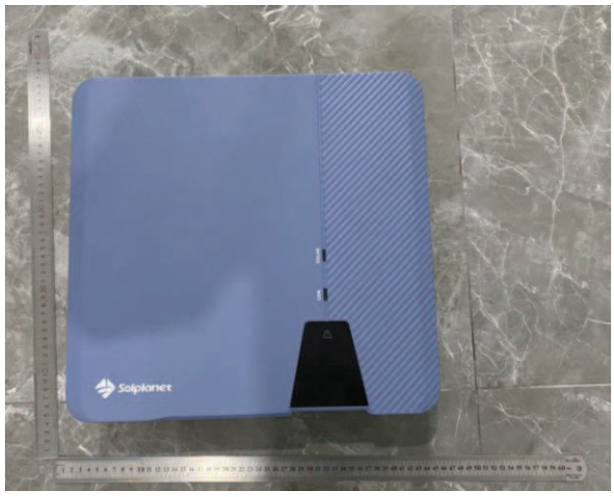
Prüfbericht-Nr.: *Test Report No.*:	**50297428 002**	**Auftrags-Nr.:** *Order No.*:	**244262830**	Seite 1 von 23 *Page 1 of 23*
Kunden-Referenz-Nr.: *Client Reference No.*:	2104110	**Auftragsdatum:** *Order date*:	28.08.2020	
Auftraggeber: *Client*:	AISWEI New Energy Technology (Jiangsu) Co., Ltd. No.198, Xiangyang Road, Suzhou 215011, P. R. China			
Prüfgegenstand: *Test item*:	Grid-Connected PV Inverter			
Bezeichnung / Typ-Nr.: *Identification / Type No.*:	ASW5000-S, ASW4000-S, ASW3680-S, ASW3000-S			
Auftrags-Inhalt: *Order content*:	TUV Bauart approval			
Prüfgrundlage: *Test specification*:	EN 62109-1: 2010 IEC 62109-1: 2010, EN 62109-2: 2011, IEC 62109-2: 2011			

Wareneingangsdatum: *Date of receipt*:	16.09.2020
Prüfmuster-Nr.: *Test sample No.*:	Engineering sample
Prüfzeitraum: *Testing period*:	24.09.2020 - 25.09.2020
Ort der Prüfung: *Place of testing*:	AISWEI New Energy Technology (Jiangsu) Co., Ltd.
Prüflaboratorium: *Testing laboratory*:	TÜV Rheinland (Shanghai) Co.,Ltd.
Prüfergebnis*: *Test result**:	Pass



geprüft von / *tested by*:			**kontrolliert von** / *reviewed by*:		
27.11.2020	John Dai / PE	John Dai	27.11.2020	Yin Yue / TC	
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

Sonstiges / *Other*:

Differences: — Changed the shape and position of the LCD and the color of the front cover plate, but the structure was same as the originals.

— Update the CDF, replaced some of the original device manufacturers, including inverter inductor, Boost inductor, DC common mode inductor, AC common mode inductor, DC sensor, AC sensor, and AC side X capacitor, see Appendix No. 1.1.

Zustand des Prüfgegenstandes bei Anlieferung: *Condition of the test item at delivery*:	Prüfmuster vollständig und unbeschädigt *Test item complete and undamaged*

* Legende:	1 = sehr gut P(ass) = entspricht o.g.	2 = gut Prüfgrundlage(n)	3 = befriedigend F(ail) = entspricht nicht o.g.	4 = ausreichend N/A = nicht anwendbar	5 = mangelhaft N/T = nicht getestet
Legend:	*1 = very good* *P(ass) = passed a.m. test specification(s)*	*2 = good*	*3 = satisfactory* *F(ail) = failed a.m. test specification(s)*	*4 = sufficient* *N/A = not applicable*	*5 = poor* *N/T = not tested*

Test Report issued under the responsibility of:

TÜVRheinland®

www.tuv.com

TEST REPORT
IEC 62109-1
Safety of power converters for use in photovoltaic power systems – Part1: General requirements

