

System Expansion Using Enphase IQ 7-Based M215 and M250 Microinverters

Read and follow all warnings and instructions in this guide. Safety warnings are listed on the back of this guide. Follow this procedure to install an IQ 7™-based M215 Microinverter™ or M250 Microinverter™ using the parts provided in the expansion kit. Read and understand the safety information at the back of this guide before installing the microinverters.

The Enphase Microinverter models listed in this guide do not require grounding electrode conductors (GEC), equipment grounding conductors (EGC), or grounded conductor (neutral). The microinverter has a Class II double-insulated rating, which includes ground fault protection (GFP).

PREPARATION

- A) Download the Enphase Installer Toolkit mobile app and open it to log in to your Enlighten account. With this app, you can scan microinverter serial numbers and connect to the Enphase Envoy to track system installation progress. To download, go to enphase.com/toolkit or scan the QR code at right.



- B) Refer to the following table to check module pairing for your kit.

Kit Model	DC adapter (dongle)	Microinverter
M215208-IQ7-S22-US	Q-DCC-2 (MC-4)	M215IQ7-208
M215208-IQ7-S25-US	Q-DCC-5 (UTX)	
M215240-IQ7-S22-US	Q-DCC-2 (MC-4)	M215IQ7-240
M215240-IQ7-S25-US	Q-DCC-5 (UTX)	
M250208-IQ7-S22-US	Q-DCC-2 (MC-4)	M250IQ7-208
M250208-IQ7-S25-US	Q-DCC-5 (UTX)	
M250240-IQ7-S22-US	Q-DCC-2 (MC-4)	M250IQ7-240
M250240-IQ7-S25-US	Q-DCC-5 (UTX)	

- M215 Microinverters are compatible only with 60-cell PV modules.
- M250 Microinverters are compatible with 60-cell or 72-cell PV modules.

- C) In addition to the Enphase Microinverters, PV modules and racking, check that you have the following items:
- Enphase Engage Coupler (ET-SPLK-05)
 - Enphase Engage Cable - single-phase 240 VAC or three-phase 208 VAC:

Cable model #	Voltage/ # conductors	Connector spacing	PV Module orientation	# con- nectors	Weight
ET10-240-BULK	240 VAC, 4	1.025 m (40")	Portrait	240	221 lbs
ET17-240-BULK	240 VAC, 4	1.7 m (67")	Landscape	240	333 lbs
ET21-240-192-12AWG	240 VAC, 4	2.11 m (84")	Landscape	192	300 lbs
ET17-208-BULK	208 VAC, 5	1.7 m (67")	Landscape	240	333 lbs
ET10-208-BULK	208 VAC, 5	1.025 m (40")	Portrait	240	221 lbs
ET21-208-192-12AWG	208 VAC, 5	2.11 m (84")	Landscape	192	300 lbs

- Enphase Engage Terminator (ET-TERM-10)
- Enphase Q Connectors: either Q-DCC-2 (MC-4 dongle) or Q-DCC-5 (UTX dongle)
- Enphase AC adapter (Q-ET-2LL)
- Cable ties or Engage clips (ET-CLIP-100)
- Enphase Sealing caps for unused Engage connectors, if needed (ET-SEAL)
- Enphase Disconnect Tools (ET-DISC-05 and Q-DISC-10). Number 2 and 3 Phillips screwdrivers can be substituted.
- Tools: screwdrivers, voltmeter, torque wrench, sockets, and wrenches for mounting hardware

