



IEC 61850 Model Implementation Conformance Statement(MICS) for P&B SuperVision Series FeederVision FVD relays

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Abbreviated Terms

- **ACSI** Abstract Communication Service Interface
- **ASN.1** Abstract Syntax Notation One
- **API** Application Program Interface
- **CDC** Common Data Class
- **CT** Current Transformer
- **IED** Intelligent Electronic Device
- **LD** Logical Device
- **LN** Logical Node
- **LLN0** Logical Node Zero
- **LPHD** Logical Node Physical Device
- **MMS** Manufacturing Message Specification
- **PHD** Physical Device
- **PICOM** Piece Of Communication
- **SCSM** Specific Communication Service Mapping
- **SoE** Sequence Of Events
- **UML** Unified Modelling Language
- **VMD** Virtual Manufacturing Device
- **VT** Voltage Transformer
- **XML** eXtended Markup Language

IEC 61850 MODEL IMPLEMENTATION CONFORMANCE STATEMENT (MICS)**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 provided for completeness.

2 Objective

The objective of this MICS document is to provide comprehensive details of the standard data object model elements supported by the P&B SuperVision Series FeederVision FVD relay. 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 tables presented within this document are conformant to the part 7 series of the IEC 61850 standard specifications without showing the "Trigger Options" field and the "M/O" field.

3 Logical device(LD) definitions

The SuperVision Series FeederVision FVD 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(LN) 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).

There is only one Logical Device included in the IEC 61850 data model for the P&B FeederVision FVD relays. All P&B SuperVision Series relays will name the supported Logical Devices consistently to ensure that data model variables with the same purpose will have the same name within each P&B SuperVision Series server.

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, the Logical Node name, and an instance ID (e.g. suffix). All of the data models are divided into such five groups as control type, measurement type, protection type, record type and system type, and presented in an alphabetically sorted order, rather than a logical order in each group.

LD	LN Instance	LN Type	Description
FeederVision FVD	(control type)		
	ArcRREC1	RREC1	Auto-reclosing
	AscRSYN1	RSYN1	Sync Check
	CbcCSWI1	CSWI1	Circuit-Breaker Control
	CbmXCBR1	XCBR1	Circuit-Breaker Monitoring
	SrfCSWI1	CSWI2	Serial Reset Fault
	(Measurement type)		
	EngMMTR1	MMTR1	Energy Statistics
	RmsMMXU1	MMXU1	Analogue RMS Measurements
	(Protection type)		
	CbfRBRF1	RBRF1	Circuit-Breaker Failure
	EftPTOC1	PTOC1	Earth Fault 1
	EftPTOC2	PTOC1	Earth Fault 2
	ErrPITF1	PITF1 (Private)	Internal Failure
	ExtPEXF1	PEXF1 (Private)	External Fault 1
	ExtPEXF2	PEXF1 (Private)	External Fault 2
	ExtPEXF3	PEXF1 (Private)	External Fault 3
	ExtPEXF4	PEXF1 (Private)	External Fault 4

	ExtPEXF5	PEXF1 (Private)	External Fault 5
	ExtPEXF6	PEXF1 (Private)	External Fault 6
	ExtPEXF7	PEXF1 (Private)	External Fault 7
	ExtPEXF8	PEXF1 (Private)	External Fault 8
	ExtPEXF9	PEXF1 (Private)	External Fault 9
	ExtPEXF10	PEXF1 (Private)	External Fault 10
	ExtPEXF11	PEXF1 (Private)	External Fault 11
	ExtPEXF12	PEXF1 (Private)	External Fault 12
	ExtPEXF13	PEXF1 (Private)	External Fault 13
	ExtPEXF14	PEXF1 (Private)	External Fault 14
	ExtPEXF15	PEXF1 (Private)	External Fault 15
	HsePTOC1	PTOC1	High set Earth Fault 1
	HsePTOC2	PTOC1	High set Earth Fault 2
	HspPTOC1	PTOC1	High Set(HS) Overcurrent
	LdiPTOC1	PTOC2	Load Increase
	LspPTOC1	PTOC1	Low Set(LS) Overcurrent
	NdrPDOP1	PDOP1	Over Power(non-directional)
	PhsPTOC1	PTOC1	Overcurrent 1
	PhsPTOC2	PTOC1	Overcurrent 2
	PhsPTOV1	PTOV1	Over Voltage
	PhsPTUV1	PTUV1	Under Voltage
	SrlPSTO1	PSTO1 (Private)	Serial Timeout
	SysPTOF1	PTOF1	Over Frequency
	SysPTUF1	PTUF1	Under Frequency
	(Record Type)		
	AlmRFLT1	RFLT1 (Private)	Recent Alarm Recording
	DisRDRE1	RDRE1	Disturbance Recorder
	TrpRFLT1	RFLT1 (Private)	Recent Trip Recording
	(System Type)		
	EfcTCTR1	TCTR1	E/F Current Transformer 1
	EfcTCTR2	TCTR1	E/F Current Transformer 2
	LLN0	LLN01	Logical Device Information
	LPHD1	LPHD1	Physical Device Information
	MixGGIO1	GGIO1	Mixed Digital I/O
	PhsTCTR1	TCTR1	Phase Current Transformer
	PhsTVTR1	TVTR1	Voltage Transformer

3.2 Logical node definitions

The definition tables for each of the Logical Nodes in the top-level data model are presented as below.

3.2.1 Logical Node: CSWI1

Description: Switch controller for circuit breaker

LN Class: CSWI

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	
Pos	DPC_1_Pos	Dual point switch control and status	Circuit Breaker control
OpOpn	ACT_1_OpOpn	Operation "Open Switch"	

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OpCls	ACT_1_OpOpn	Operation "Close Switch"	
OpnSrc	ING_1_ClsOpnSrc	Open setup source (Private)	Open source setting
ClsSrc	ING_1_ClsOpnSrc	Close setup source (Private)	Close source setting

3.2.2 Logical Node: CSWI2

Description: Switch controller for serial reset fault

LN Class: CSWI

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	
Pos	DPC_1_Pos	Dual point switch control and status	for serial reset fault

3.2.3 Logical Node: GGIO1

Description: Generic Process I/O

LN Class: GGIO

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	
AnIn	MV_1_AnIn	Analogue Input	
SPCSO	SPC_1_SPCSO	Single point controllable status output	Optional
DPCSO	DPC_1_DPCSO	Double point controllable status output	Optional
ISCSO	INC_2_ISCSO	Integer status controllable status output	Status of relay output 1-8
IntIn01	INS_3_IntIn	Integer status input	Status of Digital Input(1-8)
IntIn02	INS_3_IntIn	Integer status input	Status of Digital Input(9-16)
IntIn03	INS_3_IntIn	Integer status input	Status of Digital Input(17-24)
IntOut01	INS_1_IntOut	Integer status output (private)	Trip Status (bit 0 –bit 15)
IntOut02	INS_1_IntOut	Integer status output (private)	Trip Status (bit 16 –bit 31)
IntOut03	INS_1_IntOut	Integer status output (private)	Trip Status (bit 32 –bit 47)
IntOut04	INS_1_IntOut	Integer status output (private)	Alarm Status (bit 0 -bit 15)
IntOut05	INS_1_IntOut	Integer status output (private)	Alarm Status (bit 16 -bit 31)
IntOut06	INS_1_IntOut	Integer status output (private)	Alarm Status (bit 32 -bit 47)
IntOut07	INS_1_IntOut	Integer status output (private)	Inhibit Status (bit 0 -bit 15)
IntOut08	INS_1_IntOut	Integer status output (private)	Inhibit Status (bit 16 -bit 31)
IntOut09	INS_1_IntOut	Integer status output (private)	Inhibit Status (bit 32 -bit 47)

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Alm	SPS_1_Alm	General single alarm	Optional
Ind	SPS_1_Alm	General single indication(binary input)	Optional
DoSet3	CURVE_1_DOFunc	Enumerated type for relay output setting (private)	Relay output 3 setting
DoSet4	CURVE_1_DOFunc	Enumerated type for relay output setting (private)	Relay output 4 setting
DoSet5	CURVE_1_DOFunc	Enumerated type for relay output setting (private)	Relay output 5 setting
DoSet6	CURVE_1_DOFunc	Enumerated type for relay output setting (private)	Relay output 6 setting
DoSet7	CURVE_1_DOFunc	Enumerated type for relay output setting (private)	Relay output 7 setting
DoSet8	CURVE_1_DOFunc	Enumerated type for relay output setting (private)	Relay output 8 setting
DiSet01	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 1 Setting
DiSet02	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 2 Setting
DiSet03	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 3 Setting
DiSet04	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 4 Setting
DiSet05	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 5 Setting
DiSet06	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 6 Setting
DiSet07	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 7 Setting
DiSet08	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 8 Setting
DiSet09	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 9 Setting
DiSet10	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 10 Setting
DiSet11	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 11 Setting
DiSet12	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 12 Setting
DiSet13	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 13 Setting
DiSet14	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 14 Setting
DiSet15	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 15 Setting
DiSet16	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 16 Setting
DiSet17	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 17 Setting
DiSet18	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 18 Setting
DiSet19	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 19 Setting
DiSet20	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 20 Setting
DiSet21	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 21 Setting
DiSet22	CURVE_1_DIFunc	Enumerated type for digital input setting	Digital Input 22 Setting

