

ATTESTATION OF CONFORMITY

Issued to: EcoFlow Inc.
RM 401, Plant #1, Runheng Industrial Zone, Fuyuan Road, Zhancheng Community,
Fuhai Street, Bao'an District, Shenzhen City, Guangdong Province, China

For the product: EcoFlow OCEAN 2 Plus Hybrid Inverter Single-Phase

Trade name:



Type/Model: EF HD-P1-12K0-S2, EF HD-P1-12K0-S2F, EF HD-P1-12K0-S2A, EF HD-P1-10K0-S2,
EF HD-P1-10K0-S2F, EF HD-P1-9K9-S2A, EF HD-P1-8K0-S2, EF HD-P1-8K0-S2F,
EF HD-P1-8K0-S2A, EF-HD-P1-6K0-S2, EF-HD-P1-6K0-S2F

Ratings: See Annex

Manufactured by: EcoFlow Inc.
RM 401, Plant #1, Runheng Industrial Zone, Fuyuan Road, Zhancheng Community,
Fuhai Street, Bao'an District, Shenzhen City, Guangdong Province, China

Subject: Complete evaluation of electrical system of the appliances

Requirements: Engineering Recommendation G99 Issue 2:2025

This Attestation is granted on account of an examination by DEKRA, the results of which are laid down in a test file / test report no 4949207.50.

The examination has been carried out on one single specimen or several specimens of the product, submitted by the manufacturer. The Attestation does not include an assessment of the manufacturer's production. Conformity of this production with the specimen tested by DEKRA is not the responsibility of DEKRA.

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Guangzhou, 20 April 2026

Number: 4949207.01AOC V1.0

DEKRA Testing and Certification (Shanghai) Ltd.,
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Annex

Document no. : 4949207.01AOC V1.0

Ratings of the test product:

Model		EF HD-P1-6K0-S2 EF HD-P1-6K0-S2F	EF HD-P1-8K0-S2 EF HD-P1-8K0-S2F EF HD-P1-8K0-S2A	EF HD-P1-9K9-S2A	EF HD-P1-10K0-S2 EF HD-P1-10K0-S2F	EF HD-P1-12K0-S2 EF HD-P1-12K0-S2F EF HD-P1-12K0-S2A
PV Input	PV Operating Voltage Range(V)	50-900				
	MPPT Voltage Range at Rated Power (V)	500-810				
	Rated Input Voltage (V)	600				
	Max. Input Voltage (V)	900				
	Max. Input Current per MPPT (A d.c.)	16				
	Number of MPPT Trackers	3				
	Max. Total Input Power (W)	12000	16000	20000	20000	24000
Battery	Nominal Voltage (V d.c.)	800				
	Voltage Range (V)	720-900				
	Max. Charging Power (W)	18000	24000	30000	30000	30000
	Max. Discharging Power (W)	12000	16000	19900	20000	24000
	Max. Charge Current of Stacking Terminal (A d.c.)	20.8				
	Max. Discharge Current of Stacking Terminal (A d.c.)	9	12	15	15	18
	Max. Charging Current of Expansion port (A d.c.)	24	28	28	28	28
	Max. Discharging Current of Expansion port (A d.c.)	9	12	15	15	18
AC Input (On-grid)	Nominal Input Voltage (V)	220/230, L+N+PE				
	Max. AC Current from Utility Grid (A)	72				
	Frequency (Hz)	50/60				
AC Output (On-grid)	Rated Power to Utility Grid (W)	6000	8000	9999	10000	12000
	Max. Apparent Power Output (VA)	6600	8800	9999	11000	12000
	Nominal Output Voltage (V)	220/230/240, L+N+PE				
	Nominal AC Grid Frequency (Hz)	50/60				
	Rated Output Current	26.1	34.8	43.5	43.5	52.2
	Max. Output Current (A)	32.1	42.8	53.5	53.5	64.2
	Power Factor	-0.8 to +0.8				
AC Output (Backup)	Nominal Output Power	6000	8000	9999	10000	12000
	Rated Output Current (A)	26.1	34.8	43.5	43.5	52.2
	Nominal Output Voltage (V)	220/230, L+N+PE				
	Frequency (Hz)	50/60				
General	Operating Temperature Range (°C)	-20 to 60 (>40 derating)				
	Storage Temperature (°C)	-30 to 60				
	Weight (kg)	Approx. 38				
	Dimension (W×D×H mm)	Approx. 680×406.5×203				
	Ingress Protection Rating	IP66				

