Application Note:

ICC Raspberry Pi initial setup and Setup with Axpert and Pylon

1) Introduction:

The ICC (Inverter Control Centre) is the ideal solution for Pylon when used with Axpert in an on-grid solution. The main purpose of the ICC is to provide accurate monitoring and the ability to remotely monitor when used with an Axpert or InfiniSolar inverter. Alternatively, the ICC offers the ability to connect to the Pylontech BMS and by doing so the inverter can be controlled by the ICC based on the SoC reported by the BMS.

Adding the ICC greatly improves the cycling efficiency of the Axpert with Pylontech, as the ICC will use the SoC reported by the BMS of the Pylontech battery to control when the Axpert will use grid or battery, rather than relying on the Axpert measuring the very narrow battery voltage range. By using SOC based control, the system will be able to use the full rated capacity of the Pylontech battery if set to do so. This is especially useful for Axpert inverters because they can't supply loads from mixed power sources. Maximising the energy available from the battery means the inverter will delay switching to the grid for as long as possible.

The ICC will therefore increase the overall value of the system as the full 80% DoD of the Pylontech can be used in a self-consumption battery cycling setup.

This short guide demonstrates how to setup and access the ICC as part of your storage installation.

2) Options, capabilities and limitations:

Two components will be required when using ICC with a Pylon battery:

- Inverter Control Centre Module (Raspberry Pi 3 b+)
- Pylon Communication Cable for ICC

The ICC offers the following features:

- Real-time monitoring of all the different power sources in use in a solar system (solar panels, batteries, grid power, etc).
- All data is captured, stored and can be exported for a specific time period.
- Specific monitoring of the batteries in use.
- Can monitor up to 9 Axpert inverters in parallel.

- Support for a host of different Voltronic inverters, including the new InfiniSolar 4 Super inverter.
- Can monitor grid tie as well as hybrid inverters.
- Support for Pylontech batteries with true SoC and voltage monitoring.
- Hourly trend analysis of the load, the solar panels, the batteries as well as the utility consumption and/or production.
- Easy setup with integrated hotspot and configuration wizard.

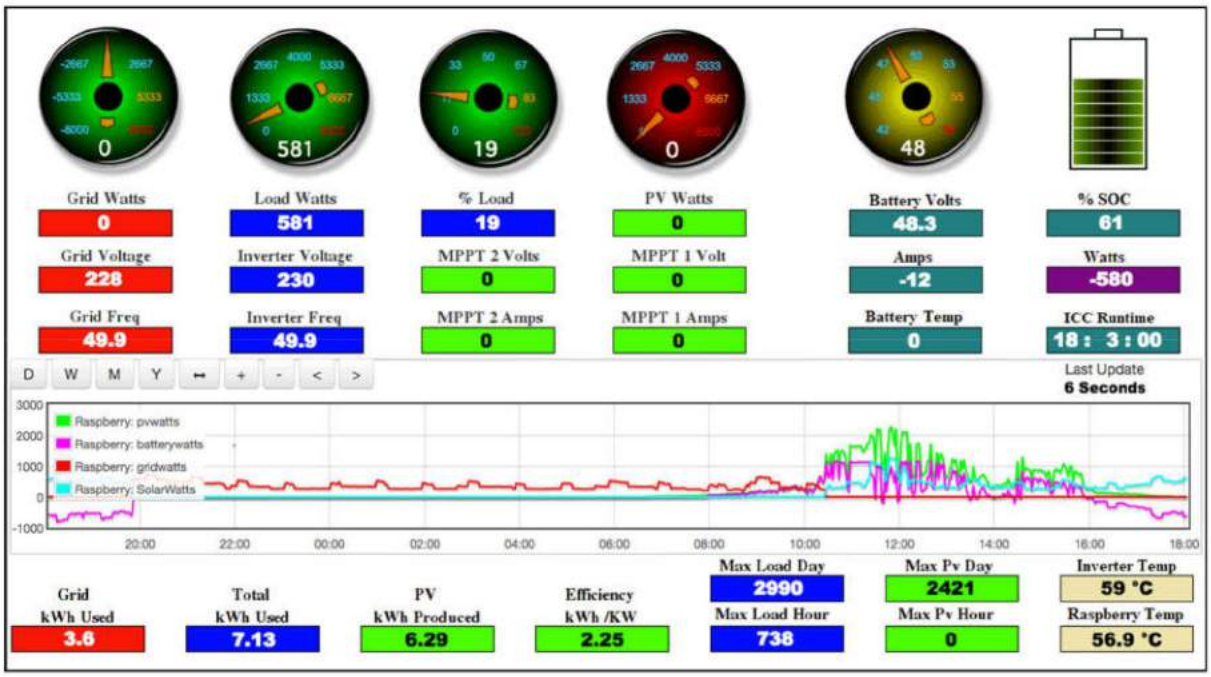

Figure 1: ICC Dashboard

When using ICC and Pylon with the intention to implement battery control, a few things must be taken into consideration.

