Konformitätserklärung für NA-Schutz

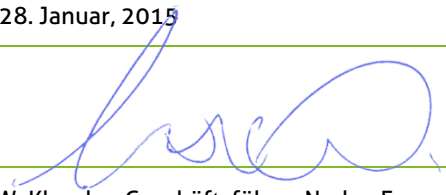
Firma	N.V. Nederlandsche Apparatenfabriek „Nedap"
Anschrift	Parallelweg 2, 7141 DC Groenlo, Niederlande

Hiermit bestätigt die Firma N.V. Nederlandsche Apparatenfabriek „Nedap", dass folgende PowerRouter Produkte:

Produktbeschreibung / Verwendungszweck	Netzwechselrichter mit optionaler Backup-Funktion; und Universelles Nachrüstgerät		
Hersteller	N.V. Nederlandsche Apparatenfabriek "Nedap"		
Marke	Nedap		
Modellnummer	PowerRouter Modelle:		
	PR30S PR30SB	PR37S PR37SB PR37SBi PR37Bi	PR50S PR50SB PR50SBi PR50Bi

Die für Wechselrichter geltenden Vorgaben der Netzanschlussregel VDE-AR-N 4105:2011-08 „Erzeugungsanlagen am Niederspannungsnetz – Technische Mindestanforderungen für Anschluss und Parallelbetrieb von Erzeugungsanlagen am Niederspannungsnetz" zu erfüllen.

Der integrierte Netz- und Anlagenschutz (NA-Schutz), wie auch die Inselnetzerkennung, erfüllen die Anforderungen der VDE-AR-N 4105. Die Inselnetzerkennung ist mit Hilfe des Schwingkreistestes nachgewiesen worden.

Unterschrieben	Groenlo, Niederlande
Datum	28. Januar, 2015
	
Name und Funktion	W. Klunder, Geschäftsführer Nedap Energy Systems

Anhang:

- F.3 Einheiten-Zertifikat für Erzeugungseinheiten
- F.4 Einheiten-Zertifikat zum NA Schutz

VDE-AR-N 4105:2011-08 F.3

F.3 Anforderungen an den Prüfbericht für Erzeugungseinheiten.

Firma	N.V. Nederlandsche Apparatenfabriek „Nedap"
Anschrift	Parallelweg 2, 7141 DC Groenlo, Niederlande

Produktbeschreibung / Verwendungszweck	Netzwechselrichter mit optionaler Backup-Funktion; und Universelles Nachrüstgerät		
VDE-Anwendungsregel	VDE-AR-N 4105:2011-08 Erzeugungsanlagen am Niederspannungsnetz - Technische Mindestanforderungen für Anschluss und Parallelbetrieb von Erzeugungsanlagen am Niederspannungsnetz		
Modellnummer	PowerRouter Modelle:		
	PR30S PR30SB	PR37S PR37SB PR37SBi PR37Bi	PR50S PR50SB PR50SBi PR50Bi PRE-Bi
Wirkleistung PEmax	3000VA	3700VA	4600VA

Blindleistungsbezug										
Wirkleistung P/Pn(%)	10	20	30	40	50	60	70	80	90	100
Maximal möglicher cos phi (unterregt)	0.891	0.890	0.895	0.893	0.891	0.893	0.891	0.892	0.891	0.891
Maximal möglicher cos phi (überregt)	0.896	0.899	0.903	0.905	0.905	0.904	0.904	0.904	0.905	0.905

Einhaltung eines fest fortgegebenen Verschiebungsfaktor cos phi					
Vorgabe in der Anlagensteuerung	0.900 üb	0.950 üb	1.000	0.920 üb	0.900 üb
Messwert an den klemmen der EZE	0.905	0.955	1.00	0.945	0.891

Blindleistungsübergangsfünktion – standard-cos phi (P) kennlinie										
Wirkleistung P/Pn(%)	10	20	30	40	50	60	70	80	90	100
cos phi	0.954	0.986	0.993	0.995	0.994	0.985	0.975	0.966	0.955	0.947
Die standard-cos phi(P) kenlinie wird eingehalten.										