		(private)	
DiSet23	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 23 Setting
DiSet24	CURVE_1_DIFunc	Enumerated type for digital input setting (private)	Digital Input 24 Setting
LgcSt	INS_3_LgcSt	Integer status (private)	Logical status
Binp01	SPS_1_Binp	General single indication(binary input) (private)	Digital input 1 status
Binp02	SPS_1_Binp	General single indication(binary input) (private)	Digital input 2 status
Binp03	SPS_1_Binp	General single indication(binary input) (private)	Digital input 3 status
Binp04	SPS_1_Binp	General single indication(binary input) (private)	Digital input 4 status
Binp05	SPS_1_Binp	General single indication(binary input) (private)	Digital input 5 status
Binp06	SPS_1_Binp	General single indication(binary input) (private)	Digital input 6 status
Binp07	SPS_1_Binp	General single indication(binary input) (private)	Digital input 7 status
Binp08	SPS_1_Binp	General single indication(binary input) (private)	Digital input 8 status
Binp09	SPS_1_Binp	General single indication(binary input) (private)	Digital input 9 status
Binp10	SPS_1_Binp	General single indication(binary input) (private)	Digital input 10 status
Binp11	SPS_1_Binp	General single indication(binary input) (private)	Digital input 11 status
Binp12	SPS_1_Binp	General single indication(binary input) (private)	Digital input 12 status
Binp13	SPS_1_Binp	General single indication(binary input) (private)	Digital input 13 status
Binp14	SPS_1_Binp	General single indication(binary input) (private)	Digital input 14 status
Binp15	SPS_1_Binp	General single indication(binary input) (private)	Digital input 15 status
Binp16	SPS_1_Binp	General single indication(binary input) (private)	Digital input 16 status
Binp17	SPS_1_Binp	General single indication(binary input) (private)	Digital input 17 status
Binp18	SPS_1_Binp	General single indication(binary input) (private)	Digital input 18 status
Binp19	SPS_1_Binp	General single indication(binary input) (private)	Digital input 19 status
Binp20	SPS_1_Binp	General single indication(binary input) (private)	Digital input 20 status
Binp21	SPS_1_Binp	General single indication(binary input) (private)	Digital input 21 status
Binp22	SPS_1_Binp	General single indication(binary input) (private)	Digital input 22 status
Binp23	SPS_1_Binp	General single indication(binary input) (private)	Digital input 23 status
Binp24	SPS_1_Binp	General single indication(binary input) (private)	Digital input 24 status
Bout1	SPS_1_Binp	General single indication(binary output) (private)	Relay output 1 status
Bout2	SPS_1_Binp	General single indication(binary output)	Relay output 2 status

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		(private)	
Bout3	SPS_1_Binp	General single indication(binary output) (private)	Relay output 3 status
Bout4	SPS_1_Binp	General single indication(binary output) (private)	Relay output 4 status
Bout5	SPS_1_Binp	General single indication(binary output) (private)	Relay output 5 status
Bout6	SPS_1_Binp	General single indication(binary output) (private)	Relay output 6 status
Bout7	SPS_1_Binp	General single indication(binary output) (private)	Relay output 7 status
Bout8	SPS_1_Binp	General single indication(binary output) (private)	Relay output 8 status

3.2.4 Logical Node: LLN01

Description: Logical node 0 information

LN Class: LLN0

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	

3.2.5 Logical Node: LPHD1

Description: Physical device information

LN Class: LPHD

Attribute	Attribute Type	Explanation	Comment
PhyNam	DPL_1_PhyNam	Physical device name plate	
PhyHealth	INS_1_PhyHealth	Physical device health	
WrtPrt	SPC_1_WrtPrt	Dual point switch control and status	Deactivate write protection
PasWrd	CURVE_1_DisEna	Enumerated type for user password activation (private)	Enable/disable User Password
PasStr	ING_1_PasStr	Text string setting	User password string
SysPas	CURVE_1_DisEna	Enumerated type for Engineer Password activation (private)	Enable/disable Engineer Password
ScnSav	CURVE_1_DisEna	Enumerated type for Screen Saver activation (private)	Enable/disable Screen Saver
ScnTim	ING_1_ScnTim	Screen saver timeout setting	
InvLed	CURVE_1_NoYes	Enumerated type for Invert-LEDs activation (private)	Invert the LED colour or not
SwpLed	CURVE_1_NoYes	Enumerated type for Swap-LEDs activation (private)	Swap the LED position or not

3.2.6 Logical Node: MMTR1

Description: Metering

LN Class: MMTR

Attribute	Attribute Type	Explanation	Comment
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Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	
TotVAh	BCR_1_TotVAh	Net apparent energy since last reset	Unit:VAh
TotWh	BCR_1_TotVAh	Net real energy since last reset	Unit: Wh
TotVArh	BCR_1_TotVAh	Net reactive energy since last reset	Unit: VArh
DmdWpk	BCR_1_DmdWpk	Real power peak demand (<i>private</i>)	Unit: watts
SmpPrd	ASG_1_SmpPrd	kW Sample Period (<i>private</i>)	Unit: Minutes
RstStats	SPC_1_RdFlgClr	Reset Stats(<i>private</i>)	CtlVal=1 -> reset

3.2.7 Logical Node: MMXU1**Description:** Phase-related measurements**LN Class:** MMXU

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	
TotW	MV_1_TotW	Total real power	Unit: watts
TotVAr	MV_1_TotW	Total reactive power	Unit: VAr
TotVA	MV_1_TotW	Total apparent power	Unit: VA (volt ampere)
TotPF	MV_1_TotW	Average power factor	
Hz	MV_1_TotW	System frequency	Unit: Hz
PPV	DEL_1_PPV	Phase to phase voltages	Unit: volt
PhV	WYE_1_PhV	Phase to ground voltages	Unit: volt
A	WYE_2_A	Phase currents	Unit: ampere
W	WYE_1_PhV	Phase real power	Unit: watts
VAr	WYE_4_VAr	Phase reactive power	Unit: VAr
VA	WYE_1_PhV	Phase apparent power	Unit:VA
PF	WYE_1_PhV	Phase power factor	
SynAng	MV_1_SynAng	Sync checking Angle	Unit:degrees

3.2.8 Logical Node: PDOP1**Description:** Overpower protection**LN Class:** PDOP

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	
Str	ACD_1_Str	Start	Trip Pickup
Op	ACT_1_OpOpn	Operate	Trip
StrVal	ASG_1_StrVal	Start Value	Trip level
OpDITmms	ING_1_OpDITmms	Operate delay time	
PrtOps	ING_1_ProtOpts	Overpower Protection setting (<i>private</i>)	Protection function setting

3.2.9 Logical Node: PEXF1**Description:** External fault protection**LN Class:** PEXF (*self-defined private class*)

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_2_NamPlt	Name Plate	
Str	ACD_1_Str	Start	Trip Pickup
Op	ACT_1_OpOpn	Operate	Trip
PlrtVal	CURVE_1_Polarity	Enumerated type for polarity setting	Polarity setting
OpDITmms	ING_1_OpDITmms	Operate delay time	
PrtOps	ING_2_ProtOps	External Fault Protection setting	Protection function setting

3.2.10 Logical Node: PITF1**Description:** Internal Failure(error) protection**LN Class:** PITF (*self-defined private class*)

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_2_NamPlt	Name Plate	
Str	ACD_1_Str	Start	Trip Pickup
Op	ACT_1_OpOpn	Operate	Trip
PrtOps	ING_1_ProtOps	Internal Failure Protection setting	Protection function setting

3.2.11 Logical Node: PSTO1**Description:** Serial timeout protection**LN Class:** PSTO (*self-defined private class*)

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_2_NamPlt	Name Plate	
Str	ACD_1_Str	Start	Trip Pickup
Op	ACT_1_OpOpn	Operate	Trip
OpDITmms	ING_1_OpDITmms	Operate delay time	
PrtOps	ING_1_ProtOps	Serial Timeout Protection setting	Protection function setting

3.2.12 Logical Node: PTOC1**Description:** Timed overcurrent protection**LN Class:** PTOC

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	
Str	ACD_1_Str	Start	Trip Pickup
Op	ACT_1_OpOpn	Operate	Trip
TmACrv	CURVE_1_TmACrv	Operating curve type	
StrVal	ASG_2_StrVal	Start Value	Trip level
TmMult	ASG_2_StrVal	Time dial multiplier	For time-inverse curve type only
OpDITmms	ING_1_OpDITmms	Operation delay time	For DEFT curve type only
PrtOps	ING_1_ProtOps	Overcurrent Protection setting (<i>private</i>)	Protection function setting

