

## Ensemble Commissioning using Installer Toolkit 3.0

### Overview

This document is intended for Ensemble certified installation professionals who are commissioning Ensemble systems in the field. Follow the steps below to establish successful communication between Ensemble components and validate that the system is operating as designed.

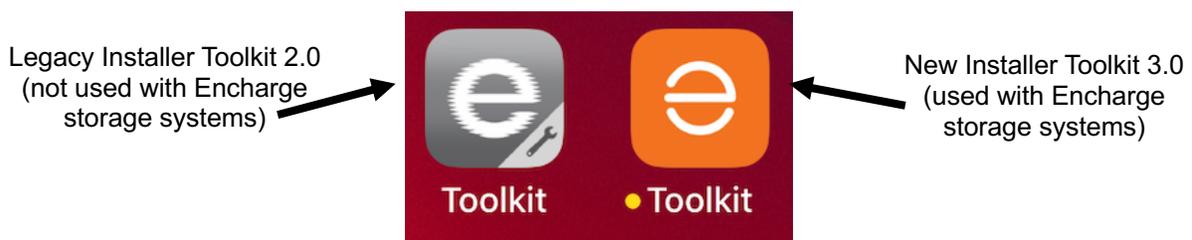
### Contents

Overview .....	1
Preparing for Installer Toolkit Communications .....	1
Commissioning Instructions .....	5
Functional Validation Instructions .....	20
Decommissioning an Encharge/Enpower While Replacing it On Site .....	28
Provisioning Ensemble System with Multiple Envoy's .....	29
Known Issues and Limitations.....	32
Features for troubleshooting the system.....	32

### Preparing for Installer Toolkit Communications

The following process assumes that all Ensemble equipment has been installed in a code-compliant manner, tested for appropriate voltages, and are ready to be energized.

- For all products, always follow the safety instructions and instructions in the Enphase quick install guides and installation manuals.
- Ensemble is commissioned using Installer Toolkit. Ensure that Installer Toolkit is updated to version 3.X or later:



- You can install the application using the following links
  - [iOS](#)
  - [Android](#)
- Enable Bluetooth communication on the smart phone or tablet you will use for commissioning.
- Turn OFF automatic sleep mode on your smart phone or tablet. This prevents your phone from going to sleep and interrupting the Envoy firmware upgrade.

- In iOS, this setting is called “Auto Lock” and can be changed to “never” under “display and brightness”
- In Android, this setting is called “screen saver” and can be changed to “never” under settings, display, advanced display.
- After commissioning is complete, you can reset the phone to automatic sleep.
- Ensure that the Enphase Envoy has software version
  - 6.0.X for commissioning and operation of IQ series Ensemble systems
  - 6.1.X for
    - Commissioning and operation of M series Ensemble systems or
    - Commissioning and operation of IQ series Ensemble systems with Load control or PCS features

You can update the Envoy software using Installer Toolkit.

- You must create a system activation before commissioning if the activation does not exist. However, an activation should already exist if you are commissioning an M series site.
- If you have to create a site, do this beforehand using Enlighten Manager or, on site, using Installer Toolkit.
  - Creating an activation beforehand to save time in the field.
  - If completing the activation on site, ensure that Installer Toolkit has Internet access (cell signal or Wi-Fi).
- Before visiting the site, ensure that the Envoy software 6.0.x and 6.1.x has been downloaded to the phone.
  - The **Settings** tab in Installer Toolkit has an Envoy Software section with an **Update Now** button for downloading Envoy software.
  - Users will see three versions of Envoy software. Installer Toolkit will automatically select the right version for Ensemble, Ensemble for M Series and PV only sites.
  - A stable Wi-Fi connection is required to successfully download the software. Do not move the phone around or step out of Wi-Fi range while downloading the software.
    - If an activation does not exist, create an activation using Installer Toolkit 3.0, or Enlighten Manager.
    - If your existing Envoy is not connected to the internet, you can either get it connected to the internet, or provision all microinverters on site to the new Envoy.
    - If your existing Envoy is connected to the internet, you must associate the Envoy to the new activation.
- Access the site via enlighten manager and confirm hardware requirements:
  - Only IQ6, IQ7, or M250, M215 microinverters are compatible with Ensemble.
  - M250 and M215 Microinverters cannot be installed within the same microgrid as IQ series Microinverters.
  - M series Microinverters require an Envoy S metered
  - IQ series microinverters require an IQ Envoy.
- Only For an M-series site
  - Ensure the expected quantity of microinverters can be seen. This can be done via Enlighten manager or ITK step 2, devices and array within the activation.



## Ensemble Commissioning: Installer Toolkit

- Prior to on site commissioning, download the M series microinverter firmware to the devices on site by visiting the activation page in Enlighten Manager, and tapping on the below icon:

The screenshot shows the 'Activations' page in the Enlighten Manager interface. The system is named 'Enphase System Five' and is currently 'System Active'. The activation checklist is 100% complete, with four stages: 1. Started (12/11/2019 10:42 PM PST), 2. Connecting (12/11/2019 10:42 PM PST), 3. Verifying (12/11/2019 10:42 PM PST), and 4. Ready (12/11/2019 10:42 PM PST). A blue button labeled 'Make this M-series site Ensemble compatible' is highlighted with a red arrow pointing to a yellow callout box that says 'Click here to pre-download M series Ensemble Microinverter Firmware'.

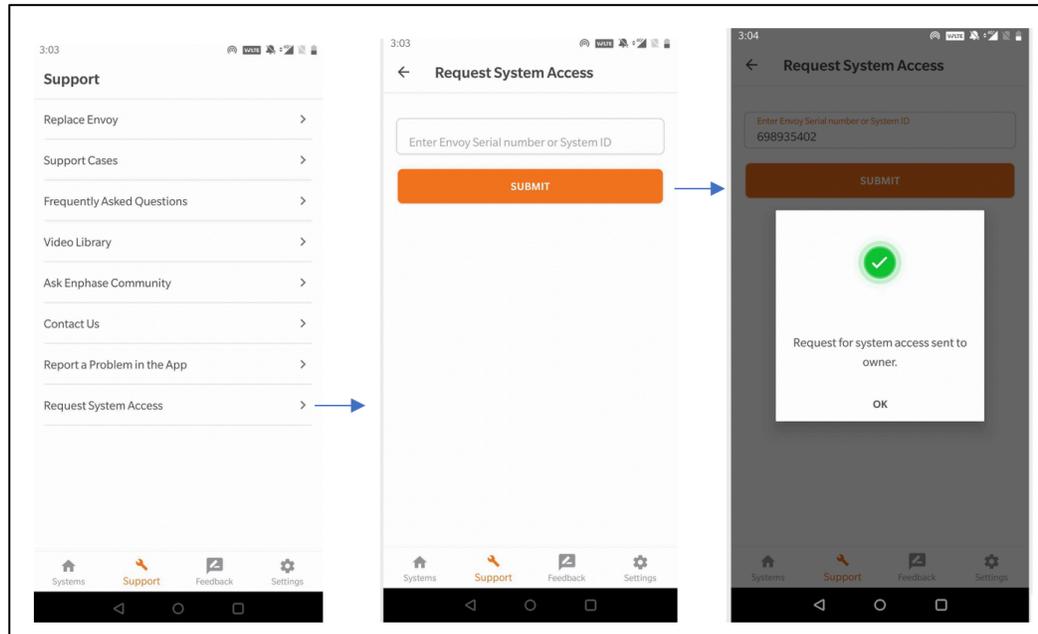
- Prior to visiting the site, view the activation page to confirm that the firmware has been downloaded. If the activation page shows: “Status: Request Completed” the download was successful.<sup>1</sup>

The screenshot shows the 'Make this M-series site Ensemble compatible' button and its status. The status is 'Request Completed', with a 'Request Sent Date' of 11/02/2020 12:25 AM PST and a 'Request Completed Date' of 18/02/2020 09:12 AM PST.

- If you were not the original installer of the system, you must be granted access to the activation as a system maintainer. For an M-series site, It is best to get this access prior to the

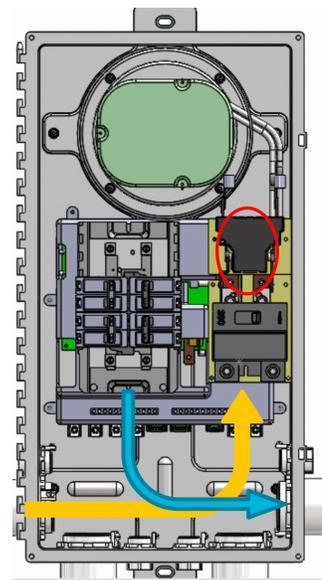
installation so that the new firmware can be pre-downloaded to the site, saving time during commissioning. To request for a system access:

- Go to support -> Request system access
- Enter the Envoy serial number and submit the request
- An email will be sent to the homeowner to provide accesses to the site
- If you do not receive the access, please contact customer support for more help. Contact Enphase customer support at [\(877\) 797-4743](tel:8777974743) or at <https://enphase.com/en-us/support/contact-support>



- **[Not required if you are installing Enpower R2]** Best practice is to disable manual override before Enpower has been wired or energized. To do this, remove the Enpower deadfront to access the grey MID toggle switch at middle right side of Enpower.

