



SUMMARY TEST REPORT

Report Number.....: **220510BW001-EG-FR-001**

Total pages.....: 19

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

Approved by (name + signature): Jack Shi / Supervisor

Date of issue: 2022-06-30

Allen
Jack



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.

Address: Room 815, No.122, Houjie Road (West), Houjie Town, Dongguan City, Guangdong, 523960 P.R.C

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Web: www.huachuang-ts.com

Product name	Solar Grid-tied Inverter
Trademark	
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 60KTLX-G3	SOFAR 70KTLX-G3
Ratings:		
Input DC voltage [V]	Max.1100	
Input MPP voltage range [V]	180 -1000	
Max. input DC current [A]	6*32	6*40
Nominal output AC voltage [V]	230/400Vac, 3~ + N + PE; 50/60 Hz	
Nominal. output AC current [A]	86,9	101,4
Max. output AC current [A]	100,0	116,7
Nominal active output power [kW].....	60,0	70,0
Max. apparent output power [kVA]....	66,0	77,0
Model/Type reference	SOFAR 75KTLX-G3	SOFAR 80KTLX-G3
Ratings:		
Input DC voltage [V]	Max.1100	
Input MPP voltage range [V]	180 -1000	
Max. input DC current [A]	6*40	
Nominal output AC voltage [V]	230/400Vac, 3~ + N + PE; 50/60 Hz	
Nominal. output AC current [A]	108,7	115,9
Max. output AC current [A]	113,0	133,3
Nominal active output power [kW].....	75,0	80,0
Max. apparent output power [kVA]....	75,0	88,0
Software version.....	V000001	
* According to customer requirements, only SOFAR 80KTLX-G3 is tested, and other models are not tested.		

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Revision history of test report

Issued Date	Description	Report No.
2022-06-30	Initial issue.	220510BW001-EG-FR-001

Copy of marking plate

 Solar Grid-tied Inverter

Model No:	SOFAR 60KTLX-G3
Max.DC Input Voltage	1100V
Operating MPPT Voltage Range	180~1000V
Max. Input Current	6*32A
Max. PV Isc	6*50A
Rated Grid Voltage	3/N/PE,230/400Vac
Max. Output Current	100A
Rated Grid Frequency	50/60Hz
Rated Output Power	60KW
Max. Output Power	66KVA
Power Factor	1(adjustable+/-0.8)
Ingress Protection	IP66
Operating Temperature Range	-30°C~+60°C
Protective Class	Class I
Inverter Topology	Non-Isolated
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


 Solar Grid-tied Inverter

Model No:	SOFAR 70KTLX-G3
Max.DC Input Voltage	1100V
Operating MPPT Voltage Range	180~1000V
Max. Input Current	6*40A
Max. PV Isc	6*60A
Rated Grid Voltage	3/N/PE,230/400Vac
Max. Output Current	116.7A
Rated Grid Frequency	50/60Hz
Rated Output Power	70KW
Max. Output Power	77KVA
Power Factor	1(adjustable+/-0.8)
Ingress Protection	IP66
Operating Temperature Range	-30°C~+60°C
Protective Class	Class I
Inverter Topology	Non-Isolated
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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VDE0126-1-1,VDE-AR-N4105,G99,IEC61727
IEC62116,AS4777


 Solar Grid-tied Inverter

Model No:	SOFAR 75KTLX-G3
Max.DC Input Voltage	1100V
Operating MPPT Voltage Range	180~1000V
Max. Input Current	6*40A
Max. PV Isc	6*60A
Rated Grid Voltage	3/N/PE,230/400Vac
Max. Output Current	113A
Rated Grid Frequency	50/60Hz
Rated Output Power	75KW
Max. Output Power	75KVA
Power Factor	1(adjustable+/-0.8)
Ingress Protection	IP66
Operating Temperature Range	-30°C~+60°C
Protective Class	Class I
Inverter Topology	Non-Isolated
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
VDE0126-1-1,VDE-AR-N4105,G99,IEC61727
IEC62116,AS4777