Report Reference No. ..... :	50297428 002
Tested by (name + signature) ..... :	See cover page
Witnessed by (name + signature).... :	N/A
Supervised by (name + signature)... :	N/A
Approved by (name + signature) ..... :	See cover page
Date of issue..... :	See cover page
Testing Laboratory..... :	**TÜV Rheinland (Shanghai) Co., Ltd.**
Address ..... :	B1-13F, No. 177, Lane 777, West Guangzhong Road, Jingan District, Shanghai 200072, P. R. China
Testing location/ procedure..... :	CBTL☐ TMP☐ WMT☐ SMT☐ RMT☐ CCATL☒
Testing location/ address ..... :	See cover page.
Applicant's name ..... :	**AISWEI New Energy Technology (Jiangsu) Co., Ltd.**
Address ..... :	No.198, Xiangyang Road, Suzhou 215011, P. R. China
Test specification:	
Standard..... :	IEC 62109-1: 2010, EN 62109-1: 2010
Test procedure ..... :	TUV Bauart approval
Non-standard test method……..:	N/A
Test Report Form No. ..... :	MS-0024886-appendix 1 V.0
Test Report Form(s) Originator ..... :	VDE Testing and Certification Institute
Master TRF ..... :	Dated 2011-03

Test item description..... :	Grid-connected PV Inverter
Trade Mark..... :	Solplanet
Manufacturer ..... :	Same as the applicant
Model/Type reference ..... :	ASW5000-S, ASW4000-S, ASW3680-S, ASW3000-S
Ratings..... :	See marking label and model list

Testing procedure and testing location:	
☐ **CB Testing Laboratory:**	
Testing location/ address ..... :	
☐ **Associated CB Test Laboratory:**	
Testing location/ address ..... :	
Tested by (name + signature)..... :	See cover page
Approved by (+ signature) ..... :	See cover page
☐ Testing procedure: TMP	
Tested by (name + signature)..... :	
Approved by (+ signature) ..... :	
Testing location/ address ..... :	
☐ Testing procedure: WMT	
Tested by (name + signature)..... :	
Witnessed by (+ signature)..... :	
Approved by (+ signature) ..... :	
Testing location/ address ..... :	
☐ Testing procedure: SMT	
Tested by (name + signature)..... :	
Approved by (+ signature) ..... :	
Supervised by (+ signature)..... :	
Testing location/ address ..... :	
☐ Testing procedure: RMT	
Tested by (name + signature)..... :	
Approved by (+ signature) ..... :	
Supervised by (+ signature)..... :	
Testing location/ address ..... :	

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

None.

Summary of testing

Tests performed (name of test and test clause):

None.

Testing location:

The laboratory described on cover page.

Summary of compliance with National Differences

List of countries addressed: None.

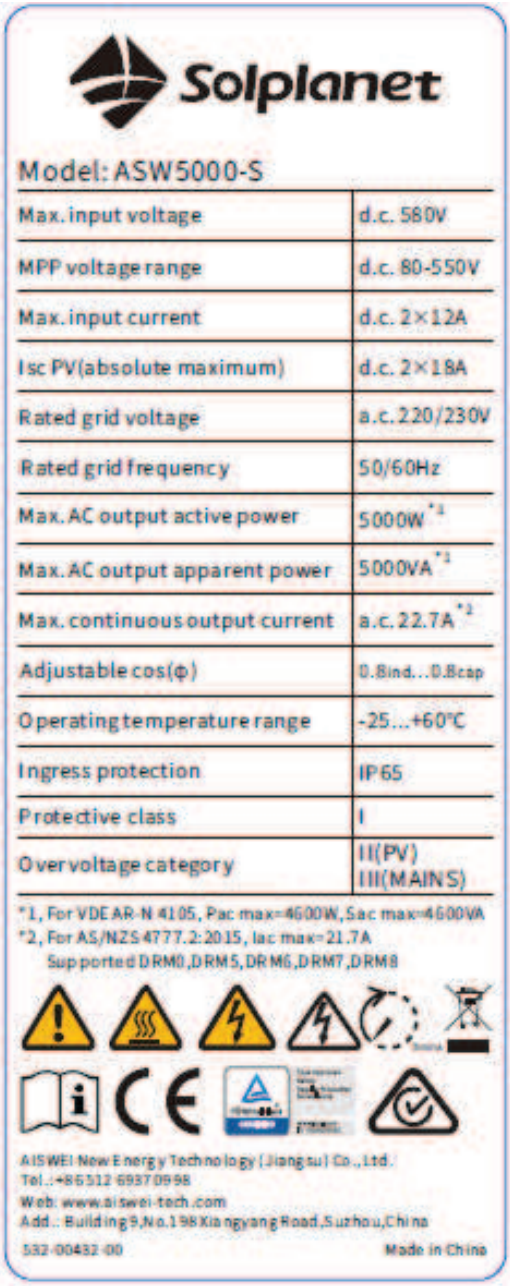
☒ The product fulfils the requirements of
IEC/EN 62109-1: 2010 and IEC/EN 62109-2: 2011

