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SPRECON-E

IEC 61850

MODEL IMPLEMENTATION CONFORMANCE STATEMENT



MICS
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Issue E

Exclusion of liability

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The information in this manual is checked periodically, and necessary corrections will be included in future editions. Sprecher Automation appreciates any suggestions for improvement. Please direct them to

documentation@sprecher-automation.com.

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Contact address



Sprecher Automation GmbH
Customer service
A-4018 Linz / Franckstraße 51



24 hours service hotline
Tel: +43/(0)732/6908-358



Fax: +43/(0)732/6908-442



service@sprecher-automation.com



www.sprecher-automation.com

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Model Implementation Conformance Statement (MICS) 1

The Model Implementation of Sprecher Automation GmbH supports free modelling. This means, every Logical Node from the standard can be used, as long as the respective device is supporting the expected functionality. The following lists are describing the Logical Nodes and Common Data Classes, which were already used in a project or have been tested otherwise.

1.1 Introduction

This model implementation conformance statement is applicable for **SPRECON-E®**, with firmware **V8.15**.

This MICS chapter 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.

Filename: **SPRECON.SCD**

Version: **V1.0**

- Clause 1.2 describes the new and extended enum types (if any).
- Clause 1.5 describes the new and extended common data classes (if any).
- Clause 1.6 contains the list of implemented logical nodes (if any).
- Clause 1.7 describes the new and extended logical nodes (if any).
- Clause 1.8 describes any other extensions (if any).

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.

1.2 Enum type Extension

1.2.1 New Enum types

There are no new enum types available.

1.2.2 Extended Enum types

There are no enum types extended with new extra data.

1.3 Common Data Attribute Classes

1.3.1 Quality

Quality Type Definition				
Attribute Name	Attribute Type	Value / Value Range	M/O/C	Comments
	PACKED LIST			
validity	CODED ENUM	good invalid reserved questionable	M	Supported
detailQual	PACKED LIST		M	Supported
overflow	BOOLEAN		M	
outOfRange	BOOLEAN		M	
badReference	BOOLEAN		M	
oscillatory	BOOLEAN		M	
failure	BOOLEAN		M	
oldData	BOOLEAN		M	
inconsistent	BOOLEAN		M	
inaccurate	BOOLEAN		M	
source	CODED ENUM	process ^[Default value] substituted	M	Supported
test	PACKED LIST	FALSE ^[Default value] TRUE	M	
operatorBlocked	PACKED LIST	FALSE ^[Default value] TRUE	M	

1.3.2 AnalogueValue

AnalogueValue Type Definition				
Attribute Name	Attribute Type	Value / Value Range	M/O/C	Comments
f	FLOAT32	floating point value	GC_1	Supported
i	INT32	integer value	GC_1	Not Supported

1.3.3 Originator

Originator Type Definition				
Attribute Name	Attribute Type	Value / Value Range	M/O/C	Comments
orCat	ENUMERATED	not-supported bay-control stationcontrol remote-control ^[Default value] automatic-bay automatic-station automatic-remote maintenance process	M	Supported
orIdnt	OCTET STRING64		M	Supported

1.4 Common Data Classes

1.4.1 Single status information (SPS)

SPS class						
Attribute Name	Attribute Type	FC	TrgOp	Value / Value Range	M/O/C	Comments
DataName	Inherited from Data Class (see IEC 61850-7-2)					
DataAttribute						
status						
stVal	BOOLEAN	ST	dchg	TRUE I FALSE	M	Supported
q	Quality	ST	qchg		M	Supported
t	TimeStamp	ST			M	Supported
substitution						
subEna	BOOLEAN	SV			PICS-SUBST	Not Supported
subVal	BOOLEAN	SV		TRUE I FALSE	PICS-SUBST	Not Supported
subQ	Quality	SV			PICS-SUBST	Not Supported
subID	VISIBLE STRING64	SV			PICS-SUBST	Not Supported
configuration, description and extension						
d	VISIBLE STRING255	DC		Text	O	Supported
dU	UNICODE STRING255	DC			O	Not Supported
cdcNs	VISIBLE STRING255	EX			AC_DLND_A_M	Not Supported
cdcName	VISIBLE STRING255	EX			AC_DLND_A_M	Not Supported
dataNs	VISIBLE STRING255	EX			AC_DLN_M	Supported ¹⁾
Services						
As defined in Table 13						
¹⁾used at DAI “CSW\$BIK”						

1.4.2 Integer status (INS)

INS class						
Attribute Name	Attribute Type	FC	TrgOp	Value / Value Range	M/O/C	Comments
DataName	Inherited from Data Class (see IEC 61850-7-2)					
DataAttribute						
status						
stVal	INT32	ST	dchg		M	Supported
q	Quality	ST	qchg		M	Supported
t	TimeStamp	ST			M	Supported
substitution						
subEna	BOOLEAN	SV			PICS_SUBST	Not Supported
subVal	INT32	SV			PICS_SUBST	Not Supported
subQ	Quality	SV			PICS_SUBST	Not Supported
subID	VISIBLE STRING64	SV			PICS_SUBST	Not Supported
configuration, description and extension						
d	VISIBLE STRING255	DC		Text	O	Supported
dU	UNICODE STRING255	DC			O	Not Supported
cdcNs	VISIBLE STRING255	EX			AC_DLND_A_M	Not Supported
cdcName	VISIBLE STRING255	EX			AC_DLND_A_M	Not Supported
dataNs	VISIBLE STRING255	EX			AC_DLN_M	
Services						
As defined in Table 13						

1.4.3 Protection activation information (ACT)

ACT class						
Attribute Name	Attribute Type	FC	TrgOp	Value / Value Range	M/O/C	Comments
DataName	Inherited from Data Class (see IEC 61850-7-2)					
DataAttribute						
status						
general	BOOLEAN	ST	dchg		M	Supported
phsA	BOOLEAN	ST	dchg		O	Not Supported
phsB	BOOLEAN	ST	dchg		O	Not Supported
phsC	BOOLEAN	ST	dchg		O	Not Supported
neut	BOOLEAN	ST	dchg		O	Not Supported
q	Quality	ST	qchg		M	Supported
t	TimeStamp	ST			M	Supported
configuration, description and extension						
operTm	TimeStamp	CF			O	Not Supported
d	VISIBLE STRING255	DC		Text	O	Supported
dU	UNICODE STRING255	DC			O	Not Supported
cdcNs	VISIBLE STRING255	EX			AC_DLND_A_M	Not Supported
cdcName	VISIBLE STRING255	EX			AC_DLND_A_M	Not Supported
dataNs	VISIBLE STRING255	EX			AC_DLN_M	Not Supported
Services						
As defined in Table 13						

