

**TEST REPORT****Standard Engineering Recommendation G99,
Issue 1 – Amendment 9, 03 October 2022****TUV SUD Test report for Requirements for the connection of generation equipment in
parallel with public distribution networks on or after 27 April 2019**

Report reference No. :	704092386602-00
Date of issue :	2023-11-30
Project handler..... :	Xin Xu, Xiaolong Zhou
Testing Laboratory..... :	TÜV SÜD New Energy Vehicle Testing (Jiangsu) Co., Ltd.
Address..... :	Building A, No.15 Factory, Jintong International Industrial Park, No.8 Xihu Road, Wujin National Hi-tech Industrial Development Zone, Changzhou City, Jiangsu Province, P.R. China
Testing location :	Refer to test report No.: 704092228619-01
Client..... :	Ruihe(Chongqing) New Energy Technology Co., Ltd.
Client number..... :	123231
Address :	Building 7, No.6 Jinchuan Road, Shibao Town, Hi-Tech Zone, 401329 Chongqing, PEOPLE'S REPUBLIC OF CHINA
Contact person..... :	William
Standard :	This TÜV SÜD test report form is based on the following requirements: G99/1-9:2022
TRF number and revision :	TRF G99/1-9:2022 rev.0
TRF originated by..... :	TUV SUD Certification and Testing (China) Co., Ltd. Shanghai Branch Mr. Kai Zhao
Copyright blank test report..... :	This test report is based on the content of the standard (see above). The test report considered selected clauses of the a.m. standard(s) and experience gained with product testing. It was prepared by TUV SUD Product Service GmbH. TUV SUD Group takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.
General disclaimer:	This test report may only be quoted in full. Any use for advertising purposes must be granted in writing. This report is the result of a single examination of the object in question and is not generally applicable evaluation of the quality of other products in regular production.
Scheme:	<input type="checkbox"/> TUV Mark <input type="checkbox"/> without certification <input type="checkbox"/> AoC/CoC for EU-Directive / EU-Regulation: <input type="checkbox"/> GS Mark <input type="checkbox"/> NRTL Mark <input checked="" type="checkbox"/> other:Compliance Document
Non-standard test method:	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes, see details under <i>Summary of testing</i>
National deviations:	N/A
Number of pages (Report) :	8
Number of pages (Attachments) :	See page 6



Product Service

Compiled by : *Xin Xu, Xiaolong Zhou*

(+ signature)

(Printed Name and Signature)

Approved by: *Shan Huang*

(+ signature)

(Printed Name and Signature)



Test sample.....:	Engineering prototype	
Type of test object.....:	Grid-connected Hybrid Inverter	
Trademark.....:		
Model and/or type reference.....:	RV4000H-S2, RV5000H-S2, RV6000H-S2	
Rating(s).....:	See rating labels	
Manufacturer.....:	Ruihe(Chongqing) New Energy Technology Co., Ltd.	
Manufacturer number.....:	123231	
Address.....:	Building 7, No.6 Jinchuan Road, Shibao Town, Hi-Tech Zone, 401329 Chongqing, PEOPLE'S REPUBLIC OF CHINA	
Name and address of factory(ies)		
AISWEI New Energy Technology(Yangzhong) Co., Ltd. No.588 Gangxing Road, Economic Development Zone, 212200 Yangzhong City, Jiangsu Province, PEOPLE'S REPUBLIC OF CHINA Note: Type verification of conformity, no FI required.		
Sub-contractors/ tests (clause):	N/A	
Name:	N/A	
Order description...:	<input type="checkbox"/>	Complete test according to TRF
	<input type="checkbox"/>	Partial test according to manufacturer's specifications
	<input type="checkbox"/>	Preliminary test
	<input type="checkbox"/>	Spot check
	<input checked="" type="checkbox"/>	Others: evaluation based on application
Date of order:	2023-09-25	
Date of receipt of test item:	2023-10-11	
Date(s) of performance of test:	2023-10-18 (evaluation based on application)	
Test item particulars:		
All the tests results confirmed to the requirements of the standard.		
Purpose of the product		
These devices are transformer-less grid-connected PV inverters which convert direct current optimized by photovoltaic DC conditioner to alternating current, and they are intended to be connected in parallel with the public LV grid. Options to have adjustable setpoints or other custom features may be required by the interconnecting utility, depending on the impact of the PV system on the portion of the utility system to which it is interconnected. They are intended for professional incorporation into PV system, and they are assessed on a component test basis. Main DPS:V610-02003-00 Slave DPS: V610-60009-00 Firmware version (settings for grid protection and power control): V610-10008-02		



