



Q.HOME Application Specific Design Guide – AC Coupled with Enphase

Purpose

The purpose of this document is to provide application specific information on the Q.HOME CORE product in AC Coupled with Enphase products. The information below includes example single line diagrams, bill of materials, and other important application specific information related to the installation and commissioning process. For more details on the installation and commissioning of the AC Coupled with Enphase application, please refer to the Installation Quick Start Guide – AC Coupled with Enphase.

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Compatible Enphase Products

Model Name	Compatibility Note
IQ7A Microinverter	<ul style="list-style-type: none"> • Validated through testing.
IQ7+ Microinverter	<ul style="list-style-type: none"> • Partial validation through similarity with IQ7A. • <i>Case by case basis, please contact Qcells Support.</i>
IQ7 Microinverter	<ul style="list-style-type: none"> • Partial validation through similarity with IQ7A. • <i>Case by case basis, please contact Qcells Support.</i>
IQ8 Microinverter	<ul style="list-style-type: none"> • Validated through testing. • Should not be paired with Enphase IQ System Controller: <ul style="list-style-type: none"> ○ Anti-islanding function of the IQ System Controller must be disabled. Otherwise, it will prevent the operation of the AC Coupled PV system when the grid is offline and the ESS system is providing backup power. ○ It will be required to disable the anti-islanding function of the IQ System Controller hardware, and the preferred configuration is to remove the hardware from the system.
IQ8+ Microinverter	
IQ8M Microinverter	
IQ8A Microinverter	
IQ8H Microinverter	

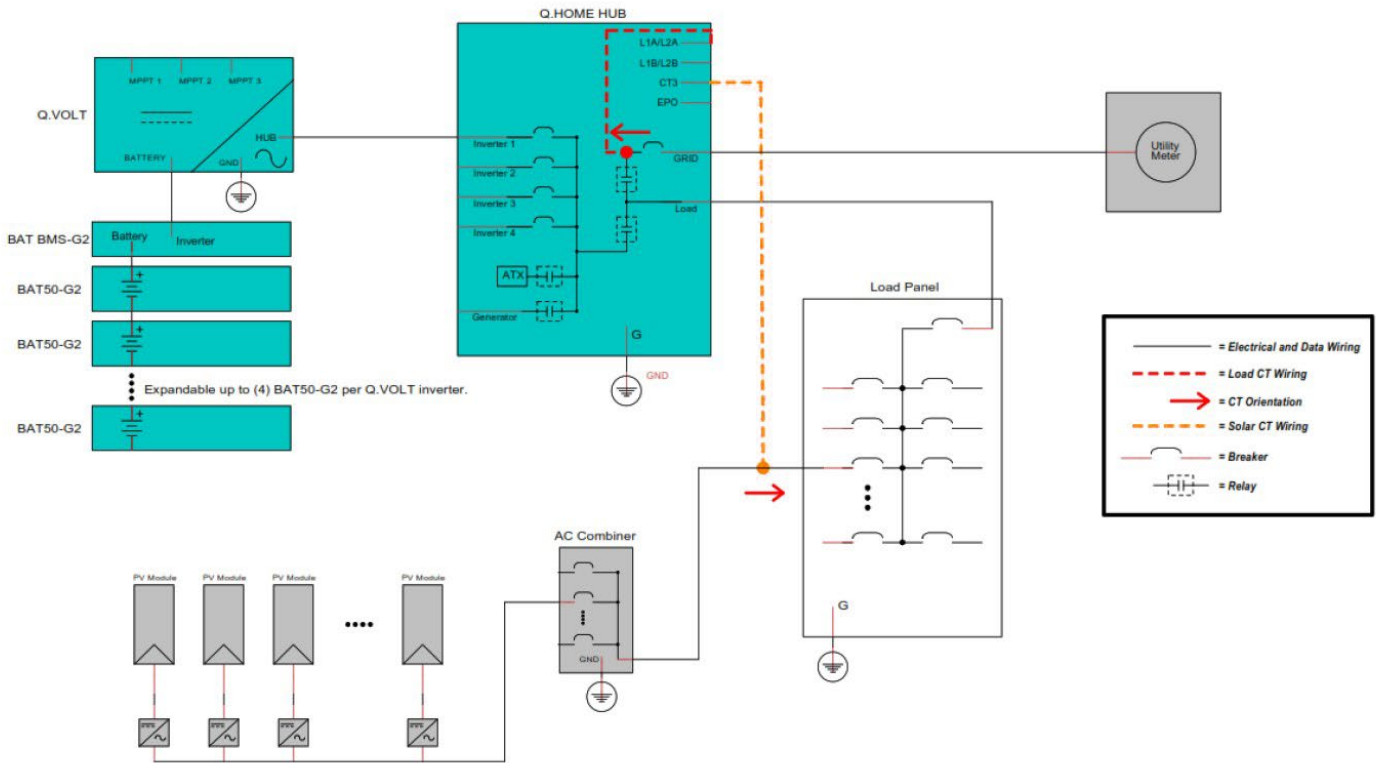
This application can work with a variety of Enphase microinverter product models for PV power generation. The Q.HOME CORE system will keep the Enphase system powered on during grid outage scenarios to supply the loads or charge the battery. A CT sensor will be connected around the output of the Enphase system so that the Q.HOME CORE system knows exactly how much PV generation there is.

