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TEST REPORT
Engineering recommendation
IEC61000-3-2& IEC61000-3-3
Type Approval and manufacturer/supplier compliance with the requirements of IEC61000-3-2& IEC61000-3-3

Report Reference NO.....:ES160317028S

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Date of issue .....:Mar. 17.2016

Total number of pages .....:6 pages

Testing Laboratory name.....:EMTEK(SHENZHEN)CO.,LTD.

Address .....:Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China

Testing location/address .....:Same as above

Applicant's name.....:Ningbo Ginlong technologies Co., Ltd

Address .....:No.57 Jintong Road Seafront(Binhai) Industrial Park, Xiangshan, Ningbo, Zhejiang, China

Test specification:

Standard .....: IEC61000-3-2，IEC61000-3-3

Testing procedure .....:Verification report

Non-standard test method.....:N/A

Test Report Form NO.....: IEC61000-3-2，IEC61000-3-3 form A

Test Report Form(s) Originator.....: EMTEK

Master TRF .....:Dated 2014-12

Test item description.....:Transformer less PV inverter

Trade Mark.....:N/A

Manufacturer .....:Ningbo Ginlong technologies Co., Ltd
No.57 Jintong Road Seafront(Binhai) Industrial Park, Xiangshan, Ningbo, Zhejiang, China

Model/Type reference.....: Solis-20K, Solis-25K, Solis-30K, Solis-36K-HV, Solis-40K-HV,

Ratings .....:N/A

Summary of testing :

The product has been tested according to standard IEC61000-3-2，IEC61000-3-3

List of Attachment (including a total number of pages in each attachment):

N/A

Test item particulars.....:

Equipment mobility .....: ☐movable ☐hand-held ☒stationary
☒fixed ☐transportable ☐for building-in

Connection to the mains .....:☐pluggable equipment ☐direct plug-in
☒permanent connection ☐for building-in

Environmental category .....: ☒outdoor ☐indoor unconditional
☐indoor conditional

Class of equipment .....: ☒Class I ☐Class II ☐Class III
☐Not classified

Mass of equipment.....: N/A

IP protection class .....: IP 65

Possible test case verdicts:

-test case does not apply to the object .....: N (/A, Not applicable)

-test object does meet the requirement .....: P (Pass)

-test object does not meet the requirement .....: F (Fail)

Testing.....:

Date of issue .....:Mar, 16,2016

Date(s) of performance of test.....:Mar, 16,2016 to Mar 17,2016

General remarks:

"(see Attachment#)"refers to additional information appended to the report.
"(see appended table)"refers to a table appended to the report.
The tests results presented in this report relate only to the object tested.
The report shall not be reproduced except in full without the written approval of the testing laboratory.
List of test equipment must be kept on file and available for review.
Additional test data and/or information provided in the attachments to this report.
Throughout this report a☐comma /☒point is used as the decimal separator.

General product information:

1. The Solar Inverter converts DC voltage into AC voltage.
2. The unit is providing EMC filtering at the output toward mains. The unit does not provide galvanic separation from input to output (transformerless).The output is switched off redundant by the high power switching bridge and a two relays. This assures that the opening of the output circuit will also operate in case of one error.

Power Quality. Harmonics. These tests should be carried out as specified in IEC61000-3-2. Only one set of tests is required and the **Manufacturer** should decide which one to use and complete the relevant table. The chosen test should be undertaken with a fixed source of energy at two power levels a) between 45 and 55% and b) at 100% of maximum export capacity.