G99/2 Form A2-3: Compliance Verification Report

Extract form test report number:

4949207.50

1. Operating Range:

P

Tests should be carried with the **Power Generating Module** operating at **Registered Capacity** and connected to a suitable test supply or grid simulation set. The power supplied by the primary source shall be kept stable within $\pm 5\%$ of the apparent power value set for the entire duration of each test sequence.

Frequency, voltage and **Active Power** measurements at the output terminals of the **Power Generating Module** shall be recorded every second. The tests will verify that the **Power Generating Module** can operate within the required ranges for the specified period of time.

The **Interface Protection** shall be disabled during the tests.

In case of a PV **Power Park Module** the PV primary source may be replaced by a DC source.
In case of a full converter **Power Park Module** (eg wind) the primary source and the prime mover **Inverter/rectifier** may be replaced by a DC source.

Pass or failure of the test should be indicated in the fields below (right hand side), for example with the statement "Pass", "No disconnection occurs", etc. Graphical evidence is preferred.

Note that the value of voltage stated in brackets assumes a **LV** connection. This should be adjusted for **HV** as required.

Model: EF HD-P1-12K0-S2A

P

Test 1:

Measured Voltage (V)	Measured Frequency (Hz)	Measured Power (kW)	Measured Power factor	Test Time (seconds)
195.78	46.99	12.2	1.00	21.40

Test 2:

Measured Voltage (V)	Measured Frequency (Hz)	Measured Power (kW)	Measured Power factor	Test Time (Minutes)
196.14	47.49	12.1	1.00	90.90

Test 3:

Measured Voltage (V)	Measured Frequency (Hz)	Measured Power (kW)	Measured Power factor	Test Time (Minutes)
253.38	51.50	11.9	1.00	90.37

Test 4:

Measured Voltage (V)	Measured Frequency (Hz)	Measured Power (kW)	Measured Power factor	Test Time (Minutes)
252.80	51.99	11.9	1.00	15.31

Test 5:

Measured Voltage (V)	Measured Frequency (Hz)	Measured Power (kW)	Measured Power factor	Test Time (Minutes)
230.91	49.99	12.1	1.00	90.67

Test 6:

Measured Voltage (V)	Ramp range	Test frequency ramp	Test Duration	Confirm no trip
230.29	50 Hz → 47.50 Hz	-1 Hzs ⁻¹	2.50 s	No trip
230.25	47.50 Hz → 50 Hz	+1 Hzs ⁻¹	2.50 s	No trip
230.29	50 Hz → 52.00 Hz	+1 Hzs ⁻¹	2.00 s	No trip
230.30	52.00 Hz → 50 Hz	-1 Hzs ⁻¹	2.00 s	No trip

