

## C250 Microinverter System Safety

### Important Safety Information

This document contains important instructions to use during installation of the Enphase Microinverter™ System. To reduce the risk of electrical shock, and to ensure the safe installation and operation of the Enphase Microinverter System, follow these instructions. The following safety symbols and information indicate dangerous conditions and important safety instructions.

### Product Labels

	<b>WARNING:</b> Hot surface.
	<b>DANGER:</b> Refer to safety instructions.
	<b>DANGER:</b> Risk of electric shock.

### Safety and Advisory Symbols

	<b>DANGER!</b> This indicates a hazardous situation, which if not avoided, will result in death or serious injury.
	<b>WARNING!</b> This indicates a situation where failure to follow instructions may be a safety hazard or cause equipment malfunction. Use extreme caution and follow instructions carefully.
	<b>WARNING!</b> This indicates a situation where failure to follow instructions may result in burn injury.
	<b>NOTE:</b> This indicates information particularly important for optimal system operation. Follow instructions carefully.

### Safety Instructions















General Safety	
	<b>DANGER:</b> Before installing or using the Enphase Microinverter, read all instructions and cautionary markings in the technical description, on the Enphase Microinverter System, and on the photovoltaic (PV) equipment.
	<b>DANGER:</b> Risk of electric shock. Do not use Enphase equipment in a manner not specified by the manufacturer. Doing so may cause death or injury to persons, or damage to equipment.
	<b>DANGER:</b> Risk of electric shock. Be aware that installation of this equipment includes risk of electric shock. Do not install the AC junction box without first removing AC power from the Enphase System.
	<b>DANGER:</b> Risk of electric shock. The DC conductors of this photovoltaic system are ungrounded and may be energized.
	<b>DANGER:</b> Risk of electric shock. Always de-energize the AC branch circuit before servicing. Never disconnect the DC connectors under load.
	<b>DANGER:</b> Risk of electric shock. Risk of fire. Only use electrical system components approved for wet locations.
	<b>DANGER:</b> Risk of electric shock. Risk of fire. Only qualified personnel should troubleshoot, install, or replace Enphase Microinverters or the Engage Cable and accessories.
	<b>DANGER:</b> Risk of electric shock. Risk of fire. Ensure that all AC and DC wiring is correct and that none of the AC or DC wires are pinched or damaged. Ensure that all AC junction boxes are properly closed.













	<b>DANGER:</b> Risk of electric shock. Risk of fire. Do not exceed the maximum number of microinverters in an AC branch circuit as listed in this guide. You must protect each microinverter AC branch circuit with a 20A maximum breaker.
	<b>WARNING:</b> Do not connect Enphase Microinverters to the grid or energize the AC circuit(s) until you have completed all of the installation procedures and have received prior approval from the electrical utility company.
	<b>NOTE:</b> To ensure optimal reliability and to meet warranty requirements, install the Enphase Microinverters and Engage Cable according to the instructions in this guide.
	<b>NOTE:</b> Perform all electrical installations in accordance with all applicable local electrical codes and the National Electrical Code (NEC), ANSI/NFPA 70.
	<b>NOTE:</b> The AC and DC connectors on the cabling are rated as a disconnect only when used with an Enphase Microinverter.
	<b>NOTE:</b> Protection against lightning and resulting voltage surge must be in accordance with local standards.
	<b>NOTE:</b> Many PV modules have a central stiffening brace. In these cases, do <b>not</b> position the connector and microinverter at the exact center of the PV module. Instead, position the drop connectors so that the connectors do not conflict with the braces.
	<b>NOTE:</b> Completely install all microinverters and all system AC connections prior to installing the PV modules.



148-88865-01

## Safety Instructions, continued

Microinverter Safety	
	<b>DANGER:</b> Risk of electric shock. Risk of fire. If the AC cable on the microinverter is damaged, do not install the microinverter.
	<b>DANGER:</b> Risk of electric shock. Risk of fire. Do not attempt to repair the Enphase Microinverter; it contains no user-serviceable parts. If it fails, contact Enphase customer service to obtain an RMA (return merchandise authorization) number and start the replacement process. Tampering with or opening the Enphase Microinverter will void the warranty.
	<b>WARNING:</b> Risk of skin burn. The body of the Enphase Microinverter is the heat sink. Under normal operating conditions, the temperature is 15°C above ambient, but under extreme conditions the microinverter can reach a temperature of 80°C. To reduce risk of burns, use caution when working with microinverters.
	<b>WARNING:</b> Risk of fire. When pairing with C250, the PV module DC conductors must be labeled “PV Wire” or “PV Cable”.
	<b>WARNING:</b> Risk of equipment damage. The transformer must adapt the utility voltage (usually 480Y/277VAC) to no more than 248V line-to-neutral for connection to the Envoy-C and C250 microinverters.
	<b>WARNING:</b> You must match the DC operating voltage range of the PV module with the allowable input voltage range of the Enphase Microinverter.
	<b>WARNING:</b> The maximum open circuit voltage of the PV module must not exceed the specified maximum input DC voltage of the Enphase Microinverter.
	<b>WARNING:</b> Risk of equipment damage. The microinverter must be installed under the module, out of rain and sun. Do not mount the microinverter in a position that allows long-term exposure to direct sunlight or in a vertical orientation that allows water to collect in the DC connector recess. Do not install the microinverter black side up or vertically, with the DC connectors facing up.
	<b>WARNING:</b> Be aware that only qualified personnel should connect the Enphase Microinverter to the utility grid.
	<b>NOTE:</b> The Enphase Microinverter has field-adjustable voltage and frequency trip points that may need to be set, depending upon local requirements. Only an authorized installer with the permission and following requirements of the local electrical authorities should make adjustments.
Engage Cable and Accessory Safety	
	<b>DANGER:</b> Risk of electric shock. Do not install the Engage Cable terminator cap while power is connected.
	<b>DANGER:</b> Risk of electric shock. Risk of fire. When stripping the sheath from the Engage Cable, make sure the conductors are not damaged. If the exposed wires are damaged, the system may not function properly.
	<b>DANGER:</b> Risk of electric shock. Treat all connector contacts as though they are live. Pin one in the splice box (drop connector) is live, though not used.
	<b>DANGER:</b> Risk of electric shock. Risk of fire. Do not leave AC connectors on the Engage Cable uncovered for an extended period. If you do not replace the microinverter immediately, you must cover any unused connector with a sealing cap. Do not reuse sealing caps.

