

TECHNICAL BRIEF – North America

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.

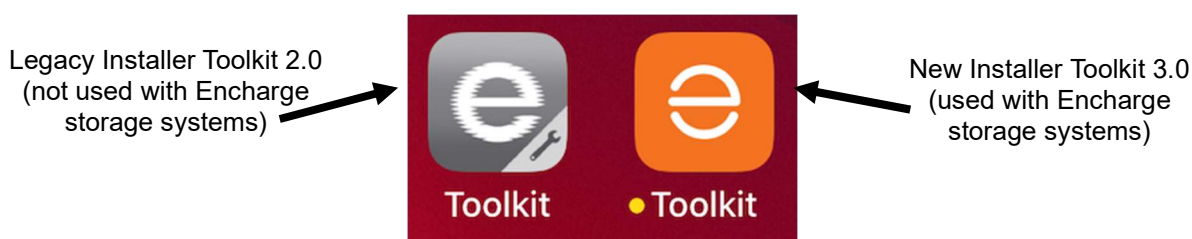
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Preparing for Installer Toolkit Communications

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 (ITK). Ensure that Installer Toolkit is updated to version 3.X or later:

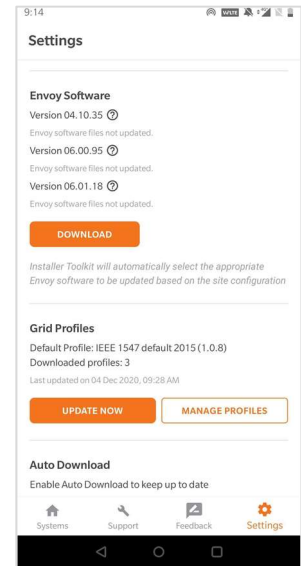


- You can install the application using the following links
 - [iOS](#)
 - [Android](#)
- Enable Bluetooth communication on the smart phone or tablet you will use for commissioning.
- Turn OFF automatic sleep mode on your smart phone or tablet. This prevents your phone from going to sleep and interrupting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

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 IQ 6, IQ 7, 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.
 - 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:



System

Name: Enphase System Five

Type: Residential

☒ Third Party Owned (ex: PPA or Leased)

System Host

User has logged in and cannot be edited.

User: Abhinav S (abikumar@enphaseenergy.com) 886.7890345

Host has access to Enlighten Manager for system performance monitoring.

Owner can view module-level information and receive alert emails.

Send system access to host

Owner

The system owner is the contact at the Lease or PPA company.

Email: prarora@enphaseenergy.com

Location

*Street Address: 25th Street North

Street Address 2

*City: Fargo

*State/Province: North Dakota

*Zip/Postal Code: 58001

*Country: United States

Latitude: 46.8684069

Longitude: -96.8290329

Envoy

#1

Envoy Serial Number: 121820004230

Envoy Status: Reporting Status: Device Online

Last Report Date: 11/02/2020 12:25 AM PST

First Report Date: 04/16/2020 06:09 PM PDT

Grid Profile Success

Make this M-series site Ensemble compatible

Firmware Upgrade Status: Request Pending

Add Another Envoy

Activation Checklist

Stage: Final

100% Complete

1 Started

- Owner Entered 12/11/2019 10:42 PM PST
- Location Entered 12/11/2019 10:42 PM PST
- Envoy(s) Entered 12/11/2019 10:42 PM PST

2 Connecting

- Envoy(s) Reported 12/11/2019 10:42 PM PST

3 Verifying

- Good Communication Established 12/11/2019 10:42 PM PST
- System Operation Verified 12/11/2019 10:42 PM PST

4 Ready

- Arrays Built 12/11/2019 10:42 PM PST
- System Operational 12/11/2019 10:42 PM PST
- Access Granted to Owner 12/11/2019 10:42 PM PST

System created on 12/09/2019 08:18 AM PST

Activation entered by nash@enphaseenergy.com

Last updated by abikumar@enphaseenergy.com on 06/11/2019 08:18 AM PST

- 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.

Make this M-series site Ensemble compatible

Status: Request Completed

Request Sent Date: 11/02/2020 12:25 AM PST

Request Completed Date: 18/02/2020 09:12 AM PST

Please contact [Enphase customer support](#) if you are facing any issues.

- 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.

- Contact Enphase customer support at [\(877\) 797-4743](tel:877-797-4743) or at <https://enphase.com/en-us/support/contact-support>
- Informative notes:
 - Encharge batteries ship with approximately 30% state of charge.
 - Encharge batteries ship with “self-consumption” as their default mode.
 - 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 with its DC switch on, 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, grid profile, 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. **(Only for M-Series Ensemble)** Replacing Legacy Envoys with Envoy-S Metered for M-Series Ensemble Installations.

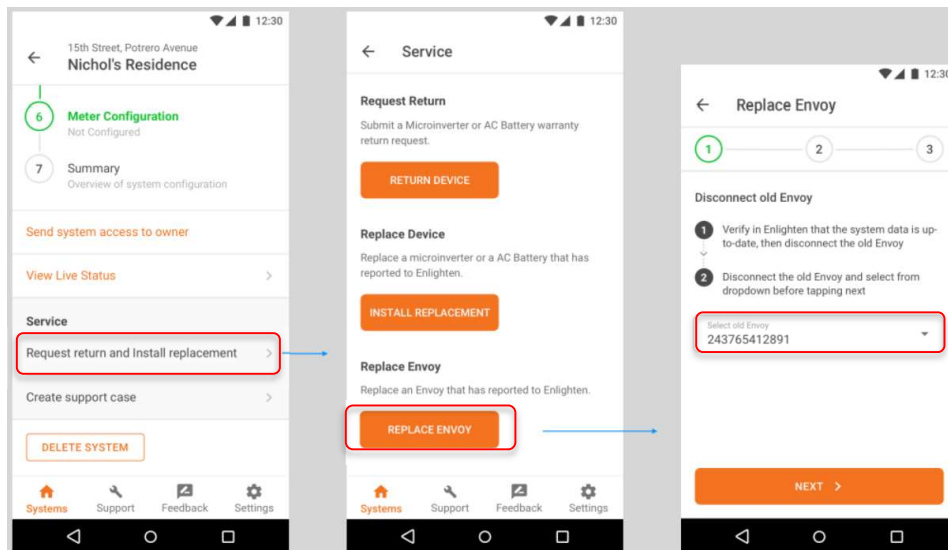
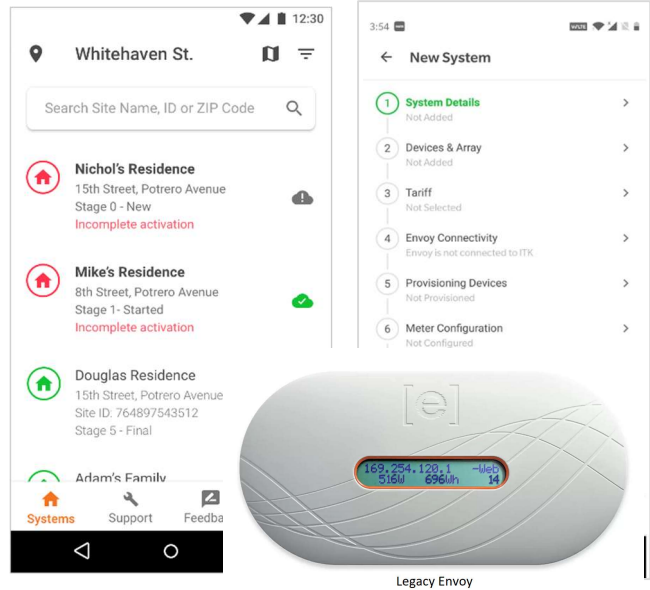
C.1. Replace the Legacy Envoy or Envoy-S Standard on site with the Envoy-S Metered.