Schalthandlungen		
Einschalten ohne vorgabe (zum primärenergieträger) – 10 %	K*i*	0.88
Einschalten bei nennbedingungen (des rimärenergieträger) – 100 %	K*i*	0.88
Ausschalten bei nenleistung – 100%	K*i*	0.35
Schlechtester Wert aller schaltvorgänge	K*imax*	0.88

Flicker	
Netzimpedanzwinkel (phik)	45.8°
Anlagenflickerbeiwert (Cphi)	7

Oberschwingungen

Tabelle 8 – NEDAP PR50-S: Messung der Emission von harmonischen Strömen nach EN 61000-3-12 und VDE-AR-N 4105 Anhang F.3 (Phase L1); Oberschwingungsmessungen (Harmonics) nach EN 61000-3-12 und VDE-AR-N 4105 Anhang F.3 (Phase L1);

Pbin [%]	0	10	20	30	40	50	60	70	80	90	100
Nr./ Order	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]
2	0.09%	0.10%	0.10%	0.11%	0.11%	0.11%	0.12%	0.13%	0.14%	0.17%	0.20%
3	0.33%	0.36%	0.42%	0.40%	0.45%	0.52%	0.52%	0.57%	0.63%	0.69%	0.77%
4	0.02%	0.04%	0.03%	0.03%	0.03%	0.02%	0.04%	0.04%	0.05%	0.06%	0.09%
5	0.39%	0.41%	0.27%	0.37%	0.44%	0.47%	0.47%	0.50%	0.53%	0.56%	0.58%
6	0.03%	0.04%	0.02%	0.04%	0.03%	0.02%	0.05%	0.05%	0.05%	0.06%	0.07%
7	0.11%	0.12%	0.23%	0.18%	0.25%	0.31%	0.28%	0.30%	0.32%	0.35%	0.39%
8	0.03%	0.03%	0.02%	0.02%	0.03%	0.02%	0.04%	0.04%	0.04%	0.03%	0.03%
9	0.07%	0.03%	0.15%	0.13%	0.13%	0.17%	0.13%	0.15%	0.18%	0.21%	0.23%
10	0.03%	0.03%	0.03%	0.02%	0.02%	0.02%	0.03%	0.03%	0.03%	0.03%	0.03%
11	0.03%	0.04%	0.06%	0.12%	0.11%	0.13%	0.08%	0.09%	0.12%	0.15%	0.16%
12	0.03%	0.03%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.03%
13	0.03%	0.03%	0.03%	0.09%	0.11%	0.11%	0.06%	0.08%	0.10%	0.12%	0.12%
14	0.03%	0.02%	0.01%	0.02%	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.03%
15	0.02%	0.03%	0.03%	0.05%	0.07%	0.08%	0.05%	0.05%	0.07%	0.08%	0.08%
16	0.02%	0.02%	0.02%	0.02%	0.01%	0.01%	0.02%	0.03%	0.03%	0.02%	0.03%
17	0.03%	0.02%	0.02%	0.04%	0.06%	0.07%	0.04%	0.05%	0.06%	0.06%	0.06%
18	0.02%	0.02%	0.02%	0.01%	0.01%	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%
19	0.03%	0.01%	0.01%	0.03%	0.05%	0.06%	0.04%	0.04%	0.04%	0.04%	0.04%
20	0.02%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%	0.02%	0.01%	0.01%
21	0.03%	0.02%	0.01%	0.03%	0.03%	0.05%	0.06%	0.05%	0.04%	0.03%	0.03%
22	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%	0.01%	0.01%	0.01%	0.01%
23	0.02%	0.02%	0.02%	0.02%	0.03%	0.04%	0.05%	0.05%	0.04%	0.03%	0.04%
24	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%
25	0.02%	0.02%	0.02%	0.01%	0.02%	0.03%	0.05%	0.05%	0.04%	0.02%	0.03%
26	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%
27	0.02%	0.02%	0.02%	0.01%	0.02%	0.03%	0.04%	0.04%	0.02%	0.02%	0.02%
28	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%
29	0.02%	0.02%	0.02%	0.01%	0.02%	0.02%	0.04%	0.03%	0.01%	0.02%	0.02%
30	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
31	0.02%	0.02%	0.02%	0.01%	0.01%	0.02%	0.02%	0.02%	0.01%	0.02%	0.02%
32	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
33	0.02%	0.02%	0.02%	0.01%	0.01%	0.02%	0.02%	0.01%	0.02%	0.03%	0.03%
34	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
35	0.02%	0.02%	0.02%	0.01%	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
36	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
37	0.02%	0.02%	0.02%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%	0.02%	0.02%
38	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
39	0.02%	0.02%	0.02%	0.01%	0.01%	0.01%	0.01%	0.02%	0.01%	0.01%	0.01%
40	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
THC(%)	0.55%	0.58%	0.60%	0.63%	0.74%	0.83%	0.79%	0.87%	0.93%	1.07%	1.10%