	<b>DANGER:</b> Risk of electric shock. Risk of fire. Make sure protective sealing caps have been installed on all unused AC connectors. Unused AC connectors are live when the system is energized. Do not reuse sealing caps.
	<b>WARNING:</b> Use terminator only once. If you open the terminator following installation, the latching mechanism is destroyed. Do not reuse the terminator. If the latching mechanism is defective, do not use the terminator. Do not circumvent or manipulate the latching mechanism.
	<b>WARNING:</b> When installing the Engage Cable, secure any loose cable to minimize tripping hazard.
	<b>NOTE:</b> Check the labeling on the Engage Cable drop connectors to be sure that the cable matches the electrical service at the site. Use only C250 Engage Cable with the C250 Microinverter.
	<b>NOTE:</b> There are two release-holes in the drop connector on the cable. These are not for mounting but are used to disconnect the connector. Keep these release holes clear and accessible.
	<b>NOTE:</b> When looping the Engage Cable, do not form loops smaller than 4.75 inches (12 cm) in diameter.
	<b>NOTE:</b> If you need to remove a sealing cap, you must use the Enphase disconnect tool or a #3 Phillips screwdriver. Do not reuse sealing caps.
	<p><b>NOTE:</b> When installing the Engage Cable and accessories, adhere to the following:</p> <ul style="list-style-type: none"> <li>• Do not expose the terminator cap or cable connections to directed, pressurized liquid (water jets, etc.).</li> <li>• Do not expose the terminator cap or cable connections to continuous immersion.</li> <li>• Do not expose the terminator cap or cable connections to continuous tension (e.g., tension due to pulling or bending the cable near the connection).</li> <li>• Use only the connectors and cables provided.</li> <li>• Do not allow contamination or debris in the connectors.</li> <li>• Use the terminator cap and cable connections only when all parts are present and intact.</li> <li>• Do not install or use in potentially explosive environments.</li> <li>• Do not allow the terminator to come into contact with open flame.</li> <li>• Make sure that all terminator cap seals are seated correctly in the wire organizer.</li> <li>• Fit the terminator cap using only the prescribed tools and in the prescribed manner.</li> <li>• Use the terminator to seal the conductor end of the Engage Cable; no other method is allowed.</li> </ul>
	<b>NOTE:</b> Do not use the shipping cap to cover unused connectors. The shipping cap does not provide an adequate environmental seal. Enphase sealing caps are required to protect against moisture ingress.
Envoy Safety	
	<b>DANGER:</b> Risk of electric shock. Do not attempt to repair the Enphase Envoy; it contains no user-serviceable parts. If it fails, contact Enphase customer service to obtain an RMA (return merchandise authorization) number and start the replacement process. Tampering with or opening the Enphase Envoy will void the warranty.
	<b>WARNING:</b> Risk of equipment damage. Do not remove power from the Envoy if the LCD screen displays: <b>“Upgrading. . . Do Not Unplug.”</b>
	<b>NOTE:</b> Do not plug the Envoy into a power strip, surge protector, or uninterruptible power supply (UPS). These devices impede power line communications.

## Required System Components

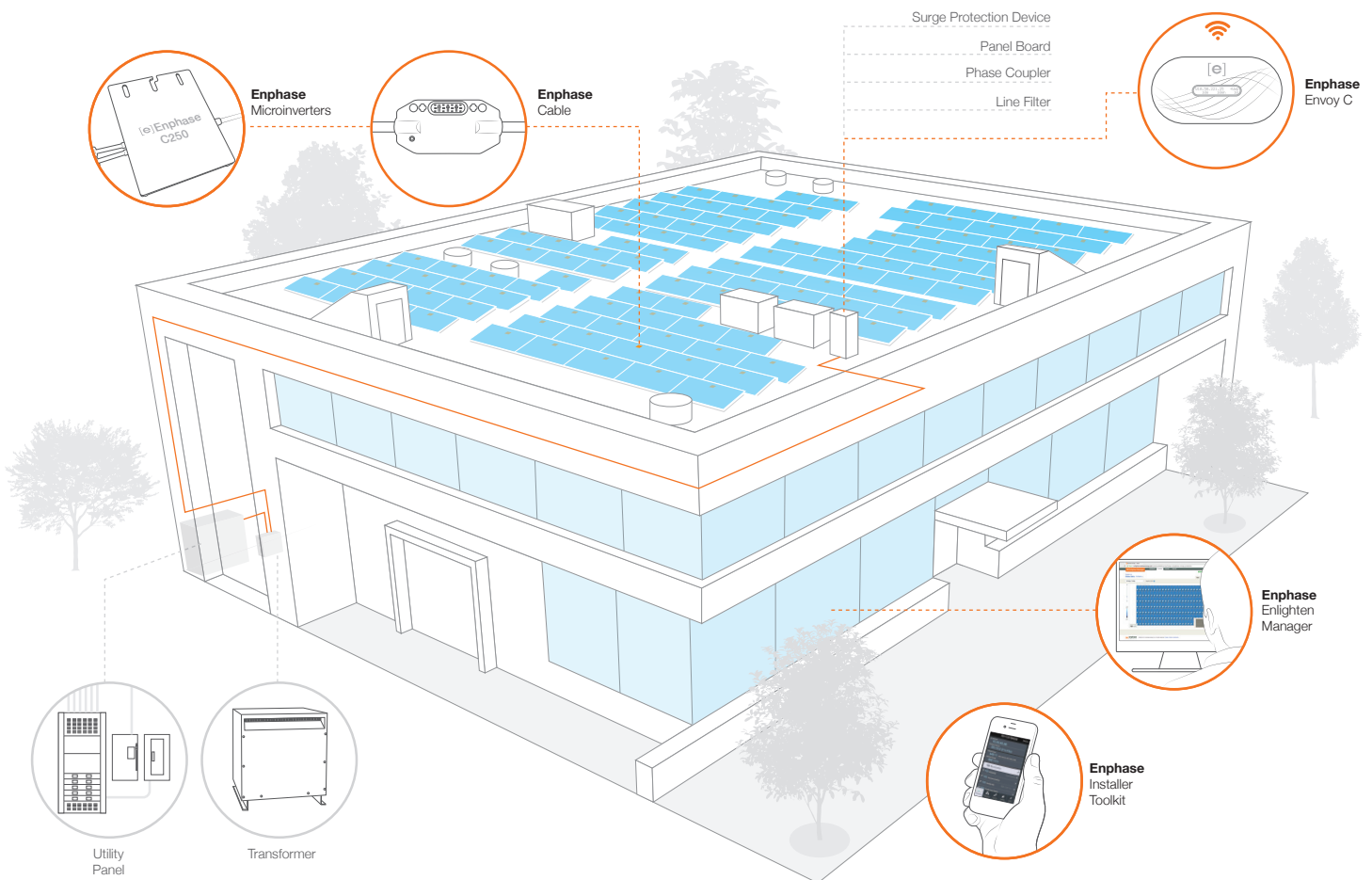
Read and follow all warnings and instructions in this Guide before installing the Enphase® C250 Microinverter System™. This system includes the Enphase C250 Microinverter, Enphase Envoy® Communications Gateway™ and Engage™ Cable. For more detailed information on the C250 System, refer to the *C250 Microinverter System Installation and Operation Manual* at <http://www.enphase.com/support>.

