2012002402H

CNAS L1659

LVD TEST REPORT

Report No.: CE2013-PV8009S

Product: SOLAR OFF-GRID INVERTER

Model No. : GF3000,GF5000,GF6000,GF8000

Brand Name: /

Applicant: GUANGDONG EAST POWER CO.,LTD.

Issued by: CCIC Southern Electronic Product Testing(Shenzhen) Co.,Ltd

Lab Location: Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen, 518055, P. R. China

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CE

Test Report

Product.....:	SOLAR OFF-GRID INVERTER
Model No. .....:	GF3000,GF5000,GF6000,GF8000
Brand Name.....:	/
Applicant.....:	GUANGDONG EAST POWER CO.,LTD.
Applicant Address.....:	No 6 Northern Industry Road, Songshan Lake SCI&TECH Industry Park,DongGuan,P.R.China
Manufacturer .....:	GUANGDONG EAST POWER CO.,LTD.
Manufacturer Address.....:	No 6 Northern Industry Road, Songshan Lake SCI&TECH Industry Park,DongGuan,P.R.China
Rating.....:	GF8000:DC Input : PV input :DC192-400 d.c.V, PV current:80d.c.A max, DC input:192d.c.V; AC Input: 175-280 a.c.V,50/60Hz;Max AC input current:63.5 a.c.A;AC Output: 230 a.c.V,50/60Hz, AC Current: 34.8 a.c. A , Power :8000W. GF6000:DC Input : DC Input : PV input :DC192-400 d.c.V, PV current:80d.c.A max, DC input:192d.c.V; AC Input: 175-280 a.c.V,50/60Hz;Max AC input current:47.6 a.c.A;AC Output: 230 a.c.V,50/60Hz, Max. AC current: 26 a.c.A, Power :6000W. GF5000:DC Input : DC Input : PV input :DC192-400 d.c.V, PV current:80d.c.A max, DC input:192d.c.V; AC Input: 175-280 a.c.V,50/60Hz; Max AC input current:39.7 a.c.A;AC Output: 230 a.c.V,50/60Hz , AC Current: 21.7 a.c. A ,Power :5000W. GF3000:DC Input : DC Input : PV input :DC192-400 d.c.V, PV current:60d.c.A max, DC input:192d.c.V; AC Input: 175-280 a.c.V,50/60Hz; Max AC input current:23.8 a.c.A;AC Output: 230 a.c.V,50/60Hz, AC Current: 13 a.c. A ,Power :3000W.
Test Standards.....:	EN 62109-1:2010 Safety of power converters for use in photovoltaic power systems-Part1:General requirements. EN 62109-2 :2011 Safety of power converters for use in photovoltaic power systems-Part2:Particular requirements for inverters
Test Result.....:	PASS

Tested by .....: Zhou Jun

2013.3.4.

Signature, Date

Reviewed by.....: Xie Yuzhang

2013.3.4

Signature, Date

Approved by.....: Wu Lian

2013.3.

Signature, Date

Southern Electronic Product Testing (Shenzhen) Co.,Ltd. CCIC CCIC-SET

Testing

Date of receipt of test item .....: 2012-12-19

Date(s) of performance of test.....: 2012-12-19 to 2013-03-04

Factory..... .....: GUANGDONG EAST POWER CO.,LTD.

Address .....: No 6 Northern Industry Road, Songshan Lake SCI&TECH Industry Park,DongGuan,P.R.China

Test case verdicts

Test case does not apply to the test object.....: N/A

Test item does meet the requirement.....: P(ass)

Test item does not meet the requirement.....: F(ail)

.....:

General remarks:	Attached with:/
This test report shall not be reproduced except in full without the written approval of the testing laboratory. The test results presented in this report relate only to the item tested. "(see remark #)" refers to a remark appended to the report. "(see appended table)" refers to a table appended to the report. Throughout this report, a coma is used as the decimal separator.	

General descriptions:

Model GF3000,GF5000,GF6000,GF8000 are a serious of solar off-grid inverter which converts direct current generated from the PV array field and batteries to alternating current, and it is intended to be connected in parallel with the mains to charge batteries to supply common load. It is intended for professional incorporation into PV system, and it is assessed on a component test basis, Communication port: RS232;Environmental category: Indoor; Pollution degree rating: 2;Ingress protection: IP20;Protection class: Class I

All models are classified a family with the following characteristic:

--Same appearance and structure;

--The control circuits and power circuit have same scheme;

--Difference only in electrical rating ,transformer and power component;

Full testing was performed on model GF8000,and variations with additional examination and testing subjected to model differences:

--electrical rating test,

--temperature test

Test results are represent to other models.

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
1	GENERAL		P

4	General testing requirements		P
4.1	General		P
4.2	General conditions for testing		P
4.2.1	Sequence of tests		P
4.2.2	Reference test conditions		P
4.2.2.1	Environmental conditions		P
	Unless otherwise specified in this standard, for example with regard to environmental category as defined in 6.1,the following ambient environmental conditions shall exist in the test location: a)temperature of 15 °C to 40 °C; b)a relative humidity of not more than 75 % and not less than 5 %; c)an air pressure of 75 kPa to 106 kPa; d)no frost, dew, percolating water, rain, solar radiation, etc.		P
4.2.2.2	State of equipment		P
4.2.2.3	Position of equipment		P
4.2.2.4	Accessories	No accessories and operator interchangeable parts influence to safety.	P
4.2.2.5	Covers and removable parts	Need to use a tool to remove covers	P
4.2.2.6	Mains supply		P
	a)Voltage:	230Vac	P
	b) Frequency:	50/60Hz	P
	c) Polarity:	Not pluggable equipment type A.	N/A
	d)Earthing:		P
	e)Over-current Protection		P

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
4.2.2.7	Supply ports other than the mains		P
4.2.2.7.1	Photovoltaic supply sources		P
4.2.2.7.2	Battery inputs	192Vdc input	P
4.2.2.8	Conditions of loading for output ports		P
	- for continuous operation ratings		P
	- for intermittent operation ratings		N/A
	- for short-term operation ratings		N/A
4.2.2.9	Earthing terminals	Protective conductor terminal connected to earth.	P
4.2.2.10	Controls		P
	a) mains selection devices shall be set to the correct value unless otherwise noted in this standard.	No such selection devices.	N/A
	b) combinations of settings shall not be made if they are prohibited by the manufacturer's instructions provided with the equipment.		P
4.2.2.11	Available short circuit current	More than 500A	P
4.3	Thermal Testing		P
4.3.1	General		P
	This subclause specifies requirements intended to prevent hazards due to:		P
	- touchable parts exceeding safe temperatures; and		P
	- components, parts, insulation and plastic materials exceeding temperatures which may degrade safety-related electrical, mechanical, or other properties during normal use over the expected life of the equipment;		P
	- structures and mounting surfaces exceeding temperatures which may degrade the materials over the expected life of the equipment		P
4.3.2	Maximum temperatures	(see appended table 4.3)	P
4.3.2.1	General		P

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
4.3.2.2	Touch temperatures		N/A
4.3.2.3	Temperature limits for mounting surfaces		N/A
4.4	Testing in Three fault condition	(see appended table 4.4)	P
4.4.1	General		P
4.4.2	Test conditions and duration for testing under fault conditions		P
4.4.2.1	General		P
4.4.2.2	Duration of tests		P
4.4.3	Pass/fail criteria for testing under fault conditions		P
4.4.3.1	Protection against shock hazard		P
	Compliance with requirements for protection against electric shock is checked during and after the application of Three faults as follows:	No shock hazards.	P
	a) by making measurements to check that no accessible DVC-A circuits have become shock-hazardous using the steady state limits for DVC-A in Table 6 and the short-term limits of 7.3.2.3, and that such circuits remain separated from live parts at voltages greater than DVC A with at least basic insulation. Compliance is checked by the test of 7.5.2 (without humidity preconditioning) for basic insulation		P
	b) by performing a dielectric strength test as per 7.5.2 (without humidity preconditioning) in the following cases: i) on reinforced or double Insulation, using the test level for basic insulation, and ii) on basic insulation in protective class I equipment, using the test level for basic insulation, unless it can be determined that the fault did not result in any damage to the protective earthing conductor or terminal, or to protective bonding means		P

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
	c) by inspection to ensure a fuse connected between the protective earthing terminal and the protective earthing conductor in the test setup has not opened; the fuse shall be rated 3 A non-time-delay (for equipment rated for use on circuits protected by overcurrent protection rated 30 A or less) or 30 A to 35 A non-time-delay (for equipment rated for use on circuits protected by overcurrent protection rated more than 30 A); the enclosure is not to be contacting earth in any other location during the testing		P
	d) by inspection of the enclosure to ensure that no damage has resulted that allows access to parts that are hazardous live.		P
4.4.3.2	Protection against the spread of fire	No fire hazards	P
4.4.3.3	Protection against other hazards	No other hazards after application of the faults	P
4.4.3.4	Protection against parts expulsion hazards	No such hazards after application of the faults	P
4.4.4	Three fault condition to be applied:		P
4.4.4.1	Component fault tests		P
4.4.4.2	Equipment or parts for short-term or intermittent operation	(see appended table 4.4)	P
4.4.4.3	Motors	(see appended table 4.4)	P
4.4.4.4	Transformer short circuit tests	(see appended table 4.4)	P
4.4.4.5	Output short circuit	(see appended table 4.4)	P
4.4.4.6	Backfeed current test for equipment with more than one source of supply	No backfeed current from anthother source.	P
4.4.4.7	Output overload		P
4.4.4.8	Cooling system failure	(see appended table 4.4)	P
	a) air-intakes blocked or partially blocked	(see appended table 4.4)	P
	b) cooling fans stopped or disconnected,one at a time		P
	c) circulation of water or other coolant shall be stopped or partially restricted		N/A

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
4.4.4.9	Heating devices	Without heating devices.	N/A
	a) timers which limit the heating period shall be overridden to energize the heating circuit continuously		N/A
	b) temperature control devices or circuits shall have Three fault conditions applied such that control over the heater is lost. Over-temperature protection devices meeting the requirements of 14.3 are left operational during the test		N/A
4.4.4.10	Safety interlock systems		N/A
4.4.4.11	Reverse d.c. connections	(see appended table 4.4)	P
4.4.4.12	Voltage selector mismatch	No such device	N/A
4.4.4.13	Mis-wiring with incorrect phase sequence or polarity	(see appended table 4.4)	P
4.4.4.14	PWB short-circuit test	(see appended table 4.4)	P
4.5	Humidity preconditioning		P
4.5.1	General		P
4.5.2	Conditions	Before applying humidity, the equipment is brought to a temperature of 42 ℃ ± 2 ℃, normally by keeping it at this temperature for at least 4 h before the humidity preconditioning. Then worst case per manufacturer's manual: 93%; 40°C, 2 days	P
4.6	Voltage Backfeed Protection	Relay and blocking diode used in the PV terminal	P
4.6.1	Backfeed tests under normal conditions		P
4.6.2	Backfeed tests under Three-fault conditions		P
4.6.3	Compliance with backfeed tests		P
	- 15 s for sources that are permanently connected	<1s	P
	- 1 s for sources that are cord-connected or use connectors that can be opened without the use of a tool		N/A

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
4.7	Electrical Ratings Tests	(see appended table 4.7.1)	P
4.7.1	Input Ratings		P
4.7.1.1	Measurement requirements for DC input ports		P
4.7.1.2	Measurement requirements for DC input ports		P
4.7.2	Output Ratings		P
5	Marking and documentation		P
5.1	Marking		P
5.1.1	General		P
5.1.2	Durability	The markings are rubbed quickly by hand, without undue pressure, for 30 s with a cloth soaked with the specified cleaning agent (or, if not specified, with isopropyl alcohol). The markings shall be clearly legible after the above treatment, and adhesive labels shall not have worked loose or become curled at the edges	P
5.1.3	Identification mark		P
	a) the name or trade mark of the manufacturer or supplier	See copy of marking plate provided in this report	P
	b) a model number, name or other means to identify the equipment	See copy of marking plate provided in this report	P
	c) a serial number, code or other marking allowing identification of manufacturing location and the manufacturing batch or date within a three month time period.	See copy of marking plate provided in this report	P
5.1.4	Power rating	See copy of marking plate provided in this report	P
	- input voltage, type of voltage (a.c. or d.c.), frequency, and maximum continuous current for each input	See copy of marking plate provided in this report	P

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
	- output voltage, type of voltage (a.c. or d.c.), frequency, maximum continuous current, and for a.c. outputs, either the power or power factor for each output.....	See copy of marking plate provided in this report	P
	- the ingress protection (IP) rating as in 6.3 below	See copy of marking plate provided in this report	P
5.1.5	Fuse identification (marking, special fusing characteristics, cross-reference)		P
5.1.6	Terminals, connections and controls	DC input, battery input,load	P
5.1.6.1	Protective conductor terminals	the colour coding green-yellow and symbol 7 of Annex C	P
5.1.7	Swtiches and circuit-breakers		P
5.1.8	Class II symbol if applicable	No such devices	N/A
5.1.9	Terminal boxes for External Connections		P
	a) the minimum temperature rating and size of the cable to be connected to the terminals		N/A
	b) a marking to warn the installer to consult the installation instructions. Symbol 9 of Annex C is an acceptable marking.	Add warning 	P

5.2	Warning markings		P
5.2.1	Visibility and legibility requirements for warning markings		P
5.2.2	Content for warning markings		P
5.2.2.1	Ungrounded heatsinks and similar parts	Without grounded heatsinks.	N/A
5.2.2.2	Hot Surfaces		N/A
5.2.2.3	Coolant		N/A
5.2.2.4	Stored energy	Warning marking used	P
5.2.2.5	Motor guarding		P
5.2.3	Sonic hazard markings and instructions	No sonic hazard.	N/A
5.2.4	Equipment with multiple sources of supply	Warning marking used	P

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
5.2.5	Excessive touch current	Warning marking used	P

5.3	Documentation		P
5.3.1	General		P
	a) Explanations of markings and symbols		P
	b) Location and function of terminals and controls		P
	c) Ratings or specifications		P
	d) Warning for suppling voltage		P
5.3.1.1	Language	English version was checked. At least the safety relevant information will be given in other applicable languages to be confirmed during the respective national approval.	P
5.3.1.2	Format		P
5.3.2	Information related to installation		P
	a) assembly, location, and mounting requirements		P
	b) ratings and means of connection to each source of supply and any requirements related to wiring and external controls, colour coding of leads, disconnection means, or overcurrent protection needed, including instructions that the installation position shall not prevent access to the disconnection means		P
	c) ratings and means of connection of any outputs from the PCE, and any requirements related to wiring and external controls, colour coding of leads, or overcurrent protection needed		P
	d) explanation of the pin-out of connectors for external connections, unless the connector is used for a standard purpose (e.g. RS 232)		P
	e) ventilation requirements		P
	f) requirements for special services, for example cooling liquid		N/A

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
	g) instructions and information relating to sound pressure level if required by 10.2.1		N/A
	h) where required by 14.8.1.3, instructions for the adequate ventilation of the room or location in which PCE containing vented or valve-regulated batteries is located, to prevent the accumulation of hazardous gases		N/A
	i) tightening torque to be applied to wiring terminals		P
	j) values of backfeed short-circuit currents available from the PCE on input and output conductors under fault conditions, if those currents exceed the max. rated current of the circuit, as per 4.4.4.6		N/A
	k) for each input to the PCE, the maximum value of short-circuit current available from the source, for which the PCE is designed		P
	l) compatibility with RCD and RCM		P
	m) instructions for protective earthing of the PCE, including the information required by 7.3.6.3.7 if a second protective earthing conductor is to be installed		P
	n) where required by 7.3.8, the installation instructions shall include the following or equivalent wording:"This product can cause current with a d.c. component. Where a residual current-operated protective (RCD) or monitoring (RCM) device is used for protection in case of direct or indirect contact, only an RCD or RCM of Type B is allowed on the supply side of this product."		N/A
	o) for PCE intended to charge batteries, the battery nominal voltage rating, size, and type		P
	p) PV array configuration information, such as ratings, whether the array is to be grounded or floating, any external protection devices needed, etc.		P
5.3.3	Information related to operation		P
	– instructions for adjustment of controls including the effects of adjustment;		P

