



## SUMMARY TEST REPORT

Report Number.....: **211205BW001-1210-EG-002**

Total pages.....: 19

Tested by (name + signature).....: Lukes Lin / Senior engineer

*Lukes*

Approved by (name + signature).....: Jack Shi / Senior engineer

*Jack*

Date of issue .....: 2022-01-06



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

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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/ Address.....: Same Above


Test specification:

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

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

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Issued by: Guangdong HuaChuang Technology Service Co., Ltd.  
 Address: Room 815, No.122, Houjie Road (West), Houjie Town, Dongguan City, Guangdong, 523960 P.R.C  
 Tel: +86 769 85598986      E-Mail: service-hc@huachuang-ts.com      Web: www.huachuang-ts.com

Product name .....	<b>Solar Grid-tied Inverter</b>	
Trade Mark .....		
Factory's name .....	<b>Dongguan SOFAR SOLAR Co., Ltd.</b>	
Factory address.....	1F-6F, Building E,NO.1 JinQi Road,Bihu Industrial Park,Wulian Village,Fenggang Town,Dongguan City.	
Model/Type reference .....	<b>SOFAR 80KTL</b>	
Ratings:		
Input DC voltage range [V] .....	180 -1100	
Max. input DC current [A] .....	8*26	
Nominal output AC voltage [V] .....	380/400Vac, 3W + N + PE; 50 Hz	
Nominal. output AC current [A] .....	116A	
Max. output AC current [A] .....	128A	
Nominal active output power [kW].....	80kW	
Max. apparent output power [kVA]....	88kVA	
Software version.....	V020010	


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**Revision history of test report**

<b>Issued Date</b>	<b>Description</b>	<b>Revision No.</b>
2022-01-06	Initial issue.	V1.0

## Copy of marking plate


**Solar Grid-tied Inverter**

Model No:	SOFAR 80KTL
Max.DC Input Voltage	1100V
Operating MPPT Voltage Range	180~1000V
Max. Input Current	8*26A
Max. PV Isc	8*40A
Rated Grid Voltage	3/N/PE,380/400Vac
Max. Output Current	128A
Rated Grid Frequency	50/60Hz
Rated Output Power	80KW
Max. Output Power	88KVA
Power Factor	1(adjustable+/-0.8)
Ingress Protection	IP66
Operating Temperature Range	-30°C~+60°C
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  
 VDE0126-1-1,VDE-AR-N4105,G99,IEC61727  
 IEC62116,AS4777



**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 .....: 2021-12-10  
Date(s) of performance of tests .....: 2021-12-10 to 2021-12-29

**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.

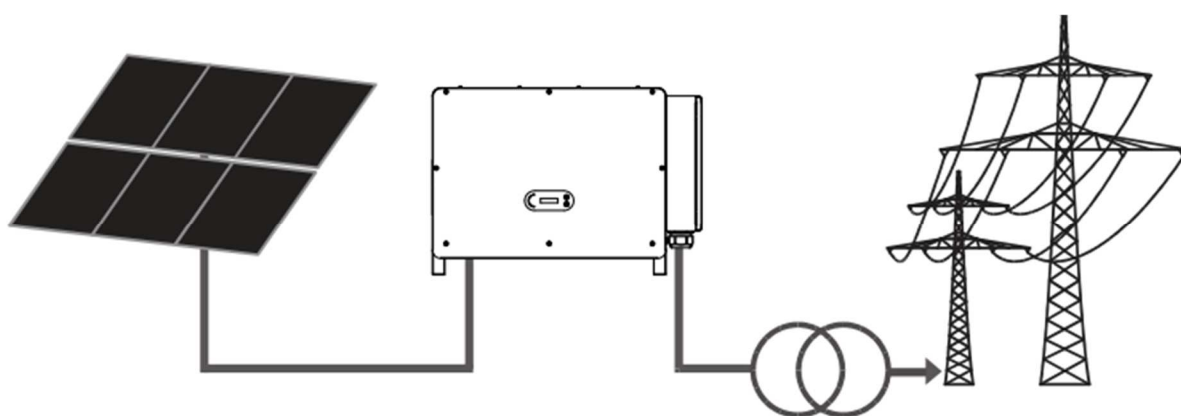
Throughout this report a  comma /  point is used as the decimal separator.

