

Unbedenklichkeitsbescheinigung

Antragsteller: POWER-ONE ITALY S.P.A.
Via S. Giorgio, 642 - 52028 Terranuova Bracciolini, Arezzo, Italy

Typ Erzeugungseinheit: PVS-60-TL, PVS-60-TL-S, PVS-60-TL-SX, PVS-60-TL-SX2,
PVS-60-TL-SX-CN, PVS-50-TL, PVS-50-TL-S,
PVS-50-TL-SX, PVS-50-TL-SX2

Firmwareversion: C.0.0.C

Netzanschlussregel: VDE-AR-N 4105:2011-08 – Erzeugungsanlagen am Niederspannungsnetz
Technische Mindestanforderungen für Anschluss und Parallelbetrieb von
Erzeugungsanlagen am Niederspannungsnetz

Mitgeltende Normen: E DIN VDE V 0124-100 (VDE V 0124-100):2013-10 – Netzintegration von
Erzeugungsanlagen – Niederspannung
Prüfanforderungen an Erzeugungseinheiten vorgesehen zum Anschluss und
Parallelbetrieb am Niederspannungsnetz

Prüfberichtsnummer: 50178505 001

Zertifikatsnummer: AK 50420139 0001

Ausstellungsdatum: 12.10.2018



Li Weichun
General Manager

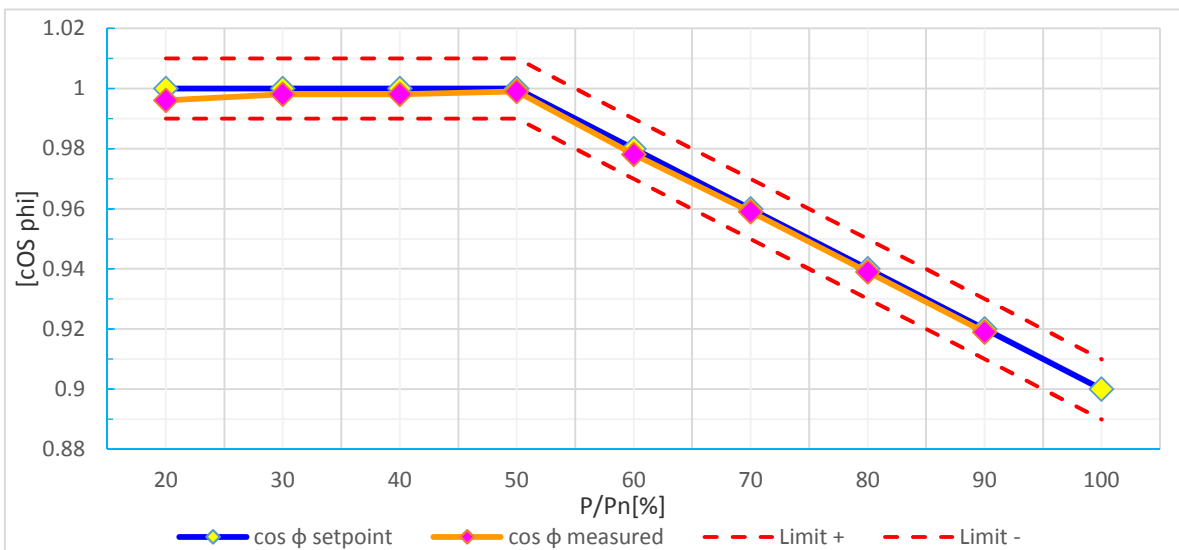
Anlagentyp:	Grid tied inverter						
Hersteller:	POWER-ONE ITALY S.P.A. Via S. Giorgio, 642 52028 Terranuova Bracciolini, Arezzo, Italy						
Referenzreport:	50178505 001						
Messzeitraum:	2018-04-02 to 2018-08-20						
Wirkleistung [$P_{E_{max}}$]: (Nominale Leistung unter Referenzbedingungen)	<table border="1"> <thead> <tr> <th>Model</th> <th>Pac rated [kW]</th> </tr> </thead> <tbody> <tr> <td>PVS-50-TL, PVS-50-TL-S, PVS-50-TL-SX, PVS-50-TL-SX2</td> <td>50.0</td> </tr> <tr> <td>PVS-60-TL-SX-CN, PVS-60-TL, PVS-60-TL-S, PVS-60-TL-SX, PVS-60-TL-SX2</td> <td>60.0</td> </tr> </tbody> </table>	Model	Pac rated [kW]	PVS-50-TL, PVS-50-TL-S, PVS-50-TL-SX, PVS-50-TL-SX2	50.0	PVS-60-TL-SX-CN, PVS-60-TL, PVS-60-TL-S, PVS-60-TL-SX, PVS-60-TL-SX2	60.0
Model	Pac rated [kW]						
PVS-50-TL, PVS-50-TL-S, PVS-50-TL-SX, PVS-50-TL-SX2	50.0						
PVS-60-TL-SX-CN, PVS-60-TL, PVS-60-TL-S, PVS-60-TL-SX, PVS-60-TL-SX2	60.0						
Nominale Ausgangsspannung:	PVS-50-TL, PVS-50-TL-S, PVS-50-TL-SX, PVS-50-TL-SX2, PVS-50-TL-SX2 SPD1+2: 230Vac (P-N) / 400Vac (P-P) PVS-60-TL-SX-CN, PVS-60-TL, PVS-60-TL-S, PVS-60-TL-SX, PVS-60-TL-SX2, PVS-60-TL-SX2 SPD1+2: 277Vac (P-N) / 480Vac (P-P)						

