



**BUREAU
VERITAS**

Certificate of compliance

Applicant: UPOWER ELECTRIC CO., LTD
4F-A Block, No.62, Yinhe Road, Longgang District, Shenzhen, Guangdong
China

Product: Photovoltaic (PV) and battery inverter

Model: UHome-4K0L
UHome-4K6L
UHome-5K0L
UHome-6K0L
UHome-8K0L

Use in accordance with regulations:

Automatic disconnection device with single-phase mains surveillance in accordance with Engineering Recommendation G99/1 for photovoltaic systems with a single-phase parallel coupling via an inverter in the public mains supply. The automatic disconnection device is an integral part of the aforementioned inverter. This serves as a replacement for the disconnection device with isolating function, which can be accessed the distribution network provider at any time.

Applied rules and standards:

Engineering Recommendation G99/1-9:2022

Requirements for the connection of generation equipment in parallel with public 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: CIZC-ESH-P22120609

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

Certificate number: U23-1032

Date of issue: 2023-11-15

Certification body



Domenik Koll
Head of Energy Systems

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

Testing laboratory accredited according to DIN EN ISO/IEC 17025

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



Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering
Recommendation G99

Nr. CIZC-ESH-P22120609

Type Approval and declaration of compliance with the requirements of Engineering Recommendation G99.

PGM Technology:	Photovoltaic (PV) and battery inverter		
Manufacturer / applicant:	UPOWER ELECTRIC CO., LTD		
Address:	4F-A Block, No.62, Yinhe Road, Longgang District, Shenzhen, Guangdong, China		
Tel	--	Fax:	--
Email:	--	Website:	--

Rated values	UHome-4K0L	UHome-4K6L	UHome-5K0L	UHome-6K0L	UHome-8K0L
MPP DC voltage range [V]	80-500				
Max. input DC voltage [V]	550				
Input DC current [A]	14/14	14/14	14/14	14/14	14/28
Output AC voltage [V]	L/N/PE, 230, 50/60 Hz				
Output AC current [A]	17,4	20,0	21,7	26,0	34,7
Max. output power [VA]	4400	4600	5000	6600	8800
Battery DC voltage range [V]	44,8-57,6				
Battery charge / discharge current [A]	84	96	105	120	160

Firmware version	DSP: V1.05.07 ARM: V1.04.15
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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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Nr. CIZC-ESH-P22120609

Differences between Generating Units:

Component/Model	UHome-4K0L, UHome-4K6L, UHome-5K0L, UHome-6K0L	UHome-8K0L
IGBT Infine IKW50N65EH5	10pcs IGBT3-IGBT8 Q9-Q12	7pcs Q9-Q12 IGBT1, IGBT9 IGBT2
IGBT Infine IKW50N65SS5	not used	2pcs IGBT7, IGBT8
IGBT Infine IKW50N65ES5	not used	4pcs IGBT5, IGBT3, IGBT4, IGBT6
IGBT Infine IKW50N65H5	2pcs IGBT1, IGBT9	not used
Input electrolytic capacitors ;AiShi ;63V;1200uF;±20%	15pcs C1-C15	not used
Input electrolytic capacitors ;AiShi ;63V;1800uF;±20%	not used	15pcs C1-C15
BUS capacitance ; AiShi; 550V;470uF;±20%	7pcs C32-C38	not used
BUS capacitance; AiShi; 550V;680uF;±20%	not used	7pcs C32-C38
Output relay: HongFa; HF161F-40W 50A	6pcs K1-K4, K9, K10	not used
Output relay: ONG CHUAN :117L 66A	not used	6pcs K1-K4, K9, K10
inductance	PV1, PV2: 1.11mH±10% @0A"0.7mH±10% @15A0.7 mH±10% INV1, INV2: 1690uH±10% @0A0.77mH±10% BAT: 0.8mH±10% @0A0.21mH±10%	PV1, PV2: 0.836mH±10% @0A0.6mH±10% INV1, INV2: 0.48mH±10% @0A0.42mH±10% BAT: 0.8mH±10% @0A0.21mH±10%

The above stated Generating Units are tested according the requirements in the Engineering Recommendation G99/1. 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 Engineering Recommendation G99/1.