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
	– instructions for interconnection to accessories and other equipment, including indication of suitable accessories, detachable parts and any special materials		N/A
	– warnings regarding the risk of burns from surfaces permitted to exceed the temperature limits of 4.3.2 and required operator actions to reduce the risk		N/A
	– instructions that if the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.		N/A
5.3.4	Information related to maintenance		P
	– intervals and instructions for any preventive maintenance that is required to maintain safety (for example air filter replacement or periodic re-tightening of terminals);	Limited to trained and authorized professional personnel from manufacturer or its authorized representative	P
	– instructions for accessing operator access areas, if any are present, including a warning not to enter other areas of the equipment;		N/A
	– part numbers and instructions for obtaining any required operator replaceable parts;		N/A
	– instructions for safe cleaning (if recommended);		P
	– where there is more than one source of supply energizing the PCE, information shall be provided in the manual to indicate which disconnect device or devices are required to be operated in order to completely isolate the equipment.		N/A
5.3.4.1	Battery maintenance	Without battery used	N/A
	– Servicing of batteries should be performed or supervised by personnel knowledgeable about batteries and the required precautions		N/A
	– When replacing batteries, replace with the same type and number of batteries or battery packs		N/A
	– General instructions regarding removal and installation of batteries.		N/A

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
	– CAUTION: Do not dispose of batteries in a fire. The batteries may explode.		N/A
	– CAUTION: Do not open or damage batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic		N/A
	– CAUTION: A battery can present a risk of electrical shock and high short-circuit current. The following precautions should be observed when working on batteries:		N/A
	a) Remove watches, rings, or other metal objects.		N/A
	b) Use tools with insulated handles.		N/A
	c) Wear rubber gloves and boots.		N/A
	d) Do not lay tools or metal parts on top of batteries.		N/A
	e) Disconnect charging source prior to connecting or disconnecting battery terminals.		N/A
	e) Disconnect charging source prior to connecting or disconnecting battery terminals.		N/A
	f) Determine if battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).		N/A

6	Environmental requirements and conditions		P
6.1	Environmental categories and minimum environmental conditions		P
6.1.1	OUTDOOR		N/A
6.1.2	INDOOR, unconditioned		N/A
6.1.3	INDOOR, conditioned		P
6.2	Pollution degree	PDII	P

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
6.3	Ingress Protection	IP20	P
6.4	UV exposure		N/A
6.5	Temperature and humidity	Ambient temperature Operation: 0 °C to +40 °C Operation: ≤95 %, no condensation.	P

7	Protection against electric shock and energy hazards		P
7.1	General		P
7.2	Fault conditions		P
7.3	Protection against electric shock		P
7.3.1	General		P
7.3.2	Decisive voltage classification		P
7.3.2.1	Use of decisive voltage class (DVC)		P
7.3.2.2	Limits of *DVC*	Accessible circuit: DVC A Power circuit: DVC C	P
7.3.2.3	Short-term limits of accessible voltages under fault conditions		P
7.3.2.4	Requirements for protection		P
7.3.2.5	Connection to PELV and SELV circuits		P
7.3.2.6	Working voltage and DVC		P
7.3.2.6.1	General		P
7.3.2.6.2	AC working voltage		P
7.3.2.6.3	DC working voltage		P
7.3.2.6.4	Pulsating working voltage		N/A
7.3.3	Protective separation		P
	• double or reinforced insulation,	Double insulation: opto-coupler Reinforced insulation:switching transforemr.	P

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
	• protective screening, i.e. by a conductive screen connected to earth by protective bonding in the PCE, or connected to the protective earth conductor itself, whereby the screen is separated from live parts by at least basic insulation	Accessible metal parts were earthed and separated from live part by basic insulation	P
	• protective impedance comprising limitation of current per 7.3.5.3.1 and of discharged energy per 7.3.5.3.2		N/A
	• limitation of voltage according to 7.3.5.4		N/A
7.3.4	Protection against direct contact		P
7.3.4.1	General		P
7.3.4.2	Protection by means of enclosures and barriers		P
7.3.4.2.1	General	User could not open the door without a tool.	P
7.3.4.2.2	Access probe criteria		P
	a) decisive voltage classification A, (DVC A) - the probe may touch the live parts;		P
	b) decisive voltage classification B, (DVC B) - the probe shall have adequate clearance to live parts, based on the clearance for functional insulation;		N/A
	c) decisive voltage classification C, (DVC C) - the probe shall have adequate clearance to live parts, based on the clearance for basic insulation.		P
7.3.4.2.3	Access probe tests		P
	Test by inspection	Compliance	P
	Test with test finger&pin (Figure D.1& D.2)	No hazards.	P
	Test with jointed test finger (Figure D.1)	No hazards.	P
	Test with IP3X test probe	No TNV circuit	N/A

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
7.3.4.2.4	Service access areas	The manufacturer's manual with the following substance: Always disconnect the unit from the Batteries and PV supply by the external customer installed disconnecting devices before installation, servicing and maintenance works	P
7.3.4.3	Protection by means of insulation of live parts		P
7.3.5	Protection in case of direct contact		P
7.3.5.1	General		P
7.3.5.2	Protection using decisive voltage class A		P
7.3.5.3	Protection by means of protective impedance		N/A
7.3.5.3.1	Limitation of current through protective impedance		N/A
7.3.5.3.2	Limitation of discharging energy through protective impedance		N/A
7.3.5.4	Protection by means of limited voltages		N/A
7.3.6	Protection against indirect contact		P
7.3.6.1	General		P
7.3.6.2	Insulation between live parts and accessible conductive parts		P
7.3.6.3	Protective class I - Protective bonding		P
7.3.6.3.1	General		P
	a) accessible conductive parts that are protected by one of the measures in 7.3.5.2 to 7.3.5.4		P
	b) accessible conductive parts that are separated from live parts of DVC-B or -C using double or reinforced insulation.		P
7.3.6.3.2	Rating of protective bonding		P
	a) through direct metallic contact;		N/A
	b) through other conductive parts which are not removed when the PCE or sub-units are used as intended		N/A

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
	c) through dedicated protective bonding conductors;		P
	d) through other metallic components of the PCE.		N/A
7.3.6.3.3	Rating of protective bonding		P
7.3.6.3.3.1	Test current, duration, and acceptance criteria	The alternative of 7.3.6.3.5 is considered	N/A
7.3.6.3.4	Protective bonding impedance (routine test)	The alternative of 7.3.6.3.5 is considered	N/A
7.3.6.3.5	External protective earthing conductor	The cross-sectional area of protective earthing conductor is not less than 2.5mm^2.only qualified person can install the protective earthing.	P
7.3.6.3.6	Means of connection for the external protective earthing conductor		P
7.3.6.3.6.1	General	Symbol 7 of annex C and the colour coding green-yellow	P
7.3.6.3.7	Touch current in case of failure of the protective earthing conductor	Permanently connected wire and not less than 10mm^2 of cross-section of protective earthing conductor is used.	P
7.3.6.4	Protective class II - Double or reinforced insulation		N/A
7.3.7	Insulation Including Clearance and Creepage Distances		P
7.3.7.1	General		P
7.3.7.1.1	Pollution degrees	II	P
7.3.7.1.2	Overvoltage category and Impulse withstand voltage rating category:	OVCIIfor AC, and OVC II for DC	P
7.3.7.1.3	Supply earthing systems	TN system	P
7.3.7.1.4	Insulation voltages	AC: 2500V DC:2500V	P
7.3.7.2	Insulation between a circuit and its surroundings		P
7.3.7.2.1	General		P
7.3.7.2.2	Circuits connected directly to the MAINS		P

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
7.3.7.2.3	Circuits other than MAINS circuits		P
7.3.7.2.4	Insulation between circuits		P
7.3.7.3	Functional insulation		P
7.3.7.4	Clearance distances	(see append table 7.3.7)	P
7.3.7.4.1	Determination		P
7.3.7.4.2	Electric field homogeneity		N/A
7.3.7.4.3	Clearance to conductive enclosures		P
7.3.7.5	Creepage distances	(see append table 7.3.7)	P
7.3.7.5.1	General		P
7.3.7.5.2	Voltage		P
7.3.7.5.3	Materials	Insulating material group IIIb: 175 CTI ≥ 100, compliance checked for material certificate and specifications.	P
7.3.7.6	Coating		N/A
7.3.7.7	PWB spacings for functional insulation	UL approved PCB used	P
7.3.7.8	Solid insulation		P
7.3.7.8.1	General		P
7.3.7.8.2	Requirements for electrical withstand capability of solid insulation		P
7.3.7.8.2.1	Basic, supplemental, reinforced, and double insulation		P
7.3.7.8.2.2	Functional insulation		P
7.3.7.8.3	Thin sheet or tape material		P
7.3.7.8.3.1	General		P
7.3.7.8.3.2	Material thickness not less than 0,2 mm	Sleeving use for insulation not less than 0.3mm	P
7.3.7.8.3.3	Material thickness less than 0,2 mm		N/A
7.3.7.8.3.4	Compliance		P
7.3.7.8.4	Printed wiring boards (PWBs)		P
7.3.7.8.4.1	General		P

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Clause	Requirement – Test	Result - Remark	Verdict
7.3.7.8.4.2	Use of coating materials		N/A
7.3.7.8.5	Wound components		P
7.3.7.8.6	Potting materials		N/A
7.3.7.9	Insulation requirements above 30 kHz		N/A
7.3.8	Residual Current Detection (RCD) or Monitoring (RCM) device compatibility		P
7.3.9	Protection against shock hazard due to stored energy	Add warning label	P
7.3.9.1	Operator access area		P
7.3.9.2	Service access areas	The warning symbol of Annex D was placed on the outer enclosure.	P
7.4	Protection against energy hazards		P
7.4.1	Determination of hazardous energy level		P
7.4.2	Operator access areas		P
7.4.3	Service access areas		P
7.5	Electrical tests related to shock hazard		P
7.5.1	Impulse voltage test (type test)	See append table 7.5.1	P
7.5.2	Voltage test (dielectric strength test) (type test and routine test)		P
7.5.2.1	Purpose of test		P
7.5.2.2	Value and type of test voltage		P
7.5.2.3	Humidity pre-conditioning	40°C, 93%RH 48 h	P
7.5.2.4	Performing the voltage test		P
7.5.2.5	Duration of the a.c. or d.c. voltage test		P
7.5.2.6	Verification of the a.c. or d.c. voltage test		P
7.5.3	Partial discharge test (type test or sample test)		P
7.5.4	Touch current measurement (type test)		P
	Measured touch current (mA)	See 7.3.6.3.7	P
	Max. allowed touch current (mA)		—

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Clause	Requirement – Test	Result - Remark	Verdict
7.5.5	Equipment with multiple sources of supply		N/A
8	Protection against mechanical HAZARDS		P
8.1	General		P
8.2	Moving parts		N/A
8.2.1	Protection of service persons		N/A
8.3	Stability		N/A
8.4	Provisions for lifting and carrying		P
8.5	Wall mounting		N/A
8.6	Expelled parts		N/A
9	Protection against fire hazards		P
9.1	Resistance to fire		P
9.1.1	Reducing the risk of ignition and spread of flame	Use of materials with the required flammability classes.	P
	Method 1, selection and application of components wiring and materials	(see appended table 4.7)	P
	Method 2, application of all of simulated fault condition tests		N/A
9.1.2	Conditions for a fire enclosure	See below	P
9.1.2.1	Parts requiring a fire enclosure		P
	– components in mains circuits;		P
	– components in secondary circuits supplied by power sources which exceed the limits for a limited power source as specified in 9.2;		P
	– components in secondary circuits supplied by a limited power source as specified in 9.2, but not mounted on material of flammability class V-1;		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
	– components within a power supply unit or assembly having a limited power output complying with the criteria for a limited power source as specified in 9.2, including overcurrent protective devices, limiting impedances, regulating networks and wiring, up to the point where the limited power source output criteria are met;		N/A
	– components having unenclosed arcing parts, such as open switch and relay contacts and commutators, in a circuit at hazardous voltage or at a hazardous energy level;		P
	– insulated wiring, except as permitted in 9.1.2.2.		P
9.1.2.2	Parts not requiring a fire enclosure		P
	– wiring and cables insulated with PVC, TFE, PTFE, FEP, neoprene or polyimide;		P
	– plugs and connectors forming part of a power supply cord or interconnecting cable;		N/A
	– components, including connectors, meeting the requirements of 9.1.3.2, which fill an opening in a fire enclosure;		P
	– connectors in secondary circuits supplied by power sources which are limited to a maximum of 15 VA under normal operating conditions and after a Three fault in the equipment;		N/A
	– connectors in secondary circuits supplied by a limited power source as specified in 9.2,		N/A
	– other components in secondary circuits:		N/A
9.1.3	Materials requirements for protection against fire hazard		P
9.1.3.1	General	PCB is with flammability catecary V-0	P
9.1.3.2	Materials for fire enclosures	Metal enclosure used.	P
9.1.3.3	Materials for components and other parts inside fire enclosures	Plastic parts outside metal enclosure rated at HF-1	P

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Clause	Requirement – Test	Result - Remark	Verdict
9.1.3.4	Materials for air filter assemblies	Internal components except small parts are V-2 or better.	P
9.1.4	Openings in fire enclosures		N/A
9.1.4.1	General		N/A
9.1.4.2	Side openings treated as bottom openings		N/A
9.1.4.3	Openings in the bottom of a fire enclosure		N/A
	Construction of the bottomm, dimensions (mm)		N/A
9.1.4.4	Equipment for use in a closed electrical operating area		N/A
9.1.4.5	Doors or covers in fire enclosures		N/A
9.1.4.6	Additional requirements for openings in transportable equipment	Not transportable equipment.	N/A
	dimensions (mm)		N/A
9.2	Limited power sources		N/A
	a) Inherently limited output		N/A
	b) Impedance limited output		N/A
	c) Overcurrent protective device limited output		N/A
	d) Regulating network limits the output		N/A
	Max. output voltage (V), max. output current (A), max. apparent power (VA).....		—
	Current rating of overcurrent protective device (A) :		—
9.3	Short-circuit and overcurrent protection		P
9.3.1	General		P
9.3.2	Number and location of overcurrent protective devices		P
9.3.3	Short-circuit co-ordination (backup protection)		P

10	Protection Against Sonic Pressure Hazards		P
10.1	General	<70dB	P
10.2	Sonic Pressure and Sound level		P
10.2.1	Hazardous noise levels	No such hazards.	P

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Clause	Requirement – Test	Result - Remark	Verdict
11	Protection Against Liquid Hazards		N/A
11.1	Liquid Containment, Pressure and Leakage		N/A
	a) Normal operation, including condensation;		N/A
	b) Servicing of the equipment;		N/A
	c) Inadvertent loosening or detachment of hoses or other cooling system parts over time.		N/A
11.2	Fluid pressure and leakage		N/A
11.2.1	Maximum pressure		N/A
	a) the rated maximum supply pressure specified for an external source;		N/A
	b) the pressure setting of an overpressure safety device provided as part of the assembly		N/A
	c) the maximum pressure that can be developed by an air compressor that is part of the assembly, unless the pressure is limited by an overpressure safety device.		N/A
11.2.2	Leakage from parts		N/A
11.2.3	Overpressure safety device		N/A
	a) be connected as close as possible to the liquid-containing parts of the system that it is intended to protect;		N/A
	b) be installed so as to provide easy access for inspection, maintenance and repair;		N/A
	c) only be adjustable via the use of a tool;		N/A
	d) have its discharge opening so located and directed that the released material is not directed towards any person;		N/A
	e) have its discharge opening so located and directed that operation of the device will not deposit liquid on parts that may cause a hazard;		N/A
	f) have adequate discharge capacity to ensure that, in the event of a failure of the supply pressure control, the pressure does not exceed the rated maximum working pressure of the system;		N/A
	g) have no shut-off valve between it and the parts that it is intended to protect.		N/A
11.3	Oil and grease		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
12	Chemical Hazards		N/A
12.1	General		N/A
13	Physical Requirements		P
13.1	Handles and manual controls		P
13.1.1	Adjustable controls	No such controls.	N/A
13.2	Securing of parts		P
13.3	Provisions for external connections		P
13.3.1	General		P
13.3.2	Connection to an a.c. MAINS supply		P
13.3.2.1	General		P
13.3.2.2	Permanently connected equipment		P
13.3.2.3	Appliance inlets		N/A
13.3.2.4	Power supply cords	No provide	N/A
	Type		N/A
	Rated current (A), cross-sectional area (mm^2), AWG		N/A
13.3.2.5	Cord anchorages and strain relief	Use wire connector to fix	N/A
	Mass of equipment (kg), pull (N)		—
	Longitudinal displacement (mm)		—
13.3.2.6	Protection against mechanical damage		P
13.3.3	Wiring terminals for connection of external conductors		P
13.3.3.1	Wiring terminals		P
13.3.3.2	Screw terminals		P
13.3.3.3	Wiring terminal sizes		P
	Rated current (A), type, nominal thread diameter (mm)		—
13.3.3.4	Wiring terminal design		P
13.3.3.5	Grouping of wiring terminals		P

