


MiCOM P638

Transformer Differential Protection for Rail Applications

PICS and MICS

This document does not replace the Technical Manual

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Schneider
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CONTENT

1	Protocol Implementation Conformance Statement (PICS)	3
1.1	Introduction	3
1.2	ACSI Basic Conformance Statement	3
1.3	ACSI Models Conformance Statement	4
1.4	ACSI Service Conformance Statement	5
2	Model Implementation Conformance Statement (MICS)	9
2.1	Introduction	9
2.2	Objective	9
2.3	Logical Device Definitions	9
2.4	Logical Node Definitions	11
2.5	Common Data Class Definitions	23
2.6	Common Data Attribute Type Definitions	33
2.7	Enumerated Type Definitions	33
2.8	MMS Data-Type Conversions	38

Introduction

1 Protocol Implementation Conformance Statement (PICS)

1.1 Introduction

This specification is the Protocol Implementation Conformance Statement (PICS) and presents the ACSI conformance statements as defined in Annex A of part 7-2 of the IEC 61850 standard specifications.

1.2 ACSI Basic Conformance Statement

The basic conformance statement shall be as defined in Table 1

Table 1 – Basic conformance statement

		Client / Subscriber		Server / Publisher		Value / Comments
Client-Server roles						
B11	Server side (of TWO-PARTY-APPLICATION-ASSOCIATION)	—	—	c1	Y	
B12	Client side (of TWO-PARTY-APPLICATION-ASSOCIATION)	c1	N	—	—	
SCSMs supported						
B21	SCSM: IEC 61850-8-1 used		N		Y	
B22	SCSM: IEC 61850-9-1 used					
B23	SCSM: IEC 61850-9-2 used					
B24	SCSM: other					
Generic substation event model (GSE)						
B31	Publisher side	—	—	O	Y	
B32	Subscriber side	O	Y	—	—	
Transmission of sampled value model (SVC)						
B41	Publisher side	—	—	O	N	
B42	Subscriber side	O	N	—	—	
c1 – shall be 'M' if support for LOGICAL-DEVICE model has been declared. O – Optional M – Mandatory Y – Yes (supported) N – No (not supported)						

1.3 ACSI Models Conformance Statement

The ACSI models conformance statement shall be as defined in Table 2.

Table 2 – ACSI models conformance statement

		Client / Subscriber		Server / Publisher		Value / Comments
If Server side (B1) supported						
M1	Logical device	a	N	c2	Y	
M2	Logical node	c3	N	c3	Y	
M3	Data	c4	N	c4	Y	
M4	Data set	c5	N	c5	Y	
M5	Substitution	O	N	O	N	
M6	Setting group control	O	N	O	y	supp.Phase 2
Reporting						
M7	Buffered report control	O	N	O	y	supp.Phase 2
M7-1	sequence-number				y	supp.Phase 2
M7-2	report-time-stamp				y	supp.Phase 2
M7-3	reason-for-inclusion				y	supp.Phase 2
M7-4	data-set-name				y	supp.Phase 2
M7-5	data-reference				y	supp.Phase 2
M7-6	buffer-overflow				y	supp.Phase 2
M7-7	entryID				y	supp.Phase 2
M7-8	BufTim				y	supp.Phase 2
M7-9	IntgPd				y	supp.Phase 2
M7-10	GI				y	supp.Phase 2
M7-11	conf-revision				Y	supp.Phase 2
M8	Unbuffered report control	O	N	O	Y	
M8-1	sequence-number		N		Y	
M8-2	report-time-stamp		N		Y	
M8-3	reason-for-inclusion		N		Y	
M8-4	data-set-name		N		Y	
M8-5	data-reference		N		Y	
M8-6	BufTim		N		Y	
M8-7	IntgPd		N		Y	
M8-8	GI		N		Y	
M8-9	conf-revision		N		Y	supp.Phase 2
Logging		O	N	O	N	
M9	Log control	O	N	O	N	
M9-1	IntgPd		N		N	
M10	Log	O	N	O	N	
M11	Control	M	N	M	Y	

ACSI Service Conformance Statement

		Client / Subscriber		Server / Publisher		Value / Comments
If GSE (B31/32) is supported						
	GOOSE	O	Y	O	Y	
M12-1	entryID		Y	O	Y	
M12-2	DataRefInc		Y	O	Y	
M13	GSSE	O	Y	O	Y	
If SVC (41/42) is supported						
M14	Multicast SVC	O	N	O	N	
M15	Unicast SVC	O	N	O	N	
M16	Time	M	Y	M	N	Time source with required accuracy shall be available
M17	File Transfer	O	N	O	Y	

c2 – shall be 'M' if support for LOGICAL-NODE model has been declared

c3 – shall be 'M' if support for DATA model has been declared

c4 – shall be 'M' if support for DATA-SET, Substitution, Report, Log Control, or Time model has been declared

c5 – shall be 'M' if support for Report, GSE, or SMV models has been declared

1.4 ACSI Service Conformance Statement

The ACSI service conformance statement shall be as defined in Table 3 – ACSI service Conformance statement (depending on the statements in Table 1).