3.2.13 Logical Node: PTOC2**Description:** Timed overcurrent protection**LN Class:** PTOC

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	
Str	ACD_1_Str	Start	Trip Pickup
Op	ACT_1_OpOpn	Operate	Trip
TmACrv	CURVE_1_TmACrv	Operating curve type	
StrVal	ASG_2_StrVal	Start Value	Trip level
TmMult	ASG_2_StrVal	Time dial multiplier	For time-inverse curve type only
OpDITmms	ING_1_OpDITmms	Operation delay time	For DEFT curve type only
PrtOps	ING_1_ProtOps	Overcurrent Protection setting (<i>private</i>)	Protection function setting
CcrVal	ASG_2_CcrVal	CCR setting	In percentage

3.2.14 Logical Node: PTOF1**Description:** Over frequency protection**LN Class:** PTOF

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	
Str	ACD_1_Str	Start	Trip Pickup
Op	ACT_1_OpOpn	Operate	Trip
StrVal	ASG_1_StrVal	Start Value	Trip level
OpDITmms	ING_1_OpDITmms	Operation delay time	

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PrtOps	ING_1_ProtOps	Over frequency Protection setting (<i>private</i>)	Protection function setting
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3.2.15 Logical Node: PTOV1

Description: Over voltage protection

LN Class: PTOV

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	
Str	ACD_1_Str	Start	Trip Pickup
Op	ACT_1_OpOpn	Operate	Trip
StrVal	ASG_1_StrVal	Start Value	Trip level
OpDITmms	ING_1_OpDITmms	Operation delay time	
PrtOps	ING_1_ProtOps	Over voltage Protection setting (<i>private</i>)	Protection function setting

3.2.16 Logical Node: PTUF1

Description: Under frequency protection

LN Class: PTUF

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	
Str	ACD_1_Str	Start	Trip Pickup
Op	ACT_1_OpOpn	Operate	Trip
StrVal	ASG_1_StrVal	Start Value	Trip level
OpDITmms	ING_1_OpDITmms	Operation delay time	
PrtOps	ING_1_ProtOps	Under frequency Protection setting (<i>private</i>)	Protection function setting

3.2.17 Logical Node: PTUV1

Description: Under voltage protection

LN Class: PTUV

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	
Str	ACD_1_Str	Start	Trip Pickup
Op	ACT_1_OpOpn	Operate	Trip
StrVal	ASG_1_StrVal	Start Value	Trip level
OpDITmms	ING_1_OpDITmms	Operation delay time	
PrtOps	ING_1_ProtOps	Under voltage Protection setting (<i>private</i>)	Protection function setting

3.2.18 Logical Node: RBRF1**Description:** Breaker failure protection and monitoring**LN Class:** RBRF

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	
Str	ACD_1_Str	Start	Trip Pickup
OpIn	ACT_1_OpOpn	Operate	
FailMod	ING_1_FailMod	Breaker Failure Detection Mode	
FailTmms	ING_1_OpDITmms	Breaker failure time delay	
PrtOps	ING_1_ProtOps	Breaker failure Protection setting (<i>private</i>)	Protection function setting

3.2.19 Logical Node: RDRE1**Description:** Disturbance recorder function**LN Class:** RDRE

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	
RdFlgClr	SPC_1_RdFlgClr	Clear the flag in order to read all disturbance traces again (<i>private</i>)	
RcdMade	SPS_1_RcdMade	Recording made (RCD available)	
FltNum	INS_3_FltNum	Recorded File Name (<i>private</i>)	
FltNam	INS_3_FltNam	Recorded File Name	
TrgTyp	CURVE_1_TrkTyp	Enumerated type for Trigger Type (<i>private</i>)	3 choices
PreTpos	CURVE_1_PreTpos	Enumerated type for Trigger Position (<i>private</i>)	6 choices
RcdRes	CURVE_1_RcdRes	Enumerated type for Record Resolution (<i>private</i>)	2 choices
MaxTrace	ING_1_ProtOps	Maximum recording traces (<i>private</i>)	Range: 1-8
DiChNum	ING_1_ProtOps	Digital Input Channel Number (<i>private</i>)	Range: 1-24
DoChNum	ING_1_ProtOps	Digital Output Channel Number (<i>private</i>)	Range: 1-8

3.2.20 Logical Node: RFLT1**Description:** Last fault (trip or alarm) recorder function**LN Class:** RFLT (*self-defined private class*)

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_2_NamPlt	Name Plate	

FltPos	INC_1_FltPos	Recent Fault Sequence Number	
FltNo	INS_1_TrpCnt	Fault Number and activated Time-Date	
A	WYE_2_A	Pre fault current values	
PhV	WYE_1_PhV	Pre fault voltage values	
PF	WYE_1_PhV	Pre fault power factors	
W	WYE_1_PhV	Pre fault real powers	
Hz	MV_1_TotW	Pre fault frequency	
SynAng	MV_1_SynAng	Pre fault sync. Angle	

3.2.21 Logical Node: RREC1**Description:** Auto reclosing function**LN Class:** RREC

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	
BlkRec	SPC_2_SPCSO	Block reclosing	Enable/disable Auto reclosing
Op	ACT_1_Op	Operate	
AutoRecSt	INS_1_AutoRecSt	Auto reclosing status	
Rec1Tmms	ING_1_OpDITmms	First reclose time	Reclose Int. 1
Rec2Tmms	ING_1_OpDITmms	Second reclose time	Reclose Int. 2
Rec3Tmms	ING_1_OpDITmms	Third reclose time	Reclose Int. 3

3.2.22 Logical Node: RSYN1**Description:** Synchronism-check function**LN Class:** RSYN

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	
Rel	SPS_1_Proxy	Release	In sync
DifVClc	MV_1_DifVClc	Calculated difference in voltage	Voltage difference(%)
DifAngClc	MV_1_DifVClc	Calculated difference of phase angle	Angle difference (degrees)
DifV	ASG_1_StrVal	Difference voltage	
DifAng	ASG_1_StrVal	Difference phase angle	
SynTmms	ING_1_ScnTim	Time in sync (private)	
PrtOps	ING_1_ProtOpts	Synch-check Protection setting (private)	Protection Function setting

3.2.23 Logical Node: TCTR1**Description:** Current transformer (CT) settings**LN Class:** TCTR

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	

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Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	
Amp	SAV_1_Amp	Current (sampled value)	
ARtg	ASG_1_ARtg	Rated current	CT primary setting
PolOps	CURVE_1_OCPOles	Enumerated type for poles selection (<i>private</i>)	2 o/c poles or 3 o/c poles

3.2.24 Logical Node: TCTR2

Description: Current transformer (CT) settings

LN Class: TCTR

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	
Amp	SAV_1_Amp	Current (sampled value)	
ARtg	ASG_1_ARtg	Rated current	CT primary setting

3.2.25 Logical Node: TVTR1

Description: Voltage transformer (VT) settings

LN Class: TVTR

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	
NamPlt	LPL_1_NamPlt	Name Plate	
Vol	SAV_2_Amp	Voltage (sampled value)	
VRtg	ASG_1_Artg	Rated voltage	VT primary setting
VTsec	ASG_1_VTsec	VT secondary (<i>private</i>)	VT secondary setting
VtgVal	ASG_1_VTsec	Voltage (<i>private</i>)	In %(VT Primary)
VtgRef	CURVE_1_VoltRef	Enumerated type for voltage ref./sync selection (<i>private</i>)	

3.2.26 Logical Node: XCBR1

Description: Circuit-breaker function

LN Class: XCBR

Attribute	Attribute Type	Explanation	Comment
Mod	INC_1_Mod	Mod	
Beh	INS_1_Beh	Behavior	
Health	INS_1_Health	Health	

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NamPlt	LPL_1_NamPlt	Name Plate	
Loc	SPS_1_Proxy	Local operation	
OpCnt	INS_1_OpCnt	Operation counter	Number of opening, In Stats
Pos	DPC_1_DPCSO	Switch position	Breaker position status
BlkOpn	SPC_1_BlkOpn	Block opening	
BlkCls	SPC_1_BlkOpn	Block closing	
CBOpCap	INS_1_CBOpCap	Circuit breaker operating capability	
TrpCnt	INS_1_TrpCnt	Number of trips (<i>private</i>)	In Stats
ClsCnt	INS_1_TrpCnt	Number of closes (<i>private</i>)	In Stats
ClsFrm	INS_1_TrpCnt	Last Close Source (<i>private</i>)	In Stats
OpnFrm	INS_1_TrpCnt	Last Open Source (<i>private</i>)	In Stats
ClsHrsThis	INS_1_TrpCnt	Hours of This Close(hrs) (<i>private</i>)	In Stats
ClsHrsTot	INS_1_TrpCnt	Total Hours Closed(hrs) (<i>private</i>)	In Stats
LoadPcnt	INS_1_TrpCnt	Feeder Load (<i>private</i>)	In percentage
RstStats	SPC_1_RdFlgClr	Reset XCBR Stats	In Stats

3.3 Typical Logical node attributes

The typical logical node attributes used in FeederVision FVD are presented in an alphabetically sorted order as below.

