

# SIEMENS

SIPROTEC 4  
SIPROTEC Compact  
Reyrolle IEDs

EN100 Communication Module

IEC 61850  
PIXIT, PICS, TICS

Manual

---

Preface

---

Contents

---

Applications

---

1

IEC 61850 Conformance Statements

---

2

### **Disclaimer of Liability**

Subject to changes and errors. The information given in this document only contains general descriptions and/or performance features which may not always specifically reflect those described, or which may undergo modification in the course of further development of the products. The requested performance features are binding only when they are expressly agreed upon in the concluded contract.

Document version: C53000-G1140-C385-3.04

Edition: 05.2023

Version of the product described: V4.41

### **Copyright**

Copyright © Siemens 2023. All rights reserved.

The disclosure, duplication, distribution and editing of this document, or utilization and communication of the content are not permitted, unless authorized in writing. All rights, including rights created by patent grant or registration of a utility model or a design, are reserved.

### **Registered Trademarks**

SIPROTEC, DIGSI, SIGRA, SIGUARD, SIMEAS, SAFIR, SICAM, and MindSphere are trademarks of Siemens. Any unauthorized use is prohibited.

---

# Preface

## Purpose of this manual

In this Manual, you will find the Specification of the applications of the IEC 61850 interface EN100.

## Target audience

This manual is intended mainly for all persons who configure, parameterize and operate SIPROTEC 4, SIPROTEC Compact and Reyrolle IED devices.

## Scope of validity

This manual is valid for SIPROTEC 4, SIPROTEC Compact, Reyrolle IED devices with Edition 1 and Edition 2 mode of IEC 61850, and EN100 Firmware version V4.41 and higher.

## Standards

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

## Additional support

For questions about EN100, please contact your Siemens sales representative.

## Support

Our Customer Support Center provides a 24-hour service.

Siemens AG

Smart Infrastructure – Digital Grid

Customer Support Center

Phone: +49 911 2155 4466

E-mail: [energy.automation@siemens.com](mailto:energy.automation@siemens.com)

## Training courses

Inquiries regarding individual training courses should be addressed to our Training Center:

Siemens AG

Siemens Power Academy TD

Humboldtstraße 59

90459 Nuremberg

Germany

Phone: +49 911 9582 7100

E-mail: [poweracademy@siemens.com](mailto:poweracademy@siemens.com)

Internet: [www.siemens.com/poweracademy](http://www.siemens.com/poweracademy)



# Contents

- Preface ..... 3**
- 1 Applications ..... 7**
  - 1.1 General ..... 8
  - 1.2 Documentation ..... 9
  - 1.3 Association model ..... 10
  - 1.4 Server model ..... 11
  - 1.5 Data set model ..... 12
  - 1.6 Setting group control model ..... 13
  - 1.7 Reporting model ..... 14
  - 1.8 GOOSE publish model ..... 16
  - 1.9 GOOSE subscribe model ..... 17
  - 1.10 Control model ..... 19
  - 1.11 Time and time synchronisation model ..... 23
  - 1.12 File transfer model ..... 24
  - 1.13 General items ..... 25
  - 1.14 TICS - Technical Issues Implementation Conformance Statement ..... 26
    - 1.14.1 Mandatory Edition 2 TISSUES ..... 26
- 2 IEC 61850 Conformance Statements ..... 35**
  - 2.1 Definitions of the ISO/OSI Reference Model ..... 36
  - 2.2 Definition of the Communication Services Acc. to Standard (PICS) ..... 37
    - 2.2.1 Profile Compliance ..... 37
  - 2.3 Model Implementation Conformance Statement (MICS) ..... 43



# 1 Applications

## Contents

This chapter specifies the protocol implementation extra information for testing (PIXIT) of the IEC 61850 interface EN100.

1.1	General	8
1.2	Documentation	9
1.3	Association model	10
1.4	Server model	11
1.5	Data set model	12
1.6	Setting group control model	13
1.7	Reporting model	14
1.8	GOOSE publish model	16
1.9	GOOSE subscribe model	17
1.10	Control model	19
1.11	Time and time synchronisation model	23
1.12	File transfer model	24
1.13	General items	25
1.14	TICS - Technical Issues Implementation Conformance Statement	26

## 1.1 General

This manual specifies the protocol implementation extra information for testing (PIXIT) of the IEC 61850 interface EN100.

The following applicable ACSI service models are specified:

- Association model
- Server model
- Data set model
- Reporting model
- Setting Group model
- GOOSE publish model
- GOOSE subscribe 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 4 or SIPROTEC Compact specific data is specified in the device specific MICS Descriptions, Chapter 2.3.



## 1.2 Documentation

ID	ED	Description	Value / Clarification
Do1	2	How to expose required firmware versions not present in the datamodel	The value is available reading the MMS variable: LPHD\$DC\$PhyNam\$swRev (any of the LPHD available in the device)

## 1.3 Association model

ID	ED	Description	Value / Clarification
As1	1	Maximum number of clients that can set-up an association simultaneously	6
As2	1, 2	TCP_KEEPLIVE value	1 second to 20 seconds
As3	1, 2	Lost connection detection time range	20 seconds
As4		Authentication is not supported	Not supported
As5	1, 2	What association parameters are necessary for successful association ?	Y Transport selector Y Session selector Y Presentation selector Y AP Title (ANY) Y AE Qualifier (ANY)  Where Y means: as defined within the ICD-File ANY means: any value accepted
As6	1, 2	If association parameters are necessary for association, describe the correct Called values e.g.	Transport selector 0001 Session selector 0001 Presentation selector 00000001
As7	1, 2	What is the maximum and minimum MMS PDU size ?	Max MMS PDU size 32768 Min MMS PDU size 8192
As8	1, 2	What is the maximum startup time after a power supply interrupt ?	Typical 30 seconds The value depends on the size of the object directory
As9	1, 2	Does this device function only as test equipment?	N

## 1.4 Server model

ID	ED	Description	Value / Clarification
Sr1	1, 2	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 N OperatorBlocked
Sr2	1, 2	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 N Substituted Y Test N OperatorBlocked
Sr3		What is the maximum number of data values in one GetDataValues request ?	Not restricted; depends on the max. MMS PDU size given above.
Sr4		What is the maximum number of data values in one SetDataValues request ?	Not restricted; depends on the max. MMS PDU size given above.
Sr5		Which Mode / Behaviour values are supported?	Y On N (On-)Blocked Y Test N Test/Blocked Y Off

## 1.5 Data set model

ID	ED	Description	Value / Clarification
Ds1	1	What is the maximum number of data elements in one data set? (compare ICD setting)	Not limited by an internal configuration parameter. It depends on the available memory and MMS PDU size.
Ds2	1	How many persistent data sets can be created by one or more clients ?	64 data sets for each LD. It depends on the available memory.
Ds3	1	How many non-persistent data sets can be created by one or more clients ?	10 data sets. It depends on the available memory.