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

C.1.2. In Installer Toolkit, navigate to “request return and install replacement” button at the bottom of the activation screen in ITK

C.1.3. Tap “replace Envoy”

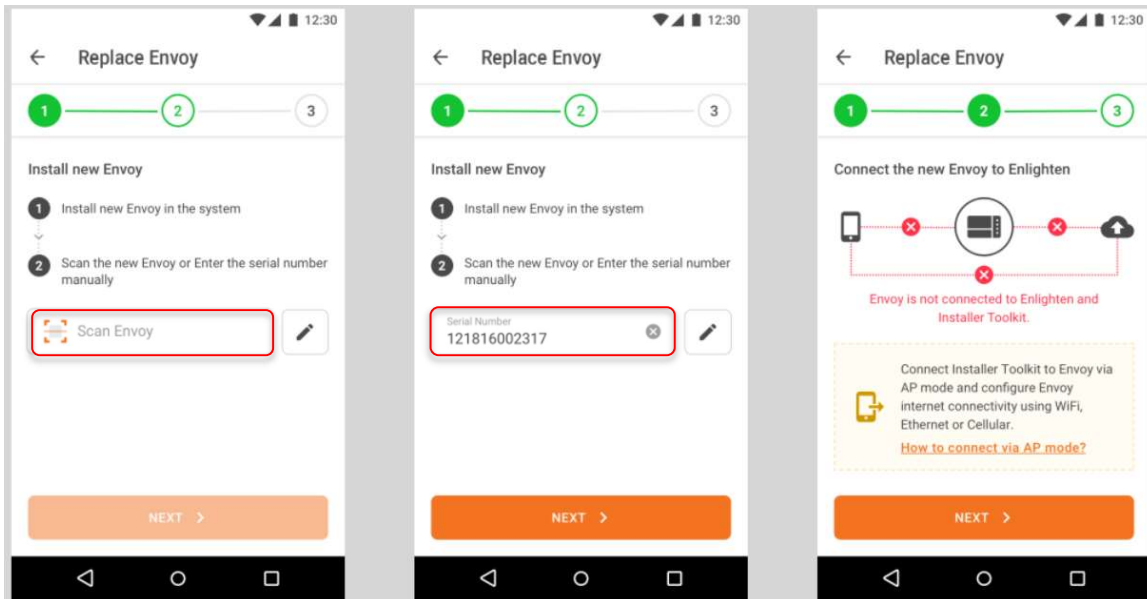
C.1.4. Input old Envoy serial number.



C.1.4.1 Install Envoy-S Metered into the system

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

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

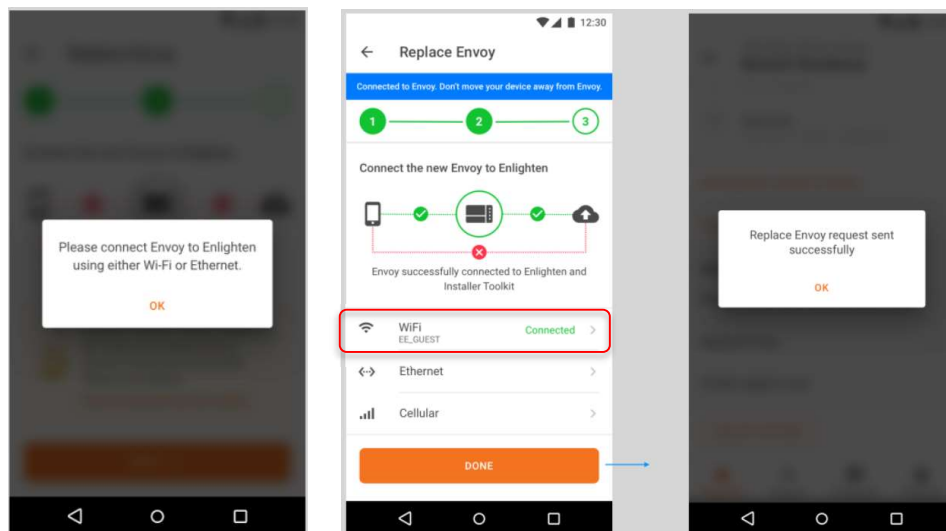


C.1.4.4 If using Ethernet, plug into Envoy-S Metered.

C.1.4.5 If using Wi-Fi, Tap AP mode button, and connect to the Envoy's network in your phone settings.

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

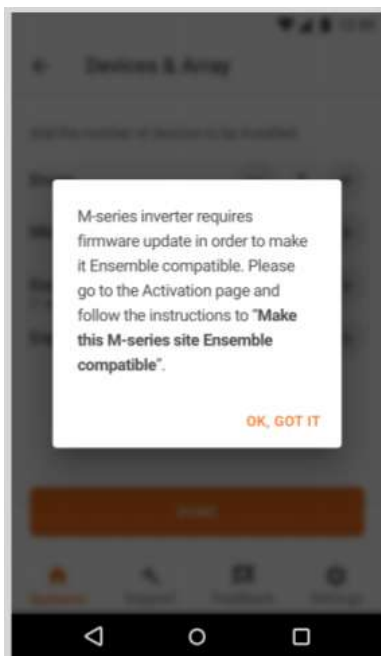
C.1.4.5.2 After the Envoy request has been successfully sent, exit AP mode.



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

D.1. Enter the total count of each device type to be added in the system.

- D.1.1. If M-Series microinverter firmware pre-download was not successful, the user will be blocked from moving forward at this step and re-directed to Enlighten Manager. Follow 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)

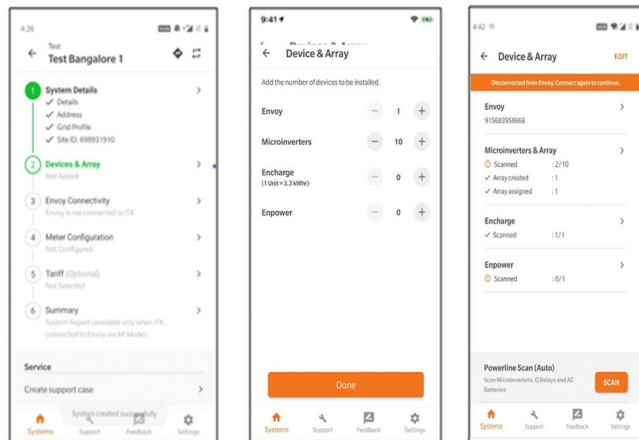
- D.1.2. You must manually scan Enpower and Encharge serial numbers using a barcode photograph (i.e., use your phone with the ITK toolkit to scan barcodes on the Encharge and Enpower units), while PV microinverters can use power line scan.
- D.1.2.1 If retrofitting an existing site, microinverters will appear in the activation.
- D.1.3. When adding Enpower, select the backup type for the system. Select either:
- D.1.3.1 Partial-Home backup (consumption CT placed between Enpower and the main panel)
- D.1.3.2 Partial-Home backup (consumption CT placed between the utility service and the main breaker)

D.1.3.3 Whole-Home backup

D.1.4. If you are backing up any large /heavy motor loads, it is recommended to use a soft starter.

