

SIPROTEC

Differential Protection 7UT613/63x

V4.6

IEC 61850

PIXIT

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Preface

Purpose of this manual

In this Manual, you will find the

- ❑ Specification of the applications of the IEC 61850 interface
- ❑ General information about the effects of configuration of your device to the different Logical Nodes and DOIs
- ❑ Mapping of device relevant information to Logical Nodes as part of protocol IEC61850

Target audience

This manual is intended mainly for all persons who configure, parameterize and operate a SIPROTEC Device 7UT613/63x.

Scope of validity of this Manual

SIPROTEC 7UT613/63x, Version 4.60.

Standards

This document has been created according to the ISO 9001 quality standards.

Further Support

If you have questions about SIPROTEC IEC 61850 interface, please contact your Siemens sales representative.

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Applications

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1.1 General

This chapter specifies the protocol implementation extra information for testing (PIXIT) of the IEC 61850 interface in SIPROTEC 7UT613/63x V4.6.

It is based on the service subset definition given in the protocol implementation conformance statement (PICS), which is specified within the user manual *SIPROTEC 4 Ethernet Module EN 100 IEC 61850 Electrical Interface 100 MBit, Manual /1/*.

The following applicable ACSI service models are specified:

- Association model
- Server model
- Data set model
- Substitution model
- Setting group control model
- Reporting model
- Logging model
- Generic substitution model
- Transmission of sample values model
- Control model
- Time and time synchronisation model
- File transfer model
- General items

Together with the PICS and the MICS the PIXIT forms the basis for a conformance test according to IEC 61850-10.

The mapping between the IEC 61850 server data model and the SIPROTEC specific data is specified in Chapter 3.

1.2 Association model

Description	Value / Clarification
Maximum number of clients that can set-up an association simultaneously	5
Lost connection detection time range (default range of TCP_KEEPALIVE is 1 -30 seconds) Remark: Regarding router/socket holding with OS of client	3 seconds
Is authentication supported	N
What called association parameters are necessary for successful association ?	Transport selector Y Session selector Y Presentation selector Y AP Title ANY AE Qualifier ANY Where Y means: as defined within the ICD-File ANY means: any value accepted
What is the maximum and minimum MMS PDU size ?	Max MMS PDU size 32768 Min MMS PDU size
What is the typical startup time after a power supply interrupt ?	15 SECONDS
<additional items>	

1.3 Server model

Description	Value / Clarification
Which analogue value (MX) quality bits are supported (can be set by server) ?	Validity: Y Good, Y Invalid, N Reserved, Y Questionable Y Overflow Y OutofRange N BadReference N Oscillatory Y Failure Y OldData N Inconsistent Y Inaccurate Source: Y Process N Substituted Y Test Y OperatorBlocked
Which status value (ST) quality bits are supported (can be set by server) ?	Validity: Y Good, Y Invalid, N Reserved, Y Questionable N BadReference Y Oscillatory Y Failure Y OldData N Inconsistent N Inaccurate Source: Y Process Y Substituted Y Test Y OperatorBlocked
What is the maximum number of data values in one GetDataValues request ?	Not restricted; depends on the max. MMS PDU size given above.
What is the maximum number of data values in one SetDataValues request ?	Not restricted; depends on the max. MMS PDU size given above. No Data Attribute within our object directory is writable with the service SetDataValues.
<additional items>	

1.4 Data set model

Description	Value / Clarification
Maximum number of data elements in one data set	Not limited by an internal configuration parameter. It depends on the available memory.
How many persistent data sets can be created by one or more clients ?	64 data sets for each LD. It dedends on the available memory.
How many non-persistent data sets can be created by one or more clients ?	10 data sets. It depends on the available memory.
additional items:	
Maximum number of data sets	Could not be defined, it depends on the available memory space. In principle, this information it not necessary from type conformance testing standpoint.

1.5 Substitution model

This service will not be supported (see also *SIPROTEC 4 Ethernet Module EN 100 IEC 61850 Electrical Interface 100 MBit, Manual /1/*).

1.6 Setting group control model

Description	Value / Clarification
What is the number of supported setting groups for each logical device ?	Setting groups available for LLN0 only in LD PROT. The number of supported setting groups is 1 or 4, it depends on the given configuration. Specified in the ICD-File.
What is the effect of when and how the non-volatile storage is updated ? (compare IEC 61850-8-1 §16.2.4)	Just SelectActiveSG service will supported according to PICS.
<additional items>	

1.7 Reporting model

Description	Value / Clarification
The supported trigger conditions are	Y Integrity Y Data change Y Quality change Y Data update Y General Interrogation
The supported optional fields are	Y Sequence-number Y Report-time-stamp Y Reason-for-inclusion Y Data-set-name Y Data-reference N Buffer-overflow N EntryID Y Conf-rev Y Segmentation
Can the server send segmented reports ?	Y
Mechanism on second internal data change notification of the same analogue data value within buffer period (Compare IEC 61850-7-2 §14.2.2.9)	Send report immediately
Multi client URCB approach (Compare IEC 61850-7-2 §14.2.1)	All clients can access all URCB's
What is the format of EntryID ?	EntryID is an attribute of BRCB. Buffered report will not supported acc. to PICS.
What is the buffer size for each BRCB or how many reports can be buffered ?	Not supported.
additional items:	
Interrupt of general interrogation	Running GI could not be interrupted. If a new GI request occurs during a running GI, the current GI will be finished first before the second GI request will be processed.
Integrity period	Configurable >=1 second;
Dynamic URCB reservation after an abort of the client/server association	Reservation of the URCB is lost. After a re-establishment of the association the URCB reservation has to be done by the client before. This behavior is implemented to avoid unnecessary memory residuals if temporarily client associations (e.g. for maintenance) are established.
Configured URCB reservation after an abort of the client/server association	Reservation of the URCB is not lost.

1.8 Logging model

This service will not be supported (see also *SIPROTEC 4 Ethernet Module EN 100 IEC 61850 Electrical Interface 100 MBit, Manual /1/*).

1.9 Generic substation model

Description	Value / Clarification
What is the behavior when one subscribed GOOSE message isn't received or syntactically incorrect ?	The telegram will be discarded (i.e not forwarded to the application) since it is corrupt or syntactically incorrect and therefore not readable. The data objects will be declared as invalid after a timeout detection since no telegram have been received by the application.
What is the behavior when a subscribed GOOSE message is out-of-order ?	Error message will be stored into the error buffer (could be accessed by EN100 web-server). All expected data objects will be declared as invalid.
What is the behavior when a subscribed GOOSE message is duplicated ?	The sequence number given in the GOOSE-message is out-of-order. Error message will be stored into the error buffer (could be accessed by EN100 web-server). All expected data objects will be declared as invalid.
additional items:	
Maximum number of GOOSE messages which could be sent	<= 16 ; It depends on the available memory.
Maximum number of GOOSE messages which could be received	<= 128 ; It depends on the available memory.
Interpretation of GOOSE messages at subscriber side	<ol style="list-style-type: none"> 1. Received GOOSE data objects without assigned quality attribute are interpreted as invalid. 2. Received GOOSE data objects which quality attribute are set to questionable are changed to invalid.
GOOSE subscriber behavior in case of missing GOOSE messages	<p>After a GOOSE multicast application association has been interrupted, the reception of the second consecutive GOOSE telegram is required to validate the state of this GOOSE association again.</p> <p>However, the IED tolerates a missing telegram as long as the next telegram (expected n, received n+1) is received within the time allowed to live time out detection (the time allowed to live timeout detection occurs after 2*TAL).</p>
GOOSE subscriber behaviour in case of multiple GOOSE messages	If a message is received twice or more, the IED already reports an error after the second reception. Therefore, network configuration error can be more easily tracked.
What is the behavior when a GOOSE header parameter is mismatching with the expected one? (datSet, goID, confRev, numDatSetEntries, number of allData)	Error message will be stored into the error buffer (could be accessed by EN100 web-server). All expected data objects will be declared as invalid.

What is the behavior when a timeAllowedToLive is 0?	Error message will be stored into the error buffer (could be accessed by EN100 web-server) since the timeAllowedToLive expired. All expected data objects will be declared as invalid.
What is the behavior when there is an out-of-order entry in the allData?	The confRev attribute in the header guarantees that the allData entries are in the correct order. Therefore, it's necessary to check the confRev attribute. There is no chance to detect such an out-of-order.
What is the behavior when no telegram is received within a TAL timeout?	To avoid an incorrect timeout detection, the subscriber detects a timeout after a period of 2×TAL. The information is then declared as questionable, oldData.
What is the behavior when a GOOSE header parameter goCBRef is mismatching with the expected one?	Since the goCBRef shall be unique stationwide, the received telegram with the mismatched goCBRef will be discarded: it has not been published. In that case only the timeout detection will set the data to invalid.
What is the behavior when a GOOSE header parameter APPID is mismatching with the expected one?	The APPID is a link layer parameter. It is used as a filter on link layer. If the APPID is mismatching, the telegram will therefore be discarded on link layer without notifying the application. Only the timeout detection will set the data to invalid.
What is the behavior when a GOOSE header parameter t is not increasing?	The t parameter is not checked. Therefore it doesn't lead to any error detection.
What is the behavior when numDatSetEntries and number of allData are inconsistent?	The telegram is discarded since it is corrupt (not well formed). After the timeout detection (no telegram forwarded to the application) the data objects are declared invalid.

1.10 Transmission of sample values model

Compare the "Implementation Guidelines for Electrical Current and Voltage Transducers according to IEC 60044-7/8 with Digital Output according to IEC 61850-9-2; Version 1.0; as specified by ABB, Areva, Landis+Gyr, OMICRON and SIEMENS

This service will not be supported (see also *SIPROTEC 4 Ethernet Module EN 100 IEC 61850 Electrical Interface 100 MBit, Manual /1/*).

