Model Implementation Conformance Statement for the IEC 61850 interface in SEL-787-2,-3,-4

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1. Introduction

This model implementation conformance statement is applicable for SEL-787-2,-3,-4 with firmware R200:

This MICS document specifies the modelling extensions compared to IEC 61850 edition 2. For the exact details on the standardized model please compare the ICD substation configuration file: “0787-4 006.ICD”, version R200.

Clause 2 contains the list of implemented logical nodes.
Clause 3 describes the new and extended logical nodes (if any).
Clause 4 describes the new and extended enum types (if any).

2. Logical Nodes List

The following table contains the list of logical nodes implemented in the device:

C: **Supervisory Control**
CSWI (Switch Controller)
G: **Generic Function References**
GGIO (Generic Process I/O)
L: System Logical Nodes
LLN0 (Logical Node Zero)
LPHD (Physical Device Information)
M: **Metering and Measurement**
MDST (Demand Metering Statistics)
MHAI (Harmonics or Interharmonics)
MMXU (Measurement)
MSQI (Sequence and Imbalance)
MSTA (Metering Statistics)
MTHR (Thermal Metering)
P: **Protection Functions**
PDIF (Differential)
PDOP (Directional Overpower)
PDUP (Directional Underpower)
PHAR (Harmonic Restraint)
PIOC (Instantaneous Overcurrent)
PTOC (Time Overcurrent)
PTOF (Overfrequency)
PTOV (Overvoltage)
PTRC (Protection Trip Conditioning)
PTUV (Undervoltage)

PVPH (Volts per Hz)
R: **Protection Related Functions**
RBRF (Breaker Failure)
RDRE (Disturbance Recorder Function)
S: **Sensors, Monitoring**
SCBR (Circuit Breaker Supervision)
X: **Switchgear**
XCBR (Circuit Breaker)
Z: **Further (power system) Equipment**
ZBAT (Battery)

3. Logical Node Extensions

The following tables use:

- M: Data is mandatory in the IEC 61850-7-4 Ed.2.
- O: Data is optional in the IEC 61850-7-4 Ed.2 and is used in the device.
- C: Data is conditional in the IEC 61850-7-4 Ed.2 and is used in the device.
- E: Data is an extension to the IEC 61850-7-4 Ed.2.

3.1. New Logical Nodes

New logical nodes have the LnNs attribute in the Name plate. The value of LnNs is a reference to the MICS document. All extra data has been highlighted in the tables and marked as "E" (Extended), these data contain the dataNs attribute.

3.1.1 MDST: Demand Metering Statistics

This LN shall be used for calculation of demand currents and energy in a three-phase system.

MDST Class				
Data Object Name	**Common Data Class**	**Explanation**	**M/O/C/E**	**Remarks**
LNName		The name shall be composed of the class name, the LN-Prefix and LN-Instance-ID according to IEC 61850-7-2.		
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class.	M	
Data Objects				
Measured Values				
DmdA	WYE	Demand Currents	E	
DmdAnseq	MV	Negative Sequence Demand Current	E	
PkDmdA	WYE	Peak Demand Currents	E	

PkDmdAnseq	MV	Negative Sequence Peak Demand Current	E	
SupWh	MV	Real energy supply (default supply direction: energy flow towards busbar)	E	
SupVArh	MV	Reactive energy supply (default supply direction: energy flow towards busbar)	E	
DmdWh	MV	Real energy demand (default demand direction: energy flow from busbar away)	E	
DmdVArh	MV	Reactive energy demand (default demand direction: energy flow from busbar away)	E	

3.1.2 MTHR: Thermal Metering

This LN shall be used to acquire values from RTDs and to calculate thermal capacity. This is mainly used for Thermal Monitoring.

MTHR Class				
Data Object Name	**Common Data Class**	**Explanation**	**M/O/C/E**	**Remarks**
LNName		The name shall be composed of the class name, the LN-Prefix and LN-Instance-ID according to IEC 61850-7-2.		
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class.	M	
EEHealth	INS	External equipment health (RTD Communications Status)	E	
Data Objects				
Measured Values				
MaxAmbTmp	MV	Maximum Ambient Temperature	E	
MaxOthTmp	MV	Maximum Other Temperature	E	
Tmp	MV	Temperature	E	

3.2. Extended Logical Nodes

The following logical nodes have been extended with extra data. All extra data has been highlighted in the tables and marked as "E" (Extended), these data contain the dataNs attribute.