 Solar Grid-tied Inverter

Model No:	SOFAR 80KTLX-G3
Max.DC Input Voltage	1100V
Operating MPPT Voltage Range	180~1000V
Max. Input Current	6*40A
Max. PV Isc	6*60A
Rated Grid Voltage	3/N/PE,230/400Vac
Max. Output Current	133.3A
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
Inverter Topology	Non-Isolated
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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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: 2022-05-13

Date(s) of performance of tests: 2022-05-13 to 2022-06-28

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 50kg

The SOFAR 60~80KTLX-G3 on-grid inverter can transform a direct electric current, (DC) coming from a photovoltaic generator (PV) into an alternating electric current (AC) Suitable for being fed into the utility grid.

(See Figure 1)

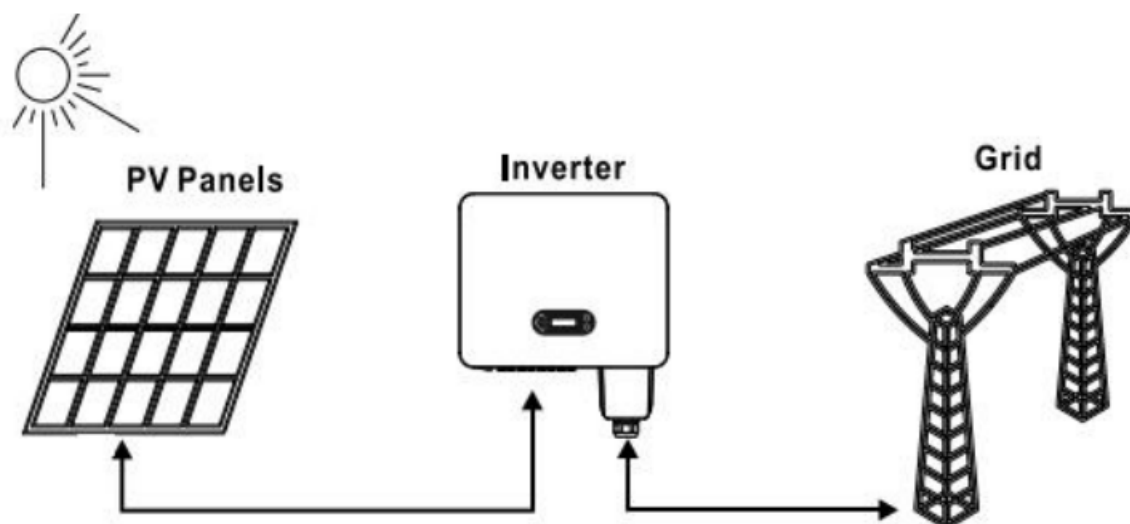


Figure 1 – Scheme of an installation

The product was tested on following revision:

Hardware version: V101

Software version: V000001

General product information

Differences of the models:

Model	SOFAR 60KTLX-G3	SOFAR 70KTLX-G3	SOFAR 75KTLX-G3	SOFAR 80KTLX-G3
MPPT maximum current	6*32A	6*40A	6*40A	6*40A
Boost single tube	IGBT	SiC MOSFET	SiC MOSFET	SiC MOSFET
Boost anti -merger diode	0pcs	6pcs	6pcs	6pcs
BUS film capacitance quantity	10pcs	12pcs	12pcs	12pcs
Boost inductor box size	419*81*73mm	305*75*66mm	305*75*66mm	305*75*66mm
Number of external fans	3pcs	4pcs	4pcs	4pcs
Number of internal fans	1pcs	2pcs	2pcs	2pcs

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 (U1) and slave DSP (U2).

The Main DSP (U1) 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 (U2) is measuring the grid voltage, grid frequency and residual current, also can switch off the relays independently, and communicate with Main DSP (U1) 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 (U1). The Main DSP (U1) tests and calibrates before each start up all current sensors.