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Clause	Requirement – Test	Result - Remark	Verdict
13.3.3.6	Stranded wire		P
13.3.4	Supply wiring space		P
13.3.5	Wire bending space for wires 10 mm2 and greater		N/A
13.3.6	Disconnection from supply sources		P
13.3.7	Connectors, plugs and sockets		P
13.3.8	Direct plug-in equipment		N/A
	Torque .....:		N/A
	Compliance with the relevant mains plug standard .....:		N/A
13.4	Internal wiring and connections		P
13.4.1	General		P
13.4.2	Routing		P
13.4.3	Colour coding	Yellow/green only used for protective bonding.	P
13.4. 4	Splices and connections		P
13.4.5	Interconnections between parts of the PCE		P
13.5	Openings in enclosures		N/A
13.5.1	Top and side opening		N/A
	Dimensions (mm) .....:	Ingress degree IP20	—
13.6	Polymeric Materials	No such materials.	N/A
13.6.1	General		N/A
13.6.1.1	Thermal index or capability		N/A
13. 6.2	Polymers serving as enclosures or barriers preventing access to hazards		P
13.6.2.1	Stress relief test	Bobbin material 70℃ 7H	P
13.6.3	Polymers serving as solid insulation		P
13.6.3.1	Resistance to arcing		P
13.6.4	UV resistance		N/A
13.7	Mechanical resistance to deflection, impact, or drop		P
13.7.1	General		P

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Clause	Requirement – Test	Result - Remark	Verdict
13.7.2	Thickness requirements for metal enclosures		P
13.7.3	7 J impact test for polymeric enclosures		N/A
13.7.4	Drop test		N/A
13.8	Thickness requirements for metal enclosures		P
13.8.1	General		P
13.8.2	Cast metal		N/A
13.8.3	Sheet metal	Min 2.0mm	P
14	Components		P
14.1	General		P
14.2	Motor Overtemperature Protection		P
14.3	Overtemperature protection devices		P
14.4	Fuse holders		P
14.5	MAINS voltage selecting devices	No such devices.	N/A
14.6	Printed circuit boards	PCB rated v-0	P
14.7	Circuits or components used as transient overvoltage limiting devices		P
14.8	Batteries		P
14.8.1	Battery enclosure ventilation		N/A
14.8.1.1	Ventilation requirements		N/A
14.8.1.2	Ventilation testing		N/A
14.8.1.3	Ventilation instructions		N/A
14.8.2	Battery mounting		N/A
14.8.3	Electrolyte spillage		N/A
14.8.4	Battery connections		N/A
14.8.5	Battery maintenance instructions		N/A
14.8.6	Battery accessibility and maintainability		N/A
15	Software and firmware performing safety functions		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
A	ANNEX A, MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES		P
B	ANNEX B, PROGRAMMABLE SOFTWARE		N/A
B.1	Software or firmware that performs safety critical functions		N/A
B.1.1	Firmware or Software that performs a critical safety function/s		N/A
B.2.	Evaluation of controls employing software		N/A
B.2.1	Risk analysis		N/A
B.2.1.1	Risk analysis determine a set of risks and that the software addresses the identified risks		N/A
B.2.1.2	Risk analysis identify the critical, non-critical, and supervisory parts of the software		N/A
B.2.1.3	Risk analysis identify transitions or states that can result in a risk		N/A
B.2.1.4	Risks to be considered		N/A
	a) Temperature control, monitoring and response (i.e. coolant, internal ambient, device)		N/A
	b) Safety interlocks		N/A
	c) Synchronization between multiple AC sources		N/A
	d) Emergency stop of operation (including staged shutdown / sequencing)		N/A
	e) Connection / disconnection – from an input source and output source		N/A
	f) RCD functions		N/A
	g) Over current protection or control		N/A
C	ANNEX C, SYMBOLS TO BE USED IN EQUIPMENT MARKINGS		P
D	ANNEX D, TEST PROBES FOR DETERMINING ACCESS		P
E	ANNEX E, RCDs		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
E.1	Selection of RCD type in AC circuits		N/A
F	ANNEX F, RCDs		N/A
F.1	Correction factor for clearances at altitudes above 2 000 m		N/A
F.2	Test voltages for verifying clearances at different altitude		N/A
G	ANNEX G, CLEARANCE AND CREEPAGE DISTANCE DETERMINNATION FOR FREQUENCIES GREATER THAN 30 KHZ		N/A
G.1	Clearances		N/A
G.2	Creepage		N/A
H	ANNEX H, MEASURING INSTRUMENT FOR TOUCH CURRENT MEASUREMENTS		P
H.1	Measuring instrument		P
H.2	Alternative measuring instrument		N/A
I	ANNEX I, EXAMPLES OF PROTECTION, INSULATION, AND OVERVOLTAGE CATEGORY REQUIREMENTS FOR PCE		P
I.1	Numerical		P
I.2	Illustrative		P
J	ANNEX J, ULTRABIOLET LIGHT CONDITIONING TEST		N/A
J.1	General		N/A
J.2	Mounting		N/A
J.3	Carbon-arc light-exposure apparatus		N/A
J.4	Xenon-arc light-exposure apparatus		N/A

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Clause	Requirement – Test		Result - Remark		Verdict
4.3.a	TABLE: Thermal requirements(model: GF8000)				P
Supply voltage (V)	DC 400V(PV mode)		DC 400V(AC mode)		—
Ambient T_{min} (°C)	20.7		26.5		—
Ambient T_{max} (°C)	24.3		28.9		—
Maximum measured temperature T of part/at:	T (°C)		T (°C)		Allowed T_{max} (°C)
	Measure	Correct to ambient temperture 40℃	Measure	Correct to ambient temperture 40℃	
CPU	29.1	44.8	34.5	45.6	105
Winding of main transformer	89.2	104.9	102.4	113.5	130
Core of main transformer	53.1	68.8	66.6	77.7	130
Winding of reactor	26.3	42.0	93.1	104.2	110
Core of reactor	26.5	42.2	70.3	81.4	110
Winding of SPS transformer	37.0	52.7	44.2	55.3	90
Core of SPS transformer	36.5	52.2	43.1	54.2	90
Q5 heatsink of SPS	29.9	45.6	37.3	48.4	105
SPS heatsnk	38.7	54.4	43.3	54.4	105
Winding of inductor for MPPT	101.4	117.1	60.9	72.0	90
Relay J1 enclsure for MPPT	50.3	66.0	46.8	57.9	90
Filter capacitor C19 for MPPT	39.7	55.4	39.2	50.3	85
IGBT Q7	95.0	110.7	55.9	67.0	130
Heatsink on MPPT board	62.7	78.4	44.9	56.0	105
Inductor L1 on AC charger board	26.7	42.4	31.3	42.4	85
Fuse body F1 on AC charger board	26.5	42.2	31.1	42.2	90
AC charger Winding of TX1 on AC charger board	31.2	46.9	35.2	46.3	105
AC charger Q7	25.5	41.2	30.5	41.6	130

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Clause	Requirement – Test		Result - Remark		Verdict
Heatsink on AC charger board	24.3	40.0	29.4	40.5	105
AC current hall	27.5	43.2	34.6	45.7	90
PV input breaker	27.2	42.9	29.4	40.5	90
DC input breaker	33.9	49.6	32.7	43.8	90
Input inductor of AC filter board	29.2	44.9	46.5	57.6	130
AC output breaker	34.4	50.1	56.3	67.4	90
Output inductor of AC filter board	26.6	42.3	47.4	58.5	130
Relay of batteries	43.7	59.4	31.9	43.0	90
Output replay	44.2	59.9	53.0	64.1	90
IGBT Q9 body	75.2	90.9	95.4	106.5	130
SCR2 for filter	43.7	59.4	95.6	106.7	130
Top heatsink	53.8	69.5	78.7	89.8	130
Bus capacitor	25.8	41.5	32.5	43.6	105
AC inductor	29.5	45.2	79.6	90.7	130
Fan	34.2	49.9	44.6	55.7	85
Inside ambient	25.7	41.4	31.1	42.2	--
Top enclosure	28.3	44.0	36.0	47.1	60
Front enclosure	22.5	38.2	25.1	36.2	60

Note: this temperature test are performed under worst condition according to the circuit analysis

4.3.b	TABLE: Thermal requirements(model: GF6000)				P
Supply voltage (V)	DC 400V(PV mode)		DC 400V(AC mode)		—
Ambient T_{min} (°C)	20.1		24.5		—
Ambient T_{max} (°C)	23.9		28.5		—
Maximum measured temperature T of part/at:	T (°C)		T (°C)		Allowed T_{max} (°C)
	Measure	Correct to ambient temperture 40℃	Measure	Correct to ambient temperture 40℃	
CPU body	28.2	44.3	34.5	46.0	105
Winding of main transformer	72.2	88.3	86.7	98.2	130

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Clause	Requirement – Test		Result - Remark		Verdict
Core of main transformer	50.8	66.9	60.6	72.1	130
Winding of reactor	25.5	41.6	76.0	87.5	110
Core of reactor	25.9	42.0	70.2	81.7	110
Winding of SPS transformer	36.6	52.7	44.2	55.7	90
Core of SPS transformer	36.0	52.1	43.1	54.6	90
Q5 heatsink of SPS	29.4	45.5	37.3	48.8	105
SPS heatsnk	38.2	54.3	43.3	54.8	105
Winding of inductor for MPPT	76.6	92.7	60.9	72.4	90
Relay J1 enclsure for MPPT	49.7	65.8	46.8	58.3	90
Filter capacitor C19 for MPPT	38.9	55.0	39.2	50.7	85
IGBT Q9	52.8	68.9	74.4	85.9	130
Heatsink on MPPT board	56.2	72.3	44.9	56.4	105
Inductor L1 on AC charger board	26.4	42.5	31.3	42.8	85
Fuse body F1 on AC charger board	26.3	42.4	31.1	42.6	90
AC charger Winding of TX1 on AC charger board	31.0	47.1	35.2	46.7	105
AC charger Q7	25.2	41.3	30.5	42.0	130
Heatsink on AC charger board	24.0	40.1	29.3	40.8	105
AC current hall	27.0	43.1	34.5	46.0	90
PV input breaker	26.9	43.0	29.3	40.8	90
DC input breaker	33.4	49.5	32.6	44.1	90
Input inductor of AC filter board	28.7	44.8	46.4	57.9	130
AC output breaker	33.9	50.0	56.3	67.8	90
Output inductor of AC filter board	26.2	42.3	47.4	58.9	130
Relay of batteries	43.6	59.7	31.9	43.4	90
Output replay	43.9	60.0	52.9	64.4	90

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Clause	Requirement – Test		Result - Remark		Verdict
IGBT Q7 body	71.8	87.9	74.4	85.9	130
SCR2 for filter	43.2	59.3	74.4	85.9	130
Top heatsink	53.5	69.6	69.7	81.2	130
Bus capacitor	25.4	41.5	32.4	43.9	105
AC inductor	29.0	45.1	69.1	80.6	130
Fan	33.7	49.8	44.7	56.2	85
Inside ambient	24.8	40.9	30.8	42.3	--
Top enclosure	28.0	44.1	35.6	47.1	60
Front enclosure	22.2	38.3	24.9	36.4	60

4.3.c	TABLE: Thermal requirements(model: GF5000)				P
Supply voltage (V)	DC 400V(PV mode)		DC 400V(AC mode)		—
Ambient T_{min} (°C)	24.2		27.3		—
Ambient T_{max} (°C)	26.7		29.3		—
Maximum measured temperature T of part/at:	T (°C)		T (°C)		Allowed T_{max} (°C)
	Measure	Correct to ambient temperture 40℃	Measure	Correct to ambient temperture 40℃	
CPU	34.8	48.1	38.8	49.5	105
Winding of main transformer	63.5	76.8	78.2	88.9	130
Core of main transformer	44.9	58.2	56.3	67.0	130
Winding of reactor	29.7	43	60.1	70.8	110
Core of reactor	29.7	43	53.4	64.1	110
Winding of SPS transformer	41.6	54.9	46.1	56.8	90
Core of SPS transformer	36.9	50.2	40.4	51.1	90
Q5 heatsink of SPS	35.8	49.1	40.1	50.8	105
SPS heatsnk	45.9	59.2	47.5	58.2	105
Winding of inductor for MPPT	76.8	90.1	50.4	61.1	90
Relay J1 enclsure for MPPT	46.0	59.3	46.3	57.0	90

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Clause	Requirement – Test		Result - Remark		Verdict
Filter capacitor C19 for MPPT	35.7	49	36.1	46.8	85
Q7	75.6	88.9	48.8	59.5	130
Heatsink on MPPT board	32.3	45.6	35.9	46.6	105
Inductor L1 on AC charger board	30.9	44.2	33.4	44.1	85
Fuse body F1 on AC charger board	30.0	43.3	32.6	43.3	90
AC charger Winding of TX1 on AC charger board	33.1	46.4	35.0	45.7	105
AC charger Q7	29.3	42.6	32.0	42.7	130
Heatsink on AC charger board	29.2	42.5	32.0	42.7	105
AC current hall	30.3	43.6	33.9	44.6	90
PV input breaker	30.7	44	32.8	43.5	90
DC input breaker	32.7	46	36.3	47.0	90
Input inductor of AC filter board	34.1	47.4	48.2	58.9	130
AC output breaker	35.5	48.8	38.7	49.4	90
Output inductor of AC filter board	39.4	52.7	41.6	52.3	130
Relay of batteries	40.1	53.4	32.6	43.3	90
Output replay	37.8	51.1	38.7	49.4	90
IGBT Q9 body	52.6	65.9	60.0	70.7	130
SCR2 for filter	38	51.3	65.0	75.7	130
Top heatsink	43.3	56.6	53.1	63.8	130
Bus capacitor	29.7	43	33.2	43.9	105
AC inductor	34.2	47.5	38.0	48.7	130
Fan	33.0	46.3	44.4	55.1	85
Inside ambient	29.5	42.8	32.6	43.3	--
Top enclosure	30.5	43.8	33.7	44.4	60
Front enclosure	29.3	42.6	31.6	42.3	60

EN 62109-1 : 2010					
Clause	Requirement – Test		Result - Remark		Verdict
4.3.d	TABLE: Thermal requirements(model: GF3000)				P
Supply voltage (V)	DC 400V(PV mode)		DC 400V(AC mode)		—
Ambient T_{min} (°C)	26.6		27.1		—
Ambient T_{max} (°C)	27.0		28.0		—
Maximum measured temperature T of part/at:	T (°C)		T (°C)		Allowed T_{max} (°C)
	Measure	Correct to ambient temperture 40℃	Measure	Correct to ambient temperture 40℃	
CPU	34.8	47.8	34.9	46.9	105
Winding of main transformer	68.4	81.4	79.8	91.8	130
Core of main transformer	45.7	58.7	51.3	63.3	130
Winding of reactor	29.7	42.7	41.4	53.4	110
Core of reactor	41.6	54.6	39.9	51.9	110
Winding of SPS transformer	36.9	49.9	35.9	47.9	90
Core of SPS transformer	37.8	50.8	43.6	55.6	90
Q5 heatsink of SPS	45.9	58.9	37.8	49.8	105
SPS heatsnk	76.8	89.8	45.4	57.4	105
Winding of inductor for MPPT	65.1	78.1	45	57	90
Relay J1 enclsure for MPPT	75.6	88.6	45.1	57.1	90
Filter capacitor C19 for MPPT	33.1	46.1	33.3	45.3	85
Q7	64.4	77.4	42.8	54.8	130
Heatsink on MPPT board	33.9	46.9	36.2	48.2	105
Inductor L1 on AC charger board	33.1	46.1	33.5	45.5	85
Fuse body F1 on AC charger board	29.3	42.3	32.5	44.5	90
AC charger Winding of TX1 on AC charger board	32.1	45.1	34.8	46.8	105
AC charger Q7	30.3	43.3	30.9	42.9	130

EN 62109-1 : 2010					
Clause	Requirement – Test		Result - Remark		Verdict
Heatsink on AC charger board	30.7	43.7	30.3	42.3	105
AC current hall	63.5	76.5	30.9	42.9	90
PV input breaker	32.7	45.7	30.9	42.9	90
DC input breaker	34.1	47.1	32.5	44.5	90
Input inductor of AC filter board	35.5	48.5	34.3	46.3	130
AC output breaker	39.4	52.4	36.6	48.6	90
Output inductor of AC filter board	40.1	53.1	32.6	44.6	130
Relay of batteries	37.8	50.8	31.9	43.9	90
Output replay	52.6	65.6	35.7	47.7	90
IGBT Q9 body	47.2	60.2	59.7	71.7	130
SCR2 for filter	46	59	69.5	81.5	130
Top heatsink	43.3	56.3	49.7	61.7	130
Bus capacitor	29.7	42.7	31.2	43.2	105
AC inductor	33	46	35.5	47.5	130
Fan	34.2	47.2	36.3	48.3	85
Inside ambient	29.5	42.5	30.6	42.6	--
Top enclosure	30.5	43.5	32.1	44.1	60
Front enclosure	29.3	42.3	30.1	42.1	60

4.4	TABLE: Fault condition tests						P
	Ambient temperature (°C) .....:					24,8℃	—
	Power source for EUT: Manufacturer, model/type, output rating:					--	—
Component No.	Fault	Supply voltage(V)	Test time	Fuse #	Fuse current(A)	Observation	
Output	Shorted-circuit	I/P: 350Vdc O/P: 230Vac	1S	----	----	EUT shut down immediately. No display due to system shun down. No component damaged, once the short-circuit resume, EUT is worked normally. No hazards.	