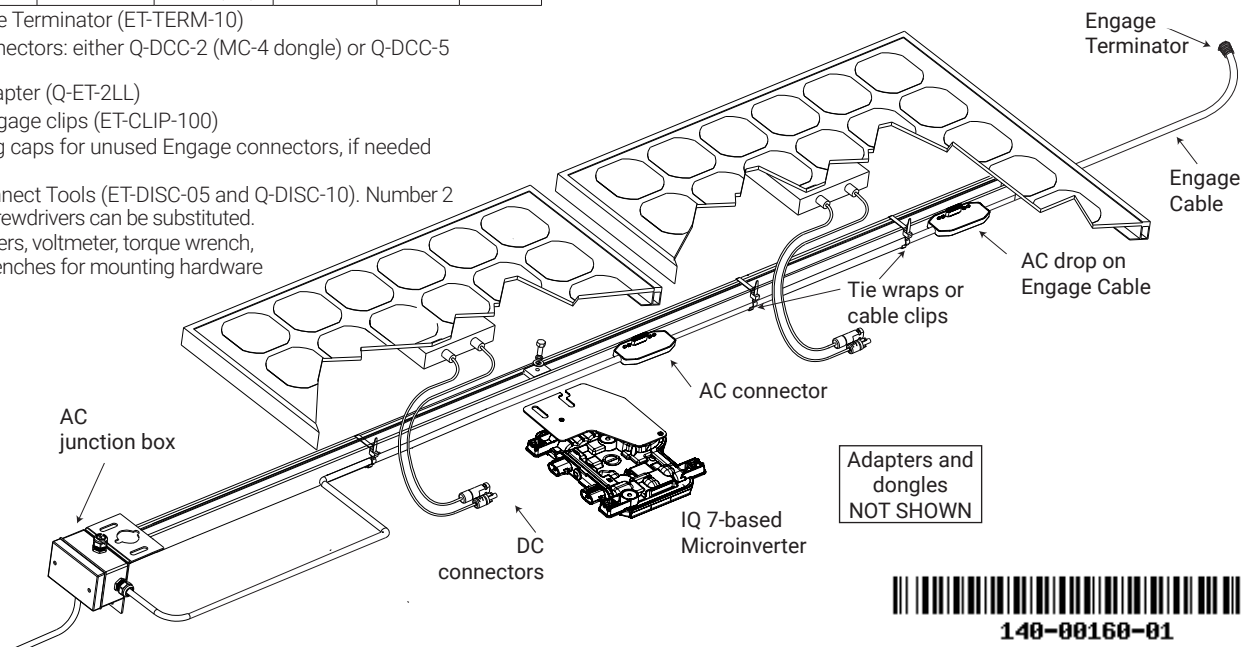
- D) Protect your system with lightning and/or surge suppression devices. It is also important to have insurance that protects against lightning and electrical surges.
- E) Check that your AC branch circuits to meet the following limits for maximum number of microinverters per branch when protected with a 20-amp over-current protection device (OCPD).

Maximum* Enphase Microin- verters per AC branch circuit	M215 (240V single phase)	M250 (240V single phase)
	17	16
	M215 (208V three phase)	M250 (208V three phase)
	25	24

* Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

- F) Use your paper installation map to record device serial numbers and positions in the array. You will scan this map later using Installer Toolkit and your mobile device. The map is essential for system troubleshooting later, if needed.
- Peel the removable label from each new microinverter and affix it to the paper installation map.
 - Always keep a copy of the installation map for your records.
- G) Size the homerun AC wire gauge to account for voltage rise. Select the correct wire size based on the distance from the beginning of the Engage Cable to the breaker in the load center. Design for a voltage rise total of less than 2% for these sections.

Best practice: Center-feed the branch circuit to minimize voltage rise in a fully-populated branch.



INSTALLATION

1 Connect Engage Coupler to Expand Engage Cable

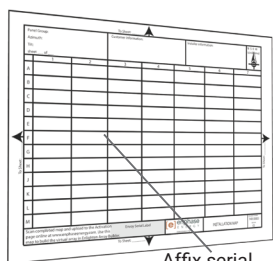
- A) De-energize AC by opening the branch circuit breaker.
- B) Cover PV modules with opaque covers if necessary.
- C) Using a current probe, verify that no current is flowing in conductors.
- D) Remove the terminator and expand the Engage Cable using the Engage Coupler, per instructions included with the Engage Coupler. Plan each cable segment to allow drop connectors on the Engage Cable to align with each PV module.

2 Mount the Microinverter(s)

- A) Connect the Enphase DC adapter to the new microinverter. Make sure it is fully seated.
- B) Attach the IQ 7-based M215 or M250 Microinverter to the racking, bracket side up (as shown) and under the PV module, away from rain and sun. Allow a minimum of 1.9 cm (0.75 inches) between the roof and the microinverter. Also allow 1.3 cm (0.50 inches) between the back of the PV module and the top of the microinverter.

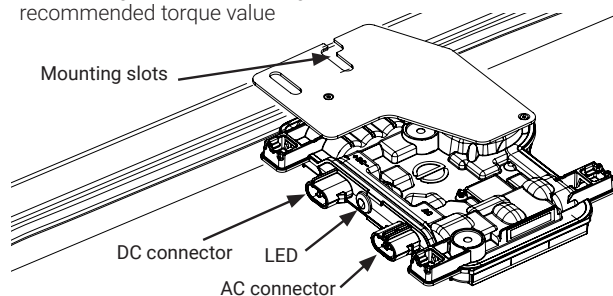
WARNING: Install the microinverter under the PV module to avoid direct exposure to rain, UV, and other harmful weather events. Do not mount the microinverter upside down.

