

ATTESTATION OF CONFORMITY KONFORMITÄTSBESCHEINIGUNG

Issued to: SolaX Power Network Technology (Zhejiang) Co., Ltd.
Ausgestellt an: No. 288 Shizhu Road, Tonglu Economic Development Zone, 311500, Tonglu City, Zhejiang Province, China

For the product: Grid-connected PV inverter
für das Produkt: Netzverbundener PV-Wechselrichter

Trade name:
Handelsname:



Type/Model: X3-8.0P-T-N, X3-8.0P-T-D, X3-10.0P-T-N, X3-10.0P-T-D
Typ/Modell: X3-12.0P-T-N, X3-12.0P-T-D, X3-15.0P-T-N, X3-15.0P-T-D

Ratings: See Annex
Bewertungen: Siehe Anhang

Manufactured by: SolaX Power Network Technology (Zhejiang) Co., Ltd.
Hergestellt von: No. 288 Shizhu Road, Tonglu Economic Development Zone, 311500, Tonglu City, Zhejiang Province, China

Requirements: VDE-AR-N 4105:2018-11 – Erzeugungsalagen am Niederspannungsnetz
Anforderungen: Technische Mindestanforderungen für Anschluss und Parallelbetrieb von Erzeugungsalagen am Niederspannungsnetz (mit Ausnahme von Klausel 5.5.2)

DIN VDE V 0124-100:2019-09 – Netzintegration von Erzeugungsalagen – Niederspannung – Prüfanforderungen an Erzeugungseinheiten vorgesehen zum Anschluss und Parallelbetrieb am Niederspannungsnetz (mit Ausnahme von Klausel 5.7)

This Attestation is granted on account of an examination by DEKRA, the results of which are laid down in a confidential file No. 6069439.50.

Diese Bescheinigung wird aufgrund einer Prüfung durch DEKRA gewährt, deren Ergebnisse in einer vertraulichen Akte Nr. 6069439.50 niedergelegt sind.

The examination has been carried out on one single specimen or several specimens of the product, submitted by the manufacturer. The Attestation does not include an assessment of the manufacturer's production. Conformity of his production with the specimen tested by DEKRA is not the responsibility of DEKRA.

Die Prüfung wurde an einer einzelnen Probe oder mehreren vom Hersteller eingereichten Exemplaren Proben des Produkts durchgeführt. Die Bescheinigung enthält keine Bewertung der Produktion des Herstellers. Die Konformität seiner Produktion mit dem von DEKRA getesteten Exemplar liegt nicht in der Verantwortung von DEKRA.

Arnhem, 10 April 2020

Number: 6069439.01AOC
Anzahl:

DEKRA Testing and Certification (Shanghai) Ltd.

C. Lin
Certification Manager

© Integral publication of this attestation and adjoining reports is allowed

Page 1 of 18

DEKRA Testing and Certification (Shanghai) Ltd.

3F #250 Jiangchangsan Road Building 16 Headquarter Economy Park Shibe Hi-Tech Park, Jing'an District, Shanghai 200436 China
T +86 21 6056 7600 F +86 21 6056 7555 www.dekra-certification.com

Ratings of the products:

Bewertungen der Produkte:

X3-8.0P-T-N, X3-8.0P-T-D:

PV input: Max. 1000 Vdc, Operating voltage range: 160-950 Vdc, max 10 A/20 A, Isc PV: 12 A/24 A

AC Output: 3/N/PE, 400/230 Vac, 50 Hz, Max. Apparent AC power 8000 VA, max 3*12.8 A

X3-10.0P-T-N, X3-10.0P-T-D:

PV input: Max. 1000 Vdc, Operating voltage range: 160-950 Vdc, max 10 A/20 A, Isc PV: 12 A/24 A

AC Output: 3/N/PE, 400/230 Vac, 50 Hz, Max. Apparent AC power 10000 VA, max 3*16.0 A

X3-12.0P-T-N, X3-12.0P-T-D:

PV input: Max. 1000 Vdc, Operating voltage range: 160-950 Vdc, max 10 A/20 A, Isc PV: 12 A/24 A

AC Output: 3/N/PE, 400/230 Vac, 50 Hz, Max. Apparent AC power 12000 VA, max 3*19.2 A

X3-15.0P-T-N, X3-15.0P-T-D:

PV input: Max. 1000 Vdc, Operating voltage range: 160-950 Vdc, max 10 A/20 A, Isc PV: 12 A/24 A

AC Output: 3/N/PE, 400/230 Vac, 50 Hz, Max. Apparent AC power 15000 VA, max 3*23.8 A

E.4 Unit certificate (VDE-AR-N 4105:2018-11) E.4 Einheitenzertifikat				
Manufacturer / Address: <i>Hersteller / Adresse:</i>	SolaX Power Network Technology (Zhejiang) Co., Ltd. No. 288 Shizhu Road, Tonglu Economic Development Zone, 311500, Tonglu City, Zhejiang Province, China			
Type of power generation unit: <i>Typ Erzeugungseinheit:</i>	X3-8.0P-T-N, X3-8.0P-T-D, X3-10.0P-T-N, X3-10.0P-T-D X3-12.0P-T-N, X3-12.0P-T-D, X3-15.0P-T-N, X3-15.0P-T-D			
<input checked="" type="checkbox"/> Inverter <i>umrichter</i>	<input type="checkbox"/> Asynchronous generator <i>Asynchrongenerator</i>	<input type="checkbox"/> Synchronos generator <i>Synchrongenerator</i>		
<input type="checkbox"/> Stirling generator <i>Stirlinggenerator</i>	<input type="checkbox"/> Fuel cell <i>Brennstoffzelle</i>	<input type="checkbox"/> Others <i>andere</i>		
Rated values <i>Bemessungswerte</i>	X3-8.0P-T-N, X3-8.0P-T-D	X3-10.0P-T-N, X3-10.0P-T-D	X3-12.0P-T-N, X3-12.0P-T-D	X3-15.0P-T-N, X3-15.0P-T-D
Max. active power $P_{E_{max}}$ <i>Max. Wirkleistung $P_{E_{max}}$</i>	8000 W	10000 W	12000 W	15000 W
Max. apparent power $S_{E_{max}}$ <i>Max. Scheinleistung $S_{E_{max}}$</i>	8000 VA	10000 VA	12000 VA	15000 VA
Rated voltage: <i>Bemessungsspannung:</i>	3/N/PE, 400/230 Vac			
Rated current: <i>Bemessungsstrom:</i>	3*11.6 A	3*14.5 A	3*17.4 A	3*21.7 A
Network connection rule: <i>Netzanschlussregel</i>	VDE-AR-N 4105 „Erzeugungsanlagen am Niederspannungsnetz“ <i>Technische Mindestanforderungen für Anschluss und Parallelbetrieb von Erzeugungsanlagen am Niederspannungsnetz(mit Ausnahme von Klausel 5.5.2)</i>			
Test requirement: <i>Prüfanforderung</i>	DIN VDE V 0124-100 (VDE V 0124-100) „Netzintegration von Erzeugungsanlagen – Niederspannung“ <i>Prüfanforderungen an Erzeugungseinheiten vorgesehen zum Anschluss und Parallelbetrieb am Niederspannungsnetz(mit Ausnahme von Klausel 5.7)</i>			
Test report <i>Prüfbericht</i>	6069439.50			
The power generation unit described above meets the requirements of VDE-AR-N 4105. <i>Die oben bezeichnete Erzeugungseinheit erfüllt die Anforderungen der VDE-AR-N 4105.</i>				

E.5 Test report "Utility interactive" for power generation units with an input current > 75A (VDE-AR-N 4105:2018-11) E.5 Prüfbericht „Netzurückwirkungen“ für Erzeugungseinheiten mit einem Eingangsstrom > 75 A					
Extract from test report for unit certificate "Determination of electrical properties" <i>Auszug aus dem Prüfbericht für Gerätezertifikat "Bestimmung elektrischer Eigenschaften"</i>		Report No.: 6069439.50 Bericht Nr.:			
Manufacturer: <i>Anlagenhersteller</i>		SolaX Power Network Technology (Zhejiang) Co., Ltd.			
Manufacturer specifications: <i>Herstellerangaben</i>		Type (PV-inverter): <i>Anlagenart (PV-WR):</i>	X3-8.0P-T-N(D), X3-10.0P-T-N(D), X3-12.0P-T-N(D), X3-15.0P-T-N(D)		
		maximum active power $P_{E_{max}}$: <i>maximale Wirkleistung $P_{E_{max}}$:</i>	8000 / 10000 / 12000 /15000 (W)		
		Rated voltage: <i>Bemessungsspannung:</i>	3/N/PE, 400/230 Vac		
Measuring period: <i>Messzeitraum:</i>		From yyyy-mm-dd to yyyy-mm-dd <i>vom JJJJ-MM-TT bis JJJJ-MM-TT</i>	From 2019-12-26 to 2020-04-01 <i>Vom 2019-12-26 bis 2020-04-01</i>		
Rapid voltage changes <i>Schnelle Spannungsänderungen</i>					
Switching on without specification <i>Einschalten ohne Vorgabe (zum Primärenergieträger)</i>			k_i :	0.108	
Most unfavorable case when switching the generator <i>Ungünstigster Fall beim Umschalten der Generatorstufen</i>			k_i :	0.999	
Switching on at rated power <i>Einschalten bei Nennbedingungen (des Primärenergieträgers)</i>			k_i :	0.999	
Switch off at rated power <i>Ausschalten bei Bemessungsleistung</i>			k_i :	0.033	
Worst-case value of all switching operations <i>Schlechtester Wert aller Schaltvorgänge</i>			$k_{i_{max}}$:	0.999	
Flicker	Angle of network impedance ψ_k : <i>Netzimpedanzwinkel ψ_k</i>	30°	50°	70°	85°
	Coefficient of system flicker c_ψ : <i>Anlagenflickerbeiwert c_ψ</i>	1.68	N/A	N/A	N/A

