



SUMMARY TEST REPORT

Report Number.....: **221129BWA146-EG-FR-001**

Total pages.....: 18

Tested by (name + signature).....: Allen Zhang / Test engineer

Allen

Approved by (name + signature): Lukes Lin / Project Manager

Lukes



Date of issue: 2023-02-14

Applicant's name: Shenzhen SOFARSOLAR Co.,Ltd.

Address: 11/F., Gaoxinqi Technology Building, No.67 Area, Xingdong Community, Xin'an Sub-district, Bao'an District, Shenzhen City, China

Manufacturer: Same as applicant

Address: Same as applicant

Testing laboratory name: Guangdong HuaChuang Technology Service Co., Ltd.

Address: Room 815, No.122, Houjie Road (West), Houjie Town, Dongguan City, Guangdong, 523960, People's Republic of China

Testing Location.....: Shenzhen Academy of Metrology & Quality Inspection

Address: No. 4 Tongfa Road, Nanshan District, Shenzhen

Test specification:

Standard.....: According to client's requirement

Test Report Form No.....: SUMMARY TEST REPORT VER.1.0

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. The report would be invalid without specific stamp of test institute and the signatures of tester and approver.

Issued by: Guangdong HuaChuang Technology Service Co., Ltd.

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Product name	Solar Grid-tied Inverter
Trademark	SOFAR
Factory's name	Dongguan SOFAR SOLAR Co., Ltd.
Factory address.....	1F - 6F, Building E, No. 1 JinQi Road, Bihu Industrial Park, Wulian Village, Fenggang Town, Dongguan, Guangdong, China.

Model/Type reference	SOFAR 100KTLX-G4	SOFAR 110KTLX-G4
Ratings:		
Input DC voltage [V]	Max.1100	
Input MPP voltage range [V]	180 -1000	
Max. input DC current [A].....	10*40	
Nominal output AC voltage [V]	220/380Vac, 230/400Vac, 240/415Vac, 3~ + N + PE; 50/60 Hz	
Max. output AC current [A].....	152,0A / 380Vac 145,0A / 400Vac 139,2A / 415Vac	167,2A / 380Vac 159,5A / 400Vac 153,1A / 415Vac
Nominal active output power [kW].....	100,0	100,0
Max. apparent output power [kVA].....	100,0	110,0
Model/Type reference	SOFAR 125KTLX-G4	SOFAR 125KTLX-G4-A
Ratings:		
Input DC voltage [V]	Max.1100	
Input MPP voltage range [V]	180 -1000	
Max. input DC current [A].....	10*40	
Nominal output AC voltage [V]	220/380Vac, 230/400Vac, 240/415Vac, 3~ + N + PE; 50/60 Hz	
Max. output AC current [A].....	190,0A / 380Vac 181,2A / 400Vac 174,0A / 415Vac	190,0A / 380Vac 181,2A / 400Vac 174,0A / 415Vac
Nominal active output power [kW].....	110,0	125,0
Max. apparent output power [kVA].....	125,0	125,0
Software version.....	V000001	
* According to customer requirements, only SOFAR 125KTLX-G4-A is tested, and other models are not tested.		

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Revision history of test report

Issued Date	Description	Report No.
2023-02-14	Initial issue.	221129BWA146-EG-FR-001

Copy of marking plate

SOFAR Solar Grid-tied Inverter

Model:	SOFAR 100KTLX-G4
Max.DC Input Voltage	1100V
Operating MPPT Voltage Range	180~1000V
Max. Input Current	10*40A
Max. PV Isc	10*50A
Rated Output Voltage	3/N/PE,220/380Vac 230/400Vac,240/415Vac
Max.Output Current	152A/380Vac 145A/400Vac 139.2A/415Vac
Rated Output Frequency	50/60Hz
Rated Output Power	100kW
Max.Output Apparent Power	100kVA
Power Factor	1(adjustable+/-0.8)
Ingress Protection	IP66
Operating Temperature Range	-30°C~+60°C
Inverter Topology	Non-Isolation
Protective Class	Class I
Overvoltage Category	AC III,DC II
Made in China	

Manufacturer : Shenzhen SOFARSOLAR Co.,Ltd.
Address : 11/F., Gaoxinqi Technology Building, No.67 Area,
Xingdong Community, Xin'an Sub-district,
Bao'an District, Shenzhen City,China


