Intyg om överensstämmelse

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

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

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 50549-1:2019, SS-EN 50549-1:2019
Fordringar på generatoranläggningar för anslutning i parallelldrift med elnät - Del 1: Anslutning till lågspänningsnät - Generatoranläggningar upp till och med typ B

4.4 Normalt driftsområde
4.5 Immunitet mot störningar
4.6 Aktivt svar på frekvensavvikelse
4.7 Kraftsvar på spänningsvariationer och spänningsförändringar
4.8 EMC och effektkvalitet
4.9 Gränssnittsskydd
4.10 Anslutning och börja generera elkraft
4.11 Stopp och minskning av aktiv effekt på börvärdet
4.12 Fjärranslutet informationsutbyte
4.13 Krav på enkel feltolerans för gränssnittsskyddssystemet och gränssnittsomkopplaren

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
Om fastställande av nätföreskrifter med krav för nätanslutning av generatorer.
Typgodkännande för produktionsenheter för användning i anläggningar av typ A och typ B.

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

Rapportnummer:	**20TH0532-EN50549-1_4** **20TH0532-FRT_0** **20TH0532-Power Quality_0**	**Certifieringsprogram:**	**NSOP-0032-DEU-ZE-V01**
Certifikatnummer:	**U21-0466**	**Datum för utfärdande:**	**2021-05-21**

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 50549-1 **Nr. 20TH0532-EN50549-1_4**

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

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	--
Input DC voltage range [V]	680 - 1000	680 - 1000	680 - 1000	--
Input DC current [A]	3 x 43,5	3 x 43,5	3 x 48,25	--
Output AC voltage [V]	220 / 380 230 / 400	220 / 380 230 / 400	220 / 380 230 / 400	--
Output AC current [A]	130,5	130,5	145	--
Output power [VA]	89970	90000	100000	--

Firmware version	Beginning with DSP1: 1.20 / DSP2: 2.20
Measurement period	2019-11-29 – 2020-05-29, 2020-06-01 – 2020-07-31, 2021-05-20

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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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 50549-1	Ref	Parameter	Micro generator setting range	Default settings used	
4.3.2 Interface switch	n.a.	Single fault tolerance for interface switch	yes | no	yes	
4.4.2 Operating frequency range (EIFS 2018:2 1§)	A,B	47,0 – 47,5 Hz Duration	0,06 – unlimited	0 s	
	A,B	47,5 – 48,5 Hz Duration	0,06 – unlimited	≥30 min	
	A,B	48,5 – 49,0 Hz Duration	0,06 – unlimited	≥30 min	
	A,B	49,0 – 51,0 Hz Duration	0,06 – unlimited	unlimited	
	A,B	51,0 – 51,5 Hz Duration	0,06 – unlimited	≥30 min	
	A,B	51, 5 – 52 Hz Duration	0,06 – unlimited	0 s	
4.4.3 Minimal requirement for active power delivery at under frequency (EIFS 2018:2 7§)	A,B	Reduction threshold	44 Hz – 60 Hz	Electronic inverter no power reduction take place	
	A,B	Maximum reduction rate	1 – 12 % P_M/Hz	≤ 2 %	
4.4.4 Continuous operating voltage range	n.a.	Upper limit	1,0 U_n – 335V	N/A	
	n.a.	Lower limit	0,0 U_n – 1,0 U_n	N/A	
4.5.2 Rate of change of frequency (ROCOF) immunity (EIFS 2018:2 2§)	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	≥2 Hz/s	
4.5.3.2 Generating plant with non-synchronous generating technology (FRT) (EIFS 2018:2 10§)	B	Maximum power resumption time	not defined	≤1 s	
	B	Voltage-Time-Diagram	see Figure 6, EN 50549-1 * The inverters can stay connected from 0 to 40VAC up to 3 s. For voltage above 40VAC the inverters will stay connected till the NS protection setting (voltage and time are reached).	Time [s]	U [p.u.]
				N/A*	N/A*
4.5.3.3 Generating plant with synchronous generating technology (FRT) (EIFS 2018:2 10§)	B	Maximum power resumption time	not defined	N/A	
	B	Voltage-Time-Diagram	see Figure 7, EN 50549-1	Time [s]	U [p.u.]
				N/A	N/A
				N/A	N/A
				N/A	N/A
				N/A	N/A
				N/A	N/A

