

GE
Grid Solutions

Multilin Agile

P14D, P14N, P94V

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.

This document is applicable for Multilin Agile range products (P14N, P14D and P94V) with firmware version 06 and IEC 61850 version 6.

Note:

The Multilin Agile range is undergoing a transition, with 30TE models being branded as Multilin Agile, whereas the 20TE model continues to carry the P40 Agile Enhanced branding for this transition period. Both 20TE and 30TE products are similar, with any differences between them highlighted by reference to the case size. For more information refer to instruction manual MAP14-TM-EN-5.pdf on the Grid Solutions web page.

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 Multilin Agile device 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 LLNO 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 Multilin Agile 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 Multilin Agile server.

Logical Device	Comment/Usage
Ctrl	MultilinAgile Controls Domain
Meter	MultilinAgile Measurements Domain
Prot	MultilinAgile Protection Domain
Master	MultilinAgile System Domain

1.3.1 IEC 61850 LOGICAL DEVICE DATA MODEL

The IEC 61850 Logical Device top-level data model consists of instances of Logical Nodes. The data model name for a Logical Node instance is constructed from an optional prefix (known as the wrapper), the Logical Node name, and an instance ID (or suffix).

The presented data model is in an alphabetically sorted order, rather than a logical order, because this is the natural order of the data when presented by a native MMS browser. (Higher level browsers can of course impart any ordering that they desire).

LD	LN Instance	LN Type	Description	P14N	P14D	P94V
Ctrl						
	ColdLodGAPC1	GAPC	Cold Load Pickup	Yes	Yes	No
	CSW1	CSWI_LOC	SW1 Control	Yes	Yes	Yes
	CSW2	CSWI_LOC	SW2 Control	Yes	Yes	Yes
	CSW3	CSWI_LOC	SW3 Control	Yes	Yes	Yes
	CSW4	CSWI_LOC	SW4 Control	Yes	Yes	Yes
	CSW5	CSWI_LOC	SW5 Control	Yes	Yes	Yes
	CSW6	CSWI_LOC	SW6 Control	Yes	Yes	Yes
	CSW7	CSWI_LOC	SW7 Control	Yes	Yes	Yes
	CSW8	CSWI_LOC	SW8 Control	Yes	Yes	Yes
	CTSupGAPC1	CTSupervisionGAPC_2	CT Supervision	Yes	Yes	No
	HaDetPHAR1	PHAR	HarmDet1	Yes	Yes	No
	HaDetPHAR2	PHAR	HarmDet2	Yes	Yes	No
	HaDetPHAR3	PHAR	HarmDet3	Yes	Yes	No
	HaDetPHAR4	PHAR	HarmDet4	Yes	Yes	No
	HaDetPHAR5	PHAR	HarmDet5	Yes	Yes	No
	HaDetPHAR6	PHAR	HarmDet6	Yes	Yes	No
	LLN0	LLNO	Controls Logical Device	Yes	Yes	Yes
	LPHD	LPHD_1	Physical Device Information	Yes	Yes	Yes
	PoleDeaGAPC1	PoleDeadGAPC	Pole Dead 1	Yes	Yes	No
	PoleDscGAPC1	PoleDiscordanceGAPC	Pole Discordance	Yes	Yes	No
	RBRF1	RBRF	CB Fail & I<	Yes	Yes	No
	RREC1	RREC	Auto Reclose	Yes (P14NL)	Yes (P14DL)	Yes (P94VP)
	SynChkRSYN1	RSYN	Synchrocheck	No	Yes (P14DL)	Yes (P94VP)
	TVTR1	TVTR	VT Supervision	No	Yes	No
	XCBR1	XCBR	CB Control	Yes	Yes	Yes
	XSWI1	XSWI_0	SW1 Status	Yes	Yes	Yes
	XSWI2	XSWI_0	SW2 Status	Yes	Yes	Yes
	XSWI3	XSWI_0	SW3 Status	Yes	Yes	Yes
	XSWI4	XSWI_0	SW4 Status	Yes	Yes	Yes
	XSWI5	XSWI_0	SW5 Status	Yes	Yes	Yes
	XSWI6	XSWI_0	SW6 Status	Yes	Yes	Yes
	XSWI7	XSWI_0	SW7 Status	Yes	Yes	Yes
	XSWI8	XSWI_0	SW8 Status	Yes	Yes	Yes
Master						
	GGIO1	GGIO_RO	GGIO1 Indication 1 to 32 Status	Yes	Yes	Yes
	GGIO2	GGIO_CI	Opto Inputs Status	Yes	Yes	Yes
	GGIO3	GGIO_VI	Virtual Inputs 1-128	Yes	Yes	Yes
	GGIO4	GGIO_VO	Virtual Outputs 1-128	Yes	Yes	Yes
	GGIO5	GGIO_RI	Remote Inputs 1-128	Yes	Yes	Yes
	GGIO6	GGIO_CO	Output Relays status	Yes	Yes	Yes
	LEDsIHMI1	IHMI_LEDS	Leds status of the front panel	Yes	Yes	Yes
	LGOS1	LGOS	GOOSE 1 subscription monitoring	Yes	Yes	Yes
	LGOS10	LGOS	GOOSE 10 subscription monitoring	Yes	Yes	Yes

LD	LN Instance	LN Type	Description	P14N	P14D	P94V
	LGOS11	LGOS	GOOSE 11 subscription monitoring	Yes	Yes	Yes
	LGOS12	LGOS	GOOSE 12 subscription monitoring	Yes	Yes	Yes
	LGOS13	LGOS	GOOSE 13 subscription monitoring	Yes	Yes	Yes
	LGOS14	LGOS	GOOSE 14 subscription monitoring	Yes	Yes	Yes
	LGOS15	LGOS	GOOSE 15 subscription monitoring	Yes	Yes	Yes
	LGOS16	LGOS	GOOSE 16 subscription monitoring	Yes	Yes	Yes
	LGOS17	LGOS	GOOSE 17 subscription monitoring	Yes	Yes	Yes
	LGOS18	LGOS	GOOSE 18 subscription monitoring	Yes	Yes	Yes
	LGOS19	LGOS	GOOSE 19 subscription monitoring	Yes	Yes	Yes
	LGOS2	LGOS	GOOSE 2 subscription monitoring	Yes	Yes	Yes
	LGOS20	LGOS	GOOSE 20 subscription monitoring	Yes	Yes	Yes
	LGOS21	LGOS	GOOSE 21 subscription monitoring	Yes	Yes	Yes
	LGOS22	LGOS	GOOSE 22 subscription monitoring	Yes	Yes	Yes
	LGOS23	LGOS	GOOSE 23 subscription monitoring	Yes	Yes	Yes
	LGOS24	LGOS	GOOSE 24 subscription monitoring	Yes	Yes	Yes
	LGOS25	LGOS	GOOSE 25 subscription monitoring	Yes	Yes	Yes
	LGOS26	LGOS	GOOSE 26 subscription monitoring	Yes	Yes	Yes
	LGOS27	LGOS	GOOSE 27 subscription monitoring	Yes	Yes	Yes
	LGOS28	LGOS	GOOSE 28 subscription monitoring	Yes	Yes	Yes
	LGOS29	LGOS	GOOSE 29 subscription monitoring	Yes	Yes	Yes
	LGOS3	LGOS	GOOSE 3 subscription monitoring	Yes	Yes	Yes
	LGOS30	LGOS	GOOSE 30 subscription monitoring	Yes	Yes	Yes
	LGOS31	LGOS	GOOSE 31 subscription monitoring	Yes	Yes	Yes
	LGOS32	LGOS	GOOSE 32 subscription monitoring	Yes	Yes	Yes
	LGOS4	LGOS	GOOSE 4 subscription monitoring	Yes	Yes	Yes
	LGOS5	LGOS	GOOSE 5 subscription monitoring	Yes	Yes	Yes
	LGOS6	LGOS	GOOSE 6 subscription monitoring	Yes	Yes	Yes
	LGOS7	LGOS	GOOSE 7 subscription monitoring	Yes	Yes	Yes
	LGOS8	LGOS	GOOSE 8 subscription monitoring	Yes	Yes	Yes
	LGOS9	LGOS	GOOSE 9 subscription monitoring	Yes	Yes	Yes

LD	LN Instance	LN Type	Description	P14N	P14D	P94V
	LLN0	LLN0_MOD	Master Logical Device	Yes	Yes	Yes
	LPHD	LPHD	Physical Device Information	Yes	Yes	Yes
	LTIM1	LTIM	Time management	Yes	Yes	Yes
	RptRFLO1	RFLO	Fault Report 1	Yes	Yes	Yes
	RptRFLO10	RFLO	Fault Report 10	Yes	Yes	Yes
	RptRFLO11	RFLO	Fault Report 11	Yes	Yes	Yes
	RptRFLO12	RFLO	Fault Report 12	Yes	Yes	Yes
	RptRFLO13	RFLO	Fault Report 13	Yes	Yes	Yes
	RptRFLO14	RFLO	Fault Report 14	Yes	Yes	Yes
	RptRFLO15	RFLO	Fault Report 15	Yes	Yes	Yes
	RptRFLO16	RFLO	Fault Report 16	Yes	Yes	Yes
	RptRFLO17	RFLO	Fault Report 17	Yes	Yes	Yes
	RptRFLO18	RFLO	Fault Report 18	Yes	Yes	Yes
	RptRFLO19	RFLO	Fault Report 19	Yes	Yes	Yes
	RptRFLO2	RFLO	Fault Report 2	Yes	Yes	Yes
	RptRFLO20	RFLO	Fault Report 20	Yes	Yes	Yes
	RptRFLO21	RFLO	Fault Report 21	Yes	Yes	Yes
	RptRFLO22	RFLO	Fault Report 22	Yes	Yes	Yes
	RptRFLO23	RFLO	Fault Report 23	Yes	Yes	Yes
	RptRFLO24	RFLO	Fault Report 24	Yes	Yes	Yes
	RptRFLO25	RFLO	Fault Report 25	Yes	Yes	Yes
	RptRFLO3	RFLO	Fault Report 3	Yes	Yes	Yes
	RptRFLO4	RFLO	Fault Report 4	Yes	Yes	Yes
	RptRFLO5	RFLO	Fault Report 5	Yes	Yes	Yes
	RptRFLO6	RFLO	Fault Report 6	Yes	Yes	Yes
	RptRFLO7	RFLO	Fault Report 7	Yes	Yes	Yes
	RptRFLO8	RFLO	Fault Report 8	Yes	Yes	Yes
	RptRFLO9	RFLO	Fault Report 9	Yes	Yes	Yes
	TmCikLTMS1	LTMS	Time master supervision	Yes	Yes	Yes
	TransRcdRDRE1	RDRE_TRANSIENTS	Transients Records status	Yes	Yes	Yes
Meter						
	EnrLogMMTR1	MMTR_2	EnergyLog	No	Yes	No
	HThdAMHAI1	MHAI	Harmonic Currents Metering	Yes	Yes	No
	HThdVMHAI1	MHAI	Harmonic Voltages Metering	No	Yes	Yes
	LLN0	LLN0	Meter Logical Device	Yes	Yes	Yes
	LPHD	LPHD_1	Physical Device Information	Yes	Yes	Yes
	MMTR1	MMTR_1	Energy Metering	No	Yes	No
	MMXU1	MMXU_2_2	CT Bank-B Metering	Yes	No	No
	MMXU1	MMXU_3	VT Bank-A, CT Bank-B, Frequency and Power Metering	No	Yes	No
	MMXU1	MMXU_4	VT Bank-A and Frequency Metering	No	No	Yes
	MSQ1	MSQ1_1	Sequence Metering	No	Yes	No
	MSQ1	MSQ1_A	Sequence Metering	Yes	No	No
	MSQ1	MSQ1_V	Sequence Metering	No	No	Yes
	MvmAvMMXU1	MMXU_MVMAV	Moving Average Overvoltage Metering	No	Yes	Yes
	PwrDmdMMTR1	MMTR_3	Power Demand Metering	No	Yes	No