- Press MID toggle switch to the right approximately 5 degrees
- Manual override on Enpower has been disabled
- If you Enpower is already energized, manual override can be cleared with software before going to Step M



- Informative notes:
  - Encharge batteries ship with approximately 30% state of charge.
  - Encharge batteries ship with “self-consumption” as their default mode.
  - Always supply the AC power to Encharges and wait for message on Installer Toolkit to turn on the DC switch. (Do not turn on the DC switch until the toolkit instructs)
  - If an Encharge is in very low state of charge when it arrives to a site, as long as it is connected to the AC side, it can be commissioned, and it will start charging by setting it to Full backup mode after it is commissioned. Encharge housekeeping supply will get power from AC supply during commissioning time and Encharge can communicate with Envoy. Charging in Full backup profile will start only after Encharge is commissioned.

## Commissioning Instructions

Date and time of commissioning start: \_\_\_\_\_

Address: \_\_\_\_\_

System being commissioned: \_\_\_\_\_

Installer: \_\_\_\_\_

Individual (name and email) overseeing commissioning:  
\_\_\_\_\_

- Perform the following steps, and mark completed steps in the boxes provided on the left side of the page.
- Initial the bottom of each page indicating all steps on that page are complete.

## Commissioning Process

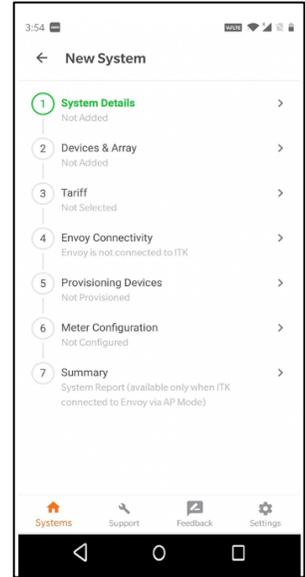
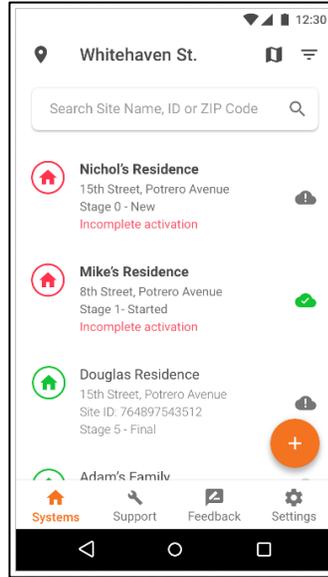
- A. Open Installer Toolkit. Tap the **Systems** tab in the lower left side of the screen.

- B. If an activation has not previously been completed using Enlighten Manager, complete Step 1 in Installer Toolkit (input system details including address etc.).

- B.1. When installing Ensemble on an existing M series or IQ series site, tap on the previously completed system activation

- B.2. A grid profile is not selected by default for an activation created in Enlighten Manager. When prompted, select the default profile for your area.

- B.3. Only for a M-series site with legacy Envoy, select the appropriate grid profile for your region. An existing M series activation with legacy Envoy will not have a grid profile selected.



- C. Go to Installer Toolkit step 1 and tap on 'Edit'

- C.1. Go to 'Installation Details' and enter these below fields if available.

- C.2. Contract Signed Date

- C.3. Permit AHJ

- C.4. Permit Application Date

- C.5. Permit Approval Date

- C.6. Hardware Installation (Begin) Date



Legacy Envoy

These dates will be shown to the Home Owner on the Enlighten application

- D. **(Only for M-series Ensemble)** Replacing Legacy Envoys with Envoy S metered for M series Ensemble Installations.

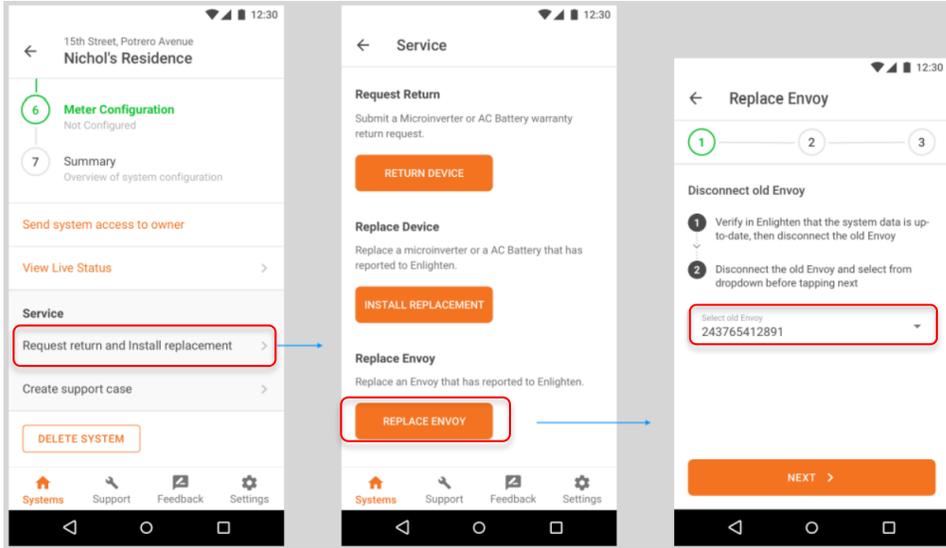
- D.1. Replace the Legacy Envoy or Envoy S standard on site with the Envoy S metered.

- D.1.1. Follow all instructions included in the Envoy S metered, and the Wireless Communications Kit Quick Install guides.

- D.1.2. In Installer toolkit, navigate to "request return and install replacement" button at the bottom of the activation screen in ITK

- D.1.3. Tap "replace Envoy"

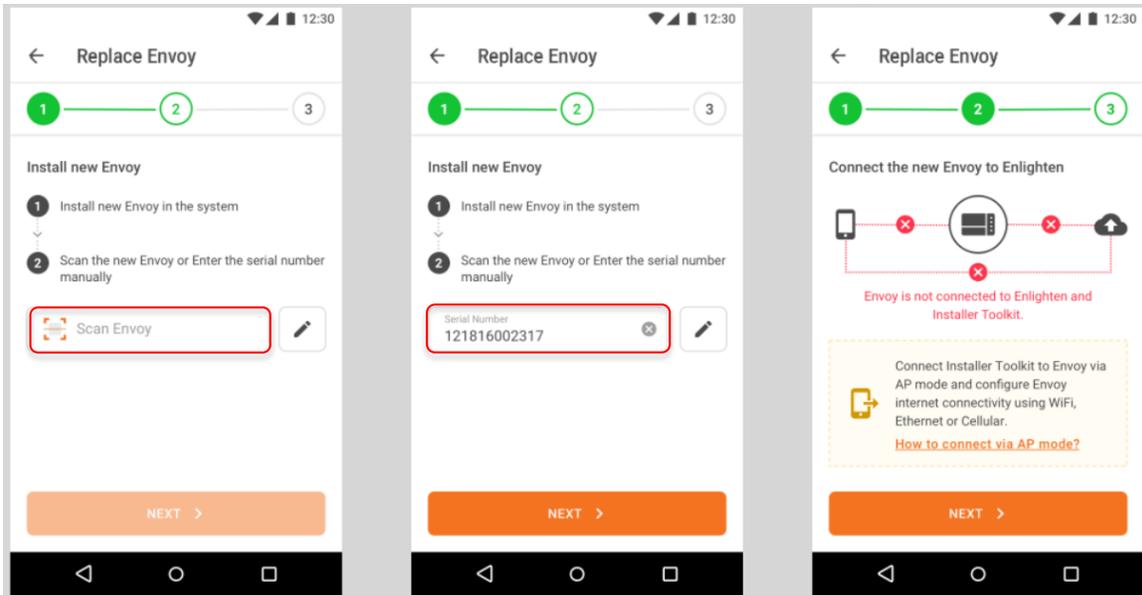
- D.1.4. Input old Envoy serial number.