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

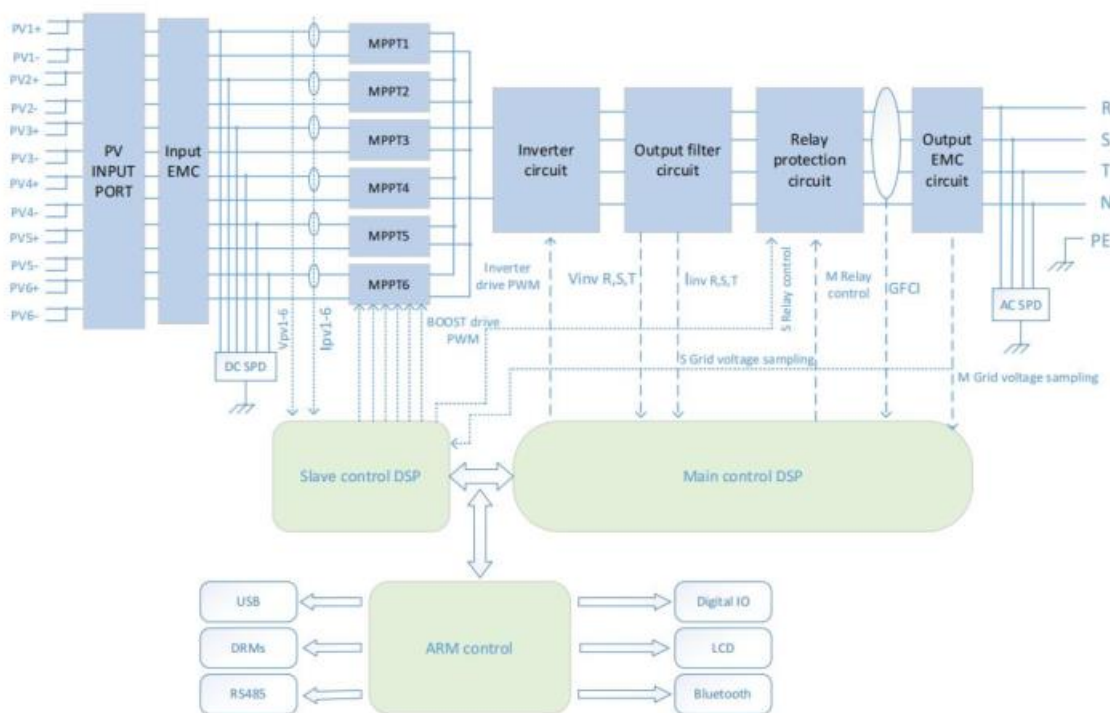
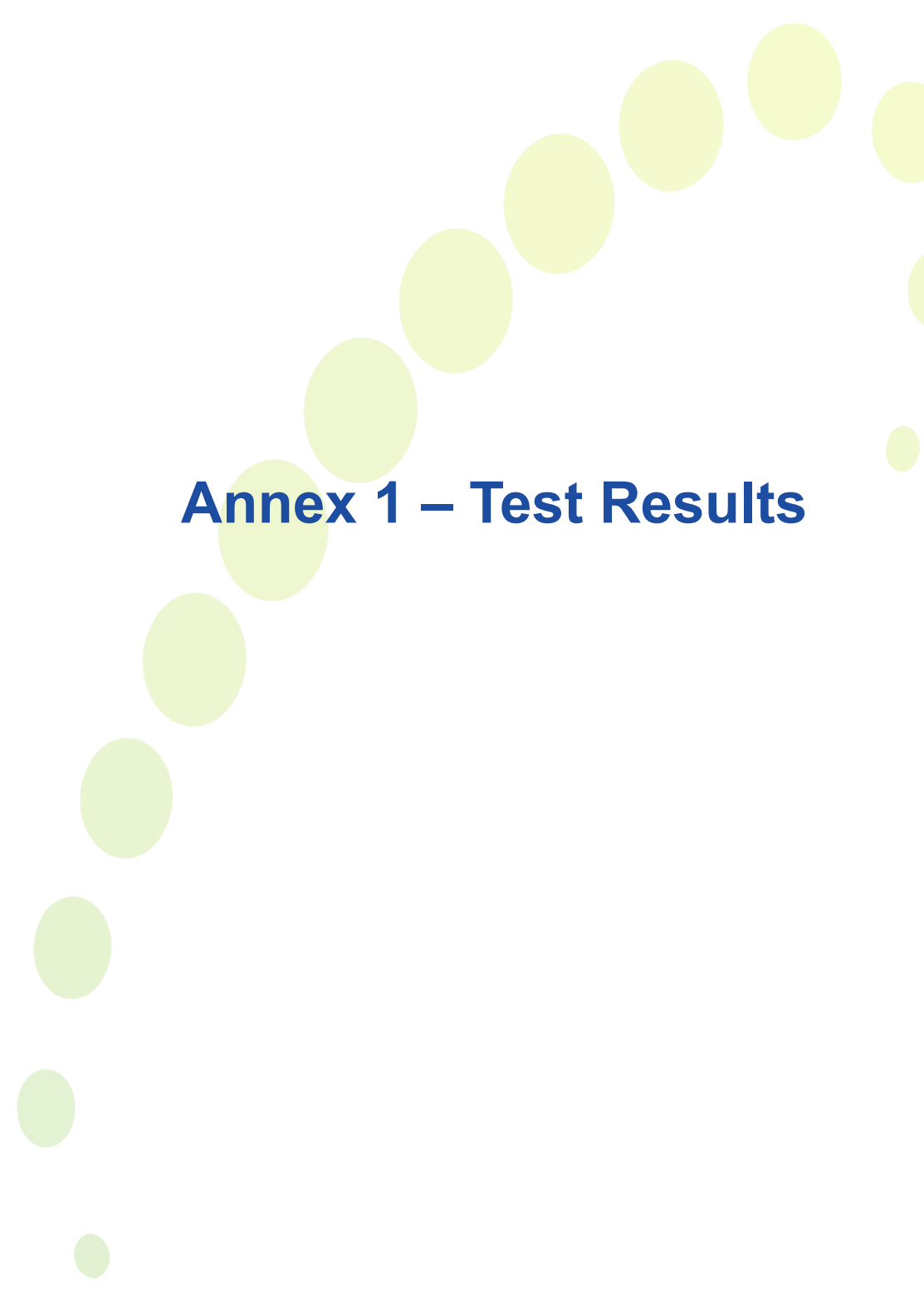


