

# YASKAWA SOLECTRIA SOLAR

## Installation Guide for Ethernet Network Card Gen 2

Revision A

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# 1. Overview

## 1.1 Introduction

The Ethernet Network Card is used for monitoring and controlling purposes. The Ethernet Network Card supports industry standard Modbus RS-485 communication and TCP/IP protocol. When provided with internet connection, it can send data to an online portal from where you can monitor up to 70 inverters connected to it. It can also be used to remotely update the inverter firmware.

## 1.2 Appearance and Main Item Description

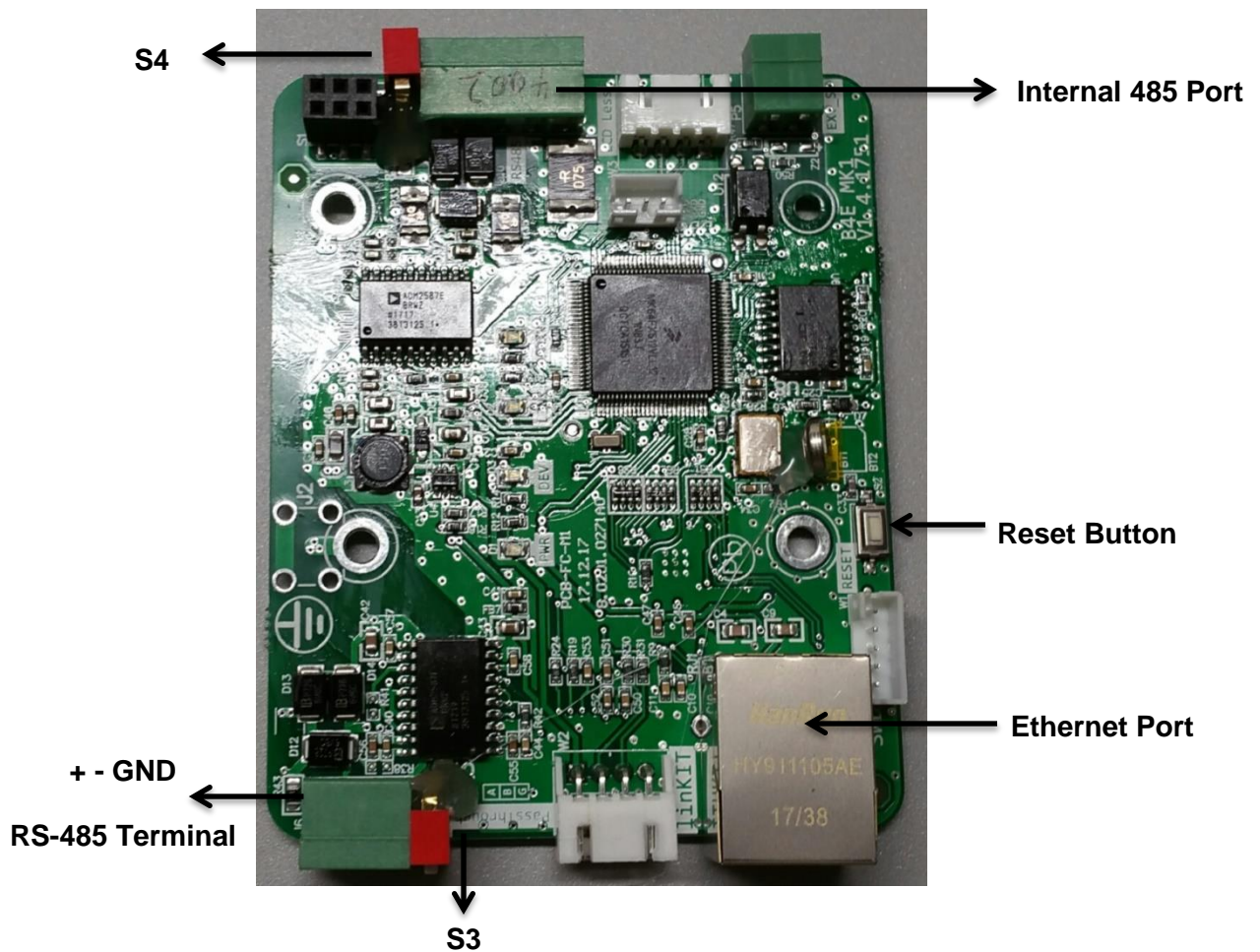
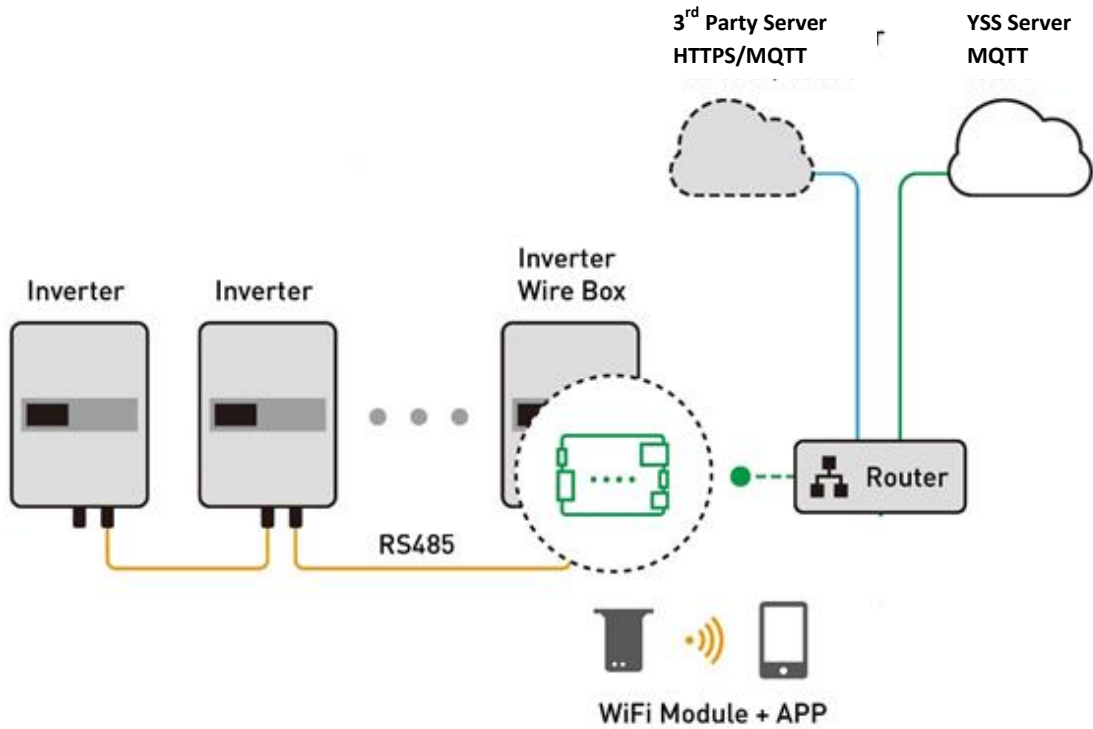


