

Certificate of Conformity

No. ESY 090313 0027 Rev. 00

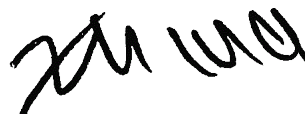
Holder of Certificate: **Autarco Group BV**
Torenallee 20
5617 BC Eindhoven
THE NETHERLANDS

Product: **Converter**
AC Coupled Inverter

This Certificate of Conformity confirms the compliance with the above listed standards on a voluntary basis. It refers only to the sample submitted to TÜV SÜD Product Service GmbH and does not certify the quality or safety of the serial products. It was issued according to TÜV SÜD Product Service certification program Photovoltaics and Grid Integration. For details see: www.tuvsud.com/ps-cert

Test report no.: 50409230013209-00

Date, 2023-09-07



(Zhengdong Ma)



Product Service

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Model(s): S2.MR3000

Parameters:

Please see pages 3 to 13

Applicable standards:

VDE-AR-N 4105:2018
DIN VDE V 0124-100 (VDE V 0124-100):2020

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Battery Input Port Parameters	
Battery type	Li-ion / Lead-acid
Battery voltage range	d.c. 40 – 60 V
Max. charge current	d.c. 60 A
Max. discharge current	d.c. 60 A
AC-Output (Grid Side) Parameters	
Max. apparent output power	3000 VA
Rated output voltage	a.c. 230 V
Rated frequency	a.c. 50 Hz
Rated output current	a.c. 13 A
Displacement factor	-0.8 ...1...+0.8
AC-Input Parameters	
Rated input voltage	a.c. 230 V
Current (maximum continuous)	a.c. 32 A
Rated frequency	a.c. 50 Hz

E.4 Unit certificate

Unit certificate	No. 50409230013209-00	
Manufacturer	Autarco Group BV Torenallee 20, 5617 BC, Eindhoven, THE NETHERLANDS	
Power generation unit type	S2.MR3000	
<input checked="" type="checkbox"/> Inverter	<input type="checkbox"/> Asynchronous generator	<input type="checkbox"/> Synchronous generator
<input type="checkbox"/> Stirling generator	<input type="checkbox"/> Fuel cell	<input type="checkbox"/> others
Assessment values	Max. active power $P_{E_{max}}$	2973.11 W
	Max. apparent power $S_{E_{max}}$	2990.22 VA
	Rated voltage	230 V
Rated values	Rated current (AC) I_r	13 A
Rated values	Max. current (AC) I_{max}	14.3 A
Rated values	Initial short-circuit current I_k''	20 A
Network connection rules	VDE-AR-N 4105:2018-11/Corrigendum 1:2020-10 Generators connected to the low-voltage distribution network - Technical requirements for the connection to and parallel operation with low-voltage distribution networks.	
Test requirement	DIN VDE V 0124-100 (VDE V 0124-100):2020-06 "Network integration of power generation system – Low voltage" Test requirements for power generation units intended for connection to and parallel operation on the low-voltage network.	
The above mentioned power generation unit meets the requirements of VDE-AR-N 4105:2018.		

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E.5 Test report "Network interactions " for generating units with an input current > 75 A

Extract from test report for unit certificate "Determination of electrical properties"		No. 50409230013209-00	
Generation unit manufacturer:	Autarco Group BV Torenallee 20, 5617 BC, Eindhoven, THE NETHERLANDS		
Manufacturer indications:	Type of system	AC coupled energy storage inverter	
	Max. active power $P_{E_{max}}$	3000 W	
	Rated voltage	230 V	
Period of measurement:	From 2023-04-17 to 2023-06-29, 2023-09-06		

Flicker (DIN EN 61000-3-3)			Mode: Energy supply	
$d_{(t)} - 500ms$ [%]	d_c [%]	d_{max} [%]	P_{st}	P_{lt}
0	0.39	0.40	0.11	0.11

