ATTESTATION OF CONFORMITY

Issued to:	EcoFlow Inc. RM 401,Plant #1, Runheng Industrial Zone, Fuyuanyi Road, Zhancheng Community, Fuhai Street, Bao'an District, Shenzhen City, Guangdong Province, China
For the product:	EcoFlow PowerOcean Plus CSL Control System
Trade name:	
Type/Model:	EF HD-P3-29K9-S1, EF HD-P3-25K0-S1, EF HD-P3-20K0-S1, EF HD-P3-15K0-S1
Ratings:	See annex
Manufactured by:	EcoFlow Inc. RM 401,Plant #1, Runheng Industrial Zone, Fuyuanyi Road, Zhancheng Community, Fuhai Street, Bao'an District, Shenzhen City, Guangdong Province,China
Subject:	Complete evaluation of electrical system of the appliances
Requirements:	ENA EREC G100 A2 Issue 2:2023

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 4929472.51.

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.

This document does not authorize the use of any DEKRA approved mark.

Arnhem, 15 April 2025 Number: 4929472.02AOC V1.0

DEKRA Testing and Certification (Shanghai) Ltd.,
Guangzhou Branch

Miranda Zhou
Certification Manager

© Integral publication of this attestation and adjoining reports is allowed

DEKRA Testing and Certification (Shanghai) Ltd., Guangzhou Branch
Block 5, No.3, Qiyun Road, Huangpu District, Guangzhou, Guangdong, China
T +86 20 6661 2000 F +86 20 6661 2001 www.dekra-product-safety.com

Annex

Document no. : 4929472.02AOC V1.0

Ratings:

Model		EF HD-P3-29K9-S1	EF HD-P3-25K0-S1	EF HD-P3-20K0-S1	EF HD-P3-15K0-S1
PV Input	VMAX PV [VDC]	1000			
	ISC PV [ADC]	PV1 19/19,PV2&3 24/24			
	MPPT Voltage Range VMPP [VDC]	200-850			
	Max. Input Current IMAX [ADC]	PV1 16/16,PV2&3 16/16			
	MPPT Full Power Voltage Range [VDC]	200-850			
	Number of MPPT	3			
	String per MPPT	PV1 2,PV2/3 1/1			
	Overvoltage Category (OVC)	II			
Battery	Rated input voltage [VDC]	800			
	Input voltage range [VDC]	750~960			
	Max. charge/ Discharge current [ADC]	40.0	33.3	26.6	20.0
	Max. charge/ Discharge Power [kW]	29.9	25.0	20.0	15.0
	Battery Type	Li-ion			
AC Input (Side Grid)	Rated Output Voltage [VAC]	230/400,3L/N/PE			
	Rated Output Frequency [Hz]	50			
	Max. Input Current [AAC]	63.0			
	Power Factor cosφ [λ]	-0.8 leading to +0.8 lagging (adjustable)			
	Overvoltage Category (OVC)	III			
AC output (Grid Side)	Rated Output Voltage [VAC]	230/400, 3L/N/PE			
	Rated Output Frequency [Hz]	50			
	Rated Output Power [kW]	29.9	25	20	15
	Max. Apparent power [kVA]	29.9	25	20	15
	Max. Output Current [AAC]	43.3	36.2	29	21.7
	Overvoltage Category (OVC)	III			
AC Output	Rated Output Voltage [VAC]	230/400, 3L/N/PE			
	Rated Output Frequency [Hz]	50			
	Rated Output Current [AAC]	43.3	36.2	29.0	21.7
	Rated Output Power [kW]	29.9	25	20	15
	Max. Apparent power [kVA]	35.88@1s	30.0@1s	24.0@1s	18.0@1s
	Max. Output Current (off-grid) [AAC]	52.0@1s	43.4@1s	34.8@1s	26.0@1s
	Overvoltage Category (OVC)	III			
General	Type of inverter	Non-Isolated			
	Type of NS Protection	Integrated			
	Protective Class	Class I			
	Enclosure Protection (IP)	IP65			
	Operating Temperature Range [ºC]	-20°C to +50°C (45°C with derating)			
	Pollution degree	PD2(internal), PD3(outside)			
	Altitude [m]	3000			