You need the following components to install the C250 system:

- Enphase C250 Microinverter: (model C250-72-2LN-S2)
- Enphase Envoy-C Communications Gateway: (model ENV-C250). This unit has a 250V-rated (NEMA 6-15P) plug; the receptacle must be NEMA 6-15R.
- Enphase Engage Cable:

Model number	PV module orientation
ET10-277-BULK	Portrait, 60- and 72-cell modules
ET17-277-BULK	Landscape, 60-cell modules
ET21-277-192-12AWG	Landscape, 72-cell modules

- Transformer: The transformer must adapt the utility voltage (usually 480Y/277VAC) to no more than 248V line-to-neutral for connection to the Envoy-C and C250 microinverters.
- Phase Coupler
- Filters, for additional Envoys, if needed.



# Pre-Installation Tasks

Install supporting structures, home-run wiring, load centers, revenue grade meter, and any other equipment required for your installation. Install this equipment per manufacturer instructions.

- Verify DC polarity between the PV module and the microinverter by temporarily connecting a PV module to a microinverter with no grid connection. The microinverter LED lights solid green for a few seconds to indicate compatibility. After two minutes the LED will flash red to indicate that no grid is present. This is normal.
- Install an auto-transformer or isolation transformer so that the voltage presented to the microinverter is limited to no more than 248V, line to neutral.
  - **Auto-transformer:** An auto-transformer is more affordable, smaller, lighter and more efficient than an isolation transformer. You can use one to generate the operating voltage for C250 from a 480Y/277V grid. The primary disadvantages of auto-transformers are that they do not provide isolation and do not derive a neutral from a delta configured system. Used in boost mode (as viewed from the PV side), these transformers usually have taps for adjustments to the PV side voltage.
  - **Isolation Transformer:** Isolation transformers with a WYE configured winding on the PV side can derive a neutral conductor when the grid side is delta configured, filter electrical noise and communication signals, and provide isolation of communication domains. These transformers usually have taps for voltage.
- Install a phase coupler to couple the Enphase power line communication signal between the three phases. You need a phase coupler with each Envoy-C in a C250 system to allow communication with the microinverters on all three phases.
- Install filters, if needed. If you have more than one communication domain and multiple Envoy-Cs that are tied to a common service panel or off of a single transformer, you need filters to prevent cross-talk between the communication domains. You can accomplish this with power line filters or with a single isolation transformer feeding a single communication domain, such as when a medium voltage transformer is provided for each sub-array. You must also physically separate the racking, conduits and wires of one communication domain from another communication domain by at least 12 inches.
- Install surge protection. An inline surge protective device provides the greatest level of protection, but is usually more expensive than a surge protective device that sits in parallel to the microinverter panel board. If using an inline surge protective device, locate the Envoy-C and C250s together on the load side of this device.

For equipment recommendations, refer to the *C250 Commercial Design Guide* at <http://www.enphase.com/support>.

## C250 System Installation Tasks

1

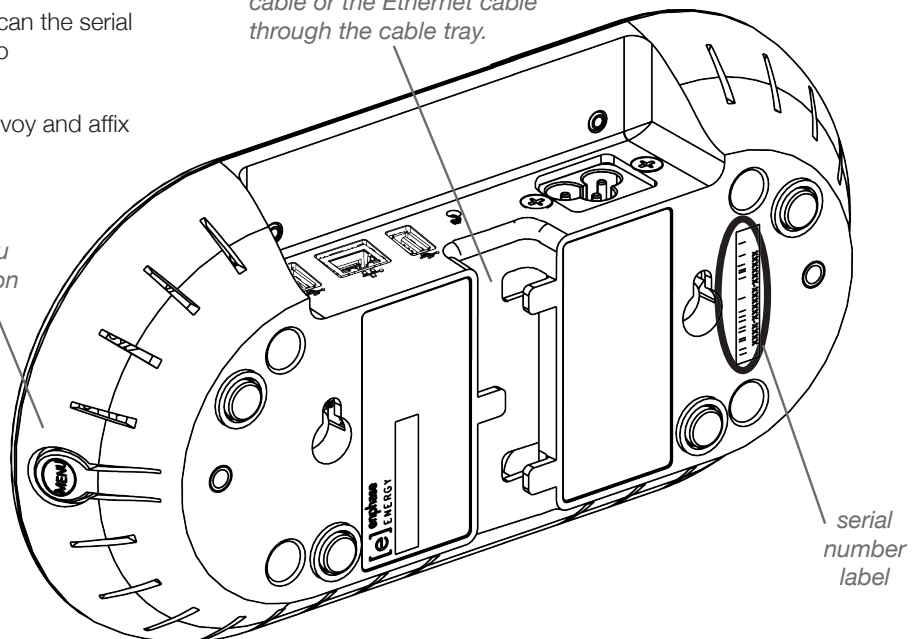
### Find the Envoy Serial Number

The serial number label is on the back of the Envoy, near the left mounting bracket.

