

Critical updates and best practices for installing and commissioning Enphase Energy Systems

Applicable Countries

- United States of America
- Puerto Rico

Overview

This document provides Enphase Authorized installers with a summary of all critical information needed to properly install and commission Enphase Energy Systems. Make sure to check for a new version of this document regularly as it is updated frequently: <https://link.enphase.com/best-practices>



Most recent revision

Revision V3.9 - 2023-08-30

Added Enphase Energy System 3rd generation commissioning best practices.

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Revision history

Most recent revision

Revision V1.9

Added Enphase Energy System 3rd Generation commissioning best practices

Important documents

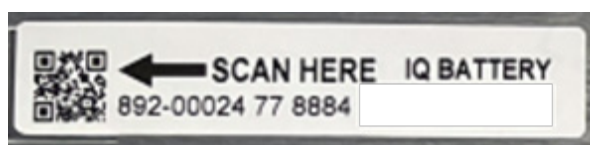
- [IQ Battery 5P QIG](#)
- [IQ System Controller 3 INT QIG](#)

Known field issues

1. For some IQ Combiner 5/5C, the CT color coding shown on the labels stuck on the door is incorrect. Installing according to the color coding shown would lead to a negative consumption reading.
 - Fix: To fix this, installers need to reverse the CT polarity if the error is shown while enabling the consumption meter.

2. BMS QR code is confused with the IQ Battery QR code

On some IQ Batteries, the QR code is near the battery management system (BMS) QR code. Make sure you scan the IQ Battery's QR code while adding the IQ Batteries in the Enphase Installer App (formerly known as Installer Toolkit). Cover the BMS code by hand if needed. The new sticker for IQ Battery is shown below.



New IQ Battery QR Code

Critical updates

Update 1.9

Added Enphase Energy System 3rd generation commissioning best practices.

Update 1.8

- **Feb 8, 2023** (<https://enphase.com/installers/updates>)
 - Remotely reverse the polarity of an installed current transformer (CT).
 - Quickly send site access to your customers from the Enphase Installer Portal.
 - Issue tasks remotely in the Enphase Installer Portal.

- **Dec 31, 2022**

Starting January 1, 2023, New York ISO, New England ISO, and PPL in Pennsylvania will begin enforcing the IEEE 1547-2018 standard that governs grid interconnection. In those states, installations and permit applications will need to use new SKUs for IQ Combiner 4/4C (X2-IQAM1-240-4, X2-IQ-AM1-240-4C) or IQ Gateway (ENV2-IQ-AM1-240).

- **Dec 26, 2022**

To ensure a hassle-free homeowner experience when installing an Enphase Sunlight Backup energy system, installers must follow three easy steps to configure systems correctly.

- **Nov 23, 2022**

Firmware update 2.48.01 for all IQ8 Series Microinverters has been released to increase max continuous current from 10.6 A to 12 A. No action is needed from installers as this is an automatic update.

- **Nov 8, 2022**

Do not use the PV breaker in the IQ System Controller 2 to turn off PV.

- **Oct 26, 2022**

Enphase has released software update 7.03.120 for the IQ Gateway, with several major improvements:

- Improvements to Zigbee wireless communication
- Faster commissioning time
- Improved grid transition performance
- Reintroduction of [Grid services](#)
- Fixes for jump start in Sunlight Backup systems
- Enhancements and bug fixes for improved overall system stability

- **Oct 10, 2022**

Last month we shared that new shipments of the IQ System Controller 2 now include a prewired System Shutdown Switch, and a 20 A circuit breaker, and will arrive with the latest software update to improve the installation experience. In one batch of these shipments, there are a small number of the IQ System Controller 2 units that installers have reported they are unable to commission. We have an on-site resolution should any issues come up and will quickly deploy our team to provide support.

Software update version 3.31 is now available for the Enphase Installer App (formerly known as the Installer Toolkit). Refer to the release note - [Documentation center](#).

Critical updates

Update 1.7

To ensure installer convenience, all future shipments of IQ System Controller 2 from our distribution center will include a pre-wired System Shutdown Switch and a 20 A circuit breaker in the generator position. Systems with an IQ8 Microinverter and a System Controller 2 must use a System Shutdown Switch, and the IQ Gateway in the IQ Combiner must be powered using the IQ System Controller 2 busbar.

The existing IQ System Controller 2 SKU EP200G101-M240US01 is being discontinued and replaced by SKU EP200G-SC2-RSD-KIT. The SKU EP200G-SC2-RSD-K will be a kit consisting of:

1. IQ System Controller 2 (EP200G101-M240US01)
2. RSD switch (EP200G-NA-02-RSD)
3. Circuit breaker for IQ Gateway pre-installed in generator spot of IQ System Controller (BRK-20A-2P-240V)
4. 20 ft each of color-coded wires and labels for ease of System Shutdown Switch wiring

Update 1.6

Do not leave the DC switch on the IQ Battery in the on position for an extended period (such as overnight or for more than 24 hours) unless the IQ Battery is commissioned, is communicating with IQ Gateway, is connected to AC power, has passed functional testing, and is fully operational.

Recommended solution: Leaving the DC switch on, without AC power or communication with the IQ Gateway, will drain the battery. Follow these instructions to avoid the battery cells damage and voiding the limited warranty.

Update 1.5

The DC switch on the IQ Battery must not be turned on without first supplying AC power, including during provisioning and commissioning. Turning on the DC switch without AC power can damage the IQ Battery.

Recommended solution: Before commissioning, the DC switch on the IQ Battery must not be turned on, unless instructed by the Enphase Installer App. Turning the DC switch on before it is instructed can damage the IQ Battery. After commissioning, always follow the sequence to supply the AC power first and then turn the DC switch on. The turn off sequence for AC power or DC switch does not matter.

Critical updates

Update 1.4

If the IQ Gateway circuit is powered by the busbar on the IQ Combiner, damage to the ESub circuit board will occur. This issue applies to Enphase Energy Systems with IQ8 Microinverters and an IQ System Controller 2.

Recommended solution: To prevent damage to the ESub circuit board, the IQ Gateway circuit breaker must be installed on the generator slot of the IQ System Controller 2 busbar. Refer to the diagrams on the following pages for detailed wiring instructions.

If the Enphase Energy System requires generator support, the generator slot on the IQ System Controller 2 busbar will not be available to power the IQ Gateway. In this case, the pre-installed 40-amp NPT circuit breaker must be replaced with a quad circuit breaker (Eaton BQC215240 or BQC220240) to provide power to the IQ Gateway.



A demonstration video is also available:
<https://link.enphase.com/video/install-breaker>

Update 1.3

PLC scan for IQ8 Microinverters will not work if the IQ Gateway version is less than 5.0.55.

Recommended solution: To avoid this situation, use the Enphase Installer App to upgrade the IQ Gateway software to a version greater than 7.X.

Update 1.2

When wiring a System Shutdown Switch, always de-energize the IQ System Controller 2 before installing, testing, or troubleshooting the switch. If any one of the control wires touches ground or neutral while the IQ System Controller 2 is energized, the IQ System Controller 2 will be damaged.

Recommended solution: Do not wire the System Shutdown Switch while the IQ System Controller 2 is energized/ powered on. System Shutdown Switch installation and wiring should be treated as a live wire installation. De-energize the system when disconnecting or connecting any RSD wiring. Refer to the diagrams on the following pages for detailed wiring instructions.



A demonstration video is also available:
<https://link.enphase.com/video/install-Rapid Shutdown Switch>

Update 1.1

Plugging the Communications Kit into the IQ Gateway before updating the IQ Gateway software version will corrupt the Communication Kit software, making the Communications Kit nonfunctional.

Recommended solution: To avoid this situation, update the IQ Gateway software via the Enphase Installer App prior to connecting the Communications Kit to the IQ Gateway.

Critical update 1.2

Components

The four connectors are located in the accessories kit that is provided with the IQ System Controller 2.

Accessories kit



Connectors



Watch a demonstration video of this installation:

<https://link.enphase.com/video/install-Rapid Shutdown Switch>

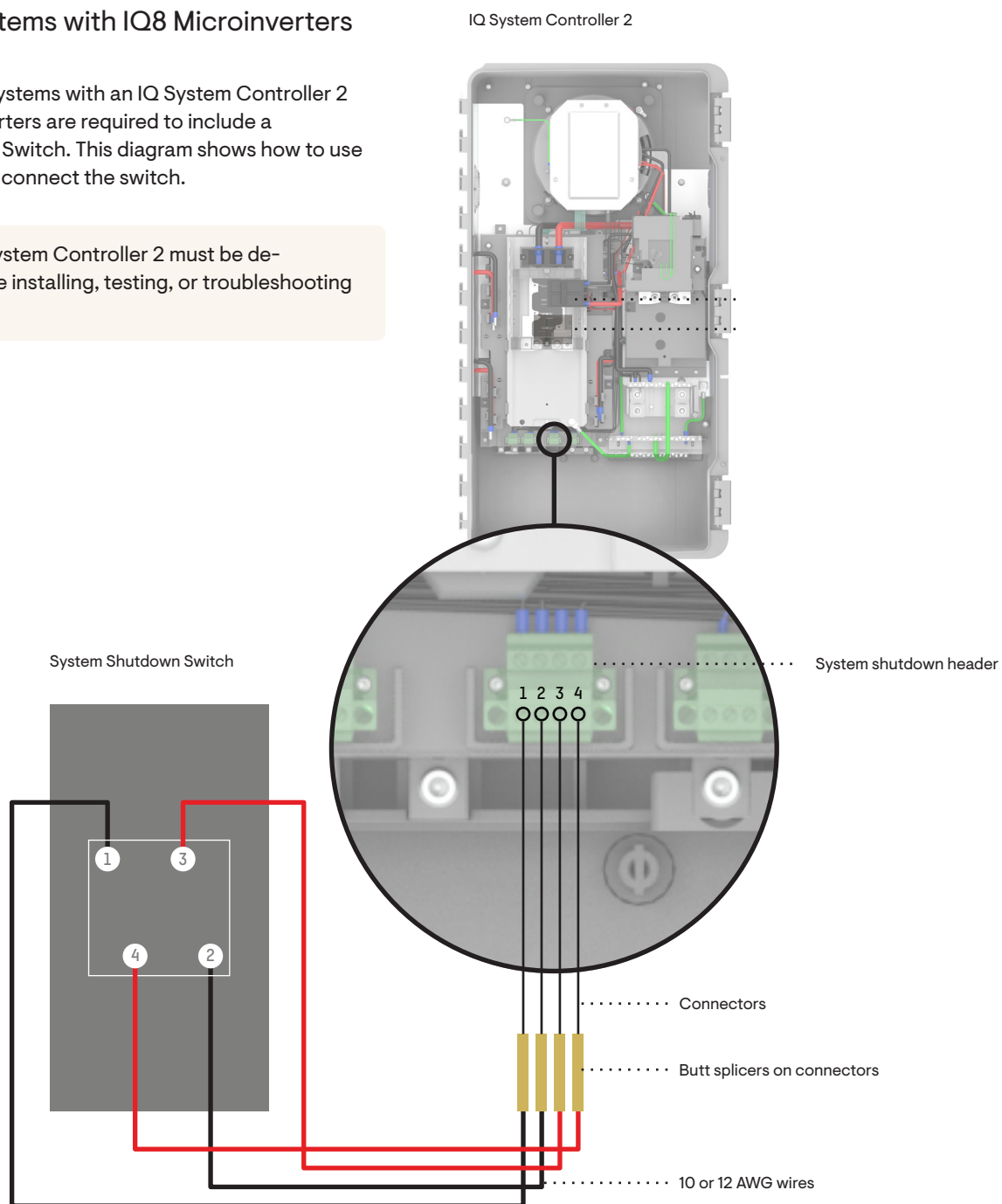
Critical update 1.2

Wiring diagram

Wiring for systems with IQ8 Microinverters

Enphase Energy Systems with an IQ System Controller 2 and IQ8 Microinverters are required to include a System Shutdown Switch. This diagram shows how to use the connectors to connect the switch.