1.4.4 Directional protection activation information (ACD)

ACD class						
Attribute Name	Attribute Type	FC	TrgOp	Value / Value Range	M/O/C	Comments
DataName	Inherited from Data Class (see IEC 61850-7-2)					
DataAttribute						
status						
general	BOOLEAN	ST	dchg		M	Supported
dirGeneral	ENUMERATED	ST	dchg	unknown forward backward both	M	Supported
phsA	BOOLEAN	ST	dchg		GC_2(1)	Supported ¹⁾²⁾
dirPhsA	ENUMERATED	ST	dchg	unknown forward backward	GC_2(1)	Supported ¹⁾²⁾
phsB	BOOLEAN	ST	dchg		GC_2(2)	Supported ¹⁾²⁾
dirPhsB	ENUMERATED	ST	dchg	unknown forward backward	GC_2(2)	Supported ¹⁾²⁾
phsC	BOOLEAN	ST	dchg		GC_2(3)	Supported ¹⁾²⁾
dirPhsC	ENUMERATED	ST	dchg	unknown forward backward	GC_2(3)	Supported ¹⁾²⁾
neut	BOOLEAN	ST	dchg		GC_2(4)	Supported ²⁾
dirNeut	ENUMERATED	ST	dchg	unknown forward backward	GC_2(4)	Supported ²⁾
q	Quality	ST	qchg		M	Supported
t	TimeStamp	ST			M	Supported
configuration, description and extension						
operTm	TimeStamp	CF			O	Not Supported
d	VISIBLE STRING255	DC		Text	O	Supported
dU	UNICODE STRING255	DC			O	Not Supported
cdcNs	VISIBLE STRING255	EX			AC_DLND_A_M	Not Supported
cdcName	VISIBLE STRING255	EX			AC_DLND_A_M	Not Supported
dataNs	VISIBLE STRING255	EX			AC_DLN_M	Not Supported
Services						
As defined in Table 13						
¹⁾used by PHIZ, PTOC-IL..., PTOV-U..., PTUV-U...						
²⁾used by PTRC-PTOCTRIP						

1.4.5 Measured value (MV)

ACT class						
Attribute Name	Attribute Type	FC	TrgOp	Value / Value Range	M/O/C	Comments
DataName	Inherited from Data Class (see IEC 61850-7-2)					
DataAttribute						
measured attributes						
instMag	AnalogueValue	MX			O	Not Supported
mag	AnalogueValue	MX	dchg		M	Supported
range	ENUMERATED	MX	dchg	normal high low high-high low-low ...	O	Not Supported
q	Quality	MX	qchg		M	Supported
t	TimeStamp	MX			M	Supported
substitution						
subEna	BOOLEAN	SV			PICS_SUBST	Not Supported
subMag	AnalogueValue	SV			PICS_SUBST	Not Supported
subQ	Quality	SV			PICS_SUBST	Not Supported
subID	VISIBLE STRING64	SV			PICS_SUBST	Not Supported
configuration, description and extension						
units	Unit	CF		see Annex A	O	Not Supported
db	INT32U	CF		0 ... 100 000	O	Not Supported
zeroDb	INT32U	CF		0 ... 100 000	O	Not Supported
sVC	ScaledValueConfig	CF			AC_SCAV	Not Supported
rangeC	RangeConfig	CF			GC_CON	Not Supported
smpRate	INT32U	CF			O	Not Supported
d	VISIBLE STRING255	DC		Text	O	Supported
dU	UNICODE STRING255	DC			O	Not Supported
cdcNs	VISIBLE STRING255	EX			AC_DLND_M	Not Supported
cdcName	VISIBLE STRING255	EX			AC_DLND_M	Not Supported
dataNs	VISIBLE STRING255	EX			AC_DLN_M	Not Supported
Services						
As defined in Table 21						

1.4.6 Complex measured value (CMV)

CMV class						
Attribute Name	Attr. Type	FC	TrgOp	Value/Value Range	M/O/E	Comments
DataName	Inherited from Data Class (see IEC 61850-7-2)					
DataAttribute						
measured attributes						
instCVal	Vector	MX			O	Not Supported
cVal	Vector	MX	dchg		M	Supported
range	ENUMERATED	MX	dchg	normal high low high-high low-low ...	O	Not Supported
q	Quality	MX	qchg		M	Supported
t	TimeStamp	MX			M	Supported
substitution						
subEna	BOOLEAN	SV			PICS_SUBST	Not Supported
subCVal	Vector	SV			PICS_SUBST	Not Supported
subQ	Quality	SV			PICS_SUBST	Not Supported
subID	VISIBLE STRING64	SV			PICS_SUBST	Not Supported
configuration, description and extension						
units	Unit	CF		see Annex A	O	Not Supported
db	INT32U	CF		0 ... 100 000	O	Not Supported
zeroDB	INT32	CF		0 ... 100 000	O	Not Supported
rangeC	RangeConfig	CF			GC_CON	Not Supported
magSVC	ScaledValueConfig	CF			AC_SCAV	Not Supported
angSVC	ScaledValueConfig	CF			AC_SCAV	Not Supported
angRef	ENUMERATED	CF		V A other ...	O	Not Supported
smpRate	INT32U	CF			O	Not Supported
d	VISIBLE STRING255	DC		Text	O	Supported
dU	UNICODE STRING255	DC			O	Not Supported
cdcNs	VISIBLE STRING255	EX			AC_DLND_A_M	Not Supported
cdcName	VISIBLE STRING255	EX			AC_DLND_A_M	Not Supported
dataNs	VISIBLE STRING255	EX			AC_DLND_;	Not Supported
Sevices						
As defined in Table 21						

1.4.7 Phase to ground related measured values of a three phase system (WYE)

WYE class						
Attribute Name	Attribute Type	FC	TrgOp	Value / Value Range	M/O/C	Comments
DataName	Inherited from Data Class (see IEC 61850-7-2)					
Data						
phsA	CMV				GC_1	Supported
phsB	CMV				GC_1	Supported
phsC	CMV				GC_1	Supported
neut	CMV				GC_1	Supported
net	CMV				GC_1	Not Supported
res	CMV				GC_1	Supported
DataAttribute						
configuration, description and extension						
angRef	ENUMERATED	CF		Va Vb Vc Aa Ab Ac Vab Vbc Vca Vother Aother	O	Not Supported
d	VISIBLE STRING255	DC		Text	O	Supported
dU	UNICODE STRING255	DC			O	Not Supported
cdcNs	VISIBLE STRING255	EX			AC_DLND_M	Not Supported
cdcName	VISIBLE STRING255	EX			AC_DLND_M	Not Supported
dataNs	VISIBLE STRING255	EX			AC_DLN_M	Not Supported
Services						
As defined in Table 21						

1.4.8 Phase to phase related measured values of a three phase system (DEL)

DEL class						
Attribute Name	Attribute Type	FC	TrgOp	Value / Value Range	M/O/C	Comments
DataName	Inherited from Data Class (see IEC 61850-7-2)					
Data						
phsAB	CMV				GC_1	Supported
phsBC	CMV				GC_1	Supported
phsCA	CMV				GC_1	Supported
DataAttribute						
configuration, description and extension						
angRef	ENUMERATED	CF		Va Vb Vc Aa Ab Ac Vab Vbc Vca Vother Aother	O	Not Supported
d	VISIBLE STRING255	DC		Text	O	Supported
dU	UNICODE STRING255	DC			O	Not Supported
cdcNs	VISIBLE STRING255	EX			AC_DLND_A_M	Not Supported
cdcName	VISIBLE STRING255	EX			AC_DLND_A_M	Not Supported
dataNs	VISIBLE STRING255	EX			AC_DLN_M	Not Supported
Services						
As defined in Table 21						

