Intyg om överensstämmelse

Sökande:	**SolarEdge Technologies Ltd.** 1 HaMada Street Herzliya 4673335 **Israel**
Produkt:	**Fotovoltaisk växelriktare (Photovoltaikwechselrichter)**

Modell:	**SE50K**	**SE55K**	**SE66.6K**	**SE82.8K**
	SE90K	**SE100K**	**SE66.6K***	**SE80K***
	SE100K*	**SE120K***	**--**	**--**

Notera: *** 480 V nätspänningsmodeller**

Inverter för trefas parallellanslutning till det allmänna nätet. Nätverksövervaknings- och frånkopplingsanordningen är en integrerad del av ovannämnda modell.

Tillämpliga dokument:

Energimarknadsinspektionens föreskrifter om fastställande av generellt tillämpliga krav för nätanslutning av generatorer (EIFS 2018:2)

Gällande bestämmelser och standarder:

EN 50549-2:2019, SS-EN 50549-2:2019
Krav för att generera anläggningar som ska anslutas parallellt med distributionsnät - Del 2: Anslutning till en MV distributionsnätverk - Generera anläggningar till och med typ B

4.4 Normalt arbetsområde
4.5 Immunitet mot störningar
4.6 Aktivt svar på frekvensavvikelse
4.7 Effektrespons på spänningsvariationer och spänningsförändringar
4.8 EMC och effektkvalitet
4.9 Gränssnittsskydd
4.10 Anslutning och börja generera elkraft
4.11 Avbrytande och minskning av aktiv effekt vid börvärdet
4.12 Fjärranslutet informationsutbyte

EN 50438:2013, SS-EN 50438:2014
Fordringar för anslutning av smågeneratorer i parallelldrift med det allmänna elnätet kompletterat med ändringar beslutade av SEK TK 8

DIN V VDE V 0126-1-1:2006 (4.1 Funktionell Säkerhet)
Automatisk frånkopplingsanordning mellan en generator och det allmänna lågspänningsnätet

Kommissionens Förordning (EU) 2016/631 av den 14 april 2016
Upprättande av en nätverkskod för krav för nätanslutning av generatorer (NC RFG).
Typgodkännande för produktionsenheter för användning i typ B-anläggningar.

Notera:
Detta certifikat bevisar överensstämmelsen för en genereringsenhet baserad på NC RFG. Vissa krav, såsom frekvenskänsligt läge (FSM), reaktiv effektkapacitet etc. kan dock vara tillämpliga på produktionsanläggningsnivån, vilken bedömning kan falla utanför detta certifikats räckvidd. Följaktligen är det möjligt att bedömningen av överensstämmelse för en genereringsenhet inte täcker alla aspekter av ovannämnda standardiseringsdokument, vanligtvis när ett krav snarare utvärderas på anläggningsnivå.

Vid tidpunkten för utfärdandet av detta intyg uppfyller den representativa produkt som anges ovan de angivna reglerna och standarderna.

Rapportnummer:	**20TH0532-EN50549-2_2** **20TH0532-FRT_0** **20TH0532-Power Quality_0**	**Certifieringsprogram:**	**NSOP-0032-DEU-ZE-V01**
Certifikatnummer:	**U21-0484**	**Datum för utfärdande:**	**2021-05-28**

Institutet certifiering

Thomas Lammel

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

Institutet Certifiering för Bureau Veritas Consumer Products Services Germany GmbH ackrediterat enligt DIN EN ISO / IEC 17065

En partiell representation av intyget kräver skriftligt godkännande av Bureau Veritas Consumer Products Services Germany GmbH

Appendix

Extract from test report according to EN 50549-2

Nr. 20TH0532-EN50549-2_2
20TH0532-FRT_0
20TH0532-Power Quality_0

Type Approval and declaration of compliance with the requirements of EN 50549-2 and Commission Regulation (EU) 2016/631 of 14 April 2016 with EIFS:2018:2 for Sweden