NOTE: The IQ System Controller 2 must be de-energized before installing, testing, or troubleshooting the switch.



Watch a demonstration video of this installation:

<https://link.enphase.com/video/install-Rapid Shutdown Switch>

Critical update 1.2

Wiring diagram

Wiring for systems with non-IQ8 Microinverters

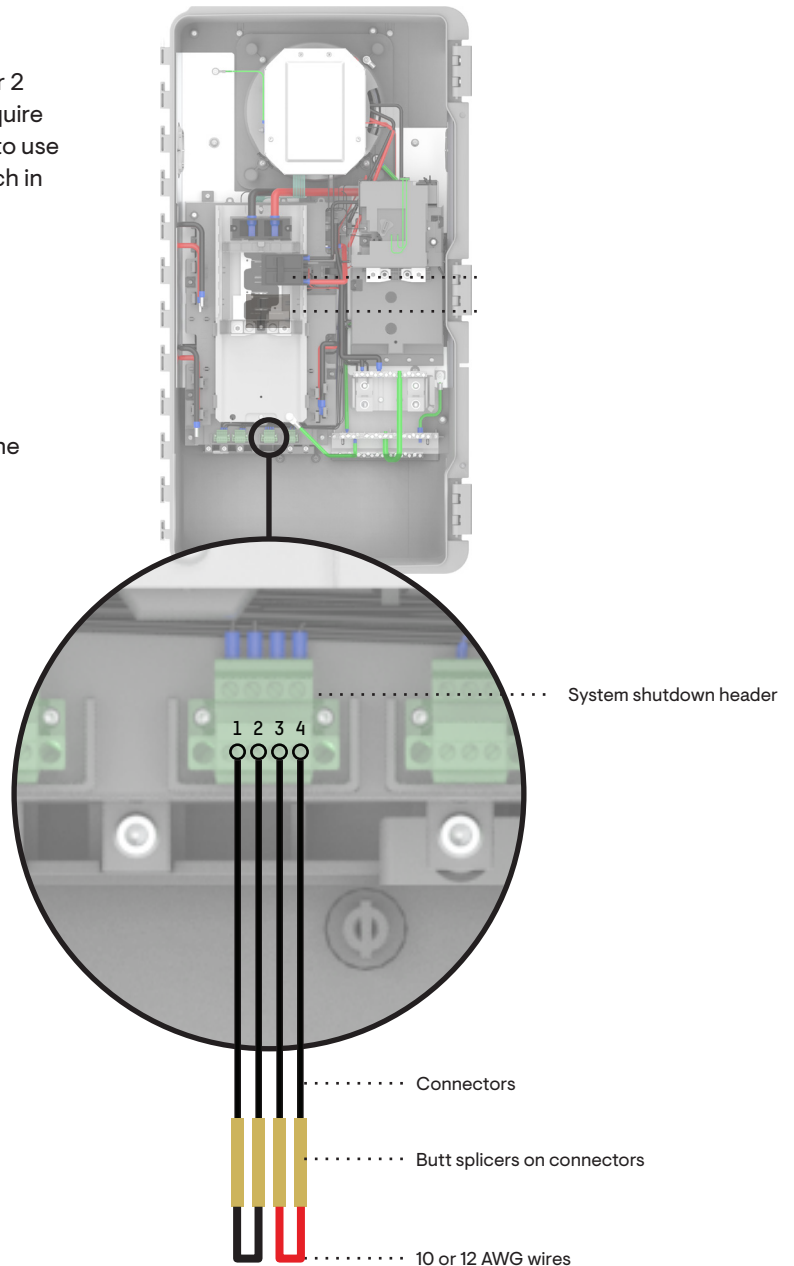
Enphase Energy Systems with an IQ System Controller 2 and M215, M250, IQ6, or IQ7 Microinverters do not require a System Shutdown Switch. This diagram shows how to use the connectors to bypass the System Shutdown Switch in the IQ System Controller 2.

Rapid shutdown functionality is still achieved in these systems in one of these methods:

- The branch circuit breaker(s) installed within the IQ Combiner
- The aggregate PV circuit breaker installed within the IQ System Controller
- A dedicated AC disconnect switch

NOTE: The IQ System Controller 2 must be de-energized before installing, testing, or troubleshooting the switch.

IQ System Controller 2



Watch a demonstration video of this installation:

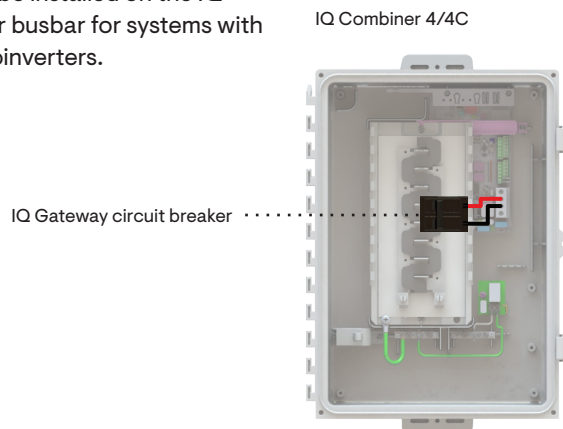
[https://link.enphase.com/video/install-Rapid Shutdown Switch](https://link.enphase.com/video/install-Rapid%20Shutdown%20Switch)

Critical update 1.4

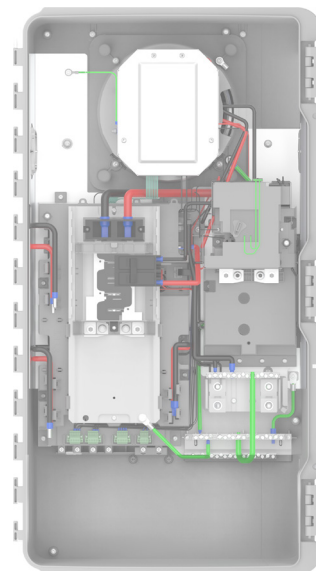
Wiring diagram

- ❌ Incorrect installation for systems with an IQ System Controller 2 and IQ8 Microinverters.

The IQ Gateway circuit breaker must not be installed on the IQ Combiner busbar for systems with IQ8 Microinverters.



IQ System Controller 2

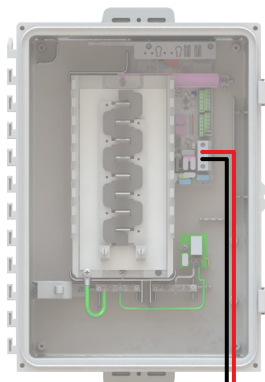


- ✅ Correct installation for systems with an IQ System Controller 2 and IQ8 Microinverters, **without** generator support.

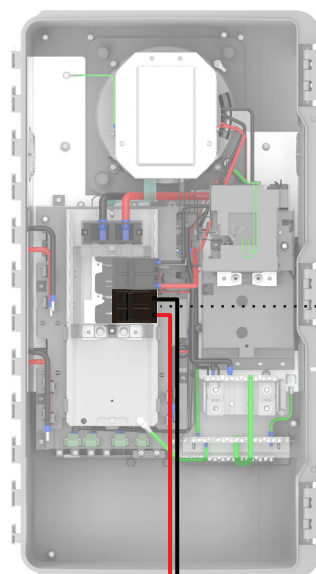
The IQ Gateway circuit breaker must be installed on the IQ System Controller 2 busbar in the slot intended for the generator circuit breaker.

The Eaton circuit breaker provided in the IQ Combiner for powering the IQ Gateway can be used for this purpose. Please carry a spare Eaton 15 A or 20 A, 240 V, 2-pole circuit breaker (BR 215 or BR 220) in case an Eaton circuit breaker is not provided in the IQ Combiner.

IQ Combiner 4/4C



IQ System Controller 2



IQ Gateway circuit breaker



Watch a demonstration video of this installation:
<https://link.enphase.com/video/install-breaker>

