

Importance: Major
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To: All customers

Protocol Implementation Conformance Statement (PICS) for the IEC 61850 interface in AQ250

Version 2.5.7

Based upon UCAIUG PICS Template version 3.0

In Vaasa, Finland, March 04, 2022
Arcteq Relays Ltd.

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1. General

The following ACSI conformance statements are used to provide an overview and details about AQ250, with firmware version 2.5.7:

- ACSI basic conformance statement
- ACSI model conformance statement
- ACSI service conformance statement
- 61850-9-3 Clock Profile conformance statement

The statements specify the communication features mapped to IEC 61850-8-1 and IEC 61850-9-2.

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2. ACSI basic conformance statement

The basic conformance statement is defined in Table 1.

Table 1 – ACSI basic conformance statement

		Client Subscriber	Server Publisher	Value/Comments
Client-Server roles				
B11	Server side	N/A	Yes	
B12	Client side	Yes	N/A	
SCSMs supported				
B21	SCSM: IEC 61850-8-1 used	Yes	Yes	
B22	SCSM: IEC 61850-9-1 used	N/A	N/A	Deprecated Ed2
B23	SCSM: IEC 61850-9-2 used	No	No	
B24	SCSM: other	No	No	
Generic substation event model (GSE)				
B31	Publisher side	N/A	Yes	
B32	Subscriber side	Yes	N/A	
Transmission of sampled value model (SVC)				
B41	Publisher side	N/A	No	
B42	Subscriber side	No	N/A	
N/A = not applicable Yes = supported No or empty = not supported				

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3. ACSI model conformance statement

The ACSI model conformance statement is defined in Table 2.

Table 2 – ACSI model conformance statement

		Client Subscriber	Server Publisher	Value/Comments
If Server side (B11) and/or Client side (B12) supported				
M1	Logical device	Yes	Yes	
M2	Logical node	Yes	Yes	
M3	Data	Yes	Yes	
M4	Data set	Yes	Yes	
M5	Substitution	Yes	Yes	
M6	Setting group control	Yes	Yes	
	Reporting			
M7	Buffered report control	Yes	Yes	
M7-1	sequence-number	Yes	Yes	
M7-2	report-time-stamp	Yes	Yes	
M7-3	reason-for-inclusion	Yes	Yes	
M7-4	data-set-name	Yes	Yes	
M7-5	data-reference	Yes	Yes	
M7-6	buffer-overflow	Yes	Yes	
M7-7	entryID	Yes	Yes	
M7-8	BufTm	Yes	Yes	
M7-9	IntgPd	Yes	Yes	
M7-10	GI	Yes	Yes	
M7-11	conf-revision	Yes	Yes	
M8	Unbuffered report control	Yes	Yes	
M8-1	sequence-number	Yes	Yes	
M8-2	report-time-stamp	Yes	Yes	
M8-3	reason-for-inclusion	Yes	Yes	
M8-4	data-set-name	Yes	Yes	
M8-5	data-reference	Yes	Yes	
M8-6	BufTm	Yes	Yes	

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M8-7	IntgPd	Yes	Yes	
M8-8	GI	Yes	Yes	
M8-9	conf-revision	Yes	Yes	
	Logging			
M9	Log control	No	No	
M9-1	IntgPd	No	No	
M10	Log	No	No	
M11	Control	Yes	Yes	
M17	File Transfer	Yes	Yes	
M18	Application association	Yes	Yes	
M19	GOOSE Control Block	Yes	Yes	
M20	Sampled Value Control Block	No	No	
If GSE (B31/32) is supported				
M12	GOOSE	Yes	Yes	
M13	GSSE	No	No	Deprecated Ed2
If SVC (B41/42) is supported				
M12	GOOSE	No	No	
M13	GSSE	No	No	
For all IEDs				
M16	Time	Yes	Yes	Time source with required accuracy shall be available. Only Time Master are SNTP (Mode 4 response) time server. All other Client / Server devices are SNTP (Mode 3 request) clients
<p>N/A = not applicable Yes = supported No or empty = not supported</p>				

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4. ACSI service conformance statement

The ACSI service conformance statement is defined in Table 3 (depending on the statements in Table 1 and in Table 2).