D.1.4.1 Install Envoy S Metered into the system

D.1.4.2 In Installer toolkit, Scan the new Envoy Serial number

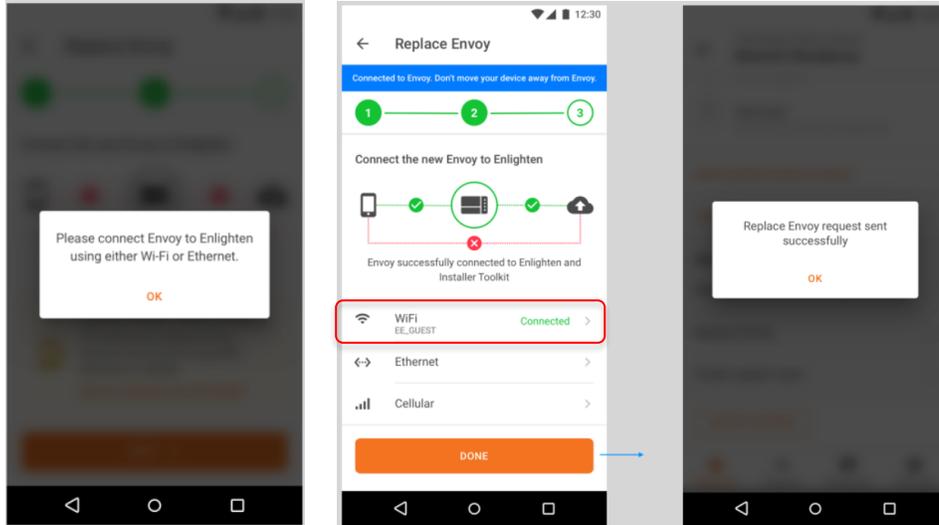
D.1.4.3 Tap next to connect the new Envoy to Enlighten



- D.1.4.4 If using Ethernet, plug into Envoy S metered.
- D.1.4.5 If using Wi-Fi, Tap AP mode button, and connect to the Envoy's network in your phone settings.

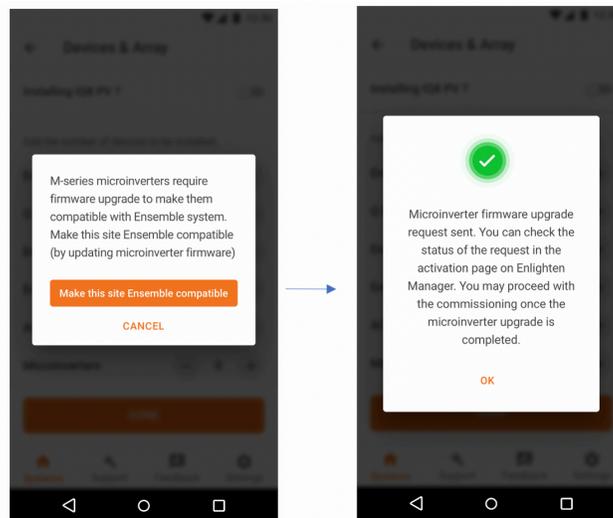
D.1.4.5.1 Input Client's network SSID and password into Wi-Fi section.

D.1.4.5.2 After the Envoy request has been successfully sent, exit AP mode.



E. Installer Toolkit Step 2, **Devices & Array:**

- E.1. Enter the total count of each device type to be added in the system.
  - E.1.1. If M series microinverter firmware pre-download was not successful, the user will be blocked from moving forward at this step. Select 'Make this site Ensemble Compatible'. Track the status of the firmware upgrade in activation page of Enlighten manager using the steps outlined in the "Preparing for Commissioning" section of this document to download M series microinverter firmware.



**If your activation has or will have multiple Envoys, go to [Provisioning Ensemble System with Multiple Envoys](#) (p. 28) for instructions to assign devices to the Ensemble Envoy.**

Some situations require splitting the system with more than one Envoy per site/system ID.

Examples include: System where the PV exceeds the allowed PV to storage ratio, Microinverters incompatible with Ensemble, etc. You can refer the ([Ensemble Storage System Planning Guide](#) for details on PV to storage ratios, compatible microinverters and other aspects of system design)

- E.1.2. You must scan Envoy and select the appropriate grid profile for the system.
- E.1.3. You must manually scan Enpower and Encharge serial numbers using a barcode photograph (i.e., use your phone with the ITK toolkit to scan barcodes on the Encharge and Enpower units), while PV microinverters can use power line scan.

**Note:** Please ensure you have selected right grid profile for the Ensemble system. If not, go to Envoy detailed screen to modify the grid profile selected.

E.1.3.1 If retrofitting an existing site, microinverters will appear in the activation.

- E.1.4. When adding Enpower, select the backup type for the system. Select either:

E.1.4.1 Partial-Home backup (consumption CT placed between Enpower and the main panel)

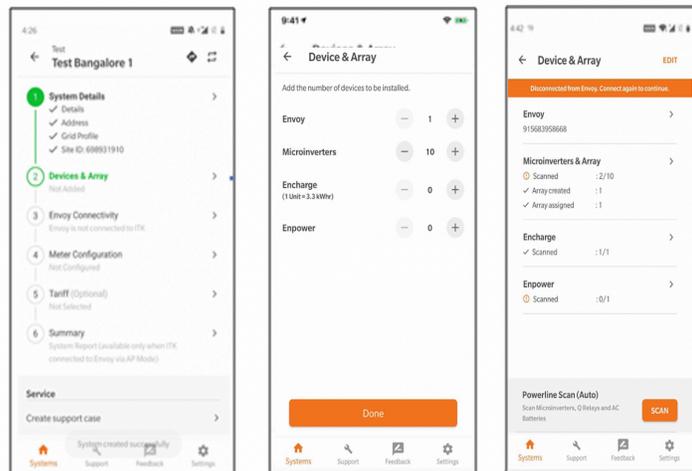
E.1.4.2 Partial-Home backup (consumption CT placed between the utility service and the main breaker)

E.1.4.3 Whole-Home backup

- E.1.5. If you are backing up any large /heavy motor loads, it is recommended to use a soft starter.

E.1.6. We strongly recommend that you barcode photograph (i.e., use your phone with the ITK toolkit to scan barcodes on the PV microinverters) the PV microinverters because a power line scan can “poach” an incorrect serial number from a nearby site.

E.1.7. Note: The LED status indicator, and state of charge in Installer Toolkit will be inaccurate until Envoy software is updated at the end of step I.



F. Energize Ensemble equipment in the following order:

- F.1. Ensure that the Envoy and PV branch circuit breakers are turned ON in the IQ Combiner or AC combiner panel.

- F.2. Ensure that the AC combiner, auto transformer and Encharge breakers are turned ON in Enpower.
  - F.2.1. First, turn ON the AC combiner, then the auto transformer, then the Encharge breaker.
- F.3. For all Encharge units, ensure that the DC disconnect switch is turned OFF, then power ON the Enpower by turning ON the utility breaker and/or any breakers on the line side of Enpower.
  - F.3.1. Battery AC disconnects may be required by local jurisdiction. If one is present, turn the switch to the on position.
  - F.3.2. Wait 60-330 seconds for the microgrid interconnect device relay to close.

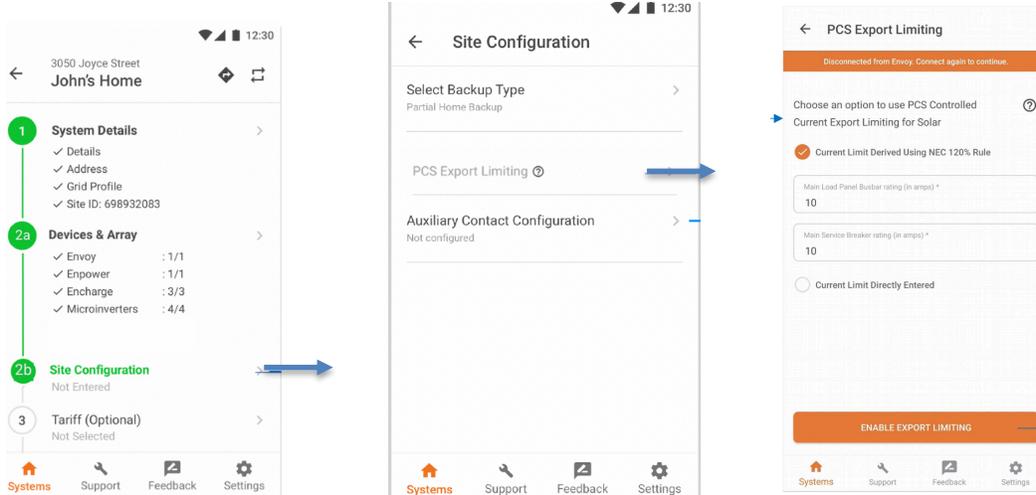
**DANGER! Risk of electric shock. When energizing equipment, check that Encharge units are properly wired as prompted. Miswiring can result in a safety hazard. Ensure Encharge ground connection does not have a L1 or L2 connection, as this introduces a safety hazard. To check correct wiring, follow these steps:**

- F.3.3. Ensure that AC power is supplied to the Encharge. Check that the breaker inside Enpower is closed, as well as any AC breakers between Enpower and Encharge (if there is a battery combiner panel).
- F.3.4. Using a voltmeter, measure the Encharge chassis metal to ground, (e.g., grounded conduit) and ensure there is no AC voltage source present. If there is incorrect wiring, a ground fault may exist, and the AC voltage may read ~120Vac. If voltage is present, DO NOT touch the chassis, immediately remove AC power from the Encharge circuits, and turn OFF the DC switch on the Encharge battery.
- F.3.5. Correct the wiring before proceeding, making sure all AC sources are removed and that the DC switches on ALL Encharge units are turned OFF.
- F.4. Make sure DC switches are turned OFF on all Encharge units.