Flicker (DIN EN 61000-3-3)			Mode: Energy consumption	
$d_{(t)} - 500ms$ [%]	d_c [%]	d_{max} [%]	P_{st}	P_{lt}
0	0.38	0.48	0.13	0.13

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Harmonics (DIN EN 61000-3-2 ($\leq 16A$)) (Energy supply)												
Power P/Pn [%]	0	10	20	30	40	50	60	70	80	90	100	Limit
Ordinal number	A	A	A	A	A	A	A	A	A	A	A	A
2	0.034	0.071	0.077	0.068	0.063	0.057	0.055	0.052	0.052	0.052	0.051	1.080
3	0.076	0.121	0.217	0.259	0.267	0.261	0.248	0.233	0.214	0.195	0.176	2.300
4	0.044	0.042	0.017	0.027	0.028	0.024	0.020	0.018	0.016	0.015	0.014	0.430
5	0.109	0.055	0.017	0.101	0.155	0.185	0.202	0.215	0.228	0.239	0.249	1.140
6	0.013	0.023	0.007	0.016	0.022	0.022	0.020	0.016	0.015	0.014	0.012	0.300
7	0.058	0.099	0.032	0.047	0.098	0.127	0.142	0.152	0.158	0.164	0.169	0.770
8	0.006	0.025	0.018	0.003	0.012	0.015	0.016	0.015	0.013	0.012	0.010	0.230
9	0.041	0.059	0.051	0.016	0.036	0.066	0.084	0.095	0.101	0.105	0.109	0.400
10	0.001	0.015	0.018	0.007	0.007	0.011	0.013	0.012	0.012	0.010	0.009	0.184
11	0.028	0.013	0.044	0.025	0.023	0.049	0.066	0.077	0.086	0.090	0.093	0.330
12	0.003	0.011	0.007	0.012	0.004	0.008	0.010	0.009	0.010	0.009	0.008	0.153
13	0.016	0.021	0.031	0.028	0.014	0.024	0.040	0.052	0.061	0.068	0.071	0.210
14	0.005	0.008	0.009	0.013	0.005	0.005	0.008	0.010	0.008	0.008	0.007	0.131
15	0.010	0.018	0.015	0.024	0.018	0.019	0.034	0.046	0.053	0.060	0.066	0.150
16	0.005	0.008	0.002	0.004	0.008	0.003	0.005	0.007	0.007	0.006	0.006	0.115
17	0.005	0.007	0.007	0.018	0.016	0.010	0.018	0.029	0.039	0.044	0.050	0.132
18	0.005	0.004	0.005	0.005	0.009	0.004	0.003	0.004	0.007	0.006	0.005	0.102
19	0.003	0.005	0.010	0.013	0.015	0.011	0.015	0.024	0.034	0.041	0.045	0.118
20	0.005	0.006	0.007	0.005	0.006	0.007	0.006	0.006	0.006	0.006	0.006	0.092
21	0.003	0.007	0.008	0.006	0.013	0.011	0.011	0.017	0.024	0.032	0.037	0.107
22	0.004	0.004	0.004	0.003	0.004	0.006	0.003	0.003	0.003	0.004	0.004	0.084
23	0.004	0.006	0.005	0.005	0.009	0.010	0.009	0.015	0.021	0.028	0.034	0.098
24	0.003	0.003	0.004	0.001	0.002	0.006	0.005	0.003	0.002	0.002	0.002	0.077
25	0.004	0.006	0.004	0.003	0.008	0.008	0.007	0.007	0.013	0.019	0.024	0.090
26	0.002	0.004	0.003	0.001	0.003	0.003	0.004	0.002	0.002	0.002	0.003	0.071
27	0.005	0.006	0.002	0.004	0.005	0.008	0.010	0.009	0.012	0.019	0.024	0.083
28	0.001	0.002	0.003	0.003	0.004	0.002	0.005	0.004	0.002	0.002	0.002	0.066
29	0.005	0.007	0.004	0.002	0.002	0.007	0.008	0.007	0.008	0.011	0.016	0.078
30	0.002	0.003	0.004	0.004	0.004	0.002	0.003	0.004	0.002	0.002	0.002	0.061
31	0.006	0.006	0.004	0.003	0.002	0.005	0.007	0.008	0.009	0.011	0.016	0.073
32	0.001	0.002	0.003	0.004	0.003	0.003	0.002	0.003	0.003	0.002	0.003	0.058
33	0.005	0.005	0.004	0.004	0.001	0.003	0.004	0.005	0.004	0.004	0.005	0.068
34	0.001	0.001	0.002	0.003	0.003	0.005	0.003	0.002	0.003	0.003	0.003	0.054
35	0.005	0.006	0.005	0.003	0.002	0.002	0.003	0.005	0.006	0.006	0.006	0.064
36	0.001	0.003	0.003	0.001	0.003	0.003	0.003	0.003	0.002	0.002	0.003	0.051
37	0.005	0.005	0.005	0.004	0.003	0.002	0.003	0.006	0.007	0.006	0.005	0.061
38	0.001	0.003	0.003	0.002	0.003	0.004	0.003	0.002	0.002	0.003	0.004	0.048
39	0.005	0.006	0.005	0.004	0.002	0.004	0.002	0.004	0.006	0.007	0.007	0.058
40	0.004	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.003	0.004	0.009	0.046

