



# MANUFACTURER'S ELS PRODUCT DECLARATION FOR ESB NETWORKS FORM NC7-03-R1

ESB Networks DAC requires the information requested on this form to manage your electricity supply connection. As the Distribution System Operator, this information is also required to enable ESB Networks DAC to manage the electricity network. The data controller is ESB Networks DAC. Please refer to our privacy policy at <https://esbnetworks.ie/privacy>

All mandatory requirements in this form are as those required by ESB Networks Standard 'Conditions Governing the Connection and Operation of Export Limiting Schemes' (DOC-250221-GBT)

'Conditions Governing the Connection and Operation of Export Limiting Schemes' (DOC-250221-GBT) defines the technical design requirements for Export Limitation Schemes which limit the net site export to below an agreed maximum and are installed on the Customer's side of the Connection Point.

While DOC-250221-GBT does not describe a type test procedure, it does describe a number of system requirements. This document describes how the ELS product (outlined in Part 1 below) performs relative to key ESB Networks ELS requirements.

**Please complete Parts 1 to 9 below**

## PART 1: PRODUCT DETAILS

Name of Product: Export power Manger	Model No.: EPM3-5G;EPM3-5G-PLUS;EPM3-5G-PRO
Manufacturer: Ginlong Technologies Co., Ltd.	Make: Solis

**Where Manufacturer's ESB Networks ELS Product Declaration Form is unavailable an Export Limiting Relay shall be installed as per ESB Networks Standard 'Conditions Governing the Connection and Operation of Export Limiting Schemes' (DOC-250221-GBT)**

## PART 2: DESCRIPTION OF OPERATION

ESB Networks ELS Requirement: *A description of the scheme, its settings, and a single line diagram shall be permanently displayed on site.*  
 When installed, the ELS product (as outlined in Part 1) operates as described below:

Please insert details of operation below or if attached as PDF to this form tick here:

[https://www.solisinverters.com/uploads/file/Solis\\_Manual\\_EPM-5G%20Series\\_V1,0\(20230518\).pdf](https://www.solisinverters.com/uploads/file/Solis_Manual_EPM-5G%20Series_V1,0(20230518).pdf)

## PART 3: POWER QUALITY REQUIREMENTS

**ESB Networks ELS Requirements:**

Where the ELS product (as outlined in Part 1) relies on power electronics (e.g. Converters etc) to control the load it shall also provide information demonstrating compliance with the harmonics standards ([I.S. EN 61000-3-2](#) and/or [I.S. EN 61000-3-12](#)) or provide data on the harmonic currents produced in accordance with the format in the Distribution Code i.e. individual harmonic current and Total Harmonic Distortion.

It is necessary to confirm the ELS product(as outlined in Part 1) complies with harmonic standards cited in the Distribution Code and product standards cited in <a href="#">I.S. EN 50549-1</a> .	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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The Manufacturer (as outlined in Part 1) confirms that the ELS product (as outlined in Part 1) complies with the requirements of the harmonics standards listed above or that the harmonic data has been provided.

## PART 4: SYSTEM SCHEMATIC

The ELS product (as outlined in Part 1) is formed of the following main elements:  
 Document the main elements and provide a system schematic or if attached as PDF to this form tick here:

1. Main elements:

Export power Manager:EPM3-5G; EPM3-5G-PLUS;EPM3-5G-PRO  
 CT: \*\*\*\*A/5A  
 Three phase PV inverter: Solis-3P(3-20)K-4G;S5-GR3P(3-20)K;Solis-(25-40)K-5G;S5-GC(25-40)K;S5-GC(50-60)K  
 Solis-(80-110)K-5G;S5-GC(80-110)K;Solis-(80-110)K-5G-PRO

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2. System Schematic

**PART 5: COMPONENT INTERCONNECTION/FAILSAFE OPERATION**

**ESB Networks ELS Requirements:** The ELS product (as outlined in Part 1) may be formed of discrete units or integrated into a single packaged scheme. Where discrete units are used, they should preferably be interconnected using metallic or fibre optic cables. Other means of connection such as Wi-Fi are not deemed 'Fail Safe' and require installation of Export Limiting Relay. Irrespective of the media used for interconnecting between the discrete units, if the communication path fails the generation output shall be reduced to the allowed MEC within 5 seconds time to prevent the Agreed Export Capacity from being exceeded.

