Certificate of compliance

Applicant:	**Renac Power Technology Co., Ltd** Building 6, No.2, West Jinzhi Road, High-Tech District, Suzhou City, Jiangsu Province **China**
Product:	**Grid-tied photovoltaic (PV) inverter**
Model:	**R3-4K-DT, R3-5K-DT, R3-6K-DT, R3-8K-DT, R3-10K-DT, R3-12K-DT, R3-15K-DT**

Use in accordance with regulations:

Automatic disconnection device with three-phase mains surveillance in accordance with EN50549-1:2019 for photovoltaic systems with a three-phase parallel coupling via an inverter in the public mains supply. The automatic disconnection device is an integral part of the aforementioned inverter.

Applied rules and standards:

EN 50549-1:2019
Requirements for parallel connection of installations with distribution networks - Part 1: Connection to an LV distribution network - Production of installations up to and including Type B

4.4 Normal operating range
4.5 Immunity to disturbances
4.6 Active response to frequency deviation
4.7 Power response to voltage variations and voltage changes
4.8 EMC and power quality
4.9 Interface protection
4.10 Connection and starting to generate electrical power
4.11 Ceasing and reduction of active power on set point
4.12 Remote information exchange
4.13 Requirements regarding single fault tolerance of interface protection system and interface switch

EN 50438:2013
Requirements for micro-generating plants to be connected in parallel with public low-voltage distribution networks

DIN V VDE V 0126-1-1:2006 (4.1 Functional safety)
Automatic disconnection device between a generator and the public low-voltage grid

At the time of issue of this certificate the safety concept of an aforementioned representative product corresponds to the valid safety specifications for the specified use in accordance with regulations.

Report number:	**ABRE-19JY0914FCSHP-R1**	**Certification Program:**	**NSOP-0032-DEU-ZE-V01**
Certificate number:	**U20-0330**	**Date of issue:**	**2020-05-11**

Certification body

Thomas Lammel

DAkkS Deutsche Akkreditierungsstelle D-ZE-12024-01-00

Certification body Bureau Veritas Consumer Products Services Germany GmbH accreditation to DIN EN ISO/IEC 17065

Appendix

Extract from test report according to EN 50549-1 **Nr. ABRE-19JY0914FCSHP-R1**

Type Approval and declaration of compliance with the requirements of EN 50549-1.				
Manufacturer / applicant:	Renac Power Technology Co., Ltd Building 6, No.2, West Jinzhi Road, High-Tech District, Suzhou City, Jiangsu Province China			
Micro-generator Type	Grid-tied photovoltaic inverter			
	R3-4K-DT	R3-5K-DT	R3-6K-DT	
MPP DC voltage range [V]	160-950	160-950	160-950	
Max Input DC voltage [V]	1000	1000	1000	
Max Input DC current [A]	12,5/12,5	12,5/12,5	12,5/12,5	
Output AC voltage [V]	230, 3/N/PE, 50/60Hz			
Output AC current [A]	6,4 (per phase)	8 (per phase)	9,6 (per phase)	
Output power [VA]	4000	5000	6000	
	R3-8K-DT	R3-10K-DT	R3-12K-DT	R3-15K-DT
MPP DC voltage range [V]	250-950	250-950	250-950	250-950
Max Input DC voltage [V]	1000	1000	1000	1000
Max Input DC current [A]	12,5/12,5	12,5/12,5	12,5/12,5	20/12,5
Output AC voltage [V]	230, 3/N/PE, 50/60Hz			
Output AC current [A]	12,8 (per phase)	16 (per phase)	19,2 (per phase)	24 (per phase)
Output power [VA]	8000	10000	12000	15000
Firmware version	1.00			
Measurement period:	2019-07-09 – 2019-09-20			
Description of the structure of the power generation unit: The power generation unit is equipped with a PV and line-side EMC filter. The power generation unit has no galvanic isolation between DC input and AC output. Output switch-off is performed with single-fault tolerance based on two series-connected relays in each line and neutral. This enables a safe disconnection of the power generation unit from the network in case of error.				

Appendix

Extract from test report according to EN 50549-1 **Nr. ABRE-19JY0914FCSHP-R1**

Setting of the interface protection			
Parameter	**Max. disconnection time**	**Min. operate time**	**Trip value**
Over voltage (stage 1) [a]	3s	-	230V +10% (253V)
Over voltage (stage 2)	0,2s	0,1s	230V +15% (264,5V)
Under voltage	1,5s	1,2s	230V -15% (195,5V)
Over frequency	0,5s	0,3s	50Hz +4% (52Hz)
Under frequency	0,5s	0,3s	50Hz -5% (47,5Hz)
Reconnection settings for voltage (normal operational startup)	$0{,}85V_n$ (195,5V) ≤ V ≤ $1{,}10V_n$ (253V)		
Reconnection settings for frequency (normal operational startup)	49,5Hz ≤ f ≤ 50,1Hz		
Reconnection time (normal operational startup)	≥ 60s		
Reconnection settings for voltage (automatic reconnection after tripping)	$0{,}85V_n$ (195,5V) ≤ V ≤ $1{,}10V_n$ (253V)		
Reconnection settings for frequency (automatic reconnection after tripping)	49,5Hz ≤ f ≤ 50,2Hz		
Reconnection time (automatic reconnection after tripping)	≥ 60s		
Active power gradient after reconnection	10% P_{Emax} / per minute		
Active power delivery at under frequency	electronic inverter, no active power reduction		
Power response to over frequency (frequency / droop s)	50,2Hz / 5%		
Permanent DC-injection	0,5% of rated inverter output current or 20mA		
Rate of change of frequency (ROCOF)	2Hz/s		
Loss of mains according EN 62116 (LoM)	2,0s		

Note:

[a] Over voltage – stage1: 10 min-mean-value corresponding to EN 50160.

Default interface setting according to EN 50438:2013 are used.

The settings of the interface protection are password protected adjustable.

In case the above stated generators are used with an external protection device, the protection settings of the inverters are to be adjusted according to the manufacturer's declaration.

The above stated generators are tested according to the requirements in the EN 50549-1:2019. Any modification that affects the stated tests must be named by the manufacturer/supplier of the product to ensure that the product meets all requirements of the EN 50549-1:2019.