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Inter-harmonics (Energy supply)											
Active power P/Pn[%]	0	10	20	30	40	50	60	70	80	90	100
Frequency [Hz]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]
75	0.011	0.014	0.018	0.023	0.027	0.033	0.037	0.043	0.046	0.052	0.060
125	0.005	0.005	0.009	0.014	0.017	0.019	0.020	0.022	0.023	0.025	0.028
175	0.002	0.003	0.007	0.007	0.007	0.007	0.008	0.009	0.010	0.011	0.013
225	0.003	0.004	0.003	0.003	0.006	0.007	0.008	0.009	0.009	0.010	0.011
275	0.002	0.003	0.003	0.005	0.005	0.005	0.005	0.005	0.005	0.006	0.006
325	0.002	0.004	0.004	0.002	0.004	0.006	0.006	0.007	0.008	0.008	0.008
375	0.002	0.003	0.003	0.004	0.005	0.006	0.006	0.006	0.006	0.006	0.006
425	0.002	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.005	0.005
475	0.002	0.003	0.004	0.003	0.004	0.005	0.005	0.006	0.005	0.006	0.006
525	0.002	0.003	0.004	0.004	0.003	0.003	0.003	0.003	0.004	0.004	0.004
575	0.002	0.002	0.003	0.004	0.004	0.005	0.006	0.006	0.006	0.007	0.007
625	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
675	0.002	0.003	0.003	0.004	0.003	0.004	0.005	0.006	0.006	0.006	0.007
725	0.002	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.004
775	0.002	0.002	0.002	0.003	0.004	0.004	0.005	0.006	0.006	0.007	0.008
825	0.002	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.004
875	0.002	0.002	0.003	0.003	0.004	0.003	0.004	0.005	0.006	0.006	0.007
925	0.002	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.005
975	0.002	0.003	0.003	0.003	0.004	0.004	0.005	0.005	0.006	0.007	0.008
1025	0.002	0.003	0.003	0.003	0.004	0.004	0.004	0.005	0.005	0.005	0.006
1075	0.002	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.005	0.006	0.007
1125	0.002	0.004	0.003	0.003	0.004	0.004	0.005	0.005	0.005	0.006	0.007
1175	0.002	0.004	0.003	0.004	0.004	0.006	0.005	0.005	0.006	0.006	0.008
1225	0.003	0.003	0.004	0.004	0.005	0.005	0.005	0.005	0.006	0.006	0.008
1275	0.002	0.004	0.003	0.004	0.004	0.005	0.005	0.005	0.005	0.006	0.007
1325	0.003	0.004	0.004	0.004	0.005	0.005	0.005	0.005	0.006	0.007	0.008
1375	0.003	0.005	0.004	0.005	0.005	0.005	0.005	0.006	0.006	0.007	0.008
1425	0.004	0.005	0.004	0.006	0.005	0.005	0.005	0.005	0.006	0.008	0.009
1475	0.003	0.005	0.004	0.007	0.005	0.005	0.005	0.006	0.006	0.007	0.008
1525	0.004	0.007	0.005	0.007	0.005	0.005	0.005	0.006	0.006	0.008	0.010
1575	0.004	0.005	0.005	0.006	0.005	0.005	0.005	0.006	0.007	0.008	0.009
1625	0.004	0.003	0.007	0.007	0.004	0.004	0.005	0.006	0.007	0.008	0.009
1675	0.004	0.003	0.008	0.005	0.005	0.005	0.005	0.007	0.007	0.008	0.009
1725	0.004	0.005	0.008	0.005	0.004	0.005	0.006	0.007	0.007	0.009	0.010
1775	0.005	0.010	0.009	0.004	0.004	0.006	0.006	0.007	0.007	0.008	0.011
1825	0.005	0.007	0.008	0.004	0.004	0.004	0.006	0.006	0.007	0.008	0.011
1875	0.005	0.010	0.007	0.004	0.004	0.006	0.006	0.006	0.006	0.007	0.011
1925	0.006	0.012	0.005	0.007	0.004	0.004	0.006	0.005	0.007	0.008	0.020
1975	0.011	0.010	0.007	0.008	0.007	0.007	0.006	0.007	0.006	0.008	0.026

