TEST REPORT
IEC 60255-27
Measuring relays and protection equipment – Part 27: Product safety requirements

Report Number.....:	BL-DG20A0099-B01
Date of issue.....:	Jan. 13, 2021
Total number of pages	50
Name of Testing Laboratory preparing the Report .....:	Shenzhen BALUN Technology Co., Ltd
Applicant's name .....:	Shenzhen SOFARSOLAR Co., Ltd.
Address.....:	401, Building 4, AnTongDa Industrial Park, District 68, XingDong Community, XinAn Street, BaoAn District, Shenzhen, China.
Test specification:	
Standard .....:	IEC 60255-27:2013
Test procedure .....:	Commissioned test
Non-standard test method .....:	N/A
Test item description.....:	Solar Grid-tied Inverter
Trade Mark.....:	SOFAR SOLAR
Manufacturer .....:	Shenzhen SOFARSOLAR Co., Ltd.
Model/Type reference.....:	SOFAR 15KTLX-G3, SOFAR 17KTLX-G3, SOFAR 20KTLX-G3, SOFAR 22KTLX-G3, SOFAR 24KTLX-G3
Ratings.....:	See copy of marking label and model list.
Testing Laboratory .....:	Shenzhen BALUN Technology Co., Ltd
Testing location/ address 1 .....:	Room 104, 204, 205, Building 1, No. 6, Industrial South Road, Songshan Lake District, Dongguan, Guangdong, China
Testing location/ address 2 .....:	Block B, 1/F., Baisha Science & Technology Park, Shahe West Road, Nanshan District, Shenzhen, Guangdong, China
Tested by (name, function, signature).....:	Colin Chen /Engineer
Approved by (name, function, signature).....:	Simon Qi /Chief Engineer

General disclaimer:

The test results presented in this report relate only to the object tested.

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For the report with CNAS mark, the items marked with "☆" are not within the accredited scope.

List of Attachments (including a total number of pages in each attachment):

Tests against:

Total test reports contain 1 part and 1 attachments listed in below table:

Item	Description	pages
Part 1	Test report of IEC 60255-27:2013	51
ATTACHMENT 1	Photo documentation	7

Summary of testing:

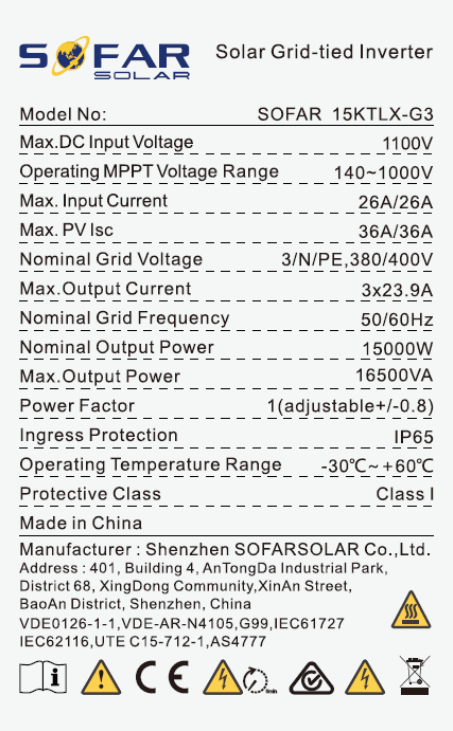
Tests performed (name of test and test clause):	**Testing location:**
10.6.1.1 Dry-heat test – operational. 10.6.1.2 Cold test – operational. 10.6.1.3 Dry heat test at maximum storage temperature. 10.6.1.4 Cold test at minimum storage temperature. 10.6.1.5 Damp-heat test. 10.6.1.6 Cyclic temperature with humidity test. 10.6.2.1 Vibration 10.6.2.2 Shock 10.6.2.3 Bump 10.6.2.4 Seismic ☆ 10.6.2.5 Accessible parts test 10.6.2.6 IP rating 10.6.3 Clearances and creepage distances 10.6.4.2 Impulse voltage 10.6.4.3 AC or d.c. dielectric voltage 10.6.4.4 Insulation resistance 10.6.4.5 Protective bonding resistance 10.6.4.5.2 Protective bonding continuity 10.6.5.1 Maximum temperature of parts and materials ☆ 10.6.5.3 Thermal short time 10.6.5.4 Output relay, make and carry 10.6.5.5 Single-fault condition 10.6.6 Reverse polarity and slow ramp Remark: - The max.operating temperature is 60ºC specified by manufacturer, the temperature rise tests were conducted at the max.rated ambient temperature of 45°C or 60ºC (derating) in the chamber. - Other testing conditions considered in this test report, see General Product Information on the following pages.	All tests except Ingress protection are performed at address 1 listed on page 1. Ingress protection test is performed at address 2 listed on page 1

Summary of compliance with National Differences (List of countries addressed): None.

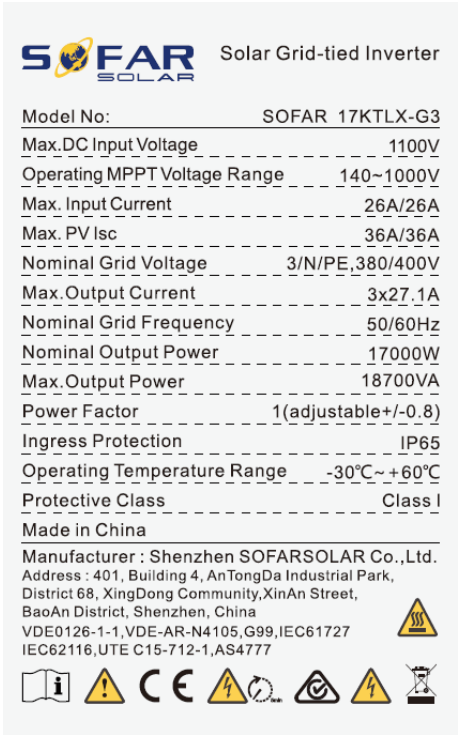
☒ **The product fulfils the requirements of IEC 60255-27:2013.**

Copy of marking plate:

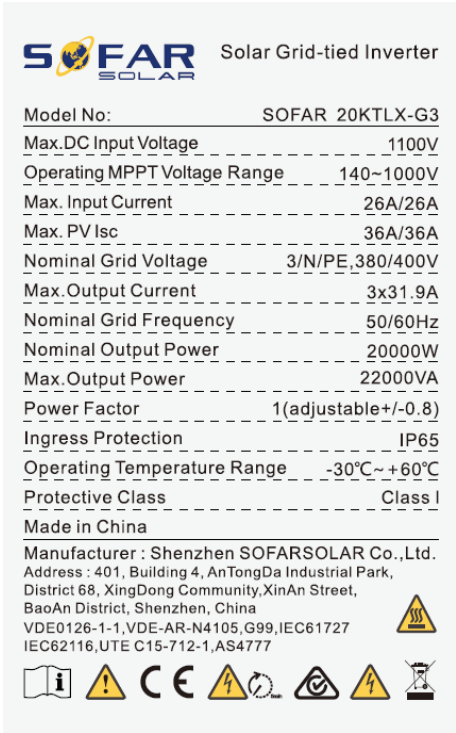
The artwork below may be only a draft.



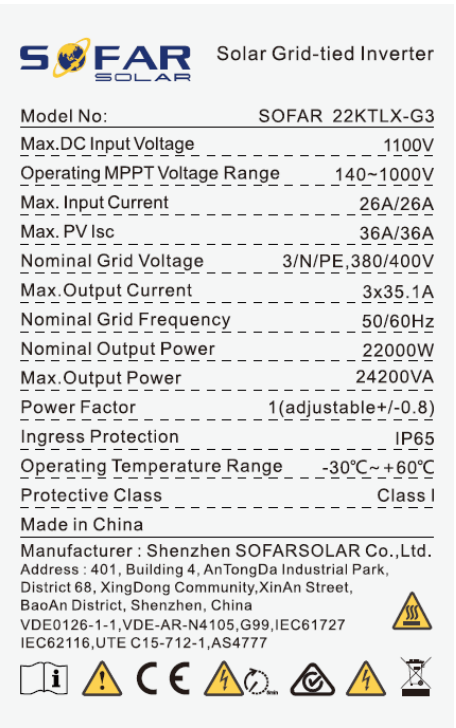
SOFAR 15KTLX-G3



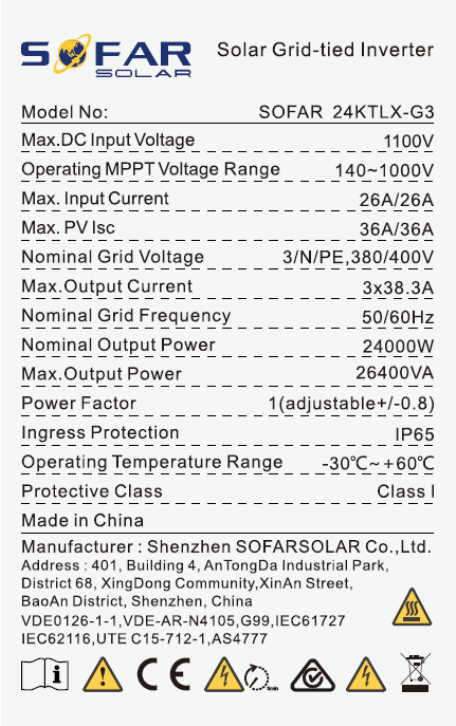
SOFAR 17KTLX-G3



SOFAR 20KTLX-G3



SOFAR 22KTLX-G3



SOFAR 24KTLX-G3

Note:

1. The above markings are the minimum requirements required by the safety standard. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.
2. Label is attached on the side surface of enclosure and visible after installation

Test item particulars .....:	
Equipment mobility .....:	☐ movable ☐ hand-held ☐ stationary ☒ fixed ☐ transportable ☐ for building-in
Connection to the mains .....:	☐ pluggable equipment ☐ direct plug-in ☒ permanent connection ☐ for building-in
Environmental category .....:	☒ outdoor ☐ indoor unconditional ☐ indoor conditional
Over voltage category Mains .....:	☐ OVC I ☐ OVC II ☒ OVC III ☐ OVC IV
Over voltage category PV.....:	☐ OVC I ☒ OVC II ☐ OVC III ☐ OVC IV
Mains supply tolerance (%).....:	According to the specified supply range.
Tested for power systems.....:	TN
IT testing, phase-phase voltage (V) .....:	N/A
Class of equipment .....:	☒ Class I ☐ Class II ☐ Class III ☐ Not classified
Mass of equipment (kg) .....:	See model list.
Pollution degree.....:	PD3(Inside PD2)
IP protection class.....:	IP65
.....:	
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement ..... :	P (Pass)
- test object was not evaluated for the requirement:	N/E
- test object does not meet the requirement..... :	F (Fail)
Testing ..... :	
Date of receipt of test item ..... :	Oct. 14, 2020
Date (s) of performance of tests..... :	Oct. 14, 2020 to Nov. 27, 2020

General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. The tests results presented in this report relate only to the object tested. This report shall not be reproduced except in full without the written approval of the testing laboratory. List of test equipment must be kept on file and available for review. Additional test data and/or information provided in the attachments to this report. **Throughout this report a ☐ comma / ☒ point is used as the decimal separator.** Determination of the test results includes consideration of measurement uncertainty from the test equipment and methods.	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided .....:	☐ **Yes** ☒ **Not applicable**
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)..... :	Dongguan SOFAR SOLAR Co., Ltd. 1F - 6F, Building E, No. 1 JinQi Road, Bihu Industrial Park, Wulian Village, Fenggang Town, Dongguan City.

