



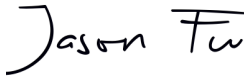

中国认可  
国际互认  
检测  
TESTING  
CNAS L0220

Test Report issued under the responsibility of:



<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>	
<b>Report Number</b> ..... :	130918053GZU-004
<b>Date of issue</b> ..... :	10 Jan., 2014, Revision 3: 07 April 2020
<b>Total number of pages</b> .....	12 pages
<b>Name of Testing Laboratory preparing the Report</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>Applicant's name</b> .....	Shenzhen SOFAR SOLAR Co., Ltd.
<b>Address</b> ..... :	401, Building 4, AnTongDa Industrial Park, District 68, XingDong Community, XinAn Street, BaoAn District, Shenzhen, China
<b>Test specification:</b>	
<b>Standard</b> .....	IEC/EN 62109-1:2010 (First Edition)
<b>Test procedure</b> .....	SAA,LVD
<b>Non-standard test method</b> .....	N/A
<b>Test Report Form No.</b> .....	IEC62109_1B
<b>Test Report Form(s) Originator</b> .... :	VDE Testing and Certification Institute
<b>Master TRF</b> .....	Dated 2016-04
<b>Copyright © 2016 IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components (IECEE System). All rights reserved.</b> This publication may be reproduced in whole or in part for non-commercial purposes as long as the IECEE is acknowledged as copyright owner and source of the material. IECEE takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context. If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed. <b>This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.</b>	
<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 20000TL-Sx Series, Sofar 17000TL-Sx Series , Sofar 15000TL-Sx Series , Sofar 10000TL-Sx Series (x=0-6)
<b>Ratings</b> ..... :	<p>Maximum d.c. input voltage: 1000 V</p> <p>Input voltage rang: 250-960 V</p> <p>Max. input current: 2x24 A (for Sofar 20000TL-Sx Series); 2x21 A (for Sofar 17000TL-Sx Series, Sofar 15000TL-Sx Series); 2x15 A (for Sofar 10000TL-Sx Series)</p> <p>Max. PV Isc: 2x30 A (for Sofar 20000TL-Sx Series); 2x27 A (for Sofar 17000TL-Sx Series, Sofar 15000TL-Sx Series); 2x20 A (for Sofar 10000TL-Sx Series)</p> <p>Nominal output voltage: 3/N/PE230V/400V</p> <p>Max. output current: 3x29 A (for Sofar 20000TL-Sx Series); 3x25 A (for Sofar 17000TL-Sx Series); 3x22 A (for Sofar 15000TL-Sx Series); 3x15 A (for Sofar 10000TL-Sx Series)</p> <p>Nominal frequency: 50/60 Hz</p> <p>Max. output power: 20000 VA (for Sofar 20000TL-Sx Series); 17000 VA (for Sofar 17000TL-Sx Series); 15000 VA (for Sofar 15000TL-Sx Series); 10000 VA (for Sofar 10000TL-Sx Series)</p> <p>Ingress protection: IP65</p> <p>Operating temperature range: -25~60°C</p> <p>Software Version: V4.40</p>

<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 10000-Sx-Series

Max. DC Input Voltage	1000V
Operating MPPT Voltage Range	250~960V
Max. Input Current	2x15A
Max. PV Isc	2x20A
Nominal Grid Voltage	3/N/PE, 230/400V~
Max. Output Current	3x15A
Nominal Grid Frequency	50/60Hz
Max. Output Power	10000VA
Power Factor	>0.99(adjustable+/-0.8)
Ingress Protection	IP65
Operating Temperature Range	-25°C~+60°C
Protective Calss	Class I

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  
SAA161911  
VDE0126-1-1, VDE-AR-N4105, G83/2, EN50438,  
C10/11, RD1699, UTE C15-712-1, AS4777

**SOFAR SOLAR** Solar Grid-tied Inverter

Model No: SOFAR 15000-Sx-Series

Max. DC Input Voltage	1000V
Operating MPPT Voltage Range	250~960V
Max. Input Current	2x21A
Max. PV Isc	2x27A
Nominal Grid Voltage	3/N/PE, 230/400V~
Max. Output Current	3x22A
Nominal Grid Frequency	50/60Hz
Max. Output Power	15000VA
Power Factor	>0.99(adjustable+/-0.8)
Ingress Protection	IP65
Operating Temperature Range	-25°C~+60°C
Protective Calss	Class I

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  
SAA161911  
VDE0126-1-1, VDE-AR-N4105, G83/2, EN50438,  
C10/11, RD1699, UTE C15-712-1, AS4777

