

# SIEMENS

SICAM I/O Unit  
7XV5673

IEC 61850

PIXIT, PICS, TICS

V1.00

Manual

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Preface

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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.

## **Target audience**

This manual is intended mainly for all persons who configure, parameterize and operate a SICAM I/O Unit device.

## **Scope of validity**

SICAM I/O Unit V02.11 and higher.

This manual is valid for SICAM I/O Unit devices running Edition 1 or Edition 2 mode of IEC 61850.

## **Standards**

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



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# 1 Applications

## Contents

This chapter specifies the protocol implementation extra information for testing (PIXIT) of the IEC 61850 interface in SICAM I/O Unit.

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## 1.1 General

This manual specifies the protocol implementation extra information for testing (PIXIT) of the IEC 61850 interface in SICAM I/O Unit.

It is based on the service subset definition given in the protocol implementation conformance (PICS), which is specified within the user manual SICAM I/O Unit IEC 61850.

The following applicable ACSI service models are supported and specified:

- Association model
- Server model
- Data set model
- Reporting model
- GOOSE publish model
- GOOSE subscribe model
- Control model
- Time and time synchronization model

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



## 1.2 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_KEEPALIVE value. The recommended range is 1 s to 20 s	10 seconds Adjustable under "Configuration Modbus TCP"
As3	1,2	Lost connection detection time	30 seconds
As5	1,2	What association parameters are necessary for successful association?	Transport selector      Y Session selector        Y Presentation selector    Y AP Title                    Y (ANY) AE Qualifier                Y (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 values	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      20000 Min MMS PDU size      8192
As8	1,2	What is the maximum start up time after a power supply interrupt?	30 seconds

## 1.3 Server model

ID	Ed	Description	Value / Clarification
Sr1	1,2	Which analogue value (MX) quality bits are supported (can be set by server)?	N/A (there are no analogue values in the device)
Sr2	1,2	Which status value (ST) quality bits are supported (can be set by server)?	Validity: Good Y Invalid Y Reserved N Questionable N BadReference Y Oscillatory N Failure Y OldData N Inconsistent N Inaccurate N  Source: Process Y Substituted N Test Y OperatorBlocked N

## 1.4 Data set model

No additional information. See Services section in SCL files.

## 1.5 Substitution model

Substitution model is not supported by the device.

## 1.6 Setting group control model

Setting Group control model is not supported by the device.

## 1.7 Reporting model

ID	Ed	Description	Value / Clarification
Rp1	1	The supported trigger conditions are (compare PICS)	Integrity Y Data change Y Quality change Y Data update Y General Interrogation Y
Rp2	1	The supported optional fields are	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 Y
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
Rp5	1	Multi client URCB approach (Compare IEC 61850-7-2 §14.2.1)	Each URCB is visible to all clients
Rp7	1,2	What is the buffer size for each BRCB or how many reports can be buffered?	No fixed size, depends on total number of BRCBs
Rp9	1	May the reported data set contain: - structured data objects? - data attributes?	Y N/A (datasets are fix)
Rp10	1,2	What is the scan cycle for binary events?  Is this fixed, configurable?	2 ms if binary inputs are used to generate binary events.  Fixed
Rp11	1	Does the device support to pre-assign a RCB to a specific client in SCL?	N
Rp12	2	After restart of the server is the value of ConfRev restored from the original configuration or retained prior to restart?	Restored from original configuration (ConfRev is fix)

## 1.8 Logging model

Logging model is not supported by the device.

## 1.9 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?	GOOSE Publisher cannot be configured incorrect. Default values are used. Initially GOOSE Publishers are disabled.
Gp3	1,2	Published FCD supported common data classes are	SPS Arrays are not supported
Gp4	1,2	What is the slow retransmission time? Is it fixed or configurable?	Configured by SCD file or via web server
Gp5	2	What is the fast retransmission scheme? Is it fixed or configurable?	Configured by SCD file or via web server
Gp7	1,2	What is the initial GOOSE sqNum after restart?	sqNum = 0
Gp8	1	May the GOOSE data set contain: - structured data objects (FCD)? - Timestamp data attributes?	N/A (datasets are fix) N/A (datasets are fix)
additional items:			
	1,2	Which TAL (time allowed to live) value is sent by the GOOSE Publishers?	1.5 MaxTime