Figure 2 – Block diagram



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)	☒ Serial equivalent schema	$R_{175\text{Hz}}=0,14 \quad \Omega$
	☐ Parallel equivalent schema	$X_{175 \text{ Hz}}=0,92 \quad \Omega$

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)	$I_p = 224,4 \quad A$
	$I_{k''} = 76,1 \quad A$

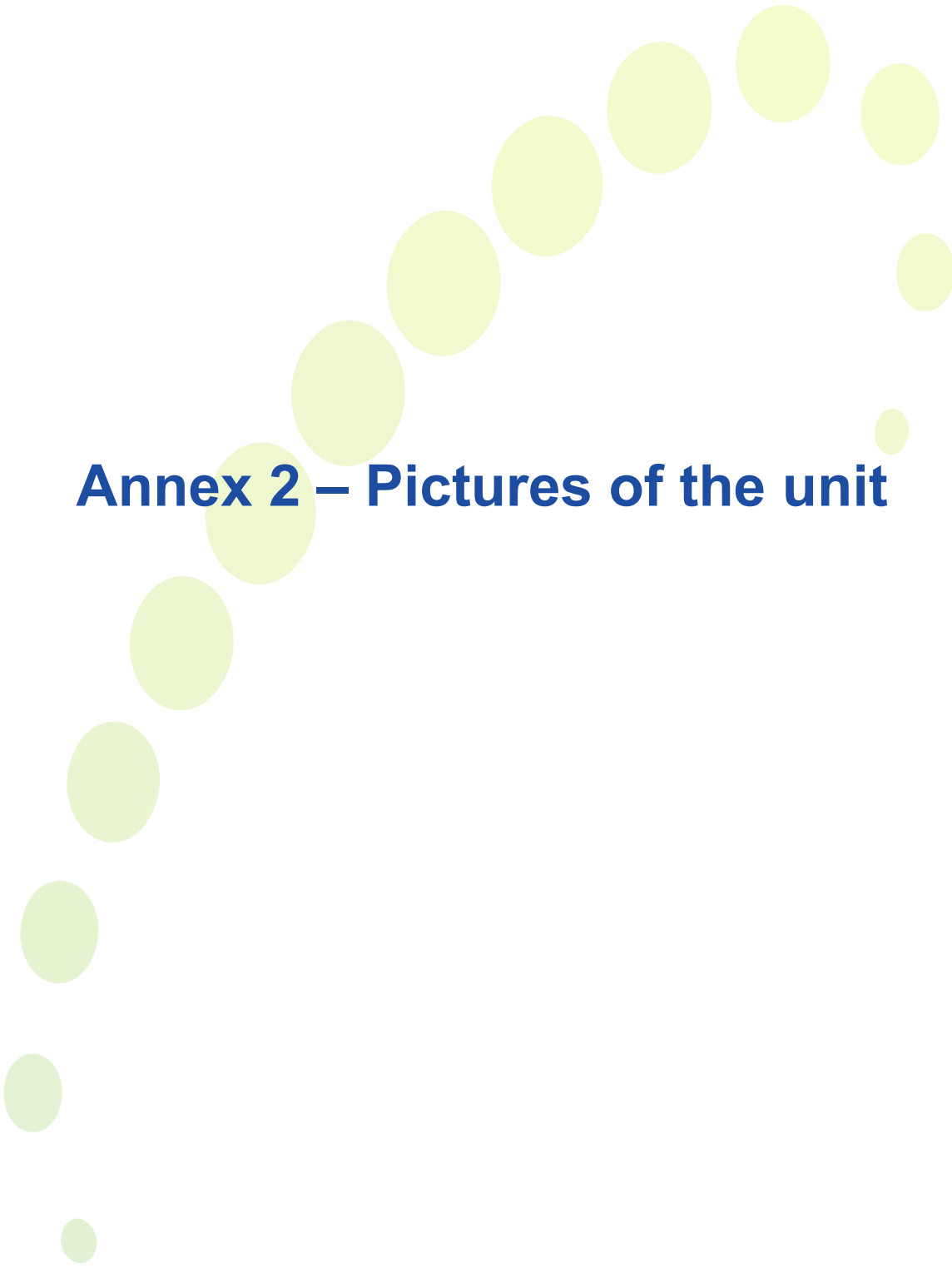
Harmonic

Test results:

Harmonics	Current Magnitude [A]			% of Fundamental			Phase	Harmonic Current Limits [%]
	L1	L2	L3	L1	L2	L3		
1st	115,653	115,622	115,511	100,000	100,000	100,000	Three phase	--
2nd	0,046	0,033	0,027	0,040	0,029	0,023	Three phase	1
3rd	0,044	0,033	0,040	0,038	0,029	0,035	Three phase	4
4th	0,077	0,074	0,071	0,066	0,064	0,062	Three phase	1
5th	0,148	0,117	0,121	0,128	0,101	0,105	Three phase	4
6th	0,016	0,018	0,023	0,014	0,015	0,020	Three phase	1
7th	0,181	0,162	0,150	0,157	0,141	0,130	Three phase	4
8th	0,081	0,082	0,063	0,070	0,071	0,055	Three phase	1
9th	0,065	0,031	0,050	0,056	0,027	0,043	Three phase	4
10th	0,053	0,062	0,038	0,046	0,054	0,033	Three phase	0,5
11th	0,194	0,181	0,184	0,168	0,156	0,159	Three phase	2
12th	0,012	0,009	0,009	0,010	0,007	0,008	Three phase	0,5
13th	0,115	0,134	0,112	0,100	0,116	0,097	Three phase	2
14th	0,074	0,070	0,047	0,064	0,060	0,041	Three phase	0,5
15th	0,022	0,017	0,011	0,019	0,015	0,009	Three phase	2
16th	0,038	0,035	0,049	0,033	0,030	0,042	Three phase	0,5
17th	0,090	0,073	0,055	0,078	0,064	0,048	Three phase	1,5
18th	0,017	0,016	0,029	0,015	0,014	0,025	Three phase	0,5
19th	0,043	0,054	0,056	0,038	0,047	0,048	Three phase	1,5
20th	0,012	0,021	0,029	0,011	0,018	0,025	Three phase	0,5
21th	0,019	0,017	0,029	0,016	0,015	0,025	Three phase	1,5
22th	0,093	0,090	0,081	0,080	0,078	0,070	Three phase	0,5
23th	0,025	0,024	0,022	0,022	0,021	0,019	Three phase	0,6
24th	0,021	0,022	0,040	0,018	0,019	0,034	Three phase	0,5
25th	0,059	0,069	0,066	0,051	0,060	0,057	Three phase	0,6
26th	0,066	0,057	0,059	0,057	0,049	0,051	Three phase	0,5
27th	0,017	0,019	0,025	0,015	0,016	0,022	Three phase	0,6
28th	0,045	0,049	0,023	0,039	0,042	0,020	Three phase	0,5
29th	0,073	0,066	0,064	0,063	0,057	0,056	Three phase	0,6
30th	0,009	0,012	0,017	0,008	0,010	0,015	Three phase	0,5
31th	0,055	0,053	0,040	0,048	0,046	0,034	Three phase	0,6
32th	0,044	0,038	0,023	0,038	0,033	0,020	Three phase	0,5
33th	0,010	0,014	0,012	0,009	0,012	0,011	Three phase	0,6

Harmonic

34th	0,008	0,014	0,019	0,007	0,012	0,016	Three phase	--
35th	0,047	0,038	0,050	0,041	0,033	0,043	Three phase	--
36th	0,009	0,009	0,011	0,007	0,008	0,009	Three phase	--
37th	0,054	0,056	0,055	0,047	0,049	0,047	Three phase	--
38th	0,014	0,011	0,009	0,012	0,010	0,008	Three phase	--
39th	0,011	0,014	0,016	0,010	0,012	0,014	Three phase	--
40th	0,013	0,015	0,014	0,011	0,013	0,012	Three phase	--
41th	0,054	0,052	0,052	0,046	0,045	0,045	Three phase	--
42th	0,008	0,008	0,009	0,007	0,007	0,008	Three phase	--
43th	0,066	0,067	0,064	0,057	0,058	0,056	Three phase	--
44th	0,008	0,006	0,009	0,007	0,005	0,008	Three phase	--
45th	0,019	0,018	0,017	0,016	0,015	0,014	Three phase	--
46th	0,016	0,014	0,009	0,014	0,012	0,008	Three phase	--
47th	0,073	0,072	0,071	0,063	0,063	0,062	Three phase	--
48th	0,008	0,007	0,009	0,007	0,006	0,008	Three phase	--
49th	0,035	0,037	0,029	0,030	0,032	0,025	Three phase	--
50th	0,015	0,008	0,008	0,013	0,007	0,007	Three phase	--
THD50[%]	--	--	--	0,386	0,386	0,386	--	--

A series of green circles of varying sizes arranged in a curved, spiral-like pattern across the page.

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: 2022-05-13 to 2022-06-28

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	SB8900	YOKOGAWA	WT3000	91LB39847	2022/12/28
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	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