2. Power Quality – Harmonics:								P	
For Power Generating Modules of Registered Capacity of less than 75 A per phase (ie 50 kW) the test requirements are specified in Annex A.7.1.5. These tests should be carried out as specified in BS EN 61000-3-12, and measurements for the 2nd – 13th harmonics should be provided. The results need to comply with the limits of Table 2 of BS EN 61000-3-12 for single phase equipment and Table 3 of BS EN 61000-3-12 for three phase equipment. For three phase Power Generating Modules, measurements for all phases should be provided. For Power Generating Modules of Registered Capacity of greater than 75 A per phase (ie 50 kW) the installation must be designed in accordance with EREC G5. The rating of the Power Generating Module (per phase) should be provided below, and the Total Harmonic Distortion (THD) and Partial Weighted Harmonic Distortion (PWhd) should be provided at the bottom of this section.									
Model		EF HD-P1-12K0-S2A							
Power Generating Module tested to BS EN 61000-3-12									
Power Generating Module rating per phase (rpp)				12.0		kVA		Harmonic % = Measured Value (A) x 23/rating per phase (kVA)	
Single or three phase measurements (for single phase measurements, only complete L1 columns below)				Single-phase PV inverter					
Harmonic	At 45-55% of Registered Capacity						Limit in BS EN 61000-3-12		
	Measured Value (MV) in Amps			Measured Value (MV) in %					
	L1	L2	L3	L1	L2	L3	1 phase	3 phase	
2	0.292	--	--	0.56%	--	--	8%	8%	
3	0.847	--	--	1.62%	--	--	21.6%	Not stated	
4	0.139	--	--	0.27%	--	--	4%	4%	
5	0.276	--	--	0.53%	--	--	10.7%	10.7%	
6	0.070	--	--	0.13%	--	--	2.67%	2.67%	
7	0.181	--	--	0.35%	--	--	7.2%	7.2%	
8	0.055	--	--	0.11%	--	--	2%	2%	
9	0.107	--	--	0.20%	--	--	3.8%	Not stated	
10	0.036	--	--	0.07%	--	--	1.6%	1.6%	
11	0.136	--	--	0.26%	--	--	3.1%	3.1%	

12	0.053	--	--	0.10%	--	--	1.33%	1.33%
13	0.104	--	--	0.20%	--	--	2%	2%
THD	-	-	-	4.11%	--	--	23%	13%
PWHD	-	-	-	2.95%	--	--	23%	22%

THD = Total Harmonic Distortion

PWHD = Partial Weighted Harmonic Distortion

Harmonic	At 100% of Registered Capacity						Limit in BS EN 61000-3-12	
	Measured Value (MV) in Amps			Measured Value (MV) in %				
	L1	L2	L3	L1	L2	L3	1 phase	3 phase
2	0.257	-	-	0.49%	-	-	8%	8%
3	0.712	-	-	1.36%	-	-	21.6%	Not stated
4	0.183	-	-	0.35%	-	-	4%	4%
5	0.407	-	-	0.78%	-	-	10.7%	10.7%
6	0.090	-	-	0.17%	-	-	2.67%	2.67%
7	0.289	-	-	0.55%	-	-	7.2%	7.2%
8	0.071	-	-	0.14%	-	-	2%	2%
9	0.268	-	-	0.51%	-	-	3.8%	Not stated
10	0.036	-	-	0.07%	-	-	1.6%	1.6%
11	0.361	-	-	0.69%	-	-	3.1%	3.1%
12	0.070	-	-	0.13%	-	-	1.33%	1.33%
13	0.264	-	-	0.51%	-	-	2%	2%
THD	-	-	-	1.95%	-	-	23%	13%
PWHD	-	-	-	2.52%	-	-	23%	22%

THD = Total Harmonic Distortion

PWHD = Partial Weighted Harmonic Distortion

Model	EF HD-P1-8K0-S2A								
Power Generating Module tested to BS EN 61000-3-12									
Power Generating Module rating per phase (rpp)				8.0		kVA		Harmonic % = Measured Value (A) x 23/rating per phase (kVA)	
Single or three phase measurements (for single phase measurements, only complete L1 columns below)				Single-phase PV inverter					
Harmonic	At 45-55% of Registered Capacity						Limit in BS EN 61000-3-12		
	Measured Value (MV) in Amps			Measured Value (MV) in %					
	L1	L2	L3	L1	L2	L3	1 phase	3 phase	
2	0.135	-	-	0.39%	-	-	8%	8%	
3	0.730	-	-	2.10%	-	-	21.6%	Not stated	
4	0.075	-	-	0.22%	-	-	4%	4%	
5	0.144	-	-	0.41%	-	-	10.7%	10.7%	
6	0.063	-	-	0.18%	-	-	2.67%	2.67%	
7	0.116	-	-	0.33%	-	-	7.2%	7.2%	
8	0.050	-	-	0.14%	-	-	2%	2%	
9	0.108	-	-	0.31%	-	-	3.8%	Not stated	
10	0.050	-	-	0.14%	-	-	1.6%	1.6%	
11	0.204	-	-	0.59%	-	-	3.1%	3.1%	
12	0.046	-	-	0.13%	-	-	1.33%	1.33%	
13	0.092	-	-	0.26%	-	-	2%	2%	
THD	-	-	-	5.43%	-	-	23%	13%	
PWHD	-	-	-	5.35%	-	-	23%	22%	