D.1.5. 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.

D.1.6. **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 H.



E. Disable manual override in Enpower

E.1. Remove the Enpower deadfront to access the manual override switch on the MID. Do not remove the cover and sticker on the Enpower deadfront.

E.2. Follow the sequence specified below:

E.2.1. OPEN the Encharge breaker inside Enpower

E.2.2. OPEN the mains breaker powering the Enpower from the grid side (this could be inside or outside the Enpower unit)

E.2.3. OPEN the auto transformer breaker inside Enpower

E.2.4. Turn OFF all the DC disconnect switches on all Encharge batteries and wait for at least 60 seconds

E.2.5. Turn the manual override toggle inside Enpower to the right to manually OPEN the MID relay.

E.3. Re-energize breakers in the following sequence

E.3.1. CLOSE the NFT breaker inside of Enpower

E.3.2. CLOSE the mains breaker powering Enpower from the grid side.

E.3.3. CLOSE the Encharge breaker inside Enpower

E.3.4. If the load breaker or PV combiner breakers were open inside Enpower, CLOSE them now.

E.4. The Enpower system is no longer in manual override state and is ready for commissioning.

F. Energize Ensemble equipment in the following order:

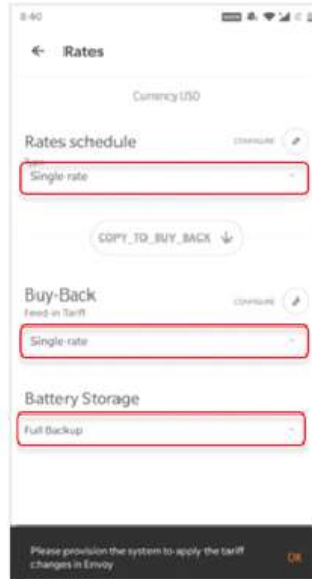
- F.1. Ensure that the Envoy and PV branch circuit breakers are turned ON in the IQ Combiner or AC combiner panel.
- F.2. Ensure that the AC combiner, auto transformer and Encharge breakers are turned ON in Enpower.
 - F.2.1. First, turn ON the AC combiner, then the auto transformer, then the Encharge 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. Allow Encharge LEDs to flash red.
- F.5. Turn ON DC switches on all Encharge units. The Encharge LEDs should stop flashing red after DC switches are turned ON.

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

- G.1. Select single rate for sell and buy back rate schedules and select Full Backup battery storage during commissioning.



H. Installer Toolkit step 4, **Envoy Connectivity**:

H.1. This brings up the screen indicating your phone's connectivity to the web and to the Envoy.

H.2. Your phone should be shown as connected to the web, but not to the Envoy.

H.3. To provision devices, connect to the Envoy using AP Mode:

H.4. On the Envoy, press the AP mode button (first button from left) for about one second. The LED will light solid green.

H.5. Go to your phone's settings and connect to the Envoy's locally broadcasted network.

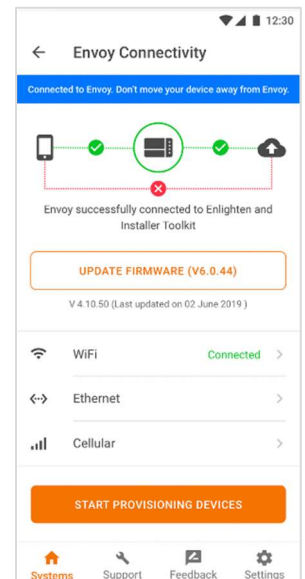
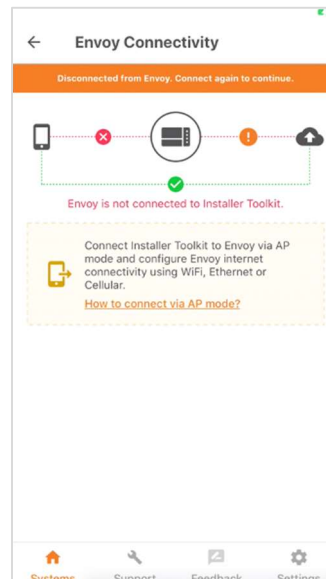
H.6. It will show up on the available Wi-Fi networks as ENVOY_____ with the appended digits being the final numbers of the Envoy serial number. Tap this network to connect.

H.7. Once connected, Installer Toolkit will show your phone connected to the Envoy, but not to the web.

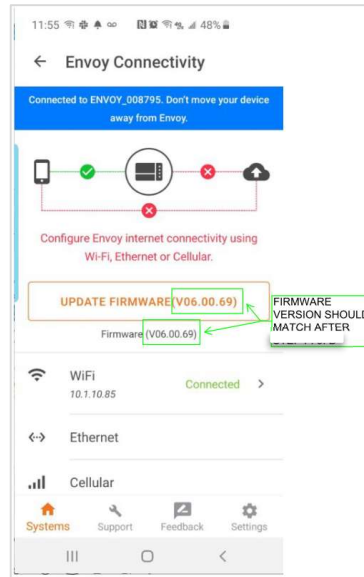
H.7.1. If there are issues connecting to this network, turn AP Mode off and on by repeating steps H.4 through H.7.

H.8. 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.

H.9. REMOVE the cell modem from the Envoy USB port.



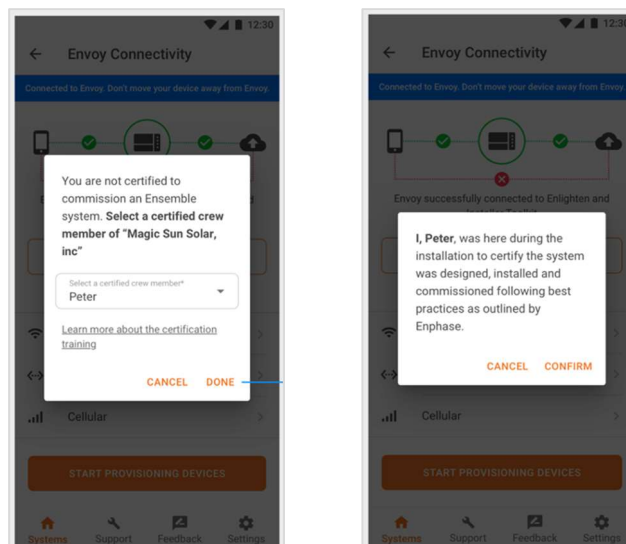
- H.10. Before device provisioning can occur, ensure that the Envoy has software version
 - H.10.1. 6.0.X (or later) installed for IQ Ensemble and
 - H.10.2. 6.1.X (or later) installer for M-Series Ensemble
 - Tap **update firmware** to complete this process (takes approximately 30 minutes).
 - H.10.3. 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.
 - H.10.4. Your phone screen must stay active while this update occurs. Allowing your phone to go to sleep will interrupt the update.
 - H.10.5. After the Envoy firmware update, Envoy will restart.
 - H.10.5.1 While the Envoy is restarting, all four LEDs will flash red in unison.
 - H.10.5.2 Once the restart is complete, the network communications LED will light solid green.
 - H.10.6. 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.
 - H.10.6.1 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.
 - H.10.6.2 Repeat steps H.4 to H.6 to reconnect to the Envoy.
 - H.10.7. 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.
 - H.10.8. Installer Toolkit will take approximately 10 minutes to correctly display system metrics (including web connectivity) after reboot.
 - H.10.8.1 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.
 - H.10.9. If, after completing the previous step, the Envoy software version shown on the **Update Firmware** button does not match the Envoy software version shown below the button, then the upgrade has failed, and you must tap **Upgrade Firmware** again.