No.	Attribute Name	Description	Data Type
1	AlmRFLT1\$MX\$A\$phsA\$cVal\$mag\$i	Recent pre alarm I1 (red phase)	Long
2	AlmRFLT1\$MX\$A\$phsB\$cVal\$mag\$i	Recent pre alarm I1 (yellow phase)	Long
3	AlmRFLT1\$MX\$A\$phsC\$cVal\$mag\$i	Recent pre alarm I1 (blue phase)	Long
4	AlmRFLT1\$MX\$A\$net\$cVal\$mag\$i	Recent pre alarm Ist (standby)	Long
5	AlmRFLT1\$MX\$A\$res\$cVal\$mag\$i	Recent pre alarm I0 (e/f)	Long
6	AlmRFLT1\$MX\$PhV\$phsA\$cVal\$mag\$i	Recent pre alarm V1 (red phase)	Long
7	AlmRFLT1\$MX\$PhV\$phsB\$cVal\$mag\$i	Recent pre alarm V2 (yellow phase)	Long
8	AlmRFLT1\$MX\$PhV\$phsC\$cVal\$mag\$i	Recent pre alarm V3 (blue phase)	Long
9	AlmRFLT1\$MX\$PF\$phsA\$cVal\$mag\$i	Recent pre alarm PF1(red phase)	Long
10	AlmRFLT1\$MX\$PF\$phsB\$cVal\$mag\$i	Recent pre alarm PF2(yellow phase)	Long
11	AlmRFLT1\$MX\$PF\$phsC\$cVal\$mag\$i	Recent pre alarm PF3(blue phase)	Long
12	AlmRFLT1\$MX\$W\$phsA\$cVal\$mag\$i	Recent pre alarm power 1(red phase)	Long
13	AlmRFLT1\$MX\$W\$phsB\$cVal\$mag\$i	Recent pre alarm power 2(yellow phase)	Long
14	AlmRFLT1\$MX\$W\$phsC\$cVal\$mag\$i	Recent pre alarm power 3(blue phase)	Long
15	AlmRFLT1\$MX\$Hz\$mag\$i	Recent pre alarm frequency	Long
16	AlmRFLT1\$MX\$SynAng\$mag\$i	Recent pre alarm sync angle	Long
17	AlmRFLT1\$ST\$FltPos\$stVal	Recent alarm sequence number	Byte
18	AlmRFLT1\$ST\$FltNo\$stVal	Recent alarm number	Ulong
19	AlmRFLT1\$ST\$FltNo\$t	Recent alarm time & date	Utctime
20	AlmRFLT1\$CO\$FltPos\$Oper\$ctlVal	Set the Recent alarm sequence number	Byte
21	ArcRREC1\$ST\$BlkRec\$stVal	Auto reclosing enabled	Bool
22	ArcRREC1\$CO\$BlkRec\$Oper\$ctlVal	Enable/disable auto reclosing	Bool
23	ArcRREC1\$SP\$Rec1Tmms\$setVal	Reclose Int. 1 (x0.1s)	Long
24	ArcRREC1\$SP\$Rec2Tmms\$setVal	Reclose Int. 2 (x0.1s)	Long
25	ArcRREC1\$SP\$Rec3Tmms\$setVal	Reclose Int. 3 (x0.1s)	Long
26	AscRSYN1\$MX\$DifVClc\$mag\$i	Measured voltage difference	Long
27	AscRSYN1\$MX\$DifAngClc\$mag\$i	Measured sync angle	Long
28	AscRSYN1\$ST\$Rel\$stVal	In sync status	Bool
29	AscRSYN1\$SP\$DifV\$setMag\$i	Voltage difference	Long
30	AscRSYN1\$SP\$DifAng\$setMag\$i	Angle difference	Long
31	AscRSYN1\$SP\$SynTmms\$setVal	Time in sync	Long

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32	AscRSYN1\$SP\$PrtOps\$setVal	Sync check protection setting	Long
33	CbcCSWI1\$ST\$Pos\$stVal	Circuit breaker status	Bstring2
34	CbcCSWI1\$ST\$Pos\$t	The time & date when circuit breaker changes status	Utctime
35	CbcCSWI1\$ST\$OpOpn\$general	Circuit breaker opened status	Bool
36	CbcCSWI1\$ST\$OpCls\$general	Circuit breaker closed status	Bool
37	CbcCSWI1\$CO\$Pos\$Oper\$ctlVal	Operate circuit breaker	Bool
38	CbcCSWI1\$SP\$OpnSrc\$setVal	Open setup source	Long
39	CbcCSWI1\$SP\$ClsSrc\$setVal	Close setup source	Long
40	CbfRBRF1\$ST\$Str\$general	Breaker failure trip pickup	Bool
41	CbfRBRF1\$ST\$OpIn\$general	Breaker failure trip status	Bool
42	CbfRBRF1\$SP\$FailTmms\$setVal	Circuit breaker failure time delay	Long
43	CbfRBRF1\$SP\$PrtOps\$setVal	Circuit breaker failure protection setting	Long
44	CbmXCBR1\$ST\$OpCnt\$stVal	Number of circuit breaker opening	Ulong
45	CbmXCBR1\$ST\$Pos\$stVal	Circuit breaker status	Bstring2
46	CbmXCBR1\$ST\$BlkOpn\$stVal	Block opening	Bool
47	CbmXCBR1\$ST\$BlkCls\$stVal	Block closing	Bool
48	CbmXCBR1\$ST\$TrpCnt\$stVal	Number of circuit breaker trips	Ulong
49	CbmXCBR1\$ST\$ClsCnt\$stVal	Number of circuit breaker closing	Ulong
50	CbmXCBR1\$ST\$ClsFrm\$stVal	Last close source	Ulong
51	CbmXCBR1\$ST\$ClsFrm\$t	Last close time & date	Utctime
52	CbmXCBR1\$ST\$OpnFrm\$stVal	Last open source	Ulong
53	CbmXCBR1\$ST\$OpnFrm\$t	Last open time & date	Utctime
54	CbmXCBR1\$ST\$ClsHrsThis\$stVal	Total hours of this close	Ulong
55	CbmXCBR1\$ST\$ClsHrsTot\$stVal	Total hours closed	Ulong
56	CbmXCBR1\$ST\$LoadPcnt\$stVal	Feeder load	Ulong
57	CbmXCBR1\$CO\$RstStats\$Oper\$ctlVal	Reset XCBR stats	Bool
58	DisRDRE1\$ST\$RcdMade\$stVal	RCD available	Bool
59	DisRDRE1\$ST\$FltNum\$rcdNam	RCD comtrade name	Vstring255
60	DisRDRE1\$CO\$RdFlgClr\$Oper\$ctlVal	Clear the RCD flag in order to read the comtrade files again	Bool
61	DisRDRE1\$SP\$TrgTyp\$setCharact	Trigger type	Byte
62	DisRDRE1\$SP\$PreTpos\$setCharact	Trigger position	Byte
63	DisRDRE1\$SP\$RcdRes\$setCharact	Record resolution	Byte
64	DisRDRE1\$SP\$MaxTrace\$setVal	Max record traces	Long
65	DisRDRE1\$SP\$DiChNum\$setVal	Digital input channel number	Long
66	DisRDRE1\$SP\$DoChNum\$setVal	Digital output channel number	Long
67	EftCTCR1\$SP\$ARtg\$setMag\$i	EFCT Primary 1	Long
68	EftCTCR2\$SP\$ARtg\$setMag\$i	EFCT Primary 2	Long
69	EftPTOC1\$ST\$Str\$general	E/F1 trip pickup	Bool
70	EftPTOC1\$ST\$Op\$general	E/F1 trip status	Bool
71	EftPTOC1\$SP\$TmACrv\$setCharact	E/F1 characteristic curve	Byte
72	EftPTOC1\$SP\$StrVal\$setMag\$i	E/F1 trip level	Long
73	EftPTOC1\$SP\$TmMult\$setMag\$i	E/F1 time multiplier for inverse-curve	Long
74	EftPTOC1\$SP\$OpDITmms\$setVal	E/F1 Trip time delay for definite time-curve	Long
75	EftPTOC1\$SP\$PrtOps\$setVal	E/F1 protection setting	Long
76	EftPTOC2\$ST\$Str\$general	E/F2 trip pickup	Bool
77	EftPTOC2\$ST\$Op\$general	E/F2 trip status	Bool
78	EftPTOC2\$SP\$TmACrv\$setCharact	E/F2 characteristic curve	Byte
79	EftPTOC2\$SP\$StrVal\$setMag\$i	E/F2 trip level	Long
80	EftPTOC2\$SP\$TmMult\$setMag\$i	E/F2 time multiplier for inverse-curve	Long
81	EftPTOC2\$SP\$OpDITmms\$setVal	E/F2 Trip time delay for definite time-curve	Long
82	EftPTOC2\$SP\$PrtOps\$setVal	E/F2 protection setting	Long