Table 3 – ACSI service Conformance statement

	Services	AA: TP/MC	Client/ Subscriber		Server/ Publisher		Comments
Server (clause 6)							
S1	ServerDirectory	TP		N	M	Y	
Application association (clause 7)							
S2	Associate		M	N	M	Y	
S3	Abort		M	N	M	Y	
S4	Release		M	N	M	Y	
Logical device (clause 8)							
S5	LogicalDeviceDirectory	TP	M	N	M	Y	

	Services	AA: TP/MC	Client/ Subscriber		Server/ Publisher		Comments
Logical node (clause 9)							
S6	LogicalNodeDirectory	TP	M	N	M	Y	
S7	GetAllDataValues	TP	O	N	M	Y	
Data (clause 10)							
S8	GetDataValues	TP	M	N	M	Y	
S9	SetDataValues	TP	O	N	O	Y	
S10	GetDataDirectory	TP	O	N	M	Y	
S11	GetDataDefinition	TP	O	N	M	Y	
Data set (clause 11)							
S12	GetDataSetValues	TP	O	N	M	Y	
S13	SetDataSetValues	TP	O	N	O	N	
S14	CreateDataSet	TP	O	N	O	N	
S15	DeleteDataSet	TP	O	N	O	N	
S16	GetDataSetDirectory	TP	O	N	O	Y	
Substitution (clause 12)							
S17	SetDataValues	TP	M	N	M	Y	
Setting group control (clause 13)							
S18	SelectActiveSG	TP	O	N	O	Y	supp.by Phase 2
S19	SelectEditSG	TP	O	N	O	N	
S20	SetSGValues	TP	O	N	O	N	
S21	ConfirmEditSGValues	TP	O	N	O	N	
S22	GetSGValues	TP	O	N	O	N	
S23	GetSGCBValues	TP	O	N	O	N	
Reporting (clause 14)							
Buffered report control block (BRCB)							
S24	Report	TP	c6	N	c6	Y	supp.by Phase 2
S24-1	data-change (dchg)					Y	supp.by Phase 2
S24-2	qchg-change (qchg)					Y	supp.by Phase 2
S24-3	data-update (dupd)					N	
S25	GetBRCBValues	TP	c6	N	c6	Y	supp.by Phase 2
S26	SetBRCBValues	TP	c6	N	c6	Y	supp.by Phase 2

ACSI Service Conformance Statement

	Services	AA: TP/MC	Client/ Subscriber		Server/ Publisher		Comments
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Unbuffered report control block (URCB)

S27	Report	TP	c6	N	c6	Y	
S27-1	data-change (dchg)			N		Y	
S27-2	qchg-change (qchg)			N		Y	
S27-3	data-update (dup)			N		N	
S28	GetURCBValues	TP	c6	N	c6	Y	
S29	SetURCBValues	TP	c6	N	c6	Y	supp.by Phase 2

c6 – shall declare support for at least one (BRCB or URCB)

Logging (clause 14)**Log control block**

S30	GetLCBValues	TP	M	N	M	N	
S31	SetLCBValues	TP	O	N	M	N	

Log

S32	QueryLogByTime	TP	c7	N	M	N	
S33	QueryLogAfter	TP	c7	N	M	N	
S34	GetLogStatusValues	TP	M	N	M	N	

c7 – shall declare support for at least one (QueryLogByTime or QueryLogByEntry)

Generic substation event model (GSE) (clause 15)**GOOSE-CONTROL-BLOCK**

S35	SendGOOSEMessage	MC	c8	N	c8	Y	
S36	GetGoReference	TP	O	N	c9	Y	
S37	GetGOOSEElementNumber	TP	O	N	c9	Y	
S38	GetGoCBValues	TP	O	N	O	Y	
S39	SetGoCBValues	TP	O	N	O	Y	

GSSE-CONTROL-BLOCK

S40	SendGSSEMessage	MC	c8	N	c8	N	
S41	GetGsReference	TP	O	N	c9	N	
S42	GetGSSEElementNumber	TP	O	N	c9	N	
S43	GetGsCBValues	TP	O	N	O	N	
S44	SetGsCBValues	TP	O	N	O	N	

c8 – shall declare support for at least one (SendGOOSEMessage or SendGSSEMessage)

c9 – shall declare support if TP association is available

	Services	AA: TP/MC	Client/ Subscriber		Server/ Publisher		Comments
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Transmission of sampled value model (SVC) (clause 16)**Multicast SVC**

S45	SendMSVMessage	MC	c10	N	c10	N	
S46	GetMSVCBValues	TP	O	N	O	N	
S47	SetMSVCBValues	TP	O	N	O	N	

Unicast SVC

S48	SendUSVMessage	TP	c10	N	c10	N	
S49	GetUSVCBValues	TP	O	N	O	N	
S50	SetUSVCBValues	TP	O	N	O	N	

c10 – shall declare support for at least one (SendMSVMessage or SendUSVMessage)

Control (clause 17.5.1)

S51	Select		M	N	O	Y	
S52	SelectWithValue	TP	M	N	O	Y	
S53	Cancel	TP	O	N	O	Y	
S54	Operate	TP	M	N	M	Y	
S55	Command-Termination	TP	M	N	O	Y	
S56	TimeActivated-Operate	TP	O	N	O	N	

File transfer (clause 20)

S57	GetFile	TP	O	N	M	Y	
S58	SetFile	TP	O	N	O	N	
S59	DeleteFile	TP	O	N	O	N	
S60	GetFileAttributeValues	TP	O	N	M	Y	

Time (5.5)

T1	Time resolution of internal clock		1ms		1ms		Nearest negative power of 2 in seconds
T2	Time accuracy of internal clock				1ms		T0
					N		T1
					N		T2
					N		T3
					N		T4
					N		T5
T3	Supported TimeStamp resolution	-			1ms		Nearest value of 2 ^{**} -n in seconds according to 5.5.3.7.3.3

2 Model Implementation Conformance Statement (MICS)

2.1 Introduction

This specification is the Model Implementation Conformance Statement (MICS) and presents the top-level IEC 61850 data model that has been implemented. The definitions of all used Logical Nodes and their associated Common Data Classes, components and associated enumerated values are also included for completeness.

The reader is expected to be conversant with the terminology presented within the IEC 61850 part 7 series of specifications.

2.2 Objective

To provide comprehensive details of the standard data object model elements supported by the device. The MICS is conformant to the devices associated ICD (Substation Configuration Language) file, according to part 6 of the IEC 61850 standards. The layout of the presented tables within this document are conformant to the part 7 series of the IEC 61850 standard specifications with the following exceptions:

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

2.3 Logical Device Definitions

The MiCOM relay implements an IEC 61850 server that can contain one or more Logical Devices. Each Logical Device contains a data model built from instances of specific Logical Nodes and must consist of at least an instance of the LPHD Logical Node (which is responsible for providing physical device information) and an instance of the LLN0 Logical Node (for addressing common issues across the Logical Device).