For technical support please contact us at: pti-ess@qcells.com.

Single Line Diagram Examples

Whole Home Backup:

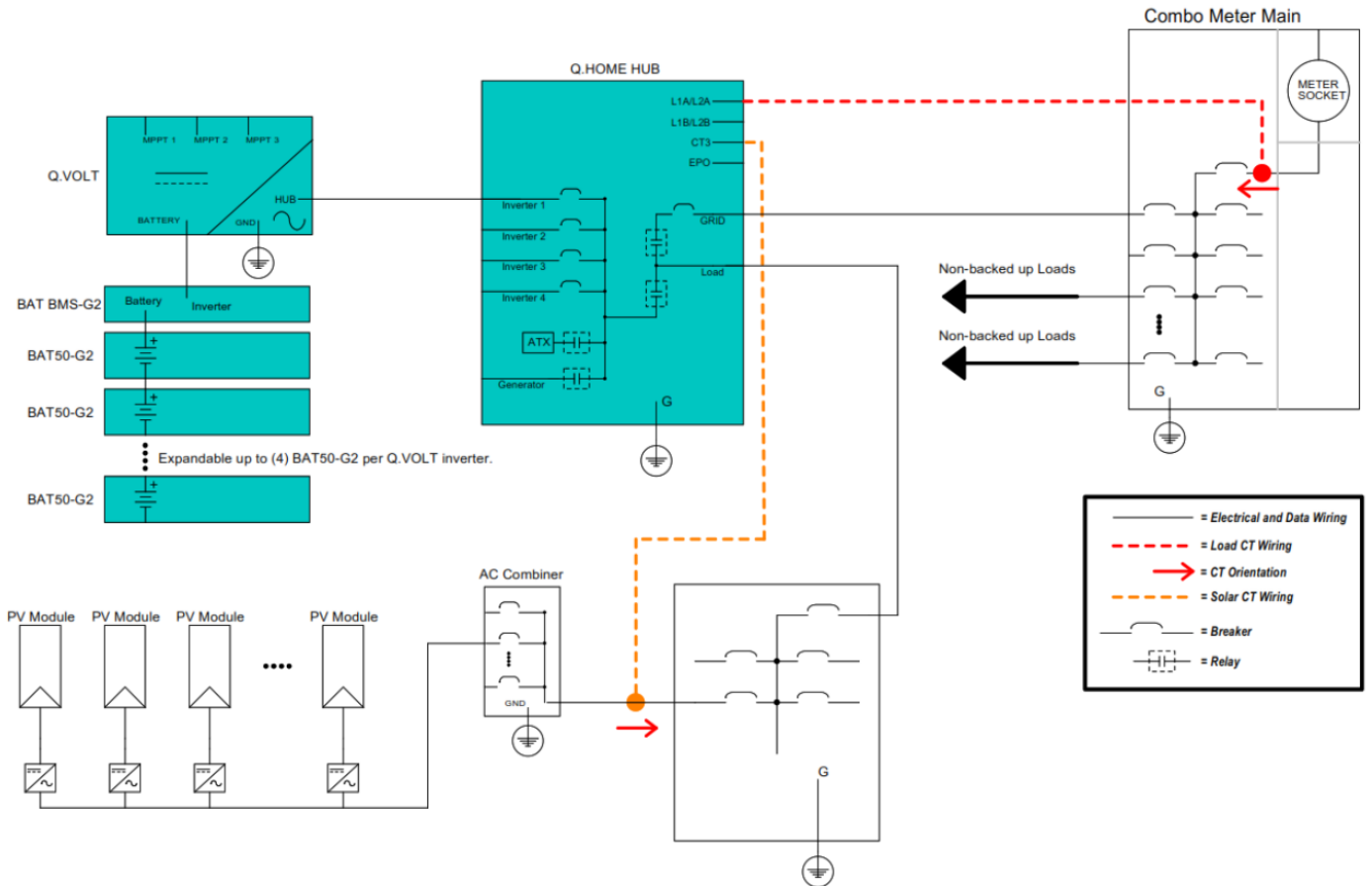
The electrical feed from the utility meter is connected directly to the Q.HOME HUB grid terminal and the main service panel is then connected to the load terminal of the Q.HOME HUB. This way, the home’s entire main service panel can be energized during grid outage events. **The Q.HOME HUB has integrated CT sensors measuring the grid terminal lines, and (1) external CT will be needed to measure the current output of the AC coupled PV system.**