	Size (W*H*D) [mm]	636*235*498 (without trim cover)
	Weight [kg]	41

G100/2 - Form B - Compliance Verification Report for Customer Export or Import Limitation Schemes	
Extract form test report number:	4929472.51
CLS Designation	EcoFlow PowerOcean Plus CSL Control System
Manufacturer name	EcoFlow Inc.
Address	RM 401,Plant #1, Runheng Industrial Zone, Fuyuanyi Road, Zhancheng Community, Fuhai Street, Bao'an District, Shenzhen City, Guangdong Province, China
CLS information:	
Hybrid Inverter	EF HD-P3- 29K9-S1, EF HD-P3- 25K0-S1, EF HD-P3- 20K0-S1, EF HD-P3- 15K0-S1
Three-Phase Smart Meter	YDS60-80 SDM630Modbus V2 DTSU666 ADL400N-CT/D10 ADL400N-CT-D16 ADL400N-CT/D24 EF EM-P3

Export/Import capabilities			
Export	Y / ~~N~~	Import	Y / ~~N~~

Description of Operation

EREC G100 section 4.2 requires a description of the **CLS**, and schematic diagram, to be provided to the **Customer**. Please provide that description and the diagram here.

EcoFlow design and build distribution and control panels for renewable energy. These include G99 and G100 panels, the following describes our approach to implementing and testing engineering recommendation G100 Issue 2 Amendment 2.

A CT/VT connected metering panel will be installed at the Customer's Point of Connection where we can monitor the Customer's imported and exported energy, power, voltage and current values. The CLS will read the PoC import/export power meter at a rate of 1Hz. For sites with multiple PoCs, a separate meter will be installed at each PoC and our software will summate the values to calculate the overall import/export value.

A MIL/MEL setpoint will be agreed with the DNO and this will be applied to the reverse power relay.

State 1

In this mode the control computer reads the site import/export values with respect to the MELs/MILs and modulates generation and load from the system to keep the current flow at the Point of Connection within those limits. In parallel the control computer is monitoring voltage at the Point of Connection and also currents on each phase (that they are not reading a continuous zero value, which would indicate a potential loss of CT).

State 2

If the MIL/MEL setpoint value is breached for over 60 seconds, a signal will be sent to the Control Unit PLC to trip the power generating device circuit breaker.

Voltage limits will be coded into the PLC (Programmable Logic Controller) program in respect of Section 4.4.2 Voltage Limits in EREC G100/2. If setpoint values are breached for over 15 seconds, the master PLC will send a command to instantly trip the power generating device circuit breaker.

The CLS will respond typically within 1 second, based on the polling rate to the PoC meter(s). In some cases where commands are sent to power generating devices and the devices do not respond quickly enough, the reverse power relay will ensure any excursion over 60 seconds will enter into State 3.

Excessive State 2 operation will result in a State 3 mode (Failed State - where generation is tripped off), where operation within State 2 is recorded over 15 seconds and under 60 seconds, for either more than three times within 24 hours or the time between any two excursions is under 10 minutes (measured from the time of re-entry into State 1 operation from State 2 operation following the first excursion).;