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83	EngMMTR1\$ST\$TotVAh\$actVal	Total apparent energy value	Long
84	EngMMTR1\$ST\$TotVAh\$t	Time stamp for total apparent energy	
85	EngMMTR1\$ST\$TotWh\$actVal	Total real energy value	Long
86	EngMMTR1\$ST\$TotWh\$t	Time stamp for total real energy	
87	EngMMTR1\$ST\$TotVARh\$actVal	Total reactive energy value	
88	EngMMTR1\$ST\$TotVARh\$t	Time stamp for total reactive energy value	
89	EngMMTR1\$ST\$DmdWpk\$actVal	kW peak demand value	Long
90	EngMMTR1\$ST\$DmdWpk\$t	Time stamp for kW peak demand	Utctime
91	EngMMTR1\$CO\$RstStats\$Oper\$ctlVal	Reset Stats	Bool
92	EngMMTR1\$SP\$SmpPrd\$setMag\$i	kW sample period (in minutes)	Long
93	ErrPITF1\$ST\$Str\$general	Internal failure trip pickup	Bool
94	ErrPITF1\$ST\$Op\$general	Internal failure trip status	Bool
95	ErrPITF1\$SP\$PrtOps\$setVal	Internal failure protection setting	Long
96	ExtPEXF1\$ST\$Str\$general	External fault 1 trip pickup	Bool
97	ExtPEXF1\$ST\$Op\$general	External fault 1 trip status	Bool
98	ExtPEXF1\$SP\$PrtVal\$setCharact	External fault 1 polarity	Byte
99	ExtPEXF1\$SP\$OpDITmms\$setVal	External fault 1 trip time delay	Long
100	ExtPEXF1\$SP\$PrtOps\$setVal	External fault 1 protection setting	Long
101	ExtPEXF1\$SP\$PrtOps\$setNam	External fault 1 custom-name	Vstring64
102	ExtPEXF10\$ST\$Str\$general	External fault 10 trip pickup	Bool
103	ExtPEXF10\$ST\$Op\$general	External fault 10 trip status	Bool
104	ExtPEXF10\$SP\$PrtVal\$setCharact	External fault 10 polarity	Byte
105	ExtPEXF10\$SP\$OpDITmms\$setVal	External fault 10 trip time delay	Long
106	ExtPEXF10\$SP\$PrtOps\$setVal	External fault 10 protection setting	Long
107	ExtPEXF10\$SP\$PrtOps\$setNam	External fault 10 custom-name	Vstring64
108	ExtPEXF11\$ST\$Str\$general	External fault 11 trip pickup	Bool
109	ExtPEXF11\$ST\$Op\$general	External fault 11 trip status	Bool
110	ExtPEXF11\$SP\$PrtVal\$setCharact	External fault 11 polarity	Byte
111	ExtPEXF11\$SP\$OpDITmms\$setVal	External fault 11 trip time delay	Long
112	ExtPEXF11\$SP\$PrtOps\$setVal	External fault 11 protection setting	Long
113	ExtPEXF11\$SP\$PrtOps\$setNam	External fault 11 custom-name	Vstring64
114	ExtPEXF12\$ST\$Str\$general	External fault 12 trip pickup	Bool
115	ExtPEXF12\$ST\$Op\$general	External fault 12 trip status	Bool
116	ExtPEXF12\$SP\$PrtVal\$setCharact	External fault 12 polarity	Byte
117	ExtPEXF12\$SP\$OpDITmms\$setVal	External fault 12 trip time delay	Long
118	ExtPEXF12\$SP\$PrtOps\$setVal	External fault 12 protection setting	Long
119	ExtPEXF12\$SP\$PrtOps\$setNam	External fault 12 custom-name	Vstring64
120	ExtPEXF13\$ST\$Str\$general	External fault 13 trip pickup	Bool
121	ExtPEXF13\$ST\$Op\$general	External fault 13 trip status	Bool
122	ExtPEXF13\$SP\$PrtVal\$setCharact	External fault 13 polarity	Byte
123	ExtPEXF13\$SP\$OpDITmms\$setVal	External fault 13 trip time delay	Long
124	ExtPEXF13\$SP\$PrtOps\$setVal	External fault 13 protection setting	Long
125	ExtPEXF13\$SP\$PrtOps\$setNam	External fault 13 custom-name	Vstring64
126	ExtPEXF14\$ST\$Str\$general	External fault 14 trip pickup	Bool
127	ExtPEXF14\$ST\$Op\$general	External fault 14 trip status	Bool
128	ExtPEXF14\$SP\$PrtVal\$setCharact	External fault 14 polarity	Byte
129	ExtPEXF14\$SP\$OpDITmms\$setVal	External fault 14 trip time delay	Long
130	ExtPEXF14\$SP\$PrtOps\$setVal	External fault 14 protection setting	Long
131	ExtPEXF14\$SP\$PrtOps\$setNam	External fault 14 custom-name	Vstring64
132	ExtPEXF15\$ST\$Str\$general	External fault 15 trip pickup	Bool
133	ExtPEXF15\$ST\$Op\$general	External fault 15 trip status	Bool
134	ExtPEXF15\$SP\$PrtVal\$setCharact	External fault 15 polarity	Byte

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135	ExtPEXF15\$SP\$OpDITmms\$setVal	External fault 15 trip time delay	Long
136	ExtPEXF15\$SP\$PrtOps\$setVal	External fault 15 protection setting	Long
137	ExtPEXF15\$SP\$PrtOps\$setNam	External fault 15 custom-name	Vstring64
138	ExtPEXF2\$ST\$Str\$general	External fault 2 trip pickup	Bool
139	ExtPEXF2\$ST\$Op\$general	External fault 2 trip status	Bool
140	ExtPEXF2\$SP\$PrtVal\$setCharact	External fault 2 polarity	Byte
141	ExtPEXF2\$SP\$OpDITmms\$setVal	External fault 2 trip time delay	Long
142	ExtPEXF2\$SP\$PrtOps\$setVal	External fault 2 protection setting	Long
143	ExtPEXF2\$SP\$PrtOps\$setNam	External fault 2 custom-name	Vstring64
144	ExtPEXF3\$ST\$Str\$general	External fault 3 trip pickup	Bool
145	ExtPEXF3\$ST\$Op\$general	External fault 3 trip status	Bool
146	ExtPEXF3\$SP\$PrtVal\$setCharact	External fault 3 polarity	Byte
147	ExtPEXF3\$SP\$OpDITmms\$setVal	External fault 3 trip time delay	Long
148	ExtPEXF3\$SP\$PrtOps\$setVal	External fault 3 protection setting	Long
149	ExtPEXF3\$SP\$PrtOps\$setNam	External fault 3 custom-name	Vstring64
150	ExtPEXF4\$ST\$Str\$general	External fault 4 trip pickup	Bool
151	ExtPEXF4\$ST\$Op\$general	External fault 4 trip status	Bool
152	ExtPEXF4\$SP\$PrtVal\$setCharact	External fault 4 polarity	Byte
153	ExtPEXF4\$SP\$OpDITmms\$setVal	External fault 4 trip time delay	Long
154	ExtPEXF4\$SP\$PrtOps\$setVal	External fault 4 protection setting	Long
155	ExtPEXF4\$SP\$PrtOps\$setNam	External fault 4 custom-name	Vstring64
156	ExtPEXF5\$ST\$Str\$general	External fault 5 trip pickup	Bool
157	ExtPEXF5\$ST\$Op\$general	External fault 5 trip status	Bool
158	ExtPEXF5\$SP\$PrtVal\$setCharact	External fault 5 polarity	Byte
159	ExtPEXF5\$SP\$OpDITmms\$setVal	External fault 5 trip time delay	Long
160	ExtPEXF5\$SP\$PrtOps\$setVal	External fault 5 protection setting	Long
161	ExtPEXF5\$SP\$PrtOps\$setNam	External fault 5 custom-name	Vstring64
162	ExtPEXF6\$ST\$Str\$general	External fault 6 trip pickup	Bool
163	ExtPEXF6\$ST\$Op\$general	External fault 6 trip status	Bool
164	ExtPEXF6\$SP\$PrtVal\$setCharact	External fault 6 polarity	Byte
165	ExtPEXF6\$SP\$OpDITmms\$setVal	External fault 6 trip time delay	Long
166	ExtPEXF6\$SP\$PrtOps\$setVal	External fault 6 protection setting	Long
167	ExtPEXF6\$SP\$PrtOps\$setNam	External fault 6 custom-name	Vstring64
168	ExtPEXF7\$ST\$Str\$general	External fault 7 trip pickup	Bool
169	ExtPEXF7\$ST\$Op\$general	External fault 7 trip status	Bool
170	ExtPEXF7\$SP\$PrtVal\$setCharact	External fault 7 polarity	Byte
171	ExtPEXF7\$SP\$OpDITmms\$setVal	External fault 7 trip time delay	Long
172	ExtPEXF7\$SP\$PrtOps\$setVal	External fault 7 protection setting	Long
173	ExtPEXF7\$SP\$PrtOps\$setNam	External fault 7 custom-name	Vstring64
174	ExtPEXF8\$ST\$Str\$general	External fault 8 trip pickup	Bool
175	ExtPEXF8\$ST\$Op\$general	External fault 8 trip status	Bool
176	ExtPEXF8\$SP\$PrtVal\$setCharact	External fault 8 polarity	Byte
177	ExtPEXF8\$SP\$OpDITmms\$setVal	External fault 8 trip time delay	Long
178	ExtPEXF8\$SP\$PrtOps\$setVal	External fault 8 protection setting	Long
179	ExtPEXF8\$SP\$PrtOps\$setNam	External fault 8 custom-name	Vstring64
180	ExtPEXF9\$ST\$Str\$general	External fault 9 trip pickup	Bool
181	ExtPEXF9\$ST\$Op\$general	External fault 9 trip status	Bool
182	ExtPEXF9\$SP\$PrtVal\$setCharact	External fault 9 polarity	Byte
183	ExtPEXF9\$SP\$OpDITmms\$setVal	External fault 9 trip time delay	Long
184	ExtPEXF9\$SP\$PrtOps\$setVal	External fault 9 protection setting	Long
185	ExtPEXF9\$SP\$PrtOps\$setNam	External fault 9 custom-name	Vstring64
186	HsePTOC1\$ST\$Str\$general	HS E/ F1 trip pickup	Bool