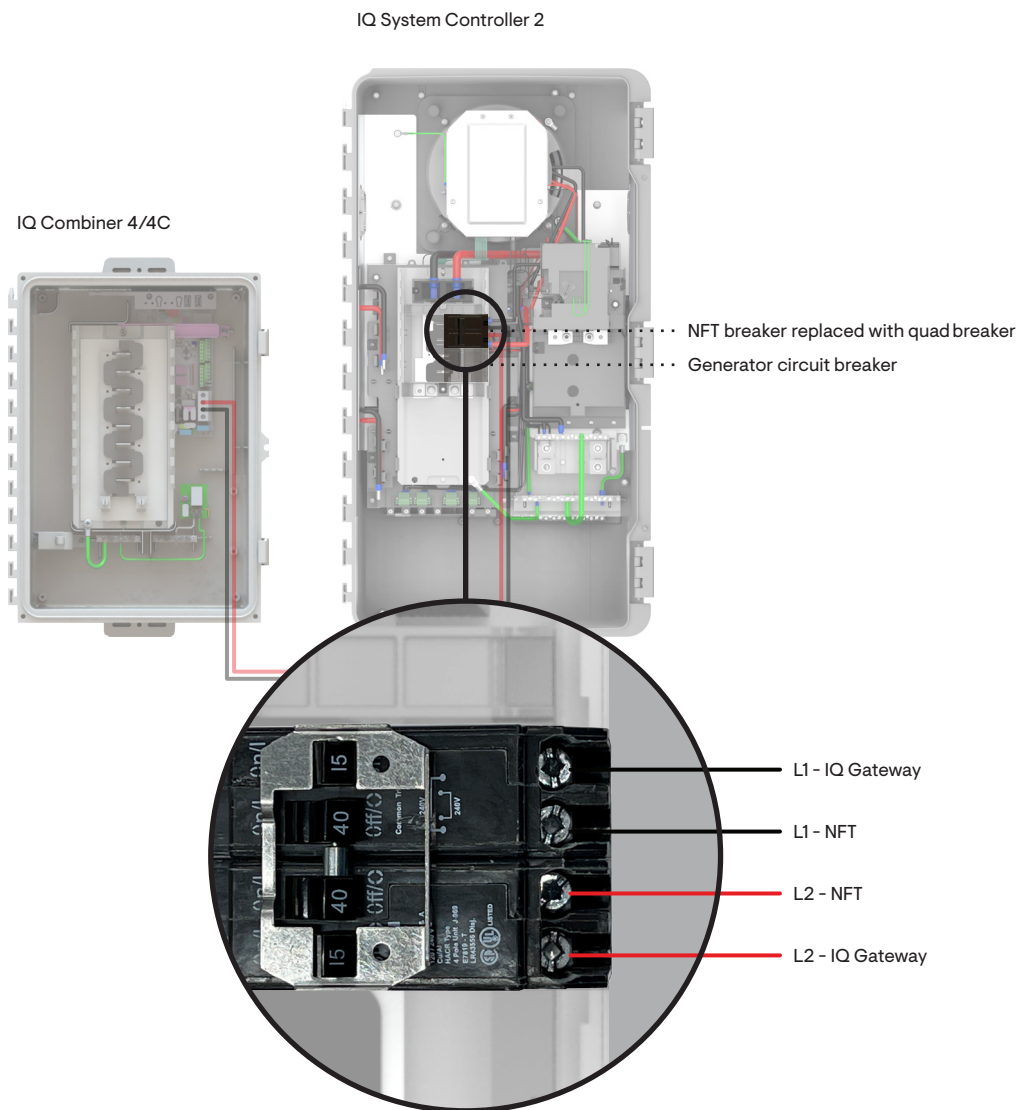
Critical update 1.4

Wiring diagram



Correct installation for systems with an IQ System Controller 2 and IQ8 Microinverters, **with** generator support.

The existing NFT circuit breaker must be replaced with a new quad circuit breaker (Eaton circuit breaker BQC215240 or BQC220240). The IQ Gateway can then be wired to the 15/20 A circuit in the quad circuit breaker. The generator slot on the IQ System Controller 2 busbar must be used for the generator circuit breaker.



Watch a demonstration video of this installation:
<https://link.enphase.com/video/install-breaker>

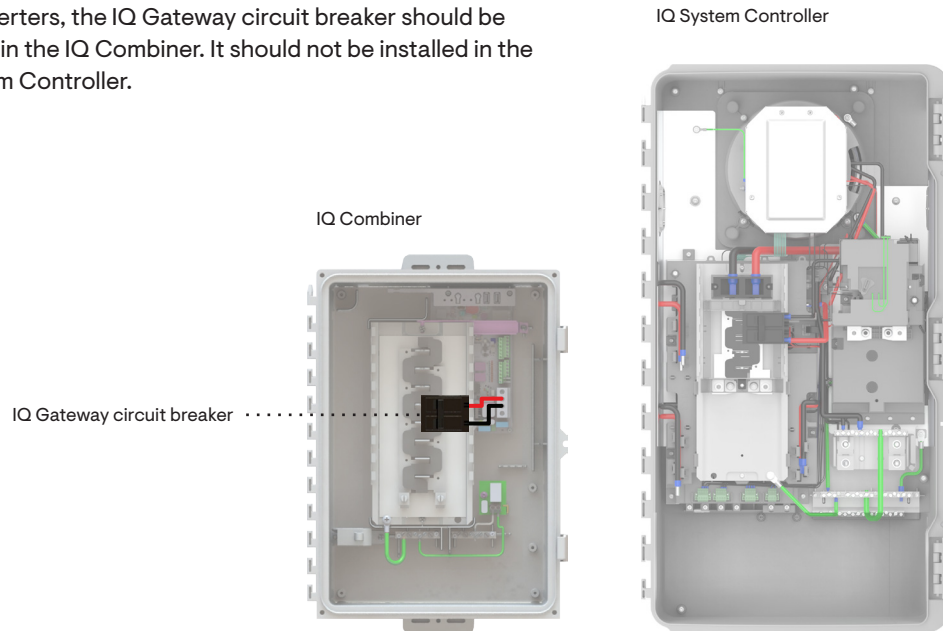
Critical update 1.4

Wiring diagram for systems with grid-tied microinverters



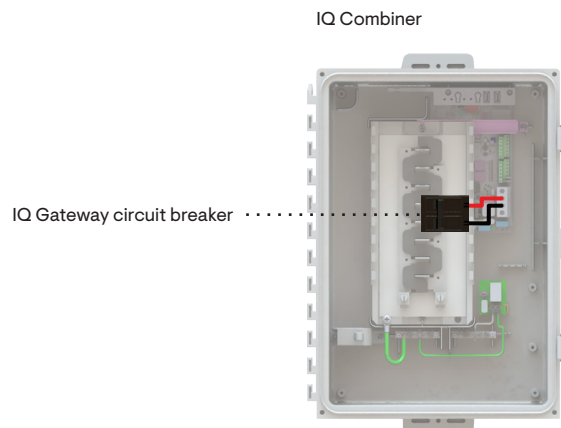
Correct installation for backup systems with an IQ System Controller 1 or 2 and M215, M250, IQ6, or IQ7 Microinverters.

In backup systems with M215, M250, IQ6, or IQ7 Microinverters, the IQ Gateway circuit breaker should be installed in the IQ Combiner. It should not be installed in the IQ System Controller.



Correct installation for solar-only systems with M215, M250, IQ6, IQ7, or IQ8 Microinverters.

In grid-tied solar-only systems with M215, M250, IQ6, IQ7, or IQ8 Microinverters, the IQ Gateway circuit breaker should be installed in the IQ Combiner.



Critical update 1.4

Frequently asked questions

1. What if there is a Siemens or ABB circuit breaker fitted in the IQ Combiner for an IQ Gateway?
 - Siemens and ABB 20 A circuit breakers are approved by UL for use with IQ Combiners, but they are not approved by UL for use with IQ System Controller 2. Installers will have to procure Eaton circuit breaker BR220 or BR215, which can be fitted into IQ System Controller 2 and wired to IQ Gateway.
2. Does the IQ Gateway circuit breaker need to be moved to existing installations?
 - The IQ Gateway circuit breaker must be moved to the IQ System Controller 2 busbar in systems with IQ System Controller 2 and IQ8 Microinverters because leaving the circuit breaker on the IQ Combiner busbar will eventually result in equipment damage.
 - The IQ Gateway circuit breaker must remain on the IQ Combiner busbar for systems with an IQ System Controller 1 or 2 and M215, M250, IQ6, or IQ7 Microinverters.
 - The IQ Gateway circuit breaker must remain on the IQ Combiner busbar for solar-only systems with M215, M250, IQ6, IQ7, or IQ8 Microinverters.
3. Why does the IQ Gateway circuit breaker ship with the IQ Combiner?
 - The IQ Gateway circuit breaker ships with the IQ Combiner because the majority of systems require the circuit breaker to remain in the IQ Combiner. For further details, refer to question #2 above.
4. Why do some circuit breakers require hold-down kits?
 - As per the National Electric Code, all circuit breakers that back-feed voltage into the busbar need a hold-down kit to ensure the circuit breakers are not inadvertently removed when the busbar is energized.



Watch a demonstration video of this installation:

<https://link.enphase.com/video/install-breaker>

Critical update 1.7

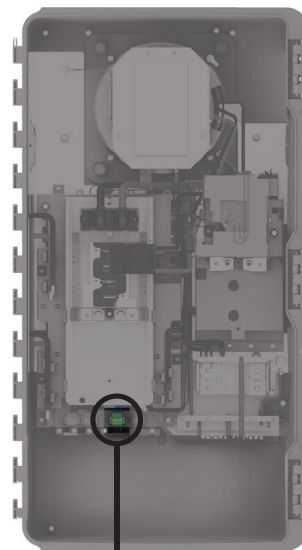
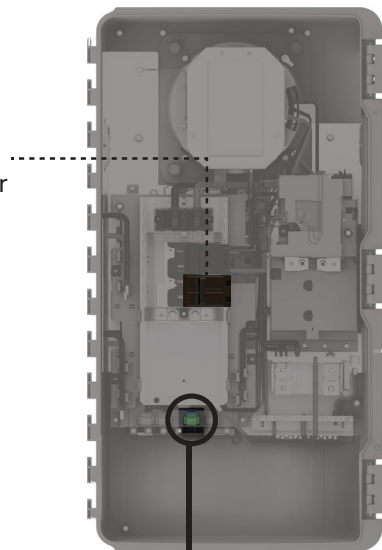
EP200G-SC2-RSD-KIT with pre-wired System Shutdown Switch and IQ Gateway circuit breaker

Wiring for systems with IQ8 Microinverters

Wiring for systems with Non-IQ8 Microinverters

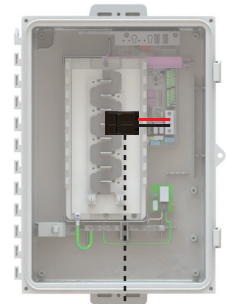
Update 1

IQ Gateway circuit breaker included in generator position on the busbar. Use this circuit breaker to power the IQ Gateway.



Remove the circuit breaker included in System Controller 2. Use the circuit breaker in the IQ Combiner to power the IQ Gateway.

IQ Combiner

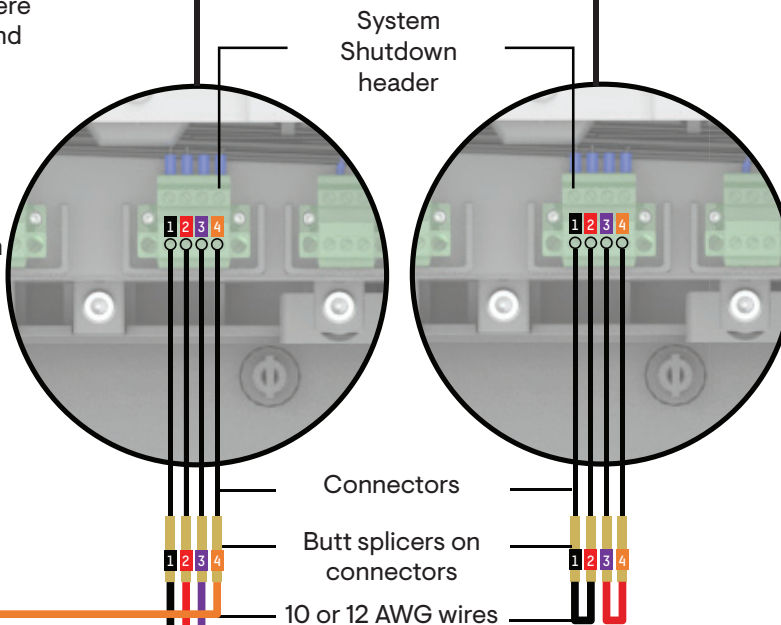
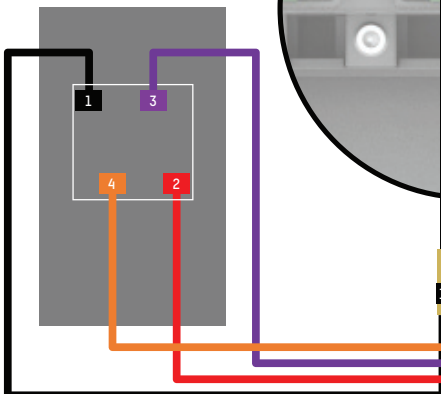


IQ Gateway circuit breaker

Update 2

System Shutdown Switch and 20 ft of colored wires included in the packaging. Color-coded labels were added to the switch and header.