Manufacturer / applicant	SolarEdge Technologies Ltd. 1 HaMada Street Herzliya 4673335 Israel
Micro-generator Type	Photovoltaic inverter

	SE50K	SE55K	SE66.6K	SE82.8K
Input DC voltage range [V]	680 - 1000	680 - 1000	680 - 1000	680 - 1000
Input DC current [A]	2 x 36,25	2 x 40	2 x 48,25	3 x 40
Output AC voltage [V]	220 / 380 230 / 400	220 / 380 230 / 400	220 / 380 230 / 400	220 / 380 230 / 400
Output AC current [A]	72,5	80	96,5	120
Output power [VA]	50000	55000	66600	82800

	SE90K	SE90K	SE100K	SE66.6K*
Input DC voltage range [V]	680 - 1000	680 - 1000	680 - 1000	680 - 1000
Input DC current [A]	3 x 43,5	3 x 43,5	3 x 48,25	2 x 40
Output AC voltage [V]	220 / 380 230 / 400	220 / 380 230 / 400	220 / 380 230 / 400	277 / 480
Output AC current [A]	130,5	130,5	145	80
Output power [VA]	89970	90000	100000	66600

	SE80K*	SE100K*	SE120K*	--
Input DC voltage range [V]	680 - 1000	680 - 1000	680 - 1000	--
Input DC current [A]	2 x 48,25	3 x 40	3 x 48,5	--
Output AC voltage [V]	277 / 480	277 / 480	277 / 480	--
Output AC current [A]	96,5	120	145	--
Output power [VA]	80000	100000	120000	--

Firmware version	Beginning with DSP1:1.20 / DSP2: 2.20
Measurement period	2019-11-29 – 2020-05-29, 2020-06-01 – 2020-07-31

Description of the structure of the power generation unit:

The power generation unit is equipped with a PV and line-side EMC filter. The power generation unit has no galvanic isolation between DC input and AC output. Output switch-off is performed with single-fault tolerance based on two series-connected relays in each line and neutral. This enables a safe disconnection of the power generation unit from the network in case of error.

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Extract from test report according to EN 50549-2

Nr. 20TH0532-EN50549-2_2
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Type Approval and declaration of compliance with the requirements of EN 50549-1 and Commission Regulation (EU) 2016/631 of 14 April 2016 with EIFS:2018:2 for Sweden

Parameter Table:

Clause EN 50549-2	Ref	Parameter	Micro generator setting range
4.3.2 Interface switch	n.a.	Single fault tolerance for interface switch	yes | no
4.4.2 Operating frequency range “Poland RoGA NC RFG Article 13”	A,B	47,0 – 47,5 Hz Duration	0,06 – unlimited
	A,B	47,5 – 48,5 Hz Duration	0,06 – unlimited
	A,B	48,5 – 49,0 Hz Duration	0,06 – unlimited
	A,B	49,0 – 51,0 Hz Duration	0,06 – unlimited
	A,B	51,0 – 51,5 Hz Duration	0,06 – unlimited
	A,B	51, 5 – 52 Hz Duration	0,06 – unlimited
4.4.3 Minimal requirement for active power delivery at under frequency “Poland RoGA NC RFG Article 13”	A,B	Reduction threshold	44 Hz – 60 Hz
	A,B	Maximum reduction rate	1 – 12 % P_M/Hz
4.4.4 Continuous operating voltage range	n.a.	Upper limit	1,0 U_n – 335V
	n.a.	Lower limit	0,0 U_n – 1,0 U_n
4.5.2 Rate of change of frequency (ROCOF) immunity “Poland RoGA NC RFG Article 13”	A,B	ROCOF withstand capability (defined with a sliding measurement window of 500 ms) non-synchronous generating technology: synchronous generating technology:	0-100 Hz/s
4.5.3.2 Generating plant with non- synchronous generating technology (FRT) “Poland RoGA NC RFG Article 14”	B	Maximum power resumption time	not defined
	B	Voltage-Time-Diagram	see Figure 6, EN 50549-1 Poland NC RFG Article 14 Type B PGMs *The inverters have a DC to DC converter, so there are no limits. The inverters will stay connected till the NS protection setting (voltage and time are reached).
4.5.3.3 Generating plant with synchronous generating technology (FRT) “Poland RoGA NC RFG Article 14”	B	Maximum power resumption time	not defined
	B	Voltage-Time-Diagram	see Figure 7, EN 50549-1 Poland NC RFG Article 14 Type B PGMs