LD	LN Instance	LN Type	Description	P14N	P14D	P94V
Prot						
	auxPTOV1	AuxPTOV	Auxiliary OV 1	No	Yes	Yes
	auxPTOV2	AuxPTOV	Auxiliary OV 2	No	Yes	Yes
	auxPTOV3	AuxPTOV	Auxiliary OV 3	No	Yes	Yes
	auxPTOV4	AuxPTOV	Auxiliary OV 4	No	Yes	Yes
	BrknCondGAPC1	GAPC	Broken Conductor	Yes	Yes	No
	gndPIOC1	GndPIOC	EF1 IOC 1	Yes	Yes	No
	gndPIOC2	GndPIOC	EF1 IOC 2	Yes	Yes	No
	gndPIOC3	GndPIOC	EF1 IOC 3	Yes	Yes	No
	gndPIOC4	GndPIOC	EF1 IOC 4	Yes	Yes	No
	gndPTOC1	PTOC_2	EF1 TOC 1	Yes	Yes	No
	gndPTOC2	PTOC_2	EF1 TOC 2	Yes	Yes	No
	gndRDIR1	GndRDIR	EF1 Dir OC 1	No	Yes	No
	gndRDIR2	GndRDIR	EF1 Dir OC 2	No	Yes	No
	gndRDIR3	GndRDIR	EF1 Dir OC 3	No	Yes	No
	gndRDIR4	GndRDIR	EF1 Dir OC 4	No	Yes	No
	hsePIOC1	HsePIOC	Sen Gnd IOC1	Yes	Yes	No
	hsePIOC2	HsePIOC	Sen Gnd IOC2	Yes	Yes	No
	hsePIOC3	HsePIOC	Sen Gnd IOC3	Yes	Yes	No
	hsePIOC4	HsePIOC	Sen Gnd IOC4	Yes	Yes	No
	hsePTOC1	HsePTOC	Sen Gnd TOC1	Yes	Yes	No
	hsePTOC2	HsePTOC	Sen Gnd TOC2	Yes	Yes	No
	hseRDIR1	HseRDIR	Sen Gnd Dir OC1	No	Yes	No
	hseRDIR2	HseRDIR	Sen Gnd Dir OC2	No	Yes	No
	hseRDIR3	HseRDIR	Sen Gnd Dir OC3	No	Yes	No
	hseRDIR4	HseRDIR	Sen Gnd Dir OC4	No	Yes	No
	LLN0	LLN0	Protection Logical Device	Yes	Yes	Yes
	LodEncPDIS1	PDIS_0	Load Encroachment 1	No	Yes	No
	LodEncPDIS2	PDIS_0	Load Encroachment 2	No	Yes	No
	LPHD	LPHD_1	Physical Device Information	Yes	Yes	Yes
	MvmAvPTOV1	MvmAvPTOV	Moving Average Overvoltage 1	No	Yes	Yes
	MvmAvPTOV2	MvmAvPTOV	Moving Average Overvoltage 2	No	Yes	Yes
	ndPIOC1	NdPIOC	EF2 IOC1	Yes	Yes	No
	ndPIOC2	NdPIOC	EF2 IOC2	Yes	Yes	No
	ndPIOC3	NdPIOC	EF2 IOC3	Yes	Yes	No
	ndPIOC4	NdPIOC	EF2 IOC4	Yes	Yes	No
	ndPTOC1	NdPTOC	EF2 TOC1	Yes	Yes	No
	ndPTOC2	NdPTOC	EF2 TOC2	Yes	Yes	No
	ndPTOV1	NdPTOV	Neutral OV 1	No	Yes	Yes
	ndPTOV2	NdPTOV	Neutral OV 2	No	Yes	Yes
	ndPTOV3	NdPTOV	Neutral OV 3	No	Yes	Yes
	ndPTOV4	NdPTOV	Neutral OV 4	No	Yes	Yes
	ndRDIR1	NdRDIR	EF2 Dir OC 1	No	Yes	No
	ndRDIR2	NdRDIR	EF2 Dir OC 2	No	Yes	No
	ndRDIR3	NdRDIR	EF2 Dir OC 3	No	Yes	No
	ndRDIR4	NdRDIR	EF2 Dir OC 4	No	Yes	No
	NeutAdmPSDE1	PSDE_1	Neutral Admittance 1	No	Yes (P14DL)	No
	NeutAdmPSDE2	PSDE_1	Neutral Admittance 2	No	Yes (P14DL)	No

LD	LN Instance	LN Type	Description	P14N	P14D	P94V
	NeutAdmPSDE3	PSDE_1	Neutral Admittance 3	No	Yes (P14DL)	No
	NeutAdmPSDE4	PSDE_1	Neutral Admittance 4	No	Yes (P14DL)	No
	ngseqPIOC1	NgSeqPIOC	Neg Seq IOC1	Yes	Yes	No
	ngseqPIOC2	NgSeqPIOC	Neg Seq IOC2	Yes	Yes	No
	ngseqPIOC3	NgSeqPIOC	Neg Seq IOC3	Yes	Yes	No
	ngseqPIOC4	NgSeqPIOC	Neg Seq IOC4	Yes	Yes	No
	ngseqPTOC1	NgSeqPTOC	Neg Seq TOC1	Yes	Yes	No
	ngseqPTOC2	NgSeqPTOC	Neg Seq TOC2	Yes	Yes	No
	ngseqPTOC3	NgSeqPTOC	Neg Seq TOC3	Yes	Yes	No
	ngseqPTOC4	NgSeqPTOC	Neg Seq TOC4	Yes	Yes	No
	ngseqPTOV1	NgSeqPTOV	Neg Seq OV 1	No	Yes	Yes
	ngseqPTOV2	NgSeqPTOV	Neg Seq OV 2	No	Yes	Yes
	ngseqRDIR1	NgSeqRDIR	Neg Seq Dir OC1	No	Yes	No
	ngseqRDIR2	NgSeqRDIR	Neg Seq Dir OC2	No	Yes	No
	ngseqRDIR3	NgSeqRDIR	Neg Seq Dir OC3	No	Yes	No
	ngseqRDIR4	NgSeqRDIR	Neg Seq Dir OC4	No	Yes	No
	PDOP1	PDOP_2	Overpower 1	No	Yes (P14DL)	No
	PDOP2	PDOP_2	Overpower 2	No	Yes (P14DL)	No
	PDUP1	PDUP	Underpower 1	No	Yes (P14DL)	No
	PDUP2	PDUP	Underpower 2	No	Yes (P14DL)	No
	PFRC1	PFRC	df/dt 1	No	Yes (P14DL)	Yes
	PFRC2	PFRC	df/dt 2	No	Yes (P14DL)	Yes
	PFRC3	PFRC	df/dt 3	No	Yes (P14DL)	Yes
	PFRC4	PFRC	df/dt 4	No	Yes (P14DL)	Yes
	PFRC5	PFRC	df/dt 5	No	Yes (P14DL)	Yes
	PFRC6	PFRC	df/dt 6	No	Yes (P14DL)	Yes
	PFRC7	PFRC	df/dt 7	No	Yes (P14DL)	Yes
	PFRC8	PFRC	df/dt 8	No	Yes (P14DL)	Yes
	PFRC9	PFRC	df/dt 9	No	Yes (P14DL)	Yes
	PHIZ1	PHIZ_0	Earth fault Protection/Ground detection 1	Yes (P14NZ)	Yes (P14DZ)	No
	phRDIR1	PhsRDIR	Ph Dir OC1	No	Yes	No
	phRDIR2	PhsRDIR	Ph Dir OC2	No	Yes	No
	phRDIR3	PhsRDIR	Ph Dir OC3	No	Yes	No
	phRDIR4	PhsRDIR	Ph Dir OC4	No	Yes	No
	phRDIR5	PhsRDIR	Ph Dir OC5	No	Yes	No
	phRDIR6	PhsRDIR	Ph Dir OC6	No	Yes	No
	phsPIOC1	PhsPIOC	Phase IOC 1	Yes	Yes	No
	phsPIOC2	PhsPIOC	Phase IOC 2	Yes	Yes	No
	phsPIOC3	PhsPIOC	Phase IOC 3	Yes	Yes	No
	phsPIOC4	PhsPIOC	Phase IOC 4	Yes	Yes	No
	phsPIOC5	PhsPIOC	Phase IOC 5	Yes	Yes	No
	phsPIOC6	PhsPIOC	Phase IOC 6	Yes	Yes	No
	phsPTOC1	PhsPTOC	Phase TOC 1	Yes	Yes	No
	phsPTOC2	PhsPTOC	Phase TOC 2	Yes	Yes	No
	phsPTOC3	PhsPTOC	Phase TOC 3	Yes	Yes	No
	phsPTOV1	PhsPTOV	Phase OV 1	No	Yes	Yes
	phsPTOV2	PhsPTOV	Phase OV 2	No	Yes	Yes

LD	LN Instance	LN Type	Description	P14N	P14D	P94V
	phsPTOV3	PhsPTOV	Phase OV 3	No	Yes	Yes
	phsPTOV4	PhsPTOV	Phase OV 4	No	Yes	Yes
	phsPTUV1	PhsPTUV	Phase UV 1	No	Yes	Yes
	phsPTUV2	PhsPTUV	Phase UV 2	No	Yes	Yes
	phsPTUV3	PhsPTUV	Phase UV 3	No	Yes	Yes
	phsPTUV4	PhsPTUV	Phase UV 4	No	Yes	Yes
	posseqPTOV1	PosSeqPTOV	Pos Seq OV 1	No	Yes	Yes
	posseqPTOV2	PosSeqPTOV	Pos Seq OV 2	No	Yes	Yes
	posseqPTUV1	PosSeqPTUV	Pos Seq UV 1	No	Yes	Yes
	posseqPTUV2	PosSeqPTUV	Pos Seq UV 2	No	Yes	Yes
	PTEF1	PTEF	Transient Ground Fault 1	No	Yes (P14DZ)	No
	PTEF2	PTEF	Transient Ground Fault 2	No	Yes (P14DZ)	No
	PTOF1	PTOF	Overfrequency 1	No	Yes	Yes
	PTOF2	PTOF	Overfrequency 2	No	Yes	Yes
	PTOF3	PTOF	Overfrequency 3	No	Yes	Yes
	PTOF4	PTOF	Overfrequency 4	No	Yes	Yes
	PTOF5	PTOF	Overfrequency 5	No	Yes	Yes
	PTOF6	PTOF	Overfrequency 6	No	Yes	Yes
	PTOF7	PTOF	Overfrequency 7	No	Yes	Yes
	PTOF8	PTOF	Overfrequency 8	No	Yes	Yes
	PTOF9	PTOF	Overfrequency 9	No	Yes	Yes
	PTUC1	PTUC_2	Undercurrent 1	Yes	Yes	No
	PTUF1	PTUF	Underfrequency 1	No	Yes	Yes
	PTUF2	PTUF	Underfrequency 2	No	Yes	Yes
	PTUF3	PTUF	Underfrequency 3	No	Yes	Yes
	PTUF4	PTUF	Underfrequency 4	No	Yes	Yes
	PTUF5	PTUF	Underfrequency 5	No	Yes	Yes
	PTUF6	PTUF	Underfrequency 6	No	Yes	Yes
	PTUF7	PTUF	Underfrequency 7	No	Yes	Yes
	PTUF8	PTUF	Underfrequency 8	No	Yes	Yes
	PTUF9	PTUF	Underfrequency 9	No	Yes	Yes
	PVPH1	PVPH	Volts Per Hertz 1	No	Yes (P14DL)	Yes (P94VP)
	PVPH2	PVPH	Volts Per Hertz 2	No	Yes (P14DL)	Yes (P94VP)
	PVPH3	PVPH	Volts Per Hertz 3	No	Yes (P14DL)	Yes (P94VP)
	PVPH4	PVPH	Volts Per Hertz 4	No	Yes (P14DL)	Yes (P94VP)
	PVPH5	PVPH	Volts Per Hertz 5	No	Yes (P14DL)	Yes (P94VP)
	PVPH6	PVPH	Volts Per Hertz 6	No	Yes (P14DL)	Yes (P94VP)
	RctPwrPTUV1	ReactPwrPTUV	Reactive Power Undervoltage 1	No	Yes (P14DL)	No
	RctPwrPTUV2	ReactPwrPTUV	Reactive Power Undervoltage 2	No	Yes (P14DL)	No
	RctPwrPTUV3	ReactPwrPTUV	Reactive Power Undervoltage 3	No	Yes (P14DL)	No
	RGFPDIF1	RGFPDIF	Restricted E/F 1	Yes	Yes	No
	SwOntoFltGAPC1	GAPC	SOTF 1	Yes	Yes	No
	ThmOvlPTTR1	PTTR_5	Thermal Overload 1	Yes	Yes	No
	TmPTUV1	TimedPTUV	Timed Undervoltage 1	No	Yes	Yes
	TmPTUV2	TimedPTUV	Timed Undervoltage 2	No	Yes	Yes
	TmPTUV3	TimedPTUV	Timed Undervoltage 3	No	Yes	Yes
	TmPTUV4	TimedPTUV	Timed Undervoltage 4	No	Yes	Yes
	WatPSDE1	PSDE_0	Wattmetric Ground Fault 1	No	Yes (P14DL)	No

LD	LN Instance	LN Type	Description	P14N	P14D	P94V
	WatPSDE2	PSDE_0	Wattmetric Ground Fault 2	No	Yes (P14DL)	No
	WatPSDE3	PSDE_0	Wattmetric Ground Fault 3	No	Yes (P14DL)	No
	WatPSDE4	PSDE_0	Wattmetric Ground Fault 4	No	Yes (P14DL)	No