THD = Total Harmonic Distortion

PWHD = Partial Weighted Harmonic Distortion

Harmonic	At 100% of Registered Capacity						Limit in BS EN 61000-3-12	
	Measured Value (MV) in Amps			Measured Value (MV) in %			1 phase	3 phase
	L1	L2	L3	L1	L2	L3		
2	0.329	-	-	0.94%	-	-	8%	8%
3	0.862	-	-	2.48%	-	-	21.6%	Not stated
4	0.154	-	-	0.44%	-	-	4%	4%
5	0.307	-	-	0.88%	-	-	10.7%	10.7%
6	0.079	-	-	0.23%	-	-	2.67%	2.67%
7	0.234	-	-	0.67%	-	-	7.2%	7.2%
8	0.054	-	-	0.15%	-	-	2%	2%
9	0.161	-	-	0.46%	-	-	3.8%	Not stated
10	0.038	-	-	0.11%	-	-	1.6%	1.6%
11	0.280	-	-	0.81%	-	-	3.1%	3.1%
12	0.049	-	-	0.14%	-	-	1.33%	1.33%
13	0.168	-	-	0.48%	-	-	2%	2%
THD	-	-	-	3.34%	-	-	23%	13%
PWHD	-	-	-	4.28%	-	-	23%	22%

THD = Total Harmonic Distortion

PWHD = Partial Weighted Harmonic Distortion

3. Power Quality – Voltage fluctuations and Flicker:								P	
For Power Generating Modules of Registered Capacity of less than 75 A per phase (ie 50 kW) these tests should be undertaken in accordance with Annex A.7.1.4.3. Results should be normalised to a standard source impedance, or if this results in figures above the limits set in BS EN 61000-3-11 to a suitable Maximum Impedance. For Power Generating Modules of Registered Capacity of greater than 75 A per phase (ie 50 kW) the installation must be designed in accordance with EREC P28. The standard test impedance is 0.4 Ω for a single phase Power Generating Module (and for a two phase unit in a three phase system) and 0.24 Ω for a three phase Power Generating Module (and for a two phase unit in a split phase system). Please ensure that both test and standard impedance are completed on this form. If the test impedance (or the measured impedance) is different to the standard impedance, it must be normalised to the standard impedance as follows (where the Power Factor of the generation output is 0.98 or above): d max normalised value = (Standard impedance / Measured impedance) x Measured value. Where the Power Factor of the output is under 0.98 then the X to R ratio of the test impedance should be close to that of the standard impedance. The stopping test should be a trip from full load operation. The duration of these tests needs to comply with the particular requirements set out in the testing notes for the technology under test. The test date and location must be declared.									
Model:	EF HD-P1-12K0-S2A								
	Starting			Stopping			Running		
	d(max)	d(c)	d(t)	d(max)	d(c)	d(t)	P _{st}	P _{lt} 2 hours	
Measured Values at test impedance	0.000	0	0	1.49	0.013	0	0.545	0.498	
Normalised to standard impedance	0.000	0	0	1.49	0.013	0	0.545	0.498	
Normalised to required maximum impedance	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Limits set under BS EN 61000-3-11	4%	3.3%	3.3%	4%	3.3%	3.3%	1.0	0.65	
Test Impedance	R	0.4		Ω	XI	0.25		Ω	