EN 62109-1 : 2010							
Clause	Requirement – Test				Result - Remark		Verdict
Output	overload	I/P: 350Vdc O/P: 230Vac	1S	----	----	EUT shut down immediately. Display "output overloard" warning. No hazards.	
Ventilation hole	Blocked	I/P: 350Vdc O/P: 230Vac	30 min	----	----	EUT limit output when temperature of thermal detector rised to 85℃. The output power limited to 0	
Fan	Blocked	I/P: 350Vdc O/P: 230Vac	30 min	----	----	Test result as above. No hazards.	
batteries	Reverse	I/P: 350Vdc O/P: 230Vac	1S	----	----	EUT shut down immediately. Breaker is opened,once the short-circuit resume, EUT is worked normally. No hazards	
Input	Reverse	I/P: 350Vdc O/P: 230Vac	5 min	----	----	The EUT change to battery mode. LCD display "PV reverse". No hazards.	
Manual by pass AC switch	Mis-match	I/P: 350Vdc O/P: 230Vac	5 min	----	----	EUT under PV mode, close AC power switch, work normally.	
Manual by pass maintance switch	Mis-match	I/P: 350Vdc O/P: 230Vac	5 min	----	----	EUT under PV mode, close Maintance switch, the unit immediately shut down,the input and output breaker are opened, No hazards.	
Current sample signal R7	Shorted-cir cuit	I/P: 350Vdc O/P: 230Vac	2 min	----	----	PV LED lignt on,The power display "0" no effect. No hazards.	
Current sample signal C20	Shorted-cir cuit	I/P: 350Vdc O/P: 230Vac	2min	----	----	PV LED lignt on,The power display "0" no effect. No hazards.	
C15	Shorted-cir cuit	I/P: 350Vdc O/P: 230Vac	1s	----	----	EUT shut down immediately. Breaker is opened,once the short-circuit resume, EUT is worked normally. No hazards.	
R27	Open-circui t	I/P: 350Vdc O/P: 230Vac	10min	----	----	EUT is worked normally. No hazards.	
Q5 D and S	Shorted-cir cuit	I/P: 350Vdc O/P: 230Vac	1s	----	----	EUT shut down immediately, AC and DC breaker is opened, Q15,Q16,Q11,Q12,Q13damaged, hi-pot test is ok, No hazards .	
C4	Shorted-cir cuit	I/P: 350Vdc O/P: 230Vac	1s	----	----	EUT shut down immediately. No display due to system shun down , No hazards.	

EN 62109-1 : 2010							
Clause	Requirement – Test				Result - Remark		Verdict
C12	Shorted-circuit	I/P: 350Vdc O/P: 230Vac	1s	----	----	EUT shut down immediately.and cann't start, No hazard.	
SCR3 C and E	Shorted-circuit	I/P: 350Vdc O/P: 230Vac	1s	----	----	AC breaker is opened, waring "AC fault" on display, SCR2 damaged, chang e to batteries supply power to IGBT,output is work normaly, No hazards	
Q7 C and E	Shorted-circuit	I/P: 350Vdc O/P: 230Vac	1s	----	----	EUT shut down immediately, AC and DC breaker is opened, Q15,Q16,Q11,Q12,Q13damaged, hi-pot test is ok, No hazards .	
R9	Shorted-circuit	I/P: 350Vdc O/P: 230Vac	2min	----	----	The output power is larger than actual on diaplay, No harzards.	
R9	Open-circuit	I/P: 350Vdc O/P: 230Vac	2min	----	----	The output power is larger than actual on diaplay, No harzards.	
PWM1 Q1 C and E	Shorted-circuit	I/P: 350Vdc O/P: 230Vac	2min	----	----	EUT shut down immediately, AC and DC breaker is opened, Q6,Q5,Q8,Q9 damaged,, hi-pot test is ok, No hazards .	
PWM1 Q1 C and G	Shorted-circuit	I/P: 350Vdc O/P: 230Vac	2min	----	----	EUT shut down immediately, AC and DC breaker is opened, Q6,Q5,Q8,Q9, hi-pot test is ok, No hazards .	
PV V-signal R153	Shorted-circuit	I/P: 350Vdc O/P: 230Vac	2min	----	----	The PV LED light on, No charge function,output is worked normally. No hazards	
C60	Shorted-circuit	I/P: 350Vdc O/P: 230Vac	2min	----	----	PV power diaplay"0" , No charger function, output is normal.	
C55	Shorted-circuit	I/P: 350Vdc O/P: 230Vac	5min	----	----	Output is ok,the message on display is out of control . No hazards .	

4.7	TABLE: Electrical rating tests (off grid)							P
output Level	input Voltage (V)	input current (A)	input power (kW)	output voltage (V)	Uthd (%)	output current (A)	output power (kW)	Frequency (Hz)
GF8000								
0%	201.06	1.07	0.22	231.03	2.94%	/	/	50.005
5%	199.73	3.25	0.65	229.59	2.72%	1.91	0.65	50.005
50%	193.64	23.68	4.57	231.03	0.84%	18.07	4.17	50.006

EN 62109-1 : 2010								
Clause	Requirement – Test				Result - Remark			Verdict
4.7	TABLE: Electrical rating tests (off grid)							P
output Level	input Voltage (V)	input current (A)	input power (kW)	output voltage (V)	Uthd (%)	output current (A)	output power (kW)	Frequency (Hz)
100%	188.58	47.90	9.87	229.26	0.92%	35.71	8.19	50.006
0%	403.24	4.46	1.81	228.46	3.03%	/	/	50.006
5%	403.51	4.45	1.81	228.05	2.83%	1.97	0.44	50.007
50%	403.19	13.54	5.47	229.48	0.98%	18.11	4.16	50.008
100%	399.45	22.38	8.95	227.76	0.96%	35.72	8.13	50.008
0%	195.46	0.05	0.01	230.75	2.93%	/	/	50.007
5%	223.31	10.77	2.41	229.72	2.82%	1.94	0.44	50.005
50%	222.59	26.84	5.98	229.99	0.96%	18.16	4.18	50.007
100%	220.91	43.36	9.54	228.31	0.95%	35.96	8.21	50.006
*0%-100 %	/	/	/	228.48	/	/	/	/
*100%-0 %	/	/	/	229.18	/	/	/	/
Note: * After 1.5S, measure output voltage by oscilloscopes.								
GF6000								
0%	201.64	0.69	0.14	230.59	3.60%	/	/	50.005
5%	200.71	2.24	0.45	230.56	2.87%	1.34	0.30	50.006
50%	194.44	18.16	3.53	230.61	1.14%	13.93	3.21	50.004
100%	190.16	36.80	6.96	230.35	1.25%	27.44	6.32	50.005
0%	279.96	6.04	1.70	230.61	3.75%	/	/	50.003
5%	228.39	8.26	1.89	230.55	3.06%	1.36	0.31	50.006
50%	227.74	26.99	6.15	230.17	1.36%	13.91	3.20	50.004
100%	224.82	38.97	8.76	230.56	1.36%	27.44	6.33	50.004
0%	403.36	7.74	3.13	230.74	3.75%	/	/	50.005
5%	403.58	5.18	2.10	230.14	3.09%	1.35	0.30	50.004
50%	403.55	7.02	2.84	232.64	1.40%	13.88	3.23	50.004
100%	402.01	21.51	8.66	230.43	1.53%	27.37	6.31	50.003
GF5000								
0%	206.68	0.70	0.15	231.55	3.38%	/	/	50.004

EN 62109-1 : 2010								
Clause	Requirement – Test				Result - Remark			Verdict
4.7	TABLE: Electrical rating tests (off grid)							P
output Level	input Voltage (V)	input current (A)	input power (kW)	output voltage (V)	Uthd (%)	output current (A)	output power (kW)	Frequency (Hz)
5%	205.27	2.02	0.42	230.99	2.62%	1.20	0.26	50.005
50%	200.71	15.15	3.04	230.67	0.99%	11.74	2.71	50.007
100%	196.51	30.05	5.88	230.86	1.19%	22.80	5.26	50.007
0%	216.09	13.23	2.87	231.02	3.21%	/	/	50.004
5%	216.29	11.24	2.44	231.21	2.76%	1.17	0.26	50.005
50%	216.04	21.92	4.74	230.27	1.12%	11.74	2.50	50.004
100%	215.45	34.14	7.36	230.52	1.32%	22.74	5.24	50.006
0%	387.47	13.22	5.12	231.21	3.53%	/	/	50.005
5%	397.31	12.07	4.81	229.78	3.02%	1.20	0.26	50.005
50%	397.23	13.69	5.45	231.02	1.2%	11.65	2.56	50.023
100%	395.77	22.33	8.85	231.97	1.46%	22.89	5.31	50.007
GF3000								
0%	207.53	0.51	0.11	230.44	3.39%	/	/	50.003
5%	206.97	1.21	0.25	230.38	2.96%	0.73	0.15	50.006
50%	203.29	8.75	1.78	230.95	1.12%	6.97	1.60	50.005
100%	200.77	17.31	3.47	228.72	1.12%	13.81	3.16	50.007
0%	220.22	7.79	1.74	229.92	3.40%	/	/	50.005
5%	220.27	6.42	1.42	230.65	3.07%	0.72	0.16	50.002
50%	220.73	14.88	3.28	230.73	1.18%	7.09	1.63	50.006
100%	219.85	21.33	4.70	229.98	1.37%	13.91	3.20	50.006
0%	396.50	4.83	1.93	228.91	3.51%	/	/	50.004
5%	396.43	8.90	3.54	230.73	3.13%	0.77	0.16	50.004
50%	396.36	9.15	3.64	232.21	1.25%	6.99	1.62	50.005
100%	396.24	12.13	4.82	230.63	2.40%	13.92	3.21	50.006
Note: 1st test condition is for Nominal DC voltag, 2nd test condition is for PV min voltage and 3rd test condition is for PV max voltage.								

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
7.3.7.4&7.3.7.5	Clearance distances and creepage		P

Clearance (cl) and creepage distance (cr) at/of/between:	U r.m.s. (V)	System Voltage (V)	Required cl (mm)	cl (mm)	Required dcr (mm)	dcr (mm)
DC circuit to GND on PCB of main board/SMPS board (BI)	400	2500	1.5	3.0	2.0	3.0
DC circuit to GND (BI)	400	2500	1.5	8.0	4.0	8.0
AC circuit to GND on PCB of main board/SMPS board (BI)	<250	2500	1.5	3.0	1.5	3.0
AC circuit to GND (BI)	<250	2500	1.5	8.0	2.3	8.0
AC circuit to RS232 circuit on PCB of RS232 board (RI)	<50	2500	4.8	5.0	4.8	5.0
DC circuit to RS232 circuit on PCB of RS232 board (RI)	400	2500	3.0	5.0	4.0	5.0
DC circuit to panel (RI)	400	2500	3.0	10.0	8.0	10.0
AC circuit to panel (RI)	400	2500	4.8	10.0	4.8	10.0

Supplementary information:

1. Inforce insulation was used between RS 232 port communicated with PC and control board.

7.5.1 7.5.2 7.5.3	TABLE: Impulse voltage test AC or DC voltage test Partial Discharge Test	P

test voltage applied between:	test voltage (V)	impulse withstand voltage (V)	partial discharge extinction voltage (V)	result
DC input to Ground	2120V d.c.	--	--	No breakdown
DC input to ungrouded assesposible part	4240V d.c.	--	--	No breakdown
AC output to ground	2120V d.c.	--	--	No breakdown
AC output to ungrouded assesposible part	4240V d.c.	--	--	No breakdown

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
14	TABLE: List of critical components		P

Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity[1])
SCR	ST	BTA41-600B	TOP3,600V,40A	UL1557	UL E81734
SCR	VISHAY	40TPS12APBF	35A,1200V 125℃	--	--
Breaker	PEOPLE	DZ47-63 Series C63, C40, C32, C50	C63:230/400V 63A C40:230/400V 40A C32:230/400V 32A C50:230/400V 50A	GB10963.1-2005	CCC 2002010307012494
Breaker	PEOPLE	RDX2-125 C80A	220/380V 80A	GB14048.2-2008	CCC 2002010307013316
PCB	Various	Various	130℃ V-0	UL94	UL
IGBT (for GF3000)	INFINEON	IKW30N60H3	Vce=600V Ic=30A Vcesat=1.95V Tvjmax 175℃	--	--
IGBT (for GF5000, GF6000, GF8000)	INFINEON	IKW50N60H3	Vce=600V Ic=50A Vcesat=1.85V Tvjmax 175℃	--	--
MOSFET	TOSHIBA	2SK2962	4V Gate Drive Rds(on)=0.5Ω Yfs=1.2S Idss=100uA Vth=0.8-2V	--	--
MOSFET	INFINEON	IPW60R041C6	Rds(on)=0.041Ω Vds=V Id.pulse=272A	--	--

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
14	TABLE: List of critical components		P

Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity[1])
Temperature switch (for all)	DONGGUAN KAIN ELECTRONIC CO., LTD	KI66 50℃ Normally Open	AC250V 5A 50℃	DIN EN 60730-1(VDE 0631-1):2009-06 DIN EN 60730-2-2(VDE 0631-2-2):2006-09	VDE 40031876
Temperature switch (for all)	DONGGUAN KAIN ELECTRONIC CO., LTD	KI66 85℃ Normally Closed	AC250V 5A 85℃	DIN EN 60730-1 (VDE 0631-1) :2009-06 DIN EN 60730-2-2 (VDE 0631-2-2) :2006-09	VED 40031876
FUSE	LITTLE FUSE INC	324 Series	20A 250Vac	UL248	UL E10480
Transformer (for GF3000)	Yangzhou Jinying Electric Appliance Co., Ltd.	GF3000-110V/230V	Input 110VAC CLASS F output 230VAC	Applicable parts of EN 62109	Tested with appliance
Transformer (for GF5000)	Yangzhou Jinying Electric Appliance Co., Ltd.	GF30000-110V/230V	Input 110VAC CLASS F output 230VAC	Applicable parts of EN 62109	Tested with appliance
Transformer (for GF6000)	Yangzhou Jinying Electric Appliance Co., Ltd.	GF6000-110V/230V	Input 110VAC CLASS F output 230VAC	Applicable parts of EN 62109	Tested with appliance
Transformer (for GF8000)	Yangzhou Jinying Electric Appliance Co., Ltd.	GF8000W-110V/230V	Input 110VAC CLASS F output 230VAC	Applicable parts of EN 62109	Tested with appliance