History of amendments and modifications:

Test Report No.	Date dd.mm.yyyy	Remark(s)
50297428 001	20.11.2019	Original report of IEC 62109-1/EN 62109-1/IEC 62109-2/ EN 62109-2

Copy of marking plate:

"The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCB' s that own these marks"



Solplanet

Model: ASW5000-S

Max. input voltage	d.c. 580V
MPP voltage range	d.c. 80-550V
Max. input current	d.c. 2×12A
Isc PV(absolute maximum)	d.c. 2×18A
Rated grid voltage	a.c. 220/230V
Rated grid frequency	50/60Hz
Max. AC output active power	5000W *1
Max. AC output apparent power	5000VA *1
Max. continuous output current	a.c. 22.7A *1
Adjustable cos(φ)	0.8ind...0.8cap
Operating temperature range	-25...+60°C
Ingress protection	IP65
Protective class	I
Overvoltage category	II(PV) III(MAINS)

*1, For VDE AR-N 4105, Pac max=4600W, Sac max=4600VA
*2, For AS/NZS 4777.2:2015, Iac max=21.7A
Supported DRM0,DRM5,DRM6,DRM7,DRM8

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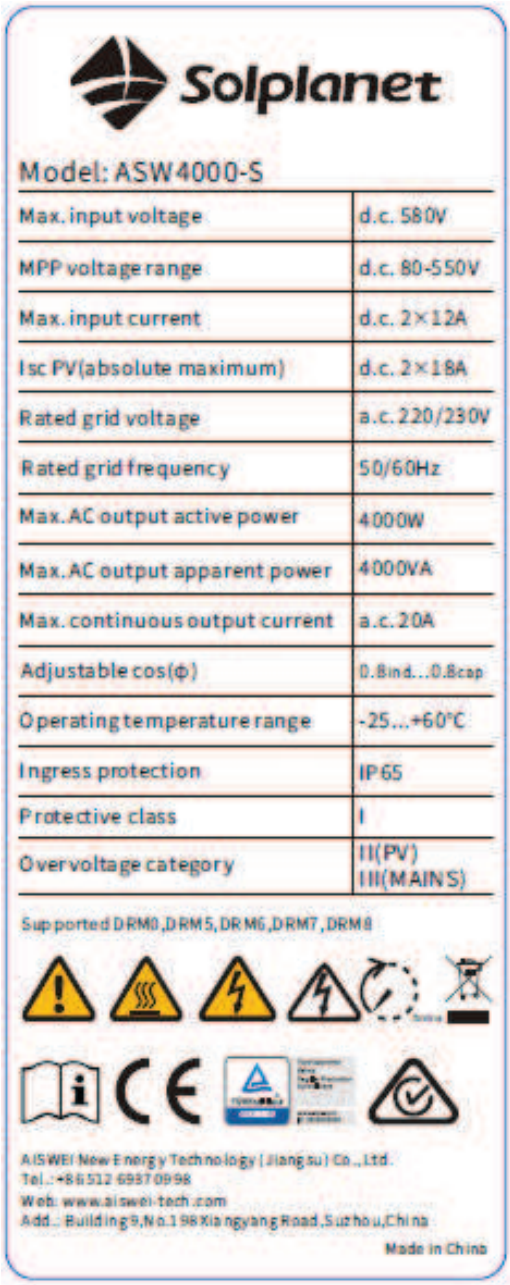
532-00432-00 Made in China