Blindleistungsbezug										
Wirkleistung P/P_n [%]	10	20	30	40	50	60	70	80	90	100
Max. $\cos \varphi$ untererregt	N/A	0.900	0.899	0.899	0.900	0.899	0.899	0.899	0.899	N/A
Max. $\cos \varphi$ übererregt	N/A	0.902	0.902	0.901	0.901	0.902	0.902	0.901	0.901	N/A

Einhaltung eines fest vorgegebenen Verschiebungsfaktors $\cos \varphi$											
Vorgabewert	0.9 _{ov}	0.92 _{ov}	0.94 _{ov}	0.96 _{ov}	0.98 _{ov}	1	0.98 _{un}	0.96 _{un}	0.94 _{un}	0.92 _{un}	0.9 _{un}
Messwert an den Klemmen	0.901	0.921	0.942	0.961	0.981	1.000	0.982	0.961	0.941	0.922	0.901

Blindleistungsübergangsfunktion – Standard $\cos \varphi$ (P) - Kurve

Wirkleistung P/P _n [%]	10	20	30	40	50	60	70	80	90	100
$\cos \varphi$	-	0.996	0.998	0.998	0.999	0.978	0.959	0.939	0.919	0.919


Schalthandlungen

Einschalten ohne Vorgabe	k _i :	0.533
Ungünstigster Fall beim Umschalten der Generatorstufen	k _i :	--
Einschalten bei Nennbedingungen	k _i :	0.561
Schaltvorgang bei Nennleistung	k _i :	0.017
Schlechtester Wert aller Schaltvorgänge	k _{i max} :	0.561

Flickers:

Netzimpedanzwinkel Ψ_k <i>Im schlechtesten Fall</i>	30°	50°	70°	85°
Coefficient of system flicker c_ψ	1.197	1.035	0.868	0.759

Harmonics: PVS-50-TL-SX2 SPD1+2
Harmonics
Maximum 10 min average values of line current harmonics based on rated current [%] up to 40th order for 11 power bins from 0% to 100% of Pn

Power Bin [%]	0-5	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85-95	95-105
Order	Iv/In [%]	Iv/In [%]	Iv/In [%]	Iv/In [%]	Iv/In [%]	Iv/In [%]	Iv/In [%]	Iv/In [%]	Iv/In [%]	Iv/In [%]	Iv/In [%]
1	0.06%	10.07%	20.01%	30.17%	40.11%	50.09%	60.12%	70.16%	80.25%	90.18%	100.11%
2	0.00%	0.01%	0.01%	0.02%	0.04%	0.06%	0.08%	0.09%	0.10%	0.11%	0.16%
3	0.00%	0.02%	0.05%	0.05%	0.06%	0.10%	0.18%	0.26%	0.32%	0.37%	0.45%
4	0.00%	0.00%	0.01%	0.01%	0.01%	0.02%	0.04%	0.05%	0.06%	0.07%	0.10%
5	0.49%	0.73%	1.25%	1.31%	1.32%	1.15%	0.95%	0.80%	0.66%	0.57%	0.50%
6	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%	0.03%	0.03%
7	0.27%	0.36%	0.45%	0.60%	0.70%	0.70%	0.66%	0.60%	0.52%	0.44%	0.37%
8	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%	0.02%
9	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%
10	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%
11	0.00%	0.00%	0.05%	0.00%	0.01%	0.01%	0.03%	0.07%	0.08%	0.06%	0.05%
12	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
13	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
14	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%
16	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%
17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%
18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%
19	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%
20	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%
21	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%
22	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%
23	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%
24	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%
25	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%
26	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%
27	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%
28	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%

Auszug Nr.: 1 _ Annex F.3 (VDE-AR-N 4105)

Power Bin [%]	0-5	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85-95	95-105
	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In
Order	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]
29	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
30	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%
31	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
32	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
33	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
34	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
35	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%
36	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
37	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
38	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
39	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
40	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Inter-harmonics
**Maximum 10 min average values of line current interharmonics based on rated current [%]
 up to 40.5th order for 11 power bins from 0% to 100% of Pn**