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
AuxPTOV	(PTOV)	Overvoltage (w.r.t Auxiliary OV)	IEC 61850-7-4:2007A
CSWI_LOC	(CSWI)	Switch Controller (w.r.t Mandatory Attributes Only)	IEC 61850-7-4:2007A
CTSupervisionGAPC_2	(GAPC)	Generic Automatic Process Control (w.r.t CT Supervision)	IEC 61850-7-4:2007A
GAPC	(GAPC)	Generic Automatic Process Control (w.r.t Broken Conductor, Switch on to Fault, Cold Load)	IEC 61850-7-4:2007A
GGIO_CI	(GGIO)	Generic Process I/O (w.r.t Opto Inputs)	IEC 61850-7-4:2007A
GGIO_CO	(GGIO)	Generic Process I/O (w.r.t Output Relays)	IEC 61850-7-4:2007A
GGIO_RI	(GGIO)	Generic Process I/O (w.r.t Remote Inputs)	IEC 61850-7-4:2007A
GGIO_RO	(GGIO)	Generic Process I/O (w.r.t GGIO1 Indications)	IEC 61850-7-4:2007A
GGIO_VI	(GGIO)	Generic Process I/O (w.r.t Virtual Inputs)	IEC 61850-7-4:2007A
GGIO_VO	(GGIO)	Generic Process I/O (w.r.t Virtual Outputs)	IEC 61850-7-4:2007A
GndPIOC	(PIOC)	Instantaneous Overcurrent (w.r.t EF1 IOC)	IEC 61850-7-4:2007A
GndRDIR	(RDIR)	Directional Element (w.r.t EF1 Dir OC)	IEC 61850-7-4:2007A
HsePIOC	(PIOC)	Instantaneous Overcurrent (w.r.t Sensitive Ground IOC)	IEC 61850-7-4:2007A
HsePTOC	(PTOC)	Time Overcurrent (w.r.t Sensitive Ground TOC)	IEC 61850-7-4:2007A
HseRDIR	(RDIR)	Directional Element (w.r.t Sensitive Ground Directional OC)	IEC 61850-7-4:2007A
LGOS	(LGOS)	GOOSE Subscription	IEC 61850-7-4:2007A
MSQI_1	(MSQI)	Sequence and imbalance (w.r.t Pos, Neq, Zero)	IEC 61850-7-4:2007A
MSQI_A	(MSQI)	Sequence and imbalance (w.r.t Pos, Neq, Zero)	IEC 61850-7-4:2007A
MSQI_V	(MSQI)	Sequence and imbalance (w.r.t Pos, Neq, Zero)	IEC 61850-7-4:2007A
NdPIOC	(PIOC)	Instantaneous Overcurrent (w.r.t EF2 IOC)	IEC 61850-7-4:2007A
NdPTOC	(PTOC)	Time Overcurrent (w.r.t EF2 TOC)	IEC 61850-7-4:2007A
NdPTOV	(PTOV)	Overvoltage (w.r.t Neutral)	IEC 61850-7-4:2007A
NdRDIR	(RDIR)	Directional Element (w.r.t EF2 Dir OC)	IEC 61850-7-4:2007A
NgSeqPIOC	(PIOC)	Instantaneous Overcurrent (w.r.t Negative Sequence IOC)	IEC 61850-7-4:2007A
NgSeqPTOC	(PTOC)	Time Overcurrent (w.r.t Negative Sequence TOC)	IEC 61850-7-4:2007A
NgSeqPTOV	(PTOV)	Overvoltage (w.r.t Negative Sequence OV)	IEC 61850-7-4:2007A
NgSeqRDIR	(RDIR)	Directional Element (w.r.t Negative Sequence Directional OC)	IEC 61850-7-4:2007A
LLNO	(LLNO)	Logical Node Zero (w.r.t Controls Logical Device, Meter Logical Device, Protection Logical Device)	IEC 61850-7-4:2007A
LLNO_MOD	(LLNO)	Logical Node Zero (w.r.t Master Logical Device)	IEC 61850-7-4:2007A
LPHD	(LPHD)	Physical Device Information	IEC 61850-7-4:2007A

LN Type	(LN Class)	Description	Name Space
LPHD_1	(LPHD)	Physical Device Information	IEC 61850-7-4:2007A
MHAI_A	(MHAI)	Harmonics and Interharmonics (w.r.t Harmonic Currents metering)	IEC 61850-7-4:2007A
MHAI_V	(MHAI)	Harmonics and Interharmonics (w.r.t Harmonic Voltages metering)	IEC 61850-7-4:2007A
MMTR_1	(MMTR)	Metering (w.r.t Energy metering)	IEC 61850-7-4:2007A
MMTR_2	(MMTR)	Metering (w.r.t EnergyLog)	IEC 61850-7-4:2007A
MMTR_3	(MMTR)	Metering (w.r.t Real Power Demand metering)	IEC 61850-7-4:2007A
MMXU_2_2	(MMXU)	Measurement (w.r.t Current, Voltage)	IEC 61850-7-4:2007A
MMXU_3	(MMXU)	Measurement (w.r.t Current, Voltage, Frequency and Power)	IEC 61850-7-4:2007A
MMXU_4	(MMXU)	Measurement (w.r.t Voltage and Frequency)	IEC 61850-7-4:2007A
MSQI_1	(MSQI)	Sequence and imbalance (w.r.t Pos, Neq, Zero)	IEC 61850-7-4:2007A
MSQI_A	(MSQI)	Sequence and imbalance (w.r.t Pos, Neq, Zero)	IEC 61850-7-4:2007A
MSQI_V	(MSQI)	Sequence and imbalance (w.r.t Pos, Neq, Zero)	IEC 61850-7-4:2007A
NdPIOC	(PIOC)	Instantaneous Overcurrent (w.r.t EF2 IOC)	IEC 61850-7-4:2007A
NdPTOC	(PTOC)	Time Overcurrent (w.r.t EF2 TOC)	IEC 61850-7-4:2007A
NdPTOV	(PTOV)	Overvoltage (w.r.t Neutral)	IEC 61850-7-4:2007A
NdRDIR	(RDIR)	Directional Element (w.r.t EF2 Dir OC)	IEC 61850-7-4:2007A
NgSeqPIOC	(PIOC)	Instantaneous Overcurrent (w.r.t Negative Sequence IOC)	IEC 61850-7-4:2007A
NgSeqPTOC	(PTOC)	Time Overcurrent (w.r.t Negative Sequence TOC)	IEC 61850-7-4:2007A
NgSeqPTOV	(PTOV)	Overvoltage (w.r.t Negative Sequence OV)	IEC 61850-7-4:2007A
NgSeqRDIR	(RDIR)	Directional Element (w.r.t Negative Sequence Directional OC)	IEC 61850-7-4:2007A
PDOP_2	(PDOP)	Directional Overpower (w.r.t Directional Power)	IEC 61850-7-4:2007A
PDUP	(PDUP)	Directional Underpower (w.r.t Directional Power)	IEC 61850-7-4:2007A
PFRC	(PFRC)	Rate of Change of Frequency	IEC 61850-7-4:2007A
PHAR	(PHAR)	Harmonic restraint (w.r.t Harmonic Detection)	IEC 61850-7-4:2007A
PhsPIOC	(PIOC)	Instantaneous Overcurrent (w.r.t Phase IOC)	IEC 61850-7-4:2007A
PhsPTOC	(PTOC)	Time Overcurrent (w.r.t Phase TOC)	IEC 61850-7-4:2007A
PhsPTOV	(PTOV)	Overvoltage (w.r.t Phase OV)	IEC 61850-7-4:2007A
PhsPTUV	(PTUV)	Undervoltage (w.r.t Phase UV)	IEC 61850-7-4:2007A
PhsRDIR	(RDIR)	Directional Element (w.r.t Phase Directional OC)	IEC 61850-7-4:2007A
PoleDeadGAPC	(GAPC)	Generic Automatic Process Control (w.r.t Pole Dead)	IEC 61850-7-4:2007A
PoleDiscordanceGAPC	(GAPC)	Generic Automatic Process Control (w.r.t Pole Discordance)	IEC 61850-7-4:2007A
PosSeqPTOV	(PTOV)	Overvoltage (w.r.t Positive Sequence OV)	IEC 61850-7-4:2007A
PosSeqPTUV	(PTUV)	Undervoltage (w.r.t Positive Sequence UV)	IEC 61850-7-4:2007A
TimedPTUV	(PTUV)	Undervoltage (w.r.t Timed UV)	IEC 61850-7-4:2007A
ReactPwrPTUV	(PTUV)	Undervoltage (w.r.t Reactive Power UV)	IEC 61850-7-4:2007A
PTOC_2	(PTOC)	Time Overcurrent (w.r.t EF1 TOC)	IEC 61850-7-4:2007A
PTOF	(PTOF)	Over frequency	IEC 61850-7-4:2007A
PTTR_5	(PTTR)	Thermal Overload	IEC 61850-7-4:2007A
PSDE_0	(PSDE)	Sensitive directional earthfault (w.r.t Wattmetric Ground Fault)	IEC 61850-7-4:2007A
PSDE_1	(PSDE)	Sensitive directional earthfault (w.r.t Neutral Admittance)	IEC 61850-7-4:2007A
PVPH	(PVPH)	Volts per Hz	IEC 61850-7-4:2007A

LN Type	(LN Class)	Description	Name Space
PTUC_2	(PTUC)	Undercurrent	IEC 61850-7-4:2007A
PTUF	(PTUF)	Underfrequency	IEC 61850-7-4:2007A
PDIS_0	(PDIS)	Distance (w.r.t Load Encroachment)	IEC 61850-7-4:2007A
PTEF	(PTEF)	Transient Earth Fault	IEC 61850-7-4:2007A
PHIZ_0	(PHIZ)	Ground detector (w.r.t HiZ Fault Detection)	IEC 61850-7-4:2007A
RBRF	(RBRF)	Breaker Failure (w.r.t CB Fail & I<)	IEC 61850-7-4:2007A
RFLO	(RFLO)	Fault Locator (w.r.t Fault Report)	IEC 61850-7-4:2007A
RGFPDIF	(PDIF)	Differential (w.r.t Restricted E/F)	IEC 61850-7-4:2007A
RREC	(RREC)	Autoreclosing (w.r.t Auto Reclose)	IEC 61850-7-4:2007A
RSYN	(RSYNC)	Synchronism-check (w.r.t Synchrocheck)	IEC 61850-7-4:2007A
TVTR	(TVTR)	Voltage Transformer (w.r.t VT Supervision)	IEC 61850-7-4:2007A
XCBR	(XCBR)	Circuit Breaker (w.r.t CB Control)	IEC 61850-7-4:2007A
XSWI_0	(XSWI)	Circuit Switch (w.r.t SW Control)	IEC 61850-7-4:2007A

1.4.1 LOGICAL NODE: AUXPTOV

Description: Overvoltage (w.r.t Auxiliary OV)

LN Class: PTOV

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	VN1>[X] Start		
Op	ACT_2	VN1>[X] Trip	T	

1.4.2 LOGICAL NODE: CSWI_LOC

Description: Switch controller (w.r.t Mandatory Attributes Only)

LN Class: CSWI

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Loc	SPS_0	Local Mode ON		
Pos	DPC_0	SWI[X] Status		

1.4.3 LOGICAL NODE: CTSUPERVISIONGAPC_2

Description: Generic Automatic Process Control (w.r.t CT Supervision)

LN Class: GAPC

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		

Attribute	Attr. Type	Explanation	T	X
Str	ACD_2	CTS Block		
Op	ACT_2	CTS Alarm	T	

1.4.4 LOGICAL NODE: GAPC

Description: Generic Automatic Process Control (w.r.t Broken Conductor, Switch on to Fault, Cold Load)

LN Class: GAPC

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	Bkn Line 1 Start/SOTF 1 Alarm/N/A)		
Op	ACT_2	Bkn Line 1 Trip/SOTF 1 Trip/CLP Operation 1)	T	

1.4.5 LOGICAL NODE: GGIO_CI

Description: Generic Process I/O (w.r.t Opto Inputs)

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Ind1	SPS_0	CI 1 On		
Ind2	SPS_0	CI 2 On		
Ind3	SPS_0	CI 3 On		
Ind4	SPS_0	CI 4 On		
Ind5	SPS_0	CI 5 On		
Ind6	SPS_0	CI 6 On		
Ind7	SPS_0	CI 7 On		
Ind8	SPS_0	CI 8 On		
Ind9	SPS_0	CI 9 On		
Ind10	SPS_0	CI 10 On		
Ind11	SPS_0	CI 11 On		

1.4.6 LOGICAL NODE: GGIO_CO

Description: Generic Process I/O (w.r.t Output Relays)

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Ind1	SPS_0	Trip On		
Ind2	SPS_0	Close On		
Ind3	SPS_0	Aux Relay 3 On		

Attribute	Attr. Type	Explanation	T	X
Ind4	SPS_0	Aux Relay 4 On		
Ind5	SPS_0	Aux Relay 5 On		
Ind6	SPS_0	Aux Relay 6 On		
Ind7	SPS_0	Aux Relay 7 On		
Ind8	SPS_0	Aux Relay 8 On		
Ind9	SPS_0	Aux Relay 9 On		
Ind10	SPS_0	Aux Relay 10 On		
Ind11	SPS_0	Aux Relay 11 On		
Ind12	SPS_0	Aux Relay 12 On		

1.4.7 LOGICAL NODE: GGIO_RI

Description: Generic Process I/O (w.r.t Remote Inputs)

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Ind1	SPS_0	RI 1		
---	---	---		
Ind128	SPS_0	RI 128		
DPSInd1	DPS_0	RI DPS 1		X
---	---	---		
DPSInd16	DPS_0	RI DPS 16		X
AnIn1	MV_2	Float 1		
---	---	---		
AnIn24	MV_2	Float 24		
AnIn25	MV_4	SINT32 1		
---	---	---		
AnIn32	MV_4	STINT32 8		
InRef1	ORG_1	Remote Input 1		
---	---	---		
InRef128	ORG_1	Remote Input 128		
InRef129	ORG_1	Doble Point Remote Input 1		
---	---	---		
InRef144	ORG_1	Doble Point Remote Input 16		
InRef145	ORG_1	Analog Input 1		
---	---	---		
InRef176	ORG_1	Analog Input 32		