Description of the fail-safe functionality (Interruption of sensor signals, disconnection of load, loss of power, internal fault detection etc.)

5.1 Describe Component Interconnection here:

Text or diagram or if attached as PDF to this form tick here:

Connections between the Export power Manager and inverter are completed using a MODBUS RTU connection, utilizing CAT5 cabling or better. A simple Data + / Data - / Ground is required for the connection.

In the event of a loss of communication between the inverter and smart meter the inverter will reduce its generation either to 0W or to a predetermined value, such as 6000W. (In the event that the agreed export capacity is 6000W and the system size is greater than 6000W) This value is set in the initial commissioning stages and is locked behind a password to prevent unauthorized changes. The same process occurs in the event of a loss of communication between the smart meter and CTs as well as between any of the slave inverters connected to the master device.

All power reductions are implemented within 5 seconds of loss of communication.

**5.2 System Fail Safe Test Results:**

Please indicate appropriate answer

No.	Test	System Response	Time <5s	Pass
1	Remove Power Supply to PMU	Reduce output power to 0W	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2	Remove Power Supply to CU	Reduce output power to 0W	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
3	Remove Power Supply to all Energy Source Units	Reduce output power to 0W	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
4	Remove power Supply to all DCUs	N/A-no demand control used	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
5	Remove Power Supply to all Communication Hub Switches	N/A-no demand control used	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
6	Unplug PMU- CU Communications Cable	Reduce output power to 0W	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
7	Unplug CU – ESIU Communications Cable (at ESIU end)	N/A-no demand control used	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
8	Unplug all ESIU –Communication Cables in turn	N/A-no demand control used	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
9	Unplug CU – DCU Comms. Cable for each DCU unit (at DCU end)	N/A-no demand control used	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
10	Unplug DCU – Load Comms cable	Reduce output power to 0W	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

The purpose of the 'Fail Safe' Tests is to ensure that if any part of the ELS fail, the exported power does not exceed the MEC by more than 5% for more than 5 seconds.

It is a fixed requirement that at no time during the 'Fail Safe' sequence shall the exported power rise above the MEC by more than 5% for more than 5 seconds.

**PART 6: ACCURACY AND RESPONSE TIME**

ESB Networks ELS requirements:

The overall accuracy of the ELS product (as outlined in Part 1) with regard to measurement and control of MEC shall be determined by the manufacturer of the system and published within its operating manual. In carrying out the functional tests these tolerances shall be taken into account.

Functional testing – Injection testing

Export limit conditions can be simulated by temporarily connecting the PMU to a calibrated injection test set.

When using an injection test set, there is no feedback loop between the ELS product (as outlined in Part 1) and the injection test set. This has two significant implications for the test process:

1. As soon as the ELS begins to operate, because it sees no corresponding decrease in export levels, the control loop continues running until the Energy Source Units output is reduced to the programmed export capacity or below.
2. To ensure that the ELS is reacting by the correct amount and within an acceptable time period, a step change needs to be applied by the test set to the PMU.

