



中国认可  
国际互认  
检测  
TESTING  
CNAS L0220

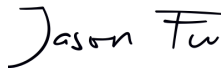

Test Report issued under the responsibility of:



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<b>TEST REPORT</b> <b>IEC 62109-1</b> <b>Safety of Power Converter for use in Photovoltaic Power Systems</b> <b>Part 1: General requirements</b>	
Report Number.....	190411091GZU-001
Date of issue.....	18 Jun., 2019, Revision 1: 07 April 2020
Total number of pages .....	10 pages
Name of Testing Laboratory preparing the Report .....	Intertek Testing Services Shenzhen Ltd. Guangzhou Branch Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD, Guangzhou, China
Applicant's name .....	Shenzhen SOFAR SOLAR Co., Ltd.
Address.....	401, Building 4, AnTongDa Industrial Park, District 68, XingDong Community, XinAn Street, BaoAn District, Shenzhen, China
<b>Test specification:</b>	
Standard .....	IEC/EN 62109-1:2010 (First Edition)
Test procedure .....	SAA
Non-standard test method .....	N/A
Test Report Form No. ....	IEC62109_1B
Test Report Form(s) Originator ....	VDE Testing and Certification Institute
Master TRF .....	Dated 2016-04
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<b>General disclaimer:</b>	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.	

<b>Test item description</b> ..... :	Solar Grid-tied Inverter			
<b>Trade Mark</b> ..... :	SOFAR SOLAR			
<b>Manufacturer</b> .....	Same as applicant			
<b>Model/Type reference</b> ..... :	SOFAR 10000TL-G2, SOFAR 12000TL-G2, SOFAR 15000TL-G2			
<b>Ratings</b> ..... :	Model	SOFAR 10000TL-G2	SOFAR 12000TL-G2	SOFAR 15000TL-G2
	Max.PV voltage	1000 d.c.V		
	PV MPPT voltage range	160-960 d.c.V		
	Max.input current	21 /11 d.c.A		
	PV Isc	30/15 d.c.A		
	Max.output power	10000W	12000W	15000W
	Max.apparent power	11000VA	13200VA	16500VA
	Nominal output voltage	3/N/PE, 230 /400 a.cV		
	Max.output current	3×16.5 a.c.A	3×20.0 a.c.A	3×24.0 a.c.A
	Nominal output Frequency	50 Hz		
	Power factor range	0.8Leading – 0.8 lagging		
	Inverter technology	Non-isolated		
	Safety level	Class I		
	Ingress Protection	IP 65		
	Operation Ambient Temperature	-25°C - +60°C		
	Software Version	V0.21		

<b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b>		
<input checked="" type="checkbox"/>	<b>Testing Laboratory:</b>	Intertek Testing Services Shenzhen Ltd. Guangzhou Branch
<b>Testing location/ address .....</b>		Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD, Guangzhou, China
<input type="checkbox"/>	<b>Associated CB Testing Laboratory:</b>	N/A
<b>Testing location/ address .....</b>		N/A
<b>Tested by (name, function, signature).....:</b>		Jason Fu Technical Team Leader 
<b>Approved by (name, function, signature)....:</b>		Tommy Zhong Technical Manager 
<hr/>		
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 1:</b>	N/A
<b>Testing location/ address .....</b>		N/A
<b>Tested by (name, function, signature).....:</b>		N/A
<b>Approved by (name, function, signature)....:</b>		N/A
<hr/>		
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 2:</b>	N/A
<b>Testing location/ address .....</b>		N/A
<b>Tested by (name + signature) .....</b>		N/A
<b>Witnessed by (name, function, signature) .:</b>		N/A
<b>Approved by (name, function, signature)....:</b>		N/A
<hr/>		
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 3:</b>	N/A
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 4:</b>	N/A
<b>Testing location/ address .....</b>		N/A
<b>Tested by (name, function, signature).....:</b>		N/A
<b>Witnessed by (name, function, signature) .:</b>		N/A
<b>Approved by (name, function, signature)....:</b>		N/A
<b>Supervised by (name, function, signature) :</b>		N/A

<b>List of Attachments (including a total number of pages in each attachment):</b> N/A	
<b>Summary of testing:</b>	
<b>Tests performed (name of test and test clause):</b> All applicable tests	<b>Testing location:</b> Intertek Testing Services Shenzhen Ltd. Guangzhou Branch Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD, Guangzhou, China
<b>Summary of compliance with National Differences (List of countries addressed):</b> N/A	
<input checked="" type="checkbox"/> <b>The product fulfils the requirements of IEC/EN 62109-1:2010 (First Edition)</b>	

**Copy of marking plate:**

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBS that own these marks.

