

Backup-ready installation in California

Applicable regions: North America

© 2026 Enphase Energy. All rights reserved. Enphase, the e and CC logos, IQ, and certain other marks listed at <https://enphase.com/trademark-usage-guidelines> are trademarks of Enphase Energy, Inc. in the U.S. and other countries. Data subject to change.

Contents

1	About this document.....	3
2	What is a backup-ready system?.....	3
3	When to install a backup-ready system?.....	3
4	Planning backup-ready systems.....	4
5	Designing a backup-ready system.....	5
6	Installing a backup-ready system.....	9
7	Commissioning a backup-ready system.....	13
8	Appendix A: Abbreviations.....	16
9	Appendix B: Legend.....	17
10	Revision history.....	19

1. About this document

This document provides guidance for site surveyors, design engineers, electricians, and technicians to plan and support **backup-ready** Enphase Energy Systems in California. It applies to the **4th-generation Enphase Energy System**, which includes:

- IQ Battery 10C/10CS
- IQ Combiner 6C
- IQ Meter Collar (not installed)
- IQ Microinverters

This is not an installation or operation manual. It supplements Enphase data sheets, quick install guides, and product manuals. Diagrams and guidance illustrate typical configurations but **may not cover all local codes or AHJ requirements**.



NOTE: Unless otherwise noted, "Enphase Energy System" refers to its fourth generation throughout this document.

Related documents

- [IQ Battery 10C quick install guide](#)
- [IQ Combiner 6C quick install guide](#)
- [IQ Meter Collar quick install guide](#)
- [Compatibility matrix](#)
- [PCS integration in 4th-generation Enphase Energy Systems](#)

2. What is a backup-ready system?

A backup-ready system is a grid-tied system that does not have backup capability but can be easily modified to add backup capability. A backup-ready system has:

- **IQ Battery 10C** and **IQ Combiner 6C** installed.
- **IQ Meter Collar** onsite (ready for utility installation under the utility meter), but not yet installed.
- **Consumption CTs** wired to the IQ Combiner 6C to enable battery operation while grid-connected, maximizing homeowner savings.

3. When to install a backup-ready system?

Install a backup-ready system if the following criteria are met:

- **Utility billing plans or tariffs make batteries attractive.**
This can be true if the system is in a territory where the utility offers
 - Low feed-in rates for power exported to the grid.
 - Dynamic rates, with more credit for power exported to the grid at certain times of a day, certain days, or certain months.
 - Dynamic rates, with power credits exported to the grid, change daily, monthly, or yearly.

In such cases, the grid-tied operation of the battery provides significant value by storing power from the sun and discharging to loads or exporting to the grid when it is economically ideal to do so.

- **The IQ Meter Collar is either not approved by the utility or, if approved, its installation is being delayed by the utility.**

IQ Meter Collar houses the Microgrid Interconnect Device (MID) and the consumption metering. Without the IQ Meter Collar, the house cannot be isolated from the grid, and the system cannot provide backup. While the system is waiting for utility approval to put the IQ Meter Collar under the utility meter, Consumption CTs can be installed and connected to the IQ Combiner 6C to allow the battery to charge/discharge while the grid is present to provide the system owner the economic benefit of the battery, even though they cannot get the backup functionality without the IQ Meter Collar.

With Net Energy Metering 3 (NEM3) in California, a grid-tied battery system has significant economic value. California's Investor-Owned Utilities (IOUs) have not fully approved the IQ Meter Collar at the point of publication of this document. California is, therefore, a market where a backup-ready system can be considered. Illinois is another market where dynamically changing rates make a backup-ready system attractive while waiting on utilities, too.

4. Planning backup-ready systems

A backup-ready system is installed and operates as a grid-tied or grid-interactive system. It is upgraded to a backup-capable, grid-forming, or multi-mode system with the addition of an IQ Meter Collar. This flow has implications for design, permitting, installation, commissioning, and interconnection.

- The system must be designed to function as a grid-interactive system initially and later as a multi-mode or grid-forming system. To ensure minimum effort while converting the system to grid-forming by adding an IQ Meter Collar, see [Designing a backup-ready system](#) on page 5.
- Typically, the plans for permitting show the grid-tied system, and the system does not require a re-permit post upgrade with the IQ Meter Collar. This is because the IQ Meter Collar is installed by utility personnel behind the utility meter. Follow the requirements of the Authority Having Jurisdiction (AHJ) to determine if a second permit is needed.
- The sections [Installing a backup-ready system](#) on page 9 and [Commissioning a backup-ready system](#) on page 13 in this document provide key points to pay attention to while installing and commissioning backup-ready systems.
- Interconnection application requirements vary by utility. The backup-ready system requires an interconnection application as a grid-tied or grid-interactive system. Some utilities may require a modification to the interconnection to be submitted, or a re-application when multi-mode capability is enabled with the addition of the IQ Meter Collar.

The value of the backup-ready system is that batteries offer bill offset immediately. However, depending on AHJ and utility requirements, there may be additional interconnection and permitting costs.

To prepare for designing, installing, and commissioning systems:

- Complete Enphase's training on 4th-generation battery systems.
- Read and follow the instructions in the [Enphase Energy System planning guide](#).
- Read and follow the instructions in the [IQ Battery 10C quick install guide](#) and the [IQ Combiner 6C quick install guide](#).

5. Designing a backup-ready system

The following figure shows a grid-tied battery system with IQ Series Microinverters for PV, IQ Battery 10C, and IQ Combiner 6C.