The IEC 61850 data model is contained within the Logical Devices detailed in the table below. All 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	PX638 Controls Domain
Measurements	PX638 Measurements Domain
Protection	PX638 Protection Domain
Records	PX638 Records Domain
System	PX638 System Domain

2.3.1 IEC 61850 Logical Device Data Model

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

The presented data model is in an alphabetically sorted order, rather than a logical order, because this is the natural order of the data when presented by a native MMS browser.

(Higher level browsers can of course impart any ordering that they desire.)

LD	LN Instance	LN Type	Description
Control			
	LLN0	tp30_LLNO_1	Logical node device
	LPHD1	tp30_LPHD_1	Physical device
Measurements			
	LLN0	tp30_LLNO_1	Logical node device
	LPHD1	tp30_LPHD_2	Physical device
	Md1PriMMXU1	tp30_MMXU_1	Basic Measurements
	Md1SecMMXU1	tp30_MMXU_1	Basic Measurements
	Md2PriMMXU1	tp30_MMXU_2	Basic Measurements
	Md2SecMMXU1	tp30_MMXU_2	Basic Measurements
	MmuPriMMXN1	tp30_MMXN_1	Primary Basic Measurements
	MmuPriMMXN2	tp30_MMXN_2	Primary Basic Measurements
	MmuSecMMXN1	tp30_MMXN_1	Basic Measurements
	MmuSecMMXN2	tp30_MMXN_2	Basic Measurements
Protection			
	Dt1PhsPTOC1	tp30_PTOC_1	Time over current
	Dt1PhsPTOC2	tp30_PTOC_1	Time over current
	Dt2PhsPTOC1	tp30_PTOC_1	Time over current
	Dt2PhsPTOC2	tp30_PTOC_1	Time over current
	DtpEftPTOC1	tp30_PTOC_1	Time over current
	FrqPTOF1	tp30_PTOF_1	Over frequency
	FrqPTOF2	tp30_PTOF_1	Over frequency
	FrqPTOF3	tp30_PTOF_1	Over frequency
	FrqPTOF4	tp30_PTOF_1	Over frequency
	FrqPTUF1	tp30_PTUF_1	Under frequency
	FrqPTUF2	tp30_PTUF_1	Under frequency
	FrqPTUF3	tp30_PTUF_1	Under frequency
	FrqPTUF4	tp30_PTUF_1	Under frequency
	ItpPhsPTOC1	tp30_PTOC_1	Time over current
	LLN0	tp30_LLNO_2	Logical node device
	LPHD1	tp30_LPHD_2	Physical device
	PTRC1	tp30_PTRC_1	Trip conditioning
	PTRC2	tp30_PTRC_1	Trip conditioning

Logical Node Definitions

LD	LN Instance	LN Type	Description
	PTRC3	tp30_PTRC_1	Trip conditioning
	PhsPDIF1	tp30_PDIF_1	Differential Protection
	PhsPDIF2	tp30_PDIF_1	Differential Protection
	PhsPDIF3	tp30_PDIF_2	Differential Protection
	RBRF1	tp30_RBRF_1	Breaker failure
	RBRF2	tp30_RBRF_1	Breaker failure
	ThmPTTR1	tp30_PTTR_1	Thermal overload
	TrvPDIF1	tp30_PDIF_2	Differential Protection
	TrvPDIF2	tp30_PDIF_2	Differential Protection
	VtpPhsPTOV1	tp30_PTOV_1	Time over voltage
	VtpPhsPTOV2	tp30_PTOV_1	Time over voltage
	VtpPhsPTUV1	tp30_PTUV_1	Time under voltage
	VtpPhsPTUV2	tp30_PTUV_1	Time under voltage
Records			
	LLN0	tp30_LLN0_1	Logical node device
	LPHD1	tp30_LPHD_2	Physical device
	RDRE1	tp30_RDRE_1	Disturbance recording
System			
	AlmGGIO1	tp30_GGIO_1	Generic process I/O
	GosGGIO1	tp30_GGIO_2	Generic process I/O
	GosGGIO2	tp30_GGIO_3	Generic process I/O
	IdcGGIO1	tp30_GGIO_4	Generic process I/O
	LLN0	tp30_LLN0_3	Logical node device
	LPHD1	tp30_LPHD_2	Physical device
	PloGGIO1	tp30_GGIO_5	Generic process I/O
	PloGGIO2	tp30_GGIO_6	Generic process I/O
	PloGGIO3	tp30_GGIO_6	Generic process I/O
	PloGGIO4	tp30_GGIO_5	Generic process I/O
	RtdGGIO1	tp30_GGIO_4	Generic process I/O

2.4 Logical Node Definitions

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

The following table presents a summary of the Logical Node templates used across the Logical Devices within the overall IEC 61850 product data model:

LN Type	(LN Class)	Description	Name Space
tp30_GGIO_1	(GGIO)	Generic process I/O	
tp30_GGIO_2	(GGIO)	Generic process I/O	
tp30_GGIO_3	(GGIO)	Generic process I/O	

LN Type	(LN Class)	Description	Name Space
tp30_GGIO_4	(GGIO)	Generic process I/O	
tp30_GGIO_5	(GGIO)	Generic process I/O	
tp30_GGIO_6	(GGIO)	Generic process I/O	
tp30_LLNO_1	(LLNO)	Logical node device	
tp30_LLNO_2	(LLNO)	Logical node device	
tp30_LLNO_3	(LLNO)	Logical node device	
tp30_LPHD_1	(LPHD)	Physical device	
tp30_LPHD_2	(LPHD)	Physical device	
tp30_MMXN_1	(MMXN)	Primary Basic Measurements	
tp30_MMXN_2	(MMXN)	Primary Basic Measurements	
tp30_MMXU_1	(MMXU)	Basic Measurements	
tp30_MMXU_2	(MMXU)	Basic Measurements	
tp30_PDIF_1	(PDIF)	Differential Protection	
tp30_PDIF_2	(PDIF)	Differential Protection	
tp30_PTOC_1	(PTOC)	Time over current	
tp30_PTOF_1	(PTOF)	Over frequency	
tp30_PTOV_1	(PTOV)	Time over voltage	
tp30_PTRC_1	(PTRC)	Trip conditioning	
tp30_PTTR_1	(PTTR)	Thermal overload	
tp30_PTUF_1	(PTUF)	Under frequency	
tp30_PTUV_1	(PTUV)	Time under voltage	
tp30_RBRF_1	(RBRF)	Breaker failure	
tp30_RDRE_1	(RDRE)	Disturbance recording	

