EQUIPMENT CERTIFICATE

Certificate No.:	Issued:	Valid until:	GCC class
TC-GCC-DNVGL-SE-0124-09276-0	2022-10-18	Unlimited	TC$_I$

Issued for:

ELECTRUM POWER PLANT CONTROLLER Renedium 3152

(PPC Type A, B, C, D)

With specifications and software version as listed in Annex 2

Issued to:

ELECTRUM SOLUTIONS Sp. z o.o.

Ul. Watykańska 13, 15-638 Białystok, Poland

According to:

DNVGL-SE-0124, 2016-03: Certification of Grid Code Compliance

PTPiREE, 2021-04: Conditions and procedures for using certificates in the process of connecting power generating modules to power networks

32016R0631, 2016-04: Requirements for Generators (NC RfG)

PSE, 2018-12: Requirements of general application resulting from Commission Regulation (EU) 2016/631 of 14 April 2016

detailed in Annex 1

Based on the document:

CR-GCC-DNVGL-SE-0124-09276-A072-0	Network Code Requirements for a PGU of Type A, B, C, D - Poland, Certification Report, dated 2022-10-18

Further assessment information, including scope and conditions, is found in Annex 1. Description of the Power Plant Controller and type tests performed is found in Annex 2 and Annex 3 respectively.

Hamburg, 2022-10-18

For DNV Renewables Certification

Bente Vestergaard
Director and Service Line Leader Type and Component Certification

DAkkS Deutsche Akkreditierungsstelle D-ZE-11053-01-00

By DAkkS according DIN EN IEC/ISO 17065 accredited Certification Body for products. The accreditation is valid for the fields of certification listed in the certificate.

Hamburg, 2022-10-18

For DNV Renewables Certification

Artur Zbroński
Project Manager

EQUIPMENT CERTIFICATE – ANNEX 1

Conditions, assessment criteria and scope of assessment

Provided that the conditions listed in section 1 are considered at project level, the PPC as further specified in Annex 2 complies with the requirements within scope of this certification, as specified in section 3.

1 **Conditions**

- Changes of the system design, hardware or the software of the certified PPC are to be approved by DNV
- PPC settings must finally be agreed and checked at project level to ensure grid code compliance, based on the requirements of relevant System Operator (SO). For the functionalities within scope of this certification, more information about the settings assessed is found in Control Settings in section 4.2 as well as the corresponding assessment sections 5.1-5.4 of the certification report CR-GCC-DNVGL-SE-0124-09276-A072-0.
- The capability of remote control has been shown on unit level but must finally be ensured at project level, considering any further requirements of relevant System Operator (SO) and the full communication network. For the functionalities within scope of this certification, this concerns:
  - Remote cessation of active power,
  - Remote set-point control of active power,
  - Remote blocking and control of LFSM-O,
  - Remote blocking of LFSM-U

  as further described in sections 5.1-5.4 of the certification report CR-GCC-DNVGL-SE-0124-09276-A072-0.

2 **Assessment criteria and normative references for this certificate:**

/A/ Service Specification DNVGL-SE-0124: Certification of Grid Code Compliance, DNV GL, March 2016

/B/ Conditions and procedures for using certificates in the process of connecting power generating modules to power networks, Warunki i procedury wykorzystania certyfikatów w procesie przyłączenia modułów wytwarzania energii do sieci elektroenergetycznych, version 1.2, PTPiREE, dated 2021-04-28, (in the following: PTPiREE 2021-04)

/C/ Requirements of general application resulting from Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators (NC RfG) – as approved by the decision of the President of the Energy Regulatory Office DRE.WOSE.7128.550.2.2018.ZJ dated January 2nd 2019, Wymogi ogólnego stosowania wynikające z Rozporządzenia Komisji (UE) 2016/631 z dnia 14 kwietnia 2016 r. ustanawiającego kodeks sieci dotyczący wymogów w zakresie przyłączenia jednostek wytwórczych do sieci (NC RfG), PSE S.A., dated 2018-12-18 zatwierdzone Decyzją Prezesa Urzędu Regulacji Energetyki DRE.WOSE.7128.550.2.2018.ZJ z dnia 2 stycznia 2019 r, (in the following: PSE 2018-12)

/D/ Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators, published in the Official Journal of the European Union L112/1, The European Commission, 27/04/2016. Document 32016R0631, (in the following: NC RfG)

3 Scope of assessment and results

The following functionalities have been assessed based on the rules for the use of equipment certificates for Power Park Controllers (PPCs), as specified in chapter 7 and 9 of the PTPiREE 2021-04 /B/. The functions denoted “Not Applicable” in the table of chapter 7 has not been included.