General product information:

Brief description:

The PCE under test (EUT) is Solar Gird-tied Inverter. During inverter, which convert the variable DC power generated from the photovoltaic (PV) arrays to the stable utility AC power which can be fed into the commercial electrical grid.

Model Number	SOFAR 15KTLX-G3	SOFAR 17KTLX-G3	SOFAR 20KTLX-G3	SOFAR 22KTLX-G3	SOFAR 24KTLX-G3
Input (DC)					
Max. input voltage	1100Vdc				
Rated input voltage	600Vdc				
MPPT operating voltage range	140V~1000V				
Full load MPPT Voltage Range	420V~850V	450V~850V	480V~850V	510V~850V	540V~850V
Number of MPP trackers	2/2				
Number for DC inputs	2 for each MPPT				
Max. input current per MPPT	26A/26A	26A/26A	26A/26A	26A/26A	26A/26A
Max. input short circuit current per MPPT	36A/26A	36A/36A	36A/36A	36A/36A	36A/36A
Output(AC)					
Rated power	15kW	17kW	20kW	22kW	24kW
Max. AC power	16.5kVA	18.7kVA	22kVA	24.2kVA	26.4kVA
Max. output current	23.9A	27.1A	31.9A	35.1A	38.3A
Nominal grid voltage	3/N/PE, 230V/400Vac, 220V/380Vac				
Grid voltage range	310Vac-480Vac				
Nominal frequency	50 / 60Hz				
General Data					
Ambient temperature range	-30℃~+60℃				
Degree of protection	IP65				
Weight	20kg	22kg	22kg	23kg	23kg
Dimension	513*425*189mm				

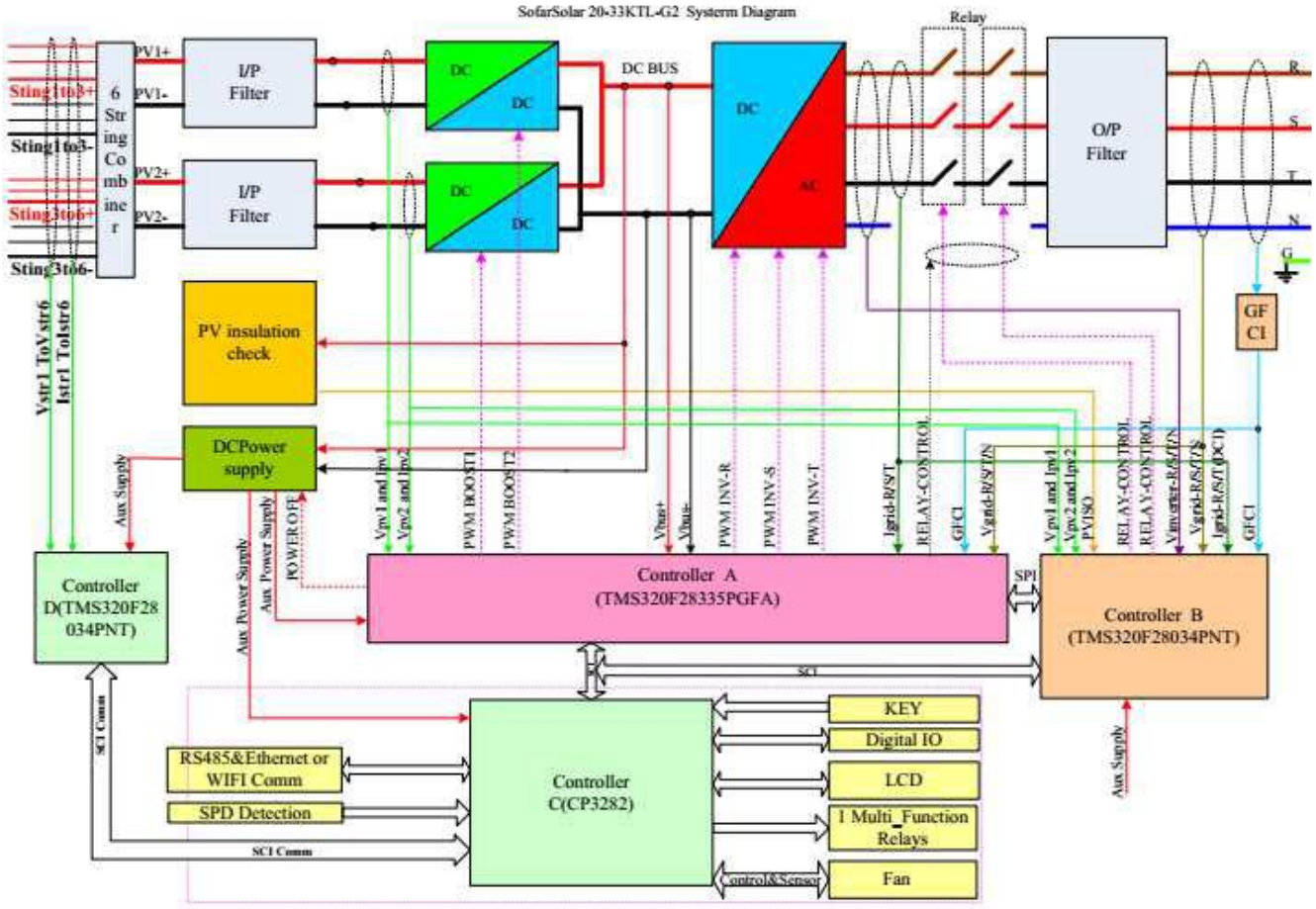
The model SOFAR 15KTLX-G3, SOFAR 17KTLX-G3, SOFAR 20KTLX-G3, SOFAR 22KTLX-G3 and SOFAR 24KTLX-G3 are almost identical in hardware, except the Communication control (CSB or COM), DC input channel and Fuse board for PV input. The difference as below.

	SOFAR 15KTLX-G3	SOFAR 17KTLX-G3	SOFAR 20KTLX-G3 SOFAR 22KTLX-G3 SOFAR 24KTLX-G3
BUS film capacitor	4 pcs 110uF/550V	6 pcs 110uF/550V	
Inverter IGBT	6 pcs 40A/1200V	6 pcs 75A/1200V	
fan	1 pcs		2pcs

Unless otherwise specified, all the tests were conducted on the basic model of SOFAR 24KTLX-G3

The input and output are protected by varistors to Earth. The unit is providing EMC filtering at the output toward mains. The unit does not provide galvanic separation from input to output (transformerless). The output is switched off redundant by the high-power switching bridge and two relays. This assures that the opening of the output circuit can operate in case of single fault.

Block Diagram:



Throughout the test report following abbreviations may be used:

- input	i/p	- Test repeated, similar result(3 times)	TRSR
- output	o/p	- No indication of dielectric breakdown	NB
- short-circuited	s-c	- Cheesecloth remained intact	NC
- overloaded	o-l	- Tissue paper remained intact	NT
- open-circuited	o-c	- No hazards	NH
- normal conditions	N.C.	- The PCE can recover to operate automaticly after removing the abnormal condition	RO
- single fault conditions	SFC	- functional insulation	FI
- between parts of opposite polarity	BOP	- basic insulation	BI
- internal protection operated	IPO	- supplementary insulation	SI
- Component damage (list damaged component)	CD	- double insulation	DI

- No component damaged	NCD	- reinforced insulation	RI
- Power Conversion Equipment Indicate used abbreviations (if any)	PCE	- Equipment Under Test	EUT

IEC 60255-27			
Clause	Requirement – Test	Result – Remark	Verdict

4	**General safety requirements**		-
4.1	General		P
4.2	Earthing requirements		P
5	**Protection against electric shock**		-
5.1	General		-
5.1.1	Introductory remark ..... :		P
5.1.2	Protection from contact with hazardous live parts		P
5.1.2.1	General		P
5.1.2.2	Insulation		P
5.1.2.3	Equipment case and barriers	IP65 enclosure and no opening in the case.	-
	Hazardous live parts..... :	Hazardous live parts were separated from the accessible part.	P
	Top surfaces of barriers accessible in normal use . :	No opening of EUT and the cover only can be removed with tool by trained personnel.	P
	Protection in service access areas..... :		P
	- with rigid test finger and a force of 10 N ..... :		N/A
	- with jointed test finger ..... :		N/A
5.1.2.4	Hazardous live terminations using stranded wire		P
5.1.3	Discharge of capacitors		-
	Compliance checked by calculation ..... :		P
	Measured voltage (V); time-constant (s) .....:		P
	Residual charge (µC) .....:		P
5.1.4	Protective impedance	No protective impedance used.	-
	Requirements of 5.1.5.3.2 in normal and to level of 5.2.4.1.2 in single fault condition		N/A
	The protective impedance consists of one or more of the following:		N/A
	- appropriate high-integrity single component ..... :		N/A
	- combination of components..... :		N/A
	- combination of basic insulation and a current- or voltage-limiting device ..... :		N/A
	Voltage test for double/reinforced insulation .....:		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	Components and associated basic insulation checked after a single-fault condition assessment or test according to 10.6.5.5. .....:		N/A
	Clearance, creepage distance between terminations of the impedance meet requirements of double or reinforced insulation of Annex C of this standard and 6.7 of IEC 61010-1:2010 ..... :		N/A
5.1.5	Accessible parts		-
5.1.5.1	General	All accessible metal parts were earthed and separated from live parts by basic insulation. All external accessible circuit were separated from live parts by reinforce insulation.	P
5.1.5.2	Determination of accessible parts		-
5.1.5.2.1	General		P
	Normal operational use, with or without the aid of a too lwhich will increase the accessibility..... :	See 5.1.5.2.2 to 5.1.5.2.4 or test by inspection	P
5.1.5.2.2	General examination	No opening of EUT and the cover only can be removed with tool by trained personnel.	-
	Test with jointed test finger.....:		N/A
	Test with rigid test finger (force of 10 N) .....:		N/A
5.1.5.2.3	Openings above parts, enclosed by the case, which are hazardous live	No opening of EUT and the cover only can be removed with tool by trained personnel.	-
	Test with test pin (100mm, Ø4mm) ..... :		N/A
5.1.5.2.4	Openings for pre-set controls	No opening of EUT and the cover only can be removed with tool by trained personnel.	-
	Test with test pin (100mm, Ø3mm) ..... :		N/A
5.1.5.2.5	ELV rated or live parts accessible when cover removed		-
	Removing the cover without tools ..... :	No opening of EUT and the cover only can be removed with tool by trained personnel.	N/A
	- Symbol 14 ..... :		N/A
	- Symbol 12 ..... :		N/A
5.1.5.2.6	Wiring terminals		-
	IP1X according to 5.1 of IEC 60529 ..... :		P
	- Symbol 12 ..... :		P
5.1.1.3	Permissible limits for accessible parts		-

