	Enumeration	Comment	X
f	FLOAT32		Floating point value	

1.6.2 COMPONENT: ORIGINATOR

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

Parent Type:

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

1.6.3 COMPONENT: RANGECONFIG_DEADBAND

Comment: Measurement range configuration

Parent Type: RangeConfig

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

1.6.4 COMPONENT: UNIT_MULTIPLIER

Comment: SI Unit definitions

Parent Type: Unit

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

1.6.5 COMPONENT: VECTOR_MAGNITUDE_FLOAT

Comment: Complex vector (w.r.t Floating Point Magnitude value)

Parent Type: Vector

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

1.6.6 COMPONENT: VECTOR_MAGNITUDEANGLE_FLOAT

Comment: Complex vector (w.r.t Floating Point Magnitude and Angle values)

Parent Type: Vector

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

1.7 ENUMERATED TYPE DEFINITIONS

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

1.7.1 ENUMERATED TYPE: ADDCAUSE

Description: IEC61850 phase 2.0 and 2.1

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

Ordinal	Semantic
26	Inconsistent-parameters
27	Locked-by-other-client

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: BEH_3

Description: Behaviour including 3 states

Ordinal	Semantic
1	on
3	test
4	test/blocked

1.7.4 ENUMERATED TYPE: BEH_4

Description: Behaviour including 4 states

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

1.7.5 ENUMERATED TYPE: CBOPCAP

Description: CB Operating Capability

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

1.7.6 ENUMERATED TYPE: CTLMODEL

Description: Control Model

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

Ordinal	Semantic
3	direct-with-enhanced-security
4	sbo-with-enhanced-security

1.7.7 ENUMERATED TYPE: DBPOS

Description: Circuit Breaker position

Ordinal	Semantic
0	intermediate
1	off
2	on
3	bad

1.7.8 ENUMERATED TYPE: DIR

Description: Direction

Ordinal	Semantic
0	unknown
1	forward
2	backward
3	both

1.7.9 ENUMERATED TYPE: HEALTH

Description: Health

Ordinal	Semantic
1	Ok
2	Warning
3	Alarm

1.7.10 ENUMERATED TYPE: MOD

Description: Mode

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

1.7.11 ENUMERATED TYPE: MOD_2

Description: Mode including 2 states

Ordinal	Semantic
1	on
5	off

1.7.12 ENUMERATED TYPE: MOD_3

Description: Mode including 3 states

Ordinal	Semantic
1	on
3	test
4	test/blocked

1.7.13 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

1.7.14 ENUMERATED TYPE: ORCATEGORY

Description: IEC61850 phase 2.0 and 2.1

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

1.7.15 ENUMERATED TYPE: SEQT

Description: Sequence Measurement Type

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

1.7.16 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
27	S
28	H
29	V
30	ohm
31	J
32	N
33	Hz

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

1.7.17 ENUMERATED TYPE: SWTYPE

Description: Switch Type

Ordinal	Semantic
1	Load Break
2	Disconnecter
3	Earthing Switch
4	High Speed Earthing Switch

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 (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	Utctime	IEC61850 Time stamp
UNICODE_STRING255	UTF8Vstring255	255 character string (16 bits per unicode character)
UTC_TM	Utctime	UTC Timestamp
VISIBLE_STRING129	Vstring129	129 character string
VISIBLE_STRING255	Vstring255	255 character string
VISIBLE_STRING64	Vstring64	64 character string
VISIBLE_STRING65	Vstring65	65 character string
VISIBLE_STRING97	Vstring97	97 character string



Imagination at work

Grid Solutions
St Leonards Building
Redhill Business Park
Stafford, ST16 1WT, UK
+44 (0) 1785 250 070
www.gegridsolutions.com/contact

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