1.4.9 Controllable single point (SPC)

SPC class						
Attribute Name	Attribute Type	FC	TrgOp	Value / Value Range	M/O/C	Comments
DataName	Inherited from Data Class (see IEC 61850-7-2)					
DataAttribute						
control and status						
ctlVal	BOOLEAN	CO		off (FALSE) on (TRUE)	AC_CO_M	Supported
operTm	TimeStamp	CO			AC_CO_O	Not Supported
origin	Originator	CO, ST			AC_CO_O	Supported
ctlNum	INT8U	CO, ST		0 ... 255	AC_CO_O	Supported
stVal	BOOLEAN	ST	dchg	FALSE TRUE	AC_ST	Supported
q	Quality	ST	qchg		AC_ST	Supported
t	TimeStamp	ST			AC_ST	Supported
stSeld	BOOLEAN	ST	dchg		AC_CO_O	Not Supported
substitution						
subEna	BOOLEAN	SV			PICS_SUBST	Not Supported
subVag	BOOLEAN	SV			PICS_SUBST	Not Supported
subQ	Quality	SV			PICS_SUBST	Not Supported
subID	VISIBLE STRING64	SV			PICS_SUBST	Not Supported
configuration, description and extension						
pulseConfig	PulseConfig	CF			AC_CO_O	Not Supported
ctlModel	CtlModels	CF			M	Supported
sboTimeout	INT32U	CF			AC_CO_O	Not Supported
sboClass	SboClasses	CF			AC_CO_O	Not Supported
d	VISIBLE STRING255	DC		Text	O	Supported
dU	UNICODE STRING255	DC			O	Not Supported
cdcNs	VISIBLE STRING255	EX			AC_DLNDA_M	Not Supported
cdcName	VISIBLE STRING255	EX			AC_DLNDA_M	Not Supported
dataNs	VISIBLE STRING255	EX			AC_DLN_M	Supported
Services						
As defined in Table 31						

1.4.10 Controllable double point (DPC)

DPC class						
Attribute Name	Attribute Type	FC	TrgOp	Value / Value Range	M/O/C	Comments
DataName	Inherited from Data Class (see IEC 61850-7-2)					
DataAttribute						
control and status						
ctlVal	BOOLEAN	CO		off (FALSE) on (TRUE)	AC_CO_M	Supported
operTm	TimeStamp	CO			AC_CO_O	Not Supported
origin	Originator	CO, ST			AC_CO_O	Supported
ctlNum	INT8U	CO, ST		0 ... 255	AC_CO_O	Supported
stVal	CODED ENUM	ST	dchg	intermediate-state off on bad-state	M	Supported
q	Quality	ST	qchg		M	Supported
t	TimeStamp	ST			M	Supported
stSeld	BOOLEAN	ST	dchg		AC_CO_O	Supported
substitution						
subEna	BOOLEAN	SV			PICS_SUBST	Not Supported
subVal	CODED ENUM	SV		intermediate-state off on bad-state	PICS_SUBST	Not Supported
subQ	Quality	SV			PICS_SUBST	Not Supported
subID	VISIBLE STRING64	SV			PICS_SUBST	Not Supported
configuration, description and extension						
pulseConfig	PulseConfig	CF			AC_CO_O	Not Supported
ctlModel	CtlModels	CF			M	Supported
sboTimeout	INT32U	CF			AC_CO_O	Not Supported
sboClass	SboClasses	CF			AC_CO_O	Not Supported
d	VISIBLE STRING255	DC		Text	O	Supported
dU	UNICODE STRING255	DC			O	Not Supported
cdcNs	VISIBLE STRING255	EX			AC_DLNDA_M	Not Supported
cdcName	VISIBLE STRING255	EX			AC_DLNDA_M	Not Supported
dataNs	VISIBLE STRING255	EX			AC_DLN_M	Not Supported
Services						
As defined in Table 31						

1.4.11 Device name plate (DPL)

DPL class						
Attribute Name	Attribute Type	FC	TrgOp	Value / Value Range	M/O/C	Comments
DataName	Inherited from Data Class (see IEC 61850-7-2)					
DataAttribute						
configuration, description and extension						
vendor	VISIBLE STRING255	DC			M	Supported
hwRev	VISIBLE STRING255	DC			O	Supported
swRev	VISIBLE STRING255	DC			O	Supported
serNum	VISIBLE STRING255	DC			O	Supported
model	VISIBLE STRING255	DC			O	Supported
location	VISIBLE STRING255	DC			O	Supported
cdcNs	VISIBLE STRING255	DC			AC_DLND_A_M	Not Supported
cdcName	VISIBLE STRING255	DC			AC_DLND_A_M	Not Supported
dataNs	VISIBLE STRING255	DC			AC_DLN_M	Not Supported
Services						
As defined in Table 45						

1.4.12 Logical node name (LPL)

LPL class						
Attribute Name	Attr. Type	FC	TrgOp	Value/Value Range	M/O/E	Comments
DataName	Inherited from Data Class (see IEC 61850-7-2)					
Data						
configuration, description and extension						
vendor	VISIBLE STRING255	DC			M	Supported
swRev	VISIBLE STRING255	DC			M	Supported
d	VISIBLE STRING255	DC			M	Supported
dU	UNICODE STRING255	DC			O	Not Supported
configRev	VISIBLE STRING255	DC			AC_LN0_M	Supported
ldNs	VISIBLE STRING255	EX		shall be included in LLN0 only; for example "IEC 61850-7-4:2003"	AC_LN0_EX	Supported
cdcNs	VISIBLE STRING255	EX			AC_DLND_A_M	Not Supported
cdcName	VISIBLE STRING255	EX			AC_DLND_A_M	Not Supported
dataNs	VISIBLE STRING255	EX			AC_DLN_M	Not Supported
Sevices						
As defined in Table 45						

1.5 Common Data Class Extensions

The following common data classes have been extended with extra data. All extra data has been highlighted in the tables and marked as “E” (Extended).

1.5.1 New common data classes

New common data classes have the “**cdcNs**” attribute in the Name plate. These data contains “**cdcNs**” attribute.

There are no new common data classes defined.

1.5.2 Extended common data classes

The following common data classes have been extended with extra data. All extra data has been highlighted in the tables and marked as “E” (Extended).

There are no common data classes extended with extra data.

1.6 Logical Nodes

The following table shows logical node classes that are supported:

LN Name	LN Description	Server (S)	Comments
A – Automatic Control Functions			
ANCR	Neutral Current Regulator		
ARCO	Reactive Power Control		
ATCC	Automatic Tap Changer Controller		
AVCO	Voltage Control		
C – Control Functions			
CALH	Alarm Handling	YES	
CCGR	Cooling Group Control		
CILO	Interlocking	YES	
CPOW	Point on Wave Switching		
CSWI	Switch Controller	YES	
G – Generic Functions			
GAPC	Generic Automatic Process Control		
GGIO	Generic Process I/O	YES	
GSAL	Generic Security Application		
I – Interfacing and Archiving Functions			
IARC	Archiving		
IHMI	Human Machine Interface		
ITCI	Telecontrol Interface		
ITMI	Telemonitoring Interface		
L - System Logical Nodes			
LLN0	Common Logical Node Zero	YES	
LPHD	Physical Device	YES	
M – Metering and Measurement Functions			
MDIF	Differential Measurements		
MHAI	Harmonics or Interharmonics		
MHAN	Non- Phase Related Harmonics or Inter-harmonics		
MMTR	Metering	YES	
MMXN	Non-Phase Related Measurement		
MMXU	Measurement	YES	
MSQI	Sequence and Imbalance		
MSTA	Metering Statistics		
P – Protection Functions			
PDIF	Differential		
PDIR	Directional		
PDIS	Distance	YES	
PDOP	Directional Over Power	YES	
PDUP	Directional Under Power		
PFRC	Rate of Frequency Change		
PHAR	Harmonic Restraint		
PHIZ	Ground Detector	YES	
PIOC	Instantaneous Over Current		
PMRI	Motor Restart Inhibition	YES	
PMSS	Motor Starting Time Supervision	YES	
POPF	Over Power Factor		
PPAM	Phase Angle Measuring		