SOFAR Solar Grid-tied Inverter

Model:	SOFAR 110KTLX-G4
Max.DC Input Voltage	1100V
Operating MPPT Voltage Range	180~1000V
Max. Input Current	10*40A
Max. PV Isc	10*50A
Rated Output Voltage	3/N/PE,220/380Vac 230/400Vac,240/415Vac
Max.Output Current	167.2A/380Vac 159.5A/400Vac 153.1A/415Vac
Rated Output Frequency	50/60Hz
Rated Output Power	100kW
Max.Output Apparent Power	110kVA
Power Factor	1(adjustable+/-0.8)
Ingress Protection	IP66
Operating Temperature Range	-30°C~+60°C
Inverter Topology	Non-Isolation
Protective Class	Class I
Overvoltage Category	AC III,DC II
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SOFAR Solar Grid-tied Inverter

Model:	SOFAR 125KTLX-G4
Max.DC Input Voltage	1100V
Operating MPPT Voltage Range	180~1000V
Max. Input Current	10*40A
Max. PV Isc	10*50A
Rated Output Voltage	3/N/PE,220/380Vac 230/400Vac,240/415Vac
Max.Output Current	190A/380Vac 181.2A/400Vac 174A/415Vac
Rated Output Frequency	50/60Hz
Rated Output Power	110kW
Max.Output Apparent Power	125kVA
Power Factor	1(adjustable+/-0.8)
Ingress Protection	IP66
Operating Temperature Range	-30°C~+60°C
Inverter Topology	Non-Isolation
Protective Class	Class I
Overvoltage Category	AC III,DC II
Made in China	

Manufacturer : Shenzhen SOFARSOLAR Co.,Ltd.
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SOFAR Solar Grid-tied Inverter

Model:	SOFAR 125KTLX-G4-A
Max.DC Input Voltage	1100V
Operating MPPT Voltage Range	180~1000V
Max. Input Current	10*40A
Max. PV Isc	10*50A
Rated Output Voltage	3/N/PE,220/380Vac 230/400Vac,240/415Vac
Max.Output Current	190A/380Vac 181.2A/400Vac 174A/415Vac
Rated Output Frequency	50/60Hz
Rated Output Power	125kW
Max.Output Apparent Power	125kVA
Power Factor	1(adjustable+/-0.8)
Ingress Protection	IP66
Operating Temperature Range	-30°C~+60°C
Inverter Topology	Non-Isolation
Protective Class	Class I
Overvoltage Category	AC III,DC II
Made in China	

Manufacturer : Shenzhen SOFARSOLAR Co.,Ltd.
Address : 11/F., Gaoxinqi Technology Building, No.67 Area,
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Bao'an District, Shenzhen City,China


Note:

The marking plates shown above may be only a draft. The use of certification marks on products must be approved by the respective NCBs to which these marks belong.

The marking plate is attached to the side surface or the back of the enclosure and is visible after installation.

General remarks - documentation**Possible test case verdicts**

Test case does not apply to the test object: N/A
Test case is not rated: N/R
Test item does meet the requirement: P (Pass)
Test item does not meet the requirement: F (Fail)

Testing

Date of receipt of test items: 2022-12-01
Date(s) of performance of tests: 2022-12-01 to 2023-01-16

General remarks:

The test result presented in this report relate only to the object(s) tested. This report shall not be reproduced in part or in full without the written approval of the issuing testing laboratory.

"(see Annex #)" 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.

Conformity statements are decided in accordance with IEC GUIDE 115:2021 Procedure 2 (accuracy method), unless otherwise normatively specified or contractually agreed.

General product information

Equipment mobility	Permanent connection
Operating condition.....	Continuous
Class of equipment.....	Class I
Protection against ingress of water.....	IP66 according to EN 60529
Mass of equipment [kg].....	Approximately 75kg

SOFAR 100~125KTLX-G4 is a transformerless on grid PV inverter, that converts the direct current of the PV array to the grid-compliant, three-phase current and feeds into the utility grid. (See *Figure 1*)