**Important Note:** Please skip the optional Step 2b, if you are not interested in configuring load control or enabling export limit for your solar

**G. (Only for configuring Load control and PCS)** Go to Step 2b to configure load control and PCS configuration

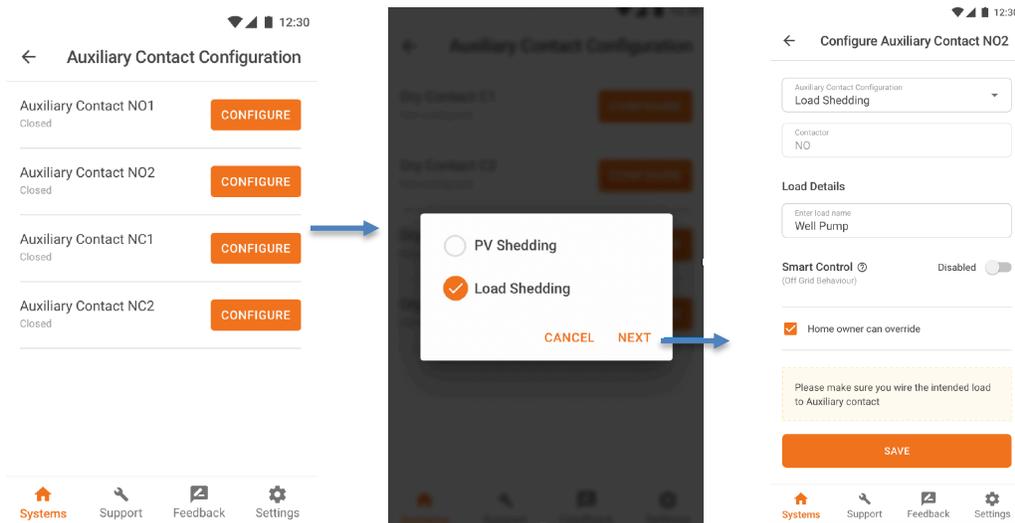
- G.1. PCS Export limiting under 'Site Configuration' will be available only for a system with Partial-Home backup (consumption CT placed between Enpower and the main panel)
- G.2. To enable PCS either
  - G.2.1. Select Current Limit Derived Using NEC 120% Rule and enter breaker details or
  - G.2.2. Select Current Limit Directly and enter the Export limit



G.3. To configure load control or PV shedding, select Auxiliary contact configuration and enter the details

G.3.1. For PV shedding, select the microinverters that are part of the branch circuit connected to the auxiliary contact

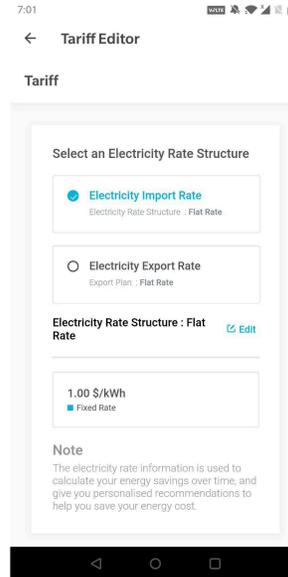
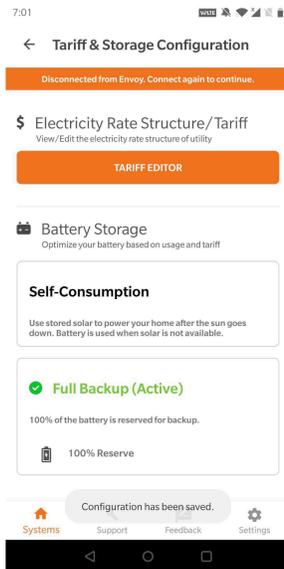
G.3.2. For Load shedding, enter the load name and the smart control to configure off-grid behavior



H. Installer Toolkit Step 3, **Set Utility Tariff:**

□ H.1. (Optional) Go to Tariff Editor to select the import rate schedules. If you are offline and not connected to internet, select the 'Tariff Editor' Lite' option

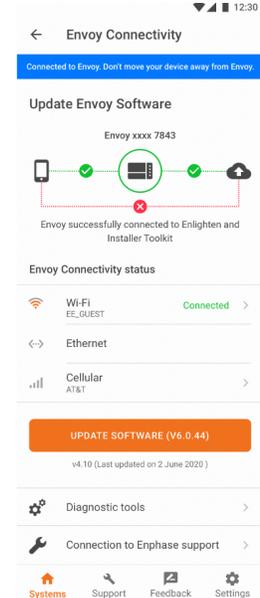
H.2. Select full backup battery storage during commissioning



## I. Installer Toolkit step 4, **Envoy Connectivity:**

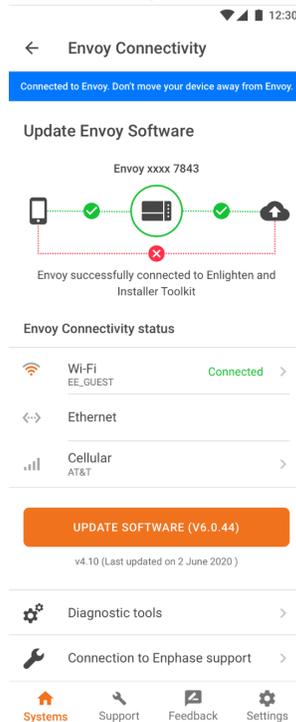
- I.1. This brings up the screen indicating your phone's connectivity to the web and to the Envoy.
- I.2. Your phone should be shown as connected to the web, but not to the Envoy.
- I.3. To provision devices, connect to the Envoy using AP Mode:
- I.4. On the Envoy, press the AP mode button (first button from left) for about one second. The LED will light solid green.
- I.5. Go to your phone's settings and connect to the Envoy's locally broadcasted network.
- I.6. It will show up on the available Wi-Fi networks as ENVOY\_\_\_\_\_ with the appended digits being the final numbers of the Envoy serial number. Tap this network to connect.
- I.7. Once connected, Installer Toolkit will show your phone connected to the Envoy, but not to the web.

- I.8. If there are issues connecting to this network, turn AP Mode off and on by repeating steps I.4 through I.7.
- I.9. Configure the Envoy with Wi-Fi or Ethernet connectivity. You must input network and password information in the Wi-Fi section. If connecting using Ethernet, simply plug the cable into the Envoy. If Ethernet/Wi-Fi is not connected, the user will be blocked from provisioning.
- I.10. Before device provisioning can occur, ensure that the Envoy has software version



- I.10.1. 6.0.X (or later) installed for IQ Ensemble and
- I.10.2. 6.1.X (or later) installed for M series Ensemble
- I.10.3. 6.1.X (or later) installed for IQ Ensemble with load control or PCS enabled
- Tap **update software** to complete this process (takes approximately 30 minutes).
- I.10.4. Ensure that the phone is close to the Envoy, and do not move the phone away while upgrading the Envoy. Moving the phone away from the Envoy could result in problems during Envoy upgrade.
- I.10.5. Your phone screen must stay active while this update occurs. Allowing your phone to go to sleep will interrupt the update.
- I.10.6. Ensure that you are not connected to the Envoy in AP mode with more than one android/iOS device
- I.10.7. After the Envoy firmware update, Envoy will restart.
  - I.10.7.1 While the Envoy is restarting, all four LEDs will flash red in unison.
  - I.10.7.2 Once the restart is complete, the network communications LED will light solid green.
- I.10.8. When the Envoy reboots, you will lose AP mode connectivity on your phone. Once the Envoy has rebooted successfully, reconnect to Envoy AP mode in the Wi-Fi settings menu of your smartphone or tablet.
  - I.10.8.1 If you have issues connecting to AP mode, turn OFF AP mode on the Envoy by pressing the AP mode button for one second, and then “forget” the AP mode network in your smartphone or tablet Wi-Fi settings.
  - I.10.8.2 Repeat steps I.4 to I.6 to reconnect to the Envoy.
- I.10.9. Configure Wi-Fi or Ethernet in the options. Ensemble installations must have a cellular modem set to remain always connected. Ensure the Enphase Mobile Connect modem (LTE-M cell modem) is plugged into the USB terminals of the Envoy.