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Clause	Requirement – Test	Result – Remark	Verdict
5.1.5.3.1	General ..... :		P
	Values of 5.1.5.3.2 in normal operational condition and nor those of 5.2.4.1.2 in single-fault condition.		P
5.1.5.3.2	Values under normal conditions		-
	a) Voltage limits less than 33 V r.m.s. or 70 V d.c. :		P
	for wet locations voltage limits less than 25 V r.m.s. or 37.5V d.c. ..... :	Communication port was accessible conductive part that voltage less than 25 V r.m.s. or 37.5 V d.c.	P
	Voltages are not hazardous live the levels of:	Communication port.	P
	b) Current less than 0,5 mA r.m.s. for sinusoidal, 0,7 mA peak non-sinusoidal or mixed frequencies or 2 mA d.c. when measured with measuring circuit A.1 or A.2 if less than 100 Hz		N/A
	for WET LOCATIONS measuring circuit A.4 used		N/A
	70 mA r.m.s. when measured with circuit A.3 for higher frequencies :		N/A
	c) Levels of capacitive charge or energy less:		N/A
	1) 45 µC for voltages up to 15 kV peak or d.c. or line A of Figure 3 of IEC 61010-1:2010		N/A
	2) 350 mJ stored energy for voltages above 15 kV peak or d.c.		N/A
5.1.6	Bonding to the protective conductor		-
5.1.6.1	Insulation between live parts and accessible conductive parts		P
	Accessible conductive parts ..... :		P
	Unearthed accessible conductive parts:		P
	- separated from by double insulation or reinforced insulation, or..... :		P
	- Equipment of class I protection..... :		P
5.1.6.2	Protective bonding		P
	Accessible conductive parts bonded, or		P
	- EVL circuit protected in case of direct contact of 5.1.5..... :		P
	- magnetic cores are used..... :		P
	- parts of small dimensions separated from hazardous live parts by at least basic insulation ..... :		P
5.1.6.3	Bonding of parts connected to the protective conductor..... :		P

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Clause	Requirement – Test	Result – Remark	Verdict

5.1.6.4	Protection against corrosion ..... :		P
5.1.6.5	Interruption of protective bonding ..... :	No such protective bonding.	N/A
5.1.7	Protective conductor connection ..... :		P
	- means of connection ..... :		P
	- suitable for use ..... :		P
	- not be used as a part of the mechanical assembly ..... :		P
5.1.8	High leakage current ..... :		N/A
5.1.9	Solid insulation		-
5.1.9.1	General ..... :		P
5.1.9.2	Requirements ..... :		P
5.1.10	Clearances and creepage distances		-
5.1.10.1	General ..... :		P
5.1.10.2	Clearances ..... :		P
5.1.10.2.1	General ..... :		P
5.1.10.2.2	Clearances for primary circuits ..... :	(see appended table 10.6.3)	P
5.1.10.2.3	Clearances for non-primary circuits..... :	(see appended table 10.6.3)	P
5.1.10.2.4	Creepage distances..... :	(see appended table 10.6.3)	P
5.1.11	Functional earthing ..... :		P
	Requirements:		P
	- Connection to protective conductor terminal permitted ..... :		P
	- separated by a functional insulation..... :		P
	- separated from parts at hazardous voltage by ..... :		P
	1) double insulation or reinforced insulation : or		P
	2) a protectively earthed screen or another protectively earthed conductive part, separated from parts at hazardous voltages by at least basic insulation:		P
5.2	Single-fault conditions		-
5.2.1	Testing in single-fault condition	(see appended table 5.2)	P
	not risk of electric shock or fire after a single-fault test ..... :		P
5.2.2	Application of single-fault condition		P
5.2.2.1	General ..... :		P

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Clause	Requirement – Test	Result – Remark	Verdict
5.2.2.2	Protective impedance ..... :		N/A
5.2.2.3	Transformers ..... :		P
5.2.2.4	Outputs ..... :		P
5.2.2.5	Insulation between circuits and parts ..... :		P
5.2.2.6	Primary circuits and hazardous voltage non-primary circuits ..... :		P
5.2.2.7	Overloads ..... :		P
5.2.2.8	Intermittently rated resistors ..... :	No such resistors used.	N/A
5.2.2.9	DC inputs ..... :		P
5.2.3	Duration of tests ..... :		P
5.2.4	Compliance		-
5.2.4.1	Compliance with requirements for electric shock protection		-
5.2.4.1.1	General ..... :		P
5.2.4.1.2	Values in single-fault condition	(see appended table 5.2)	P
	a) Voltage limits less than 55 V r.m.s. or 140 Vd.c. ..... :		P
	- For temporary voltages, limits less than 55 V r.m.s. and 78 V peak or 140 V d.c.		P
	- for wet locations voltage limits less than 33V r.m.s. or 70d.c. ..... :	Communication port was accessible conductive part that voltage less than 33 V r.m.s. or 70 V d.c.	P
	b) Current less than 3,5 mA r.m.s. for sinusoidal, 5 mA peak non-sinusoidal or mixed frequencies or 15 mA d.c. when measured with measuring circuit A.1 or A.2 if less than 100 Hz or 500mA r.m.s (Figure with *R*B = 75 Ω Relates to possible burns in the frequency range 30 kHz to 500 kHz)		N/A
	- for wet locations measuring circuit A.4 used (with RS = 375 Ω (instead of 1 500 Ω) ..... :		N/A
	- Current less than 3,5 mA r.m.s. for sinusoidal, 5 mA peak non-sinusoidal or mixed frequencies or 15 mA d.c ..... :		N/A
	c) capacitance level is that defined in Figure 3. curve B in IEC 61010-1:2010 ..... :		N/A
5.2.4.2	Compliance with requirements for temperature protection ..... :		P
5.2.4.3	Compliance with requirements for protection against the spread of fire ..... :		P

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Clause	Requirement – Test	Result – Remark	Verdict
5.2.4.4	Compliance with requirements for hazardous gases and chemicals..... :		P
5.2.4.5	Compliance with requirements for mechanical protection		P
6	**Mechanical aspects**		**-**
6.1	Protection against mechanical hazards		-
6.1.1	Stability ..... :		P
6.1.2	Moving parts ..... :		P
6.1.3	Edges and corners ..... :		P
6.2	Mechanical requirements		P
	Mechanical tests requirements of 10.6.2.1 to 10.6.2.4. ..... :		P
	Higher severity levels ..... :		N/A
6.3	Mechanical security of terminations	(see Annex E)	P
7	**Flammability and resistance to fire**		-
7.1	General		P
	reducing the risk of fire by one of the following means:		-
	- Eliminating or reducing the sources of ignition within the equipment..... :		P
	- Reducing the amount of combustible (or flammable) materials within the equipment ..... :		P
	- Containment of a fire within the equipment ..... :		P
7.2	Rationale		P
	Risk of fire in normal and single fault condition..... :		P
	In order for a risk of fire within the equipment to exist, all three of the following basic elements shall exist:		P
	- The equipment circuits shall have sufficient power or energy to be an ignition source.. :		P
	- There shall be oxygen present (air is about 21 % oxygen) ..... :		P
	- There shall be combustible materials present to support the combustion process ..... :		P
	Conformity is checked by minimum one or a combination of the following (see Figure 1):		P
	- Equipment temperature limits of 7.3.1 ..... :		P

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Clause	Requirement – Test	Result – Remark	Verdict
	- Single Fault test of 7.11 and 10.6.5.5 ..... :		P
	- Minimization of fire risk and reducing sources of ignition of 7.4 and 7.4.2 ..... :		P
	- Containment of a fire within equipment of 7.10 ..... :		P
7.3	General hazards from overheating and fire		-
7.3.1	Equipment temperature limits:		P
	- In normal conditions..... :	(See appended table 7.3)	P
	- In single-fault condition (limits of clause 7.11) ..... :	(See appended table 5.2)	P
	Symbol 13 of Table 10..... :		P
	Symbol 14 of Table 10..... :		P
7.3.2	Hazardous gases and chemicals	No gases and chemicals used.	-
	Manufacturer's documentation ..... :		N/A
7.4	Minimization of fire risk		-
7.4.1	General:		P
	Critical components of primary circuits and circuits exceeding ELV voltage limits. Compliance with Annex D ..... :		P
7.4.2	Eliminating or reducing the sources of ignition within the equipment		P
	a) Either 1) or 2)		P
	1) Limited-energy circuit as specified in 7.12 ..... :		P
	2) Insulation between parts at different potentials, compliance with clause 7.11 ..... :		P
	b) circuits designed to produce heat in compliance with clause 5.2..... :		N/A
	Circuits not classified as limited-energy circuits. Method i) or ii) below shall be used.		P
	i) Testing in the single-fault conditions in compliance with clause 5.2 ..... :		P
	ii) Verifying as in 7.11 that if a fire occurs it will be contained within the equipment..... :		P
7.5	Cabling and fusing		P
	Manufacturer's recommendations:		P
	- Connection cables: minimum cross-section and voltage rating ..... :		P
	- Protection devices ..... :		P
7.6	Flammability of materials and components		-

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Clause	Requirement – Test	Result – Remark	Verdict
7.6.1	General ..... :		P
	Conformity is checked by inspection ..... :		P
	Tests in compliance with IEC 60695-11-10..... :		P
7.6.2	Materials for components and other parts inside fire enclosures ..... :		P
7.6.3	Materials for fire enclosures ..... :		P
7.6.4	Materials for components and other parts outside fire enclosures ..... :		P
7.7	Fire ignition sources ..... :		P
7.8	Conditions for a fire enclosure	Metal enclosure used.	-
7.8.1	General ..... :		P
7.8.2	Parts requiring a fire enclosure ..... :		P
7.8.3	Parts not requiring a fire enclosure ..... :		P
7.9	Requirements for primary circuits and circuits exceeding ELV limits ..... :		P
7.10	Fire enclosures and flame barriers		-
	Enclosure meets following requirements:	No opening in the metal enclosure.	P
	Bottom:		P
	- no openings, or ..... :		P
	- to the extent in Figure 3, shall be constructed with baffles as specified in Figure 2, or..... :		N/A
	- be made of metal, perforated as specified in Table 6, or ..... :		N/A
	- be a metal screen with a mesh not exceeding 2 mm × 2 mm centre to centre and a wire diameter of at least 0,45 mm .. :		N/A
	The sides shall have no openings within the area that is included within the inclined line C in Figure 3 or..... :		N/A
	Case and baffle or flame barrier ..... :		N/A
7.11	Assessment of the fire risk due to a single-fault condition		-
7.11.1	Guidelines for maximum acceptable temperatures when subjecting a circuit or component to a single-fault condition		P
7.11.2	Temperature of windings under a normal condition or a single-fault condition	(See appended table 7.3 and 5.2)	P