LN Name	LN Description	Server (S)	Comments
PSCH	Protection Scheme	YES	
PSDE	Sensitive Directional Earth Fault	YES	
PTEF	Transient Earth Fault		
PTOC	Time Over Current	YES	
PTOF	Over Frequency	YES	
PTOV	Over Voltage	YES	
PTRC	Protection Trip Conditioning	YES	
PTTR	Thermal Overload	YES	
PTUC	Under Current		
PTUV	Under Voltage	YES	
PUPF	Under Power Factor		
PTUF	Under Frequency	YES	
PVOC	Voltage Controlled Time Over Current		
PVPH	Volts per Hz		
PZSU	Zero Speed or Under Speed		
R – Protection Related Functions			
RADR	Disturbance Recorder Channel Analogue		
RBDR	Disturbance Recorder Channel Binary		
RBRF	Breaker Failure	YES	
RDIR	Directional Element		
RDRE	Disturbance Recorder Function	YES	
RDRS	Disturbance Record Handling		
RFLO	Fault Locator	YES	
RPSB	Power Swing Detection/Blocking		
RREC	Auto Reclosing	YES	
RSYN	Synchronism Check or Synchronizing	YES	
S – Sensors and Monitoring Functions			
SARC	Monitoring and Diagnostics for Arcs		
SIMG	Insulation Medium Supervision (gas)	YES	
SIML	Insulation Medium Supervision (liquid)		
SPDC	Monitoring and Diagnostics for Partial Discharges		
T – Instrument Transformers			
TCTR	Current Transformer		
TVTR	Voltage Transformer		
X – Switchgear Functions			
XCBR	Circuit Breaker	YES	
XSWI	Circuit Switch	YES	
Y – Power Transformers			
YEFN	Earth Fault Neutralizer		
YLTC	Tap Changer		
YPSH	Power Shunt		
YPTR	Power Transformer		
Z – Further Power Systems Equipment			
ZAXN	Auxiliary Network	YES	
ZBAT	Battery		
ZBSN	Bushing		
ZCAB	Power Cable		
ZCAP	Capacitor Bank		
ZCON	Converter		
ZGEN	Generator		
ZGIL	Gas Insulated Line		

LN Name	LN Description	Server (S)	Comments
ZLIN	Power Overhead Line		
ZMOT	Motor		
ZREA	Reactor		
ZRRC	Rotating reactive component		
ZSAR	Surge arrestor		
ZTCF	Thyristor controlled frequency converter		
ZTCR	Thyristor controlled reactive component		

1.6.1 Common Functions

1.6.1.1 LN: Common Logical Node

Common Logical Node class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Mandatory Logical Node Information (Shall be inherited by ALL LN but LPHD)				
Mod	INC	Mode	M	Supported
Beh	INS	Behaviour	M	Supported
Health	INS	Health	M	Supported
NamPlt	LPL	Name plate	M	Supported
Optional Logical Node Information				
Loc	SPS	Local operation	O	Not Supported
EEHealth	INS	External equipment health	O	Not Supported
EENam	DPL	External equipment name plate	O	Not Supported
OpCntRs	INC	Operation counter resetable	O	Not Supported
OpCnt	INS	Operation counter	O	Not Supported
OpTmh	INS	Operation time	O	Not Supported
Data Sets (see IEC 61850-7-2)				
Inherited and specialised from Logical Node class (see IEC 61850-7-2)				
Control Blocks (see IEC 61850-7-2)				
Inherited and specialised from Logical Node class (see IEC 61850-7-2)				
Services (see IEC 61850-7-2)				
Inherited and specialised from Logical Node class (see IEC 61850-7-2)				

1.6.2 Control Functions LN Group: C

1.6.2.1 LN Alarm Handling - Name: CALH

CALH class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
Status Information				
GrAlm	SPS	Group alarm	M	Supported
GrWrm	SPS	Group warning	O	Supported
AlmLstOv	SPS	Alarm list overflow	O	Not Supported

1.6.2.2 LN: Interlocking - Name: CILO

CILO class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
Status Information				
EnaOpn	SPS	Enable Open	M	Supported
EnaCls	SPS	Enable Close	M	Supported

1.6.2.3 LN: Switch Controller - Name: CSWI

CSWI class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
Loc	SPS	Local operation	O	Not Supported
OpCntRs	INC	Resetable operation counter	O	Not Supported
Controls				
Pos	DPC	Switch, general	M	Supported (SBO-with-enhanced-security)
PosA	DPC	Switch L1	O	Not Supported
PosB	DPC	Switch L2	O	Not Supported
PosC	DPC	Switch L3	O	Not Supported
OpOpn	ACT	Operation "Open Switch"	O	Not Supported
OpCls	ACT	Operation "Close Switch"	O	Not Supported
Blk ¹⁾	SPC	Block, general	E	Supported (direct-with-normal-security) SPRECHER61850:2009 ²⁾
¹⁾ for description see "4.7.2.3 XCBR - Circuit breaker" on page 1 ²⁾ default value				

1.6.3 Generic Functions - LN Group: G

1.6.3.1 LN Generic Process I/O - Name: GGIO

GGIO class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
EEHealth	INS	External equipment health (external sensor)	O	Not Supported
EENName	DPL	External equipment name plate	O	Not Supported
Loc	SPS	Local operation	O	Not Supported
OpCntRs	INC	Resetable operation counter	O	Not Supported
Measured values				
AnIn	MV	Analogue input	O	Supported
Controls				
SPCSO	SPC	Single point controllable status output	O	Supported
DPCSO	DPC	Double point controllable status output	O	Not Supported
ISCSO	INC	Integer status controllable status output	O	Not Supported
Status Information				
IntIn	INS	Integer status input	O	Supported
Alm	SPS	General single alarm	O	Supported
Ind	SPS	General indication (binary input)	O	Supported

1.6.4 System Logical Nodes - LN Group: L

1.6.4.1 LN Common Logical Node Zero - Name: LLN0

LLNO class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
Loc	SPS	Local operation for complete logical device	O	Supported ¹⁾
OpTmh	INS	Operation time	O	Not Supported
Controls				
Diag	SPC	Run Diagnostics	O	Not Supported
LEDRs	SPC	LED reset	O	Supported ¹⁾
¹⁾ only available in LD CTRL				

1.6.4.2 LN: Physical device information - Name: LPHD

LPHD class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2).		
Data				
Common Logical Node Information				
PhyName	DPL	Physical device name plate	M	Supported
PhyHealth	INS	Physical device health	M	Supported
OutOv	SPS	Output communications buffer overflow	O	Not Supported
Proxy	SPS	Indicates if this LN is a proxy	M	Supported
InOv	SPS	Input communications buffer overflow	O	Not Supported
NumPwrUp	INS	Number of Power ups	O	Not Supported
WrmStr	INS	Number of Warm Starts	O	Not Supported
WacTrg	INS	Number of watchdog device resets detected	O	Not Supported
PwrUp	SPS	Power Up detected	O	Not Supported
PwrDn	SPS	Power Down detected	O	Not Supported
PwrSupAlm	SPS	External power supply alarm	O	Not Supported
RsStat	SPC	Reset device statistics	O	Not Supported