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Operating Range.	
Test 1	Voltage = 85% of nominal (195,5V) Frequency = 47Hz Power Factor = 1 Period of test 20 s
Connection:	Always connected
Limit:	Always connected
Test 2	Voltage = 85% of nominal (195,5V) Frequency = 47,5Hz Power Factor = 1 Period of test 90 minutes
Connection:	Always connected
Limit:	Always connected
Test 3	Voltage = 110% of nominal (253V) Frequency = 51,5Hz Power Factor = 1 Period of test 90 minutes
Connection:	Always connected
Limit:	Always connected
Test 4	Voltage = 110% of nominal (253V) Frequency = 52,0Hz Power Factor = 1 Period of test 15 minutes
Connection:	Always connected
Limit:	Always connected
Test 5	Voltage = 100% of nominal (230 V) Frequency = 50,0 Hz Power Factor = 1 Period of test 90 minutes
Connection:	Always connected
Limit:	Always connected
Test 6	Confirm that the Power Generating Module is capable of staying connected to the Distribution Network and operate at rates of change of frequency up to 1 Hzs-1 as measured over a period of 500ms. Note that this is not expected to be demonstrated on site.
Connection:	Always connected
Limit:	Always connected

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering
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Protection. Voltage tests.

Phase 1

Function	Setting		Trip test		No trip test	
	Voltage [V]	Time delay [s]	Voltage [V]	Time delay [s]	Voltage / time	Confirm no trip
U/V	184	2,5	184,0	2,52	188V / 5,0s	No trip
					180V / 2,45s	No trip
O/V stage 1	262,2	1,0	262,0	1,01	258,2V 5,0s	No trip
O/V stage 2	273,7	0,5	272,6	0,50	269,7V 0,95s	No trip
					277,7V 0,45s	No trip

Note. For Voltage tests the Voltage required to trip is the setting $\pm 3,45V$. The time delay can be measured at a larger deviation than the minimum required to operate the protection. The No trip tests need to be carried out at the setting $\pm 4V$ and for the relevant times as shown in the table above to ensure that the protection will not trip in error.

Protection. Frequency tests.

Function	Setting		Trip test		No trip test	
	Frequency [Hz]	Time delay [s]	Frequency [Hz]	Time delay [s]	Frequency / time	Confirm no trip
U/F stage 1	47,5	20	47,48	20,04	47,7Hz / 30s	No trip
U/F stage 2	47	0,5	46,97	0,50	47,2Hz / 19,5s	No trip
					46,8Hz / 0,45s	No trip
O/F stage 2	52	0,5	52,06	0,51	51,8Hz / 120s	No trip
					52,2Hz / 0,45s	No trip

Note. For Frequency Trip tests the Frequency required to trip is the setting $\pm 0,1Hz$. In order to measure the time delay a larger deviation than the minimum required to operate the projection can be used. The "No-trip tests" need to be carried out at the setting $\pm 0,2Hz$ and for the relevant times as shown in the table above to ensure that the protection will not trip in error.

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Extract from test report according to the Engineering
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Protection. Loss of Mains.

Inverters tested according to BS EN 62116.

Balancing load on islanded network	33% of -5% Q Test 22	66% of -5% Q Test 12	100% of -5% P Test 5	33% of +5% Q Test 31	66% of +5% Q Test 21	100% of +5% P Test 10
Trip time. Ph1 fuse removed [ms]	315,0	288,0	340,0	334,0	318,0	356,0

Note. Trip time limit is 0,5s.

Protection. Re-connection timer.

Test should prove that the reconnection sequence starts in no less than 20 seconds for restoration of voltage and frequency to within the stage 1 settings of table 10.1.

Over Voltage				
Time delay setting		Measured delay		
20s		25,26 s		
Under Voltage				
Time delay setting		Measured delay		
20s		32,26 s		
Over Frequency				
Time delay setting		Measured delay		
20s		25,26 s		
Under Frequency				
Time delay setting		Measured delay		
20s		27,31 s		
	Checks on no reconnection when voltage or frequency is brought to just outside stage 1 limits of table 1.			
	At 266,2V	At 180,0V	At 47,4Hz	At 52,1Hz
Confirmation that the Generating Unit does not re-connect.	No reconnection	No reconnection	No reconnection	No reconnection

Protection. Frequency change, Stability test.