Solplanet

Model: ASW4000-S

Max. input voltage	d.c. 580V
MPP voltage range	d.c. 80-550V
Max. input current	d.c. 2×12A
Isc PV(absolute maximum)	d.c. 2×18A
Rated grid voltage	a.c. 220/230V
Rated grid frequency	50/60Hz
Max. AC output active power	4000W
Max. AC output apparent power	4000VA
Max. continuous output current	a.c. 20A
Adjustable cos(φ)	0.8ind...0.8cap
Operating temperature range	-25...+60°C
Ingress protection	IP65
Protective class	I
Overvoltage category	II(PV) III(MAINS)

Supported DRM0,DRM5,DRM6,DRM7,DRM8

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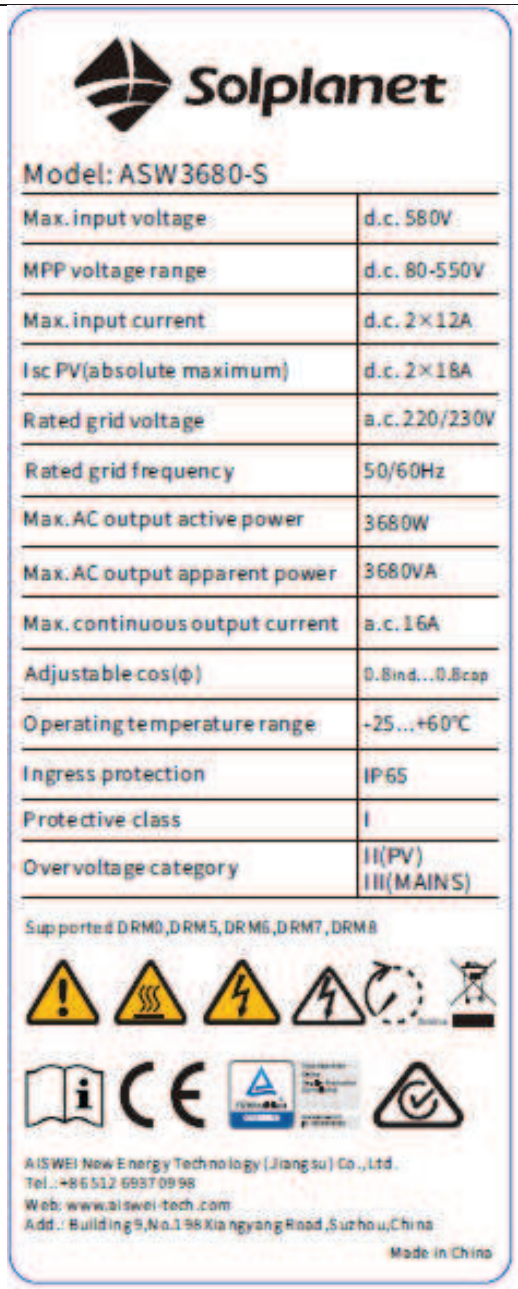

Solplanet

Model: ASW3680-S

Max. input voltage	d.c. 580V
MPP voltage range	d.c. 80-550V
Max. input current	d.c. 2×12A
Isc PV(absolute maximum)	d.c. 2×18A
Rated grid voltage	a.c. 220/230V
Rated grid frequency	50/60Hz
Max. AC output active power	3680W
Max. AC output apparent power	3680VA
Max. continuous output current	a.c. 16A
Adjustable cos(ϕ)	0.8ind...0.8cap
Operating temperature range	-25...+60℃
Ingress protection	IP65
Protective class	I
Overvoltage category	II(PV) III(MAINS)