3.2.1 GGIO: Generic Process I/O

GGIO Class				
Data Object Name	**Common Data Class**	**Explanation**	**M/O/C/E**	**Remarks**
LNName		The name shall be composed of the class name, the LN-Prefix and LN-Instance-ID according to IEC 61850-7-2.		
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class.	M	
Data Objects				
Measured Values				
AnIn	MV	Analog Input	O	
Ra	MV	Remote analog	E	
Controls				
SPCSO	SPC	Single point controllable status Output	O	
Status Information				
Ind	SPS	General indication (binary input)	O	

3.2.2 MSTA: Metering Statistics

MSTA Class				
Data Object Name	**Common Data Class**	**Explanation**	**M/O/C/E**	**Remarks**
LNName		The name shall be composed of the class name, the LN-Prefix and LN-Instance-ID according to IEC 61850-7-2.		
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class.	M	
Data Objects				
Measured and Metered Values				
AvAmps	MV	Average Current	E	
MaxAmps	MV	Maximum Current	E	
MinAmps	MV	Minimum Current	E	
AvVolts	MV	Average Voltage	E	
MaxVA	MV	Maximum apparent power	E	
MinVA	MV	Minimum apparent power	E	
MaxW	MV	Maximum real power	E	
MinW	MV	Minimum real power	E	
MaxVAr	MV	Maximum reactive power	E	
MinVAr	MV	Minimum reactive power	E	
MaxA	WYE	Maximum Phase Currents	E	
MinA	WYE	Minimum Phase Currents	E	
MaxPhV	WYE	Maximum Phase to Ground Voltages	E	
MinPhV	WYE	Minimum Phase to Ground Voltages	E	

MaxP2PV	DEL	Maximum Phase to Phase Voltages	E	
MinP2PV	DEL Minimum Phase to Phase Voltages	Minimum Phase to Phase Voltages	E	

3.2.3 MMXU: Measurement

MMXU Class				
Data Object Name	**Common Data Class**	**Explanation**	**M/O/C/E**	**Remarks**
LNName		The name shall be composed of the class name, the LN-Prefix and LN-Instance-ID according to IEC 61850-7-2.		
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class.	M	
Data Objects				
Measured and Metered Values				
TotW	MV	Total active power	O	
TotVAr	MV	Total reactive power	O	
TotVA	MV	Total apparent power	O	
TotPF	MV	Average power factor	O	
Hz	MV	Frequency	O	
PPV	DEL	Phase to phase voltages	O	
PhV	WYE	Phase to ground voltages	O	
A	WYE	Phase currents	O	

Vhz	MV	Volts per Hz	E	
VSyn	MV	Synchronizing Voltage	E	

3.2.4 XCBR: Circuit Breaker

XCBR Class				
Data Object Name	**Common Data Class**	**Explanation**	**M/O/C/E**	**Remarks**
LNName		The name shall be composed of the class name, the LN-Prefix and LN-Instance-ID according to IEC 61850-7-2.		
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class.	M	
Data Objects				
Status Information				
Loc	SPS	Local control behavior	M	
OpCnt	INS	Operation counter	M	
OpCntEx	INS	Operation counter – external	E	
Measured and Metered Values				
Pos	DPC	Switch position	M	
BlkOpn	SPC	Block opening	M	
BlkCls	SPC	Block closing	M	

3.2.5 SCBR: Circuit Breaker Supervision (Per-Phase)

SCBR Class				
Data Object Name	**Common Data Class**	**Explanation**	**M/O/C/E**	**Remarks**
LNName		The name shall be composed of the class name, the LN-Prefix and LN-Instance-ID according to IEC 61850-7-2.		
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class.	M	
Data Objects				
Status Information				
ColOpn	SPS	Open command of trip coil	M	
Measured Values				
AbrPrt	MV	Calculated or measured wear (e.g. of main contact), expressed in % where 0% corresponds to new condition	E	

4. Enum types Extensions

4.1. New Enum types

4.1.1 Dbpos

Value	Description	Remarks
0	Intermediate-state	
1	off	
2	on	
3	Bad-state	