	Start Frequency [Hz]	Change	Test Duration	Confirm no trip
Positive Vector Shift	49,5	+50 degrees		No trip
Negative Vector Shift	50,5	-50 degrees		No trip
Positive Frequency drift	49,0 to 51,0	+0,95Hz/sec	2,1s	No trip
Negative Frequency drift	51,0 to 49,0	-0,95Hz/sec	2,1s	No trip

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Limited Frequency Sensitive Mode – Over Frequency

1-min mean value [Hz]:	a) 50,00	b) 50,45	c) 50,70	d) 51,15	e) 50,70	f) 50,45	g) 50,00
1. Measurement a) to g): Active power output > 80% P_n							
Frequency [Hz]:	50,00	50,45	50,70	51,15	50,70	50,45	50,00
P_{expected} [W]:	N/A	7920	7520	6800	7520	7920	N/A
P_{measured} [W]:	7991	7916	7517	6802	7517	7915	7992
2. Measurement a) to g): Active power output 40% and 60% P_n							
Frequency [Hz]:	50,00	50,45	50,70	51,15	50,70	50,45	50,00
P_{expected} [W]:	N/A	3920	3520	2800	3520	3920	N/A
P_{measured} [W]:	3999	3921	3518	2796	3520	3922	7991

Output Power with falling Frequency						
Frequency setpoint [Hz]:	50,00	49,50	49,00	48,00	47,60	47,10
Frequency [Hz]:	50,00	49,50	49,00	48,00	47,60	47,10
Active power [kW]:	7992	7987	7987	7973	7967	7957
ΔP/P_{max} [%]:		-0,16	-0,16	-0,34	-0,41	-0,54
<p>Note.</p> <p>For a CHP the test point a) at 50,00Hz is taken as Registered capacity (P_{max}) due to limited discrete operating points of the CHP's thermal process.</p> <p>No Power reduction takes place for electronic inverter</p>						

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Extract from test report according to the Engineering Recommendation G99

Nr. CIZC-ESH-P22120609

Power Quality. Harmonics.

UHome-8K0L

Generating Unit rating per phase (rpp)			8000W			
	At 45-55% of rated output 4023 W		100% of rated output 7999 W			
Harmonic	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Limit in BS EN61000-3-12 in %	
					1 phase	3 phase
2nd	0,112	0,321	0,031	0,088	8%	8%
3rd	0,494	1,421	1,262	3,628	21,6%	N/A
4th	0,035	0,100	0,074	0,213	4%	4%
5th	0,094	0,270	0,341	0,981	10,7%	10,7%
6th	0,012	0,034	0,036	0,104	2,67%	2,67%
7th	0,124	0,356	0,160	0,459	7,2%	7,2%
8th	0,013	0,037	0,090	0,260	2%	2%
9th	0,021	0,059	0,047	0,136	3,8%	N/A
10th	0,008	0,022	0,029	0,083	1,6%	1,6%
11th	0,066	0,190	0,071	0,205	3,1%	3,1%
12th	0,015	0,042	0,078	0,224	1,33%	1,33%
13th	0,150	0,430	0,226	0,650	2%	2%
14th	0,010	0,030	0,042	0,121	N/A	N/A
15th	0,083	0,239	0,130	0,372	N/A	N/A
16th	0,007	0,021	0,018	0,052	N/A	N/A
17th	0,061	0,174	0,061	0,176	N/A	N/A
18th	0,007	0,021	0,006	0,018	N/A	N/A
19th	0,043	0,123	0,064	0,184	N/A	N/A
20th	0,006	0,018	0,010	0,027	N/A	N/A
21th	0,034	0,098	0,044	0,126	N/A	N/A
22th	0,005	0,015	0,004	0,012	N/A	N/A
23th	0,025	0,071	0,047	0,134	N/A	N/A
24th	0,005	0,014	0,008	0,022	N/A	N/A
25th	0,021	0,061	0,033	0,094	N/A	N/A
26th	0,004	0,012	0,005	0,015	N/A	N/A
27th	0,016	0,045	0,032	0,092	N/A	N/A
28th	0,003	0,010	0,012	0,035	N/A	N/A
29th	0,014	0,039	0,027	0,077	N/A	N/A
30th	0,003	0,010	0,004	0,010	N/A	N/A
31th	0,011	0,031	0,023	0,065	N/A	N/A
32th	0,003	0,009	0,006	0,018	N/A	N/A
33th	0,010	0,028	0,021	0,059	N/A	N/A
34th	0,003	0,008	0,003	0,010	N/A	N/A
35th	0,007	0,021	0,020	0,059	N/A	N/A
36th	0,003	0,008	0,005	0,013	N/A	N/A
37th	0,007	0,020	0,016	0,047	N/A	N/A
38th	0,002	0,007	0,004	0,012	N/A	N/A
39th	0,006	0,017	0,015	0,043	N/A	N/A
40th	0,003	0,010	0,005	0,015	N/A	N/A
THD ₄₀ [%]		3.270		2,178	23%	13%