## 1.6 Setting group control model

ID	ED	Description	Value / Clarification
Sg1	1	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.
Sg2	1, 2	What is the effect of when and how the non-volatile storage is updated ? (compare IEC 61850-8-1 §16.2.4)	Not applicable
Sg3	1	Can multiple clients edit the same setting group?	Not applicable
Sg4	1	What happens if the association is lost while editing a setting group?	Not applicable
Sg5	1	Is EditSG value 0 allowed?	Not applicable
Sg6	2	When ResvTms is not present how long is an edit setting group locked?	Not applicable

## 1.7 Reporting model

ID	ED	Description	Value / Clarification
Rp1	1	The supported trigger conditions are (compare PICS)	Y Integrity Y Data change Y Quality change Y Data update Y General Interrogation
Rp2	1	The supported optional fields are	Y Sequence-number Y Report-time-stamp Y Reason-for-inclusion Y Data-set-name Y Data-reference Y Buffer-overflow - for Buffered report Y EntryID - for Buffered report Y Conf-rev Y Segmentation
Rp3	1, 2	Can the server send segmented reports ?	Y
Rp4	1, 2	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 for Buffered Report: Buffer the Entry Send report if the report is enabled
Rp5	1	Multi client URCB approach (Compare IEC 61850-7-2 §14.2.1)	All clients can access all URCB's
Rp6	-	What is the format of EntryID?	First 2 Byte : Integer Last 6 Bytes: BTime6 time stamp
Rp7	1, 2	What is the buffer size for each BRCB or how many reports can be buffered ?	About 270 kB are available for the buffering. Each BRCB has an extension attribute Memory that display the percentage of those 270 kB that have been reserved/foreseen for its own entries. Default amount 270 kB/(2*Number of logical devices). The buffer size can also be adapted by configuration.
Rp8	-	Pre-configured RCB attributes that cannot be changed online when RptEna = FALSE (see also the ICD report settings)	For Buffered and Unbuffered:  All pre-configured RCB attributes can be changed online when RptEna = FALSE
Rp9	1	May the reported data set contain: - structured data objects? - data attributes?	Y Y
Rp10	1, 2	What is the scan cycle for binary events? Is this fixed, configurable	1 msecond Fixed
Rp11	1	Does the device support to pre-assign a RCB to a specific client in SCL	N ResvTms is set to -1 for the SCL BufferedReportControl that are associated to ClientLN. However, authentication of specific clients is not standardized and thus not supported.
Rp12	2	After restart of the server is the value of ConfRev restored from the original configuration or retained prior to restart	Restore from original configuration

ID	ED	Description	Value / Clarification
Rp13	1, 2	Does the server accept any client to configure / enable a BRCB with ResvTms=1? What fields are used to do the identification?	Y  AP-Title        N AE-Qualifier    N <other field>   N
Rp14	1, 2	When BRCB.ResvTms is exposed, what is the default value for BRCB.ResvTms if client does not write (must be > 0)  or  When BRCB.ResvTms is not exposed, what is the internal reservation time (must be >= 0)	60 seconds
Rp15	2	Is data model db=0 supported	N
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 $\geq$ 1 second;
		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 renewed by the client. 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 lost.
		Optional use of a flow control for transmitting history of a BRCB	As specified in the IEC61850-7-2, transmission of entries may require some time, depending of the amount of entries that have to be transmitted. Therefore, the EN100 has an optional flow control feature to accelerate the transmission of the entries: each BRCB has an extended attribute MaxOutReports that can be set from the associated-client to change the transmission strategy of the entries. Those attributes are located in VMD variables. The number ordered will then be transmitted as long as they exist in the buffer; the server then reset the attribute to 0 and wait for the client to set it again in order to continue the history transmission with MaxOutReports entries. The attribute only influences the flow control of entries while dealing with the history, and not after the history transmission has completed.

## 1.8 GOOSE publish model

ID	ED	Description	Value / Clarification
Gp1	1, 2	Can the test flag in the published GOOSE be turned on / off	N
Gp2	1	What is the behavior when the GOOSE publish configuration is incorrect	DUT will send GOOSE with NdsCom = TRUE as long as the minimum required configuration is available (dstAddress, dataSet)
Gp3	1, 2	Published FCD supported common data classes are	SPS, DPS, INS, ENS, ACT, ACD, BCR, MV, CMV, WYE, DEL, SEQ, SPC, DPC, INC, ENC, APC, BAC, BSC Arrays are not supported
Gp4	1, 2	What is the slow retransmission time? Is it fixed or configurable?	Configured by SCD file
Gp5	1, 2	What is the fast retransmission scheme? Is it fixed or configurable?	Configured by SCD file
Gp6	-	Can the GOOSE publish be turned on / off by using SetGoCBValues(GoEna)	Deprecated See PICS - SetGoCBValues
Gp7	1, 2	What is the initial GOOSE sqNum after restart	sqNum = 1
Gp8	1	May the GOOSE data set contain: - structured data objects (FCD)? - Timestamp data attributes?	Y Y
Gp9	1, 2	Does Server or ICT refuse GOOSE payload dataset length greater than SCSM supports?	N
additional items:			
		Maximum number of GOOSE messages which could be sent	≤ 16 ; It depends on the available memory.



## 1.9 GOOSE subscribe model

ID	ED	Description	Value / Clarification
Gs1	1, 2	What elements of a subscribed GOOSE header are checked to decide the message is valid and the allData values are accepted? If yes, describe the conditions. Note: the VLAN tag may be removed by a ethernet switch and should not be checked	N Source MAC address Y Destination MAC address Y Ethertype = 0x88B8 Y APPIP Y gocbRef Y timeAllowedtoLive Y datSet Y goID N t Y stNum Y sqNum Y test/simulation Y confRev Y ndsCom Y numDatSetEntries Y out-of-order dataset members
Gs2	1, 2	When is a subscribed GOOSE marked as lost ? (TAL = time allowed to live value from the last received GOOSE message)	When message does not arrive by $2 \cdot \text{TAL}$
Gs3	1, 2	What is the behavior when one or more subscribed GOOSE message isn't received or syntactically incorrect ? (missing GOOSE)	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.
Gs4	1, 2	What is the behavior when a subscribed GOOSE message is out-of-order ?	When a given state number n, sequence number l is received, only the following telegrams will be accepted: n, l + 1 n, l + 2 n + 1, 0 n + 1, 1 1,0 All other telegrams are ignored
Gs5	1, 2	What is the behavior when a subscribed GOOSE message is duplicated ?	The repetition will be ignored
Gs6	1	Does the device subscribe to GOOSE messages with/without the VLAN tag?	Y with the VLAN tag Y without the VLAN tag
Gs7	1	May the GOOSE data set contain: - structured data objects? - timestamp data attributes?	Y Y
Gs8	1, 2	Subscribed FCD supported common data classes are	SPS, DPS, ACT, ACD, BCR, MV, CMV, WYE, DEL, SEQ, SPC, DPC, INC, ENC, BSC, ISC, APC, BAC Arrays are not supported
Gs9	1	Are subscribed GOOSE with test=T (Ed1) / simulation=T (Ed2) accepted in test/simulation mode	N Simulation mode is not supported
Gs10	1, 2	Max number of dataset members	Unlimited

