

# Easergy MiCOM P841A

**Multifunctional Line Terminal IED**

**P841A/EN MC/F72**

|                  |         |
|------------------|---------|
| Software Version | G7      |
| Hardware Suffix  | M       |
| IEC61850 Edition | 1       |
| Issue Date       | 08/2017 |

**Model Implementation Conformance Statement (MICS)**

**Note**

The technical manual for this device gives instructions for its installation, commissioning, and operation. However, the manual cannot cover all conceivable circumstances or include detailed information on all topics. In the event of questions or specific problems, do not take any action without proper authorization. Contact the appropriate Schneider Electric technical sales office and request the necessary information.

Any agreements, commitments, and legal relationships and any obligations on the part of Schneider Electric including settlements of warranties, result solely from the applicable purchase contract, which is not affected by the contents of the technical manual.

This device **MUST NOT** be modified. If any modification is made without the express permission of Schneider Electric, it will invalidate the warranty, and may render the product unsafe.

Easergy MiCOM and the Schneider Electric logo and any alternative version thereof are trademarks and service marks of Schneider Electric.

All trade names or trademarks mentioned herein whether registered or not, are the property of their owners.

This manual is provided for informational use only and is subject to change without notice.

© 2017, Schneider Electric. All rights reserved.

**MODEL IMPLEMENTATION  
CONFORMANCE STATEMENT  
(MICS)**

|                                   |  |
|-----------------------------------|--|
| Date (month/year):                | 08/2017  |
| Products covered by this chapter: | This chapter covers the specific versions of the MiCOM products listed below. This includes <b>only</b> the following combinations of Software Version and Hardware Suffix.  |
| Hardware suffix:                  | M  |
| Software version:                 | G7   |
| Connection diagrams:              | This includes a list of the Connection Diagrams for the Products covered by this document.<br>10P84100<br>10P84101 (SH 1 to 2)<br>10P84102 (SH 1 to 2)<br>10P84103 (SH 1 to 2)<br>10P84104 (SH 1 to 2)<br>10P84105 (SH 1 to 2) |

**CONTENTS**

|          |   | Page-     |
|----------|---|-----------|
| <b>1</b> | <b>Introduction</b>                     | <b>7</b>  |
| <b>2</b> | <b>Objective</b>                        | <b>8</b>  |
| <b>3</b> | <b>Logical Device definitions</b>       | <b>9</b>  |
| 3.1      | IEC61850 logical device data model      | 9         |
| <b>4</b> | <b>Logical Node definitions</b>         | <b>12</b> |
| 4.1      | Logical Node: CILO_INTERLOCK            | 13        |
| 4.2      | Logical Node: GGIO_ALM_96               | 13        |
| 4.3      | Logical Node: GGIO_IND_10               | 16        |
| 4.4      | Logical Node: GGIO_IND_14               | 16        |
| 4.5      | Logical Node: GGIO_IND_16               | 17        |
| 4.6      | Logical Node: GGIO_IND_16_CTRL          | 17        |
| 4.7      | Logical Node: GGIO_IND_18               | 18        |
| 4.8      | Logical Node: GGIO_IND_32               | 18        |
| 4.9      | Logical Node: GGIO_IND_4                | 19        |
| 4.10     | Logical Node: GGIO_IND_DPS_8            | 19        |
| 4.11     | Logical Node: LLN0_CONTROL_NO_DIST      | 20        |
| 4.12     | Logical Node: LLN0_PROT_NO_DIFF_NO_DIST | 20        |
| 4.13     | Logical Node: LLN0_STANDARD             | 21        |
| 4.14     | Logical Node: LLN0_SYSTEM               | 21        |
| 4.15     | Logical Node: LPHD_STANDARD             | 21        |
| 4.16     | Logical Node: MMTR_PRIV                 | 21        |
| 4.17     | Logical Node: MMXU_FOURIER              | 22        |
| 4.18     | Logical Node: MMXU_RMS                  | 22        |
| 4.19     | Logical Node: MMXU_SPE_55               | 23        |
| 4.20     | Logical Node: MSQI_ALL                  | 23        |
| 4.21     | Logical Node: MSQI_VOLTAGE              | 23        |
| 4.22     | Logical Node: MSTA_I_W_VAR              | 23        |
| 4.23     | Logical Node: PDIF_NEU                  | 24        |
| 4.24     | Logical Node: PFRC_NO_SEG               | 24        |
| 4.25     | Logical Node: PTOC_NEU                  | 24        |
| 4.26     | Logical Node: PTOC_NO_SEG               | 24        |
| 4.27     | Logical Node: PTOC_SEG                  | 25        |
| 4.28     | Logical Node: PTOF_NO_SEG               | 25        |

|          |                                      |           |
|----------|--------------------------------------|-----------|
| 4.29     | Logical Node: PTOV_NEU               | 25        |
| 4.30     | Logical Node: PTOV_NO_SEG            | 25        |
| 4.31     | Logical Node: PTOV_SEG               | 26        |
| 4.32     | Logical Node: PTRC_NO_SEG            | 26        |
| 4.33     | Logical Node: PTTR_NO_SEG            | 26        |
| 4.34     | Logical Node: PTUF_NO_SEG            | 26        |
| 4.35     | Logical Node: PTUV_SEG               | 27        |
| 4.36     | Logical Node: RBRF_EXTTRIP_SEG       | 27        |
| 4.37     | Logical Node: RDRE_BASIC             | 27        |
| 4.38     | Logical Node: RFLO_PRIV_8A           | 27        |
| 4.39     | Logical Node: RSYN_DIFCLC_ENH        | 29        |
| 4.40     | Logical Node: XCBR_BASIC             | 29        |
| <hr/>    |                                      |           |
| <b>5</b> | <b>Common Data Class definitions</b> | <b>30</b> |
| 5.1      | Common Data Class: ACD_NEU           | 30        |
| 5.2      | Common Data Class: ACD_NO_SEG        | 30        |
| 5.3      | Common Data Class: ACD_SEG           | 31        |
| 5.4      | Common Data Class: ACT_NEU           | 31        |
| 5.5      | Common Data Class: ACT_NO_SEG        | 31        |
| 5.6      | Common Data Class: ACT_SEG           | 31        |
| 5.7      | Common Data Class: BCR_PRIV          | 32        |
| 5.8      | Common Data Class: CMV_MAG_ANG_FLOAT | 32        |
| 5.9      | Common Data Class: CMV_MAG_ANG_NDB   | 32        |
| 5.10     | Common Data Class: CMV_MAG_FLOAT     | 33        |
| 5.11     | Common Data Class: CMV_MAG_FLOAT_NDB | 33        |
| 5.12     | Common Data Class: DEL_SEG_ANG       | 33        |
| 5.13     | Common Data Class: DPC_CONTROL       | 33        |
| 5.14     | Common Data Class: DPC_STATUS_D      | 34        |
| 5.15     | Common Data Class: DPL_STANDARD      | 34        |
| 5.16     | Common Data Class: INC_CTRL_D_PRIV   | 34        |
| 5.17     | Common Data Class: INC_MOD           | 35        |
| 5.18     | Common Data Class: INS_AR_STATE      | 35        |
| 5.19     | Common Data Class: INS_BASIC         | 35        |
| 5.20     | Common Data Class: INS_BEH           | 35        |
| 5.21     | Common Data Class: INS_BEH_D_PRIV    | 35        |
| 5.22     | Common Data Class: INS_CB_OPCAP      | 36        |
| 5.23     | Common Data Class: INS_D             | 36        |
| 5.24     | Common Data Class: INS_D_NS          | 36        |
| 5.25     | Common Data Class: INS_HEALTH        | 36        |

|       |   |    |
|-------|---|----|
| 5.26  | Common Data Class: LPL_LLNO             | 36 |
| 5.27  | Common Data Class: LPL_LN               | 37 |
| 5.28  | Common Data Class: MV_FLOAT             | 37 |
| 5.29  | Common Data Class: MV_FLOAT_D           | 37 |
| 5.30  | Common Data Class: MV_FLOAT_D_NS        | 37 |
| 5.31  | Common Data Class: MV_FLOAT_D_NS_NDB    | 38 |
| 5.32  | Common Data Class: MV_FLOAT_NDB         | 38 |
| 5.33  | Common Data Class: SEQ_MAG_ANG          | 38 |
| 5.34  | Common Data Class: SPC_CONTROL          | 39 |
| 5.35  | Common Data Class: SPC_CTRL_PRIV        | 39 |
| 5.36  | Common Data Class: SPC_STATUS           | 39 |
| 5.37  | Common Data Class: SPS_D                | 40 |
| 5.38  | Common Data Class: SPS_WD               | 40 |
| 5.39  | Common Data Class: SPS_WD_PRIV          | 40 |
| 5.40  | Common Data Class: WYE_RES_ANG_D        | 40 |
| 5.41  | Common Data Class: WYE_RES_ANG_D_NS     | 40 |
| 5.42  | Common Data Class: WYE_RES_ANG_D_NS_NDB | 41 |
| 5.43  | Common Data Class: WYE_SEG              | 41 |
| 5.44  | Common Data Class: WYE_SEG_ANG_D        | 41 |
| 5.45  | Common Data Class: WYE_SEG_ANG_D_NS     | 41 |
| 5.46  | Common Data Class: WYE_SEG_D            | 41 |
| 5.47  | Common Data Class: WYE_SEG_RES_D        | 42 |
| <hr/> |   |    |
| 6     | Common data attribute type definitions  | 43 |
| 6.1   | Component: AnalogueValue_Float          | 43 |
| 6.2   | Component: Originator                   | 43 |
| 6.3   | Component: RangeConfig_DeadBand         | 43 |
| 6.4   | Component: Unit_Multiplier              | 43 |
| 6.5   | Component: Vector_Magnitude_Float       | 43 |
| 6.6   | Component: Vector_MagnitudeAngle_Float  | 44 |
| <hr/> |   |    |
| 7     | Enumerated type definitions             | 45 |
| 7.1   | Enumerated type: AddCause               | 45 |
| 7.2   | Enumerated type: AutoRecSt              | 45 |
| 7.3   | Enumerated type: Beh                    | 45 |
| 7.4   | Enumerated type: Bypass                 | 46 |
| 7.5   | Enumerated type: CBOpCap                | 46 |
| 7.6   | Enumerated type: ctlModel               | 46 |
| 7.7   | Enumerated type: dir                    | 46 |

|       |                                  |           |
|-------|----------------------------------|-----------|
| 7.8   | Enumerated type: Health          | 46        |
| 7.9   | Enumerated type: Mod             | 46        |
| 7.10  | Enumerated type: multiplier      | 47        |
| 7.11  | Enumerated type: orCategory      | 47        |
| 7.12  | Enumerated type: seqT            | 48        |
| 7.13  | Enumerated type: SIUnit          | 48        |
| <hr/> |                                  |           |
| 8     | <b>MMS Data-Type Conversions</b> | <b>50</b> |



**1 INTRODUCTION**

This specification is the Model Implementation Conformance Statement (MICS) and presents the top-level IEC61850 data model that has been implemented. The definitions of all used Logical Nodes and their associated Common Data Classes, components and associated enumerated values are also included for completeness.

The reader is expected to be conversant with the terminology presented within the IEC61850 part 7 series of specifications.

## **2 OBJECTIVE**

This document is applicable for P841 with the firmware G7A. The MICS is conformant to the devices associated ICD (Substation Configuration Language) file: P841\_1\_\_\_\_G7AED1.ICD, version V2.1, according to part 6 and part 7 of the IEC61850 standards.

The layouts of the presented tables within this document are conformant to the part 6 and 7 series of the IEC61850 standard specifications with the following exceptions:

- The "Trigger Options" field is not presented
- The "M/O" field is not present as the definitions are as deployed within the model
- An additional column "X" is used to signify MiCOM custom attributes

**3 LOGICAL DEVICE DEFINITIONS**

The MiCOM relay implements an IEC61850 server that can contain one or more Logical Devices. Each Logical Device contains a data model built from instances of specific Logical Nodes and must consist of at least an instance of the LPHD Logical Node (which is responsible for providing physical device information) and an instance of the LLN0 Logical Node (for addressing common issues across the Logical Device).

The IEC61850 data model is contained within the Logical Devices detailed in the table below. All MiCOM devices will name the supported Logical Devices consistently to ensure that data model variables with the same purpose will have the same name within each MiCOM server.

| Logical Device | Comment/Usage       |
|----------------|---------------------|
| Control        | Controls Domain     |
| Measurements   | Measurements Domain |
| Protection     | Protection Domain   |
| Records        | Records Domain      |
| System         | System Domain       |

**3.1 IEC61850 logical device data model**

The IEC61850 Logical Device top-level data model consists of instances of Logical Nodes. The data model name for a Logical Node instance is constructed from an optional prefix (known as the wrapper), the Logical Node name, and an instance ID (or suffix).