- a. Use the Enphase Installer Toolkit to scan the serial number. For more information, refer to <http://enphase.com/installer-toolkit>.
- b. Or you can peel the label from the Envoy and affix it to an installation map.

*DO NOT route the power cable or the Ethernet cable through the cable tray.*

*menu button*



*serial number label*



**Warning.** Envoy warranty void if cover removed. No serviceable parts inside. Refer servicing to qualified personnel.

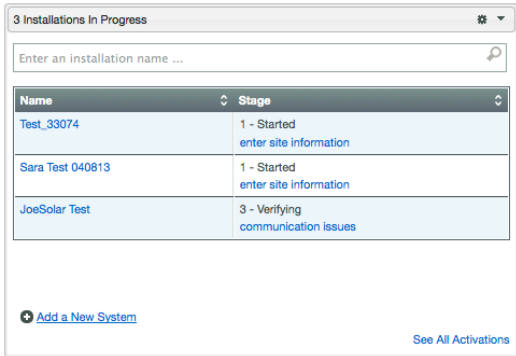
## 2

### Register the Envoy

Register the Envoy at the Enlighten website:  
<https://enlighten.enphaseenergy.com>.

#### a. Log in to Enlighten

- At the installer dashboard, click **Add a New System**.



#### b. Enter System Activation Information

- Under **System**, enter the system Name, Type and Installer Reference (optional).
- Enter **Installer** information.
- Under **Owner**, enter the Name, Email, and Phone.
- Under **Location**, enter the Country and address information.

If you select a country other than the US, or if you select Hawaii as the state under **Location**, the **Grid Profile** menu appears. You do not need to select a grid profile when installing the C250 because it is preset with the appropriate profile.

- Under **Envoy**, select the Internet Connection type and enter the Envoy Serial Number.
- Under **Modules**, enter total number of modules, type, etc.
- Click **Save** to submit the form.

### System Activation form

**System**

\*Name  Installer Reference

\*Type

Third Party Owned (ex: PPA or Leased)

**Installer**

**Owner**

First Name

Last Name

Email

Phone

Owner will receive MyEnlighten for system performance monitoring.

Change Enlighten Version

**Location**

Country

Street Address

Street Address 2

City

State/Province

Zip/Postal Code

**Envoy**

\*Internet Connection

Envoy Serial Number

Envoy Status

[Add Another Envoy](#)

**Modules**

\*Total Number of PV Modules (Panels)

PV Module

Don't see your manufacturer/model? [Let us know](#)

**Installation**

Microinverter Attachment Type

Array Type

Enter array-level details on the system settings page.

**Installation Map**

Scan or photograph the system's installation map and upload the file(s) here.

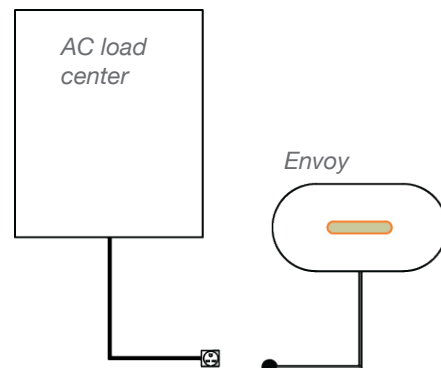
Upload A File:

## 3

### Place the Envoy

The Envoy's power line communication signal must be "coupled" between the three phases to allow the Envoy to communicate with all of the microinverters in the system.

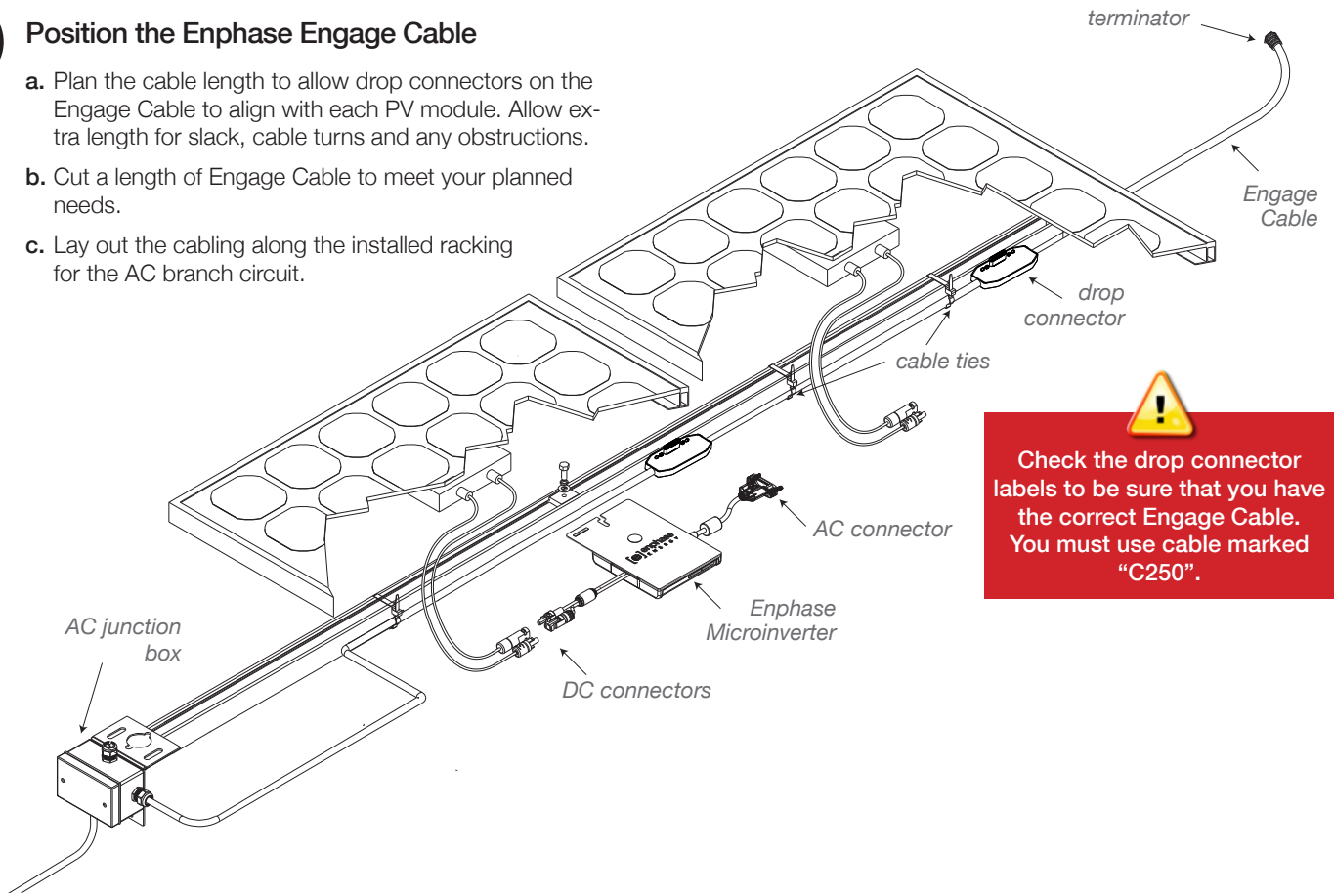
- Install a phase coupler, or wire a capacitor into the system. With either solution, install the device on the load side of the over-current protection device.
- Plug the AC cord into a dedicated NEMA 6-15R receptacle. This receptacle must be indoors or in an environmentally protected location. Locate the Envoy with the phase coupler and line filter, as shown in the *System Diagram*.