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 88kg

The **SOFAR 80KTL** is a three-phase Power Conversion System (PCS) for PV grid-connected application. Via an external generator transformer / step up transformer the **SOFAR 80KTL** can connect to the grid or loads (see *Figure 2*)



**Figure 1 – Scheme of an installation**

**Hardware version:**

The product was tested on following HW revision:

V002

**Software version:**

The product was tested on:

FW: V020010

**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 EMC filtering at the batteries input and output toward mains. The unit does not provide galvanic separation from input to output (transformerless).

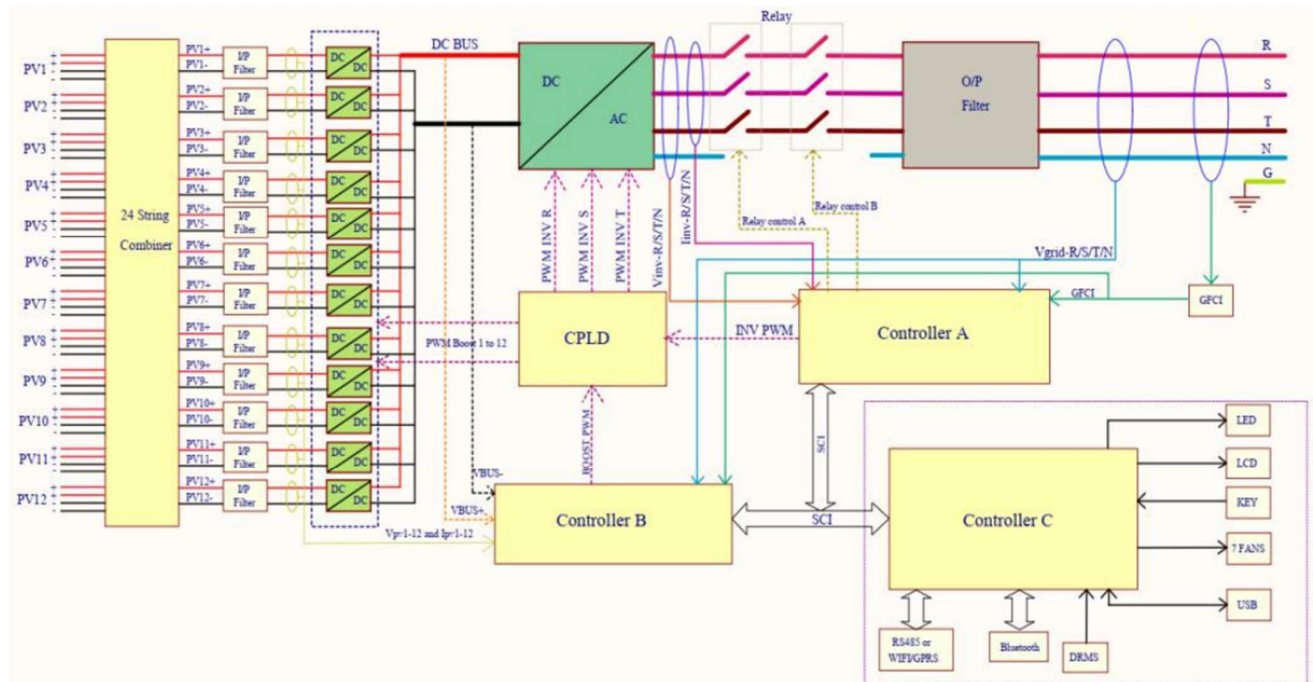
The output is switched off redundantly by the high-power switching bridge and two relays in series. When single fault applied to one relay, alarm an error code in display panel, another redundant relay provides basic insulation maintained between the battery and the mains. All the relays are tested before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

The internal control is redundant built. It consists of Microcontroller Main DSP (U2) and slave DSP (U16). The Main DSP (U2) 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 (U16) is measuring the grid voltage, grid frequency and residual current, also can switch off the relays independently, and communicate with Main DSP (U2) 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 (U2). The Main DSP (U2) 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	$X_{175 \text{ Hz}}=0,29 \ \Omega$