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Higher frequencies (Energy supply)											
Active power P/Pn[%]	0	10	20	30	40	50	60	70	80	90	100
Frequency [kHz]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]
2,1	0.058	0.078	0.036	0.032	0.018	0.017	0.015	0.016	0.016	0.085	0.247
2,3	0.059	0.039	0.088	0.100	0.091	0.094	0.066	0.110	0.087	0.127	0.039
2,5	0.016	0.017	0.014	0.018	0.027	0.033	0.070	0.039	0.076	0.023	0.015
2,7	0.010	0.010	0.010	0.008	0.015	0.016	0.016	0.015	0.015	0.010	0.011
2,9	0.009	0.009	0.009	0.008	0.007	0.009	0.009	0.008	0.007	0.008	0.009
3,1	0.008	0.011	0.006	0.007	0.005	0.006	0.006	0.006	0.005	0.005	0.006
3,3	0.016	0.013	0.006	0.005	0.004	0.004	0.004	0.004	0.004	0.004	0.004
3,5	0.008	0.011	0.006	0.004	0.003	0.003	0.002	0.002	0.002	0.003	0.003
3,7	0.004	0.004	0.004	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002
3,9	0.002	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.002
4,1	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005
4,3	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.004
4,5	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.001	0.002	0.002
4,7	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.001	0.001	0.001
4,9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.000
5,1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5,3	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.001	0.001
5,5	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001
5,7	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.001
5,9	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.002	0.002
6,1	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001
6,3	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.004
6,5	0.001	0.001	0.003	0.002	0.003	0.004	0.004	0.004	0.004	0.003	0.001
6,7	0.004	0.004	0.003	0.003	0.001	0.001	0.001	0.001	0.001	0.005	0.004
6,9	0.004	0.003	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005
7,1	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
7,3	0.001	0.001	0.001	0.001	0.002	0.002	0.001	0.001	0.001	0.001	0.001
7,5	0.001	0.002	0.001	0.001	0.002	0.002	0.002	0.003	0.004	0.001	0.002
7,7	0.002	0.002	0.001	0.002	0.009	0.010	0.002	0.005	0.002	0.002	0.002
7,9	0.005	0.007	0.008	0.008	0.002	0.003	0.012	0.009	0.011	0.007	0.003
8,1	0.004	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.011	0.009
8,3	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.011
8,5	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001
8,7	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.001	0.001	0.001	0.001
8,9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001