ID	ED	Description	Value / Clarification
Gs11	1	Is Fixed-length encoded GOOSE supported	Y
Gs12	2	Is IEC 62351-6 security supported	N
Gs13	2	How does the subscriber handle incoming data flagged as test when the destination LN.Beh is On or Blocked?  Is this behavior	Keep last non test value  fixed
additional items:			
		Maximum number of GOOSE messages which could be received	≤ 128 ; It depends on the available memory.
		Interpretation of GOOSE messages at subscriber side	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	After a GOOSE multicast application association has been interrupted, the reception of a valid GOOSE telegram is required to validate the state of this GOOSE association again. 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).
		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). The received telegram with the mismatched attribute will be discarded: It has not been subscribed.
		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 a semantic out-of-order if the types are identical.
		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.
		Does the device support Fixed Offset of GOOSE?	N

## 1.10 Control model

ID	ED	Description	Value / Clarification
Ct1	-	What control models are supported? (compare PICS)	Y Status-only Y Direct-with-normal-security N Sbo-with-normal-security Y Direct-with-enhanced-security Y Sbo-with-enhanced-security
Ct2	1, 2	Is the control model fixed, configurable and/ or online changeable?	Fixed
Ct3	-	Is TimeActivatedOperate supported (compare PICS or SCL)	N
Ct4	-	Is "operate-many" supported (compare sboClass)?	N
Ct5	1	What is the behavior of the DUT when the test attribute is set in the SelectWithValue and/or Operate request	The request will be proceed if the Beh of the logical node where the controllable object is located is test. Otherwise, it will be discarded as blocked-by-mode
Ct6	-	What are the conditions for the time (T) at- tribute in the SelectWithValue and/or Operate request	Time attribute is not relevant.
Ct7	-	Is pulse configuration supported ?	N
Ct8	1	What is the behavior of the DUT when the check conditions are not set  This behaviour is:	DUT bypasses the interlocking check  Configurable

ID	ED	Description	Value / Clarification
Ct9	1, 2	What additional cause diagnosis are supported	N Unknown Y Not-supported Y Blocked-by-switching-hierarchy Y Select-failed Y Invalid-position Y Position-reached Y Parameter-change-in-execution (in Ed1 only) Y 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 N 1-of-n-control Y Abortion-by-cancel Y Time-limit-over N Abortion-by-trip Y Object-not-selected  Edition 2 specific values:  Y Object-already-selected N No-access-authority N Ended-with-overshoot N Abortion-due-to-deviation N Abortion-by-communication-loss N Blocked-by-command N None Y Inconsistent-parameters Y Locked-by-other-client N Parameter-change-in-execution
Ct10	1, 2	How to force a “test-not-ok” respond with SelectWithValue request?	Test and logical node Beh do not match Wrong orCat
Ct11	1, 2	How to force a “test-not-ok” respond with Select request?	When the control object has already been selected
Ct12	1, 2	How to force a “test-not-ok” respond with Operate request?	DOns: Test and logical node Beh do not match Wrong orCat SBOs: N/A DOes: Test and logical node Beh do not match negative feedback with AddCause "Blocked-by-mode" SBOes: Test and logical node Beh do not match Wrong orCat
Ct13	1, 2	Which origin categories are supported?	Bay-control, station-control, remote-control, automatic-station, automatic-remote, maintenance, process
Ct14	1, 2	What happens if the orCat value is not supported?	DOns: Operate.Resp- SBOs: N/A DOes: Operate.Resp-, addCause = Blocked-by-mode SBOes: SelectWithValue.Resp-, addCause = not-supported

ID	ED	Description	Value / Clarification
Ct15	1, 2	Does the IED accept a SelectWithValue/Operate with the same ctVal as the current status value?	DONs: Y SBOs: N/A DOes: Y SBOes SelectWithValue: Y SBOes Operate: N Depending if the verify check has been disabled with
Ct16	1	Does the IED accept a Select/Operate on the same control object from 2 different clients at the same time?	DONs: Y SBOs: N/A DOes: N SBOes: N No, if the second request occurred when the object is not in unselected state (SBOes), resp. Ready state (DONs, DOes), then it will lead to a negative response
Ct17	1	Does the IED accept a Select/SelectWithValue from the same client when the control object is already selected (tissue 334)	SBOs: N/A SBOes: N
Ct18	1, 2	Is for SBOes the internal validation performed during the SelectWithValue and/or Operate step?	Operate
Ct19	-	Can a control operation be blocked by Mod=Off or Blocked	Y
Ct20	1, 2	Does the IED support local / remote operation?	Y
Ct21	1, 2	Does the IED send an InformationReport with LastApplError as part of the Operate response for control with normal security?	SBOs: N/A DONs: N
Ct22	2	How to force a "parameter-change-in-execution"	SBOs: N/A SBOes: parameter-change-in-execution is supported in Ed1 only
Ct23	1, 2	How many SBOs/SBOes control objects can be selected at the same time?	SBOs: n = N/A SBOes: n = 1
Ct24	1, 2	Can a controllable object be forced to keep its old state e.g. Internal Controllable Objects may not be accessible to force this, whereas a switch like Circuit Breaker outside the DUT can?	Y
Ct25	1, 2	When CDC=DPC is supported, is it possible to have DPC (Controllable Double Point) go to the intermediate state? (00)	N
Ct26	1, 2	Name an enhanced security control point (if any) with a finite operate timeout Specify the operate timeout (in milliseconds)	DOes: PROT/LLN0.Mod SBOes: CTRL/CSW11.Pos DOes: NA SBOes: 5000 ms
Ct27	2	Does the IED support control objects with external signals?	DONs: N SBOs: N DOes: N SBOes: Y

ID	ED	Description	Value / Clarification
Ct28		Deprecated, kept as placeholder	
additional items:			
		Inconsistency between SelectWithValue and (Operate or Cancel)	Operate or Cancel will be acknowledged with negative response if inconsistencies to the SelectWithValue request are detected. The following attributes will not be checked in this case: T (Time) The controlled object returns then in state "unselected"
		Cancel request could be sent after an operate request.	Y
		Format of the control time stamp attribute ?	Time stamp instead of EntryTime acc. to the 7-2 Errata List.
		What is the behavior of the control state machines when the association is lost with the client that issued a successful control?	For SBOes: If the current state is "Ready", then the selection ends.