**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)	$I_p = 333,9 \ \text{A}$
	$I_{k''} = 117,3 \ \text{A}$

**Harmonic**
**Test results:**

Harmonics	Current Magnitude [A]			% of Fundamental			Phase	Harmonic Current Limits [%]
	L1	L2	L3	L1	L2	L3		
1st	115,965	115,879	115,970	100,000	100,000	100,000	Three phase	--
2nd	0,025	0,025	0,030	0,022	0,022	0,026	Three phase	1
3rd	0,041	0,049	0,035	0,035	0,042	0,030	Three phase	4
4th	0,019	0,020	0,020	0,017	0,017	0,017	Three phase	1
5th	0,240	0,243	0,286	0,207	0,210	0,247	Three phase	4
6th	0,014	0,014	0,017	0,012	0,012	0,014	Three phase	1
7th	0,182	0,181	0,210	0,157	0,156	0,181	Three phase	4
8th	0,012	0,012	0,014	0,010	0,010	0,012	Three phase	1
9th	0,027	0,015	0,028	0,024	0,013	0,024	Three phase	4
10th	0,011	0,010	0,011	0,010	0,008	0,009	Three phase	0,5
11th	0,224	0,211	0,236	0,193	0,182	0,203	Three phase	2
12th	0,011	0,008	0,013	0,009	0,007	0,011	Three phase	0,5
13th	0,190	0,186	0,205	0,164	0,160	0,176	Three phase	2
14th	0,010	0,008	0,011	0,008	0,007	0,009	Three phase	0,5
15th	0,020	0,011	0,025	0,017	0,009	0,021	Three phase	2
16th	0,008	0,008	0,009	0,007	0,007	0,007	Three phase	0,5
17th	0,173	0,162	0,176	0,149	0,140	0,151	Three phase	1,5
18th	0,008	0,007	0,009	0,007	0,006	0,008	Three phase	0,5
19th	0,153	0,143	0,155	0,132	0,123	0,134	Three phase	1,5
20th	0,009	0,008	0,011	0,007	0,007	0,009	Three phase	0,5
21th	0,017	0,011	0,015	0,015	0,009	0,013	Three phase	1,5
22th	0,007	0,007	0,007	0,006	0,006	0,006	Three phase	0,5
23th	0,121	0,111	0,117	0,104	0,096	0,101	Three phase	0,6
24th	0,008	0,007	0,008	0,006	0,006	0,007	Three phase	0,5
25th	0,086	0,079	0,085	0,074	0,068	0,073	Three phase	0,6
26th	0,007	0,007	0,007	0,006	0,006	0,006	Three phase	0,5
27th	0,020	0,009	0,015	0,017	0,008	0,013	Three phase	0,6
28th	0,007	0,006	0,006	0,006	0,006	0,005	Three phase	0,5
29th	0,019	0,011	0,016	0,016	0,009	0,014	Three phase	0,6
30th	0,007	0,006	0,006	0,006	0,005	0,005	Three phase	0,5
31th	0,012	0,015	0,009	0,011	0,013	0,008	Three phase	0,6
32th	0,007	0,006	0,007	0,006	0,005	0,006	Three phase	0,5
33th	0,016	0,009	0,010	0,014	0,008	0,009	Three phase	0,6