- C) Take the removable serial number label from the IQ 7-based M215 or M250 Microinverter and attach it to your copy of the installation map in its location or note the location for entry into the virtual array map in Enlighten. You will need to scan the label later and use the Enphase Array Builder to assign their positions in the array.



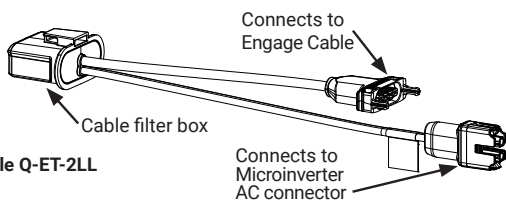
NOTE: There is no need to use a GEC with the IQ 7-based M215 or M250 Microinverter.

- D) Tighten the mounting fasteners (1/4-inch or 5/16-inch) as follows. Do not over-tighten.
 - 6 mm (1/4 inches) mounting hardware: 5 N m (45 to 50 in-lbs) minimum.
 - 8 mm (5/16 inches) mounting hardware: 9 N m (80 to 85 in-lbs) minimum.
 - When using UL 2703 mounting hardware, use the manufacturer's recommended torque value



3 Connect Microinverters to Cabling

- A) Connect the AC adapter cable to the AC connector of the IQ 7-based M215 or M250 Microinverter.
- B) Attach the AC cable adapter to the Engage Cable.
- C) Listen for clicks as the connectors engage.

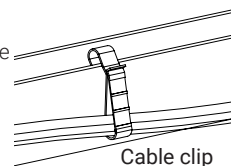


AC adapter cable Q-ET-2LL (840-00438)

4 Manage the Cabling

- A) Check that any unused connectors on the AC cable are equipped with Enphase Sealing Caps (ET-SEAL). Listen for a click as the sealing caps engage.

WARNING: Install sealing caps on all unused AC connectors as these connectors become live when the system is energized. Sealing caps are required for protection against moisture ingress.



- B) Use cable clips or tie wraps to attach the cable to the racking. Add one at least every 1.8 m (6 feet).
- C) Dress any excess cabling in loops so that it **does not contact the roof**. Do not form loops smaller than 12 cm (4.75 inches) in diameter.
- D) Mount the AC adapter cable filter box onto the rail using a cable clip inserted into the mounting feature on the filter housing.

5 Connect the PV Modules

DANGER! Electric shock hazard. The DC conductors of this PV system are ungrounded and may be energized.

- A) Connect the DC leads of each PV module to the DC connector of the microinverter.
- B) Check the LED on the connector side of the microinverter. The LED flashes six times when DC power is applied.

6 Energize the System

- A) Turn ON the AC disconnect or circuit breaker for the branch circuit.
- B) Turn ON the main utility-grid AC circuit breaker. Your system will start producing power **after a five-minute wait time**.
- C) Check the LED on the connector side of the microinverter:

LED	Indicates
Flashing green	Normal operation. AC grid function is normal and there is communication with the Envoy.
Flashing orange	The AC grid is normal but there is no communication with the IQ Envoy. This is normal until you complete Step 7.
Flashing red	The AC grid is either not present or not within specification.
Solid red	There is an active "DC Resistance Low, Power Off" (GFI Tripped) condition. Use Enlighten Manager to reset it or refer to the <i>Enphase Envoy Installation and Operation Manual</i> at: http://www.enphase.com/support for more information.

7 Update the Virtual Array

- A) While still at the site, start a device scan at the Envoy to detect the new unit:
 - For older Envoys, press and hold the Envoy Menu button on the right edge of the Envoy. After two seconds the Envoy menu appears. Continue holding the Menu button. When the LCD screen displays **Enable Device Scan**, release the Menu button.
 - For Envoy-S or IQ Envoy, press the Device Scan button (lower button). The Device Communications LED flashes green during the scan. (Alternatively, you can initiate a scan using Installer Toolkit.)

NOTE: Complete the following steps when you are back in the office.

- B) Place the new microinverter in the virtual array by logging into Enlighten Manager and locating the array in your **Installer Dashboard**, and clicking on the **Gear icon** in the upper right. Scroll down to the **Array Details** pane, and open **Array Builder**. Drag the newly installed unit in the empty module position in the array, and click **Save**.