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

| LD           | LN Instance | LN Type                             | Description                           |
|--------------|-------------|-------------------------------------|---------------------------------------|
| Control      |             |                                     |                                       |
|              | ArcRREC1    | RREC_NO_SEG                         | Auto Reclose                          |
|              | AscRSYN1    | RSYN_DIFCLC_ENH                     | System Checks - Check Sync 1          |
|              | AscRSYN2    | RSYN_DIFCLC_ENH                     | System Checks - Check Sync 2          |
|              | CILO1       | CILO_INTERLOCK                      | Circuit Breaker Interlocking (Pole 1) |
|              | CILO2       | CILO_INTERLOCK                      | Circuit Breaker Interlocking (Pole 2) |
|              | CILO3       | CILO_INTERLOCK                      | Circuit Breaker Interlocking (Pole 3) |
|              | CILO4       | CILO_INTERLOCK                      | Circuit Breaker Interlocking (3 Pole) |
|              | LLN0        | LLN0_CONTROL_NO_DIST                | LLN0 control for non-distance relays  |
|              | LPHD1       | LPHD_STANDARD                       | Physical Device Information           |
|              | XCBR1       | XCBR_BASIC                          | Circuit Breaker Monitoring (Pole 1)   |
|              | XCBR2       | XCBR_BASIC                          | Circuit Breaker Monitoring (Pole 2)   |
|              | XCBR3       | XCBR_BASIC                          | Circuit Breaker Monitoring (Pole 3)   |
| XCBR4        | XCBR_BASIC  | Circuit Breaker Monitoring (3 Pole) |                                       |
| Measurements |             |                                     |                                       |
|              | LLN0        | LLN0_STANDARD                       | Measurements Logical Device           |
|              | LPHD1       | LPHD_STANDARD                       | Physical Device Information           |
|              | PriFouMMXU1 | MMXU_FOURIER                        | Primary Fourier Measurements          |
|              | PriMMTR1    | MMTR_PRIV                           | Primary based metering quantities     |
|              | PriMSQI1    | MSQI_ALL                            | Primary Sequence Measurements         |
|              | PriMSTA1    | MSTA_I_W_VAR                        | Primary Metering Statistics           |

| LD         | LN Instance | LN Type                   | Description                                    |
|------------|-------------|---------------------------|--|
|            | PriRmsMMXU1 | MMXU_RMS                  | Primary RMS Measurements                       |
|            | PriSpeMMXU1 | MMXU_SPE_55               | Primary Specific Measurements                  |
|            | PriVcpMSQI1 | MSQI_VOLTAGE              | Primary Compensated Overvoltage Measurements   |
|            | SecFouMMXU1 | MMXU_FOURIER              | Secondary Fourier Measurements                 |
|            | SecMMTR1    | MMTR_PRIV                 | Secondary based metering quantities            |
|            | SecMSQI1    | MSQI_ALL                  | Secondary Sequence Measurements                |
|            | SecMSTA1    | MSTA_I_W_VAR              | Secondary Metering Statistics                  |
|            | SecRmsMMXU1 | MMXU_RMS                  | Secondary RMS Measurements                     |
|            | SecSpeMMXU1 | MMXU_SPE_55               | Secondary Specific Measurements                |
|            | SecVcpMSQI1 | MSQI_VOLTAGE              | Secondary Compensated Overvoltage Measurements |
| Protection |             |                           |  |
|            | CbfRBRF1    | RBRF_EXTTRIP_SEG          | CB1 Fail 1                                     |
|            | CbfRBRF2    | RBRF_EXTTRIP_SEG          | CB1 Fail 2                                     |
|            | DfpPFRC1    | PFRC_NO_SEG               | df/dt> 1 Frequency Rate of Change              |
|            | DfpPFRC2    | PFRC_NO_SEG               | df/dt> 2 Frequency Rate of Change              |
|            | DfpPFRC3    | PFRC_NO_SEG               | df/dt> 3 Frequency Rate of Change              |
|            | DfpPFRC4    | PFRC_NO_SEG               | df/dt> 4 Frequency Rate of Change              |
|            | EfdPTOC1    | PTOC_NEU                  | IN1> 1 Earth Fault (Derived)                   |
|            | EfdPTOC2    | PTOC_NEU                  | IN1> 2 Earth Fault (Derived)                   |
|            | EfdPTOC3    | PTOC_NEU                  | IN1> 3 Earth Fault (Derived)                   |
|            | EfdPTOC4    | PTOC_NEU                  | IN1> 4 Earth Fault (Derived)                   |
|            | FrqPTOF1    | PTOF_NO_SEG               | F> 1 Over Frequency                            |
|            | FrqPTOF2    | PTOF_NO_SEG               | F> 2 Over Frequency                            |
|            | FrqPTUF1    | PTUF_NO_SEG               | F< 1 Under Frequency                           |
|            | FrqPTUF2    | PTUF_NO_SEG               | F< 2 Under Frequency                           |
|            | FrqPTUF3    | PTUF_NO_SEG               | F< 3 Under Frequency                           |
|            | FrqPTUF4    | PTUF_NO_SEG               | F< 4 Under Frequency                           |
|            | LLN0        | LLN0_PROT_NO_DIFF_NO_DIST | Protection LLN0 No Dist No Diff                |
|            | LPHD1       | LPHD_STANDARD             | Physical Device Information                    |
|            | NgcPTOC1    | PTOC_NO_SEG               | I2> 1 Negative Sequence                        |
|            | NgcPTOC2    | PTOC_NO_SEG               | I2> 2 Negative Sequence                        |
|            | NgcPTOC3    | PTOC_NO_SEG               | I2> 3 Negative Sequence                        |
|            | NgcPTOC4    | PTOC_NO_SEG               | I2> 4 Negative Sequence                        |
|            | OcpPTOC1    | PTOC_SEG                  | I> 1 Overcurrent                               |
|            | OcpPTOC2    | PTOC_SEG                  | I> 2 Overcurrent                               |
|            | OcpPTOC3    | PTOC_SEG                  | I> 3 Overcurrent                               |
|            | OcpPTOC4    | PTOC_SEG                  | I> 4 Overcurrent                               |
|            | PTRC1       | PTRC_NO_SEG               | Protection Trip Conditioning                   |
|            | SenEftPTOC1 | PTOC_NEU                  | ISEF> 1 Sensitive Earth Fault                  |
|            | SenEftPTOC2 | PTOC_NEU                  | ISEF> 2 Sensitive Earth Fault                  |
|            | SenEftPTOC3 | PTOC_NEU                  | ISEF> 3 Sensitive Earth Fault                  |

| LD      | LN Instance | LN Type          | Description  |
|---------|-------------|------------------|--|
|         | SenEftPTOC4 | PTOC_NEU         | ISEF> 4 Sensitive Earth Fault  |
|         | SenRefPDIF1 | PDIF_NEU         | IREF> 1 Restricted Earth Fault   |
|         | ThmPTTR1    | PTTR_NO_SEG      | Thermal Overload   |
|         | VtpCmpPTOV1 | PTOV_NO_SEG      | Compensated V1> 1 Overvoltage  |
|         | VtpCmpPTOV2 | PTOV_NO_SEG      | Compensated V1> 2 Overvoltage  |
|         | VtpPhsPTOV1 | PTOV_SEG         | V> 1 Overvoltage   |
|         | VtpPhsPTOV2 | PTOV_SEG         | V> 2 Overvoltage   |
|         | VtpPhsPTUV1 | PTUV_SEG         | V< 1 Undervoltage  |
|         | VtpPhsPTUV2 | PTUV_SEG         | V< 2 Undervoltage  |
|         | VtpResPTOV1 | PTOV_NEU         | VN> 1 Residual Overvoltage   |
|         | VtpResPTOV2 | PTOV_NEU         | VN> 2 Residual Overvoltage   |
| Records |             |                  |  |
|         | LLN0        | LLN0_STANDARD    | Records Logical Device   |
|         | LPHD1       | LPHD_STANDARD    | Physical Device Information  |
|         | RDRE1       | RDRE_BASIC       | Disturbance Recorder   |
|         | RFLO1       | RFLO_PRIV_8A     | Fault Record   |
| System  |             |                  |  |
|         | AlmGGIO1    | GGIO_ALM_96      | Alarms   |
|         | FnkGGIO1    | GGIO_IND_10      | Function Keys  |
|         | GosGGIO1    | GGIO_IND_32      | GOOSE Input Signals  |
|         | GosGGIO2    | GGIO_IND_32      | GOOSE Output Signals   |
|         | LedGGIO1    | GGIO_IND_18      | Red LED Signals  |
|         | LedGGIO2    | GGIO_IND_18      | Green LED Signals  |
|         | LLN0        | LLN0_SYSTEM      | System Logical Device  |
|         | LPHD1       | LPHD_STANDARD    | Physical Device Information  |
|         | OptGGIO1    | GGIO_IND_16      | Opto node for 16 inputs only   |
|         | OrdRunGGIO1 | GGIO_IND_32      | Uniqueness of control "Order Running" indications for Control operations |
|         | PloGGIO1    | GGIO_IND_16_CTRL | Controllable Inputs  |
|         | PloGGIO2    | GGIO_IND_16_CTRL | Controllable Inputs  |
|         | PloGGIO3    | GGIO_IND_16      | Control Input Status   |
|         | RlyGGIO1    | GGIO_IND_14      | Output (14) Contacts   |
|         | UsrGGIO1    | GGIO_IND_DPS_8   | User Mapped (PSL) Double Point Status Indications                        |
|         | UsrGGIO2    | GGIO_IND_4       | User Mapped (PSL) Single Point Status Indications                        |

## 4 LOGICAL NODE DEFINITIONS

The definition tables for each of the Logical Nodes in the top-level data model are presented in the following sub-sections.

The following table presents a summary of the Logical Node templates used across the Logical Devices within the overall IEC61850 product data model:

| LN Type              | (LN)   | Description   | Name Space         |
|----------------------|--------|---|--------------------|
| CILO_INTERLOCK       | (CILO) | Control Interlocking  | IEC 61850-7-4:2003 |
| GGIO_IND_DPS_8       | (GGIO) | Generic process I/O (w.r.t 8 Dual Point Status Indication Elements)               | IEC 61850-7-4:2003 |
| GGIO_ALM_96          | (GGIO) | Generic Process I/O (w.r.t 96 Alarm Elements)                                     | IEC 61850-7-4:2003 |
| GGIO_IND_10          | (GGIO) | Generic Process I/O (w.r.t 10 Indication Elements)                                | IEC 61850-7-4:2003 |
| GGIO_IND_14          | (GGIO) | Generic process I/O (w.r.t. 14 indications)                                       | IEC 61850-7-4:2003 |
| GGIO_IND_16          | (GGIO) | Generic process I/O (w.r.t. 16 indications)                                       | IEC 61850-7-4:2003 |
| GGIO_IND_16_CTRL     | (GGIO) | Generic process I/O (w.r.t 16 Indications Ctrl i/p)                               | IEC 61850-7-4:2003 |
| GGIO_IND_18          | (GGIO) | Generic Process I/O (w.r.t 18 Indication Elements)                                | IEC 61850-7-4:2003 |
| GGIO_IND_32          | (GGIO) | Generic Process I/O (w.r.t 32 Indication Elements)                                | IEC 61850-7-4:2003 |
| GGIO_IND_4           | (GGIO) | Generic process I/O (w.r.t 4 Indication Elements)                                 | IEC 61850-7-4:2003 |
| LLN0_SYSTEM          | (LLN0) | System Logical Node 0   | IEC 61850-7-4:2003 |
| LLN0_STANDARD        | (LLN0) | General Logical Node 0  | IEC 61850-7-4:2003 |
| LLN0_CONTROL_NO_DI   | (LLN0) | Control LLN0 for non-distance relays  | IEC 61850-7-4:2003 |
| STLLN0_PROT_NO_DIFF_ | (LLN0) | Protection LLN0 for non_Differential non_Distance relays                          | IEC 61850-7-4:2003 |
| NO_DISTLPHD_STANDARD | (LPHD) | Px40 Physical Device Information  | IEC 61850-7-4:2003 |
| MMTR_PRIV            | (MMTR) | Metering  | IEC 61850-7-4:2003 |
| MMXU_FOURIER         | (MMXU) | Standard Measurements (w.r.t Fourier Values)                                      | IEC 61850-7-4:2003 |
| MMXU_RMS             | (MMXU) | Standard Measurements (w.r.t RMS Values)  | IEC 61850-7-4:2003 |
| MMXU_SPE_55          | (MMXU) | Standard measurements   | IEC 61850-7-4:2003 |
| MSQI_VOLTAGE         | (MSQI) | Sequence and imbalance (w.r.t Pos, Neg, Zero Voltage Only)                        | IEC 61850-7-4:2003 |
| MSQI_ALL             | (MSQI) | Sequence and imbalance (w.r.t Pos, Neg, Zero)                                     | IEC 61850-7-4:2003 |
| MSTA_I_W_VAR         | (MSTA) | Metering Statistics (w.r.t Current, Real + Reactive Power - Average + Max values) | IEC 61850-7-4:2003 |
| PDIF_NEU             | (PDIF) | Differential (w.r.t Neutral)  | IEC 61850-7-4:2003 |
| PFRC_NO_SEG          | (PFRC) | Rate of change of frequency (w.r.t No Phase Segregation)                          | IEC 61850-7-4:2003 |
| PTOC_NEU             | (PTOC) | Timed Overcurrent (w.r.t Neutral)   | IEC 61850-7-4:2003 |
| PTOC_NO_SEG          | (PTOC) | Timed Overcurrent (w.r.t No Phase Segregation)                                    | IEC 61850-7-4:2003 |
| PTOC_SEG             | (PTOC) | Timed Overcurrent (w.r.t Phase Segregation)                                       | IEC 61850-7-4:2003 |