1.4.8 LOGICAL NODE: GGIO_RO

Description: Generic Process I/O (w.r.t GGIO1 Indications)

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		

Attribute	Attr. Type	Explanation	T	X
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Ind1	SPS_0	RO 1 On		
Ind2	SPS_0	RO 2 On		
Ind3	SPS_0	RO 3 On		
Ind4	SPS_0	RO 4 On		
Ind5	SPS_0	RO 5 On		
Ind6	SPS_0	RO 6 On		
Ind7	SPS_0	RO 7 On		
Ind8	SPS_0	RO 8 On		
Ind9	SPS_0	RO 9 On		
Ind10	SPS_0	RO 10 On		
Ind11	SPS_0	RO 11 On		
Ind12	SPS_0	RO 12 On		
Ind13	SPS_0	RO 13 On		
Ind14	SPS_0	RO 14 On		
Ind15	SPS_0	RO 15 On		
Ind16	SPS_0	RO 16 On		
Ind17	SPS_0	RO 17 On		
Ind18	SPS_0	RO 18 On		
Ind19	SPS_0	RO 19 On		
Ind20	SPS_0	RO 20 On		
Ind21	SPS_0	RO 21 On		
Ind22	SPS_0	RO 22 On		
Ind23	SPS_0	RO 23 On		
Ind24	SPS_0	RO 24 On		
Ind25	SPS_0	RO 25 On		
Ind26	SPS_0	RO 26 On		
Ind27	SPS_0	RO 27 On		
Ind28	SPS_0	RO 28 On		
Ind29	SPS_0	RO 29 On		
Ind30	SPS_0	RO 30 On		
Ind31	SPS_0	RO 31 On		
Ind32	SPS_0	RO 32 On		

1.4.9 LOGICAL NODE: GGIO_VI

Description: Generic Process I/O (w.r.t Virtual Inputs)

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
SPCSO1	SPC_1	VI 1 On		
---	---	---		
SPCSO128	SPC_1	VI 128 On		

1.4.10 LOGICAL NODE: GGIO_VO

Description: Generic Process I/O (w.r.t Virtual Outputs)

LN Class: GGIO

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Ind1	SPS_0	VO 1 On		
---	---	---		
Ind128	SPS_0	VO 128 On		

1.4.11 LOGICAL NODE: GNDPIOC

Description: Instantaneous Overcurrent (w.r.t EF1 IOC)

LN Class: PIOC

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	IN1>[X] IOC Start		
Op	ACT_2	IN1>[X] IOC Trip	T	

1.4.12 LOGICAL NODE: GNDRDIR

Description: Directional Element (w.r.t EF1 Dir OC)

LN Class: RDIR

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Dir	ACD_1	Gnd Dir OC [X] FWR		
Op	ACT_1	Gnd Dir OC [X] FWR	T	

1.4.13 LOGICAL NODE: HSEPIOC

Description: Instantaneous Overcurrent (w.r.t Sensitive Ground IOC)

LN Class: PIOC

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_1	ISEF>[X] IOC Start		
Op	ACT_1	ISEF>[X] IOC Trip	T	

1.4.14 LOGICAL NODE: HSEPTOC

Description: Time Overcurrent (w.r.t Sensitive Ground TOC)

LN Class: PTOC

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_1	ISEF>[X] TOC Start		
Op	ACT_1	ISEF>[X] TOC Trip	T	

1.4.15 LOGICAL NODE: HSERDIR

Description: Directional Element (w.r.t Sensitive Ground Directional OC)

LN Class: RDIR

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Dir	ACD_2	SGnd Dir OC [X] FWD		
Op	ACT_2	SGnd Dir OC [X] FWD	T	

1.4.16 LOGICAL NODE: LGOS

Description: GOOSE Subscription

LN Class: LGOS

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
NdsCom	SPS_0	Subscription needs commissioning		
St	SPS_0	Status of the subscription		
SimSt	SPS_0	Status showing that really Sim messages are received and accepted		
LastStNum	INS_0	Last state number received		
ConfRevNum	INS_0	Expected configuration revision number		
GoCRef	ORG_0	Reference to the subscribed GOOSE control block		

1.4.17 LOGICAL NODE: LLN0

Description: Logical Node Zero (w.r.t Controls Logical Device, Meter Logical Device, Protection Logical Device)

LN Class: LLN0

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		

Attribute	Attr. Type	Explanation	T	X
Health	ENS_1	Health		
NamPlt	LPL_0	Name Plate		X
Loc	SPS_0	Breaker Control local mode		
LocKey	SPS_0	Local operation for complete logical device		
MltLev	SPG_0	Select mode of authority for local control		

1.4.18 LOGICAL NODE: LLN0_MOD

Description: Logical Node Zero (w.r.t Master Logical Device)

LN Class: LLN0

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_1	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_0	Name Plate		X

1.4.19 LOGICAL NODE: LPHD

Description: Physical Device Information

LN Class: LPHD

Attribute	Attr. Type	Explanation	T	X
PhyNam	DPL_0	Physical device name plate		
PhyHealth	ENS_1	Physical device health		
Proxy	SPS_1	Indicates if this LN is a proxy		
PwrUp	SPS_0	Power up detected		
Sim	SPC_1	Receive simulated GOOSE		
SetChang	SPS_2	Setting change		X
NotInServ	SPS_2	Out of service		X
SetFilRjct	SPS_2	Settings file rejected		X
MajorErr	SPS_2	Any major error		X
MinorErr	SPS_2	Any minor error		X
Port1EthFail	SPS_2	Link error primary on		X
Port2EthFail	SPS_2	Link error secondary on		X
Port3EthFail	SPS_2	Link error third on		X
FWSuccess	SPS_2	Firmware upgrade		X
OscilGOOSE	SPS_2	Oscill GOOSE Detected On		X

1.4.20 LOGICAL NODE: LPHD_1

Description: Physical Device Information

LN Class: LPHD

Attribute	Attr. Type	Explanation	T	X
PhyNam	DPL_0	Physical device name plate		
PhyHealth	ENS_1	Physical device health		
Proxy	SPS_1	Indicates if this LN is a proxy		

1.4.21 LOGICAL NODE: LTIM

Description: Time Management

LN Class: LTIM

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
TmDT	SPS_0	Indicating if for this location DST is in effect now		
TmOfsTmm	ING_0	Offset of local time from UTC in minutes		
TmUseDT	SPG_1	Flag indicating if this location is using DST		
TmChgDT	TSG_0	Local time of next change to DST		
TmChgST	TSG_0	Local time of next change to standard time		

1.4.22 LOGICAL NODE: LTMS

Description: Time Master Supervision

LN Class: LTMS

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
TmAcc	INS_0	Num. of significant bits in the Fraction of Second in the time accuracy part of the time stamp		
TmSrc	VSS_0	Current time source		
TmChSt1	SPS_0	Time channel status		
TmSynSrc	ENS_8	RTC Sync Source actual value indicates time synchronizing source the device is using at present		X
PTPChSt1	SPS_2	PTP Port 1 Status		X
PTPChSt2	SPS_2	PTP Port 2 Status		X
PTPChSt3	SPS_2	PTP Port 3 Status		X
GrdMasterID	VSS_1	GrandMaster ID actual value		X

1.4.23 LOGICAL NODE: MHAI_A

Description: Harmonics and Interharmonics (w.r.t Harmonic Currents Metering)

LN Class: MHAI

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
ThdA	WYE_5	THD Currents		
Har2A	WYE_4	2 nd Harmonic Currents		X
Har3A	WYE_4	3 rd Harmonic Currents		X
Har4A	WYE_4	4 th Harmonic Currents		X
Har5A	WYE_4	5 th Harmonic Currents		X

Attribute	Attr. Type	Explanation	T	X
Har6A	WYE_4	6 th Harmonic Currents		X
Har7A	WYE_4	7 th Harmonic Currents		X
Har8A	WYE_4	8 th Harmonic Currents		X
Har9A	WYE_4	9 th Harmonic Currents		X
Har10A	WYE_4	10 th Harmonic Currents		X
Har11A	WYE_4	11 th Harmonic Currents		X
Har12A	WYE_4	12 th Harmonic Currents		X
Har13A	WYE_4	13 th Harmonic Currents		X
Har14A	WYE_4	14 th Harmonic Currents		X
Har15A	WYE_4	15 th Harmonic Currents		X
Har16A	WYE_4	16 th Harmonic Currents		X
Har17A	WYE_4	17 th Harmonic Currents		X
Har18A	WYE_4	18 th Harmonic Currents		X
Har19A	WYE_4	19 th Harmonic Currents		X
Har20A	WYE_4	20 th Harmonic Currents		X
Har21A	WYE_4	21 st Harmonic Currents		X
Har22A	WYE_4	22 nd Harmonic Currents		X
Har23A	WYE_4	23 rd Harmonic Currents		X
Har24A	WYE_4	24 th Harmonic Currents		X
Har25A	WYE_4	25 th Harmonic Currents		X

1.4.24 LOGICAL NODE: MHAI_V

Description: Harmonics and Interharmonics (w.r.t Harmonic Voltages Metering)

LN Class: MHAI

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
ThdPhV	WYE_5	THD Voltages		
Har2PhV	WYE_4	2 nd Harmonic Voltages		X
Har3PhV	WYE_4	3 rd Harmonic Voltages		X
Har4PhV	WYE_4	4 th Harmonic Voltages		X
Har5PhV	WYE_4	5 th Harmonic Voltages		X
Har6PhV	WYE_4	6 th Harmonic Voltages		X
Har7PhV	WYE_4	7 th Harmonic Voltages		X
Har8PhV	WYE_4	8 th Harmonic Voltages		X
Har9PhV	WYE_4	9 th Harmonic Voltages		X
Har10PhV	WYE_4	10 th Harmonic Voltages		X
Har11PhV	WYE_4	11 th Harmonic Voltages		X
Har12PhV	WYE_4	12 th Harmonic Voltages		X
Har13PhV	WYE_4	13 th Harmonic Voltages		X
Har14PhV	WYE_4	14 th Harmonic Voltages		X
Har15PhV	WYE_4	15 th Harmonic Voltages		X
Har16PhV	WYE_4	16 th Harmonic Voltages		X
Har17PhV	WYE_4	17 th Harmonic Voltages		X
Har18PhV	WYE_4	18 th Harmonic Voltages		X

Attribute	Attr. Type	Explanation	T	X
Har19PhV	WYE_4	19 th Harmonic Voltages		X
Har20PhV	WYE_4	20 th Harmonic Voltages		X
Har21PhV	WYE_4	21 st Harmonic Voltages		X
Har22PhV	WYE_4	22 nd Harmonic Voltages		X
Har23PhV	WYE_4	23 rd Harmonic Voltages		X
Har24PhV	WYE_4	24 th Harmonic Voltages		X
Har25PhV	WYE_4	25 th Harmonic Voltages		X

1.4.25 LOGICAL NODE: MMTR_1

Description: Metering (w.r.t Energy Metering)

LN Class: MMTR

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
CntPsWh	MV_1	+Whr		X
CntNgWh	MV_1	-Whr		X
CntPsVArh	MV_1	+VARhr		X
CntNgVArh	MV_1	-VARhr		X

1.4.26 LOGICAL NODE: MMTR_2

Description: Metering (w.r.t Energy Log)

LN Class: MMTR

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
PosLEWh	MV_3	Last Event Pos Whr		X
NegLEWh	MV_3	Last Event Neg Whr		X
PosLEVArh	MV_3	Last Event Pos VARhr		X
NegLEVArh	MV_3	Last Event Neg VARhr		X
PosTdyWh	MV_3	Today Pos Whr		X
NegTdyWh	MV_3	Today Neg Whr		X
PosTdyVArh	MV_3	Today Pos VARhr		X
NegTdyVArh	MV_3	Today Neg VARhr		X
PosYdyWh	MV_3	Yesterday Pos Whr		X
NegYdyWh	MV_3	Yesterday Neg Whr		X
PosYdyVArh	MV_3	Yesterday Pos VARhr		X
NegYdyVArh	MV_3	Yesterday NEg VARhr		X
RsEnrLogDt	INS_1	Reset EnrLog D/T		X

1.4.27 LOGICAL NODE: MMTR_3

Description: Metering (w.r.t Real Power Demand Metering)

LN Class: MMTR

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
WMaxDmd	MV_3	RealPw Max Dmd		X
WMinDmd	MV_3	RealPw Min Dmd		X

1.4.28 LOGICAL NODE: MMXU_2_2

Description: Measurement (w.r.t Current)

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
A	WYE_1_1	Phase Currents		

1.4.29 LOGICAL NODE: MMXU_3

Description: Measurement (w.r.t Current, Voltage, Frequency and Power)

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
TotW	MV_6	3 Phase Watts		
TotVAr	MV_6	3 Phase VArS		
TotVA	MV_6	3 Phase VA		
TotPF	MV_0	3Ph Power Factor		
Hz3VT	MV_1	VT1 Freq. Mag		X
Hz3VTRte	MV_1	VT1 Freq. ROC		X
HzVx	MV_1	4th VT Freq. Mag		X
HzVxRte	MV_1	4th VT Freq. ROC		X
PPV	DEL_0	Phase to Phase Voltage		
PhV	WYE_0	Phase to Ground Voltage		
A	WYE_1_1	Phase Currents		
AuxV	CMV_1	4th VT1 Mag		X