Supported DRM0,DRM5,DRM6,DRM7,DRM8

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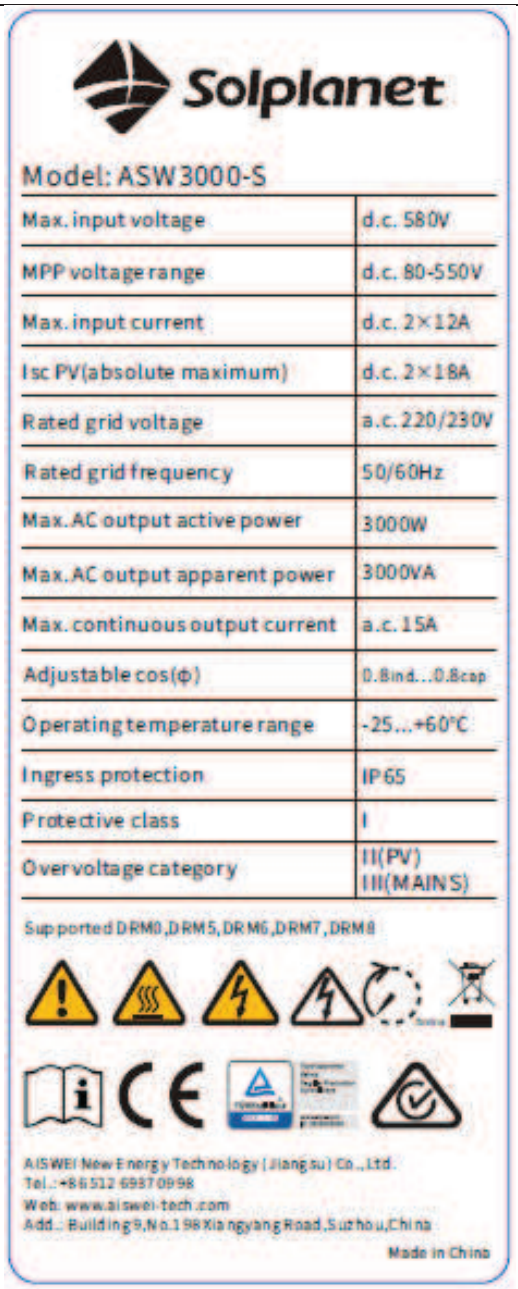

Solplanet

Model: ASW3000-S

Max. input voltage	d.c. 580V
MPP voltage range	d.c. 80-550V
Max. input current	d.c. 2×12A
Isc PV(absolute maximum)	d.c. 2×18A
Rated grid voltage	a.c. 220/230V
Rated grid frequency	50/60Hz
Max. AC output active power	3000W
Max. AC output apparent power	3000VA
Max. continuous output current	a.c. 15A
Adjustable cos(ϕ)	0.8ind...0.8cap
Operating temperature range	-25...+60℃
Ingress protection	IP65
Protective class	I
Overvoltage category	II(PV) III(MAINS)

Supported DRM0,DRM5,DRM6,DRM7,DRM8

AISWEI New Energy Technology (Jiangsu) Co.,Ltd.
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Test item particular ..... :	
Equipment mobility..... :	☐ movable ☐ hand-held ☐ transportable ☒ fixed ☐ stationary ☐ for building-in
Connection to the mains..... :	☐ pluggable equipment ☐ direct plug-in ☒ permanent connection ☐ for building-in
Enviromental category ..... :	☒ outdoor ☐ indoor conditional ☐ indoor unconditional
Operating condition..... :	☒ continuous ☐ short-time ☐ intermittent
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, see model list on the following pages for details.
Tested for IT power systems ..... :	☐ Yes ☒ No
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 on the following pages.
Pollution degree ..... :	☐ PD1 ☒ PD2 (Inside) ☒ PD3 (Outside)
IP protection class ..... :	IP65
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object was not evaluated for the requirement.....:	N/E
- test object does meet the requirement.....:	Pass (P)
- test object does not meet the requirement .....:	Fail (F)
Testing:	
Date of receipt of test items.....:	See cover page
Date(s) of performance of tests .....:	See cover page

General remarks:

"(see Attachment #)" 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 6.2.5 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): **No.588, Gangxing Road, Yangzhong, Jiangsu,212214 P. R. China**

General product information:

Description of changes:

— Changed the shape and position of the LCD and the color of the front cover plate, but the structure was same as the originals.