## 1.10 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	Source MAC address N Destination MAC address Y Ethertype = 0x88B8 Y APPIP Y gocbRef Y timeAllowedtoLive Y datSet Y goID Y t Y stNum Y sqNum Y test/sim Y confRev Y ndsCom Y numDatSetEntries Y
Gs2	1	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 1 TAL
Gs3	1,2	What is the behavior when one or more subscribed GOOSE message isn't received or syntactically incorrect? (missing GOOSE)	Last received data as mark as invalid
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	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?	with the VLAN tag Y without the VLAN tag Y
Gs7	1	May the GOOSE data set contain: - structured data objects? - timestamp data attributes?	N N
Gs8	1,2	Subscribed FCD supported common data classes are	SPC, SPS, ACT Arrays are not supported

## 1.11 Control model

ID	Ed	Description	Value / Clarification
Ct2	1,2	Is the control model fixed, configurable and/or dynamic?	Fixed
Ct5	1	What is the behavior of the DUT when the test attribute is set in the SelectWithValue and/or Operate request?	Y if own behavior is in test. The request will be proceed if the Beh of the logical node where the controlled object is located is Test. Otherwise the device will respond with "temporarily-unavailable".
Ct8	1	What is the behavior of the DUT when the check conditions are set?  Is this behavior fixed, configurable, online changeable?	Synchrocheck N/A interlock-check N/A No check is performed. The Check bits will be ignored. Controllable objects are not representing equipment.  Fixed
Ct9	1,2	Which additional cause diagnoses are supported?	N/A Only direct-with-normal-security is supported, no additional cause.
Ct10	1,2	How to force a "test-not-ok" respond with SelectWithValue request?	SelectWithValue is not supported
Ct11	1,2	How to force a "test-not-ok" respond with Select request?	Select is not supported
Ct12	1,2	How to force a "test-not-ok" respond with Operate request?	DONs: Test and logical node Beh do not match (test mode is not supported) SBOs: N/A DOes: N/A SBOes: N/A
Ct13	1,2	Which origin categories are supported / accepted?	bay-control Y station-control Y remote-control Y automatic-bay Y automatic-station Y automatic-remote Y maintenance Y process Y
Ct14	1,2	What happens if the orCat value is not supported or invalid?	DONs: oper.Resp-, object-access-unsupported (9) SBOs: N/A DOes: N/A SBOes: N/A
Ct15	1,2	Does the IED accept a SelectWithValue / Operate with the same control value as the current status value?  Is this behaviour configurable?	DONs: Y SBOs: N/A DOes: N/A SBOes: N/A  N

ID	Ed	Description	Value / Clarification
Ct16	1	Does the IED accept a select/operate on the same control object from 2 different clients at the same time?	DOns: N SBOs: N/A DOes: N/A SBOes: N/A 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)?	N/A
Ct18	1,2	Is for SBOes the internal validation performed during the SelectWithValue and/or Operate step?	N/A
Ct20	1,2	Does the IED support local / remote operation?	N
Ct21	1,2	Does the IED send an InformationReport with LastAppError 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: N/A

## 1.12 Time and time synchronization model

ID	Ed	Description	Value / Clarification
Tm1	1,2	What time quality bits are supported (may be set by the IED)?	LeapSecondsKnown    Y ClockFailure        Y ClockNotSynchronized    Y
Tm2	1,2	Describe the behaviour when the time server(s) ceases to respond  What is the time server lost detection time?	On one time server: Time quality is set to ClockNotSynchronized and ClockFailure.  On all time servers: Time quality is set to ClockNotSynchronized and ClockFailure.  Configurable from 2 – 120 minutes (default 10 minutes)
Tm3	1,2	How long does it take to take over the new time from time server?	Max. 60 seconds
Tm4	1,2	When is the time quality bit "ClockFailure" set?	At faulty internal clock or failure of the synchronization source (SNTP, field bus) or RTC failure
Tm5	1,2	When is the time quality bit "ClockNotSynchronized" set?	When connection to all time servers is lost (see PIXIT-Tm2)
Tm7	1	Does the device support time zone and daylight saving?	Y
Tm8	1,2	Which attributes of the SNTP response packet are validated?	Leap indicator not equal to 3    Y Mode is equal to SERVER        N OriginateTimestamp is equal to value sent by the SNTP client as Transmit Timestamp            N RX/TX timestamp fields are checked for reasonableness    Y SNTP version 3 and/or 4        N other (describe)                N
Tm9	1,2	Do the COMTRADE files have local time or UTC time and is this configurable?	No COMTRADE files available



### **1.13 File transfer model**

File transfer model is not supported by the device.

### **1.14 Service tracking model**

Service tracking model is not supported by the device.

