

No. 84000167-OPE/INC 17-2551

Issued to:

Efacec Energia, Máquinas e Equipamentos
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For the server product:

TPU T500 High-end transformer protection relay
Software version: 1.11.000
Hardware version (CPU board): MAP8001
ASID10000091
S/N: 933006

The server product has not been shown to be non-conforming to:

IEC 61850 Edition 2 Parts 6, 7-1, 7-2, 7-3, 7-4 and 8-1

Communication networks and systems for power utility automation

The conformance test has been performed according to IEC 61850-10 Edition 2, the UCA International Users Group Edition 2 Server Test Procedures version 1.0 with TPCL² 1.2 with product's protocol, model and technical issue implementation conformance statements: "Protocol Implementation Conformance Statement (PICS) for the IEC 61850 Interface for TPU T500, TPU L500, TPU D500, BCU 500, TCU 500, TPU T450, TPU L450 and TPU T450, AS17027396, Rev. 00, May-2017", "Model Implementation Conformance Statement (MICS) for the IEC 61850 Interface for TPU T500, TPU L500, TPU D500, BCU 500, TCU 500, TPU T450, TPU L450 and TPU T450, AS17027287, Rev. 00, May-2017" and "TISSUES Implementation Conformance Statement (TICS) for the IEC 61850 Interface for TPU T500, TPU L500, TPU D500, BCU 500, TCU 500, TPU T450, TPU L450 and TPU T450, AS17027407, Rev. 00, May-2017" and the extra information for testing: "Protocol Implementation Extra Information for Testing (PIXIT) for the IEC 61850 Interface for TPU T500, TPU L500, TPU D500, BCU 500, TCU 500, TPU T450, TPU L450 and TPU T450, AS17027276, Rev. 00, May-2017".


The following IEC 61850 conformance blocks have been tested with a positive result (number of relevant and executed test cases / total number of test cases):

1 Basic Exchange (22/26)	9b GOOSE Subscribe (13/14)
2 Data Sets (4/7)	12a Direct Control (8/18)
3 Substitution (3/3)	12b SBO Control (15/27)
4 Setting Group Selection (4/4)	12c Enhanced Direct Control (9/20)
4+ Setting Group Definition (12/13)	12d Enhanced SBO Control (17/28)
5 Unbuffered Reporting (18/21)	13 Time Synchronization (5/7)
6 Buffered Reporting (25/30)	14 File Transfer (5/8)
9a GOOSE Publish (11/13)	

This certificate includes a summary of the test results as carried out at Efacec in Portugal with UniGrid SA v1.2.305 with test suite Ed2 v1.2, and UniCA 61850 Analyzer 5.31.00. This document has been issued for information purposes only, and the original paper copy of the DNV GL verification report No. 84000167-OPE/INC 17-2552 will prevail.

The test has been carried out on one single specimen of the product as referred above and submitted to DNV GL by Efacec. The manufacturer's production process has not been assessed. This certificate does not imply that DNV GL has approved any product other than the specimen tested.

Arnhem, August 18, 2017



P. Cjoci
Business Director
Intelligent Networks and Communication

Issued by:



DNV-GL

DNV KEMA is now DNV GL



R. Schimmel
Verification Manager

¹ Level A - Independent test lab with certified ISO 9001 Quality System

² TPCL - Test procedures change list

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Applicable Test Procedures from the UCA International Users Group Edition 2 Server Test Procedures version 1.0 with TPCL 1.2

Conformance Block	Mandatory	Conditional
1: Basic Exchange	sAss1, sAss2, sAss3, sAssN2, sAssN3, sAssN4, sAssN5, sSrv1, sSrv2, sSrv3, sSrv4, sSrv5, sSrvN1abcd, sSrvN4	sSrv6, sSrv8, sSrv11, sSrv12, sSrvN1e, sSrvN1f, sSrvN2, sSrvN3
2: Data Sets	sDs1, sDs10a, sDsN1ae	sDs15
3: Substitution	sSub1, sSub2, sSub3	
4: Setting Group Selection	sSg1, sSg3, sSgN1	sSg11
4+: Setting Group Definition	sSg2, sSg4, sSg7, sSg8, sSg10, sSg12, sSgN2, sSgN3, sSgN4, sSgN5	sSg6, sSg9
5: Unbuffered Reporting	sRp1, sRp2, sRp3, sRp4, sRp5, sRp9, sRp14, sRp15, sRpN1, sRpN2, sRpN3, sRpN4, sRpN8	sRp8, sRp10, sRp11, sRp12, sRpN5
6: Buffered Reporting	sBr1, sBr2, sBr3, sBr4, sBr5, sBr9, sBr14, sBr15, sBr20, sBr21, sBr22, sBr25, sBr26, sBr27, sBr28, sBrN1, sBrN2, sBrN3, sBrN4, sBrN5, sBrN8	sBr8, sBr10, sBr11, sBr12
9a: GOOSE publish	sGop2a, sGop3, sGop4, sGop9, sGop10, sGop11	sGop1, sGop6, sGop7, sGopN1, sGopN2
9b: GOOSE subscribe	sGos1, sGos2, sGos3, sGos5, sGos6a, sGos7, sGosN1, sGosN2, sGosN3, sGosN4, sGosN5, sGosN6	sGos4
12a: Direct control	sCtl5, sCtl10, sDOns1, sDOns2	sCtl15, sCtl16, sCtl17, sCtl19
12b: SBO control	sCtl5, sCtl8, sCtl9, sCtl10, sCtl11, sCtl25, sSBOns1, sSBOns2, sSBOns6	sCtl4, sCtl6, sCtl15, sCtl16, sCtl17, sCtl19
12c: Enhanced Direct Control	sCtl5, sCtl10, sDOes1, sDOes2	sCtl14, sCtl15, sCtl16, sCtl17, sCtl19
12d: Enhanced SBO Control	sCtl5, sCtl8, sCtl9, sCtl10, sCtl11, sCtl25, sSBOes1, sSBOes2, sSBOes6, sSBOes8	sCtl4, sCtl6, sCtl15, sCtl16, sCtl17, sCtl19, sCtl26
13: Time sync	sTm1, sTm2, sTmN1	sTm3, sTmN2
14: File transfer	sFt1, sFt2ab, sFt4, sFt5, sFtN1ab	

All configuration file and data model tests have been successfully performed for the product variants using the same communication hardware and software version:

- TPU D500 High-end line differential protection relay
- TPU L500 High-end line distance protection relay
- TPU D450 Differential protection relay
- TPU L450 Distance protection relay
- TPU T450 Transformer protection relay
- BCU 500 Automation and control IED
- TCU 500 Automation and control IED