Generating Unit tested to IEC61000-3-2						
SSEG rating per phase (rpp)			10	kW		
Harmonic	At 45-55% of rated output		100% of rated output			
No.of Harmonic	Measured Value (MV) in Amps	Normalised Value (NV) in Amps	Measured Value (MV) in Amps	Normalised Value (NV) in Amps	Limit in BS EN 61000-3-2 in Amps	Higher limit for odd harmonics 21 and above
2	0.041	0.055	0.013	0.026	1.080	
3	0.375	0.097	0.339	0.382	2.300	
4	0.127	0.155	0.042	0.06	0.430	
5	0.426	0.453	0.318	0.361	1.140	
6	0.016	0.025	0.065	0.086	0.300	
7	0.326	0.366	0.155	0.17	0.770	
8	0.039	0.054	0.008	0.022	0.230	
9	0.113	0.126	0.103	0.128	0.400	
10	0.076	0.088	0.027	0.043	0.184	
11	0.153	0.177	0.111	0.129	0.330	
12	0.007	0.018	0.014	0.026	0.153	
13	0.098	0.125	0.055	0.068	0.210	
14	0.028	0.054	0.026	0.035	0.131	
15	0.037	0.059	0.047	0.059	0.150	
16	0.013	0.026	0.009	0.018	0.115	
17	0.054	0.080	0.008	0.017	0.132	
18	0.006	0.017	0.014	0.026	0.102	
19	0.045	0.054	0.031	0.043	0.118	
20	0.007	0.013	0.006	0.009	0.092	
21	0.005	0.011	0.011	0.018	0.107	0.160
22	0.014	0.023	0.009	0.014	0.084	
23	0.029	0.039	0.005	0.004	0.098	0.147
24	0.005	0.011	0.007	0.013	0.077	
25	0.009	0.017	0.01	0.016	0.090	0.135
26	0.007	0.015	0.005	0.01	0.071	
27	0.004	0.008	0.02	0.032	0.083	0.124
28	0.006	0.010	0.005	0.01	0.066	
29	0.012	0.023	0.005	0.01	0.078	0.117
30	0.004	0.011	0.005	0.01	0.061	
31	0.016	0.023	0.012	0.019	0.073	0.109
32	0.006	0.015	0.004	0.007	0.058	

33	0.003	0.008	0.005	0.01	0.068	0.102
34	0.005	0.010	0.005	0.008	0.054	
35	0.012	0.021	0.012	0.017	0.064	0.096
36	0.003	0.007	0.004	0.009	0.051	
37	0.006	0.010	0.008	0.012	0.061	0.091
38	0.003	0.007	0.004	0.007	0.048	
39	0.005	0.011	0.005	0.01	0.058	0.087
40	0.003	0.007	0.005	0.01	0.046	
41	0.004	0.009	0.005	0.007	0.057	0.085
42	0.006	0.010	0.004	0.006	0.044	
43	0.003	0.008	0.005	0.007	0.055	0.081
44	0.005	0.010	0.007	0.01	0.042	
45	0.003	0.007	0.006	0.009	0.043	0.078
46	0.003	0.007	0.006	0.008	0.051	
47	0.008	0.015	0.007	0.013	0.041	0.075
48	0.004	0.009	0.005	0.007	0.049	
49	0.003	0.008	0.005	0.007	0.058	0.071
50	0.003	0.007	0.004	0.007	0.046	

Note the higher limits for odd harmonics 21 and above are only allowable under certain conditions, if these higher limits are utilised please state the exemption used as detailed in part 6.2.3.4 of BS EN 61000-3-2 in the box below.

Power Quality. Voltage fluctuations and Flicker.

The tests should be carried out on a single Generating Unit. Results should be normalized to standard source impedance or if this results in figures above the limits set in IEC61000-3-3 to a suitable Maximum Impedance.

	Starting			Stopping			Running	
	d max	d c	d(t)	d max	d c	d(t)	P st	P lt 2 hours
Measured Values at test impedance	0.23	0.13	0	0.17	0.12	0	0.04	0.07
Normalised to standard impedance	0.33	0.24	0	0.24	0.19	0	0.06	0.09
Normalised to required maximum impedance	4%	3.3%	3.3% 500ms	4%	3.3%	3.3% 500ms	1.0	0.65
Limits set under BS EN 61000-3-11	4%	3.3%	3.3%	4%	3.3%	3.3%	1.0	0.65

Test	R	0.24	Ω	Xl	0.15	Ω

Impedance						
Standard Impedance	R	0.24 * 0.4 ^	Ω	Xl	0.15 * 0.25 ^	Ω
Maximum Impedance	R		Ω	Xl		Ω

* Applies to three phase and split single phase **Generating Unit**s

^ Applies to single phase **Generating Unit**s and **Generating Unit**s using two phases on a three phase system

For voltage change and flicker measurements the following formula is to be used to convert the measured values to the normalised values where the power factor of the generation output is 0.98 or above.

Normalised value = Measured value*reference source resistance/measured source resistance at test point

Single phase units reference source resistance is 0.4 Ω

Two phase units in a three phase system reference source resistance is 0.4 Ω

Two phase units in a split phase system reference source resistance is 0.24 Ω

Three phase units reference source resistance is 0.24 Ω

Where the power factor of the output is under 0.98 then the Xl to R ratio of the test impedance should be close to that of the Standard Impedance.

The stopping test should be a trip from full load operation.

The duration of these tests need to comply with the particular requirements set out in the testing notes for the technology under test. Dates and location of the test need to be noted below