State 3

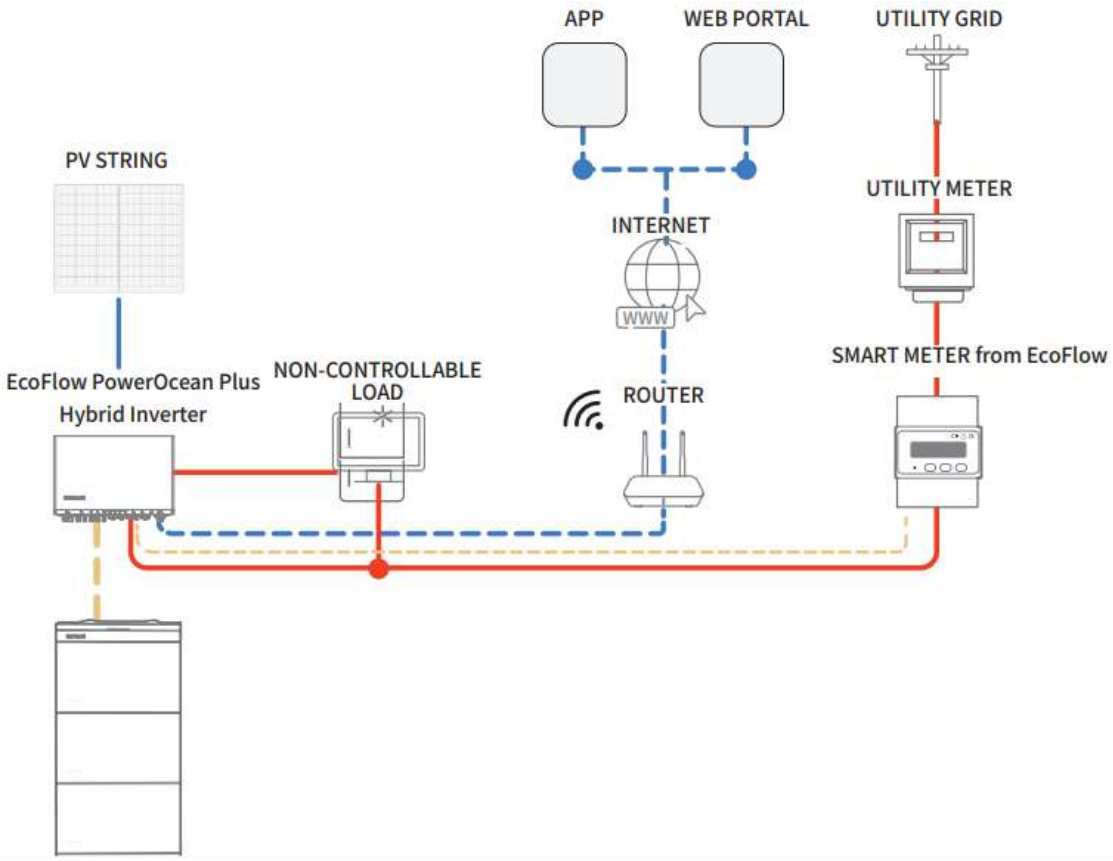
The CLS runs on a master/slave hierarchy where the master PLC (Control Unit) will send commands to slave PLCs that will then send commands to the power generating devices. The master PLC sends out a heartbeat signal to the slaves. When there is no communication between master/slave PLC, the slave PLC will see that there is no communication and send an instant trip command to the power generation device within 15 seconds.

The power generating device circuit breaker is set to a fail-safe state, where it relies on a signal from the CLS to close the circuit breaker, when there is no signal from the CLS, the power generating device circuit breaker is held open, making it impossible to export or import energy onto the DNO network.

When there is loss of power to the slave PLC, the power generating device circuit breaker will be held open. Loss of power to any control PLC will result in an immediate trip as the generation device circuit breaker Under Voltage Release coil will de-energize.

Notifications are automatically logged and notified to inverter and the customer when there is any State 2 or State 3 operation.

Operational Diagram



Communications Media

Document the provisions made for the use of various communication media, and both the inherent characteristics and the design steps made to ensure security and reliability.

The CLS used various methods of communication, depending on site specific equipment, but will consist of:

- Dedicated hardwire MODBUS RTU - RS485
- Dedicated hardwire FibreOptic
- Dedicated hardwire MODBUS TCP - Ethernet
- Dedicated hardwire digital input/output signals
- Dedicated hardwire analogue input/output signals

All devices connected to the CLS are assigned with a static IP.

The CLS operators over a private LAN.

The CLS has a private VPN operating over a dedicated 4G modem for remote monitoring from our secure server.

All devices are password protected and the passwords are not shared with the customer.

Cyber Security

Confirm that the **Manufacturer** or **Installer** of the **CLS** has provided a statement describing how the **CLS** has been designed to comply with cyber security requirements, as detailed in section 4.7.

The inverter complies with cyber security requirements of EN 303 645 by Security Evaluation Report no. NIE: 6203735RCS.001 issued by DEKRA Testing and Certification, S.A.U. and certificate no. 6203735.01AOC issued by DEKRA Testing and Certification (Shanghai) Ltd..

Power Quality Requirements

Where the **CLS** includes the power electronics that controls generation or loads (as opposed to the power

electronics being included in **Devices** that are subject to their own power quality compliance requirements) please submit the harmonic and disturbance information here as required by EREC G5 and EREC P28.
The CLS controls the power of the relevant power generation/load modules by interacting with the generator system, usually through a communication interface, without any influence on the power quality of the generation system, which meets the requirements of the relevant standards (e.g. BS EN 61000-3-2 and/or BS EN 61000-3-12) or provides harmonic data in accordance with EREC G5 and EREC P28. For customers using the G100 solution provided by EcoFlow, harmonic documentation in accordance with EREC G5 and EREC P28 can be provided by the installer to confirm that the entire system including the generator and generator control system meets the requirements of the standard.
Fail Safe
CLS internal failure: please submit here the description of the internal **Fail Safe** design and operation. Please also document how it has been demonstrated, including the non-volatile recording of times and numbers of state 2 operations, and confirm the overall response of the **CLS** to this internal failure.
The CLS is intrinsically failsafe. The system is built over a fundamental communication system which is monitored over a heartbeat, whereby the system will shut down generation to zero (or an agreed limit with the DNO) by default within 15 seconds if the heartbeat is not detected. In the event of any communication interruption or power loss of any device, the generation will go into a default state, being disconnected from the grid supply point.
Communication and power supply failures between **Components** and **Devices**. Please document here compliance with EREC G100 section 5.5.