## 1.11 Time and time synchronisation model

ID	ED	Description	Value / Clarification
Tm1	1, 2	What quality bits are supported (may be set by the IED)?	Y LeapSecondsKnown Y ClockFailure Y ClockNotSynchronized
Tm2	1, 2	Describe the behavior when the time synchronization signal/messages are lost	The quality attribute "ClockNotSynchronized" will be set to TRUE after a configured time period Configurable, at least 2 minutes
Tm3	1, 2	How long does it take to take over the new time from time server	Configurable Default: 10 min
Tm4	1, 2	When is the time quality bit "Clock failure" set?	Clock failure is set when the device internal clock drifts from the external synchronization
Tm5	1, 2	When is the time quality bit "Clock not synchronised" set?	The "ClockNotSynchronized" attribute is set to TRUE as long as no time synchronization is established.
Tm6	-	Is the timestamp of a binary event adjusted to the configured scan cycle?	Deprecated
Tm7	1	Does the device support time zone and day-light saving?	Y
Tm8	1,2	Which attributes of the SNTP response packet are validated?	N Leap indicator not equal to 3? Y Mode is equal to SERVER Y OriginateTimestamp is equal to value sent by the SNTP client as Transmit Timestamp Y RX/TX timestamp fields are checked for reasonableness Y SNTP version 3 and/or 4 Y Other (describe): Stratum is not KISS OF DEATH Clock of STNP Server is synchronized Response comes from the server to which the request was sent
Tm9	1, 2	Do the COMTRADE files have local time or UTC time and is this configurable	Local time Not configurable
additional items:			
		What is the behaviour when the time synchronisation messages indicate that the stratum is greater than 3?	A stratum with a value greater than 3 with the SNTP time synchronization messages indicates that the time server has a questionable synchronisation. It might also indicate that no GPS connection are available. Therefore the time quality attribute "ClockNotSynchronized" will be set to TRUE as long as the stratum content is greater than 3.
		What is the behavior when the time synchronization signal/messages are lost?	The quality attribute "Clock Failure" will be set to TRUE after losing communication with the Time Master for a configured time period.

## 1.12 File transfer model

ID	ED	Description	Value / Clarification
Ft1	1	What is structure of files and directories? Where are the COMTRADE files stored? Are COMTRADE Files zipped and what files are included in each zip file?	Directory name / COMTRADE / *; Files according to the COMTRADE standard and not zipped.
Ft2	1, 2	Directory names are separated from the file name by	"/"
Ft3	1	The maximum file name size including path (default 64 chars)	64
Ft4	1, 2	Are directory/file name case sensitive	Case sensitive
Ft5	1, 2	Maximum file size for SetFile	SetFile is not supported
Ft6	1	Is the requested file path included in the file name of the MMS fileDirectory respond?	Y
Ft7	1	Is the wild char supported MMS fileDirectory request?	Y only as *; not as name completion wild card
Ft8	1, 2	Is it allowed that 2 clients get a file at the same time?	N
Ft9	1, 2	Which files can be deleted	N/A
additional items:			
		Maximum number of clients that can use the File transfer service simultaneously	1
		Maximum number of files that can be accessed simultaneously	1
		Maximum time the file transfer service is locked for one client	10 min



## 1.13 General items

ID	ED	Description	Value / Clarification
additional items:			
		What is the type of the attribute actVal in the BCR (Binary Counter Reading) CDC?	Depending on the edition mode used. The type is integer 32 (INT32) if the software is running in edition 1 mode, otherwise it is integer 64 (INT64).
		What is the behaviour of the Device by GetAllDataValues?	GetAllDataValues is not supported without functional constraint indication.

## 1.14 TICS - Technical Issues Implementation Conformance Statement

### 1.14.1 Mandatory Edition 2 TISSUES

The implemented TISSUES are only relevant when the Edition Setting is set to Edition 1, otherwise those TISSUES are not relevant for Edition 2. The tables below give an overview of the applicable mandatory Tissues.

Items in *italic* are brief interpretations provided by the UCA International Users Group to aid in interpretation and is not normative.

The original TISSUE should be consulted for details of changes.

“Implemented by server”:

“Y”: means that the server has implemented the respective tissue.

“ni”: No impact on testing

“na”: not applicable if the server does not support the corresponding ACSI service(s)

Part 6 Tissue	Description	Implemented by server
658	Tracking related features <i>EntryID and CST missing, these are checked by schema</i>	Y/na
663	FCDA element cannot be a "functionally constrained logical node" <i>doName now mandatory in FCDA element, SCT: refuse to make empty doName? ICT: Refuse SCD</i>	Y
668	Autotransformer modeling <i>Autotransformer model in substation section has changed</i>	Y/na
687	SGCB ResvTms <i>SettingControl has added attribute resvTms see also TISSUE 845</i>	Y/na
719	ConfDataSet - maxAttributes definition is confusing <i>maxAttributes now means max count of FCDA allowed in dataset</i>	Y/na
721	Log element name <i>LN0/Log now has optional attribute "name"</i>	Y/na
768	bType VisString65 is missing <i>VisString65 added as SCL BasicType</i>	Y/na
779	object references <i>"@" as first character in object references now allowed</i>	Y/na
788	SICS S56 from optional to mandatory <i>SICS S56="Interpret IED capabilities and prohibit unsupported usage"</i>	Y/na
789	ConfLdName as services applies to both server and client <i>Many changes made to Services section</i>	Y/na

Part 6 Tissue	Description	Implemented by server
804	valKind and IED versus System configuration <i>valImport missing/false DAI means ICT shall ignore value in SCD and SCT shall not change from ICD/IID value. Instance section inherits from DA/BDA element.</i>	Y/na
806	Max length of log name inconsistent between -6 and -7-2 <i>LogControl.logName and Log.name restricted to 32 chars</i>	Y/na
807	Need a way to indicate if "Owner" present in RCB <i>Services/ReportSettings@owner added</i>	Y/na
823	ValKind for structured data attributes <i>valKind is prohibited on structured attributes</i>	Y/na
824	Short addresses on structured data attributes <i>sAddr is now allowed for structured attributes</i>	Y/na
825	Floating point value <i>Server shall support &lt;Val&gt; with exponential notation</i>	Y/na
845	SGCB ResvTms <i>Services/SettingGroups/SGEdit added attribute resvTms Services/SettingGroups/ConfSG added attribute resvTms See also TISSUE 687</i>	Y/na
853	SBO and ProtNs <i>DA[@name=SBO] element shall have ProtNS element</i>	Y/na
855	Recursive SubFunction <i>Substation section extension must be tolerated</i>	Y/na
856	VoltageLevel frequency and phases <i>Substation section extension must be tolerated</i>	ni
857	Function/SubFunction for ConductingEquipment <i>Substation section extension must be tolerated</i>	Y/na
886	Missing 8-1 P-types <i>"tP_IP_UDP_PORT" and "tP_IP_TCP_PORT" added</i>	Y/na
901	tServices as AP or as IED element <i>Rules for contents of AP/Server/Services are now defined</i>	Y/na
936	SupSubscription parameter usage is difficult <i>SupSubscription "max" replaced by "maxGo" and "maxSv"</i>	Y/na
1147	tServices - FileHandling not consistent with -7-2 <i>Services/FileHandling now means only support for GetFile and GetFileAttributeValues and NOT SetFile/DeleteFile</i>	Y/na
1185	Valkind value Conf for EX FC data <i>valKind=Conf is allowed for dataNs</i>	Y/na
1284	SCSM mapping may require a communication section in an ICD file <i>Server IEDs supporting client/server associations to 61850-8-1 shall include a &lt;Communication&gt; section</i>	Y/na
1328	Limitation on the size of data type templates identifiers <i>Identifier now limited to 255 characters</i>	Y

