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VERITAS**

Certificate of compliance

Applicant: Delta Electronics, Inc.
39, Sec.2, Huandong Road, Shanhua Dist.,
Tainan City 74144,
Taiwan

Product: Photovoltaic (PV) inverter

Model: RPI M6A
RPI M8A
RPI M10A

Use in accordance with regulations:

Automatic disconnection device with three-phase mains surveillance in accordance with EN 50549-1:2019 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
- 4.13 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: PV200521C41_0

Certificate number: U20-0992

Certification Program: NSOP-0032-DEU-ZE-V01

Date of issue: 2020-12-11

Certification body

Thomas Lammel



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

A partial representation of the certificate requires the written approval of Bureau Veritas Consumer Products Services Germany GmbH



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Annex to the EN 50549-1 certificate of compliance No. U20-0992

Appendix

Extract from test report according to EN 50549-1 Nr. PV200521C41_0

Type Approval and declaration of compliance with the requirements of EN 50549-1.

Manufacturer / applicant:	Delta Electronics, Inc. 39, Sec.2, Huandong Road, Shanhua Dist., Tainan City 74144, Taiwan		
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Micro-generator Type	Photovoltaic inverter		
	RPI M6A	RPI M8A	RPI M10A
MPP DC voltage range [V]	200-1000Vdc, 1000Vdc max.		
Input DC voltage range [V]	315-800Vdc	415-800Vdc	
Input DC current [A]	10A x 2 strings		15A / 10A
Output AC voltage [V]	230/400Vac, 50Hz, 3P3W or 3P4W		
Output AC current [A]	9,7A max.	13A max.	16A max.
Output power [kVA]	6,3kVA	8,4kVA	10,5kVA

Firmware version	DSP: 1.49, 1.50, 1.51, 1.52, 1.53, 1.54, 1.55, 1.56, 1.57, 1.58 RED: 1.15, 1.16, 1.17, 1.18, 1.19, 1.20, 1.21, 1.22, 1.23, 1.24 COMM: 1.32, 1.33, 1.34, 1.35, 1.36, 1.37, 1.38, 1.39, 1.40, 1.41
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Measurement period:	2020-07-20 to 2019-09-11
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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.



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Appendix

Extract from test report according to EN 50549-1

Nr. PV200521C41_0

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)	$0,85V_n (195,5V) \leq V \leq 1,10V_n (253V)$		
Reconnection settings for frequency (normal operational startup)	$49,5Hz \leq f \leq 50,2Hz$		
Reconnection time (normal operational startup)	$\geq 60s$		
Reconnection settings for voltage (automatic reconnection after tripping)	$0,85V_n (195,5V) \leq V \leq 1,10V_n (253V)$		
Reconnection settings for frequency (automatic reconnection after tripping)	$49,5Hz \leq f \leq 50,2Hz$		
Reconnection time (automatic reconnection after tripping)	$\geq 60s$		
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.