Protocol Implementation extra Information for Testing (PIXIT) for the IEC 61850 9-2LE

REX640 IEC 61850 interface

PRODUCT	PRODUCT CONNECTIVITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
REX640	PCL4	1MRS759037	C	en	1/6

Contents

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	16.8.2018	REX640 PCL1
B	15.1.2020	REX640 PCL1 or higher
C	30.3.2023	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.

1.3. 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 al-lowed both from the HMI and remotely.**

2. Abbreviations and Definitions

2.1. Abbreviations

Table 1 Abbreviations

Abbreviation	Description
GPS	Global Positioning System
HMI	Human Machine Interface
IED	Intelligent Electronic Device
MAC	Media Access Control
MICS	Model Implementation Conformance Statement
MMS	Manufacturing Message Specification
M/O	Mandatory/Optional
N	No
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
SCADA	Supervision, Control and Data Acquisition
XML	eXtensible Markup Language
Y	Yes

2.2. Definitions

Operational State   The unit is active and it is protecting and controlling the switchgear.

Stand-alone   The unit is not connected to a SCADA system.

3. References

Table 2 Reference documents

Reference	Description
[1]	IEC: IEC 61850 (1-10), Communication Networks and Systems in Substations, Part 1-10; 1st Edition.

4. Introduction

This document specifies the protocol implementation extra information for testing (PIXIT) of the IEC 61850 92LE interface in REX640.

Together with the PICS and the MICS the PIXIT forms the basis for a conformance test according to IEC 61850-10. The PIXIT entries contain information which is not available in the PICS, MICS, TICS document or SCL file.

5. PIXIT for 9- 2 LE Publish

Table 3 PIXIT for 9-2 LE Publish

Description	Value/ Clarification
Supported nominal frequencies	50 Hz Y 60 Hz Y
Supported sampling rates	80 samples per cycle Y
9-2 connector type	LC or RJ45
PPS connector type	IEC61588
Support test mode	Y
Input voltage and currents signals	4 phase voltages 4 phase currents
Are neutral sampled values calculated?	Y
How are the CT/VT ratios configured (only applicable for MU connected to conventional CT/VT)	By setting following parameters via HMI: CT: - Configuration/Analog inputs /Current(3I)/Primary Current - Configuration/Analog inputs /Current(3I)/Secondary Current VT: - Configuration/Analog inputs /Voltage(3U/Primary Voltage - Configuration/Analog inputs /Voltage(3U)/Secondary Voltage
At losing the PPS signal after how much time sets the MU 'SmpSynch' to false (hold over mode)	Never goes to after IEC61588 master is lost. Then IED itself becomes master and SmpSynch remains TRUE. To force the SmpSynch to FALSE, IED clock must detect a drift of more than 4us when IEC61588 grandmaster is connected. Drift can be achieved by disabling the grandmaster clock for few minutes.
At restoring the PPS signal after how much time sets the MU 'SmpSynch' to true	Never goes to after IEC61588 master is lost. Then IED itself becomes master and SmpSynch remains TRUE. To force the SmpSynch to FALSE, IED clock must detect a drift of more than 4us when IEC61588 grandmaster is connected. Drift can be achieved by disabling the grandmaster clock for few minutes.
Max length for IED name	Max length of MsvID = 32

Description	Value/ Clarification
What is the (rated) delay time between taking the sample and sending the corresponding SV message	1.73-1.8 milliseconds
Which quality codes are supported	Derived Y Test Y
What kind of test data are sent	Only test bits are set to TRUE when IED is in test state.
In which conditions is the quality field Validity set to the value Invalid	- Voltage/Current channel is unavailable - Time accuracy is not accurate enough. - Time sync source is not configured to IEC61588.
What is the maximum start-up time after a power supply interrupt	40 seconds

6. Appendix A: Index of Tables