# 4

## Position the Enphase Engage Cable

- a. Plan the cable length to allow drop connectors on the Engage Cable to align with each PV module. Allow extra length for slack, cable turns and any obstructions.
- b. Cut a length of Engage Cable to meet your planned needs.
- c. Lay out the cabling along the installed racking for the AC branch circuit.

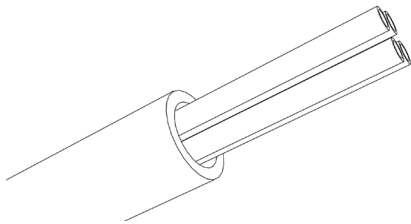


**!**  
Check the drop connector labels to be sure that you have the correct Engage Cable. You must use cable marked "C250".

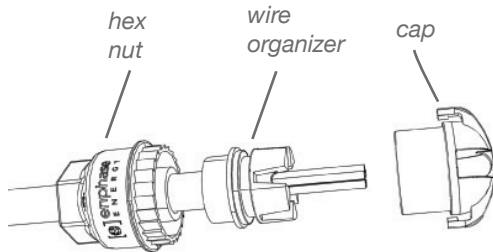
# 5

## Terminate the Unused End of the Cable

- a. Remove 60 mm (2.5") of the cable sheath from the conductors.

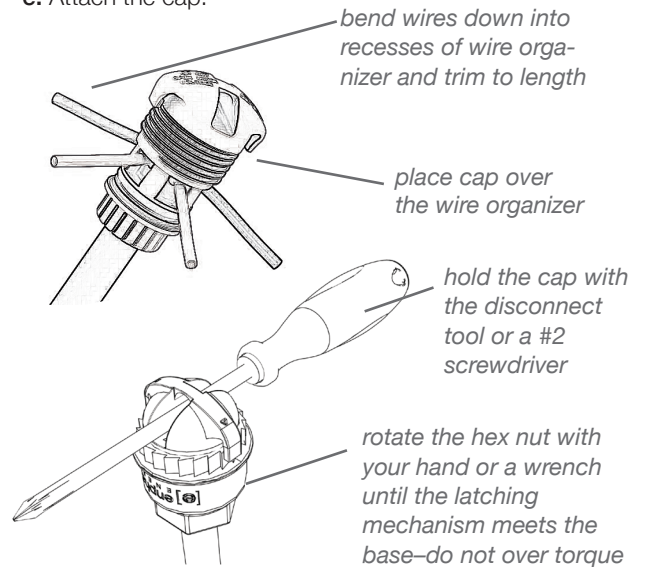


- b. Check that all terminator parts are present.



- c. Slide the hex nut onto the cable.
- d. Insert the cable end all the way into the wire organizer (up to the stop).

- e. Attach the cap.



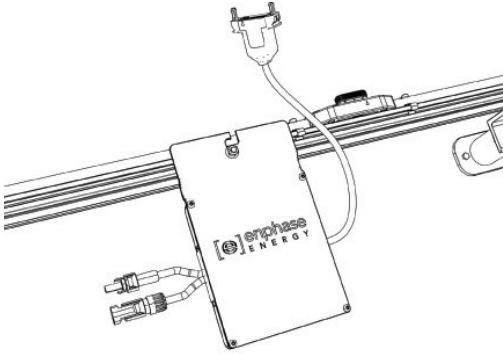
- f. Attach the terminated cable end to the PV racking with a cable clip or tie wrap.

**!**  
Never unscrew the hex nut. This action can twist and damage the cable.

# QUICK INSTALL GUIDE

## 6 Attach the Microinverters to the PV Racking

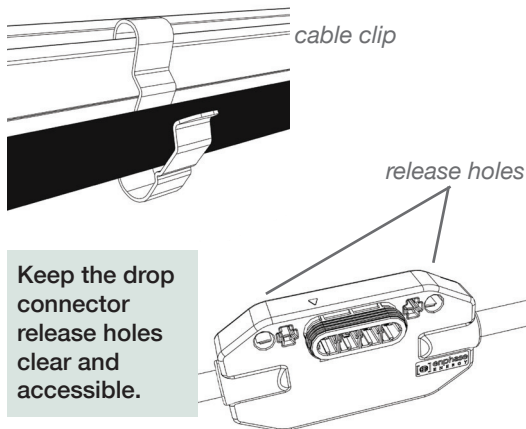
- a. Mark the approximate centers of each PV module on the PV racking. **See notes in Step Details.**