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Extract from test report according to EN 50549-2

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4.5.4 Over-voltage ride through (OVRT) “Poland RoGA NC RFG nof defined for type A and B”	n.a.	Voltage-Time-Diagram	*The inverters have a DC to DC converter, so there are no limits. The inverters will stay connected till the NS protection setting (voltage and time are reached).
4.6.1 Power response to over frequency (LFSM-O) “Poland RoGA NC RFG Article 13”	A,B	Threshold frequency f_1	50,0 – 66 Hz
	A,B	Droop	1 % – 12 %
	A,B	Power reference	P_M | P_{max}
		P(f) soft start	0 – 20 min
		P(f) reset time	0 – 20 min
	n.a.	Intentional delay	0 – 2 s
	n.a.	Deactivation threshold fstop	50,0 - 66Hz
	n.a.	Deactivation time t_{stop}	0 – 20 min
	A	Acceptance of staged disconnection	yes | no
4.6.2 Power response to under frequency “Poland RoGA NC RFG Article 13, 15”	n.a.	Threshold frequency f_1	44 Hz – 60 Hz
	n.a.	Droop	1 – 12 %
	n.a.	Power reference	P_M | P_{max}
	n.a.	Intentional delay	0 – 2 s
4.7.2.2 Capabilities “Poland RoGA NC RFG Article 20”	B	Active factor range overexcited	0,1 – 1
	B	Active factor range underexcited	0,1 – 1
4.7.2.3 Control modes “Poland RoGA NC RFG Article 13, 14, 15, 18, 21”	n.a.	Enabled control mode	Q setp. Q(U) cos φ setp. cos φ (P)
4.7.2.3.2 Set point control modes “Poland RoGA NC RFG Article 17, 20”	n.a.	Q setpoint and excitation	0 – 90 % P_{nom}
	n.a.	cos φ setpoint and excitation	0,1-1