Note:

The rated current is 34,8 A

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering
Recommendation G99

Nr. CIZC-ESH-P22120609

Power Quality. Harmonics.

UHome-6K0L

Generating Unit rating per phase (rpp)			6000W			
	At 45-55% of rated output 3040 W		100% of rated output 6026 W			
Harmonic	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Limit in BS EN61000-3-12 in %	
					1 phase	3 phase
2nd	0,082	0,315	0,109	0,417	8%	8%
3rd	0,315	1,209	0,864	3,313	21,6%	N/A
4th	0,008	0,030	0,141	0,540	4%	4%
5th	0,018	0,068	0,225	0,863	10,7%	10,7%
6th	0,018	0,069	0,014	0,054	2,67%	2,67%
7th	0,097	0,373	0,126	0,483	7,2%	7,2%
8th	0,012	0,047	0,027	0,102	2%	2%
9th	0,062	0,238	0,026	0,099	3,8%	N/A
10th	0,013	0,048	0,015	0,059	1,6%	1,6%
11th	0,041	0,158	0,077	0,297	3,1%	3,1%
12th	0,017	0,064	0,032	0,122	1,33%	1,33%
13th	0,123	0,472	0,185	0,710	2%	2%
14th	0,010	0,038	0,013	0,048	N/A	N/A
15th	0,068	0,262	0,105	0,403	N/A	N/A
16th	0,008	0,032	0,010	0,040	N/A	N/A
17th	0,047	0,182	0,061	0,235	N/A	N/A
18th	0,006	0,023	0,006	0,022	N/A	N/A
19th	0,033	0,126	0,060	0,229	N/A	N/A
20th	0,005	0,020	0,012	0,045	N/A	N/A
21th	0,024	0,091	0,040	0,153	N/A	N/A
22th	0,004	0,017	0,004	0,016	N/A	N/A
23th	0,017	0,066	0,038	0,146	N/A	N/A
24th	0,003	0,013	0,008	0,029	N/A	N/A
25th	0,012	0,047	0,031	0,119	N/A	N/A
26th	0,004	0,014	0,004	0,017	N/A	N/A
27th	0,010	0,037	0,026	0,099	N/A	N/A
28th	0,003	0,011	0,004	0,016	N/A	N/A
29th	0,007	0,027	0,022	0,086	N/A	N/A
30th	0,003	0,011	0,005	0,018	N/A	N/A
31th	0,006	0,022	0,020	0,075	N/A	N/A
32th	0,002	0,009	0,003	0,011	N/A	N/A
33th	0,005	0,019	0,016	0,060	N/A	N/A
34th	0,002	0,009	0,004	0,016	N/A	N/A
35th	0,004	0,015	0,016	0,062	N/A	N/A
36th	0,002	0,009	0,003	0,012	N/A	N/A
37th	0,004	0,014	0,012	0,046	N/A	N/A
38th	0,002	0,008	0,003	0,012	N/A	N/A
39th	0,004	0,015	0,012	0,046	N/A	N/A
40th	0,003	0,011	0,004	0,015	N/A	N/A
THD ₄₀ [%]		2,948		3,675	23%	13%

Note:

The rated current is 26,1A

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99

Nr. CIZC-ESH-P22120609

Power Quality. Harmonics.