- b. Mount the microinverter under the PV module, away from rain and sun. Do not mount the microinverter in a position that allows long-term exposure to direct sunlight or in a vertical orientation that allows water to collect in the DC connector recess.
- c. Torque the microinverter fasteners as follows. Do not over torque:
- 5 N m (45-50 in-lbs) for 6 mm (1/4") hardware
  - 9 N m (80-85 in-lbs) for 8 mm (5/16") hardware

## 7 Dress the Cable

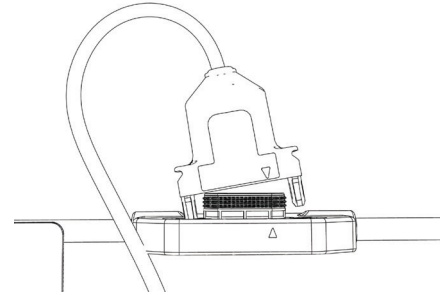
- a. Use cable clips or tie wraps to attach the cabling to the racking.



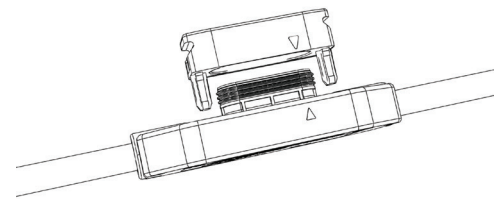
- b. Dress any excess cabling in loops so that it does not contact the roof. Do not form loops smaller than 4.75 inches (12 cm) in diameter.

## 8 Connect the Microinverters

- a. Remove and discard the temporary shipping cap from the cable connector and connect the microinverter. Listen for two clicks as the connectors engage.



- b. Cover any unused connectors with Enphase Sealing Caps. Listen for two clicks as the connectors engage. **See notes in Step Details.**



Do not use shipping caps to cover unused connectors. The shipping cap does not provide an adequate environmental seal.

- c. Avoid skipping Engage Cable connectors by using an Engage Coupler to connect two Engage Cables or to connect Engage Cable to field cable.

When cable connectors are left unused on a three-phase system, it creates a phase imbalance on the branch circuit. If multiple cable connectors are skipped over multiple branch circuits, the imbalance can multiply.

## 9

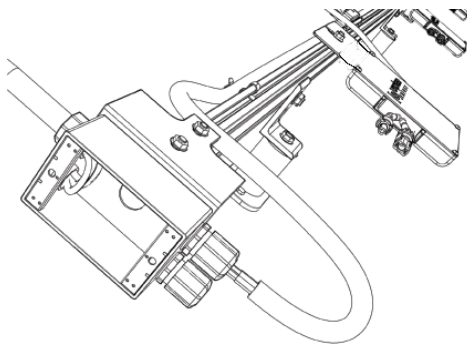
### Connect an AC Junction Box

- Install an appropriately rated, off-the-shelf junction box at a suitable location on the racking.
- Provide an AC connection from the AC junction box back to the electricity network connection using equipment and practices as required by local jurisdictions.
- Connect the Engage Cable into the AC branch circuit junction box.

The Engage Cable wiring scheme is:

Brown – L1  
 Orange – L2  
 Yellow – L3  
 Grey – Neutral  
 Green – Ground

See notes in **Step Details**.



## 10

### Complete the Installation Map

Build the system map manually, or use the Enphase Installer Toolkit to easily build and configure a system. For details, refer to <http://enphase.com/installer-toolkit>.

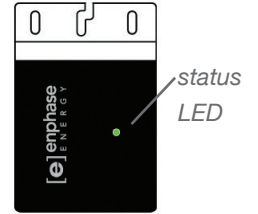
To manually build the Installation Map:

- Peel the removable serial number label from each microinverter and affix it to the respective location on an installation map.
- Log in to Enlighten.
- Scan the installation map and upload it to the System Activation form online.

## 11

### Connect the PV Modules

- Mount the PV modules above the microinverters.
- Connect the DC leads of each PV module to the DC input connectors of the corresponding microinverter.
- Check the LED on the underside of the microinverter for normal start up.



LED color	State	Meaning at Start Up
Green	Solid	Normal start up
	Flashing	Transitioning to post start-up state
Red	Solid	Failed start up
	Flashing	No grid present. Normal post start up. (AC breaker is not turned on yet)

## 12

### Energize the System

- Check that the voltage presented to the microinverters is limited to no more than 248V, line to neutral.
- If applicable, turn ON the AC disconnect or circuit breaker for the branch circuit.
- Turn ON the main utility-grid AC circuit breaker. Your system will start producing power **after a five-minute wait time**.



# 13

## Connect the Envoy to the Internet

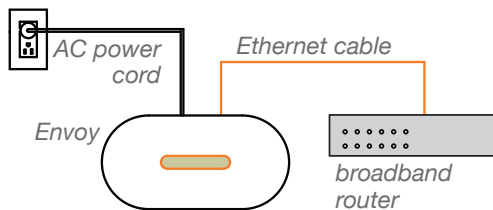
Connect to a broadband router using one of the following two methods:



**Warning:** Do not remove power from the Envoy if the LCD displays: **“Upgrading. . . Do Not Unplug.”**

### Method A: Ethernet Cable

- Plug the included Ethernet cable into the Ethernet port on the Envoy.
- Plug the other end of the cable into a port on the broadband router.

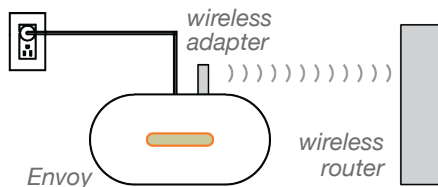


### Method B: Wi-Fi (Enphase Wireless Adapter)

Requires a wireless router.

Only install the Enphase Wireless Adapter in locations where the temperature remains between 0° and 40° C (32° and 104° F).

- On the Envoy, verify that no Ethernet cable is plugged into the Envoy RJ45 port.
- Verify that the startup message on the LCD screen reads “R3.12” or later.
  - If not, upgrade the Envoy by connecting the Envoy Ethernet port to the broadband router with the Ethernet cable that came with the Envoy.
  - After the upgrade completes, remove the Ethernet cable from the Envoy.
- Plug the Enphase wireless adapter into the left USB port (looking at Envoy from the front), and wait 10 seconds.