1.4.30 LOGICAL NODE: MMXU_4

Description: Measurement (w.r.t Voltage and Frequency)

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Hz3VT	MV_1	VT1 Freq. Mag		X
Hz3VTRte	MV_1	VT1 Freq. ROC		X
HzVx	MV_1	4 th VT Freq. Mag		X
HzVxRte	MV_1	4 th VT Freq. ROC		X
PPV	DEL_0	Phase to Phase Voltage		
PhV	WYE_0	Phase to Ground Voltage		
AuxV	CMV_1	4 th VT1 Mag		X

1.4.31 LOGICAL NODE: MMXU_MVMAV

Description: Moving Average Overvoltage Metering (w.r.t Mov Avg Voltage)

LN Class: MMXU

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
VAN	MV_1	VAN Mov Average		
VBN	MV_1	VBN Mov Average		
VCN	MV_1	VCN Mov Average		
VAB	MV_1	VAB Mov Average		
VBC	MV_1	VBC Mov Average		
VCA	MV_1	VCA Mov Average		

1.4.32 LOGICAL NODE: MSQI_1

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

LN Class: MSQI

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
SeqA	SEQ_0	Sequence Currents		
SeqV	SEQ_0	Sequence Voltages		

1.4.33 LOGICAL NODE: MSQI_A

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

LN Class: MSQI

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
SeqA	SEQ_0	Sequence Currents		

1.4.34 LOGICAL NODE: MSQI_V

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

LN Class: MSQI

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
SeqV	SEQ_0	Sequence Voltages		

1.4.35 LOGICAL NODE: MVMAVPTOV

Description: Moving Average Overvoltage (w.r.t Mov Avg OV)

LN Class: PTOV

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_0	Vavg>[X] Start		
Op	ACT_0	Vavg>[X] Trip	T	

1.4.36 LOGICAL NODE: NDPIOC

Description: Instantaneous Overcurrent (w.r.t EF2 IOC)

LN Class: PIOC

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_1	IN2>[X] IOC Start		
Op	ACT_1	IN2>[X] IOC Trip	T	

1.4.37 LOGICAL NODE: NDPTOC

Description: Time Overcurrent (w.r.t EF2 TOC)

LN Class: PTOC

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_1	IN2>[X] TOC Start		
Op	ACT_1	IN2>[X] TOC Trip	T	

1.4.38 LOGICAL NODE: NDPTOV

Description: Overvoltage (w.r.t Neutral)

LN Class: PTOV

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	VN2>[X] Start		
Op	ACT_2	VN2>[X] Trip	T	

1.4.39 LOGICAL NODE: NDRDIR

Description: Directional Element (w.r.t EF2 Dir OC)

LN Class: RDIR

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Dir	ACD_1	Ntrl Dir OC [X] FWD		
Op	ACT_1	Ntrl Dir OC [X] FWD	T	

1.4.40 LOGICAL NODE: NGSEQPIOC

Description: Instantaneous Overcurrent (w.r.t Negative Sequence IOC)

LN Class: PIOC

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	I2>[X] IOC Start		
Op	ACT_2	I2>[X] IOC Trip	T	

1.4.41 LOGICAL NODE: NGSEQPTOC

Description: Time Overcurrent (w.r.t Negative Sequence TOC)

LN Class: PTOC

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	I2>[X] TOC Start		
Op	ACT_2	I2>[X] TOC Trip	T	

1.4.42 LOGICAL NODE: NGSEQPTOV

Description: Overvoltage (w.r.t Negative Sequence OV)

LN Class: PTOV

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	V2>[X] START		
Op	ACT_2	V2>[X] TRIP	T	

1.4.43 LOGICAL NODE: NGSEQDIR

Description: Directional Element (w.r.t Negative Sequence Directional OC)

LN Class: RDIR

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Dir	ACD_2	NegSeq DirOC [X] FWD		
Op	ACT_2	NegSeq DirOC [X] FWD	T	

1.4.44 LOGICAL NODE: PDOP_2

Description: Directional Overpower (w.r.t Directional Power)

LN Class: PDOP

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	P>[X] 3PhStart		
Op	ACT_2	P>[X] 3Ph Trip	T	

1.4.45 LOGICAL NODE: PDUP

Description: Directional Underpower (w.r.t Directional Power)

LN Class: PDUP

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	P<[X] 3PhStart		
Op	ACT_2	P<[X] 3Ph Trip	T	

1.4.46 LOGICAL NODE: PFRC

Description: Rate of Change of Frequency

LN Class: PFRC

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	df/dt[X] Start		
Op	ACT_2	df/dt[X] Trip	T	

1.4.47 LOGICAL NODE: PHAR

Description: Harmonic Restraint (w.r.t Harmonic Detection)

LN Class: PHAR

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	Harm Det[X] Start		
Op	ACT_2	Harm Det[X] Trip	T	

1.4.48 LOGICAL NODE: PHSPIOC

Description: Instantaneous Overcurrent (w.r.t Phase IOC)

LN Class: PIOC

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_0	PIOC I>[X] Start		
Op	ACT_0	PIOC I>[X] Trip	T	

1.4.49 LOGICAL NODE: PHSPTOC

Description: Time Overcurrent (w.r.t Phase TOC)

LN Class: PTOC

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_0	PTOC I>[X] Start		
Op	ACT_0	PTOC I>[X] Trip	T	

1.4.50 LOGICAL NODE: PHSPTOV

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

LN Class: PTOV C

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_0	V>[X] Start		
Op	ACT_0	V>[X] Trip	T	

1.4.51 LOGICAL NODE: PHSPTUV

Description: Undervoltage (w.r.t Phase UV)

LN Class: PTUV

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_0	V<[X] Start		
Op	ACT_0	V<[X] Trip	T	

1.4.52 LOGICAL NODE: PHSRDIR

Description: Directional Element (w.r.t Phase Directional OC)

LN Class: RDIR

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Dir	ACD_0	Ph Dir OC [X] REV		
Op	ACT_0	Ph Dir OC [X] REV	T	

1.4.53 LOGICAL NODE: POLEDEADGAPC

Description: Generic Automatic Process Control (w.r.t Pole Dead)

LN Class: GAPC

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
OpAll	ACT_3	All Pole Dead	T	X
OpPhA	ACT_3	Pole Dead A	T	X
OpPhB	ACT_3	Pole Dead B	T	X
OpPhC	ACT_3	Pole Dead C	T	X
OpAny	ACT_3	Any Pole Dead	T	X

1.4.54 LOGICAL NODE: POLEDISCORDANCEGAPC

Description: Generic Automatic Process Control (w.r.t Pole Discordance)

LN Class: GAPC

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Op	ACT_2	Pole Disc[X] Trip	T	
OpEx	ACT_3	Ext PD[X] Trip	T	X
OpCon	ACT_3	Contact PD[X] Trip	T	X
OpCur	ACT_3	Current PD[X] Trip	T	X
PhAFailOpn	SPS_2	PD[X]-A Fail-Open		X
PhBFailOpn	SPS_2	PD[X]-B Fail-Open		X
PhCFailOpn	SPS_2	PD[X]-C Fail-Open		X
PhAFailCls	SPS_2	PD[X]-A Fail-Cls		X
PhBFailCls	SPS_2	PD[X]-B Fail-Cls		X
PhCFailCls	SPS_2	PD[X]-C Fail-Cls		X

1.4.55 LOGICAL NODE: POSSEQPTOV

Description: Overvoltage (w.r.t Positive Sequence OV)

LN Class: PTOV

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	V1>[X] Start		
Op	ACT_2	V1>[X] Trip	T	

1.4.56 LOGICAL NODE: POSSEQPTUV

Description: Undervoltage (w.r.t Positive Sequence UV)

LN Class: PTUV

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	V1<[X] Start		
Op	ACT_2	V1<[X] Trip	T	

1.4.57 LOGICAL NODE: TIMEDPTUV

Description: Undervoltage (w.r.t Timed UV)

LN Class: PTUV

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_0	Timed UV[X] Start		
Op	ACT_0	Timed UV[X] Trip	T	
TmCrv	SPS_2	Timed UV[X] Curve		X
Cnt	SPS_2	Timed UV[X] Counter		X

1.4.58 LOGICAL NODE: REACTPWRPTUV

Description: Undervoltage (w.r.t Reactive Power UV)

LN Class: PTUV

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	Reactive UV[X] Start		
Op	ACT_2	Reactive UV[X] Trip	T	
Restore	SPS_2	Reactive UV[X] Restore		X

1.4.59 LOGICAL NODE: PTOC_2

Description: Time Overcurrent (w.r.t EF1 TOC)

LN Class: PTOC

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		

Attribute	Attr. Type	Explanation	T	X
Str	ACD_2	IN1>[X] TOC Start		
Op	ACT_2	IN1>[X] TOC Trip	T	

1.4.60 LOGICAL NODE: PTOF

Description: Overfrequency

LN Class: PTOF

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	F>[X] Start		
Op	ACT_2	F>[X] Trip	T	

1.4.61 LOGICAL NODE: PTTR_5

Description: Thermal Overload

LN Class: PTTR

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Op	ACT_2	Thermal [X] Trip	T	
AlmThm	SPS_0	Thermal [X] Alm		

1.4.62 LOGICAL NODE: PSDE_0

Description: Sensitive Directional Earth Fault (w.r.t Wattmetric Ground Fault)

LN Class: PSDE

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	WDE>[X] Start		
Op	ACT_2	WDE>[X] Trip	T	

1.4.63 LOGICAL NODE: PSDE_1

Description: Sensitive Directional Earth Fault (w.r.t Neutral Admittance)

LN Class: PSDE

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		

Attribute	Attr. Type	Explanation	T	X
Str	ACD_2	Neutral Admittance [X] Start		
Op	ACT_2	Neutral Admittance [X] Trip	T	
NeutAdmMag	MV_3	YN [X] Mag		X
NeutAdmAng	MV_3	YN [X] Angle		X
NeutCond	MV_3	GN [X]		X
NeutSusc	MV_3	BN [X]		X

1.4.64 LOGICAL NODE: PVPH

Description: Volts Per Hertz

LN Class: PVPH

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	Volts Per Hertz [X] Start		
Op	ACT_2	Volts Per Hertz [X] Trip	T	

1.4.65 LOGICAL NODE: PTUC_2

Description: Undercurrent

LN Class: PTUC

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	I<[X] Trip PKP		
Op	ACT_2	I<[X] Trip OP	T	
StrAlm	ACD_3	I<[X] Alarm PKP		X
OpAlm	ACT_3	I<[X] Alarm OP	T	X

1.4.66 LOGICAL NODE: PTUF

Description: Underfrequency

LN Class: PTUF

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	F<[X] Start		
Op	ACT_2	F<[X] Trip	T	

1.4.67 LOGICAL NODE: PDIS_0

Description: Load Encroachment

LN Class: PDIS

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	Load Encroachment Start		
Op	ACT_2	Load Encroachment Trip	T	

1.4.68 LOGICAL NODE: PTEF

Description: Transient Ground Fault

LN Class: PTEF

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	Transient Ground Fault Start		
TrRv	SPS_2	Transient Ground Fault Reverse		X
TrFw	SPS_2	Transient Ground Fault Forward		X
TrReactPwr	MV_3	Transient Reactive Power		X
TrActPwr	MV_3	Transient Active Power		X
TrQMax	MV_3	Transient Reactive Power Max		X
TrPMax	MV_3	Transient Active Power Max		X

1.4.69 LOGICAL NODE: PHIZ_0

Description: Earth Fault Protection/Ground Detection

LN Class: PHIZ

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	Unmapping		
Op	ACT_2	Hi-Z IN Alarm	T	

1.4.70 LOGICAL NODE: RBRF

Description: Breaker Failure (w.r.t CB Fail & I<)

LN Class: RBRF

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		

Attribute	Attr. Type	Explanation	T	X
NamPlt	LPL_1	Name Plate		
OpEx	ACT_2	BF[X] OP	T	
OpIn	ACT_2	BF[X] Retrip	T	

1.4.71 LOGICAL NODE: RFLO

Description: Fault Locator (w.r.t Fault Report)

LN Class: RFLO

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
FltZ	CMV_2	Fault impedance		
FltDiskm	MV_2	Fault location		
FltLoop	ENS_4	Fault type		
RecCyc	INS_1	Fault reclose shot		X
PreFltIa	CMV_3	Prefault Ia		X
PreFltIb	CMV_3	Prefault Ib		X
PreFltIc	CMV_3	Prefault Ic		X
PreFltIg	CMV_3	Prefault Ig		X
PreFltIsg	CMV_3	Prefault Isg		X
PreFltIn	CMV_3	Prefault In		X
PreFltVan	CMV_3	Prefault Van		X
PreFltVbn	CMV_3	Prefault Vbn		X
PreFltVcn	CMV_3	Prefault Vcn		X
PreFltVab	CMV_3	Prefault Vab		X
PreFltVbc	CMV_3	Prefault Vbc		X
PreFltVca	CMV_3	Prefault Vca		X
PreFltVx	CMV_3	Prefault Vx		X
PstFltIa	CMV_3	Postfault Ia		X
PstFltIb	CMV_3	Postfault Ib		X
PstFltIc	CMV_3	Postfault Ic		X
PstFltIg	CMV_3	Postfault Ig		X
PstFltIsg	CMV_3	Postfault Isg		X
PstFltIn	CMV_3	Postfault In		X
PstFltVan	CMV_3	Postfault Van		X
PstFltVbn	CMV_3	Postfault Vbn		X
PstFltVcn	CMV_3	Postfault Vcn		X
PstFltVab	CMV_3	Postfault Vab		X
PstFltVbc	CMV_3	Postfault Vbc		X
PstFltVca	CMV_3	Postfault Vca		X
PstFltVx	CMV_3	Postfault Vx		X