Power Bin [%]	0-5	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85-95	95-105
	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In
Order	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]
1.5	0.001%	0.021%	0.023%	0.045%	0.091%	0.121%	0.140%	0.159%	0.183%	0.212%	0.247%
2.5	0.002%	0.006%	0.007%	0.013%	0.028%	0.048%	0.073%	0.093%	0.116%	0.139%	0.176%
3.5	0.003%	0.005%	0.006%	0.009%	0.018%	0.042%	0.071%	0.084%	0.100%	0.109%	0.131%
4.5	0.008%	0.010%	0.013%	0.014%	0.016%	0.021%	0.028%	0.032%	0.044%	0.062%	0.073%
5.5	0.011%	0.014%	0.019%	0.017%	0.016%	0.019%	0.023%	0.025%	0.043%	0.063%	0.073%
6.5	0.006%	0.009%	0.010%	0.012%	0.015%	0.016%	0.019%	0.020%	0.023%	0.027%	0.031%
7.5	0.008%	0.011%	0.013%	0.016%	0.017%	0.017%	0.019%	0.020%	0.021%	0.023%	0.024%
8.5	0.002%	0.003%	0.004%	0.005%	0.008%	0.010%	0.012%	0.013%	0.015%	0.017%	0.019%
9.5	0.001%	0.002%	0.002%	0.004%	0.006%	0.008%	0.010%	0.011%	0.013%	0.014%	0.016%
10.5	0.001%	0.002%	0.002%	0.003%	0.005%	0.007%	0.009%	0.010%	0.012%	0.013%	0.015%
11.5	0.001%	0.001%	0.002%	0.003%	0.005%	0.007%	0.008%	0.009%	0.010%	0.012%	0.013%
12.5	0.001%	0.001%	0.002%	0.002%	0.004%	0.006%	0.008%	0.008%	0.010%	0.011%	0.012%
13.5	0.001%	0.001%	0.001%	0.002%	0.004%	0.006%	0.007%	0.008%	0.009%	0.010%	0.011%
14.5	0.001%	0.001%	0.001%	0.002%	0.004%	0.005%	0.007%	0.007%	0.008%	0.009%	0.010%
15.5	0.001%	0.001%	0.001%	0.002%	0.004%	0.005%	0.006%	0.007%	0.008%	0.009%	0.010%

Power Bin [%]	0-5	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85-95	95-105
	lv/ln	lv/ln	lv/ln	lv/ln	lv/ln	lv/ln	lv/ln	lv/ln	lv/ln	lv/ln	lv/ln
Order	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]
16.5	0.000%	0.001%	0.001%	0.002%	0.003%	0.005%	0.006%	0.006%	0.007%	0.008%	0.009%
17.5	0.000%	0.001%	0.001%	0.002%	0.003%	0.004%	0.006%	0.006%	0.007%	0.008%	0.009%
18.5	0.000%	0.001%	0.001%	0.002%	0.003%	0.004%	0.005%	0.006%	0.007%	0.007%	0.008%
19.5	0.000%	0.001%	0.001%	0.002%	0.003%	0.004%	0.005%	0.006%	0.006%	0.007%	0.008%
20.5	0.000%	0.001%	0.001%	0.001%	0.003%	0.004%	0.005%	0.005%	0.006%	0.007%	0.008%
21.5	0.000%	0.001%	0.001%	0.001%	0.003%	0.004%	0.005%	0.005%	0.006%	0.006%	0.007%
22.5	0.000%	0.001%	0.001%	0.001%	0.003%	0.003%	0.004%	0.005%	0.005%	0.006%	0.007%
23.5	0.000%	0.001%	0.001%	0.001%	0.002%	0.003%	0.004%	0.005%	0.005%	0.006%	0.007%
24.5	0.000%	0.001%	0.001%	0.001%	0.002%	0.003%	0.004%	0.005%	0.005%	0.006%	0.006%
25.5	0.000%	0.001%	0.001%	0.001%	0.002%	0.003%	0.004%	0.004%	0.005%	0.006%	0.006%
26.5	0.000%	0.001%	0.001%	0.001%	0.002%	0.003%	0.004%	0.004%	0.005%	0.005%	0.006%
27.5	0.000%	0.001%	0.001%	0.001%	0.002%	0.003%	0.004%	0.004%	0.005%	0.005%	0.006%
28.5	0.000%	0.001%	0.001%	0.001%	0.002%	0.003%	0.004%	0.004%	0.005%	0.005%	0.006%
29.5	0.000%	0.001%	0.001%	0.001%	0.002%	0.003%	0.004%	0.004%	0.004%	0.005%	0.006%
30.5	0.000%	0.001%	0.001%	0.001%	0.002%	0.003%	0.004%	0.004%	0.004%	0.005%	0.006%
31.5	0.000%	0.000%	0.001%	0.001%	0.002%	0.003%	0.003%	0.004%	0.004%	0.005%	0.005%
32.5	0.000%	0.000%	0.001%	0.001%	0.002%	0.003%	0.003%	0.004%	0.004%	0.005%	0.005%
33.5	0.000%	0.000%	0.001%	0.001%	0.002%	0.003%	0.003%	0.004%	0.004%	0.005%	0.005%
34.5	0.000%	0.000%	0.001%	0.001%	0.002%	0.003%	0.003%	0.004%	0.004%	0.005%	0.005%
35.5	0.000%	0.000%	0.001%	0.001%	0.002%	0.002%	0.003%	0.004%	0.004%	0.005%	0.005%
36.5	0.000%	0.000%	0.001%	0.001%	0.002%	0.002%	0.003%	0.004%	0.004%	0.004%	0.005%
37.5	0.000%	0.000%	0.001%	0.001%	0.002%	0.002%	0.003%	0.003%	0.004%	0.004%	0.005%
38.5	0.000%	0.000%	0.001%	0.001%	0.002%	0.002%	0.003%	0.003%	0.004%	0.004%	0.005%
39.5	0.000%	0.000%	0.000%	0.001%	0.002%	0.002%	0.003%	0.003%	0.004%	0.004%	0.005%
40.5	0.000%	0.000%	0.000%	0.001%	0.002%	0.002%	0.003%	0.003%	0.004%	0.004%	0.005%