UHome-5K0L

Generating Unit rating per phase (rpp)			5000 W			
	At 45-55% of rated output 2553 W		100% of rated output 5043 W			
Harmonic	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Limit in BS EN61000-3-12 in %	
					1 phase	3 phase
2nd	0,039	0,179	0,004	0,019	8%	8%
3rd	0,261	1,201	0,150	0,690	21,6%	N/A
4th	0,017	0,076	0,004	0,017	4%	4%
5th	0,037	0,170	0,048	0,222	10,7%	10,7%
6th	0,005	0,025	0,003	0,012	2,67%	2,67%
7th	0,093	0,426	0,063	0,291	7,2%	7,2%
8th	0,007	0,031	0,002	0,011	2%	2%
9th	0,070	0,320	0,098	0,449	3,8%	N/A
10th	0,006	0,026	0,003	0,012	1,6%	1,6%
11th	0,029	0,132	0,064	0,296	3,1%	3,1%
12th	0,007	0,034	0,002	0,011	1,33%	1,33%
13th	0,105	0,483	0,044	0,204	2%	2%
14th	0,005	0,025	0,002	0,011	N/A	N/A
15th	0,059	0,271	0,088	0,403	N/A	N/A
16th	0,004	0,017	0,003	0,013	N/A	N/A
17th	0,039	0,179	0,067	0,306	N/A	N/A
18th	0,003	0,015	0,003	0,013	N/A	N/A
19th	0,026	0,120	0,035	0,163	N/A	N/A
20th	0,003	0,014	0,002	0,011	N/A	N/A
21th	0,018	0,082	0,078	0,357	N/A	N/A
22th	0,003	0,012	0,002	0,011	N/A	N/A
23th	0,013	0,059	0,085	0,392	N/A	N/A
24th	0,003	0,013	0,003	0,013	N/A	N/A
25th	0,009	0,041	0,059	0,273	N/A	N/A
26th	0,003	0,012	0,002	0,011	N/A	N/A
27th	0,007	0,031	0,047	0,216	N/A	N/A
28th	0,003	0,012	0,002	0,009	N/A	N/A
29th	0,005	0,023	0,086	0,394	N/A	N/A
30th	0,002	0,010	0,002	0,010	N/A	N/A
31th	0,004	0,020	0,110	0,507	N/A	N/A
32th	0,002	0,008	0,002	0,011	N/A	N/A
33th	0,003	0,016	0,093	0,429	N/A	N/A
34th	0,002	0,007	0,002	0,010	N/A	N/A
35th	0,003	0,016	0,070	0,321	N/A	N/A
36th	0,002	0,007	0,002	0,010	N/A	N/A
37th	0,004	0,017	0,082	0,379	N/A	N/A
38th	0,002	0,007	0,003	0,012	N/A	N/A
39th	0,004	0,017	0,090	0,415	N/A	N/A
40th	0,002	0,011	0,003	0,012	N/A	N/A
THD ₄₀ [%]	--	2,958	--	2,718	23%	13%

Note:

The rated current is 21,7A.

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99

Nr. CIZC-ESH-P22120609

Power Quality. Harmonics.