Figure 1.1 - Ethernet Network Card

**Table 2.12 – Overview of Ethernet Card**

Item	Configuration Description and Function
RS485 3PIN	1.RS485+ 2. RS485- 3 .Ground For RS485 communication with another inverter
Internal RS485 Port	For RS485 communication to the communication board of inverter
S3 Switch	Selector switch for setting the 120Ω terminal resistor of the third party data logger RS485 communication.
S4 Switch	Selector switch for setting the 120Ω terminal resistor of the RS485 communication between the inverters.
Restore Button	Press the button over 5s, and the inverter will be restored to the factory setting.



**Figure 1.2 - Installation Diagram**

## 2. Installation

The Ethernet Network Card and accessories are shipped in one package. Before installation, please confirm the following items are included in the shipment.

No.	Item	Qty	Note
1	5 pin connector	1	
2	3 pin connector	1	
3	Standoffs	3	
4	WiFi module	1	
5	Cable for WiFi module	1	
5	Screws	3	

### 2.1 Overview of the Capabilities of the Ethernet Network Card

The card enables the following features via Modbus communication:

- Remote inverter firmware upgrade support by Yaskawa Solectria Solar (YSS)
- Remote diagnostics by YSS Technical Support & Service
- Direct customer data from the Ethernet Network Card via a programmable Ethernet XML Sunspec Data Exchange connection for customers who want to manage their own data directly.
- Pass thru Modbus communications to a third-party gateway

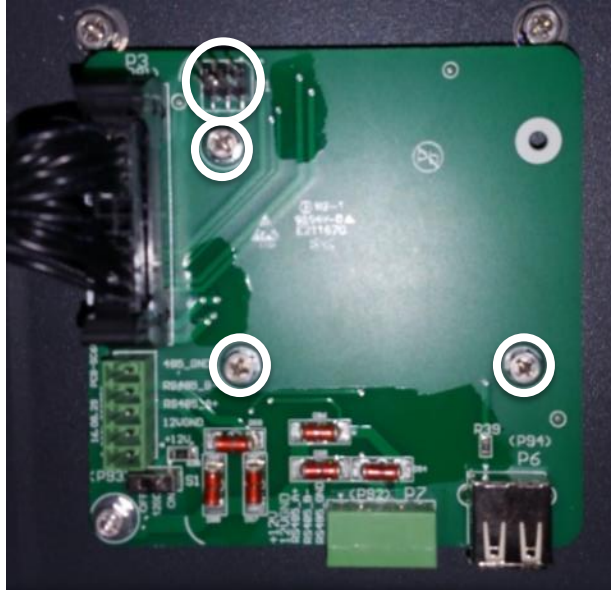
### 2.2 Installation Method

Before installing, please note the following:

- The Ethernet Network Card (ENC) must be installed in the PVI 50/60TL wiring box
- It should be installed in either the first or last inverter of the daisy chain
- The ENC works as a Modbus master gateway (site level)

Below is the installation procedure for the Ethernet Network Card. Please read carefully and install the product following the step-by-step instructions.

### 2.2.1 Installing the Ethernet Network Card



**Figure 2.1 - Communication Card and Location for Ethernet Network Card**

Install the Ethernet Network Card in the first or last inverter of the daisy chain.

1. Obtain the Ethernet Network Card shipped to you.
2. Remove the screws from the Communication Card and Install the included standoffs in the 3 locations shown.
3. Install the Ethernet Network Card, taking care to line up the black connector in the upper left corner to the pins of the Communication Card. Ensure the pins are seated in the connector. Install the 3 screws and torque to 7 in-lbs using a #2 Phillips bit.
4. Plug in the Ethernet cable into the RJ-45 (Ethernet) port.



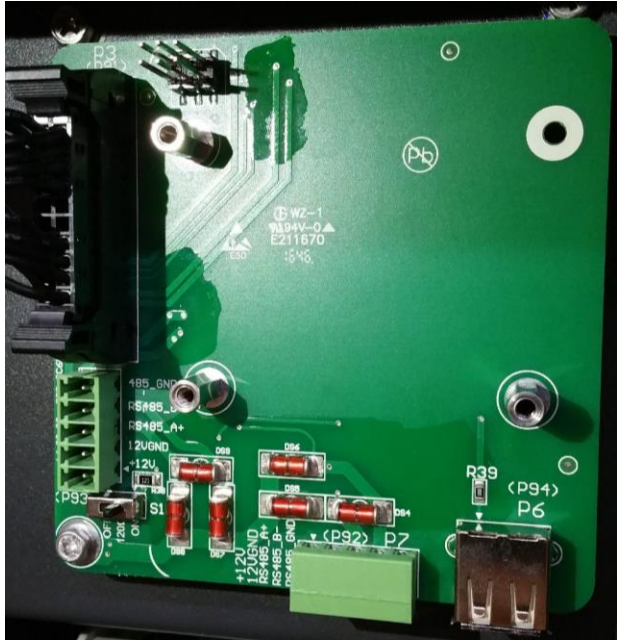


Figure 2.2 - Standoffs Installation

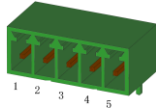
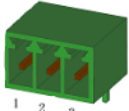