Maximum 10 min average values for higher frequency line current components based on rated current [%] from to 2kHz to 9kHz in 200Hz bands for 11 power bins from 0% to 100% of Pn

Power Bin [%]	0-5	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85-95	95-105
	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In
Order	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]
2100	0.001%	0.002%	0.001%	0.001%	0.003%	0.003%	0.002%	0.004%	0.003%	0.005%	0.004%
2300	0.001%	0.001%	0.002%	0.001%	0.002%	0.002%	0.003%	0.003%	0.004%	0.005%	0.004%
2500	0.001%	0.001%	0.000%	0.001%	0.001%	0.002%	0.003%	0.004%	0.004%	0.004%	0.005%
2700	0.001%	0.002%	0.001%	0.001%	0.002%	0.003%	0.003%	0.004%	0.003%	0.004%	0.004%
2900	0.001%	0.000%	0.001%	0.001%	0.002%	0.002%	0.002%	0.003%	0.003%	0.004%	0.005%
3100	0.001%	0.001%	0.000%	0.001%	0.002%	0.002%	0.002%	0.004%	0.003%	0.004%	0.005%
3300	0.000%	0.001%	0.000%	0.001%	0.002%	0.002%	0.003%	0.004%	0.004%	0.004%	0.005%
3500	0.000%	0.001%	0.000%	0.001%	0.001%	0.003%	0.002%	0.003%	0.003%	0.004%	0.004%
3700	0.001%	0.001%	0.001%	0.000%	0.001%	0.001%	0.001%	0.000%	0.001%	0.000%	0.001%
3900	0.001%	0.000%	0.000%	0.001%	0.000%	0.001%	0.000%	0.001%	0.001%	0.001%	0.001%
4100	0.001%	0.001%	0.000%	0.000%	0.000%	0.000%	0.001%	0.001%	0.000%	0.000%	0.001%
4300	0.001%	0.000%	0.000%	0.000%	0.000%	0.001%	0.000%	0.001%	0.001%	0.001%	0.000%
4500	0.001%	0.000%	0.001%	0.000%	0.001%	0.001%	0.000%	0.000%	0.000%	0.000%	0.001%
4700	0.001%	0.001%	0.001%	0.000%	0.000%	0.001%	0.000%	0.001%	0.001%	0.001%	0.001%
4900	0.001%	0.001%	0.000%	0.001%	0.000%	0.000%	0.001%	0.001%	0.000%	0.001%	0.000%
5100	0.001%	0.000%	0.000%	0.001%	0.000%	0.001%	0.000%	0.000%	0.001%	0.000%	0.000%
5300	0.000%	0.000%	0.000%	0.000%	0.001%	0.000%	0.001%	0.000%	0.000%	0.000%	0.000%
5500	0.001%	0.000%	0.001%	0.001%	0.000%	0.001%	0.001%	0.001%	0.000%	0.000%	0.001%
5700	0.000%	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%	0.000%
5900	0.000%	0.000%	0.000%	0.001%	0.001%	0.000%	0.001%	0.001%	0.001%	0.001%	0.000%
6100	0.001%	0.001%	0.000%	0.000%	0.001%	0.001%	0.001%	0.001%	0.000%	0.001%	0.000%
6300	0.001%	0.001%	0.001%	0.001%	0.000%	0.001%	0.001%	0.001%	0.001%	0.001%	0.000%
6500	0.001%	0.000%	0.000%	0.000%	0.001%	0.000%	0.001%	0.001%	0.001%	0.001%	0.001%
6700	0.000%	0.000%	0.000%	0.001%	0.000%	0.001%	0.000%	0.000%	0.000%	0.001%	0.001%
6900	0.001%	0.001%	0.001%	0.001%	0.000%	0.000%	0.001%	0.001%	0.001%	0.000%	0.000%
7100	0.001%	0.001%	0.000%	0.001%	0.001%	0.001%	0.000%	0.000%	0.001%	0.000%	0.001%
7300	0.001%	0.000%	0.001%	0.000%	0.001%	0.000%	0.001%	0.001%	0.000%	0.001%	0.000%
7500	0.000%	0.001%	0.001%	0.000%	0.001%	0.001%	0.000%	0.000%	0.000%	0.000%	0.001%
7700	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%	0.000%	0.000%	0.001%	0.000%
7900	0.000%	0.001%	0.001%	0.000%	0.001%	0.000%	0.000%	0.001%	0.001%	0.001%	0.001%
8100	0.001%	0.001%	0.000%	0.000%	0.001%	0.000%	0.000%	0.001%	0.000%	0.001%	0.001%
8300	0.000%	0.001%	0.001%	0.001%	0.000%	0.001%	0.001%	0.000%	0.001%	0.000%	0.001%
8500	0.001%	0.001%	0.001%	0.000%	0.001%	0.000%	0.001%	0.000%	0.000%	0.001%	0.001%