1.11 Control model

Description	Value / Clarification
What control models are supported ?	Y Status-only Y Direct-with-normal-security N Sbo-with-normal-security Y Direct-with-enhanced-security Y Sbo-with-enhanced-security
Is Time activated operate (operTm) supported	N
What is the behavior when the test attribute is set in the SelectWithValue and/or Operate request ?	Will be acknowledged with negative response. The AddCause attribute will be set to "not supported"
What are the conditions for the time (T) attribute in the SelectWithValue and/or Operate request ?	Time attribute is not relevant.
Is "operate-many" supported ?	N
Is pulse configuration supported ?	N
What check conditions are supported ?	Y Synchrocheck Y Interlock-check
What service error types are supported ?	Y Instance-not-available Y Instance-in-use Y Access-violation Y Access-not-allowed-in-current-state Y Parameter-value-inappropriate Y Parameter-value-inconsistent Y Class-not-supported Y Instance-locked-by-other-client Y Control-must-be-selected Y Type-conflict Y Failed-due-to-communications Y Constraint failed-due-to-server-constraint

What additional cause diagnosis are supported ?	<p>N Blocked-by-switching-hierarchy Y Select-failed Y Invalid-position Y Position-reached Y Parameter-change-in-execution N Step-limit Y Blocked-by-Mode Y Blocked-by-process Y Blocked-by-interlocking Y Blocked-by-synchrocheck Y Command-already-in-execution N Blocked-by-health Y 1-of-n-control Y Abortion-by-cancel Y Time-limit-over N Abortion-by-trip</p>
additional items:	
What additional cause diagnosis extensions are supported ?	<p>Y Plausibility_error Y Parameter_setting_invalid Y Hardware_error Y System_overload Y Internal_fault Y Command_sequence_error</p>
Changing the control services by configuration	N
Inconsistency between Select and (Oper or cancel)	<p>Oper or cancel will be acknowledged with negative response if inconsistencies to the select request are detected. The following attributes will not be checked in this case: T (Time)</p>
Cancel request could be sent after an operate request.	Y
Format of the control time stamp attribute ?	TimeStamp instead of EntryTime acc. to the 7-2 Errata List.
Negative response for select request could be performed only	<p>If test mode is activated or If the selection is always done.</p>

1.12 Time and time synchronisation model

Description	Value / Clarification
What kind of quality bits are supported ?	N LeapSecondsKnown Y ClockFailure Y ClockNotSynchronized
What kind of quality accuracy bits are supported ?	Y Invalid N Unspecified
What is the behavior when the time synchronization signal/messages are lost ?	The quality attribute "ClockFailure" will be set to TRUE after a configured time period.
additional items:	
What is the behavior at start up time when a time synchronization via SNTP is configured ?	The "ClockNotSynchronized" attribute is set to TRUE as long as no time synchronization is established.

1.13 File transfer model

Description	Value / Clarification
What is structure of files and directories?	Directory name / COMTRADE / *; Directory name / LD / *; Files according to the comtrade standard.
What is the resulting behavior if no file specification is present in the file directory request?	If no file specification is present in the directory request, all files are returned - not only the files in the root directory.
Is the IETF FTP protocol also implemented ?	N
Directory names are separated from the file name by	"/"
The maximum file name size including path (default 64 chars)	64
Are directory/file name case sensitive	Case sensitive
Maximum file size	Not limited by implementation or configuration. Depends on available memory.
additional items:	
Maximum number of clients that can use the FTP service simultaneously	1
Maximum number of files that can be accessed simultaneously	1

1.14 General items

Description	Value / Clarification
IED behavior when the Logical Device is blocked : LLN0.Mod.stVal = blocked	Unlike the definition of the Data Objects "Mod/Beh" in IEC 61850-7-4, outputs to the process will be generated. Details to this behavior are specified in <i>SIPROTEC 4 Ethernet Module EN 100 IEC 61850 Electrical Interface 100 MBit, Manual /1/</i>
additional items:	
GOOSE Proxy object	To be able to subscribe Data over GOOSE, Proxy Objects are added into the object directory. Typically, they are Data of GGIO logical nodes: SPCSOxx, DPCSOxx, ISCSOxx. The Data Attributes of those Data are ctlVal, q and t. The control model associated to those Data is status-only. They are not controllable from an IEC61850 client, and their function is only to enable the GOOSE subscribing.

Basics

2

Contents

This chapter contains general information about the effects of device configuration on Logical Nodes and DOIs.

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2.1 General

The protocol IEC 61850 was developed to define a standard that can be internationally employed for the transmission of power automation system data.

This cross national standard enables an interoperability between automation systems and devices made by different manufacturers.

The devices and high voltage bay control units of the SIPROTEC 4 series can be equipped with an Ethernet module EN100 via which the protocol IEC 61850 is interpreted.

The configuration of the protocol and the integration of the device with redundant IEC 61850 interfaces in your network are performed via the configuration system DIGSI.

For details please refer to the manuals:

- ❑ *SIPROTEC 4 Ethernet Module EN 100 IEC 61850 Electrical Interface 100 MBit, Manual /1/ und*
- ❑ *SIPROTEC 4 System Description /2/.*

**Note:**

The following definitions are taken mainly from standard IEC 61850, Technical Specification IEC TS 61850-2.

Logical Devices

LD Logical Devices represent a functional structuring of the LN Logical Nodes of a SIPROTEC device.

The following Logical Devices are present:

- ❑ Logical Device Protection PROT
- ❑ Logical Device Measurement MEAS
- ❑ Logical Device Disturbance Recorder DR
- ❑ Logical Device Control CTRL
- ❑ Logical Device Extended EXT

Each LD contains LN LLN0 and LN LPHD1.

The allocation of the Logical Nodes to the Logical Devices is listed in Chapter 2.3.

Logical Node LN	Smallest part of a function that exchanges data. A logical node is an object defined by its data and methods.
Data object instance DOI	A Data object is part of a logical node object representing specific information for example status of measurement. From an object-oriented point of view, a data object is an instance of a data class. Specific data classes carry the semantic within a logical node.
Data attribute instance DAI	A Data attribute defines the name (semantic), format, range of possible values, and representation of values while being communicated.
Annunciation types via GOOSE	<p>Generic Object Oriented Substation Event</p> <p>A GOOSE report enables high speed trip signals to be issued with a high probability of delivery.</p> <p>The following types of information can be configured via GOOSE.</p> <ul style="list-style-type: none"><input type="checkbox"/> External single point indication O/O<input type="checkbox"/> External single point indication I/O<input type="checkbox"/> External double point indication<input type="checkbox"/> External double point indication, fast<input type="checkbox"/> External operational measured values<input type="checkbox"/> External metered values

2.2 Effects of Configuration on the Logical Nodes

2.2.1 Function parameters

Depending on the configuration of the function parameters the functions of the SIPROTEC are enabled or disabled. If a function is disabled, the corresponding Logical Node is not available.

The following Logical Nodes are always available:

Logical Device Protection:	LLN0, LPHD1, PTRC1
Logical Device Measurement:	LLN0, LPHD1, MMXU1
Logical Device Disturbance Recorder:	LLN0, LPHD1, RDRE1
Logical Device Control:	LLN0, LPHD1, CALH1
Logical Device Extended:	LLN0, LPHD1

The following table shows which Logical Nodes are available when setting the corresponding function parameter.

The setting (-) implies that no corresponding LN is available. .

Table 2-1 Effects of Function parameters to the Logical Nodes

No.	Function	Setting	Logical Nodes
103	Setting Group Change Option		No effect
105	Protection Object	3 phase transf. Autotransf. Autotr. node Generator/Motor 3ph Busbar	MSQI1, MMTR1, M1_MMXU1 - M5_MMXU1, M1_MSQI1 - M5_MSQI1
		1 phase transf.	MMTR1, M1_MMXU1 - M5_MMXU1
		1ph Busbar	MSQI1
112	Differential Protection	Disabled	-
		Enabled	PDIF1, PDIF2
113	Restricted earth fault protection	Disabled	-
		Enabled	PDIF3

Table 2-1 Effects of Function parameters to the Logical Nodes (Forts.)

No.	Function	Setting	Logical Nodes
114	Restricted earth fault protection 2	Disabled	-
		Enabled	No effect
117	Cold Load Pickup	Disabled	-
		Enabled	PTOC1 -PTOC9 (DOI ChgSet)
120	DMT / IDMT Phase	Disabled	-
		Definite Time	PTOC1, PTOC2
		TOC IEC TOC ANSI User Defined PU User def. Reset	PTOC1 - PTOC3
122	DMT / IDMT 3I0	Disabled	-
		Definite Time	PTOC7, PTOC8
		TOC IEC TOC ANSI User Defined PU User def. Reset	PTOC7 - PTOC9
124	DMT / IDMT Earth	Disabled	-
		Definite Time	PTOC4, PTOC5
		TOC IEC TOC ANSI User Defined PU User def. Reset	PTOC4 - PTOC6
127	DMT 1Phase	Disabled	-
		Enabled	PTOC10, PTOC11
130	DMT / IDMT Phase 2	Disabled	-
		Enabled	No effect

Table 2-1 Effects of Function parameters to the Logical Nodes (Forts.)

No.	Function	Setting	Logical Nodes
132	DMT / IDMT Phase 3	Disabled	-
		Enabled	No effect
134	DMT / IDMT 3I0 2	Disabled	-
		Enabled	No effect
136	DMT / IDMT 3I0 3	Disabled	-
		Enabled	No effect
138	DMT / IDMT Earth 2	Disabled	-
		Enabled	No effect
140	Unbalance Load (Negative Sequence)	Disabled	-
		Definite Time	PTOC12, PTOC13
		TOC IEC TOC ANSI	PTOC12 - PTOC14
		DT/thermal	PTOC12, PTOC13, PTOC15
142	Thermal Overload Protection	Disabled IEC354	-
		th rep w.o. sen th repl w. sens	PTTR1
143	Overexcitation Protection (U/f)	Disabled	-
		Enabled	PVPH1, PVPH2
144	Thermal Overload Protection 2	Disabled	-
		Enabled	No effect
150	Reverse Power Protection	Disabled	-
		Enabled	PDOP1, PDOP2

Table 2-1 Effects of Function parameters to the Logical Nodes (Forts.)

No.	Function	Setting	Logical Nodes
151	Forward Power Supervision	Disabled	-
		Enabled	PDOP3, PDUP1
152	Undervoltage Protection	Disabled	-
		Enabled	PTUV1, PTUV2
153	Overvoltage Protection	Disabled	-
		Enabled	PTOV1, PTOV2
156	Over- / Underfrequency Protection	Disabled	-
		Enabled	PTOF1, PTUF1 - PTUF3
170	Breaker Failure Protection	Disabled	-
		Enabled	RBRF1
171	Breaker Failure Protection 2	Disabled	-
		Enabled	No effect
180	Disconnect measurement location	Disabled	-
		Enabled	No effect
181	Measured Values Supervision	Disabled	-
		Enabled	No effect
182	Trip Circuit Supervision	Disabled	-
		Enabled	No effect
186	External Trip Function 1	Disabled	-
		Enabled	GAPC1

Table 2-1 Effects of Function parameters to the Logical Nodes (Forts.)

No.	Function	Setting	Logical Nodes
187	External Trip Function 2	Disabled	-
		Enabled	GAPC2
190	External Temperature Input	Disabled	-
		Port C Port D	No effect
191	Ext. Temperature Input Connection Type	6 RTD simplex 6 RTD HDX 12 RTD HDX	No effect

2.3 Allocation of Logical Nodes to Logical Devices

All Logical Nodes (LN) are allocated to Logical Devices (LD). The following tables show this allocation and the DOIs available for each LN.