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187	HsePTOC1\$ST\$Op\$general	HS E/ F1 trip status	Bool
188	HsePTOC1\$SP\$StrVal\$setMag\$i	HS E/F1 trip level	Long
189	HsePTOC1\$SP\$OpDITmms\$setVal	HS E/F1 trip time delay	Long
190	HsePTOC1\$SP\$PrtOps\$setVal	HS E/F1 protection setting	Long
191	HsePTOC2\$ST\$Health\$stVal	HS E/ F2 trip pickup	Byte
192	HsePTOC2\$ST\$Str\$general	HS E/ F2 trip status	Bool
193	HsePTOC2\$SP\$StrVal\$setMag\$i	HS E/F2 trip level	Long
194	HsePTOC2\$SP\$OpDITmms\$setVal	HS E/F2 trip time delay	Long
195	HsePTOC2\$SP\$PrtOps\$setVal	HS E/F2 protection setting	Long
196	HspPTOC1\$ST\$Str\$general	HS Overcurrent trip pickup	Bool
197	HspPTOC1\$ST\$Op\$general	HS Overcurrent trip status	Bool
198	HspPTOC1\$SP\$StrVal\$setMag\$i	HS Overcurrent trip level	Long
199	HspPTOC1\$SP\$OpDITmms\$setVal	HS Overcurrent trip time delay	Long
200	HspPTOC1\$SP\$PrtOps\$setVal	HS Overcurrent protection setting	Long
201	LPHD1\$ST\$PhyHealth\$stVal	Relay hardware status	Byte
202	LPHD1\$CO\$WrtPrt\$Oper\$ctlVal	Activate setting-write protection	Bool
203	LPHD1\$DC\$PhyNam\$hwrRev	Hardware type: FeederVision FVD	Vstring255
204	LPHD1\$DC\$PhyNam\$swRev	Software version: v2.022	Vstring255
205	LPHD1\$DC\$PhyNam\$serNum	Relay serial number	Vstring255
206	LPHD1\$DC\$PhyNam\$model	Relay Type: FeederVision FVD	Vstring255
207	LPHD1\$SP\$PasWrd\$setCharact	Enable/disable user password	Byte
208	LPHD1\$SP\$PasStr\$setNam	User password text string	Vstring64
209	LPHD1\$SP\$SysPas\$setCharact	Enable/disable engineer password	Byte
210	LPHD1\$SP\$ScnSav\$setCharact	Enable/disable screen saver	Byte
211	LPHD1\$SP\$ScnTim\$setVal	Screen saver timeout setting	Long
212	LPHD1\$SP\$InvLed\$setCharact	Invert LED color setting	Byte
213	LPHD1\$SP\$SwpLed\$setCharact	Swap LED position setting	Byte
214	LdiPTOC1\$ST\$Str\$general	Load-increase trip pickup	Bool
215	LdiPTOC1\$ST\$Op\$general	Load-increase trip status	Bool
216	LdiPTOC1\$SP\$StrVal\$setMag\$i	Load-increase trip level	Long
217	LdiPTOC1\$SP\$OpDITmms\$setVal	Load-increase trip time delay	Long
218	LdiPTOC1\$SP\$PrtOps\$setVal	Load-increase protection setting	Long
219	LdiPTOC1\$SP\$CcrVal\$setMag\$i	Ccr setting for Load-increase protection	Long
220	LspPTOC1\$ST\$Str\$general	LS Overcurrent trip pickup	Bool
221	LspPTOC1\$ST\$Op\$general	LS Overcurrent trip status	Bool
222	LspPTOC1\$SP\$StrVal\$setMag\$i	LS Overcurrent trip level	Long
223	LspPTOC1\$SP\$OpDITmms\$setVal	LS Overcurrent trip time delay	Long
224	LspPTOC1\$SP\$PrtOps\$setVal	LS Overcurrent protection setting	Long
225	MixGGIO1\$ST\$ISCSO\$stVal	Relay output 1-8 status	Byte
226	MixGGIO1\$ST\$IntIn01\$stVal	Digital input 1-8 status	Byte
227	MixGGIO1\$ST\$IntIn02\$stVal	Digital input 9-16 status	Byte
228	MixGGIO1\$ST\$IntIn03\$stVal	Digital input 17-24 status	Byte
229	MixGGIO1\$ST\$IntOut01\$stVal	Trip status (bit 0-15)	Ushort
230	MixGGIO1\$ST\$IntOut02\$stVal	Trip status (bit 16-31)	Ushort
231	MixGGIO1\$ST\$IntOut03\$stVal	Trip status (bit 32-47)	Ushort
232	MixGGIO1\$ST\$IntOut04\$stVal	Alarm status (bit 0-15)	Ushort
233	MixGGIO1\$ST\$IntOut05\$stVal	Alarm status (bit 16-31)	Ushort
234	MixGGIO1\$ST\$IntOut06\$stVal	Alarm status (bit 32-47)	Ushort
235	MixGGIO1\$ST\$IntOut07\$stVal	Inhibit status (bit 0-15)	Ushort
236	MixGGIO1\$ST\$IntOut08\$stVal	Inhibit status (bit 16-31)	Ushort
237	MixGGIO1\$ST\$IntOut09\$stVal	Inhibit status (bit 32-47)	Ushort
238	MixGGIO1\$ST\$LgcSt\$stVal	Logical status	Byte