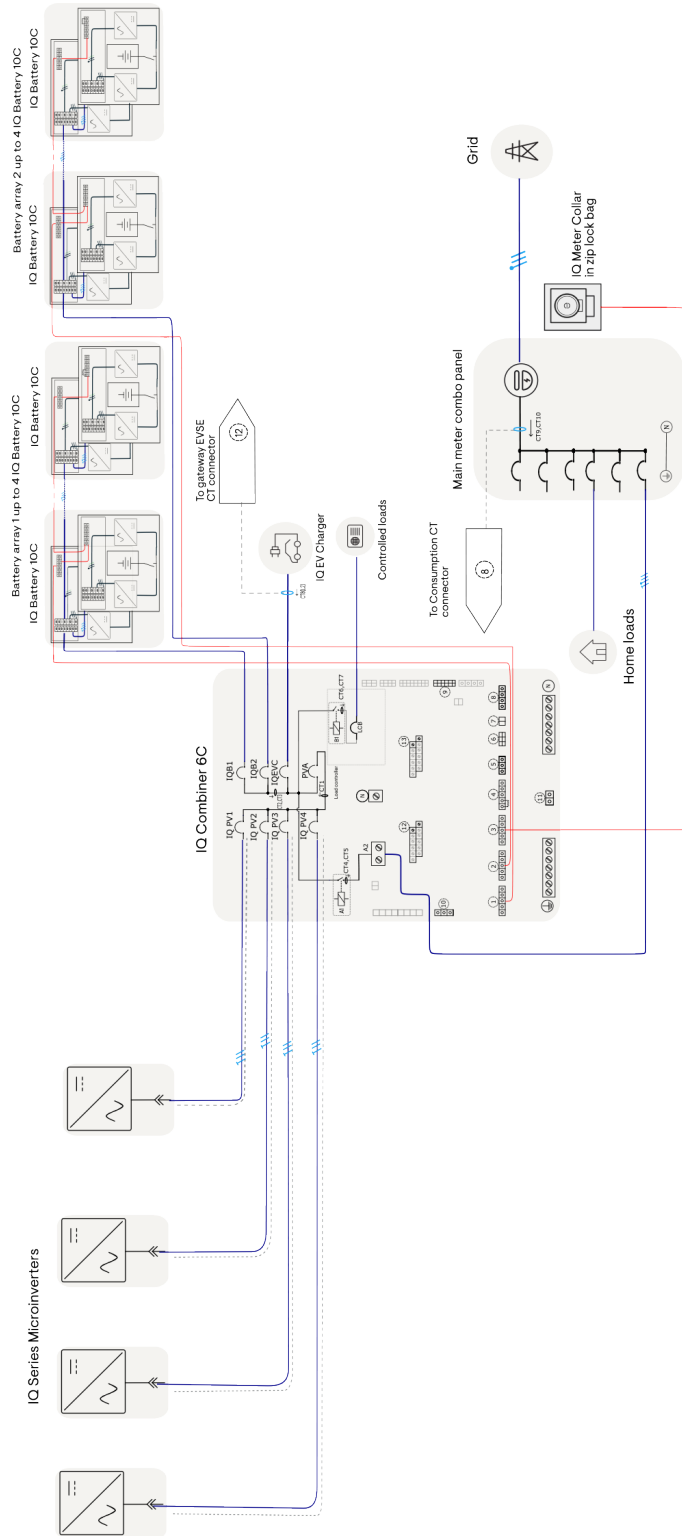


Figure 1: A grid-tied battery system with IQ Series Microinverters for PV, IQ Battery 10C, and IQ Combiner 6C

For notations, see [Legend](#) on page 17.

Key design considerations while designing a backup-ready system are:

- External Consumption CTs (L1, L2) must be installed for home energy monitoring. **Two units of CT-200-SPLIT, CT-200-CLAMP, or the CT-200-CLAMP-2A kit (comes with two units) must be procured separately.** These will need to be installed on the grid input to the main panel.
- Consumption CTs replace the load controller CTs. Ensure the crew carries wire nuts for 18 AWG wire to ensure load controller CTs can stay safely disconnected.
- If the system will be upgraded to add backup capability imminently, ensure an IQ Meter Collar is supplied to the installation crew. This should be kept onsite, either hung near the utility meter or with the homeowner.
- Ensure adequate control cable (CTRL-SC3-NA-01) is available onsite. The control cable must run from connector 3 or H3 on the IQ Combiner 6C to the IQ Meter Collar after it is installed.
- If the system will be upgraded to add backup capability imminently, ensure that the battery system is sized to meet backup requirements as well as bill offset requirements.
- If installing a single IQ Battery 10C:
 - Consider upsizing the L1, L2, Neutral, and Ground wires between the battery and IQ Combiner 6C to 4 AWG or 3 AWG. This will allow easy addition of another IQ Battery 10C should the need arise when adding backup functionality by using 4 AWG or 3 AWG wire to connect/daisy chain to the existing IQ Battery 10C unit.
 - If upsizing the conductors to higher gauge wires, even with a single battery, as stated above, ensure breakers can support the chosen wire gauges. An Eaton BR240 breaker can support up to 4 AWG, while a Siemens Q240 breaker can support 6 AWG. Consider upsizing the breaker to 80 A (BR280 or Q280) to support future battery addition.
- If an IQ EV Charger is connected to the IQ EV Charger breaker, its nameplate rating or continuous current rating must be less than the combined continuous current rating of the IQ Batteries.
- Consider shifting heavy loads to an appropriately sized breaker on the integrated load controller in the IQ Combiner 6C. This will ensure the system is ready to support backup once an IQ Meter Collar is added. The load controller supports breakers up to 80 A per phase, including double-pole or quad breakers.
- Size the backfeed breaker or DER breaker on the main panel where the IQ Combiner 6C lands to the larger of PV + Battery breaker rating and EV charger + Load Control breaker rating. The backfeed breaker can be up to 125 A.
- Ensure busbar overload control and other Enphase Power Control features are reflected in the plans for permitting.
- **Plan for the Rapid Shutdown and ESS Emergency Shutdown initiators, as well as any additional PV and ESS Disconnects that work in grid-interactive and grid-forming systems, to avoid AC rewiring and rework when the system is upgraded from backup-ready to backup-capable.** The table below summarizes typically required shutdown initiators and disconnects, and options available with the 4th-generation Enphase Energy System. Refer to the [Enphase Energy System planning guide](#) or the [IQ Combiner 6C quick install guide](#) for off-the-shelf disconnect examples, as well as detailed wiring instructions for each disconnect.