1.4.72 LOGICAL NODE: RGFPDIF

Description: Differential (w.r.t Restricted E/F)

LN Class: RGFPDIF

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Str	ACD_2	IREF> Start		
Op	ACT_2	IREF> Trip	T	
SupervOn	SPS_2	IREF> Superv ON		X

1.4.73 LOGICAL NODE: RREC

Description: Autoreclosing (w.r.t Auto Reclose)

LN Class: RREC

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
OpCls	ACT_2	AR1 Close	T	
AutoRecSt	ENS_3	AR1 Status		

1.4.74 LOGICAL NODE: RSYN

Description: Synchronism-Check (w.r.t Synchrocheck)

LN Class: RSYN

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Rel	SPS_0	CS[X] OK		
LivBus	SPS_2	CS[X] Live Bus		X
LivLin	SPS_2	CS[X] Live Line		X
DeaBus	SPS_2	CS[X] Dead Bus		X
DeaLin	SPS_2	CS[X] Dead Line		X
DeaSrc	SPS_2	CS[X] Dead Src OK		X
ClcPerm	SPS_2	CS[X] Close Perm		X
DifVClc	MV_2	CS[X] Volt Diff		X
DifHzClc	MV_2	CS[X] Freq Diff		X
DifAngClc	MV_2	CS[X] Angle Diff		X
BusVMag	MV_3	CS[X] Bus Volt		X
BusVHz	MV_3	CS[X] Bus Volt Frq		X
BusVAng	MV_3	CS[X] Bus Volt θ		X
LinVMag	MV_3	CS[X] Line Volt		X

Attribute	Attr. Type	Explanation	T	X
LinVHz	MV_3	CS[X] Line Volt Frq		X
LinVAng	MV_3	CS[X] Line Volt θ		X

1.4.75 LOGICAL NODE: TVTR

Description: Voltage Transformer (w.r.t VT Supervision)

LN Class: TVTR

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
FuFail	SPS_0	VTS Fast Block		

1.4.76 LOGICAL NODE: XCBR

Description: Circuit Breaker (w.r.t CB Control)

LN Class: XCBR

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Loc	SPS_0	Local mode ON		
OpCnt	INS_0	Operation counter		
Pos	DPC_0	Control Close		
BlkOpn	SPC_0	Block Opening		
BlkCls	SPC_0	Block Closing		
CBOpCap	ENS_2	BKR1 52a CI ON		

1.4.77 LOGICAL NODE: XSWI_0

Description: Circuit Switch (w.r.t SW Control)

LN Class: XSWI

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
Loc	SPS_0	Local mode ON		
OpCnt	INS_0	Operation counter		
Pos	DPC_1	SWI[X] Status Cls		
BlkOpn	SPC_3	SW[X] Rem Blk Open		
BlkCls	SPC_3	SW[X] Rem Blk Close		
SwTyp	ENS_7	Disconnecter		

1.4.78 LOGICAL NODE: TRANSRCDRRE

Description: Transient Recorders Status

LN Class: RDRE

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
RcdMade	SPS_0	Record made		
FltNum	INS_0	Number of records since last clear		
NumRcd	INS_1	Transients Records Available		
RsTms	INS_1	Last Clear Date/Time		X

1.4.79 LOGICAL NODE: LEDSIHMI

Description: Leds Status

LN Class: IHMI

Attribute	Attr. Type	Explanation	T	X
Mod	ENC_0	Mode		
Beh	ENS_0	Behaviour		
Health	ENS_1	Health		
NamPlt	LPL_1	Name Plate		
TripInd	SPS_2	Trip led		X
AlmInd	SPS_2	Alarm led		X
OutOfService	SPS_2	Out of Service led		X
HealthInd	SPS_2	Health led		X
UsrPrgmLED5	SPS_2	User programmable 5 led		X
UsrPrgmLED6	SPS_2	User programmable 6 led		X
UsrPrgmLED7	SPS_2	User programmable 7 led		X
UsrPrgmLED8	SPS_2	User programmable 8 led		X
UsrPrgmLED9	SPS_2	User programmable 9 led		X
UsrPrgmLED10	SPS_2	User programmable 10 led		X
UsrPrgmLED11	SPS_2	User programmable 11 led		X
UsrPrgmLED12	SPS_2	User programmable 12 led		X
UsrPrgmLED12	SPS_2	User programmable 13 led		X
UsrPrgmLED14	SPS_2	User programmable 14 led		X
UsrPrgmLED15	SPS_2	User programmable 15 led		X
UsrPrgmLED16	SPS_2	User programmable 16 led		X
UsrPrgmLED17	SPS_2	User programmable 17 led		X
UsrPrgmLED18	SPS_2	User programmable 18 led		X
UsrPrgmLED19	SPS_2	User programmable 19 led		X
UsrPrgmLED20	SPS_2	User programmable 20 led		X
UsrPrgmLED21	SPS_2	User programmable 21 led		X
UsrPrgmLED22	SPS_2	User programmable 22 led		X
UsrPrgmLED23	SPS_2	User programmable 23 led		X
UsrPrgmLED24	SPS_2	User programmable 24 led		X
UsrPrgmLED25	SPS_2	User programmable 25 led		X
UsrPrgmLED26	SPS_2	User programmable 26 led		X

1.5 COMMON DATA CLASS DEFINITIONS

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

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

FC Name	Semantic	Source Definition
BR	Buffered Reports	IEC 61850-7-2
CF	Configuration	IEC 61850-7-2
CO	Control	IEC 61850-7-2
DC	Description	IEC 61850-7-2
EX	Extended Definition	IEC 61850-7-2
GO	GOOSE Control	IEC 61850-7-2
GS	GSSE Control (UCA2 GOOSE)	IEC 61850-7-2
LG	Logging	IEC 61850-7-2
MS	Multicast Sampled Value Control	IEC 61850-7-2
MX	Measurands (Analogue Values)	IEC 61850-7-2
RP	Unbuffered Reports	IEC 61850-7-2
SE	Setting Group Editable	IEC 61850-7-2
SG	Setting Group	IEC 61850-7-2
SP	Set Point	IEC 61850-7-2
ST	Status Information	IEC 61850-7-2
SV	Substitution Values	IEC 61850-7-2
US	Unicast Sampled Value Control	IEC 61850-7-2
XX	Data Attribute Service Parameters	IEC 61850-7-2

1.5.1 COMMON DATA CLASS: ACD_0

Description: Directional Protection Activation Information

CDC Class: ACD

Attribute	Type	FC	Enumeration	Comment	X
general	BOOLEAN	ST		Trip or start has happened	
dirGeneral	Enum	ST	dir	General direction (unknown, forward, backward or both)	
phsA	BOOLEAN	ST		Trip or start event of Phase A has happened	
dirPhsA	Enum	ST	dir_1	Phase A direction (unknown, forward or backward)	
phsB	BOOLEAN	ST		Trip or start event of Phase B has happened	
dirPhsB	Enum	ST	dir_1	Phase B direction (unknown, forward or backward)	
phsC	BOOLEAN	ST		Trip or start event of Phase C has happened	
dirPhsC	Enum	ST	dir_1	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	
d	VisString255	DC		Description of the status element	

1.5.2 COMMON DATA CLASS: ACD_1

Description: Directional Protection Activation Information

CDC Class: ACD

Attribute	Type	FC	Enumeration	Comment	X
general	BOOLEAN	ST		Trip or start has happened	
dirGeneral	Enum	ST	dir	General direction (unknown, forward, backward or both)	
neut	BOOLEAN	ST		Trip or start event with earth current has happened	
dirNeut	Enum	ST	dir 1	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	
d	VisString255	DC		Description of the status element	

1.5.3 COMMON DATA CLASS: ACD_2

Description: Directional Protection Activation Information

CDC Class: ACD

Attribute	Type	FC	Enumeration	Comment	X
general	BOOLEAN	ST		Trip or start has happened	
dirGeneral	Enum)	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	
d	VisString255	DC		Description of the status element	

1.5.4 COMMON DATA CLASS: ACD_3

Description: Directional Protection Activation Information

CDC Class: ACD

Attribute	Type	FC	Enumeration	Comment	X
general	BOOLEAN	ST		Trip or start has happened	
dirGeneral	Enum	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	
d	VisString255	DC		Description of the status element	
dataNs	VisString255	EX		Data name space	X

1.5.5 COMMON DATA CLASS: ACT_0

Description: Protection Activation Information

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	

Attribute	Type	FC	Enumeration	Comment	X
t	Timestamp	ST		Timestamp of the last change in state of protection activation information	
d	VisString255	DC		Description of the status element	

1.5.6 COMMON DATA CLASS: ACT_1

Description: Protection Activation Information

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	
d	VisString255	DC		Description of the status element	

1.5.7 COMMON DATA CLASS: ACT_2

Description: Protection Activation Information

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	
d	VisString255	DC		Description of the status element	

1.5.8 COMMON DATA CLASS: ACT_3

Description: Protection Activation Information

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	
d	VisString255	DC		Description of the status element	
dataNs	VisString255	EX		Data name space	X

1.5.9 COMMON DATA CLASS: CMV_0

Description: Complex Measured Value

CDC Class: CMV

Attribute	Type	FC	Enumeration	Comment	X
instCVal	FloatVector	MX		Instant value of the vector type value	
cVal	FloatVector	MX		Deadbanded complex measured vector. Updated to the current value of instCVal when the value has changed according to the configuration parameter db	
range	Enum	MX	range	Range in which the current value of instCVal is	
q	Quality	MX		Quality of the measurement value	

Attribute	Type	FC	Enumeration	Comment	X
t	Timestamp	MX		Time deadbanded magnitude last exceeded its db configuration parameter	
units	Unit	CF		Unit of the attribute representing the data	
db	INT32U	CF		Measurement deadband	
dbAng	INT32U	CF		Deadband for Angles	
zeroDb	INT32U	CF		Configuration parameter used to calculate the range around zero, where the analogue value will be forced to zero	
rangeC	RangeConfig	CF		Measurement range configuration attributes	
d	VisString255	DC		Description of the status element	

1.5.10 COMMON DATA CLASS: CMV_1

Description: Complex Measured Value

CDC Class: CMV

Attribute	Type	FC	Enumeration	Comment	X
instCVal	FloatVector	MX		Instant value of the vector type value	
cVal	FloatVector	MX		Deadbanded complex measured vector. Updated to the current value of instCVal when the value has changed according to the configuration parameter db	
range	Enum	MX	range	Range in wich the current value of instCVal is	
q	Quality	MX		Quality of the measurement value	
t	Timestamp	MX		Time deadbanded magnitude last exceeded its db configuration parameter	
units	Unit	CF		Unit of the attribute representing the data	
db	INT32U	CF		Measurement deadband.	
dbAng	INT32U	CF		Deadband for Angles	
zeroDb	INT32U	CF		Configuration parameter used to calculate the range around zero, where the analogue value will be forced to zero	
rangeC	RangeConfig	CF		Measurement range configuration attributes	
d	VisString255	DC		Description of the status element	
dataNs	VisString255	EX		Data name space	X

1.5.11 COMMON DATA CLASS: CMV_2

Description: Complex Measured Value

CDC Class: CMV

Attribute	Type	FC	Enumeration	Comment	X
cVal	FloatVector	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	CF		Unit of the attribute representing the data	
d	VisString255	DC		Description of the status element	

1.5.12 COMMON DATA CLASS: CMV_3

Description: Complex Measured Value

CDC Class: CMV

Attribute	Type	FC	Enumeration	Comment	X
cVal	FloatVector	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	CF		Unit of the attribute representing the data	
d	VisString255	DC		Description of the status element	
dataNs	VisString255	EX		Data name space	X

1.5.13 COMMON DATA CLASS: CMV_5

Description: Complex Measured Value

CDC Class: CMV

Attribute	Type	FC	Enumeration	Comment	X
cVal	FloatVector_1	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	CF		Unit of the attribute representing the data	
d	VisString255	DC		Description of the status element	
dataNs	VisString255	EX		Data name space	X

1.5.14 COMMON DATA CLASS: CMV_6

Description: Complex Measured Value

CDC Class: CMV

Attribute	Type	FC	Enumeration	Comment	X
cVal	FloatVector_1	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	CF		Unit of the attribute representing the data	
d	VisString255	DC		Description of the status element	

1.5.15 COMMON DATA CLASS: DEL_0

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

CDC Class: DEL

Attribute	Type	FC	Enumeration	Comment	X
phsAB	CMV_0	--		Measurement values for Phase A to Phase B	
phsBC	CMV_0	--		Measurement values for Phase B to Phase C	
phsCA	CMV_0	--		Measurement values for Phase C to Phase A	
d	VisString255	DC		Description of the status element	