Auszug aus dem Prüfbericht zum Einheitszertifikat: AK 50420139 0001

(Verbindung mit Prüfbericht N. 50178505 001)

“Bestimmung der elektrischen Eigenschaften”

Seite 8 von 15

Page 8 of 15

Auszug Nr.: 1 _ **Annex F.3** (VDE-AR-N 4105)

8700	0.000%	0.001%	0.000%	0.001%	0.001%	0.000%	0.000%	0.000%	0.001%	0.001%	0.001%
8900	0.001%	0.001%	0.001%	0.000%	0.001%	0.001%	0.001%	0.000%	0.000%	0.000%	0.001%

Harmonics: PVS-60-TL-SX2 SPD1+2
Harmonics
Maximum 10 min average values of line current harmonics based on rated current [%] up to 40th order for 11 power bins from 0% to 100% of P_n

Power Bin [%]	0-5	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85-95	95-105
Order	I _v /I _n [%]	I _v /I _n [%]	I _v /I _n [%]	I _v /I _n [%]	I _v /I _n [%]	I _v /I _n [%]	I _v /I _n [%]	I _v /I _n [%]	I _v /I _n [%]	I _v /I _n [%]	I _v /I _n [%]
1	0.09%	9.99%	20.03%	30.07%	40.12%	50.09%	60.18%	70.16%	80.21%	90.21%	100.11%
2	0.00%	0.01%	0.01%	0.02%	0.04%	0.06%	0.08%	0.09%	0.10%	0.11%	0.16%
3	0.00%	0.02%	0.05%	0.05%	0.06%	0.10%	0.18%	0.26%	0.32%	0.37%	0.45%
4	0.00%	0.00%	0.00%	0.01%	0.01%	0.02%	0.04%	0.05%	0.06%	0.07%	0.10%
5	0.49%	0.73%	1.25%	1.31%	1.32%	1.15%	0.95%	0.80%	0.66%	0.57%	0.50%
6	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%	0.03%	0.03%
7	0.27%	0.36%	0.45%	0.60%	0.70%	0.70%	0.66%	0.60%	0.52%	0.44%	0.37%
8	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%	0.02%
9	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%
10	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%
11	0.00%	0.00%	0.05%	0.00%	0.00%	0.01%	0.03%	0.06%	0.08%	0.06%	0.05%
12	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
13	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
14	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%
16	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%
17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%
18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%
19	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%
20	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%
21	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%
22	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%
23	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%
24	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%
25	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%
26	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%
27	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
28	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%

Auszug Nr.: 1 _ Annex F.3 (VDE-AR-N 4105)

Power Bin [%]	0-5	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85-95	95-105
	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In
Order	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]
29	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
30	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
31	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
32	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
33	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
34	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
35	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
36	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
37	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
38	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
39	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
40	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Inter-harmonics
**Maximum 10 min average values of line current interharmonics based on rated current [%]
 up to 40.5th order for 11 power bins from 0% to 100% of Pn**

Power Bin [%]	0-5	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85-95	95-105
	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In
Order	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]
1.5	0.001%	0.022%	0.023%	0.057%	0.102%	0.130%	0.148%	0.160%	0.183%	0.206%	0.001%
2.5	0.002%	0.006%	0.007%	0.017%	0.029%	0.040%	0.053%	0.074%	0.089%	0.103%	0.002%
3.5	0.002%	0.005%	0.006%	0.011%	0.018%	0.027%	0.040%	0.064%	0.081%	0.097%	0.002%
4.5	0.008%	0.011%	0.013%	0.015%	0.018%	0.021%	0.023%	0.028%	0.041%	0.060%	0.008%
5.5	0.010%	0.014%	0.018%	0.019%	0.019%	0.019%	0.020%	0.023%	0.037%	0.056%	0.010%
6.5	0.006%	0.008%	0.010%	0.013%	0.015%	0.016%	0.017%	0.018%	0.021%	0.025%	0.006%
7.5	0.007%	0.010%	0.013%	0.015%	0.017%	0.016%	0.017%	0.018%	0.021%	0.022%	0.007%
8.5	0.002%	0.003%	0.004%	0.005%	0.008%	0.010%	0.011%	0.012%	0.013%	0.016%	0.002%
9.5	0.001%	0.002%	0.002%	0.004%	0.006%	0.008%	0.010%	0.010%	0.012%	0.013%	0.001%
10.5	0.001%	0.002%	0.002%	0.003%	0.006%	0.007%	0.009%	0.009%	0.011%	0.012%	0.001%
11.5	0.001%	0.001%	0.002%	0.003%	0.005%	0.007%	0.008%	0.009%	0.010%	0.011%	0.001%
12.5	0.001%	0.001%	0.001%	0.003%	0.005%	0.006%	0.007%	0.008%	0.009%	0.010%	0.001%
13.5	0.001%	0.001%	0.001%	0.003%	0.004%	0.006%	0.007%	0.007%	0.008%	0.009%	0.001%
14.5	0.001%	0.001%	0.001%	0.002%	0.004%	0.005%	0.006%	0.007%	0.008%	0.009%	0.001%
15.5	0.000%	0.001%	0.001%	0.002%	0.004%	0.005%	0.006%	0.006%	0.007%	0.008%	0.000%