Figure 2.3 - Ethernet Network Card Installed

The Ethernet Network Card supports industry standard Modbus RS-485 communication. Below is a brief description of the board:



Figure 2.4 - Ethernet Card

Item	Image	Configuration description
① RS485 port (5pin connector)		1 ----12V+ 2 ----12VGND 3 ----RS485+ 4 ----RS485- 5 ----COM
② RS485 port (3pin connector) Pass through function		1 ----RS485+ 2 ----RS485- 3 ----COM
③ Reset button		Restore the Ethernet Card to the factory setting
④ WiFi module connection		Plug in the cable for the WiFi connection
⑤ Ethernet Port		Connect you internet connection here. It is important to make sure with your IT specialist that your modem will allow two way communication.

### 2.3 Network Connection:

When the inverters are monitored via the Ethernet Network Card, a unique RS-485 address for each inverter can be set up through the LCD interface. Up to 70 inverters can be connected together in the communication network. The daisy-chain topology recommended for the network connection is shown in Figure 2.4. Other communication topologies, such as the star network, are not recommended.

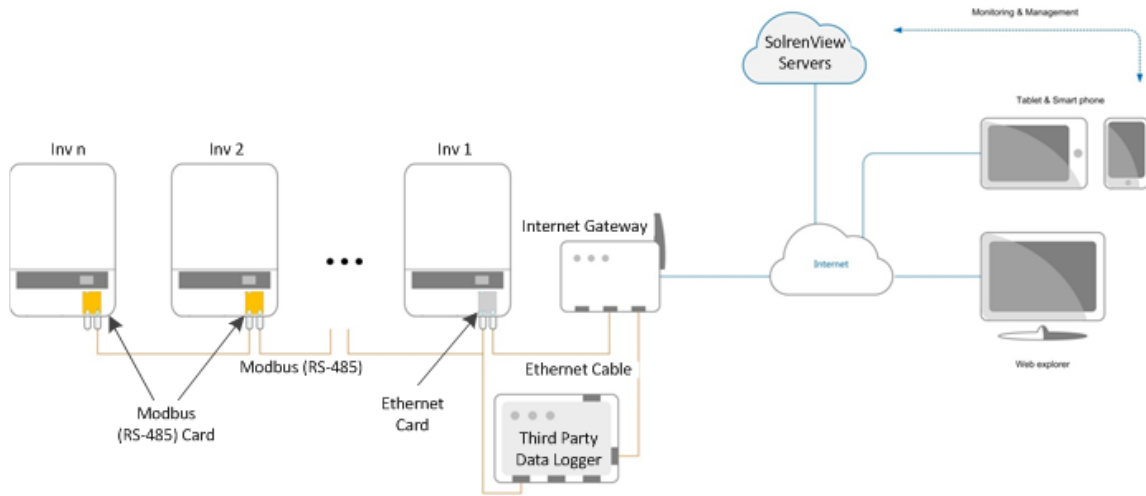


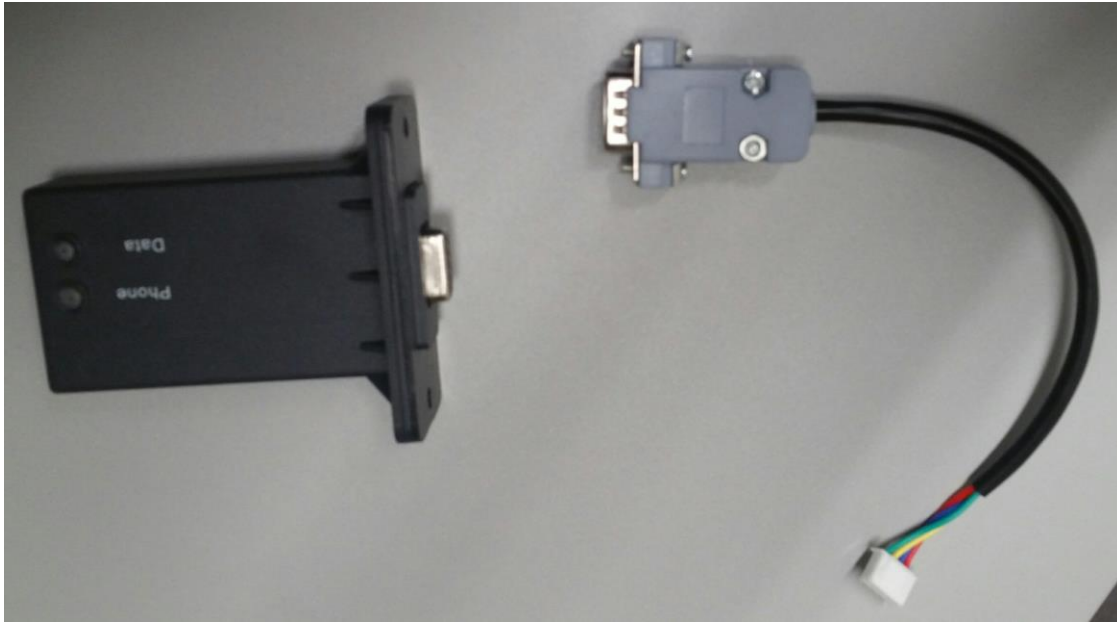
Figure 2.1 - Network topology



### 3. User setup

#### 3.1 Connect the WiFi module

##### 3.1.1 Plug in the connector to the WiFi module port



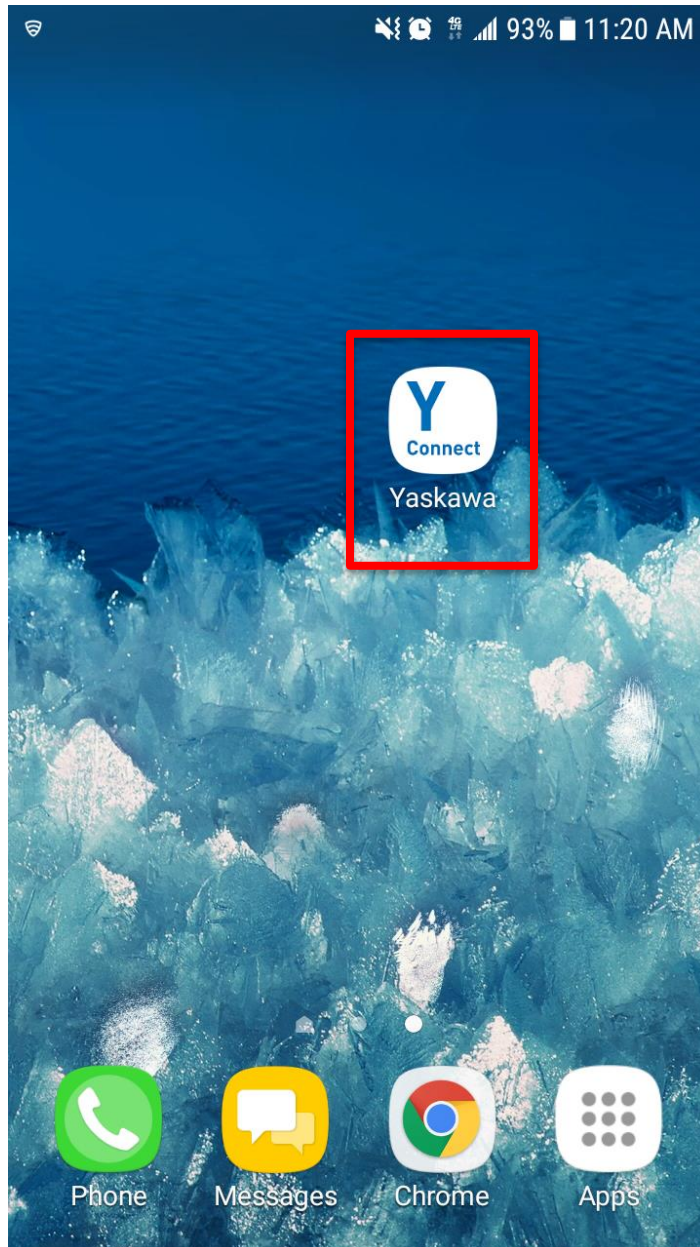
##### 3.1.2 Connect the WiFi module to the first/last inverter



### 3.1.3 Obtain the phone app

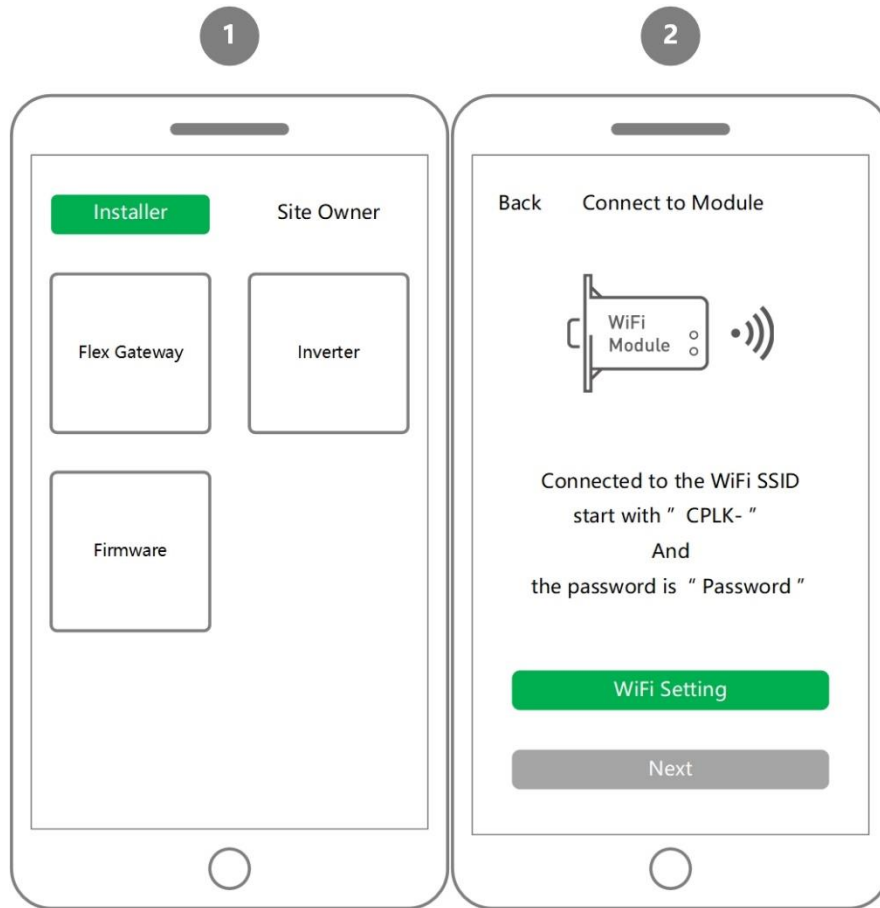
The app is available on App Store for Apple users and Google Play for Android users. Search for “Yaskawa Connect” or the developer’s team “zeninforDev”. Download and install the app.

