

<b>TEST REPORT</b> <b>IEC 62109-2</b> <b>Safety of Power Converter for use in Photovoltaic Power Systems</b> <b>Part 2: Particular requirements for inverters</b>	
Report Number. .... :	130918053GZU-005
Date of issue ..... :	10 Jan., 2014, Revision 1: 27 Oct., 2016
Total number of pages..... :	9 pages
Applicant's name..... :	Shenzhen SOFARSOLAR Co., Ltd.
Address .....	5L,Fourth Building,Antongda Industrial Park,Liuxian Avenue No.1,Xinan Street,Baoan District,Shenzhen,China
Test specification:	
Standard..... :	IEC/EN 62109-2:2011 (First Edition)
Test procedure..... :	LVD
Non-standard test method..... :	N/A
Test Report Form No. .... :	IEC62109_2A
Test Report Form(s) Originator..... :	LCIE - Laboratoire Central des Industries Electriques
Master TRF .....	Dated 2012-02
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Test item description .....	Solar Inverter
Trade Mark .....	
Manufacturer .....	Same as applicant
Model/Type reference .....	Sofar 20000TL-Sx Series, Sofar 17000TL-Sx Series , Sofar 15000TL-Sx Series , Sofar 10000TL-Sx Series (x=0-6)
Ratings .....	<p>Maximum d.c. input voltage: 1000 V</p> <p>Input voltage rang: 250-960 V</p> <p>Max. input current: 2×24 A (for Sofar 20000TL-Sx Series); 2×21 A (for Sofar 17000TL-Sx Series, Sofar 15000TL-Sx Series); 2×15 A (for Sofar 10000TL-Sx Series)</p> <p>Max. PV Isc: 2×30 A (for Sofar 20000TL-Sx Series); 2×27 A (for Sofar 17000TL-Sx Series, Sofar 15000TL-Sx Series); 2×20 A (for Sofar 10000TL-Sx Series)</p> <p>Nominal output voltage: 3/N/PE230V/400V</p> <p>Max. output current: 3×29 A (for Sofar 20000TL-Sx Series); 3×25 A (for Sofar 17000TL-Sx Series); 3×22 A (for Sofar 15000TL-Sx Series); 3×15 A (for Sofar 10000TL-Sx Series)</p> <p>Nominal frequency: 50 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>

Testing procedure and testing location:		
<input checked="" type="checkbox"/>	Testing Laboratory:	Intertek Testing Services Shenzhen Ltd. Guangzhou Branch
Testing location/ address..... :		Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD, Guangzhou, China
Tested by (name + signature)..... :		Jason Fu
Approved by (name + signature)..... :		Tommy Zhong
		
<input type="checkbox"/>	Testing procedure: TMP	N/A
Testing location/ address..... :		N/A
Tested by (name + signature)..... :		N/A
Approved by (name + signature)..... :		N/A
<input type="checkbox"/>	Testing procedure: WMT	N/A
Testing location/ address..... :		N/A
Tested by (name + signature)..... :		N/A
Witnessed by (name + signature)..... :		N/A
Approved by (name + signature)..... :		N/A
<input type="checkbox"/>	Testing procedure: SMT	N/A
Testing location/ address..... :		N/A
Tested by (name + signature)..... :		N/A
Approved by (name + signature)..... :		N/A
Supervised by (name + signature)..... :		N/A

Summary of testing:	
Tests performed (name of test and test clause):  No test required	Testing location:  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
Summary of compliance with National Differences  N/A	

**Copy of marking plate:**

**SOFAR SOLAR** Solar Inverter  
Sofar 10000TL-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+60°C
Protective Class	Class I
Made in China	

Manufacturer: Shenzhen SOFARSOLAR Co., Ltd.

SAA140078  
VDE0126-1-1,VDE-AR-N4105,G83/2,EN50438,C10/11,  
RD1699,UTE C15-712-1,AS4777

**SOFAR SOLAR** Solar Inverter  
Sofar 15000TL-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+60°C
Protective Class	Class I
Made in China	

Manufacturer: Shenzhen SOFARSOLAR Co., Ltd.