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4.5.4 Over-voltage ride through (OVRT) (EIFS 2018:2 18§)	n.a.	Voltage-Time-Diagram	* The inverters can stay connected from 0 to 40VAC up to 3 s. For voltage above 40VAC the inverters will stay connected till the NS protection setting (voltage and time are reached).	Time [s]	U [p.u.]
				N/A*	N/A*
4.6.1 Power response to over frequency (LFSM-O) (EIFS 2018:2 3§, 4§, 5§, 6§)	A,B	Threshold frequency f_1	50,0 – 66 Hz	50,5 Hz	
	A,B	Droop	1 % – 12 %	8 %	
	A,B	Power reference	P_M | P_{max}	P_M	
	n.a.	Intentional delay	0 – 20 min	0 s	
	n.a.	Deactivation threshold f_{stop}	0 – 20 min	deactivated	
	n.a.	Deactivation time t_{stop}	0 – 2 s	-	
	A	Acceptance of staged disconnection	50,0 – 66 Hz	No	
4.6.2 Power response to under frequency	n.a.	Threshold frequency f_1	44 Hz – 60 Hz	N/A	
	n.a.	Droop	1 – 12 %	N/A	
	n.a.	Power reference	P_M | P_{max}	N/A	
	n.a.	Intentional delay	0 – 2 s	N/A	
4.7.2.2 Capabilities	B	Active factor range overexcited	0,1 – 1	1	
	B	Active factor range underexcited	0,1 – 1	1	
4.7.2.3 Control modes	n.a.	Enabled control mode	Q setp. Q(U) cos φ setp. cos φ (P)	disabled enabled disabled cos φ setp. disabled	
4.7.2.3.2 Set point control modes	n.a.	Q setpoint and excitation	0 – 90 % P_{nom}	0	
	n.a.	cos φ setpoint and excitation	0,1 – 1	1	
4.7.2.3.3 Voltage related control modes	n.a.	Characteristic curve	Q(U) P(U)	disabled Q(U) disabled P(U)	
	n.a.	Time constant	3 s – 60 s	10 s	
	n.a.	Min cos φ	0,0 – 1	0,9	
	n.a.	Lock in power	0 % – 20 %	deactivated	
	n.a.	Lock out power	0 % – 20 %	deactivated	
4.7.2.3.4 Power related control mode	n.a.	Characteristic curve	cos φ (P)	-	
4.7.4.2.2 Zero current mode for converter connected generating technology	n.a.	Enabling	enable | disable	disabled	
	n.a	Static voltage range overvoltage	1,0 U_n – 335V	N/A	
	n.a	Static voltage range undervoltage	0,2 U_n – 1,0 U_n	N/A	

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4.9.2 Requirements on voltage and frequency protection	n.a	Threshold for protection as dedicated device [in A or kW, kVA]	All activated	N/A
	B	Undervoltage threshold stage 1	0,0 U_n – 1 U_n	0,85 U_n
	B	Undervoltage operate time stage 1	0,04 s – 20 min	0,18 s
	B	Undervoltage threshold stage 2	0,0 U_n – 1 U_n	N/A
	B	Undervoltage operate time stage 2	0,04 s – 20 min	N/A
	B	Overvoltage threshold stage 1	1,0 U_n – 335V	1,15 U_n
	B	Overvoltage operate time stage 1	0,04 s – 20 min	0,18 s
	B	Overvoltage threshold stage 2	1,0 U_n – 335V	N/A
	B	Overvoltage operate time stage 2	0,04 s – 20 min	N/A
	B	Overvoltage threshold 10 min mean protection[a]	1,0 U_n – 335V	1,11 U_n
	B	Overvoltage operate time 10 min mean protection[a]	3 s	60 s mean value (update every 3 s)
	B	Underfrequency threshold stage 1	44,0 Hz – 60,0 Hz	47,0 Hz
	B	Underfrequency operate time stage 1	0,06 s – 20 min	0,4 s
	B	Underfrequency threshold stage 2	44,0 Hz – 60,0 Hz	N/A
	B	Underfrequency operate time stage 2	0,06 s – 20 min	N/A
	B	Overfrequency threshold stage 1	50,0 Hz – 66,0 Hz	52,0 Hz
	B	Overfrequency operate time stage 1	0,06 s – 20 min	0,4 s
	B	Overfrequency threshold stage 2	50,0 Hz – 66,0 Hz	N/A
	B	Overfrequency operate time stage 2	0,06 s – 20 min	N/A
	B	Loss of mains according EN 62116 (LoM)	0-100 s	2,5 Hz/s (0,5s)
4.10.2 Automatic reconnection after tripping (EIFS 2018:2 8§, 9§)	B	Lower frequency	44,0 Hz – 60,0 Hz	47,5 Hz
	B	Upper frequency	50,0 Hz – 66,0 Hz	50,1 Hz
	B	Lower voltage	0,0 U_n – 1,0 U_n	0,85 U_n
	B	Upper voltage	1,0 U_n – 335 V	1,10 U_n
	B	Observation time	1 s – 20min	180 s
	B	Active power increase gradient	1 % – 10000 %/min	10 %/min
4.10.3 Starting to generate electrical power	A,B	Lower frequency	44,0 Hz – 60,0 Hz	47,5 Hz
	A,B	Upper frequency	50,0 Hz – 66,0 Hz	50,1 Hz
	A,B	Lower voltage	0,0 U_n – 1,0 U_n	0,85 U_n
	A,B	Upper voltage	1,0 U_n – 335 V	1,10 U_n
	A,B	Observation time	0s – 20min	180 s
	A,B	Active power increase gradient	1% – 10000 %/min	10 %/min
4.11.1 Ceasing active power	A,B	Remote operation of the logic interface	yes | no	Yes (RS485, DI)
4.11.2 Reduction of active power on set point	B	Remote operation NOTE: If yes further definition is provided by the DSO	yes | no	Yes (RS485, DI)
4.12 Remote information exchange	B	Remote information exchange required NOTE: If yes further definition is provided by the DSO	yes | no	No

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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.