Initiators for various NEC or utility requirements	In IQ Combiner 6C		In IQ Battery 10C	In the main panel	External disconnects			
	PV aggregate breaker	Battery breakers	Battery switches	Back-fed breaker	3-pole, grid-side disconnect	2-pole PV disconnect in line with PV aggregate breaker	2-pole PV disconnect in line with external combiner	3-pole PV disconnect in line with external combiner
PV Rapid Shutdown (2023 NEC 690.12)	Y	N	N	Y ¹	Y	Y	Y	Y
ESS Emergency Shutdown (2023 NEC 706.15B)	Y	Y	Y	Y ¹	Y	Y	N	Y
PV System disconnecting means (2023 NEC 690.13)	Y	N	N	Y ¹	Y	Y	Y	Y
ESS disconnecting means (2023 NEC 706.15)	N	Y	Y	N	Y	N	N	N
Visible break for the DER system (Only if required by AHJ or utility)	N	N	N	N	Y	N	N	N



NOTE: Check the local and national codes and standards to determine whether the initiators and disconnecting means can be used at a particular site as recommended. The suitability may vary depending on the equipment location and other site-specific factors.

¹ Only for grid-tied or grid-interactive, that is, backup-ready systems without an IQ Meter Collar.

The following figure shows the system after the IQ Meter Collar has been installed by the utility behind the utility meter.

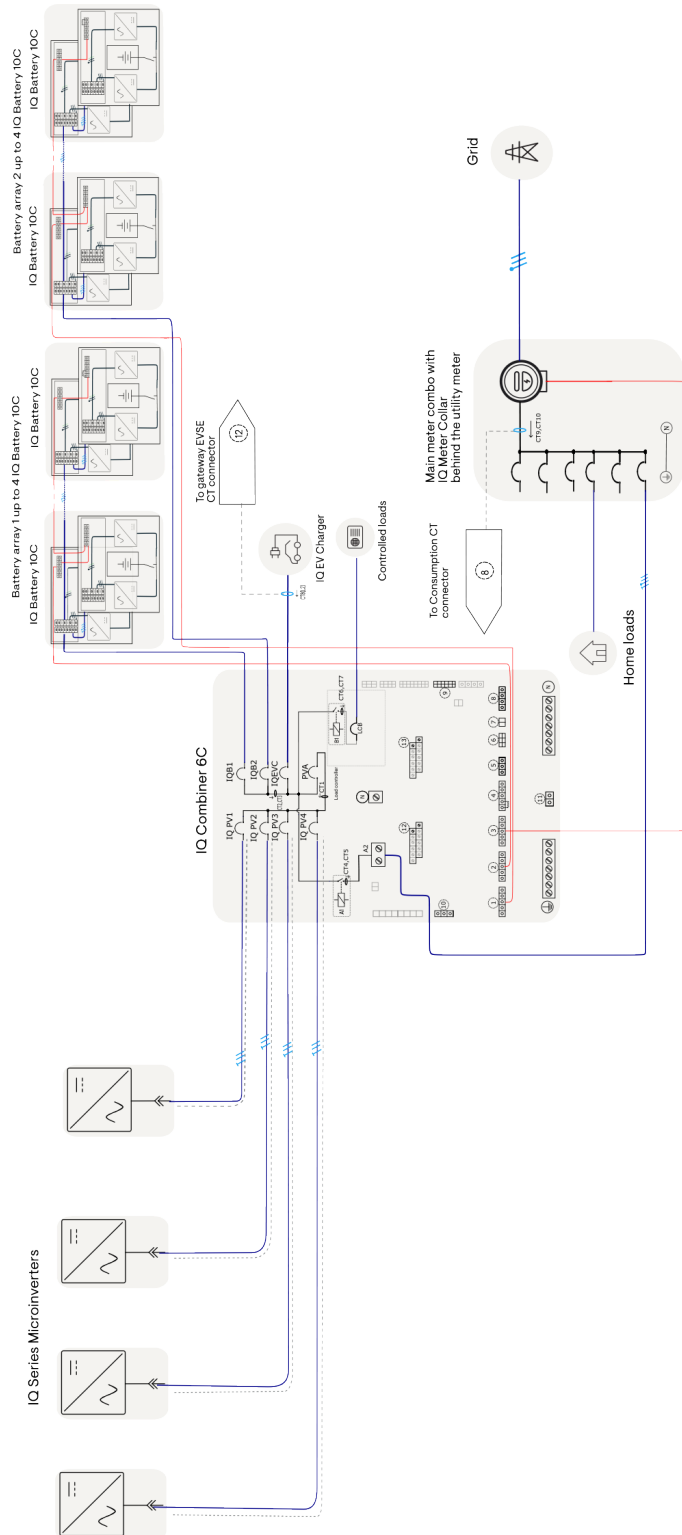


Figure 2: After IQ Meter Collar installation

6. Installing a backup-ready system

Key considerations while installing a backup-ready system are:

- Follow the instructions in the IQ Microinverter QIGs, [IQ Battery 10C quick install guide](#), and [IQ Combiner 6C quick install guide](#) for mounting, conduit entry, and wiring.
- Choose and install Rapid Shutdown and ESS Emergency Shutdown initiators as well as disconnects as required. To avoid rewiring and rework, choose initiator and disconnect options that can be used even after the utility installs the IQ Meter Collar, converting the system to a grid-forming or multi-mode system.
- Follow the instructions in the [IQ Meter Collar quick install guide](#) for ring or ringless-type meter sockets as applicable. Instructions in this document are an add-on reference for the QIG but are not comprehensive.