SAA140078  
VDE0126-1-1,VDE-AR-N4105,G59/3,IEC61727,IEC62116,  
C10/11,RD1699,UTE C15-712-1,AS4777

**SOFAR SOLAR** Solar Inverter  
Sofar 17000TL-Sx Series

Voltage Range	DC250V-960V
Max. DC input voltage	1000V
Operating MPPT voltage	420-850V
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+60°C
Protective Class	Class I
Made in China	

Manufacturer: Shenzhen SOFARSOLAR Co., Ltd.

SAA140078  
VDE0126-1-1,VDE-AR-N4105,G59/3,IEC61727,IEC62116,  
C10/11,RD1699,UTE C15-712-1,AS4777

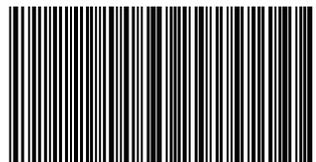
**SOFAR SOLAR** Solar Inverter  
Sofar 20000TL-Sx Series

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+60°C
Protective Class	Class I
Made in China	

Manufacturer: Shenzhen SOFARSOLAR Co., Ltd.

SAA140078  
VDE0126-1-1,VDE-AR-N4105,G59/3,IEC61727,IEC62116,  
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.
3. The labels of the other models are same as above except the model name and ratings.

<b>Test item particulars..... :</b>	
Equipment mobility..... :	<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
Connection to the mains..... :	<input type="checkbox"/> pluggable equipment <input type="checkbox"/> direct plug-in <input checked="" type="checkbox"/> permanent connection <input type="checkbox"/> for building-in
Environmental category..... :	<input checked="" type="checkbox"/> outdoor <input type="checkbox"/> indoor <input type="checkbox"/> indoor <div style="margin-left: 150px;">unconditional    conditional</div>
Over voltage category Mains..... :	<input type="checkbox"/> OVC I <input type="checkbox"/> OVC II <input checked="" type="checkbox"/> OVC III <input type="checkbox"/> OVC IV
Over voltage category PV..... :	<input type="checkbox"/> OVC I <input checked="" type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV
Mains supply tolerance (%)..... :	-90 / +110 %
Tested for power systems..... :	TN systems
IT testing, phase-phase voltage (V)..... :	N/A
Class of equipment..... :	<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III <input type="checkbox"/> Not classified
Mass of equipment (kg)..... :	46
Pollution degree..... :	Outside PD3; Inside PD2
IP protection class..... :	IP 65
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement..... :	F (Fail)
Testing..... :	
Date of receipt of test item..... :	09 Oct., 2016
Date (s) of performance of tests..... :	09 Oct., 2016 - 26 Oct.,2016
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement..... :	Pass (P)
- test object was not evaluated for the requirement..... :	N/E
- test object does not meet the requirement..... :	Fail (F)

General remarks:

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 testing laboratory.

"(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.

When determining the test conclusion, the Measurement Uncertainty of test has been considered.

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The test report only allows to be revised only within the report defined retention period unless standard or regulation was withdrawn or invalid.

**Revision 1: This report is based on original report 130918053GZU-005, 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.**

**This report shall be used together with the report 130918053GZU-005, 130918053GZU-004 and 130918053GZU-004 Revision 1: 27 Oct., 2016..**

Manufacturer's Declaration per sub-clause 6.2.5 of IEC62109 02:

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 .....:  Yes  Not applicable

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) .....:

Shenzhen SOFARSOLAR Co., Ltd.  
5L,Fourth Building,Antongda Industrial Park,Liuxian Avenue No.1,Xinan Street,Baoan District,Shenzhen,China.

**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  $-25^{\circ}\text{C}$  -  $+60^{\circ}\text{C}$  and 250-960 Vdc input, which will be specified in the user manual, The inverters will output full power when operated at  $45^{\circ}\text{C}$ . If operated at higher than  $45^{\circ}\text{C}$  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)	2×2	2×2	2×2	2×2				
Boost chock	1800 μH	2100 μH	2100 μH	3000 μH				
Boost IGBT (Q19, Q20, Q28, Q29)	2×2 parallel	2×2 parallel	2×2 parallel	2×1				
Boost diode (D19, D20, D24, D25)	2×2 parallel	2×2 parallel	2×2 parallel	2×1				
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				
Input current sampling resistor (RB46, RB52, RB79, RB81, RB95, RB58)	2,7 kΩ	2,7 kΩ	2,7 kΩ	1,5 kΩ				

(End of the report)