System Shutdown Switch



System Shutdown header

Connectors

Butt splicers on connectors

10 or 12 AWG wires

Critical update 1.8

» Feb 8, 2023 (<https://enphase.com/installers/updates>)

- Remotely reverse the polarity of an installed current transformer (CT).

In a few instances, production and consumption meters are inadvertently reversed at commissioning. [Learn how to flip the polarity remotely](#) from the Enphase Installer Portal.

- Quickly send site access to your customers from the Enphase Installer Portal.

With the updated Enphase Installer Portal, you can send a site-access email to your customers in a few simple steps. This will help you reduce the time it takes to get your customers up, running, and enjoying their new Enphase Energy System. [Learn how to resend Enphase access to a customer.](#)

- Issue tasks remotely in the Enphase Installer Portal.

You can now issue these tasks remotely:

- Provision multiple devices
- Force software updates
- Reboot IQ Gateways
- Check tariffs
- Reset IQ Battery devices

You can also perform many more tasks with the new System Diagnostic tool. Click [here](#) to learn more.

» Dec 31, 2022

Starting January 1, 2023, New York ISO, New England ISO, and PPL in Pennsylvania will begin enforcing the IEEE 1547-2018 standard that governs grid interconnection. In those states, installations and permit applications will need to use new SKUs for IQ Combiner 4/4C (X2-IQAM1-240-4, X2-IQ-AM1-240-4C) or IQ Gateway (ENV2-IQ-AM1-240).

- This standard isn't retroactive, and current sites don't need to make any changes.
- These Enphase products have been certified by UL Solutions to UL 1741-SB, 3rd edition to demonstrate compliance with IEEE 1547:2018: IQ7, IQ8, IQ Battery 3/10/3T/10T, and IQ System Controller 1/2. The data sheets have been updated.
- New SKUs for IQ Combiner 4/4C (X2-IQ-AM1-240-4, X2-IQ-AM1-240-4C) or IQ Gateway (ENV2-IQ-AM1-240) are needed for IEEE 1547:2018 compliance. See the following table. Please confirm with your distributor which SKUs you are scheduled to receive.

Solar Only and most IQ Battery sites will commission as usual with the Enphase Installer App (formerly ITK). For IQ Battery sites with a Zigbee Range Extender, please contact Customer Support to update the IQ Gateway software before provisioning the system. This is a temporary step and starting in mid-January this update will be handled by the Enphase Installer App (version 3.28) without the need to contact Customer Support.

Product	Existing SKU	New SKU (IEEE 1547:2018)
IQ Combiner 4/4C	X-IQ-AM1-240-4 or	X2-IQ-AM1-240-4
	X-IQ-AM1-240-4C	X2-IQ-AM1-240-4C
IQ Gateway	ENV-IQ-AM1-240	ENV2-IQ-AM1-240

Visit the [IEEE 1547:2018 explainer page](#) for more information.

Data sheets are available in the [Documentation center](#).

Critical update 1.8

» Dec 26, 2022

To ensure a hassle-free homeowner experience when installing an Enphase Sunlight Backup energy system, installers must follow three easy steps to configure systems correctly.

- Select the backup loads so that peak load power consumption does not exceed 30% of the AC power rating of the solar system.
- Always use one or two IQ Load Controllers and wire them to the essential loads panel and IQ System Controller 2 correctly.
- Configure the auxiliary (AUX) contacts in the IQ System Controller 2 using the Enphase Installer App. Failure to do so will result in a dysfunctional Sunlight Backup energy system.

Refer to the [support video](#) and [technical brief](#) for more details.

» Nov 23, 2022

Firmware update 2.48.01 for all IQ8 Series Microinverters has been released to increase max continuous current from 10.6 A to 12 A. No action is needed from installers as this is an automatic update.

As we see more modules entering the market with higher continuous currents, our latest firmware update will be ready to support the increase up to 12 A. Read release notes.

» Nov 8, 2022

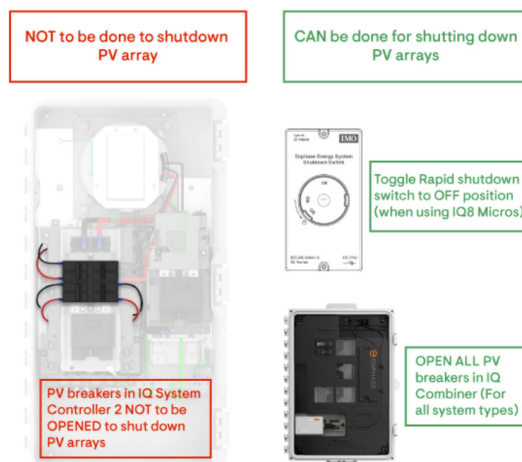
Do not use the PV Breaker in the IQ System Controller 2 to turn off PV.

During commissioning or maintenance, DO NOT use the PV breaker in the IQ System Controller 2 to turn off the PV. Instead, use either the System Shutdown Switch if installed, or use the breakers located in the IQ Combiner box to disconnect the individual PV arrays.

Opening the PV breaker inside of the IQ System Controller 2 will lead to a persistent disconnect state, and the IQ System Controller will never reconnect the PV relay. This is by design for protecting appliances and home loads from damage in the event of a breaker failure.

If a PV breaker trips due to an overcurrent event, installers are advised to rectify the fault, close the breakers, and call Enphase Customer Support to remove the error state.

This is applicable for the IQ System Controller 2 installations only.



Critical update 1.8

» Oct 26, 2022

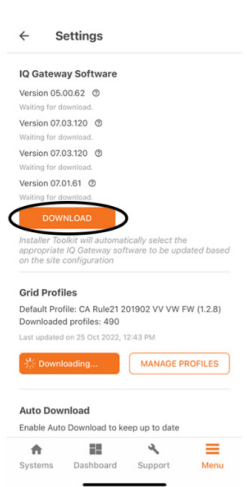
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- Fixes for Jump Start in Sunlight Backup systems
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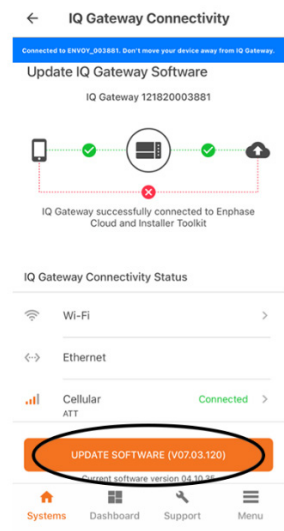
This release is available for in-progress Enphase Energy System installations using the latest version of the Enphase Installer App and as an over-the-air update for already installed systems. For more information, read release notes in [Documentation center](#).

Learn more about the steps to complete a software update:

1. In the Installer App settings, check to see if the IQ Gateway has already automatically downloaded version 7.03.120. If not, tap “Download”. We recommend performing this step in the office over Wi-Fi before going into the field.



2. Once you arrive on-site, connect to the IQ Gateway and tap “Update Software (v07.03.120)”.



Critical update 1.8

» **Oct 10, 2022**

Last month we shared that new shipments of the IQ System Controller 2 now include a prewired System Shutdown Switch and a 20 A circuit breaker, and will arrive with the latest software update to improve the installation experience. In one batch of these shipments, there are a small number of the IQ System Controller 2 units that installers have reported they're unable to commission. We have an on-site resolution should any issues come up and will quickly deploy our team to provide support.

The issue with these units has been identified and resolved in our factories and is contained in this specific batch of units. During commissioning, if you encounter an IQ System Controller 2 that can't be provisioned and cannot be found during a Bluetooth scan from your mobile device, please contact your Regional Sales Manager or Enphase Customer Support immediately. Press 2-2-2 to quickly route your call to the right support person. We will arrange for our Field Service Team to come on-site and replace the E3 board inside the affected IQ System Controller 2.

Our Customer Service team is available for questions 24/7 and can be reached at 877-797-4743 (707 774-7020 para Español).

Software update version 3.28.0 is now available for the Enphase Installer App (formerly known as the Installer Toolkit). Refer to the release note, [Documentation center](#)

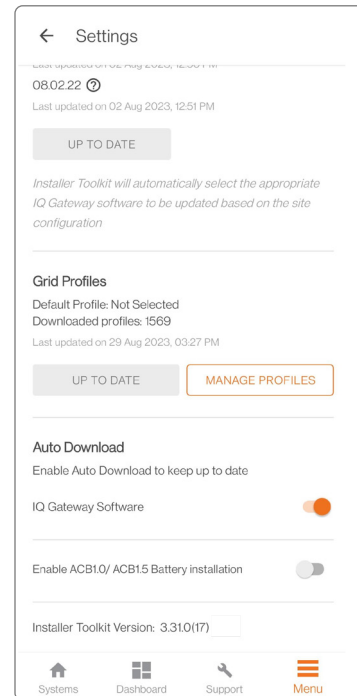
Best practices

Before going to the job site, complete these steps from the office

All Enphase Energy System

1. Check to make sure that you have the latest version of the Enphase Installer App downloaded on your phone (3.31). Log in to the Enphase Installer App using your Enphase Cloud credentials and go to the **Menu > Settings** screen to verify you have the latest version of the Enphase Installer App.

You can get the latest Enphase Installer App release from the [Apple App Store](#) and [Google Play Store](#).



2. After logging in to the Enphase Installer App, go to **Menu > Settings**, and tap on the **Download** option (under IQ Gateway Software) to download all applicable IQ Gateway software.

NOTE: When commissioning your system, the Enphase Installer App will select the appropriate software release version based on the devices and configuration of the site.

Best practices

Before going to the job site, complete these steps from the office

All Enphase Energy System

3. To save time, you can create the site in the Enphase Installer Portal. Additionally, you can perform the following operations in the Enphase Installer Portal, so that they do not need to be completed on-site:

- Update tariff, permitting information, and grid profile in the Enphase Activation.
- Make sure that the site is set to an Enphase Energy System approved grid profile.

Activations

System

*Name Installer Reference

*Type
 Select System Type
 ☐ Third Party Owned (ex: PPA or Leased)

PV Installer

Enphase Energy (26668)

Owner

First Name

Last Name

Email

Phone

Owner will receive MyEnphase for system performance monitoring.
 Change Enlighten Version

Location

*Street Address
 Enter a location

Street Address 2

*City

*State/Province

*Zip/Postal Code

*Country
 United States

Latitude

Longitude

Need Help?
 Get answers to common questions about the activation process.