Power Bin [%]	0-5	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85-95	95-105
	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In
Order	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]
16.5	0.000%	0.001%	0.001%	0.002%	0.004%	0.005%	0.006%	0.006%	0.007%	0.008%	0.000%
17.5	0.000%	0.001%	0.001%	0.002%	0.003%	0.005%	0.005%	0.006%	0.006%	0.007%	0.000%
18.5	0.000%	0.001%	0.001%	0.002%	0.003%	0.004%	0.005%	0.005%	0.006%	0.007%	0.000%
19.5	0.000%	0.001%	0.001%	0.002%	0.003%	0.004%	0.005%	0.005%	0.006%	0.007%	0.000%
20.5	0.000%	0.001%	0.001%	0.002%	0.003%	0.004%	0.005%	0.005%	0.006%	0.006%	0.000%
21.5	0.000%	0.001%	0.001%	0.002%	0.003%	0.004%	0.004%	0.005%	0.005%	0.006%	0.000%
22.5	0.000%	0.001%	0.001%	0.002%	0.003%	0.004%	0.004%	0.005%	0.005%	0.006%	0.000%
23.5	0.000%	0.001%	0.001%	0.002%	0.003%	0.003%	0.004%	0.004%	0.005%	0.006%	0.000%
24.5	0.000%	0.001%	0.001%	0.001%	0.002%	0.003%	0.004%	0.004%	0.005%	0.006%	0.000%
25.5	0.000%	0.001%	0.001%	0.001%	0.002%	0.003%	0.004%	0.004%	0.005%	0.005%	0.000%
26.5	0.000%	0.001%	0.001%	0.001%	0.002%	0.003%	0.004%	0.004%	0.005%	0.005%	0.000%
27.5	0.000%	0.001%	0.001%	0.001%	0.002%	0.003%	0.004%	0.004%	0.005%	0.005%	0.000%
28.5	0.000%	0.001%	0.001%	0.001%	0.002%	0.003%	0.003%	0.004%	0.004%	0.005%	0.000%
29.5	0.000%	0.001%	0.001%	0.001%	0.002%	0.003%	0.003%	0.004%	0.004%	0.005%	0.000%
30.5	0.000%	0.000%	0.001%	0.001%	0.002%	0.003%	0.003%	0.004%	0.004%	0.005%	0.000%
31.5	0.000%	0.000%	0.001%	0.001%	0.002%	0.003%	0.003%	0.004%	0.004%	0.005%	0.000%
32.5	0.000%	0.000%	0.001%	0.001%	0.002%	0.003%	0.003%	0.003%	0.004%	0.005%	0.000%
33.5	0.000%	0.000%	0.001%	0.001%	0.002%	0.003%	0.003%	0.003%	0.004%	0.005%	0.000%
34.5	0.000%	0.000%	0.001%	0.001%	0.002%	0.003%	0.003%	0.003%	0.004%	0.004%	0.000%
35.5	0.000%	0.000%	0.001%	0.001%	0.002%	0.003%	0.003%	0.003%	0.004%	0.004%	0.000%
36.5	0.000%	0.000%	0.001%	0.001%	0.002%	0.003%	0.003%	0.003%	0.004%	0.004%	0.000%
37.5	0.000%	0.000%	0.000%	0.001%	0.002%	0.003%	0.003%	0.003%	0.004%	0.004%	0.000%
38.5	0.000%	0.000%	0.000%	0.001%	0.002%	0.002%	0.003%	0.003%	0.004%	0.004%	0.000%
39.5	0.000%	0.000%	0.000%	0.001%	0.002%	0.002%	0.003%	0.003%	0.004%	0.004%	0.000%
40.5	0.000%	0.000%	0.000%	0.001%	0.002%	0.002%	0.003%	0.003%	0.004%	0.004%	0.000%