Capability	NC RfG /D/	PSE 2018-12 /C/	Type A	Type B	Type C	Type D	Assessment result (**)
Remote cessation of active power	13.6	13.6	x	x			Compliant
Remote control of active power	14.2	14.2 (b)		x			Compliant
Limited Frequency Sensitive Mode – over frequency (LFSM-O)	13.2 (*)	13.2 (a), (b), (f)	x	x	x	x	Compliant
Limited Frequency Sensitive Mode – under frequency (LFSM-U)	15.2 (c)	15.2 (c)(i)			x	x	Compliant

(*) Article 13.2(b) only applicable for type A PPMs according to NC RfG.

(**) Please note also the corresponding conditions for compliance, as stated in section 1.

Schematic description and technical data of the PPC

1 Schematic description of the PPC

The Electrum Power Plant Controller: Renedium 3152 is able to provide the remote control of active power, remote cessation of active power, LFSM-O and LFSM-U functionality to control power parks. Renedium 3152 is equipped with own HMI screen for parametrization.

The electrical data of the PPC is summarized in the following section.

2 Technical data of main components

According to the documents provided by the manufacturer, the following components are used.

2.1 General Specifications

Type	RENEDIUM 3152
Generic type of installation	PPC
Manufacturer	Electrum
Scope of delivery	Renedium 3152 Controller in 5U Rack case
Software version of the controller	1.A*)
PLC manufacturer, type	Phoenix Contact, AXC F 3152
PLC firmware version	2021.9.0 (21.9.0.40)
Supply voltage	Redundancy voltage supply(AC+AC) or (AC+DC) 100 V AC ... 240 V AC -15 % ... +10 % 110 V DC ... 250 V DC -20 % ... +40 %
Processor	Intel® Atom™ x5-E3930 2x 1,3 GHz
Measurement chain (parameters or accuracy of CTs, VTs, …) Interfaces	External, Class A grid parameters analyzer communicated with Renedium controller via Modbus TCP.

) Where **A ≥ 2 As stated by the Manufacturer, changes of the SW version on "A" level does not influence electrical behaviour included in the scope of the certification.*

2.2 Communication Specifications

Type	RENEDIUM 3152
Interface:	Ethernet RJ45
Cable type:	Ethernet Cable 5e
Interface number:	2
Transmission speed:	100 Mb/s

2.3 Unit transformer

The transformer is not part of the PPC and consequently has not been part of the assessment.

2.4 Grid Protection

The protection is not part of certification scope

2.5 Control settings

Renedium 3152 is parametrized with default settings based on Polish grid code and national requirements. All functions are by default disabled. For this certification report the certified functionalities were enabled and assessed for the functionalities within scope of this certification.

It should be noted that compliance can be achieved also with other parameter sets and control settings, but that changes to control settings will affect the PPC control behaviour which can thus affect compliance. Final settings must be agreed on project level in agreement with relevant system operator.

EQUIPMENT CERTIFICATE – ANNEX 3

Type tests

1 Type tests

Tests were performed on 2022-08-29 in Kaiser-Wilhelm-Koog lab in Germany. All tests were performed under ISO-17025 accreditation and they were performed on both units.

The results used for assessment are documented in the measurement report(s) as specified below:

Test	Test report
Remote cessation of active power	Section 3.1 of /1/
Remote control of active power	Section 3.2 of /1/
Limited Frequency Sensitive Mode – over frequency (LFSM-O)	Section 3.3 of /1/
Limited Frequency Sensitive Mode – under frequency (LFSM-U)	Section 3.4 of /1/

Test report(s)	Document number	Content
/1/	*10370732-A-1-A*	Measurement of the control capability of a power plant controller of the type Renedium 2152, Renedium 3152

The tests results have been assessed against the requirements of PSE 2018-12 /C/ and NC RfG /D/. Further details are described in the corresponding certification report CR-GCC-DNVGL-SE-0124-09276-A072-0.