### 3.1.4 After install the application will show up on your device



**3.1.5 Open the app and click “Flex Gateway” under the “Installer” tab**

Select WiFi settings and connect to the network name beginning with “CPLK-“. The password is “Password”. The ‘P’ is capital and it is case sensitive.



**3.1.6 Once connected to the network navigate back to the app. Note do not close the app as you will need to repeat the previous steps.**

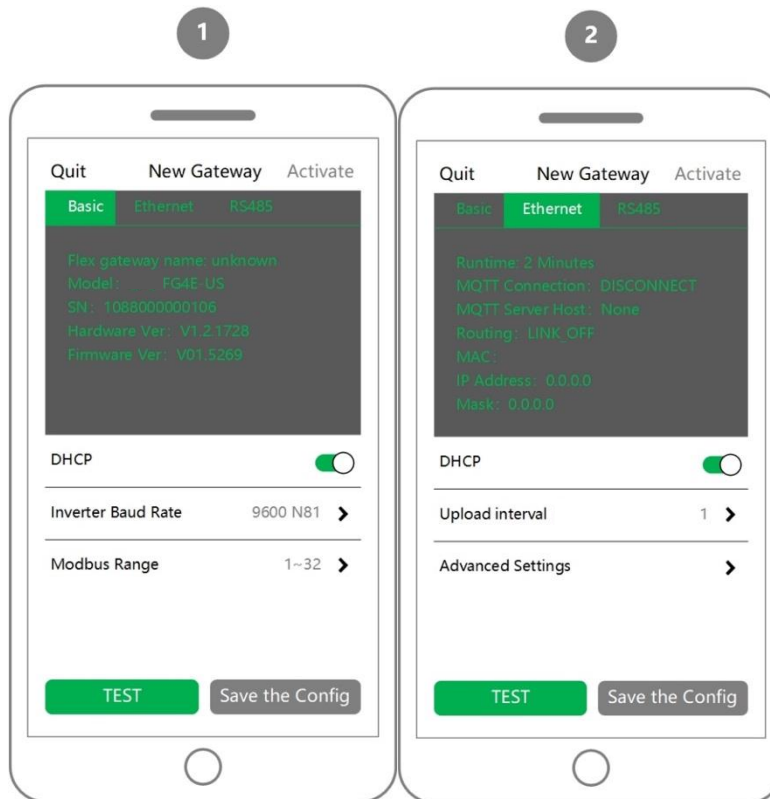
- DHCP enabled means that the card will try to obtain IP and DNS by itself from your server. This is the recommended settings. If you network administrator requires a static IP, disable this feature and enter it manually.
- Inverter Baud Rate: Speed 2400 / 4800 / **9600** / 14400 / 19200

Parity **E** / N / O

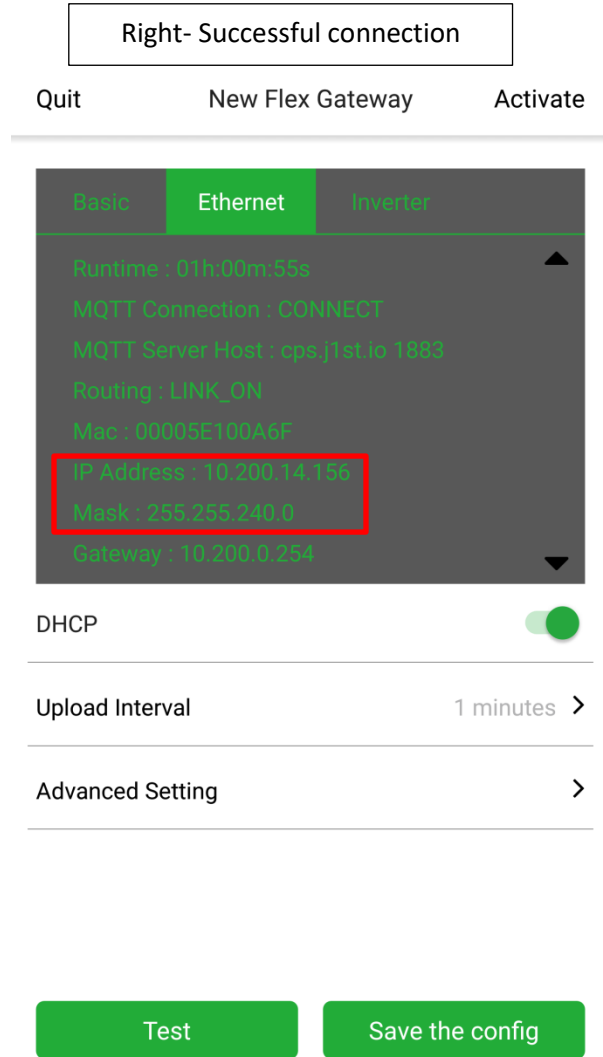
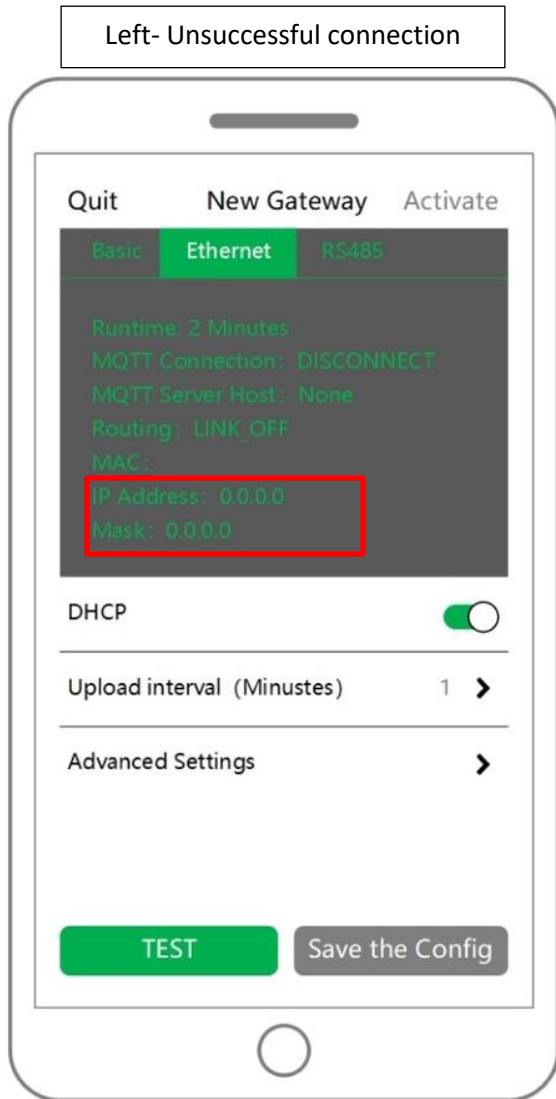
Data **8** / 9