Part 6 Tissue	Description	Implemented by server
1395	Client LN attributes <i>ReportControl/RptEnabled/ClientLN@IdInst shall be "LDO" for pure clients (without any Logical Devices)</i>	ni
1402	ExtRef during engineering <i>an ExtRef.intAddr attribute value unequal to empty string (prescribed or filled by the IED tool) is the flag indicating that the ExtRef shall not be deleted by the system tool. The system tool can however remove the link to the source IED</i> <<applicable for SCL tool test>>	ni
1415	SICS-S110 IID import mandatory for Edition2 <i>only the import of data model modifications and CF value changes is mandatory for system tool</i> <<applicable for SCL tool test>>	ni
1419	Support of IdName on other IEDs <i>SICS I212 is now mandatory for client and subscriber</i>	Y/na
1444	Need to support fixed and SCT controlled Datasets <i>Services/xxxSettings@datSet=fix now means "data set pointed by Control Block cannot be altered from ICD/IID value</i> <<applicable for SCL tool test>>	Y/na
1445	ConfReportControl and a fixed ReportSettings <i>Control block capabilities must be consistent</i> <<applicable for SCL tool test>>	Y/na
1450	originalSclXxx computation rules <i>Ed2 ICD/IID files specifying SCL@version=2007 SHALL include originalSCLVersion=2007 and originalSCLRevision as attributes of the &lt;IED&gt;element</i>	Y
1485	Need to supercede Tissue 1398 to clarify SCT behavior <i>Same as TISSUE 1450 &lt;&lt;applicable for SCL tool test&gt;&gt;</i>	Y

Part 7-1 Tissue	Description	Implemented by server
828	Data model namespace revision IEC 61850-7-4:2007[A] <i>Both 2007 and 2007A are allowed for namespace name</i>	Y/na
948	Enumeration (string) values format <i>Enums are limited to 127 characters from Basic-Latin and Latin-1 character sets</i>	Y
1151	simulated GOOSE disappears after 1st appearance when LPHD.Sim = TRUE <i>New LGOS state machine defined, but TISSUE is not IntOp2, therefore TISSUE is optional if LGOS is used</i>	Y/na
1396	The use and configuration flow of LGOS and LSVS is unclear <i>If Services/SupSubscription@maxGo &gt; 1 then at least 1 LGOS must exist. Same for maxSv/LSVS. If maxGo &gt; count(LGOS) then SCT can create additional LGOS. Same for maxSv/LSVS</i>	Y/na

Part 7-1 Tissue	Description	Implemented by server
1447	Restriction on ENUMtypes in SCL <i>If a ENUM DA limits write or configuration to a subset, then that subset must be declared</i>	Y/na
1457	Multiple DOI nodes with the same name <i>LN can have no more than one DOI with same name</i>	Y
1468	Re-use DO from other LN <i>allow standard or private dataNs</i>	Y/na
1491	CmdBlk blocks itself? <i>The data CmdBlk shall have no effect on the controllable data Mod or CmdBlk</i>	Y/na

Part 7-2 Tissue	Description	Implemented by server
728	BRCB: could PurgeBuf be set when RptEna=TRUE? <i>PurgeBuf while RptEna=true is prohibited</i>	Y/na
778	AddCause values – add value not-supported <i>Align 7-2 with 8-1 (nothing new to 8-1)</i>	Y/na
780	What are unsupported trigger option at a control block? <i>All control blocks must support all trigger options</i>	Y/na
783	TimOper Resp- ; add Authorization check <i>Clarifies Time-Operated Controls</i>	Y/na
786	AddCause values 26 and 27 are switched <i>Annex B.2 has wrong AddCause values</i>	Y/na
820	Mandatory ACSI services (use for PICS template) <i>Model entries M18 (Application Association), M19 (GCB), M20 (SVCB) are new. Services S17 (Substitution) and S61 (GetServerDirectory) are new. Services S1, S3, S4, S5, S6, S8, S16, S18, S23, S36, S37, S41, S42 are changed. Final resolution in file tissue820Resolution_final_20120308.doc</i>	Y
858	typo in enumeration ServiceType <i>Tracking serviceType now has GetLogicalNodeDirectory</i>	Y/na
861	dchg of ConfRev attribute <i>Clarifies (tracking) BTS.confRev is AFTER BRCB change</i>	Y/na
1050	GTS Phycomaddr definition in SCL <i>(Tracking) GTS needs a special structure for SCL</i>	Y/na
1071	Length of DO name <i>Private DO name length shall be &lt;=12 including instance</i>	Y/na
1127	Missing owner attribute in BTS and UTS <i>NSD files for 61850-7-3 show owner in (tracking) BTS/UTS</i>	Y/na
1202	GI not optional <i>GI support is mandatory for both URCB and BRCB</i>	Y/na

## 1.14 TICS - Technical Issues Implementation Conformance Statement

Part 7-2 Tissue	Description	Implemented by server
1232	EntryID needs clarification <i>Segments of a report shall have same identifiers</i>	Y/na
1242	NTS definition <i>NTS.resv have been added</i>	Y/na
1307	Segmented report with Buffer overflow <i>Segments of a report shall have identical buf-overflow value</i>	Y/na
1428	MTS and NTS should use svOptFlds <i>MTS.optFlds and NTS.optFlds now have bType=SvOptFlds</i>	Y/na
1630	Attributes in CDC=LTS do not match 8-1 definition <i>Order of attributes in LTS changed to: logEna, logRef, datSet, oldEntrTm, newEntrTm, oldEnt, newEnt, trgOps, intgPd</i>	Y/na