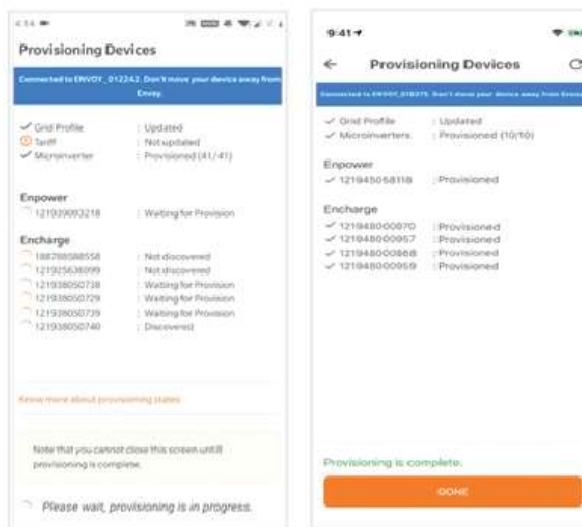
H.11. Tap **Start Provisioning Devices** at the bottom of the **Envoy Connectivity** screen.

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

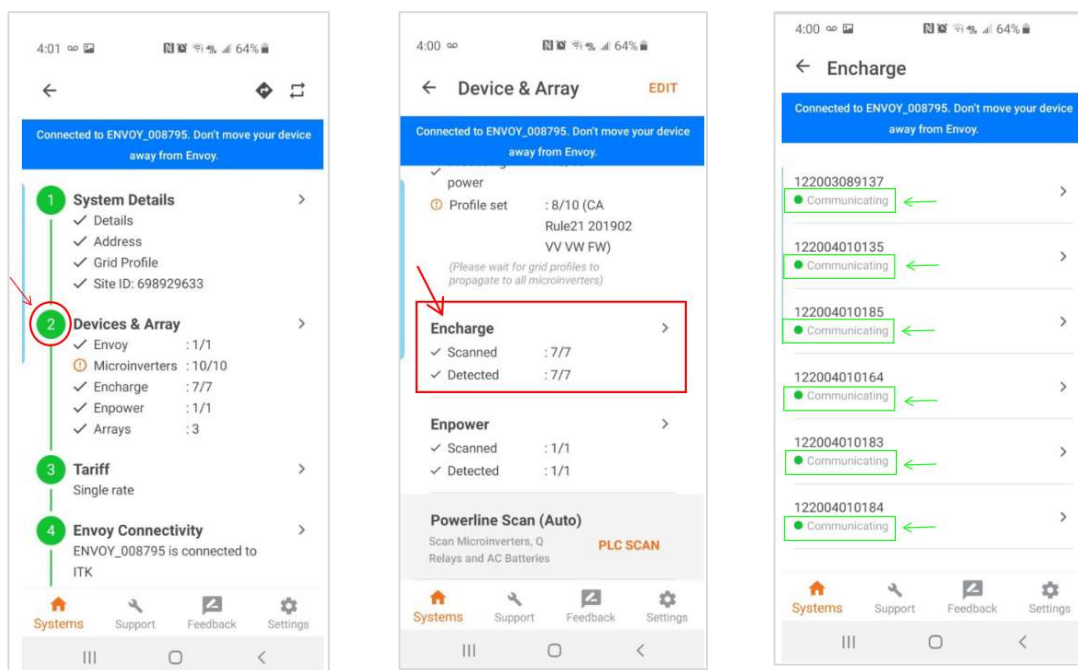
- I.1. You must be Ensemble training certified to provision Ensemble devices. If you are not, you will be asked to select a certified user from your company.
- I.2. Note that if an Envoy previously existed on site, the old Envoy must be retired before provisioning can proceed. Call Enphase Customer Support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



- I.5. Installer Toolkit will begin provisioning all devices, and several steps will occur (taking approximately three to six minutes):
 - I.5.1. The grid profile will be updated.
 - I.5.2. The tariff will be updated only if the single rate was set in step G.
 - I.5.3. The PV microinverters will be provisioned.
 - I.5.4. The Enpower will be provisioned.
 - I.5.5. The Encharge microinverters will be provisioned.
 - I.5.5.1 During provisioning, the status flows as follows:
 - I.5.5.1.1 Discovered / not discovered (Installer Toolkit is able to discover the device using Bluetooth Low Energy (BLE)).
 - I.5.5.1.2 Waiting for provisioning. (The initial communication is being established. Installer Toolkit is sending network information to the Encharge batteries and Enpower using BLE).
 - I.5.5.1.3 Waiting for acknowledgement. (The Envoy is trying to communicate with the Encharge batteries and Enpower using the wireless 2.4 GHz radio).
 - I.5.5.1.4 Provisioned. (The Envoy can communicate with the Encharge batteries and Enpower).
 - I.5.5.2 Once provisioning is complete, click **Done**.



- J. 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:



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

J.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.

J.2. If the Encharge batteries are not communicating to Envoy, follow these steps to power cycle the batteries:

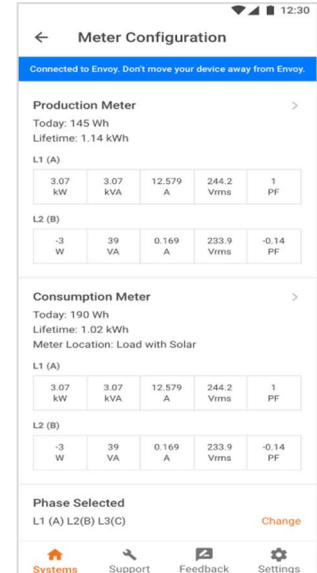
- J.2.1. Ensure that the system is on-grid.
- J.2.2. Turn OFF the DC disconnect switches for all batteries.
- J.2.3. Turn OFF the Encharge breaker in the Enpower.
- J.2.4. Wait for at least two minutes. The Encharge LEDs should be OFF at this point.
- J.2.5. Turn ON the Encharge breaker in the Enpower.
- J.2.6. Allow the Encharge LEDs to flash red.
- J.2.7. Turn ON DC switches on all Encharge batteries. The Encharge LEDs should stop flashing red after DC switches are turned ON.