UHome-4K6L

Generating Unit rating per phase (rpp)			4600 W			
	At 45-55% of rated output 2326 W		100% of rated output 4610 W			
Harmonic	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Limit in BS EN61000-3-12 in %	
					1 phase	3 phase
2nd	0,075	0,343	0,058	0,268	8%	8%
3rd	0,309	1,420	0,651	2,993	21,6%	N/A
4th	0,023	0,108	0,007	0,033	4%	4%
5th	0,125	0,576	0,107	0,492	10,7%	10,7%
6th	0,022	0,103	0,015	0,067	2,67%	2,67%
7th	0,103	0,472	0,161	0,739	7,2%	7,2%
8th	0,023	0,107	0,008	0,039	2%	2%
9th	0,077	0,352	0,041	0,190	3,8%	N/A
10th	0,018	0,085	0,014	0,066	1,6%	1,6%
11th	0,046	0,211	0,083	0,381	3,1%	3,1%
12th	0,021	0,097	0,018	0,082	1,33%	1,33%
13th	0,144	0,661	0,220	1,010	2%	2%
14th	0,013	0,059	0,024	0,109	N/A	N/A
15th	0,086	0,394	0,126	0,579	N/A	N/A
16th	0,009	0,041	0,020	0,092	N/A	N/A
17th	0,059	0,272	0,095	0,436	N/A	N/A
18th	0,010	0,046	0,019	0,087	N/A	N/A
19th	0,041	0,189	0,067	0,307	N/A	N/A
20th	0,007	0,034	0,013	0,059	N/A	N/A
21th	0,027	0,126	0,058	0,267	N/A	N/A
22th	0,006	0,027	0,006	0,028	N/A	N/A
23th	0,021	0,095	0,045	0,208	N/A	N/A
24th	0,005	0,022	0,006	0,026	N/A	N/A
25th	0,016	0,072	0,039	0,178	N/A	N/A
26th	0,006	0,028	0,004	0,019	N/A	N/A
27th	0,012	0,053	0,032	0,147	N/A	N/A
28th	0,004	0,020	0,006	0,026	N/A	N/A
29th	0,009	0,040	0,027	0,124	N/A	N/A
30th	0,003	0,015	0,004	0,018	N/A	N/A
31th	0,006	0,029	0,022	0,103	N/A	N/A
32th	0,003	0,014	0,005	0,022	N/A	N/A
33th	0,005	0,023	0,018	0,085	N/A	N/A
34th	0,004	0,020	0,003	0,016	N/A	N/A
35th	0,005	0,021	0,016	0,072	N/A	N/A
36th	0,003	0,012	0,002	0,011	N/A	N/A
37th	0,003	0,014	0,013	0,060	N/A	N/A
38th	0,004	0,018	0,002	0,010	N/A	N/A
39th	0,004	0,017	0,013	0,059	N/A	N/A
40th	0,004	0,020	0,007	0,032	N/A	N/A
THD ₄₀ [%]	--	4,172	--	3,754	23%	13%

Note:

The rated current is 20,0 A.

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99

Nr. CIZC-ESH-P22120609

Power Quality. Harmonics.

UHome-4K0L

Generating Unit rating per phase (rpp)						
	At 45-55% of rated output 2020 W		100% of rated output 4028 W			
Harmonic	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Limit in BS EN61000-3-12 in %	
					1 phase	3 phase
2nd	0,054	0,248	0,033	0,152	8%	8%
3rd	0,287	1,320	0,699	3,214	21,6%	N/A
4th	0,018	0,081	0,007	0,031	4%	4%
5th	0,069	0,318	0,155	0,713	10,7%	10,7%
6th	0,014	0,064	0,006	0,026	2,67%	2,67%
7th	0,112	0,514	0,153	0,704	7,2%	7,2%
8th	0,014	0,066	0,012	0,057	2%	2%
9th	0,073	0,336	0,012	0,053	3,8%	N/A
10th	0,011	0,051	0,011	0,050	1,6%	1,6%
11th	0,037	0,171	0,079	0,362	3,1%	3,1%
12th	0,015	0,071	0,010	0,045	1,33%	1,33%
13th	0,137	0,630	0,200	0,921	2%	2%
14th	0,010	0,046	0,011	0,052	N/A	N/A
15th	0,081	0,373	0,110	0,505	N/A	N/A
16th	0,008	0,036	0,007	0,033	N/A	N/A
17th	0,056	0,257	0,082	0,378	N/A	N/A
18th	0,006	0,026	0,008	0,038	N/A	N/A
19th	0,038	0,174	0,063	0,288	N/A	N/A
20th	0,006	0,027	0,005	0,025	N/A	N/A
21th	0,029	0,134	0,050	0,228	N/A	N/A
22th	0,003	0,016	0,007	0,032	N/A	N/A
23th	0,021	0,095	0,039	0,180	N/A	N/A
24th	0,004	0,020	0,011	0,051	N/A	N/A
25th	0,016	0,072	0,035	0,160	N/A	N/A
26th	0,004	0,017	0,011	0,052	N/A	N/A
27th	0,012	0,053	0,028	0,127	N/A	N/A
28th	0,003	0,014	0,007	0,032	N/A	N/A
29th	0,009	0,042	0,022	0,101	N/A	N/A
30th	0,003	0,014	0,008	0,038	N/A	N/A
31th	0,007	0,032	0,019	0,087	N/A	N/A
32th	0,003	0,014	0,005	0,021	N/A	N/A
33th	0,006	0,028	0,016	0,074	N/A	N/A
34th	0,002	0,011	0,003	0,015	N/A	N/A
35th	0,006	0,026	0,013	0,058	N/A	N/A
36th	0,003	0,012	0,005	0,024	N/A	N/A
37th	0,006	0,029	0,013	0,062	N/A	N/A
38th	0,003	0,013	0,004	0,019	N/A	N/A
39th	0,005	0,025	0,009	0,040	N/A	N/A
40th	0,004	0,017	0,003	0,013	N/A	N/A
THD ₄₀ [%]	--	2,171	--	4,510	23%	13%