LD PROT

The Logical Device PROT (Protection) contains the following LNs:

Table 2-2 LD PROT - Logical Nodes

LN	Function	DOI
LLN0	General	Mod, Beh, Health, NamPlt, OpTmh
PTRC1	General device pickup Total OFF	Mod, Beh, Health, NamPlt, Str, Tr
PTOF1	Overfrequency Protection	Mod, Beh, Health, NamPlt, Str, Op, BlkV
PTUF1 PTUF2 PTUF3	Underfrequency Protection	Mod, Beh, Health, NamPlt, Str, Op, BlkV
PTOC1 PTOC2 PTOC3	DMT / IDMT Phase	Mod, Beh, Health, NamPlt, Str, Op
PTOC4 PTOC5 PTOC6	DMT/IDMT Earth	Mod, Beh, Health, NamPlt, Str, Op
PTOC7 PTOC8 PTOC9	DMT / IDMT 3I0	Mod, Beh, Health, NamPlt, Str, Op
PTOV1 PTOV2	Overvoltage Protection	Mod, Beh, Health, NamPlt, Str, Op
PTUV1 PTUV2	Undervoltage Protection	Mod, Beh, Health, NamPlt, Str, Op
PTTR1	Thermal Overload Protection	Mod, Beh, Health, NamPlt, Str, Op, AlmThm
PTOC10 PTOC11	DMT 1Phase	Mod, Beh, Health, NamPlt, Str, Op

Table 2-2 LD PROT - Logical Nodes (Forts.)

LN	Function	DOI
PDIF1	Differential Protection>	Mod, Beh, Health, NamPlt, Str, Op, DifAClc, RstA
PDIF2	Differential Protection>>	Mod, Beh, Health, NamPlt, Str, Op
PDIF3	Restricted earth fault protection	Mod, Beh, Health, NamPlt, Str, Op, DifAClc, RstA
GAPC1	External Trip Function 1	Mod, Beh, Health, NamPlt, Str, Op
GAPC2	External Trip Function 2	Mod, Beh, Health, NamPlt, Str, Op
PDOP1 PDOP2	Reverse Power Protection	Mod, Beh, Health, NamPlt, Str, Op
RBRF1	Breaker Failure Protection	Mod, Beh, Health, NamPlt, Str, OpIn, OpEx
PVPH1 PVPH2	Overexcitation Protection (U/f)	Mod, Beh, Health, NamPlt, Str, Op
PDUP1 PDOP3	Forward Power Supervision	Mod, Beh, Health, NamPlt, Str, Op
PTOC12 PTOC13 PTOC14 PTOC15	Unbalance Load (Negative Sequence)	Mod, Beh, Health, NamPlt, Str, Op
LPHD1	Device	PhyNam, PhyHealth, Proxy

LD MEAS

The Logical Device MEAS (Measurement) contains the following LNs:

Table 2-3 LD MEAS - Logical Nodes

LN	Function	DOIs
LLN0	General	Mod, Beh, Health, NamPlt
MMXU1	Operational measured values	Mod, Beh, Health, NamPlt, TotW, TotVAr, TotVA, TotPF, Hz, PPV, PhV
MMTR1	Power Metering	Mod, Beh, Health, NamPlt, SupWh, SupVArh, DmdWh, DmdVArh
MSQI1	Measured values, symmetrical components	Mod, Beh, Health, NamPlt, SeqV
M1_MMXU1	Measured values, Current M1	Mod, Beh, Health, NamPlt, A
M2_MMXU1	Measured values, Current M2	Mod, Beh, Health, NamPlt, A
M3_MMXU1	Measured values, Current M3	Mod, Beh, Health, NamPlt, A
M4_MMXU1	Measured values, Current M4	Mod, Beh, Health, NamPlt, A
M5_MMXU1	Measured values, Current M5	Mod, Beh, Health, NamPlt, A
M1_MSQI1	Measured values, symmetrical components M1	Mod, Beh, Health, NamPlt, SeqA
M2_MSQI1	Measured values, symmetrical components M2	Mod, Beh, Health, NamPlt, SeqA
M3_MSQI1	Measured values, symmetrical components M3	Mod, Beh, Health, NamPlt, SeqA

Table 2-3 LD MEAS - Logical Nodes (Forts.)

M4_MSQI1	Measured values, symmetrical components M4	Mod, Beh, Health, NamPlt, SeqA
M5_MSQI1	Measured values, symmetrical components M5	Mod, Beh, Health, NamPlt, SeqA
LPHD1	Device	PhyNam, PhyHealth, Proxy

LD DR

The Logical Device DR (Disturbance Recorder) contains the following LNs:

Table 2-4 LD DR - Logical Nodes

LN	Function	DOIs
LLN0	General	Mod, Beh, Health, NamPlt
RDRE1	Fault Records	Mod, Beh, Health, NamPlt, RcdMade, FltNum, GriFltNum, RcdStr
LPHD1	Device	PhyNam, PhyHealth, Proxy

LD CTRL

The Logical Device CTRL (Control) contains the following LNs:

Table 2-5 LD CTRL - Logical Nodes

LN	Function	DOIs
LLN0	General	Mod, Beh, Health, NamPlt
CALH1	Alarms, warning messages and group alarms	Mod, Beh, Health, NamPlt, GrAlm, GrWrn
LPHD1	Device	PhyNam, PhyHealth, Proxy, CtlNum, DevStr

The Logical Nodes of the switching (and userdefined) objects will be created by DIGSI during the parameterization of your SIPROTEC device.

MICS, Model Implementation Conformance Statement, shows the assignment of the DOIs; you can use DIGSI to print the MICS.

LD EXT

The Logical Device EXT (Extended) contains the following LNs:

Table 2-6 LD EXT - Logical Nodes

LN	Function	DOIs
LLN0	General	Mod, Beh, Health, NamPlt
LPHD1	Device	PhyNam, PhyHealth, Proxy

2.4 Logical Node LLN0

2.4.1 Logical Device PROT

LLN0.Mod

No.	Information					
52	At Least 1 Protection Funct. is Active (ProtActive)	0	1	1	1	1
	Test mode (Test mode)	x	1	1	0	0
	Stop data transmission (DataStop)	x	1	0	1	0
LLN0.Mod.stVal		5	4	3	2	1

device annunciation:	1 - ON	IEC Status Mod.stVal:	1 - ON
	0 - OFF		2 - BLOCKED
	x - irrelevant		3 - TEST
			4 - TEST/BLOCKED
			5 - OFF

LLN0.Beh

No.	Information					
52	At Least 1 Protection Funct. is Active (ProtActive)	0	1	1	1	1
	Test mode (Test mode)	x	1	1	0	0
	Stop data transmission (DataStop)	x	1	0	1	0
LLN0.Beh.stVal		5	4	3	2	1

device annunciation:	1 - ON	IEC Status Beh.stVal:	1 - ON
	0 - OFF		2 - BLOCKED
	x - irrelevant		3 - TEST
			4 - TEST/BLOCKED
			5 - OFF

LLN0.Health

No.	Information		
51	Device is Operational and Protecting (Device OK)	1	0
LLN0.Health.stVal		1	3

device annunciation: 1 - ON IEC Status Health.stVal: 1 - OK
 0 - OFF 2 - WARNING
 3 - ALARM

LLN0.OpTmh

No.	Information	Value	
1020	Counter of Operating hours (Op.Hours=)	LLN0.OpTmh.stVal	Absolute value

2.4.2 Logical Devices MEAS, CTRL, DR und EXT

LLN0.Mod

No.	Information				
55	Reset Device (Reset Device)	x	x	x	x
	Test mode (Test mode)	1	1	0	0
	Stop data transmission (DataStop)	1	0	1	0
LLN0.Mod.stVal		4	3	2	1

device annunciation:	1 - ON	IEC Status Mod.stVal:	1 - ON
	0 - OFF		2 - BLOCKED
	x - irrelevant		3 - TEST
			4 - TEST/BLOCKED
			5 - OFF

LLN0.Beh

No.	Information				
55	Reset Device (Reset Device)	x	x	x	x
	Test mode (Test mode)	1	1	0	0
	Stop data transmission (DataStop)	1	0	1	0
LLN0.Beh.stVal		4	3	2	1

device annunciation:	1 - ON	IEC Status Beh.stVal:	1 - ON
	0 - OFF		2 - BLOCKED
	x - irrelevant		3 - TEST
			4 - TEST/BLOCKED
			5 - OFF

LLN0.Health

No.	Information		
51	Device is Operational and Protecting (Device OK)	0	1
LLN0.Health.stVal		3	1

device annunciation:	1 - ON	IEC Status Health.stVal:	1 - OK
	0 - OFF		2 - WARNING
			3 - ALARM

2.5 DOI Behavior

For the Logical Nodes of the PROT, MEAS, CTRL, DR and EXT Logical Devices, **LNx.Beh.stVal** is formed from **LNx.Mod.stVal** of the Logical Node and the status of the following device messages:

- At Least 1 Protection Funct. is Active,
- Test mode,
- Stop data transmission.

No.	Information												
52	At Least 1 Protection Funct. is Active (ProtActive)	1	1	1	1	0	1	1	0	1	0	x	
	Test mode (Test mode)	0	0	1	1	x	0	1	x	x	x	x	
	Stop data transmission (DataStop)	0	1	0	1	x	x	x	x	x	x	x	
	LNx .Mod.stVal	1	1	1	1	1	2	2	2	4	4	5	
LNx.Beh.stVal		1	2	3	4	5	2	4	5	4	5	5	

device annunciation:	1 - ON	IEC Status stVal:	1 - ON
	0 - OFF		2 - BLOCKED
	x - irrelevant		3 - TEST
			4 - TEST/BLOCKED
			5 - OFF

Mapping

3

Contents

This chapter shows the mapping of the information relevant to the device on the Logical Node of protocol IEC61850. It is structured according to function. In Chapter 2 you can find what consequences non-configured functions have on the Logical Nodes as well as general information about IEC 61850 mapping of information.