| LN Type          | (LN)   | Description  | Name Space         |
|------------------|--------|--|--------------------|
| PTOF_NO_SEG      | (PTOF) | Over frequency (w.r.t No Phase Segregation)                                    | IEC 61850-7-4:2003 |
| PTOV_NO_SEG      | (PTOV) | Overvoltage (w.r.t No Phase Segregation)                                       | IEC 61850-7-4:2003 |
| PTOV_SEG         | (PTOV) | Overvoltage (w.r.t Phase Segregation)  | IEC 61850-7-4:2003 |
| PTOV_NEU         | (PTOV) | Overvoltage (w.r.t Neutral)  | IEC 61850-7-4:2003 |
| PTRC_NO_SEG      | (PTRC) | Protection trip conditioning (w.r.t No Phase Segregation)                      | IEC 61850-7-4:2003 |
| PTTR_NO_SEG      | (PTTR) | Thermal overload (w.r.t No Phase Segregation)                                  | IEC 61850-7-4:2003 |
| PTUF_NO_SEG      | (PTUF) | Under frequency (w.r.t No Phase Segregation)                                   | IEC 61850-7-4:2003 |
| PTUV_SEG         | (PTUV) | Undervoltage (w.r.t Phase Segregation)   | IEC 61850-7-4:2003 |
| RBRF_EXTTRIP_SEG | (RBRF) | Breaker Failure (w.r.t External Tripping + Phase)                              | IEC 61850-7-4:2003 |
| RDRE_BASIC       | (RDRE) | Disturbance Recorder function (w.r.t Mandatory Attributes only)                | IEC 61850-7-4:2003 |
| RFLO_PRIV_8A     | (RFLO) | Fault locator for P841   | IEC 61850-7-4:2003 |
| RREC_NO_SEG      | (RREC) | Autoreclosing (w.r.t No Phase Segregation)                                     | IEC 61850-7-4:2003 |
| RSYN_DIFCLC_ENH  | (RSYN) | Synchronism-check / Synchronising (w.r.t Calculated Differential Measurements) | IEC 61850-7-4:2003 |
| XCBR_BASIC       | (XCBR) | Circuit Breaker (w.r.t Mandatory Attributes Only)                              | IEC 61850-7-4:2003 |

**4.1 Logical Node: CILO\_INTERLOCK**

Description: Control Interlocking

LN Class: CILO

| Attribute | Attr. Type | Explanation           | T | X |
|-----------|------------|-----------------------|---|---|
| Mod       | INC_MOD    | Mode                  |   |   |
| Beh       | INS_BEH    | Behaviour             |   |   |
| Health    | INS_HEALTH | Health                |   |   |
| NamPlt    | LPL_LN     | Name Plate            |   |   |
| EnaOpn    | SPS_WD     | Enable OPEN Commands  |   |   |
| EnaCls    | SPS_WD     | Enable CLOSE Commands |   |   |

**4.2 Logical Node: GGIO\_ALM\_96**

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

LN Class: GGIO

| Attribute | Attr. Type | Explanation          | T | X |
|-----------|------------|----------------------|---|---|
| Mod       | INC_MOD    | Mode                 |   |   |
| Beh       | INS_BEH    | Behaviour            |   |   |
| Health    | INS_HEALTH | Health               |   |   |
| NamPlt    | LPL_LN     | Name Plate           |   |   |
| Alm1      | SPS_D      | General single alarm |   |   |
| Alm2      | SPS_D      | General single alarm |   |   |
| Alm3      | SPS_D      | General single alarm |   |   |
| Alm4      | SPS_D      | General single alarm |   |   |

| Attribute | Attr. Type | Explanation          | T | X |
|-----------|------------|----------------------|---|---|
| Alm5      | SPS_D      | General single alarm |   |   |
| Alm6      | SPS_D      | General single alarm |   |   |
| Alm7      | SPS_D      | General single alarm |   |   |
| Alm8      | SPS_D      | General single alarm |   |   |
| Alm9      | SPS_D      | General single alarm |   |   |
| Alm10     | SPS_D      | General single alarm |   |   |
| Alm11     | SPS_D      | General single alarm |   |   |
| Alm12     | SPS_D      | General single alarm |   |   |
| Alm13     | SPS_D      | General single alarm |   |   |
| Alm14     | SPS_D      | General single alarm |   |   |
| Alm15     | SPS_D      | General single alarm |   |   |
| Alm16     | SPS_D      | General single alarm |   |   |
| Alm17     | SPS_D      | General single alarm |   |   |
| Alm18     | SPS_D      | General single alarm |   |   |
| Alm19     | SPS_D      | General single alarm |   |   |
| Alm20     | SPS_D      | General single alarm |   |   |
| Alm21     | SPS_D      | General single alarm |   |   |
| Alm22     | SPS_D      | General single alarm |   |   |
| Alm23     | SPS_D      | General single alarm |   |   |
| Alm24     | SPS_D      | General single alarm |   |   |
| Alm25     | SPS_D      | General single alarm |   |   |
| Alm26     | SPS_D      | General single alarm |   |   |
| Alm27     | SPS_D      | General single alarm |   |   |
| Alm28     | SPS_D      | General single alarm |   |   |
| Alm29     | SPS_D      | General single alarm |   |   |
| Alm30     | SPS_D      | General single alarm |   |   |
| Alm31     | SPS_D      | General single alarm |   |   |
| Alm32     | SPS_D      | General single alarm |   |   |
| Alm33     | SPS_D      | General single alarm |   |   |
| Alm34     | SPS_D      | General single alarm |   |   |
| Alm35     | SPS_D      | General single alarm |   |   |
| Alm36     | SPS_D      | General single alarm |   |   |
| Alm37     | SPS_D      | General single alarm |   |   |
| Alm38     | SPS_D      | General single alarm |   |   |
| Alm39     | SPS_D      | General single alarm |   |   |
| Alm40     | SPS_D      | General single alarm |   |   |
| Alm41     | SPS_D      | General single alarm |   |   |
| Alm42     | SPS_D      | General single alarm |   |   |
| Alm43     | SPS_D      | General single alarm |   |   |
| Alm44     | SPS_D      | General single alarm |   |   |
| Alm45     | SPS_D      | General single alarm |   |   |
| Alm46     | SPS_D      | General single alarm |   |   |
| Alm47     | SPS_D      | General single alarm |   |   |
| Alm48     | SPS_D      | General single alarm |   |   |



| Attribute | Attr. Type | Explanation          | T | X |
|-----------|------------|----------------------|---|---|
| Alm49     | SPS_D      | General single alarm |   |   |
| Alm50     | SPS_D      | General single alarm |   |   |
| Alm51     | SPS_D      | General single alarm |   |   |
| Alm52     | SPS_D      | General single alarm |   |   |
| Alm53     | SPS_D      | General single alarm |   |   |
| Alm54     | SPS_D      | General single alarm |   |   |
| Alm55     | SPS_D      | General single alarm |   |   |
| Alm56     | SPS_D      | General single alarm |   |   |
| Alm57     | SPS_D      | General single alarm |   |   |
| Alm58     | SPS_D      | General single alarm |   |   |
| Alm59     | SPS_D      | General single alarm |   |   |
| Alm60     | SPS_D      | General single alarm |   |   |
| Alm61     | SPS_D      | General single alarm |   |   |
| Alm62     | SPS_D      | General single alarm |   |   |
| Alm63     | SPS_D      | General single alarm |   |   |
| Alm64     | SPS_D      | General single alarm |   |   |
| Alm65     | SPS_D      | General single alarm |   |   |
| Alm66     | SPS_D      | General single alarm |   |   |
| Alm67     | SPS_D      | General single alarm |   |   |
| Alm68     | SPS_D      | General single alarm |   |   |
| Alm69     | SPS_D      | General single alarm |   |   |
| Alm70     | SPS_D      | General single alarm |   |   |
| Alm71     | SPS_D      | General single alarm |   |   |
| Alm72     | SPS_D      | General single alarm |   |   |
| Alm73     | SPS_D      | General single alarm |   |   |
| Alm74     | SPS_D      | General single alarm |   |   |
| Alm75     | SPS_D      | General single alarm |   |   |
| Alm76     | SPS_D      | General single alarm |   |   |
| Alm77     | SPS_D      | General single alarm |   |   |
| Alm78     | SPS_D      | General single alarm |   |   |
| Alm79     | SPS_D      | General single alarm |   |   |
| Alm80     | SPS_D      | General single alarm |   |   |
| Alm81     | SPS_D      | General single alarm |   |   |
| Alm82     | SPS_D      | General single alarm |   |   |
| Alm83     | SPS_D      | General single alarm |   |   |
| Alm84     | SPS_D      | General single alarm |   |   |
| Alm85     | SPS_D      | General single alarm |   |   |
| Alm86     | SPS_D      | General single alarm |   |   |
| Alm87     | SPS_D      | General single alarm |   |   |
| Alm88     | SPS_D      | General single alarm |   |   |
| Alm89     | SPS_D      | General single alarm |   |   |
| Alm90     | SPS_D      | General single alarm |   |   |
| Alm91     | SPS_D      | General single alarm |   |   |
| Alm92     | SPS_D      | General single alarm |   |   |

| Attribute | Attr. Type | Explanation          | T | X |
|-----------|------------|----------------------|---|---|
| Alm93     | SPS_D      | General single alarm |   |   |
| Alm94     | SPS_D      | General single alarm |   |   |
| Alm95     | SPS_D      | General single alarm |   |   |
| Alm96     | SPS_D      | General single alarm |   |   |

**4.3 Logical Node: GGIO\_IND\_10**

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

LN Class: GGIO

| Attribute | Attr. Type | Explanation        | T | X |
|-----------|------------|--------------------|---|---|
| Mod       | INC_MOD    | Mode               |   |   |
| Beh       | INS_BEH    | Behaviour          |   |   |
| Health    | INS_HEALTH | Health             |   |   |
| NamPlt    | LPL_LN     | Name Plate         |   |   |
| Ind1      | SPS_D      | General Indication |   |   |
| Ind2      | SPS_D      | General Indication |   |   |
| Ind3      | SPS_D      | General Indication |   |   |
| Ind4      | SPS_D      | General Indication |   |   |
| Ind5      | SPS_D      | General Indication |   |   |
| Ind6      | SPS_D      | General Indication |   |   |
| Ind7      | SPS_D      | General Indication |   |   |
| Ind8      | SPS_D      | General Indication |   |   |
| Ind9      | SPS_D      | General Indication |   |   |
| Ind10     | SPS_D      | General Indication |   |   |

**4.4 Logical Node: GGIO\_IND\_14**

Description: Generic process I/O (w.r.t. 14 indications)