- I.10.10. Installer Toolkit will take approximately 10 minutes to correctly display system metrics (including web connectivity) after reboot.
- I.10.10.1 The Envoy requires a means of communicating to the web to display Internet connectivity. Ensure that the Envoy Wi-Fi access has been configured, or that the Ethernet connection and cell modem connection is established.
- I.10.11. If, after completing the previous step, the Envoy software version shown on the **Update Software** button does not match the Envoy software version shown below the button, then the upgrade has failed and you must tap **Upgrade Software** again.



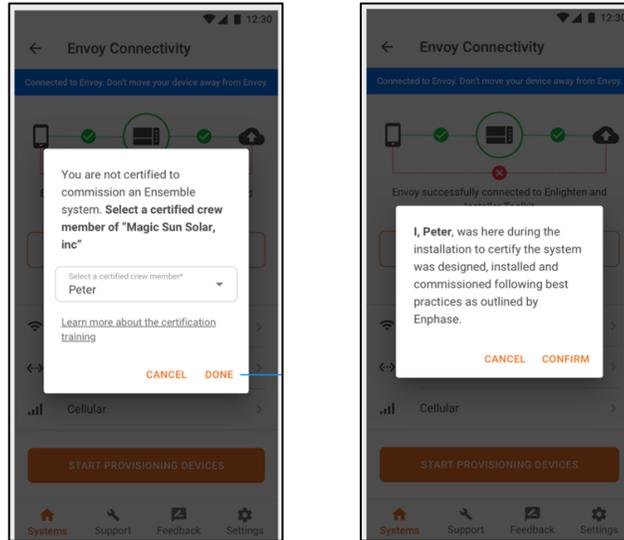
- I.11. Tap **Start Provisioning Devices** at the bottom of the **Envoy Connectivity** screen.

J. Installer Toolkit step 5, **Provisioning Devices**:

- J.1. You must be Ensemble training certified to provision Ensemble devices. If you are not, you will be asked to select a certified user from your company.
- J.2. Note that if an Envoy previously existed on site, the old Envoy must be retired before provisioning can proceed. Call Enphase Customer Support to retire the old Envoy.
- J.3. Ensure that the Ensemble communications kit or COMMS-KIT-01 is plugged into the left side Envoy USB ports.
- J.4. Ensure that the Enphase Mobile Connect cell modem is plugged into the right side Envoy USB port.
  - J.4.1. Device provisioning will not be successful if the following are not complete
    - J.4.1.1 COMMS-KIT-01 not plugged in.

J.4.1.2 Cell modem not plugged in or

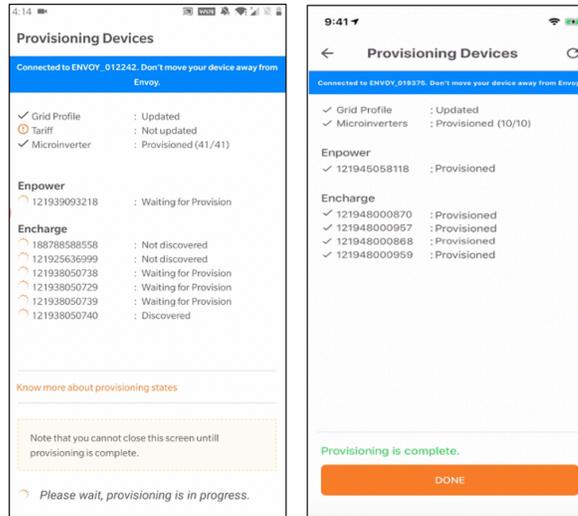
J.4.1.3 Envoy not connected to Wi-Fi or Ethernet



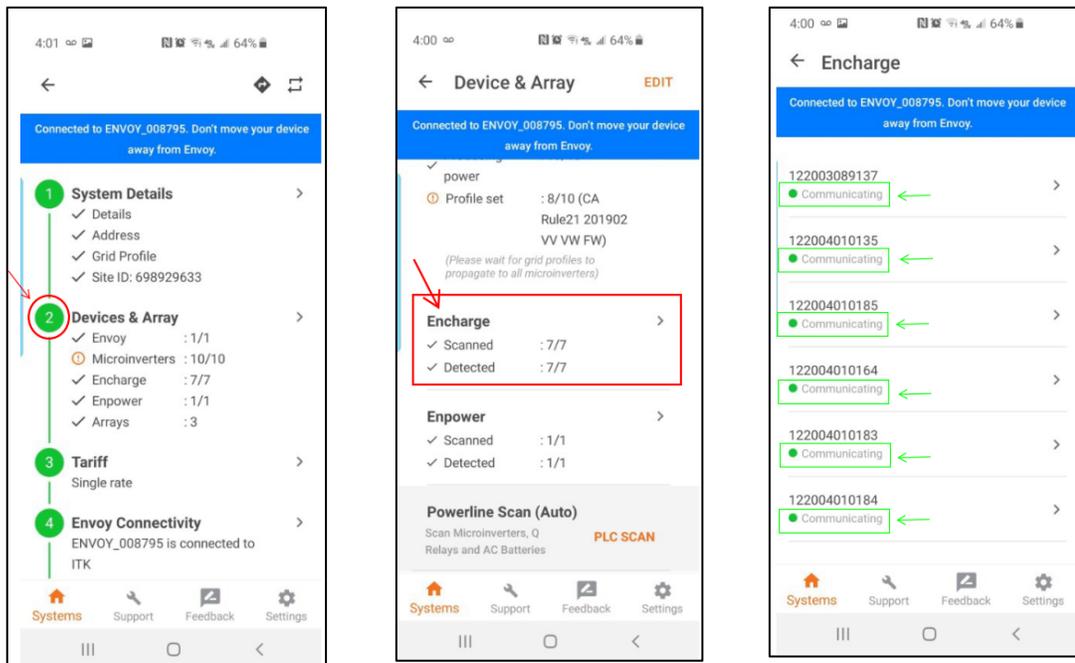
J.5. Installer Toolkit will begin provisioning all devices, and several steps will occur (taking approximately three to six minutes):

- J.5.1. The grid profile will be updated.
- J.5.2. The tariff will be updated only if the single rate was set in step H.
- J.5.3. The PV microinverters will be provisioned.
- J.5.4. The Enpower will be provisioned.
- J.5.5. The Encharge microinverters will be provisioned.
  - J.5.5.1 During provisioning, the status flows as follows:
    - J.5.5.1.1 Discovered / not discovered (Installer Toolkit is able to discover the device using Bluetooth Low Energy (BLE)).
    - J.5.5.1.2 Waiting for provisioning. (The initial communication is being established. Installer Toolkit is sending network information to the Encharges and Enpower using BLE).
    - J.5.5.1.3 Waiting for acknowledgement. (The Envoy is trying to communicate with the Encharges and Enpower using the wireless 2.4 GHz radio).
    - J.5.5.1.4 Provisioned. (The Envoy can communicate with the Encharges and Enpower).
  - J.5.5.2 Once provisioning is complete, click **Done**.
  - J.5.5.3 Turn ON the DC switch for all provisioned Encharges now.

## Ensemble Commissioning: Installer Toolkit



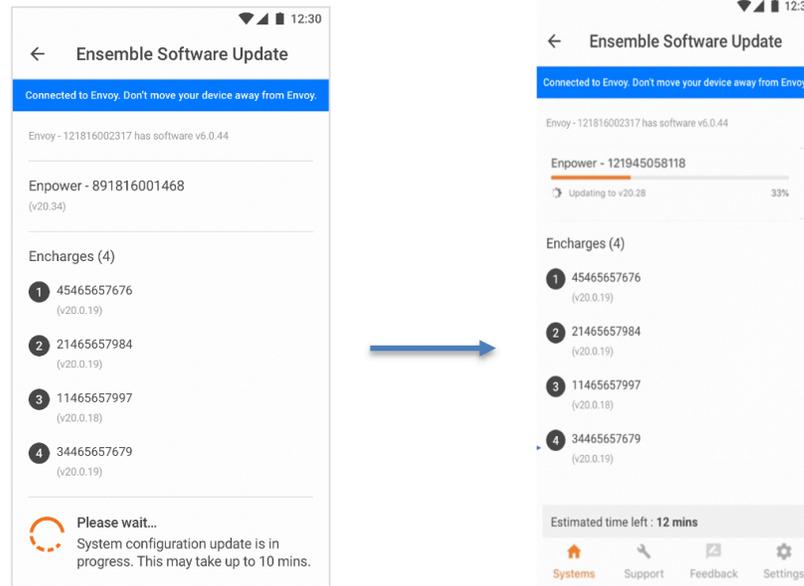
- K. Confirm that the Encharge batteries are communicating with the Envoy by checking Installer Toolkit step 2: **Device & Array**. The Encharge batteries should display “communicating” as follows:



K.1. In Installer Toolkit, LED status and state of charge will now display accurately.

K.1.1. For very early installations, a known issue may interfere with LED status and may cause the state of discharge to display inaccurately. Firmware versions later than 20.25 do not have this issue.