239	MixGGIO1\$ST\$Binp01\$stVal	Digital input 1 status	Bool
240	MixGGIO1\$ST\$Binp02\$stVal	Digital input 2 status	Bool
241	MixGGIO1\$ST\$Binp03\$stVal	Digital input 3 status	Bool
242	MixGGIO1\$ST\$Binp04\$stVal	Digital input 4 status	Bool
243	MixGGIO1\$ST\$Binp05\$stVal	Digital input 5 status	Bool
244	MixGGIO1\$ST\$Binp06\$stVal	Digital input 6 status	Bool
245	MixGGIO1\$ST\$Binp07\$stVal	Digital input 7 status	Bool
246	MixGGIO1\$ST\$Binp08\$stVal	Digital input 8 status	Bool
247	MixGGIO1\$ST\$Binp09\$stVal	Digital input 9 status	Bool
248	MixGGIO1\$ST\$Binp10\$stVal	Digital input 10 status	Bool
249	MixGGIO1\$ST\$Binp11\$stVal	Digital input 11 status	Bool
250	MixGGIO1\$ST\$Binp12\$stVal	Digital input 12 status	Bool
251	MixGGIO1\$ST\$Binp13\$stVal	Digital input 13 status	Bool
252	MixGGIO1\$ST\$Binp14\$stVal	Digital input 14 status	Bool
253	MixGGIO1\$ST\$Binp15\$stVal	Digital input 15 status	Bool
254	MixGGIO1\$ST\$Binp16\$stVal	Digital input 16 status	Bool
255	MixGGIO1\$ST\$Binp17\$stVal	Digital input 17 status	Bool
256	MixGGIO1\$ST\$Binp18\$stVal	Digital input 18 status	Bool
257	MixGGIO1\$ST\$Binp19\$stVal	Digital input 19 status	Bool
258	MixGGIO1\$ST\$Binp20\$stVal	Digital input 20 status	Bool
259	MixGGIO1\$ST\$Binp21\$stVal	Digital input 21 status	Bool
260	MixGGIO1\$ST\$Binp22\$stVal	Digital input 22 status	Bool
261	MixGGIO1\$ST\$Binp23\$stVal	Digital input 23 status	Bool
262	MixGGIO1\$ST\$Binp24\$stVal	Digital input 24 status	Bool
263	MixGGIO1\$ST\$Bout1\$stVal	Relay output 1 status	Bool
264	MixGGIO1\$ST\$Bout2\$stVal	Relay output 2 status	Bool
265	MixGGIO1\$ST\$Bout3\$stVal	Relay output 3 status	Bool
266	MixGGIO1\$ST\$Bout4\$stVal	Relay output 4 status	Bool
267	MixGGIO1\$ST\$Bout5\$stVal	Relay output 5 status	Bool
268	MixGGIO1\$ST\$Bout6\$stVal	Relay output 6 status	Bool
269	MixGGIO1\$ST\$Bout7\$stVal	Relay output 7 status	Bool
270	MixGGIO1\$ST\$Bout8\$stVal	Relay output 8 status	Bool
271	MixGGIO1\$SP\$DoSet3\$setCharact	Relay output 3 setting	Byte
272	MixGGIO1\$SP\$DoSet4\$setCharact	Relay output 4 setting	Byte
273	MixGGIO1\$SP\$DoSet5\$setCharact	Relay output 5 setting	Byte
274	MixGGIO1\$SP\$DoSet6\$setCharact	Relay output 6 setting	Byte
275	MixGGIO1\$SP\$DoSet7\$setCharact	Relay output 7 setting	Byte
276	MixGGIO1\$SP\$DoSet8\$setCharact	Relay output 8 setting	Byte
277	MixGGIO1\$SP\$DiSet01\$setCharact	Digital input 1 setting	Byte
278	MixGGIO1\$SP\$DiSet02\$setCharact	Digital input 2 setting	Byte
279	MixGGIO1\$SP\$DiSet03\$setCharact	Digital input 3 setting	Byte
280	MixGGIO1\$SP\$DiSet04\$setCharact	Digital input 4 setting	Byte
281	MixGGIO1\$SP\$DiSet05\$setCharact	Digital input 5 setting	Byte
282	MixGGIO1\$SP\$DiSet06\$setCharact	Digital input 6 setting	Byte
283	MixGGIO1\$SP\$DiSet07\$setCharact	Digital input 7 setting	Byte
284	MixGGIO1\$SP\$DiSet08\$setCharact	Digital input 8 setting	Byte
285	MixGGIO1\$SP\$DiSet09\$setCharact	Digital input 9 setting	Byte
286	MixGGIO1\$SP\$DiSet10\$setCharact	Digital input 10 setting	Byte
287	MixGGIO1\$SP\$DiSet11\$setCharact	Digital input 11 setting	Byte
288	MixGGIO1\$SP\$DiSet12\$setCharact	Digital input 12 setting	Byte
289	MixGGIO1\$SP\$DiSet13\$setCharact	Digital input 13 setting	Byte
290	MixGGIO1\$SP\$DiSet14\$setCharact	Digital input 14 setting	Byte

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291	MixGGIO1\$SP\$DiSet15\$setCharact	Digital input 15 setting	Byte
292	MixGGIO1\$SP\$DiSet16\$setCharact	Digital input 16 setting	Byte
293	MixGGIO1\$SP\$DiSet17\$setCharact	Digital input 17 setting	Byte
294	MixGGIO1\$SP\$DiSet18\$setCharact	Digital input 18 setting	Byte
295	MixGGIO1\$SP\$DiSet19\$setCharact	Digital input 19 setting	Byte
296	MixGGIO1\$SP\$DiSet20\$setCharact	Digital input 20 setting	Byte
297	MixGGIO1\$SP\$DiSet21\$setCharact	Digital input 21 setting	Byte
298	MixGGIO1\$SP\$DiSet22\$setCharact	Digital input 22 setting	Byte
299	MixGGIO1\$SP\$DiSet23\$setCharact	Digital input 23 setting	Byte
300	MixGGIO1\$SP\$DiSet24\$setCharact	Digital input 24 setting	Byte
301	NdrPDOP1\$ST\$Str\$general	Over power trip pickup	Bool
302	NdrPDOP1\$ST\$Op\$general	Over power trip status	Bool
303	NdrPDOP1\$SP\$StrVal\$setMag\$i	Over power trip level	Long
304	NdrPDOP1\$SP\$OpDITmms\$setVal	Over power trip time delay	Long
305	NdrPDOP1\$SP\$PrtOps\$setVal	Over power protection setting (non-directional)	Long
306	PhsPTOC1\$ST\$Str\$general	Overcurrent 1 trip pickup	Bool
307	PhsPTOC1\$ST\$Op\$general	Overcurrent 1 trip status	Bool
308	PhsPTOC1\$SP\$TmACrv\$setCharact	Overcurrent 1 characteristic curve	Byte
309	PhsPTOC1\$SP\$StrVal\$setMag\$i	Overcurrent 1 trip level	Long
310	PhsPTOC1\$SP\$TmMult\$setMag\$i	Overcurrent 1 time multiplier for inverse-curve	Long
311	PhsPTOC1\$SP\$OpDITmms\$setVal	Overcurrent 1 trip time delay for definite-time only	Long
312	PhsPTOC1\$SP\$PrtOps\$setVal	Overcurrent 1 protection setting	Long
313	PhsPTOC2\$ST\$Str\$general	Overcurrent 2 trip pickup	Bool
314	PhsPTOC2\$ST\$Op\$general	Overcurrent 2 trip status	Bool
315	PhsPTOC2\$SP\$TmACrv\$setCharact	Overcurrent 2 characteristic curve	Byte
316	PhsPTOC2\$SP\$StrVal\$setMag\$i	Overcurrent 2 trip level	Long
317	PhsPTOC2\$SP\$TmMult\$setMag\$i	Overcurrent 2 time multiplier for inverse-curve	Long
318	PhsPTOC2\$SP\$OpDITmms\$setVal	Overcurrent 2 trip time delay for definite-time only	Long
319	PhsPTOC2\$SP\$PrtOps\$setVal	Overcurrent 2 protection setting	Long
320	PhsPTOV1\$ST\$Str\$general	Over voltage trip pickup	Bool
321	PhsPTOV1\$ST\$Op\$general	Over voltage trip status	Bool
322	PhsPTOV1\$SP\$StrVal\$setMag\$i	Over voltage trip level	Long
323	PhsPTOV1\$SP\$OpDITmms\$setVal	Over voltage trip time delay	Long
324	PhsPTOV1\$SP\$PrtOps\$setVal	Over voltage protection setting	Long
325	PhsPTUV1\$ST\$Str\$general	Under voltage trip pickup	Bool
326	PhsPTUV1\$ST\$Op\$general	Under voltage trip status	Bool
327	PhsPTUV1\$SP\$StrVal\$setMag\$i	Under voltage trip level	Long
328	PhsPTUV1\$SP\$OpDITmms\$setVal	Under voltage trip time delay	Long
329	PhsPTUV1\$SP\$PrtOps\$setVal	Under voltage protection setting	Long
330	PhsTCTR1\$SP\$ARtg\$setMag\$i	CT primary	Long
331	PhsTCTR1\$SP\$PolOps\$setCharact	Overcurrent poles setting	Byte
332	PhsTVTR1\$SP\$VRtg\$setMag\$i	VT primary	Long
333	PhsTVTR1\$SP\$VTsec\$setMag\$i	VT secondary	Long
334	PhsTVTR1\$SP\$VtgVal\$setMag\$i	Voltage	Long
335	PhsTVTR1\$SP\$VtgRef\$setCharact	Voltage ref./sync.	Byte
336	RmsMMXU1\$MX\$TotW\$mag\$i	Total real power	Long
337	RmsMMXU1\$MX\$TotVar\$mag\$i	Total reactive power	Long
338	RmsMMXU1\$MX\$TotVA\$mag\$i	Total apparent power	Long
339	RmsMMXU1\$MX\$PPV\$phsAB\$cVal\$mag\$i	Phase A to B voltage	Long
340	RmsMMXU1\$MX\$PPV\$phsBC\$cVal\$mag\$i	Phase B to C voltage	Long
341	RmsMMXU1\$MX\$PPV\$phsCA\$cVal\$mag\$i	Phase C to A voltage	Long
342	RmsMMXU1\$MX\$PhV\$phsA\$cVal\$mag\$i	Voltage V1 (red phase)	Long