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
14	TABLE: List of critical components		P

Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity[1])
--Wire	XU ZHOU SHENGBAO INDUSTRY CO.,LTD	QL(ZY/XY)-2	200℃	UL1446	UL E194766
--Tape	YAHUA	PZ	Mylar 94V-0, 130℃	UL94	UL E165111
--Bobbin	PINGHU MEISHEN ELECTRIC APPARATUS CO.,LTD	PA66/G30	V-0, 130℃	UL746	UL E116324
Transformer	DongGuan DaZhong Electronic Co., Ltd.	T-DSP-SPS	EE40	Applicable parts of EN 62109	Tested with appliance
--Wire	TAI-I	MW75	UEW-F 94V-0 130℃	UL94	UL E85640
--Tape	YAHUA	PZ	Mylar 94V-0 130℃	UL94	UL E165111
--Bobbin	Changchun plastics	EE40	Phenolic T375J 150℃	UL94	UL E59481
--Varnish	HANG CHEUNG PETROCHEMICAL LTD	8562/C	130℃	UL94	UL E200154
--Margin	YAHUA	WF	94V-0,130℃	UL94	UL E165111
--Tube	Shenzhen Changyuan Electronic Material Co., Ltd	TFELON	200℃	UL510	UL E180908
hall effect sensor	HIEFUL	CS100B	100A 4V	--	--

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
14	TABLE: List of critical components		P

Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity[1])
Capacitor	Various	CBB61 series	350VAC 10uF	EN60252-1	VDE
Aluminum Electrolytic Capacitors	Hunan Aihua Group Co., Ltd	NR	450V 3900uF	--	--
X- capacitor	FARATRONIC	C61	X2,3.0uF 350VAC,85℃	EN60252-1	VDE 40023504
X- capacitor	FARATRONIC	C61	X2,3.5uF 350VAC,85℃	EN60252-1	VDE 40023504
X- capacitor	DONGGUAN COCEN	MEX -X2	X2,2.2uF 275VAC,85℃	IEC60384-14	VDE 40009259
Y- capacitor	FULLDE	CT81	Y1,250V 10000pF,125℃	IEC60384-14	VDE
Relay	GOLDEN RELAYS	GH-1C-12L	12VDC 5A 130℃	EN 61810-5 EN 61810-1 EN 60255-23	TUV R50079239
Relay	SONG CHUAN	737-1Z-C	250VAC,30A	EN 61810-5 EN 61810-1 EN 60255-23	TUV R50044822
Relay	GOLDEN RELAYS	GK-A-1C-12D	12VDC,1A 130℃	EN 61810-5 EN 61810-1 EN 60255-23	TUV R50019095
DC fan	YATE LOON Electronics Co., Ltd.	D12BH-12D	12V 0.30A	EN60950-1	TUV R50030868
Opto-coupler for RS232	RENESAS ELECTRONICS CORPORATIO N	PS2561-1	Double insulation 5000Vac	UL1577	UL E72422
Isolating transformer FOR RS232	JEPULS TECHNOLOGY	BCK1601-162	EF16	Applicable parts of EN 62109	Tested with appliance
Reactor	GUANG HUA INDUSTRIAL	EA806-2	CLASS H EI114-40,22.8A 0.65mH	Applicable parts of EN 62109	Tested with appliance

EN 62109-1 : 2010			
Clause	Requirement – Test	Result - Remark	Verdict
14	TABLE: List of critical components		P

Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity[1])
Reactor	GUANG HUA INDUSTRIAL	EA810-2	CLASS H EI114-50,45A 0.65mH	Applicable parts of EN 62109	Tested with appliance

14.8	TABLE: Batteries	N/A
The tests of 4.3.8 are applicable only when appropriate battery data is not available		N/A
Is it possible to install the battery in a reverse polarity position?		N/A

	Non-rechargeable batteries			Rechargeable batteries					
	Discharging		Un-intentional charging	Charging		Discharging		Reversed charging	
	Meas. current	Manuf. Specs.		Meas. current	Manuf. Specs.	Meas. current	Manuf. Specs.	Meas. current	Manuf. Specs.
Max. current during normal condition	--	--	--	--	--	--	--	--	--
Max. current during fault condition	--	--	--	--	--	--	--	--	--

Test results:		Verdict
- Chemical leaks		N/A
- Explosion of the battery		N/A
- Emission of flame or expulsion of molten metal		N/A
- Electric strength tests of equipment after completion of tests		N/A

EN 62109-2 : 2011			
Clause	Requirement – Test	Result - Remark	Verdict
4	General testing requirements		P
4.4	Testing in single fauli condition	See the IEC 62109-1 report	P
4.4.4	Single fault conditions to be applied		P
4.4.4.15	Fault-tolerance of protection for grid-interactive inverters		N/A
4.4.4.15.1	Fault-tolerance of residual current monitoring		N/A
4.4.4.15.2	Fault-tolerance of automatic disconnecting means		N/A
4.4.4.15.2.1	General (EN 62109-2)		N/A
4.4.4.15.2.2	Design of insulation or separation (EN 62109-2)		N/A
4.4.4.15.2.3	Automatic checking of the disconnect means (EN 62109-2)		N/A
4.4.4.16	Stand-alone inverters – Load transfer test		P
4.4.4.17	Cooling system failure – Blanketing test	EUT use only in closed electrical operating areas	N/A
4.7	Electrical ratings tests	(see appended table 4.7)	P
4.7.3	Measurement requirements for AC output ports for stand-alone inverters	(see appended table 4.7)	P
4.7.4	Stand-alone Inverter AC output voltage and frequency	(see appended table 4.7)	P
4.7.5	Stand-alone inverter output voltage waveform	(see appended table 4.7)	P
4.8	Additional tests for grid-interactive inverters		N/A
4.8.1	General requirements regarding inverter isolation and array grounding		N/A
4.8.2	Array insulation resistance detection for inverters for ungrounded and functionally grounded arrays		N/A
4.8.3	Array residual current detection		N/A
5	Marking and documentation		P
6	Environmental requirements and conditions		P
7	Protection against electric shock and energy hazards		P
7.3	Protection against electric shock		P

EN 62109-2 : 2011			
Clause	Requirement – Test	Result - Remark	Verdict
7.3.10	Additional requirements for stand-alone inverters	The means used to bond the grounded conductorto protective earth was provided as part of the installation.T he required means described in the installation instructions	P
7.3.11	Functionally grounded arrays		P
8	Protection against mechanical hazards		P
9	Protection against fire hazards		P
9.3	Short-circuit and overcurrent protection		P
9.3.4	Inverter backfeed current onto the array		P
10	Protection against sonic pressure hazards		P
11	Protection against liquid hazards		N/A
12	Protection against chemical hazards		P
13	Physical requirements		P
13.9	Fault indication	Fault information is display on LCD panel and LED.	P
14	Components		P

EN 62109-2 : 2011			
Clause	Requirement – Test	Result - Remark	Verdict

Table 4.8.3:Array residual current detection				Verdict
fault current that occurs suddenly				N/A
PV polarity	Trip current(mA)	Cut-off time(ms)	limits(s)	-----
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4.8.3.5.2	Test for detection of excessive continuous residual current		N/A
Fault Current (mA)		Disconnection time (ms)	
Measured Fault Current	Limit 300mA	Measured Disconnection time	Limit
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Photo document

