

RELION® PROTECTION AND CONTROL

Protocol Implementation Conformance Statement (PICS)

REX640 IEC 61850 interface



PRODUCT	PRODUCT CONNECTIVITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
REX640	PCL4	1MRS759029	B	en	1/10

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1. About this manual

1.1. Read it first!

Before attempting any operation with IED from REX640, read carefully the IED documentation first.

This document is addressed to anyone who needs to interact with REX640 and its IEC 61850 features in more detail.

1.2. Document information

Revision	Date	Note
A	12.4.2018	REX640 PCL1
B	14.11.2022	REX640 PCL4

Applicability

This manual is applicable to all REX640 Protection and Control IED versions mentioned in document Revision History above or newer versions if document update is not required.

2. Safety Information

There are safety warnings and notes in the following text. They are in a different format to distinguish them from normal text.

Safety warning

The safety warnings should always be observed. Non-observance can result in death, personal injury, or substantial damages to property. Guarantee claims might not be accepted when safety warnings are not respected. They look like below:



Do not make any changes to the REX640 configuration unless you are familiar with the REX640 and its configuration tool. This might result in disoperation and loss of warranty.

Note

A note contains additional information worth noting in the specific context, and looks like below:



The selection of this control mode requires caution, because operations are allowed both from the HMI and remotely.

3. Abbreviations and Definitions

3.1. Abbreviations

Abbreviation	Description
ACSI	Abstract Communication Service Interface
GOOSE	Generic Object Oriented Substation Event
SCSM	System Communication Service Mapping
Y	Yes
N	No

4. Introduction

This document defines the compliance to IEC 61850 in terms of service, modeling and engineering interfaces. Also, exceptions and local adaptations are described.

The conformance statements and documents are referred as PICS (Protocol Implementation Conformance Statement), MICS (Model Implementation Conformance Statement) and local adaptations to be published are described in PIXIT (Protocol Implementation eXtra Information for Testing). ACSI conformance statement describes the abstract services interfaces, which are normally mapped to certain SCSM and therefore indirectly stated in PICS.

The purpose of the information in this document is to give a user, to a system integrator a detailed explanation of IEC 61850 capabilities of a product.

5. ACSI conformance statement

5.1. General

Following ACSI conformance statements specify the communication features supported by REX640 and defined by IEC 61850-7-2, IEC 61850-8-1 and IEC 61850-9-2.

5.2. ACSI basic conformance statement

Table 1 Basic conformance statement

		Client/ Subscriber	Server/ Publisher	Value/Comments
Client-Server roles				
B11	Server side (of TWO-PARTY-APPLICATION-ASSOCIATION)	—	Y	
B12	Client side of (TWO-PARTY-APPLICATION-ASSOCIATION)	N	—	

SCSMs supported				
B21	SCSM: IEC 61850-8-1 used		Y	
B23	SCSM: IEC 61850-9-2 used		Y	
B24	SCSM: other			
Generic substation event model (GSE)				
B31	Publisher side	—	Y	
B32	Subscriber side	Y	—	
Transmission of sampled value model (SVC)				
B41	Publisher side	—	Y	
B42	Subscriber side	Y	—	

5.3. ACSI models conformance statement

Table 2 ACSI models conformance statement

		Client/ Subscriber	Server/ Publisher	Value/Comments
If Server side (B1) supported				
M1	Logical device	N	Y	
M2	Logical node	N	Y	
M3	Data	N	Y	
M4	Data set	N	Y	
M5	Substitution	N	N	
M6	Setting group control	N	Y	
	Reporting			
M7	Buffered report control	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	BufTim	N	Y	
M7-9	IntgPd	N	Y	
M7-10	GI	N	Y	
M7-11	conf-revision	N	Y	
M8	Unbuffered report control	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	BufTim	N	Y	
M8-7	IntgPd	N	Y	
M8-8	GI	N	Y	
M8-9	conf-revision	N	Y	
	Logging	N	N	
M9	Log control	N	N	
M9-1	IntgPd			
M10	Log	N	N	
M11	Control	N	Y	
M17	File Transfer	N	Y	
M18	Application association	N	Y	
M19	GOOSE Control Block	N	Y	
M20	Sampled Value Control Block	N	Y	
If GSE (B31/32) is supported				
M12	GOOSE	N	Y	
If SVC (41/42) is supported				
M14	Multicast SVC	N	Y	
M15	Unicast SVC	N	N	
M16	Time	N	Y	Time source with required accuracy is available

5.4. ACSI service conformance statement

The ACSI service conformance statement shall be as defined in Table 3 ACSI service Conformance statement (depending on the statements in Table 2 ACSI models conformance statement).