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Harmonics (DIN EN 61000-3-2 ($\leq 16A$)) (Energy consumption)												
Power P/Pn [%]	0	10	20	30	40	50	60	70	80	90	100	Limit
Ordinal number	A	A	A	A	A	A	A	A	A	A	A	A
2	0.029	0.053	0.053	0.048	0.038	0.033	0.029	0.028	0.026	0.026	0.036	1.080
3	0.066	0.091	0.224	0.272	0.281	0.275	0.265	0.251	0.235	0.215	0.175	2.300
4	0.037	0.023	0.020	0.025	0.018	0.013	0.009	0.006	0.003	0.002	0.006	0.430
5	0.096	0.033	0.035	0.117	0.161	0.181	0.192	0.203	0.213	0.223	0.243	1.140
6	0.011	0.025	0.004	0.015	0.016	0.013	0.010	0.007	0.005	0.004	0.001	0.300
7	0.051	0.074	0.010	0.067	0.112	0.132	0.142	0.147	0.151	0.156	0.161	0.770
8	0.006	0.021	0.013	0.009	0.012	0.011	0.009	0.008	0.006	0.003	0.002	0.230
9	0.036	0.056	0.034	0.017	0.058	0.079	0.090	0.098	0.102	0.105	0.110	0.400
10	0.001	0.012	0.013	0.002	0.007	0.009	0.007	0.007	0.006	0.005	0.003	0.184
11	0.025	0.019	0.039	0.011	0.043	0.064	0.075	0.081	0.087	0.092	0.096	0.330
12	0.002	0.007	0.012	0.006	0.005	0.006	0.006	0.006	0.005	0.005	0.003	0.153
13	0.014	0.017	0.028	0.014	0.018	0.037	0.050	0.057	0.061	0.065	0.072	0.210
14	0.004	0.010	0.008	0.005	0.002	0.005	0.005	0.006	0.005	0.004	0.003	0.131
15	0.009	0.014	0.019	0.016	0.011	0.028	0.040	0.049	0.055	0.056	0.062	0.150
16	0.004	0.010	0.007	0.007	0.003	0.004	0.005	0.005	0.005	0.005	0.004	0.115
17	0.004	0.005	0.006	0.017	0.006	0.016	0.028	0.035	0.041	0.047	0.050	0.132
18	0.004	0.002	0.002	0.005	0.002	0.002	0.004	0.005	0.005	0.005	0.003	0.102
19	0.003	0.003	0.007	0.016	0.006	0.013	0.023	0.032	0.035	0.042	0.048	0.118
20	0.004	0.005	0.004	0.005	0.005	0.003	0.004	0.005	0.005	0.005	0.004	0.092
21	0.003	0.002	0.004	0.010	0.007	0.005	0.013	0.020	0.026	0.029	0.038	0.107
22	0.003	0.004	0.006	0.005	0.004	0.001	0.003	0.004	0.006	0.005	0.005	0.084
23	0.003	0.003	0.005	0.008	0.010	0.004	0.013	0.018	0.025	0.030	0.036	0.098
24	0.002	0.002	0.005	0.005	0.004	0.002	0.002	0.004	0.005	0.005	0.007	0.077
25	0.004	0.003	0.003	0.004	0.008	0.003	0.007	0.014	0.017	0.023	0.034	0.090
26	0.002	0.004	0.004	0.003	0.003	0.003	0.002	0.003	0.004	0.005	0.011	0.071
27	0.004	0.004	0.002	0.002	0.008	0.004	0.004	0.011	0.016	0.021	0.033	0.083
28	0.001	0.002	0.002	0.001	0.002	0.003	0.002	0.003	0.004	0.007	0.007	0.066
29	0.005	0.004	0.003	0.002	0.005	0.005	0.003	0.005	0.019	0.024	0.020	0.078
30	0.001	0.002	0.003	0.001	0.003	0.004	0.003	0.003	0.008	0.024	0.004	0.061
31	0.005	0.005	0.003	0.003	0.004	0.006	0.004	0.010	0.051	0.034	0.018	0.073
32	0.001	0.003	0.003	0.002	0.003	0.002	0.003	0.007	0.011	0.012	0.004	0.058
33	0.004	0.003	0.002	0.003	0.003	0.003	0.004	0.033	0.014	0.011	0.012	0.068
34	0.001	0.002	0.002	0.003	0.003	0.002	0.004	0.012	0.003	0.004	0.004	0.054
35	0.005	0.004	0.003	0.003	0.002	0.004	0.010	0.018	0.005	0.007	0.010	0.064
36	0.001	0.003	0.003	0.003	0.003	0.002	0.009	0.005	0.004	0.003	0.004	0.051
37	0.004	0.005	0.004	0.004	0.002	0.005	0.038	0.004	0.003	0.004	0.006	0.061
38	0.002	0.005	0.007	0.003	0.007	0.010	0.008	0.003	0.002	0.003	0.004	0.048
39	0.011	0.012	0.006	0.005	0.006	0.013	0.009	0.003	0.003	0.003	0.005	0.058
40	0.003	0.014	0.025	0.010	0.022	0.013	0.003	0.003	0.003	0.003	0.005	0.046