Model differences:

RV6000H-S2: basic model.

RV4000H-S2, RV5000H-S2: same as basic model, except for limit the output power and current by software.

Based on manufacturer declaration for their products application.

<input checked="" type="checkbox"/> Type A	<input type="checkbox"/> Type B	<input type="checkbox"/> Type C	<input type="checkbox"/> Type D
A Power Generating Module with a Connection Point below 110 kV and a Registered Capacity of 0.8 kW or greater but less than 1 MW.	A Power Generating Module with a Connection Point below 110 kV and Registered Capacity of 1 MW or greater but less than 10 MW.	A Power Generating Module with a Connection Point below 110 kV and a Registered Capacity of 10 MW or greater but less than 50 MW.	A Power Generating Module with a Connection Point at or greater than 110 kV, and/or with a Registered Capacity of 50 MW or greater.

Protection settings (Manufacturer default settings)

Protection Function	Type A Power Generating Modules	
	Trip setting	Time Delay Setting
U/V	$V_{\phi-N} - 20\%$	2.5s
O/V st 1	$V_{\phi-N} + 14\%$	1.0s
O/V st 2	$V_{\phi-N} + 19\%$	0.5s
U/F st 1	47.5 Hz	20s
U/F st 2	47 Hz	0.5s
OF	52 Hz	0.5s
Loss of Mains (RoCoF)	1 Hzs ⁻¹ time delay 0.5 s	

Tolerances on trip values:

- voltage: $\pm 1.5\%$;
- frequency: $\pm 0.2\%$;

Unauthorised access to factory safety parameters setting and software should be prohibited.
A reset to the factory safety parameters requires retesting and verification in conjunction with the end-use system.

Protection integrated in inverter can not be used as an alternative central interface protection device at connection point.



Product Service

Characteristic data			
Model	RV4000H-S2	RV5000H-S2	RV6000H-S2
PV input parameters:			
Max. input voltage	d.c. 550 V		
Max. input current	d.c. 2*16 A		
Isc PV (absolute maximum)	d.c. 2*20 A		
MPPT Voltage range	d.c. 40-530 V		
Battery input parameters:			
Battery type	Li-ion		
Rated battery voltage	d.c. 48 V		
Battery voltage range	d.c. 40-60 V		
Max. charge/discharge current	d.c. 100 /100 A		
Grid output parameters:			
Rated grid output active power	4000 W	5000 W	6000 W
Rated grid output apparent Power	4000 VA	5000 VA	6000 VA
Max. grid output apparent Power	4000 VA	5000 VA	6000 VA
Rated output voltage	a.c. 230 V		
Rated output frequency	50 Hz		
Max. output current	a.c. 18.2 A	a.c. 22.7 A	a.c. 27.3 A
Adjustable cos(φ)	0.8ind...0.8cap		

Attachments:

Item	Description	Certificate No.	Issue by	Model	Pages
1	CE-LVD Certificate	AN 50610845 0001	TÜVRh	RV3000H-S2, RV3680H-S2, RV4000H-S2, RV5000H-S2, RV6000H-S2	2
2	EMC Test report	ACWE-E2310015	Audix Technology (Wujiang)Co., Ltd.	RV3000H-S2, RV3680H-S2, RV4000H-S2, RV5000H-S2, RV6000H-S2	1