E.5 Test report "Utility interactive" for power generation units with an input current > 75A (VDE-AR-N 4105:2018-11)
E.5 Prüfbericht „Netzrückwirkungen“ für Erzeugungseinheiten mit einem Eingangsstrom > 75 A

Extract from test report for unit certificate

"Determination of electrical properties"

Auszug aus dem Prüfbericht für Gerätezertifikat

"Bestimmung elektrischer Eigenschaften"

Report No.: 6069439.50

Bericht Nr.:

Harmonics / Oberschwingungen:

Model / Modell: X3-15.0P-T-D

Tested according to DIN VDE V 0124-100 clause 5.2.4 / geprüft nach DIN VDE V 0124-100 Punkt 5.2.4

Active power Wirkleistung P/P _n [%]	0	10	20	30	40	50	60	70	80	90	100
Harmonic order Ordnungszahl	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]
2	0.009	0.012	0.020	0.035	0.031	0.033	0.038	0.042	0.049	0.054	0.063
3	0.074	0.084	0.082	0.092	0.117	0.155	0.146	0.132	0.170	0.149	0.128
4	0.003	0.004	0.007	0.014	0.012	0.011	0.012	0.013	0.017	0.019	0.019
5	0.025	0.012	0.102	0.190	0.246	0.315	0.341	0.361	0.442	0.450	0.461
6	0.004	0.004	0.006	0.012	0.007	0.006	0.012	0.031	0.026	0.057	0.007
7	0.012	0.049	0.068	0.123	0.179	0.235	0.259	0.283	0.330	0.354	0.366
8	0.003	0.005	0.005	0.007	0.006	0.004	0.011	0.031	0.026	0.061	0.009
9	0.048	0.065	0.067	0.065	0.070	0.073	0.068	0.064	0.067	0.063	0.062
10	0.003	0.004	0.005	0.007	0.005	0.003	0.004	0.004	0.004	0.005	0.006
11	0.033	0.052	0.031	0.026	0.093	0.099	0.109	0.112	0.135	0.117	0.130
12	0.001	0.002	0.004	0.006	0.004	0.003	0.003	0.003	0.003	0.004	0.005
13	0.081	0.050	0.063	0.097	0.110	0.146	0.166	0.189	0.211	0.227	0.242
14	0.003	0.004	0.004	0.006	0.007	0.004	0.004	0.004	0.004	0.007	0.005
15	0.024	0.010	0.005	0.011	0.017	0.020	0.021	0.022	0.026	0.025	0.028
16	0.002	0.002	0.004	0.006	0.004	0.003	0.003	0.003	0.004	0.004	0.005
17	0.007	0.015	0.047	0.043	0.046	0.031	0.037	0.038	0.047	0.042	0.049
18	0.001	0.002	0.004	0.005	0.004	0.003	0.002	0.003	0.003	0.005	0.004
19	0.035	0.021	0.041	0.047	0.029	0.017	0.018	0.027	0.022	0.026	0.040
20	0.002	0.004	0.004	0.006	0.005	0.004	0.004	0.004	0.004	0.005	0.004
21	0.019	0.012	0.012	0.016	0.015	0.012	0.015	0.015	0.014	0.023	0.017
22	0.002	0.003	0.005	0.005	0.004	0.003	0.003	0.003	0.003	0.004	0.006
23	0.030	0.034	0.077	0.095	0.075	0.044	0.056	0.069	0.071	0.052	0.093
24	0.004	0.004	0.004	0.004	0.004	0.005	0.005	0.006	0.006	0.008	0.008
25	0.039	0.034	0.035	0.050	0.048	0.058	0.068	0.078	0.082	0.102	0.096
26	0.002	0.003	0.004	0.006	0.005	0.003	0.004	0.004	0.005	0.006	0.005
27	0.032	0.023	0.024	0.028	0.027	0.028	0.030	0.031	0.033	0.028	0.037
28	0.004	0.006	0.005	0.006	0.005	0.004	0.004	0.004	0.005	0.008	0.007
29	0.023	0.062	0.024	0.067	0.048	0.037	0.040	0.042	0.036	0.058	0.044
30	0.003	0.003	0.005	0.005	0.004	0.003	0.003	0.004	0.004	0.012	0.004
31	0.046	0.043	0.054	0.056	0.062	0.039	0.043	0.047	0.042	0.043	0.054
32	0.003	0.005	0.004	0.006	0.004	0.003	0.004	0.005	0.004	0.009	0.005
33	0.032	0.029	0.023	0.028	0.028	0.030	0.032	0.036	0.033	0.035	0.041
34	0.004	0.005	0.005	0.006	0.004	0.003	0.004	0.005	0.004	0.008	0.006
35	0.028	0.053	0.057	0.057	0.065	0.027	0.034	0.043	0.041	0.048	0.053
36	0.004	0.005	0.007	0.007	0.005	0.003	0.004	0.004	0.004	0.014	0.005
37	0.053	0.041	0.078	0.078	0.055	0.041	0.045	0.050	0.047	0.074	0.059
38	0.004	0.005	0.007	0.007	0.005	0.003	0.004	0.004	0.004	0.010	0.005
39	0.033	0.032	0.026	0.028	0.027	0.029	0.036	0.041	0.038	0.044	0.050
40	0.006	0.006	0.007	0.007	0.005	0.005	0.005	0.005	0.004	0.006	0.005

Remark: The maximal value of three phases is selected.*Beachtung: Die maximalwerte der drei Phasen werden gewählt.*

E.5 Test report "Utility interactive" for power generation units with an input current > 75A (VDE-AR-N 4105:2018-11)
E.5 Prüfbericht „Netrückwirkungen“ für Erzeugungseinheiten mit einem Eingangsstrom > 75 A

Extract from test report for unit certificate

"Determination of electrical properties"

Auszug aus dem Prüfbericht für Gerätezertifikat

"Bestimmung elektrischer Eigenschaften"

Report No.: 6069439.50

Bericht Nr.:

Interharmonics / Zwischenharmonische:

Model / Modell: X3-15.0P-T-D

Tested according to DIN VDE V 0124-100 clause 5.2.4 / geprüft nach DIN VDE V 0124-100 Punkt 5.2.4

Active power Wirkleistung P/P _n [%]	0	10	20	30	40	50	60	70	80	90	100
Frequency Frequenz [Hz]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]
75	0.022	0.021	0.056	0.154	0.070	0.032	0.041	0.052	0.048	0.064	0.072
125	0.006	0.006	0.015	0.039	0.020	0.008	0.010	0.012	0.011	0.016	0.018
175	0.006	0.009	0.013	0.030	0.015	0.007	0.008	0.009	0.009	0.012	0.015
225	0.003	0.004	0.013	0.031	0.016	0.006	0.008	0.008	0.008	0.012	0.013
275	0.003	0.004	0.011	0.032	0.011	0.006	0.006	0.011	0.011	0.012	0.016
325	0.002	0.004	0.010	0.029	0.014	0.006	0.008	0.010	0.012	0.024	0.117
375	0.002	0.005	0.008	0.022	0.012	0.005	0.007	0.012	0.011	0.027	0.162
425	0.002	0.004	0.005	0.010	0.006	0.003	0.004	0.011	0.010	0.015	0.126
475	0.002	0.006	0.006	0.011	0.006	0.003	0.004	0.005	0.005	0.006	0.017
525	0.002	0.003	0.006	0.013	0.010	0.004	0.005	0.006	0.005	0.007	0.010
575	0.002	0.004	0.008	0.015	0.009	0.004	0.005	0.006	0.006	0.006	0.010
625	0.002	0.004	0.008	0.014	0.011	0.005	0.005	0.006	0.006	0.007	0.009
675	0.002	0.004	0.007	0.013	0.009	0.004	0.005	0.006	0.005	0.006	0.014
725	0.002	0.004	0.006	0.010	0.005	0.003	0.004	0.004	0.004	0.004	0.015
775	0.002	0.005	0.008	0.011	0.006	0.003	0.003	0.004	0.003	0.004	0.011
825	0.003	0.004	0.006	0.009	0.011	0.006	0.005	0.006	0.005	0.006	0.009
875	0.002	0.004	0.007	0.008	0.009	0.006	0.004	0.005	0.005	0.005	0.007
925	0.003	0.004	0.007	0.010	0.009	0.006	0.005	0.006	0.006	0.006	0.008
975	0.002	0.004	0.006	0.007	0.007	0.004	0.006	0.005	0.006	0.006	0.009
1025	0.003	0.004	0.007	0.008	0.004	0.004	0.005	0.004	0.004	0.004	0.006
1075	0.003	0.006	0.010	0.010	0.005	0.004	0.005	0.004	0.004	0.004	0.007
1125	0.006	0.008	0.010	0.011	0.010	0.009	0.010	0.010	0.010	0.011	0.012
1175	0.003	0.005	0.007	0.008	0.007	0.005	0.005	0.007	0.006	0.006	0.007
1225	0.004	0.005	0.007	0.010	0.009	0.007	0.007	0.009	0.009	0.007	0.008
1275	0.003	0.004	0.006	0.007	0.008	0.005	0.005	0.006	0.007	0.006	0.009
1325	0.003	0.004	0.007	0.008	0.005	0.005	0.005	0.005	0.007	0.005	0.006
1375	0.004	0.007	0.010	0.010	0.005	0.005	0.005	0.005	0.005	0.007	0.007
1425	0.004	0.005	0.008	0.008	0.011	0.008	0.008	0.008	0.008	0.010	0.010
1475	0.004	0.007	0.008	0.008	0.010	0.007	0.006	0.007	0.007	0.008	0.010
1525	0.005	0.006	0.007	0.010	0.011	0.008	0.007	0.007	0.008	0.009	0.009
1575	0.005	0.006	0.006	0.008	0.010	0.008	0.007	0.007	0.008	0.008	0.012
1625	0.005	0.006	0.007	0.009	0.006	0.006	0.006	0.006	0.007	0.007	0.009
1675	0.005	0.008	0.010	0.011	0.007	0.006	0.006	0.006	0.007	0.007	0.010
1725	0.005	0.006	0.008	0.009	0.012	0.007	0.007	0.007	0.007	0.007	0.010
1775	0.006	0.011	0.012	0.010	0.011	0.007	0.006	0.007	0.007	0.007	0.010
1825	0.007	0.008	0.010	0.011	0.012	0.008	0.007	0.007	0.008	0.008	0.010
1875	0.008	0.008	0.008	0.010	0.010	0.008	0.007	0.007	0.007	0.008	0.010
1925	0.007	0.008	0.009	0.011	0.007	0.007	0.007	0.007	0.008	0.008	0.010
1975	0.007	0.010	0.012	0.011	0.008	0.008	0.007	0.007	0.007	0.008	0.011