2.4.1 LOGICAL NODE : tp30_GGIO_1

Description : Generic process I/O

LN Class : GGIO

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_1	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_1	Name Plate	
Alm1	tp30_Alm11_1	Alarm	
Alm2	tp30_Alm11_1	Alarm	
Alm3	tp30_Alm11_1	Alarm	
Alm5	tp30_Alm11_1	Alarm	
Alm11	tp30_Alm11_1	Alarm	
Alm12	tp30_Alm11_1	Alarm	
Alm13	tp30_Alm11_1	Alarm	
Alm14	tp30_Alm11_1	Alarm	

Logical Node Definitions

2.4.2 LOGICAL NODE : tp30_GGIO_2

Description : Generic process I/O

LN Class : GGIO

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_1	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_1	Name Plate	
Ind1	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind2	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind3	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind4	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind5	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind6	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind7	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind8	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind9	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind10	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind11	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind12	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind13	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind14	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind15	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind16	tp30_Alm11_1	Gen. ind. (bin. input)	

2.4.3 LOGICAL NODE : tp30_GGIO_3

Description : Generic process I/O

LN Class : GGIO

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_1	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_1	Name Plate	
Ind1	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind2	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind3	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind4	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind5	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind6	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind7	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind8	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind9	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind10	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind11	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind12	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind13	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind14	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind15	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind16	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind17	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind18	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind19	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind20	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind21	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind22	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind23	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind24	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind25	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind26	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind27	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind28	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind29	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind30	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind31	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind32	tp30_Alm11_1	Gen. ind. (bin. input)	

Logical Node Definitions

2.4.4 LOGICAL NODE : tp30_GGIO_4

Description : Generic process I/O

LN Class : GGIO

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_1	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_2	Name Plate	
urcbST	tp30_URCB	Unb. rep. control for status	
urcbMX	tp30_URCB	Unb. rep. control for measurement	
AnIn1	tp30_Amp_1	Analogue input	
AnIn2	tp30_Amp_1	Analogue input	

2.4.5 LOGICAL NODE : tp30_GGIO_5

Description : Generic process I/O

LN Class : GGIO

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_1	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_2	Name Plate	
Ind1	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind2	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind3	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind4	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind5	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind6	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind7	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind8	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind9	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind10	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind11	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind12	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind13	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind14	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind15	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind16	tp30_Alm11_1	Gen. ind. (bin. input)	
urcbST	tp30_URCB	Unb. rep. control for status	

2.4.6 LOGICAL NODE : tp30_GGIO_6

Description : Generic process I/O

LN Class : GGIO

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_1	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_2	Name Plate	
Ind1	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind2	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind3	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind4	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind5	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind6	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind7	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind8	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind9	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind10	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind11	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind12	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind13	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind14	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind15	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind16	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind17	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind18	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind19	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind20	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind21	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind22	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind23	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind24	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind25	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind26	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind27	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind28	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind29	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind30	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind31	tp30_Alm11_1	Gen. ind. (bin. input)	
Ind32	tp30_Alm11_1	Gen. ind. (bin. input)	
urcbST	tp30_URCB	Unb. rep. control for status	

Logical Node Definitions

2.4.7 LOGICAL NODE : tp30_LLNO_1

Description : LOGICAL NODE device

LN Class : LLN0

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_1	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_3	Name Plate	
urcbST	tp30_URCB	Unb. rep. control for status	

2.4.8 LOGICAL NODE : tp30_LLNO_2

Description : LOGICAL NODE device

LN Class : LLN0

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_2	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_3	Name Plate	
urcbST	tp30_URCB	Unb. rep. control for status	

2.4.9 LOGICAL NODE : tp30_LLNO_3

Description : LOGICAL NODE device

LN Class : LLN0

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_1	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_3	Name Plate	
Loc	tp30_Loc_1	Local operation	
LEDRs	tp30_LEDRs_1	Led Reset	
CurSG	tp30_CurSG_1	Current Setting Group	
SGCB	tp30_SGCB_1	Setting group control block	
urcbST	tp30_URCB	Unb. rep. control for status	

2.4.10 LOGICAL NODE : tp30_LPHD_1

Description : Physical device

LN Class : LPHD

Attribute	Attr. Type	Explanation	X
PhyNam	tp30_PhyNam_1	Physical device name plate	
PhyHealth	tp30_PhyHealth_1	Physical device health	
Proxy	tp30_Loc_1	Indicates if the LN is a proxy	

2.4.11 LOGICAL NODE : tp30_LPHD_2

Description : Physical device

LN Class : LPHD

Attribute	Attr. Type	Explanation	X
PhyNam	tp30_PhyNam_1	Physical device name plate	
PhyHealth	tp30_PhyHealth_1	Physical device health	
Proxy	tp30_Loc_1	Indicates if the LN is a proxy	
urcbST	tp30_URCB	Unb. rep. control for status	