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3.1 Device (LPHD1, CALH1)

LPHD1.DevStr

No.	Information				
56	Initial Start of Device (Initial Start)	0	0	1	1
67	Resume (Resume)	0	1	0	1
LPHD1.DevStr.stVal		T	2	1	T

device annunciation: 1 - ON IEC Status DevStr.stVal: 1 - Initial Start
 0 - OFF 2 - Resume
 T - toggle between 1 and 2

LPHD1.Proxy

No.	Information		
55	Reset Device (Reset Device)	0	1
LPHD1.Proxy.stVal		1	0

device annunciation: 1 - ON IEC Status Proxy.stVal: 0 - DEVICE is not a PROXY
 0 - OFF 1 - DEVICE is a PROXY

LPHD1.PhyHealth

No.	Information		
51	Device is Operational and Protecting (Device OK)	0	1
LPHD1.PhyHealth.stVal		3	1

device annunciation: 1 - ON IEC Status PhyHealth.stVal: 1 - OK
 0 - OFF 2 - WARNING
 3 - ALARM

3.1.1 Error with a summary alarm and Alarm summary event

CALH1.Mod

No.	Information		
55	Reset Device (Reset Device)	1	0
CALH1.Mod.stVal		1	5

device annunciation: 1 - ON IEC Status Mod.stVal: 1 - ON
0 - OFF 2 - BLOCKED
3 - TEST
4 - TEST/BLOCKED
5 - OFF

CALH1.Health

No.	Information		
51	Device is Operational and Protecting (Device OK)	0	1
CALH1.Health.stVal		3	1

device annunciation: 1 - ON IEC Status Health.stVal: 1 - OK
0 - OFF 2 - WARNING
3 - ALARM

CALH1.GrAlm

No.	Information		
140	Error with a summary alarm (Error Sum Alarm)	1	0
CALH1.GrAlm.stVal		1	0

device annunciation: 1 - ON IEC Status GrAlm.stVal: 0 - FALSE
0 - OFF 1 - TRUE

CALH1.GrWrn

No.	Information		
160	Alarm Summary Event (Alarm Sum Event)	1	0
CALH1.GrWrn.stVal		1	0

device annunciation: 1 - ON IEC Status GrWrn.stVal: 0 - FALSE
0 - OFF 1 - TRUE

3.2 Differential Protection (PDIF1, PDIF2)

PDIF1.Mod

No.	Information				
5617	Differential protection is ACTIVE (Diff ACTIVE)	x	x	x	x
5616	Differential protection is BLOCKED (Diff BLOCKED)	x	x	1	0
5615	Differential protection is switched OFF (Diff OFF)	1	0	0	0
	DIFF. PROT. (P1201) = Block relay	x	1	0	0
PDIF1.Mod.stVal		5	4	2	1

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PDIF1.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PDIF1.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
 0 - OFF / FALSE 2 - WARNING
 x - irrelevant 3 - ALARM

PDIF1.Str

No.	Information		
5631	Differential protection picked up (Diff picked up)	0	1
PDIF1.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PDIF1.Op

No.	Information		
5691	Differential prot.: TRIP by IDIFF> (Diff> TRIP)	0	1
PDIF1.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
0 - OFF 1 - TRUE

PDIF1.DifAClc

No.	Information	Value		
7742	IDiffL1(I/Inominal object [%]) (IDiffL1=)	PDIF1.DifAClc.phsA.cVal.mag.f	Measured value	Absolute value
		PDIF1.DifAClc.phsA.units.SIUnit	1	none
		PDIF1.DifAClc.phsA.units.multiplier	0	1

No.	Information	Value		
7743	IDiffL2(I/Inominal object [%]) (IDiffL2=)	PDIF1.DifAClc.phsB.cVal.mag.f	Measured value	Absolute value
		PDIF1.DifAClc.phsB.units.SIUnit	1	none
		PDIF1.DifAClc.phsB.units.multiplier	0	1

No.	Information	Value		
7744	IDiffL3(I/Inominal object [%]) (IDiffL3=)	PDIF1.DifAClc.phsC.cVal.mag.f	Measured value	Absolute value
		PDIF1.DifAClc.phsC.units.SIUnit	1	none
		PDIF1.DifAClc.phsC.units.multiplier	0	1

PDIF2.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PDIF2.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
 0 - OFF / FALSE 2 - WARNING
 x - irrelevant 3 - ALARM

PDIF2.Str

No.	Information		
5631	Differential protection picked up (Diff picked up)	0	1
PDIF2.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PDIF2.Op

No.	Information		
5692	Differential prot.: TRIP by IDIFF>> (Diff>> TRIP)	0	1
PDIF2.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

3.3 Earth Current Differential Protection (PDIF3)

PDIF3.Mod

No.	Information				
199.2413	Restricted earth fault is ACTIVE (REF ACTIVE)	x	x	x	x
199.2412	Restricted earth fault is BLOCKED (REF BLOCKED)	x	x	1	0
199.2411	Restricted earth fault is switched OFF (REF OFF)	1	0	0	0
	REF PROT. (P1301) = Block relay	x	1	0	0
PDIF3.Mod.stVal		5	4	2	1

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PDIF3.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PDIF3.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
 0 - OFF / FALSE 2 - WARNING
 x - irrelevant 3 - ALARM

PDIF3.Str

No.	Information		
199.2421	Restr. earth flt.: picked up (REF picked up)	0	1
PDIF3.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PDIF3.Op

No.	Information		
199.2451	Restr. earthflt.: TRIP (REF TRIP)	0	1
PDIF3.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PDIF3.DifAClc

No.	Information	Value		
199.2640	Idiff REF (I/Inominal object [%]) (IdiffREF=)	PDIF3.DifAClc.neut.cVal.mag.f	Measured value	Absolute value
		PDIF3.DifAClc.neut.units.SIUnit	1	none
		PDIF3.DifAClc.neut.units.multiplier	0	1

PDIF3.RstA

No.	Information	Value		
199.2641	Irest REF (I/Inominal object [%]) (IrestREF=)	PDIF3.RstA.neut.cVal.mag.f	Measured value	Absolute value
		PDIF3.RstA.neut.units.SIUnit	1	none
		PDIF3.RstA.neut.units.multiplier	0	1

3.4 DMT / IDMT Phase (PTOC1, PTOC2, PTOC3)

PTOC1.Mod

No.	Information							
023.2413	Time Overcurrent Phase is ACTIVE (O/C Phase ACT)	x	x	x	x	x	x	x
023.2412	Time Overcurrent Phase is BLOCKED (O/C Phase BLK)	0	1	x	x	x	x	x
023.2515	I> BLOCKED (I> BLOCKED)	0	x	1	x	x	x	x
023.2411	Time Overcurrent Phase is OFF (O/C Phase OFF)	0	0	0	0	0	1	x
109	Frequency out of range (Frequ. o.o.r.)	0	x	x	1	x	x	x
	PHASE O/C (2001) = Block relay	0	0	0	0	1	x	x
	I> (P2015) = ∞	0	0	0	0	0	x	1
PTOC1.Mod.stVal		1	2	2	2	4	5	5

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
0 - OFF / FALSE 2 - BLOCKED
x - irrelevant 3 - TEST
4 - TEST/BLOCKED
5 - OFF

PTOC1.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PTOC1.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
0 - OFF / FALSE 2 - WARNING
x - irrelevant 3 - ALARM

PTOC1.Str

No.	Information		
023.2522	I> picked up (I> picked up)	0	1
PTOC1.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
0 - OFF 1 - TRUE

PTOC1.Op

No.	Information		
023.2552	I> TRIP (I> TRIP)	0	1
PTOC1.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTOC2.Mod

No.	Information								
023.2413	Time Overcurrent Phase is ACTIVE (O/C Phase ACT)	x	x	x	x	x	x	x	x
023.2412	Time Overcurrent Phase is BLOCKED (O/C Phase BLK)	0	1	x	x	x	x	x	x
023.2514	I>> BLOCKED (I>> BLOCKED)	0	x	1	x	x	x	x	x
023.2411	Time Overcurrent Phase is OFF (O/C Phase OFF)	0	0	0	0	0	1	x	
109	Frequency out of range (Frequ. o.o.r.)	0	x	x	1	x	x	x	
	PHASE O/C (2001) = Block relay	0	0	0	0	1	x	x	
	I>> (P2012) = ∞	0	0	0	0	0	x	1	
PTOC2.Mod.stVal		1	2	2	2	4	5	5	

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PTOC2.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PTOC2.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
 0 - OFF / FALSE 2 - WARNING
 x - irrelevant 3 - ALARM

PTOC2.Str

No.	Information		
023.2521	I>> picked up (I>> picked up)	0	1
PTOC2.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTOC2.Op

No.	Information		
023.2551	I>> TRIP (I>> TRIP)	0	1
PTOC2.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTOC3.Mod

No.	Information								
023.2413	Time Overcurrent Phase is ACTIVE (O/C Phase ACT)	x	x	x	x	x	x	x	x
023.2412	Time Overcurrent Phase is BLOCKED (O/C Phase BLK)	0	1	x	x	x	x	x	x
023.2516	Ip BLOCKED (Ip BLOCKED)	0	x	1	x	x	x	x	x
023.2411	Time Overcurrent Phase is OFF (O/C Phase OFF)	0	0	0	0	0	1	x	x
109	Frequency out of range (Freque. o.o.r.)	0	x	x	1	x	x	x	x
	PHASE O/C (2001) = Block relay	0	0	0	0	1	x	x	x
	Ip (P2031) = ∞	0	0	0	0	0	x	1	x
PTOC3.Mod.stVal		1	2	2	2	4	5	5	5

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PTOC7.Op

No.	Information		
191.2552	3I0> TRIP (3I0> TRIP)	0	1
PTOC7.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTOC8.Mod

No.	Information								
191.2413	Time Overcurrent 3I0 is ACTIVE (O/C 3I0 ACTIVE)	x	x	x	x	x	x	x	x
191.2412	Time Overcurrent 3I0 is BLOCKED (O/C 3I0 BLK)	0	1	x	x	x	x	x	x
191.2514	3I0>> BLOCKED (3I0>> BLOCKED)	0	x	1	x	x	x	x	x
191.2411	Time Overcurrent 3I0 is OFF (O/C 3I0 OFF)	0	0	0	0	0	1	x	
109	Frequency out of range (Freque. o.o.r.)	0	x	x	1	x	x	x	
	3I0 O/C (P2201) = Block relay	0	0	0	0	1	x	x	
	3I0>> (P2212) = ∞	0	0	0	0	0	x	1	
PTOC8.Mod.stVal		1	2	2	2	4	5	5	

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PTOC8.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PTOC8.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
 0 - OFF / FALSE 2 - WARNING
 x - irrelevant 3 - ALARM

PTOC8.Str

No.	Information		
191.2521	3I0>> picked up (3I0>> picked up)	0	1
PTOC8.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTOC8.Op

No.	Information		
191.2551	3I0>> TRIP (3I0>> TRIP)	0	1
PTOC8.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTOC9.Mod

