Test Report

Requirements of general application resulting from Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators (NC RfG)

For the unit(s)	GIV-3HY-6.0-HV, GIV-3HY-8.0-HV, GIV-3HY-10.0-HV, GIV-3HY-11.0-HV
Test report no	230407146GZU-001
Date	2023-July-08

Test report number.....:	230407146GZU-001
Date of issue.....:	2023-07-08
Total number of pages.....:	9 pages
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Test specification	
Standard .....:	PTPiREE 2021 PSE:18 December 2018 (NC RfG) COMMISSION REGULATION (EU) 2016/631 (NC RfG) Type approval for Type A PPMs
Test report form number.....:	NC RfG_V1.0
Test report form(s) originator.....:	Intertek
Master TRF.....:	Dated 2023-01-24
Test item description.....:	PV Hybrid inverter
Trademark .....:	GivEnergy
Manufacturer.....:	Same as applicant
Model / Type reference.....:	GIV-3HY-6.0-HV, GIV-3HY-8.0-HV, GIV-3HY-10.0-HV, GIV-3HY-11.0-HV
Technical data .....:	See section 3.1.1 on p.5
Testing location / address.....:	Intertek Testing Services Shenzhen Ltd. Guangzhou Branch Room 02, & 101/E201/E301/E401/E501/E601/E701/E801 of Room 01 1-8/F., No. 7-2. Caipin Road, Science City, GETDD, Guangzhou, Guangdong, China
Dates of testing.....:	24 May 2023 – 08 July 2023

Tested by

Drewe Zhou
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Approved by

Jason Fu
Supervisor

1 General information of test report

1.1 Revision history

Revision	Date	Editor	Modification / Change	Status
1	2023-07-08	Drewe Zhou	Initial report was written	active

2 General remarks for documentation

The test results presented in this report relate only to the object(**s**) tested.

Throughout this report a ☒ comma ‘,’ / ☐ point ‘.’ is used as decimal separator and a ☐ point ‘.’ / ☐ comma ‘,’ as thousands separator.

Remark:
This report should be used together with report no. 230407144GZU-001, 08 July 2023.