LN Class: GGIO

| Attribute | Attr. Type | Explanation        | T | X |
|-----------|------------|--------------------|---|---|
| Mod       | INC_MOD    | Mode               |   |   |
| Beh       | INS_BEH    | Behaviour          |   |   |
| Health    | INS_HEALTH | Health             |   |   |
| NamPlt    | LPL_LN     | Name Plate         |   |   |
| Ind1      | SPS_D      | General Indication |   |   |
| Ind2      | SPS_D      | General Indication |   |   |
| Ind3      | SPS_D      | General Indication |   |   |
| Ind4      | SPS_D      | General Indication |   |   |
| Ind5      | SPS_D      | General Indication |   |   |
| Ind6      | SPS_D      | General Indication |   |   |
| Ind7      | SPS_D      | General Indication |   |   |
| Ind8      | SPS_D      | General Indication |   |   |
| Ind9      | SPS_D      | General Indication |   |   |
| Ind10     | SPS_D      | General Indication |   |   |
| Ind11     | SPS_D      | General Indication |   |   |
| Ind12     | SPS_D      | General Indication |   |   |
| Ind13     | SPS_D      | General Indication |   |   |

| Attribute | Attr. Type | Explanation        | T | X |
|-----------|------------|--------------------|---|---|
| Ind14     | SPS_D      | General Indication |   |   |

**4.5 Logical Node: GGIO\_IND\_16**

Description: Generic process I/O (w.r.t. 16 indications)

LN Class: GGIO

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

**4.6 Logical Node: GGIO\_IND\_16\_CTRL**

Description: Generic process I/O (w.r.t 16 Indications Ctrl i/p)

LN Class: GGIO

| Attribute | Attr. Type  | Explanation                             | T | X |
|-----------|-------------|---|---|---|
| Mod       | INC_MOD     | Mode                                    |   |   |
| Beh       | INS_BEH     | Behaviour                               |   |   |
| Health    | INS_HEALTH  | Health                                  |   |   |
| NamPlt    | LPL_LN      | Name Plate                              |   |   |
| SPCSO1    | SPC_CONTROL | Single point controllable status output |   |   |
| SPCSO2    | SPC_CONTROL | Single point controllable status output |   |   |
| SPCSO3    | SPC_CONTROL | Single point controllable status output |   |   |
| SPCSO4    | SPC_CONTROL | Single point controllable status output |   |   |
| SPCSO5    | SPC_CONTROL | Single point controllable status output |   |   |
| SPCSO6    | SPC_CONTROL | Single point controllable status output |   |   |
| SPCSO7    | SPC_CONTROL | Single point controllable status output |   |   |
| SPCSO8    | SPC_CONTROL | Single point controllable status output |   |   |
| SPCSO9    | SPC_CONTROL | Single point controllable status output |   |   |
| SPCSO10   | SPC_CONTROL | Single point controllable status output |   |   |

| Attribute | Attr. Type  | Explanation                             | T | X |
|-----------|-------------|---|---|---|
| SPCSO11   | SPC_CONTROL | Single point controllable status output |   |   |
| SPCSO12   | SPC_CONTROL | Single point controllable status output |   |   |
| SPCSO13   | SPC_CONTROL | Single point controllable status output |   |   |
| SPCSO14   | SPC_CONTROL | Single point controllable status output |   |   |
| SPCSO15   | SPC_CONTROL | Single point controllable status output |   |   |
| SPCSO16   | SPC_CONTROL | Single point controllable status output |   |   |

**4.7 Logical Node: GGIO\_IND\_18**

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

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

**4.8 Logical Node: GGIO\_IND\_32**

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

| Attribute | Attr. Type | Explanation        | T | X |
|-----------|------------|--------------------|---|---|
| Mod       | INC_MOD    | Mode               |   |   |
| Beh       | INS_BEH    | Behaviour          |   |   |
| Health    | INS_HEALTH | Health             |   |   |
| NamPlt    | LPL_LN     | Name Plate         |   |   |
| Ind1      | SPS_D      | General Indication |   |   |
| Ind2      | SPS_D      | General Indication |   |   |
| Ind3      | SPS_D      | General Indication |   |   |

| Attribute | Attr. Type | Explanation        | T | X |
|-----------|------------|--------------------|---|---|
| Ind4      | SPS_D      | General Indication |   |   |
| Ind5      | SPS_D      | General Indication |   |   |
| Ind6      | SPS_D      | General Indication |   |   |
| Ind7      | SPS_D      | General Indication |   |   |
| Ind8      | SPS_D      | General Indication |   |   |
| Ind9      | SPS_D      | General Indication |   |   |
| Ind10     | SPS_D      | General Indication |   |   |
| Ind11     | SPS_D      | General Indication |   |   |
| Ind12     | SPS_D      | General Indication |   |   |
| Ind13     | SPS_D      | General Indication |   |   |
| Ind14     | SPS_D      | General Indication |   |   |
| Ind15     | SPS_D      | General Indication |   |   |
| Ind16     | SPS_D      | General Indication |   |   |
| Ind17     | SPS_D      | General Indication |   |   |
| Ind18     | SPS_D      | General Indication |   |   |
| Ind19     | SPS_D      | General Indication |   |   |
| Ind20     | SPS_D      | General Indication |   |   |
| Ind21     | SPS_D      | General Indication |   |   |
| Ind22     | SPS_D      | General Indication |   |   |
| Ind23     | SPS_D      | General Indication |   |   |
| Ind24     | SPS_D      | General Indication |   |   |
| Ind25     | SPS_D      | General Indication |   |   |
| Ind26     | SPS_D      | General Indication |   |   |
| Ind27     | SPS_D      | General Indication |   |   |
| Ind28     | SPS_D      | General Indication |   |   |
| Ind29     | SPS_D      | General Indication |   |   |
| Ind30     | SPS_D      | General Indication |   |   |
| Ind31     | SPS_D      | General Indication |   |   |
| Ind32     | SPS_D      | General Indication |   |   |

**4.9 Logical Node: GGIO\_IND\_4**

Description: Generic process I/O (w.r.t 4 Indication Elements)  
 LN Class: GGIO

| Attribute | Attr. Type | Explanation        | T | X |
|-----------|------------|--------------------|---|---|
| Mod       | INC_MOD    | Mode               |   |   |
| Beh       | INS_BEH    | Behaviour          |   |   |
| Health    | INS_HEALTH | Health             |   |   |
| NamPlt    | LPL_LN     | Name Plate         |   |   |
| Ind1      | SPS_D      | General indication |   |   |
| Ind2      | SPS_D      | General indication |   |   |
| Ind3      | SPS_D      | General indication |   |   |
| Ind4      | SPS_D      | General indication |   |   |

**4.10 Logical Node: GGIO\_IND\_DPS\_8**

Description: Generic process I/O (w.r.t 8 Dual Point Status Indication Elements)

LN Class: GGIO

| Attribute | Attr. Type   | Explanation         | T | X |
|-----------|--------------|---------------------|---|---|
| Mod       | INC_MOD      | Mode                |   |   |
| Beh       | INS_BEH      | Behaviour           |   |   |
| Health    | INS_HEALTH   | Health              |   |   |
| NamPlt    | LPL_LN       | Name Plate          |   |   |
| DPCSO1    | DPC_STATUS_D | Double Point Status |   |   |
| DPCSO2    | DPC_STATUS_D | Double Point Status |   |   |
| DPCSO3    | DPC_STATUS_D | Double Point Status |   |   |
| DPCSO4    | DPC_STATUS_D | Double Point Status |   |   |
| DPCSO5    | DPC_STATUS_D | Double Point Status |   |   |
| DPCSO6    | DPC_STATUS_D | Double Point Status |   |   |
| DPCSO7    | DPC_STATUS_D | Double Point Status |   |   |
| DPCSO8    | DPC_STATUS_D | Double Point Status |   |   |

**4.11 Logical Node: LLN0\_CONTROL\_NO\_DIST**

Description: Control LLN0 for non-distance relays

LN Class: LLN0

| Attribute | Attr. Type      | Explanation           | T | X |
|-----------|-----------------|-----------------------|---|---|
| Mod       | INC_MOD         | Mode                  |   |   |
| Beh       | INS_BEH         | Behaviour             |   |   |
| Health    | INS_HEALTH      | Health                |   |   |
| AscMod    | INC_CTRL_D_PRIV | Check Synchronisation |   | X |
| NamPlt    | LPL_LLNO        | Name Plate            |   |   |
| AscBeh    | INS_BEH_D_PRIV  | Check Synchronisation |   | X |
| ArcMod    | INC_CTRL_D_PRIV | Auto-Reclose          |   | X |
| ArcBeh    | INS_BEH_D_PRIV  | Auto-Reclose          |   | X |

**4.12 Logical Node: LLN0\_PROT\_NO\_DIFF\_NO\_DIST**

Description: Protection LLN0 for non-Differential non-Distance relays

LN Class: LLN0

| Attribute | Attr. Type      | Explanation                        | T | X |
|-----------|-----------------|------------------------------------|---|---|
| Mod       | INC_MOD         | Mode                               |   |   |
| Beh       | INS_BEH         | Behaviour                          |   |   |
| Health    | INS_HEALTH      | Health                             |   |   |
| NamPlt    | LPL_LLNO        | Name Plate                         |   |   |
| OcpMod    | INC_CTRL_D_PRIV | Overcurrent Mode                   |   | X |
| OcpBeh    | INS_BEH_D_PRIV  | Overcurrent Behaviour              |   | X |
| NgcMod    | INC_CTRL_D_PRIV | Negative Sequence Mode             |   | X |
| NgcBeh    | INS_BEH_D_PRIV  | Negative Sequence Behaviour        |   | X |
| EfdMod    | INC_CTRL_D_PRIV | Earth Fault 1 (Derived) Mode       |   | X |
| EfdBeh    | INS_BEH_D_PRIV  | Earth Fault 1 (Derived) Behaviour  |   | X |
| SefMod    | INC_CTRL_D_PRIV | SEF Mode                           |   | X |
| SefBeh    | INS_BEH_D_PRIV  | SEF Behaviour                      |   | X |
| VtpMod    | INC_CTRL_D_PRIV | Overvoltage/Undervoltage Mode      |   | X |
| VtpBeh    | INS_BEH_D_PRIV  | Overvoltage/Undervoltage Behaviour |   | X |

| Attribute | Attr. Type      | Explanation                            | T | X |
|-----------|-----------------|--|---|---|
| NvdMod    | INC_CTRL_D_PRIV | Residual Overvoltage NVD Mode          |   | X |
| NvdBeh    | INS_BEH_D_PRIV  | Residual Overvoltage NVD Behaviour     |   | X |
| FrqMod    | INC_CTRL_D_PRIV | Overfrequency/Underfrequency Mode      |   | X |
| FrqBeh    | INS_BEH_D_PRIV  | Overfrequency/Underfrequency Behaviour |   | X |
| DfpMod    | INC_CTRL_D_PRIV | df/dt Mode                             |   | X |
| DfpBeh    | INS_BEH_D_PRIV  | df/dt Behaviour                        |   | X |
| ThmMod    | INC_CTRL_D_PRIV | Thermal Overload Mode                  |   | X |
| ThmBeh    | INS_BEH_D_PRIV  | Thermal Overload Behaviour             |   | X |
| CbfMod    | INC_CTRL_D_PRIV | CB Fail Mode                           |   | X |
| CbfBeh    | INS_BEH_D_PRIV  | CB Fail Behaviour                      |   | X |

#### 4.13 Logical Node: LLN0\_STANDARD

Description: General Logical Node 0

LN Class: LLN0

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

#### 4.14 Logical Node: LLN0\_SYSTEM

Description: System Logical Node 0

LN Class: LLN0

| Attribute | Attr. Type  | Explanation   | T | X |
|-----------|-------------|---|---|---|
| Mod       | INC_MOD     | Mode  |   |   |
| Beh       | INS_BEH     | Behaviour   |   |   |
| Health    | INS_HEALTH  | Health  |   |   |
| NamPlt    | LPL_LLNO    | Name Plate  |   |   |
| LEDrs     | SPC_CONTROL | LED reset   | T |   |
| OrdRun    | SPS_WD_PRIV | Indicate IED is operating a Control Object                  |   | X |
| SyncSt    | SPS_WD_PRIV | Indicate time synchronisation in the IED is active/inactive |   | X |