2.4.12 LOGICAL NODE : tp30_MMXN_1

Description : Primary Basic Measurements

LN Class : MMXN

Attribute	Attr. Type	Explanation	X
Vol	tp30_Amp_1	Voltage	
Hz	tp30_Amp_1	Frequency	
Mod	tp30_Mod_1	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_1	Name Plate	
urcbMX	tp30_URCB	Unb. rep. control for measurement	

2.4.13 LOGICAL NODE : tp30_MMXN_2

Description : Primary Basic Measurements

LN Class : MMXN

Attribute	Attr. Type	Explanation	X
Amp	tp30_Amp_1	Current	
Mod	tp30_Mod_1	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_1	Name Plate	
urcbMX	tp30_URCB	Unb. rep. control for measurement	

Logical Node Definitions

2.4.14 LOGICAL NODE : tp30_MMXU_1

Description : Basic Measurements

LN Class : MMXU

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_3	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_1	Name Plate	
LodAngA	tp30_LodAngA_1	Load angle Phase A	
LodAngB	tp30_LodAngA_1	Load angle Phase B	
A	tp30_A_1	Phase current	
urcbMX	tp30_URCB	Unb. rep. control for measurement	

2.4.15 LOGICAL NODE : tp30_MMXU_2

Description : Basic Measurements

LN Class : MMXU

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_3	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_1	Name Plate	
A	tp30_A_1	Phase current	
urcbMX	tp30_URCB	Unb. rep. control for measurement	

2.4.16 LOGICAL NODE : tp30_PDIF_1

Description : Differential Protection

LN Class : PDIF

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_4	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_1	Name Plate	
Op	tp30_AlmThm_1	Operate	
RstCur	tp30_Amp_1	Restrained current	
DifCurClc	tp30_Amp_1	Differential Current Calculated	
urcbST	tp30_URCB	Unb. rep. control for status	

2.4.17 LOGICAL NODE : tp30_PDIF_2

Description : Differential Protection

LN Class : PDIF

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_4	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_1	Name Plate	
Op	tp30_AlmThm_1	Operate	
urcbST	tp30_URCB	Unb. rep. control for status	

2.4.18 LOGICAL NODE : tp30_PTOC_1

Description : Time over current

LN Class : PTOC

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_2	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_1	Name Plate	
Str	tp30_Str_1	Start	
Op	tp30_AlmThm_1	Operate	
Blk	tp30_Blk_1	Block	
urcbST	tp30_URCB	Unb. rep. control for status	

2.4.19 LOGICAL NODE : tp30_PTOF_1

Description : Over frequency

LN Class : PTOF

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_2	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_1	Name Plate	
Str	tp30_Str_1	Start	
Op	tp30_AlmThm_1	Operate	
Blk	tp30_Blk_1	Block	
urcbST	tp30_URCB	Unb. rep. control for status	

Logical Node Definitions

2.4.20 LOGICAL NODE : tp30_PTOV_1

Description : Time over voltage

LN Class : PTOV

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_2	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_1	Name Plate	
Str	tp30_Str_1	Start	
Op	tp30_AlmThm_1	Operate	
Blk	tp30_Blk_1	Block	
urcbST	tp30_URCB	Unb. rep. control for status	

2.4.21 LOGICAL NODE : tp30_PTRC_1

Description : Trip conditioning

LN Class : PTRC

Attribute	Attr. Type	Explanation	X
TrBlk	tp30_BlkThm_1	Trip blocked	
Mod	tp30_Mod_1	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_1	Name Plate	
Str	tp30_Str_1	Start	
Tr	tp30_AlmThm_1	Trip	
urcbST	tp30_URCB	Unb. rep. control for status	

2.4.22 LOGICAL NODE : tp30_PTTR_1

Description : Thermal overload

LN Class : PTTR

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_2	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_1	Name Plate	
Str	tp30_Str_1	Start	
Op	tp30_AlmThm_1	Operate	
BlkThm	tp30_BlkThm_1	Block Thermal	
AlmThm	tp30_AlmThm_1	Thermal alarm	
Blk	tp30_Blk_1	Block	
urcbST	tp30_URCB	Unb. rep. control for status	

2.4.23 LOGICAL NODE : tp30_PTUF_1

Description : Under frequency

LN Class : PTUF

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_2	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_1	Name Plate	
Str	tp30_Str_1	Start	
Op	tp30_AlmThm_1	Operate	
Blk	tp30_Blkc_1	Block	
urcbST	tp30_URCB	Unb. rep. control for status	

2.4.24 LOGICAL NODE : tp30_PTUV_1

Description : Time under voltage

LN Class : PTUV

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_2	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_1	Name Plate	
Str	tp30_Str_1	Start	
Op	tp30_AlmThm_1	Operate	
Blk	tp30_Blkc_1	Block	
urcbST	tp30_URCB	Unb. rep. control for status	

2.4.25 LOGICAL NODE : tp30_RBRF_1

Description : Breaker failure

LN Class : RBRF

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_2	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_1	Name Plate	
Str	tp30_Str_1	Start	
OpEx	tp30_AlmThm_1	Breaker failure trip	
OpIn	tp30_AlmThm_1	Operate retrip	
urcbST	tp30_URCB	Unb. rep. control for status	

Common Data Class Definitions

2.4.26 LOGICAL NODE : tp30_RDRE_1

Description : Disturbance recording**LN Class** : RDRE

Attribute	Attr. Type	Explanation	X
Mod	tp30_Mod_1	Mode	
Beh	tp30_Beh_1	Behaviour	
Health	tp30_Health_1	Health	
NamPlt	tp30_NamPlt_1	Name Plate	
RcdMade	tp30_Alm11_1	Disturbance recording complete	
FltNum	tp30_FltNum_1	Fault number	
GriFltNum	tp30_FltNum_1	Grid fault number	
RcdStr	tp30_Alm11_1	Disturbance recording process started	
urcbST	tp30_URCB	Unb. rep. control for status	

2.5 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 characterisation 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:

Semantic

FC	Name Source Definition
BR	Buffered reports IEC 61850-7-2
CF	Configuration IEC 61850-7-2
CO	Control IEC 61850-7-2
DC	Description IEC 61850-7-2
EX	Extended Definition IEC 61850-7-2
GO	GOOSE Control IEC 61850-7-2
GS	GSSE Control (UCA2 GOOSE) IEC 61850-7-2
LG	Logging IEC 61850-7-2
MS	Multicast sampled value control IEC 61850-7-2
MX	Measurands (Analogue values) IEC 61850-7-2
RP	Unbuffered reports IEC 61850-7-2
SE	Setting Group Editable IEC 61850-7-2
SG	Setting Group IEC 61850-7-2
SP	Set Point IEC 61850-7-2
ST	Status Information IEC 61850-7-2
SV	Substitution Values IEC 61850-7-2
US	Unicast sampled value control IEC 61850-7-2
XX	Data attribute service parameters IEC 61850-7-2

2.5.1 COMMON DATA CLASS : tp30_A_1

Description :

CDC Class : WYE

Attribute	Type	FC	Enumeration	Comment	X
phsA	tp30_phsA_1	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.	
phsB	tp30_phsA_1	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.	
d	Vstring255	DC		Description of the status element	

2.5.2 COMMON DATA CLASS : tp30_Alm11_1

Description :

CDC Class : SPS

Attribute	Type	FC	Enumeration	Comment	X
stVal	BOOLEAN	ST		Status value of the data (Intermediate state, Off, On or Bad-state)	
q	Quality	ST		Quality of the protection,activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection, activation information	
d	Vstring255	DC		Description of the status element	

2.5.3 COMMON DATA CLASS : tp30_AlmThm_1

Description :

CDC Class : ACT

Attribute	Type	FC	Enumeration	Comment	X
general	BOOLEAN	ST		Trip or start has happened	
q	Quality	ST		Quality of the protection,activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection, activation information	
d	Vstring255	DC		Description of the status element	

Common Data Class Definitions

2.5.4 COMMON DATA CLASS : tp30_Amp_1

Description :
CDC Class : MV

Attribute	Type	FC	Enumeration	Comment	X
mag	tp30_mag_1	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 protection,activation information	
t	TimeStamp	MX		Timestamp of the last change in state of protection, activation information	
units	tp30_units_1	CF	SIUnit	Unit of the attribute representing the data	
db	INT32U	CF		Measurement deadband	
d	Vstring255	DC		Description of the status element	

2.5.5 COMMON DATA CLASS : tp30_Beh_1

Description :
CDC Class : INS

Attribute	Type	FC	Enumeration	Comment	X
stVal	Enum	ST	Beh	Status value of the data (Intermediate state, Off, On or Bad-state)	
q	Quality	ST		Quality of the protection,activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection, activation information	

2.5.6 COMMON DATA CLASS : tp30_BlKThm_1

Description :
CDC Class : SPS

Attribute	Type	FC	Enumeration	Comment	X
stVal	BOOLEAN	ST		Status value of the data (Intermediate state, Off, On or Bad-state)	
q	Quality	ST		Quality of the protection,activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection, activation information	
d	Vstring255	DC		Description of the status element	
dataNs	Vstring255	EX		Data Name Space	

2.5.7 COMMON DATA CLASS : tp30_BlK_1

Description :
CDC Class : SPS

Attribute	Type	FC	Enumeration	Comment	X
stVal	BOOLEAN	ST		Status value of the data (Intermediate state, Off, On or Bad-state)	
q	Quality	ST		Quality of the protection,activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection, activation information	
dataNs	Vstring255	EX		Data Name Space	

2.5.8 COMMON DATA CLASS : tp30_CurSG_1

Description :
CDC Class : INS

Attribute	Type	FC	Enumeration	Comment	X
stVal	INT32	ST		Status value of the data (Intermediate state, Off, On or Bad-state)	
q	Quality	ST		Quality of the protection,activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection, activation information	
ctlModel	Enumerated	CF	ctlModel	Control model (Corresponding to the behaviour of the data)	
dataNs	Vstring255	EX		Data Name Space	

2.5.9 COMMON DATA CLASS : tp30_FltNum_1

Description :
CDC Class : INS

Attribute	Type	FC	Enumeration	Comment	X
stVal	INT32	ST		Status value of the data (Intermediate state, Off, On or Bad-state)	
q	Quality	ST		Quality of the protection,activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection, activation information	
d	Vstring255	DC		Description of the status element	

2.5.10 COMMON DATA CLASS : tp30_Health_1

Description :
CDC Class : INS

Attribute	Type	FC	Enumeration	Comment	X
stVal	Enum	ST	Health	Status value of the data (Intermediate state, Off, On or Bad-state)	
q	Quality	ST		Quality of the protection,activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection, activation information	

Common Data Class Definitions

2.5.11 COMMON DATA CLASS : tp30_LEDRs_1

Description :

CDC Class : SPC

Attribute	Type	FC	Enumeration	Comment	X
stVal	BOOLEAN	ST		Status value of the data (Intermediate state, Off, On or Bad-state)	
q	Quality	ST		Quality of the protection,activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection, activation information	
ctlModel	Enumerated	CF	ctlModel	Control model (Corresponding to the behaviour of the data)	
dataNs	Vstring255	EX		Data Name Space	
Oper	tp30_Oper_1	CO		Determines the control activity	

2.5.12 COMMON DATA CLASS : tp30_Loc_1

Description :

CDC Class : INS

Attribute	Type	FC	Enumeration	Comment	X
stVal	BOOLEAN	ST		Status value of the data (Intermediate state, Off, On or Bad-state)	
q	Quality	ST		Quality of the protection,activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection, activation information	

2.5.13 COMMON DATA CLASS : tp30_LodAngA_1

Description :