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Clause	Requirement – Test	Result – Remark	Verdict

7.11.3	Compliance of equipment with requirements for protection against the spread of fire		P
7.12	Limited-energy circuit	Not applied.	N/A
	a) Potential not more than 33 r.m.s. or 70 V dc		N/A
	b) Current limited by one of following means:		N/A
	3) Inherently or by impedance (see Table 8); or		N/A
	4) Overcurrent protective device (see Table 9); or		N/A
	5) A regulating network limits also in single fault condition (see Table 8)		N/A
	c) Is separated by at least basic insulation		N/A
	Fuse or a nonadjustable electromechanical device is used		N/A
8	**General and fundamental design requirements for safety**		**-**
8.1	Climatic conditions for safety		P
	Environmental ranges declared by the manufacturer:		P
	- temperature, operation and storage..... :		P
	- humidity, non-condensing ..... :		P
	- atmospheric pressure ..... :		P
8.2	Electrical connections		P
	- electrical terminations and connection points..... :		P
	- protective bonding..... :	(See appended table 10.6.4.5)	P
	- wires and cables ..... :		P
	- Conductors ..... :		P
	- electrical connections ..... :		P
8.3	Components		-
8.3.1	General	(See appended table 8.3)	P
8.3.2	High-integrity part or component		P
8.4	Connection to telecommunication networks Requirements according to IEC 62151 ..... :	Not connect to telecommunication networks	N/A
8.5	Connection to other equipment Requirements in accordance with Table A.1 ..... :		P
8.6	Laser sources Requirements in accordance with IEC 60825-1 ..... :	No such device.	N/A
8.7	Explosion		-
8.7.1	General..... :		P

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Clause	Requirement – Test	Result – Remark	Verdict
8.7.2	Components at risk of explosion		-
8.7.2.1	General ..... :	(see clause 5.2.4.5)	P
8.7.2.2	Batteries	No battery used	N/A
	Compliance with Annex F ..... :		N/A
	Marking and warning ..... :		N/A
	Rechargeable batteries ..... :		N/A
	Battery compartment ..... :		N/A
	Batteries intended to be replaced by the user ..... :		N/A
9	**Marking, documentation and packaging**		**-**
9.1	Marking		-
9.1.1	General		P
	Removable parts .....:		P
	Symbols according to table 9.. .....:		P
	Rack or panel equipment .....:		P
	Voltages, currents, frequency and their tolerances according to IEC 60255-6.....:		P
9.1.2	Identification		-
	Equipment is identified on the equipment by ..... :		P
	a) Manufacturer's or supplier's name or trademark		P
	b) Model or type reference .....:		P
	Manufacturing location identified ..... :		P
9.1.3	Auxiliary supplies, VT, CT, I/O9	No such device.	-
9.1.3.1	General requirements for marking		-
	For marking the following should be taken into account:		N/A
	a) a.c. – with symbol 2 of Table 9 and rated frequency or frequency range ..... :		N/A
	b) d.c. – with symbol 1 of Table 9 ..... :		N/A
	c) symbol 3 of Table 9 on equipment for a.c. and d.c. supply..... :		N/A
	d) symbol 4 of Table 9 on equipment for 3 phase a.c. supply..... :		N/A
	e) a hyphen (-) shall be used to separate the lower and upper nominal voltages, for example, 125 V-230 V ..... :		N/A
	f) for measurands either a hyphen (-) or an ellipse (…) shall be used to separate the lower and upper voltages..... :		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	g) for selectable voltage or current markings:		N/A
	- the lower and upper selectable values shall be separated by means of a solidus, i.e. forward slash (/) ..... :		N/A
	- voltages or frequencies where switching is automatic then the markings shall be according to symbol 15 of Table 9 or the word “AUTO” ..... :		N/A
	- operating voltage achieved using an external, separate device, use +EXT.R. ... :		N/A
	h) the burden in watts (active power) or volt-amperes (apparent power) or the rated input current, with all accessories or plug-in modules connected :		N/A
	The documentation shall specify the burden..... :		N/A
	The measured value shall not exceed the marked value by more than 10 % ..... :		N/A
	i) the rated supply voltage(s) or the rated supply voltage range ..... :		N/A
	- voltage range more than 20 % of the mean value..... :		N/A
	- different rated supply voltages ..... :		N/A
9.1.3.2	Auxiliary supply		-
	The following information shall be provided:		-
	a) on the equipment and in the documentation..... :		N/A
	- -a.c. and/or d.c. supply..... :		N/A
	- the rated values ..... :		N/A
	b) in the documentation..... :		N/A
	- the burden..... :		N/A
9.1.3.3	Measurands		-
	The following information shall be provided:		N/A
	a) on the equipment and in the documentation..... :		N/A
	- the nominal values, for example, voltage, current, frequency..... :		N/A
	b) in the documentation..... :		N/A
	- the burden..... :		N/A
	- the overload withstand ..... :		N/A
9.1.3.4	Inputs		-
	The following information shall be provided in the documentation ..... :		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	a) a.c. and/or d.c. supply ..... :		N/A
	b) the rated values ..... :		N/A
	c) burden on the supply input ..... :		N/A
9.1.3.5	Outputs		-
	The following information shall be provided in the documentation ..... :		N/A
	a) the kind of output, for example, relay, optocoupler etc..... :		N/A
	b) burden on the supply input ..... :		N/A
	c) the switching capability on/off ..... :		N/A
	d) the switching voltage ..... :		N/A
	e) the permissible current, continuous value and short time value for 1 s ..... :		N/A
	f) withstand voltage across open contacts..... :		N/A
9.1.4	Fuses	No such device used.	-
	Operator replaceable fuse marking ..... :		N/A
	Not replaceable by the user ..... :		N/A
9.1.5	Measuring circuit terminals		-
	Marking shall be adjacent to the measuring terminals ..... :		N/A
	If insufficient space, symbol 14 used..... :		N/A
	Symbol 14 and/or 12 of Table 9 ..... :		N/A
	Voltage 33 V a.c. or 70 V d.c. ..... :		N/A
	Exceptions ..... :		N/A
9.1.6	Terminals and operating devices		-
	Safety markings ..... :		P
	AC or d.c. supply ..... :		P
	Operating device markings ..... :		P
	Functional earth terminals..... :		N/A
	Protective conductor terminals..... :		P
	Marking place ..... :		P
	Plug/socket device..... :		P
	Marking for accessible terminals..... :		P
	Marking for lasers or high-intensity infra-red diodes of class 2 rating or higher ..... :		N/A
9.1.7	Equipment protected by double or reinforced insulation..... :		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
9.1.8	Batteries		-
9.1.8.1	Replaceable batteries..... :	No battery used.	N/A
	Battery accessible to the user..... :		N/A
	Battery not accessible to the user..... :		N/A
	Polarity of the battery..... :		N/A
9.1.8.2	Charging ..... :		N/A
9.1.9	Test voltage marking ..... :		N/A
9.1.10	Warning markings		-
	Rack- or panel-mounted equipment ..... :	Wall mounted equipment.	P
	Access in normal use ..... :		P
	Equipment documentation ..... :		P
	Batteries..... :		N/A
	Warning markings size ..... :		N/A
9.1.11	Marking durability ..... :		P
9.2	Documentation		-
9.2.1	General ..... :		P
	Explanation of warning symbols ..... :		P
	Protective conductor connections..... :		P
	Equipment ratings, operating instructions and installation instructions ..... :		P
	Information specified in 9.2.2 to 9.2.5..... :		P
	Intended use ..... :		P
9.2.2	Equipment ratings	See rating label	-
9.2.2.1	General		P
	Overvoltage category .....:	OVC III for MAINS; OVC II for PV	P
	Rated voltage(s) or voltage range(s) (V) .....:		P
	Rated frequency or rated frequency range (Hz) ....:		P
	Rated power (W) rated current (mA or A) .....:		P
	Nominal functional value .....:		P
	Input and output connections .....:		P
9.2.2.2	Fuses and external protective devices		-
	Fuse ratings ..... :		N/A
	External device ..... :	According to user manual the circuit breaker should use in final Installation.	P

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Clause	Requirement – Test	Result – Remark	Verdict
9.2.2.3	Environmental requirement		-
	IP rating..... :	IP65	P
	Pollution degree ..... :	PD2 (Inside); PD3 (Outside)	P
	Insulation class..... :	Class I	P
9.2.3	Equipment installation		-
	Safe mounting..... :		P
	Protective earthing..... :		P
	Ventilation requirements..... :		P
	Digital input circuits and output relays ..... :		N/A
	Wire..... :		P
	External devices ..... :		P
9.2.4	Equipment commissioning and maintenance		-
	Fault-finding and repair ..... :		P
	Equipment part ..... :		P
	Safe methods for changing and disposal of:		-
	Accessible fuses..... :		N/A
	Replaceable batteries..... :		N/A
	Re-charging and/or replacement for re-chargeable batteries ..... :		N/A
	Fibre-optic output devices ..... :		N/A
9.2.5	Equipment operation		-
	Operating instructions:		-
	- CT circuits ..... :		N/A
	- Responsibility of the user ..... :		P
	- pictures and symbols used ..... :		P
9.3	Packaging		P
10	**Type tests and routine tests**		-
10.1	General ..... :		P
10.2	Safety type tests ..... :		P
10.3	Routine testing or sample testing ..... :		N/A
10.4	Conditions for testing..... :	Considered.	P
10.5	Verification procedure..... :	Considered.	P
10.6	Tests		-
10.6.1	Climatic environmental tests		-