Standard Impedance	R	0.24 * 0.4 ^	Ω	XI	0.15 * 0.25 ^	Ω
Maximum Impedance	R	N/A #	Ω	XI	N/A #	Ω

Model:	EF HD-P1-8K0-S2A							
	Starting			Stopping			Running	
	d(max)	d(c)	d(t)	d(max)	d(c)	d(t)	P _{st}	P _{lt} 2 hours
Measured Values at test impedance	0.000	0	0	0.000	0	0	0.388	0.347
Normalised to standard impedance	0.000	0	0	0.000	0	0	0.388	0.347
Normalised to required maximum impedance	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Limits set under BS EN 61000-3-11	4%	3.3%	3.3%	4%	3.3%	3.3%	1.0	0.65
Test Impedance	R	0.4	Ω	XI	0.25	Ω		
Standard Impedance	R	0.24 * 0.4 ^	Ω	XI	0.15 * 0.25 ^	Ω		
Maximum Impedance	R	N/A #	Ω	XI	N/A #	Ω		
* Applies to three phase and split single phase Power Generating Modules. ^ Applies to single phase Power Generating Module and Power Generating Modules using two phases on a three phase system. Delete as appropriate.								

4. Power quality – DC injection:			P
The tests should be carried out on a single Generating Unit. Tests are to be carried out at three defined power levels $\pm 5\%$. At 230 V a 50 kW three phase Inverter has a current output of 217 A so DC limit is 543 mA. These tests should be 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) / Vphase. The % DC injection should not be greater than 0.25%.			
Model: EF HD-P1-12K0-S2A			
Test power level	10%	55%	100%
Recorded DC injection value in Amps	0.023	0.027	0.027
as % of rated AC current	0.04%	0.05%	0.05%
Limit	0.25%	0.25%	0.25%
Model: EF HD-P1-8K0-S2A			
Test power level	10%	55%	100%
Recorded DC injection value in Amps	0.017	0.016	0.013
as % of rated AC current	0.04%	0.05%	0.05%
Limit	0.25%	0.25%	0.25%

5. Power quality – Power Factor:			P
The tests should be carried out on a single Power Generating Module. Tests are to be carried out at three voltage levels and at Registered Capacity and the measured Power Factor must be greater than 0.95 to pass. Voltage to be maintained within $\pm 1.5\%$ of the stated level during the test. These tests should be undertaken in accordance with Annex A.7.1.4.2 Note that the value of voltage stated in brackets assumes a LV connection. This should be adjusted for HV as required.			
Model: EF HD-P1-12K0-S2A			
Voltage	0.94 pu (216.2 V)	1 pu (230 V)	1.1 pu (253 V)
Measured value	1.000	1.000	1.000
Power Factor Limit	>0.95	>0.95	>0.95

6. Protection – Frequency tests:						P
These tests should be carried out in accordance with the Annex A.7.1.2.3. For trip tests, frequency and time delay should be stated. For “no trip tests”, “no trip” can be stated.						
Model: EF HD-P1-12K0-S2A						
Function	Setting		Trip test		“No trip tests”	
	Frequency	Time delay	Frequency	Time delay	Frequency / time	Confirm no trip
U/F stage 1	47.5 Hz	20 s	47.49 Hz	20.017 s	47.7 Hz 30 s	No trip
U/F stage 2	47.0 Hz	0.5 s	46.99 Hz	0.542 s	47.2 Hz 19.5 s	No trip
					46.8 Hz 0.45 s	No trip
O/F	52.0 Hz	0.5 s	52.01 Hz	0.530 s	51.8 Hz 120.0 s	No trip
					52.2 Hz 0.45 s	No trip
Note: For frequency trip tests the frequency required to trip is the setting ± 0.1 Hz. In order to measure the time delay a larger deviation than the minimum required to operate the protection can be used. The “No trip tests” need to be carried out at the setting ± 0.2 Hz and for the relevant times as shown in the table above to ensure that the protection will not trip in error.						