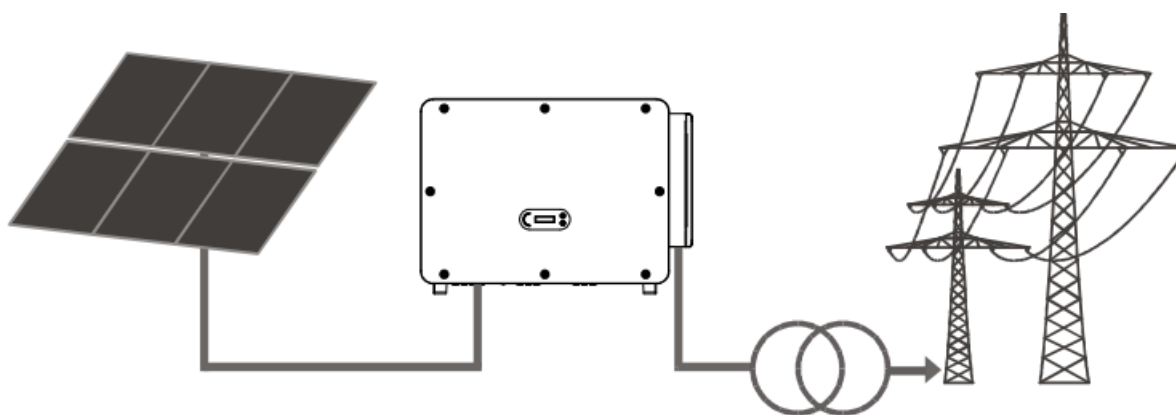


Figure 1 – PV Grid-Tied System

The product was tested on following revision:

Hardware version: V101

Software version: V000001

Differences of the models:

The units in the series are identical hardware platform.

The implemented control and firmware are identical in all units. There is no difference regarding AC behaviour between the PGU-types apart from the power rating deviation and current limitation of each unit.

General product information
Description of the power circuit (Figure 2):

The input and output of the unit are protected by varistors to Earth. The unit is providing EMI filtering at the batteries input and output toward mains. The unit does not provide galvanic separation from input to output (transformerless).

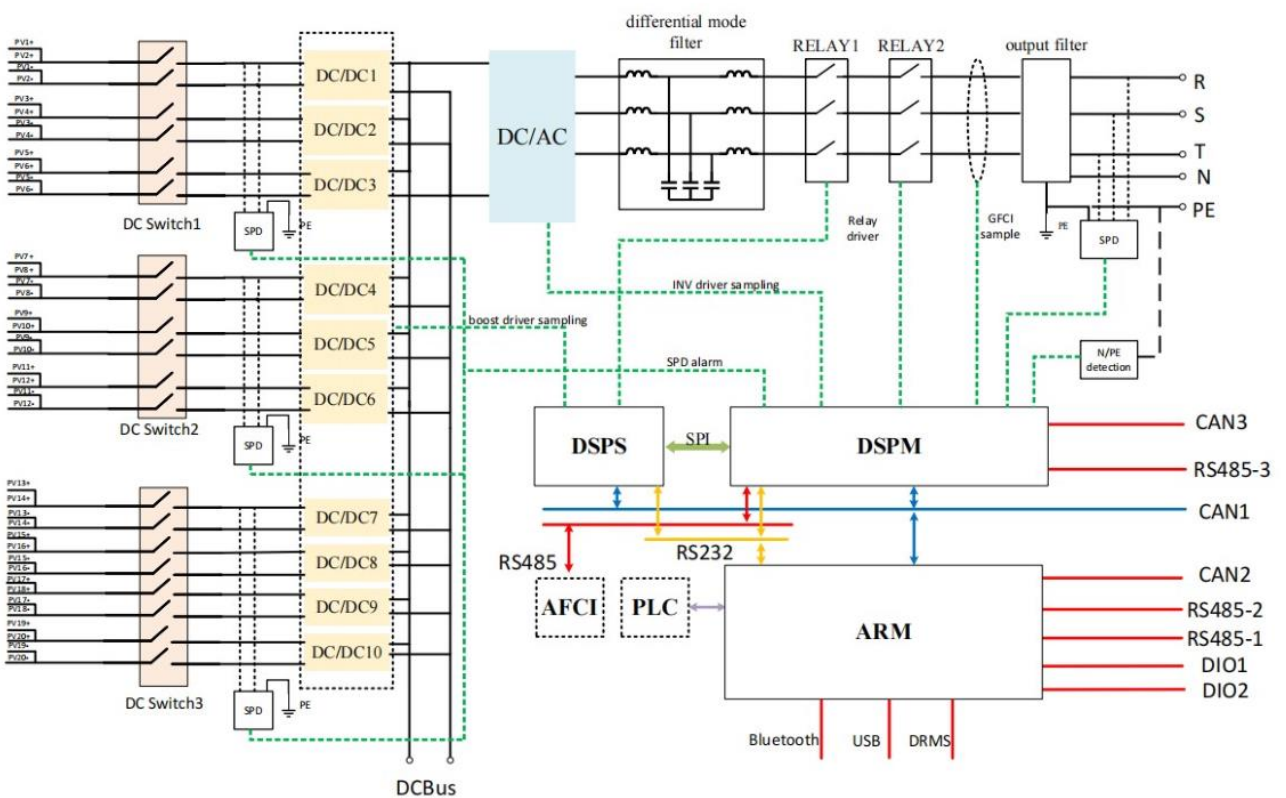
The output is switched off redundantly by the high-power switching bridge and two relays in series. When single fault applied to one relay, alarm an error code in display panel, another redundant relay provides basic insulation maintained between the battery and the mains. All the relays are tested before each start up.