No.	Information								
191.2413	Time Overcurrent 3I0 is ACTIVE (O/C 3I0 ACTIVE)	x	x	x	x	x	x	x	x
191.2412	Time Overcurrent 3I0 is BLOCKED (O/C 3I0 BLK)	0	1	x	x	x	x	x	x
191.2516	3I0p BLOCKED (3I0p BLOCKED)	0	x	1	x	x	x	x	x
191.2411	Time Overcurrent 3I0 is OFF (O/C 3I0 OFF)	0	0	0	0	0	1	x	
109	Frequency out of range (Frequ. o.o.r.)	0	x	x	1	x	x	x	
	3I0 O/C (P2201) = Block relay	0	0	0	0	1	x	x	
	I/I0p PU T/TI0p (P2231) = ∞	0	0	0	0	0	x	1	
PTOC9.Mod.stVal		1	2	2	2	4	5	5	

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PTOC4.Op

No.	Information		
024.2552	IE> TRIP (IE> TRIP)	0	1
PTOC4.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTOC5.Mod

No.	Information								
024.2413	Time Overcurrent Earth is ACTIVE (O/C Earth ACT)	x	x	x	x	x	x	x	x
024.2412	Time Overcurrent Earth is BLOCKED (O/C Earth BLK)	0	1	x	x	x	x	x	x
024.2514	IE>> BLOCKED (IE>> BLOCKED)	0	x	1	x	x	x	x	x
024.2411	Time Overcurrent Earth is OFF (O/C Earth OFF)	0	0	0	0	0	1	x	
109	Frequency out of range (Freque. o.o.r.)	0	x	x	1	x	x	x	
	EARTH O/C (P2401) = Block relay	0	0	0	0	1	x	x	
	IE>> (P2411) = ∞	0	0	0	0	0	x	1	
PTOC5.Mod.stVal		1	2	2	2	4	5	5	

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PTOC5.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PTOC5.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
 0 - OFF / FALSE 2 - WARNING
 x - irrelevant 3 - ALARM

PTOC5.Str

No.	Information		
024.2521	IE>> picked up (IE>> picked up)	0	1
PTOC5.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTOC5.Op

No.	Information		
024.2551	IE>> TRIP (IE>> TRIP)	0	1
PTOC5.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTOC6.Mod

No.	Information								
024.2413	Time Overcurrent Earth is ACTIVE (O/C Earth ACT)	x	x	x	x	x	x	x	
024.2412	Time Overcurrent Earth is BLOCKED (O/C Earth BLK)	0	1	x	x	x	x	x	
024.2516	IEp BLOCKED (IEp BLOCKED)	0	x	1	x	x	x	x	
024.2411	Time Overcurrent Earth is OFF (O/C Earth OFF)	0	0	0	0	0	1	x	
109	Frequency out of range (Frequ. o.o.r.)	0	x	x	1	x	x	x	
	EARTH O/C (P2401) = Block relay	0	0	0	0	1	x	x	
	IEp (P2431) = ∞	0	0	0	0	0	x	1	
PTOC6.Mod.stVal		1	2	2	2	4	5	5	

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PTOC6.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PTOC6.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
 0 - OFF / FALSE 2 - WARNING
 x- irrelevant 3 - ALARM

PTOC6.Str

No.	Information		
024.2523	IEp picked up (IEp picked up)	0	1
PTOC6.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTOC6.Op

No.	Information		
024.2553	IEp TRIP (IEp TRIP)	0	1
PTOC6.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

3.7 DMT 1Phase (PTOC10, PTOC11)

PTOC10.Mod

No.	Information							
200.2413	Time Overcurrent 1Phase is ACTIVE (O/C 1Ph. ACT)	x	x	x	x	x	x	x
200.2412	Time Overcurrent 1Phase is BLOCKED (O/C 1Ph. BLK)	0	1	x	x	x	x	x
200.2515	Time Overcurrent 1Phase l> BLOCKED (O/C 1Ph l> BLK)	0	x	1	x	x	x	x
200.2411	Time Overcurrent 1Phase is OFF (O/C 1Ph. OFF)	0	0	0	0	0	1	x
109	Frequency out of range (Frequ. o.o.r.)	0	x	x	1	x	x	x
	1Phase O/C (2701) = Block relay	0	0	0	0	1	x	x
	1Phase l> (P2706) = ∞	0	0	0	0	0	x	1
PTOC10.Mod.stVal		1	2	2	2	4	5	5

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PTOC10.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PTOC10.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
 0 - OFF / FALSE 2 - WARNING
 x - irrelevant 3 - ALARM

PTOC10.Str

No.	Information		
200.2522	Time Overcurrent 1Phase l> picked up (O/C 1Ph l> PU)	0	1
PTOC10.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTOC10.Op

No.	Information		
200.2552	Time Overcurrent 1Phase I> TRIP (O/C 1Ph I> TRIP)	0	1
PTOC10.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTOC11.Mod

No.	Information								
200.2413	Time Overcurrent 1Phase is ACTIVE (O/C 1Ph. ACT)	x	x	x	x	x	x	x	x
200.2412	Time Overcurrent 1Phase is BLOCKED (O/C 1Ph. BLK)	0	1	x	x	x	x	x	x
200.2514	Time Overcurrent 1Phase I>> BLOCKED (O/C 1Ph I>> BLK)	0	x	1	x	x	x	x	x
200.2411	Time Overcurrent 1Phase is OFF (O/C 1Ph. OFF)	0	0	0	0	0	1	x	
109	Frequency out of range (Frequ. o.o.r.)	0	x	x	1	x	x	x	
	1Phase O/C (2701) = Block relay	0	0	0	0	1	x	x	
	1Phase I>> (P2703) = ∞	0	0	0	0	0	x	1	
PTOC11.Mod.stVal		1	2	2	2	4	5	5	

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PTOC11.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PTOC11.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
 0 - OFF / FALSE 2 - WARNING
 x - irrelevant 3 - ALARM

3.8 Unbalanced Load (Negative Sequence) Protection (PTOC12-15)

PTOC12.Mod

No.	Information						
5153	I2 is ACTIVE (I2 ACTIVE)	x	x	x	x	x	x
5152	I2 is BLOCKED (I2 BLOCKED)	x	x	x	x	1	0
5151	I2 is switched OFF (I2 OFF)	x	1	0	0	0	0
109	Frequency out of range (Frequ. o.o.r.)	x	x	x	1	x	0
	UNBALANCE LOAD (P4001) = Block relay	x	x	1	0	0	0
	I2> (P4015) = ∞	1	x	0	0	0	0
PTOC12.Mod.stVal		5	5	4	2	2	1

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PTOC12.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PTOC12.Health.stVal		1	3	3

device annunciation / setting: 1 - ON IEC Status Health.stVal: 1 - OK
 0 - OFF 2 - WARNING
 x - irrelevant 3 - ALARM

PTOC12.Str

No.	Information		
5165	I2> picked up (I2> picked up)	0	1
PTOC12.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTOC12.Op

No.	Information		
5178	I2> TRIP (I2> TRIP)	0	1
PTOC12.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTOC13.Mod

No.	Information						
5153	I2 is ACTIVE (I2 ACTIVE)	x	x	x	x	x	x
5152	I2 is BLOCKED (I2 BLOCKED)	x	x	x	x	1	0
5151	I2 is switched OFF (I2 OFF)	x	1	0	0	0	0
109	Frequency out of range (Frequ. o.o.r.)	x	x	x	1	x	0
	UNBALANCE LOAD (P4001) = Block relay	x	x	1	0	0	0
	I2>> (P4012) = ∞	1	x	0	0	0	0
PTOC13.Mod.stVal		5	5	4	2	2	1

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PTOC13.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PTOC13.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
 0 - OFF / FALSE 2 - WARNING
 x - irrelevant 3 - ALARM

PTOC13.Str

No.	Information		
5159	I2>> picked up (I2>> picked up)	0	1
PTOC13.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
0 - OFF 1 - TRUE

PTOC13.Op

No.	Information		
5160	I2>> TRIP (I2>> TRIP)	0	1
PTOC13.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
0 - OFF 1 - TRUE

PTOC14.Mod

No.	Information					
5153	I2 is ACTIVE (I2 ACTIVE)	x	x	x	x	x
5152	I2 is BLOCKED (I2 BLOCKED)	x	x	x	1	0
5151	I2 is switched OFF (I2 OFF)	1	0	0	0	0
109	Frequency out of range (Frequ. o.o.r.)	x	x	1	x	0
	UNBALANCE LOAD (P4001) = Block relay	x	1	0	0	0
PTOC14.Mod.stVal		5	4	2	2	1

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
0 - OFF / FALSE 2 - BLOCKED
x - irrelevant 3 - TEST
4 - TEST/BLOCKED
5 - OFF

PTOC14.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PTOC14.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
 0 - OFF / FALSE 2 - WARNING
 x - irrelevant 3 - ALARM

PTOC14.Str

No.	Information		
5166	I2p picked up (I2p picked up)	0	1
PTOC14.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTOC14.Op

No.	Information		
5179	I2p TRIP (I2p TRIP)	0	1
PTOC14.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTTR1.Str

No.	Information		
044.2421	Thermal Overload picked up (O/L Th. pick.up)	0	1
PTTR1.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTTR1.Op

No.	Information		
044.2451	Thermal Overload TRIP (ThOverload TRIP)	0	1
PTTR1.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTTR1.AlmThm

No.	Information		
044.2603	Thermal Overload Alarm (O/L ⊕ Alarm)	0	1
PTTR1.AlmThm.general		0	1

device annunciation: 1 - ON IEC Status AlmThm.general: 0 - FALSE
 0 - OFF 1 - TRUE

PVPH1.Op

No.	Information		
5372	Overexc. prot.: TRIP of th. stage (U/f> th.TRIP)	0	1
PVPH1.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PVPH2.Mod

No.	Information					
5363	Overexcitation protection is ACTIVE (U/f> ACTIVE)	x	x	x	x	x
5362	Overexcitation protection is BLOCKED (U/f> BLOCKED)	x	x	x	1	0
5361	Overexcitation protection is switched OFF (U/f> OFF)	1	0	0	0	0
109	Frequency out of range (Frequ. o.o.r.)	x	x	1	0	0
	OVEREXC. PROT. (P4301) = Block relay	x	1	0	0	0
PVPH2.Mod.stVal		5	4	2	2	1

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PVPH2.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PVPH2.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
 0 - OFF / FALSE 2 - WARNING
 x - irrelevant 3 - ALARM

PDOP1.Str

No.	Information		
5096	Reverse power: picked up (Pr picked up)	0	1
PDOP1.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PDOP1.Op

No.	Information		
5097	Reverse power: TRIP (Pr TRIP)	0	1
PDOP1.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PDOP2.Mod