1.5.16 COMMON DATA CLASS: DPC_0

Description: Controllable Double Point

CDC Class: DPC

Attribute	Type	FC	Enumeration	Comment	X
SBO	VisString129	CO			
SBOw	SBOw	CO			
Oper	Operate	CO			
Cancel	Cancel	CO			
stVal	Dbpos	ST		Status value of the data (Intermediate state, Off, On or Bad-state)	
q	Quality	ST		Quality of the status value	
t	Timestamp	ST		Timestamp of the last change in state of status value	
ctlModel	Enum	CF	ctlModel	Control model (Corresponding to the behaviour of the data)	
sboTimeout	INT32U	CF		Select Before Operate timeout period (in milliseconds)	
sboClass	Enum	CF	sboClass	SBO-class according to the control model of IEC 61850-7-2 that corresponds to the behaviour of the data(operate-once or operate-many)	
operTimeout	INT32U	CF		Select Before Operate timeout period (in milliseconds)	
d	VisString255	DC		Description of the status element	

1.5.17 COMMON DATA CLASS: DPC_1

Description: Controllable Double Point

CDC Class: DPC

Attribute	Type	FC	Enumeration	Comment	X
stVal	Dbpos	ST		Status value of the data (Intermediate state, Off, On or Bad-state)	
q	Quality	ST		Quality of the status value	
t	Timestamp	ST		Timestamp of the last change in state of status value	
ctlModel	Enum	CF	ctlModel_2	Control model (Corresponding to the behaviour of the data)	
d	VisString255	DC		Description of the status element	

1.5.18 COMMON DATA CLASS: DPL_0

Description: Standard Device Name Plate

CDC Class: DPL

Attribute	Type	FC	Enumeration	Comment	X
vendor	VisString255	DC		Name of the vendor	
hwRev	VisString255	DC		Hardware revision	
swRev	VisString255	DC		Software revision	

Attribute	Type	FC	Enumeration	Comment	X
serNum	VisString255	DC		Serial Number	
model	VisString255	DC		Model Number	
location	VisString255	DC		Physical location of device	

1.5.19 COMMON DATA CLASS: DPS_0

Description: Double Point Status

CDC Class: DPS

Attribute	Type	FC	Enumeration	Comment	X
stVal	Dbpos	ST		Status value of the data (Intermediate state, Off, On or Bad-state)	
q	Quality	ST		Quality of the status value	
t	Timestamp	ST		Timestamp of the last change in state of status value	
d	VisString255	DC		Description of the status element	
dataNs	VisString255	EX		Data name space	X

1.5.20 COMMON DATA CLASS: ENC_0

Description: Controllable Enumerated Status

CDC Class: ENC

Attribute	Type	FC	Enumeration	Comment	X
stVal	Enum	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	Enum	CF	ctlModel_2	Control model (Corresponding to the behaviour of the data)	

1.5.21 COMMON DATA CLASS: ENC_1

Description: Controllable Enumerated Status

CDC Class: ENC

Attribute	Type	FC	Enumeration	Comment	X
Oper	Operate_ENC	CO			
stVal	Enum	ST	Mod_1	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	Enum	CF	ctlModel_1	Control model (Corresponding to the behaviour of the data)	

1.5.22 COMMON DATA CLASS: ENS_0

Description: Enumerated Status

CDC Class: ENS

Attribute	Type	FC	Enumeration	Comment	X
stVal	Enum	ST	Beh	Status value of the data.	
q	Quality	ST		Quality of the status value	
t	Timestamp	ST		Timestamp of the last change in state of status value	

1.5.23 COMMON DATA CLASS: ENS_1

Description: Enumerated Status

CDC Class: ENS

Attribute	Type	FC	Enumeration	Comment	X
stVal	Enum	ST	Health	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	

1.5.24 COMMON DATA CLASS: ENS_2

Description: Enumerated Status

CDC Class: ENS

Attribute	Type	FC	Enumeration	Comment	X
stVal	Enum	ST	CBOpCap	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	
d	VisString255	DC		Description of the status element	

1.5.25 COMMON DATA CLASS: ENS_3

Description: Enumerated Status

CDC Class: ENS

Attribute	Type	FC	Enumeration	Comment	X
stVal	Enum	ST	AutoRecSt	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	
d	VisString255	DC		Description of the status element	

1.5.26 COMMON DATA CLASS: ENS_4

Description: Enumerated Status

CDC Class: ENS

Attribute	Type	FC	Enumeration	Comment	X
stVal	Enum	ST	FaultType	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	
d	VisString255	DC		Description of the status element	

1.5.27 COMMON DATA CLASS: ENS_7

Description: Enumerated Status

CDC Class: ENS

Attribute	Type	FC	Enumeration	Comment	X
stVal	Enum	ST	SwTyp	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	

1.5.28 COMMON DATA CLASS: ENS_8

Description: Enumerated Status

CDC Class: ENS

Attribute	Type	FC	Enumeration	Comment	X
stVal	Enum	ST	GE_Grid_Automation_Bridge_TimeSourceKind	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	
dataNs	VisString255	EX		Data name space	

1.5.29 COMMON DATA CLASS: ING_0

Description: Integer Status Setting

CDC Class: ING

Attribute	Type	FC	Enumeration	Comment	X
setVal	INT32	SP			
d	VisString255	DC			

1.5.30 COMMON DATA CLASS: INS_0

Description: Integer Status

CDC Class: INS

Attribute	Type	FC	Enumeration	Comment	X
stVal	INT32	ST		The element status	
q	Quality	ST		The quality of the status value	
t	Timestamp	ST		Timestamp of the last change in state	
d	VisString255	DC		Description of the status element	

1.5.31 COMMON DATA CLASS: INS_1

Description: Integer Status

CDC Class: INS

Attribute	Type	FC	Enumeration	Comment	X
stVal	INT32	ST		The element status	
q	Quality	ST		The quality of the status value	
t	Timestamp	ST		Timestamp of the last change in state	
d	VisString255	DC		Description of the status element	
dataNs	VisString255	EX		Data name space	X

1.5.32 COMMON DATA CLASS: LPL_0

Description: Logical Node Name Plate

CDC Class: LPL

Attribute	Type	FC	Enumeration	Comment	X
vendor	VisString255	DC		Name of the vendor	
swRev	VisString255	DC		Software revision	
d	VisString255	DC		Description	

Attribute	Type	FC	Enumeration	Comment	X
configRev	VisString255	DC		Uniquely identifies the configuration of a local device instance	
IdNs	VisString255	EX		Logical Device name space	X

1.5.33 COMMON DATA CLASS: LPL_1

Description: Logical Node Name Plate

CDC Class: LPL

Attribute	Type	FC	Enumeration	Comment	X
vendor	VisString255	DC		Name of the vendor	
swRev	VisString255	DC		Software revision	
d	VisString255	DC		Description	

1.5.34 COMMON DATA CLASS: MV_0

Description: Measured Value

CDC Class: MV

Attribute	Type	FC	Enumeration	Comment	X
instMag	FloatAnalogueValue	MX		Instantaneous value of a measured value	
mag	FloatAnalogueValue	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.	
range	Enum	MX	range	Range in which the current value of instMag is	
q	Quality	MX		Quality of the measurement value	
t	Timestamp	MX		Time deadbanded magnitude last exceeded its db configuration parameter	
units	Unit	CF		Unit of the attribute representing the data	
db	INT32U	CF		Measurement deadband	
zeroDb	INT32U	CF		Configuration parameter used to calculate the range around zero, where the analogue value will be forced to zero	
rangeC	RangeConfig	CF		Measurement range configuration attributes	
d	VisString255	DC		Description	

1.5.35 COMMON DATA CLASS: MV_1

Description: Measured Value

CDC Class: MV

Attribute	Type	FC	Enumeration	Comment	X
instMag	FloatAnalogueValue	MX		Instantaneous value of a measured value	
mag	FloatAnalogueValue	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	
range	Enum	MX	range	Range in which the current value of instMag is	
q	Quality	MX		Quality of the measurement value	
t	Timestamp	MX		Time deadbanded magnitude last exceeded its db configuration parameter	
units	Unit	CF		Unit of the attribute representing the data	
db	INT32U	CF		Measurement deadband	

Attribute	Type	FC	Enumeration	Comment	X
zeroDb	INT32U	CF		Configuration parameter used to calculate the range around zero, where the analogue value will be forced to zero	
rangeC	RangeConfig	CF		Measurement range configuration attributes	
d	VisString255	DC		Description	
dataNs	VisString255	EX		Data name space	X

1.5.36 COMMON DATA CLASS: MV_2

Description: Measured Value

CDC Class: MV

Attribute	Type	FC	Enumeration	Comment	X
mag	FloatAnalogueValue	MX		Deadbanded magnitude of the instantaneous value of a measured value or harmonic value. Updated to the current value of instMag when the value has changed according to the configuration parameter db	
q	Quality	MX		Quality of the measurement value	
t	Timestamp	MX		Time deadbanded magnitude last exceeded its db configuration parameter	
units	Unit	CF		Unit of the attribute representing the data	
d	VisString255	DC		Description	

1.5.37 COMMON DATA CLASS: MV_3

Description: Measured Value

CDC Class: MV

Attribute	Type	FC	Enumeration	Comment	X
mag	FloatAnalogueValue	MX		Deadbanded magnitude of the instantaneous value of a measured value or harmonic value. Updated to the current value of instMag when the value has changed according to the configuration parameter db	
q	Quality	MX		Quality of the measurement value	
t	Timestamp	MX		Time deadbanded magnitude last exceeded its db configuration parameter	
units	Unit	CF		Unit of the attribute representing the data	
d	VisString255	DC		Description	
dataNs	VisString255	EX		Data name space	X

1.5.38 COMMON DATA CLASS: MV_4

Description: Measured Value

CDC Class: MV

Attribute	Type	FC	Enumeration	Comment	X
mag	IntAnalogueValue	MX		Deadbanded magnitude of the instantaneous value of a measured value or harmonic value. Updated to the current value of instMag when the value has changed according to the configuration parameter db	
q	Quality	MX		Quality of the measurement value	
t	Timestamp	MX		Time deadbanded magnitude last exceeded its db configuration parameter	
units	Unit	CF		Unit of the attribute representing the data	
d	VisString255	DC		Description	

1.5.39 COMMON DATA CLASS: MV_6

Description: Measured Value

CDC Class: MV

Attribute	Type	FC	Enumeration	Comment	X
instMag	FloatAnalogueValue	MX		Instantaneous value of a measured value	
mag	FloatAnalogueValue	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	
range	Enum	MX	range	Range in which the current value of instMag is	
q	Quality	MX		Quality of the measurement value	
t	Timestamp	MX		Time deadbanded magnitude last exceeded its db configuration parameter	
units	Unit_2	CF		Unit of the attribute representing the data	
db	INT32U	CF		Measurement deadband	
zeroDb	INT32U	CF		Configuration parameter used to calculate the range around zero, where the analogue value will be forced to zero	
rangeC	RangeConfig	CF		Measurement range configuration attributes	
d	VisString255	DC		Description	

1.5.40 COMMON DATA CLASS: ORG_0

Description: Object Reference Setting

CDC Class: ORG

Attribute	Type	FC	Enumeration	Comment	X
setSrcRef	ObjRef	SP		Value of the object reference setting	

1.5.41 COMMON DATA CLASS: ORG_1

Description: Object Reference Setting

CDC Class: ORG

Attribute	Type	FC	Enumeration	Comment	X
setSrcRef	ObjRef	SP		Value of the object reference setting	
intAddr	VisString255	SP		Manufacturer specific internal address	
d	VisString255	DC		Description	

1.5.42 COMMON DATA CLASS: SEQ_0

Description: Sequence Components of a Measurement Value

CDC Class: SEQ

Attribute	Type	FC	Enumeration	Comment	X
c1	CMV_0	--		Sequence component 1 (For semantic meaning see seqT)	
c2	CMV_0	--		Sequence component 2 (For semantic meaning see seqT)	
c3	CMV_0	--		Sequence component 3 (For semantic meaning see seqT)	
seqT	Enum	MX	seqT	Sequence quantity measurement type (Pos-Neg-Zero or Dir-Quad-Zero)	
d	VisString255	DC		Description	

1.5.43 COMMON DATA CLASS: SPC_0

Description: Controllable Single Point

CDC Class: SPC

Attribute	Type	FC	Enumeration	Comment	X
Oper	Operate	CO			
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	Enum	CF	ctlModel	Control model (Corresponding to the behaviour of the data)	
operTimeout	INT32U	CF		Select Before Operate timeout period (in milliseconds)	
d	VisString255	DC		Description	

1.5.44 COMMON DATA CLASS: SPC_1

Description: Controllable Single Point

CDC Class: SPC

Attribute	Type	FC	Enumeration	Comment	X
Oper	Operate	CO			
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	Enum	CF	ctlModel_1	Control model (Corresponding to the behaviour of the data)	
operTimeout	INT32U	CF		Select Before Operate timeout period (in milliseconds)	
d	VisString255	DC		Description	

1.5.45 COMMON DATA CLASS: SPC_2

Description: Controllable Single Point

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	Enum	CF	ctlModel	Control model (Corresponding to the behaviour of the data)	
d	VisString255	DC		Description	

1.5.46 COMMON DATA CLASS: SPC_3

Description: Controllable Single Point

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	Enum	CF	ctlModel_2	Control model (Corresponding to the behaviour of the data)	
d	VisString255	DC		Description	

