Model Implementation Conformance Statement
for the IEC 61850 interface in SEL-451

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UCA International Users Group
Testing Sub Committee

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1. Introduction

This model implementation conformance statement is applicable for SEL-451 firmware R311:

This MICS document specifies the modelling extensions compared to IEC 61850 edition 1. For the exact details on the standardized model please compare the ICD substation configuration file: “0451 005.ICD”, version R502.

Clause 2 contains the list of implemented logical nodes.
Clause 3 describes the new and extended logical nodes.

2. Logical Nodes List

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

L: System Logical Nodes
LPHD (Physical device information)
LLN0 (Logical node zero)
P: Logical Nodes for protection functions
PDIF (Differential)
PDIS (Distance)
PIOC (Instantaneous overcurrent)
PDOP (Directional overpower)
PDUP (Directional underpower)
PHAR (Harmonic restraint)
PHIZ (Ground detector)
PVPH (Volts per Hz)
PSCH (Protection scheme)
PTOC (Time overcurrent)
PTOF (Overfrequency)
PTOV (Overvoltage)
PTRC (Protection trip conditioning)
PTUF (Underfrequency)
PTUV (Undervoltage)
R: Logical nodes for protection related functions
RBRF (Breaker failure)
RDIR (Directional element)
RFLO (Fault locator)
G: Logical Nodes for generic references
GGIO (Generic process I/O)
M: Logical Nodes for metering and measurement
MDST (Demand metering statistics)

MMXN (Non phase related Measurement)
MMXU (Measurement)
MSQI (Sequence and imbalance)
MTHR (Thermal measurements)
C: Logical Nodes for control
CSWI (Switch controller)
X: Logical Nodes for switchgear
XCBR (Circuit breaker)
Z: Logical Nodes for further power system equipment
ZBAT (Battery)

3. Logical Node Extensions

The following table use

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

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.

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				
Attribute Name	**Attribute Type**	**Explanation**	**M/O/E**	**Remarks**
LNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2).		
Data				
Common Logical Node Information				
Mod	INC	Mode	M	Status-only
Beh	INS	Behavior	M	
Health	INS	Health	M	
NamPlt	LPL	Name plate	M	
Measured Values				
A	WYE	Current	E	
W	WYE	Real power	E	
VAr	WYE	Reactive power	E	
VA	WYE	Apparent power	E	
SeqA	SEQ	Sequence currents	E	
TotW	MV	Total real power	E	

TotVAr	MV	Total reactive power	E	
TotVA	MV	Total apparent power	E	
SupWh	MV	Real energy supply (default direction: energy flow towards busbar)	E	
DmdWh	MV	Real energy demand (default direction: energy flow from busbar)	E	

3.1.2 MTHR Thermal Measurements

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

MTHR class				
Attribute Name	**Attribute Type**	**Explanation**	**M/O/E**	**Remarks**
LNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2).		
Data				
Common Logical Node Information				
Mod	INC	Mode	M	Status-only
Beh	INS	Behavior	M	
Health	INS	Health	M	
NamPlt	LPL	Name plate	M	
EEHealth	INS	External equipment health (RTD Communications Status)	E	
Measured Values				
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 contains the “dataNs” attribute.

3.2.1. GGIO Generic process I/O

GGIO class				
Attribute Name	**Attribute Type**	**Explanation**	**M/O/E**	**Remarks**
LNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2).		
Data				
Common Logical Node Information				
Mod	INC	Mode	M	Status-only
Beh	INS	Behaviour	M	
Health	INS	Health	M	
NamPlt	LPL	Name plate	M	
Measured Values				
Ra	MV	Remote analog	E	

3.2.2. RFLO Fault locator

RFLO class				
Attribute Name	**Attribute Type**	**Explanation**	**M/O/E**	**Remarks**
LNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2).	M	
Data				
Common Logical Node Information				

Mod	INC	Mode	M	Status-only
Beh	INS	Behaviour	M	
Health	INS	Health	M	
NamPlt	LPL	Name plate	M	
Measured Values				
FltZ	CMV	Fault impedance	M	
FltDiskm	MV	Fault distance	M	
A	WYE	Fault current	E	

4. Enum Types Extensions

4.1. New Enum types

4.1.1. dirGeneral

Value	Description	Remarks
0	unknown	
1	forward	
2	backward	
3	both	

4.1.2. orCat

Value	Description	Remarks
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	