1.6.5 Metering and Measurement Functions - LN Group: M

1.6.5.1 LN Measurement - Name: MMXU

MMXU class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
EEHealth	INS	External equipment health (external sensor)	O	
Measured values				
TotW	MV	Total Active Power (Total P)	O	Supported ^{2) 4) 5)}
TotVAr	MV	Total Reactive Power (Total Q)	O	Supported ^{2) 4) 5)}
TotVA	MV	Total Apparent Power (Total S)	O	Supported ^{2) 4) 5)}
TotPF	MV	Average Power factor (Total PF)	O	Supported ^{2) 4)}
Hz	MV	Frequency	O	Supported ^{4) 5)}
PPV	DEL	Phase to phase voltages (VL1VL2, ...)	O	Supported ^{1) 4) 5)}
PhV	WYE	Phase to ground voltages (VL1ER, ...)	O	Supported ^{1) 4) 5)}
A	WYE	Phase currents (IL1, IL2, IL3)	O	Supported ^{3) 4) 5)}
W	WYE	Phase active power (P)	O	Supported ^{2) 4) 5)}
VAr	WYE	Phase reactive power (Q)	O	Supported ^{2) 4) 5)}
VA	WYE	Phase apparent power (S)	O	Not Supported
PF	WYE	Phase power factor	O	Supported ⁵⁾
Z	WYE	Phase Impedance	O	Not Supported
¹ used in class "MMXU-PROT-U" ² used in class "MMXU-PROT-P" ³ used in class "MMXU-PROT-I" ⁴ used in class "MMXU-PROT" ⁵ used in class "MMXU-CTRL"				

1.6.6 Protection Functions - LN Group: P

1.6.6.1 LN: Distance - Name: PDIS

PDIS class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
OpCntRs	INC	Resetable operation counter	O	Not Supported
Status Information				
Str	ACD	Start	M	Supported
Op	ACT	Operate	M	Supported
Settings				
PoRch	ASG	Polar Reach is the diameter of the Mho diagram	O	Not Supported
PhStr	ASG	Phase Start Value	O	Not Supported
GndStr	ASG	Ground Start Value	O	Not Supported
DirMod	ING	Directional Mode	O	Not Supported
PctRch	ASG	Percent Reach	O	Not Supported
Ofs	ASG	Offset	O	Not Supported
PctOfs	ASG	Percent Offset	O	Not Supported
RisLod	ASG	Resistive reach for load area	O	Not Supported
AngLod	ASG	Angle for load area	O	Not Supported
TmDlMod	SPG	Operate Time Delay Mode	O	Not Supported
OpDlTmms	ING	Operate Time Delay	O	Not Supported
PhDlMod	SPG	Operate Time Delay Multiphase Mode	O	Not Supported
PhDlTmms	ING	Operate Time Delay for Multiphase Faults	O	Not Supported
GndDlMod	SPG	Operate Time Delay for Single Phase Ground Mode	O	Not Supported
GndDlTmms	ING	Operate Time Delay for single phase ground faults	O	Not Supported

1.6.6.2 LN: Directional Over Power - Name: PDOP

PDOP class					
Attribute Name	Att. Type	Explanation	T	M/O	Is Supported
LNNName		Shall be inherited from Logical Node Class (see IEC 61850-7-2)			
Data					
Common Logical Node Information					
		LN Shall inherit all Mandatory Data from Common Logical Node Class		M	Supported
OpCntRs	INC	Restable operation counter		O	NOT Supported
Status Informations					
Str	ACD	Start		M	Supported
Op	ACT	Operate	T	M	Supported
Settings					
DirMod	ING	Directional Mode		O	NOT Supported
StrVal	ASG	Start Value		O	NOT Supported
OpDlTmms	ING	Operate Delay Time		O	NOT Supported
RsDlTmms	ING	Reset Delay Time		O	NOT Supported

1.6.6.3 LN: Ground Detector - Name: PHIZ

PHIZ class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
OpCntRs	INC	Resetable operation counter	O	Not Supported
Status Information				
Str	ACD	Start	M	Supported
Op	ACT	Operate	M	Supported
Settings				
AStr	ASG	Current Start Value	O	Not Supported
VStr	ASG	Voltage Start Value	O	Not Supported
HVStr	ASG	Third Harmonic Voltage Start Value	O	Not Supported
OpDITmms	ING	Operate Delay Time	O	Not Supported
RsDITmms	ING	Reset Delay Time	O	Not Supported

1.6.6.4 LN: Motor restart inhibition - Name: PMRI

PMRI class					
Attribute Name	Att. Type	Explanation	T	M/O	Is Supported
LNNName		Shall be inherited from Logical Node Class (see IEC 61850-7-2)			
Data					
Common Logical Node Information					
		LN Shall inherit all Mandatory Data from Common Logical Node Class		M	Supported
OpCntRs	INC	Restable operation counter		O	NOT Supported
Status Informations					
Op	ACT	Operate	T	O	Supported
StrInh	SPS	Restart inhibited		O	Supported
StrInhTMM	INS	Restart Inhibition Time		O	Supported
Settings					
SetA	ASG	Current setting for motor start-up		O	NOT Supported
SetTms	ING	Time Setting for motor start-up		O	NOT Supported
MaxNumStr	ING	Maximum number of stats (also for old cars)		O	NOT Supported
MaxWrm	ING	Maximum Warm Starts, permissible number of warm starts		O	NOT Supported
MaxStrTmn	ING	Time period for the maximum number of starts		O	NOT Supported
EqTmn	ING	Temperature Equalisation Time		O	NOT Supported
InhTms	ING	Restart Inhibit Time		O	NOT Supported

1.6.6.5 LN Motor Starting Time Supervision PMMS

PMSS class					
Attribute Name	Att. Type	Explanation	T	M/O	Is Supported
LNNName		Shall be inherited from Logical Node Class (see IEC 61850-7-2)			
Data					
Common Logical Node Information					
		LN Shall inherit all Mandatory Data from Common Logical Node Class		M	Supported
OpCntRs	INC	Restable operation counter		O	NOT Supported
Status Informations					
Str	ACD	Start		O	NOT Supported
Op	ACT	Operate	T	O	Supported
Settings					
SetA	ASG	Current setting for motor start-up		O	NOT Supported
SetTms	ING	Time Setting for motor start-up		O	NOT Supported
MotStr	ASG	I Motor Startup, (current pickup value of motor starting)		O	NOT Supported
LokRotTms	ING	Lock Rotor Time, permissible locked rotor time		O	NOT Supported

1.6.6.6 LN: Protection Scheme - Name: PSCH

PSCH class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
OpCntRs	INC	Resetable operation counter	O	Not Supported
Status Information				
ProTx	SPS	Teleprotection signal transmitted	M	Supported
ProRx	SPS	Teleprotection signal received	M	Supported
Str	ACD	Carrier Send	M	Supported
Op	ACT	Operate	M	Supported
CarRx	ACT	Carrier received after unblock logic	O	Not Supported
LosOfGrd	SPS	Loss of guard	O	Supported
Echo	ACT	Echo signal from weak end infeed function	O	Not Supported
WeiOp	ACT	Operate signal from weak end infeed function	O	Not Supported
RvABlk	ACT	Block signal from current reversal function	O	Not Supported
GrdRx	SPS	Guard Received	O	Not Supported
Settings				
SchTyp	ING	Scheme Type	O	Not Supported
OpDITmms	ING	Operate Delay Time	O	Not Supported
CrdTmms	ING	Co-ordination timer for blocking scheme	O	Not Supported
DurTmms	ING	Minimum duration of carrier send signal	O	Not Supported
UnBlkMod	ING	Unblock function mode for scheme type	O	Not Supported
SecTmms	ING	Pickup security timer on loss of carrier guard signal	O	Not Supported
WeiMod	ING	Mode of weak end infeed function	O	Not Supported
PPVVal	ASG	Voltage level for weak end infeed function-phase-phase	O	Not Supported
PhGndVal	ASG	Voltage level for weak end infeed function – phase-ground	O	Not Supported
RvAMod	ING	Mode of current reversal function	O	Not Supported
RvATmms	ING	Pickup time for current reversal logic	O	Not Supported
RvRsTmms	ING	Delay time for reset of current reversal output	O	Not Supported