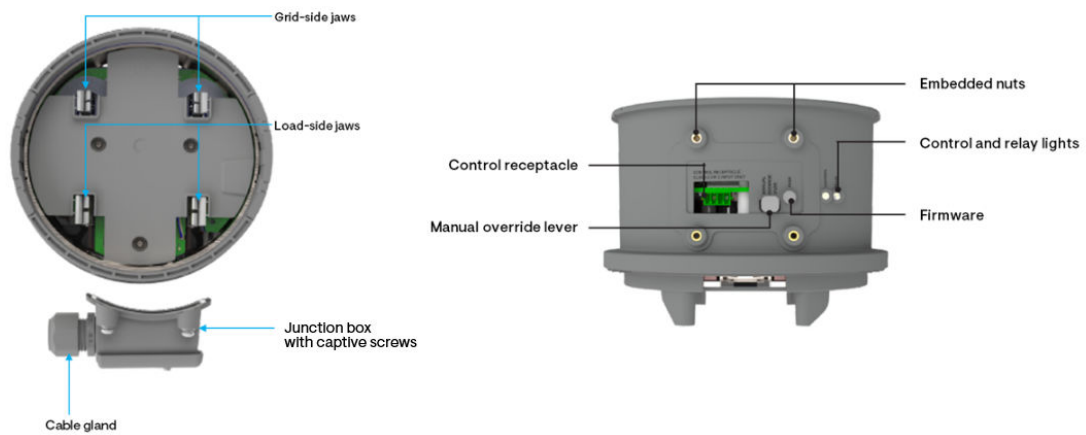


Figure 3: IQ Meter Collar

- For ring-type sockets, the control cable can be wired to the IQ Meter Collar, and the junction box can be affixed. This is common in California. The control cable should be run through the bottom right corner of the provided zip-lock bag, and the IQ Meter Collar assembly with the control cable and junction box should be in the zip-locked bag. The bag can be hung near the utility meter.
- For ringless sockets, the Manual Override lever and the firmware enable/disable button must be removed. The IQ Meter Collar should be in the zip-locked bag and hung near the utility meter. The control cable connection to the IQ Meter Collar, insertion of the Manual Override lever, firmware enable/disable button, and installation of the junction box must all be done after the utility installs the IQ Meter Collar beneath the utility meter.
- The other end of the control cable can be connected to connector 3 or H3 in IQ Combiner 6C while installing IQ Combiner 6C.

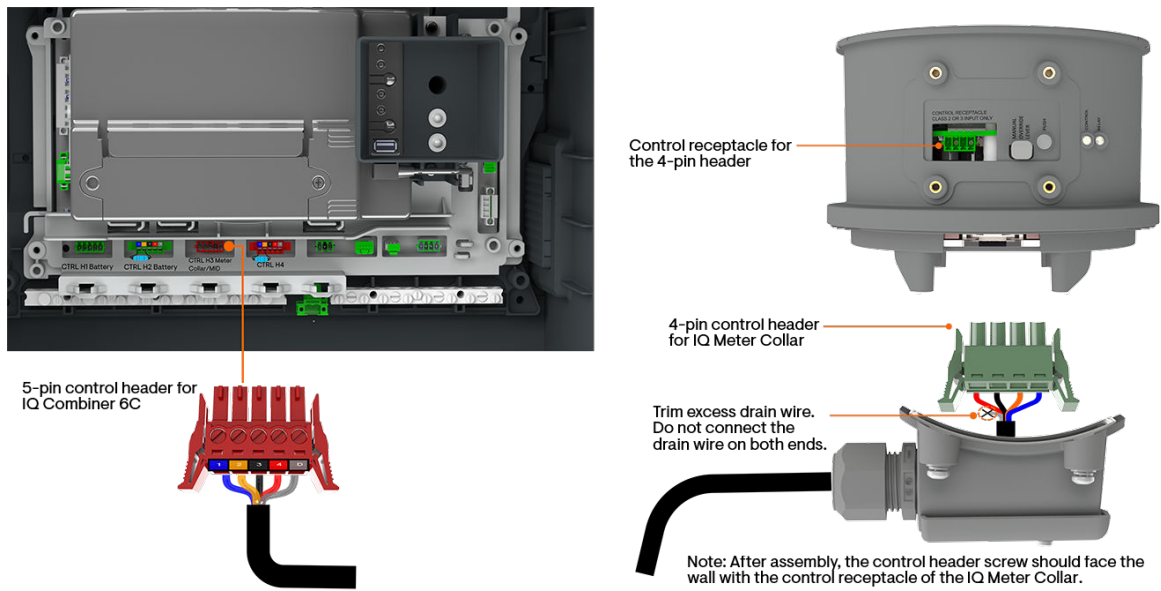


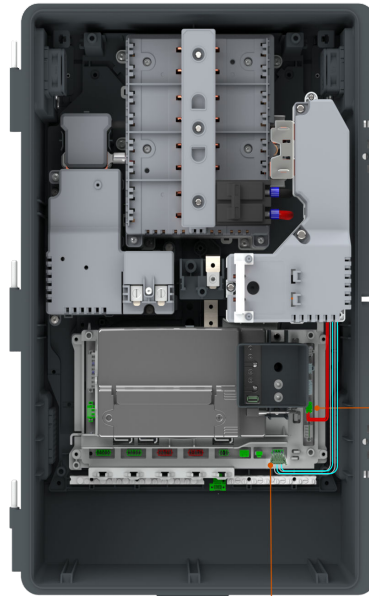
Figure 4: Control wiring for IQ Meter Collar and IQ Combiner 6C

- With ring-type meter sockets, this approach ensures that no wiring is required onsite after the utility installs the meter collar.
- With ringless meter sockets, this approach ensures that all wiring in areas where the installer is exposed to AC voltage is completed during the installation of the IQ Combiner 6C and IQ Batteries. The remaining tasks—wiring the control cable to the IQ Meter Collar, reconnecting the lever and button, and affixing the junction box—are performed after the utility installs the IQ Meter Collar and are not in areas where the installer is typically exposed to AC voltage.