Remark: The maximal value of three phases is selected.

Beachtung: Die maximalwerte der drei Phasen werden gewählt.

E.5 Test report “Utility interactive” for power generation units with an input current > 75A (VDE-AR-N 4105:2018-11)
E.5 Prüfbericht „Netzrückwirkungen“ für Erzeugungseinheiten mit einem Eingangsstrom > 75 A

Extract from test report for unit certificate

"Determination of electrical properties"

Auszug aus dem Prüfbericht für Gerätezertifikat

"Bestimmung elektrischer Eigenschaften"

Report No.: 6069439.50

Bericht Nr.:

Higher Frequencies / Höhere Frequenzen:

Model / Modell: X3-15.0P-T-D

Tested according to DIN VDE V 0124-100 clause 5.2.4 / geprüft nach DIN VDE V 0124-100 Punkt 5.2.4

Active power Wirkleistung P/P _n [%]	0	10	20	30	40	50	60	70	80	90	100
Frequency Frequenz [kHz]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]
2.1	0.084	0.088	0.085	0.111	0.103	0.074	0.073	0.074	0.067	0.079	0.081
2.3	0.113	0.086	0.066	0.086	0.084	0.076	0.080	0.085	0.082	0.096	0.098
2.5	0.170	0.180	0.171	0.147	0.125	0.113	0.114	0.119	0.116	0.139	0.127
2.7	0.199	0.214	0.225	0.195	0.185	0.144	0.136	0.139	0.136	0.137	0.141
2.9	0.116	0.118	0.111	0.110	0.095	0.092	0.087	0.090	0.092	0.089	0.098
3.1	0.093	0.093	0.099	0.092	0.081	0.068	0.065	0.066	0.069	0.070	0.070
3.3	0.050	0.080	0.086	0.072	0.055	0.042	0.039	0.037	0.037	0.036	0.036
3.5	0.023	0.051	0.046	0.045	0.031	0.022	0.021	0.021	0.021	0.024	0.022
3.7	0.014	0.044	0.037	0.042	0.028	0.011	0.011	0.011	0.011	0.013	0.009
3.9	0.031	0.045	0.047	0.051	0.035	0.024	0.023	0.022	0.021	0.022	0.017
4.1	0.024	0.044	0.040	0.039	0.024	0.022	0.021	0.020	0.018	0.022	0.016
4.3	0.021	0.045	0.052	0.043	0.033	0.024	0.024	0.023	0.021	0.024	0.019
4.5	0.021	0.059	0.064	0.054	0.033	0.023	0.022	0.020	0.017	0.028	0.016
4.7	0.029	0.057	0.054	0.051	0.029	0.021	0.019	0.016	0.015	0.026	0.012
4.9	0.037	0.063	0.055	0.053	0.033	0.025	0.026	0.020	0.018	0.027	0.013
5.1	0.042	0.078	0.065	0.060	0.037	0.033	0.029	0.027	0.025	0.037	0.019
5.3	0.032	0.059	0.049	0.047	0.029	0.024	0.020	0.024	0.019	0.033	0.015
5.5	0.022	0.051	0.042	0.042	0.019	0.017	0.014	0.017	0.014	0.038	0.011
5.7	0.010	0.051	0.037	0.033	0.020	0.009	0.010	0.011	0.022	0.042	0.015
5.9	0.012	0.030	0.025	0.022	0.016	0.009	0.011	0.012	0.015	0.036	0.016
6.1	0.013	0.026	0.024	0.018	0.014	0.011	0.012	0.013	0.013	0.040	0.016
6.3	0.016	0.021	0.018	0.015	0.016	0.014	0.014	0.015	0.015	0.029	0.017
6.5	0.013	0.014	0.014	0.012	0.012	0.013	0.013	0.014	0.014	0.024	0.015
6.7	0.010	0.013	0.014	0.011	0.012	0.012	0.012	0.012	0.012	0.023	0.015
6.9	0.007	0.011	0.012	0.009	0.012	0.010	0.010	0.010	0.010	0.016	0.011
7.1	0.006	0.009	0.011	0.009	0.009	0.009	0.008	0.009	0.009	0.014	0.009
7.3	0.006	0.008	0.009	0.008	0.010	0.010	0.009	0.010	0.009	0.015	0.009
7.5	0.006	0.007	0.008	0.007	0.008	0.007	0.007	0.007	0.006	0.010	0.006
7.7	0.009	0.007	0.008	0.008	0.008	0.008	0.008	0.008	0.007	0.012	0.007
7.9	0.011	0.009	0.009	0.009	0.010	0.009	0.009	0.009	0.008	0.012	0.008
8.1	0.012	0.009	0.009	0.008	0.010	0.010	0.009	0.009	0.008	0.011	0.008
8.3	0.012	0.009	0.010	0.008	0.009	0.009	0.008	0.008	0.007	0.010	0.007
8.5	0.010	0.009	0.009	0.008	0.008	0.007	0.007	0.007	0.006	0.009	0.006
8.7	0.007	0.007	0.008	0.007	0.008	0.006	0.006	0.006	0.006	0.008	0.006
8.9	0.007	0.006	0.008	0.007	0.007	0.006	0.006	0.007	0.006	0.009	0.006

Remark: The maximal value of three phases is selected.

Beachtung: Die maximalwerte der drei Phasen werden gewählt.

E.5 Test report “Utility interactive” for power generation units with an input current > 75A (VDE-AR-N 4105:2018-11)
E.5 Prüfbericht „Netzrückwirkungen“ für Erzeugungseinheiten mit einem Eingangsstrom > 75 A

Extract from test report for unit certificate

"Determination of electrical properties"

Auszug aus dem Prüfbericht für Gerätezertifikat

"Bestimmung elektrischer Eigenschaften"

Report No.: 6069439.50

Bericht Nr.:

Harmonics / Oberschwingungen:

Model / Modell: X3-12.0P-T-D

Tested according to DIN VDE V 0124-100 clause 5.2.4 / geprüft nach DIN VDE V 0124-100 Punkt 5.2.4