Activation Checklist

Stage: Started
 0% complete

1 Started

- Owner Entered
- Location Entered
- Gateway(s) Entered

2 Connecting

- Gateway(s) Reported

3 Verifying

- Good Communication Established
- System Operation Verified

4 Ready

- Arrays Built
- System Operational
- Access Granted to Owner

4. For retrofit installations that do not require IQ Gateway replacement, you can update the IQ Gateway software remotely from the Enphase Cloud (**NOTE:** The IQ Gateway must be installed and connected to Wi-Fi or Ethernet).

#1

Gateway Serial Number
 121836006902

Gateway Status
 Reporting Status: Device Online
 Last Report Date: 08/02/2022 04:25 AM PDT
 First Report Date: 04/08/2019 12:06 PM PDT

Select your site configuration to upgrade Gateway software in advance.

Microinverter SKU:
 IQ7/IQ6 Family
 ☐ Does this site have storage?

Upgrade Envoys Gateway upgrade is not required for IQ7/IQ6 family of microinverters without storage

Software Upgrade Status: Upgrade Not Submitted

Gateway Version: 5.0.62

IQ Battery
 [Add IQ Battery](#)

IQ System Controller
 [Add IQ System Controller](#)

Best practices

Before going to the job site, complete these steps from the office

All Enphase Energy System

5. Always carry the array map of the site containing the microinverter positions on the roof. This will save time in device scanning and array map generation for the site.
6. If you are planning to configure PV shedding, identify the branch circuit that will be shed as well as the list of microinverters so that the functional operation of the shedding operation can be verified.
7. Ensure that anyone commissioning an Enphase Energy System has completed the [required training](#), and that the user is certified (please note there are distinct trainings for installing and commissioning IQ8 PV, generator, or load shedding functionality).
8. For M Series Enphase Energy System installations, update the M Series Microinverter firmware before visiting the site to save time during your commissioning process.

Enphase Energy System 2nd generation

1. Ensure Bluetooth and location permissions are provided/granted to the Enphase Installer App. This is requested by the Enphase Installer App when the app is opened on the mobile device. Simply allow these permissions when requested by the Enphase Installer App.
2. Always carry the array map of the site containing the microinverter positions on the roof. This will save time in device scanning and array map generation for the site.
3. If you are planning to configure PV shedding, identify the branch circuit that will be shed as well as the list of microinverters so that the functional operation of the shedding operation can be verified.
4. Ensure that anyone commissioning an Enphase Energy System has completed the [required training](#), and that the user is certified (please note there are distinct trainings for installing and commissioning IQ8 PV, generator, or load shedding functionality).
5. For M Series Enphase Energy System installations, update the M Series Microinverter firmware before visiting the site to save time during your commissioning process.
6. Ensure that you have both a cellular modem and Communications Kit available to you before commissioning.

NOTE: Only plug-in the Communications Kit into the Gateway USB connection after updating the Gateway software via the Enphase Installer App. It is recommended to have a spare Communications Kit with you when arriving at the site for commissioning.

7. When installing an Enphase Energy System with an IQ System Controller 2, make sure to carry the following accessories:
 - A spare Eaton circuit breaker (Eaton SKU: BR215 or Eaton SKU: BR220) for moving the IQ Gateway circuit to the IQ System Controller 2 (only for installations without a generator).
 - A quad Eaton circuit breaker (Eaton SKU: BQC220240) for moving the IQ Gateway circuit to the IQ System Controller 2 (only for installations with a generator).
 - Eaton hold-down kits (Eaton SKU: BRHDK125) for storage and generator circuit breakers.
8. For installations with IQ8 Microinverters, in addition to the above, the following accessories must also be carried:
 - A System Shutdown Switch (Enphase SKU: EP200G-NA-02-RSD).
 - An Eaton hold-down kit (BRHDK125) for the aggregate PV circuit breaker in IQ System Controller 2.

Best practices

On-site installation best practices

Enphase Energy System 3rd generation

IQ System Controller installation

1. Make sure that the manual override switch is turned OFF on the IQ System Controller before starting provisioning.
2. Visually inspect the wiring of the PV and IQ Gateway breaker.
3. Make sure that the screw terminals for PV and IQ Battery breakers installed on IQ System Controller common bus conform to the torque specification listed in the IQ System Controller Quick Install Guide.
4. Before provisioning the device, ensure the AC breaker for the IQ Batteries is turned ON but the DC switch is in the OFF position. The LED on the IQ Battery should be flashing red.
5. Ensure that PV and IQ Batteries are connected to the correct breakers.
6. Visually inspect the PV and IQ Battery breakers contact points that will connect to the IQ System Controller common bus for imperfections that could result in a poor connection.

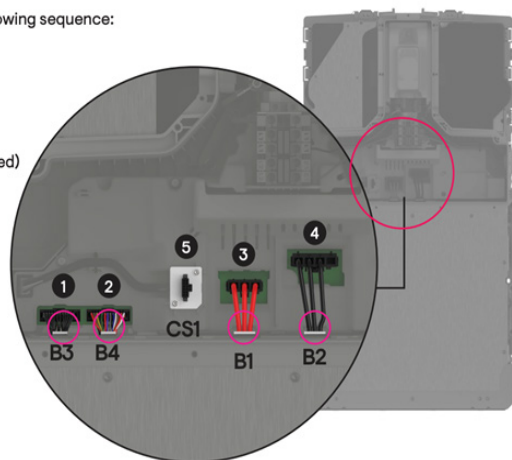
IQ Battery installation

1. Follow the instructions below to install the connectors in the IQ Battery.

Connect the following connectors to the BMS board in the following sequence:

- 1 B3: Temperature sense connector termination (black)
- 2 B4: Battery voltage sense connector termination (multicolored)
- 3 B1: Battery DC +ve connector termination
- 4 B2: Battery DC -ve connector termination
- 5 CS1: Control switch intermediate connector termination

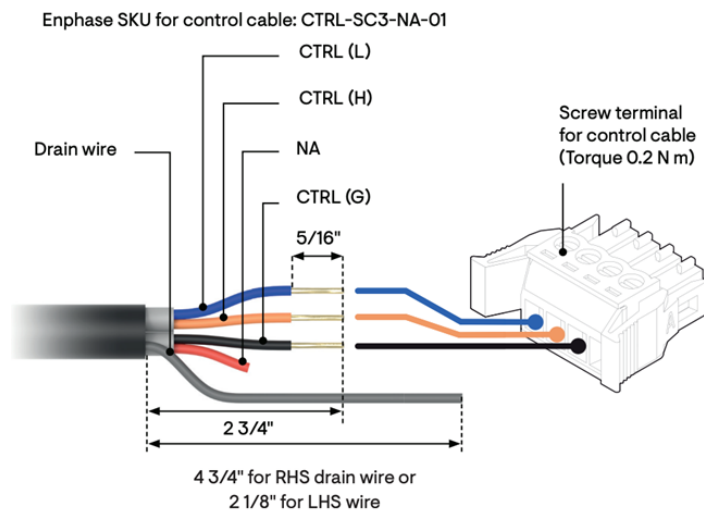
⚠ Ensure that all the connectors are latched properly and clicking sound is heard.



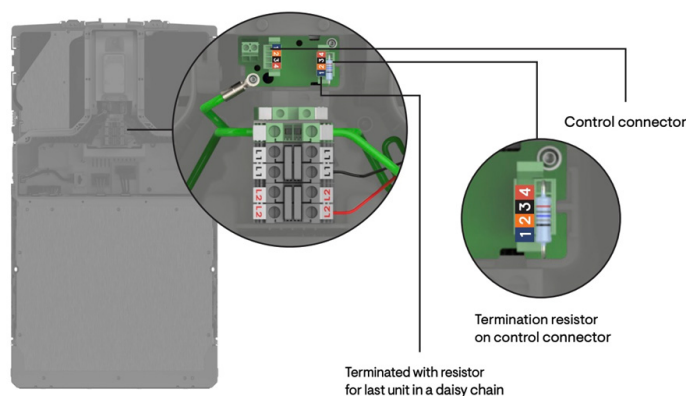
2. Make sure that the cable for the DC switch is securely plugged in.
3. Follow the jacket stripping length and connect the control communication wires to the 4-pin connectors as per the color code shown in the following image. Keep the terminating resistor only on the devices that are on the two ends of the control communication bus and remove the resistor from the rest of the devices. (Refer to the next page for details).

Best practice

Enphase Energy System 3rd generation



4. Make sure that the CTRL cable is connected as per the following image.



NOTE: For more details on how to install IQ Battery 5P, please refer to [quick installation guide](#)

Control (CTRL) cable wiring

1. When installing the control wiring for the system, refer to the following wiring sequences to best understand the termination resistor header position, control wiring order, and drain wire termination location.
2. The sequences below do not affect the functioning of the Communications Kit 2. They are the possible sequences that can occur, given the potential limitations of the physical location where the site is installed.
3. The choice of the sequence will indicate the location of the termination node, which will have to be kept track of to wire the product correctly.

NOTE: The total length of control wiring across the system should not exceed 250 feet to ensure the system operates as per the specifications.