NOTE: The drain wire must be connected to the IQ Combiner 6C control header on connector 3 or CTRL H3.

- Ensure external Consumption CTs (L1, L2) are installed for home energy monitoring.
 - Two units of CT-200-SPLIT or CT-200-CLAMP must be procured separately. These will need to be installed on the grid input to the main panel.
 - Follow the instructions in IQ Combiner 6C to wire the Consumption CTs and to connect them to the IQ Combiner 6C.
1. Disconnect the load controller CT header from connector 8.

- 1 Remove the load controller CT header from connector 8. Unfasten the CT wires from the header.



Load controller relay connector (Do not remove the load controller relay connector)

Remove the load controller CT header from the connector position 8

Figure 5: Disconnect load controller CTs

2. Remove the load controller CT wires from the header of connector 8.

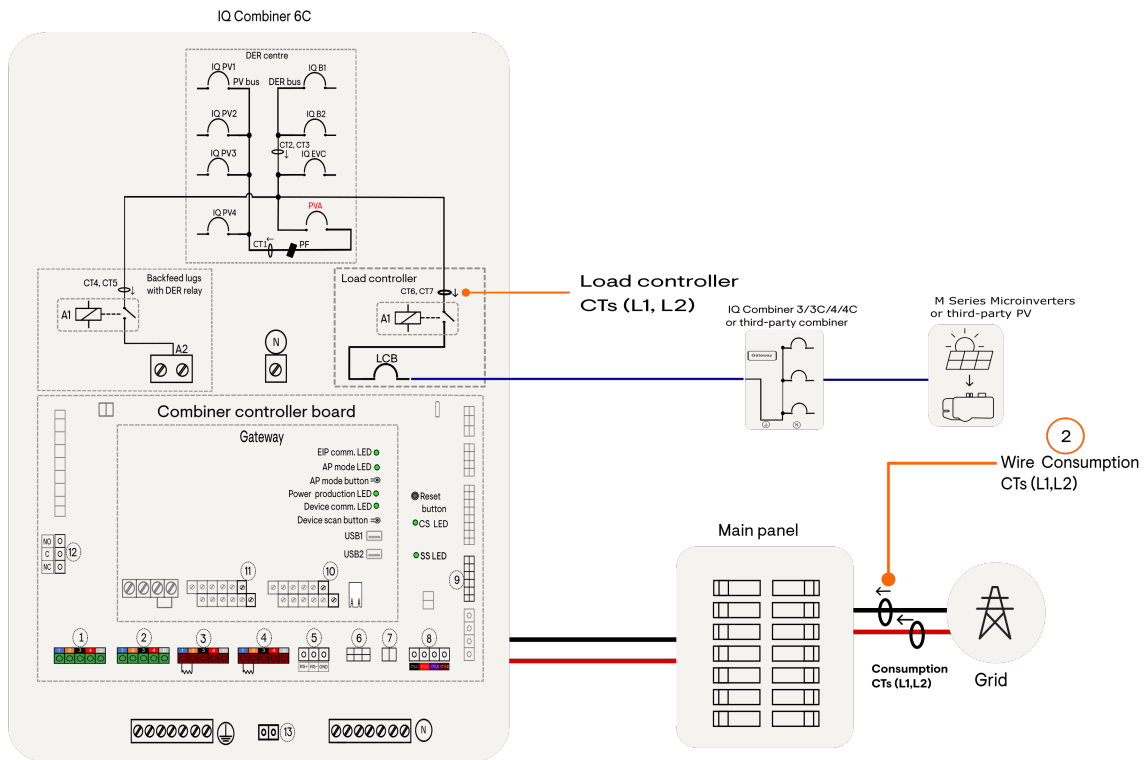


Figure 6: Install Consumption CTs

3. Connect the Consumption CTs on the L1 and L2 grid input to the main panel. Ensure the arrows on the CTs point towards the loads, that is, point away from the grid.