CDC Class : MV

Attribute	Type	FC	Enumeration	Comment	X
mag	tp30_mag_1	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 protection,activation information	
t	TimeStamp	MX		Timestamp of the last change in state of protection, activation information	
units	tp30_units_1	CF	SIUnit	Unit of the attribute representing the data	
db	INT32U	CF		Measurement deadband	
d	Vstring255	DC		Description of the status element	
dataNs	Vstring255	EX		Data Name Space	

2.5.14 COMMON DATA CLASS : tp30_Mod_1

Description :
CDC Class : INC

Attribute	Type	FC	Enumeration	Comment	X
stVal	Enum	ST	Mod	Status value of the data (Intermediate state, Off, On or Bad-state)	
q	Quality	ST		Quality of the protection,activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection, activation information	
ctlModel	Enum	CF	ctlModel	Control model (Corresponding to the behaviour of the data)	

2.5.15 COMMON DATA CLASS : tp30_Mod_2

Description :
CDC Class : INC

Attribute	Type	FC	Enumeration	Comment	X
stVal	Enum	ST	Mod	Status value of the data (Intermediate state, Off, On or Bad-state)	
q	Quality	ST		Quality of the protection,activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection, activation information	
ctlModel	Enum	CF	ctlModel	Control model (Corresponding to the behaviour of the data)	
Oper	tp30_Oper_2	CO		Determines the control activity	

2.5.16 COMMON DATA CLASS : tp30_Mod_3

Description :
CDC Class : INC

Attribute	Type	FC	Enumeration	Comment	X
stVal	Enum	ST	Mod	Status value of the data (Intermediate state, Off, On or Bad-state)	
q	Quality	ST		Quality of the protection,activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection, activation information	
d	Vstring255	DC		Description of the status element	
ctlModel	Enum	CF	ctlModel	Control model (Corresponding to the behaviour of the data)	

Common Data Class Definitions

2.5.17 COMMON DATA CLASS : tp30_Mod_4

Description :
CDC Class : INC

Attribute	Type	FC	Enumeration	Comment	X
stVal	Enum	ST	Mod	Status value of the data (Intermediate state, Off, On or Bad-state)	
q	Quality	ST		Quality of the protection,activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection, activation information	
d	Vstring255	DC		Description of the status element	
ctlModel	Enum	CF	ctlModel	Control model (Corresponding to the behaviour of the data)	
Oper	tp30_Oper_2	CO		Determines the control activity	

2.5.18 COMMON DATA CLASS : tp30_NamPlt_1

Description :
CDC Class : LPL

Attribute	Type	FC	Enumeration	Comment	X
vendor	Vstring255	DC		Unit of the attribute representing the data	
swRev	Vstring255	DC		Software revision	
d	Vstring255	DC		Description of the status element	

2.5.19 COMMON DATA CLASS : tp30_NamPlt_2

Description :
CDC Class : LPL

Attribute	Type	FC	Enumeration	Comment	X
vendor	Vstring255	DC		Unit of the attribute representing the data	
swRev	Vstring255	DC		Software revision	
d	Vstring255	DC		Description of the status element	
configRev	Vstring255	DC		Uniquely identifies the configuration of a local device instance	

2.5.20 COMMON DATA CLASS : tp30_NamPlt_3

Description :
CDC Class : LPL

Attribute	Type	FC	Enumeration	Comment	X
vendor	Vstring255	DC		Unit of the attribute representing the data	
swRev	Vstring255	DC		Software revision	
d	Vstring255	DC		Description of the status element	
configRev	Vstring255	DC		Uniquely identifies the configuration of a local device instance	
ldNs	Vstring255	EX		Logical Device name space	

2.5.21 COMMON DATA CLASS : tp30_Oper_1

Description :

CDC Class : OPER

Attribute	Type	FC	Enumeration	Comment	X
ctlVal	BOOLEAN	CO		Determines the control activity	
origin	tp30_origin_1	CO	orCategory	Related to the originator of the last change of data	
ctlNum	INT8U	CO		Show the control sequence number of the control service	
T	TimeStamp	CO		Timestamp of the last change in state of protection, activation information	
Test	BOOLEAN	CO		Test	
Check	VBSTR2	CO		Check	

2.5.22 COMMON DATA CLASS : tp30_Oper_2

Description :

CDC Class : OPER

Attribute	Type	FC	Enumeration	Comment	X
ctlVal	INT32	CO		Determines the control activity	
origin	tp30_origin_1	CO	orCategory	Related to the originator of the last change of data	
ctlNum	INT8U	CO		Show the control sequence number of the control service	
T	TimeStamp	CO		Timestamp of the last change in state of protection, activation information	
Test	BOOLEAN	CO		Test	
Check	VBSTR2	CO		Check	

2.5.23 COMMON DATA CLASS : tp30_PhyHealth_1

Description :

CDC Class : INS

Attribute	Type	FC	Enumeration	Comment	X
stVal	Enum	ST	Health	Status value of the data (Intermediate state, Off, On or Bad-state)	
q	Quality	ST		Quality of the protection, activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection, activation information	

Common Data Class Definitions

2.5.24 COMMON DATA CLASS : tp30_PhyNam_1

Description :

CDC Class : DPL

Attribute	Type	FC	Enumeration	Comment	X
vendor	Vstring255	DC		Unit of the attribute representing the data	
hwRev	Vstring255	DC		Hardware revision	
swRev	Vstring255	DC		Software revision	
serNum	Vstring255	DC		Serial Number	

2.5.25 COMMON DATA CLASS : tp30_SGCB_1

Description :

CDC Class : SGC

Attribute	Type	FC	Enumeration	Comment	X
NumOfSG	INT8U	SP		Number of setting group	
ActSG	INT8U	SP		Actual setting group	
EditSG	INT8U	SP		Edit setting group)	
CnfEdit	BOOLEAN	SP		Confirm editing	
LActTm	TimeStamp	SP		Last activation time	

2.5.26 COMMON DATA CLASS : tp30_Str_1

Description :

CDC Class : ACD

Attribute	Type	FC	Enumeration	Comment	X
general	BOOLEAN	ST		Trip or start has happened	
dirGeneral	Enumerated	ST	dir	General direction (unknown,forward,backward or both)	
q	Quality	ST		Quality of the protection,activation information	
t	TimeStamp	ST		Timestamp of the last change in state of protection, activation information	
d	Vstring255	DC		Description of the status element	

2.5.27 COMMON DATA CLASS : tp30_URCB

Description :

CDC Class :

Attribute	Type	FC	Enumeration	Comment	X
	BASRCB	RP			

2.5.28 COMMON DATA CLASS : tp30_cVal_1

Description :
CDC Class : WYE

Attribute	Type	FC	Enumeration	Comment	X
mag	tp30_mag_1	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.	