Part 7-3 Tissue	Description	Implemented by server
697	persistent command / PulseConfig <i>PulseConfig adds enum "persistent-feedback" DPC.cmdQual=="persistent" is conditionally allowed</i>	Y/na
698	Wrong case is BAC.dB attribute <i>attribute renamed from "dB" to "db"</i>	Y/na
711	blkEna freeze data update while setting its quality to operator-Blocked <i>Mode=Blocked shall not cause q.operatorBlocked</i>	Y/na
722	Units for 'h' and 'min' not in UnitKind enumeration. <i>New unit enums 84=hours, 85=minutes</i>	Y/na
919	Presence Condition for svC <i>svC may be valKind=Conf in ICD file</i>	Y/na
925	Presence of i or f attribute - Problem with writing <i>New constructed attribute class "AnalogueValueCtl"</i>	Y/na
926	Presence Conditions within RangeConfig <i>All or none of hhLim+hLim+lLim+lLim shall be present</i>	Y/na
954	Data attributes with FC=CF should have trgOp=dchg <i>Some INS and HST and CSG attributes missing dchg</i>	Y/na
1078	CMV.t update if rangeAng changed <i>Add rangeAng to "reasons-to-update-timestamp-of-CMV"</i>	Y/na
1565	db=0 behaviour <i>db=0 not longer suppresses reporting</i>	Y/na
1578	dataAttribute NameSpace content <i>Attributes with FC=EX must be initialized in ICD/IID file</i>	Y

Part 7-4 Tissue	Description	Implemented by server
671	mistake in definition of Mod & Beh <i>Beh=on, q=test should be "Processed as valid"</i>	Y/na
674	CDC of ZRRC.LocSta is wrong <i>ZRRC LocSta should be CDC=SPC</i>	Y/na
676	Same data object name used with different CDC <i>LCCH.Fer renamed to FerCh, LCCH.RedFer to RedFerCh</i>	Y/na
677	MotStr is used with different CDC in PMMS and SOPM LN classes <i>Rename SOPM.MotStr to MotStrNum</i>	Y/na
679	Remove CycTrMod Enum <i>Enum is no longer used, use TrMod instead</i>	Y/na
680	SI unit for MHYD.Cndct <i>Change unit from S/cm2 to S/m</i>	Y/na
681	Enum PIDAlg <i>Typographical error, invalid XML syntax</i>	Y/na
682	ANCR.ParColMod <i>ParColMod enum values text have changed</i>	Y/na
683	Enum QVVR.IntrDetMth <i>IntrDetMth enum values text have changed</i>	Y/na
685	Enum ParTraMod <i>ParTraMod enum values text have changed</i>	Y/na
686	New annex H - enums types in XML <i>Many changes have been made to enumeration names</i>	Y/na
694	Data object CmdBlk <i>CmdBlk semantics have changed</i>	Y/na
696	LSVS.St (Status of subscription) <i>LSVS.St is now mandatory</i>	Y/na
712	interpretation of quality operatorBlocked <i>Mode and Behavior semantics have changed</i>	Y/na
713	DO Naming of time constants in FFIL <i>Many DO names in FFIL have changed</i>	Y/na
714	Enums for ShOpCap and SwOpCap <i>Type for YPSH.ShOpCap and XSWI.SwOpCap have changed</i>	Y/na
715	RBDR.ChNum1 <i>RBDR.ChNum1 changes from optional to conditional</i>	Y/na
716	TAXD text for condition <i>TAXD.SmRte condition for inclusion has changed</i>	Y/na
724	ANCR.Auto <i>ANCR.Auto changes from mandatory to optional</i>	Y/na
725	Loc in LN A-group <i>Loc changes to optional, LocKey/LocSta conditions change</i>	Y/na

Part 7-4 Tissue	Description	Implemented by server
734	LLN0.OpTmh vs. LPHD.OpTmh <i>LLN0.OpTmh deleted, LPHD.OpTmH added as conditional</i>	ni
736	PFSign <i>PFSign description in Clause 6 is clarified</i>	Y/na
742	GAPC.Str, GAPC.Op and GAPC.StrVal <i>Objects have instance indicator removed (ex, Str1 to Str)</i>	Y/na
743	CCGR.PmpCtl and CCGR.FanCtl <i>Object have instance indicator added (ex:PmpCtl to PmpCtl1)</i>	Y/na
744	LN STMP, EEHealth and EEName <i>Removed STMP.EEHealth and STMP.EEName</i>	Y/na
772	LPHD.PwrUp/PwrDn should be transient <i>These objects are now transient</i>	Y/na
773	Loc, LockKey and LocSta YPSH and YLTC <i>Add Loc, LockKey and LocSta in YLTC and YPSH (optional)</i>	Y/na
774	ITCI.LockKey <i>Add ITCI.LockKey as optional</i>	Y/na
776	LPHD.OutOv/InOv and LCCH.OutOv/InOv <i>Clarified: stays true until buffer space again available</i>	Y/na
800	Misspelling in CSYN <i>CSYN.VInvTmms renamed to CSYN.VIntvTmms</i>	Y/na
802	CCGR and Harmonized control authority <i>Add Loc, LockSta to every controllable LN (e.g. FSPT)</i>	Y/na
808	Presence condition of ZMoT.DExt and new DOs <i>Change ZMOT.DExt to optional; add TotThmSt and MotSt</i>	Y/na
831	Setting of ConfRevNum in LGOS <i>Add RxConfRevNum to LGOS and LSVS</i>	Y/na
838	Testing in Beh=Blocked <i>Change sematic of Beh=Blocked to allow controls to be acknowledged even when LN is blocked.</i>	Y/na
844	MFLK.PhPiMax, MFLK.PhPiLoFil, MFLK.PhPiRoot DEL->WYE <i>Change these NFLK objects from cdc=DEL to cdc=WYE</i>	Y/na
877	QVUB -settings should be optional <i>Change QVUB.UnbDetMth and QVUB.StrVal to optional</i>	ni
908	ARIS.StrSeq – transient <i>Change ARIS.StrSeq to transient Transient is not tested</i>	ni
909	Remove ANCR.ColOpR and ColOpL <i>Replace ANCR.ColOpR and ANCR.ColOpL with ANCR.ColChg. Add YEFN.ColChg</i>	Y/na
912	Clarification of PwrRtg/VARtg <i>Change many DOs in YPTR, and ZGEN, see name space 2007A2.nsd for final result</i>	Y/na



Part 7-4 Tissue	Description	Implemented by server
920	Resetable Counter is NOT resetable <i>Change GGIO.CntRs to CntVal; Same for FCNT</i>	Y/na
932	Rename AVCO.SptVol to AVCO.VolSpt	Y/na
933	Presence of LCCH.RedFerCh and RedRxCnt <i>Change the presence condition of LCCH.RedChLiv</i>	Y/na
939	Change CDC for ANCR.FixCol <i>Change ANCR.FixCol from APC to ASG</i>	Y/na
991	LGOS: GoCBRef (as well as LSVS.SvCBRef) should be mandatory <i>LGOS.GoCBRef and LSVS.SvCBRef are now both mandatory</i>	Y/na
1007	PTRC as fault indicator - Update of description required <i>PTRC.Tr and Op and Str conditional (at least 1 of group)</i>	Y/na
1044	TapChg in AVCO <i>AVCO.TapChg is now optional</i>	Y/na
1077	Rename DOnames within LTIM <i>LTIM.TmChgDayTm, changed to TmChgDay; LTIM.TmChgStdTm changed to TmChgStd</i>	Y/na
1331	Mod, Beh and Health with q=TEST, client can't receive their states <i>Mod while in Blocked will always be processed</i>	Y/na
1456	Annex A and Mod/Beh/Health <i>Mod.stVal writes always ignore test bits in controls</i>	Y/na
1568	ISAF.AlmReset ->transient <i>Change ISAF.AmlReset to transient Transient is not tested</i>	ni