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343	RmsMMXU1\$MX\$PhV\$phsB\$cVal\$mag\$i	Voltage V2 (yellow phase)	Long
344	RmsMMXU1\$MX\$PhV\$phsC\$cVal\$mag\$i	Voltage V3 (blue phase)	Long
345	RmsMMXU1\$MX\$A\$phsA\$cVal\$mag\$i	Current I1 (red phase)	Long
346	RmsMMXU1\$MX\$A\$phsB\$cVal\$mag\$i	Current I2 (yellow phase)	Long
347	RmsMMXU1\$MX\$A\$phsC\$cVal\$mag\$i	Current I3 (blue phase)	Long
348	RmsMMXU1\$MX\$A\$net\$cVal\$mag\$i	E/F current Ist (standby)	Long
349	RmsMMXU1\$MX\$A\$res\$cVal\$mag\$i	E/F current I0 (residual)	Long
350	RmsMMXU1\$MX\$W\$phsA\$cVal\$mag\$i	Real power 1 (red phase)	Long
351	RmsMMXU1\$MX\$W\$phsB\$cVal\$mag\$i	Real power 2 (yellow phase)	Long
352	RmsMMXU1\$MX\$W\$phsC\$cVal\$mag\$i	Real power 3 (blue phase)	Long
353	RmsMMXU1\$MX\$VAr\$phsA\$cVal\$mag\$i	Reactive power 1 (red phase)	Long
354	RmsMMXU1\$MX\$VAr\$phsB\$cVal\$mag\$i	Reactive power 2 (yellow phase)	Long
355	RmsMMXU1\$MX\$VAr\$phsC\$cVal\$mag\$i	Reactive power 3 (blue phase)	Long
356	RmsMMXU1\$MX\$VA\$phsA\$cVal\$mag\$i	Apparent power 1 (red phase)	Long
357	RmsMMXU1\$MX\$VA\$phsB\$cVal\$mag\$i	Apparent power 2 (yellow phase)	Long
358	RmsMMXU1\$MX\$VA\$phsC\$cVal\$mag\$i	Apparent power 3 (blue phase)	Long
359	RmsMMXU1\$MX\$PF\$phsA\$cVal\$mag\$i	Power factor 1 (red phase)	Long
360	RmsMMXU1\$MX\$PF\$phsB\$cVal\$mag\$i	Power factor 2 (yellow phase)	Long
361	RmsMMXU1\$MX\$PF\$phsC\$cVal\$mag\$i	Power factor 3 (blue phase)	Long
362	RmsMMXU1\$MX\$SynAng\$mag\$i	Sync angle	Long
363	SrfCSWI1\$CO\$Pos\$Oper\$ctlVal	Serial rest fault command	Bool
364	SrlPSTO1\$ST\$Str\$general	Serial timeout trip pickup	Bool
365	SrlPSTO1\$ST\$Op\$general	Serial timeout trip status	Bool
366	SrlPSTO1\$SP\$OpDITmms\$setVal	Serial timeout delay	Long
367	SrlPSTO1\$SP\$PrtOps\$setVal	Serial timeout protection setting	Long
368	SysPTOF1\$ST\$Str\$general	Over frequency trip pickup	Bool
369	SysPTOF1\$ST\$Op\$general	Over frequency trip status	Bool
370	SysPTOF1\$SP\$StrVal\$setMag\$i	Over frequency trip level	Long
371	SysPTOF1\$SP\$OpDITmms\$setVal	Over frequency trip time delay	Long
372	SysPTOF1\$SP\$PrtOps\$setVal	Over frequency protection setting	Long
373	SysPTUF1\$ST\$Str\$general	Under frequency trip pickup	Bool
374	SysPTUF1\$ST\$Op\$general	Under frequency trip status	Bool
375	SysPTUF1\$SP\$StrVal\$setMag\$i	Under frequency trip level	Long
376	SysPTUF1\$SP\$OpDITmms\$setVal	Under frequency trip time delay	Long
377	SysPTUF1\$SP\$PrtOps\$setVal	Under frequency protection setting	Long
378	TrpRFLT1\$MX\$A\$phsA\$cVal\$mag\$i	Recent pre trip I1 (red phase)	Long
379	TrpRFLT1\$MX\$A\$phsB\$cVal\$mag\$i	Recent pre trip I1 (yellow phase)	Long
380	TrpRFLT1\$MX\$A\$phsC\$cVal\$mag\$i	Recent pre trip I1 (blue phase)	Long
381	TrpRFLT1\$MX\$A\$net\$cVal\$mag\$i	Recent pre trip Ist (standby)	Long
382	TrpRFLT1\$MX\$A\$res\$cVal\$mag\$i	Recent pre trip I0 (e/f)	Long
383	TrpRFLT1\$MX\$PhV\$phsA\$cVal\$mag\$i	Recent pre trip V1 (red phase)	Long
384	TrpRFLT1\$MX\$PhV\$phsB\$cVal\$mag\$i	Recent pre trip V2 (yellow phase)	Long
385	TrpRFLT1\$MX\$PhV\$phsC\$cVal\$mag\$i	Recent pre trip V3 (blue phase)	Long
386	TrpRFLT1\$MX\$PF\$phsA\$cVal\$mag\$i	Recent pre trip PF1(red phase)	Long
387	TrpRFLT1\$MX\$PF\$phsB\$cVal\$mag\$i	Recent pre trip PF2(yellow phase)	Long
388	TrpRFLT1\$MX\$PF\$phsC\$cVal\$mag\$i	Recent pre trip PF3(blue phase)	Long
389	TrpRFLT1\$MX\$W\$phsA\$cVal\$mag\$i	Recent pre trip power 1(red phase)	Long
390	TrpRFLT1\$MX\$W\$phsB\$cVal\$mag\$i	Recent pre trip power 2(yellow phase)	Long
391	TrpRFLT1\$MX\$W\$phsC\$cVal\$mag\$i	Recent pre trip power 3(blue phase)	Long
392	TrpRFLT1\$MX\$Hz\$mag\$i	Recent pre trip frequency	Long
393	TrpRFLT1\$MX\$SynAng\$mag\$i	Recent pre trip sync angle	Long
394	TrpRFLT1\$ST\$FltPos\$stVal	Recent trip sequence number	Byte

395	TrpRFLT1\$ST\$FltNo\$stVal	Recent trip number	Ulong
396	TrpRFLT1\$ST\$FltNo\$t	Recent trip time & date	Utctime
397	TrpRFLT1\$CO\$FltPos\$Oper\$ctlVal	Set the Recent trip sequence number	Byte

Note:

1) All analogue values or parameter values are stored in integer format (i.e. floating point format “\$f” is not used).

Their actual value = ((i) value)*(\$scaleFactor)+(\$offset).

2) The write-protection must be deactivated first by manipulating the “WrtPrt” control of the logic node “LPHD1” before any operation of writing to a desired logic attribute is executed. The write-protection is activated when the system powers up and the de-activation status automatically becomes invalid in 5 minutes after the deactivation operation is successfully carried out. In order to de-activate the write-protection, the value of “1” has to be successfully written to the logic attribute “LHPD1\$CO\$WrtPrt\$Oper\$ctlVal” and the correct order of manipulating a control model has to be followed as well.

3.4 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 MMS (Part 8-1) data types.

Part 7 Data Type	MMS Data Type (Part 8-1)	Part 7 Description
BOOLEAN	Bool	Logical TRUE/FALSE value
BVstring13	BVstring13	Variable bit string (up to 13 bits)
CODED_ENUM	Byte	Coded enumeration
CODED_ENUM2	Byte	Coded enumeration (2)
EntryTime	Btime6	8.1 Section 8.1.3.7
ENUMERATED8	Byte	8 bit enumerated value
ENUMERATED16	Short	16 bit enumerated value
FLOAT32	Float	32 bit floating point value
FLOAT64	Double	64 bit floating point value
INT8	Byte	8 bit signed integer value
INT8U	Ubyte	8 bit unsigned 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
INT128	Long	128 bit signed integer value
OCTET_STRING6	Ostring6	6 character string (8 bits per character)
OCTET_STRING8	Ostring8	8 character string (8 bits per character)
OCTET_STRING64	Ostring64	64 character string (8 bits per character)
Quality	BVstring13	IEC 61850 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_BTME6	Btime6	Reporting type - 6 byte timestamp
RTYP_BVSTR6	BVstring6	Reporting type - Variable bit string (up to 6 bits)
RTYP_BVSTR8	BVstring8	Reporting type - Variable bit string (up to 8 bits)
RTYP_BVSTR10	BVstring10	Reporting type - Variable bit string (up to 10 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	IEC 61850 Time stamp
UNICODE_STRING255	UTF8Vstring255	255 character string (16 bits per unicode character)
UTC_TM	Utctime	UTC Timestamp
VISIBLE_STRING64	Vstring64	64 character string
VISIBLE_STRING65	Vstring65	65 character string
VISIBLE_STRING97	Vstring97	97 character string
VISIBLE_STRING255	Vstring255	255 character string