Maximum 10 min average values for higher frequency line current components based on rated current [%] from to 2kHz to 9kHz in 200Hz bands for 11 power bins from 0% to 100% of Pn

Power Bin [%]	0-5	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85-95	95-105
	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In	Iv/In
Order	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]
2100	0.001%	0.002%	0.001%	0.001%	0.003%	0.003%	0.002%	0.004%	0.003%	0.005%	0.004%
2300	0.001%	0.001%	0.002%	0.001%	0.002%	0.002%	0.003%	0.003%	0.004%	0.005%	0.004%
2500	0.001%	0.001%	0.000%	0.001%	0.001%	0.002%	0.003%	0.004%	0.004%	0.004%	0.005%
2700	0.001%	0.002%	0.001%	0.001%	0.002%	0.003%	0.003%	0.004%	0.003%	0.004%	0.004%
2900	0.001%	0.000%	0.001%	0.001%	0.002%	0.002%	0.002%	0.003%	0.003%	0.004%	0.005%
3100	0.001%	0.001%	0.000%	0.001%	0.002%	0.002%	0.002%	0.004%	0.003%	0.004%	0.005%
3300	0.000%	0.001%	0.000%	0.001%	0.002%	0.002%	0.003%	0.004%	0.004%	0.004%	0.005%
3500	0.000%	0.001%	0.000%	0.001%	0.001%	0.003%	0.002%	0.003%	0.003%	0.004%	0.004%
3700	0.001%	0.001%	0.001%	0.000%	0.001%	0.001%	0.001%	0.000%	0.001%	0.000%	0.001%
3900	0.001%	0.000%	0.000%	0.001%	0.000%	0.001%	0.000%	0.001%	0.001%	0.001%	0.001%
4100	0.001%	0.001%	0.000%	0.000%	0.000%	0.000%	0.001%	0.001%	0.000%	0.000%	0.001%
4300	0.001%	0.000%	0.000%	0.000%	0.000%	0.001%	0.000%	0.001%	0.001%	0.001%	0.000%
4500	0.001%	0.000%	0.001%	0.000%	0.001%	0.001%	0.000%	0.000%	0.000%	0.000%	0.001%
4700	0.001%	0.001%	0.001%	0.000%	0.000%	0.001%	0.000%	0.001%	0.001%	0.001%	0.001%
4900	0.001%	0.001%	0.000%	0.001%	0.000%	0.000%	0.001%	0.001%	0.000%	0.001%	0.000%
5100	0.001%	0.000%	0.000%	0.001%	0.000%	0.001%	0.000%	0.000%	0.001%	0.000%	0.000%
5300	0.000%	0.000%	0.000%	0.000%	0.001%	0.000%	0.001%	0.000%	0.000%	0.000%	0.000%
5500	0.001%	0.000%	0.001%	0.001%	0.000%	0.001%	0.001%	0.001%	0.000%	0.000%	0.001%
5700	0.000%	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%	0.000%
5900	0.000%	0.000%	0.000%	0.001%	0.001%	0.000%	0.001%	0.001%	0.001%	0.001%	0.000%
6100	0.001%	0.001%	0.000%	0.000%	0.001%	0.001%	0.001%	0.001%	0.000%	0.001%	0.000%
6300	0.001%	0.001%	0.001%	0.001%	0.000%	0.001%	0.001%	0.001%	0.001%	0.001%	0.000%
6500	0.001%	0.000%	0.000%	0.000%	0.001%	0.000%	0.001%	0.001%	0.001%	0.001%	0.001%
6700	0.000%	0.000%	0.000%	0.001%	0.000%	0.001%	0.000%	0.000%	0.000%	0.001%	0.001%
6900	0.001%	0.001%	0.001%	0.001%	0.000%	0.000%	0.001%	0.001%	0.001%	0.000%	0.000%
7100	0.001%	0.001%	0.000%	0.001%	0.001%	0.001%	0.000%	0.000%	0.001%	0.000%	0.001%
7300	0.001%	0.000%	0.001%	0.000%	0.001%	0.000%	0.001%	0.001%	0.000%	0.001%	0.000%
7500	0.000%	0.001%	0.001%	0.000%	0.001%	0.001%	0.000%	0.000%	0.000%	0.000%	0.001%
7700	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%	0.000%	0.000%	0.001%	0.000%
7900	0.000%	0.001%	0.001%	0.000%	0.001%	0.000%	0.000%	0.001%	0.001%	0.001%	0.001%
8100	0.001%	0.001%	0.000%	0.000%	0.001%	0.000%	0.000%	0.001%	0.000%	0.001%	0.001%
8300	0.000%	0.001%	0.001%	0.001%	0.000%	0.001%	0.001%	0.000%	0.001%	0.000%	0.001%
8500	0.001%	0.001%	0.001%	0.000%	0.001%	0.000%	0.001%	0.000%	0.000%	0.001%	0.001%

Auszug aus dem Prüfbericht zum Einheitszertifikat: AK 50420139 0001

(Verbindung mit Prüfbericht N. 50178505 001)