- K.2. If the Encharge batteries are not communicating to Envoy, follow these steps to power cycle the batteries:
  - K.2.1. Ensure that the system is on-grid.
  - K.2.2. Turn OFF the DC disconnect switches for all batteries.
  - K.2.3. Turn OFF the Encharge breaker in the Enpower.
  - K.2.4. Wait for at least two minutes. The Encharge LEDs should be OFF at this point.
  - K.2.5. Turn ON the Encharge breaker in the Enpower.
  - K.2.6. Allow the Encharge LEDs to flash red.
  - K.2.7. Turn ON DC switches on all Encharges. The Encharge LEDs should stop flashing red after DC switches are turned ON.
- K.3. If Enpower is not communicating with the Envoy, follow these steps to power cycle the system:
  - K.3.1. Ensure that the system is on-grid.
  - K.3.2. Turn OFF the DC disconnect switches for all batteries.
  - K.3.3. Turn OFF the utility-side breaker in Enpower or the supply breaker to Enpower in the main panel.
  - K.3.4. Wait for at least two minutes. The Encharge LEDs should be OFF at this point.
  - K.3.5. Power ON Enpower, that is, turn ON the utility-side breaker in Enpower or the supply breaker to Enpower in the main panel.
  - K.3.6. Wait 60-330 seconds for the microgrid interconnect device relay to close.
  - K.3.7. Allow the Encharge LEDs to flash red.
  - K.3.8. Turn ON DC switches on all the Encharges. The Encharge LEDs should stop flashing red after DC switches are turned ON.
- L. Upon successful completion of provisioning, important software updates will be completed in the system:
  - L.1. System configuration update will be automatically started by the Envoy
  - L.2. Enpower software will be automatically updated by Envoy if the Enpower software version is less than 20.34. This update will complete in less than an hour.
  - L.3. You can go to Step 6 to configure production and consumption meters when Enpower software update is in progress.



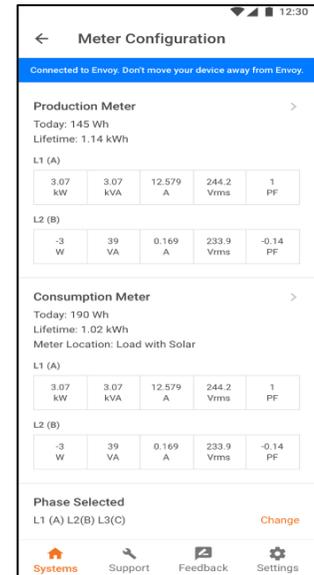
**Important Note:** If you had forgotten to disable the manual override on Enpower before commissioning, Toolkit will show a pop-up to disable the manual override before moving forward.

M. Installer Toolkit step 6, the meters will be disabled by default after installing Encharge and Enpower. **Configure Production and Consumption CTs** using the meter wizard:

- M.1. Verify that the configuration matches what is installed (**Partial vs Whole home backup and the location of CT**).
- M.2. Enable the meters by verifying the readings by going through the meter wizard (required).
- M.3. While in the production meter wizard, switch OFF all PV breakers (microgrid and non-microgrid) as instructed to make sure the readings go to zero before enabling.
- M.4. While in the consumption meter wizard, turn ON the PV and a known load in the home to confirm consumption rises as expected, and select the meter location. Select one of the 3 options
  - M.4.1. Partial backup – Consumption CT between Enpower and Main Load Panel
  - M.4.2. Partial backup – Consumption CT between Main Load panel and Utility meter
  - M.4.3. Whole home backup

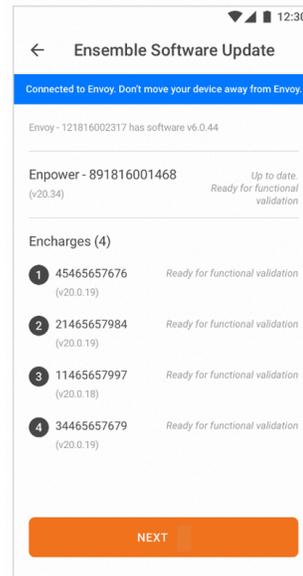
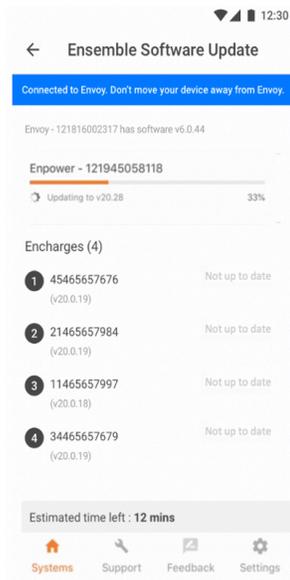
**Warning: Do not place the consumption CT on the load side of Enpower. It should always be on grid side.**

- M.5. Once the meters are configured correctly, you will be able to see if the Encharge batteries are charging or discharging in the **Devices** section of Installer Toolkit.



N. Go to 'Ensemble Software Update' step. You will note that the Enpower software update will be in progress if the current software version of Enpower is less than 20.34 (See Figure 2). If the update is in progress, wait for it to complete.

N.1. Once the Enpower software update is complete, an "NEXT" button will appear at the bottom of the Ensemble Software Update screen (Figure 3) Since the Encharge units have not been fully updated. We recommend this step be skipped for update will take 6-12 hours. **The Encharge software update will commence after functional testing has completed and the commissioning process is finished.**

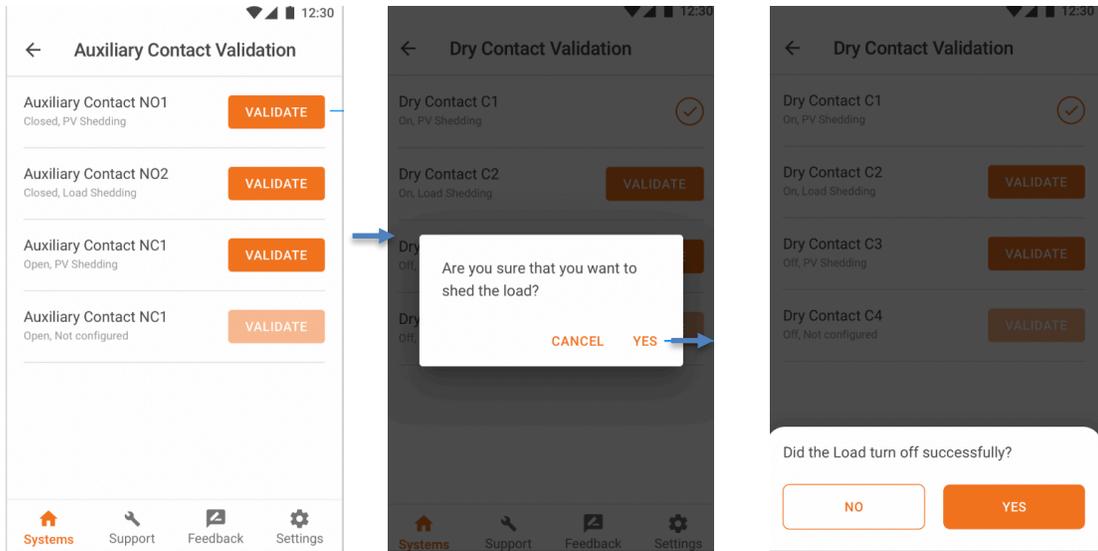


O. Installer toolkit step 7: Live Status & Functional Validation:

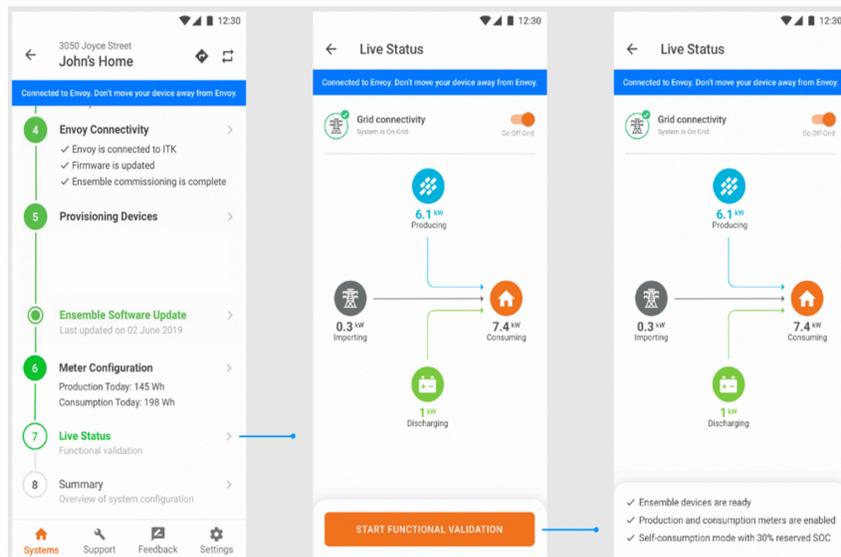
O.1. Live status displays real time data about the Ensemble system. It provides the same information as visible from the MyEnlighten or Enlighten Manager.