Active power Wirkleistung P/P _n [%]	0	10	20	30	40	50	60	70	80	90	100
Harmonic order Ordnungszahl	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]
2	0.009	0.007	0.016	0.031	0.026	0.028	0.033	0.039	0.041	0.049	0.065
3	0.043	0.058	0.059	0.072	0.093	0.117	0.110	0.104	0.111	0.105	0.098
4	0.002	0.005	0.007	0.011	0.007	0.004	0.004	0.005	0.006	0.007	0.005
5	0.052	0.014	0.131	0.229	0.281	0.335	0.360	0.382	0.456	0.469	0.480
6	0.004	0.003	0.005	0.011	0.008	0.006	0.012	0.031	0.026	0.057	0.010
7	0.040	0.064	0.086	0.136	0.197	0.255	0.277	0.296	0.355	0.371	0.384
8	0.003	0.004	0.006	0.008	0.007	0.005	0.012	0.031	0.027	0.060	0.008
9	0.018	0.049	0.051	0.053	0.044	0.017	0.020	0.020	0.022	0.027	0.022
10	0.001	0.004	0.003	0.006	0.004	0.002	0.002	0.003	0.003	0.003	0.005
11	0.028	0.045	0.055	0.049	0.107	0.086	0.100	0.105	0.113	0.104	0.114
12	0.002	0.005	0.006	0.007	0.005	0.003	0.003	0.003	0.004	0.005	0.005
13	0.074	0.062	0.065	0.107	0.104	0.141	0.162	0.186	0.215	0.231	0.242
14	0.002	0.004	0.004	0.005	0.005	0.003	0.003	0.004	0.004	0.006	0.005
15	0.023	0.009	0.025	0.022	0.030	0.033	0.034	0.034	0.031	0.035	0.036
16	0.002	0.003	0.004	0.005	0.004	0.002	0.002	0.003	0.003	0.005	0.004
17	0.013	0.030	0.053	0.045	0.054	0.036	0.041	0.041	0.042	0.034	0.041
18	0.001	0.003	0.005	0.004	0.004	0.003	0.002	0.003	0.003	0.006	0.004
19	0.036	0.041	0.034	0.033	0.025	0.029	0.042	0.055	0.061	0.062	0.076
20	0.002	0.004	0.005	0.006	0.004	0.002	0.003	0.003	0.003	0.005	0.004
21	0.029	0.029	0.035	0.031	0.027	0.032	0.033	0.036	0.040	0.037	0.044
22	0.003	0.005	0.008	0.007	0.005	0.003	0.003	0.004	0.004	0.005	0.005
23	0.042	0.032	0.074	0.089	0.074	0.041	0.048	0.060	0.056	0.054	0.077
24	0.005	0.005	0.006	0.006	0.006	0.004	0.005	0.005	0.006	0.007	0.009
25	0.026	0.031	0.054	0.068	0.050	0.030	0.034	0.036	0.045	0.076	0.046
26	0.004	0.008	0.005	0.007	0.006	0.004	0.004	0.005	0.005	0.009	0.005
27	0.034	0.036	0.031	0.033	0.036	0.041	0.043	0.046	0.042	0.046	0.052
28	0.007	0.008	0.007	0.006	0.006	0.006	0.006	0.007	0.007	0.013	0.009
29	0.041	0.053	0.058	0.084	0.069	0.044	0.046	0.046	0.044	0.067	0.051
30	0.007	0.008	0.007	0.007	0.008	0.007	0.008	0.009	0.009	0.014	0.011
31	0.041	0.062	0.032	0.067	0.055	0.035	0.041	0.043	0.040	0.061	0.063
32	0.006	0.007	0.008	0.008	0.009	0.006	0.007	0.008	0.007	0.011	0.009
33	0.052	0.040	0.045	0.046	0.045	0.052	0.060	0.065	0.062	0.057	0.077
34	0.008	0.009	0.010	0.009	0.010	0.008	0.009	0.010	0.009	0.012	0.011
35	0.045	0.053	0.091	0.091	0.083	0.049	0.058	0.065	0.061	0.071	0.083
36	0.010	0.008	0.012	0.011	0.011	0.010	0.012	0.012	0.011	0.017	0.014
37	0.038	0.063	0.058	0.073	0.071	0.037	0.041	0.043	0.043	0.069	0.052
38	0.011	0.008	0.013	0.013	0.011	0.011	0.013	0.014	0.013	0.021	0.016
39	0.055	0.054	0.049	0.050	0.053	0.056	0.063	0.068	0.062	0.076	0.074
40	0.011	0.009	0.013	0.013	0.012	0.010	0.012	0.014	0.013	0.024	0.016

Remark: The maximal value of three phases is selected.

Beachtung: Die maximalwerte der drei Phasen werden gewählt.

E.5 Test report "Utility interactive" for power generation units with an input current > 75A (VDE-AR-N 4105:2018-11)
E.5 Prüfbericht „Netzurückwirkungen“ für Erzeugungseinheiten mit einem Eingangsstrom > 75 A

Extract from test report for unit certificate

"Determination of electrical properties"

Auszug aus dem Prüfbericht für Gerätezertifikat

"Bestimmung elektrischer Eigenschaften"

Report No.: 6069439.50

Bericht Nr.:

Interharmonics / Zwischenharmonische:

Model / Modell: X3-12.0P-T-D

Tested according to DIN VDE V 0124-100 clause 5.2.4 / geprüft nach DIN VDE V 0124-100 Punkt 5.2.4

Active power Wirkleistung P/P _n [%]	0	10	20	30	40	50	60	70	80	90	100
Frequency Frequenz [Hz]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]
75	0.023	0.022	0.055	0.147	0.066	0.033	0.040	0.053	0.048	0.063	0.072
125	0.007	0.007	0.015	0.032	0.018	0.009	0.010	0.013	0.011	0.015	0.018
175	0.004	0.009	0.012	0.027	0.011	0.006	0.007	0.008	0.007	0.010	0.012
225	0.003	0.005	0.014	0.030	0.012	0.006	0.007	0.008	0.008	0.011	0.012
275	0.003	0.004	0.012	0.035	0.015	0.006	0.007	0.009	0.010	0.013	0.016
325	0.002	0.004	0.009	0.026	0.014	0.006	0.007	0.011	0.010	0.019	0.117
375	0.002	0.005	0.008	0.020	0.011	0.005	0.006	0.010	0.009	0.016	0.060
425	0.002	0.004	0.006	0.011	0.006	0.003	0.005	0.009	0.010	0.016	0.125
475	0.002	0.006	0.006	0.012	0.006	0.003	0.004	0.004	0.005	0.005	0.017
525	0.002	0.003	0.007	0.018	0.010	0.004	0.005	0.006	0.005	0.006	0.007
575	0.002	0.004	0.009	0.019	0.010	0.004	0.005	0.005	0.005	0.006	0.009
625	0.002	0.005	0.007	0.013	0.011	0.004	0.006	0.006	0.006	0.007	0.009
675	0.002	0.004	0.007	0.012	0.009	0.004	0.005	0.006	0.006	0.006	0.010
725	0.002	0.004	0.007	0.009	0.005	0.003	0.003	0.004	0.004	0.004	0.008
775	0.002	0.005	0.008	0.011	0.006	0.003	0.003	0.004	0.004	0.004	0.010
825	0.003	0.004	0.007	0.008	0.010	0.006	0.005	0.006	0.005	0.006	0.008
875	0.002	0.004	0.007	0.008	0.009	0.004	0.004	0.004	0.004	0.005	0.007
925	0.003	0.005	0.007	0.009	0.009	0.005	0.005	0.005	0.005	0.006	0.008
975	0.002	0.004	0.006	0.006	0.007	0.004	0.005	0.005	0.005	0.005	0.007
1025	0.003	0.004	0.007	0.008	0.005	0.004	0.005	0.004	0.004	0.004	0.007
1075	0.003	0.006	0.011	0.010	0.006	0.004	0.005	0.004	0.005	0.004	0.006
1125	0.007	0.008	0.010	0.011	0.010	0.009	0.010	0.011	0.010	0.011	0.012
1175	0.003	0.006	0.007	0.008	0.006	0.004	0.004	0.005	0.005	0.005	0.006
1225	0.004	0.005	0.008	0.010	0.010	0.006	0.007	0.008	0.008	0.007	0.008
1275	0.003	0.005	0.006	0.007	0.008	0.004	0.004	0.005	0.006	0.005	0.006
1325	0.004	0.005	0.008	0.010	0.007	0.006	0.006	0.006	0.008	0.005	0.008
1375	0.004	0.009	0.013	0.013	0.007	0.006	0.006	0.006	0.007	0.007	0.008
1425	0.004	0.006	0.010	0.010	0.011	0.008	0.008	0.008	0.008	0.009	0.009
1475	0.004	0.008	0.010	0.010	0.009	0.006	0.006	0.006	0.006	0.008	0.010
1525	0.005	0.006	0.009	0.011	0.012	0.007	0.007	0.007	0.006	0.009	0.009
1575	0.005	0.006	0.007	0.009	0.012	0.006	0.006	0.007	0.008	0.007	0.010
1625	0.006	0.006	0.008	0.012	0.008	0.009	0.008	0.008	0.009	0.008	0.012
1675	0.006	0.012	0.014	0.015	0.009	0.009	0.008	0.009	0.011	0.008	0.012
1725	0.006	0.008	0.011	0.011	0.014	0.009	0.008	0.009	0.009	0.007	0.011
1775	0.006	0.010	0.014	0.013	0.014	0.009	0.009	0.009	0.010	0.009	0.013
1825	0.007	0.008	0.012	0.013	0.015	0.008	0.009	0.009	0.008	0.008	0.012
1875	0.007	0.008	0.009	0.010	0.014	0.008	0.008	0.010	0.010	0.009	0.012
1925	0.010	0.009	0.012	0.013	0.011	0.013	0.012	0.011	0.012	0.010	0.016
1975	0.009	0.017	0.020	0.017	0.013	0.012	0.010	0.012	0.014	0.011	0.015

Remark: The maximal value of three phases is selected.

Beachtung: Die maximalwerte der drei Phasen werden gewählt.