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Clause	Requirement – Test	Result – Remark	Verdict
10.6.1.1	Dry-heat test – operational. Tests according to IEC 60255-1 ..... :	Test Bd of IEC60068-2-2 60℃,16h.	P
10.6.1.2	Cold test – operational. Tests according to IEC 60255-1 ..... :	Test Bd of IEC60068-2-1 -30℃, 16h.	P
10.6.1.3	Dry heat test at maximum storage temperature. Tests according to IEC 60255-1 ..... :	Test Bb of IEC60068-2-2 60℃, 16h	P
10.6.1.4	Cold test at minimum storage temperature. Tests according to IEC 60255-1 ..... :	Test Bd of IEC60068-2-1 -40℃, 16h	P
10.6.1.5	Damp-heat test. Tests according to IEC 60255-1..... :	Test Cab of IEC60068-2-78 40℃, 93%, 10d	P
10.6.1.6	Cyclic temperature with humidity test. Tests according to IEC 60255-1..... :	Test Db: IEC 60068-2-30	P
10.6.2	Mechanical tests		-
10.6.2.1	Vibration Tests according to IEC 60255-21-1..... :	1. Frequency: 10-150Hz; 2. Acceleration:1g; 3. Cycle Time:8 min / axis, total 20 cycles / axis; 4. Direction: X, Y ,Z axis.	P
10.6.2.2	Shock Tests according to IEC 60255-21-2..... :	1. Acceleration: 15g 2. Duration: 11ms; 3. Times: 3 times / direction, total 18 times, 4.Direction: ±X, ±Y , ±Z axis.	P
10.6.2.3	Bump Tests according to IEC 60255-21-2..... :	1. Acceleration: 10g 2. Duration: 16ms; 3. Number: 1000 times / direction. 4. Direction: ±X, ±Y , ±Z axis.	P
10.6.2.4	Seismic Tests according to IEC 60255-21-3..... :	1.Frequency: 1-35Hz; 2. Cross-over Frequency: 8-9Hz; 3. Horizontal (X, Y): Peak Displacement : 3.5mm; Acceleration: 1.0g; 4. Vertical (Z); 5. Cycle time: 10 min/ axis; 6. Direction: X, Y ,Z axis.	P
10.6.2.5	Accessible parts test	(See clause 5.1.5)	P
10.6.2.6	Dust/water ingress protection Tests according to IEC 60529 ..... :	IP 65	P

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Clause	Requirement – Test	Result – Remark	Verdict
10.6.3	Clearances and creepage distances		-
	Compliance with Annex C ..... :	(see appended table 10.6.3)	P
	Compliance with clause 5.1.10.2.2..... :	(see appended table 10.6.3)	P
	Transient suppressor used to reduce the overvoltage. Tests according to IEC 60255-26..... :		N/A
10.6.4	Safety-related electrical tests		-
10.6.4.1	General..... :		P
10.6.4.2	Impulse voltage test		-
10.6.4.2.1	General..... :		P
10.6.4.2.2	Test procedures..... :		P
10.6.4.2.3	Waveform and generator characteristics..... :		P
10.6.4.2.4	Selection of impulse test voltage..... :		P
10.6.4.2.4.1	General..... :		P
	Altitudes(m) ..... :		P
10.6.4.2.4.2	Equipment to tested at 5 kV peak nominal		P
10.6.4.2.4.3	Equipment to tested at 1 kV peak nominal		N/A
	- auxiliary (power supply) circuits..... :		N/A
	- equipment power supply..... :		N/A
	- I/O circuits ..... :		N/A
10.6.4.2.5	Performing of tests		P
	test performed between the followings part:	(see appended table 10.6.4.2)	P
	- between each circuit specified for the same impulse voltage ..... :		P
	- between independent circuits ..... :		P
	- across the terminals of a given circuit..... :		P
	Equipment with an insulated case..... :		P
10.6.4.2.6	Test acceptance criteria		-
	During the tests ..... :		P
	After the tests ..... :		P
10.6.4.2.7	Repetition of the impulse voltage test ..... :		P
10.6.4.3	AC or d.c. dielectric voltage test		-
10.6.4.3.1	General..... :		P

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Clause	Requirement – Test	Result – Remark	Verdict
10.6.4.3.2	Performing the dielectric voltage test ..... :	(see appended table 10.6.4.3)	-
10.6.4.3.2.1	Type tests		-
	test performed between the followings part:		P
	- between each circuit and the accessible conductive parts ..... :		P
	- between independent circuits ..... :		P
	- dielectric voltage withstand, for open metallic contacts..... :		P
10.6.4.3.2.2	Routine tests..... :		N/A
10.6.4.3.2.3	Routine tests by sampling ..... :		N/A
10.6.4.3.3	Value of the dielectric test voltage..... :		P
10.6.4.3.4	Test voltage source ..... :		P
10.6.4.3.5	Test method..... :		P
10.6.4.3.6	Test acceptance criteria ..... :		P
10.6.4.3.7	Repetition of the dielectric voltage test..... :		P
10.6.4.4	Insulation resistance..... :	(See appended table 10.6.4.4)	P
10.6.4.5	Protective bonding tests	(See appended table 10.6.4.5)	P
10.6.5	Electrical environment and flammability		-
10.6.5.1	Maximum temperature of parts and materials..... :		P
10.6.5.2	Flammability of insulating materials, components and fire enclosures ..... :	(See appended table 7.6)	N/A
10.6.5.3	Thermal short-time test		-
	Overvoltage ..... :		N/A
	Overcurrent..... :		N/A
10.6.5.4	Output relay parameters Parameters in according to IEC 60255-26 ..... :		N/A
10.6.5.5	Single-fault condition ..... :		N/A
10.6.6	Reverse polarity and slow ramp test ..... :	(See appended table 5.2)	P

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Clause	Requirement – Test	Result – Remark	Verdict
A	ANNEX A, ISOLATION CLASS REQUIREMENTS AND EXAMPLE DIAGRAMS (NORMATIVE) (see 5.1.2; 5.1.6.2; 5.1.10)		P
B	ANNEX B, RATED IMPULSE VOLTAGES (NORMATIVE) (see 5.1.2.2)		P
C	ANNEX C, GUIDANCE FOR THE DETERMINATION OF CLEARANCE, CREEPAGE DISTANCE AND WITHSTAND VOLTAGES (NORMATIVE) (see 5.1.2.2; 5.1.4; 5.1.10; 10.6.3)		P
D	ANNEX D, COMPONENTS (INFORMATIVE) (see 7.4.1; 8.3; 8.7.1)		P
E	ANNEX E, EXTERNAL WIRING TERMINATIONS (NORMATIVE) (see 6.3)		-
E.1	General		P
E.2	Permanently connected equipment		P
	a) a set of terminals; or		P
	b) a non-detachable power supply cable.		N/A
	terminals ..... :		P
	screws and nuts ..... :		P
	power supply cables:		N/A
	a) two independent fixings..... :		N/A
	b) mechanical fixing of the cables ..... :		N/A
E.3	Conductors		N/A
	Connection of conductors in compliance with Table E1. ..... :		N/A
E.4	Terminals		P
	Contact pressure size in compliance with Table E2. ..... :		P
	Terminals contact pressure..... :		P
	Slipping of the conductor..... :		P
	Terminals shall be so fixed that when the means of clamping the conductor is tightened or loosened:		P
	a) the terminal itself does not work loose ..... :		P
	b) internal wiring is not subjected to stress..... :		P
	Ordinary non-detachable power supply cables ..... :		N/A
	c) creepage distances and clearances are not reduced below the values specified in Annex C. ..... :		P

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Clause	Requirement – Test	Result – Remark	Verdict
F	ANNEX F, EXAMPLES OF BATTERY PROTECTION (INFORMATIVE) (see 8.7.2.2)		N/A

5.2	TABLE: Fault condition tests						P
No.	component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	Comments/ Observation
1	R5	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
2	R12	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
3	R3	Short	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" HwPVOCP". No damaged. No hazard.
4	R852	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
5	U1 pin1-3	Short	Input:230V Output:850V	10min.	--	--	I Inverter operated normally. No damaged. No hazard.
6	Q50	Short	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" HwPVOCP". No damaged. No hazard.
7	CTF4	Short	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" VbusRmsUnbalance". No damaged. No hazard.
8	CTF9	Short	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" VbusRmsUnbalance". No damaged. No hazard.
9	RL1	Short before start-up	Input:230V Output:850V	10min.	--	--	Inverter did not start-up. Error message:" RelayTestFail". No damage. No hazard.
10	RL2	Short before start-up	Input:230V Output:850V	10min.	--	--	Inverter did not start-up. Error message:" RelayTestFail". No damage. No hazard.
11	RL3	Short before start-up	Input:230V Output:850V	10min.	--	--	Inverter did not start-up. Error message:" RelayTestFail". No damage. No hazard.

12	RL4	Short before start-up	Input:230V Output:850V	10min.	--	--	Inverter did not start-up. Error message:" RelayTestFail". No damage. No hazard.
13	RL5	Short before start-up	Input:230V Output:850V	10min.	--	--	Inverter did not start-up. Error message:" RelayTestFail". No damage. No hazard.
14	RL6	Short before start-up	Input:230V Output:850V	10min.	--	--	Inverter did not start-up. Error message:" RelayTestFail". No damage. No hazard.
15	R56	Open	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
16	R58	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
17	R95	Open	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
18	R96	Open	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
19	R97	Open	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
20	R101	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
21	R102	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
22	R103	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
23	R168	Open	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" IsoFault". No damaged. No hazard.
24	R169	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
25	R22	Open	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" IsoFault". No damaged. No hazard.
26	R23	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.

27	R186	Open	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" IsoFault". No damaged. No hazard.
28	R188	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
29	R193	Open	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" IsoFault". No damaged. No hazard.
30	R194	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
31	R174	Open	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" IsoFault". No damaged. No hazard.
32	R175	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
33	R212	Open	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" IsoFault". No damaged. No hazard.
34	R207	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
35	T1 pin6-8	Short	Input:230V Output:850V	10min.	--	--	Non-display, Auxiliary source hiccup protections. No damaged. No hazard.
36	T1 pin3-5	Short	Input:230V Output:850V	10min.	--	--	Non-display, Auxiliary source hiccup protections. No damaged. No hazard.
37	T1 pin1-2	Short	Input:230V Output:850V	10min.	--	--	Non-display, Auxiliary source hiccup protections. No damaged. No hazard.
38	CAE1	Short	Input:230V Output:850V	10min.	--	--	Non-display, Auxiliary source hiccup protections. No damaged. No hazard.
39	CAE3	Short	Input:230V Output:850V	10min.	--	--	Non-display, Auxiliary source hiccup protections. No damaged. No hazard.
40	EC19	Short	Input:230V Output:850V	10min.	--	--	Non-display, Auxiliary source hiccup protections. No damaged. No hazard.

41	R147	Short	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" AFCIFault". No damaged. No hazard.
42	R421	Open	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" AFCIFault". No damaged. No hazard.
43	R426	Open	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" AFCIFault". No damaged. No hazard.
44	C275	Short	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" AFCIFault". No damaged. No hazard.
45	C270	Short	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" AFCIFault". No damaged. No hazard.
46	R146	Short	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" AFCIFault". No damaged. No hazard.
47	R413	Short	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" AFCIFault". No damaged. No hazard.
48	U5 pin12-14	Short	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" AFCIFault". No damaged. No hazard.
49	U5 pin10-8	Short	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" AFCIFault". No damaged. No hazard.
50	C252	Short	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" AFCIFault". No damaged. No hazard.