Partial Home Backup CT Sensor Application 1:

The Q.HOME HUB is connected to the main service panel, a separate load panel is installed, and loads to be backed up during grid outages are placed on this new panel. The AC coupled PV system can be connected to the new “backup” load panel or left on the main service panel; however, PV-charging the battery when the grid is down does require the PV system be connected to the new panel. Please refer to the General Design Guide for more details on AC coupling. **The Q.HOME HUB integrated CT sensors must be disconnected, and (2) external CTs will need to be installed at the grid interconnect point. (1) additional CT (not included) will be required to measure the output of the AC Coupled Enphase system.**

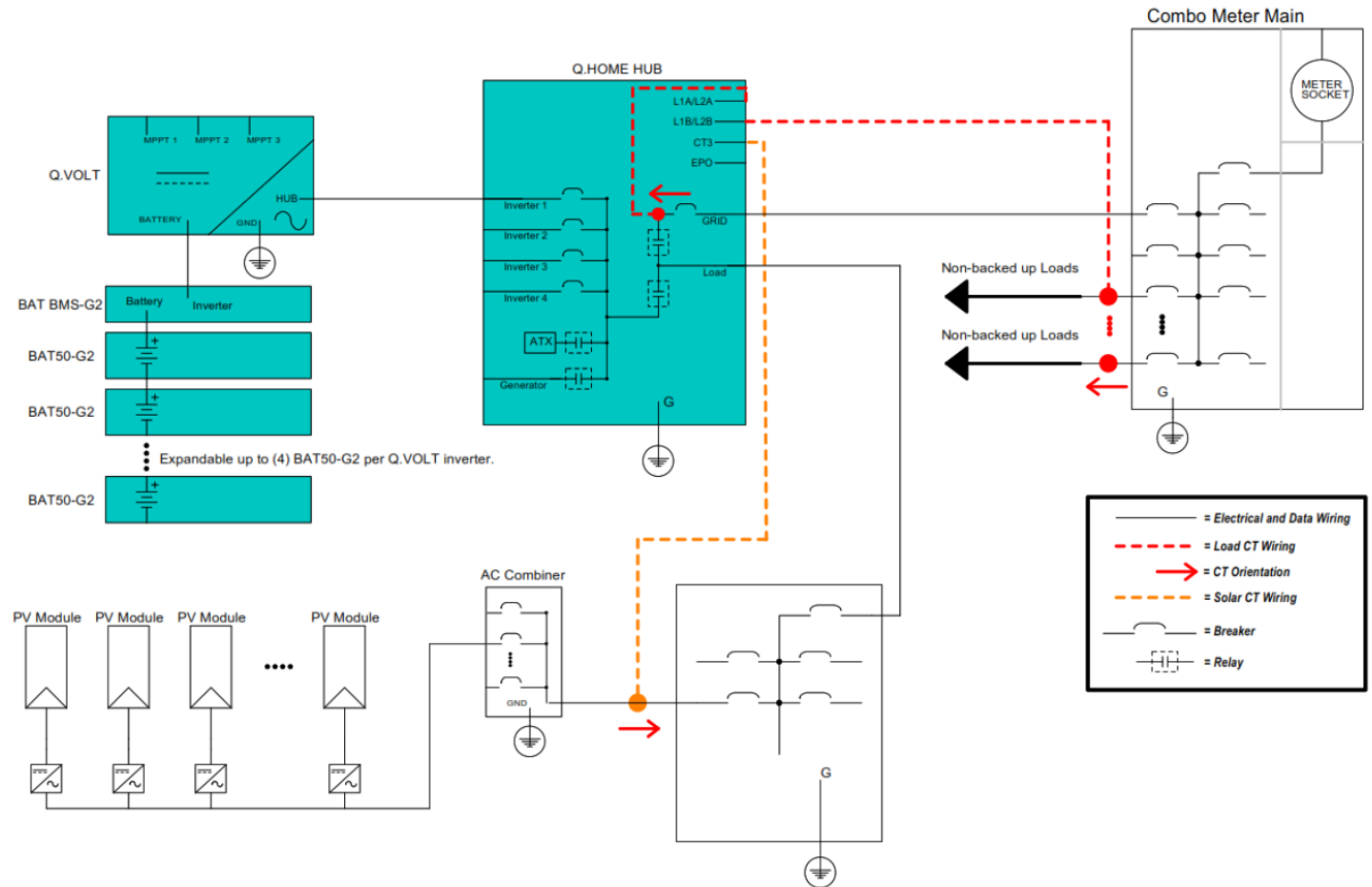
An alternative method is provided next if the provided CTs cannot be used due to space constraints around conductors at the service entry point.