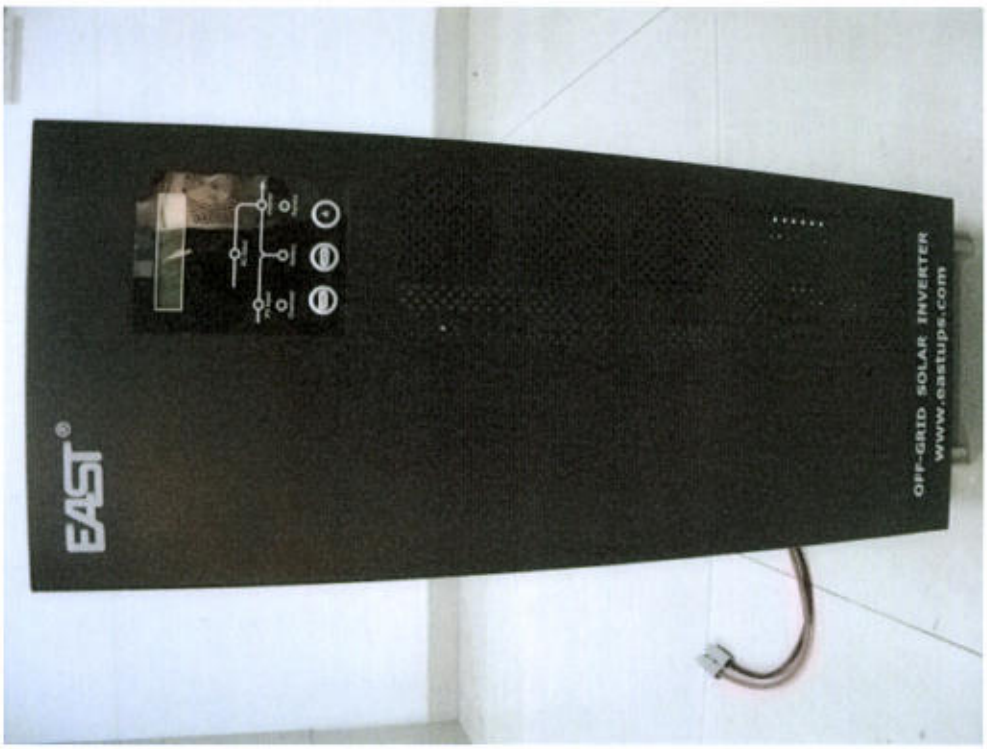

Photo 1 Front view

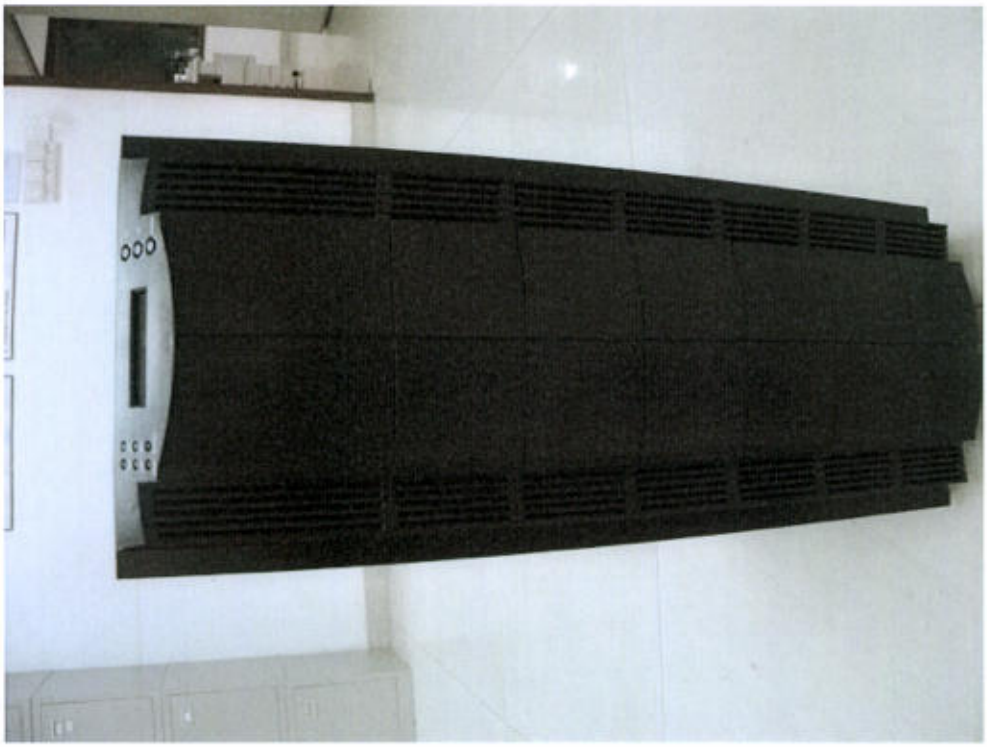

Photo 2 Front view for different front enclosure

Photo document

Photo 3 Side view

Photo 4 Back view

Photo document

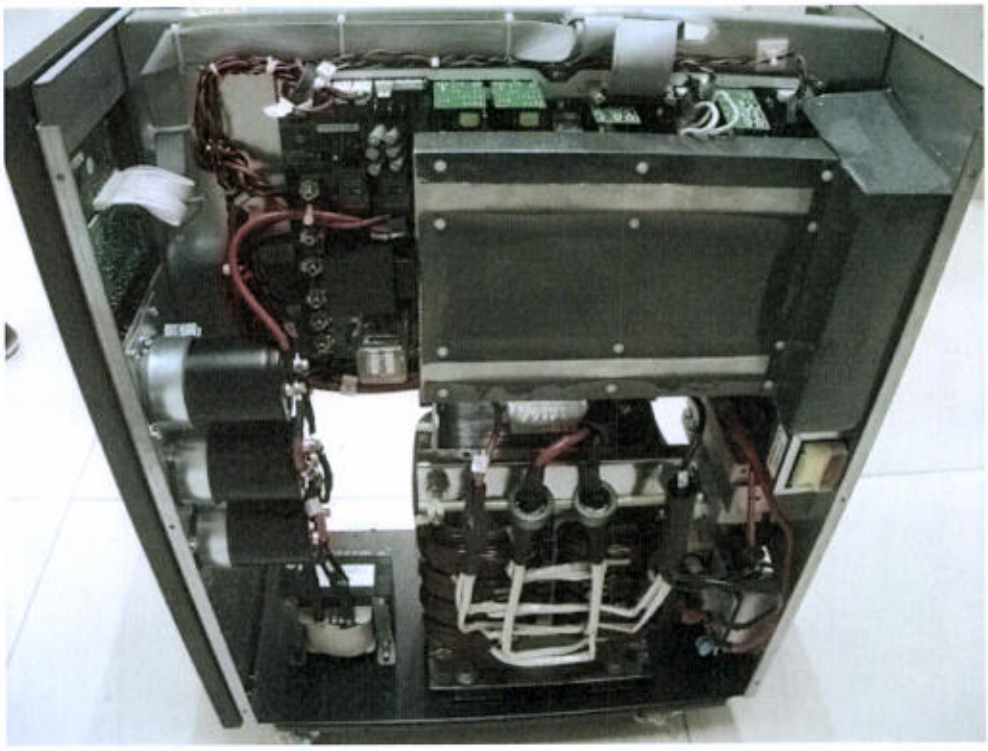

Photo 5 Inside instruction

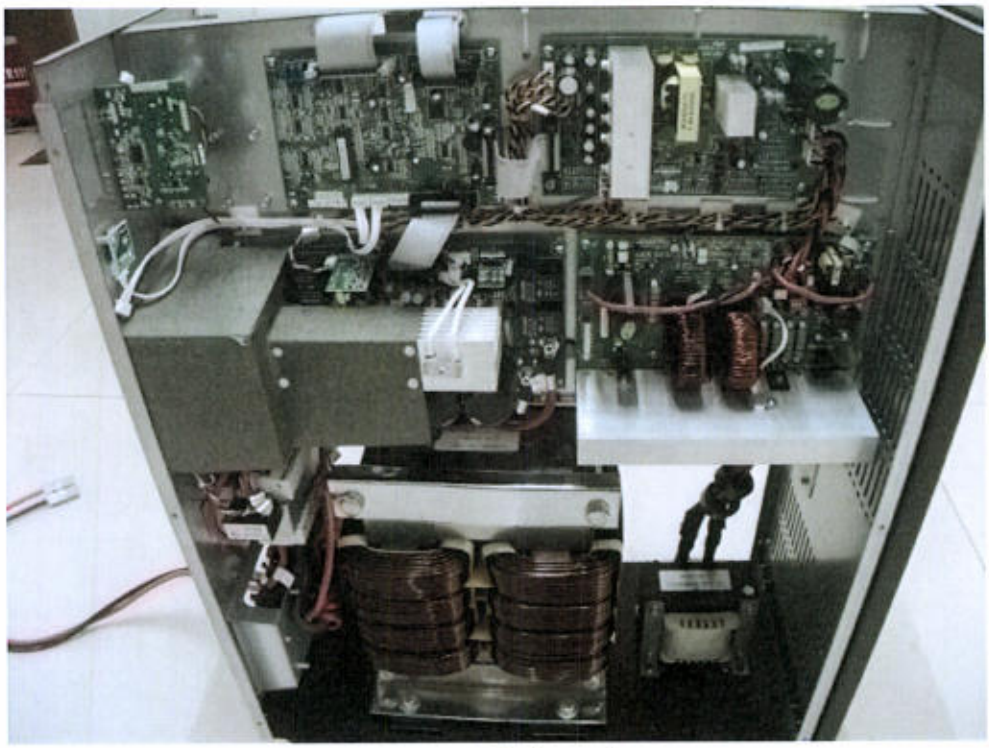

Photo 6 Inside instruction

Photo document

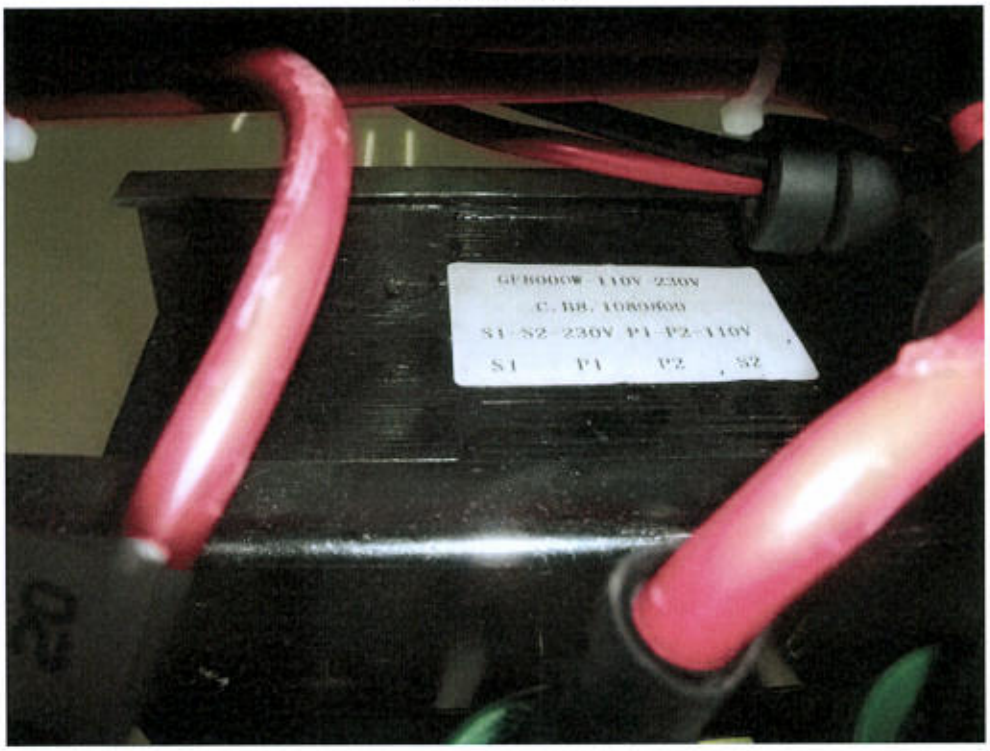

Photo 7 Main transformer

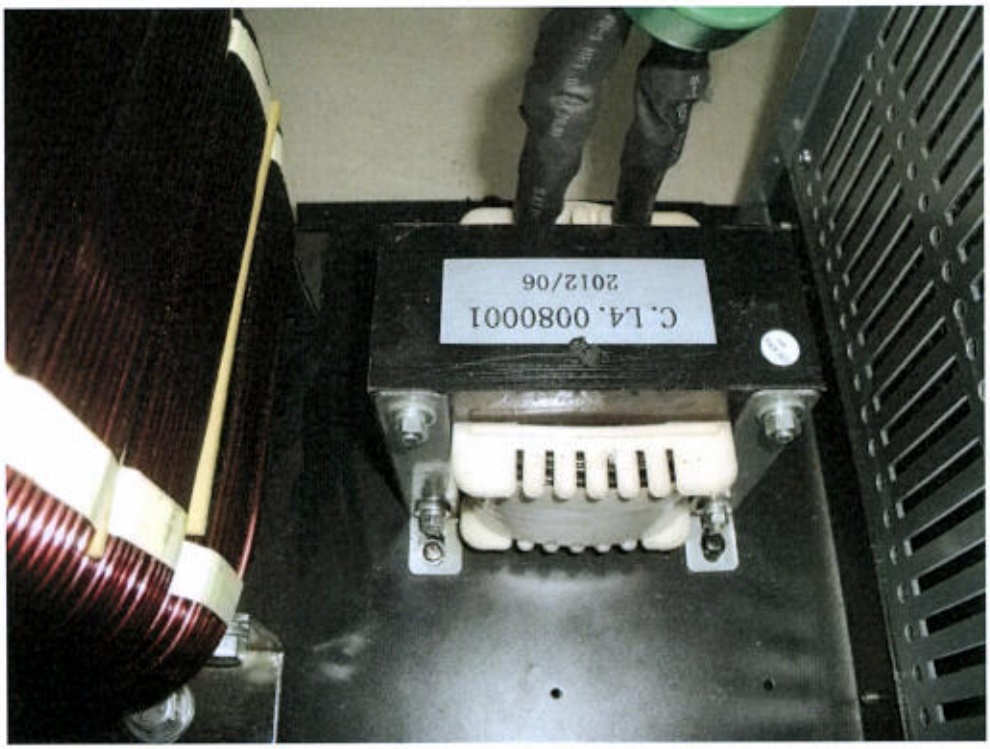

Photo 8 reactor

Photo document

Photo 9 Bus capacitor

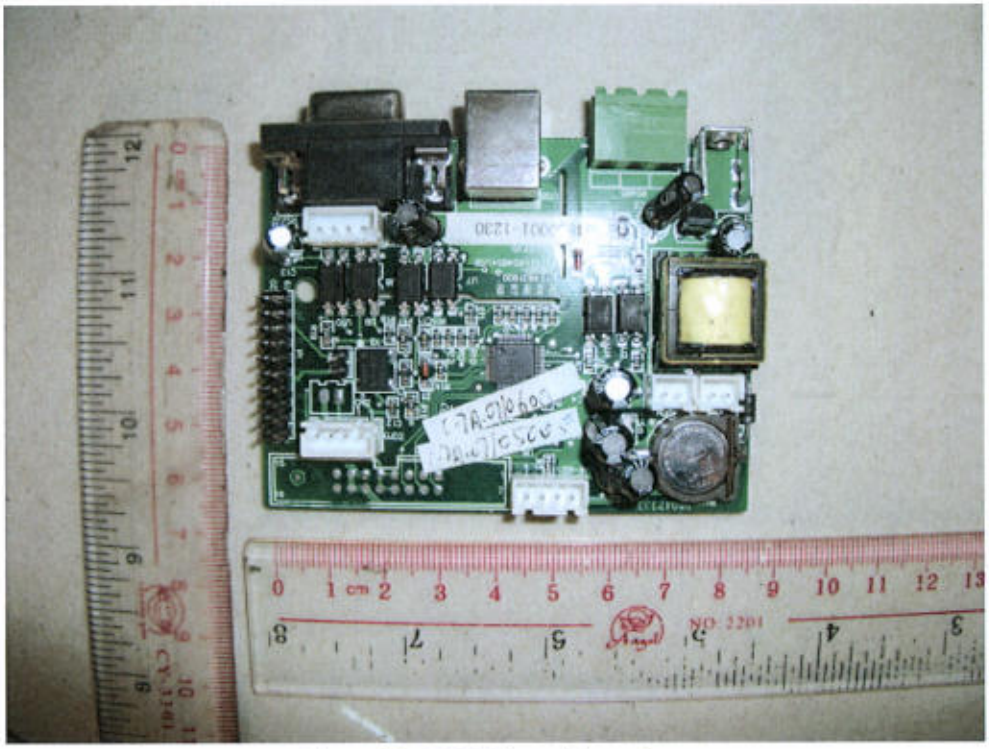

Photo 10 RS232 board front view

Photo document

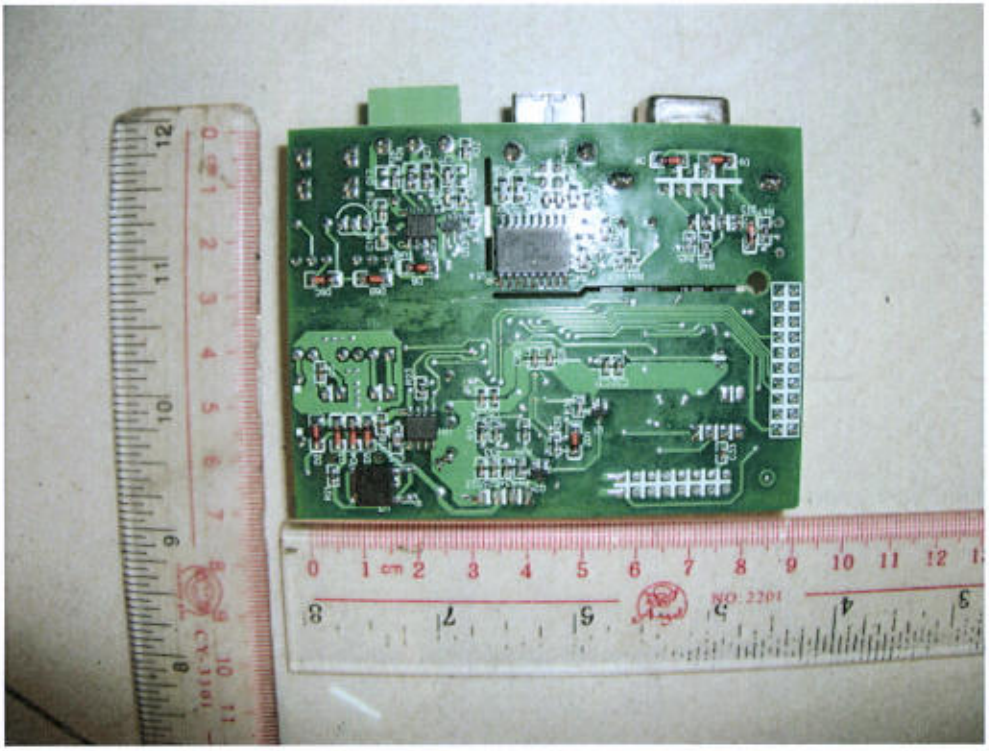

Photo 11 RS232 board back view

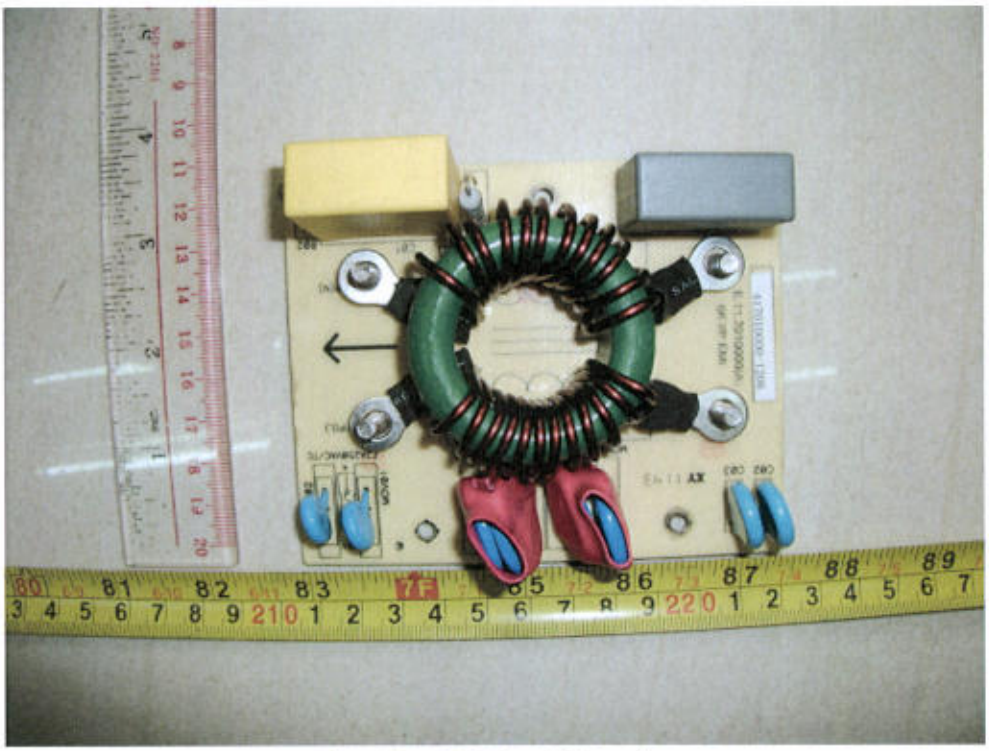