Zwischenharmonische

Tabelle 9 – NEDAP PR50-S: Messung der Emission von zwischenharmonischen Strömen nach VDE-AR-N 4105 Anhang F.3 (Phase L1); Zwischenharmonische im Normalbetrieb (Interharmonics) VDE-AR-N 4105 Anhang F.3 (Phase L1);

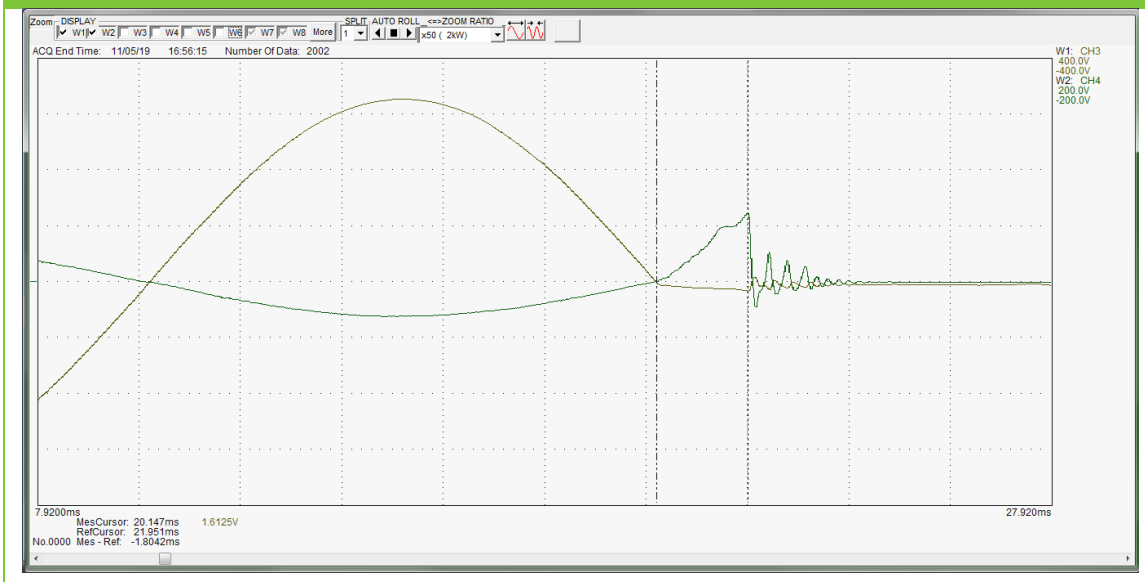
Pbin (%)	0	10	20	30	40	50	60	70	80	90	100
f 50Hz (Hz)	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]
75	0.56%	0.57%	0.55%	0.53%	0.54%	0.53%	0.54%	0.58%	0.58%	0.56%	1.12%
125	0.11%	0.12%	0.10%	0.10%	0.10%	0.10%	0.12%	0.12%	0.12%	0.12%	0.22%
175	0.09%	0.07%	0.08%	0.07%	0.07%	0.07%	0.08%	0.08%	0.08%	0.08%	0.14%
225	0.05%	0.04%	0.04%	0.04%	0.04%	0.04%	0.05%	0.05%	0.05%	0.05%	0.08%
275	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.07%
325	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.05%
375	0.04%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.05%
425	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.02%	0.04%
475	0.03%	0.02%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.04%
525	0.02%	0.02%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%
575	0.03%	0.02%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%
625	0.02%	0.02%	0.03%	0.03%	0.03%	0.03%	0.02%	0.02%	0.03%	0.03%	0.03%
675	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.03%
725	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.03%
775	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
825	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
875	0.01%	0.02%	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
925	0.01%	0.01%	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
975	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
1025	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
1075	0.01%	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
1125	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
1175	0.01%	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
1225	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
1275	0.01%	0.01%	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
1325	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
1375	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%
1425	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%
1475	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%
1525	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%
1575	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%
1625	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%
1675	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%
1725	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%
1775	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
1825	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%
1875	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%	0.02%	0.02%
1925	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
1975	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%