Note:

The rated current is 13,0A.

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99

Nr. CIZC-ESH-P22120609

Power Quality. Power factor.

Output power	216,2V	230V	253V	Measured at three voltage levels and at full output. Voltage to be maintained within $\pm 1,5\%$ of the stated level during the test.
20%	0,9902	0,9885	0,9839	
50%	0,9991	0,9990	0,9983	
75%	0,9995	0,9994	0,9993	
100%	0,9999	0,9993	0,9993	
Limit	>0,95	>0,95	>0,95	

Power Quality. Voltage fluctuation and Flicker.

	Starting			Stopping			Running	
	dmax	dc	d(t)	dmax	dc	d(t)	Pst	Plt 2 hours
Measured values at test impedance	0,38	0,12	0,00	0,16	0,04	0,00	0,07	0,05
Measured values at standard impedance	0,38	0,12	0,00	0,16	0,04	0,00	0,07	0,05
Values for maximum impedance	0,38	0,12	0,00	0,16	0,04	0,00	0,07	0,05
Limits set under BS EN 61000-3-11	4%	3,3%	3,3% 500ms	4%	3,3%	3,3% 500ms	1,0	0,65
Test impedance	R	0,400	Ω	XI		0,250	Ω	
	Z	0,472	Ω					
Standard impedance	R	0,400	Ω	XI		0,250	Ω	
	Z	0,472	Ω					
Maximum impedance	R	0,400	Ω	XI		0,250	Ω	
	Zmax	0,472	Ω					

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering
Recommendation G99

Nr. CIZC-ESH-P22120609

Power Quality. DC injection.

UHome-4K0L

Test level power [%]	10	55	100
Recorded value [mA]	40	39	40
Recorded value [%]	0,23	0,22	0,23
Limit [%]	0,25	0,25	0,25

Note:

Tests are carried out at three defined power levels $\pm 5\%$. At 230 V a 4 kW Single phase Inverter has a current output of 17,39 A so DC limit is 43 mA. These tests is undertaken in accordance with Annex A.7.1.4.4.

The % DC injection ("as % of rated AC current" below) is calculated as follows:

% DC injection = Recorded DC value in Amps / Base current where the base current is the Registered Capacity (W) / V phase.
The % DC injection should not be greater than 0,25%.

UHome-8K0L

Test level power [%]	10	55	100
Recorded value [mA]	80	72	70
Recorded value [%]	0,23	0,21	0,20
Limit [%]	0,25	0,25	0,25

Note. Informative measurement of DC-injection of each phase of the inverter and a limit of 0,25% per phase of the rated current per phase as pass criteria.