E.5 Test report "Utility interactive" for power generation units with an input current > 75A (VDE-AR-N 4105:2018-11)
E.5 Prüfbericht „Netzrückwirkungen“ für Erzeugungseinheiten mit einem Eingangsstrom > 75 A

Extract from test report for unit certificate

"Determination of electrical properties"

Auszug aus dem Prüfbericht für Gerätezertifikat

"Bestimmung elektrischer Eigenschaften"

Report No.: 6069439.50

Bericht Nr.:

Higher Frequencies / Höhere Frequenzen:

Model / Modell: X3-12.0P-T-D

Tested according to DIN VDE V 0124-100 clause 5.2.4 / geprüft nach DIN VDE V 0124-100 Punkt 5.2.4

Active power Wirkleistung P/P _n [%]	0	10	20	30	40	50	60	70	80	90	100
Frequency Frequenz [kHz]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]
2.1	0.059	0.088	0.094	0.135	0.115	0.059	0.069	0.077	0.070	0.104	0.094
2.3	0.079	0.101	0.111	0.105	0.092	0.074	0.074	0.084	0.078	0.113	0.098
2.5	0.051	0.087	0.079	0.104	0.093	0.052	0.056	0.059	0.058	0.083	0.071
2.7	0.047	0.104	0.101	0.098	0.085	0.043	0.043	0.047	0.046	0.068	0.055
2.9	0.028	0.065	0.061	0.068	0.044	0.028	0.031	0.034	0.035	0.044	0.044
3.1	0.046	0.053	0.052	0.055	0.048	0.044	0.040	0.039	0.040	0.044	0.041
3.3	0.028	0.062	0.062	0.064	0.040	0.023	0.022	0.022	0.022	0.027	0.022
3.5	0.050	0.056	0.061	0.053	0.045	0.039	0.035	0.032	0.032	0.030	0.027
3.7	0.027	0.049	0.048	0.047	0.037	0.025	0.025	0.023	0.022	0.025	0.021
3.9	0.033	0.056	0.055	0.054	0.040	0.030	0.028	0.025	0.024	0.025	0.019
4.1	0.022	0.057	0.059	0.051	0.028	0.022	0.021	0.019	0.017	0.022	0.015
4.3	0.019	0.045	0.043	0.046	0.028	0.018	0.017	0.015	0.013	0.016	0.011
4.5	0.020	0.062	0.066	0.058	0.032	0.017	0.016	0.015	0.013	0.020	0.012
4.7	0.022	0.055	0.056	0.046	0.021	0.017	0.015	0.013	0.012	0.019	0.010
4.9	0.025	0.049	0.051	0.047	0.025	0.015	0.017	0.012	0.012	0.016	0.009
5.1	0.028	0.062	0.057	0.049	0.024	0.019	0.018	0.017	0.016	0.024	0.012
5.3	0.027	0.049	0.046	0.040	0.023	0.022	0.022	0.023	0.020	0.025	0.018
5.5	0.027	0.048	0.045	0.042	0.023	0.023	0.021	0.024	0.021	0.035	0.020
5.7	0.025	0.045	0.037	0.033	0.024	0.023	0.021	0.021	0.027	0.041	0.023
5.9	0.022	0.031	0.027	0.026	0.023	0.024	0.022	0.023	0.025	0.038	0.024
6.1	0.015	0.026	0.022	0.021	0.017	0.016	0.016	0.017	0.017	0.038	0.019
6.3	0.012	0.021	0.018	0.016	0.017	0.014	0.014	0.015	0.015	0.026	0.016
6.5	0.009	0.014	0.014	0.013	0.012	0.009	0.009	0.010	0.010	0.019	0.011
6.7	0.008	0.013	0.012	0.012	0.011	0.008	0.009	0.009	0.009	0.018	0.012
6.9	0.008	0.011	0.011	0.010	0.011	0.008	0.008	0.009	0.009	0.014	0.010
7.1	0.009	0.010	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.016	0.011
7.3	0.009	0.010	0.011	0.009	0.011	0.011	0.011	0.011	0.011	0.016	0.011
7.5	0.010	0.010	0.010	0.009	0.011	0.011	0.011	0.010	0.010	0.013	0.010
7.7	0.011	0.010	0.010	0.009	0.010	0.010	0.009	0.009	0.008	0.011	0.008
7.9	0.011	0.009	0.010	0.009	0.010	0.009	0.008	0.008	0.008	0.010	0.007
8.1	0.010	0.008	0.009	0.008	0.009	0.007	0.007	0.007	0.006	0.008	0.006
8.3	0.014	0.013	0.014	0.013	0.013	0.012	0.012	0.012	0.012	0.013	0.012
8.5	0.008	0.006	0.008	0.007	0.007	0.006	0.005	0.005	0.005	0.007	0.005
8.7	0.007	0.006	0.008	0.006	0.007	0.006	0.005	0.006	0.005	0.007	0.005
8.9	0.006	0.005	0.008	0.006	0.007	0.006	0.006	0.006	0.006	0.007	0.006

Remark: The maximal value of three phases is selected.

Beachtung: Die maximalwerte der drei Phasen werden gewählt.

E.5 Test report "Utility interactive" for power generation units with an input current > 75A (VDE-AR-N 4105:2018-11)
E.5 Prüfbericht „Netzrückwirkungen“ für Erzeugungseinheiten mit einem Eingangsstrom > 75 A

Extract from test report for unit certificate

"Determination of electrical properties"

Auszug aus dem Prüfbericht für Gerätezertifikat

"Bestimmung elektrischer Eigenschaften"

Report No.: 6069439.50

Bericht Nr.:

Harmonics / Oberschwingungen:

Model / Modell: X3-10.0P-T-D

Tested according to DIN VDE V 0124-100 clause 5.2.4 / geprüft nach DIN VDE V 0124-100 Punkt 5.2.4

Active power Wirkleistung P/P _n [%]	0	10	20	30	40	50	60	70	80	90	100
Harmonic order Ordnungszahl	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]
2	0.011	0.007	0.014	0.035	0.016	0.009	0.011	0.017	0.016	0.019	0.027
3	0.142	0.162	0.160	0.178	0.215	0.279	0.261	0.239	0.278	0.250	0.221
4	0.003	0.006	0.008	0.019	0.010	0.012	0.012	0.013	0.018	0.020	0.018
5	0.040	0.027	0.129	0.214	0.259	0.317	0.334	0.351	0.432	0.439	0.450
6	0.002	0.003	0.007	0.012	0.008	0.007	0.013	0.031	0.027	0.057	0.010
7	0.044	0.067	0.086	0.133	0.197	0.266	0.289	0.310	0.374	0.393	0.407
8	0.005	0.006	0.006	0.009	0.006	0.005	0.013	0.031	0.028	0.061	0.008
9	0.064	0.111	0.113	0.115	0.115	0.093	0.091	0.086	0.087	0.085	0.082
10	0.002	0.003	0.005	0.008	0.005	0.004	0.004	0.005	0.005	0.007	0.007
11	0.009	0.067	0.058	0.043	0.118	0.096	0.109	0.112	0.129	0.108	0.128
12	0.002	0.004	0.006	0.008	0.005	0.003	0.003	0.003	0.003	0.005	0.006
13	0.077	0.072	0.076	0.118	0.119	0.156	0.174	0.194	0.225	0.244	0.251
14	0.002	0.003	0.004	0.007	0.005	0.004	0.004	0.004	0.004	0.005	0.005
15	0.011	0.010	0.022	0.025	0.015	0.007	0.007	0.007	0.008	0.009	0.006
16	0.002	0.003	0.005	0.007	0.004	0.002	0.003	0.003	0.003	0.005	0.004
17	0.014	0.020	0.046	0.047	0.057	0.040	0.042	0.041	0.040	0.039	0.043
18	0.002	0.003	0.005	0.005	0.004	0.004	0.003	0.003	0.003	0.004	0.004
19	0.056	0.031	0.061	0.050	0.036	0.039	0.047	0.062	0.064	0.058	0.089
20	0.003	0.004	0.005	0.007	0.005	0.004	0.005	0.004	0.005	0.005	0.005
21	0.024	0.016	0.023	0.018	0.027	0.036	0.036	0.035	0.040	0.033	0.038
22	0.003	0.005	0.009	0.010	0.006	0.003	0.004	0.005	0.004	0.006	0.007
23	0.050	0.043	0.073	0.095	0.086	0.063	0.075	0.092	0.091	0.081	0.117
24	0.005	0.005	0.006	0.006	0.006	0.004	0.004	0.006	0.006	0.008	0.009
25	0.065	0.063	0.061	0.082	0.078	0.078	0.084	0.090	0.094	0.110	0.106
26	0.005	0.008	0.006	0.010	0.007	0.006	0.006	0.008	0.008	0.010	0.009
27	0.024	0.027	0.025	0.024	0.027	0.029	0.030	0.031	0.029	0.028	0.036
28	0.008	0.011	0.007	0.010	0.008	0.008	0.009	0.009	0.009	0.015	0.012
29	0.039	0.062	0.049	0.064	0.064	0.046	0.047	0.053	0.047	0.062	0.057
30	0.006	0.008	0.007	0.007	0.008	0.008	0.008	0.009	0.009	0.010	0.010
31	0.063	0.083	0.057	0.064	0.078	0.067	0.077	0.084	0.076	0.078	0.102
32	0.007	0.010	0.008	0.009	0.009	0.008	0.008	0.009	0.009	0.012	0.010
33	0.026	0.027	0.033	0.026	0.023	0.025	0.030	0.033	0.032	0.038	0.038
34	0.010	0.010	0.013	0.012	0.012	0.010	0.012	0.013	0.012	0.014	0.015
35	0.060	0.044	0.103	0.091	0.091	0.055	0.064	0.075	0.071	0.083	0.089
36	0.011	0.009	0.014	0.011	0.011	0.011	0.012	0.014	0.013	0.016	0.014
37	0.089	0.063	0.111	0.095	0.083	0.086	0.095	0.103	0.097	0.123	0.117
38	0.014	0.011	0.017	0.016	0.012	0.012	0.014	0.015	0.014	0.017	0.016
39	0.032	0.036	0.039	0.038	0.030	0.025	0.027	0.028	0.026	0.036	0.030
40	0.016	0.013	0.015	0.019	0.015	0.014	0.017	0.017	0.016	0.027	0.020