Partial Home Backup CT Sensor Application 2:

This configuration is similar to Application 1, but is used when placing CTs above the loads at the service connection is impossible due to space constraints. The Q.HOME HUB is connected to the main service panel and a separate load panel is installed (AC Coupled PV system location considerations are the same as Application 1). Other home loads need to be captured by installing additional CT sensors. **The Q.HOME HUB has integrated CT sensors measuring the grid terminal lines into the Hub, (1) external CT will be needed to measure the current output of the AC coupled inverter, and additional pairs of external CTs connected in parallel will be needed to measure the non-backed up loads.**

Due to impedance differences between CT products all CTs connected in parallel must be the same make and model.



Balance of System Components

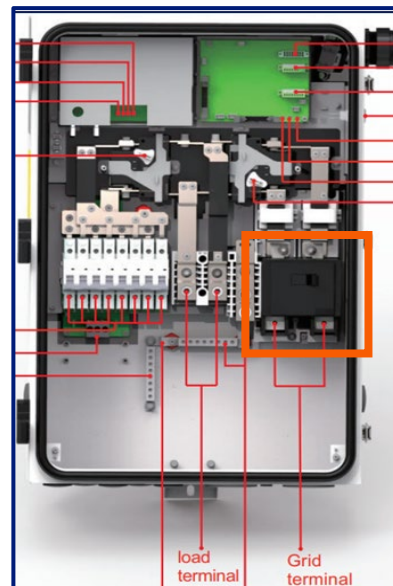
See below for a list of materials that come with the product, a few recommended tools, and **important items sold separately that are needed to install the Q.HOME CORE product in this application.** This list is intended to be high level and does not include details such as conduit, wire length, load distribution breakers, etc.

Note that the categories “Tools”, “Wiring”, and “BOS” do not come with the product.

Category	Quantity	Item	Item Description
Product	1	Q.VOLT H3.8SX or Q.VOLT H7.6SX	Hybrid Inverter carton
	1	BAT50 BMS-G2	Battery management system carton
	2-4	BAT50 SYS-G2	Battery module carton
	1	Battery Mounting Carton	Battery mounting bracket carton
	1	Mounting Accessories Carton	Mounting accessories carton
Tools	1	5 mm Phillips head	Used for installing system
	1	4 mm Phillips head	Used for installing system
	1	8 mm Drill bit	Used for installing system
	1	10 mm bolt head	Used for installing system
Wiring	Site Specific	12 - 8 AWG	Inverter to Hub wiring based on lug/terminal size or breaker size
	Site Specific	6 - 4/0 AWG	Hub to load wiring based on lug/terminal size
	Site Specific	6 - 4/0 AWG	Hub – utility meter wiring based on lug/terminal or breaker size
	Site Specific	8 - 4 AWG	Hub and Load Ground wiring based on lug/terminal size
BOS	1	Q.HOME Hub Breaker, up to 200A	Main breaker for Q.HOME HUB, see approved list
	1	E-stop Switch	Optional RSD activation source
	1-5	CT Sensors	Additional CT sensors may be required for partial home backup or applications
	Site Specific	CT Sensor Extension Cable	CT sensor extension cable may be required depending on the site requirements

When installed as service equipment (in the whole-home backup scenario), a main breaker must be installed in the Hub. The following are a list of compatible EATON breakers:

Index	Part Number	Description
1	CSR2100	100A/240V, 25kAIC, 2-Pole
2	CSR2125N	125A/240V, 25kAIC, 2-Pole
3	CSR2150N	150A/240V, 25kAIC, 2-Pole
4	CSR2175N	175A/240V, 25kAIC, 2-Pole
5	CSR2200N	200A/240V, 25kAIC, 2-Pole
6	BW2100	100A/240V, 10kAIC, 2-Pole
7	BW2125	125A/240V, 10kAIC, 2-Pole
8	BW2150	150A/240V, 10kAIC, 2-Pole
9	BW2175	175A/240V, 10kAIC, 2-Pole
10	BW2200	200A/240V, 10kAIC, 2-Pole
11	BWH2100	100A/240V, 25kAIC, 2-Pole
12	BWH2125	125A/240V, 25kAIC, 2-Pole
13	BWH2150	150A/240V, 25kAIC, 2-Pole
14	BWH2175	175A/240V, 25kAIC, 2-Pole
15	BWH2200	200A/240V, 25kAIC, 2-Pole



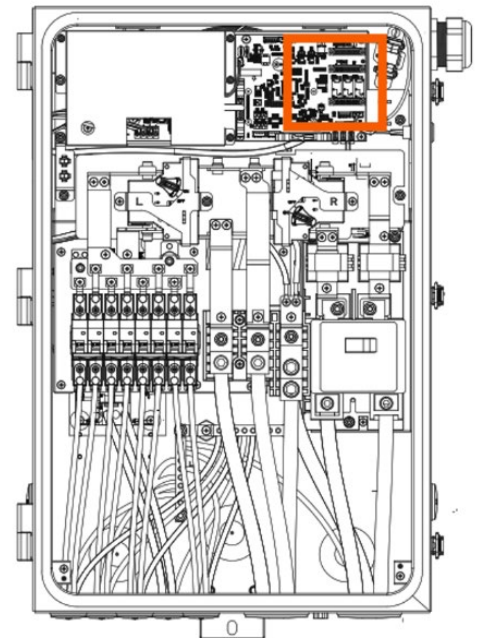
System Installation Considerations

To see the full breakdown of the mechanical and electrical installation process, please refer to the Q.HOME CORE Installation and Operation Manual or the Q.HOME CORE Quick Start – AC Coupled with Enphase document.

Note that if the Enphase IQ8 Microinverters are being used, ensure that the Enphase microgrid forming and Sunlight Backup features are not enabled. Please reach out to Enphase’s technical support to ensure this.

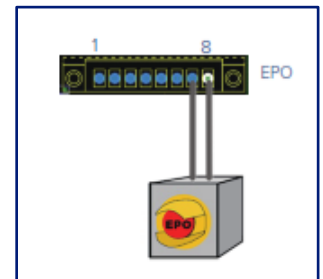
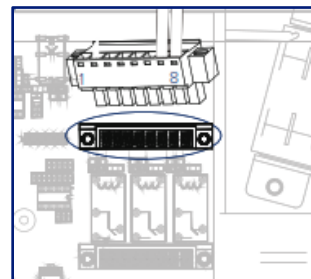
Rapid Shutdown (RSD) Activation: The AC coupled Enphase system has built in RSD functionality that will activate when the Enphase system loses its connection to the grid. However, if installed on the load side of the Q.HOME HUB, the microgrid formed by the Q.HOME CORE system will make the Enphase system operate as though the grid is still on, preventing the RSD from activating.

To shut off the microgrid and activate the RSD of the Enphase system, the Q.HOME CORE system has a normally closed (NC) contact emergency stop connection point that can be used to trigger the rapid shutdown function of the Enphase system. See the instructions below for information on wiring the optional emergency stop switch.



Connection of the RSD Activation Initiation Device

1. Remove the factory installed 8-pin connector with jumper wire from the Q.HOME HUB communication board.
2. Remove the jumper wire and rewire pins 7 and 8, using 18-24 AWG, to a suitable emergency stop switch.
3. Positioning the switch to the OFF (open) position will force the system into IDLE mode, initiating discharge of DC energy from the PV circuit coming from the array.





System Commissioning Considerations

To review the entire commissioning process, please refer to the Q.HOME Installation and Operation Manual. For application-specific guidance refer to the Q.HOME Installation Quick Start Guide – AC Coupled with Enphase.

Installation teams should be capable and prepared to perform the following steps:

Installation team will require either a laptop or cellular device with access to the Qcells monitoring portal. This will be required to:

- Verify battery operation, home consumption, and PV production data appear correctly on the monitoring portal to ensure correct CT location and configuration.

It is recommended, and often required, to perform the RSD activation test during the commissioning and inspection processes to ensure the means of activation are all configured properly. If an AHJ will require validating the voltage reading on the AC PV circuit while being deenergized, the installer should have the appropriate electrical safety equipment and training to perform work on energized equipment.

For technical support please contact us at: pti-ess@qcells.com.

Revision Table

Revision	Date	Description	Author
v1.0	3/8/23	Document created	SR/JP