#### 4.15 Logical Node: LPHD\_STANDARD

Description: Px40 Physical Device Information

LN Class: LPHD

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

#### 4.16 Logical Node: MMTR\_PRIV

Description: Metering

LN Class: MMTR

| Attribute | Attr. Type    | Explanation  | T | X |
|-----------|---------------|--|---|---|
| Mod       | INC_MOD       | Mode   |   |   |
| Beh       | INS_BEH       | Behaviour  |   |   |
| Health    | INS_HEALTH    | Health   |   |   |
| NamPlt    | LPL_LN        | Name Plate   |   |   |
| SupWh     | BCR_PRIV      | Real energy supply (Energy flow towards bus bar)     |   |   |
| SupVArh   | BCR_PRIV      | Reactive energy supply (Energy flow towards bus bar) |   |   |
| DmdWh     | BCR_PRIV      | Real energy demand (Energy flow from bus bar)        |   |   |
| DmdVArh   | BCR_PRIV      | Reactive energy demand (Energy flow from bus bar)    |   |   |
| MTRRs     | SPC_CTRL_PRIV | Reset Energy Meters                                  |   | X |

**4.17 Logical Node: MMXU\_FOURIER**

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

LN Class: MMXU

| Attribute | Attr. Type       | Explanation                         | T | X |
|-----------|------------------|-------------------------------------|---|---|
| Mod       | INC_MOD          | Mode                                |   |   |
| Beh       | INS_BEH          | Behaviour                           |   |   |
| Health    | INS_HEALTH       | Health                              |   |   |
| NamPlt    | LPL_LN           | Name Plate                          |   |   |
| TotW      | MV_FLOAT         | Total active power (Total P)        |   |   |
| TotVAr    | MV_FLOAT         | Total reactive power (Total Q)      |   |   |
| TotVA     | MV_FLOAT         | Total apparent power (Total S)      |   |   |
| TotPF     | MV_FLOAT         | Average power factor (Total PF)     |   |   |
| Hz        | MV_FLOAT         | Frequency                           |   |   |
| PPV       | DEL_SEG_ANG      | Phase to Phase voltages             |   |   |
| PhV       | WYE_SEG_ANG_D    | Phase to Ground voltages            |   |   |
| A1        | WYE_SEG_RES_D    | Phase currents (Fourier Magnitudes) |   |   |
| A2        | WYE_RES_ANG_D    | Phase currents (ISEF Magnitude)     |   |   |
| A3        | WYE_RES_ANG_D    | Phase currents (Mutual Magnitude)   |   |   |
| W         | WYE_SEG          | Phase active power (P)              |   |   |
| VAr       | WYE_SEG          | Phase reactive power (Q)            |   |   |
| VA        | WYE_SEG          | Phase apparent power (S)            |   |   |
| PF        | WYE_SEG          | Phase power factor                  |   |   |
| Vx        | WYE_RES_ANG_D_NS | C/S Voltage                         |   | X |

**4.18 Logical Node: MMXU\_RMS**

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

LN Class: MMXU

| Attribute | Attr. Type | Explanation              | T | X |
|-----------|------------|--------------------------|---|---|
| Mod       | INC_MOD    | Mode                     |   |   |
| Beh       | INS_BEH    | Behaviour                |   |   |
| Health    | INS_HEALTH | Health                   |   |   |
| NamPlt    | LPL_LN     | Name Plate               |   |   |
| PhV       | WYE_SEG_D  | Phase to Ground voltages |   |   |
| A         | WYE_SEG_D  | Phase currents           |   |   |



**4.19 Logical Node: MMXU\_SPE\_55**

Description: Standard measurements  
LN Class: MMXU

| Attribute | Attr. Type    | Explanation | T | X |
|-----------|---------------|-------------|---|---|
| Mod       | INC_MOD       | Mode        |   |   |
| Beh       | INS_BEH       | Behaviour   |   |   |
| Health    | INS_HEALTH    | Health      |   |   |
| NamPlt    | LPL_LN        | Name Plate  |   |   |
| DfDt      | MV_FLOAT_D_NS | df/dt       |   | X |

**4.20 Logical Node: MSQI\_ALL**

Description: Sequence and imbalance (w.r.t Pos, Neq, Zero)  
LN Class: MSQI

| Attribute | Attr. Type  | Explanation                                  | T | X |
|-----------|-------------|--|---|---|
| Mod       | INC_MOD     | Mode   |   |   |
| Beh       | INS_BEH     | Behaviour                                    |   |   |
| Health    | INS_HEALTH  | Health                                       |   |   |
| NamPlt    | LPL_LN      | Name Plate                                   |   |   |
| SeqA      | SEQ_MAG_ANG | Positive, Negative and Zero sequence current |   |   |
| SeqV      | SEQ_MAG_ANG | Positive, Negative and Zero sequence voltage |   |   |

**4.21 Logical Node: MSQI\_VOLTAGE**

Description: Sequence and imbalance (w.r.t Pos, Neq, Zero Voltage Only)  
LN Class: MSQI

| Attribute | Attr. Type  | Explanation                                  | T | X |
|-----------|-------------|--|---|---|
| Mod       | INC_MOD     | Mode   |   |   |
| Beh       | INS_BEH     | Behaviour                                    |   |   |
| Health    | INS_HEALTH  | Health                                       |   |   |
| NamPlt    | LPL_LN      | Name Plate                                   |   |   |
| SeqV      | SEQ_MAG_ANG | Positive, Negative and Zero sequence voltage |   |   |

**4.22 Logical Node: MSTA\_I\_W\_VAR**

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

| Attribute | Attr. Type | Explanation     | T | X |
|-----------|------------|-----------------|---|---|
| Mod       | INC_MOD    | Mode            |   |   |
| Beh       | INS_BEH    | Behaviour       |   |   |
| Health    | INS_HEALTH | Health          |   |   |
| NamPlt    | LPL_LN     | Name Plate      |   |   |
| AvAmps1   | MV_FLOAT_D | Average current |   |   |
| AvAmps2   | MV_FLOAT_D | Average current |   |   |
| AvAmps3   | MV_FLOAT_D | Average current |   |   |
| AvAmps4   | MV_FLOAT_D | Average current |   |   |
| AvAmps5   | MV_FLOAT_D | Average current |   |   |
| AvAmps6   | MV_FLOAT_D | Average current |   |   |

| Attribute | Attr. Type | Explanation            | T | X |
|-----------|------------|------------------------|---|---|
| MaxAmps1  | MV_FLOAT_D | Maximum current        |   |   |
| MaxAmps2  | MV_FLOAT_D | Maximum current        |   |   |
| MaxAmps3  | MV_FLOAT_D | Maximum current        |   |   |
| AvW1      | MV_FLOAT_D | Average real power     |   |   |
| AvW2      | MV_FLOAT_D | Average real power     |   |   |
| MaxW      | MV_FLOAT_D | Maximum real power     |   |   |
| AvVAr1    | MV_FLOAT_D | Average reactive power |   |   |
| AvVAr2    | MV_FLOAT_D | Average reactive power |   |   |
| MaxVAr    | MV_FLOAT_D | Maximum reactive power |   |   |

**4.23 Logical Node: PDIF\_NEU**

Description: Differential (w.r.t Neutral)

LN Class: PDIF

| Attribute | Attr. Type | Explanation | T | X |
|-----------|------------|-------------|---|---|
| Mod       | INC_MOD    | Mode        |   |   |
| Beh       | INS_BEH    | Behaviour   |   |   |
| Health    | INS_HEALTH | Health      |   |   |
| NamPlt    | LPL_LN     | Name Plate  |   |   |
| Op        | ACT_NEU    | Operate     | T |   |

**4.24 Logical Node: PFRC\_NO\_SEG**

Description: Rate of change of frequency (w.r.t No Phase Segregation)

LN Class: PFRC

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

**4.25 Logical Node: PTOC\_NEU**

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

LN Class: PTOC

| Attribute | Attr. Type | Explanation | T | X |
|-----------|------------|-------------|---|---|
| Mod       | INC_MOD    | Mode        |   |   |
| Beh       | INS_BEH    | Behaviour   |   |   |
| Health    | INS_HEALTH | Health      |   |   |
| NamPlt    | LPL_LN     | Name Plate  |   |   |
| Str       | ACD_NEU    | Start       |   |   |
| Op        | ACT_NEU    | Operate     | T |   |

**4.26 Logical Node: PTOC\_NO\_SEG**

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

LN Class: PTOC

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

**4.27 Logical Node: PTOC\_SEG**

Description: Timed Overcurrent (w.r.t Phase Segregation)  
 LN Class: PTOC

| Attribute | Attr. Type | Explanation | T | X |
|-----------|------------|-------------|---|---|
| Mod       | INC_MOD    | Mode        |   |   |
| Beh       | INS_BEH    | Behaviour   |   |   |
| Health    | INS_HEALTH | Health      |   |   |
| NamPlt    | LPL_LN     | Name Plate  |   |   |
| Str       | ACD_SEG    | Start       |   |   |
| Op        | ACT_SEG    | Operate     | T |   |

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

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

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

**4.29 Logical Node: PTOV\_NEU**

Description: Overvoltage (w.r.t Neutral)  
 LN Class: PTOV

| Attribute | Attr. Type | Explanation | T | X |
|-----------|------------|-------------|---|---|
| Mod       | INC_MOD    | Mode        |   |   |
| Beh       | INS_BEH    | Behaviour   |   |   |
| Health    | INS_HEALTH | Health      |   |   |
| NamPlt    | LPL_LN     | Name Plate  |   |   |
| Str       | ACD_NEU    | Start       |   |   |
| Op        | ACT_NEU    | Operate     | T |   |

**4.30 Logical Node: PTOV\_NO\_SEG**

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

| Attribute | Attr. Type | Explanation | T | X |
|-----------|------------|-------------|---|---|
| Mod       | INC_MOD    | Mode        |   |   |

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

**4.31 Logical Node: PTOV\_SEG**

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

LN Class: PTOV

| Attribute | Attr. Type | Explanation | T | X |
|-----------|------------|-------------|---|---|
| Mod       | INC_MOD    | Mode        |   |   |
| Beh       | INS_BEH    | Behaviour   |   |   |
| Health    | INS_HEALTH | Health      |   |   |
| NamPlt    | LPL_LN     | Name Plate  |   |   |
| Str       | ACD_SEG    | Start       |   |   |
| Op        | ACT_SEG    | Operate     | T |   |

**4.32 Logical Node: PTRC\_NO\_SEG**

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

LN Class: PTRC

| Attribute | Attr. Type | Explanation                                      | T | X |
|-----------|------------|--|---|---|
| Mod       | INC_MOD    | Mode   |   |   |
| Beh       | INS_BEH    | Behaviour  |   |   |
| Health    | INS_HEALTH | Health   |   |   |
| NamPlt    | LPL_LN     | Name Plate                                       |   |   |
| Tr        | ACT_NO_SEG | Trip   |   |   |
| Str       | ACD_NO_SEG | Sum of all starts of all connected Logical Nodes |   |   |

**4.33 Logical Node: PTTR\_NO\_SEG**

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

LN Class: PTTR

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

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

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

LN Class: PTUF

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

**4.35 Logical Node: PTUV\_SEG**

Description: Undervoltage (w.r.t Phase Segregation)  
 LN Class: PTUV

| Attribute | Attr. Type | Explanation | T | X |
|-----------|------------|-------------|---|---|
| Mod       | INC_MOD    | Mode        |   |   |
| Beh       | INS_BEH    | Behaviour   |   |   |
| Health    | INS_HEALTH | Health      |   |   |
| NamPlt    | LPL_LN     | Name Plate  |   |   |
| Str       | ACD_SEG    | Start       |   |   |
| Op        | ACT_SEG    | Operate     | T |   |

**4.36 Logical Node: RBRF\_EXTTRIP\_SEG**

Description: Breaker Failure (w.r.t External Tripping + Phase)  
 LN Class: RBRF

| Attribute | Attr. Type | Explanation          | T | X |
|-----------|------------|----------------------|---|---|
| Mod       | INC_MOD    | Mode                 |   |   |
| Beh       | INS_BEH    | Behaviour            |   |   |
| Health    | INS_HEALTH | Health               |   |   |
| NamPlt    | LPL_LN     | Name Plate           |   |   |
| OpEx      | ACT_SEG    | Breaker failure trip | T |   |

**4.37 Logical Node: RDRE\_BASIC**

Description: Disturbance Recorder function (w.r.t Mandatory Attributes only)  
 LN Class: RDRE

| Attribute | Attr. Type | Explanation    | T | X |
|-----------|------------|----------------|---|---|
| Mod       | INC_MOD    | Mode           |   |   |
| Beh       | INS_BEH    | Behaviour      |   |   |
| Health    | INS_HEALTH | Health         |   |   |
| NamPlt    | LPL_LN     | Name Plate     |   |   |
| RcdMade   | SPS_WD     | Recording made |   |   |
| FltNum    | INS_BASIC  | Fault number   |   |   |