## 1.15 TICS – Technical Issues Implementation Conformance Statement

### 1.15.1 TISSUES Edition 1

The implemented TISSUES are only relevant when the Edition Setting is set to Edition 1.

Part 7-2 Tissue	Description	Implemented?
30	control parameter T	Y
49	BRCB TimeOfEntry?	Y
52	Ambiguity GOOSE SqNum	Y
190	BRCB: EntryId and TimeOfEntry	Y
191	BRCB: Integrity and buffering reports	Y
234	New type CtxInt	Y
275	Confusing statement on GI usage	Y
278	EntryId not valid for a server	Y
297	Sequence number	Y
298	Type of SqNum	Y
300	Attribute Resv in BRCB	Y
322	Write Configuration attribute of BRCBs	Y
329	Reporting and BufOvl	Y
332	Ambiguity in use of trigger options	Y
335	Clearing of Bufovfl	Y
348	URCB class and report	Y
349	BRCB TimeOfEntry has two definitions	Y
453	Reporting & Logging model revision	Y
474	GI for URCB	Y

Part 8-1 Tissue	Description	Implemented?
116	GetNameList with empty response?	Y
120	Type - Mod.stVal and Mod.ctlVal	Y
165	Improper Error Response for GetDataSetValues	Y
168	Order of attributes in MMS components	Y
177	Ignoring OptFlds bits for URCB	Y
183	GetNameList error handling	Y
301	SqNum in Buffered Reports	Y
344	TimeOfEntry misspelled	Y
377	DeleteDataSet response-	Y
422	Order of extension data objects and data attributes	Y
433	Order of attributes in specialized CDCs for control service mapping	Y
438	EntryTime base should be GMT	Y

## 1.15.2 TISSUES Edition 2

Below tables give an overview of the mandatory Edition 2 Tissues.

Part 6 Tissue	Description	Implemented?
658	Tracking related features	N/A
663	FCDA element cannot be a "functionally constrained logical node"	N/A
668	Autotransformer modeling	N/A
687	SGCB ResvTms	N/A
719	ConfDataSet - maxAttributes definition is confusing	N/A
721	Log element name	N/A
768	bType VisString65 is missing	Y
779	object references	N/A
788	SICS S56 from optional to mandatory	N/A
789	ConfLdName as services applies to both server and client	Y
804	valKind and IED versus System configuration	N/A
806	Max length of log name inconsistent between -6 and -7-2	N/A
807	Need a way to indicate if "Owner" present in RCB	N/A
822	Extension of IED capabilities	N/A
823	ValKind for structured data attributes	N/A
824	Short addresses on structured data attributes	N/A
825	Floating point value	N/A
845	SGCB ResvTms	N/A
853	SBO and ProtNs	N/A
855	Recursive SubFunction	N/A
856	VoltageLevel frequency and phases	N/A
857	Function/SubFunction for ConductingEquipment	N/A
886	Missing 8-1 P-types	N/A
901	tServices as AP or as IED element	N/A
936	SupSubscription parameter usage is difficult	N/A
1168	doName and daName of ExtRef	N/A
1175	IPv6 address lowercase only	N/A

Part 7-1 Tissue	Description	Implemented?
828	Data model namespace revision	Y
1129	Rules for extending nameplate information	N/A
1151	simulated GOOSE disappears after 1st appearance when LPHD.Sim = TRUE	N/A
1196	Extensions to standardized LN classes made by third parties	N/A

Part 7-2 Tissue	Description	Implemented?
778	AdCause values	N/A
780	What are 'unsupported trigger option at a control block?	Y

## 1.15 TICS – Technical Issues Implementation Conformance Statement

Part 7-2 Tissue	Description	Implemented?
783	TimOper Resp-	N/A
786	AddCause values	N/A
820	Mandatory ACSI services	Y
858	typo in enumeration ServiceType	N/A
861	dchg of ConfRev attribute	N/A
876	GenLogicNodeClass and SGCB, GoCB, MsvCB, UsvCB	N/A
1038	Loss of Info Detection After Resynch	N/A
1050	GTS Phycomaddr definition in SCL example	N/A
1062	Entrytime not used in CDC	N/A
1071	Length of DO name	N/A
1091	The sentence "The initial value of EditSG shall be 0", has to be stated in part 7.2 not in 8.1	N/A
1127	Missing owner attribute in BTS and UTS	N/A
1163	Old report in URCB	Y
1202	GI not optional	Y