No.	Information					
5093	Reverse power protection is ACTIVE (Pr ACTIVE)	x	x	x	x	x
5092	Reverse power protection is BLOCKED (Pr BLOCKED)	x	x	x	1	0
5091	Reverse power prot. is switched OFF (Pr OFF)	1	0	0	0	0
109	Frequency out of range (Frequ. o.o.r.)	x	x	1	0	0
	REVERSE POWER (P5001) = Block relay	x	1	0	0	0
PDOP2.Mod.stVal		5	4	2	2	1

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PDOP2.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PDOP2.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
 0 - OFF / FALSE 2 - WARNING
 x - irrelevant 3 - ALARM

PDOP2.Str

No.	Information				
5096	Reverse power: picked up (Pr picked up)	0	0	1	1
5086	>Stop valve tripped (>SV tripped)	0	1	0	1
PDOP2.Str.general		0	0	0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PDOP2.Op

No.	Information		
5098	Reverse power: TRIP with stop valve (Pr+SV TRIP)	0	1
PDOP2.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PDOP3.Op

No.	Information		
5129	Forward power: Pf> stage TRIP (Pf> TRIP)	0	1
PDOP3.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PDUP1.Mod

No.	Information						
5123	Forward power supervision is ACTIVE (Pf ACTIVE)	x	x	x	x	x	x
5122	Forward power supervision is BLOCKED (Pf BLOCKED)	0	1	x	x	x	x
5116	>BLOCK forw. power superv. Pf< stage (>Pf< BLOCK)	0	x	1	x	x	x
5121	Forward power supervis. is switched OFF (Pf OFF)	0	0	0	0	0	1
109	Frequency out of range (Frequ. o.o.r.)	0	x	x	1	x	x
	FORWARD POWER (P5101) = Block relay	0	0	0	0	1	x
PDUP1.Mod.stVal		1	2	2	2	4	5

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PDUP1.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PDUP1.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
 0 - OFF / FALSE 2 - WARNING
 x - irrelevant 3 - ALARM

3.13 Undervoltage Protection (PTUV1, PTUV2)

PTUV1.Mod

No.	Information						
033.2413	Undervoltage protection is ACTIVE (Undervolt. ACT)	x	x	x	x	x	x
033.2412	Undervoltage protection is BLOCKED (Undervolt. BLK)	0	1	x	x	x	x
033.2503	>BLOCK overvoltage protection U< (>BLOCK U<)	0	x	1	x	x	x
033.2411	Undervoltage protection switched OFF (Undervolt. OFF)	0	0	0	0	0	1
109	Frequency out of range (Frequ. o.o.r.)	0	x	x	1	x	x
	UNDERVOLTAGE (P5201) = Block relay	0	0	0	0	1	x
PTUV1.Mod.stVal		1	2	2	2	4	5

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PTUV1.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PTUV1.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
 0 - OFF / FALSE 2 - WARNING
 x - irrelevant 3 - ALARM

PTUV1.Str

No.	Information		
033.2522	Undervoltage U< picked up (U< picked up)	0	1
PTUV1.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTUV1.Op

No.	Information		
033.2552	Undervoltage U< TRIP (U< TRIP)	0	1
PTUV1.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
0 - OFF 1 - TRUE

PTUV2.Mod

No.	Information						
033.2413	Undervoltage protection is ACTIVE (Undervolt. ACT)	1	x	x	x	x	x
033.2412	Undervoltage protection is BLOCKED (Undervolt. BLK)	0	1	x	x	x	x
033.2502	>BLOCK overvoltage protection U<< (>BLOCK U<<)	0	x	1	x	x	x
033.2411	Indervoltage protection switched OFF (Undervolt. OFF)	0	0	0	0	0	1
109	Frequency out of range (Frequ. o.o.r.)	0	x	x	1	x	x
	UNDERVOLTAGE (P5201) = Block relay	0	0	0	0	1	x
PTUV2.Mod.stVal		1	2	2	2	4	5

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
0 - OFF / FALSE 2 - BLOCKED
x - irrelevant 3 - TEST
4 - TEST/BLOCKED
5 - OFF

PTUV2.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PTUV2.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
0 - OFF / FALSE 2 - WARNING
x - irrelevant 3 - ALARM

PTUV2.Str

No.	Information		
033.2521	Undervoltage U<< picked up (U<< picked up)	0	1
PTUV2.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTUV2.Op

No.	Information		
033.2551	Undervoltage U<< TRIP (U<< TRIP)	0	1
PTUV2.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

3.14 Overvoltage Protection (PTOV1, PTOV2)

PTOV1.Mod

No.	Information					
034.2413	Overvoltage protection is ACTIVE (Overvolt. ACT)	x	x	x	x	x
034.2412	Overvoltage protection is BLOCKED (Overvolt. BLK)	0	1	x	x	x
034.2503	>BLOCK overvoltage protection U> (>BLOCK U>)	0	x	1	x	x
034.2411	Overvoltage protection switched OFF (Overvolt. OFF)	0	0	0	0	1
109	Frequency out of range (Frequ. o.o.r.)	0	x	x	1	x
	OVERVOLTAGE (P5301) = Block relay	0	0	0	0	1
PTOV1.Mod.stVal		1	2	2	2	4 5

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PTOV1.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PTOV1.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
 0 - OFF / FALSE 2 - WARNING
 x - irrelevant 3 - ALARM

PTOV1.Str

No.	Information		
034.2522	Overvoltage U> picked up (U> picked up)	0	1
PTOV1.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTOV1.Op

No.	Information		
034.2552	Overvoltage U> TRIP (U> TRIP)	0	1
PTOV1.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTOV2.Mod

No.	Information						
034.2413	Overvoltage protection is ACTIVE (Overvolt. ACT)	x	x	x	x	x	x
034.2412	Overvoltage protection is BLOCKED (Overvolt. BLK)	0	1	x	x	x	x
034.2502	>BLOCK overvoltage protection U>> (>BLOCK U>>)	0	x	1	x	x	x
034.2411	Overvoltage protection switched OFF (Overvolt. OFF)	0	0	0	0	0	1
109	Frequency out of range (Frequ. o.o.r.)	0	x	x	1	x	x
	OVERVOLTAGE (P5301) = Block relay	0	0	0	0	1	x
PTOV2.Mod.stVal		1	2	2	2	4	5

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PTOV2.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PTOV2.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
 0 - OFF / FALSE 2 - WARNING
 x - irrelevant 3 - ALARM

PTOV2.Str

No.	Information		
034.2521	Overvoltage U>> picked up (U>> picked up)	0	1
PTOV2.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
0 - OFF 1 - TRUE

PTOV2.Op

No.	Information		
034.2551	Overvoltage U>> TRIP (U>> TRIP)	0	1
PTOV2.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
0 - OFF 1 - TRUE

PTOF1.Str

No.	Information		
12035	Frequency prot.: Pick-up Stage f> (Freq. f> P-up)	0	1
PTOF1.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTOF1.Op

No.	Information		
12039	Frequency prot.: Trip Stage f> (Freq. f> Trip)	0	1
PTOF1.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTOF1.BIkV

No.	Information				
5214	Frequency protection undervoltage Blk (Freq UnderV Blk)	0	0	1	1
	f> (P5614/P5624/P5634) = ∞	0	1	1	0
PTOF1.BIkV.stVal		0	0	0	1

device annunciation / setting: 1 - ON / TRUE IEC Status BlkV.stVal: 0 - FALSE
 0 - OFF / FALSE 1 - TRUE

PTUF1.Str

No.	Information		
12032	Frequency prot.: Pick-up Stage f< (Freq. f< P-up)	0	1
PTUF1.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTUF1.Op

No.	Information		
12036	Frequency prot.: Trip Stage f< (Freq. f< Trip)	0	1
PTUF1.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTUF1.BIkV

No.	Information				
5214	Frequency protection undervoltage Blk (Freq UnderV Blk)	0	0	1	1
	f< (P5611/P5621/P5631) = 0	0	1	1	0
PTUF1.BIkV.stVal		0	0	0	1

device annunciation / setting: 1 - ON / TRUE IEC Status BlkV.stVal: 0 - FALSE
 0 - OFF / FALSE 1 - TRUE

PTUF2.Mod

No.	Information						
5213	Frequency protection is ACTIVE (Freq. ACTIVE)	x	x	x	x	x	x
5212	Frequency protection is BLOCKED (Freq. BLOCKED)	x	x	x	x	1	0
12007	>Frequency prot.: Block Stage f<< (>Freq. f<< blk)	x	x	x	1	x	0
5211	Frequency protection is OFF (Freq. OFF)	x	1	0	0	0	0
	O/U FREQUENCY (P5601) = Block relay	x	x	1	0	0	0
	f<< (P5612/P5622/P5632) = 0	1	x	0	0	0	0
PTUF2.Mod.stVal		5	5	4	2	2	1

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PTUF2.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PTUF2.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
 0 - OFF / FALSE 2 - WARNING
 x - irrelevant 3 - ALARM

PTUF2.Str

No.	Information		
12033	Frequency prot.: Pick-up Stage f<< (Freq. f<< P-up)	0	1
PTUF2.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTUF2.Op

No.	Information		
12037	Frequency prot.: Trip Stage f<< (Freq. f<< Trip)	0	1
PTUF2.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTUF2.BIkV

No.	Information				
5214	Frequency protection undervoltage Blk (Freq UnderV Blk)	0	0	1	1
	f<< (P5612/P5622/P5632) = 0	0	1	1	0
PTUF2.BIkV.stVal		0	0	0	1

device annunciation / setting: 1 - ON / TRUE IEC Status BlkV.stVal: 0 - FALSE
 0 - OFF / FALSE 1 - TRUE

PTUF3.Mod

No.	Information						
5213	Frequency protection is ACTIVE (Freq. ACTIVE)	x	x	x	x	x	x
5212	Frequency protection is BLOCKED (Freq. BLOCKED)	x	x	x	x	1	0
12008	>Frequency prot.: Block Stage f<<< (>Freq. f<<< blk)	x	x	x	1	x	0
5211	Frequency protection is OFF (Freq. OFF)	x	1	0	0	0	0
	O/U FREQUENCY (P5601) = Block relay	x	x	1	0	0	0
	f<<< (P5613/P5623/P5633) = 0	1	x	0	0	0	0
PTUF3.Mod.stVal		5	5	4	2	2	1

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

PTUF3.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
PTUF3.Health.stVal		1	3	3

device annunciation / setting: 1 - ON / TRUE IEC Status Health.stVal: 1 - OK
 0 - OFF / FALSE 2 - WARNING
 x - irrelevant 3 - ALARM

PTUF3.Str

No.	Information		
12034	Frequency prot.: Pick-up Stage f<<< (Freq. f<<< P-up)	0	1
PTUF3.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTUF3.Op