The internal control is redundant built. It consists of Microcontroller Main DSP (U71) and slave DSP (U80). The Main DSP (U71) control the relays by switching signals; measures the battery voltage, battery current, Bus voltage, grid voltage, frequency, AC current with injected DC and the array insulation resistance to ground. In addition, it tests the current sensors and the RCMU circuit before each start up.

The slave DSP (U80) is measuring the grid voltage, grid frequency and residual current, also can switch off the relays independently, and communicate with Main DSP (U71) each other.

The current is measured by a current sensor. The AC current signal and the injected DC current signal are sent to the Main DSP (U71). The Main DSP (U71) tests and calibrates before each start up all current sensors.

The unit provides two relays in series in all output conductors.


Figure 2 – Block diagram



Annex 1 – Test Results

Impedance at 175 Hz
Test results:

Impedance of the converter at 175 Hz - R and X in ohm, give the values on the LV side (not taken into account of the transformer)	<input checked="" type="checkbox"/> Serial equivalent schema	$R_{175\text{Hz}}=0,13 \ \Omega$
	<input type="checkbox"/> Parallel equivalent schema	$X_{175 \text{ Hz}}=0,03 \ \Omega$

Behavior in case of short inverter output circuit
Test results:

Values measured at the output of the aero generator, give the values on the LV side (Not taken into account of the transformer)	$I_p = 300,2 \ \text{A}$
	$I_{k''} = 96,8 \ \text{A}$

Harmonic
Test results:

Harmonics	Current Magnitude [A]			% of Fundamental			Phase	Harmonic Current Limits [%]
	L1	L2	L3	L1	L2	L3		
1st	178,855	178,616	178,825	100,000	100,000	100,000	Three phase	--
2nd	0,015	0,018	0,015	0,009	0,010	0,008	Three phase	1
3rd	0,077	0,162	0,165	0,043	0,091	0,092	Three phase	4
4th	0,013	0,013	0,014	0,007	0,007	0,008	Three phase	1
5th	0,476	0,410	0,415	0,266	0,230	0,232	Three phase	4
6th	0,012	0,014	0,019	0,007	0,008	0,011	Three phase	1
7th	0,745	0,793	0,841	0,417	0,444	0,471	Three phase	4
8th	0,014	0,013	0,017	0,008	0,007	0,010	Three phase	1
9th	0,076	0,090	0,060	0,043	0,050	0,034	Three phase	4
10th	0,012	0,015	0,014	0,006	0,009	0,008	Three phase	0,5
11th	0,647	0,635	0,688	0,362	0,356	0,385	Three phase	2
12th	0,012	0,018	0,013	0,007	0,010	0,007	Three phase	0,5
13th	0,348	0,344	0,343	0,195	0,193	0,192	Three phase	2
14th	0,013	0,014	0,009	0,007	0,008	0,005	Three phase	0,5
15th	0,072	0,051	0,095	0,040	0,029	0,053	Three phase	2
16th	0,012	0,011	0,013	0,007	0,006	0,007	Three phase	0,5
17th	0,238	0,299	0,310	0,133	0,167	0,174	Three phase	1,5
18th	0,011	0,016	0,010	0,006	0,009	0,005	Three phase	0,5
19th	0,067	0,059	0,028	0,038	0,033	0,015	Three phase	1,5
20th	0,009	0,009	0,008	0,005	0,005	0,005	Three phase	0,5
21th	0,047	0,053	0,044	0,026	0,030	0,025	Three phase	1,5
22th	0,008	0,011	0,014	0,004	0,006	0,008	Three phase	0,5
23th	0,435	0,482	0,447	0,243	0,270	0,250	Three phase	0,6
24th	0,010	0,010	0,010	0,006	0,006	0,005	Three phase	0,5
25th	0,227	0,264	0,232	0,127	0,148	0,129	Three phase	0,6
26th	0,012	0,015	0,015	0,007	0,008	0,009	Three phase	0,5
27th	0,054	0,050	0,045	0,030	0,028	0,025	Three phase	0,6
28th	0,009	0,012	0,010	0,005	0,006	0,005	Three phase	0,5
29th	0,062	0,071	0,069	0,034	0,040	0,038	Three phase	0,6
30th	0,010	0,009	0,008	0,006	0,005	0,005	Three phase	0,5
31th	0,236	0,246	0,272	0,132	0,138	0,152	Three phase	0,6
32th	0,012	0,021	0,018	0,007	0,012	0,010	Three phase	0,5
33th	0,078	0,053	0,048	0,044	0,030	0,027	Three phase	0,6