Stop **1** / 2

- Modbus range can be select in the range of 1-128 in increments of 32.
- Upload Interval (Minutes): You can select the upload interval for the data going to the cloud.

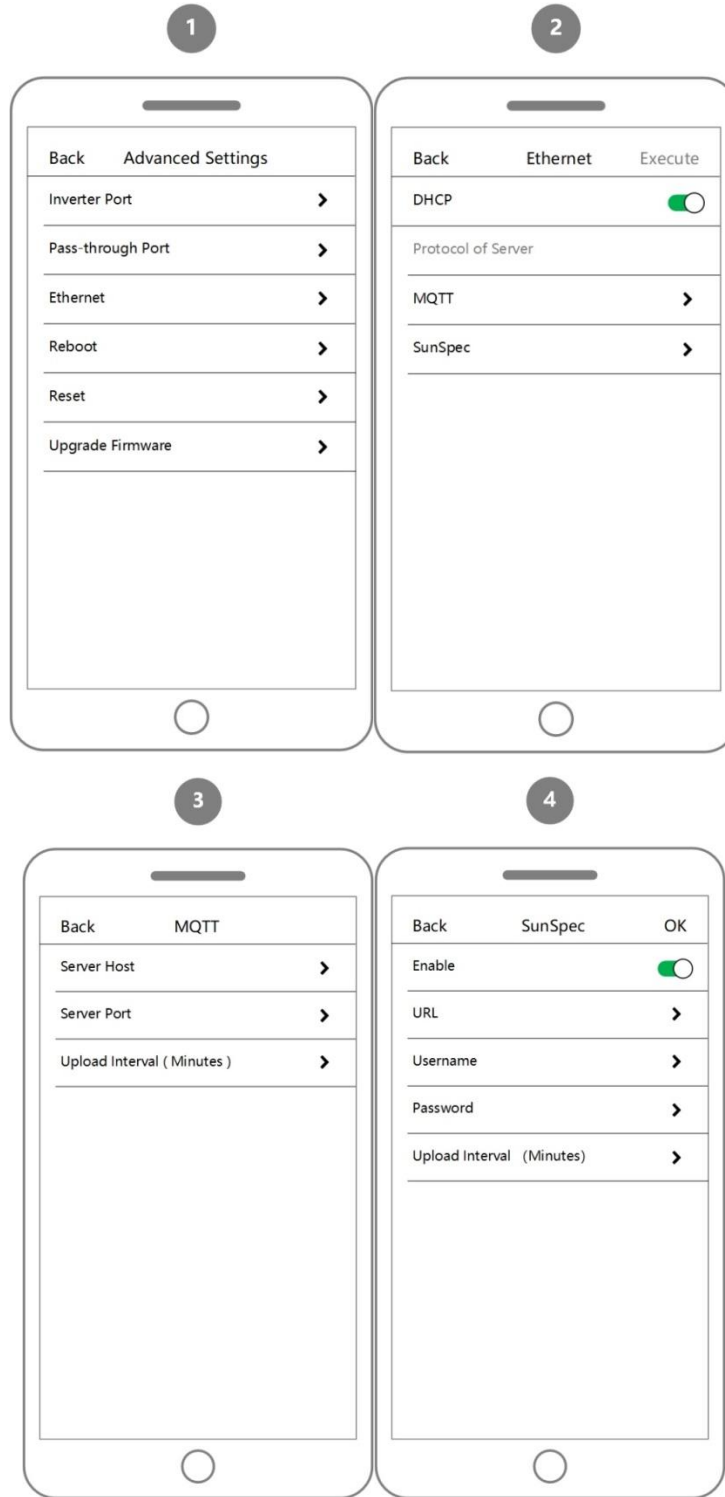


- If the card has successfully obtained an IP address it will be displayed (as seen at the right image below). If it is showing 0.0.0.0 (as seen at the left image below) please contact your network administrator for further help. See below an example for both successful and unsuccessful connection.



- **Advanced settings:**

- In the **Ethernet** area, the user can connect the ENC to the two different server

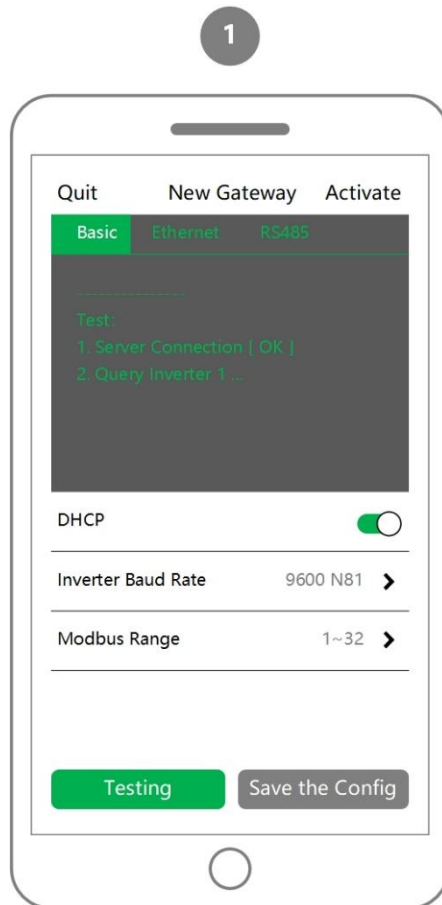




- Reboot- this will only restart the ENC. It will not erase any settings
- Reset- this will restore the ENC to factory settings. All previous data will be permanently deleted.