— Update the CDF, replaced some of the original device manufacturers, including inverter inductor, Boost inductor, DC common mode inductor, AC common mode inductor, DC sensor, AC sensor, and AC side X capacitor, the specific changes as below:

Changes					
Item	Object	Before change		After change	
		manufacturer	Type/ Specifications	manufacturer	Type/ Specifications
1	inverter inductor	CATECH	CATECH/CA01-11682	FLUX	FL02-0460012/13
2	Boost inductor	CATECH	CATECH/CA01-11683	FLUX	FL02-0460010/11
3	DC common mode inductor	CATECH	CA01-11711	FLUX	FL02-0460014
4	AC common mode inductor	CATECH	CA01-11712	FLUX	FL02-0460016
5	DC sensor	LEM	GO-10	Senko Micro	SC810
6	AC sensor	LEM	LESR-25	LEM	CASR-25

7	AC side X capacitor	FALA	C4BQ2105M9VC350	FENGMING ELECTRONIC TECH. CO., LTD.	MKP-X2

For the above described change(s) the following was considered to be necessary:

No test items need to be tested.

Model list:

Model or Type designation		ASW5000-S	ASW4000-S	ASW3680-S	ASW3000-S
PV input	V_{MAX} PV [Vd.c.]	580			
	I_{SC} PV [Ad.c.]	2 x 18			
	MPP Voltage Range [Vd.c.]	80 – 550			
	MPP Full Power Voltage Range [Vd.c.]	220 - 500	180 - 500	165 - 500	140 - 500
	Max. Input Current [Ad.c.]	2 x 12			
	MPPT tracking	2			
	Back-feed Current [A]	0			
	Overvoltage Category (OVC)	II			
AC output	Rated Output Voltage [Va.c.]	220 / 230			
	Rated Output Frequency [Hz]	50 / 60			
	Rated Output Power [W]	5000	4000	3680	3000
	Max. Output Apparent Power [VA]	5000	4000	3680	3000
	Max. Output Current [Aa.c.]	22.7 (21.7)	20.0	16.0	15.0
	Power Factor cosφ [λ]	1 (default), 0.8 leading to 0.8 lagging			
	Overvoltage Category (OVC)	III			
System	Type of inverter	Non-isolated			
	Protective Class	Class I			
	Enclosure Protection (IP)	IP65			
	Operating Temperature Range [°C]	-25 to 60 (> 40 derating)			
	Pollution degree (PD)	PD2 (inside), PD 3 (outside)			
	Weight [kg]	12			
	Size (W x H x D) [mm]	376 x 355 x 145			
Note(s): the value with "()" is for the setting of models to Australia and New Zealand markets.					

IEC/EN 62109-1: 2010			
Clause	Requirement – Test	Result - Remark	Verdict
5	Marking and documentation		P
5.1	Marking		P
5.1.1	General		P
5.1.2	Durability of markings	The labels were subjected to the permanence of marking test. The labels were rubbed with the cloth soaked with petroleum spirit for 30 s. After this test there was no damage to the labels. The marking on the labels did not fade. There was no curling or lifting of the label's edges.	P
5.1.3	Identification	See below.	P
	a) the name or trade mark of the manufacturer or supplier	Trade mark is provided on the front enclosure.	P
	b) a model number, name or other means to identify the equipment	The model name is provided on the label.	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.	The serial number is provided on the equipment body.	P
5.1.4	Equipment ratings	See below	P
	- input voltage, type of voltage (a.c. or d.c.), frequency, and max. continuous current for each input	See model list.	P
	- output voltage, type of voltage (a.c. or d.c.), frequency, max. continuous current, and for a.c. outputs, either the power or power factor	See model list.	P
	- Protective class (I, II, or III)	See model list.	P
	- Overvoltage Category	See model list.	P
	- the environmental information required in section 6	See model list and section 6.	P
5.1.5	Fuse identification	No such devices	N/A
5.1.6	Terminals, Connections, and Controls	Relevant symbol, indicator or information are available.	P
5.1.6.1	Protective Conductor Terminals	Symbol 7 of Table C.1 is used.	P
5.1.7	Switches and circuit-breakers	The letter “ON” and “OFF” is clearly marked.	P