Best practice

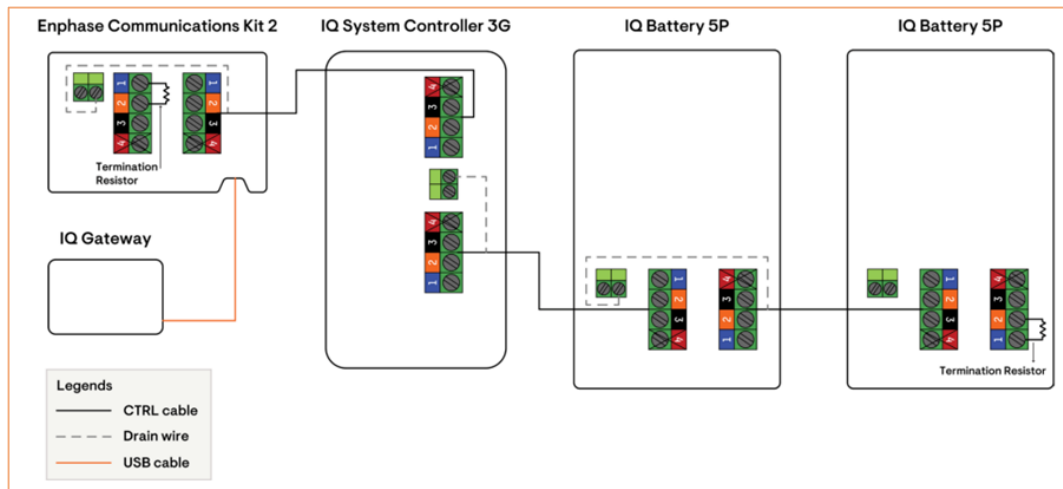
Enphase Energy System 3rd generation

4. Ensure that the following guidelines are followed to avoid system failures during commissioning:

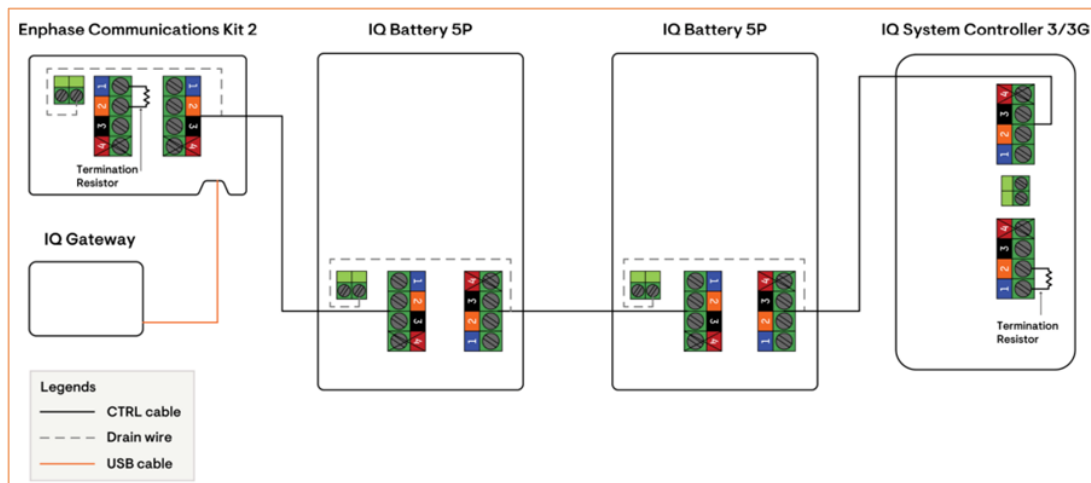
- One header with a termination resistor should be installed on each component at the end of the control network.
- The drain wire should only be terminated on one end of the control wiring between system components.
- It is recommended that the drain wire be terminated at the component from which the control wiring for the section is initiated.
- The same conduits can be used for power and control wire routing only when using Enphase CTRL cable, CTRL-SC3-NA-01.

5. The following are the five common wiring sequences:

Scenario 1: Sequence 1: Enphase Communications Kit 2 - IQ System Controller 3G - IQ Battery(s) 5P



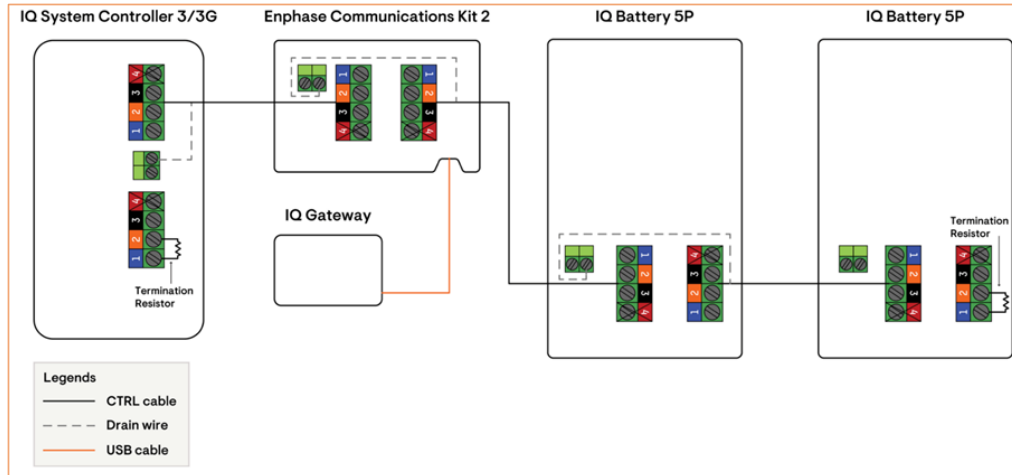
Scenario 2: Enphase Communications Kit 2 - IQ Battery(s) 5P - IQ System Controller 3/3G



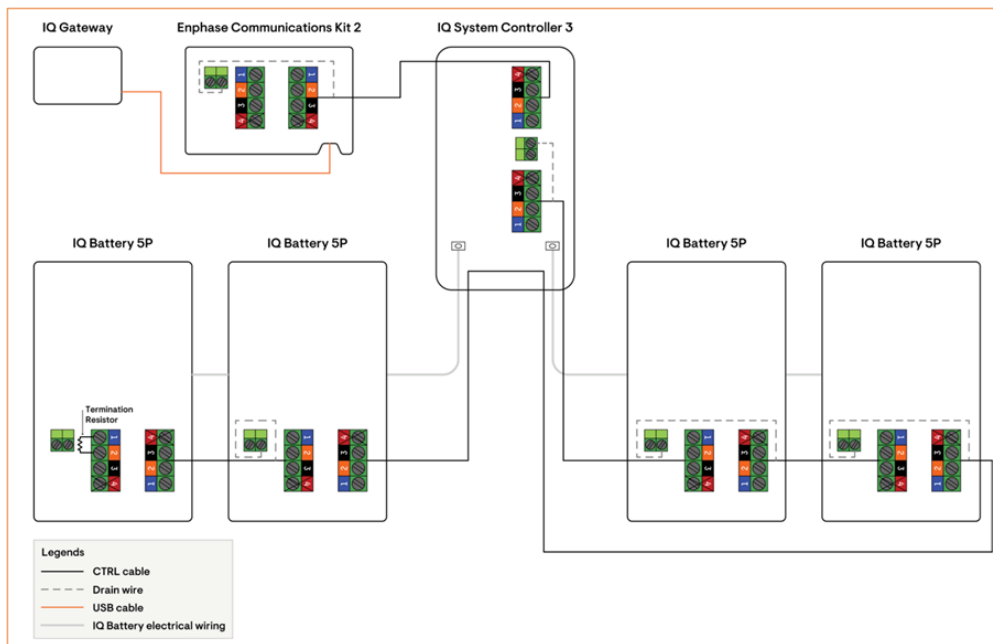
Best practice

Enphase Energy System 3rd generation

Scenario 3: IQ System Controller 3/3G - Enphase Communications Kit 2 - IQ Battery(s) 5P



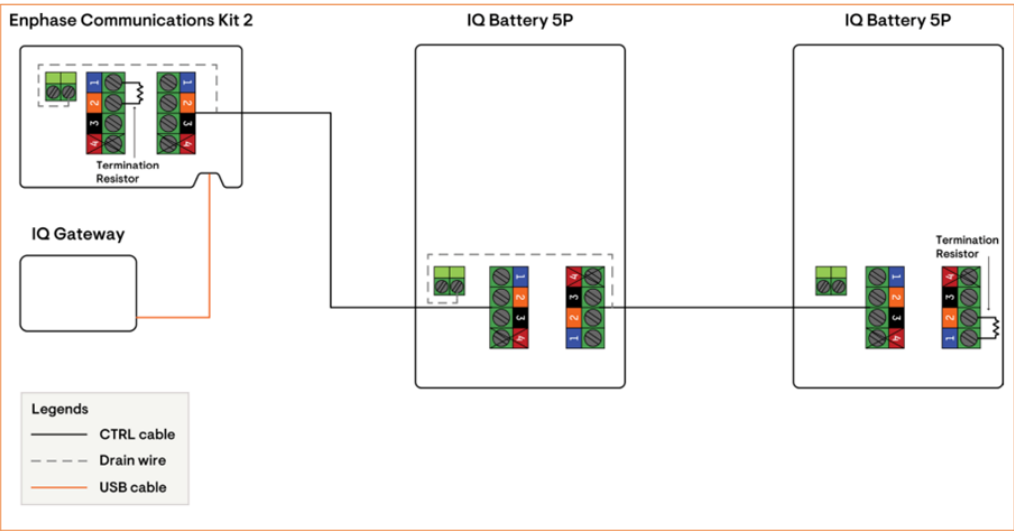
Scenario 4: Enphase Communications Kit 2 - IQ System Controller 3 - IQ Battery(s) 5P



Best practice

Enphase Energy System 3rd generation

Scenario 5: Enphase Communications Kit 2 - IQ Battery(s) 5P



The following table provides termination resistor locations for the above sequences:

CONTROL WIRING SEQUENCE	TERMINATION RESISTOR LOCATION
Enphase Communications Kit 2 - IQ System Controller 3G - IQ Battery (s) 5P	<ul style="list-style-type: none">Enphase Communications Kit 2Last IQ Battery 5P in the daisy chain
Enphase Communications Kit 2 - IQ Battery (s) 5P - IQ System Controller 3G	<ul style="list-style-type: none">Enphase Communications Kit 2IQ System Controller 3/3G
IQ System Controller 3G - Enphase Communications Kit 2 - IQ Battery (s) 5P	<ul style="list-style-type: none">IQ System Controller 3/3GLast IQ Battery 5P in the daisy chain
Enphase Communications Kit 2 - IQ System Controller 3 - IQ Battery (s) 5P	<ul style="list-style-type: none">Enphase Communications Kit 2Last IQ Battery 5P in the daisy chain
Enphase Communications Kit 2 - IQ Battery (s) 5P	<ul style="list-style-type: none">Enphase Communications Kit 2Last IQ Battery 5P in the daisy chain

Best practices

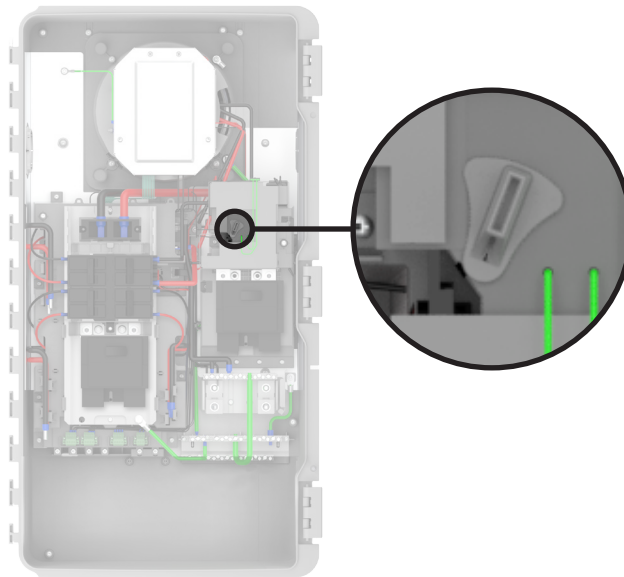
Enphase Energy System 2nd generation

1. Make sure that the IQ System Controller is taken out of manual override (after de-energizing the system). To remove manual override, remove the IQ System Controller dead front to access the gray MID toggle switch located on the middle-right side of the IQ System Controller.