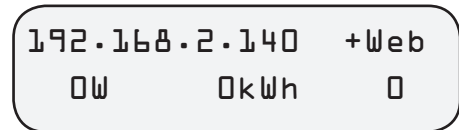
- Press and hold the WPS button on the wireless router for two seconds. On many routers, the WPS button flashes at this point.

- Return to the Envoy. Press and hold the Envoy menu button. Release the Envoy menu button when the LCD displays **Enable Wi-Fi WPS**.
- Within two minutes an updated IP address appears on the Envoy LCD screen. This IP address begins with a “W” to indicate a wireless connection.
- If the connection fails, see *Troubleshooting* **a**.

If the wireless router does not support WPS, refer to the *Envoy-Communications Gateway Installation and Operation Manual* at: <http://www.enphase.com/support> for set up.

### Verification: Check the Internet Connection

Look for the **+ Web** indication. If it does not appear within 5 minutes after connecting to the broadband router, see *Troubleshooting* **b**.



# 14

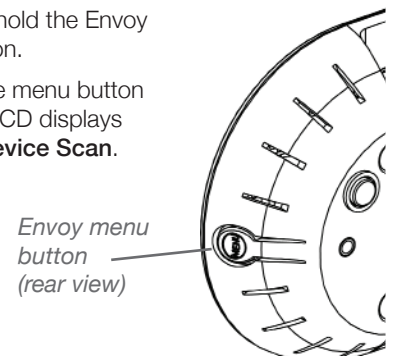
## Use the Envoy to Complete System Setup

An automatic device scan will detect the microinverters when the DC and AC connections are completed and the AC circuit is energized.

- a.** Check the power line communications. Check the number of bars shown on the Envoy LCD (Level/Devices screen). If fewer than three bars are shown, see *Troubleshooting* **c**.



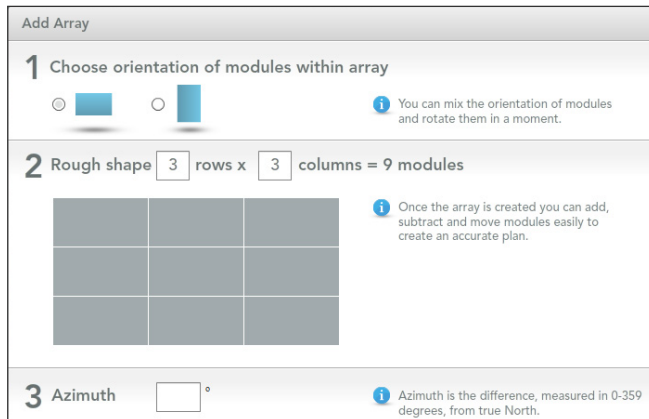
- b.** Check that the Envoy LCD shows a complete device count after about 30 minutes. If it does not, see *Troubleshooting* **d** and **e**.
- c.** Stop the scan when all devices are detected.
  - Press and hold the Envoy menu button.
  - Release the menu button when the LCD displays **Disable Device Scan**.



# 15

## Build the Virtual Array in Enlighten

- Log in to Enlighten.
- Use Array Builder to create the virtual array using the installation map as your reference.
- To see the Array Builder demo, go to <http://enphase.com/support/videos>.



- You can now view System Performance in Enlighten.

## Step Details

6

**DANGER:** ELECTRIC SHOCK HAZARD. THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UN-GROUNDED AND MAY BE ENERGIZED.

**WARNING:** Allow a minimum of 1.9 cm (0.75") between the roof and the microinverter. Also allow 1.3 cm (0.50") between the back of the PV module and the top of the microinverter.

**NOTE:** Torque the microinverter fasteners to the values shown. Do not over torque:

- 1/4" mounting hardware – 5 N m (45-50 in-lbs)
- 5/16" mounting hardware – 9 N m (80-85 in-lbs)

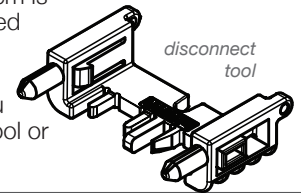
Using a power screwdriver is not recommended due to the risk of thread galling.

**NOTE:** The AC output neutral is not bonded to ground inside the microinverter.

8

**WARNING:** Install sealing caps on all unused AC connectors as these become live when the system is energized by the utility. The IP67-rated sealing caps are required for protection against moisture ingress.

**NOTE:** To remove a sealing cap, you must use the Enphase disconnect tool or a #3 Phillips screwdriver.



9

**WARNING:** Only use electrical system components approved for wet locations.

**WARNING:** Each branch circuit must be protected by a dedicated circuit breaker of 20 A or less. Do not exceed the following maximums:

- Max C250s per 20 A branch circuit: 48
- Max C250s per phase: 16

**WARNING:** Size the AC wire gauge to account for voltage drop for both the branch circuit and all upstream conductors leading back to the PCC. See the Technical Brief on Voltage Drop at <http://www.enphase.com/support>.

**NOTE:** Minimize the number of unused Engage Cable connectors. When cable connectors are left unused on a three-phase system, it creates a phase imbalance on the branch circuit.

**NOTE:** The Engage Cable uses the following wiring scheme.

- Brown – L1
- Orange – L2
- Yellow – L3
- Grey – Neutral
- Green – Ground

**NOTE:** The green wire acts as equipment ground (EGC).



**Warning.** Microinverter warranty void if cover removed. No serviceable parts inside. Refer servicing to qualified personnel.

# Microinverter Troubleshooting

LED color	State	Meaning During Normal Operation
Green	Flashing	Normal operation
Orange	Flashing	Not receiving messages from the Envoy
Red	Solid	Fault. Not producing.
	Flashing	Grid not present. Not producing.

The Status LED of each microinverter will light solid green a few seconds after connection to DC power and then blink green six times to indicate normal start-up operation about two minutes after connecting to DC power. The LED subsequently resumes normal operation if the grid is present.