1.6.6.7 LN: Sensitive Directional Earth Fault - Name: PSDE

PSDE class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
OpCntRs	INC	Resetable operation counter	O	Not Supported
Status Information				
Str	ACD	Start	M	Supported
Op	ACT	Operate	O	Supported
Settings				
Ang	ASG	Angle between voltage (U0) and current (I0)	O	Not Supported
GndStr	ASG	Ground Start Value (3 U0)	O	Not Supported
GndOp	ASG	Ground Operate Value (3 I0)	O	Not Supported
StrDITmms	ING	Start Delay Time	O	Not Supported
OpDITmms	ING	Operate Delay Time	O	Not Supported
DirMod	ING	Directional Mode	O	Not Supported

1.6.6.8 LN: Time Over Current - Name: PTOC

PTOC class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
OpCntRs	INC	Resetable operation counter	O	Not Supported
Status Information				
Str	ACD	Start	M	Supported
Op	ACT	Operate	M	Supported
TmASt	CSD	Active curve characteristic	O	Not Supported
Settings				
TmAcrv	CURVE	Operating Curve Type	O	Not Supported
StrVal	ASG	Start Value	O	Not Supported
TmMult	ASG	Time Dial Multiplier	O	Not Supported
MinOpTmms	ING	Minimum Operate Time	O	Not Supported
MaxOpTmms	ING	Maximum Operate Time	O	Not Supported
OpDITmms	ING	Operate Delay Time	O	Not Supported
TypRsCrv	ING	Type of Reset Curve	O	Not Supported
RsDITmms	ING	Reset Delay Time	O	Not Supported
DirMod	ING	Directional Mode	O	Not Supported

1.6.6.9 LN: Over Frequency - Name: PTOF

PTOF class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
OpCntRs	INC	Resetable operation counter	O	Not Supported
Status Information				
Str	ACD	Start	M	Supported
Op	ACT	Operate	M	Supported
BlkV	SPS	Blocked because of voltage	O	Not Supported
Settings				
StrVal	ASG	Start Value (frequency)	O	Not Supported
BlkVal	ASG	Voltage Block Value	O	Not Supported
OpDITmms	ING	Operate Delay Time	O	Not Supported
RsDITmms	ING	Reset Delay Time	O	Not Supported

1.6.6.10 LN: Over Voltage - Name: PTOV

PTOV class					
Attribute Name	Att. Type	Explanation	T	M/O	Is Supported
LNNName		Shall be inherited from Logical Node Class (see IEC 61850-7-2)			
Data					
Common Logical Node Information					
		LN Shall inherit all Mandatory Data from Common Logical Node Class		M	Supported
OpCntRs	INC	Restable operation counter		O	NOT Supported
Status Informations					
Str	ACD	Start		M	Supported
Op	ACT	Operate	T	O	Supported
TmVst	CSD	Activate curve characteristic		O	NOT Supported
Settings					
TmVCrv	CURVE	Operating curve type		O	NOT Supported
StrVal	ASG	Start Value		O	NOT Supported
TmMult	ASG	Time Dial Multiplier		O	NOT Supported
MinOpTmms	ING	Minimum Operate Time		O	NOT Supported
MaxOpTmms	ING	Maximum Operate Time		O	NOT Supported
OpDITmms	ING	Operate Delay Time		O	NOT Supported
RsDITmms	ING	Reset Delay Time		O	NOT Supported

1.6.6.11 LN: Protection Trip Conditioning - Name: PTRC

PTRC class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
OpCntRs	INC	Resetable operation counter	O	Not Supported
Status Information				
Tr	ACT	Trip	C	Supported ¹⁾
Op	ACT	Operate (combination of subscribed Op from protection functions)	C	Supported ²⁾
Str	ACD	Sum of all starts of all connected Logical Nodes	O	Supported ¹⁾²⁾
Settings				
TrMod	ING	Trip Mode	O	Not Supported
TrPlsTmms	ING	Trip Pulse Time	O	Not Supported
C.....At least on of the two status information (Tr, Op) shall be used				
¹⁾used in class "PTRC1-GENERALTRIP"				
²⁾used in class "PTRC2- PTOCTRIP" && class "PTRC3-PDISTRIP"				

1.6.6.12 LN: Thermal Overload - Name:PTTR

PTTR class					
Attribute Name	Att. Type	Explanation	T	M/O	Is Supported
LNNName		Shall be inherited from Logical Node Class (see IEC 61850-7-2)			
Data					
Common Logical Node Information					
		LN Shall inherit all Mandatory Data from Common Logical Node Class		M	Supported
OpCntRs	INC	Restable operation counter		O	NOT Supported
Measured Values					
Amp	MV	Current for thermal load model		O	NOT Supported
Tmp	MV	Temperature for thermal load		O	NOT Supported
TmpRI	MV	Relation between temperature and max. temperature		O	NOT Supported
LodRsvAlm	MV	Load reserve to alarm		O	NOT Supported
LodRsvTr	MV	Load reserve to trip		O	NOT Supported
AgeRat	MV	Ageing rate		O	NOT Supported
Status Informations					
Str	ACD	Start		O	NOT Supported
Op	ACT	Operate	T	M	Supported
AlmThm	ACT	Thermal Alarm		O	Supported
TmTmpSt	CSD	Active curve characteristic		O	NOT Supported
TmASt	CSD	Active curve characteristic		O	NOT Supported
Settings					
TmTmpCrv	CURVE	Characteristic Curve for temperature measurement		O	NOT Supported
TmAcrv	CURVE	Characteristic Curve for current measurement / Thermal model		O	NOT Supported
TmpMax	ASG	Maximum allowed temperature		O	NOT Supported
StrVal	ASG	Start value		O	NOT Supported
OpDI Tmms	ING	Operate Delay Time		O	NOT Supported
MinOpTmms	ING	Minimum Operate Time		O	NOT Supported
MaxOpTmms	ING	Maximum Operate Time		O	NOT Supported
RsDI Tmms	ING	Reset Delay Time		O	NOT Supported
ConsTms	ING	Time constant of the thermal model		O	NOT Supported
AlmVal	ASG	Alarm Value		O	NOT Supported

1.6.6.13 LN: Under Voltage - Name: PTUV

PTUV class					
Attribute Name	Att. Type	Explanation	T	M/O	Is Supported
LNNName		Shall be inherited from Logical Node Class (see IEC 61850-7-2)			
Data					
Common Logical Node Information					
		LN Shall inherit all Mandatory Data from Common Logical Node Class		M	Supported
OpCntRs	INC	Restable operation counter		O	NOT Supported
Status Informations					
Str	ACD	Start		M	Supported
Op	ACT	Operate	T	M	Supported
TmVst	CSD	Activate curve characteristic		O	NOT Supported
Settings					
TmVCrv	CURVE	Operating curve type		O	NOT Supported
StrVal	ASG	Start Value		O	NOT Supported
TmMult	ASG	Time Dial Multiplier		O	NOT Supported
MinOpTmms	ING	Minimum Operate Time		O	NOT Supported
MaxOpTmms	ING	Maximum Operate Time		O	NOT Supported
OpDITmms	ING	Operate Delay Time		O	NOT Supported
RsDITmms	ING	Reset Delay Time		O	NOT Supported