The ICC Pylon battery control function can only be used in an on-grid application, while in off-grid the ICC can only be used for monitoring.

The on-grid control only comprises the battery cycling. The ICC will take over the cycling control logic and will not rely on the inverter logic. The paramaters “to Battery” and ”to Grid” will be controlled by the ICC based on the SOC reported by the battery BMS.

Please note: When using the ICC and Pylon for Grid connected self-consumption applications, the system will run the risk of the batteries shutting down in the event of a power failure. If the battery shuts down due to the low-voltage cutout protection, the battery will have to be manually turned on once a charging source is availiable. This can be done by simply pressing the RED button on the master battery. During grid connected cycling, the battery will be limted to 80% DoD and during a grid outage the DoD will be limited to 90%.

Figure 2: Power SW

ICC offers mobile monitoring and can be used on Android platforms. IOS platforms will be supported soon. The information displayed can be customized to the user's needs.

Figure 3: Android Monitoring

3) <u>ICC Initial Setup</u>

The ICC Module plugs in using a normal AC adaptor and the adaptor must be plugged into a circuit connected to the backup of the inverter. In other words, the ICC module must be powered by the inverter. The process is as follows:

- Make sure everything is powered down. The inverter, battery and ICC module must be off when connecting the communication cables.
- Connect the USB cable to the ICC and to the inverter. The USB cable is included in the box with the inverter.
- Now connect the Pylon communication cable to the ICC module and to Pylon battery - it plugs into the 'Console' port on the battery.

Everything is now ready to be powered on.

Figure 4: Communication Plugs

Please ensure that the settings on the inverter are set to the Pylon Specified settings. Refer to the Installation Manual Pylontech Voltronic Settings for the inverter settings. When using the system for cycling, then Program 12 & 29 will be set to 46V (or 45.5V if 46V does not work). This will bypass the inverter control and will allow the ICC to control the cycling.

The next step will be to connect the ICC module to a network. This can be done by using a laptop or a mobile phone. It is recommended to use a mobile as the setup is very easy.

Step 1: Go to WiFi networks and connect to **ICC-Hotspot,** the password is **raspberry**

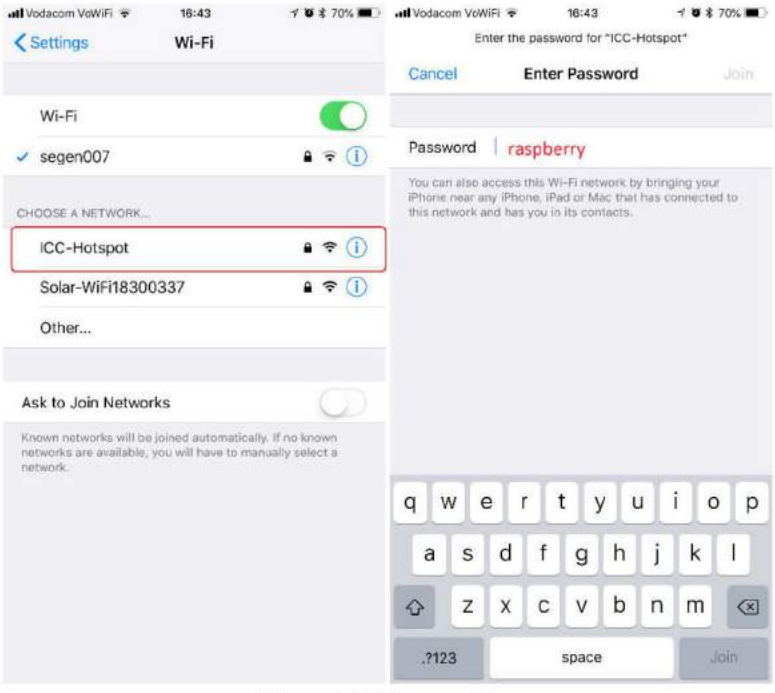

Figure 5: WiFi connection

Step 2: Open Web browser (Safari, Google Chrome or any browser app) and enter **10.3.141.1** and this will prompt for a username and password. The username is **pi** and the password is **raspberry**. This will open an ICC dashboard. Click on **Join WiFi Network**