Höhere Frequenzen

Tabelle 10 – NEDAP PR50-S: Messung der Emission von höher frequenten Strömen nach VDE-AR-N 4105 Anhang F.3 (Phase L1); Höhere Frequenzen im Normalbetrieb (Higher frequencies components) nach VDE-AR-N 4105 Anhang F.3 (Phase L1);

Pbin (%)	0	10	20	30	40	50	60	70	80	90	100
f (kHz)	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]	Ih/In [%]
2.1	0.07%	0.08%	0.06%	0.07%	0.07%	0.07%	0.08%	0.08%	0.08%	0.08%	0.13%
2.3	0.03%	0.03%	0.03%	0.02%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.05%
2.5	0.33%	0.36%	0.42%	0.40%	0.45%	0.52%	0.52%	0.57%	0.62%	0.69%	0.76%
2.7	0.06%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.06%	0.05%	0.10%
2.9	0.06%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.09%
3.1	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.03%
3.3	0.02%	0.04%	0.03%	0.03%	0.02%	0.02%	0.04%	0.04%	0.04%	0.06%	0.08%
3.5	0.03%	0.03%	0.03%	0.02%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.05%
3.7	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.04%	0.04%	0.04%	0.04%	0.06%
3.9	0.02%	0.02%	0.01%	0.02%	0.02%	0.01%	0.02%	0.02%	0.01%	0.02%	0.03%
4.1	0.39%	0.41%	0.27%	0.37%	0.44%	0.47%	0.47%	0.50%	0.53%	0.56%	0.58%
4.3	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.05%
4.5	0.02%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.04%
4.7	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%
4.9	0.03%	0.04%	0.02%	0.04%	0.03%	0.02%	0.05%	0.05%	0.05%	0.06%	0.07%
5.1	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.04%
5.3	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.03%	0.03%	0.03%	0.02%	0.04%
5.5	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%
5.7	0.11%	0.12%	0.23%	0.18%	0.25%	0.31%	0.28%	0.30%	0.32%	0.35%	0.38%
5.9	0.03%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.03%
6.1	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.03%
6.3	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%
6.5	0.03%	0.03%	0.02%	0.02%	0.03%	0.02%	0.04%	0.04%	0.04%	0.03%	0.03%
6.7	0.02%	0.02%	0.02%	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.03%
6.9	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
7.1	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%
7.3	0.07%	0.03%	0.15%	0.13%	0.13%	0.17%	0.13%	0.15%	0.18%	0.21%	0.23%
7.5	0.02%	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.01%	0.02%	0.02%
7.7	0.02%	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
7.9	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%
8.1	0.03%	0.02%	0.03%	0.01%	0.02%	0.02%	0.02%	0.03%	0.03%	0.03%	0.03%
8.3	0.01%	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
8.5	0.02%	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
8.7	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%
8.9	0.02%	0.04%	0.06%	0.12%	0.11%	0.13%	0.07%	0.09%	0.12%	0.15%	0.16%