Note: TISSUE 675, 735, 772, 775, 776, 878 are not relevant for conformance testing

Part 8-1 Tissue	Description	Implemented by Server
770	GoID type mismatch 18.1.1 and 18.1.2.5.2 <i>GoID string length is now 129</i>	Y/na
784	Tracking of control (CTS) <i>Tracking CTS has been added</i>	Y/na
817	Fixed-length GOOSE float encoding <i>GOOSE float is encoded Tag=0x87, length=5, first octet=8</i>	Y/na
827	Mandatory ACSI services (Part of 7-2 TISSUE resolution) <i>Change Table 111 (ServicesSupported): Add initiate, abort, and release. Change conditions for defineNamedVariables.Final resolution in file tissue820Resolution_final_20120308.doc</i>	ni

Part 8-1 Tissue	Description	Implemented by Server
834	File dir name length 64 <i>Filename length changed from 32 to 64</i>	Y/na
951	Encoding of Owner attribute <i>xRCB.owner is encoded as 4 octets(IPv4) or 16 octets(IPv6)</i>	Y/na
1040	More associate error codes <i>3 additional associate error codes added</i>	Y/na
1178	Select Response+ is non-null value <i>Response to SBO read should be &lt;CO_CtrlObjectRef&gt;</i>	Y/na
1324	The response- for DeleteNamedVariableList is not defined <i>numDeleted=0; error=service/object-constraint-conflict</i>	Y/na
1345	Fixed-length GOOSE ASN.1 length encoding <i>GOOSE publisher shall always encode minimum size legth field</i>	Y/na
1441	Optional fields in buffered reports <i>Writing BRCB.optFld shall not cause a purgeBuf operation</i>	Y/na
1442	Journal variableTag for ReasonCode <i>Example in the standard is incorrect</i>	Y/na
1453	Purge buffer on write to BRCB <i>PurgeBuf only occurs if different value is written</i>	Y/na
1454	Reports can be transmitted before write(RptEna=true) is confirmed	ni
1495	GetVariableAccessAttributes error code <i>Return MMS error access/object-non-existent if the object does not exist</i>	Y/na
1500	the response for DeleteNamedVariableList with a non-existent LN is not specified <i>CreateDataSet/DefineNamedVariableList specifying a non-existing LD/LN shall fail with access/object-non-existent</i>	Y/na

Compare the TISSUE database for more details: <http://iec61850.tissue-db.com>

## 2 IEC 61850 Conformance Statements

### Contents

This chapter describes conformity with IEC 61850. It does not describe the entire standard but only parts in which there is a choice in the services.

2.1	Definitions of the ISO/OSI Reference Model	36
2.2	Definition of the Communication Services Acc. to Standard (PICS)	37
2.3	Model Implementation Conformance Statement (MICS)	43

## 2.1 Definitions of the ISO/OSI Reference Model

To achieve stable data exchange, all communication is based on the OSI Reference Model (OSI/IEC 7498-1) for a multi-layer communication function. Fig. 2-1 shows the seven layers defined there.

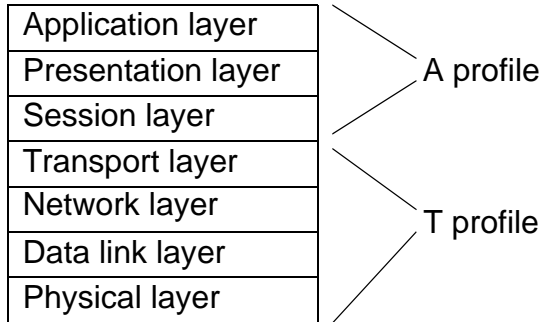


Fig. 2-1 OSI reference model and profiles

This section on using the ISO application (application profile) and transport profiles (T profile) describes the various stack profiles. An ISO application profile is a set of specifications and declarations regarding the top 3 layers of the ISO/OSI reference model (i.e. the application, presentation, and session layers). The T profile is a set of specifications and declarations regarding the lower 4 layers (i.e. transport, network, data link, and physical layers).

A and T profiles can be combined in various ways to form different types of services and information items that can be exchanged. The services specified in Part 7-2 of the IEC 61850 standard are mapped onto 4 different combinations of the profiles. These 4 combinations are used for

- Client/server services,
- GOOSE services,
- Time synchronization,
- Services for sampled measured values.

## 2.2 Definition of the Communication Services Acc. to Standard (PICS)

The tables in the sections below are specified according to IEC61850 Part 7-2 Annex A.

The descriptions below refer to implementation in the SIPROTEC 4, the SIPROTEC Compact and the Reyrolle IED device range.

The tables give the names stated in the standard.

### 2.2.1 Profile Compliance

#### Basic conformance statement

		Client/ Subscriber	Server/ Publisher	Value/Comments
<b>Client-Server roles</b>				
B11	<b>Server</b> side (of TWO-PARTY-APPLICATION-ASSOCIATION)	--	Y	
B12	<b>Client</b> side (of TWO-PARTY-APPLICATION-ASSOCIATION)	N	--	
<b>SCSMs supported</b>				
B21	<b>SCSM:</b> IEC 6185-8-1 used	Y	Y	
B22	<b>SCSM:</b> IEC 6185-9-1 used			
B23	<b>SCSM:</b> IEC 6185-9-2 used			
B24	<b>SCSM:</b> other			
<b>Generic substation event model (GSE)</b>				
B31	<b>Publisher</b> side	--	Y	
B32	<b>Subscriber</b> side	Y	--	
<b>Transmission of sample value model (SVC)</b>				
B41	<b>Publisher</b> side	--	N	
B42	<b>Subscriber</b> side	N	--	
Y = supported N or empty = not supported				

## ACSI models conformance statement

		Client/ Subscriber	Server/ Publisher	Value/Comments
If <b>Server or Client</b> side (B11/12) supported				
M1	<b>Logical device</b>		Y	
M2	<b>Logical node</b>		Y	
M3	<b>Data</b>		Y	
M4	<b>Data set</b>		Y	
M5	<b>Substitution</b>		N	
M6	<b>Setting group control</b>		Y	
	<b>Reporting</b>			
M7	<b>Buffered report control</b>		Y	
M7-1	sequence-number		Y	
M7-2	report-time-stamp		Y	
M7-3	reason-for-inclusion		Y	
M7-4	data-set-name		Y	
M7-5	data-reference		Y	
M7-6	buffer-overflow		Y	
M7-7	entryID		Y	
M7-8	BufTim		Y	
M7-9	IntgPd		Y	
M7-10	GI		Y	
M7-11	conf-revision		Y	
M8	<b>Unbuffered report control</b>		Y	
M8-1	sequence-number		Y	
M8-2	report-time-stamp		Y	
M8-3	reason-for-inclusion		Y	
M8-4	data-set-name		Y	
M8-5	data-reference		Y	
M8-6	BufTim		Y	
M8-7	IntgPd		Y	
M8-8	GI		Y	
M8-9	conf-revision		Y	
	<b>Logging</b>		N	
M9	<b>Log control</b>		N	
M9-1	IntgPd		N	
M10	<b>Log</b>		N	
M11	<b>Control</b>		Y	