**SOFAR SOLAR** Solar Grid-tied Inverter

Model No:	SOFAR 10000TL-G2
Max.DC Input Voltage	1000V
Operating MPPT Voltage Range	160~960V
Max. Input Current	21A/11A
Max. PV Isc	30A/15A
Nominal Grid Voltage	3/N/PE,230/400Vac
Max.Output Current	3x16.5A
Nominal Grid Frequency	50/60Hz
Nominal Output Power	10000W
Max.Output Power	11000VA
Power Factor	>0.99(adjustable+/-0.8)
Ingress Protection	IP65
Operating Temperature Range	-25°C~ +60°C
Protective Class	Class I
Topology	Non-isolated
Made In China	

Manufacturer : Shenzhen SOFAR SOLAR Co.,Ltd.  
 Address : 401, Building 4, AnTongDa Industrial Park,  
 District 68, XingDong Community,XinAn Street,  
 BaoAn District, Shenzhen, China  
 IEC62109-1,IEC62109-2,NB-T 32004

**SOFAR SOLAR** Solar Grid-tied Inverter

Model No:	SOFAR 12000TL-G2
Max.DC Input Voltage	1000V
Operating MPPT Voltage Range	160~960V
Max. Input Current	21A/11A
Max. PV Isc	30A/15A
Nominal Grid Voltage	3/N/PE,230/400Vac
Max.Output Current	3x20A
Nominal Grid Frequency	50/60Hz
Nominal Output Power	12000W
Max.Output Power	13200VA
Power Factor	>0.99(adjustable+/-0.8)
Ingress Protection	IP65
Operating Temperature Range	-25°C~ +60°C
Protective Class	Class I
Topology	Non-isolated
Made In China	

Manufacturer : Shenzhen SOFAR SOLAR Co.,Ltd.  
 Address : 401, Building 4, AnTongDa Industrial Park,  
 District 68, XingDong Community,XinAn Street,  
 BaoAn District, Shenzhen, China  
 IEC62109-1,IEC62109-2,NB-T 32004

**SOFAR** Solar Grid-tied Inverter  
SOLAR

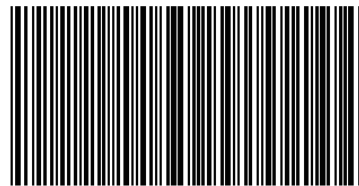
Model No:	SOFAR 15000TL-G2
Max.DC Input Voltage	1000V
Operating MPPT Voltage Range	160~960V
Max. Input Current	21A/11A
Max. PV Isc	30A/15A
Nominal Grid Voltage	3/N/PE,230/400Vac
Max.Output Current	3x24A
Nominal Grid Frequency	50/60Hz
Nominal Output Power	15000W
Max.Output Power	16500VA
Power Factor	>0.99(adjustable+/-0.8)
Ingress Protection	IP65
Operating Temperature Range	-25°C~ +60°C
Protective Class	Class I
Topology	Non-isolated

Made In China

Manufacturer : Shenzhen SOFAR SOLAR Co.,Ltd.  
Address : 401, Building 4, AnTongDa Industrial Park,  
District 68, XingDong Community,XinAn Street,  
BaoAn District, Shenzhen, China  
IEC62109-1,IEC62109-2,NB-T 32004



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**Note:**

1. The above markings are the minimum requirements required by the safety standard. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.
2. Label is attached on the side surface of enclosure and visible after installation.