Remark: The maximal value of three phases is selected.**Beachtung: Die maximalwerte der drei Phasen werden gewählt.**

E.5 Test report "Utility interactive" for power generation units with an input current > 75A (VDE-AR-N 4105:2018-11)
E.5 Prüfbericht „Netzurückwirkungen“ für Erzeugungseinheiten mit einem Eingangsstrom > 75 A

Extract from test report for unit certificate

"Determination of electrical properties"
Auszug aus dem Prüfbericht für Gerätezertifikat
"Bestimmung elektrischer Eigenschaften"

Report No.: 6069439.50

Bericht Nr.:

Interharmonics / Zwischenharmonische:

Model / Modell: X3-10.0P-T-D

Tested according to DIN VDE V 0124-100 clause 5.2.4 / geprüft nach DIN VDE V 0124-100 Punkt 5.2.4

Active power Wirkleistung P/P _n [%]	0	10	20	30	40	50	60	70	80	90	100
Frequency Frequenz [Hz]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]
75	0.023	0.022	0.056	0.168	0.065	0.034	0.040	0.053	0.050	0.064	0.071
125	0.006	0.006	0.015	0.047	0.016	0.008	0.009	0.012	0.013	0.015	0.017
175	0.004	0.008	0.012	0.037	0.010	0.006	0.006	0.008	0.009	0.011	0.012
225	0.003	0.004	0.011	0.039	0.012	0.006	0.006	0.008	0.009	0.011	0.012
275	0.003	0.004	0.012	0.026	0.013	0.005	0.007	0.010	0.008	0.016	0.016
325	0.002	0.004	0.010	0.025	0.014	0.006	0.007	0.011	0.013	0.017	0.116
375	0.002	0.005	0.009	0.022	0.011	0.005	0.007	0.010	0.011	0.017	0.102
425	0.002	0.004	0.006	0.013	0.005	0.003	0.004	0.009	0.009	0.019	0.127
475	0.002	0.006	0.007	0.013	0.005	0.003	0.004	0.005	0.005	0.007	0.017
525	0.002	0.003	0.007	0.016	0.009	0.004	0.005	0.006	0.005	0.007	0.009
575	0.002	0.004	0.009	0.018	0.010	0.004	0.005	0.005	0.005	0.007	0.010
625	0.003	0.004	0.009	0.014	0.011	0.005	0.006	0.006	0.006	0.008	0.010
675	0.003	0.004	0.008	0.016	0.008	0.004	0.005	0.006	0.006	0.006	0.012
725	0.003	0.003	0.007	0.012	0.005	0.003	0.004	0.004	0.004	0.005	0.012
775	0.002	0.005	0.009	0.013	0.006	0.003	0.003	0.004	0.004	0.004	0.011
825	0.003	0.004	0.007	0.010	0.011	0.006	0.006	0.006	0.006	0.007	0.009
875	0.003	0.004	0.007	0.010	0.010	0.006	0.004	0.005	0.005	0.006	0.008
925	0.003	0.004	0.007	0.011	0.010	0.007	0.006	0.006	0.007	0.007	0.009
975	0.003	0.004	0.007	0.009	0.007	0.005	0.007	0.006	0.007	0.007	0.009
1025	0.003	0.004	0.007	0.009	0.005	0.004	0.006	0.005	0.005	0.005	0.006
1075	0.003	0.005	0.011	0.010	0.005	0.004	0.006	0.004	0.004	0.005	0.008
1125	0.007	0.007	0.011	0.012	0.011	0.010	0.011	0.011	0.010	0.012	0.013
1175	0.004	0.005	0.008	0.009	0.008	0.006	0.005	0.008	0.007	0.006	0.007
1225	0.006	0.005	0.009	0.011	0.011	0.009	0.008	0.010	0.011	0.009	0.011
1275	0.005	0.005	0.007	0.009	0.009	0.008	0.007	0.008	0.009	0.008	0.011
1325	0.004	0.004	0.008	0.010	0.006	0.006	0.005	0.006	0.008	0.006	0.007
1375	0.004	0.008	0.012	0.011	0.006	0.005	0.007	0.006	0.005	0.008	0.009
1425	0.005	0.006	0.009	0.009	0.012	0.009	0.010	0.009	0.009	0.011	0.012
1475	0.006	0.008	0.010	0.011	0.012	0.009	0.007	0.009	0.010	0.009	0.010
1525	0.007	0.006	0.010	0.012	0.013	0.012	0.010	0.011	0.012	0.011	0.014
1575	0.007	0.006	0.008	0.011	0.011	0.012	0.011	0.011	0.013	0.011	0.016
1625	0.006	0.006	0.008	0.010	0.007	0.008	0.007	0.008	0.008	0.008	0.010
1675	0.006	0.012	0.013	0.013	0.008	0.007	0.009	0.008	0.007	0.009	0.013
1725	0.008	0.008	0.011	0.011	0.017	0.011	0.012	0.010	0.010	0.011	0.015
1775	0.009	0.010	0.013	0.014	0.018	0.012	0.009	0.013	0.014	0.010	0.013
1825	0.013	0.008	0.013	0.015	0.016	0.017	0.013	0.015	0.017	0.012	0.019
1875	0.013	0.009	0.011	0.014	0.016	0.016	0.015	0.015	0.017	0.015	0.021
1925	0.010	0.009	0.012	0.013	0.011	0.011	0.010	0.012	0.011	0.011	0.012
1975	0.010	0.016	0.020	0.016	0.012	0.011	0.013	0.011	0.009	0.013	0.016

Remark: The maximal value of three phases is selected.
Beachtung: Die maximalwerte der drei Phasen werden gewählt.

E.5 Test report “Utility interactive” for power generation units with an input current > 75A (VDE-AR-N 4105:2018-11)
E.5 Prüfbericht „Netzurückwirkungen“ für Erzeugungseinheiten mit einem Eingangsstrom > 75 A

Extract from test report for unit certificate

"Determination of electrical properties"

Auszug aus dem Prüfbericht für Gerätezertifikat

"Bestimmung elektrischer Eigenschaften"

Report No.: 6069439.50

Bericht Nr.:

Higher Frequencies / Höhere Frequenzen:

Model / Modell: X3-10.0P-T-D

Tested according to DIN VDE V 0124-100 clause 5.2.4 / geprüft nach DIN VDE V 0124-100 Punkt 5.2.4

Active power Wirkleistung P/P _n [%]	0	10	20	30	40	50	60	70	80	90	100
Frequency Frequenz [kHz]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]
2.1	0.123	0.114	0.100	0.149	0.150	0.121	0.129	0.142	0.133	0.135	0.164
2.3	0.127	0.128	0.130	0.143	0.117	0.085	0.085	0.094	0.090	0.132	0.111
2.5	0.132	0.148	0.139	0.124	0.105	0.103	0.112	0.119	0.115	0.134	0.137
2.7	0.165	0.219	0.228	0.210	0.201	0.151	0.143	0.151	0.148	0.160	0.170
2.9	0.070	0.093	0.083	0.099	0.074	0.058	0.056	0.058	0.060	0.072	0.070
3.1	0.053	0.077	0.078	0.090	0.066	0.048	0.048	0.050	0.052	0.058	0.062
3.3	0.062	0.072	0.069	0.078	0.069	0.048	0.043	0.039	0.039	0.043	0.034
3.5	0.046	0.055	0.065	0.054	0.039	0.033	0.030	0.027	0.027	0.031	0.025
3.7	0.044	0.053	0.059	0.053	0.043	0.037	0.033	0.031	0.031	0.030	0.028
3.9	0.048	0.064	0.059	0.064	0.050	0.040	0.036	0.032	0.031	0.032	0.026
4.1	0.027	0.053	0.058	0.050	0.029	0.024	0.022	0.020	0.019	0.025	0.016
4.3	0.028	0.053	0.061	0.052	0.037	0.029	0.028	0.025	0.023	0.025	0.019
4.5	0.033	0.069	0.076	0.064	0.038	0.025	0.024	0.022	0.020	0.028	0.018
4.7	0.042	0.071	0.069	0.061	0.034	0.028	0.024	0.022	0.021	0.031	0.016
4.9	0.059	0.073	0.065	0.063	0.043	0.035	0.031	0.025	0.023	0.026	0.015
5.1	0.068	0.084	0.073	0.067	0.047	0.048	0.041	0.037	0.035	0.038	0.023
5.3	0.058	0.064	0.048	0.057	0.039	0.044	0.038	0.036	0.034	0.037	0.025
5.5	0.046	0.054	0.035	0.050	0.030	0.037	0.031	0.030	0.029	0.029	0.022
5.7	0.032	0.045	0.027	0.038	0.024	0.026	0.020	0.020	0.021	0.025	0.016
5.9	0.025	0.033	0.020	0.027	0.020	0.022	0.017	0.018	0.019	0.022	0.016
6.1	0.022	0.027	0.019	0.022	0.018	0.018	0.017	0.017	0.017	0.022	0.018
6.3	0.023	0.022	0.023	0.019	0.022	0.021	0.020	0.021	0.021	0.025	0.021
6.5	0.023	0.021	0.021	0.019	0.021	0.021	0.021	0.021	0.021	0.025	0.022
6.7	0.023	0.021	0.023	0.021	0.023	0.023	0.023	0.024	0.023	0.027	0.024
6.9	0.021	0.020	0.023	0.020	0.022	0.021	0.022	0.022	0.021	0.025	0.022
7.1	0.021	0.020	0.023	0.020	0.023	0.023	0.023	0.023	0.022	0.025	0.022
7.3	0.020	0.019	0.022	0.020	0.021	0.020	0.021	0.021	0.020	0.022	0.019
7.5	0.021	0.020	0.022	0.021	0.021	0.021	0.021	0.021	0.020	0.022	0.019
7.7	0.022	0.021	0.022	0.022	0.021	0.020	0.020	0.020	0.019	0.020	0.018
7.9	0.021	0.023	0.023	0.022	0.020	0.019	0.019	0.020	0.019	0.018	0.018
8.1	0.019	0.023	0.022	0.021	0.018	0.017	0.017	0.018	0.019	0.016	0.018
8.3	0.014	0.022	0.020	0.019	0.015	0.015	0.015	0.016	0.017	0.014	0.017
8.5	0.009	0.020	0.018	0.018	0.012	0.011	0.011	0.013	0.015	0.012	0.015
8.7	0.007	0.018	0.017	0.016	0.010	0.009	0.009	0.011	0.012	0.010	0.013
8.9	0.011	0.015	0.016	0.014	0.011	0.009	0.009	0.010	0.010	0.010	0.011

Remark: The maximal value of three phases is selected.