**4.38 Logical Node: RFLO\_PRIV\_8A**

Description: Fault locator for P841  
 LN Class: RFLO

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

| Attribute    | Attr. Type        | Explanation                       | T | X |
|--------------|-------------------|-----------------------------------|---|---|
| Health       | INS_HEALTH        | Health                            |   |   |
| NamPlt       | LPL_LN            | Name Plate                        |   |   |
| FltZ         | CMV_MAG_FLOAT_NDB | Fault Impedance                   |   |   |
| FltDiskm     | MV_FLOAT_NDB      | Fault Distance in km              |   |   |
| FltDismi     | MV_FLOAT_D_NS_NDB | Fault Distance in miles           |   | X |
| FltLoc       | MV_FLOAT_D_NS_NDB | Fault Location in Percentage      |   | X |
| FltPhs       | INS_D_NS          | Fault Phase                       |   | X |
| FltSt1U      | INS_D_NS          | Fault Start Element 1 Upper Bits  |   | X |
| FltSt1L      | INS_D_NS          | Fault Start Element 1 Lower Bits  |   | X |
| FltSt2U      | INS_D_NS          | Fault Start Element 2 Upper Bits  |   | X |
| FltSt2L      | INS_D_NS          | Fault Start Element 2 Lower Bits  |   | X |
| FltSt3U      | INS_D_NS          | Fault Start Element 3 Upper Bits  |   | X |
| FltSt3L      | INS_D_NS          | Fault Start Element 3 Lower Bits  |   | X |
| FltOp1U      | INS_D_NS          | Fault Trip Element 1 Upper Bits   |   | X |
| FltOp1L      | INS_D_NS          | Fault Trip Element 1 Lower Bits   |   | X |
| FltOp2U      | INS_D_NS          | Fault Trip Element 2 Upper Bits   |   | X |
| FltOp2L      | INS_D_NS          | Fault Trip Element 2 Lower Bits   |   | X |
| FltOp3U      | INS_D_NS          | Fault Trip Element 3 Upper Bits   |   | X |
| FltOp3L      | INS_D_NS          | Fault Trip Element 3 Lower Bits   |   | X |
| FltAlm1U     | INS_D_NS          | Fault Alarm 1 Upper Bits          |   | X |
| FltAlm1L     | INS_D_NS          | Fault Alarm 1 Lower Bits          |   | X |
| FltTU        | INS_D_NS          | Fault Time Upper Bits             |   | X |
| FltTL        | INS_D_NS          | Fault Time Lower Bits             |   | X |
| FltTms       | INS_D_NS          | Fault Time in ms                  |   | X |
| FltNum       | INS_D             | Number of Fault Records           |   | X |
| ActiveSG     | INS_D_NS          | Fault Record Active Group         |   | X |
| ARSeqCnt     | INS_D_NS          | AR Sequence Count                 |   | X |
| FltHz        | MV_FLOAT_D_NS_NDB | Fault Record Frequency            |   | X |
| FltDur       | MV_FLOAT_D_NS_NDB | Fault Record Duration             |   | X |
| CBOpTm       | MV_FLOAT_D_NS_NDB | Fault CB Operation Time           |   | X |
| RlyOpTm      | MV_FLOAT_D_NS_NDB | Fault Relay Operation Time        |   | X |
| PreFltA      | WYE_SEG_ANG_D_NS  | PreFault Phase Current            |   | X |
| PreFltIN     | WYE_RES_ANG_D_NS_ | Prefault Current IN               |   | X |
| NDBPreFltIM  | WYE_RES_ANG_D_NS_ | Prefault Current IM               |   | X |
| NDBPreFltPhV | WYE_SEG_ANG_D_NS  | Prefault Phase to Ground Voltage  |   | X |
| PreFltVN     | WYE_RES_ANG_D_NS_ | Prefault Voltage VN               |   | X |
| NDBFltA      | WYE_SEG_ANG_D_NS  | Fault Phase Current               |   | X |
| FltIN        | WYE_RES_ANG_D_NS_ | Postfault Current IN              |   | X |
| NDBFltIM     | WYE_RES_ANG_D_NS_ | PostFault Current IM              |   | X |
| NDBFltPhV    | WYE_SEG_ANG_D_NS  | Postfault Phase to Ground Voltage |   | X |
| FltVN        | WYE_RES_ANG_D_NS_ | PostFault Voltage VN              |   | X |
| NDBFltV1Rem  | WYE_RES_ANG_D_NS_ | Latest Fault Rem V1               |   | X |

**NDB**Logical Node: RREC\_NO\_SEG

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

LN Class: RREC

| Attribute | Attr. Type   | Explanation                                  | T | X |
|-----------|--------------|--|---|---|
| Mod       | INC_MOD      | Mode   |   |   |
| Beh       | INS_BEH      | Behaviour                                    |   |   |
| Health    | INS_HEALTH   | Health                                       |   |   |
| NamPlt    | LPL_LN       | Name Plate                                   |   |   |
| Op        | ACT_NO_SEG   | Operate (used here to provide close to XCBR) | T |   |
| AutoRecSt | INS_AR_STATE | Auto reclosing status                        |   |   |

**4.39 Logical Node: RSYN\_DIFCLC\_ENH**

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

LN Class: RSYN

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

**4.40 Logical Node: XCBR\_BASIC**

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

LN Class: XCBR

| Attribute | Attr. Type    | Explanation  | T | X |
|-----------|---------------|--|---|---|
| Mod       | INC_MOD       | Mode   |   |   |
| Beh       | INS_BEH       | Behaviour  |   |   |
| Health    | INS_HEALTH    | Health   |   |   |
| NamPlt    | LPL_LN        | Name Plate   |   |   |
| Loc       | SPS_WD        | Local operation  |   |   |
| EEHealth  | INS_HEALTH    | External equipment health  |   |   |
| OpCnt     | INS_BASIC     | Operation counter  |   |   |
| Pos       | DPC_CONTROL   | Switch position  |   |   |
| BlkOpn    | SPC_STATUS    | Block opening  |   |   |
| BlkCls    | SPC_STATUS    | Block closing  |   |   |
| SumSwARs  | BCR_PRIV      | Sum of switched amperes, resetable   |   |   |
| CBOpCap   | INS_CB_OPCAP  | Circuit Breaker operating capability   |   |   |
| Lock      | SPC_CTRL_PRIV | Prevention, i.e Lock, Trip/Close operations of the Circuit Breaker over IEC61850 |   | X |

## 5 COMMON DATA CLASS DEFINITIONS

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

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

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

### 5.1 Common Data Class: ACD\_NEU

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

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

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

Description: Directional Protection Activation Information (w,r,t No Phase Segregation)  
CDC Class: ACD

| Attribute | Type    | FC | Enumeration | Comment                    | X |
|-----------|---------|----|-------------|----------------------------|---|
| general   | BOOLEAN | ST |             | Trip or start has happened |   |



| Attribute  | Type                            | FC | Enumeration | Comment  | X |
|------------|---------------------------------|----|-------------|--|---|
| dirGeneral | ENUMERATED8<br>(MMS Type: INT8) | ST | dir         | General direction (unknown, forward, backward or both)                     |   |
| q          | Quality                         | ST |             | Quality of the protection activation information                           |   |
| t          | TimeStamp                       | ST |             | Timestamp of the last change in state of protection activation information |   |

### 5.3 Common Data Class: ACD\_SEG

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

CDC Class: ACD

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

### 5.4 Common Data Class: ACT\_NEU

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

CDC Class: ACT

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

### 5.5 Common Data Class: ACT\_NO\_SEG

Description: Protection Activation Information (w.r.t No Phase Segregation)

CDC Class: ACT

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

### 5.6 Common Data Class: ACT\_SEG

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

CDC Class: ACT

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

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

Description: Binary Counter Reading  
 CDC Class: BCR

| Attribute | Type      | FC | Enumeration | Comment   | X |
|-----------|-----------|----|-------------|---|---|
| actVal    | INT32     | ST |             | Binary counter status represented as an integer                       |   |
| q         | Quality   | ST |             | Quality of counter value  |   |
| t         | TimeStamp | ST |             | Time of last counter change   |   |
| pulsQty   | FLOAT32   | CF |             | Magnitude of the counted value 'per count' (value = actVal x pulsQty) |   |

**5.8 Common Data Class: CMV\_MAG\_ANG\_FLOAT**

Description: Complex Measured value (w.r.t Floating Point Magnitude and Angle)  
 CDC Class: CMV

| Attribute | Type                        | FC | Enumeration | Comment  | X |
|-----------|-----------------------------|----|-------------|--|---|
| cVal      | Vector_MagnitudeAngle_Float | MX |             | Deadbanded complex measured vector. Updated to the current value of instCVal when the value has changed according to the configuration parameter db. |   |
| q         | Quality                     | MX |             | Quality of the measurement value   |   |
| t         | TimeStamp                   | MX |             | Time deadbanded magnitude last exceeded its db configuration parameter   |   |
| units     | Unit_Multiplier             | CF |             | Unit of the attribute representing the data  |   |
| db        | INT32U                      | CF |             | Measurement deadband   |   |
| rangeC    | RangeConfig_DeadBand        | CF |             | Measurement range configuration attributes   |   |

**5.9 Common Data Class: CMV\_MAG\_ANG\_NDB**

Description: Complex Measured value without deadband  
 CDC Class: CMV

| Attribute | Type                        | FC | Enumeration | Comment  | X |
|-----------|-----------------------------|----|-------------|--|---|
| cVal      | Vector_MagnitudeAngle_Float | MX |             | Deadbanded complex measured vector. Updated to the current value of instCVal when the value has changed according to the configuration parameter db. |   |
| q         | Quality                     | MX |             | Quality of the measurement value   |   |
| t         | TimeStamp                   | MX |             | Time deadbanded magnitude last exceeded its db configuration parameter   |   |
| units     | Unit_Multiplier             | CF |             | Unit of the attribute representing the data  |   |

**5.10 Common Data Class: CMV\_MAG\_FLOAT**

Description: Complex Measured value (w.r.t Floating Point Magnitude)  
CDC Class: CMV

| Attribute | Type                   | FC | Enumeration | Comment  | X |
|-----------|------------------------|----|-------------|--|---|
| cVal      | Vector_Magnitude_Float | MX |             | Deadbanded complex measured vector. Updated to the current value of instCVal when the value has changed according to the configuration parameter db. |   |
| q         | Quality                | MX |             | Quality of the measurement value   |   |
| t         | TimeStamp              | MX |             | Time deadbanded magnitude last exceeded its db configuration parameter   |   |
| units     | Unit_Multiplier        | CF |             | Unit of the attribute representing the data  |   |
| db        | INT32U                 | CF |             | Measurement deadband   |   |
| rangeC    | RangeConfig_DeadBand   | CF |             | Measurement range configuration attributes   |   |

**5.11 Common Data Class: CMV\_MAG\_FLOAT\_NDB**

Description: Complex Measured value  
CDC Class: CMV

| Attribute | Type                   | FC | Enumeration | Comment  | X |
|-----------|------------------------|----|-------------|--|---|
| cVal      | Vector_Magnitude_Float | MX |             | Deadbanded complex measured vector. Updated to the current value of instCVal when the value has changed according to the configuration parameter db. |   |
| q         | Quality                | MX |             | Quality of the measurement value   |   |
| t         | TimeStamp              | MX |             | Time deadbanded magnitude last exceeded its db configuration parameter   |   |
| units     | Unit_Multiplier        | CF |             | Unit of the attribute representing the data  |   |

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

Description: Phase to phase measurements for a 3-Phase system (w.r.t Phase Segregation + Angle)  
CDC Class: DEL

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

**5.13 Common Data Class: DPC\_CONTROL**

Description: Controllable Double Point  
CDC Class: DPC

| Attribute | Type       | FC | Enumeration | Comment   | X |
|-----------|------------|----|-------------|---|---|
| ctlVal    | BOOLEAN    | CO |             | Control value (Off - FALSE, On - TRUE)                              |   |
| origin    | Originator | ST |             | Originator of the last change of the controllable data              |   |
| stVal     | Dbpos      | ST |             | Status value of the data (Intermediate state, Off, On or Bad-state) |   |
| q         | Quality    | ST |             | Quality of the status value   |   |
| t         | TimeStamp  | ST |             | Timestamp of the last change in state of status value               |   |

| Attribute  | Type                         | FC | Enumeration | Comment  | X |
|------------|------------------------------|----|-------------|--|---|
| ctlModel   | ENUMERATED8 (MMS Type: INT8) | CF | ctlModel    | Control model (Corresponding to the behaviour of the data) |   |
| sboTimeout | INT32U                       | CF |             | Select Before Operate timeout period (in milliseconds)     |   |
| cdcNs      | VISIBLE_STRING255            | EX |             | Common Data Class name space                               |   |
| cdcName    | VISIBLE_STRING255            | EX |             | Name of the Common Data Class                              |   |