Photo 12 EMC board front view

Photo document

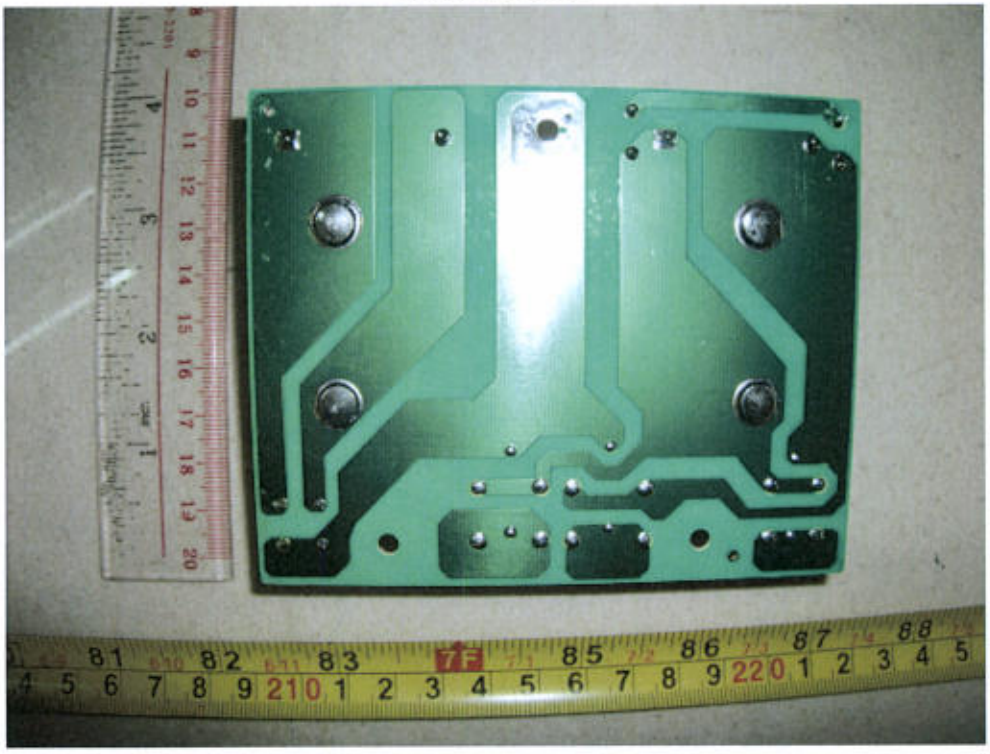

Photo 13 EMC board back view

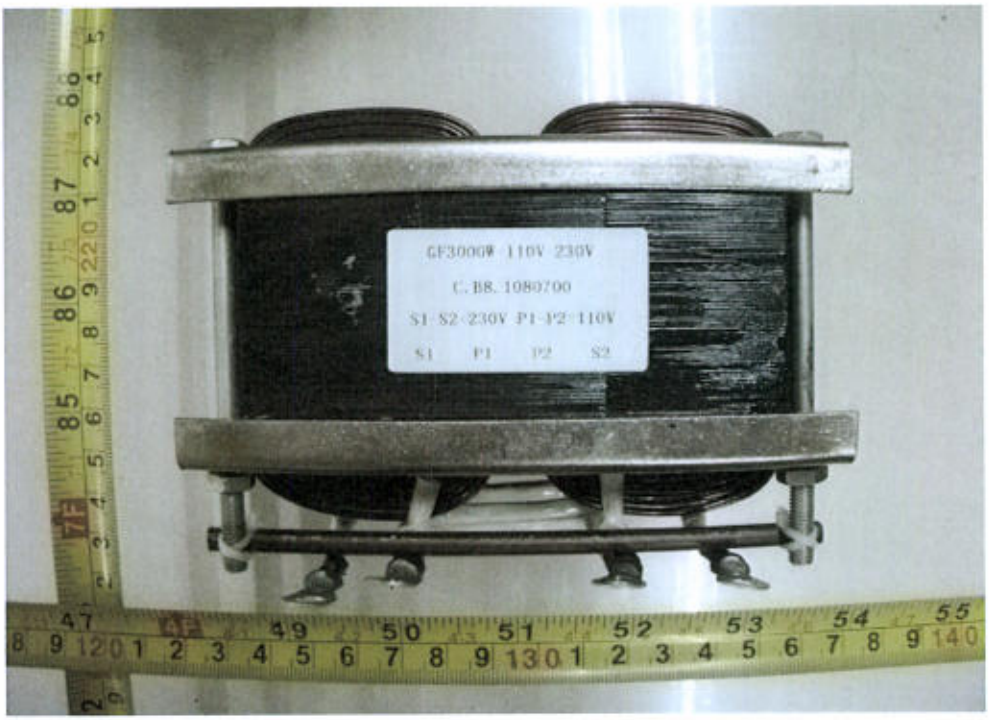

Photo 14 Transformer for GF3000

Photo document

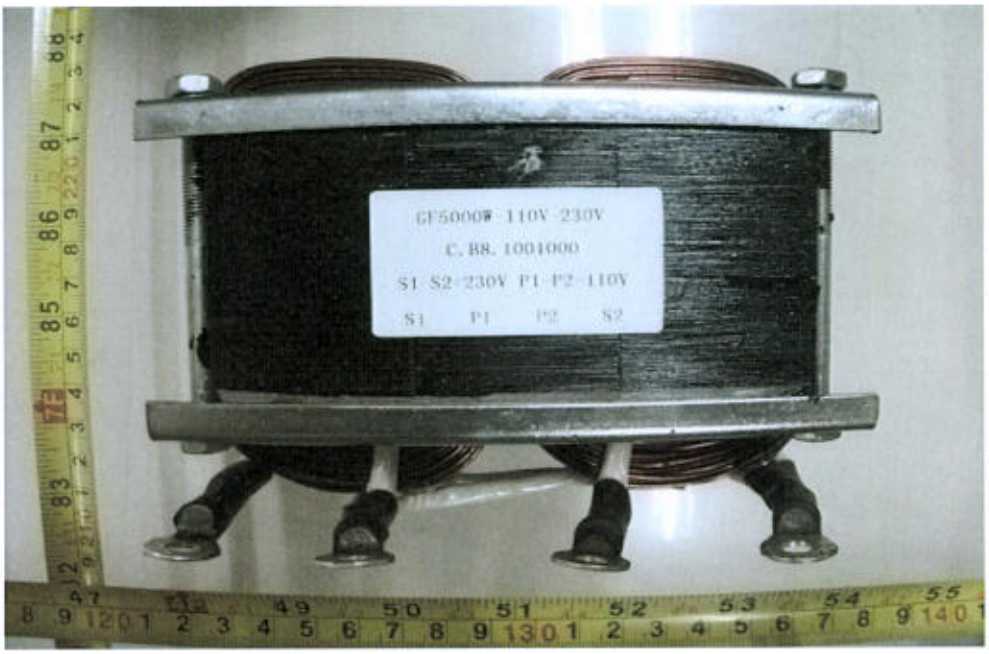

Photo 15 Transformer for GF5000

Photo 16 Transformer for GF6000

Photo document

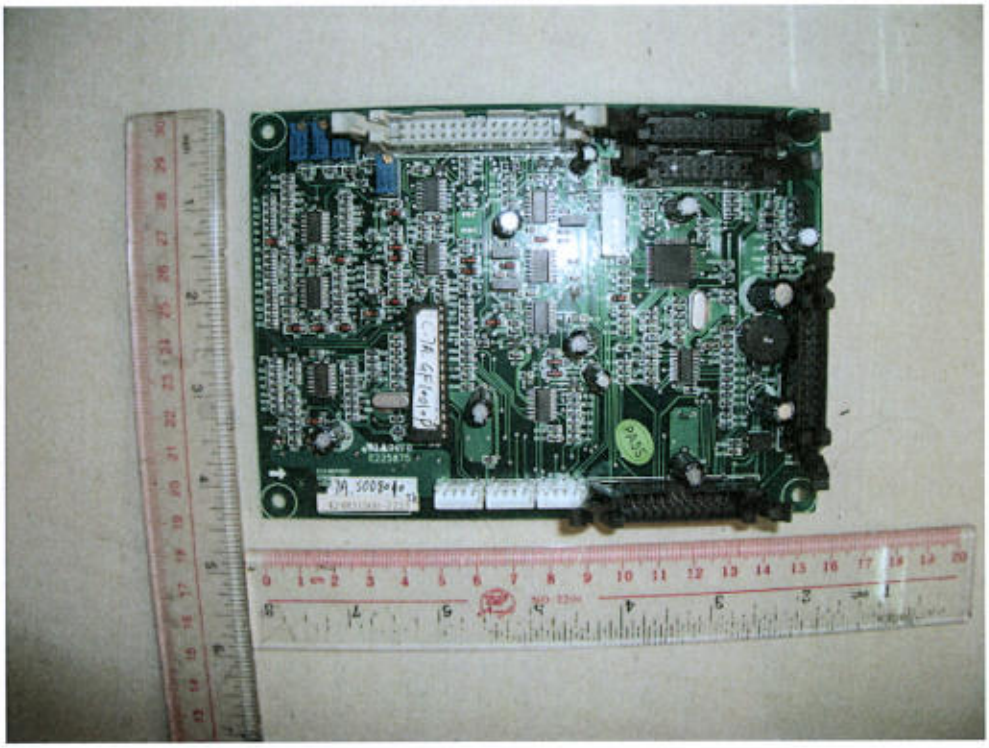

Photo 17 Control board front view

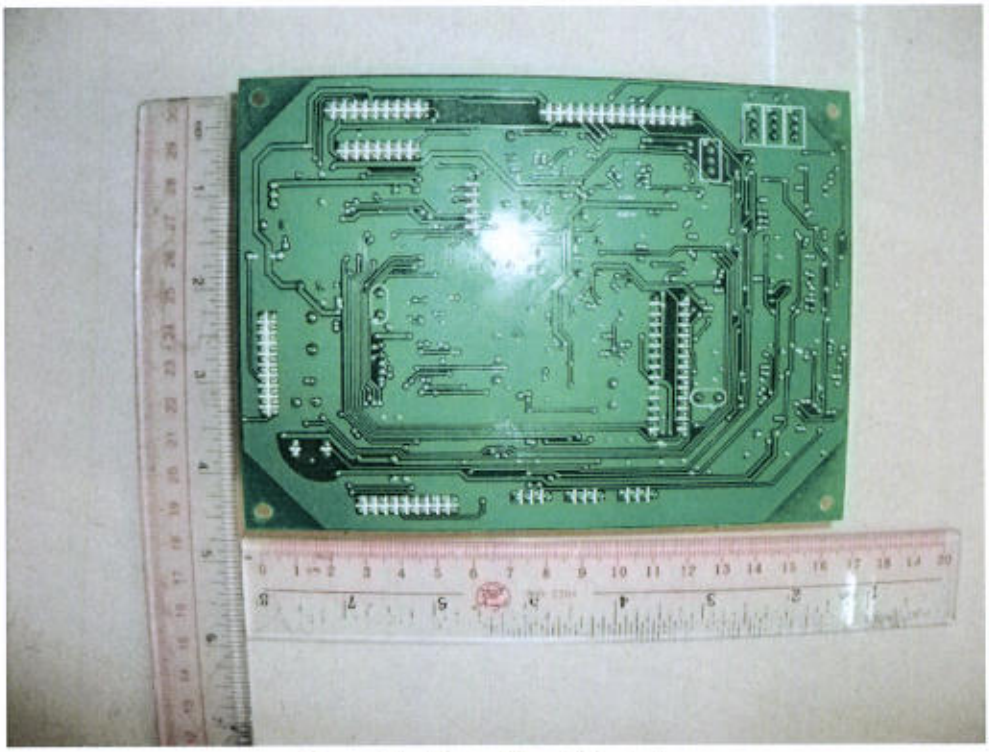

Photo 18 Control board front view

Photo document

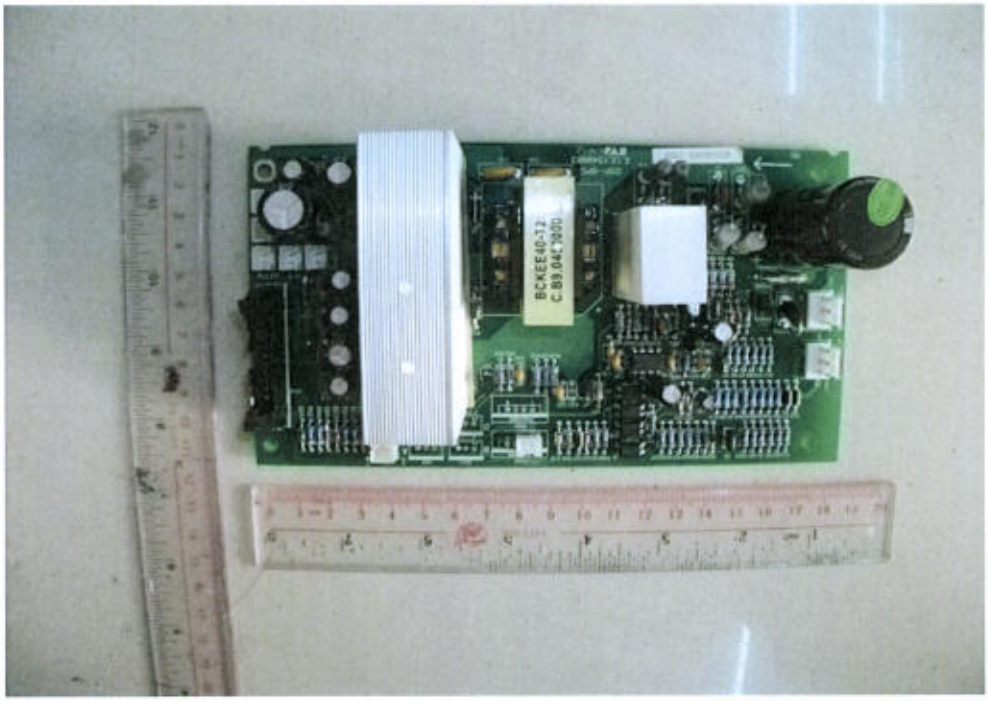

Photo 19 SMPS board front view

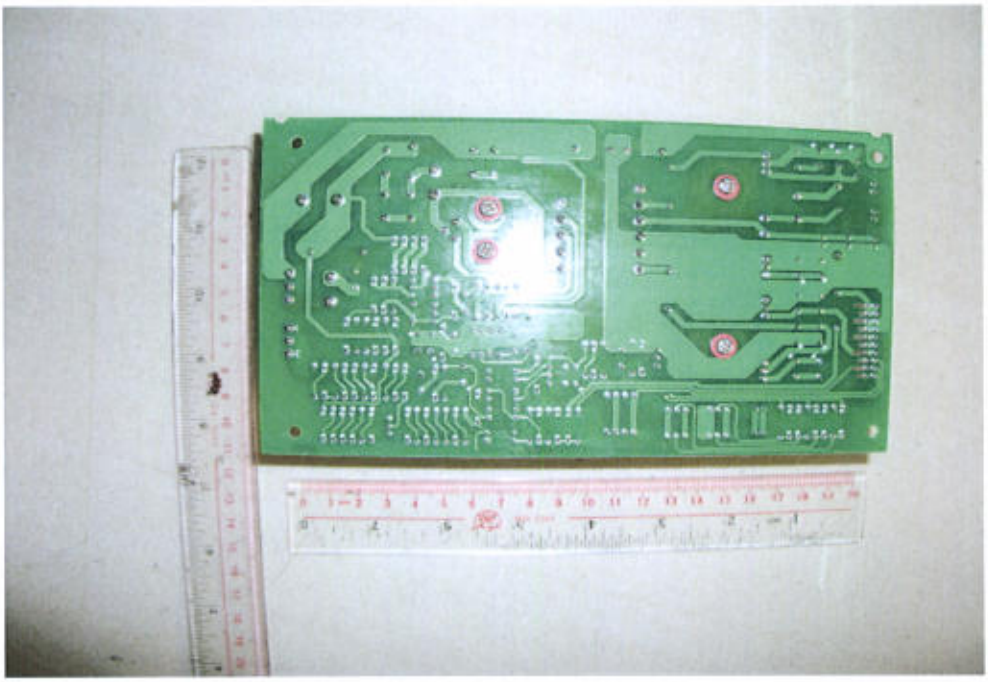

Photo 20 SMPS board back view

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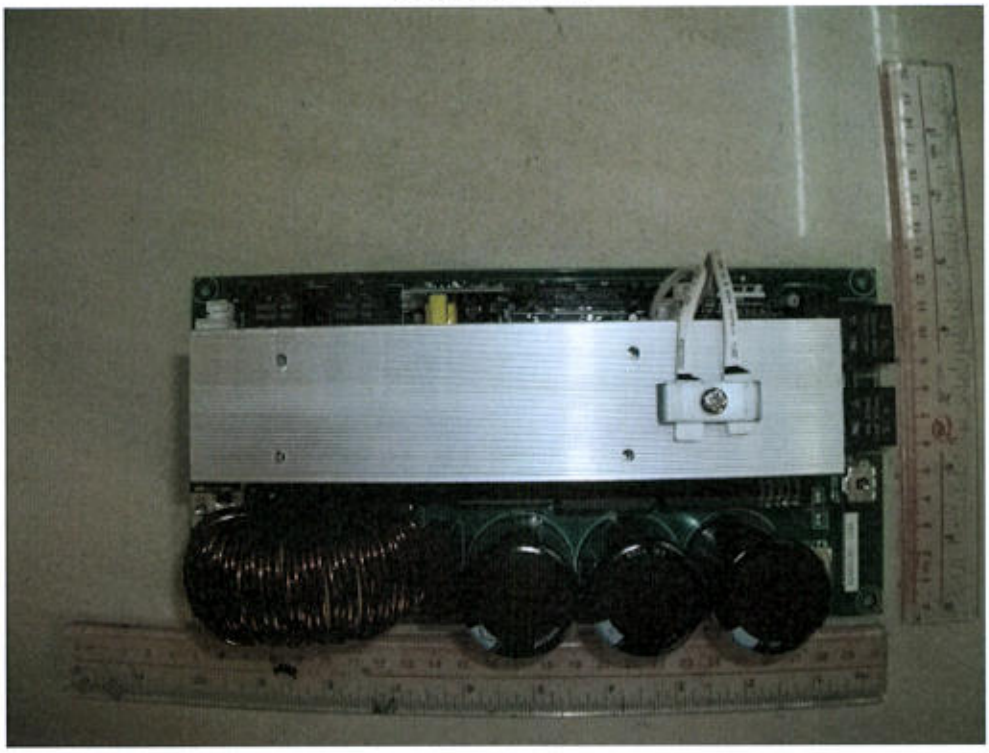