General remarks for testing

3.1 General product information

3.1.1 Technical data of the unit(s)

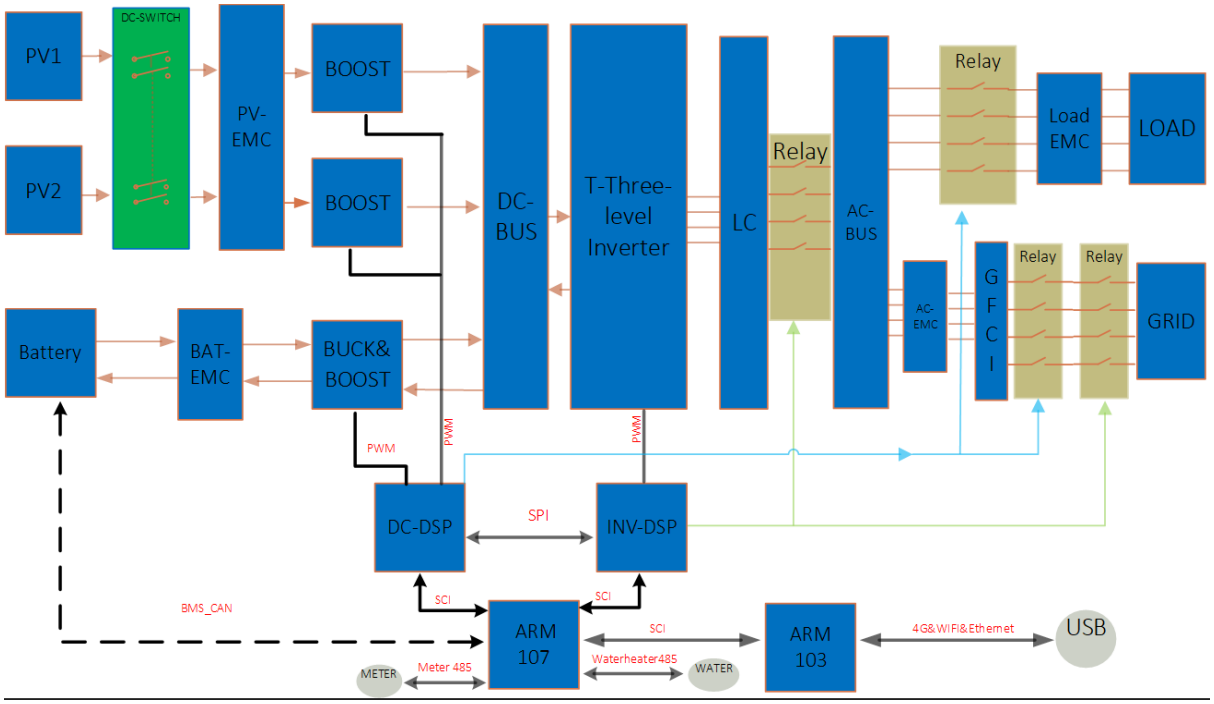
Model	GIV-3HY-6.0-HV	GIV-3HY-8.0-HV	GIV-3HY-10.0-HV	GIV-3HY-11.0-HV
Input Date (PV)				
Max. PV array open-circuit Voltage	1000Vd.c			
Max. total PV array short-circuit circuit	2*20Ad.c			
Max. operating PV input current	2*15Ad.c			
PV input operating voltage range	200~1000Vd.c			
MPPT input operating voltage range	200~850Vd.c			
Number of independent MPP input	2			
Output Date (AC)				
Nominal AC output Power	6000W	8000W	10000W	11000W
AC nominal voltage	230/400Va.c			
AC grid frequency	50Hz			
Nominal output current (pure phase)	8.7Aa.c	11.6Aa.c	14.5Aa.c	15.9Aa.c
Max. output current (pure phase)	10.5Aa.c	13.5 Aa.c	16.5 Aa.c	18 Aa.c
Power factor (Full load)	>0.99			
Backup terminal parameter (AC)				
Nominal AC output Power	6000W	8000W	10000W	11000W
AC nominal voltage	230/400Va.c			
AC grid frequency	50Hz			
Nominal output current (pure phase)	8.7Aa.c	11.6Aa.c	14.5Aa.c	15.9Aa.c
Max. output current (pure phase)	10.5Aa.c	13.5 Aa.c	16.5 Aa.c	18 Aa.c
Battery				
Battery Type	Li-ion			
Normal voltage	450V			
Operating voltage range	200~600V			
Max. charging current	25Ad.c			
Max. discharging current	25Ad.c			
Max. charging Power	6000W	8000W	10000W	11000W
Max. discharging Power	6000W	8000W	10000W	11000W
Others				
Ingress protection	IP65			
Protective Class	Class I			
Operating Temperature Range	-25℃~60℃			

Equipment mobility	:	pluggable equipment
Operating condition	:	Continuous
Class of equipment	:	Class I
Protection against ingress of water	:	IP65 according to EN 60529

The unit is bidirectional which applies to the PV system with battery storage. Energy produced by the PV system is used to optimize self-consumption. Excess energy is used to charge the batteries, and then fed into the public grid when the PV energy is adequate.

When PV energy output is insufficient to support connected loads, the system automatically draws energy from the batteries if battery capacity is sufficient. If the battery capacity is insufficient to meet own consumption requirements, electricity will be drawn from the public grid.

The topology diagram as following:



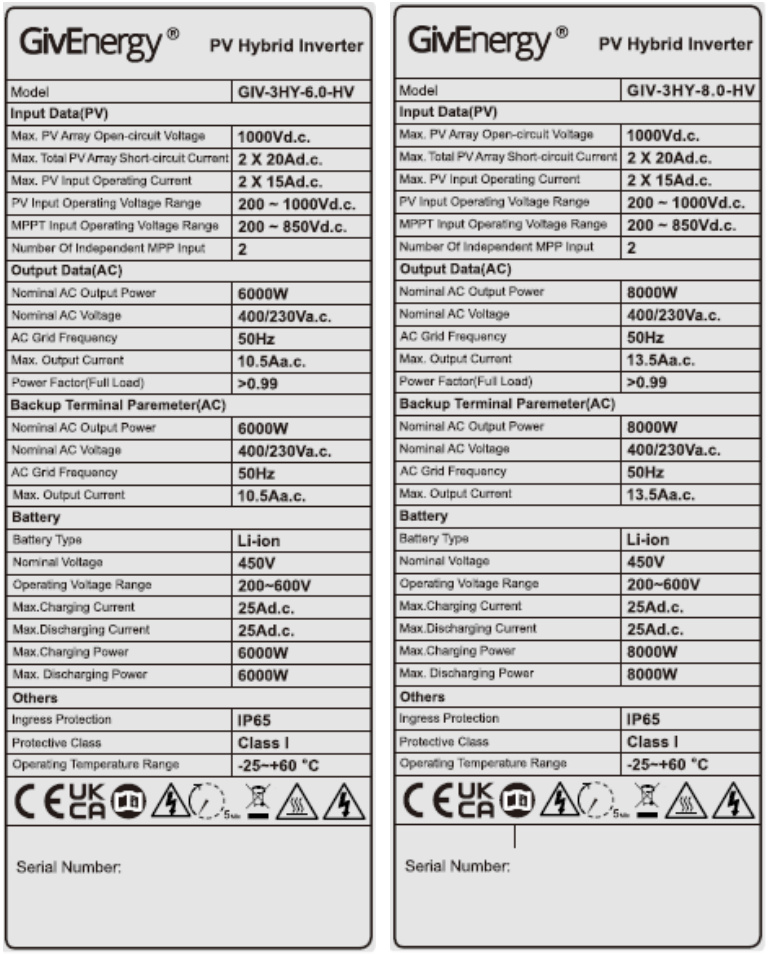
3.1.2 Description of the differences of the models within the product series

All models have identical mechanical and electrical construction except some parameter of the software architecture to control the max output power.

The Software version: ZA1.0

The Hardware version: V1.0

3.1.3 Copy of marking plate



GivEnergy® PV Hybrid Inverter

Model	GIV-3HY-6.0-HV
Input Data(PV)	
Max. PV Array Open-circuit Voltage	1000Vd.c.
Max. Total PV Array Short-circuit Current	2 X 20Ad.c.
Max. PV Input Operating Current	2 X 15Ad.c.
PV Input Operating Voltage Range	200 ~ 1000Vd.c.
MPPT Input Operating Voltage Range	200 ~ 850Vd.c.
Number Of Independent MPP Input	2
Output Data(AC)	
Nominal AC Output Power	6000W
Nominal AC Voltage	400/230Va.c.
AC Grid Frequency	50Hz
Max. Output Current	10.5Aa.c.
Power Factor(Full Load)	>0.99
Backup Terminal Paremeter(AC)	
Nominal AC Output Power	6000W
Nominal AC Voltage	400/230Va.c.
AC Grid Frequency	50Hz
Max. Output Current	10.5Aa.c.
Battery	
Battery Type	Li-ion
Nominal Voltage	450V
Operating Voltage Range	200~600V
Max.Charging Current	25Ad.c.
Max.Discharging Current	25Ad.c.
Max.Charging Power	6000W
Max. Discharging Power	6000W
Others	
Ingress Protection	IP65
Protective Class	Class I
Operating Temperature Range	-25~+60 °C

Serial Number:

GivEnergy® PV Hybrid Inverter

Model	GIV-3HY-8.0-HV
Input Data(PV)	
Max. PV Array Open-circuit Voltage	1000Vd.c.
Max. Total PV Array Short-circuit Current	2 X 20Ad.c.
Max. PV Input Operating Current	2 X 15Ad.c.
PV Input Operating Voltage Range	200 ~ 1000Vd.c.
MPPT Input Operating Voltage Range	200 ~ 850Vd.c.
Number Of Independent MPP Input	2
Output Data(AC)	
Nominal AC Output Power	8000W
Nominal AC Voltage	400/230Va.c.
AC Grid Frequency	50Hz
Max. Output Current	13.5Aa.c.
Power Factor(Full Load)	>0.99
Backup Terminal Paremeter(AC)	
Nominal AC Output Power	8000W
Nominal AC Voltage	400/230Va.c.
AC Grid Frequency	50Hz
Max. Output Current	13.5Aa.c.
Battery	
Battery Type	Li-ion
Nominal Voltage	450V
Operating Voltage Range	200~600V
Max.Charging Current	25Ad.c.
Max.Discharging Current	25Ad.c.
Max.Charging Power	8000W
Max. Discharging Power	8000W
Others	
Ingress Protection	IP65
Protective Class	Class I
Operating Temperature Range	-25~+60 °C

Serial Number:

GivEnergy® PV Hybrid Inverter

Model	GIV-3HY-10.0-HV
Input Data(PV)	
Max. PV Array Open-circuit Voltage	1000Vd.c.
Max. Total PV Array Short-circuit Current	2 X 20Ad.c.
Max. PV Input Operating Current	2 X 15Ad.c.
PV Input Operating Voltage Range	200 ~ 1000Vd.c.
MPPT Input Operating Voltage Range	200 ~ 850Vd.c.
Number Of Independent MPP Input	2
Output Data(AC)	
Nominal AC Output Power	10000W
Nominal AC Voltage	400/230Va.c.
AC Grid Frequency	50Hz
Max. Output Current	16.5Aa.c.
Power Factor(Full Load)	>0.99
Backup Terminal Paremeter(AC)	
Nominal AC Output Power	10000W
Nominal AC Voltage	400/230Va.c.
AC Grid Frequency	50Hz
Max. Output Current	16.5Aa.c.
Battery	
Battery Type	Li-ion
Nominal Voltage	450V
Operating Voltage Range	200~600V
Max.Charging Current	25Ad.c.
Max.Discharging Current	25Ad.c.
Max.Charging Power	10000W
Max. Discharging Power	10000W
Others	
Ingress Protection	IP65
Protective Class	Class I
Operating Temperature Range	-25~+60 °C

Serial Number:

GivEnergy® PV Hybrid Inverter

Model	GIV-3HY-11.0-HV
Input Data(PV)	
Max. PV Array Open-circuit Voltage	1000Vd.c.
Max. Total PV Array Short-circuit Current	2 X 20Ad.c.
Max. PV Input Operating Current	2 X 15Ad.c.
PV Input Operating Voltage Range	200 ~ 1000Vd.c.
MPPT Input Operating Voltage Range	200 ~ 850Vd.c.
Number Of Independent MPP Input	2
Output Data(AC)	
Nominal AC Output Power	11000W
Nominal AC Voltage	400/230Va.c.
AC Grid Frequency	50Hz
Max. Output Current	18Aa.c.
Power Factor(Full Load)	>0.99
Backup Terminal Paremeter(AC)	
Nominal AC Output Power	11000W
Nominal AC Voltage	400/230Va.c.
AC Grid Frequency	50Hz
Max. Output Current	18Aa.c.
Battery	
Battery Type	Li-ion
Nominal Voltage	450V
Operating Voltage Range	200~600V
Max.Charging Current	25Ad.c.
Max.Discharging Current	25Ad.c.
Max.Charging Power	11000W
Max. Discharging Power	11000W
Others	
Ingress Protection	IP65
Protective Class	Class I
Operating Temperature Range	-25~+60 °C

Serial Number:

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.

3.2 Scope of measurements

3.2.1 General

The assessment covers requirements applicable to Types A Power Park Modules (PPMs) for which Equipment Certificates are requested in the Polish certification guideline, as further detailed in Section 3.2.2. The assessment covers both exhaustive requirements, fully defined by the NC RfG, and non-exhaustive requirements, for which complementary requirement details have been collected from the national specification for Poland in PSE 2018-12. ss
The scope of assessment covers the following:

• The completeness of documents and measurements

• The plausibility of the documents received

• The compliance of the test conditions of the documents with those listed in standard

• The assessment of the measurement results concerning the requirements of the documents listed in standard

3.2.2 Paragraphs of NC RfG within scope

Capability	NC RfG	PSE 2018-12	Type A	Assessment result
Frequency range	13.1(a)	13.1(a)(i)	x	Compliant
Rate of Change of Frequency (ROCOF) Withstand capability, df/dt	13.1(b)	13.1(b)	x	Compliant
Remote cessation of active power	13.6	13.6	x	Compliant
Limited Frequency Sensitive Mode – Over frequency (LFSM-O)	13.2	13.2(a).(b).(f)	x	Compliant

Capability	NC RfG	PSE 2018-12	Based on EN 50549-1 test report, report no. 230523124GZU-001
Frequency range	13.1(a)	13.1(a)(i)	Refer to item 4.4.2
Rate of Change of Frequency (ROCOF) Withstand capability, df/dt	13.1(b)	13.1(b)	Refer to item 4.5.2
Remote cessation of active power	13.6	13.6	Refer to item 4.11
Limited Frequency Sensitive Mode – Over frequency (LFSM-O)	13.2	13.2(a).(b).(f)	Refer to item 4.6.1

End of Test Report