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Inter-harmonics (Energy consumption)											
Active power P/Pn[%]	0	10	20	30	40	50	60	70	80	90	100
Frequency [Hz]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]
75	0.010	0.009	0.009	0.012	0.016	0.021	0.028	0.032	0.037	0.047	0.054
125	0.004	0.004	0.003	0.005	0.006	0.008	0.010	0.012	0.013	0.016	0.019
175	0.002	0.003	0.003	0.004	0.003	0.003	0.004	0.004	0.005	0.007	0.009
225	0.002	0.002	0.002	0.003	0.003	0.004	0.005	0.005	0.005	0.006	0.008
275	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.005
325	0.001	0.002	0.002	0.002	0.003	0.004	0.004	0.004	0.005	0.006	0.006
375	0.002	0.002	0.002	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.005
425	0.001	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.004	0.005
475	0.001	0.002	0.002	0.002	0.003	0.003	0.003	0.004	0.004	0.005	0.005
525	0.001	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.004	0.005
575	0.001	0.002	0.002	0.002	0.002	0.003	0.004	0.004	0.005	0.005	0.006
625	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.004	0.005
675	0.002	0.002	0.002	0.002	0.002	0.003	0.004	0.004	0.005	0.006	0.006
725	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.005	0.005
775	0.002	0.002	0.002	0.003	0.002	0.003	0.004	0.005	0.006	0.006	0.007
825	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.004	0.005	0.006
875	0.002	0.002	0.003	0.003	0.003	0.003	0.004	0.005	0.007	0.006	0.007
925	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.006	0.007
975	0.002	0.003	0.004	0.003	0.004	0.003	0.004	0.005	0.008	0.007	0.008
1025	0.002	0.004	0.004	0.003	0.004	0.004	0.004	0.005	0.004	0.007	0.010
1075	0.002	0.003	0.003	0.003	0.004	0.003	0.004	0.006	0.008	0.007	0.009
1125	0.002	0.004	0.003	0.003	0.003	0.004	0.004	0.005	0.005	0.008	0.025
1175	0.003	0.005	0.004	0.004	0.004	0.004	0.005	0.007	0.009	0.008	0.019
1225	0.003	0.004	0.004	0.004	0.003	0.004	0.005	0.006	0.006	0.011	0.076
1275	0.003	0.004	0.004	0.004	0.003	0.004	0.006	0.007	0.013	0.010	0.063
1325	0.004	0.006	0.005	0.005	0.004	0.005	0.006	0.007	0.008	0.022	0.077
1375	0.003	0.004	0.005	0.004	0.004	0.005	0.008	0.010	0.014	0.018	0.045
1425	0.004	0.004	0.006	0.004	0.004	0.006	0.006	0.010	0.020	0.063	0.030
1475	0.003	0.007	0.005	0.003	0.005	0.005	0.007	0.010	0.078	0.080	0.012
1525	0.004	0.006	0.006	0.004	0.004	0.007	0.006	0.025	0.067	0.155	0.017
1575	0.004	0.009	0.006	0.004	0.008	0.007	0.010	0.028	0.194	0.058	0.013
1625	0.005	0.007	0.004	0.004	0.004	0.007	0.008	0.081	0.028	0.052	0.012
1675	0.005	0.007	0.003	0.004	0.009	0.007	0.014	0.126	0.030	0.015	0.010
1725	0.008	0.005	0.004	0.007	0.006	0.009	0.021	0.066	0.009	0.022	0.012
1775	0.016	0.009	0.009	0.007	0.013	0.009	0.032	0.064	0.014	0.012	0.010
1825	0.006	0.010	0.008	0.009	0.006	0.013	0.076	0.017	0.009	0.009	0.011
1875	0.009	0.018	0.015	0.009	0.026	0.026	0.100	0.014	0.012	0.009	0.011
1925	0.030	0.024	0.018	0.014	0.016	0.059	0.022	0.010	0.006	0.009	0.011
1975	0.066	0.065	0.053	0.019	0.096	0.074	0.025	0.009	0.008	0.007	0.011