<b>Test item particulars</b> ..... :	
<b>Equipment mobility</b> ..... :	<input type="checkbox"/> movable <input type="checkbox"/> hand-held <input type="checkbox"/> stationary <input checked="" type="checkbox"/> fixed <input type="checkbox"/> transportable <input type="checkbox"/> for building-in
<b>Connection to the mains</b> ..... :	<input type="checkbox"/> pluggable equipment <input type="checkbox"/> direct plug-in <input checked="" type="checkbox"/> permanent connection <input type="checkbox"/> for building-in
<b>Environmental category</b> ..... :	<input checked="" type="checkbox"/> outdoor <input type="checkbox"/> indoor unconditional <input type="checkbox"/> indoor conditional
<b>Over voltage category Mains</b> ..... :	<input type="checkbox"/> OVC I <input type="checkbox"/> OVC II <input checked="" type="checkbox"/> OVC III <input type="checkbox"/> OVC IV
<b>Over voltage category DC</b> ..... :	<input type="checkbox"/> OVC I <input checked="" type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV
<b>Mains supply tolerance (%)</b> .....	-90 / +110 %
<b>Tested for power systems</b> .....	TN systems
<b>IT testing, phase-phase voltage (V)</b> .....	- - -
<b>Class of equipment</b> ..... :	<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III <input type="checkbox"/> Not classified
<b>Mass of equipment (kg)</b> ..... :	Approx. 25Kg for model SOFAR 15000TL-G2 Approx. 23.5Kg for model SOFAR 10000TL-G2 and model SOFAR 12000TL-G2
<b>Pollution degree</b> .....	Outside PD3; Inside PD2
<b>IP protection class</b> .....	IP 65
..... :	
<b>Possible test case verdicts:</b>	
- test case does not apply to the test object .....	N/A
- test object does meet the requirement .....	P (Pass)
- test object was not evaluated for the requirement.....	N/E
- test object does not meet the requirement .....	F (Fail)
<b>Testing</b> .....	
<b>Date of receipt of test item</b> ..... :	31 Mar., 2020
<b>Date (s) of performance of tests</b> .....	31 Mar., 2020 – 06 Apr., 2020

<b>General remarks:</b>					
<p>"(See Enclosure #)" refers to additional information appended to the report.          "(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p> <p><b>Revision 1:</b>          This report is based on original report No.190411091GZU-001, dated 18 Jun., 2019 to have following addition          1, Added below alternative DC switch in critical components list</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Manufacturer</th> <th style="width: 50%;">Type</th> </tr> </thead> <tbody> <tr> <td>Santon International bv</td> <td>XBHP+3410/2 , XBHP3410/2</td> </tr> </tbody> </table> <p>After checking the specification and certificate, no tests are required on this addition.          This report shall be used together with report No. 190411091GZU-001 and 190411091GZU-002</p>		Manufacturer	Type	Santon International bv	XBHP+3410/2 , XBHP3410/2
Manufacturer	Type				
Santon International bv	XBHP+3410/2 , XBHP3410/2				
<b>Manufacturer's Declaration per sub-clause 4.2.5 of IEC62109-2:</b>					
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable				
<b>When differences exist; they shall be identified in the General product information section.</b>					
Name and address of factory (ies) .....: Dongguan SOFAR SOLAR Co., Ltd. 1F-6F, Building E, No.1 JinQi Road, Bihu Industrial Park, Wulian Village, Fenggang Town, Dongguan City					



**General product information:**

The unit is a three-phases non-isolated PV Grid-tied inverter, it can convert the high PV voltage to Grid voltage and feed into Grid network.

The unit is providing EMI filtering at the PV side and AC side. It does provide basic insulation from PV side to Grid.