Table 3 – ACSI service conformance statement

	Edition	Services	AA: TP/MC	Client (C)	Server (S)	Value/Comments
Server						
S1	1, 2, A1	GetServerDirectory (LOGICAL-DEVICE)	TP	No	Yes	
Application association						
S2-1	1, 2, A1	Associate_Request	TP	No	Yes	
S2-2	A1	Associate_Response		No	Yes	
S3-1	1, 2, A1	Abort_Request	TP	No	Yes	
S3-2	A1	Abort_Processing		No	Yes	
S4-1	A1	Release_Request		No	Yes	
S4-2	1, 2, A1	Release_Response	TP	No	Yes	
Logical device						
S5	1, 2, A1	GetLogicalDevice- Directory	TP	No	Yes	
Logical node						
S6	1, 2, A1	GetLogicalNode- Directory	TP	No	Yes	
S7	1, 2, A1	GetAllDataValues	TP	No	Yes	
Data						
S8	1, 2, A1	GetDataValues	TP	No	Yes	
S9	1, 2, A1	SetDataValues	TP	No	Yes	
S10	1, 2, A1	GetDataDirectory	TP	No	Yes	
S11	1, 2, A1	GetDataDefinition	TP	No	Yes	
Data set						
S12	1, 2, A1	GetDataSetValues	TP	No	Yes	
S13	1, 2, A1	SetDataSetValues	TP	No	No	
S14	1, 2, A1	CreateDataSet	TP	No	No	

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S15	1, 2, A1	DeleteDataSet	TP	No	No	
S16	1, 2, A1	GetDataSetDirectory	TP	No	Yes	
Substitution						
S17	1	SetDataValues	TP	No	Yes	
Setting group control						
S18	1, 2, A1	SelectActiveSG	TP	No	Yes	
S19	1, 2, A1	SelectEditSG	TP	No	No	
S20	1, 2, A1	SetEditSGValues	TP	No	No	
S21	1, 2, A1	ConfirmEditSGValues	TP	No	No	
S22	1, 2, A1	GetEditSGValues	TP	No	No	
S23	1, 2, A1	GetSGCBValues	TP	No	Yes	
Report						
Buffered report control block (BRCB)						
S24	1, 2, A1	Report	TP	No	Yes	
S24-1	1, 2, A1	data-change (dchg)		No	Yes	
S24-2	1, 2, A1	quality-change (qchg)		No	Yes	
S24-3	1, 2, A1	data-update (dupd)		No	Yes	
S25	1, 2, A1	GetBRCBValues	TP	No	Yes	
S26	1, 2, A1	SetBRCBValues	TP	No	Yes	
Unbuffered report control block (URCB)						
S27	1, 2, A1	Report	TP	No	Yes	
S27-1	1, 2, A1	data-change (dchg)		No	Yes	
S27-2	1, 2, A1	quality-change (qchg)		No	Yes	
S27-3	1, 2, A1	data-update (dupd)		No	Yes	
S28	1, 2, A1	GetURCBValues	TP	No	Yes	
S29	1, 2, A1	SetURCBValues	TP	No	Yes	
Logging						
Log control block						
S30	1, 2, A1	GetLCBValues	TP	No	No	
S31	1, 2, A1	SetLCBValues	TP	No	No	
Log						
S32	1, 2, A1	QueryLogByTime	TP	No	No	
S33	1, 2, A1	QueryLogAfter	TP	No	No	

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S34	1, 2, A1	GetLogStatusValues	TP	No	No	
Generic substation event model (GSE)						
GOOSE						
S35	1, 2, A1	SendGOOSEMessage	MC	No	Yes	
GOOSE-CONTROL-BLOCK						
S36	1, 2, A1	GetGoReference	TP	No	No	
S37	1, 2, A1	GetGOOSEElement-Number	TP	No	No	
S38	1, 2, A1	GetGoCBValues	TP	No	Yes	
S39	1, 2, A1	SetGoCBValues	TP	No	Yes	
GSSE						
S40	1	SendGSSEMessage	MC	N/A	N/A	Deprecated Ed2
GSSE-CONTROL-BLOCK						
S41	1	GetReference	TP	N/A	N/A	Deprecated Ed2
S42	1	GetGSSEElement-Number	TP	N/A	N/A	Deprecated Ed2
S43	1	GetGsCBValues	TP	N/A	N/A	Deprecated Ed2
S44	1	SetGsCBValues	TP	N/A	N/A	Deprecated Ed2
Transmission of sampled value model (SVC)						
Multicast SV						
S45	1, 2, A1	SendMSVMessage	MC	No	No	
Multicast Sampled Value Control Block						
S46	1, 2, A1	GetMSVCBValues	TP	No	No	
S47	1, 2, A1	SetMSVCBValues	TP	No	No	
Unicast SV						
S48	1, 2, A1	SendUSVMessage	TP	No	No	
Unicast Sampled Value Control Block						
S49	1, 2, A1	GetUSVCBValues	TP	No	No	
S50	1, 2, A1	SetUSVCBValues	TP	No	No	
Control						
S51	1, 2, A1	Select		No	Yes	
S52	1, 2, A1	SelectWithValue	TP	No	Yes	
S53	1, 2, A1	Cancel	TP	No	Yes	
S54	1, 2, A1	Operate	TP	No	Yes	