Harmonic								
34th	0,012	0,013	0,015	0,007	0,007	0,009	Three phase	--
35th	0,210	0,215	0,226	0,117	0,120	0,126	Three phase	--
36th	0,014	0,012	0,009	0,008	0,007	0,005	Three phase	--
37th	0,239	0,200	0,233	0,134	0,112	0,130	Three phase	--
38th	0,007	0,015	0,015	0,004	0,009	0,008	Three phase	--
39th	0,049	0,035	0,036	0,028	0,020	0,020	Three phase	--
40th	0,012	0,018	0,020	0,007	0,010	0,011	Three phase	--
41th	0,230	0,269	0,236	0,129	0,151	0,132	Three phase	--
42th	0,010	0,011	0,009	0,006	0,006	0,005	Three phase	--
43th	0,031	0,036	0,041	0,018	0,020	0,023	Three phase	--
44th	0,006	0,011	0,010	0,004	0,006	0,006	Three phase	--
45th	0,036	0,030	0,032	0,020	0,017	0,018	Three phase	--
46th	0,011	0,017	0,018	0,006	0,009	0,010	Three phase	--
47th	0,229	0,237	0,220	0,128	0,133	0,123	Three phase	--
48th	0,007	0,009	0,007	0,004	0,005	0,004	Three phase	--
49th	0,154	0,152	0,147	0,086	0,085	0,082	Three phase	--
50th	0,006	0,014	0,012	0,003	0,008	0,007	Three phase	--
THD50[%]	--	--	--	0,781	0,805	0,827	--	--



Annex 2 – Pictures of the unit

Enclosure front view



Left side view



Right side view



Enclosure top view



Enclosure rear view



Enclosure bottom view





Annex 3 – Test equipment list

Date(s) of performance of tests: 2022-12-01 to 2023-01-16

Equipment	Internal No.	Manufacturer	Type	Serial No.	Next Calibration date
AC Source	SB9540/03	APC	AFG-S-33150T	C312020029	Monitored by Power Analyzer
DC Simulation Power Supply	SB11175	KEWELL	IVS-300-1000	602003131200460	
RLC Load	SB9605	Qunling	ACLT-3830H	--	
Power Analyzer	HC-ENG-003	DEWESOFT	SIRIUSi-HS-4xHV-4xLV	DB20123915	2023-09-05
Eight Channel Digital Phosphor Oscilloscope	SB11177	YOKOGAWA	DL850	91P215763	2023-11-15
Oscilloscope probe	SB9148	TEKTRONIX	A622	08JJ35694DV	2023-11-13
	SB11203	TEKTRONIX	A621	10JJ37370DV	2023-11-13
	SB11205	YOKOGAWA	96001	23P1019	2023-06-16
	SB11207	YOKOGAWA	96001	23N9037	2023-06-16
Current transducer	SB11179/01	YOKOGAWA	CT1000	1132540023	2023-03-01
	SB11179/02	YOKOGAWA	CT1000	1132320003	2023-03-01
	SB11179/03	YOKOGAWA	CT1000	1132320004	2023-03-01
	SB11179/04	YOKOGAWA	CT1000	1132540009	2023-03-01

End of Test Report