Note

Tests are carried out at three defined power levels $\pm 5\%$. At 230 V a 6 kW single phase Inverter has a current output of 26,09 A so DC limit is 65 mA. These tests is undertaken in accordance with Annex A.7.1.4.4.

The % DC injection ("as % of rated AC current" below) is calculated as follows:

% DC injection = Recorded DC value in Amps / Base current where the base current is the Registered Capacity (W) / V phase.
The % DC injection should not be greater than 0,25%.

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99

Nr. CIZC-ESH-P22120609

Fault level Contribution.

For a directly coupled SSEG			For a Inverter SSEG		
Parameter	Symbol	Value	Time after fault	Volts [V]	Amps [A]
Peak Short Circuit current	I_p	N/A	20ms	144,9	23,30
Initial Value of aperiodic current	A	N/A	100ms	N/A	N/A
Initial symmetrical short-circuit current*	I_k	N/A	250ms	N/A	N/A
Decaying (aperiodic) component of short circuit current*	i_{DC}	N/A	500ms	N/A	N/A
Reactance/Resistance Ratio of source*	X/R	N/A	Time to Trip [s]	0,006	

For rotating machines and linear piston machines the test should produce a 0s – 2s plot of the short circuit current as seen at the Generating Unit terminals.

* Values for these parameters should be provided where the short circuit duration is sufficiently long to enable interpolation of the plot.

Self Monitoring – Solid state switching.	N/A
It has been verified that in the event of the solid state switching device failing to disconnect the Power Park Module, the voltage on the output side of the switching device is reduced to a value below 50 volts within 0,5 seconds.	N/A
Note. Unit do not provide solid state switching relays. In case the semiconductor bridge is switched off, then the voltage on the output drops to 0. In this case the relays on the output will also open (Functional safety of the internal automatic disconnection device according to VDE 0124-100.	

Cyber security	P
Confirm that the Manufacturer or Installer of the Micro-generator has provided a statement describing how the Micro-generator has been designed to comply with cyber security requirements, as detailed in 9.7.	Yes
Note. Different levels of access, all are password protected, only certain parameters can be changed on maintenance level. Manufacturer information provided, see test report.	

Wiring functional tests if required by para. 15.2.1	N/A
Confirm that the relevant test schedule is attached (tests to be undertaken at time of commissioning).	N/A
Note. The inverter was tested in a test laboratory. The correct wiring functional test in the field has to be done by the responsible person for the installation of the plant.	

Logic Interface (input port) Required by paragraph 11.1.3.1	P
Confirm that an input port is provided and can be used to reduce the Active Power output to zero	Yes
Note. Manufacturer information provided.	
Provide high level description of logic interface, e.g. details in 11.1.3.1 such as AC or DC signal	Yes
By default, the DRM logical interface will take the form of a simple binary output that can be operated by a simple switch controlled by pins 2 and 5 of the RJ45. Pin 2 outputs 3.3V DC signal, pin 5 is ground signal. After turning off the switch, the inverter works normally. After the switch is turned on, the energy yield of the inverter falls to 0 within 5 seconds	



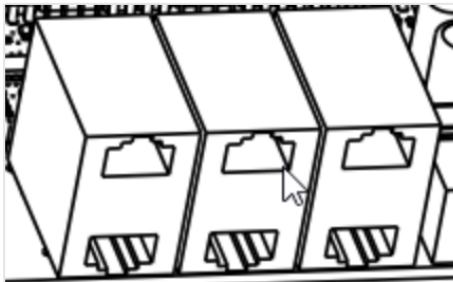
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Annex to the G99/1 certificate of compliance No. U23-1032

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering
Recommendation G99

Nr. CIZC-ESH-P22120609



DRM	CT	CAN1
LEAD NTC	CAN_BMS 485_BMS	CAN2

+

* Port Function

- CAN1/CAN2: Communication interface for connecting inverter.
- CAN_BMS/ 485_BMS: BMS communication for lithium batteries.
- CT: For external grid side CT to detect current size.
- DRM: Reserve dry contact for engine start signal.
- NTC: Used for communication of battery temperature.