### 3.2 Test and Save the configuration

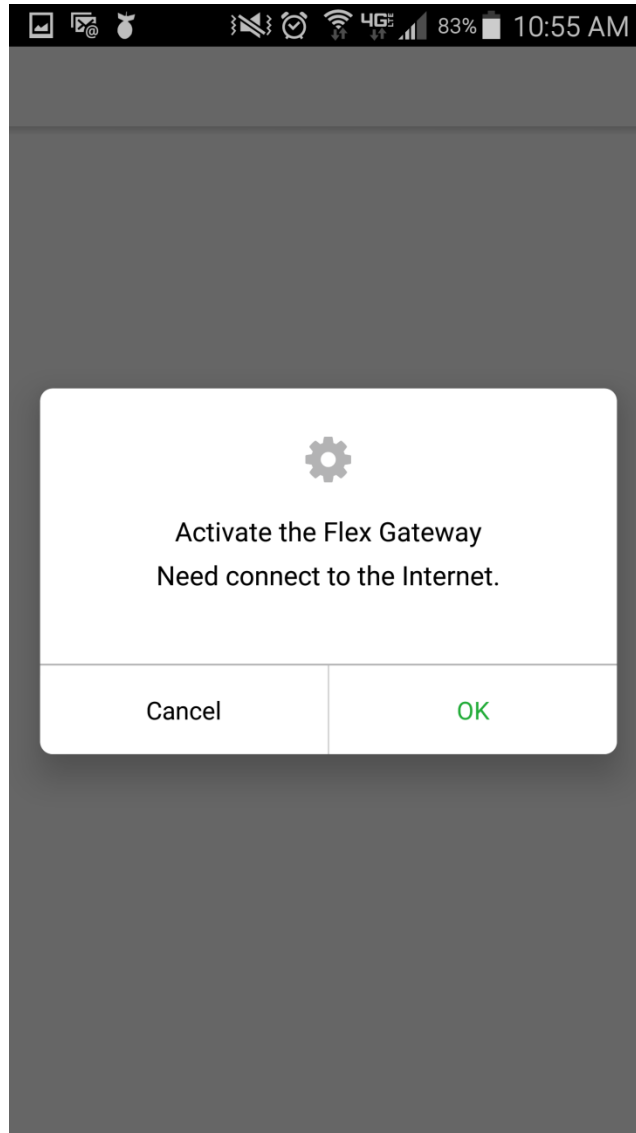
Click **Test** to check the default configuration and the ENC will ping each inverter in the daisy chain and display the connection with all units. Make sure all inverters have unique Modbus ID address.



Once the test is complete the user should be able to see all the inverters that were found in the given range. If the user is missing an inverter, make sure it has a unique ID and it is within the range. Once you find all the expected inverters, please press “Save the Config”.

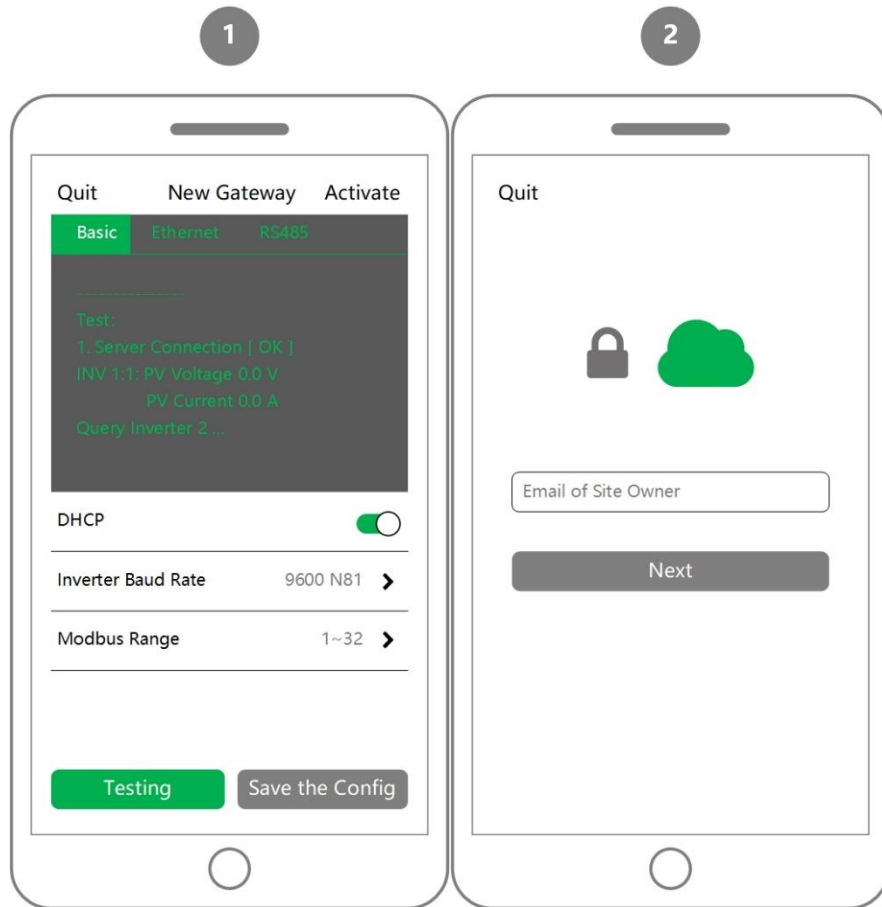
### 3.3 Activate the ENC

At this point the “Activate” button at the top right corner should be enabled, press it. The app will prompt you for internet connection. This will require the user to disable the wireless network between his/hers smart device and the WiFi module and enable the 3G/4G network of the smart device to take over. Once you disable the WiFi, navigate back to the app, do not close the app.