**SOFAR SOLAR** Solar Grid-tied Inverter

Model No: SOFAR 17000-Sx-Series

Max. DC Input Voltage	1000V
Operating MPPT Voltage Range	250~960V
Max. Input Current	2x21A
Max. PV Isc	2x27A
Nominal Grid Voltage	3/N/PE, 230/400V~
Max. Output Current	3x25A
Nominal Grid Frequency	50/60Hz
Max. Output Power	17000VA
Power Factor	>0.99(adjustable+/-0.8)
Ingress Protection	IP65
Operating Temperature Range	-25°C~+60°C
Protective Calss	Class I

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  
SAA161911  
VDE0126-1-1, VDE-AR-N4105, G83/2, IEC61727,  
IEC62116, C10/11, RD1699, UTE C15-712-1, AS4777

**SOFAR SOLAR** Solar Grid-tied Inverter

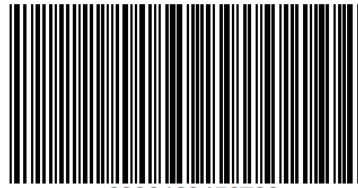
Model No: SOFAR 20000-Sx-Series

Max. DC Input Voltage	1000V
Operating MPPT Voltage Range	250~960V
Max. Input Current	2x24A
Max. PV Isc	2x30A
Nominal Grid Voltage	3/N/PE, 230/400V~
Max. Output Current	3x29A
Nominal Grid Frequency	50/60Hz
Max. Output Power	20000VA
Power Factor	>0.99(adjustable+/-0.8)
Ingress Protection	IP65
Operating Temperature Range	-25°C~+60°C
Protective Calss	Class I

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  
SAA161911  
VDE0126-1-1, VDE-AR-N4105, G83/2, EN50438,  
C10/11, RD1699, UTE C15-712-1, AS4777

S/N



9990123456789

**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> ..... :	46		
<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			

**General remarks:**

"(See Enclosure #)" refers to additional information appended to the report.  
 "(See appended table)" refers to a table appended to the report.

Throughout this report a  comma /  point is used as the decimal separator.

**Revision 1:** This report is based on original report 130918053GZU-004, dated 10 Jan., 2014 with below modified information:

- 1) Change the address of applicant to "5L,Fourth Building,Antongda Industrial Park,Liuxian Avenue No.1,Xinan Street,Baoan District,Shenzhen,China "
- 2) Change the model to "Sofar 20000TL-Sx Series, Sofar 17000TL-Sx Series , Sofar 15000TL-Sx Series , Sofar 10000TL-Sx Series (x=0-6) "
- 3) Change the name of factory to "Shenzhen SOFARSOLAR Co., Ltd."
- 4) Change the address of factory to "5L,Fourth Building,Antongda Industrial Park,Liuxian Avenue No.1,Xinan Street,Baoan District,Shenzhen,China."
- 5) Updated the marking correspond to model.

**Revision 2:** This report is based on original report 130918053GZU-004, dated 10 Jan., 2014 and 130918053GZU-004, Revision 1: 27 Oct., 2016 to add/modify the following information:

1. Added an alternative frequency 60Hz
2. Changed the address of applicant from "5/F, Building 4, Antongda Industrial Park, No.1 Liuxian Avenue. Xin'an Street , Bao'an District, Shenzhen, P.R, China " to "401, Building 4, AnTongDa Industrial Park, District 68, XingDong Community, XinAn Street, BaoAn District, Shenzhen, China"
3. Changed the name of factory from"Shenzhen SOFAR SOLAR Co., Ltd." to "Dongguan SOFAR SOLAR Co., Ltd. "
4. Chnaged the address of factory from "5/F, Building 4, Antongda Industrial Park, No.1 Liuxian Avenue. Xin'an Street , Bao'an District, Shenzhen, P.R, China" to "1F-6F, Building E, No.1 JinQi Road, Bihu Industrial Park, Wulian Village, Fenggang Town, Dongguan City

**Revision 3:**

This report is based on original report No. 130918053GZU-004, dated 10 Jan., 2014 and 130918053GZU-004, Revision 1: 27 Oct., 2016 and Revision 2:04 Mar 2019 to have following addition

1, Added below alternative DC switch in critical components list

Manufacturer	Type
Santon International bv	XBHP+3410/2, XBHP3410/2

After checking the specification and certificate, no tests are required on this addition.

This report shall be used together with report No. 130918053GZU-004, 130918053GZU-004, Revision 1: 27 Oct., 2016 and Revision 2: 04 Mar 2019, 130918053GZU-005 and 130918053GZU-005 Revision 1: 27 Oct., 2016 and 130918053GZU-005 Revision 2: 04 Mar., 2019.