- Power down the system.
- Move the MID toggle switch to the right at approximately five degrees.
- Manual override on the IQ System Controller has been disabled. IQ System Controller will power up in normal operation once power is restored to it.

NOTE: Manual override must not be switched while the system is energized.

2. The DC switch on the IQ Battery must not be turned on without first supplying AC power, including during provisioning and commissioning. Turning on the DC switch without AC power can damage the IQ Battery.



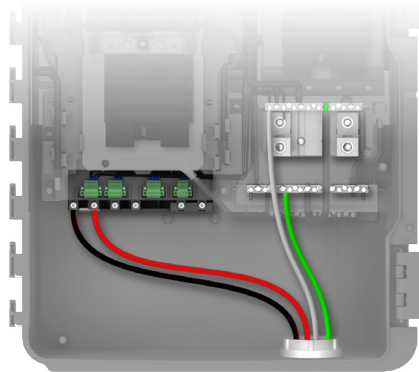
3. Do not leave the DC switch on the IQ Battery in the on position for an extended period (such as overnight or for more than 24 hours) unless the IQ Battery is commissioned, is communicating with IQ Gateway, is connected to AC power, has passed functional testing, and is fully operational.
4. Make sure that you scan all devices, including IQ Batteries, IQ System Controller, and microinverters, before updating the IQ Gateway software (in step 4 of the commissioning process).

Best practices

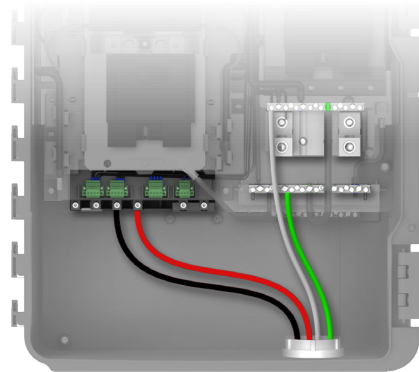
Enphase Energy System 2nd generation

5. If you are using IQ System Controller 2, ensure the PV and IQ Battery circuits are connected to the correct terminal blocks in the bottom and NOT directly to the circuit breakers. Learn more about [IQ System Controller 2 wiring details](#).

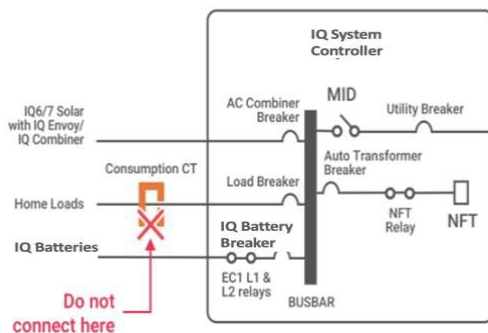
Storage wiring



PV wiring



6. Ensure that the Consumption CT is placed on the grid side of the IQ System Controller.



7. With IQ8 Sunlight Backup and/or energy storage systems, the IQ Combiner 4/4C must be wired directly to the AC Combiner terminal lugs in the IQ System Controller 2 to enable extra protection provided by a relay. PV cannot be wired into a loads panel.
 - The relay rating limits maximum backup system size to 64 A, and the remaining balance of the system will need to be grid-tied with a separated IQ Combiner 4/4C or stand-alone IQ Gateway with a Q-LCF-064-1P (radius line filter).
 - Enphase sales and installation guidance: For large IQ8 PV Sunlight Backup and/or energy storage systems, customers can back up one IQ Combiner 4/4C with IQ8 Microinverters. Any additional IQ8 Microinverters will need to be grid-tied with a separated IQ Combiner or IQ Gateway with a Q-LCF-064-1P (radius line filter).

Read more about [design and installation parameters for IQ8 configurations](#).

Commissioning process

On-site commissioning using the Enphase Installer App

1. Use the camera scan feature to add all IQ Microinverters, IQ Batteries, and IQ System Controllers.
2. If the Enphase Installer App is not able to complete Step 4 (provisioning step), check the [Control \(CTRL\) cable wiring best practices](#) section.
3. Make sure that there is sufficient sunlight and production by the microinverters. This is required to enable meters.
4. Make sure that the DC switches of all IQ Batteries are turned ON before functional validation (Step 4).
5. Functional validation troubleshooting steps:
 - Make sure that the batteries are sufficiently charged (above 15%) but not completely charged (100%) before starting the test.
 - Follow the instructions in the functional test and wait for loads and IQ Batteries to stabilize in each step before moving forward.
 - The off-grid and on-grid toggle buttons are placed on the top right of the functional validation screen.
 - When going off-grid or on-grid, wait until you hear the relay (inside the IQ System Controller) open or close audibly to confirm the grid transition.

Post commissioning

Post commissioning, follow the homeowner walkthrough instructions on the Enphase Installer App to ensure you have informed the homeowner about the features of the Enphase Energy System before leaving the site.

After functional testing, the battery mode will be changed to Full Backup automatically by the Enphase Installer App to bring the state of charge to 100%.

Commissioning process

 Enphase Installer App commissioning steps		Step description	On-site Enphase Installer App step duration with best practices (hrs.: min)	On-site Enphase Installer App step duration without best practices (hrs.: min)	Best practice
1	System details	Where system name, owner details, site address and grid profile are entered.	Done from office	0:05	Create the commissioning site from the office using the Enphase Installer Portal or Enphase Installer App before going to the job site.
2a	Devices and array	Where all devices are scanned: microinverters, IQ System Controller, and IQ Batteries.	0:10	0:30	Have a physical copy of the microinverter serial number map. Get familiar with the bar codes to be scanned in the IQ System Controller and IQ Batteries before this activity.
2b	Site configuration	Where PV microinverters are assigned to the contactor (for PV shedding applications).	0:02	0:40	Have a physical copy of the microinverter serial number map and bar codes to avoid manual entry of the microinverter serial numbers. Always enable aux contact before moving forward.
3	IQ Gateway Connectivity	Where the Gateway is connected to the client's home network, and the IQ Gateway software is upgraded.	Done from office	0:25	Remotely update the IQ Gateway software (if installed and connected) using the Enphase Installer Portal before going to the site. If on-site: Ensure your phone is charged; Locate your phone close to the IQ Gateway.
4	Provisioning	Where devices are provisioned, and begin communication with the IQ Gateway.	0:02*/0:10**	0:20	<p>*3rd generation - The provisioning time is optimized and it takes <2 minutes.</p> <p>**2nd generation - Connect the Communications Kit to the Gateway (after the software update) and wait for the Communications Kit to become ready. This can take ~5 minutes.</p>
5	Validation	Checks are performed on CT meters (production and consumption) to validate operation/wiring and functional testing is completed to confirm expected system operation.	0:12	0:50	Identify what load(s) should be turned on ahead of time. For example, a dryer, microwave oven, etc. during CT validation. Identify a 120 V load/connection that is part of the backup panel; bring a hair dryer or other load for testing (as needed).
6	Post commissioning	Where the PDF summary report is generated summarizing the status and configuration of the system. Also the install can change the client's battery mode and rate schedule.	0:02	0:02	N/A
Total commissioning time			0:28*/0:36**	02:52	<p>*3rd generation</p> <p>**2nd generation</p>

NOTE:

- If the IQ Gateway requires a mandatory update, it will increase the commissioning time by ~30 minutes.
- If the IQ System Controller requires a mandatory update, it will increase the commissioning time by ~30 minutes.

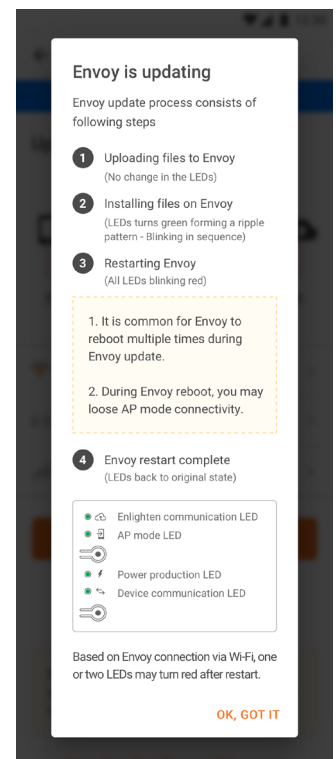
Troubleshooting

Enphase Energy System 3rd generation

1. Incorrect Control Communications cable wiring - Refer to the [Control \(CTRL\) cable wiring best practices](#) section.
2. If your Enphase Installer App screen is stuck or frozen, please close and restart the application.
3. If you are unable to connect to the IQ Gateway in AP mode, use the AP mode button on the IQ Gateway to turn OFF and turn ON AP mode, and try connecting again.
4. Always test voltages before and after relays, as there will be no voltage on the battery and PV lugs at the lower region of the IQ System Controller if the relays are open (possibly due to Manual Override not being exited).
5. For any assistance, either reach out to customer support or create a support case for the site. You can also go through the Enphase FAQs and video library under support for assistance.
6. Check [Device permission-related best practices](#) if your phone is not connecting to IQ Gateway AP mode.

Enphase Energy System 2nd generation

1. IQ Battery or IQ System Controller stuck during provisioning:
 - Always stay close to the IQ Gateway when starting provisioning. However, if one or more devices are stuck in the “Not discovered” state, move closer to the non-discovered devices. This will ensure that Bluetooth communication from the phone to the devices is improved.
 - If one or more devices are stuck in the “Waiting for acknowledgment” state:
 - Please retry provisioning before reaching out to customer support.
 - You can reconnect the Communications Kit to a different USB port on the IQ Gateway.
 - You can connect the Communications Kit USB dongle (inside of the black Communications Kit enclosure) directly to the IQ Gateway.
 - Power cycle the IQ Battery using the steps mentioned in section 3.7 or the IQ System Controller that is in the “Waiting for acknowledgment” state.



Troubleshooting

Enphase Energy System 2nd generation

2. Functional validation troubleshooting steps:

- Ensure batteries are sufficiently charged (above 15%) but not completely charged (100%) before starting the test.
- Follow the instructions in the functional test and wait for loads and IQ Batteries to stabilize in each step before moving forward.
- When going off-grid or on-grid, wait until you hear the relay (inside the IQ System Controller) opening/closing audible sound to confirm the grid transition.

3. Additional troubleshooting:

- Post commissioning, follow the homeowner walk-through instructions on the Enphase Installer App to ensure you have informed the homeowner about the features of the Enphase Energy System before leaving the site.
- If you are stuck (frozen) on any screen of the Enphase Installer App, please close and restart the application.
- If you are not able to connect to the IQ Gateway in AP mode, turn off and turn on AP mode using the AP mode button on the IQ Gateway and retry your connection.
- Always test voltages before and after relays as there will be no voltage on the IQ Battery and PV lugs at the lower region of the IQ System Controller if the relays are open (possibly because of manual override not being exited properly).
- For any assistance, either reach out to customer support or create a support case for the site. You can also go through the Enphase FAQs and video library under support for assistance.