7. Protection – Voltage tests:						P
These tests should be carried out in accordance with Annex A.7.1.2.2. For trip tests, voltage and time delay should be stated. For “no trip tests”, “no trip” can be stated.						
Note that the value of voltage stated below assumes a LV connection This should be adjusted for HV taking account of the VT ratio as required.						
Model: EF HD-P1-12K0-S2A						
Function	Setting		Trip test		“No trip tests”	
	Voltage	Time delay	Voltage	Time delay	Voltage / time	Confirm no trip
U/V	0.8 pu (184 V)	2.5 s	182.5 V	2.58 s	188 V 5.0 s	No trip
					180 V 2.45 s	No trip
O/V stage 1	1.14 pu (262.2 V)	1.0 s	261.5 V	1.09 s	258.2 V 5.0 s	No trip
O/V stage 2	1.19 pu (273.7 V)	0.5 s	273.1 V	0.528 s	269.7 V 0.95 s	No trip
					277.7 V 0.45 s	No trip
Note: For Voltage tests the Voltage required to trip is the setting ± 3.45 V. 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 ± 4 V and for the relevant times as shown in the table above to ensure that the protection will not trip in error.						

8. Protection – Loss of Mains test:									P
These tests should be carried out in accordance with BS EN 62116. Annex A.7.1.2.4. For test condition A, EUT output = 100 % P_n, test condition B, EUT output = 50 % to 66 % P_n, and test condition C, EUT output = 25 % to 33 % P_n.									
Model: EF HD-P1-12K0-S2A									
The following sub set of tests should be recorded in the following table.									
Test Power and imbalance	33% -5% Q Test 22	66% -5% Q Test 12	100% -5% P Test 5	33% +5% Q Test 31	66% +5% Q Test 21	100% +5% P Test 10			
Trip time. Limit is 0.5s	310.4 ms	267.3 ms	436.7 ms	450.7 ms	355.4 ms	436.7 ms			
No.	P _{EUT} ^{a)} (% of EUT rating)	Reactive load (% of Q _L)	P _{AC} ^{b)} (% of nominal)	Q _{AC} ^{c)} (% of nominal)	Run-on time (ms)	P _{EUT} (kW)	Actual Q _r	V _{DC} ^{d)} (V)	Remarks ^{e)}
1	100	100	0	0	499.1	12.0	0.99	733	Test A at BL
2	66	66	0	0	498.2	7.92	0.99	705	Test B at BL
3	33	33	0	0	498.7	3.96	1.00	602	Test C at BL
4	100	100	-5	-5	236.3	12.0	1.00	733	Test A at IB
5	100	100	-5	0	436.7	12.0	1.02	733	Test A at IB
6	100	100	-5	+5	338.0	12.0	1.04	733	Test A at IB
7	100	100	0	-5	217.4	12.0	0.96	733	Test A at IB
8	100	100	0	+5	337.2	12.0	1.01	733	Test A at IB
9	100	100	+5	-5	230.6	12.0	0.92	733	Test A at IB
10	100	100	+5	0	311.3	12.0	0.94	733	Test A at IB
11	100	100	+5	+5	330.6	12.0	0.96	733	Test A at IB
12	66	66	0	-5	267.3	7.92	0.95	705	Test B at IB
13	66	66	0	-4	273.6	7.92	0.96	705	Test B at IB
14	66	66	0	-3	301.4	7.92	0.97	705	Test B at IB
15	66	66	0	-2	351.0	7.92	0.97	705	Test B at IB
16	66	66	0	-1	489.2	7.92	0.98	705	Test B at IB
17	66	66	0	+1	304.5	7.92	1.00	705	Test B at IB
18	66	66	0	+2	449.8	7.92	1.01	705	Test B at IB
19	66	66	0	+3	410.3	7.92	1.01	705	Test B at IB