**5.14 Common Data Class: DPC\_STATUS\_D**

Description: Controllable Double Point (with description)  
 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  | ENUMERATED8 (MMS Type: INT8) | CF | ctlModel    | Control model (Corresponding to the behaviour of the data)          |   |
| d         | VISIBLE_STRING255            | DC |             | Description of the status element                                   |   |

**5.15 Common Data Class: DPL\_STANDARD**

Description: Standard Device Name Plate  
 CDC Class: DPL

| Attribute | Type              | FC | Enumeration | Comment                     | X |
|-----------|-------------------|----|-------------|-----------------------------|---|
| vendor    | VISIBLE_STRING255 | DC |             | Name of the vendor          |   |
| hwRev     | VISIBLE_STRING255 | DC |             | Hardware revision           |   |
| swRev     | VISIBLE_STRING255 | DC |             | Software revision           |   |
| serNum    | VISIBLE_STRING255 | DC |             | Serial Number               |   |
| model     | VISIBLE_STRING255 | DC |             | Model Number                |   |
| location  | VISIBLE_STRING255 | DC |             | Physical location of device |   |

**5.16 Common Data Class: INC\_CTRL\_D\_PRIV**

Description: Controllable Integer Status (with NameSpace and description)  
 CDC Class: INC

| Attribute | Type                         | FC | Enumeration | Comment  | X |
|-----------|------------------------------|----|-------------|--|---|
| ctlVal    | INT32                        | CO |             | Control value  |   |
| origin    | Originator                   | ST |             | Originator of the last change of the controllable data     |   |
| stVal     | ENUMERATED8 (MMS Type: INT8) | ST | Mod         | Status value of the data                                   |   |
| q         | Quality                      | ST |             | Quality of the status value                                |   |
| t         | TimeStamp                    | ST |             | Timestamp of the last change in state of status value      |   |
| ctlModel  | ENUMERATED8 (MMS Type: INT8) | CF | ctlModel    | Control model (Corresponding to the behaviour of the data) |   |
| d         | VISIBLE_STRING255            | DC |             | Description of the status element                          |   |
| cdcNs     | VISIBLE_STRING255            | EX |             | Common Data Class name space                               |   |
| cdcName   | VISIBLE_STRING255            | EX |             | Name of the Common Data Class                              |   |

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

**5.17 Common Data Class: INC\_MOD**

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

CDC Class: INC

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

**5.18 Common Data Class: INS\_AR\_STATE**

Description: Integer Status (w.r.t Auto Reclose Status)

CDC Class: INS

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

**5.19 Common Data Class: INS\_BASIC**

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

CDC Class: INS

| Attribute | Type      | FC | Enumeration | Comment                               | X |
|-----------|-----------|----|-------------|---------------------------------------|---|
| stVal     | INT32     | ST |             | The element status                    |   |
| q         | Quality   | ST |             | The quality of the status value       |   |
| t         | TimeStamp | ST |             | Timestamp of the last change in state |   |

**5.20 Common Data Class: INS\_BEH**

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

CDC Class: INS

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

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

Description: Integer Status (w.r.t Behaviour, with Description (Private DO))

CDC Class: INS

| Attribute | Type                            | FC | Enumeration | Comment                         | X |
|-----------|---------------------------------|----|-------------|---------------------------------|---|
| stVal     | ENUMERATED8<br>(MMS Type: INT8) | ST | Beh         | The element status              |   |
| q         | Quality                         | ST |             | The quality of the status value |   |

| Attribute | Type              | FC | Enumeration | Comment                               | X |
|-----------|-------------------|----|-------------|---------------------------------------|---|
| t         | TimeStamp         | ST |             | Timestamp of the last change in state |   |
| d         | VISIBLE_STRING255 | DC |             | Description of the status element     |   |
| dataNs    | VISIBLE_STRING255 | EX |             | Data name space                       |   |

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

Description: Integer Status (w.r.t. Circuit Breaker Operating Capacity)  
 CDC Class: INS

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

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

Description: Integer Status  
 CDC Class: INS

| Attribute | Type              | FC | Enumeration | Comment                               | X |
|-----------|-------------------|----|-------------|---------------------------------------|---|
| stVal     | INT32             | ST |             | The element status                    |   |
| q         | Quality           | ST |             | The quality of the status value       |   |
| t         | TimeStamp         | ST |             | Timestamp of the last change in state |   |
| d         | VISIBLE_STRING255 | DC |             | Description of the status element     |   |

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

Description: Integer Status with d and dataNs  
 CDC Class: INS

| Attribute | Type              | FC | Enumeration | Comment                               | X |
|-----------|-------------------|----|-------------|---------------------------------------|---|
| stVal     | INT32             | ST |             | The element status                    |   |
| q         | Quality           | ST |             | The quality of the status value       |   |
| t         | TimeStamp         | ST |             | Timestamp of the last change in state |   |
| d         | VISIBLE_STRING255 | DC |             | Description of the status element     |   |
| dataNs    | VISIBLE_STRING255 | EX |             | Data name space                       |   |

**5.25 Common Data Class: INS\_HEALTH**

Description: Integer Status (w.r.t health)  
 CDC Class: INS

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

**5.26 Common Data Class: LPL\_LLNO**

Description: Logical Node 0 Name Plate  
 CDC Class: LPL

| Attribute | Type              | FC | Enumeration | Comment            | X |
|-----------|-------------------|----|-------------|--------------------|---|
| vendor    | VISIBLE_STRING255 | DC |             | Name of the vendor |   |

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

### 5.27 Common Data Class: LPL\_LN

Description: Standard Logical Node Name Plate  
CDC Class: LPL

| Attribute | Type              | FC | Enumeration | Comment            | X |
|-----------|-------------------|----|-------------|--------------------|---|
| vendor    | VISIBLE_STRING255 | DC |             | Name of the vendor |   |
| swRev     | VISIBLE_STRING255 | DC |             | Software revision  |   |
| d         | VISIBLE_STRING255 | DC |             | Description        |   |

### 5.28 Common Data Class: MV\_FLOAT

Description: Measured value (w.r.t. Floating Point value)  
CDC Class: MV

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

### 5.29 Common Data Class: MV\_FLOAT\_D

Description: Measured value (w.r.t Floating Point Value with Description)  
CDC Class: MV

| Attribute | Type                 | FC | Enumeration | Comment  | X |
|-----------|----------------------|----|-------------|--|---|
| mag       | AnalogueValue_Float  | MX |             | Deadbanded magnitude of the instantaneous value of a measured value or harmonic value. Updated to the current value of instMag when the value has changed according to the configuration parameter db. |   |
| q         | Quality              | MX |             | Quality of the measurement value   |   |
| t         | TimeStamp            | MX |             | Time deadbanded magnitude last exceeded its db configuration parameter   |   |
| units     | Unit_Multiplier      | CF |             | Unit of the attribute representing the data  |   |
| db        | INT32U               | CF |             | Measurement deadband   |   |
| rangeC    | RangeConfig_DeadBand | CF |             | Measurement range configuration attributes   |   |
| d         | VISIBLE_STRING255    | DC |             | Description of the status element  |   |

### 5.30 Common Data Class: MV\_FLOAT\_D\_NS

Description: Measured value with d and dataNs

CDC Class: MV

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

**5.31 Common Data Class: MV\_FLOAT\_D\_NS\_NDB**

Description: Measured value with d, dataNs and without deadband

CDC Class: MV

| Attribute | Type                | FC | Enumeration | Comment  | X |
|-----------|---------------------|----|-------------|--|---|
| mag       | AnalogueValue_Float | MX |             | Deadbanded magnitude of the instantaneous value of a measured value or harmonic value. Updated to the current value of instMag when the value has changed according to the configuration parameter db. |   |
| q         | Quality             | MX |             | Quality of the measurement value   |   |
| t         | TimeStamp           | MX |             | Time deadbanded magnitude last exceeded its db configuration parameter   |   |
| units     | Unit_Multiplier     | CF |             | Unit of the attribute representing the data  |   |
| d         | VISIBLE_STRING255   | DC |             | Description of the status element  |   |
| dataNs    | VISIBLE_STRING255   | EX |             | Data name space  |   |

**5.32 Common Data Class: MV\_FLOAT\_NDB**

Description: Measured value without Deadband

CDC Class: MV

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

**5.33 Common Data Class: SEQ\_MAG\_ANG**

Description: Sequence components of a measurement value (w.r.t Magnitudes + Angles)

CDC Class: SEQ



| Attribute | Type                            | FC | Enumeration | Comment  | X |
|-----------|---------------------------------|----|-------------|--|---|
| c1        | CMV_MAG_ANG_FLOAT               | -- |             | Sequence component 1 (For semantic meaning see seqT)               |   |
| c2        | CMV_MAG_ANG_FLOAT               | -- |             | Sequence component 2 (For semantic meaning see seqT)               |   |
| c3        | CMV_MAG_ANG_FLOAT               | -- |             | Sequence component 3 (For semantic meaning see seqT)               |   |
| seqT      | ENUMERATED8<br>(MMS Type: INT8) | MX | seqT        | Sequence quantity measurement type (Pos-Neg-Zero or Dir-Quad-Zero) |   |

### 5.34 Common Data Class: SPC\_CONTROL

Description: Controllable Single Point

CDC Class: SPC

| Attribute  | Type                            | FC | Enumeration | Comment  | X |
|------------|---------------------------------|----|-------------|--|---|
| ctlVal     | BOOLEAN                         | CO |             | Control value (Off - FALSE, On - TRUE)                     |   |
| origin     | Originator                      | ST |             | Originator of the last change of the controllable data     |   |
| stVal      | BOOLEAN                         | ST |             | Status value of the data                                   |   |
| q          | Quality                         | ST |             | Quality of the status value                                |   |
| t          | TimeStamp                       | ST |             | Timestamp of the last change in state of status value      |   |
| ctlModel   | ENUMERATED8<br>(MMS Type: INT8) | CF | ctlModel    | Control model (Corresponding to the behaviour of the data) |   |
| sboTimeout | INT32U                          | CF |             | Select Before Operate timeout period (in milliseconds)     |   |
| d          | VISIBLE_STRING255               | DC |             | Description of the status element                          |   |
| cdcNs      | VISIBLE_STRING255               | EX |             | Common Data Class name space                               |   |
| cdcName    | VISIBLE_STRING255               | EX |             | Name of the Common Data Class                              |   |

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

Description: Controllable Single Point (With Namespace)

CDC Class: SPC

| Attribute  | Type                            | FC | Enumeration | Comment  | X |
|------------|---------------------------------|----|-------------|--|---|
| ctlVal     | BOOLEAN                         | CO |             | Control value (Off - FALSE, On - TRUE)                     |   |
| origin     | Originator                      | ST |             | Originator of the last change of the controllable data     |   |
| ctlModel   | ENUMERATED8<br>(MMS Type: INT8) | CF | ctlModel    | Control model (Corresponding to the behaviour of the data) |   |
| stVal      | BOOLEAN                         | ST |             | Status value of the data                                   |   |
| q          | Quality                         | ST |             | Quality of the status value                                |   |
| t          | TimeStamp                       | ST |             | Timestamp of the last change in state of status value      |   |
| sboTimeout | INT32U                          | CF |             | Select Before Operate timeout period (in milliseconds)     |   |
| cdcNs      | VISIBLE_STRING255               | EX |             | Common Data Class name space                               |   |
| cdcName    | VISIBLE_STRING255               | EX |             | Name of the Common Data Class                              |   |
| dataNs     | VISIBLE_STRING255               | EX |             | Data name space  |   |

### 5.36 Common Data Class: SPC\_STATUS

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

CDC Class: SPC

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

**5.37 Common Data Class: SPS\_D**

Description: Standard Single Point Status (with Description)

CDC Class: SPS

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

**5.38 Common Data Class: SPS\_WD**

Description: Single Point Status (without Description)

CDC Class: SPS

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

**5.39 Common Data Class: SPS\_WD\_PRIV**

Description: Single Point Status(without Description with Name Space)

CDC Class: SPS

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

**5.40 Common Data Class: WYE\_RES\_ANG\_D**

Description: Phase to ground measurements for a 3-Phase system (w.r.t Residual + Description + Angle)