4. Please refer to the [Enphase Energy System Commissioning Guide](#) for more details.

- Communications Kit troubleshooting. Take the green USB drive out of the black box and plug it directly into the USB port.
- Perform an IQ Gateway hard reset.

5. IQ Battery troubleshooting—Steps to perform Power Cycle in IQ Battery.

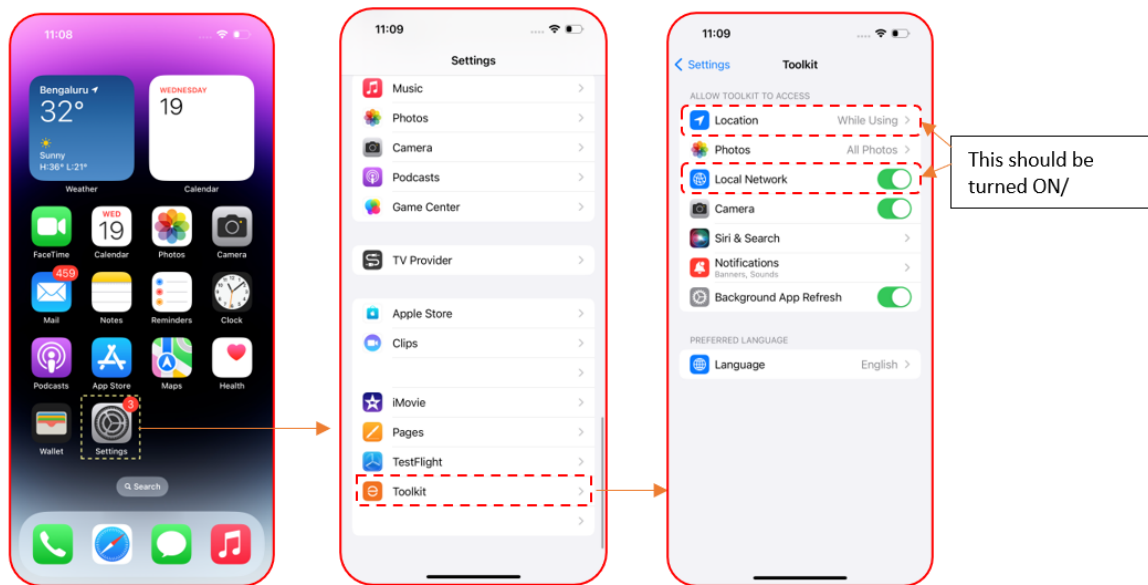
- Turn the DC switches off in the IQ Battery.
- Turn the AC feeding battery off.
- Wait for five minutes.
- Turn the AC feeding battery on.
- Verify the red light in the IQ Battery flashing in three seconds.
- Wait for two minutes.
- Turn on the DC switches in the IQ Battery.

Troubleshooting

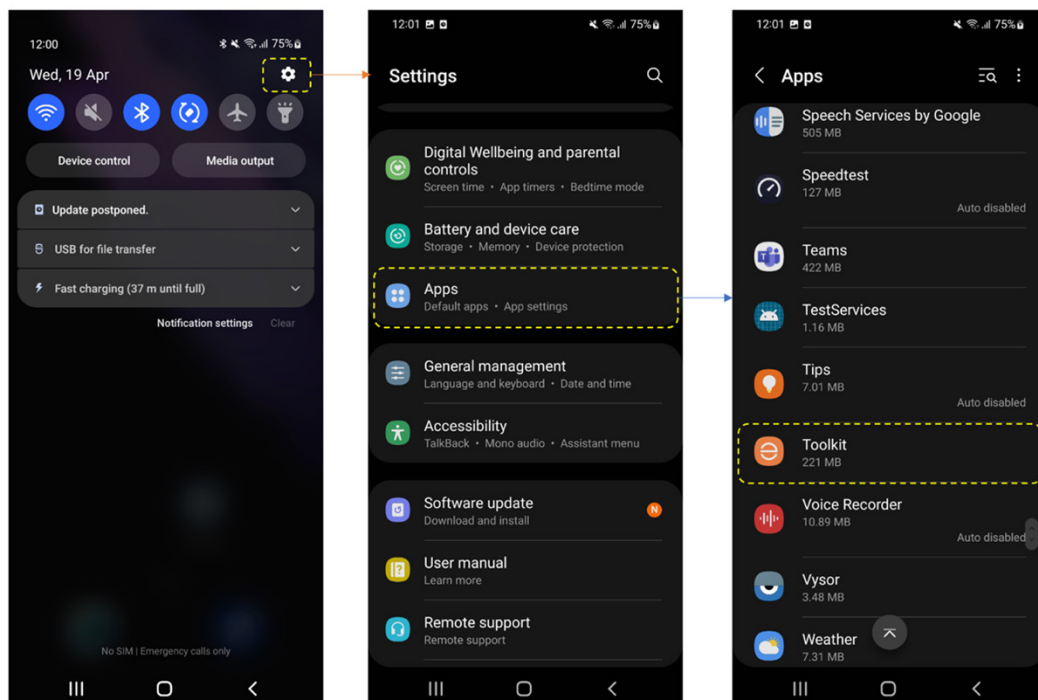
Device permission-related troubleshooting

- Make sure that your device permissions for location and network are provided/granted to the Enphase Installer App. This is requested by the app when it is opened on the mobile device. Allow these permissions when requested by the Enphase Installer App. Refer to the following screenshots to verify.

IOS



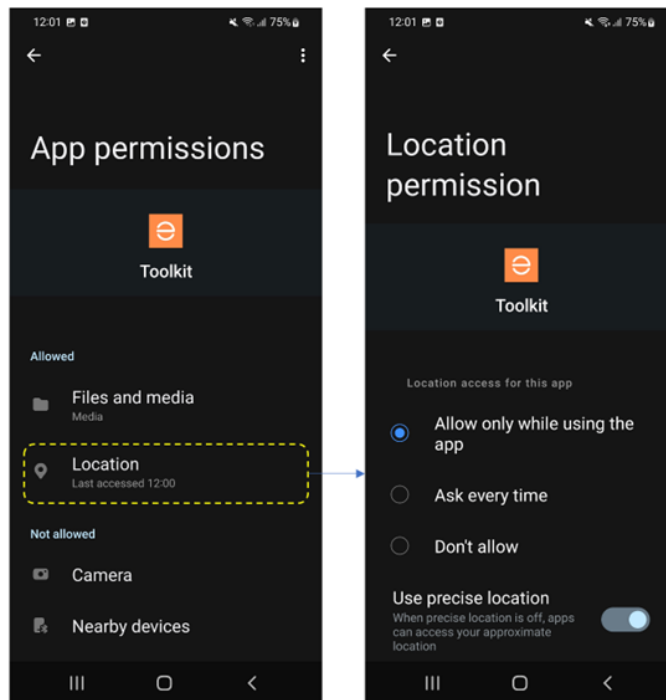
Android



Troubleshooting

Device permission-related troubleshooting

Android



- [iOS] Disable the “Auto-Join” toggle button. When your device is connected to IQ Gateway’s AP mode, connecting to a Wi-Fi network may cause issues. If you are facing frequent IQ Gateway disconnections, make sure the “Auto-Join” is disabled.



Disable Auto-Join if you are connected to other Wi-Fi network other than IQ Gateway AP mode

- Make sure that the mobile device is not connected to a VPN. Connecting to a VPN can disrupt the IQ Gateway AP mode connectivity.
- Make sure that your phone’s cellular data is turned OFF. Turning on cellular data might disrupt the IQ Gateway AP mode connectivity.

Product name reference

A number of installers and homeowners asked us to clarify our product and service names, so we conducted an audit of all our names and came to the same conclusion: We needed to simplify our product names to make it easier to navigate and remember our system, product, and service offerings. We believe that our new names more accurately describe product function, are easier to remember, and will benefit homeowners and installers alike.

PREVIOUS NAME	NEW NAME
Ensemble	Enphase Energy System
Encharge	IQ Battery
IQ Envoy	IQ Gateway
Enpower	IQ System Controller
Q Cabling	IQ Cabling and IQD Cabling
Q Relay	IQ Relay
Load Control	IQ Load Controller
Enlighten App	Enphase App
Enlighten Manager	Enphase Installer Portal
Enlighten Installer Toolkit (ITK)	Enphase Installer App

Revision history

REVISION	DATE	DESCRIPTION
Revision V3.9 (TEB-00074-1.0)	September 2023	<ul style="list-style-type: none"> Added Enphase Energy System 3rd Generation commissioning best practices.
Revision V3.88	March 2023	<ul style="list-style-type: none"> Added update 1.8 to critical updates.
Revision V3.7	August 2022	<ul style="list-style-type: none"> Added update 1.7 to critical updates.
Revision V3.6	August 2022	<ul style="list-style-type: none"> Added IQ Battery power sequencing instructions in best practices. Added new diagrams for grid-tied microinverters in critical update 1.4. Added update 1.5 and update 1.6 to critical updates.
Revision V3.5.1	August 2022	<ul style="list-style-type: none"> Added new diagrams for the System Shutdown Switch in critical update 1.2. Added new diagrams for IQ Gateway circuit breaker installation in critical update 1.4.
Revision V3.4	June 2022	<ul style="list-style-type: none"> Added schematic diagram for IQ Gateway circuit breaker installation in IQ System Controller 2 with and without generator in critical update 1.4. Added product name reference to show the mapping of an old product names to new product names for quick reference.
Revision V3.3	June 2022	<ul style="list-style-type: none"> Added instructions for avoiding system failure on IQ System Controller 2 due to ESUB over-voltage caused by incorrect wiring of IQ Gateway circuit breaker in critical update 1.4. Added FAQ related to ESUB over-voltage in critical update 1.4.
Revision V3.2	June 2022	<ul style="list-style-type: none"> Added instructions on the sequence of switching on AC and DC in IQ Battery while commissioning Enphase Energy system in best practices. Added Communications Kit troubleshooting steps. Added IQ Battery power cycle troubleshooting steps. Added best practices for scanning microinverters in the commissioning process.
Revision V3.1	May 2022	<ul style="list-style-type: none"> PLC scan for IQ8 Microinverters works only if the IQ Gateway software version is 7.X or above. Refer to the best practices for more information. IQ8 Sunlight Backup and/or energy storage systems must be landed on the PV relay in IQ System Controller 2 due to the extra protection function needed. IQ Gateway circuit breaker is wired directly to the IQ System Controller 2. Refer to the best practices for more information.

Revision history

REVISION	DATE	DESCRIPTION
Revision V3.0	May 2022	<ul style="list-style-type: none">Added instructions for wiring the System Shutdown Switch in critical update 1.2.
Revision V2.0	May 2022	<ul style="list-style-type: none">Added containment actions on how to prevent Communications Kit failure and avoid damaging the IQ System Controller when installing a System Shutdown Switch.
Revision V1.0	January 2021	<ul style="list-style-type: none">An initial version of the storage system best practices and troubleshooting tips.