The following Step Change test sequence shall be performed:

Please indicate appropriate answer

No.	Test	Step Change Final Value	Outcome	Pass / Fail
1.	Step change A 95% to 105%	Export = 105% of programmed export limit value	At 95% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 100% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 110% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
	Step change A 95% to 110%	Export = 105% of programmed export limit value	At 95% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 100% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 110% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
	Step change A 95% to 120%	Export = 105% of programmed export limit value	At 95% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 100% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 110% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
2.	Step change B 95% to 105%	Export = 110% of programmed export limit value	At 95% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 100% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 110% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
	Step change B 95% to 110%	Export = 110% of programmed export limit value	At 95% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 100% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 110% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
	Step change B 95% to 120%	Export = 110% of programmed export limit value	At 95% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 100% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 110% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
3.	Step change C 95% to 105%	Export = 120% of programmed export limit value	At 95% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 100% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 110% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
	Step change C 95% to 110%	Export = 120% of programmed export limit value	At 95% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 100% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 110% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
	Step change C 95% to 120%	Export = 120% of programmed export limit value	At 95% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 100% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 110% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>

The procedure for performing the test is as follows:

- Initially apply 100% of nominal voltage and inject current (at unity power factor) to mimic an exported Active Power equivalent to 95% of the export limit setting. Check that the ELS product(as outlined in Part 1) does not operate.
- Step up the current to give an export Active Power equivalent to 105% of the export Active Power limit (for Test A), Check that change in export level is "seen" by the PMU.
- Check that the Active Power exported by the generation reduces to a value at least 5% below the export limit setting within the specified reaction time. The test shall be repeated at the maximum statutory voltage (i.e. at 110% of nominal voltage at LV) and also at the minimum voltage limit (i.e. 90% of nominal voltage for LV connections).
- All the above tests shall also be repeated for step increases from 95% to 110% of the export limit and from 95% to 120% of the export limit as detailed above.

When injection testing is complete, the correct orientation of any current monitoring connections (including CT orientations) which may have been removed for the test shall be checked and verified as correct.

Remark: Solis inverters comply with ESB networks ELS requirement DOC-250221-GBT section 2.6 accuracy no more than 5% difference.

#### PART 6A: CONFIRMATION OF OPERATION OF ELS TO LIMIT EXPORT AS REQUIRED

ESB Networks ELS requirements:

The ELS product(as outlined in Part 1) shall detect an excursion and reduce the export to the MEC or less, within 5 seconds.

Under normal operating conditions, the ELS product (as outlined in Part 1) response time is less than 5 seconds.

Under loss of communications, or loss of power to any part of the ELS product (as outlined in Part 1), response time is less than 5 seconds.

Operation of above is confirmed	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operating Manual is available	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
The settings applied to ELS product(as outlined in Part 1) have taken account of the published (DOC-250221-GBT) tolerances to ensure the required export limits and voltage limits shall be maintained.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

## PART 7: PASSWORD PROTECTION

ESB Networks ELS requirement:

Once installed and commissioned, the ELS product(as outlined in Part 1) settings shall not be capable of being readily altered by the Customer and shall only be changed with the written agreement of ESB Networks.	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
All settings of the ELS product(as outlined in Part 1) are password protected and cannot be altered by the customer.	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>

## PART 8: INSTALLATION REQUIREMENTS

ELS Installation Requirements for ELS Product(as outlined in Part 1):

Please insert installation requirements or if attached as PDF to this form tick here:

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## PART 9: MANUFACTURERS ELS PRODUCT DECLARATION FOR ESB NETWORKS

ESB Networks ELS requirement: Once installed and commissioned, the scheme settings shall not be capable of being readily altered by the Customer and shall only be changed with the written agreement of ESB Networks.

The ELS product (as outlined in Part 1) complies with the 'Conditions Governing the Connection and Operation of Export Limiting Schemes' (DOC-250221-GBT) when installed and commissioned in accordance with the product documentation.

Manufacturer's (as outlined in Part 1) Representative Details

Representative Name: Ruyi.Pan  
Title: Certification director  
Email: Ruyi.pan@ginlong.com  
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Signature: 

Date: 2023-08-04

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DON'T BUILD UNDER OR NEAR ELECTRICITY WIRES  
**STAY SAFE STAY CLEAR**  
**OF ELECTRICITY WIRES**  
ESB NETWORKS DAC



ESB Networks DAC

Directors: Marguerite Sayers (Chairperson),  
Nicholas Tarrant, Caroline Spillane, Ian Talbot,  
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