

IEC 61850 Certificate Level A¹

Issued to:

Schweitzer Engineering Laboratories, Inc
 2350 NE Hopkins Court
 Pullman, WA 99163-5603
 USA

For the server product:

SEL-451-6
 Protection, Automation, and Bay Control System with
 Sampled Values or TiDL Technology
 Firmware version: SEL-451-6-R405
 IEC 61850 library ID: 49DD6E42
 Hardware version: MB6E

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 2.0.6 with product's protocol, model and technical issue implementation conformance statements: "Protocol Implementation Conformance Statement for the IEC 61850 interface in SEL-451-6, SEL-487B-2, SEL-487E-5, SEL-421-7S, SEL-421-7P, SEL-401, SEL-411L-0, SEL-411L-1, SEL-411L-A, SEL-411L-2, SEL-400G-0, SEL-400G-1, Version 1", "Model Implementation Conformance Statement (MICS) for the IEC 61850 Edition 2 server interface in SEL-451-6, SEL-487B-2, SEL-487E-5, SEL-421-7S, SEL-421-7P, SEL-401, SEL-411L-0, SEL-411L-1, SEL-411L-A, SEL-411L-2, SEL-400G-0, SEL-400G-1, Version 1" and "TISSUES Implementation Conformance Statement for the IEC 61850 interface in SEL-451-6, SEL-487B-2, SEL-487E-5, SEL-421-7S, SEL-421-7P, SEL-401, SEL-411L-0, SEL-411L-1, SEL-411L-A, SEL-411L-2, SEL-400G-0, SEL-400G-1, Version 2.1" and the extra information for testing: "Protocol Implementation eXtra Information for Testing (PIXIT) for the IEC 61850 Edition 2 server interface in SEL-451-6, SEL-487B-2, SEL-487E-5, SEL-421-7S, SEL-421-7P, SEL-401, SEL-411L-0, SEL-411L-1, SEL-411L-A, SEL-411L-2, SEL-400G-0, SEL-400G-1, Version 1".

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):

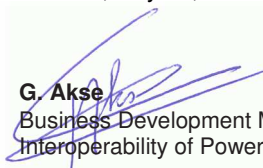
1 Basic Exchange (21/26)	12a Direct Control (8/18)
2 Data Sets (4/7)	12c Enhanced Direct Control (8/20)
4 Setting Group Selection (4/4)	12d Enhanced SBO Control (16/28)
5 Unbuffered Reporting (20/23)	13 Time Synchronization (6/7)
6 Buffered Reporting (30/33)	14 File Transfer (6/8)
9a GOOSE Publish (10/13)	15 Service Tracking (6/17)
9b GOOSE Subscribe (21/21)	

This certificate includes a summary of the test results as carried out at DNV in The Netherlands with UniGrid SA Simulator 2.2.0 with test suite 20230620.1 and UniCA 61850 Analyzer 6.40.01. This document has been issued for information purposes only, and the archived DNV verification report No. 10438034-DSO 23-3002 rev 2 will prevail.

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

Arnhem, July 17, 2023

Issued by:


G. Akse
 Business Development Manager
 Interoperability of Power Systems




R. Schimmel
 Verification Manager

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

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Applicable Test Procedures from the UCA International Users Group Edition 2 Server Test Procedures version 2.0.6

Conformance Block	Mandatory	Conditional
1: Basic Exchange	sAss1, sAss2, sAss3, sAss4, sAssN2, sAssN3, sAssN4, sAssN5, sSrv1, sSrv2, sSrv3, sSrv4, sSrv5, sSrv8, sSrvN1abcd, sSrvN4	sAssN6, sSrv9, sSrv10, sSrv12, sSrv13
2: Data Sets	sDs1, sDs10a, sDsN1ae	sDs15
4: Setting Group Selection	sSg1, sSg3, sSgN1	sSg11
5: Unbuffered Reporting	sRp1, sRp2, sRp3, sRp4, sRp5, sRp9, sRp14, sRp16, sRpN1, sRpN2, sRpN3, sRpN4, sRpN8	sRp8, sRp10, sRp11, sRp12, sRp13, sRp15, sRpN5
6: Buffered Reporting	sBr1, sBr2, sBr3, sBr4, sBr5, sBr9, sBr14, sBr16, sBr20, sBr21, sBr22, sBr25, sBr26, sBr27, sBr28, sBr29, sBrN1, sBrN2, sBrN3, sBrN4, sBrN5, sBrN8	sBr8, sBr10, sBr11, sBr12, sBr13, sBr15, sBr23, sBr24
9a: GOOSE publish	sGop2a, sGop3, sGop4, sGop9, sGop10, sGop11, sGop12	sGop1, sGop5, sGopN2
9b: GOOSE subscribe	sGos1, sGos2, sGos3, sGos5, sGos6a, sGos7, sGos8, sGos9, sGos10, sGos11, sGos12, sGos23, sGosN1, sGosN2, sGosN3, sGosN4, sGosN5, sGosN6	sGos4, sGos6b, sGos13
12a: Direct control	sCtl5, sCtl10, sDOs1, sDOs2	sCtl7, sCtl15, sCtl16, sCtl17
12c: Enhanced Direct Control	sCtl5, sCtl10, sDOes1, sDOes2	sCtl7, sCtl15, sCtl16, sCtl17
12d: Enhanced SBO Control	sCtl5, sCtl8, sCtl9, sCtl10, sCtl11, sCtl25, sSBOes1, sSBOes2, sSBOes6, sSBOes8	sCtl4, sCtl7, sCtl15, sCtl16, sCtl17, sCtl26
13: Time sync	sTm1, sTm2, sTmN1	sTm3, sTm4, sTm5
14: File transfer	sFt1, sFt2ab, sFt4, sFt5, sFtN1ab	sFt3
15: Service tracking		sTrk1, sTrk2, sTrk7, sTrk8, sTrk9, sTrk11

Test case	Comments
sRpN5	Performed according to Redmine #6193

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

- SEL-487B-2 Bus Differential and Breaker Failure Relay with Sampled Values or TiDL Technology
Firmware version: SEL-487B-2-R404
- SEL-487E-5 Transformer Protection Relay with Sampled Values or TiDL Technology
Firmware version: SEL-487E-5-R405
- SEL-421-7 Protection, Automation, Control System with Sampled Values or TiDL Technology
Firmware version: SEL-421-7-R410
- SEL-401 Protection, Automation, and Control Merging Unit
Firmware version: SEL-401-R410
- SEL-411L-0 Advanced Line Differential Protection, Automation, and Control System
Firmware version: SEL-411L-0-R130
- SEL-411L-1 Advanced Line Differential Protection, Automation, and Control System
Firmware version: SEL-411L-1-R130
- SEL-411L-A Advanced Line Differential Protection, Automation, and Control System
Firmware version: SEL-411L-A-R130
- SEL-411L-2 Advanced Line Differential Protection, Automation, and Control System with Sampled Values or TiDL Technology, Firmware version: SEL-411L-2-R203
- SEL-400G-0 Advanced Generator Protection System
Firmware version: SEL-400G-0-R104
- SEL-400G-1 Advanced Generator Protection System
Firmware version: SEL-400G-1-R104