Certificate of Conformity

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Higher frequencies (Energy consumption)											
Active power P/Pn[%]	0	10	20	30	40	50	60	70	80	90	100
Frequency [kHz]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]	I [%]
2,1	0.020	0.030	0.058	0.097	0.041	0.046	0.019	0.014	0.014	0.014	0.019
2,3	0.012	0.018	0.014	0.020	0.017	0.015	0.011	0.012	0.012	0.012	0.032
2,5	0.011	0.013	0.013	0.009	0.010	0.010	0.009	0.009	0.010	0.010	0.133
2,7	0.008	0.009	0.008	0.006	0.006	0.007	0.007	0.007	0.008	0.009	0.081
2,9	0.006	0.006	0.006	0.006	0.005	0.005	0.005	0.005	0.008	0.042	0.016
3,1	0.008	0.013	0.006	0.005	0.004	0.004	0.004	0.005	0.061	0.050	0.006
3,3	0.014	0.012	0.006	0.005	0.004	0.004	0.004	0.029	0.013	0.013	0.004
3,5	0.007	0.009	0.006	0.005	0.004	0.004	0.004	0.014	0.005	0.003	0.003
3,7	0.005	0.005	0.004	0.003	0.004	0.004	0.014	0.005	0.002	0.002	0.003
3,9	0.009	0.008	0.006	0.003	0.007	0.008	0.005	0.002	0.002	0.001	0.002
4,1	0.003	0.003	0.004	0.005	0.004	0.004	0.002	0.001	0.001	0.001	0.001
4,3	0.001	0.002	0.002	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.001
4,5	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
4,7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001
4,9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
5,1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5,3	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001
5,5	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.000	0.001
5,7	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.003	0.003	0.001	0.000
5,9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.005	0.000
6,1	0.000	0.001	0.002	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001
6,3	0.004	0.004	0.002	0.003	0.004	0.004	0.001	0.001	0.001	0.001	0.008
6,5	0.001	0.001	0.001	0.001	0.001	0.002	0.004	0.001	0.001	0.001	0.002
6,7	0.002	0.003	0.002	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001
6,9	0.004	0.004	0.003	0.003	0.004	0.004	0.004	0.003	0.005	0.001	0.001
7,1	0.002	0.003	0.001	0.001	0.001	0.001	0.002	0.010	0.011	0.002	0.001
7,3	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.004	0.016	0.001
7,5	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.003
7,7	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.022
7,9	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.004
8,1	0.002	0.002	0.006	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001
8,3	0.005	0.005	0.003	0.007	0.008	0.009	0.008	0.001	0.001	0.001	0.001
8,5	0.001	0.001	0.001	0.001	0.001	0.001	0.004	0.003	0.004	0.002	0.001
8,7	0.000	0.001	0.000	0.000	0.001	0.001	0.001	0.009	0.006	0.007	0.001
8,9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.004