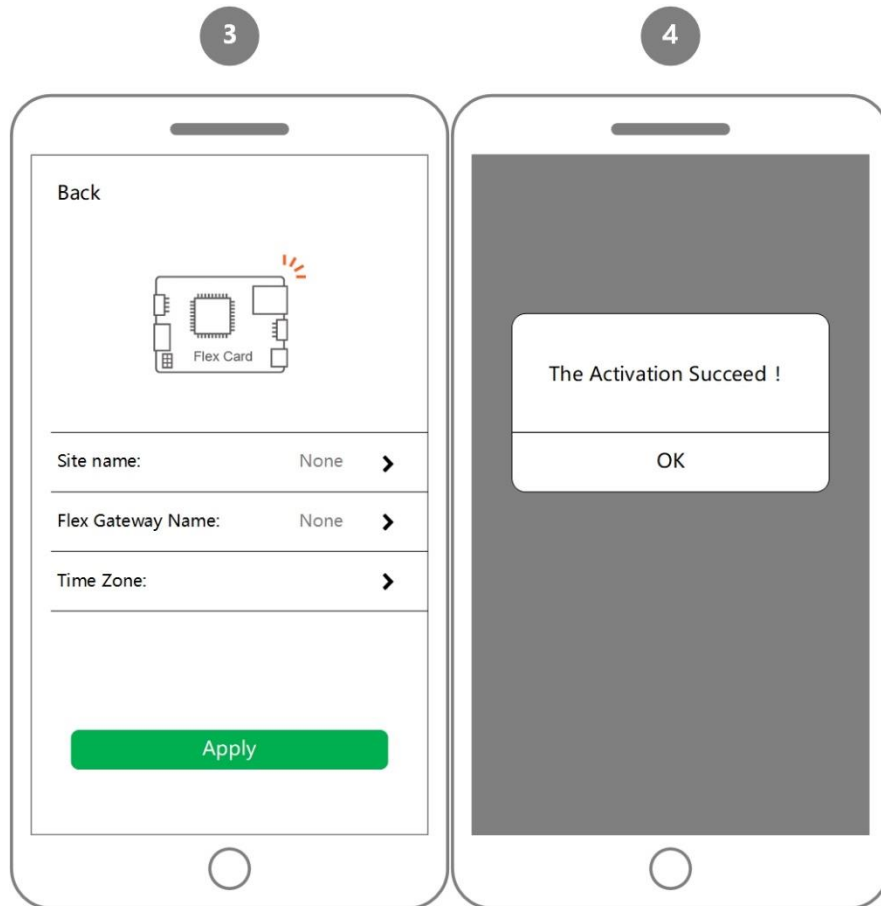


### 3.3.1 User name

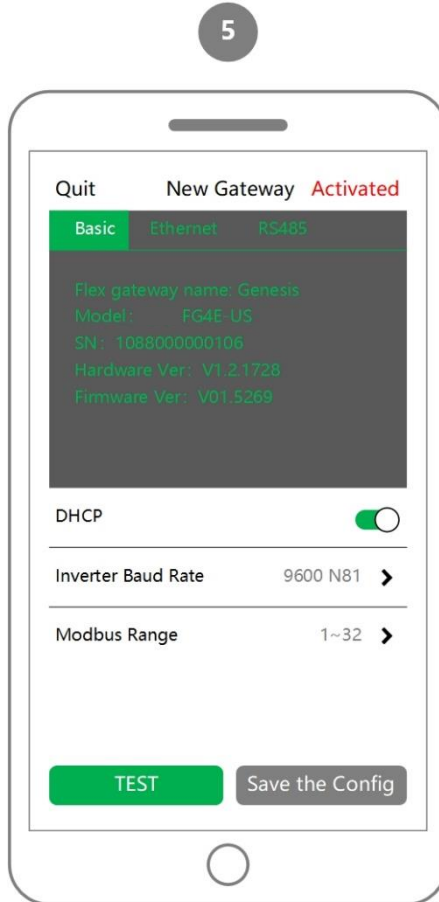
- Once you are back into the App you can press “Activate” and it will bring you to the next screen shown below. For email type [enc@solectria.com](mailto:enc@solectria.com) and then press “Next”. This is the only email you can use in this step.
- Note the first line of the Test log → Server connection- if the card has internet access and it is not being blocked by anything it will display [OK]. For any different message there, please contact your network administrator.



- Name the site. If you have previously communicated with Yaskawa Solectria Solar Technical Support & Service team and shared a site name, please use the same name or call us so we can update our records to the newly desired site name.
- Name the Flex gateway (ENC) - for large sites you may have more than 1 card per site.
- Select your time zone.



- For verification purposes, please log out and close the app
- Connect via WiFi to the ENC
- If the Connection is successful the user will see an “Activated” status at the top right corner
- The firmware version is also visible in this screen.



**3.3.3 Upon successful creation of the site, it will appear on the Service portal. The service portal is only available for service personnel. Please call Yaskawa Solectria Service to ensure that your site was successfully created.**

### **3.4 Firewall access**

**3.4.1 If a firewall is used to protect the network the following ports must be opened both ways (incoming and outgoing communications). If the user or site owner is unable to have those ports open, he/she will not be able to get the full benefit of remote diagnostics and firmware updates. (It is recommended to use a separate modem so that the inverters' network is not part of the high security network used on the site.)**

**3.4.1.1 TCP 1883 with destination IP 47.254.52.209**

**3.4.1.2 TCP 80 and TCP 88 with destination IP 47.88.73.131**

**3.4.1.3 TCP 443 with destination IP 209.160.64.80**