No.	Information		
12038	Frequency prot.: Trip Stage f<<< (Freq. f<<< Trip)	0	1
PTUF3.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

PTUF3.BIkV

No.	Information				
5214	Frequency protection undervoltage Blk (Freq UnderV Blk)	0	0	1	1
	f<<< (P5613/P5623/P5633) = 0	0	1	1	0
PTUF3.BIkV.stVal		0	0	0	1

device annunciation / setting: 1 - ON / TRUE IEC Status BlkV.stVal: 0 - FALSE
 0 - OFF / FALSE 1 - TRUE

3.16 Breaker Failure Protection (RBRF1)

RBRF1.Mod

No.	Information					
047.2413	Breaker failure is ACTIVE (BkrFail ACTIVE)	x	x	x	x	x
047.2412	Breaker failure is BLOCKED (BkrFail BLOCK)	x	x	x	1	0
047.2411	Breaker failure is switched OFF (BkrFail OFF)	1	0	0	0	0
109	Frequency out of range (Frequ. o.o.r.)	x	x	1	0	0
	BREAKER FAILURE (P7001) = Block relay	x	1	0	0	0
RBRF1.Mod.stVal		5	4	2	2	1

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

RBRF1.Health

No.	Information			
51	Device is Operational and Protecting (Device OK)	1	0	x
	Function is incorrectly parameterized	0	x	1
RBRF1.Health.stVal		1	3	3

device annunciation / setting: 1 - ON IEC Status Health.stVal: 1 - OK
 0 - OFF 2 - WARNING
 x - irrelevant 3 - ALARM

RBRF1.Str

No.	Information				
047.2652	Breaker failure (internal) PICKUP (BkrFail int PU)	0	0	1	1
047.2653	Breaker failure (external) PICKUP (BkrFail ext PU)	0	1	0	1
RBRF1.Str.general		0	1	1	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

GAPC1.Str

No.	Information		
4536	External trip 1: General picked up (Ext 1 picked up)	0	1
GAPC1.Str.general		0	1

device annunciation: 1 - ON IEC Status Str.general: 0 - FALSE
 0 - OFF 1 - TRUE

GAPC1.Op

No.	Information		
4537	External trip 1: General TRIP (Ext 1 Gen.TRP)	0	1
GAPC1.Op.general		0	1

device annunciation: 1 - ON IEC Status Op.general: 0 - FALSE
 0 - OFF 1 - TRUE

GAPC2.Mod

No.	Information				
4553	External trip 2 is ACTIVE (Ext 2 ACTIVE)	x	x	x	x
4552	External trip 2 is BLOCKED (Ext 2 BLOCKED)	x	x	1	0
4551	External trip 2 is switched OFF (Ext 2 OFF)	1	0	0	0
	EXTERN TRIP 2 (P8701) = Block relay	x	1	0	0
GAPC2.Mod.stVal		5	4	2	1

device annunciation / setting: 1 - ON / TRUE IEC Status Mod.stVal: 1 - ON
 0 - OFF / FALSE 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

GAPC2.Health

No.	Information		
51	Device is Operational and Protecting (Device OK)	0	1
GAPC2.Health.stVal		3	1

device annunciation: 1 - ON IEC Status Health.stVal: 1 - OK
 0 - OFF 2 - WARNING
 3 - ALARM

MMXU1.TotW

No.	Information	Value		
			Measured value	Absolute value
641	P (active power) (P =)	MMXU1.TotW.mag.f		
		MMXU1.TotW.units.SIUnit	62	W (Watt)
		MMXU1.TotW.units.multiplier	3	Kilo

MMXU1.TotVAr

No.	Information	Value		
			Measured value	Absolute value
642	Q (reactive power) (Q =)	MMXU1.TotVAr.mag.f		
		MMXU1.TotVAr.units.SIUnit	63	VAr
		MMXU1.TotVAr.units.multiplier	3	Kilo

MMXU1.TotVA

No.	Information	Value		
			Measured value	Absolute value
645	S (apparent power) (S =)	MMXU1.TotVA.mag.f		
		MMXU1.TotVA.units.SIUnit	61	VA
		MMXU1.TotVA.units.multiplier	3	Kilo

MMXU1.TotPF

No.	Information	Value		
			Measured value	Absolute value
901	Power Factor (PF =)	MMXU1.TotPF.mag.f		
		MMXU1.TotPF.units.SIUnit	1	NONE
		MMXU1.TotPF.units.multiplier	0	1

MMXU1.Hz

No.	Information	Value		
644	Frequency (Freq=)	MMXU1.Hz.mag.f	Measured value	Absolute value
		MMXU1.Hz.units.SIUnit	33	Hz
		MMXU1.Hz.units.multiplier	0	1

MMXU1.PPV

No.	Information	Value		
624	U L12 (UL12=)	MMXU1.PPV.phsAB.cVal.mag.f	Measured value	Absolute value
		MMXU1.PPV.phsAB.units.SIUnit	29	V (Volt)
		MMXU1.PPV.phsAB.units.multiplier	3	Kilo

No.	Information	Value		
625	U L23 (UL23=)	MMXU1.PPV.phsBC.cVal.mag.f	Measured value	Absolute value
		MMXU1.PPV.phsBC.units.SIUnit	29	V (Volt)
		MMXU1.PPV.phsBC.units.multiplier	3	Kilo

No.	Information	Value		
626	U L31 (UL31=)	MMXU1.PPV.phsCA.cVal.mag.f	Measured value	Absolute value
		MMXU1.PPV.phsCA.units.SIUnit	29	V (Volt)
		MMXU1.PPV.phsCA.units.multiplier	3	Kilo

MMXU1.PhV

No.	Information	Value		
621	U L1-E (UL1E=)	MMXU1.PhV.phsA.cVal.mag.f	Measured value	Absolute value
		MMXU1.PhV.phsA.units.SIUnit	29	V (Volt)
		MMXU1.PhV.phsA.units.multiplier	3	Kilo
No.	Information	Value		
622	U L2-E (UL2E=)	MMXU1.PhV.phsB.cVal.mag.f	Measured value	Absolute value
		MMXU1.PhV.phsB.units.SIUnit	29	V (Volt)
		MMXU1.PhV.phsB.units.multiplier	3	Kilo
No.	Information	Value		
623	U L3-E (UL3E=)	MMXU1.PhV.phsC.cVal.mag.f	Measured value	Absolute value
		MMXU1.PhV.phsC.units.SIUnit	29	V (Volt)
		MMXU1.PhV.phsC.units.multiplier	3	Kilo
No.	Information	Value		
627	Displacement voltage UE (UE =)	MMXU1.PhV.neut.cVal.mag.f	Measured value	Absolute value
		MMXU1.PhV.neut.units.SIUnit	29	V (Volt)
		MMXU1.PhV.neut.units.multiplier	0	1

3.19.2 Operational Measured Values Current M1(M1_MM XU1)

M1_MM XU1.Mod

No.	Information	
55	Reset Device (Reset Device)	x
M1_MM XU1.Mod.stVal		1

device annunciation: 1 - ON IEC Status Mod.stVal: 1 - ON
 0 - OFF 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

M1_MM XU1.Health

No.	Information		
51	Device is Operational and Protecting (Device OK)	0	1
M1_MM XU1.Health.stVal		3	1

device annunciation: 1 - ON IEC Status Health.stVal: 1 - OK
 0 - OFF 2 - WARNING
 3 - ALARM

M1_MM XU1.A

No.	Information	Value		
30661	Operat. meas. current IL1 meas. loc. 1 (IL1M1=)	M1_MM XU1.A.phsA.cVal.mag.f	Measured value	Absolute value
		M1_MM XU1.A.phsA.units.SIUnit	5	A (Ampere)
		M1_MM XU1.A.phsA.units.multiplier	3	Kilo

No.	Information	Value		
30662	Operat. meas. current IL2 meas. loc. 1 (IL2M1=)	M1_MM XU1.A.phsB.cVal.mag.f	Measured value	Absolute value
		M1_MM XU1.A.phsB.units.SIUnit	5	A (Ampere)
		M1_MM XU1.A.phsB.units.multiplier	3	Kilo

No.	Information	Value		
30663	Operat. meas. current IL3 meas. loc. 1 (IL3M1=)	M1_MM XU1.A.phsC.cVal.mag.f	Measured value	Absolute value
		M1_MM XU1.A.phsC.units.SIUnit	5	A (Ampere)
		M1_MM XU1.A.phsC.units.multiplier	3	Kilo

3.19.4 Operational Measured Values Current M3 (M3_MM XU1)

M3_MM XU1.Mod

No.	Information	
55	Reset Device (Reset Device)	x
M3_MM XU1.Mod.stVal		1

device annunciation: 1 - ON IEC Status Mod.stVal: 1 - ON
 0 - OFF 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

M3_MM XU1.Health

No.	Information		
51	Device is Operational and Protecting (Device OK)	0	1
M3_MM XU1.Health.stVal		3	1

device annunciation: 1 - ON IEC Status Health.stVal: 1 - OK
 0 - OFF 2 - WARNING
 3 - ALARM

M3_MM XU1.A

No.	Information	Value		
30673	Operat. meas. current IL1 meas. loc. 3 (IL1M3=)	M3_MM XU1.A.phsA.cVal.mag.f	Measured value	Absolute value
		M3_MM XU1.A.phsA.units.SIUnit	5	A (Ampere)
		M3_MM XU1.A.phsA.units.multiplier	3	Kilo

No.	Information	Value		
30674	Operat. meas. current IL2 meas. loc. 3 (IL2M3=)	M3_MM XU1.A.phsB.cVal.mag.f	Measured value	Absolute value
		M3_MM XU1.A.phsB.units.SIUnit	5	A (Ampere)
		M3_MM XU1.A.phsB.units.multiplier	3	Kilo

No.	Information	Value		
30675	Operat. meas. current IL3 meas. loc. 3 (IL3M3=)	M3_MM XU1.A.phsC.cVal.mag.f	Measured value	Absolute value
		M3_MM XU1.A.phsC.units.SIUnit	5	A (Ampere)
		M3_MM XU1.A.phsC.units.multiplier	3	Kilo

3.19.5 Operational Measured Values Current M4 (M4_MM XU1)

M4_MM XU1.Mod

No.	Information	
55	Reset Device (Reset Device)	x
M4_MM XU1.Mod.stVal		1

device annunciation: 1 - ON IEC Status Mod.stVal: 1 - ON
 0 - OFF 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

M4_MM XU1.Health

No.	Information		
51	Device is Operational and Protecting (Device OK)	0	1
M4_MM XU1.Health.stVal		3	1

device annunciation: 1 - ON IEC Status Health.stVal: 1 - OK
 0 - OFF 2 - WARNING
 3 - ALARM