J.3. If Enpower is not communicating with the Envoy, follow these steps to power cycle the system:

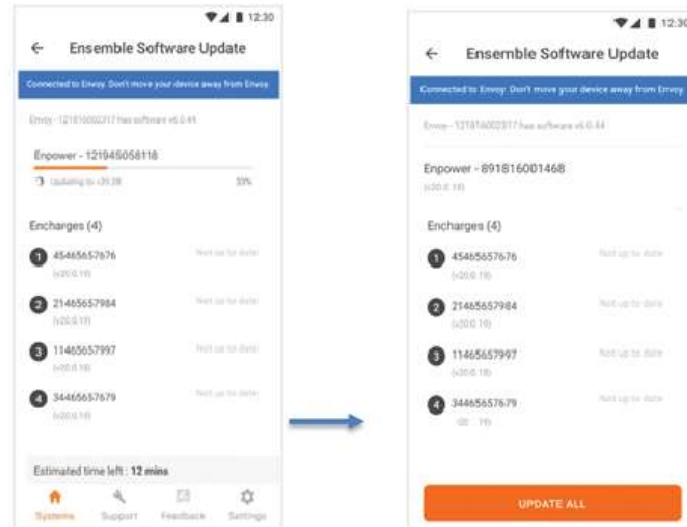
- J.3.1. Ensure that the system is on-grid.
- J.3.2. Turn OFF the DC disconnect switches for all batteries.
- J.3.3. Turn OFF the utility-side breaker in Enpower or the supply breaker to Enpower in the main panel.
- J.3.4. Wait for at least two minutes. The Encharge LEDs should be OFF at this point.
- J.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.

- J.3.6. Wait 60-330 seconds for the microgrid interconnect device relay to close.
- J.3.7. Allow the Encharge LEDs to flash red.
- J.3.8. Turn ON DC switches on all the Encharge batteries. The Encharge LEDs should stop flashing red after DC switches are turned ON.

- K. Upon successful completion of provisioning, the following critical software updates will be completed in the system:
 - K.1. 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.
 - K.2. You can go to Step 6 to configure production and consumption meters now.



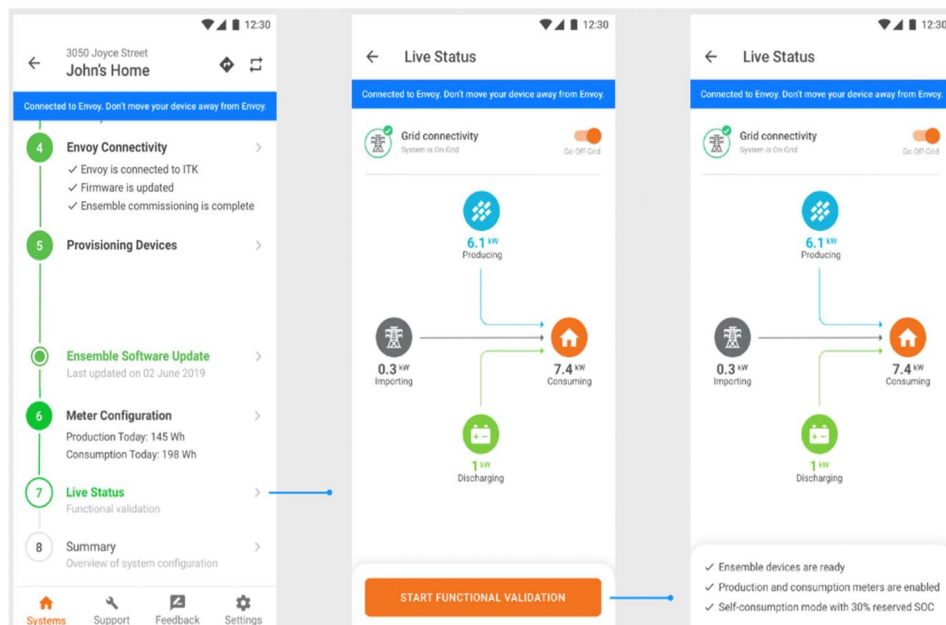
- L. Installer Toolkit step 6, **Configure Production and Consumption CTs** using the meter wizard:
 - L.1. Verify that the configuration matches what is installed (**solar + load** or **load only**).
 - L.2. Enable the meters by verifying the readings by going through the meter wizard (required).
 - L.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.
 - L.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 (**solar + load**)
 - L.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.
- M. 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.
 - M.1. Once the Enpower software update is complete, an "UPDATE ALL" 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 now, as this update will take 6-12 hours. **The Encharge software update will commence after functional testing has completed and the commissioning process is finished.**



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

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

N.2. At the bottom 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: _____

Set Battery Mode to Self-Consumption:

N. During ITK commissioning, batteries are set to Full Backup to bring state of charge to 100%. Before functional testing, battery mode must be changed back to self-consumption (Step 3). Once the self-consumption is set in Step 3 (Tariff), Go to the **Provisioning devices** step and tap **Provision devices** to update the battery mode details to the Envoy.

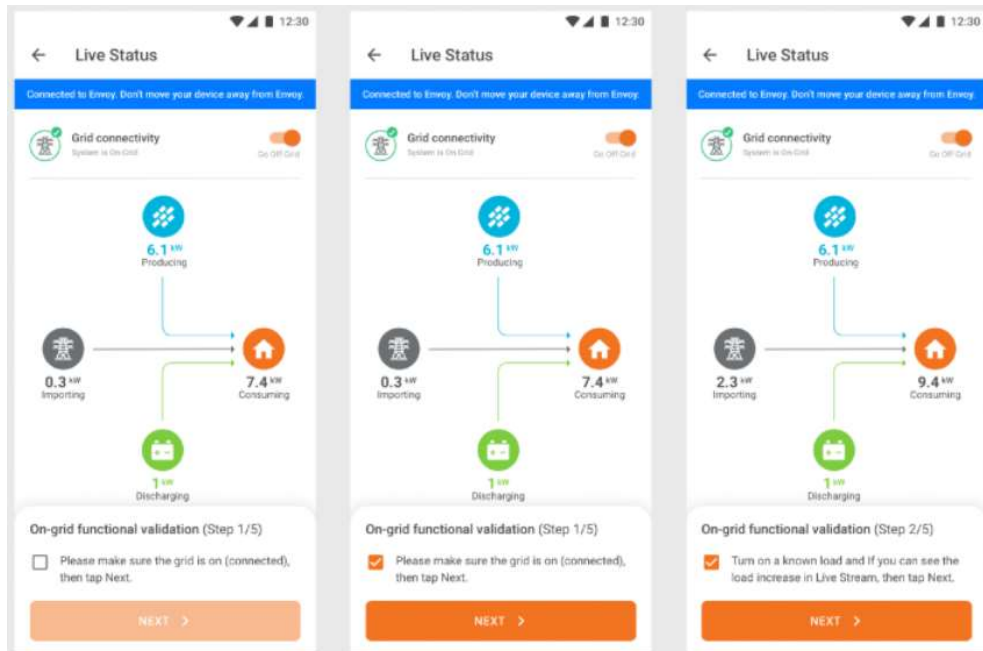
N.1. Is the Ensemble system placed into self-consumption?

- ☐ Yes
- ☐ No (do not continue with functional testing until system is in self-consumption)

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. Turn on a known load and confirm if that can see the load increase in the **Live Status** interface of Installer Toolkit.