- Make sure AC breakers and disconnects are closed.
- Check the connection to the utility grid and verify that the utility voltage is within allowable range.
- Verify that AC line voltages at all solar power circuit breakers at the load center and subpanels are within allowable range.
- Verify that AC line voltage at the junction box for each AC branch circuit is within allowable range.
- Using an Enphase disconnect tool, disconnect the AC cable for the microinverter in question from the Engage Cable. Verify that utility power is present at the microinverter by measuring line to line and line to neutral at the Engage Cable connector.
- Check that the AC branch circuit connections (Engage Cable and AC connections) are properly seated. Reseat if necessary. Check the AC and DC cables for damage.
- Make sure that any upstream AC disconnects, as well as the dedicated circuit breakers for each AC branch circuit, are functioning properly and are closed.
- Check the DC connections between the microinverter and the PV module. The connection may need to be tightened or reseated. If the connection is worn or damaged, it may need replacement.
- Attach an ammeter clamp to one conductor of the DC cables from the PV module to measure microinverter current. This will be under one Amp if AC is disconnected.
- Verify the PV module DC voltage is within the allowable range.
- Swap DC leads with a known good, adjacent PV module. If after checking Enlighten periodically (this may take up to 30 minutes), the problem moves to the adjacent module, this indicates that the PV module isn't functioning correctly. If it stays in place, the problem is with the microinverter.
- Verify with your utility that line frequency is within range.

Enphase integrated ground microinverters meet the requirements of NEC 690.35. Because the DC circuit is isolated and insulated from ground, the Enphase Microinverter does not require a GEC. Ground fault protection (GFP) is integrated into the microinverter. For details, refer to "[Microinverters with Integrated Ground](http://www.enphase.com/support)" at <http://www.enphase.com/support>.

# Envoy Troubleshooting

## a Wi-Fi Connection Issue

If WPS connection fails, retry the connection steps as the connection window may have timed out.

Remember that metal enclosures or obstructions impede wireless communication.

If you remove the wireless adapter, wait 15 seconds before reinserting it.

If the wireless router does not support WPS, refer to the *Envoy-Communications Gateway Installation and Operation Manual* for set up at: <http://www.enphase.com/support> for set up.

## b Internet Connection Issue

If, after 15 minutes, you see **-Web** instead of **+Web**, make sure that the broadband router is operational. Check that other devices at the site can access the Internet.

If the broadband router is operational, press and hold the Envoy menu button. Release the button when the LCD displays **Get New IP Address**. Wait for 5 minutes.

If this fails, unplug the Envoy, wait for 20 seconds, and plug it back in. Wait 5 minutes for connection.

## c Power Line Communication Level is Low

If the number of bars is fewer than three as a result of a communication check, make sure that the Envoy is located with the phase coupler and line filter as shown in the *System Diagram*.

## d Device Detection Slow

If, after 30 minutes (longer for large installations), the device count shown is lower than the number of microinverters installed, or if the number of bars is between zero and two, make sure that the Envoy is located with the phase coupler and line filter as shown in the *System Diagram*.

## e Device Detection Stalled

If the number of bars is three or more, but the Envoy has not detected all of the installed microinverters within 30 minutes (longer for large installations), contact Enphase Customer Support.

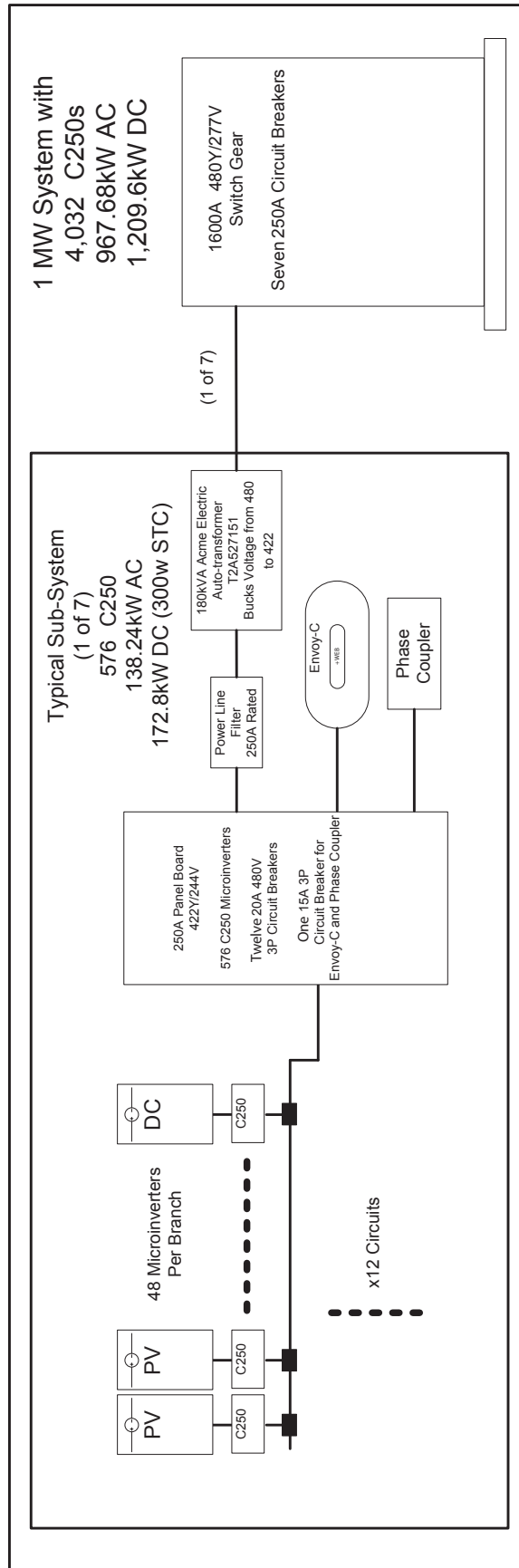
## FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## Industry Canada

This Class A digital apparatus complies with Industry Canada ICES-003.

# C250 System Diagram



Enphase Energy, Inc.  
 1420 N. McDowell Blvd.  
 Petaluma, CA 94954  
 USA  
[support@enphaseenergy.com](mailto:support@enphaseenergy.com)  
<http://www.enphase.com>