M4_MM XU1.A

No.	Information	Value		
			Measured value	Absolute value
30679	Operat. meas. current IL1 meas. loc. 4 (IL1M4=)	M4_MM XU1.A.phsA.cVal.mag.f		
		M4_MM XU1.A.phsA.units.SIUnit	5	A (Ampere)
		M4_MM XU1.A.phsA.units.multiplier	3	Kilo

No.	Information	Value		
			Measured value	Absolute value
30680	Operat. meas. current IL2 meas. loc. 4 (IL2M4=)	M4_MM XU1.A.phsB.cVal.mag.f		
		M4_MM XU1.A.phsB.units.SIUnit	5	A (Ampere)
		M4_MM XU1.A.phsB.units.multiplier	3	Kilo

No.	Information	Value		
			Measured value	Absolute value
30681	Operat. meas. current IL3 meas. loc. 4 (IL3M4=)	M4_MM XU1.A.phsC.cVal.mag.f		
		M4_MM XU1.A.phsC.units.SIUnit	5	A (Ampere)
		M4_MM XU1.A.phsC.units.multiplier	3	Kilo

3.19.6 Operational Measured Values Current M5 (M5_MM XU1)

M5_MM XU1.Mod

No.	Information	
55	Reset Device (Reset Device)	x
M5_MM XU1.Mod.stVal		1

device annunciation: 1 - ON IEC Status Mod.stVal: 1 - ON
 0 - OFF 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

M5_MM XU1.Health

No.	Information		
51	Device is Operational and Protecting (Device OK)	0	1
M5_MM XU1.Health.stVal		3	1

device annunciation: 1 - ON IEC Status Health.stVal: 1 - OK
 0 - OFF 2 - WARNING
 3 - ALARM

M5_MM XU1.A

No.	Information	Value		
30685	Operat. meas. current IL1 meas. loc. 5 (IL1M5=)	M5_MM XU1.A.phsA.cVal.mag.f	Measured value	Absolute value
		M5_MM XU1.A.phsA.units.SIUnit	5	A (Ampere)
		M5_MM XU1.A.phsA.units.multiplier	3	Kilo

No.	Information	Value		
30686	Operat. meas. current IL2 meas. loc. 5 (IL2M5=)	M5_MM XU1.A.phsB.cVal.mag.f	Measured value	Absolute value
		M5_MM XU1.A.phsB.units.SIUnit	5	A (Ampere)
		M5_MM XU1.A.phsB.units.multiplier	3	Kilo

No.	Information	Value		
30687	Operat. meas. current IL3 meas. loc. 5 (IL3M5=)	M5_MM XU1.A.phsC.cVal.mag.f	Measured value	Absolute value
		M5_MM XU1.A.phsC.units.SIUnit	5	A (Ampere)
		M5_MM XU1.A.phsC.units.multiplier	3	Kilo

3.19.8 Measured values, symmetrical components M1 (M1_MSQI1)

M1_MSQI1.Mod

No.	Information	
55	Reset Device (Reset Device)	x
M1_MSQI1.Mod.stVal		1

device annunciation: 1 - ON IEC Status Mod.stVal: 1 - ON
 0 - OFF 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

M1_MSQI1.Health

No.	Information		
51	Device is Operational and Protecting (Device OK)	0	1
M1_MSQI1.Health.stVal		3	1

device annunciation: 1 - ON IEC Status Health.stVal: 1 - OK
 0 - OFF 2 - WARNING
 3 - ALARM

M1_MSQI1.SeqA

No.	Information	Value		
30665	I1 (positive sequence) of meas. loc. 1 (I1M1=)	M1_MSQI1.SeqA.c1.cVal.mag.f	Measured value	Absolute value
		M1_MSQI1.SeqA.c1.units.SIUnit	5	A (Ampere)
		M1_MSQI1.SeqA.c1.units.multiplier	3	Kilo
30666	I2 (negative sequence) of meas. loc. 1 (I2M1=)	M1_MSQI1.SeqA.c2.cVal.mag.f	Measured value	Absolute value
		M1_MSQI1.SeqA.c2.units.SIUnit	5	A (Ampere)
		M1_MSQI1.SeqA.c2.units.multiplier	3	Kilo
30664	3I0 (zero sequence) of meas. loc. 1 (3I0M1=)	M1_MSQI1.SeqA.c3.cVal.mag.f	Measured value	Absolute value
		M1_MSQI1.SeqA.c3.units.SIUnit	5	A (Ampere)
		M1_MSQI1.SeqA.c3.units.multiplier	3	Kilo

3.19.9 Measured values, symmetrical components M2 (M2_MSQ11)

M2_MSQ11.Mod

No.	Information	
55	Reset Device (Reset Device)	x
M2_MSQ11.Mod.stVal		1

device annunciation: 1 - ON IEC Status Mod.stVal: 1 - ON
 0 - OFF 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

M2_MSQ11.Health

No.	Information		
51	Device is Operational and Protecting (Device OK)	0	1
M2_MSQ11.Health.stVal		3	1

device annunciation: 1 - ON IEC Status Health.stVal: 1 - OK
 0 - OFF 2 - WARNING
 3 - ALARM

M2_MSQ11.SeqA

No.	Information	Value		
			Measured value	Absolute value
30671	I1 (positive sequence) of meas. loc. 2 (I1M2=)	M2_MSQ11.SeqA.c1.cVal.mag.f		
		M2_MSQ11.SeqA.c1.units.SIUnit	5	A (Ampere)
		M2_MSQ11.SeqA.c1.units.multiplier	3	Kilo

No.	Information	Value		
			Measured value	Absolute value
30672	I2 (negative sequence) of meas. loc. 2 (I2M2=)	M2_MSQ11.SeqA.c2.cVal.mag.f		
		M2_MSQ11.SeqA.c2.units.SIUnit	5	A (Ampere)
		M2_MSQ11.SeqA.c2.units.multiplier	3	Kilo

No.	Information	Value		
			Measured value	Absolute value
30670	3I0 (zero sequence) of meas. loc. 2 (3I0M2=)	M2_MSQ11.SeqA.c3.cVal.mag.f		
		M2_MSQ11.SeqA.c3.units.SIUnit	5	A (Ampere)
		M2_MSQ11.SeqA.c3.units.multiplier	3	Kilo

3.19.12 Measured values, symmetrical components M5 (M5_MSQI1)

M5_MSQI1.Mod

No.	Information	
55	Reset Device (Reset Device)	x
M5_MSQI1.Mod.stVal		1

device annunciation: 1 - ON IEC Status Mod.stVal: 1 - ON
 0 - OFF 2 - BLOCKED
 x - irrelevant 3 - TEST
 4 - TEST/BLOCKED
 5 - OFF

M5_MSQI1.Health

No.	Information		
51	Device is Operational and Protecting (Device OK)	0	1
M5_MSQI1.Health.stVal		3	1

device annunciation: 1 - ON IEC Status Health.stVal: 1 - OK
 0 - OFF 2 - WARNING
 3 - ALARM

M5_MSQI1.SeqA

No.	Information	Value		
30689	I1 (positive sequence) of meas. loc. 5 (I1M5=)	M5_MSQI1.SeqA.c1.cVal.mag.f	Measured value	Absolute value
		M5_MSQI1.SeqA.c1.units.SIUnit	5	A (Ampere)
		M5_MSQI1.SeqA.c1.units.multiplier	3	Kilo
30690	I2 (negative sequence) of meas. loc. 5 (I2M5=)	M5_MSQI1.SeqA.c2.cVal.mag.f	Measured value	Absolute value
		M5_MSQI1.SeqA.c2.units.SIUnit	5	A (Ampere)
		M5_MSQI1.SeqA.c2.units.multiplier	3	Kilo
30688	3I0 (zero sequence) of meas. loc. 5 (3I0M5=)	M5_MSQI1.SeqA.c3.cVal.mag.f	Measured value	Absolute value
		M5_MSQI1.SeqA.c3.units.SIUnit	5	A (Ampere)
		M5_MSQI1.SeqA.c3.units.multiplier	3	Kilo

MMTR1.SupWh

No.	Information	Value		
924	Wp Forward (Wp+=)	MMTR1.SupWh.actVal	Metered value	Current value of accumulated interrupted current = actVal × pulsQty
		MMTR1.SupWh.units.SIUnit	72	Wh
		MMTR1.SupWh.units.multiplier	6	Mega
		MMTR1.SupWh.pulsQty	6.34999e-004	Wh / Metered value

MMTR1.SupVARh

No.	Information	Value		
925	Wq Forward (Wq+=)	MMTR1.SupVARh.actVal	Metered value	Current value of accumulated interrupted current = actVal × pulsQty
		MMTR1.SupVARh.units.SIUnit	73	VARh
		MMTR1.SupVARh.units.multiplier	6	Mega
		MMTR1.SupVARh.pulsQty	6.34999e-004	VARh / Metered value

MMTR1.DmdWh

No.	Information	Value		
928	Wp Reverse (Wp-=)	MMTR1.DmdWh.actVal	Metered value	Current value of accumulated interrupted current = actVal × pulsQty
		MMTR1.DmdWh.units.SIUnit	72	Wh
		MMTR1.DmdWh.units.multiplier	6	Mega
		MMTR1.DmdWh.pulsQty	6.34999e-004	Wh / Metered value

MMTR1.DmdVARh

No.	Information	Value		
929	Wq Reverse (Wq-=)	MMTR1.DmdVARh.actVal	Metered value	Current value of accumulated interrupted current = actVal × pulsQty
		MMTR1.DmdVARh.units.SIUnit	73	VARh
		MMTR1.DmdVARh.units.multiplier	6	Mega
		MMTR1.DmdVARh.pulsQty	6.34999e-004	VARh / Metered value

RDRE1.FltNum

No.	Information	Value	
302	Fault Event (Fault Event)	RDRE1.FltNum.stVal	Present fault number

RDRE1.GriFltNum

No.	Information	Value	
301	Power System fault (Pow.Sys.Flt.)	RDRE1.GriFltNum.stVal	Network fault number

Literature

- /1/ SIPROTEC 4 Ethernet Module EN 100 IEC 61850 Electrical Interface 100 MBit, Manual
C54000-G1176-C167
- /2/ SIPROTEC 4 System Description
E50417-H1176-C151
- /3/ SIPROTEC DIGSI, StartUP
E50417-G1176-C152
- /4/ DIGSI CFC, Manual
E50417-H1176-C098
- /5/ SIPROTEC SIGRA 4, Manual
E50417-H1176-C1100-C070
- /6/ SIPROTEC Diferential Protection 7UT613/63x, Manual
C53000-G1176-C160

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