O.3. Document the results. Is Ensemble operating in an on-grid state, and does Installer Toolkit **Live Status** interface display increased load as expected?

- ☐ Yes
- ☐ No

Minutes

Observations:

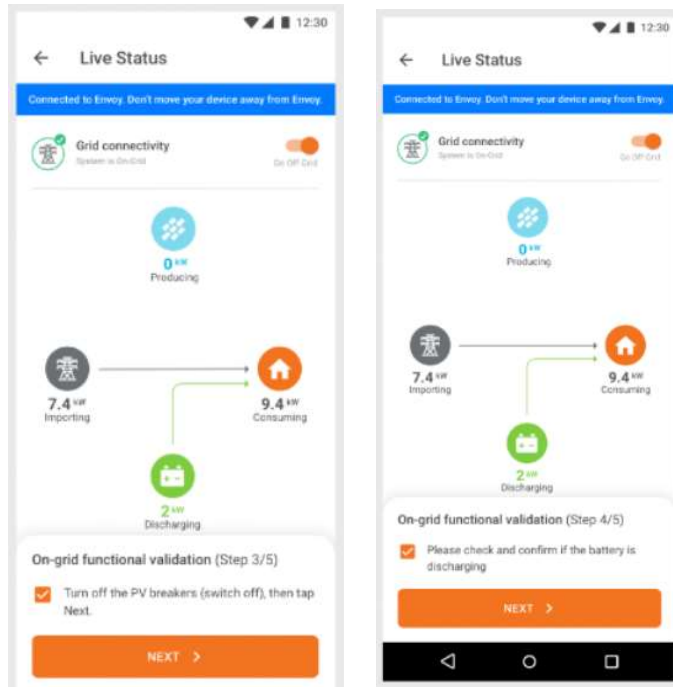
P. On-grid battery test (for this test the system must be in self-consumption):

P.1. Ensure that the known load is still switched on.

P.2. Turn off the PV breaker(s) in IQ Combiner or interconnection panel (do not turn off the Envoy breaker).

P.3. Use Installer Toolkit **Live Status** and each battery LED to check and confirm that the batteries are discharging. (Discharge is indicated by a pulsing blue LED. For a full list of LED states, see the table at the end of this document).

- ☐ Note: consumption reading in Installer Toolkit may be higher than the known load if the homeowner is using other loads in the home.



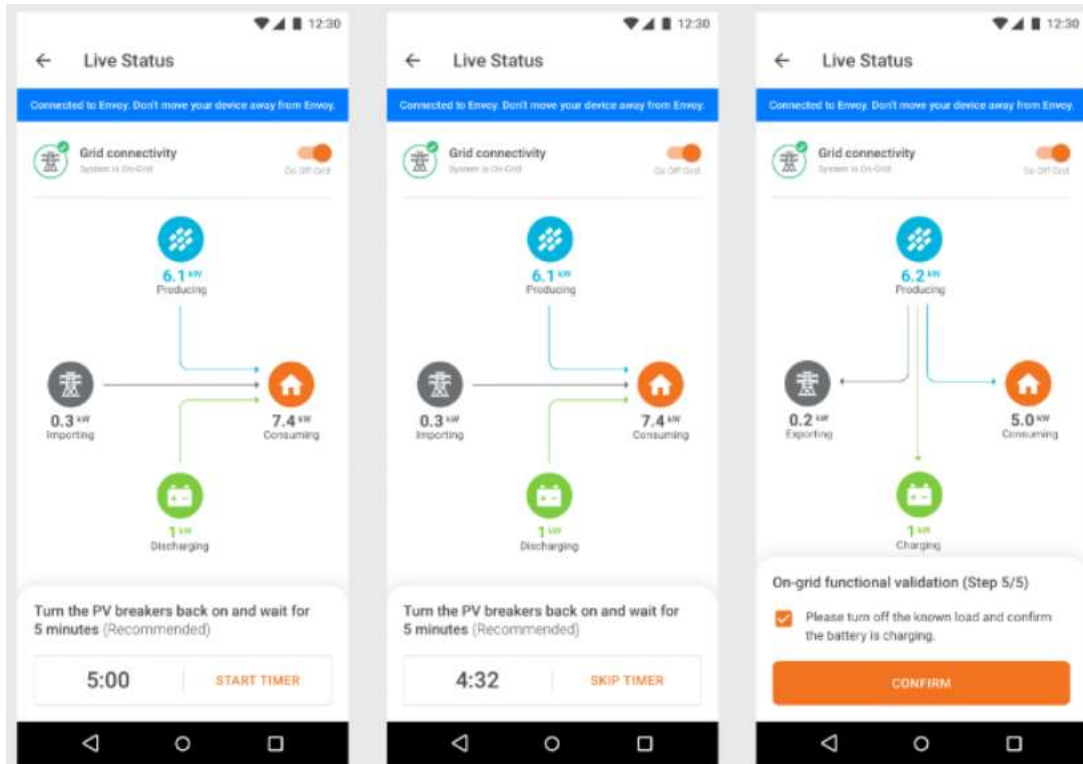
Document the results. Are the batteries discharging as indicated by Installer Toolkit **Live Status** interface and blue pulsing LED lights on Encharge?

- ☐ Yes
- ☐ No

minutes

Observations:

- P.4. Turn on the PV breaker(s) in IQ Combiner or interconnection panel.
- P.5. Turn off loads to ensure that production exceeds consumption.
- P.6. Wait for the microinverters to reconnect (30 seconds to 5 minutes depending on the grid profile).
- P.7. Check and confirm that the batteries are charging using the **Live Status** interface as well as by LED indications on each battery.
 - ☐ **Note:** this step requires sufficient sunlight to enable the PV to produce more power than the on-site load. If this is not possible, note it in the observations section. Alternatively, you can shut off the load breaker in Enpower to ensure on site loads do not exceed PV production.



P.8. Document the results. After microinverter reconnection, did the Encharge batteries begin charging as shown in Installer Toolkit **Live Status** and by green pulsing LEDs on the batteries?

- ☐ Yes
☐ No

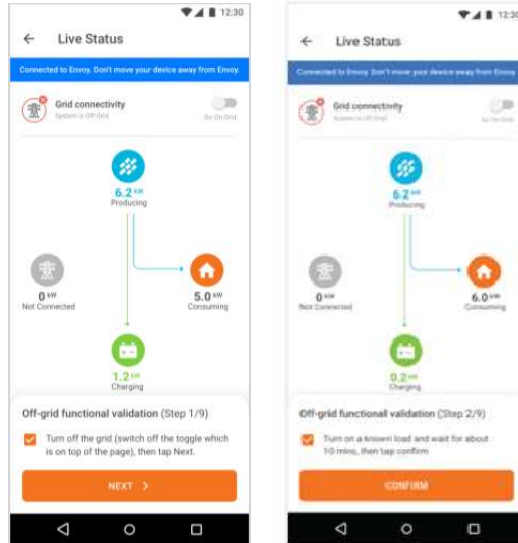
minutes

Observations:

Off-grid functional testing:

Q. Off-grid test using Installer Toolkit or Enlighten Manager.

- Q.1. Installer Toolkit and Enlighten Manager **Live Status** feature a button that allows the Ensemble system to transition between on-grid and off-grid modes.
- Q.2. With backup loads operating, turn off power from the grid using this button in Installer Toolkit or Enlighten.
- Q.3. Wait approximately 45 seconds for the microgrid interconnect device (MID) to open. You will hear a click when this occurs.
- Q.4. 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.