2.5.29 COMMON DATA CLASS : tp30_mag_1

Description :
CDC Class : MV

Attribute	Type	FC	Enumeration	Comment	X
f	FLOAT32	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.	

2.5.30 COMMON DATA CLASS : tp30_origin_1

Description :
CDC Class : OPER

Attribute	Type	FC	Enumeration	Comment	X
orCat	ENUM8	CO	orCategory	Related to the originator of the last change of data	
orIdent	VOSTR64	CO		Related to the originator of the last change of data	

2.5.31 COMMON DATA CLASS : tp30_phsA_1

Description :
CDC Class : WYE

Attribute	Type	FC	Enumeration	Comment	X
cVal	tp30_cVal_1	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 protection, activation information	
t	TimeStamp	MX		Timestamp of the last change in state of protection, activation information	
units	tp30_units_1	CF	SIUnit	Unit of the attribute representing the data	
db	INT32U	CF		Measurement deadband	

Common Data Attribute Type Definitions

2.5.32 COMMON DATA CLASS : tp30_units_1

Description :**CDC Class :** MV

Attribute	Type	FC	Enumeration	Comment	X
SIUnit	Enumerated	CF	SIUnit	Unit of the attribute representing the data	
multiplier	Enumerated	CF	multiplier	Unit of the attribute representing the data	

2.6 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.

2.7 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 IEC 61850-7-3 and IEC 61850-7-4 unless otherwise stated.

2.7.1 Enumerated Type: Beh

Description : Behaviour

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

2.7.2 Enumerated Type: Dbpos

Description :

Ordinal	Semantic
0	intermediate
1	Off
2	On
3	Bad

2.7.3 Enumerated Type: Health

Description : Health

Ordinal	Semantic
1	Ok
2	Warning
3	Alarm

2.7.4 Enumerated Type: Mod

Description : Mode

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

2.7.5 Enumerated Type: SIUnit

Description : Unit of the attribute representing the data

Ordinal	Semantic
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

Enumerated Type Definitions

Ordinal	Semantic
28	H
29	V
30	Ohm
31	J
32	N
33	Hz
34	Ic
35	Lm
36	Wb
37	T
38	W
39	PA
41	m ²
42	m ³
43	m/s
44	m/s ²
45	m ³ /s
46	m/m ³
47	M
48	kg/m ³
49	m ² /s
50	w/mK
51	J/K
52	ppm
53	1/s
54	rad/s
61	VA
62	W
63	VAr
64	theta
65	Cos theta
66	Vs
67	V ²
68	As
69	A ²
70	A ² t
71	VAh
72	Qh
73	VArh
74	V/Hz

2.7.6 Enumerated Type: ctlModel

Description : Control model (Corresponding to the behaviour of the data)

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

2.7.7 Enumerated Type: dir

Description : General direction (unknown,forward,backward or both)

Ordinal	Semantic
0	unknown
1	forward
2	backward
3	both

Enumerated Type Definitions

2.7.8 Enumerated Type: multiplier

Description : Unit of the attribute representing the data

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

2.7.9 Enumerated Type: orCategory

Description : Related to the originator of the last change of data

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

2.8 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
BVstring13	BVstring13	Variable bit string (upto 13 bits)
CODED_ENUM	Byte	Coded enumeration
CODED_ENUM2	Byte	Coded enumeration (2)
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
INT128	Long	128 bit signed integer 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
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	Ostring64	64 character string (8 bits per character)
OCTET_STRING8	Ostring8	8 character string (8 bits per character)
Quality	BVstring13	IEC61850 Quality
RTYP_BOOL	Bool	Reporting type - BOOLEAN
RTYP_BSTR6	Bstring6	Reporting type - 6 bit string
RTYP_BSTR8	Bstring8	Reporting type - 8 bit string
RTYP_BSTR9	Bstring9	Reporting type - 9 bit string
RTYP_BTIME6	Btime6	Reporting type - 6 byte timestamp
RTYP_BVSTR10	BVstring10	Reporting type - Variable bit string (upto 10 bits)
RTYP_BVSTR6	BVstring6	Reporting type - Variable bit string (upto 6 bits)
RTYP_BVSTR8	Bvstring8	Reporting type - Variable bit string (upto 8 bits)
RTYP_INT16U	Ushort	Reporting type - 16 bit unsigned integer value
RTYP_INT32U	Ulong	Reporting type - 32 bit unsigned integer value
RTYP_INT8U	Ubyte	Reporting type - 8 bit unsigned integer value
RTYP_OSTR8	Ostring8	Reporting type - 8 character string (8 bits per character)
RTYP_VSTR32	Vstring32	Reporting type - 32 character string
RTYP_VSTR65	Vstring65	Reporting type - 65 character string
TimeStamp	Utctime	IEC61850 Time stamp
UNICODE_STRING255	UTF8Vstring255	255 character string (16 bits per unicode character)

MMS Data-Type Conversions

Part 7 Type	MMS Type	Part 7 Description
UTC_TM	Utctime	UTC Timestamp
VISIBLE_STRING255	Vstring65	255 character string
VISIBLE_STRING64	Vstring64	64 character string
VISIBLE_STRING65	Vstring65	65 character string
VISIBLE_STRING97	Vstring97	97 character string



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