51	R411	Short	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" AFCIFault". No damaged. No hazard.
52	T5 Pin7-8-9-10-11-12	Short	Input:230V Output:850V	10min.	--	--	Non-display, Auxiliary source hiccup protections. No damaged. No hazard.
53	T5 Pin5-6	Short	Input:230V Output:850V	10min.	--	--	Non-display, Auxiliary source hiccup protections. No damaged. No hazard.
54	T5 Pin3-4	Short	Input:230V Output:850V	10min.	--	--	Non-display, Auxiliary source hiccup protections. No damaged. No hazard.
55	T5 Pin17-18	Short	Input:230V Output:850V	10min.	--	--	Non-display, Auxiliary source hiccup protections. No damaged. No hazard.
56	CAE5	Short	Input:230V Output:850V	10min.	--	--	Non-display, Auxiliary source hiccup protections. No damaged. No hazard.
57	CAE7	Short	Input:230V Output:850V	10min.	--	--	Non-display, Auxiliary source hiccup protections. No damaged. No hazard.
58	CAE8	Short	Input:230V Output:850V	10min.	--	--	Non-display, Auxiliary source hiccup protections. No damaged. No hazard.
59	CAE10	Short	Input:230V Output:850V	10min.	--	--	Non-display, Auxiliary source hiccup protections. No damaged. No hazard.
60	CAE11	Short	Input:230V Output:850V	10min.	--	--	Non-display, Auxiliary source hiccup protections. No damaged. No hazard.
61	CAE12	Short	Input:230V Output:850V	10min.	--	--	Non-display, Auxiliary source hiccup protections. No damaged. No hazard.
62	CAE13	Short	Input:230V Output:850V	10min.	--	--	Non-display, Auxiliary source hiccup protections. No damaged. No hazard.
63	R515	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
64	R517	Open	Input:230V Output:850V	10min.	--	--	MPPT1 operation failure, MPPT2 normal operation. Inverter operated normally. No damaged. No hazard.
65	R522	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.

66	R524	Open	Input:230V Output:850V	10min.	--	--	MPPT1 operation failure, MPPT2 normal operation. Inverter operated normally. No damaged. No hazard.
67	R529	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
68	R531	Open	Input:230V Output:850V	10min.	--	--	MPPT2 operation failure, MPPT1 normal operation. Inverter operated normally. No damaged. No hazard.
69	R538	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
70	R540	Open	Input:230V Output:850V	10min.	--	--	MPPT2 operation failure, MPPT1 normal operation. Inverter operated normally. No damaged. No hazard.
71	R547	Short	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" VbusRmsUnbalance". No damaged. No hazard.
72	R549	Open	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" VbusRmsUnbalance". No damaged. No hazard.
73	R552	Short	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" VbusRmsUnbalance". No damaged. No hazard.
74	R554	Open	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" VbusRmsUnbalance". No damaged. No hazard.
75	R557	Short	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" VbusRmsUnbalance". No damaged. No hazard.
76	R559	Open	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" VbusRmsUnbalance". No damaged. No hazard.

77	R562	Short	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" VbusRmsUnbalance". No damaged. No hazard.
78	R564	Open	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" VbusRmsUnbalance". No damaged. No hazard.
79	C62	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
80	R601	Open	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" GridUVP". No damaged. No hazard.
81	R602	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged.No hazard.
82	R613	Open	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" GridUVP". No damaged. No hazard.
83	R614	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
84	R189	Open	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" IsoFault". No damaged. No hazard.
85	R510	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
86	R799	Open	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" IsoFault". No damaged. No hazard.
87	R801	Short	Input:230V Output:850V	10min.	--	--	Inverter operated normally. No damaged. No hazard.
88	U13 pin82	Open	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" BluetoothFault". No damaged. No hazard.

89	U13 pin95	Open	Input:230V Output:850V	10min.	--	--	Inverter disconnected from grid immediately. Error message:" BluetoothFault". No damaged. No hazard.
Supplementary information							

7.3	TABLE: Heating Test				P
	test voltage (V) :		See below		—
	t1 (°C) :		See below		—
	t2 (°C) :		See below		—

Thermocouple Locations	Max. temperature measured (°C)				Max. temperature limit (°C)
Test voltage	Input: 850Vdc	Input: 540Vdc	Input: 850Vdc	Input: 540Vdc	--
Outside fan 1	52.7	53.1	66.2	66.2	70
Outside fan 2	57.4	56.9	66.9	66.9	70
PV input connector	47.2	47.8	62.4	62.4	85
DC switch handle	46.1	46.8	61.4	61.4	85
LCD display button	52.9	53.9	67.2	67.2	100
AC terminals	54.9	55.2	68.8	68.8	105
Enclosure surface	58.7	61.1	72.7	72.7	100
Enclosure side	59.9	61.4	74.8	74.8	100
Mounting surface	64.8	60.8	79.0	79.0	100
Q6	85.8	74.1	99.7	99.7	130
Q13	96.8	83.2	107.2	107.2	130
Q3	100.8	86.4	110.3	110.3	130
Q8	83.4	81.0	94.2	94.2	130
D2	70.5	87.8	84.1	84.1	130
Q14	65.9	88.0	79.7	79.7	130
Q50	65.4	81.9	78.7	78.7	130
D98	70.2	75.0	83.0	83.0	130
CY1	60.6	68.7	73.9	73.9	85
Varistor MOV1	63.6	69.9	76.8	76.8	125
Input DC SPD F4	62.5	67.8	75.7	75.7	85
Winding of T1 transformer	71.3	73.3	84.3	84.3	110
Core of T1 transformer	71.0	73.5	84.2	84.2	110
Winding of T3 transformer	68.6	72.3	82.6	82.6	110
Core of T3 transformer	67.6	71.4	81.4	81.4	110

Winding of EMI inductor L1	67.3	92.1	79.7	79.7	130
C16	63.8	70.8	77.4	77.4	105
HCT1	64.3	70.7	77.9	77.9	105
Relay RL2	73.0	74.3	86.0	86.0	105
Winding of EMI inductor L2	87.1	86.8	103.6	103.6	130
Winding of GFCI LP2	74.5	76.2	88.2	88.2	130
Core of EMI inductor L2	82.1	81.9	103.3	103.3	130
Y-Cap CY26	70.6	72.8	82.4	82.4	85
C62	71.6	73.5	84.8	84.8	105
Winding of EMI inductor L3	84.6	86.7	96.9	96.9	130
Varistor MOV5	70.0	72.5	83.7	83.7	125
R phase INV Inductor	96.1	86.6	99.1	99.1	130
T phase INV Inductor	109.1	78.1	98.2	98.2	130
C32	73.5	75.6	86.2	86.2	105
Line of INV inductor	73.3	75.2	85.6	85.6	105
C34	74.5	75.2	87.7	87.7	105
VU11	73.5	74.3	86.7	86.7	105
HCT6	80.3	74.7	81.7	81.7	85
C35	70.9	72.6	84.5	84.5	105
Relay RL5	76.8	77.4	88.7	88.7	105
C65	67.8	70.2	81.1	81.1	110
CAS1	68.3	70.5	81.5	81.5	90
AC line	70.6	72.2	82.3	82.3	105
DSP U13	69.3	70.9	82.8	82.8	130
DSP U30	71.1	72.1	82.5	82.5	130
PCB	87.7	82.0	99.9	99.9	130
PV line	46.3	46.2	61.7	61.7	105
ISO relay RY2	64.3	70.5	77.7	77.7	85
Winding of boost1 inductor	61.0	78.9	74.8	74.8	130
Winding of boost2 inductor	62.6	89.7	76.4	76.4	130
CTF9	64.6	69.6	78.0	78.0	105
UV2	68.5	75.6	81.9	81.9	130
Line of boost inductor	63.8	71.5	77.7	77.7	105
CTF5	72.8	74.1	86.0	86.0	105
DC switch body	59.8	66.6	72.8	72.8	85

UV1	75.7	78.2	86.7	86.7	130
ambient	44.7	44.6	60.3	60.4	--

	TABLE: Heating test, resistance method		
	Test voltage (V) ..... :		**—**
	Ambient, t_1 (°C) ..... :		**—**
	Ambient, t_2 (°C) ..... :		**—**

Temperature rise of winding	**R_1 (Ω)**	**R_2 (Ω)**	**ΔT (K)**	**Max. dT (K)**	**Insulation class**
Supplementary information: Virtual ground used for the test.					

7.6	**TABLE: Flammability of materials and components**				**N/A**
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
--	--	--	--	--	--
Supplementary information:					

Part	Manufacturer of material	Type of material	Thickness (mm)	Flammability class	Evidence
--	--	--	--	--	--
Supplementary information:					

8.3	TABLE: Critical components information				P
Component	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity
Metal Enclosure	All	All accepted	Min. thickness : 1.5mm	--	--
Plastic cover (LCD screen)	MACDERMID AUTOTYPE LTD	Autotex XE(f2)	105°C, V-0, min. 0.2mm thickness	UL 94 UL 746C	UL
DC connector	Stäubli Electrical Connectors AG	PV-KST4/xy-UR PV-KBT4/xy-UR	1000Vdc, 39A, Max. 85°C, IP68	IEC 62852:2014	TUV R60127190
	Dongguan Vaconn Electronic Technology Co.,Ltd.	VP-D4a-bcdef (DEVALAN)	1000Vdc, 39A, Max. 85°C, IP68	IEC 62852:2014 EN 62852:2014	TUV R50396796
Internal wiring(DC switch-The mainboard PV line)	All	All accepted	Min.10AWG, 2000V,105°C	UL11627	UL
Internal wiring(PV-DC)	All	All accepted	Min,12AWG,2000V,105°C	UL11627	UL
Internal wiring (AC-out)	All	All accepted	Min,10AWG,1000V,105°C	UL10269	UL
Earthing wire	All	All accepted	Min.10AWG, yellow-green, 105°C	UL10269	UL
DC Switch	Santon Switchgear Ltd	XBHP+3410/2-D	1000V/30A, 600V/60A, Max.85°C	EN 60947-3:2009 EN60947-3:2009/A1:2012/C1:2013 EN 60947-3:2009/A2:2015	DEKRA 71-107727
		XBHP+3419-AAX/6	1000V/30A, 600V/50A, Max.85°C		
	ProJoy Electric Co., Ltd.	PEDS150R-HM55-4	1000V/25A,4P, Max.85°C	EN 60947-3:2009+AI+A2	TUV R 50389807
	Shanghai Liangxin Electrical Co., Ltd	NDG3V-32/20/4/1/02/M/1100	1100V/20A, 600V/30A,4P, Max.85°C	IEC 60947-1 IEC 60947-3	TUV B 083574 02 50 Rev.03
Inductor	ANHUI ECRIEEMAG TECHNOLOGY CO., LTD.	Alloy power core	BOOST: 2*475μH INV: 3*244μH	--	--
	Huizhou baohui electro-tech ltd				
	CHINA AMORPHOUS				