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S55	1, 2, A1	CommandTermination	TP	No	Yes	
S56	1, 2, A1	TimeActivatedOperate	TP	No	No	
File Transfer						
S57	1, 2, A1	GetFile	TP	No	Yes	
S58	1, 2, A1	SetFile	TP	No	No	
S59	1, 2, A1	DeleteFile	TP	No	Yes	
S60	1, 2, A1	GetFileAttributeValues	TP	No	Yes	
S61	1, 2, A1	GetServerDirectory (FILE-SYSTEM)	TP	No	Yes	
Time						
T1	1, 2, A1	Time resolution of internal clock		-	10	Nearest negative power of 2-n in seconds (number 0...24)
T2	1, 2, A1	Time accuracy of internal clock		-	T1	(*)
T3	1, 2, A1	Supported TimeStamp resolution		-	10	Nearest value n of 2-n in seconds (number 0...24)
(*)						
TL (ms) (low accuracy) 00 ≤ T3 < 07 (only Ed2) T0 (ms) ≤ 10ms 07 ≤ T3 < 10 T1 (μs) ≤ 1ms 10 ≤ T3 < 13 T2 (μs) ≤ 100μs 13 ≤ T3 < 15 T3 (μs) ≤ 25μs 15 ≤ T3 < 18 T4 (μs) ≤ 25μs 18 ≤ T3 < 19 T5 (μs) ≤ 1μs 20 ≤ T3						
AA: Application Association type MC: Multicast (for GOOSE and SMV) TP: Two part (for MMS) N/A = not applicable Yes = supported No or empty = not supported						

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5. 61850-9-3 Clock Profile conformance statement

The capabilities and options supported by the PTP clock is shown in Table 4

Table 4 – PICS for A-Profile support: 61850-9-3

PIC proforma reference	Edition	Capability	Client (C)	Server (S)
CLOCK_TYPE_OC	2	Clock is OC according to this base	No	Yes
CLOCK_TYPE_TC	2	Clock is TC according to this base	No	No
CLOCK_TYPE_BC	2	Clock is BC according to this base	No	No
NR_PORTS	2	Number of clock ports (total)	-	{1,3} (*)
PORTS_STEP	2	1: all ports support 1-step on egress 2: all ports support 2-step on egress 3: all ports support both 1-step and 2	-	3
SLAVE_ONLY	2	All ports of the clock are slave-only	No	No
TIME_TRACEABLE	2	Connectable to a time reference outside of PTP (e.g., GPS)	No	No
FREQ_TRACEABLE	2	Connectable to a frequency reference outside of PTP (e.g., GPS)	No	No
DAC	2	Doubly attached OC	No	Yes
PORTS_PAISED	2	Paired clock ports for redundancy (e.g. {3-4})	-	{0,2} (*)
REDBOX_DATC	2	Redbox as Transparent Clock	No	No
REDBOX_SLTC	2	Redbox as Stateless Transparent Clock	No	No
REDBOX_TWBC	2	Redbox as three-way Boundary Clock	No	No
REDBOX_DABC	2	Redbox as DAC BC	No	No
MIB_SNMP	2	Supports MIB of IEC 62439-3 Annex E	No	No
MIB_61850	2	Supports IEC 61859-90-4 Clock Objects	No	No
MIB_OTHER	2	Clock supports fixed values, or a mechanism defined by the manufacturer (If True, this list is appended to this PICS)	No	Yes (**)
ATOI	2	A master clock attaches the ALTERNATE_TIME_OFFSET_INDICATOR TLV as defined in IEC 61588 as set by its application. A slave clock makes this TLV information available to the application if it receives it. A BC forwards the ATOI TLV from the slave port to the master ports	No	No

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(*)

If the Redundant Ethernet option card is available, NR_PORTS = 3 and PORTS_PAISED = 2.
Otherwise, NR_PORTS = 1 and PORTS_PAISED = 0.

(**)

Parameters default values. Settings are configurable using setting tool.

Name	Description	Default value
PTP_ROLE	Role	Auto
PTP_MECHANISM	Mechanism	P2P
PTP_STATE	State	N/A
PTP_MASTERID	Best master	N/A
PTP_LASTRECEIVE	Last receive	N/A
PTP_TXCOUNT	Messages sent	0
PTP_RXCOUNT	Messages received	0
PTP_DIAG	PTP diagnostic flags	0
PTP_DOMAINNUMBER	Domain number	0
PTP_AP	AP	10
PTP_AI	AI	1000
PTP_DELAYS	DelayS	6
PTP_ANNINTERVAL	Announce interval	1
PTP_DELAYREQINTERVAL	DelayReq interval	0
PTP_SYNCINTERVAL	Sync interval	-1
PTP_SYNCRECTIMEOUT	Sync receipt timeout	3
PTP_ANNRECTIMEOUT	Announce receipt timeout	20
PTP_CLOCKCLASS	Clock class	187
PTP_CLOCKACCURACY	Clock accuracy	254
PTP_PRIORITY1	Priority 1	128
PTP_PRIORITY2	Priority 2	128
PTP_CLOCKVARIANCE	Clock variance	32768
PTP_TIMESRC	PTP time source	0

N/A = not applicable
Yes = supported
No or empty = not supported

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