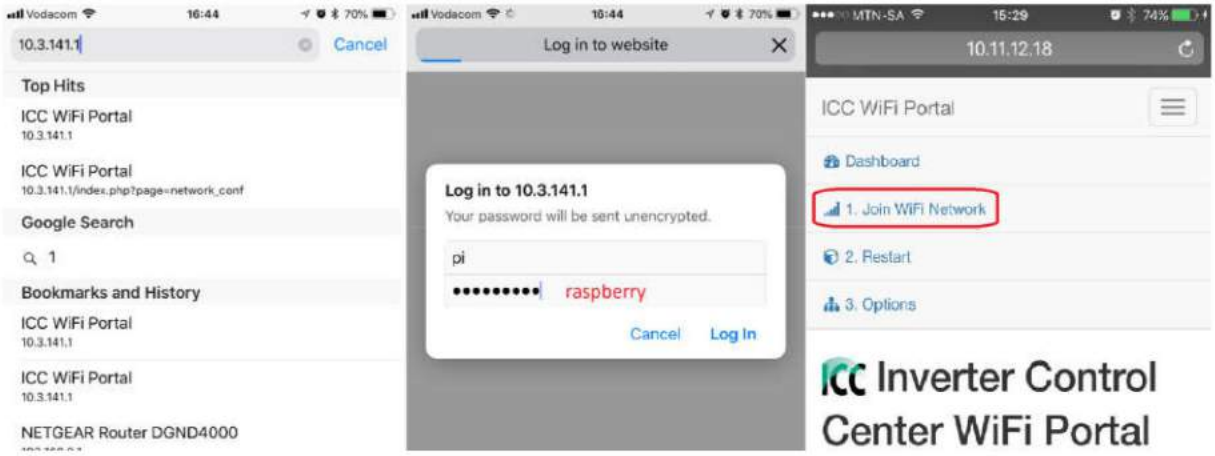

Figure 6: Connecting to the browser configuration

Step 3: All available WiFi networks will show up on the screen after clicking on **1. Join WiFi Network**. Select the desired network, enter the WiFi network password and click on add. After completing this step, the unit should be connected to the WiFi network. click on **2. Restart** and select **Reboot** to complete the setup process.