8.3	TABLE: Critical components information				P
Component	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity
	TECHNOLOGY CO.,LTD				
	Shenzhen jingquanhua electronics co., ltd				
	ShenZhen Highlight Electronic Co., LTD				
-Lead wire	All	All accepted	10AWG,1000V, 105°C, VW-1	UL10269	UL
DC Fans (internal)	Dongguan PROTECHNIC ELECTRIC CO., LTD.	MGT9212UB R25	12V, 0.54A, Max.70°C	EN60950-1：2006/A2:2013	TUV B 031023 0131 Rev.02
	ASAI VITAL COMPONENTS CO LTD	DS09225B12 U	12V, 0.56A, Max.70°C	EN55032:2015 EN 55024:2010/A1: 2015	TUV E8A 17 09 25730 775
DC Fans (External)	NMB Technologies Corporation	08025KA-12NGT-01	12V,0.3A, Max.70°C	EN 62368-1:2014/A11:2017 IEC 62368-1:2014 EN 62368-1:2014	VDE
		08025VE-12MCTD	12V,0.3A, Max.70°C	EN 62368-1:2014/A11:2017 IEC 62368-1:2014 EN 62368-1:2014	VDE
Heat shrinkable tube	Shenzhen QFR Electronics Co., Ltd	QFR-H-600	125°C, VW-1, 600V	UL 224	UL
	SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO.,LTD	RSFR-H	125°C, VW-1, 600V	UL 224	UL
	Shenzhen QFR Electronics Co., Ltd	QFR-H-600	125°C, VW-1, 600V	UL 224	UL
AC output terminal Block	Shenzhen Connection Electronic Co Ltd	DRTB16-05-RST	65A/600Vac, Max. 105°C	UL1059	UL
All PCB	All	All accepted	Min.130°C, min. V-0, CTI≥175	UL 796	UL

8.3	TABLE: Critical components information				P
Component	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity
Input Y-Cap (CY1, CY2, CY3, CY4, CY5, CY6, CY7, CY10, CY14, CY15)	Samwha Capacitor Co., Ltd	SC	Y1, 4.7nF, 400Vac, Max.85°C	EN 60384-14:2013/A1:2016; EN 60384-14:2013-08	VDE
	WALSIN TECHNOLOGY CORP	AH	Y1, 4.7nF, 400Vac, Max. 85°C	EN 60384-14:2013/A1:2016; EN 60384-14:2013-08	VDE
Input Y-Cap (CY8, CY9, CY11, CY12, CY13, CY16, CY21)	Samwha Capacitor Co., Ltd	SC	100pF, 400Vac, Max. 85°C	EN 60384-14:2013/A1:2016; EN 60384-14:2013-08	VDE
	WALSIN TECHNOLOGY CORP	AH	100pF, 400Vac, Max. 85°C	EN 60384-14:2013/A1:2016; EN 60384-14:2013-08	VDE
Input Current transformer(LP1)	HUIZHOU BAOHUI ELECTRONICS TECHNOLOGY CO.,LTD	115-20-007A	Class B (130°C)	--	--
--Winding	All	All accepted	130°C	UL 1446	UL
Input Varistor (MOV1, MOV2, MOV3, MOV4,)	TDK (ZHUHAI FTZ) CO., LTD	S20K510/SNF20K510E2S5	510VAC, Imax: 10kA, Max.: 125°C	IEC 60151-1 IEC 60151-2 IEC 60151-2/AMD1 IEC 61051-2-2	VDE
	DongGuan LittelfuseElectronics Co., Ltd.	LA SeriesV20E510P	510Vac, Imax: 10kA, Max.: 125°C	CECC 42201-006, Issue 3, 2004-10 IEC 60950-1:2013-05 IEC 61051-1:1992 IEC 61051-2(ed.1);am1:2009-05 IEC 61051-2:1992 IEC 61051-1:2007	VDE
Input DC SPD (F4)	Sichuan Zhongguang Lightning Protection Technologies Co., Ltd.	ZGGS20-500PVh1c1	385Vac/500Vdc Imax:10kA, Max. 85°C	IEC 61643-11:2011 EN 61643-11:2012	TUV R 50342738
	SHENZHEN HAIPENGXIN ELECTRONICS CO.,LTD.	PV20K-500	385Vac/500Vdc Imax:10kA, Max. 85°C	EN 61643-11:2012	TUV R 50316472

8.3	TABLE: Critical components information				P
Component	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity
Input Line filter (L1)	HUIZHOU BAOHUI ELECTRONICS TECHNOLOGY CO.,LTD	115-20-028A	0.7mH, Max. 130°C	--	--
--Winding	All	All accepted	180°C	UL 1446	UL
Input Electronics capacitor(CTF1, CTF2,CTF3)	Xiamen Faratronic Co., Ltd.	C3D1M205K B00382	2μF,1100Vdc, Max.105°C	--	--
	Hua Jung Components Co., Ltd	DMJ-PS Series	2μF,1100Vdc, Max.105°C	--	--
Input Electronics capacitor(C10, C16)	Xiamen Faratronic Co., Ltd.	C3D1M156K F12382	15μF, 1100Vdc, Max. 105°C	--	--
	TDK	B32776S015 6K519	15μF, 1100Vdc, Max. 105°C	--	--
	Hua Jung Components Co., Ltd	DMJ-PS Series	15μF, 1100Vdc, Max. 105°C	--	--
Input Current sensor (HCT1,HCT4)	Sinomags Technology Co., Ltd	STK-20HD/P2	IPN: 20A Vc: 5V Icc: 5mA Max.: 105°C	--	--
Current sensor (HCT2、HCT3)	Allegro MicroSystems, LLC	ACS724KMA TR-30AB-T	Di≧0.4mm Internall di≧ 7.0mm External di≧ 7.62mm, AC 8000V, reinforced Insulation 115°C	UL 60950-1:2007/A2:2014 EN 60950-1:2006/A2:2013	TUV U8V 16 03 54214 040
Input Relay (RY1, RY2)	Xiamen Hongfa Electroacoustic Co. Ltd.	HFD3/5	2A, 250Vac, 5Vdc, Max.85°C	IEC 61810-1 VDE 0435	VDE
Boost IGBT(Q4, Q12, Q50, Q51)	Fairchild	FGY40T120S MD	1200V, 40A, Max.175°C	--	--
DOr	Infineon	IKQ40N120C H3	1200V,40A, Max.175°C	--	--
Bus Electronics capacitor(CTF4, CTF5, CTF6, CTF7, CTF8, CTF9)	Xiamen Faratronic Co., Ltd.	C3D	110μF, 550V, Max. 105°C	EN 61071:2007 IEC 61071:2007 IEC 61881-1:2010 EN 61881-1:2011	TUV R 50266108
	Wuxi CRE New Energy Technology	DMJ-PS DPS1170550 K4	110μF, 550V, Max. 105°C	--	--

8.3	TABLE: Critical components information				P
Component	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity
	CO.,Ltd	22101			
	Hua Jung Components Co., Ltd	EPB-117K0550DB 1523-FF	110μF, 550V, Max. 105°C	--	--
INV IGBT(Q5,Q6,Q7,Q8,Q9,Q10)	Fairchild	FGA40T65SHD	40A, 650V, Max. 175°C	--	--
	Infineon	IKW40N65H5 /IKW40N65ES5	40A, 650V, Max. 175°C	--	--
INV IGBT(Q1,Q2,Q3,Q11,Q12,Q13)	On-Semi	FGY75T120SQDN	75A, 1200V, Max. 175°C	--	--
	Infineon	IKQ75N120CH3	75A, 1200V, Max. 175°C	--	--
INV IGBT(Q1,Q2,Q3,Q11,Q12,Q13)(SOFAR 15KTLX-G3)	On-Semi	FGY40T120SMD	40A, 1200V, TP-247, Max.175°C	--	--
	Infineon	IKQ40N120CH3	40A, 1200V, TP-247, Max.175°C	--	--
Power Diode (D1、D2)	CREE	C4D20120D	1200V, 32A, 175°C	--	--
	On-Semi	FFSH30120ADN-F155	1200V, 30A, 175°C	--	--
Output Electronics capacitor(C35, C41, C47)	Xiamen Faratronic Co., Ltd.	C6AR8805KF20382	8μF, 380Vac, Max. 105°C	--	--
	TDK	Z905927714s512	8μF, 380Vac, Max. 105°C	--	--
Output Relay for all models except (RL1, RL2, RL3, RL4, RL5, RL6)	Xiamen Hongfa Electroacoustic Co. Ltd.	HF161F-40W/12-HTF(967)	40A, 277Vac, 12Vdc, Max. 105°C	IEC 61810-1:2015 EN 61810-1:2015	TUV R 50475730
	ZETTLER	AZSR143-1AE-12D	40A, 277Vac, 12Vdc, Max. 105°C	IEC 61810-1	TUV B 088793 0015 Rev.00
Output Relay for all models except (RL1, RL2, RL3, RL4, RL5, RL6) (SOFAR 15KTLX-G3)	Xiamen Hongfa Electroacoustic Co. Ltd.	HF161F-W/12-HT(477)	26A, 277Vac, 12Vdc, Max. 85°C	EN61810-1:2015	VDE
	ZETTLER	AZSR131-1AE-12D	31A, 277Vac, 12Vdc, Max. 85°C	IEC 61810-1	TUV B 088793 0005 Rev.01
Output GFCI Module(LP2)	HUIZHOU BAOHUI ELECTRONICS TECHNOLOGY CO.,LTD	SH-T009	Class B (130°C)	--	--
	CHINA	CA01-12054			