“Bestimmung der elektrischen Eigenschaften”

Seite 13 von 15

Page 13 of 15

Auszug Nr.: 1 _ **Annex F.3** (VDE-AR-N 4105)

8700	0.000%	0.001%	0.000%	0.001%	0.001%	0.000%	0.000%	0.000%	0.001%	0.001%	0.001%
8900	0.001%	0.001%	0.001%	0.000%	0.001%	0.001%	0.001%	0.000%	0.000%	0.000%	0.001%

Auszug aus dem Prüfbericht zum NA-Schutz-Zertifikat: AK 50420139 0001 Seite 14 von 15
 (Verbindung mit Prüfbericht N. 50178505 001) Page 14 of 15
“Bestimmung der elektrischen Eigenschaften”

Auszug No: 2A _ Annex F.4 (VDE-AR-N 4105)

Zentraler NA-Schutz			
NA-Schutz wie Zentraler NA-Schutz		<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Typ NA-Schutz	---	Herstellerangaben	
Software version	---	---	
Hersteller	---	---	
Messzeitraum		---	
Schutzfunktion	Eistellwert	Auslösewert	Abschaltzeit der Schutzeinrichtung
Spannungsrückgangsschutz U<	0,8 * U _n	* U _n	- ms
Spannungssteigerungsschutz U>	1,1 * U _n	* U _n	- s
Spannungssteigerungsschutz U>>	1,15 * U _n	* U _n	- ms
Frequenzrückgangsschutz f<	47,5 Hz	Hz	- ms
Frequenzsteigerungsschutz f>	51,5 Hz	Hz	- ms
Intergrieter NA-Schutz			
NA-Schutz wie Intergrieter NA-Schutz		<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
Typ NA-Schutz	AC Kontaktor	Herstellerangaben	
Software version	C.0.0.C	Zugeordnet zu Erzeugungseinheit Typ:	
Hersteller	POWER-ONE ITALY S.P.A. Via S. Giorgio, 642 52028, Terranuova Bracciolini, Arezzo, Italy	PVS-60-TL-SX-CN, PVS-60-TL, PVS-60-TL-S, PVS-60-TL-SX, PVS-60-TL-SX2, PVS-50-TL, PVS-50-TL-S, PVS-50-TL-SX, PVS-50-TL-SX2, Kuppelschalter Typ Schalteinrichtung 1: AC Kontaktor Typ Schalteinrichtung 2: AC Kontaktor	
Messzeitraum		From 2018-04-02 to 2018-08-20	
For model with output voltage: 230/400V.			
Schutzfunktion	Eistellwert	Auslösewert	Abschaltzeit der Schutzeinrichtung
Spannungsrückgangsschutz U<	0.8 * U _n	L1: 184.5V L2: 184.8V L3: 184.7V	L1: 171 ms L2: 171 ms L3: 169 ms
Spannungssteigerungsschutz U>	1.1 * U _n	100% → 112%	498.5 s
		100% → 108%	No disconnection
		106% → 114%	309.3 s
Spannungssteigerungsschutz U>>	1.15 * U _n	L1: 264.9V L2: 265.2V L3: 265.5V	L1: 171 ms L2: 174 ms L3: 173 ms

**Auszug aus dem Prüfbericht zum NA-Schutz-Zertifikat: AK 50420139
0001**

Seite 15 von 15
Page 15 of 15

(Verbindung mit Prüfbericht N. 50178505 001)

“Bestimmung der elektrischen Eigenschaften”

Auszug No: 2A _ **Annex F.4** (VDE-AR-N 4105)

Frequenzrückgangsschutz f<	47.5 Hz	47.50Hz	182 ms
Frequenzsteigerungsschutz f>	51.5 Hz	51.51Hz	183 ms
Eigenzeit des kuppelschalters (bei integrierterm NA-Schutz)	20 ms Max.		
For model with output voltage: 277/480V.			
Schutzfunktion	Eistellwert	Auslösewert	Abschaltzeit der Schutzeinrichtung
Spannungsrückgangsschutz U<	0.8 * Un	L1: 221.8V L2: 222.1V L3: 221.9V	L1: 176 ms L2: 173 ms L3: 178 ms
Spannungssteigerungsschutz U>	1.1 * Un	100% → 112%	498 s
		100% → 108%	No disconnection
		106% → 114%	295 s
Spannungssteigerungsschutz U>>	1.15 * Un	L1: 318.6V L2: 318.7V L3: 318.9V	L1: 174 ms L2: 171 ms L3: 169 ms
Frequenzrückgangsschutz f<	47.5 Hz	47.50Hz	173 ms
Frequenzsteigerungsschutz f>	51.5 Hz	51.51Hz	177 ms
Eigenzeit des kuppelschalters (bei integrierterm NA-Schutz)	20 ms Max.		
Die Abschaltzeit (Summe der Auslösezeit NS Protection Plus Eigenzeit Schnittstelle Schalter) darf nicht mehr als 200ms sein.			
Note :			