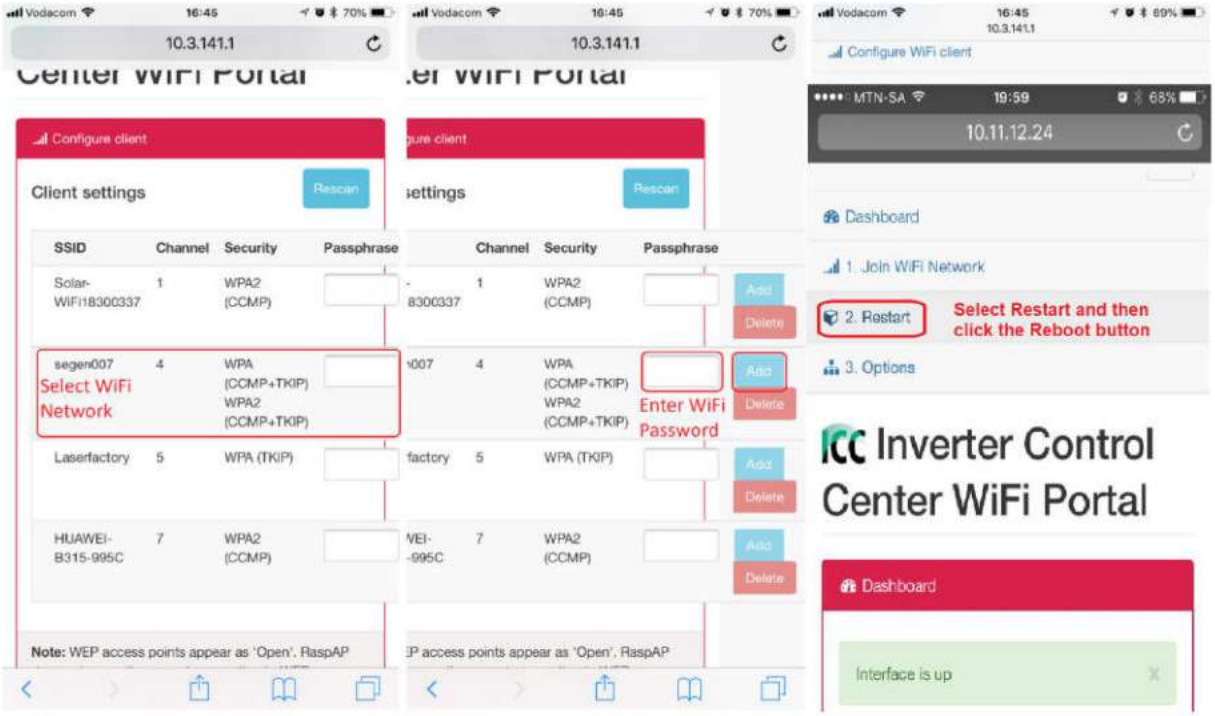

Figure 7: Connect to WiFi network example.

Now that the unit is connected to the internet, the remote monitoring can be used. The ICC account is pre-registered and the login details can be found inside the ICC module packaging. The username and password can be changed by the user. It is strongly recommended to change the password after registration.

The registration link is also found inside the packaging. Please make sure to read this properly, as your account may be connected to a different instance.

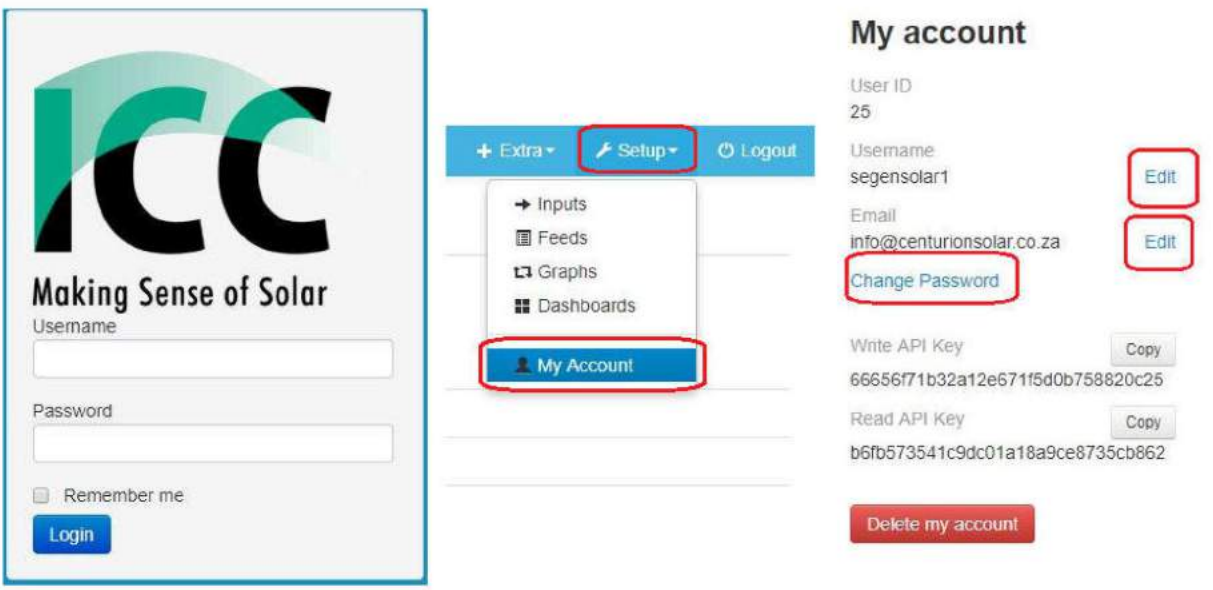

Figure 8: ICC Monitoring Account

The Mobile app setup is done from the ICC portal and all that's needed is an app to be downloaded and then to scan a QR code with the app, after which the mobile monitoring will work. The Emoncms APP can be downloaded on the Google Playstore. IOS support is coming soon.

Android APP direct link: https://play.google.com/store/apps/details?id=org.emoncms.myapps

Figure 9: Mobile App Registration