8.3	TABLE: Critical components information				P
Component	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity
	AMORPHOUS TECHNOLOGY CO., LTD				
- Winding	All	All accepted	155°C	UL 1446	UL
Output Y-Cap (C59, C60, C61,C63,CY24, CY25, CY26,CY17, CY18, CY19, CY22, CY27, CY28)	SAMWHA CAPACITOR CO LTD	SD	Y1, 4.7nF, 400Vac, Max. 85°C	EN 60384-14:2013/A1:2016 IEC 60384-14:2013 IEC 60384-14:2013/AMD1:2016; EN 60384-14:2013-08	VDE
	WALSIN TECHNOLOGY CORP	AH	Y1, 4.7nF, 500Vac, Max. 85°C	EN 60384-14:2013/A1:2016 IEC 60384-14:2013 IEC 60384-14:2013/AMD1:2016; EN 60384-14:2013-08	VDE
Output Y-Cap(C58, C62, C64, C69)	Xiamen faratronic Co., Ltd	MKP63	Y2, 33nF, 300Vac, Max. 110°C	EN 60384-14:2013+A1 UL60384-14:2009	ENEC:SE/0366-2D
Output Line filter(L2)	HUIZHOU BAOHUI ELECTRONICS TECHNOLOGY CO.,LTD	115-20-030A	13μH, Max.130°C	--	--
- Winding	All	3.0*3.7mm	200°C	UL 758	UL
Or	All	All accepted	Short wiring, Min2.0*3.8mm, copper, 150°C	--	--
--Tape	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	PF-301	180°C	UL 510	UL
Output Current sensor (HCT5, HCT6, HCT7)	LEM	CASR 25-NP	IPN:25A; Vc: 5V. Max.: 85°C	--	--
	VAC	T60404-	IPN:25A;	--	--

8.3	TABLE: Critical components information				P
Component	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity
		N4646-X661	Vc: 5V. Max. 85°C		
Output Varistor (MOV5, MOV6, MOV7, MOV8)	TDK	S20K510/SN F20K510E2 S5	510Vac, Imax: 10kA, Max.:125°C	IEC 60151-1 IEC 60151-2 IEC 60151-2/AMD1 IEC 61051-2-2	VDE
Or	Littelfuse	LA Series V20E510P	510Vac, Imax: 10kA, Max. 125°C	CECC 42201-006, Issue 3, 2004-10 IEC 60950-1:2013-05 IEC 61051-1:1992 IEC 61051-2(ed.1);am1:2009-05 IEC 61051-2:1992 IEC 61051-1:2007	VDE
Output Gas tube (GAS1)	Bencent electronics ltd	B8G1500M	380V, 10kA, Max.: 90°C	UL1449	UL
Output Thermal fuse(F5, F6, F7)	AUPO ELECTRONICS LTD	A2	2A, 250V, Max. 203°C	UL 60691	UL
Output Electronics capacitor(C65, C66, C67, C415)	XIAMEN FARATRONIC CO.,LTD	C46H2474K B3 C450	X1, 0.47uF, 500Vac, Max. 110°C X1, 0.56uF, 500Vac, Max. 110°C X1, 0.68uF, 500Vac, Max. 110°C	--	--
Opt coupler (U18, U21, U20, U22, U11)	Lite-On Technology Corporation	LTV-816 S2	Di≧0.4mm External Cr. And Cl. ≧ 8.0mm, AC 8000V, reinforced Insulation 115°C	IEC 60747-5-5:2007 IEC 60747-5-5:2007/AMD1:2013 DIN EN 60747-5-5 (0884-5):2015-11; EN60747-5-5:2011; A1:2015	VDE
Auxiliary_power transformer(T1)	HUIZHOU BAOHUI ELECTRONICS TECHNOLOGY CO.,LTD	115-20-005A	Class B, Max. 130°C	--	--

8.3	TABLE: Critical components information				P
Component	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity
- Winding	All	All accepted	130°C	UL 1446	UL
- Bobbin	SUMITOMO BAKELITE CO LTD	PM-9820, PM-9030	V-0, min. thickness: 0.75mm, 150°C	UL 94	UL
Or	CHANG CHUN PLASTICS CO.,LTD	T375J	V-0, min. thickness: 0.75mm, 150°C	UL 94	UL
--Tape	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	CT-	130°C	UL 510	UL
- Margin Tape	Jingjiang Yahua Pressure Sensitive Glue Co Ltd	WF-	3.0mm, 130°C	UL 510	UL
- Tube	SHENZHEN WOER HEAT-SHRINKABLE M ATERIAL CO.,LTD	WF(PTFE)	600V, Max. 200°C	UL224	UL
Auxiliary_power transformer(T2)	HUIZHOU BAOHUI ELECTRONICS TECHNOLOGY CO.,LTD	115-19-067C	Class B, Max. 130°C	--	--
- Winding	All	All accepted	130°C	UL 1446	UL
- Bobbin	SUMITOMO BAKELITE CO LTD	PM-9820, PM-9030	V-0, min. thickness: 0.75mm, 150°C	UL 94	UL
	CHANG CHUN PLASTICS CO.,LTD	T375J	V-0, min. thickness: 0.75mm, 150°C	UL 94	UL
--Tape	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	CT-	130°C	UL 510	UL
- Margin Tape	Jingjiang Yahua Pressure	WF-	1.5mm,130°C	UL 510	UL

8.3	TABLE: Critical components information				P
Component	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity
	Sensitive Glue Co Ltd				
- Tube	SHENZHEN WOER HEAT-SHRINKABLE M ATERIAL CO.,LTD	WF(PTFE)	600V, Max. 200°C	UL224	UL
Auxiliary_power Current transformer(T3, T4)	Shenzhen Spit Electronics Co. LTD	SPT-08E0313-CT	Max. 130°C	--	--
- Winding	All	All accepted	155°C	UL 1446	UL
- Bobbin	CHANG CHUN PLASTICS CO LTD	T373J	V-0	UL 94	UL
IGBT Driver Power Fuse(FC1)	Littelfuse Inc.	1812L110/33	1.1A, 33V, Max. 85°C	EN 60738-1:2006 EN 60738-1-1:2008 IEC 60738-1:2006 IEC 60738-1-1:2008	TUV R 50119118
IGBT Driver Power transformer(T5)	HUIZHOU BAOHUI ELECTRONICS TECHNOLOGY CO.,LTD	115-20-004A	Max. 130°C	--	--
Digital Isolators (U19)	Texas Instruments Deutschland GmbH	ISO7721DWVR	External Cr. And Cl. ≧ 8.0mm, AC 8000V, reinforced Insulation 125°C	DIN VDE V 0884-11:2017	VDE
LCD_RS485 Gas tube (GAS2,GAS3)	SHENZHEN BENCENT ELECTRONIC CO LTD	B3D090L-C	90V/5kA, 90°C	UL1449	UL

10.6.3	TABLE: Clearance and creepage distance measurements					P
clearance cl and creepage distance dcr at / of:	Up (V)	U r.m.s. (V)	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)
PV circuit and earthed enclosure(BI)	--	1100Vdc	3.1	11.2	3.1	11.2
AC circuit and earthed enclosure(BI)	--	1100Vdc	3.1	11.2	3.1	11.2
Main power board: AC circuit go through Y capacitor C134, C151 to earth on PCB (BI)	--	1100Vdc	3.1	7.3	3.1	7.3
Main power board: AC circuit go through optocoupler U11 to earth on PCB (BI)	--	1100Vdc	3.1	7.3	3.1	7.3
AC output circuit L and N on PCB (BI)	--	1100Vdc	4.0	5.5	4.0	5.5
Main power board: PV circuit go through Y capacitor CY21, CY1, CY16, CY3 to earth on PCB (BI)	--	1100Vdc	4.0	7.4	5.6	7.4
Power board: PV circuit go through isolation transformer TX3 to communication ports (RI)	--	1100Vdc	6.5	10.1	6.5	10.1
Main power board: PV circuit go through Y capacitor CY14, CY15 to communication ports (RI)	--	1100Vdc	6.5	16.0	6.5	16.0
Power board: PV circuit go through optocoupler U20, U21, U18, U22, U10, U9 to communication ports (RI)	--	100Vdc	6.5	8.3	6.5	8.3
Live parts IGBT and earthed screws (BI)	--	1100Vdc	4.0	7.0	5.6	7.0
Main power board: Relay (RL3, RL4, RL5, RL6) two polarity on PCB board(BI)	--	230Vac	4.0	7.2	4.0	7.2
Transformer(T1) primary parts to secondary part	--	1100Vdc	6.5	9.0	6.5	9.0
Transformer(T1) Iron-core to secondary part	--	1100Vdc	6.5	11.8	6.5	11.8
Note(s): *, BI=basic insulation, RI=reinforced insulation. When determine the clearance: Consider the maximum working altitude of the machine is 2000m.						

10.6.4.2/ 10.6.4.3	TABLE: Impulse voltage test/Dielectric Strength	P

test voltage applied between:	test voltage (Vdc)	impulse withstand voltage (V)	partial discharge extinction voltage (V)	result
DC input terminal to earthed enclosure	2797	4000	--	P
DC input terminal to communication port	5494	6000	--	P
AC output terminal to earthed enclosure	2120	4000	--	P
AC output terminal to communication port	4240	6000	--	P
Insulation sheet	2797	4000	--	P
Two layers of insulation tape	5494	6000	--	P
Relay pin 3 to pin 4	2797	4000	--	P
DC input terminal to earthed enclosure	2797	4000	--	P
Supplementary information:				

10.6.4.4	TABLE: insulation resistance measurements	P

Insulation resistance R between:	R (MΩ)	Required R (MΩ)
Between mains poles (primary fuse disconnected)	>100	10
Between parts separated by basic or supplementary insulation	>100	10
Between parts separated by double or reinforced insulation	>100	10
Supplementary information:		

10.6.4.5	TABLE: resistance of bonding conductors and their terminations	P

Accessible conductive part	Test current (A) 20x1’	Voltage drop (V)	Calculated Resistance (Ω)
PE to Enclosure	20	1.4	0.07
Supplementary information:			

List of test equipment used:

No	Test Equipment	Equipment model	Equipment No.	Calibration due date
1	Simulation of ac power supply	WPLA-330200KVA	BZ-DGD-L204	2021/07/12
2	Solar IV simulator	WPLA-150KW	BZ-DGD-L013	2021/11/14
3	Programmable ac load	ACLT-38160H	BZ-DGD-L003	--
4	Power analyser	PW6001-16	BZ-DGD-L025	2021/3/25
5	Oscilloscope	MSO4054B	BZ-DGD-L028	2021/3/24
6	Heating Recorder	LR8400-21	BZ-DGD-L032	2021/8/27
7	Hi-Pot & IR tester	Chroma 19032	BZ-DGD-L066	2021/4/25
8	Noise meter	TES-1357	BZ-DGD-L029	2021/3/09
9	Digital Caliper	LS160	BZ-DGD-L048	2021/3/09
10	Testing Finger B	AUTO-B	BZ-DGD-L011	2020/11/1
11	DC Electronic Load	IT8511+	BZ-DGD -L027	2020/10/31
12	Pull and push	2P-1000	BZ-DGB-L080	2021/8/27
13	Electronic Scale	TCS-300	BZ-DGB-L020	2021/3/09
14	Thermostat	16m³	BZ-DGD-L015	2021/3/09
15	Surge generator	HCWG 70	BZ-DGE-L036	2021/5/05
16	Electromagnetic vibration table	ES-20-321	BZ-DGB-L026-1	2021/9/08
17	Impact table	SY11-50	BZ-DGB-L069	2021/3/03

- End of Test Report -