Kurzschlussstrom



0 to > 2 sec. plot at 180° phase angle. See also remark (1).

Parameter	Symbol	Value 1	Value 2	Value 3	Value 4	Value 5
Peak short-circuit current	Ip	79	-227(1)	-220(1)	61	225(1)
Initial value of a periodical component	A	N/A (2)	N/A (2)	N/A (2)	N/A (2)	N/A (2)
Initial symmetrical short-circuit current	Ik	N/A (2)	N/A (2)	N/A (2)	N/A (2)	N/A (2)
Decaying (a periodical) component of short-circuit current	iDC	N/A (2)	N/A (2)	N/A (2)	N/A (2)	N/A (2)
Reactance/Resistance ratio of source	X/R	N/A (3)	N/A (3)	N/A (3)	N/A (3)	N/A (3)

Remarks:

(1) Instantaneous peak value of the output current recorded during the short circuit, lasting for a period of a few 100 microseconds only.

(2) The test object is a self-commutated, current controlled PWM inverter, which has a fundamentally different behavior under short circuit conditions compared to synchronous or induction machine based generators. The output current is controlled by the internal controls and its r.m.s values can-not exceed the specified maximum output current. In case of a short circuit at the output terminals of the inverter, the inverter stops operating and reduces the output current to zero within a few milliseconds. Therefore, the values A, Ik, iDC and X/R cannot be evaluated as for rotating machine based micro generators.

(3) As AC source for the tests a programmable linear power amplifier was used (5mΩ at 50/60Hz). The output impedance is electronically compensated and therefore, no X/R ratio can be given.

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F.4 Anforderungen an den Prüfbericht zum NA Schutz

Auszug aus dem Prüfbericht zum Einheiten-Zertifikat „Bestimmung der elektrischen Eigenschaften"			
NA Schutz als integrierter NA-Schutz			
Typ NA-Schutz	Zwei in Reihe geschalteten Leistungsrelais (damit redundant Ausgeführt)		
Software- version	Ab version 3.4 (december 2011)		
Zugeordnet zu erzeugungseinheit	PowerRouter Modelle:		
	PR30S PR30SB	PR37S PR37SB PR37SBi PR37Bi	PR50S PR50SB PR50SBi PR50Bi
Hersteller	N.V. Nederlandsche Apparatenfabriek "Nedap" Parallelweg 2, 7141 DC Groenlo, Niederlande		

	Einstellwert	Auslösewert	Gesamtabschaltzeit (ms)
Spannungsrückgangsschutz U<	0.8 * Un	184.7 Vac	≤ 200
Spannungssteigerungsschutz[1] U>	1.1 * Un	253.0Vac	≤ 200
Spannungssteigerungsschutz U>>	1.15 * Un	263.0 Vac	≤ 200
Frequenzrückgangsschutz f <	47.5 Hz	47.52 Hz	≤ 200
Frequenzrückgangsschutz f >	51.5 Hz	51.49 Hz	≤ 200
Davon Eigenzeit des Kuppelschalters			≥ 100

[1] gleitender 10-Minuten-Mittelwert-schutz gem. DIN EN 50160.

Der integrierte Netz- und Anlagenschutz (NA-Schutz), wie auch die Inselnetzerkennung, erfüllen die Anforderungen der VDE-AR-N 4105. Die Inselnetzerkennung ist mit Hilfe des Schwingkreistestes nachgewiesen worden.