O.2. **(Only if you have configured Load control)** You can validate the Auxiliary contact configured earlier using the 'Auxiliary Contact Validate' option under live status. Select 'Validate' for each of the auxiliary contact and confirm that the load or the PV was shed by the Envoy.

## Ensemble Commissioning: Installer Toolkit



O.3. At the foot of step 7 is a button to begin Functional Validation. This will guide you through testing of your client's Encharge system to make sure it behaves as expected during grid transition events.



## Functional Validation Instructions

- Complete all steps in the order listed.
- Mark steps completed in the Document Results section of each step.
- If any of the steps cannot be completed, record what occurred in the Observations section. See the **Ensemble Troubleshooting Guide** for further information.
- At the bottom of each page, initial that all steps have been completed.

**Date & Time Functional Validation began:** \_\_\_\_\_

**Battery Mode in Self-Consumption:**

N. After functional testing, battery mode will be changed to full backup automatically by the Toolkit to bring the state of charge to 100%

**On-grid functional testing:**

O. Consumption (load monitoring) test:

O.1. Ensure Ensemble is operating in an on-grid state. Confirm this by measuring voltage between the line and load sides of Enpower smart switch microgrid interconnect device. If on grid, voltage will be 0V from L1 to L1. If off-grid, voltage will be 120V from L1 to L1.



O.2. Installer Toolkit and Enlighten Manager **Live Status** feature a button that allows the Ensemble system to transition between on-grid and off-grid modes.

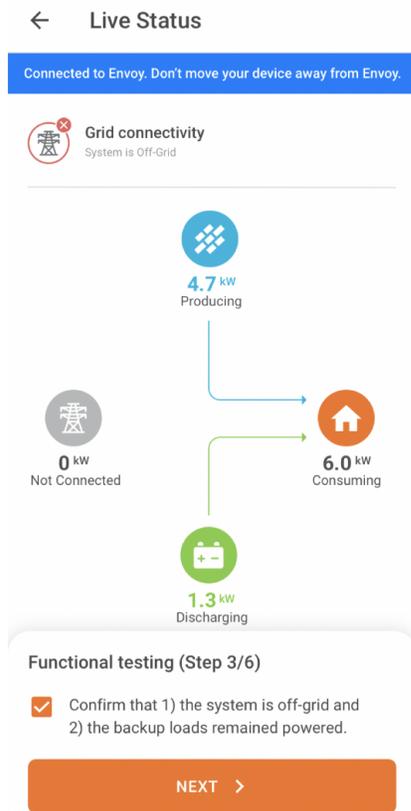
O.3. With backup loads operating, turn off power from the grid using this button in Installer Toolkit or Enlighten.

O.4. Wait approximately 45 seconds for the microgrid interconnect device (MID) to open. You will hear a click when this occurs.



O.5. Confirm that the microgrid is operational and that loads did not drop. Do this by observing loads and testing for voltage at the backup panel.

- Check that the **Live Status** interface in Installer Toolkit shows off-grid.
- Ensure the loads stays powered on for two minutes or more.



O.6. Turn ON additional loads in the backup panel and wait for 60 seconds.



O.7. Document the results. After grid turn off, did loads remain powered up for five minutes, and did Installer Toolkit display off-grid in the **Live Status** interface?

- Yes
- No

minutes

Observations:

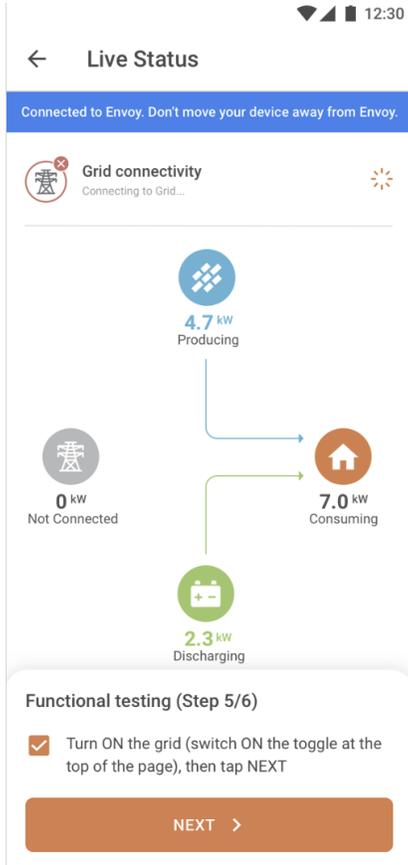
---



---

P. Off-grid to on-grid transition using Installer Toolkit or Enlighten Manager:

P.1. With the system still operating in off-grid mode and loads still operating, restore power to the grid using the button in Installer Toolkit or Enlighten **Live Status**.



- P.2. Wait for 60 to 330 seconds for the microinverters to restart (depending on grid profile).
- P.3. You should hear a click of the microgrid interconnect device relay closing inside Enpower.
- P.4. Check and confirm that the system is now operating on-grid. Observe this in the Installer Toolkit **Live Status** interface.
- P.5. Document the results. Did the microgrid interconnect device close, and was on-grid status observed in Installer Toolkit? Did any loads drop? (If so, record in Observations)
  - Yes
  - No

minutes

Observations:

---



---

P.6.

P.7. Check and confirm that the system is now operating on-grid. Observe this in the Installer Toolkit **Live Status** interface.



P.8. Once the functional validation is complete, if the Encharges and Enpower require a firmware update, the Envoy will update them automatically.

P.9. The battery mode of the system will also be set to Full Back-up by the Installer Toolkit.

P.10. Document the results. Did the microgrid Interconnect device close, and was on-grid status observed in Installer Toolkit?

- Yes
- No

minutes

Observations:

---



---

Q. After batteries charge to 100% and remain there for one hour, the installer, or homeowner can set the full-time operating battery mode (Self-Consumption, Savings, or Full-Backup). This can be changed in the settings of Enlighten Manger, or Enlighten Mobile app.

A 'Homeowner Walk-through' pop-up will be shown after functional validation is complete. Ensure all the topics mentioned in the pop-up are discussed with homeowner before leaving the site.

R. Installer Toolkit step 8, **Generate a Summary Report:**

- R.1. You can share this report using email, text or airdrop. It contains details of each provisioned device and the commissioned status of the system.

**NOTE!** Before leaving the site, ensure all breakers feeding the Encharge and PV system are closed (if permitted by utility Permission to Operate).

- S. With the previous steps complete, it is important to set expectations about how many loads a homeowner should use during an outage. Some installation companies ask their homeowners to live in backup mode for the first couple days after the system is installed so they understand how to modify their behavior during an outage. If they drain or overpower the batteries, they can turn the main breaker back on.

**Different states of Encharge batteries**

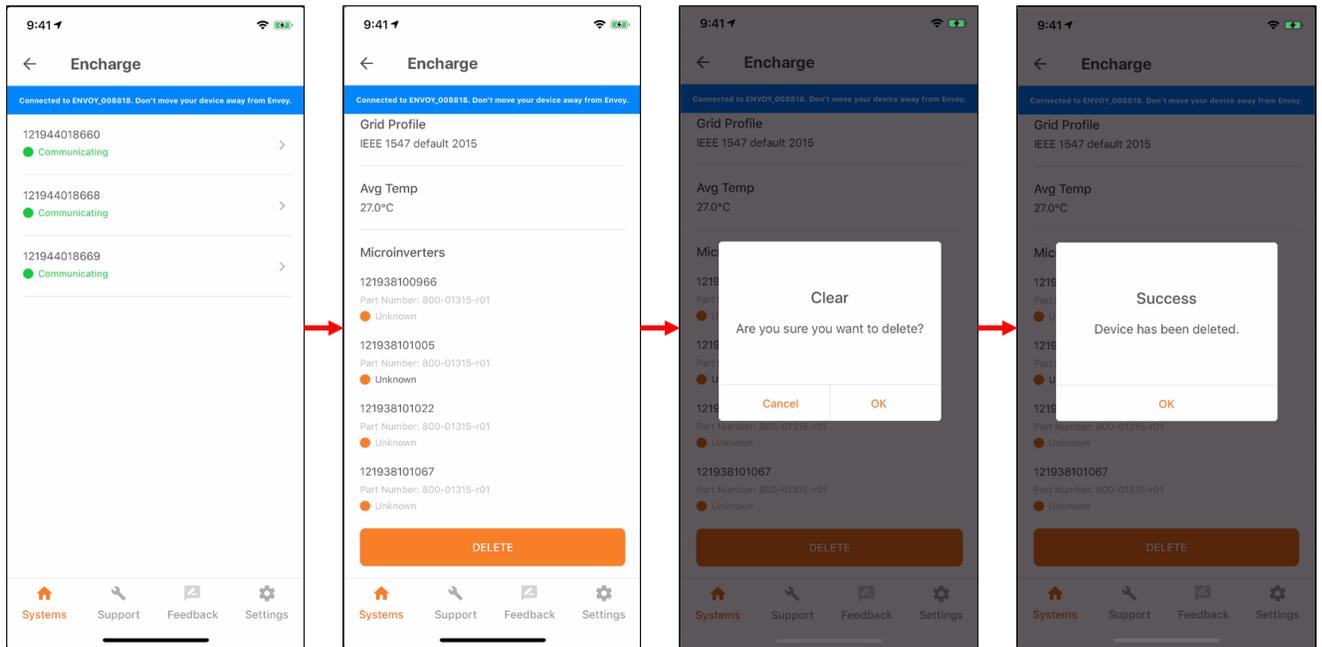
State	Description
Uncommissioned	
Flashing blue	After booting up, when Encharge has paired with an IQ Envoy but has not passed the commissioning three-way handshake to confirm that it is an Enphase device.
Flashing green	After passing the three-way handshake with the IQ Envoy.
After commissioning (normal operation)*	
Rapidly flashing yellow	Starting up / Establishing communications
Red flashes in sequences of 2	Error.
Solid yellow	Not operating due to high temperature.
Solid blue or green	Idle. Color transitions from blue to green as state of charge increases. You can check Enlighten for charge status.
Slowly flashing blue	Discharging
Slowly flashing green	Charging
Slowly flashing yellow	Sleep mode activated
Off	Not operating.