1.5.47 COMMON DATA CLASS: SPG_0

Description: Single Point Setting

CDC Class: SPG

Attribute	Type	FC	Enumeration	Comment	X
setVal	BOOLEAN	SP			
d	VisString255	DC		Description of the element	

1.5.48 COMMON DATA CLASS: SPG_1

Description: Single Point Setting

CDC Class: SPG

Attribute	Type	FC	Enumeration	Comment	X
setVal	BOOLEAN	SP			
D	VisString255	DC		Description of the element	

1.5.49 COMMON DATA CLASS: SPS_0

Description: Standard Single Point Status

CDC Class: SPS

Attribute	Type	FC	Enumeration	Comment	X
stVal	BOOLEAN	ST		The element status (TRUE or FALSE)	
q	Quality	ST		The quality of the status value	
t	Timestamp	ST		Timestamp of the last change in state	
d	VisString255	DC		Description of the status element	

1.5.50 COMMON DATA CLASS: SPS_1

Description: Standard 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	

1.5.51 COMMON DATA CLASS: SPS_2

Description: Standard Single Point Status

CDC Class: SPS

Attribute	Type	FC	Enumeration	Comment	X
stVal	BOOLEAN	ST		The element status (TRUE or FALSE)	
q	Quality	ST		The quality of the status value	
t	Timestamp	ST		Timestamp of the last change in state	
d	VisString255	DC		Description of the status element	
dataNs	VisString255	EX		Data name space	X

1.5.52 COMMON DATA CLASS: TSG_0

Description: Time Setting Group

CDC Class: TSG

Attribute	Type	FC	Enumeration	Comment	X
setCal	Struct	SP		Calendar time	
d	VisString255	DC		Description of the status element	

1.5.53 COMMON DATA CLASS: VSS_0

Description: Visible String Status

CDC Class: VSS

Attribute	Type	FC	Enumeration	Comment	X
stVal	VisString255	ST		Text	
q	Quality	ST		The quality of the status value	
t	Timestamp	ST		Timestamp of the last change in state	
d	VisString255	DC		Description of the status element	

1.5.54 COMMON DATA CLASS: VSS_1

Description: Visible String Status

CDC Class: VSS

Attribute	Type	FC	Enumeration	Comment	X
stVal	VisString255	ST		Text	
q	Quality	ST		The quality of the status value	
t	Timestamp	ST		Timestamp of the last change in state	
d	VisString255	DC		Description of the status element	
dataNs	VisString255	EX		Data name space	

1.5.55 COMMON DATA CLASS: WYE_0

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

CDC Class: WYE

Attribute	Type	FC	Enumeration	Comment	X
phsA	CMV_0	--		Measurement values for Phase A	
phsB	CMV_0	--		Measurement values for Phase B	
phsC	CMV_0	--		Measurement values for Phase C	
neut	CMV_0	--		Measurement values for neutral input	
d	VisString255	DC		Description of the status element	

1.5.56 COMMON DATA CLASS: WYE_1_1

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

CDC Class: WYE

Attribute	Type	FC	Enumeration	Comment	X
phsA	CMV_0	--		Measurement values for Phase A	
phsB	CMV_0	--		Measurement values for Phase B	
phsC	CMV_0	--		Measurement values for Phase C	
neut	CMV_0	--		Measurement values for ground input (only available in 6-1 option)	

Attribute	Type	FC	Enumeration	Comment	X
net	CMV_0	--		Measurement values for neutral input	
res	CMV_0	--		Measurement values for sensitive ground input (only available in 6-2 option)	
d	VisString255	DC		Description of the status element	

1.5.57 COMMON DATA CLASS: WYE_4

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

CDC Class: WYE

Attribute	Type	FC	Enumeration	Comment	X
phsA	CMV_5	--		Measurement values for Phase A	
phsB	CMV_5	--		Measurement values for Phase B	
phsC	CMV_5	--		Measurement values for Phase C	
d	VisString255	DC		Description of the status element	
dataNs	VisString255	EX		Data name space	X

1.5.58 COMMON DATA CLASS: WYE_5

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

CDC Class: WYE

Attribute	Type	FC	Enumeration	Comment	X
phsA	CMV_6	--		Measurement values for Phase A	
phsB	CMV_6	--		Measurement values for Phase B	
phsC	CMV_6	--		Measurement values for Phase C	
d	VisString255	DC		Description of the status element	

1.6 COMMON DATA ATTRIBUTE TYPE DEFINITIONS

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

1.6.1 COMPONENT: CANCEL

Comment: Cancel Operating

Parent Type: Cancel

Attribute	Type	Enumeration	Comment	X
ctlVal	BOOLEAN		Control activity (off-FALSE or on-TRUE)	
origin	Originator		Originator of the control service	
ctlNum	INT8U		Control sequence number	
T	Timestamp		Control time-stamp	
Test	BOOLEAN		Test status	

1.6.2 COMPONENT: FLOATANALOGUEVALUE

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

Parent Type: AnalogueValue

Attribute	Type	Enumeration	Comment	X
f	FLOAT32		Floating point value	

1.6.3 COMPONENT: FLOATVECTOR

Comment: Complex Vector (w.r.t Floating Point Magnitude and Angle Values)

Parent Type: Vector Type

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

1.6.4 COMPONENT: FLOATVECTOR_1

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

Parent Type: Vector Type

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

1.6.5 COMPONENT: INTANALOGUEVALUE

Comment: Analogue Value (w.r.t Integer Value)

Parent Type: Analogue Value

Attribute	Type	Enumeration	Comment	X
i	INT32		Integer value	

1.6.6 COMPONENT: OPERATE

Comment: Start/Select Operating

Parent Type: Oper

Attribute	Type	Enumeration	Comment	X
ctlVal	BOOLEAN		Control activity (off-FALSE or on-TRUE)	
origin	Originator		Originator of the control service	
ctlNum	INT8U		Control sequence number	
T	Timestamp		Control time-stamp	
Test	BOOLEAN		Test status. no-test (FALSE) or test (TRUE)	
Check	Check		Check condition	

1.6.7 COMPONENT: OPERATE_ENC

Comment: Start/Select Operating

Parent Type: Oper

Attribute	Type	Enumeration	Comment	X
ctlVal	Enum	Mod		
origin	Originator		Originator of the control service	
ctlNum	INT8U		Control sequence number	
T	Timestamp		Control time-stamp	
Test	BOOLEAN		Test status. no-test(FALSE) or test (TRUE)	
Check	Check		Check condition	

1.6.8 COMPONENT: ORIGINATOR

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

Parent Type: Originator

Attribute	Type	Enumeration	Comment	X
orCat	Enum	orCategory	Originator category (Not-supported, bay-control, station-control, remote-control, automatic-bay, automatic-station, automatic-remote, maintenance or process)	
orIdent	Octet64		Originator identification (Null value indicates unknown or not reported)	

1.6.9 COMPONENT: RANGECONFIG

Comment: Measurement Range Configuration

Parent Type: RangeConfig

Attribute	Type	Enumeration	Comment	X
hhLim	FloatAnalogueValue		High High range limit	
hLim	FloatAnalogueValue		High range limit	
lLim	FloatAnalogueValue		Low range limit	
llLim	FloatAnalogueValue		Low Low range limit	
min	FloatAnalogueValue		Minimum process measurement for which values of i and f are considered within limits	
max	FloatAnalogueValue		Maximum process measurement for which values of i and f are considered within limits	
limDb	INT32U		Value used to introduce a hysteresis in the calculation of range	

1.6.10 COMPONENT: SBOW

Comment: Start/Select Operating

Parent Type: Oper

Attribute	Type	Enumeration	Comment	X
ctlVal	INT32		Control activity (off-FALSE or on-TRUE)	
origin	Originator		Originator of the control service	
ctlNum	INT8U		Control sequence number	
T	Timestamp		Control time-stamp	
Test	BOOLEAN		Test status. no-test(FALSE) or test (TRUE)	
Check	Check		Check condition	

1.6.11 COMPONENT: UNIT

Comment: SI Unit Definitions

Parent Type: Unit

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

1.6.12 COMPONENT: UNIT_2

Comment: SI Unit Definitions

Parent Type: Unit

Attribute	Type	Enumeration	Comment	X
SIUnit	Enum	SIUnit	SI Unit	
multiplier	Enum	multiplier_2	Multiplier value, the default of which is 0 (i.e. multiplier = 1)	

1.6.13 COMPONENT: CALENDARTIME

Attribute	Type	Enumeration	Comment	X
occ	INT16U			
occType	Enum	Time, WeekDay, WeekOfYear, DayOfMonth, DayOfYear		
occPer	Enum	Hour, Day, Week, Month, Year		
weekDay	Enum	Reserved, Monday, Tuesday, ...Sunday		
month	Enum	Reserved, January, February, ...December		
day	INT8U	1..31		
hr	INT8U	0..23		
mn	INT8U	0..59		

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 is according to IEC 61850-7-3 and IEC 61850-7-4 unless otherwise stated.

1.7.1 ENUMERATED TYPE: AUTORECST

Description: Auto Reclosing Status

Ordinal	Semantic
1	Ready
2	InProgress
3	Successful
4	WaitingForTrip
5	TripFromProtection
6	FaultDisappeared
7	WaitToComplete
8	CBclosed
9	CycleUnsuccessful
10	Unsuccessful
11	Aborted

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: CBOPCAP

Description: Enumeration for CB Operation

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

1.7.4 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: CTLMODEL_1

Description: Control Model

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

1.7.6 ENUMERATED TYPE: CTLMODEL_2

Description: Control Model

Ordinal	Semantic
0	status-only

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

Ordinal	Semantic
2	backward
3	both

1.7.9 ENUMERATED TYPE: DIR_1

Description: Direction

Ordinal	Semantic
0	unknown
1	forward
2	backward

1.7.10 ENUMERATED TYPE: FAULTTYPE

Description: Direction

Ordinal	Semantic
1	PhaseAtoGround
2	PhaseBtoGround
3	PhaseCtoGround
4	PhaseAtoB
5	PhaseBtoC
6	PhaseCtoA
7	Others

1.7.11 ENUMERATED TYPE: GE_GRID_AUTOMATION_BRIDGE_TIMESOURCEKIND

Ordinal	Semantic
0	None
1	Port3 PTP Clock
2	Port4 PTP Clock
3	IrigB
4	SNTP Server 1
5	SNTP Server 2
6	Port1 PTP Clock
7	Port2 PTP Clock

1.7.12 ENUMERATED TYPE: HEALTH

Description: Health

Ordinal	Semantic
1	Ok
2	Warning
3	Alarm

1.7.13 ENUMERATED TYPE: MOD

Description: Mode

Ordinal	Semantic
1	on
2	blocked

Ordinal	Semantic
3	test
4	test/blocked
5	off

1.7.14 ENUMERATED TYPE: MOD_1

Description: Mode

Ordinal	Semantic
1	on
3	test

1.7.15 ENUMERATED TYPE: MONTH

Ordinal	Semantic
0	Reserved
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

1.7.16 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

Ordinal	Semantic
15	P
18	E
21	Z
24	Y

1.7.17 ENUMERATED TYPE: MULTIPLIER_2

Description: Exponents of the Multiplier Value in Base 10

Ordinal	Semantic
0	
3	k
6	M

1.7.18 ENUMERATED TYPE: OCCPER

Ordinal	Semantic
0	Hour
1	Day
2	Week
3	Month
4	Year

1.7.19 ENUMERATED TYPE: OCCTYPE

Ordinal	Semantic
0	Time
1	WeekDay
2	WeekOfYear
3	DayOfMonth
4	DayOfYear

1.7.20 ENUMERATED TYPE: ORCATEGORY

Description: orCategory

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

1.7.21 ENUMERATED TYPE: RANGE

Description: Range

Ordinal	Semantic
0	normal
1	high
2	low
3	high-high
4	low-low

1.7.22 ENUMERATED TYPE: SBOCLASS

Description: SBO-Class

Ordinal	Semantic
0	operate-once
1	operate-many

1.7.23 ENUMERATED TYPE: SEQT

Description: Sequence Measurement Type

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

1.7.24 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
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

Ordinal	Semantic
32	N
33	Hz
34	lx
35	Lm
36	Wb
37	T
38	W
39	Pa
41	m ²
42	m ³
43	m/s
44	m/s ²
45	m ³ /s
46	m/m ³
47	M
48	kg/m ³
49	m ² /s
50	W/m K
51	J/K
52	ppm
53	1/s
54	rad/s
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

1.7.25 ENUMERATED TYPE: WEEKDAY

Ordinal	Semantic
0	Reserved
1	Monday
2	Tuesday
3	Wednesday
4	Thursday
5	Friday
6	Saturday
7	sunday

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
INT32	Long	32 bit signed integer value
INT8U	Ubyte	8 bit unsigned integer value
INT16U	Ushort	16 bit unsigned integer value
INT32U	Ulong	32 bit unsigned integer value
FLOAT32	Float	32 bit floating point value
ENUMERATED	Byte	8 bit enumerated value
OCTET_STRING64	Ostring64	64 character string (8 bits per character)
VISIBLE_STRING129	Vstring129	129 character string
VISIBLE_STRING255	Vstring255	255 character string
Quality	BVstring13	IEC 61850 Quality
TimeStamp	Utctime	IEC 61850 Time stamp
Check	BVstring2	Control Object check flags



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