Beachtung: Die maximalwerte der drei Phasen werden gewählt.

E.5 Test report "Utility interactive" for power generation units with an input current > 75A (VDE-AR-N 4105:2018-11)
E.5 Prüfbericht „Netzrückwirkungen“ für Erzeugungseinheiten mit einem Eingangsstrom > 75 A

Extract from test report for unit certificate
 "Determination of electrical properties"
 Auszug aus dem Prüfbericht für Gerätezertifikat
 "Bestimmung elektrischer Eigenschaften"

Report No.: 6069439.50
 Bericht Nr.:

Harmonics / Oberschwingungen:

Model / Modell: X3-8.0P-T-D

Tested according to DIN VDE V 0124-100 clause 5.2.4 / geprüft nach DIN VDE V 0124-100 Punkt 5.2.4

Active power Wirkleistung P/P _n [%]	0	10	20	30	40	50	60	70	80	90	100
Harmonic order Ordnungszahl	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]
2	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.172	0.172	0.259
3	0.776	0.776	0.948	0.948	0.948	0.948	0.948	0.948	0.862	0.862	0.776
4	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
5	0.517	0.345	0.690	1.121	1.293	1.466	1.552	1.552	1.638	1.724	1.724
6	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
7	0.259	0.431	0.259	0.517	0.690	0.862	0.948	1.034	1.034	1.121	1.207
8	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
9	0.259	0.259	0.431	0.345	0.345	0.345	0.345	0.431	0.431	0.431	0.431
10	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
11	0.086	0.086	0.086	0.086	0.172	0.259	0.345	0.431	0.431	0.517	0.603
12	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
13	0.086	0.086	0.086	0.086	0.086	0.172	0.172	0.259	0.259	0.345	0.345
14	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
15	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
16	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
17	0.086	0.086	0.086	0.086	0.086	0.086	0.172	0.172	0.172	0.172	0.172
18	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
19	0.086	0.086	0.086	0.086	0.086	0.086	0.172	0.172	0.172	0.259	0.172
20	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
21	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
22	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
23	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.172	0.172	0.172
24	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
25	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.172	0.172
26	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
27	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
28	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
29	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.172
30	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
31	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
32	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
33	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
34	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
35	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
36	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
37	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
38	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
39	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
40	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086

Remark: The maximal value of three phases is selected.

Beachtung: Die maximalwerte der drei Phasen werden gewählt.

E.5 Test report “Utility interactive” for power generation units with an input current > 75A (VDE-AR-N 4105:2018-11)
E.5 Prüfbericht „Netzurückwirkungen“ für Erzeugungseinheiten mit einem Eingangsstrom > 75 A

Extract from test report for unit certificate "Determination of electrical properties" <i>Auszug aus dem Prüfbericht für Gerätezertifikat</i> <i>"Bestimmung elektrischer Eigenschaften"</i>	Report No.: 6069439.50 Bericht Nr.:
--	--

Interharmonics / Zwischenharmonische:
 Model / Modell: X3-8.0P-T-D
 Tested according to DIN VDE V 0124-100 clause 5.2.4 / geprüft nach DIN VDE V 0124-100 Punkt 5.2.4

Active power <i>Wirkleistung</i> P/P _n [%]	0	10	20	30	40	50	60	70	80	90	100
Frequency <i>Frequenz</i> [Hz]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]
75	0.010	0.040	0.080	0.100	0.140	0.170	0.220	0.250	0.300	0.330	0.380
125	0.010	0.040	0.020	0.020	0.030	0.040	0.050	0.060	0.070	0.070	0.090
175	0.010	0.010	0.010	0.020	0.020	0.030	0.040	0.040	0.040	0.040	0.060
225	0.010	0.010	0.020	0.020	0.020	0.030	0.040	0.030	0.040	0.040	0.060
275	0.010	0.020	0.010	0.020	0.030	0.030	0.030	0.030	0.030	0.040	0.030
325	0.010	0.010	0.020	0.020	0.020	0.020	0.030	0.030	0.030	0.030	0.040
375	0.010	0.020	0.010	0.010	0.020	0.020	0.020	0.030	0.030	0.030	0.030
425	0.010	0.010	0.010	0.010	0.020	0.020	0.020	0.020	0.030	0.020	0.030
475	0.010	0.010	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
525	0.010	0.010	0.020	0.020	0.020	0.020	0.030	0.020	0.030	0.030	0.030
575	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.030	0.030
625	0.020	0.020	0.010	0.010	0.010	0.020	0.020	0.020	0.020	0.030	0.030
675	0.010	0.010	0.010	0.010	0.020	0.020	0.020	0.030	0.030	0.030	0.030
725	0.010	0.010	0.010	0.010	0.020	0.020	0.020	0.020	0.030	0.030	0.030
775	0.010	0.010	0.020	0.020	0.020	0.020	0.020	0.020	0.030	0.020	0.020
825	0.010	0.010	0.010	0.020	0.020	0.020	0.020	0.020	0.030	0.030	0.030
875	0.020	0.010	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.030	0.030
925	0.010	0.010	0.010	0.020	0.020	0.020	0.020	0.020	0.020	0.030	0.030
975	0.010	0.010	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.030	0.030
1025	0.010	0.010	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
1075	0.010	0.010	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
1125	0.020	0.010	0.020	0.020	0.020	0.020	0.020	0.030	0.030	0.030	0.030
1175	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.030	0.030	0.030
1225	0.020	0.010	0.020	0.020	0.020	0.030	0.030	0.030	0.040	0.040	0.040
1275	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.030	0.030	0.030	0.030
1325	0.020	0.020	0.030	0.030	0.030	0.030	0.030	0.040	0.040	0.040	0.040
1375	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.030	0.030	0.030
1425	0.030	0.020	0.030	0.030	0.030	0.030	0.030	0.030	0.040	0.040	0.040
1475	0.020	0.030	0.020	0.020	0.020	0.020	0.030	0.030	0.030	0.040	0.050
1525	0.030	0.020	0.030	0.030	0.030	0.030	0.040	0.040	0.050	0.040	0.040
1575	0.020	0.020	0.020	0.020	0.020	0.020	0.030	0.030	0.030	0.040	0.060
1625	0.030	0.020	0.030	0.030	0.040	0.040	0.040	0.050	0.050	0.040	0.040
1675	0.020	0.030	0.020	0.020	0.020	0.030	0.030	0.030	0.030	0.030	0.040
1725	0.030	0.020	0.030	0.030	0.030	0.030	0.040	0.030	0.040	0.030	0.040
1775	0.020	0.030	0.020	0.020	0.020	0.030	0.030	0.030	0.030	0.030	0.040
1825	0.020	0.020	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.040
1875	0.020	0.020	0.020	0.020	0.020	0.030	0.030	0.030	0.030	0.030	0.040
1925	0.030	0.020	0.030	0.030	0.030	0.030	0.040	0.030	0.040	0.040	0.050
1975	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.040	0.040	0.040

Remark: The maximal value of three phases is selected.
Beachtung: Die maximalwerte der drei Phasen werden gewählt.