Certificate of Conformity

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E.6 Certificate of the network and system protection

Certificate of NS protection	No. 50409230013209-00		
Manufacturer	Autarco Group BV Torenallee 20, 5617 BC, Eindhoven, THE NETHERLANDS		
Type of NS protection			
Central NS protection	<input type="checkbox"/>		
Integrated NS protection	<input checked="" type="checkbox"/>	Assigned to power generation unit type	S2.MR3000
Network connection rules	VDE-AR-N 4105:2018-11/Corrigendum 1:2020-10 Generators connected to the low-voltage distribution network - Technical requirements for the connection to and parallel operation with low-voltage distribution networks.		
Test requirement	DIN VDE V 0124-100 (VDE V 0124-100):2020-06 “Network integration of power generation system – Low voltage” Test requirements for power generation units intended for connection to and parallel operation on the low-voltage network.		
The network and system protection mentioned above meets the requirements of VDE-AR-N 4105:2018.			

Certificate of Conformity

No. ESY 090313 0027 Rev. 00

E.7 Requirement for the test report for the NS protection

Extract from test report for NS protection "Determination of electrical properties"		No. 50409230013209-00	
NS protection test report			
Type of NS system:	Integrated NS protection	Other Manufacturer indications	
Software version:	150012		
Manufacturer:	Autarco Group BV Torenallee 20, 5617 BC, Eindhoven, THE NETHERLANDS		
Measuring period:	From 2023-04-17 to 2023-06-29, 2023-09-06		
	Inverter		
	directly coupled synchronous and asynchronous generators with Pn > 50 kW		
Protection function	Setting value	Tripping value	Break time NS protection *
Rise-in-voltage protection $U >>$	$1,25 * U_n$	$1,25 * U_n$	127 ms
Rise-in-voltage protection $U >$	$1,10 * U_n$	$1,12 * U_n$	ms**
Voltage drop protection $U <$	$0,8 * U_n$	$0,80 * U_n$	3015 ms
Voltage drop protection $U <<$	$0,45 * U_n$	$0,44 * U_n$	322 ms
Frequency decrease protection $f <$	47,5 Hz	47,49 Hz	139 ms
Frequency increase protection $f >$	51,5 Hz	51,51 Hz	117 ms
*: The tripping time includes the period from the limit value violation U/f until the tripping signal to the interface switch. When planning the power generation system, the response time of the interface switch shall be added to the maximum time value obtained as indicated above. The disconnection time (sum of tripping time of the NS protection plus response time of the interface switch) shall not exceed 200 ms. **: Verification disconnection time of moving 10-min-average value. Disconnecting time as below: <ol style="list-style-type: none"> 1. 503 s (from 600s@U_n to 112%U_n) 2. Continuous operation (from 600s@U_n to 108%U_n) 3. 308 s (from 600s@106%U_n to 114%U_n) 			

Certificate of Conformity

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<input checked="" type="checkbox"/> as integrated NS protection	
Assigned to power generation unit type	S2.MR3000
Integrated interface switch type	Series-connected relays for both line and neutral conductors Relay type: AZSR131-1AE-12D
Response time of interface switch for integrated NS protection	Operate time: Max. 20 ms Release time: Max. 10 ms
Verification of the entire functional chain "integrated NS protection – interface switch" has resulted in successful disconnection.	<input checked="" type="checkbox"/>