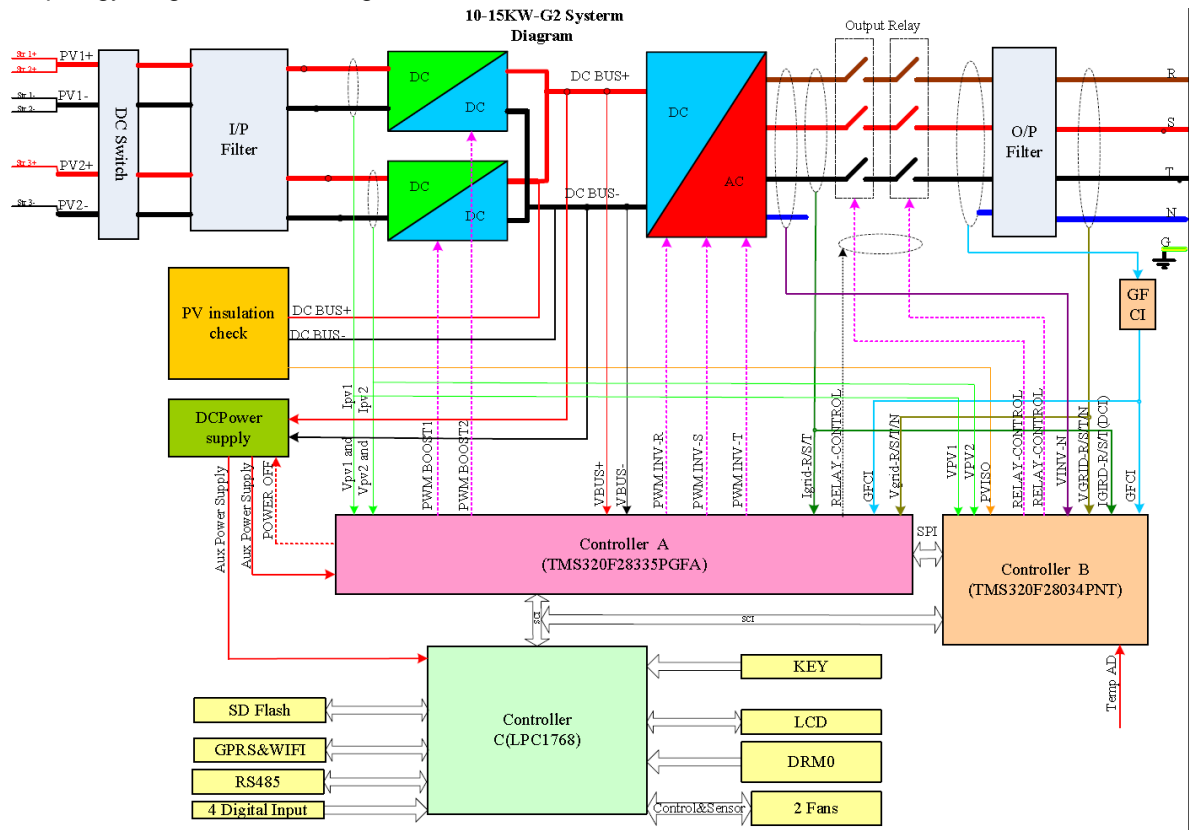
The unit has two controllers. The master controller A monitor the invert statue; measure the PV voltage and current, bus voltage, AC voltage, current, GFCI and frequency, also communicate with the slave controller B

The slave controller B monitor AC voltage, current, frequency, GFCI and communicate with the master controller A

The relays are designed to redundant structure that controlled by separately.

The master controller and slave controller are used together to control relay open or close, if the single fault on one controller, the other controller can be capable to open the relay, so that still providing safety means.

The topology diagram as following:



**Model differences:**

The model SOFAR 1000TL-G2, SOFAR 1200TL-G2 and SOFAR 1500TL-G2 are completely identical, except output power derating in software.

The only differences on hardware between the models SOFAR 1000TL-G2, SOFAR 1200TL-G2 and SOFAR 1500TL-G2 are below:

1. The main output inductor is NPS226060\*2+NPF226060\*2, 2.0Φ\*2P /37Ts L=756μH for model SOFAR 1500TL-G2 while it's NPS226060\*2+NPF226060\*1, 2.0Φ\*2P\*42Ts L=0.73mH for model SOFAR 1000TL-G2, SOFAR 1200TL-G2

Other than special notes, typical model SOFAR 1500TL-G2 is used as representative for testing in this report

IEC 62109-1			
Clause	Requirement – Test	Result – Remark	Verdict

14	TABLE: list of critical components					P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity <sup>1)</sup>	
DC switch	Santon International B.V.	XBHP+3410/2	1000Vdc,30A, 800Vdc, 40A, 600Vdc, 60A IP66, Max. 85°C	EN 60947- 3:2009+A1+A2	DEKRA: 71- 107727	
(Alternative)	Santon International B.V	XBHP3410/2	1000Vdc,20A, 800Vdc, 30A, 500Vdc, 45A IP66, Max. 85°C	EN 60947- 3:2009+A1+A2	TUV R 50423069	

<sup>1)</sup> an asterisk indicates a mark which assures the agreed level of surveillance

(End of Report)