E.5 Test report "Utility interactive" for power generation units with an input current > 75A (VDE-AR-N 4105:2018-11)
E.5 Prüfbericht „Netzurückwirkungen“ für Erzeugungseinheiten mit einem Eingangsstrom > 75 A

Extract from test report for unit certificate

"Determination of electrical properties"*Auszug aus dem Prüfbericht für Gerätezertifikat**"Bestimmung elektrischer Eigenschaften"*

Report No.: 6069439.50

Bericht Nr.:

Higher Frequencies / *Höhere Frequenzen:*Model / *Modell:* X3-8.0P-T-DTested according to DIN VDE V 0124-100 clause 5.2.4 / *geprüft nach DIN VDE V 0124-100 Punkt 5.2.4*

Active power Wirkleistung P/P _n [%]	0	10	20	30	40	50	60	70	80	90	100
Frequency Frequenz [kHz]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]
2.1	0.070	0.070	0.070	0.070	0.070	0.070	0.080	0.080	0.090	0.090	0.110
2.3	0.100	0.090	0.090	0.090	0.090	0.090	0.090	0.100	0.100	0.120	0.110
2.5	0.100	0.090	0.080	0.080	0.080	0.090	0.090	0.090	0.090	0.100	0.100
2.7	0.060	0.060	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.070	0.060
2.9	0.050	0.050	0.040	0.040	0.040	0.040	0.040	0.050	0.050	0.050	0.050
3.1	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.050
3.3	0.060	0.070	0.080	0.080	0.080	0.080	0.080	0.080	0.090	0.090	0.100
3.5	0.050	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040
3.7	0.050	0.050	0.050	0.050	0.050	0.050	0.040	0.040	0.040	0.040	0.040
3.9	0.070	0.060	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070
4.1	0.070	0.070	0.080	0.080	0.080	0.080	0.090	0.090	0.090	0.100	0.100
4.3	0.050	0.060	0.060	0.060	0.070	0.070	0.080	0.080	0.090	0.090	0.110
4.5	0.040	0.040	0.050	0.050	0.050	0.050	0.050	0.060	0.060	0.060	0.070
4.7	0.040	0.050	0.050	0.050	0.050	0.050	0.050	0.060	0.060	0.060	0.060
4.9	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
5.1	0.030	0.040	0.040	0.040	0.040	0.050	0.060	0.050	0.060	0.040	0.040
5.3	0.050	0.060	0.060	0.060	0.060	0.060	0.050	0.060	0.050	0.060	0.060
5.5	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.060	0.060
5.7	0.030	0.020	0.020	0.020	0.030	0.020	0.020	0.030	0.020	0.030	0.030
5.9	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
6.1	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
6.3	0.010	0.020	0.020	0.020	0.010	0.020	0.020	0.020	0.020	0.020	0.020
6.5	0.010	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
6.7	0.040	0.040	0.050	0.050	0.050	0.050	0.060	0.060	0.060	0.060	0.050
6.9	0.010	0.020	0.020	0.010	0.010	0.020	0.020	0.020	0.020	0.020	0.020
7.1	0.010	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
7.3	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
7.5	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
7.7	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
7.9	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
8.1	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
8.3	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
8.5	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
8.7	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
8.9	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010

Remark: The maximal value of three phases is selected.*Beachtung: Die maximalwerte der drei Phasen werden gewählt.*

E.6 Certificate for network and system protection (VDE-AR-N 4105:2018-11) E.6 Zertifikat für den Netz- und Anlagenschutz	
Manufacturer / Address: <i>Hersteller / Adresse:</i>	SolaX Power Network Technology (Zhejiang) Co., Ltd. No. 288 Shizhu Road, Tonglu Economic Development Zone, 311500, Tonglu City, Zhejiang Province, China
Type NS protection <i>Typ NA-Schutz</i>	Panasonic Relay: ALFG2PF121
Central NS protection <i>Zentraler NA-Schutz</i>	<input type="checkbox"/> --
Integrated NS protection <i>Integrierter NA-Schutz</i>	<input checked="" type="checkbox"/> Assigned to Power generation unit type: <i>Zugeordnet zu Erzeugungseinheit Typ:</i> X3-8.0P-T-N(D), X3-10.0P-T-N(D), X3-12.0P-T-N(D), X3-15.0P-T-N(D)
Network connection rule: <i>Netzanschlussregel</i>	VDE-AR-N 4105 „Erzeugungsanlagen am Niederspannungsnetz“ <i>Technische Mindestanforderungen für Anschluss und Parallelbetrieb von Erzeugungsanlagen am Niederspannungsnetz(mit Ausnahme von Klausel 5.5.2)</i>
Test requirement: <i>Prüfanforderung</i>	DIN VDE V 0124-100 (VDE V 0124-100) „Netzintegration von Erzeugungsanlagen – Niederspannung“ <i>Prüfanforderungen an Erzeugungseinheiten vorgesehen zum Anschluss und Parallelbetrieb am Niederspannungsnetz(mit Ausnahme von Klausel 5.7)</i>
Test report <i>Prüfbericht</i>	6069439.50
The network and system protection described above meets the requirements of VDE-AR-N 4105. <i>Der oben bezeichnete Netz- und Anlagenschutz erfüllt die Anforderungen der VDE-AR-N 4105.</i>	

E.7 Requirement for the NS protection test report (VDE-AR-N 4105:2018-11)

E.7 Anforderungen an den Prüfbericht zum NA-Schutz

Extract from test report for unit certificate "Determination of electrical properties" <i>Auszug aus dem Prüfbericht für Gerätezertifikat "Bestimmung elektrischer Eigenschaften"</i>			Report No.: 6069439.50 Bericht Nr.:			
Test report NS protection <i>Prüfbericht NA-Schutz</i>						
Type of NS protection: <i>Typ NA-Schutz:</i>	Integrated NS protection <i>Integrierter NA-Schutz</i>			Other manufacturer's data <i>Weitere Herstellerangaben</i>		
Software version: <i>Software version:</i>	DSP1: V1.0, DSP2: V1.0, ARM:V1.0					
Manufacturer: <i>Hersteller:</i>	SolaX Power Network Technology (Zhejiang) Co., Ltd.					
Measuring period: <i>Messzeitraum:</i>	From yyyy-mm-dd to yyyy-mm-dd <i>vom JJJJ-MM-TT bis JJJJ-MM-TT</i>			From 2019-12-26 to 2020-04-01 <i>Vom 2019-12-26 bis 2020-04-01</i>		
	Stirling engines, fuel cell systems <i>Stirlinggeneratoren, Brennstoffzellen</i>			Inverter <i>Umrichter</i>		
	Direct or by converter coupled synchronous- and asynchronous generators with $P_n \leq 50$ kW <i>direkt oder über Umrichter gekoppelte Synchron- und Asynchrongeneratoren mit $P_n \leq 50$ kW</i>			Direct or coupled synchronous- and asynchronous generators with $P_n > 50$ kW <i>direkt gekoppelte Synchron- und Asynchrongeneratoren mit $P_n > 50$ kW</i>		
Protection function <i>Schutzfunktion</i>	Setting tripping value <i>Einstellwert</i>	Measured tripping value <i>Auslösewert</i>	Measured tripping time <i>Auslösezeit NA-Schutz</i>	Setting tripping value <i>Einstellwert</i>	Measured tripping value <i>Auslösewert</i>	Measured tripping time <i>Auslösezeit NA-Schutz</i>
Rise-in-voltage protection $U >>$ <i>Spannungssteigerungsschutz $U >>$</i>	$1.15 * U_n$	--	--	$1.25 * U_n$	288.9 V	182 ms
Rise-in-voltage protection $U >$ <i>Spannungssteigerungsschutz $U >$</i>	$1.1 * U_n$	--	--	$1.1 * U_n$	255.0 V	≤ 100 ms *
Voltage drop protection $U <$ <i>Spannungsrückgangsschutz $U <$</i>	$0.8 * U_n$	--	--	$0.8 * U_n$	182.6 V	3000 ms
Voltage drop protection $U <<$ <i>Spannungsrückgangsschutz $U <<$</i>	Not applicable <i>entfällt</i>			$0.45 * U_n$	102.2 V	298 ms
Frequency decrease protection $f <$ <i>Frequenzrückgangsschutz $f <$</i>	47.5 Hz	--	--	47.5 Hz	47.48 Hz	165 ms
Frequency decrease protection $f >$ <i>Frequenzsteigerungsschutz $f >$</i>	51.5 Hz	--	--	51.5 Hz	51.52 Hz	173 ms
* The rise-in voltage protection as a running 10-minute mean value, Max. disconnecting time is 511 s. <i>* Der anstiege Spannungsschutz als laufender 10-Minuten-Mittelwert, Max. Trennzeit beträgt 511 s.</i>						
The tripping time covers the period from the limit value violation U/f to the tripping signal to the interface switch. <i>Die Auslösezeit umfasst den Zeitraum von der Grenzwertverletzung U/f bis zum Auslösesignal an den Kuppelschalter.</i>						
When planning the power generation system, the inherent time of the interface switch must be added to the highest time value determined above. <i>Bei der Planung der Erzeugungsanlage ist die Eigenzeit des Kuppelschalters zum höchsten oben ermittelten Zeitwert zu addieren.</i>						
The switch-off time (total of the tripping time NS protection plus the inherent time of the interface switch) must not exceed 200 ms. <i>Die Abschaltzeit (Summe der Auslösezeit NA-Schutz zzgl. Eigenzeit des Kuppelschalters) darf 200 ms nicht überschreiten.</i>						
<input checked="" type="checkbox"/> By integrated NS Protection <i>Bei integriertem NA-Schutz</i>						
Assigned to PGU type: <i>Typ Erzeugungseinheit:</i>	X3-8.0P-T-N(D), X3-10.0P-T-N(D), X3-12.0P-T-N(D), X3-15.0P-T-N(D)					
Integrated interface switch type: <i>Typ integrierter Kuppelschalter</i>	Panasonic Relay: ALFG2PF121					
Interface switch own time with integrated NS protection <i>Eigenzeit des Kuppelschalters bei integriertem NA-Schutz</i>	Operation time: 20 ms max; Release time: 10 ms max					
The verification of the full function chain "NS protection- Interface switch" has yield to intended disconnection <i>Die Überprüfung der Gesamtwirkungskette „integrierter NA-Schutz – Kuppelschalter“ führte zu einer erfolgreichen Abschaltung.</i>						