Table 3 ACSI service Conformance statement

	Services	AA: TP/MC	Client (C)	Server (S)	Comments
Server					
S1	GetServerDirectory	TP	N	Y	
Application association					
S2	Associate		N	Y	
S3	Abort		N	Y	
S4	Release		N	Y	
Logical device					

S5	GetLogicalDeviceDirectory	TP	N	Y	
Logical node					
S6	GetLogicalNodeDirectory	TP	N	Y	
S7	GetAllDataValues	TP	N	Y	
Data					
S8	GetDataValues	TP	N	Y	
S9	SetDataValues	TP	N	Y	
S10	GetDataDirectory	TP	N	Y	
S11	GetDataDefinition	TP	N	Y	
Data set					
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	
Substitution					
S17	SetDataValues	TP	N	N	
Setting group control					
S18	SelectActiveSG	TP	N	Y	
S19	SelectEditSG	TP	N	Y	
S20	SetSGValues	TP	N	Y	
S21	ConfirmEditSGValues	TP	N	Y	
S22	GetSGValues	TP	N	Y	
S23	GetSGCBValues	TP	N	Y	
Reporting					
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	

Logging

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	

Generic substation event model (GSE)

GOOSE

S35	SendGOOSEMessage	MC	N	Y	
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GOOSE-CONTROL-BLOCK

S36	GetReference	TP	N	N	
S37	GetGOOSEElementNumber	TP	N	N	
S38	GetGoCBValues	TP	N	Y	
S39	SetGoCBValues	TP	N	Y	

Transmission of sampled value model (SVC)

Multicast SV

S45	SendMSVMessage	MC	N	Y	
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Multicast Sampled Value Control Block

S46	GetMSVCBValues	TP	N	Y	
S47	SetMSVCBValues	TP	N	N	

Unicast SV

S48	SendUSVMessage	TP	N	N	
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Unicast Sampled Value Control Block

S49	GetUSVCBValues	TP	N	N	
S50	SetUSVCBValues	TP	N	N	

Control

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

File transfer

S57	GetFile	TP	N	Y	
S58	SetFile	TP	N	N	
S59	DeleteFile	TP	N	Y	
S60	GetFileAttributeValues	TP	N	Y	
S61	GetServerDirectory	TP	N	Y	

Time

T1	Time resolution of internal clock			2^{-10} (1ms)	nearest negative power of 2 in seconds
T2	Time accuracy of internal clock			T1	T0 (10ms) T1 (1ms) T2 (100μs) T3 (25μs) T4 (4μs) T5 (1μs)
T3	supported TimeStamp resolution	-		2^{-10} (1ms)	nearest negative power of 2 in seconds

6. IEC 61850-9-3 Clock Profile conformance statement

Table 4 PICS for A-Profile support: IEC 61850

PICS proforma reference	Capability	Support	Comments
CLOCK_TYPE_OC	clock is OC according to this base	Y	
CLOCK_TYPE_TC	clock is TC according to this base	Y	
CLOCK_TYPE_BC	clock is BC according to this base	N	
NR_PORTS	number of clock ports (total)	3	
PORTS_STEP	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.	1	
SLAVE_ONLY	all ports of the clock are slave-only	Y	This functionality is enabled by a dedicated parameter.
TIME_TRACEABLE	connectable to a time reference outside of PTP (e.g. GPS)	N	
FREQ_TRACEABLE	connectable to a frequency reference outside of PTP (e.g. GPS)	N	
DAC	doubly attached OC	Y	
PORTS_PAired	paired clock ports for redundancy	LAN 1A, LAN 1B	
REDBOX_DATC	Redbox as TC	Y	
REDBOX_SLTC	Redbox as Stateless TC	N	
REDBOX_TWBC	Redbox as three-way BC	N	
REDBOX_DABC	Redbox as DAC BC	N	
MIB_SNMP	supports MIB of IEC 62439-3:2016, Annex E	N	
MIB_61850	supports IEC TR 61850-90-4 Clock Objects	Y	
MIB_OTHER	clock supports fixed values or a mechanism defined by the manufacturer	N	
ATOI	supports ATOI TLV as specified in IEC 61588:2009 IEEE Std 1588-2008, 16.3	Y	
PPS	clock has a 1 PPS output	N	
ACCURACY	Design value of clockAccuracy	<250ns	

HOLDOVER	The length of time the clock is expected to stay in clockClass 7, if it is the grandmaster and no longer synchronized to its time reference signal.	25s	at minimum.
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