If additional information is necessary, please provide

N/A

Copy of marking plate:

Model: RV4000H-S2

PV input	Max. PV input power	6500Wp
	Max. PV input voltage	d.c. 550V
	MPP voltage range	d.c. 40-530V
	Max. PV input current	d.c. 2X16A
	Isc PV (absolute maximum)	d.c. 2X20A
Battery input	Rated battery voltage	d.c. 48V
	Battery voltage range	d.c. 40-60V
	Max. battery charge / discharge current	d.c. 100/100A
	Battery type	Li-Ion
Grid output	Rated grid voltage	a.c. 230V
	Rated grid frequency	50Hz / 60Hz
	Rated grid output active power	4000W
	Rated grid output apparent power	4000VA
	Max. grid output apparent power	4000VA
	Max. grid output current	a.c. 18.2A
Grid input	Rated grid voltage	a.c. 230V
	Rated grid frequency	50Hz / 60Hz
	Rated grid input apparent power	6000VA
	Max. grid input apparent power	6000VA
	Max. grid input current	a.c. 27.3A
EPS output	Rated output voltage	a.c. 230V
	Rated output frequency	50Hz / 60Hz
	Rated output apparent power	5000VA
	Max. output apparent power	5000VA
	Max. output current	a.c. 21.7A
General information	Adjustable cos(φ)	0.8ind...0.8cap
	Operating temperature range	-25...+60°C
	Inverter topology	Non-Isolated
	Ingress protection	IP66
	Protective class	I
	Overvoltage category	II(PV), III(MAINS)

Supported DRMO

Ruihe (Chongqing) New Energy Technology Co., Ltd.
 Hotline: 0755-22219916
 Web: https://rahvolt.com
 Add.: Building 7, No.6 Jinchuan Road, Shibao Town, Hi-Tech Zone, Chongqing, China

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532-100006-00 Made in China

Model: RV5000H-S2

PV input	Max. PV input power	7600Wp
	Max. PV input voltage	d.c. 550V
	MPP voltage range	d.c. 40-530V
	Max. PV input current	d.c. 2X16A
	Isc PV (absolute maximum)	d.c. 2X20A
Battery input	Rated battery voltage	d.c. 48V
	Battery voltage range	d.c. 40-60V
	Max. battery charge / discharge current	d.c. 100/100A
	Battery type	Li-Ion
Grid output	Rated grid voltage	a.c. 230V
	Rated grid frequency	50Hz / 60Hz
	Rated grid output active power	5000W*
	Rated grid output apparent power	5000VA*
	Max. grid output apparent power	5000VA*
	Max. grid output current	a.c. 22.7A*
Grid input	Rated grid voltage	a.c. 230V
	Rated grid frequency	50Hz / 60Hz
	Rated grid input apparent power	6000VA
	Max. grid input apparent power	6000VA
	Max. grid input current	a.c. 27.3A
EPS output	Rated output voltage	a.c. 230V
	Rated output frequency	50Hz / 60Hz
	Rated output apparent power	5000VA
	Max. output apparent power	5000VA
	Max. output current	a.c. 21.7A
General information	Adjustable cos(φ)	0.8ind...0.8cap
	Operating temperature range	-25...+60°C
	Inverter topology	Non-Isolated
	Ingress protection	IP66
	Protective class	I
	Overvoltage category	II(PV), III(MAINS)

*1 For VDE-AR-N4105, Pn=4600W, Sn=5max=4600VA
 *2 For AS/NZS 4777.2, Iac max=21.7A