\* Encharge batteries have a one-hour orphan timer. If the IQ Envoy stops communicating with them, after one hour the Encharge batteries return to an "uncommissioned" state.

## Decommissioning an Encharge/Enpower While Replacing it On Site

When replacing an Encharge on site, the old Encharge or Enpower must be deleted using Installer Toolkit.

1. Connect to the Envoy using AP mode.
2. Go to Step 2: **Devices and Array** and select and delete the devices as shown in the following images. The device will be removed from Enlighten and will be synced to ITK after Envoy reports the deletion.

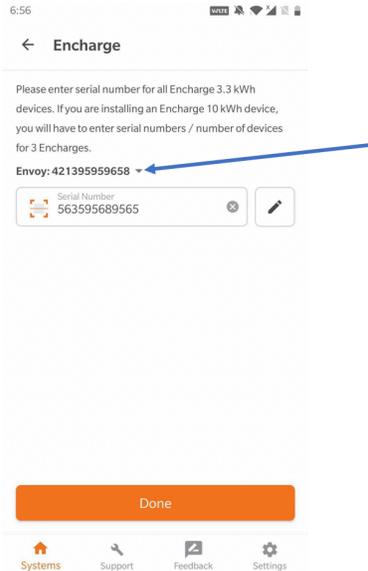


3. After Encharge battery has been retired, Turn DC switch OFF
4. Add and provision the new devices as documented steps E and J

## Provisioning Ensemble System with Multiple Envoys

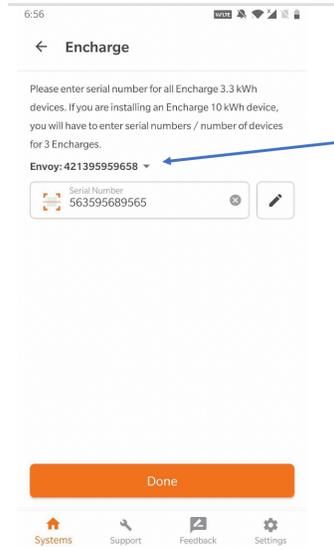
You can add multiple Envoys but the system can have only one Ensemble Envoy (i.e. Envoy inside the microgrid on the load side of Enpower). All the Ensemble devices (Encharge, Enpower and microinverters) must be connected to the microgrid Envoy.

1. Make sure you have scanned the serial numbers of all Envoys (two or more)
2. Assign the Encharge(s) and Enpower to the microgrid Envoy as follows:
  - a. Manually scan the serial numbers of Ensemble components into Installer Toolkit.
  - b. After scanning the Encharge serial number, tap on Envoy drop down and select the microgrid Envoy

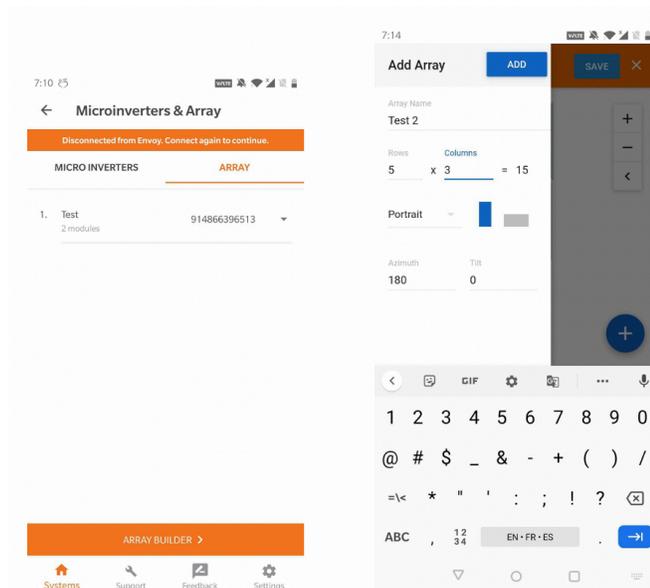


3. While adding Enpower, select the backup type for the system. Select either:
  - a. Partial-home backup (Consumption CT placed between Enpower and the main panel)
  - b. Partial-home backup (Consumption CT placed between the utility service and the main breaker)
  - c. Whole-home backup
4. After scanning the Enpower serial number, tap on the Envoy drop down and select the microgrid Envoy.

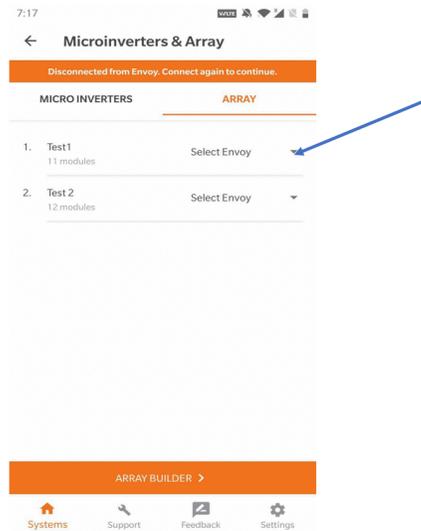
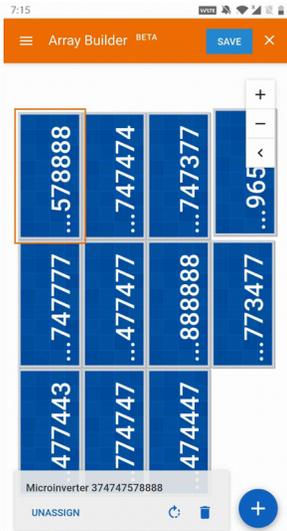
# Ensemble Commissioning: Installer Toolkit



5. Steps to assign your Microinverters to the microgrid Envoy:
  - a. It is strongly recommended to photograph/scan the PV microinverter barcodes as a power line scan can “poach” an incorrect serial number from a nearby site.
  - b. After successfully barcode photographing all the microinverters, make sure you are connected to the Internet
  - c. Under **Devices and Array**, tap on **Microinverters and Array** and go to the **Array** tab.
    - i. Tap on **Array Builder**.
    - ii. Make sure you create a separate array and assign microinverters that need to be included in the microgrid.
    - iii. Save and exit the array builder and assign an Envoy to the array.



# Ensemble Commissioning: Installer Toolkit



## Known Issues and Limitations

Note: These are temporary limitations. Enphase is taking action to fix these with software upgrades.

#	Issue	Workaround/Fix
1	On sites with M-series microinverters transition from on grid to off grid may take a long time. This issue is only seen when the Encharge batteries are at a very high SoC and there is very little or no load on the system.	If the system not going on-grid simply ask the homeowner to turn on a few loads. The system will go back to the grid once it discharges to serve loads and reduces the battery SoC.  Enphase is working to fix this limitation in the next software release.
2	M-series microinverter firmware upgrade for cellular only sites cannot be triggered by installer	Call Enphase customer support to trigger the M series microinverter firmware upgrade for these sites
3	M-series microinverter firmware upgrade for multiple Envoy's on the same site cannot be triggered by installer	Call Enphase customer support to trigger the M series microinverter firmware upgrade for these sites

## Features for troubleshooting the system

**Noise detection over PLC** -You can now monitor the quality of Power-line communication between Envoy and the microinverters. The PLC Noise detection provides real time data of the noise detected when communicating with Envoy.

# Ensemble Commissioning: Installer Toolkit