1.6.6.14 LN: Under Frequency - Name: PTUF

PTUF class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
OpCntRs	INC	Resetable operation counter	O	Not Supported
Status Information				
Str	ACD	Start	M	Supported
Op	ACT	Operate	M	Supported
BlkV	SPS	Blocked because of voltage	O	Not Supported
Settings				
StrVal	ASG	Start Value (frequency)	O	Not Supported
BlkVal	ASG	Voltage Block Value	O	Not Supported
OpDITmms	ING	Operate Delay Time	O	Not Supported
RsDITmms	ING	Reset Delay Time	O	Not Supported

1.6.7 Protection Related Functions - LN Group: R

1.6.7.1 LN Breaker Failure - Name: RBRF

RBRF class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
OpCntRs	INC	Resetable operation counter	O	Not Supported
Status Information				
Str	ACD	Start, timer running	O	Supported
OpEx	ACT	Breaker failure trip ("external trip")	C	Supported
OpIn	ACT	Operate, retrip ("internal trip")	C	Not Supported
Settings				
FailMod	ING	Breaker Failure Detection Mode (current, breaker status, both, other)	O	Not Supported
FailTmms	ING	Breaker Failure Time Delay for bus bar trip	O	Not Supported
SPITrTmms	ING	Single Pole Retrip Time Delay	O	Not Supported
TPTrTmms	ING	Three Pole Retrip Time Delay	O	Not Supported
DetValA	ASG	Current Detector Value	O	Not Supported
ReTrMod	ING	Retrip Mode	O	Not Supported
Blk ¹⁾	SPS	Block	E	Supported SPRECHER61850:2009²⁾
C.....At least one of either data shall be used depending one the applied tripping schema.				
¹⁾for description see "Data name semantics for Extended Logical Node Attributes" on page 34				
²⁾default value				

1.6.7.2 LN: Disturbance Recorder Function - Name: RDRE

RDRE class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
OpCntRs	INC	Resettable operation counter	O	Not Supported
Controls				
RcdTrg	SPC	Trigger recorder	O	Not Supported
MemRs	SPC	Reset recorder memory	O	Not Supported
MemClr	SPC	Clear Memory	O	Not Supported
Status Information				
RcdMade	SPS	Recording made	M	Supported
FltNum	INS	Fault Number	M	Supported
GriFltNum	INS	Grid Fault Number	O	Supported
RcdStr	SPS	Recording started	O	Supported
MemUsed	INS	Memory used in %	O	Not Supported
Settings				
TrgMod	ING	Trigger mode (internal trigger, external or both)	O	Not Supported
LevMod	ING	Level Trigger Mode	O	Not Supported
PreTmms	ING	Pre-trigger time	O	Not Supported
PstTmms	ING	Post-trigger time	O	Not Supported
MemFull	ING	Memory full level	O	Not Supported
MaxNumRcd	ING	Maximum number of records	O	Not Supported
ReTrgMod	ING	Retrigger Mode	O	Not Supported
PerTrgTms	ING	Periodic trigger time in s	O	Not Supported
ExclTmms	ING	Exclusion time	O	Not Supported
OpMod	ING	Operation mode (Saturation, Overwrite)	O	Not Supported

1.6.7.3 LN Fault Factor RFLO

RFLO class					
Attribute Name	Att. Type	Explanation	T	M/O	Is Supported
LNNName		Shall be inherited from Logical Node Class (see IEC 61850-7-2)			
Data					
Common Logical Node Information					
		LN Shall inherit all Mandatory Data from Common Logical Node Class		M	Supported
OpCntRs	INC	Restable operation counter		O	NOT Supported
Measured Values					
FltZ	CMV	Fault Impedance		M	Supported
FltDiskm	MV	Fault Distance in km		M	Supported
Status Informations					
FltLoop	INS	Fault Loop		O	NOT Supported
Settings					
LinLenKm	ASG	Line length in km		O	NOT Supported
R1	ASG	Positive-sequence line resistance		O	NOT Supported
X1	ASG	Positive-sequence line reactance		O	NOT Supported
R0	ASG	Zero-sequence line resistance		O	NOT Supported
X0	ASG	Zero-sequence line reactance		O	NOT Supported
Z1Mod	ASG	Positive-sequence line impedance value		O	NOT Supported
Z1Ang	ASG	Positive-sequence line impedance angle		O	NOT Supported
Z0Mod	ASG	Zero-sequence line impedance value		O	NOT Supported
Z0Ang	ASG	Zero-sequence line impedance angle		O	NOT Supported
Rm0	ASG	Mutual resistance		O	NOT Supported
Xm0	ASG	Mutual reactance		O	NOT Supported
Zm0Mod	ASG	Mutual impedance value		O	NOT Supported
Zm0Ang	ASG	Mutual impedance angle		O	NOT Supported

1.6.7.4 LN: Auto Reclosing - Name: RREC

RREC class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
OpCntRs	INC	Resetable operation counter	O	Not Supported
Controls				
BlkRec	SPC	Block Reclosing	O	Not Supported
ChkRec	SPC	Check Reclosing	O	Not Supported
Status Information				
Auto	SPS	Automatic Operation (external switch status)	O	Not Supported
Op	ACT	Operate (used here to provide close to XCBR)	M	Supported
AutoRecSt	INS	Auto Reclosing Status	M	Supported
Settings				
Rec1Tmms	ING	First Reclose Time	O	Not Supported
Rec2Tmms	ING	Second Reclose Time	O	Not Supported
Rec3Tmms	ING	Third Reclose Time	O	Not Supported
PlsTmms	ING	Close Pulse Time	O	Not Supported
RclTmms	ING	Reclaim Time	O	Not Supported

1.6.7.5 LN: Synchronism Check or Synchronizing - Name: RSYN

RSYN class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments / Value
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
Controls				
RHz	SPC	Raise Frequency	O	Not Supported
LHz	SPC	Lower Frequency	O	Not Supported
RV	SPC	Raise Voltage	O	Not Supported
LV	SPC	Lower Voltage	O	Not Supported
Status Information				
Rel	SPS	Release	M	Supported
VInd	SPS	Voltage Difference Indicator	O	Not Supported
AngInd	SPS	Angle Difference Indicator	O	Not Supported
HzInd	SPS	Frequency Difference Indicator	O	Not Supported
SynPrg	SPS	Synchronising in process	O	Supported
Measured values				
DifVCic	MV	Calculated Difference in Voltage	O	Supported
DifHzCic	MV	Calculated Difference in Frequency	O	Supported
DifAngCic	MV	Calculated Difference of Phase Angle	O	Supported
Settings				
DifV	ASG	Difference Voltage	O	Not Supported
DifHz	ASG	Difference Frequency	O	Not Supported
DifAng	ASG	Difference Phase Angle	O	Not Supported
LivDeaMod	ING	Live Dead Mode	O	Not Supported
DeadLinVal	ASG	Dead Line Value	O	Not Supported
LivLinVal	ASG	Live Line Value	O	Not Supported
DeaBusVal	ASG	Dead Bus Value	O	Not Supported
LivBusVal	ASG	Live Bus Value	O	Not Supported
PlsTmms	ING	Close Pulse Time	O	Not Supported
BkrTmms	ING	Closing time of breaker	O	Not Supported

1.6.8 Sensors and monitoring - LN Group: S

1.6.8.1 LN Insulation medium supervision (gas) - Name: SIMG

SIMG class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
EEHealth	INS	External equipment health	O	Not Supported
EENName	DPL	External equipment name plate	O	Not Supported
Measured Values				
Pres	MV	Isolation gas pressure	O	Not Supported
Den	MV	Isolation gas density	O	Not Supported
Tmp	MV	Isolation gas temperature	O	Not Supported
Status Information				
InsAlm	SPS	Insulation gas critical (refill isolation medium)	M	Supported
InsBlk	SPS	Insulation gas not safe (block device operation)	O	Supported
InsTr	SPS	Insulation gas dangerous (trip for device isolation)	O	Not Supported
PresAlm	SPS	Isolation gas pressure alarm	C	Supported
DenAlm	SPS	Isolation gas density alarm	C	Not Supported
TmpAlm	SPS	Isolation gas temperature alarm	C	Not Supported
InsLevMax	SPS	Insulation gas level maximum (relates to predefined filling value)	O	Not Supported
InsLevMin	SPS	Insulation gas level minimum (relates to predefined filling value)	O	Not Supported

Condition C: depending on the supervised properties of the insulation gas, at least one status information shall be used.

