Certificat de conformité

Demandeur:	**SMA Solar Technology AG** **Sonnenallee 1** **34266 Niestetal** **Allemagne**
Produit:	**Onduleurs Photovoltaïques**
Modèle:	**STP 50-40** **STP 50-41**

Onduleur pour connexion parallèle triphasée au réseau public. Le dispositif de surveillance et de déconnexion du réseau fait partie intégrante du modèle susmentionné.

Réglementations et normes appliquées:

EN 50549-1:2019-02, NBN EN 50549-1:2019-02
Exigences relatives aux centrales électriques destinées à être raccordées en parallèle à des réseaux de distribution - Partie 1: Raccordement à un réseau de distribution BT - Centrales électriques jusqu'au Type B inclus

4.4 Plage de fonctionnement normale
4.5 Immunité aux perturbations
4.6 Réponse active à l'écart de fréquence
4.7 Réponse de puissance aux variations de tension et aux changements de tension
4.8 CEM et qualité de l'alimentation
4.9 Protection d'interface
4.10 Connexion et démarrage de la production d'énergie électrique
4.11 Arrêt et réduction de la puissance active au point de consigne
4.13 Exigences concernant la tolérance de panne unique du système de protection d'interface et du commutateur d'interface

C10/11:2019-09
Prescriptions techniques spécifiques de raccordement d'installations de production décentralisée fonctionnant en parallèle sur le réseau de distribution

DIN V VDE V 0126-1-1:2006 (4.1 Sécurité fonctionnelle)
Dispositif de déconnexion automatique entre un générateur et le réseau public á basse tension

Règlement (UE) 2016/631 De La Commission du 14 avril 2016
Etablissant un code de réseau sur les exigences applicables au raccordement au réseau des installations de production d'électricité. Homologation de type pour les unités de production à utiliser dans les installations de type A et de type B.

Un échantillon représentatif des produits mentionnés ci-dessus correspond à la date de la délivrance de ce certificat en vigueur des exigences de sécurité technique et pour l´utilisation conformément à sa destination.

Numéro de rapport:	**17TH0199-EN50549-1_1**	**Programme de certification:**	**NSOP-0032-DEU-ZE-V01**
Numéro de certificat:	**U21-0153**	**Délivré le:**	**2021-02-16**

Organisme de certification

Thomas Lammel

Organisme de certification Bureau Veritas Consumer Products Services Germany GmbH accrédité par DIN EN ISO/IEC 17065

Une représentation partielle du certificat nécessite l'autorisation écrite de Bureau Veritas Consumer Products Services Germany GmbH

Appendix

Extract from test report according to EN 50549-1 / C10/11 **Nr. 17TH0199-EN50549-1_1**

Type Approval and declaration of compliance with the requirements of EN 50549-1 / C10/11.	
Manufacturer / applicant:	SMA Solar Technology AG Sonnenallee 1 34266 Niestetal Germany
Micro-generator Type	Photovoltaic inverter
	STP 50-40 STP 50-41
MPP DC voltage range [V]	500 – 800
Input DC voltage range [V]	max. 1000
Input DC current [A]	6 x 20
Output AC voltage [V]	400
Output AC current [A]	72,5
Output power [VA]	50000
Firmware version	beginning with V03.10.03.R
Measurement period:	2019-12-27 to 2020-02-12
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.	

Appendix

Extract from test report according to EN 50549-1 / C10/11 **Nr. 17TH0199-EN50549-1_1**

Type Approval and declaration of compliance with the requirements of EN 50549-1 / C10/11 and Commission Regulation (EU) 2016/631 of 14 April 2016

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	A,B	47,0 – 47,5 Hz Duration	0 – 20 s	0,3 s	
	A,B	47,5 – 48,5 Hz Duration	30 – 90 min	unlimited	
	A,B	48,5 – 49,0 Hz Duration	30 – 90 min	unlimited	
	A,B	49,0 – 51,0 Hz Duration	not configurable	unlimited	
	A,B	51,0 – 51,5 Hz Duration	30 – 90 min	unlimited	
	A,B	51, 5 – 52 Hz Duration	0 – 15 min	0,1 s	
4.4.3 Minimal requirement for active power delivery at under frequency	A,B	Reduction threshold	49 Hz – 49,5 Hz	Electronic inverter no power reduction take place	
	A,B	Maximum reduction rate	2 – 10 % P_M/Hz	≤ 2 %	
4.4.4 Continuous operating voltage range	n.a.	Upper limit	100 – 110%	N/A	
	n.a.	Lower limit	90 – 100%	N/A	
4.5.2 Rate of change of frequency (ROCOF) immunity	A,B	ROCOF withstand capability (defined with a sliding measurement window of 500 ms) non-synchronous generating technology: synchronous generating technology:	not defined	2,5 Hz/s	
4.5.3.2 Generating plant with non-synchronous generating technology (FRT)	B	Maximum power resumption time	not defined	≤1 s	
	B	Voltage-Time-Diagram	see Figure 6, EN 50549-1	Time [s]	U [p.u.]
				0,0	0,05
				0,25	0,05
				3	0,85
4.5.3.3 Generating plant with synchronous generating technology (FRT)	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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Extract from test report according to EN 50549-1 / C10/11 **Nr. 17TH0199-EN50549-1_1**