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4.7.2.3.3 Voltage related control modes “Poland RoGA NC RFG Article 21”	n.a.	Characteristic curve	Q(U) P(U)
	n.a.	Time constant	3 s – 60 s
	n.a.	Min cos φ	0,0 – 1
	n.a.	Lock in power	0 % – 20 %
	n.a.	Lock out power	0 % – 20 %
4.7.2.3.4 Power related control mode	n.a.	Characteristic curve	cos φ (P)
4.7.4.2.1 Voltage support during faults and voltage steps – general “Poland RoGA NC RFG Article 20”	B	Enabling	enable | disable
	B	Static voltage range overvoltage	1,0 U_n – 335V
	B	Static voltage range undervoltage	0,0 U_n – 1,0 U_n
	B	Intensitivity range Δ50per	0 % - 25%
	B	Gradient K1	0 – 10
	B	Gradient K2	0 – 10
4.7.4.2.1.2 Optional Modes	n.a	Active power priority	enable | disable
	n.a	Reactive current limitation [% rated current]	0 % - 100 %
	n.a	Zero current threshold	0,2 U_n – 1,0 U_n
4.7.4.2.2 Zero current mode for converter connected generating technology	n.a.	Enabling	enable | disable
	n.a	Static voltage range overvoltage	1,0 U_n – 335V
	n.a	Static voltage range undervoltage	0,0 U_n – 1,0 U_n
4.9.2 Requirements on voltage and frequency protection	n.a	Threshold for protection as dedicated device [in A or kW, kVA]	All activated
	B	Undervoltage threshold stage 1	0,0 U_n – 1 U_n
	B	Undervoltage operate time stage 1	0,04 s – 20 min
	B	Undervoltage threshold stage 2	0,0 U_n – 1 U_n
	B	Undervoltage operate time stage 2	0,04 s – 20 min
	B	Overvoltage threshold stage 1	1,0 U_n – 335V
	B	Overvoltage operate time stage 1	0,04 s – 20 min
	B	Overvoltage threshold stage 2	1,0 U_n – 335V
	B	Overvoltage operate time stage 2	0,04 s – 20 min
	B	Overvoltage threshold 10 min mean protection[a]	1,0 U_n – 335V
	B	Overvoltage operate time 10 min mean protection[a]	3 s
	B	Underfrequency threshold stage 1	44,0 Hz – 60,0 Hz
	B	Underfrequency operate time stage 1	0,06 s – 20 min
	B	Underfrequency threshold stage 2	44,0 Hz – 60,0 Hz
	B	Underfrequency operate time stage 2	0,06 s – 20 min
	B	Overfrequency threshold stage 1	50,0 Hz – 66,0 Hz
	B	Overfrequency operate time stage 1	0,06 s – 20min
	B	Overfrequency threshold stage 2	50,0 Hz – 66,0 Hz
	B	Overfrequency operate time stage 2	0,06 s – 20 min

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	B	Positive sequence under-voltage protection threshold	N/A
	B	Positive sequence under-voltage protection operation time	N/A
	B	Negative sequence over-voltage protection threshold	N/A
	B	Negative sequence over-voltage protection operation time	N/A
	B	Zero Sequence over voltage protection threshold	N/A
	B	Zero Sequence over voltage protection operation time	N/A
4.10.2 Automatic reconnection after tripping “Poland RoGA NC RFG Article 13, 14”	B	Lower frequency	44,0 Hz – 60,0 Hz
	B	Upper frequency	50,0 Hz – 66,0 Hz
	B	Lower voltage	0,0 U_n – 1,0 U_n
	B	Upper voltage	1,0 U_n – 335 V
	B	Observation time	1 s – 20min
	B	Active power increase gradient	1 % – 10000 %/min
4.10.3 Starting to generate electrical power “Poland RoGA NC RFG Article 13, 14”	A,B	Lower frequency	44,0 Hz – 60,0 Hz
	A,B	Upper frequency	50,0 Hz – 66,0 Hz
	A,B	Lower voltage	0,0 U_n – 1,0 U_n
	A,B	Upper voltage	1,0 U_n – 335 V
	A,B	Observation time	0s – 20min
	A,B	Active power increase gradient	1% – 10000 %/min
4.11.1 Ceasing active power “Poland RoGA NC RFG Article 13, 14”	A,B	Remote operation of the logic interface	yes | no
4.11.2 Reduction of active power on set point “Poland RoGA NC RFG Article 13, 14, 15”	B	Remote operation NOTE: If yes further definition is provided by the DSO	yes | no
4.12 Remote information exchange “Poland RoGA NC RFG Article 13, 14”	B	Remote information exchange required NOTE: If yes further definition is provided by the DSO	yes | no

Note:

[a] Over voltage – stage1: 10 min-mean-value corresponding to EN 50160.

The settings of the interface protection are password protected adjustable in the stated range above.

In case the above stated generators are used with an external protection device, the protection settings of the inverters are to be adjusted according to the manufacturer’s declaration.

The above stated generators are tested according to the requirements in the EN 50549-1:2019 and Commission Regulation (EU) 2016/631 of 14 April 2016 with EIFS:2018:2 for Sweden. Any modification that affects the stated tests must be named by the manufacturer/supplier of the product to ensure that the product meets all requirements.