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532-100006-00 Made in China

Model: RV6000H-S2

PV input	Max. PV input power	9000Wp
	Max. PV input voltage	d.c. 550V
	MPP voltage range	d.c. 40-530V
	Max. PV input current	d.c. 2X16A
	Isc PV (absolute maximum)	d.c. 2X20A
Battery input	Rated battery voltage	d.c. 48V
	Battery voltage range	d.c. 40-60V
	Max. battery charge / discharge current	d.c. 100/100A
	Battery type	Li-Ion
Grid output	Rated grid voltage	a.c. 230V
	Rated grid frequency	50Hz / 60Hz
	Rated grid output active power	6000W
	Rated grid output apparent power	6000VA
	Max. grid output apparent power	6000VA
	Max. grid output current	a.c. 27.3A
Grid input	Rated grid voltage	a.c. 230V
	Rated grid frequency	50Hz / 60Hz
	Rated grid input apparent power	6000VA
	Max. grid input apparent power	6000VA
	Max. grid input current	a.c. 27.3A
EPS output	Rated output voltage	a.c. 230V
	Rated output frequency	50Hz / 60Hz
	Rated output apparent power	5000VA
	Max. output apparent power	5000VA
	Max. output current	a.c. 21.7A
General information	Adjustable cos(φ)	0.8ind...0.8cap
	Operating temperature range	-25...+60°C
	Inverter topology	Non-Isolated
	Ingress protection	IP66
	Protective class	I
	Overvoltage category	II(PV), III(MAINS)

Supported DRMO

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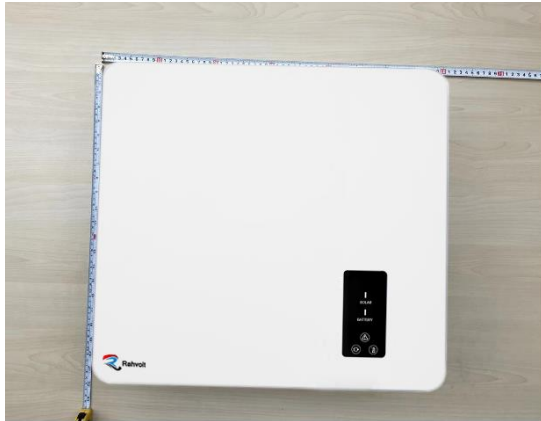
532-100006-00 Made in China

Interface protection has been tested and evaluated on basis of rated grid voltage L/N/PE~, 230 V, 50Hz according to the grid code on page 1; Interface protection settings is limited to authorized installer, password and seal provided to protect these from unpermitted interference. Inverters with multi-voltage and/or frequencies ratings are available in difference versions based on output voltages and frequencies, the ratings on which the testing has been based was identified on paper tag and control panel.

Picture of the product:

Representative model: RV6000H-S2

Front view



Rear view



Bottom view



Inner view





Summary of testing:

The devices covered by this report are same as the products in the test report 704092228619-01, except for minor variations on markings.

Inverter models in this test report	are identical as	Inverter models in test report 704092228619-01
RV4000H-S2		ASW4000H-S2
RV5000H-S2		ASW5000H-S2
RV6000H-S2		ASW6000H-S2

Additional tests need not be carried out, as same products had been type tested refer to test report 704092228619-01.

The test results with report 704092228619-01 is adapted and could be used for declaration of confirmation by agreement with original report holder.

Documentation was verified, marking plate, user manual were checked, photo was taken as well.

Additional information on non-standard test method(s)

Sub clause: N/A
Page: N/A
Rational: N/A

Possible test case verdicts:

- test case does not apply to the test object..... : N(A.) / not included in the order
- test object does meet the requirement..... : P(ass)
- test object does not meet the requirement : F(ail)

Possible suffixes to the verdicts:

- suffix for detailed information for the client..... : - C(omment)
- suffix for important information for factory inspection...: - M(anufacturing)

General remarks:

"(see remark #)" refers to a remark appended to the report.
"(see appended table)" refers to a table appended to the report.
Throughout this report **a point** is used as the decimal separator.
The test 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.

----- End of test report -----