

# Protection and Control Relay

## 615 series

### Protocol Implementation extra Information for Testing (PIXIT) for the IEC 61850 9-2LE interface in 615 series



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# 1 About this manual

## 1.1 Read it first!

Before attempting any operation with IED from 615 series, read carefully the IED documentation first.

This document is addressed to anyone who needs to interact with 615 series and its IEC 61850 features in more detail.

## 1.2 Document information

### Revision History

Revision	Date	Note
A	24.6.2015	REF615 v5.0 FP1

### Applicability

This manual is applicable to all 615 series 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 615 series configuration unless you are familiar with the 615 series 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.

## 2 Abbreviations and Definitions

### 2.1 Abbreviations

FTP	<b>F</b> ile <b>T</b> ransfer <b>P</b> rotocol
GOOSE	<b>G</b> eneric <b>O</b> bject <b>O</b> riented <b>S</b> ubstation <b>E</b> vent
GPS	<b>G</b> lobal <b>P</b> ositioning <b>S</b> ystem
GSE	<b>G</b> eneric <b>S</b> ubstation <b>E</b> vent
GSSE	<b>G</b> eneric <b>S</b> ubstation <b>S</b> tatus <b>E</b> vent
HMI	<b>H</b> uman <b>M</b> achine <b>I</b> nterface
IED	<b>I</b> ntelligent <b>E</b> lectronic <b>D</b> evice
LED	<b>L</b> ight <b>E</b> mitting <b>D</b> iode
MAC	<b>M</b> edia <b>A</b> ccess <b>C</b> ontrol
MICS	<b>M</b> odel <b>I</b> mplementation <b>C</b> onformance <b>S</b> tatement
MMS	<b>M</b> anufacturing <b>M</b> essage <b>S</b> pecification
M/O	<b>M</b> andatory/ <b>O</b> ptional
N	<b>N</b> o
PICS	<b>P</b> rotocol <b>I</b> mplementation <b>C</b> onformance <b>S</b> tatement
PIXIT	<b>P</b> rotocol <b>I</b> mplementation <b>eX</b> tra <b>I</b> nformation for <b>T</b> esting
RCB	<b>R</b> eport <b>C</b> ontrol <b>B</b> lock
SCADA	<b>S</b> upervision, <b>C</b> ontrol and <b>D</b> ata <b>A</b> cquisition
SLD	<b>S</b> ingle <b>L</b> ine <b>D</b> iagram
XML	<b>eX</b> tensible <b>M</b> arkup <b>L</b> anguage
Y	<b>Y</b> es

### 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

- [1] IEC: IEC 61850 (1-10), Communication Networks and Systems in Substations, Part 1-10; 1<sup>st</sup> Edition.

### 4 Introduction

This document specifies the protocol implementation extra information for testing (PIXIT) of the IEC 61850 92LE interface in 615 series.

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 92LE Publish

Description	Value/ Clarification
Supported nominal frequencies	50 Hz Y 60 Hz Y
Supported sampling rates	80 samples per cycle Y 256 samples per cycle N
9-2 connector type	LC or RJ45
PPS connector type	<i>IEC61588</i>
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)	0 if there is no hold-over mode 2-3seconds after IEC61588 master is lost. Then IED itself becomes master in 2-3 seconds and SmpSynch is set to TRUE.

At restoring the PPS signal after how much time sets the MU 'SmpSynch' to true	2-3 seconds after IEC61588 master is connected.
Max length for IED name	Max length of MsvID = 32
What is the (rated) delay time between taking the sample and sending the corresponding SV message	1.23-1.3 microseconds
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 con-figured to IEC61588.
What is the maximum startup time after a power supply interrupt	30 seconds

**Table 1 PIXIT for 92LE Publish**



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