IEC/EN 62109-1: 2010			
Clause	Requirement – Test	Result - Remark	Verdict
5.1.8	Class II Equipment	Class I Equipment.	N/A
5.1.9	Terminal boxes for External Connections	The temperature observed on the terminals were not exceed the limited values specified.	N/A
5.2	Warning markings	See below.	P
5.2.1	Visibility and legibility requirements for warning markings	Warning markings are be visible and legible.	P
	- Printed symbols shall be at least 2,75 mm high		P
	- Printed text characters shall be at least 1,5 mm high and shall contrast in colour with the background		P
	- Symbols or text that are moulded, stamped or engraved in a material shall have a character height of at least 2,0 mm, and if not contrasting in colour from the background, shall have a depth or raised height of at least 0,5 mm	No such symbols.	N/A
5.2.2	Content for warning markings		P
5.2.2.1	Ungrounded heatsinks and similar parts	All accessible metal parts were grounded.	N/A
5.2.2.2	Hot Surfaces	Marked with symbol 14 of Table C.1.	P
5.2.2.3	Coolant	Not used.	N/A
	a) a statement that coolant system servicing is to be done only by SERVICE PERSONNEL		N/A
	b) instructions for safe venting, draining or otherwise working on the cooling system		N/A
5.2.2.4	Stored energy	Marked with Symbol 21 of Table C.1 and the time to discharge capacitors to safe voltage and energy levels accompany the symbol.	P
5.2.2.5	Motor guarding	No such devices which can conducted injury to service personal.	N/A
5.2.3	Sonic hazard markings and instructions	No such hazard.	N/A
	a) be marked to warn the OPERATOR of the sonic pressure hazard		N/A
	b) be provided with installation instructions that specify how the installer can ensure that the sound pressure level from equipment		N/A
5.2.4	Equipment with multiple sources of supply		P

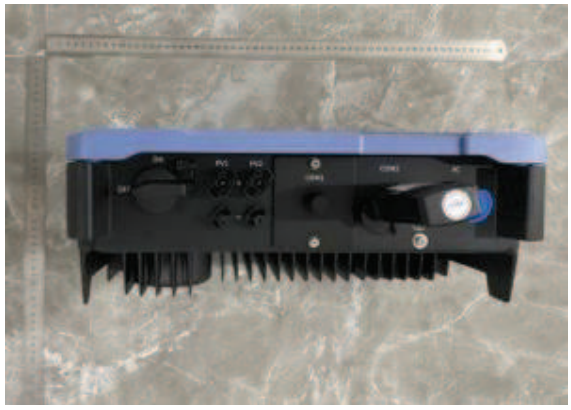
IEC/EN 62109-1: 2010			
Clause	Requirement – Test	Result - Remark	Verdict
5.2.5	Excessive touch current	No touch current exceed 3.5mAac. or 10mAdc. Under any operation conditions	N/A
5.3	Documentation	See below.	P
5.3.1	General	All related informations provided in the user's maunal.	P
	a) explanations of equipment markings, including symbols used		P
	b) location and function of terminals and controls		P
	c) all ratings or specifications that are necessary to safely install and operate the PCE		P
	- ENVIRONMENTAL CATEGORY as per 6.1		P
	- WET LOCATIONS classification as per 6.1		P
	- POLLUTION DEGREE classification for the intended external environment as per 6.2		P
	- INGRESS PROTECTION rating as per 6.3		P
	- Ambient temperature and relative humidity ratings		P
	- OVERVOLTAGE CATEGORY assigned to each input and output port as per 7.3.7.1.2		P
	d) a warning that when the photovoltaic array is exposed to light, it supplies a d.c. voltage to the PCE		P
5.3.1.1	Language	Instructions related to safety is in English.	P
5.3.1.2	Format	The printed form is available and is delivered with the PCE.	P
5.3.2	Information related to installation	All below related informations provided in the user's maunal.	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) ventilation requirements		P