20	66	66	0	+4	377.0	7.92	1.02	705	Test B at IB
21	66	66	0	+5	355.4	7.92	1.03	705	Test B at IB
22	33	33	0	-5	310.4	3.96	0.92	602	Test B at IB
23	33	33	0	-4	345.7	3.96	0.93	602	Test C at IB
24	33	33	0	-3	377.4	3.96	0.95	602	Test C at IB
25	33	33	0	-2	409.1	3.96	0.96	602	Test C at IB
26	33	33	0	-1	351.1	3.96	0.98	602	Test C at IB
27	33	33	0	+1	393.1	3.96	1.01	602	Test C at IB
28	33	33	0	+2	398.4	3.96	1.02	602	Test C at IB
29	33	33	0	+3	351.1	3.96	1.03	602	Test C at IB
30	33	33	0	+4	377.4	3.96	1.05	602	Test C at IB
31	33	33	0	+5	303.7	3.96	1.06	602	Test C at IB

Note:

- a) PEUT: EUT output power.
- b) Pac: Active power flow at S1 in Figure 1. Positive means power from EUT to utility. Nominal is the 0 % test condition value.
- c) Q_{ac} : Reactive power flow at S1 in Figure 1. Positive means power from EUT to utility. Nominal is the 0 % test condition value.
- d) For test condition A, > 75 % of rated input voltage range used, for test condition B, 50 % of rated input voltage range, ± 10 % used, for test condition C, < 20 % of rated input voltage range used. Based on EUT rated input operating range. For example, if range is between X volts and Y volts, 75 % of range = $X + 0,75 \times (Y - X)$. Y shall not exceed $0,8 \times$ EUT maximum system voltage (i.e., maximum allowable array open circuit voltage). In any case, the EUT should not be operated outside of its allowable input voltage range.
- e) BL: Balance condition, IB: Imbalance condition.

If the device requires additional shut down time (beyond 0.5 s but less than 1 s) then this should be stated on this form.

8. Loss of Mains Protection, Vector Shift Stability test:			P
This test should be carried out in accordance with Annex A.7.1.2.6. Confirmation is required that the Power Generating Module does not trip under positive / negative vector shift.			
Model: EF HD-P1-12K0-S2A			
	Start Frequency	Change	Confirm no trip
Positive Vector Shift	49.5 Hz	+50 degrees	No trip
Negative Vector Shift	50.5 Hz	- 50 degrees	No trip
8. Loss of Mains Protection, RoCoF Stability test:			P
This test should be carried out in accordance with Annex A.7.1.2.6. Confirmation is required that the Power Generating Module does not trip for the duration of the ramp up and ramp down test.			
Model: EF HD-P1-12K0-S2A			
Ramp range	Test frequency ramp:	Test Duration	Confirm no trip
49.0 Hz to 51.0 Hz	+0.95 Hzs ⁻¹	2.10 s	No trip
51.0 Hz to 49.0 Hz	-0.95 Hzs ⁻¹	2.10 s	No trip