4.5.4 Over-voltage ride through (OVRT)	n.a.	Voltage-Time-Diagram	not configurable	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
				N/A	N/A
				N/A	N/A
4.6.1 Power response to over frequency (LFSM-O)	A,B	Threshold frequency f_1	50,2 Hz – 52 Hz	50,2 Hz	
	A,B	Droop	2 % – 12 %	5 %	
	A,B	Power reference	P_M | P_{max}	P_M	
	n.a.	Intentional delay	0 – 2 s	0 s	
	n.a.	Deactivation threshold fstop	50,0 Hz – f_1	deactivated	
	n.a.	Deactivation time t_{stop}	0 – 600 s	-	
	A	Acceptance of staged disconnection	yes | no	No	
4.6.2 Power response to under frequency	n.a.	Threshold frequency f_1	49,8 Hz – 46 Hz	N/A	
	n.a.	Droop	2 – 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	0,9 – 1	0,9	
	B	Active factor range underexcited	0,9 – 1	0,9	
4.7.2.3 Control modes	n.a.	Enabled control mode	Q setp. Q(U) cos φ setp. cos φ (P)	All can be set!	
4.7.2.3.2 Set point control modes	n.a.	Q setpoint and excitation	0 – 48 % P_D	0	
	n.a.	cos φ setpoint and excitation	1 – 0,9	1	
4.7.2.3.3 Voltage related control modes	n.a.	Characteristic curve	Q(U) P(U)	disabled	
	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)	disabled	
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	100 % U_n – 120 % U_n	N/A	
	n.a	Static voltage range undervoltage	20 % U_n – 100 % U_n	N/A	

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Extract from test report according to EN 50549-1 / C10/11 **Nr. 17TH0199-EN50549-1_1**

4.9.2 Requirements on voltage and frequency protection	n.a	Threshold for protection as dedicated device [in A or kW, kVA]	16 A – 250 kVA	N/A
	B	Undervoltage threshold stage 1	0,2 U_n – 1 U_n	0,8 U_n
	B	Undervoltage operate time stage 1	0,1 s – 100 s	0,1
	B	Undervoltage threshold stage 2	0,2 U_n – 1 U_n	N/A
	B	Undervoltage operate time stage 2	0,1 s – 5 s	N/A
	B	Overvoltage threshold stage 1	1,0 U_n – 1,2 U_n	1,15 U_n
	B	Overvoltage operate time stage 1	0,1 s – 100 s	0,1 s
	B	Overvoltage threshold stage 2	1,0 U_n – 1,3 U_n	disable
	B	Overvoltage operate time stage 2	0,1 s – 5 s	disable
	B	Overvoltage threshold 10 min mean protection[a]	1,0 U_n – 1,15 U_n	1,1 U_n
	B	Overvoltage operate time 10 min mean protection[a]	0 – 3 s	10 min (update every 0,1s)
	B	Underfrequency threshold stage 1	47,0 Hz – 50,0 Hz	47,5 Hz
	B	Underfrequency operate time stage 1	0,1 s – 100 s	0,3 – 0,5 s
	B	Underfrequency threshold stage 2	47,0 Hz – 50,0 Hz	N/A
	B	Underfrequency operate time stage 2	0,1 s – 5 s	N/A
	B	Overfrequency threshold stage 1	50,0 Hz – 52,0 Hz	52,0 Hz
	B	Overfrequency operate time stage 1	0,1 s – 100 s	0,3-0,5s
	B	Overfrequency threshold stage 2	50,0 Hz – 52,0 Hz	N/A
	B	Overfrequency operate time stage 2	0,1 s – 5 s	N/A
	B	Loss of mains according EN 62116 (LoM)	0-6000s	2 s
4.10.2 Automatic reconnection after tripping	B	Lower frequency	47,0 Hz – 50,0 Hz	49,9 Hz
	B	Upper frequency	50,0 Hz – 52,0 Hz	50,1 Hz
	B	Lower voltage	50 % U_n – 100 % U_n	85 % Un
	B	Upper voltage	100 % U_n – 120 % U_n	110 % Un
	B	Observation time	10 s – 600 s	60 s
	B	Active power increase gradient	6 % – 3000 %/min	9 % /min
4.10.3 Starting to generate electrical power	A,B	Lower frequency	47,0 Hz – 50,0 Hz	49,9 Hz
	A,B	Upper frequency	50,0 Hz – 52,0 Hz	50,1 Hz
	A,B	Lower voltage	50 % – 100 % U_n	85 % Un
	A,B	Upper voltage	100 % – 120 % U_n	110 % Un
	A,B	Observation time	10 s – 600 s	60 s
	A,B	Active power increase gradient	6 % – 3000 %/min	19 %/min

Appendix

Extract from test report according to EN 50549-1 / C10/11 **Nr. 17TH0199-EN50549-1_1**

4.11.1 Ceasing active power	A,B	Remote operation of the logic interface	yes | no	No
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	No
4.12 Remote information exchange	B	Remote information exchange required NOTE: If yes further definition is provided by the DSO	yes | no	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 / C10/11:2019 and Commission Regulation (EU) 2016/631 of 14 April 2016. 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.