Component/Device number/description	Communication failure test	Power supply failure test
Current Transducer	Communication cable unplugged /disconnected System enters stage 3 within 5 seconds	--
Smart Meter	Communication cable unplugged /disconnected System enters stage 3 within 5 seconds	Power supply cable unplugged /disconnected System enters stage 3 within 5 seconds
Inverter	Communication cable unplugged /disconnected System enters stage 3 within 5 seconds	Inverter disconnected from grid within 5 seconds

Operational Tests						
In accordance with EREC G100 section 5.6 undertake the tests A and B to confirm correct operation in state 1 and state 2, that transition into state 3 occurs as required, and that behaviour in state 3 is also as required.						
Test A						
Nominal Export Limit (for type tests this will be at maximum, minimum and one intermediate setting) in Amp:					4.35 A (3 kW)*	
Nominal Import Limit (for type tests this will be at maximum, minimum and one intermediate setting) in Amp:					4.35 A (3 kW)*	
No	Starting level	Step value	**CLS** registers change in level?	**CLS** and/or **Component** and/or **Device** initiates correct response of ≥ 5%?	Duration of step in test	Correct state 1/state 2 operation
1	4.13 A (95% of MEL)	4.56 A (105% of MEL)	Yes, CLS in State 2 State 2 counter increments +1 24-hour timer and 10-minute timer starts	Yes, reacted in 3.7s	58 s	Yes, State 1
2	--	--	--	--	--	--
3	4.13 A (95% of MEL)	5.22 A (120% of MEL)	Yes, CLS in State 2 State 2 counter increments +1 24-hour timer and 10-minute timer starts	Yes, reacted in 5.0s	58 s	Yes, State 1
4	-4.13 A (95% of MIL)	-4.56 A (105% of MIL)	Yes, CLS in State 2 State 2 counter increments +1 24-hour timer and 10-minute timer starts	No response of import limit	58 s	Yes, State 1
5	--	--	--	--	--	--
6	-4.13 A (95% of MIL)	-5.22 A (120% of MIL)	Yes, CLS in State 2 State 2 counter increments +1 24-hour timer and 10-minute timer starts	No response of import limit	58 s	Yes, State 1
Test B						
Nominal Export Limit:					4.35 A (3 kW)*	
Nominal Import Limit					4.35 A (3 kW)*	
No	Starting	Step	**CLS** registers change in	**CLS** and/or	Duration	Correct state

	level	value	level?	**Component** and/or **Device** initiates correct response of ≥ 5%?	of step in test	3 operation
7	4.13 A (95% of MEL)	4.56 A (105% of MEL)	Yes, system will stay in State 2 for <60s and will enter State 3 for >60s. State 2 counter increments +1 State 3 counter increments +1 4-hour countdown begins System to remain in State 3 until reset is enabled after 4-hour countdown has finished.	Yes, reacted in 1.8s	62 s	Yes
8	-4.13 A (95% of MIL)	-4.56 A (105% of MIL)	Yes, system will stay in State 2 for <60s and will enter State 3 for >60s. State 2 counter increments +1 State 3 counter increments +1 4-hour countdown begins System to remain in State 3 until reset is enabled after 4-hour countdown has finished.	No response of import limit	62 s	Yes
NOTE: * Random value, adjustable from 0 to 43.33A (29900W).						

State 3 Reset
These tests are to demonstrate compliance with section EREC G100 4.5.2. Please document how the reset from state 3 to state 1 has been demonstrated. Please include how the reset is achieved. Please confirm that for **CLSs** to be installed in **Domestic installations** three (3) resets causes lockout or that for non-domestic installations lockout can only be reset after four hours. Please explain how lockout is reset.
The monitoring platform will alert the inverter and the customer of a State 3 occurrence. The inverter can then interrogate the data to understand the cause for the State 3 operation. Once cause is identified - the CLS can be reset remotely or locally on site by the inverter or the customer. For non-domestic installation, the control system will start a 4-hour timer after a State 3 occurrence. This will deactivate the reset key switch until the timer has expired. Turning the key within the 4-hour will not reset the system.

End