



**BUREAU
VERITAS**

Type Certificate

Applicant: SolarEdge Technologies Ltd.
Address: 1 HaMada Street, Herzeliya 467335, Israel

Type of power generating unit	Grid-tied photovoltaic inverter *Synergy types see ²⁾	Jupiter+ Improved (for details see <i>Supplement of certificate</i> on p.2, p.3)
	Technical data:	
	Max. apparent power:	40 kVA
	Nominal output AC voltage:	400 V (3~ + N + PE)
	Nominal frequency:	50 Hz
Technical data determined by measurements:	Max. active power $P_{E_{max}}$ / Max. active power peak P_{600}	(for details see <i>Supplement of certificate</i> on p.2, p. 3)
Firmware version:		DSP1:1.20 (Main DSP) or higher DSP2:2.20 (Aux DSP) 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]
VDE-AR-N 4120:2018-11 – Technical requirements for the connection and operation of customer installations to the high voltage network (TCR high voltage) [2]

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 fulfill the requirements of the grid connection regulation:

- Quasi-steady-state operation
- 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.4.

¹⁾ For details see *Supplement of Certificate* on p.3.

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 129 pages (including Annex of 125 pages).

BV project number : 19TH0534
Certificate no. : 21-0940_0
Issued : 2022-01-26

Certification scheme : NSOP-0032-DEU-ZE-V01
Valid until : 2027-01-25

Certification body



Thomas Lammel



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



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Supplement of Certificate (21-0940_0)

Type of power generating unit:	Grid-tied photovoltaic inverter	SE25K	SE27.6K
	*Synergy types of SE25K and SE27.6K, see ²⁾		SE55K * (2 x SE27.6K), SE82.8K * (3 x SE27.6K)
Technical data:	Nominal active output power:	25 kW	27,6 kW
	Max. apparent power:	25 kVA	27,6 kVA
	Nominal output AC voltage:	400 V (3~ + N + PE)	
	Nominal frequency:	50 Hz	
Technical data determined by measurements:	Max. active power $P_{E_{max}}$ / Max. active power peak $P_{600}^{1)}$:	0,99 p.u. / 24,96 kW ¹⁾	0,99 p.u. / 27,45 kW
	Firmware version:	DSP1:1.20 (Main DSP) or higher DSP2:2.20 (Aux DSP) or higher	

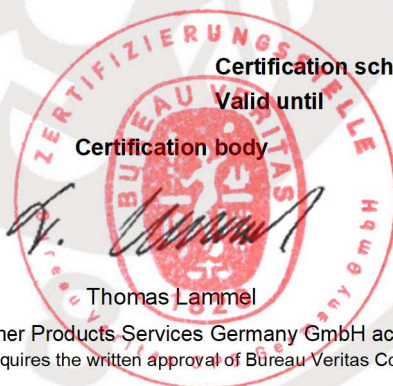
Type of power generating unit:	Grid-tied photovoltaic inverter	SE30K	SE30K	SE30K
	*Synergy types of SE30K see ²⁾	SE90K * (3 x SE30K)	SE90K * (3 x SE30K)	
Technical data:	Nominal active output power:	29,99kW	30 kW	
	Max. apparent power:	30kVA	30 kVA	
	Nominal output AC voltage:	400 V (3~ + N + PE)		480 V (3~ + PE)
	Nominal frequency:	50 Hz		
Technical data determined by measurements:	Max. active power $P_{E_{max}}$ / Max. active power peak $P_{600}^{1)}$:	0,99 p.u. / 29,70 kW ¹⁾		
	Firmware version:	DSP1:1.20 (Main DSP) or higher DSP2:2.20 (Aux DSP) or higher		

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Type of power generating unit:

Grid-tied photovoltaic inverter * Synergy types of SE33.3K and SE40K, see ²⁾	SE33.3K SE66.6K * (2 x SE33.3K), SE100K * (3 x SE33.3K)	SE33.3K SE66.6K * (2 x SE33.3K), SE100K * (3 x SE33.3K)	SE40K SE80K * (2 x SE40K) SE120K * (3 x SE40K)	
Technical data:	Nominal active output power:		33,3 kW	33,3 kW
	Max. apparent power:		33,3 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 $P_{E_{max}}$ / Max. active power peak P_{600} ¹⁾ :		0,99 p.u. / 33,12 kW ¹⁾	0,99 p.u. / 39,6 kW ¹⁾
Firmware version:	DSP1:1.20 (Main DSP) or higher DSP2:2.20 (Aux DSP) or higher			

Note:

¹⁾ The $P_{E_{max}}$ 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 SE33.3K can be applied to the SE25K (scaled by $P_{n, SE25K} / P_{n, SE33.3K} = 0,751$), to the SE27.6K (scaled by $P_{n, SE27.6K} / P_{n, SE33.3K} = 0,829$), to the SE30K (scaled by $P_{n, SE30K} / P_{n, SE33.3K} = 0,901$) and to the SE40K (scaled by $U_{n, SE40K} / U_{n, SE33.3K} = 1,2$).

²⁾ The Synergy types of the SE25K, SE27.6K, SE30K, SE33.3K, and SE40K consist of 2 or 3 inverters:

The Synergy type SE50K is made up by 2 x SE25K.

The Synergy type SE55K is made up by 2 x SE27.6K and the SE82.8K is made up by 3 x SE27.6K.

The Synergy type SE90K is made up by 3 x SE30K.

The Synergy type SE66.6K is made up by 2 x SE33.3K and the SE100K is comprised of 3 x SE33.3K.

The Synergy type SE80K is made up by 2 x SE40K and the SE120K is comprised of 3 x SE40K.

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

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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 $\cos\varphi$ function is not implemented and if needed this must 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. 87f). 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 332 V reduces the ride through capability of the SE33.3K operated at 400V, L-L and the SE40K during overvoltage events to 120%.
- 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 SE33.3K.

These need to be considered on the project level.

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