Photo 21 Main board front view

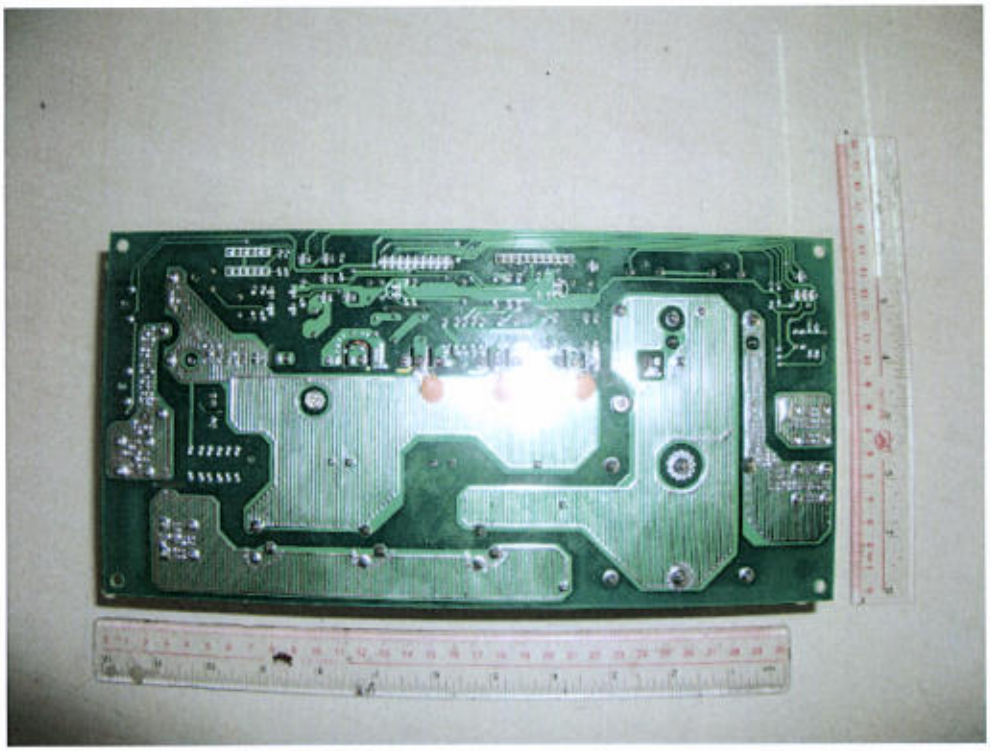

Photo 22 Main board back view

Photo document

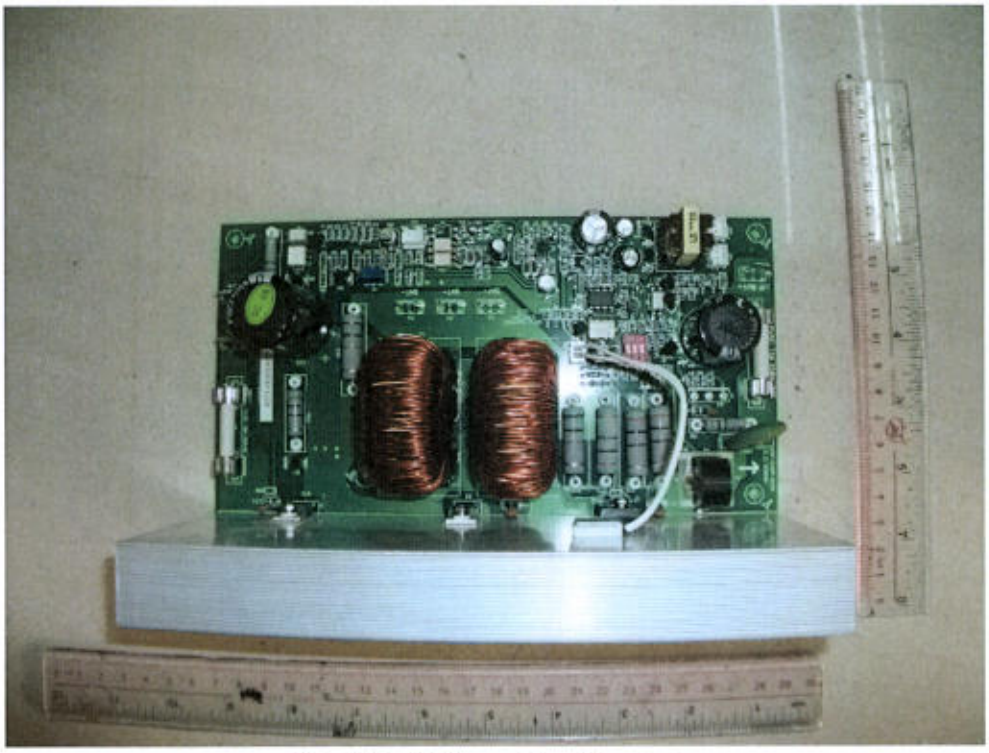

Photo 23 AC charge board front view

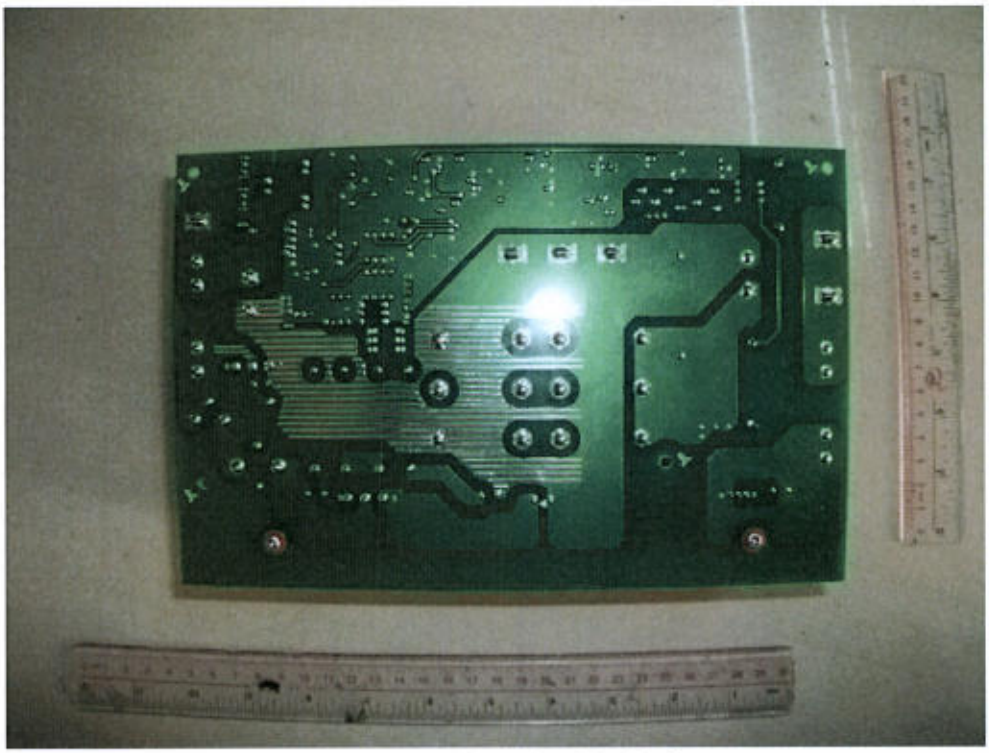

Photo 24 AC charge board back view

Photo document

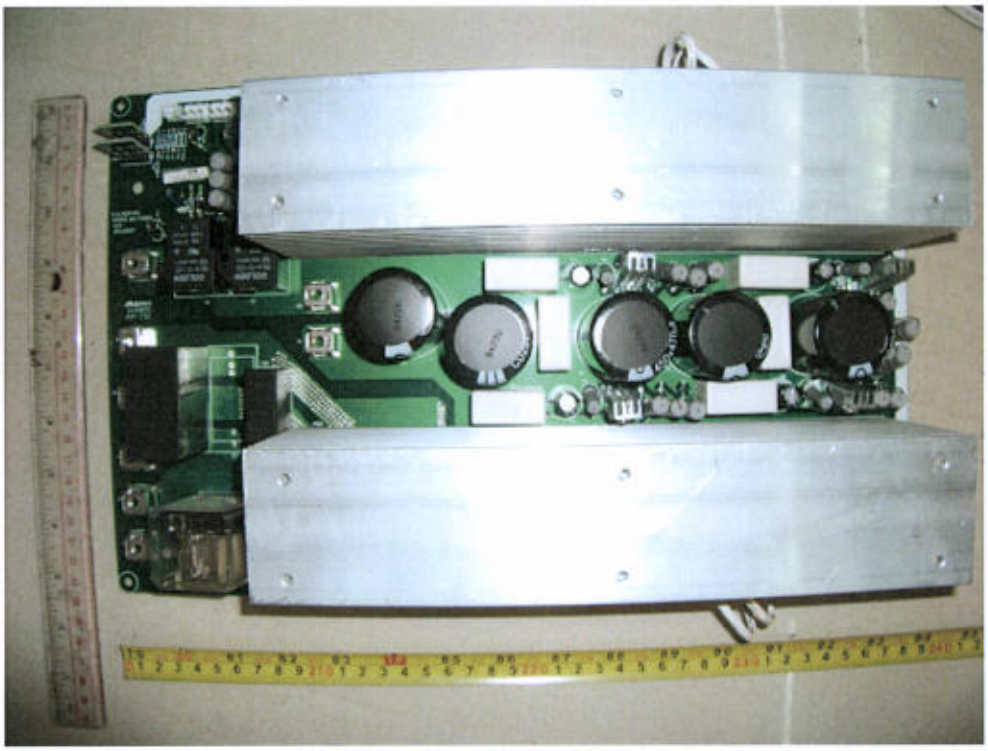

Photo 25 Inverter board front view

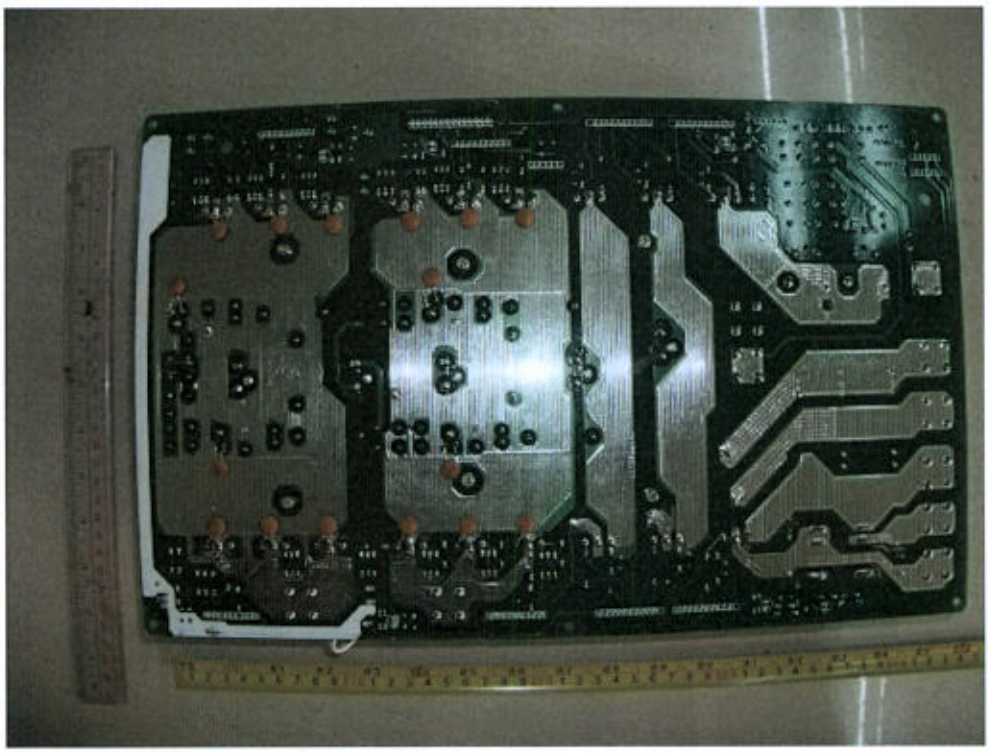

Photo 26 Inverter board back view

Photo document

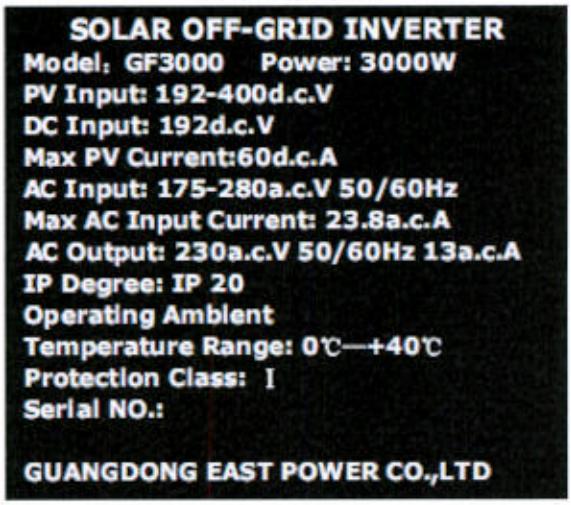

Photo 27 Rating plate of GF3000

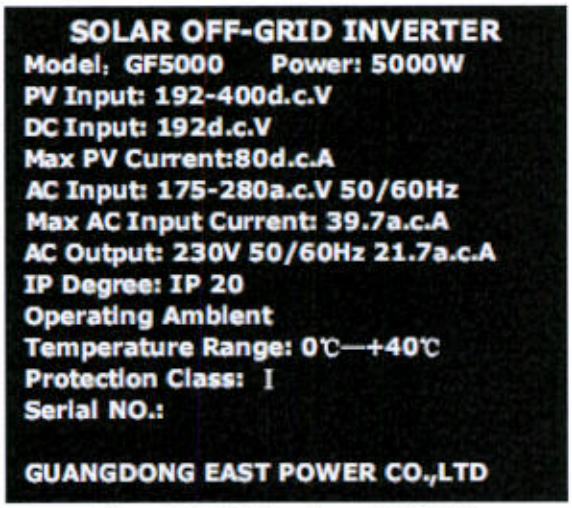

Photo 28 Rating plate of GF5000

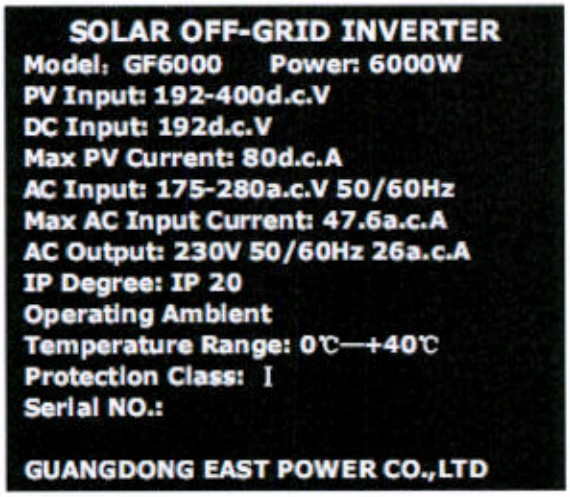

Photo 29 Rating plate of GF6000

Photo document

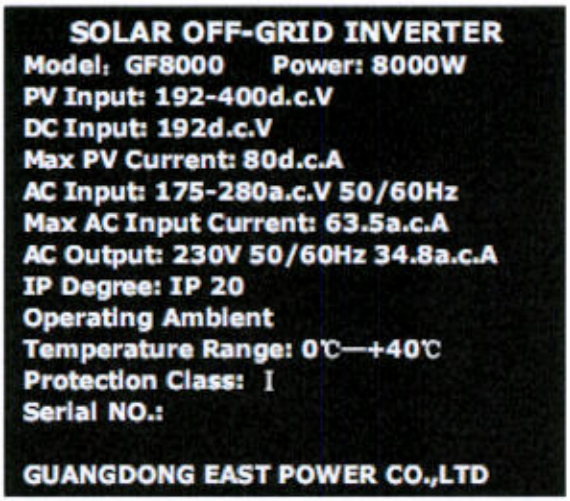

Photo 30 Rating plate of GF8000

Photo 30 Warning marking