Q.5. 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:

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

R.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**.



- R.2. Wait for 60 to 330 seconds for the microinverters to restart (depending on grid profile).
- R.3. You should hear a click of the microgrid interconnect device relay closing inside Enpower.
- R.4. Check and confirm that the system is now operating on-grid. Observe this in the Installer Toolkit **Live Status** interface.
- R.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

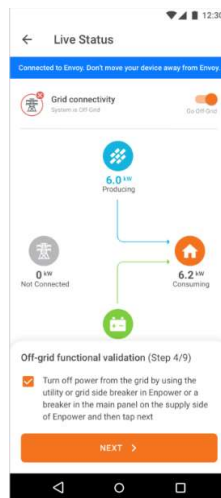
☐ No

minutes

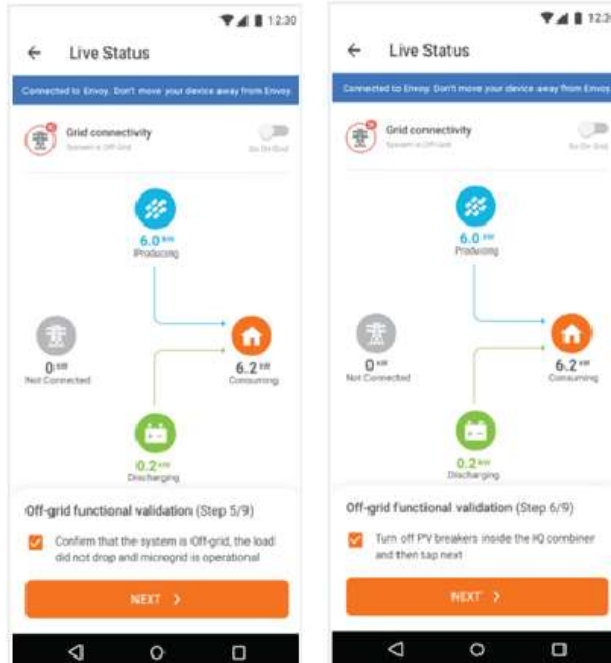
Observations:

S. Manual off-grid test:

- S.1. With backup loads operating, turn off power from the grid. Use the utility or grid side breaker in Enpower or a breaker in the main panel on the supply side of Enpower.



- S.2. Confirm that microgrid is operational and that loads did not drop. Do this by observing loads and testing for voltage at backup panel.



S.3. Check that **Live Status** interface in Installer Toolkit (or Enlighten) shows off-grid.

S.4. Ensure loads stay powered up for two minutes or more.

S.5. Document the results. After grid turn off, did loads remain powered up for two minutes and Installer Toolkit display off-grid in **Live Status** interface?

☐ Yes

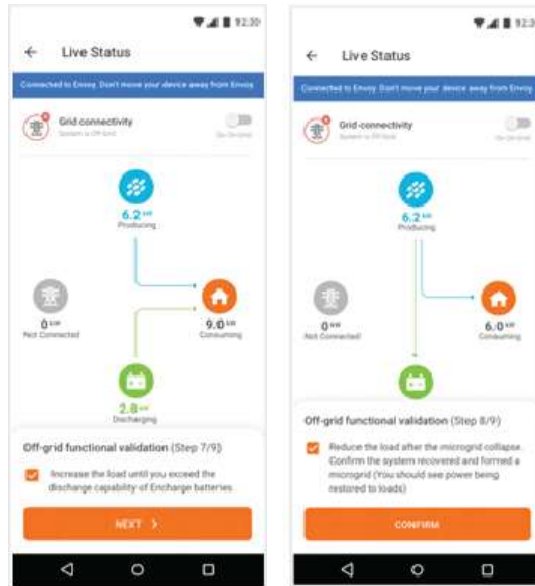
☐ No,

minutes

Observations:

T. Microgrid overload and black start test:

- T.1. Turn off PV breaker(s) inside the IQ Combiner.
- T.2. While still operating in grid down from step E, increase the load on the system until you exceed the discharge capability of the Encharge batteries (e.g., exceeding 1.5 kW of load per Encharge 3 over a sustained period).
- T.3. Reduce the load after the microgrid collapses (less than 1.2 kW load per Encharge 3).
- T.4. Confirm the system recovers and forms a microgrid ("black start"). You should see power being restored to loads.



T.5. Document the results. Did black start occur once load was reduced?

- ☐ Yes
- ☐ No

minutes

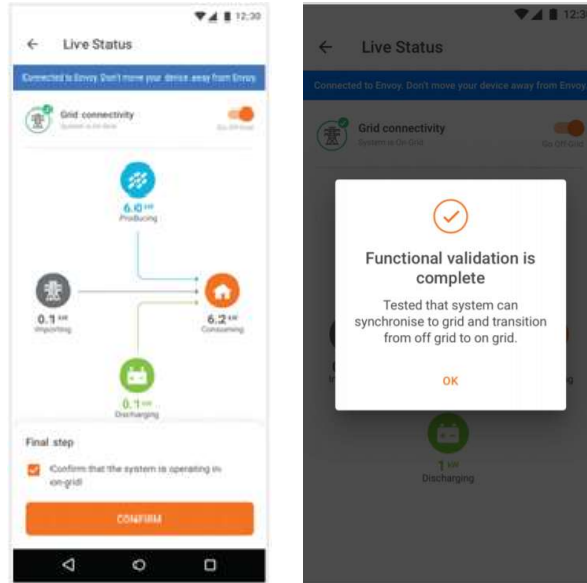
Observations:

U. Manual off-grid to on-grid transition:

- U.1. With the system still operating in off-grid mode, restore power to the grid (turn the main breaker back on).



- U.2. Wait for 60 to 330 seconds for the microinverters to turn back on (depending on grid profile).
- U.3. You should hear a click of the Microgrid Interconnect Device relay closing inside Enpower.
- U.4. Check and confirm that the system is now operating on-grid. Observe this in the Installer Toolkit **Live Status** interface.
- U.5. Once the functional validation is complete, if the Encharge batteries and Enpower require a firmware update, the Envoy will update them automatically.
- U.6. The battery mode of the system will also be set to Full Backup by the Installer Toolkit.



U.7. Document the results. Did the microgrid Interconnect device close, and was on-grid status observed in Installer Toolkit?

- ☐ Yes
☐ No

minutes

Observations:

V. With the above steps complete, 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.

W. Installer Toolkit step 7, **Generate a Summary Report:**

- ☐ W.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).