20

		Client/ Subscriber	Server/ Publisher	Value/Comments
If <b>GSE</b> (B31/32) is supported				
M12	<b>GOOSE</b>	Y	Y	
M13	<b>GSSE</b>	N	N	
If <b>SVC</b> (41/42) is supported				
M14	Multicast SVC	N	N	
M15	Unicast SVC	N	N	
If <b>Server or Client</b> side (B11/B12) supported				
M16	<b>Time</b>	Y	N	
M17	<b>File Transfer</b>	N	Y	
Y = supported N or empty = not supported				

**ACSI service conformance statement**

	Services	AA: TP/MC	Client (C)	Server (S)	
<b>Server</b>					
S1	GetServerDirectory	TP	N	Y	
<b>Application association</b>					
S2	Associate	TP	N	Y	
S3	Abort	TP	N	Y	
S4	Release	TP	N	Y	
<b>Logical device</b>					
S5	GetLogicalDeviceDirectory	TP	N	Y	
<b>Logical Node</b>					
S6	GetLogicalNodeDirectory	TP	N	Y	
S7	GetAllDataValues	TP	N	Y	
<b>Data</b>					
S8	GetDataValues	TP	N	Y	
S9	SetDataValues	TP	N	Y	
S10	GetDataDirectory	TP	N	Y	
S11	GetDataDefinition	TP	N	Y	
<b>Data set</b>					
S12	GetDataSetValues	TP	N	Y	
S13	SetDataSetValues	TP	N	N	
S14	CreateDataSet	TP	N	Y	
S15	DeleteDataSet	TP	N	Y	
S16	GetDataSetDirectory	TP	N	Y	
<b>Substitution</b>					
S17	SetDataValues	TP	N	N	
<b>Setting group control</b>					
S18	SelectActiveSG	TP	N	Y	
S19	SelectEditSG	TP	N	N	
S20	SetSGValues/ SetEditSGValue	TP	N	N	
S21	ConfirmEditSGValues	TP	N	N	
S22	GetSGValues/ GetEditSGValue	TP	N	N	
S23	GetSGCBValues	TP	N	Y	



	Services	AA: TP/MC	Client (C)	Server (S)	
<b>Reporting</b>					
Buffered report control block (BRCB)					
S24	Report	TP	N	Y	
S24-1	data-change (dchg)		N	Y	
S24-2	qchg-change (qchg)		N	Y	
S24-3	data-update (dupd)		N	Y	
S25	GetBRCBValues	TP	N	Y	
S26	SetBRCBValues	TP	N	Y	
Unbuffered report control block (URCB)					
S27	Report	TP	N	Y	
S27-1	data-change (dchg)		N	Y	
S27-2	qchg-change (qchg)		N	Y	
S27-3	data-update (dupd)		N	Y	
S28	GetURCBValues	TP	N	Y	
S29	SetURCBValues	TP	N	Y	
<b>Logging</b>					
Log control block					
S30	GetLCBValues	TP	N	N	
S31	SetLCBValues	TP	N	N	
Log					
S32	QueryLogByTime	TP	N	N	
S33	QueryLogAfter	TP	N	N	
S34	GetLogStatusValues	TP	N	N	
<b>Generic substation event model (GSE)</b>					
GOOSE-CONTROL-BLOCK					
S35	SendGOOSEMessage	MC	Y	Y	
S36	GetReference	TP	N	N	
S37	GetGOOSEElementNumber	TP	N	N	
S38	GetGoCBValues	TP	N	Y	
S39	SetGoCBValues	TP	N	Y	
GSSE-CONTROL-BLOCK					
S40	SendGSSEMessage	MC	N	N	
S41	GetReference	TP	N	N	
S42	GetGSSEElementNumber	TP	N	N	
S43	GetGsCBValues	TP	N	N	
S44	SetGsCBValues	TP	N	N	

## 2.2 Definition of the Communication Services Acc. to Standard (PICS)

	Services	AA: TP/MC	Client (C)	Server (S)	
<b>Transmission of sample value model (SVC)</b>					
Multicast SVC					
S45	SendMSVMessage	MC	N	N	
S46	GetMSVCBValues	TP	N	N	
S47	SetMSVCBValues	TP	N	N	
Unicast SVC					
S48	SendUSVMessage	TP	N	N	
S49	GetUSVCBValues	TP	N	N	
S50	SetUSVCBValues	TP	N	N	
<b>Control</b>					
S51	Select	TP	N	N	
S52	SelectWithValue	TP	N	Y	
S53	Cancel	TP	N	Y	
S54	Operate	TP	N	Y	
S55	Command-Termination	TP	N	Y	
S56	TimeActivated-Operate	TP	N	N	
<b>File transfer</b>					
S57	GetFile	TP	N	Y	
S58	SetFile	TP	N	N	
S59	DeleteFile	TP	N	N	
S60	GetFileAttributeValues	TP	N	Y	
<b>Time</b>					
T1	Time resolution of internal clock			10 (1 ms)	nearest negative power of 2 in seconds
T2	Time accuracy of internal clock				T0
				ClassT1	T1
					T2
					T3
					T4
					T5
T3	Supported TimeStamp resolution	-		10 (approx. 0.9 ms)	nearest negative power of 2 in seconds
Y = supported N or empty = not supported					

## 2.3 Model Implementation Conformance Statement (MICS)

### Content of the statement

This statement contains the description of all objects that are provided by a device and is especially important if devices are connected to a central system that supplies data to certain applications via the objects provided by the device.

In the case of SIPROTEC 4 or SIPROTEC Compact or Reyrolle IEDs, this document depends on both the device type and the defined user objects and can therefore not be a permanent part of the manual. It is therefore generated from DIGSI.

### Generation in DIGSI 4

Generation is selected in the device processing via menu items *File* → *Export* → *IEC 61850 System Interface for Documentation (PDF)*. The dialog that opens let you enter a device-related, editable filename under which the MICS document to be generated will be stored.

The document is generated with the correct version and device type data. It shows the assignment lists of the devices to IEC 61850 and vice versa. The whole document is shown in a hyperlinked table of contents. The MICS is a readable form of the current mapping of a device on IEC 61850.