Part 7-3 Tissue	Description	Implemented?
697	persistent command / PulseConfig	N/A
698	Wrong case is BAC.dB attribute	N/A
722	Units for 'h' and 'min' not in UnitKind enumeration.	N/A
919	Presence Condition for sVC	N/A
925	Presence of i or f attribute - Problem with writing	N/A
926	Presence Conditions within RangeConfig	N/A

Part 7-4 Tissue	Description	Implemented?
671	mistake in definition of Mod & Beh	Y
674	CDC of ZRRC.LocSta is wrong	N/A
676	Same data object name used with different CDC	N/A
677	MotStr is used with different CDC in PMMS and SOPM LN classes	N/A
679	Remove CycTrMod Enum	N/A
680	SI unit for MHYD.Cndct	N/A
681	Enum PIDAlg	N/A
682	ANCR.ParColMod	N/A
683	Enum QVVR.IntrDetMth	N/A
685	Enum ParTraMod	N/A
686	New annex H - enums types in XML	Y
694	Data object CmdBlk	N/A
696	LSVS.St (Status of subscription)	N/A
712	interpretation of quality operatorBlocked	N/A
713	DO Naming of time constants in FFIL	N/A

Part 7-4 Tissue	Description	Implemented?
724	ANCR.Auto	N/A
725	Loc in LN A-group	N/A
734	LLN0.OpTmh vs. LPHD.OpTmh	N/A
736	PFSign	N/A
742	GAPC.Str, GAPC.Op and GAPC.StrVal	N/A
743	CCGR.PmpCtl and CCGR.FanCtl	N/A
744	LN STMP, EEHealth and EENAME	N/A
773	Loc, LocKey and LocSta YPSH and YLTC	N/A
774	ITCI.LocKey	N/A
800	Misspelling in CSYN	N/A
802	CCGR and Harmonized control authority	N/A
808	Presence condition of ZMOT.DExt and new DOs	N/A
831	Setting of ConfRevNum in LGOS	N/A
838	Testing in Beh=Blocked	N/A
844	MFLK.PhPiMax, MFLK.PhPiLoFil, MFLK.PhPiRoot DEL->WYE	N/A
849	Presence conditions re-assessing in case of derived statistical calculation	N/A
877	QVUB -seetings should be optional	N/A
909	Remove ANCR.ColOpR and ColOpL	N/A
912	Clarification of PwrRtg/VARtg	N/A
920	Resetable Counter is NOT resetable	N/A
932	Rename AVCO.SptVol to AVCO.VolSpt	N/A
939	Change CDC for ANCR.FixCol	N/A
991	LGOS: GoCBRef (as well as LSVS.SvCBRef) should be mandatory	N/A
1007	PTRC as fault indicator - Update of description required	N/A
1044	TapChg in AVCO	N/A
1077	Rename DOnames within LTIM	N/A

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

Part 8-1 Tissue	Description	Implemented?
784	Tracking of control (CTS)	N/A
817	Fixed-length GOOSE float encoding	N/A
834	File dir name length	N/A
951	Encoding of Owner attribute	N/A
1040	Associate error code	N/A
1178	TABLE 84 Specifies incorrect Select Positive Result value	N/A

Compare the IEC 61850 Tissue Database for more details: [www.tissues.iec61850.com](http://www.tissues.iec61850.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.

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2.1	Definition of the Communication Services acc. to Standard (PICS)	24
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## 2.1 Definition of the Communication Services acc. to Standard (PICS)

The tables in the section below appear in the same sequence as in standard IEC 61850, Part 8-1, Section 24.

The tables refer to Part 7 of the standard and the corresponding information must be contained in the PICS.

This section describes the conformance statements. The standard groups them together under the term Protocol Implementation Conformance Statement (PICS).

### Mandatory services

Please note that a number of services are prescribed and must be implemented to comply with the standard. Only the optional services and protocols are listed here because they constitute freedom of implementation. None of the mandatory services is explicitly explained here. Please refer to the standard IEC 61850, Part 8-1.

The description below refers to implementation in the SICAM I/O Unit device.

The tables give the names stated in the standard.