X. 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 Full 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.

State	Description
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Ensemble Commissioning: Installer Toolkit

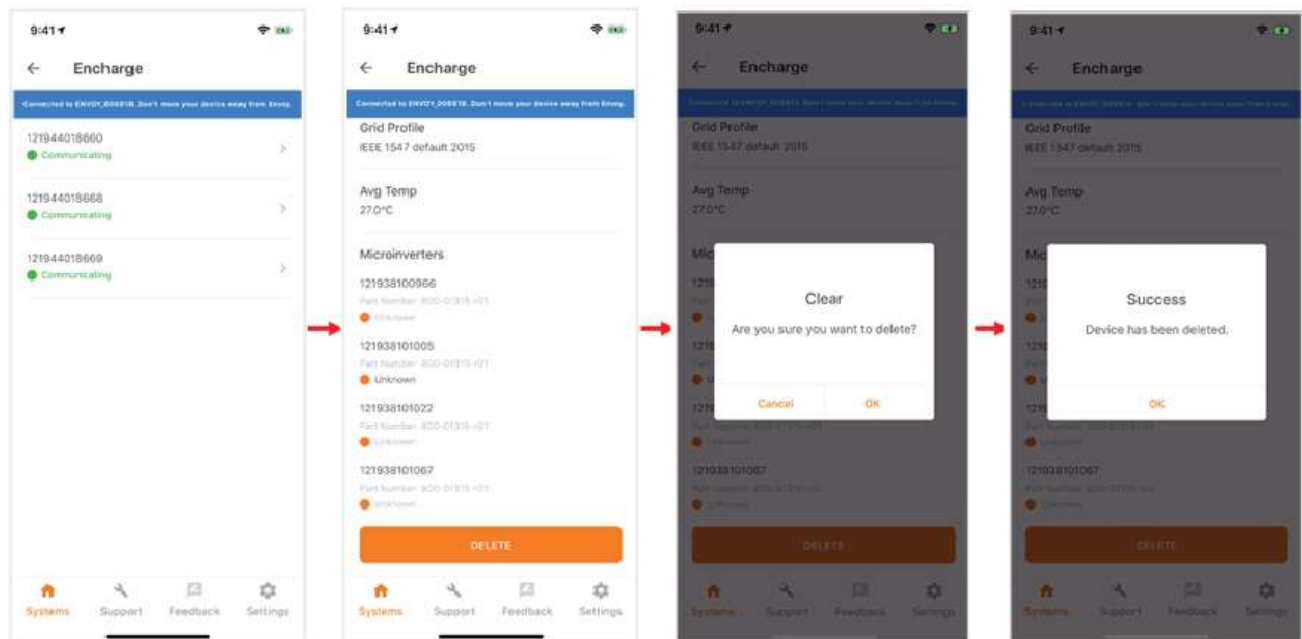
Uncommissioned	
Flashing blue	After booting up, when Encharge has paired with an IQ Envoy but has not passed the commissioning three-way handshake to confirm that it is an Enphase device.
Flashing green	After passing the three-way handshake with the IQ Envoy.
After commissioning (normal operation)*	
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.

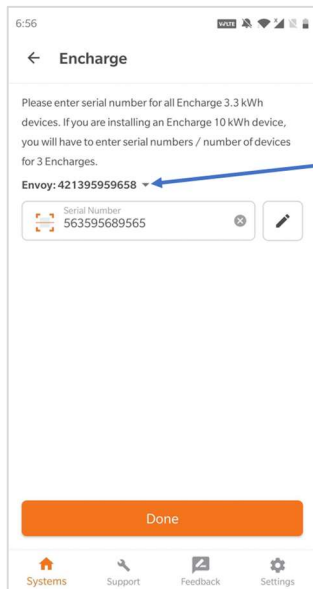


3. After Encharge battery has been retired, Turn DC switch OFF
4. Add and provision the new devices as documented steps D and I

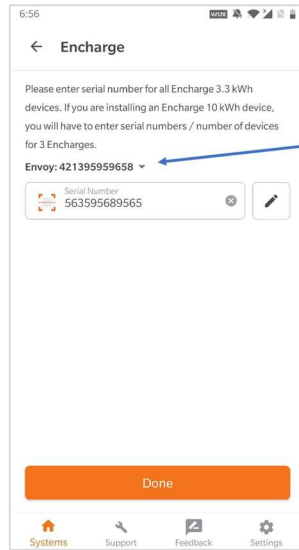
Provisioning Ensemble System with Multiple Envoys

You can add multiple Envoys but the system can have only one 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.

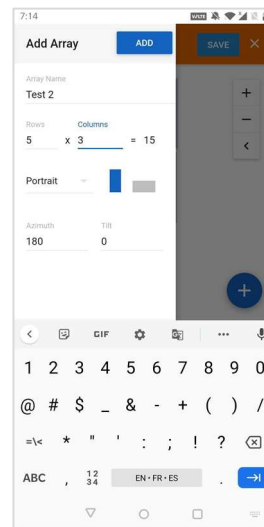
1. Make sure you have scanned the serial numbers of all Envoys (two or more)
2. Assign the Encharge(s) and Enpower to the microgrid Envoy as follows:
 - a. Manually scan the serial numbers of Ensemble components into Installer Toolkit.
 - b. After scanning the Encharge serial number, tap on Envoy drop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



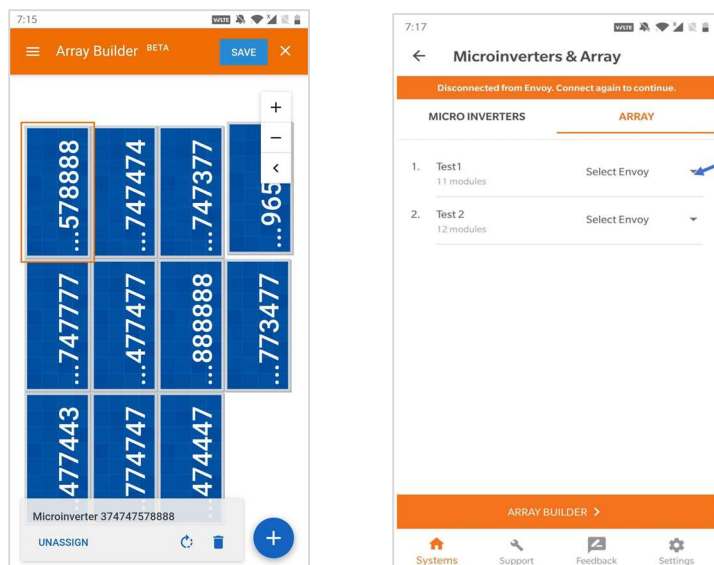
3. While adding Enpower, select the backup type for the system. Select either:
 - a. Partial-home backup (Consumption CT placed between Enpower and the main panel)
 - b. Partial-home backup (Consumption CT placed between the utility service and the main breaker)
 - c. Whole-home backup
4. After scanning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



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



Go back to the “Disable manual override in Enpower” to continue with commissioning.

Known Issues and Limitations

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

#	Issue	Workaround/Fix
1	Some M-Series microinverters may stop producing power after the Enphase Storage installation.	<p>Contact Enphase customer support and provide the serial numbers of the microinverters. Enphase customer support can fix this by following the below steps via Enlighten Admin:</p> <ol style="list-style-type: none"> 1. Rebooting the microinverter remotely using the REBOOT_DEVICE task. 2. Issuing a CLEAR_GFI task. <p>If you are reporting the issue the day after installation a reboot is not required. Enphase customer support can fix the issue by simply issuing a CLEAR_GFI task.</p> <p>Enphase is working to fix this limitation in the next software release.</p>
2	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.	<p>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.</p> <p>Enphase is working to fix this limitation in the next software release.</p>