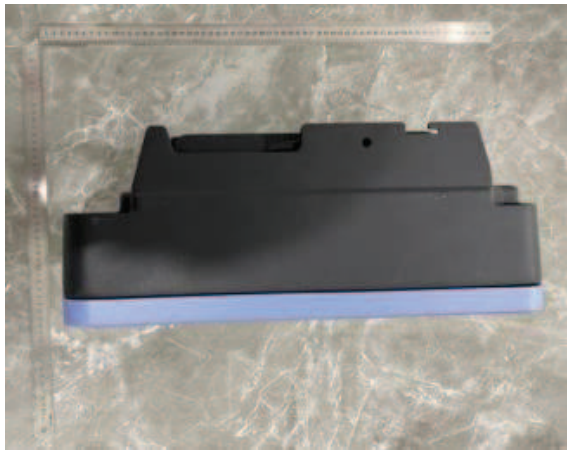
IEC/EN 62109-1: 2010			
Clause	Requirement – Test	Result - Remark	Verdict
	e) requirements for special services, for example cooling liquid		N/A
	f) instructions and information relating to sound pressure level if required by 10.2.1	No sound pressure hazard.	N/A
	g) where required by 14.8.1.3, instructions for the adequate ventilation of the room or location in which PCE containing vented or valve-regulated batteries is located, prevent the accumulation of hazardous gases	No battery used in the PCE.	N/A
	h) tightening torque to be applied to wiring terminals		P
	i) 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	No backfeed current available	N/A
	j) for each input to the PCE, the max value of short-circuit current available from the source, for which the PCE is designed		P
	k) compatibility with RCD and RCM		P
	l) instructions for protective earthing, including the information required by 7.3.6.3.6 applicable		P
5.3.3	Information related to operation	All below related informations provided in the user's maunal.	P
	- instructions for adjustment of controls including the effects of adjustment		P
	- instructions for interconnection to accessories and other equipment, including indication of suitable accessories, detachable parts and any special materials		P
	- 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		P
	- instructions that if the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired		P
5.3.4	Information related to maintenance	All below related informations provided in the service maunal.	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)		P

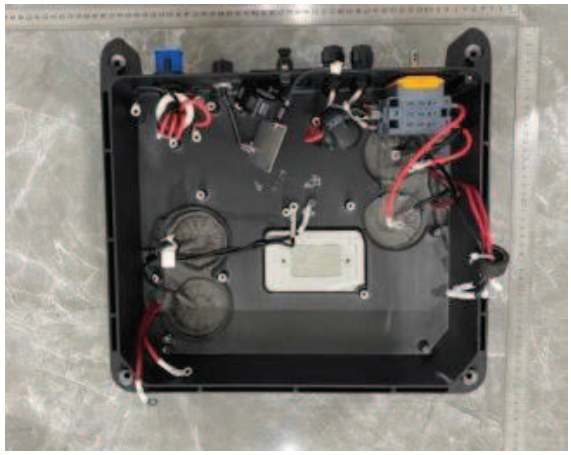
IEC/EN 62109-1: 2010			
Clause	Requirement – Test	Result - Remark	Verdict
	- instructions for accessing OPERATOR ACCESS AREAS , if any are present, including a warning not to enter other areas of the equipment		P
	- part numbers and instructions for obtaining any required operator replaceable parts	No any operator replaceable part.	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		P
	- where required by 7.3.9.2, information regarding the location(s) and safe discharge times for capacitor(s).		P
5.3.4.1	Battery maintenance	The PCE is Grid-connected inverter without battery energy storage function.	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
	- CAUTION: Do not dispose of batteries in a fire. The batteries may explode		N/A
	- CAUTION: Do not open or mutilate 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.		N/A
	The following precautions should be observed when working on batteries: 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

IEC/EN 62109-1: 2010			
Clause	Requirement – Test	Result - Remark	Verdict
	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

Photo:







- End of test report -