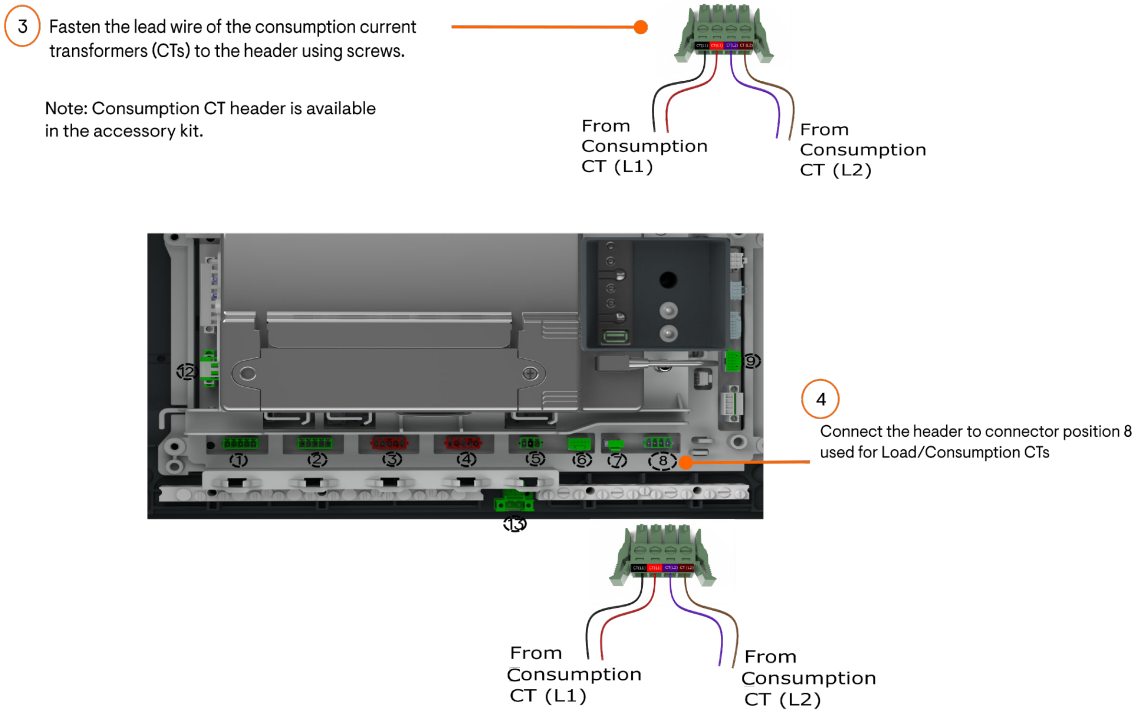


Figure 7: Connect Consumption CTs

4. Connect lead wires for the Consumption CTs to the header. If using two units of CT-200-SPLIT or CT-200-CLAMP, use the header for the load control CT. The header is labeled for blue and white lead wires as provided with CT-200-SPLIT and CT-200-CLAMP. If using CT-200-CLAMP-2A, use the header in the accessory kit. This header is labeled for red, black, purple, and brown lead wires as provided with CT-200-CLAMP-2A.
5. Plug the Consumption CT header into Connector 8.
6. **IMPORTANT:** Disconnect the load controller CT wires from the header.
7. Short the lead wires for each load controller CT with a wire nut as shown.

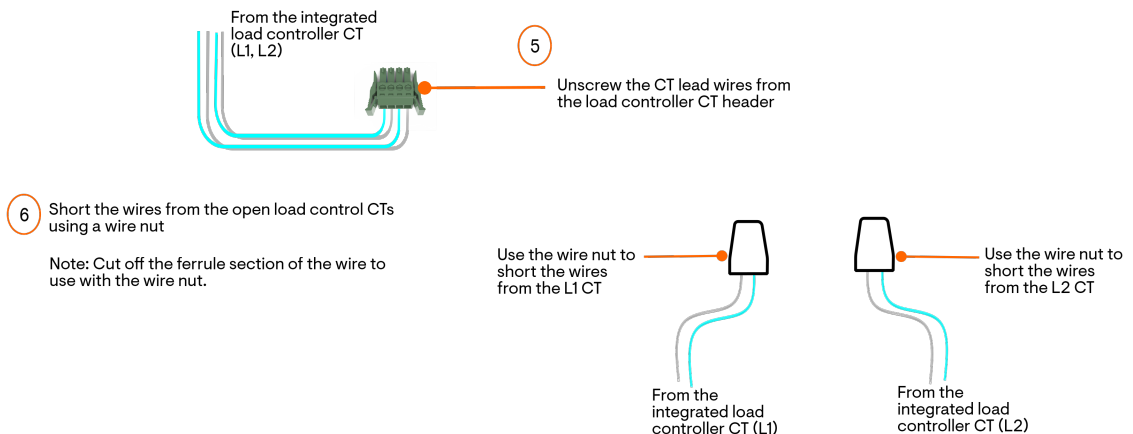



Figure 8: Short the wires for the load controller CTs

After the utility has installed the IQ Meter Collar, for ringless meter collars, connect the control cable to the IQ Meter Collar, reconnect the lever and button, and affix the junction box. The system is now backup-capable, grid-forming, or multi-mode. The previously installed Consumption CTs do not need to be disconnected. The system will automatically switch to the IQ Meter Collar-based consumption meter readings. The exposed run of control cable attached to the IQ Meter Collar or flexible liquid-tight conduit that contains the control cable must be attached to the wall via cable