1.6.9 Switchgear Functions - LN Group: X

1.6.9.1 LN Circuit Breaker - Name: XCBR

XCBR class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
Loc	SPS	Local operation (local means without substation automation communication, hardwired direct control)	M	Supported
EEHealth	INS	External equipment health	O	Not Supported
EENName	DPL	External equipment name plate	O	Not Supported
OpCnt	INS	Operation counter	M	Supported
Controls				
Pos	DPC	Switch position	M	Supported
BlkOpn	SPC	Block opening	M	Supported
BlkCls	SPC	Block closing	M	Supported
ChaMotEna	SPC	Charger motor enabled	O	Not Supported
Metered Values				
SumSwARs	BCR	Sum of Switched Amperes, resetable	O	Not Supported
Status Information				
CBOpCap	INS	Circuit breaker operating capability	M	Supported
POWCap	INS	Point On Wave switching capability	O	Not Supported
MaxOpCap	INS	Circuit breaker operating capability when fully charged	O	Not Supported
CirSpv ¹⁾	SPS	Trip circuit supervision	E	Supported SPRECHER61850:2009 ²⁾
¹⁾ for description see "Data name semantics for Extended Logical Node Attributes" on page 34				
²⁾ default value				

1.6.9.2 LN: Circuit Switch - Name: XSWI

XSWI class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
Loc	SPS	Local operation	M	Supported
EEHealth	INS	External equipment health	O	Not Supported
EENName	DPL	External equipment name plate	O	Not Supported
OpCnt	INS	Operation counter	M	Supported
Controls				
Pos	DPC	Switch position	M	Supported
BlkOpn	SPC	Block opening	M	Supported
BlkCls	SPC	Block closing	M	Supported
ChaMotEna	SPC	Charger motor enabled	O	
Status Information				
SwTyp	INS	Switch type	M	Supported
SwOpCap	INS	Switch operating capability	M	Supported
MaxOpCap	INS	Circuit switch operating capability when fully charged	O	Not Supported

1.6.10 Further Power System Equipment - LN Group: Z

1.6.10.1 LN: Auxiliary network - Name: ZAXN

ZAXN class				
Attribute Name	Attr. Type	Explanation	M/O/E	Comments
LNNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)).		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class	M	Supported
EEHealth	INS	External equipment health	O	Supported
EENName	DPL	External equipment name plate	O	Not Supported
OpTmh	INS	Operation time	O	Not Supported
Measured Values				
Vol	MV	Voltage of the auxiliary network	O	Not Supported
Amp	MV	Current of the auxiliary network	O	Not Supported

1.7 Logical Node Extensions

1.7.1 New Logical Nodes

New logical nodes have the “***InNs***” attribute in the Name plate. The value of “***InNs***” is a reference to the MICS document.

There are no new logical nodes defined.

1.7.2 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.

1.7.2.1 CSWI - Switch Controller

described at chapter "LN: Interlocking - Name: CILO" on page 16

1.7.2.2 RBRF – Breaker failure

described at chapter "Protection Related Functions - LN Group: R" on page 27

1.7.2.3 XCBR - Circuit breaker

described at chapter "Switchgear Functions - LN Group: X" on page 32

1.7.2.4 Data name semantics for Extended Logical Node Attributes

Data Name	Semantics
Blk	This Data is used to block 'all operation' from another logical node such as a MMI or from front panel. TRUE = block operation.
CirSpv	The trip circuit supervision is to detect interruptions in the trip circuit and - if possible - failure of the auxiliary voltage. TRUE = failure

1.8 Any other Extensions

Any other extensions should not impact interoperability. As such the extended attributes should have the functional constraint “***EX***” unless specified otherwise in the TISSUES database.

Glossary

ACSI	Abstract Communication Service Interface
BDA	Basic Data Attribute (not structured)
CID	Configured IED Description
CT	Current Transformer
DA	Data Attributes
DAI	Instantiated Data Attributes
DO	DATA in IEC 61850-7-2, Data Object type or instance
DOI	Instantiated Data Object (DATA)
FCD	Functionally Constrained Data
FCDA	Functionally Constrained Data Attribute
FTP	File Transfer Protocol
GCB	Control Block or GSSE Control Block
GOOSE	Generic Object Oriented Substation Events
GPS	Global Positioning System
GSE	Generic Substation Events
GSSE	Generic Substation Status Events
HMI	Human Machine Interface
ICD	IED Configuration Description
ID	Identifier
IED	Intelligent Electronic Device
LCB	Log control Block
LD	Logical Device
LN	Logical Node
M/O	Mandatory/Optional
MAC	Media Access Control
MC	Multicast
MICS	Model Implementation Conformance Statement
MMS	Manufacturing Message Specification
MSV	Multicast Sampled Value
N	No
PICS	Protocol Implementation Conformance Statement

PIXIT	Protocol Implementation eXtra Information for Testing
RCB	Report Control Block
SCADA	Supervision, Control and Data Acquisition
SCD	Substation Configuration Description File
SCL	Substation Configuration Language
SCSM	Specific Communication Service Mapping
SVC	Sampled Value Control
TP	Two Party
VT	Voltage Transformer
XML	Extensible Markup Language
Y	Yes

Sprecher Automation GmbH

Franckstraße 51, 4018 Linz, Austria
Tel: +43 732 6908-0, Fax: +43 732 6908-321

Ignaz-Köck-Straße 10, 1210 Wien, Austria
Tel: +43 732 6908-601, Fax: +43 732 6908-5601

info@sprecher-automation.com
www.sprecher-automation.at

Sprecher Automation Deutschland GmbH

Möllendorffstraße 47, 10367 Berlin, Germany
Tel: +49 30 6449241-70, Fax: +49 30 6449241-99

Fraunhoferstraße 8, 82152 Martinsried, Germany
Tel: +49 89 4520599-0, Fax: +49 89 4520599-99

Wilhelmstraße 1, 59439 Holzwickede, Germany
Tel: +49 2301 18466-00, Fax: +49 2301 18466-29

Stotternheimer Straße 9A, 99086 Erfurt, Germany
Tel: +49 361 430405-71, Fax: +49 361 430405-99

info-de@sprecher-automation.com
www.sprecher-automation.de

Sprecher Automation Polska Sp z o.o.

ul. Łączna 4, 58-100 Świdnica, Poland
Tel: +48 74 85135-31, Fax: +48 74 85135-32

ul. Wólczańska 128/134, 90-527 Łódź, Poland
Tel: +48 42 25688-22, Fax: +48 42 25688-23

info-pl@sprecher-automation.com
www.sprecher-automation.pl

Sprecher Automation spol. s r.o.

Kopčianska 14, 851-01 Bratislava, Slovakia
Tel: +421 2 682055-00, Fax: +421 2 682055-10

info-sk@sprecher-automation.com
www.sprecher-automation.sk

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