Harmonic								
34th	0,007	0,006	0,007	0,006	0,006	0,006	Three phase	--
35th	0,053	0,056	0,055	0,045	0,049	0,047	Three phase	--
36th	0,006	0,006	0,007	0,005	0,005	0,006	Three phase	--
37th	0,065	0,072	0,074	0,056	0,062	0,064	Three phase	--
38th	0,006	0,006	0,006	0,006	0,005	0,005	Three phase	--
39th	0,013	0,012	0,010	0,011	0,010	0,009	Three phase	--
40th	0,007	0,006	0,007	0,006	0,005	0,006	Three phase	--
41th	0,090	0,097	0,089	0,077	0,084	0,077	Three phase	--
42th	0,006	0,006	0,006	0,005	0,005	0,005	Three phase	--
43th	0,081	0,089	0,094	0,070	0,076	0,081	Three phase	--
44th	0,007	0,005	0,007	0,006	0,005	0,006	Three phase	--
45th	0,012	0,015	0,012	0,010	0,013	0,010	Three phase	--
46th	0,006	0,006	0,007	0,005	0,005	0,006	Three phase	--
47th	0,095	0,100	0,090	0,082	0,087	0,078	Three phase	--
48th	0,005	0,005	0,006	0,005	0,005	0,005	Three phase	--
49th	0,081	0,089	0,095	0,070	0,077	0,082	Three phase	--
50th	0,005	0,006	0,005	0,004	0,005	0,005	Three phase	--
THD50[%]	--	--	--	0,470	0,470	0,470	--	--
Note:								



## Annex 2 – Pictures of the unit

**Enclosure front view**



**Left side view**



**Right side view**



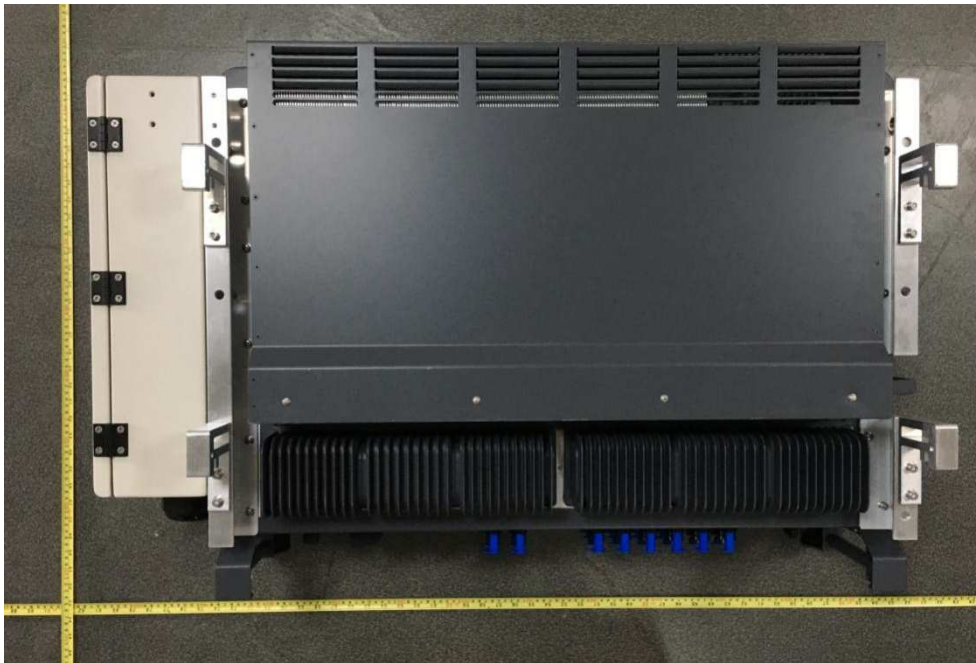
**Enclosure top view**



### Enclosure bottom view



### Enclosure rear view







## Annex 3 – Test equipment list

Date(s) of performance of tests: 2021-12-10 to 2021-12-29

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	SB11178	YOKOGAWA	WT3000	91P215776	2022-03-14
Eight Channel Digital Phosphor Oscilloscope	SB11177	YOKOGAWA	DL850	91P215763	2022-11-29
Oscilloscope probe	SB9148	TEKTRONIX	A622	08JJ35694DV	2022-11-30
	SB11203	TEKTRONIX	A621	10JJ37370DV	2022-11-30
	SB11205	YOKOGAWA	96001	23P1019	2022-07-13
	SB11207	YOKOGAWA	96001	23N9037	2022-07-13
Current transducer	SB11179/01	YOKOGAWA	CT1000	1132540023	2022-03-15
	SB11179/02	YOKOGAWA	CT1000	1132320003	2022-03-15
	SB11179/03	YOKOGAWA	CT1000	1132320004	2022-03-15
	SB11179/04	YOKOGAWA	CT1000	1132540009	2022-03-15



# End of Test Report