### 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	N	Y	
B22	<b>SCSM:</b> IEC 6185-9-1 used	N	N	
B23	<b>SCSM:</b> IEC 6185-9-2 used	N	N	
B24	<b>SCSM:</b> other	N/A	N/A	
<b>Generic substation event model (GSE)</b>				
B31	<b>Publisher</b> side	—	Y	
B32	<b>Subscriber</b> side	Y	—	
<b>Transmission of sampled 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</b> side (B11) and/or <b>Client</b> side (B12) supported				
M1	<b>Logical device</b>	N	Y	
M2	<b>Logical node</b>	N	Y	
M3	<b>Data</b>	N	Y	
M4	<b>Data set</b>	N	Y	
M5	<b>Substitution</b>	N	N	
M6	<b>Setting group control</b>	N	N	
<b>Reporting</b>				
M7	<b>Buffered report control</b>	N	Y	
M7-1	sequence-number	N	Y	
M7-2	report-time-stamp	N	Y	
M7-3	reason-for-inclusion	N	Y	
M7-4	data-set-name	N	Y	
M7-5	data-reference	N	Y	
M7-6	buffer-overflow	N	Y	
M7-7	entryID	N	Y	
M7-8	BufTm	N	Y	
M7-9	IntgPd	N	Y	
M7-10	GI	N	Y	
M8	<b>Unbuffered report control</b>	N	Y	
M8-1	sequence-number	N	Y	
M8-2	report-time-stamp	N	Y	
M8-3	reason-for-inclusion	N	Y	
M8-4	data-set-name	N	Y	
M8-5	data-reference	N	Y	
M8-6	BufTm	N	Y	
M8-7	IntgPd	N	Y	
M8-8	GI	N	Y	
<b>Logging</b>				
M9	<b>Log control</b>	N	N	
M9-1	IntgPd	N	N	
M10	<b>Log</b>	N	N	
M11	<b>Control</b>	N	Y	
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</b> or <b>Client</b> side (B11/12) supported				
M16	<b>Time</b>	Y	N	

## 2.1 Definition of the Communication Services acc. to Standard (PICS)

		Client/ Subscriber	Server/ Publisher	Value/Comments
M17	File Transfer	N	N	
Y = supported N or empty = not supported				

**ACSI service conformance statement**

	Services	AA:TP/MC	Client (C)	Server (S)	Comments
<b>Server</b>					
S1	GetServerDirectory(LOGICAL-DEVICE)	TP	N	Y	
<b>Application association</b>					
S2	Associate		N	Y	
S3	Abort		N	Y	
S4	Release		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	N	
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	N	
S15	DeleteDataSet	TP	N	N	
S16	GetDataSetDirectory	TP	N	Y	
<b>Substitution</b>					
S17	SetDataValues	TP	N	N	
<b>Setting group control</b>					
S18	SelectActiveSG	TP	N	N	
S19	SelectEditSG	TP	N	N	
S20	SetSGValues	TP	N	N	
S21	ConfirmEditSGValues	TP	N	N	
S22	GetSGValues	TP	N	N	
S23	GetSGCBValues	TP	N	N	

	Services	AA:TP/MC	Client (C)	Server (S)	Comments
<b>Reporting</b>					
Buffered report control block (BRCB)					
S24	Report	TP	N	Y	
S24-1	data-change (dchg)		N	Y	
S24-2	quality-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	quality-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	N	Y	
S36	GetGoReference	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	GetGsReference	TP	N	N	
S42	GetGSSEDataOffset	TP	N	N	
S43	GetGsCBValues	TP	N	N	
S44	SetGsCBValues	TP	N	N	
<b>Transmission of sampled value model (SVC)</b>					
Multicast SVC					
S45	SendMSVMessage	MC	N	N	
S46	GetMSVCBValues	TP	N	N	
S47	SetMSVCBValues	TP	N	N	
Unicast SVC					

## 2.1 Definition of the Communication Services acc. to Standard (PICS)

	Services	AA:TP/MC	Client (C)	Server (S)	Comments
S48	SendUSVMessage	TP	N	N	
S49	GetUSVCBValues	TP	N	N	
S50	SetUSVCBValues	TP	N	N	

Control					
S51	Select	TP	N	N	
S52	SelectWithValue	TP	N	N	
S53	Cancel	TP	N	N	
S54	Operate	TP	N	Y	
S55	CommandTermination	TP	N	N	
S56	TimeActivatedOperate	TP	N	N	

File transfer					
S57	GetFile	TP	N	N	
S58	SetFile	TP	N	N	
S59	DeleteFile	TP	N	N	
S60	GetFileAttributeValues	TP	N	N	

Time					
T1	Time resolution of internal clock			10 (1 ms)	nearest negative power of 2 in seconds
T2	Time accuracy of internal clock			+5 ms → T0 (n = 7)	T0 (10 ms), T1 (1 ms), T2 (100 μs), T3 (25 μs), T4 (4 μs), T5 (1 μs)
T3	Supported TimeStamp resolution			10 (1ms)	nearest negative power of 2 in seconds