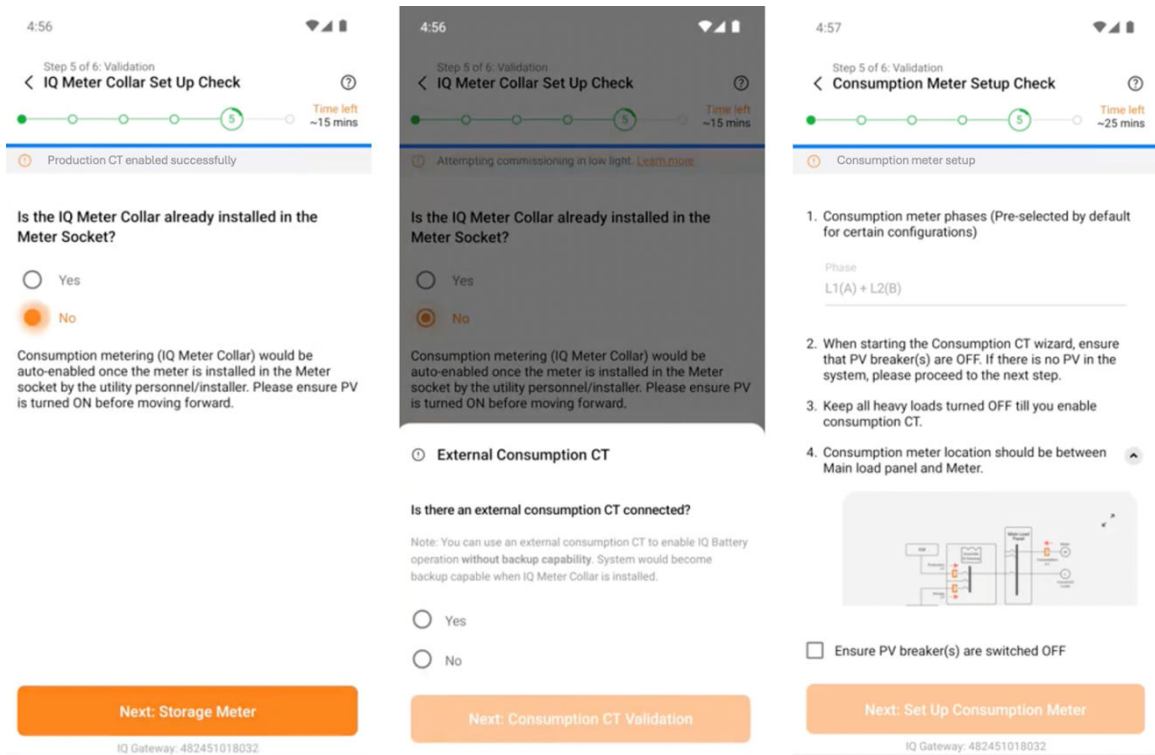
clips or cable cleats. This is essential to ensure the wire/flexible conduit is not hanging loose and to ensure it is not inadvertently pulled out of the IQ Meter Collar.

7. Commissioning a backup-ready system

Follow the normal commissioning process as described in the training. After provisioning the IQ Batteries, IQ Combiner 6C, IQ Microinverters, and IQ Meter Collar, the Enphase Installer App will provide instructions to enable the Production CT and IQ Meter Collar. Because the IQ Meter Collar is not installed, the app will ask if external Consumption CTs are connected.

 **NOTE:** External Consumption CTs are needed for grid-tied operation until the IQ Meter Collar is installed by the utility.

In the Enphase Installer App, select **Yes** to perform external Consumption CT validation. Go through the Consumption CT wizard to validate the placement and configuration of the Consumption CT and enable it. Ensure the Consumption CT is installed according to the instructions provided.



When the utility has installed the IQ Meter Collar, complete the functional validation. This can be done remotely or onsite by a technician.

 **NOTE:** If performing this remotely, notify the homeowner in advance.

Caltech Circle
 < Blr 444 IQ Collar Android Aug 7 ? Time left ~5 mins

Not connected to IQ Gateway. [Connect now](#)

Pull to Refresh/Sync

- ✓ Address
- ✓ Site ID: 701646406
- ✓ PTO: No

2 **Devices and Configuration**

Devices >

- ✓ IQ Gateway : 1/1
- ✓ IQ Microinverters : 4/4
- ✓ IQ System Controller : 1/1
- ✓ IQ Meter Collar : 1/1
- ✓ IQ Battery : 2/2
- ✓ Arrays : 1/1

Site Configuration >

- ✓ Home Backup
- ✓ Battery Mode

3 **IQ Gateway Connectivity** >

Functional Validation

Caltech Circle
 < **Functional Validation** ? Time left ~5 mins

You can start functional validation now

Functional Validation Pre-check

- ✓ Gateway is communicating
- ✓ Devices are communicating
- ✓ IQ Batteries are ready for Off-Grid
- ✓ System is On-Grid
- ✓ All meters are enabled
- ✓ DC switches are turned ON
- ✓ Battery profile set
- ✓ Load is compatible