CDC Class: WYE

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

**5.41 Common Data Class: WYE\_RES\_ANG\_D\_NS**

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

CDC Class: WYE

| Attribute | Type              | FC | Enumeration | Comment  | X |
|-----------|-------------------|----|-------------|--|---|
| res       | CMV_MAG_ANG_FLOAT | -- |             | Measurement values for the residual system current |   |
| d         | VISIBLE_STRING255 | DC |             | Description of the status element                  |   |
| dataNs    | VISIBLE_STRING255 | EX |             | Data name space                                    |   |

#### 5.42 Common Data Class: WYE\_RES\_ANG\_D\_NS\_NDB

Description: Phase to ground measurements for a 3-Phase system with d and dataNs  
CDC Class: WYE

| Attribute | Type              | FC | Enumeration | Comment  | X |
|-----------|-------------------|----|-------------|--|---|
| res       | CMV_MAG_ANG_NDB   | -- |             | Measurement values for the residual system current |   |
| d         | VISIBLE_STRING255 | DC |             | Description of the status element                  |   |
| dataNs    | VISIBLE_STRING255 | EX |             | Data name space                                    |   |

#### 5.43 Common Data Class: WYE\_SEG

Description: Phase to ground measurements for a 3-Phase system (w.r.t Phase Segregation)  
CDC Class: WYE

| Attribute | Type          | FC | Enumeration | Comment                        | X |
|-----------|---------------|----|-------------|--------------------------------|---|
| phsA      | CMV_MAG_FLOAT | -- |             | Measurement values for Phase A |   |
| phsB      | CMV_MAG_FLOAT | -- |             | Measurement values for Phase B |   |
| phsC      | CMV_MAG_FLOAT | -- |             | Measurement values for Phase C |   |

#### 5.44 Common Data Class: WYE\_SEG\_ANG\_D

Description: Phase to ground measurements for a 3-Phase system  
CDC Class: WYE

| Attribute | Type              | FC | Enumeration | Comment                           | X |
|-----------|-------------------|----|-------------|-----------------------------------|---|
| phsA      | CMV_MAG_ANG_FLOAT | -- |             | Measurement values for Phase A    |   |
| phsB      | CMV_MAG_ANG_FLOAT | -- |             | Measurement values for Phase B    |   |
| phsC      | CMV_MAG_ANG_FLOAT | -- |             | Measurement values for Phase C    |   |
| d         | VISIBLE_STRING255 | DC |             | Description of the status element |   |

#### 5.45 Common Data Class: WYE\_SEG\_ANG\_D\_NS

Description: Phase to ground measurements for a 3-Phase system  
CDC Class: WYE

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

#### 5.46 Common Data Class: WYE\_SEG\_D

Description: Phase to ground measurements for a 3-Phase system (w.r.t Phase Segregation + Description)  
CDC Class: WYE

| Attribute | Type              | FC | Enumeration | Comment                           | X |
|-----------|-------------------|----|-------------|-----------------------------------|---|
| phsA      | CMV_MAG_FLOAT     | -- |             | Measurement values for Phase A    |   |
| phsB      | CMV_MAG_FLOAT     | -- |             | Measurement values for Phase B    |   |
| phsC      | CMV_MAG_FLOAT     | -- |             | Measurement values for Phase C    |   |
| d         | VISIBLE_STRING255 | DC |             | Description of the status element |   |

**5.47 Common Data Class: WYE\_SEG\_RES\_D**

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

CDC Class: WYE

| Attribute | Type              | FC | Enumeration | Comment                              | X |
|-----------|-------------------|----|-------------|--------------------------------------|---|
| phsA      | CMV_MAG_ANG_FLOAT | -- |             | Measurement values for Phase A       |   |
| phsB      | CMV_MAG_ANG_FLOAT | -- |             | Measurement values for Phase B       |   |
| phsC      | CMV_MAG_ANG_FLOAT | -- |             | Measurement values for Phase C       |   |
| neut      | CMV_MAG_ANG_FLOAT | -- |             | Measurement values for neutral input |   |
| d         | VISIBLE_STRING255 | DC |             | Description of the status element    |   |

**6 COMMON DATA ATTRIBUTE TYPE DEFINITIONS**

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

**6.1 Component: AnalogueValue\_Float**

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

Parent Type: AnalogueValue

| Attribute | Type    | Enumeration | Comment              | X |
|-----------|---------|-------------|----------------------|---|
| f         | FLOAT32 |             | Floating point value |   |

**6.2 Component: Originator**

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

Parent Type:

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

**6.3 Component: RangeConfig\_DeadBand**

Comment: Measurement range configuration

Parent Type: RangeConfig

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

**6.4 Component: Unit\_Multiplier**

Comment: SI Unit definitions

Parent Type: Unit

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

**6.5 Component: Vector\_Magnitude\_Float**

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

Parent Type: Vector

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

**6.6 Component: Vector\_MagnitudeAngle\_Float**

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

Parent Type: Vector

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

**7 ENUMERATED TYPE DEFINITIONS**

The following sub-sections specify the enumerations that are associated to some Common Data Class attributes. The definition of the enumerations are according to IEC61850-7-3 and IEC61850-7-4 unless otherwise stated.

**7.1 Enumerated type: AddCause**

Description: AddCause

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

**7.2 Enumerated type: AutoRecSt**

Description: Auto-Reclose Status

| Ordinal | Semantic     |
|---------|--------------|
| -1      | Unsuccessful |
| 1       | Ready        |
| 2       | InProgress   |
| 3       | Successful   |

**7.3 Enumerated type: Beh**

Description: Behaviour

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

**7.4 Enumerated type: Bypass**

Description: Bypass

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

**7.5 Enumerated type: CBOpCap**

Description: Circuit Breaker Operating Capacity

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

**7.6 Enumerated type: ctIModel**

Description: Control Model

| Ordinal | Semantic                      |
|---------|-------------------------------|
| 0       | status-only                   |
| 1       | direct-with-normal-security   |
| 2       | sbo-with-normal-security      |
| 3       | direct-with-enhanced-security |
| 4       | sbo-with-enhanced-security    |

**7.7 Enumerated type: dir**

Description: Direction

| Ordinal | Semantic |
|---------|----------|
| 0       | unknown  |
| 1       | forward  |
| 2       | backward |
| 3       | both     |

**7.8 Enumerated type: Health**

Description: Health

| Ordinal | Semantic |
|---------|----------|
| 1       | Ok       |
| 2       | Warning  |
| 3       | Alarm    |

**7.9 Enumerated type: Mod**

Description: Mode



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

**7.10****Enumerated type: multiplier**

Description: Exponents of the multiplier value in base 10.

| Ordinal | Semantic |
|---------|----------|
| -24     | y        |
| -21     | z        |
| -18     | a        |
| -15     | f        |
| -12     | p        |
| -9      | n        |
| -6      | μ        |
| -3      | m        |
| -2      | c        |
| -1      | d        |
| 0       |          |
| 1       | da       |
| 2       | h        |
| 3       | k        |
| 6       | M        |
| 9       | G        |
| 12      | T        |
| 15      | P        |
| 18      | E        |
| 21      | Z        |
| 24      | Y        |

**7.11****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           |

**7.12 Enumerated type: seqT**

Description: Sequence Measurement Type

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

**7.13 Enumerated type: SIUnit**

Description: SI Units derived from ISO/IEC 1000

| Ordinal | Semantic |
|---------|----------|
| -16     | years    |
| -15     | months   |
| -14     | weeks    |
| -13     | V/s      |
| -12     | mins     |
| -11     | hours    |
| -10     | days     |
| -9      | °F       |
| -8      | ratio    |
| -7      | miles    |
| -6      | inches   |
| -5      | feet     |
| -4      | df/dt    |
| -3      | Hz/s     |
| -2      | %        |
| -1      | pu       |
| 1       | none     |
| 2       | m        |
| 3       | kg       |
| 4       | s        |
| 5       | A        |
| 6       | K        |
| 7       | mol      |
| 8       | cd       |
| 9       | deg      |
| 10      | rad      |
| 11      | sr       |
| 21      | Gy       |
| 22      | q        |
| 23      | °C       |
| 24      | Sv       |
| 25      | F        |
| 26      | C        |
| 27      | S        |
| 28      | H        |
| 29      | V        |

| Ordinal | Semantic          |
|---------|-------------------|
| 30      | ohm               |
| 31      | J                 |
| 32      | N                 |
| 33      | Hz                |
| 34      | lx                |
| 35      | Lm                |
| 36      | Wb                |
| 37      | T                 |
| 38      | W                 |
| 39      | Pa                |
| 41      | m <sup>2</sup>    |
| 42      | m <sup>3</sup>    |
| 43      | m/s               |
| 44      | m/s <sup>2</sup>  |
| 45      | m <sup>3</sup> /s |
| 46      | m/m <sup>3</sup>  |
| 47      | M                 |
| 48      | kg/m <sup>3</sup> |
| 49      | m <sup>2</sup> /s |
| 50      | W/m K             |
| 51      | J/K               |
| 52      | ppm               |
| 53      | 1/s               |
| 54      | rad/s             |
| 61      | VA                |
| 62      | Watts             |
| 63      | VA <sub>r</sub>   |
| 64      | phi               |
| 65      | cos(phi)          |
| 66      | V <sub>s</sub>    |
| 67      | V <sup>2</sup>    |
| 68      | As                |
| 69      | A <sup>2</sup>    |
| 70      | A <sup>2</sup> t  |
| 71      | VA <sub>h</sub>   |
| 72      | Wh                |
| 73      | VA <sub>r</sub> h |
| 74      | V/Hz              |

## 8 MMS DATA-TYPE CONVERSIONS

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

| Part 7 Type       | MMS Type       | Part 7 Description                                   |
|-------------------|----------------|--|
| BOOLEAN           | Bool           | Logical TRUE/FALSE value                             |
| BSTR16            | Bstring16      | Bit-string -16 bits                                  |
| BVstring13        | BVstring13     | Variable bit string (upto 13 bits)                   |
| Check             | BVstring2      | Control Object check flags                           |
| CODED_ENUM        | Byte           | Coded enumeration                                    |
| CODED_ENUM2       | Byte           | Coded enumeration (2)                                |
| Dbpos             | Bstring2       | Switch positions                                     |
| EntryTime         | Btime6         | 8.1 Section 8.1.3.7                                  |
| ENUMERATED16      | Short          | 16 bit enumerated value                              |
| ENUMERATED8       | Byte           | 8 bit enumerated value                               |
| FLOAT32           | Float          | 32 bit floating point value                          |
| FLOAT64           | Double         | 64 bit floating point value                          |
| INT16             | Short          | 16 bit signed integer value                          |
| INT16U            | Ushort         | 16 bit unsigned integer value                        |
| INT24U            | Ulong          | 24 bit unsigned integer value                        |
| INT32             | Long           | 32 bit signed integer value                          |
| INT32U            | Ulong          | 32 bit unsigned integer value                        |
| INT64             | Int64          | 64 bit signed integer value                          |
| INT8              | Byte           | 8 bit signed integer value                           |
| INT8U             | Ubyte          | 8 bit unsigned integer value                         |
| OCTET_STRING6     | Ostring6       | 6 character string (8 bits per character)            |
| OCTET_STRING64    | OVstring64     | 64 character string (8 bits per character)           |
| OCTET_STRING8     | OVstring8      | 8 character string (8 bits per character)            |
| Quality           | BVstring13     | IEC61850 Quality                                     |
| TimeStamp         | Utctime        | IEC61850 Time stamp                                  |
| UNICODE_STRING255 | UTF8Vstring255 | 255 character string (16 bits per unicode character) |
| UTC_TM            | Utctime        | UTC Timestamp  |
| VISIBLE_STRING255 | Vstring255     | 255 character string                                 |
| VISIBLE_STRING64  | Vstring64      | 64 character string                                  |
| VISIBLE_STRING65  | Vstring65      | 65 character string                                  |
| VISIBLE_STRING97  | Vstring97      | 97 character string                                  |





## Customer Care Centre

<http://www.schneider-electric.com/cc>

### **Schneider Electric**

35 rue Joseph Monier  
92506 Rueil-Malmaison  
FRANCE

Phone: +33 (0) 1 41 29 70 00  
Fax: +33 (0) 1 41 29 71 00

[www.schneider-electric.com](http://www.schneider-electric.com)

Publisher: Schneider Electric

**Publication: Easergy MiCOM P841A/EN MC/F72 Multifunctional Line Terminal IED Software Version: G7 Hardware Suffix: M IEC61850 Edition: 1**

08/2017