<b>Manufacturer's Declaration per sub-clause 4.2.5 of IEC60900:</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"/> <b>Yes</b> <input checked="" type="checkbox"/> <b>Not applicable</b>
<b>When differences exist; they shall be identified in the General product information section.</b>	
<b>Name and address of factory (ies) .....</b>	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:**

Product covered by this report is grid-connected PV inverter for indoor or outdoor installation. The connection to the DC input and AC output are through connectors. The structure of the unit complied with the IP 65 requirement.

The inverters intended to operate at ambient temperature -25°C - +60°C and 250-960 Vdc input, which will be specified in the user manual, The inverters will output full power when operated at 45°C. If operated at higher than 45°C temperature, the output power derating.

For all models, if the DC input voltage is higher than 850 Vdc the output power will be derating.

For model Sofar 20000TL-Sx Series, if the DC input voltage is lower than 430 Vdc, the output power will be derating.

For model Sofar 17000TL-Sx Series, if the DC input voltage is lower than 420 Vdc, the output power will be derating.

For model Sofar 15000TL-Sx Series, if the DC input voltage is lower than 370 Vdc, the output power will be derating.

For model Sofar 10000TL-Sx Series, if the DC input voltage is lower than 350 Vdc, the output power will be derating.

For all models, if the AC output voltage is lower than 230 Vac the output current will be limited to not higher than rated output current.

All the models have identical mechanical and electrical construction except some components and some parameter of the software architecture in order to control the max output power. And refer to the following table for detail.

Model	DC Cable Gland	PV connector	DC inside connector	Fuse PCB+ String detection board	DC surge arrester	DC switch	AC switch	AC surge arrester
Sofar 20000TL-S0 Sofar 17000TL-S0 Sofar 15000TL-S0 Sofar 10000TL-S0	√		√					
Sofar 20000TL-S1 Sofar 17000TL-S1 Sofar 15000TL-S1 Sofar 10000TL-S1	√		√			√		
Sofar 20000TL-S2 Sofar 17000TL-S2 Sofar 15000TL-S2 Sofar 10000TL-S2		√	√			√		
Sofar 20000TL-S3 Sofar 17000TL-S3 Sofar 15000TL-S3 Sofar 10000TL-S3		√		√		√		
Sofar 20000TL-S4 Sofar 17000TL-S4 Sofar 15000TL-S4 Sofar 10000TL-S4		√		√	√	√		
Sofar 20000TL-S5 Sofar 17000TL-S5 Sofar 15000TL-S5 Sofar 10000TL-S5		√		√	√	√		√
Sofar 20000TL-S6 Sofar 17000TL-S6 Sofar 15000TL-S6		√		√	√	√	√	√

Sofar 10000TL-S6								
√ denote incorporating this component								
	Sofar 20000TL-Sx Series	Sofar 17000TL-Sx Series	Sofar 15000TL-Sx Series	Sofar 10000TL-Sx Series				
PV connector (pair)	2x2	2x2	2x2	2x2				
Boost chock	1800 μH	2100 μH	2100 μH	3000 μH				
Boost IGBT (Q19, Q20, Q28, Q29)	2x2 parallel	2x2 parallel	2x2 parallel	2x1				
Boost diode (D19, D20, D24, D25)	2x2 parallel	2x2 parallel	2x2 parallel	2x1				
Input current sampling resistor (REA79, REA71, REA81, REA73)	15 kΩ	15 kΩ	15 kΩ	10 kΩ				
Bus capacitor (CD1, CD2, CD3, CD4, CD5, CD6, CD7, CD8, CD39, CD40)	10 units	8 units	6 units	4 units				
Boost capacitor (CA129, CA131, CA145, CA148)	4 units	4 units	3 units	2 units				
Inverter chock	730 μH	850 μH	960 μH	1460 μH				
IGBT module (QD1, QD2, QD3)	10- FZ12NMA080SH0 1-M260F DS_F3L80R12W1 H3_B11	10- FZ12NMA080SH0 1-M260F DS_F3L80R12W1 H3_B11	10- FZ12NMA080SH0 1-M260F DS_F3L80R12W1 H3_B11	10- FZ12NMA080SH0 1-M260F DS_F3L80R12W1 H3_B11	10- FZ12NMA040SH- M267F	10- FZ12NMA040SH- M267F		
Input current sampling resistor (RB46, RB52, RB79, RB81, RB95, RB58)	2,7 kΩ	2,7 kΩ	2,7 kΩ	1,5 kΩ				

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)