9. Limited Frequency Sensitive Mode – Over frequency test:					P
The test should be carried out using the specific threshold frequency of 50.4 Hz and Droop of 10%. This test should be carried out in accordance with A.7.1.3, which also contains the measurement tolerances.					
Active Power response to rising frequency/time plots are attached if frequency injection tests are undertaken in accordance with Annex A.7.2.4					N
Model: EF HD-P1-12K0-S2A					
Alternatively, simulation results should be noted below:					
Test sequence at Registered Capacity >80%	Measured Active Power Output (kW)	Frequency (Hz)	Calculated droop (%)	Primary Power Source	Active Power Gradient
Step a) 50.00 Hz ±0.01 Hz	11.76	50.00	-	Photovoltaic array simulator	-
Step b) 50.45 Hz ±0.05 Hz	11.65	50.45	10.13		-
Step c) 50.70 Hz ±0.10 Hz	11.04	50.70	9.88		-
Step d) 51.15 Hz ±0.05 Hz	9.96	51.14	9.86		-
Step e) 50.70 Hz ±0.10 Hz	11.04	50.70	9.83		-
Step f) 50.45 Hz ±0.05 Hz	11.65	50.45	9.92		-
Step g) 50.00 Hz ±0.01 Hz	11.76	50.00	10.77		-
Test sequence at Registered Capacity 40-60%	Measured Active Power Output (kW)	Frequency (Hz)	Calculated droop (%)	Primary Power Source	Active Power Gradient
Step a) 50.00 Hz ±0.01 Hz	5.78	50.00	--	Photovoltaic array simulator	-
Step b) 50.45 Hz ±0.05 Hz	5.65	50.45	9.10		-
Step c) 50.70 Hz ±0.10 Hz	5.05	50.70	9.91		-
Step d) 51.15 Hz ±0.05 Hz	4.13	51.15	11.72		-
Step e) 50.70 Hz ±0.10 Hz	5.06	50.70	11.56		-
Step f) 50.45 Hz ±0.05 Hz	5.66	50.45	10.00		-
Step g) 50.00 Hz ±0.01 Hz	5.78	50.00	9.55		-
The frequency at each step should be maintained for at least one minute and the Active Power reduction in the form of a gradient determined and assessed for compliance with paragraph 11.2.3. The Droop should be determined from the measurements between 50.4 Hz and 51.15 Hz. The allowed tolerance for the frequency measurement shall be ± 0.05 Hz. The allowed tolerance for Active Power output measurement shall be ±10% of the required change in Active Power. The resulting overall tolerance range for a nominal 10% Droop is +2.8% and – 1.5%, ie a Droop less than 12.8% and greater than 8.5%.					

10. Protection – Re-connection timer				P	
Model: EF HD-P1-12K0-S2A					
Test should prove that the reconnection sequence starts after a minimum delay of 20 s for restoration of voltage and frequency to within the stage 1 settings of Table 10.1. Both the time delay setting and the measured delay should be provided in this form; both should be greater than 20 s to pass. Confirmation should be provided that the Power Generating Module does not reconnect at the voltage and frequency settings below; a statement of “no reconnection” can be made.					
Time delay setting	Measured delay	Checks on no reconnection when voltage or frequency is brought to just outside stage 1 limits of Table 10.1.			
50 s	51.6 s	At 1.16 pu (266.2 V LV connection, 127.6 V HV connection assuming 110 V ph-ph VT)	At 0.78 pu (180.0 V LV connection, 85.8 V HV connection assuming 110 V ph-ph VT)	At 47.4 Hz	At 52.1 Hz
Confirmation that the Power Generating Module does not re-connect.		No reconnection	No reconnection	No reconnection	No reconnection

11. Fault level contribution:			P
These tests shall be carried out in accordance with EREC G99 Annex A.7.1.5. Please complete each entry, even if the contribution to the fault level is zero.			
Model: EF HD-P1-12K0-S2A			
For Inverter output			
Time after fault	Volts	Amps	
20ms	0	0	
100ms	0	0	
250ms	0	0	
500ms	0	0	
Time to trip	0.011 s	In seconds	

12. Self-Monitoring solid state switching: No specified test requirements. Refer to Annex A.7.1.6.	
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 s.	N/A
13. Wiring functional tests: If required by para 15.2.1.	
Confirm that the relevant test schedule is attached (tests to be undertaken at time of commissioning)	N/A
14. Logic interface (input port).	
Confirm that an input port is provided and can be used to shut down the module.	Yes
Provide high level description of logic interface, e.g. details in 11.1.3.1 such as AC or DC signal (the additional comments box below can be used)	Yes
15. Cyber security	
Confirm that the Power Generating Module has been designed to comply with cyber security requirements, as detailed in 9.1.7.	Yes Manufacturer's declaration provided
Additional comments.	
To open or short pin14 and pin16 of logic interface port to control the inverter to normal or shutdown active power of output. A logic interface is provided that can be operated by an external switch or contactor. Users can install by themselves. Users install the switch connected to pin14 and pin16 of interface port and just need control the switch signal causing the switch to open or short. When the switch is open, the inverter will operate normally. When the switch is closed, the inverter will cease to export active power immediately. The signal from the inverter that is being switched is DC (maximum value 3.3V).	

End