Start Validation

Caltech Circle
 < **Functional Validation** ? Time left ~5 mins

Follow the instructions below to continue

CHARGE 62% | PROFILE Self - Consumption

0.0 Producing

0.0 Idle | 3.8 kW Consuming

3.8 kW Discharging

✓ Confirm backup panel has an active load and batteries are charging

Next: Go Off-Grid

Caltech Circle
 < **Functional Validation** ? Time left ~5 mins

Follow the instructions below to continue

CHARGE 62% | PROFILE Self - Consumption

0.0 Not Connected | 1.4 kW Producing | 0.0 Consuming

1.4 kW Charging

✓ Confirm the backup loads are still powered ON

Next: Go On-Grid

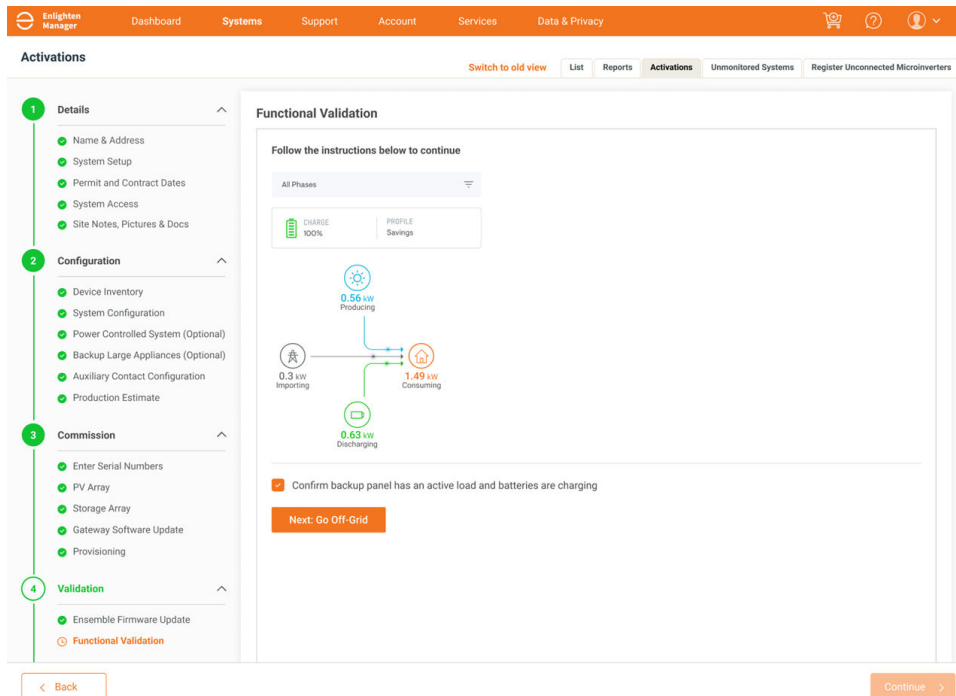
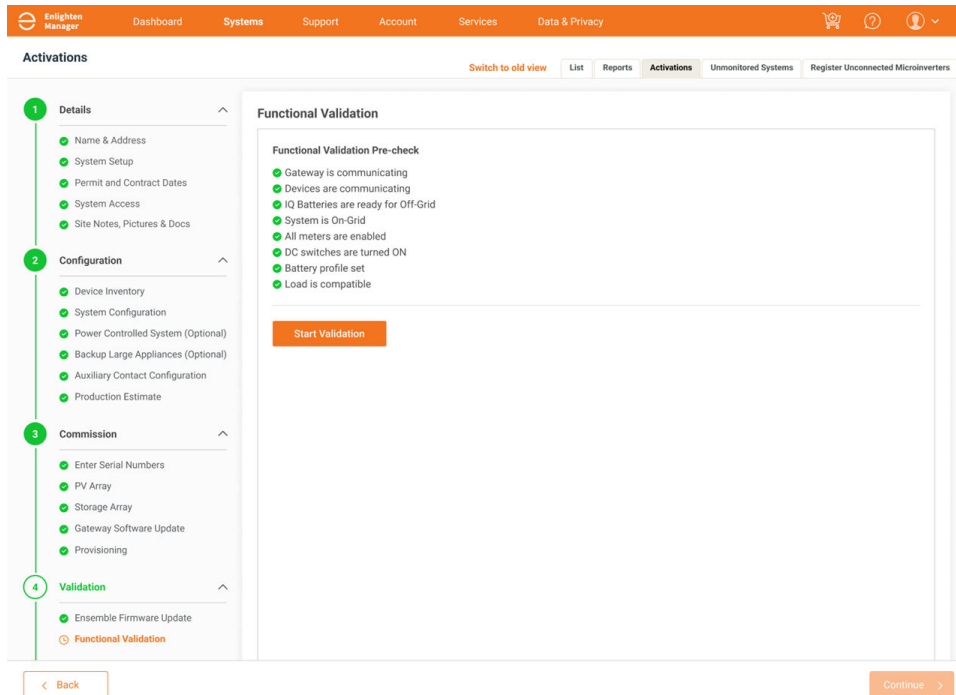
Caltech Circle
 < **Functional Validation** ? Time left ~5 mins

Functional validation successfully completed.

The System is now ON-Grid, and Functional Validation is successful

OK

The following screenshots are from the Enphase Installer Platform (Enlighten Manager).











Appendix A

Abbreviations

Abbreviation	Description
DER	Distributed energy resource
EES	Enphase Energy System
kW	Kilowatt
kVA	Kilovolt-ampere
MID	Microgrid interconnect device
NEC	National Electrical Code
NFT	Neutral forming transformer
OCPD	Overcurrent protection device
PV	Photo voltaic
RSD	Rapid shutdown device
SKU	Stock keeping unit

Appendix B

Legend

Symbols	Description
	Equipment ground conductor
	Grounded conductor (Neutral)
	Ungrounded conductor
	Field-wired conductors
	Neutral sense
	Phase detection
	Relay
	Breaker

Connectors	Description
1	IQ Battery control header - 1
2	IQ Battery control header - 2
3	IQ Collar control header
4	Spare control header (not to be used)
5	RS485
6	Ride-through (RT) power supply accessory
7	Rope CT - power supply
8	Integrated load monitoring CT/External Consumption CT connector
9	Load relay connector (accessory)
10	NO/NC dry contact relay
11	AC sense
12	EVSE CT
13	NO dry contact relay

Connectors	Description
14	Battery power terminal
15	Battery control terminal
16	Battery control terminal with termination resistor

Label	Description
A1	DER relay
A2	Backfeed lugs
B1	Load control relay
B2	Up to 1 × 80 A load control breaker
CT1	Integrated revenue-grade PV CT (L2)
CT2,CT3	Integrated revenue-grade battery CTs (L1, L2)
CT4,CT5	Integrated backfeed CTs (L1, L2)
CT6,CT7	Integrated load control CTs (L1, L2)
CT8	Field-installed EVSE CT (L2)
CT9, CT10	Field-installed Consumption CTs (L1, L2)
CT11, CT12	Field-installed third-party PV CTs (L1, L2)
IQ PV1, IQ PV2, IQ PV3, IQ PV4	Up to 4 × 20 A for PV strings or up to 3 × 20 A breaker and 1 × 20/20 A quad breaker
IQB1, IQB2	Up to 2 × 80 A for IQ Battery breaker
IQEVC	Up to 1 × 60 A for 1 × IQ EV Charger breaker
LCB	Up to 1 × 80 A for load control on non-backup loads
PF	PLC ferrite at PV aggregate (L2)
PVA	Pre-installed 60 A PV aggregate breaker as rapid shutdown initiator (RSD); can be replaced by 80 A, 100 A breakers

10. Revision history

Revision	Date	Description
TEB-00306-2.0	January 2026	Updated the "Designing a backup-ready system" section.
TEB-00306-1.0	June 2025	Initial release.