Type Certificate

Applicant: **SolarEdge Technologies Ltd.**

Address: 1 HaMada Street, Herzeliya 467335, Israel

Type of power generating unit:	**Grid-tied photovoltaic inverter** * Synergy types of SE25K and SE33.3K, see [2]	**SE25K**	**SE27.6K** **SE55K* (2 x SE27.6K),** **SE82.8K* (3 x SE27.6K)**	**SE33.3K** **SE100K* (3 x SE33.3K)**
Technical data:	Nominal active output power:	25 kW	27,6 kW	33,3 kW
	Max. apparent power:	25 kVA	27,6 kVA	33,3 kVA
	Nominal output AC voltage:	400 V (3~ + N + PE)		480 V (3~ + PE)
	Nominal frequency:	50 Hz		
Technical data determined by measurements:	Max. active power P_{Emax} / Max. active power peak P_{600} [1]:	1,011 p.u. / 25,28 kW [1]	1,011 p.u. / 27,90 kW	1,005 p.u. / 33,48 kW [1]
Software version:	**1.13.xxxx** or higher			

Validated type model:	Model file:	Sola_21-0419_0_TR4_SExx.xK_V1.zip
	Identification number (MD5):	567ebae955a7b103d6033fcc037edff8

Grid connection regulation: **VDE-AR-N 4110:2018-11** – Technical requirements for the connection and operation of customer installations to the medium voltage network (TCR medium voltage) [1]

Pertinent standards / Guidelines: Technical guidelines:
FGW TR 3 Rev. 25 [3], FGW TR 4 Rev. 09 [4], FGW TR 8 Rev. 09 [5]

The power generating units, stated in the certificate, were tested and certified according to the technical guidelines referenced to the grid connection regulation. The electrical characteristics fulfil the requirements of the grid connection regulation:

- Quasi-steady-state operation (limitation for the SE33.3K and the SE100K, see restrictions)
- Dynamic network stability (reactive current characteristic according to TCR medium voltage)
- Active power output and network security management
- Active power adjustment as a function of the grid frequency
- Protection technology and protection settings on generating unit level
- Power quality

The manufacturer has provided proof of certification of the quality management system of his production facility in accordance with ISO 9001

Restrictions, deviations or notes on usage: see *Supplement of Certificate* on p.2.
[1] For details see *Supplement of Certificate* on p.2.

The certificate includes the following information:

- technical data of the power generating unit, the auxiliary equipment used and the software version used;
- schematic structure of the power generating units;
- summarized information on the properties of the power generating unit.

The certificate is comprised of 89 pages (including Annex of 87 pages).

BV project number : **14TH0476**
Certificate no. : **21-0419_0**
Issued : **2021-05-07**
Certification scheme : **NSOP-0032-DEU-ZE-V01**
Valid until : **2026-05-06**

Certification body

Holger Schaffer

DAkkS Deutsche Akkreditierungsstelle D-ZE-12024-01-00

Certification body of Bureau Veritas Consumer Products Services Germany GmbH accredited according to DIN EN ISO/IEC 17065
A partial representation of the certificate requires the written approval of Bureau Veritas Consumer Products Services Germany GmbH

Supplement of Certificate (21-0419_0)

Note:

1) The P_{Emax} is *the highest 10-min mean of the active power of a power generating unit* defined according to VDE-AR-N 4110:2018 [1]. The P_{600} is *the maximum active power peak of the overall system (averaging period 10 min)* defined according to FGW TR 3 Rev. 25 [3].

   The stated values on the front page of this certificate were determined according to test 4.1.1, FGW TR 3 Rev. 25 [3].

   The active power results of the *SE27.6K* can be applied to the *SE25K* (scaled by $P_{n,\ SE25K} / P_{n,\ SE27.6K} = 0{,}906$) and to the SE33.3K (scaled by $U_{n,\ SE25K} / U_{n,\ SE27.6K} = 1{,}2$).

2) The Synergy types of the SE27.6K and SE33.3K consist of 2 or 3 inverters:
   - The SE55K is made up by 2 x SE27.6K the SE82.8K by 3 x SE27.6K.
   - The SE100K is comprised of 3 x SE33.3K.

   Throughout this document they will be referred to by Synergy. They are treated as two or respectively three separate units during certification.

Restrictions, deviations or notes on usage:

- The PGUs in the series do not provide test terminals for on-site testing. For necessary on-site testing, a separate test terminal must be installed additionally.
- Prioritization of different setpoints is not possible.
- The Q(U) control function implemented on the PGU level deviates from requirements according to VDE-AR-N 4110:2018-11: The voltage offset cannot be changed on parameter input while running. Instead, the configured curve must be modified. In cases where this is not sufficient, this function needs to be implemented on the plant control level and controlled in the units via reactive power set-points.
- The PGUs in the series provide only one kind of Q(U) control function. The Q(U) control function implanted on the PGU level can be used as *reactive power with voltage limitation function* by suitable setting of the characteristic curve. But this deviates from requirements according to VDE-AR-N 4110:2018-11.
- The Q(P) control function is implemented on the unit level based on 6 supporting points per default. If more supporting points are needed (e.g. to meet the requirement of 10) this must be configured in accordance with the manufacturer.
- The displacement factor cosφ function is not implemented and if needed this has to be considered on the plant level e.g. in the superimposed PGS controller
- The default configuration of the units may not meet the reactive power requirement at the grid connection point (see p. 53f). A permanent active power reduction may be needed. This needs to be considered for project planning.
- The self-protection of the PGU needs to be considered for parameterization of the protection relay.
- The absolute voltage limit for the inverter family of 315 V reduces the ride through capability of the SE33.3K during overvoltage events to 114%, as well as the quasi-steady-state operation capability.
- Note on simulation model:
  - There is one model file, needing to be configured to represent the different types of inverters. By default it is configured to represent the SE27.6K.

These need to be considered on the project level.

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