PV Rapid Shutdown Equipment (PVRSE)

This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to the following requirements:

- Microinverters and all DC connections must be installed inside the array boundary. **Enphase further requires that the microinverters and DC connections be installed under the PV module to avoid direct exposure to rain, UV, and other harmful weather events.**
- The array boundary is defined as 305 mm (1 ft.) from the array in all directions, or 1 m (3 ft.) from the point of entry inside a building.

This rapid shutdown system must be provided with an initiating device and (or with) status indicator which must be installed in a location accessible to first responders, or be connected to an automatic system which initiates rapid shutdown upon the activation of a system disconnect or activation of another type of emergency system.

The initiator shall be listed and identified as a disconnecting means that plainly indicates whether it is in the "off" or "on" position. Examples are:

- Service disconnecting means
- PV system disconnecting means
- Readily accessible switch or circuit breaker

The handle position of a switch or circuit breaker is suitable for use as an indicator. Refer to NEC or CSA C22.1-2015 for more information.

Additionally, in a prominent location near the initiator device, a placard or label must be provided with a permanent marking including the following wording: **'PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN'** The term 'PHOTOVOLTAIC' may be replaced with 'PV'.

The placard, label, or directory shall be reflective, with all letters capitalized and having a minimum height of 9.5 mm (3/8 in.) in white on red background.

SAFETY

IMPORTANT SAFETY INSTRUCTIONS SAVE THIS INFORMATION. This guide contains important instructions to follow during installation of the Enphase IQ 7-based M215 or M250 Microinverter.

	WARNING: Hot surface.
	WARNING: Refer to safety instructions.
	DANGER: Risk of electric shock.
	Refer to manual
	Double-Insulated

Safety Symbols

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

General Safety

	DANGER: 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.
	DANGER: Risk of electric shock. Be aware that installation of this equipment includes risk of electric shock.
	DANGER: Risk of electric shock. The DC conductors of this photovoltaic system are ungrounded and may be energized.
	DANGER: Risk of electric shock. Always de-energize the AC branch circuit before servicing. Never disconnect the DC connectors under load.

General Safety, continued

	DANGER: Risk of electric shock. Risk of fire. Only use electrical system components approved for wet locations.
	DANGER: Risk of electric shock. Risk of fire. Only qualified personnel should troubleshoot, install, or replace Enphase Microinverters or the Enphase Q Cable and Accessories.
	DANGER: 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.
	DANGER: 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 or fuse, as appropriate.
	DANGER: Risk of electric shock. Risk of fire. Only qualified personnel may connect the Enphase Microinverter to the utility grid.
	WARNING: Risk of equipment damage. Enphase male and female connectors must only be mated with the matching male/female connector.
	WARNING: 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.
	WARNING: 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.
	WARNING: When the PV array is exposed to light, DC voltage is supplied to the PCE.
	NOTE: To ensure optimal reliability and to meet warranty requirements, install the Enphase Microinverters and Enphase Q Cable according to the instructions in this guide.
	NOTE: Provide support for the Enphase Q Cable at least every 1.8 m (6 feet).
	NOTE: Perform all electrical installations in accordance with all applicable local electrical codes, such as the Canadian Electrical Code, Part 1 and NFPA 70 (NEC).
	NOTE: The AC and DC connectors on the cabling are rated as a disconnect only when used with an Enphase Microinverter.
	NOTE: Protection against lightning and resulting voltage surge must be in accordance with local standards.

Microinverter Safety

	DANGER: 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.
	DANGER: Risk of fire. The DC conductors of the PV module must be labeled "PV Wire" or "PV Cable" when paired with the Enphase Microinverter.
	WARNING: You must match the DC operating voltage range of the PV module with the allowable input voltage range of the Enphase Microinverter.
	WARNING: The maximum open circuit voltage of the PV module must not exceed the specified maximum input DC voltage of the Enphase Microinverter.
	WARNING: Risk of equipment damage. Install the microinverter under the PV module to avoid direct exposure to rain, UV, and other harmful weather events. Always install the microinverter bracket side up. Do not mount the microinverter upside down. Do not expose the AC or DC connectors (on the Enphase Q Cable connection, PV module, or the microinverter) to rain or condensation before mating the connectors.

Microinverter Safety, continued

	WARNING: Risk of equipment damage. The Enphase Microinverter is not protected from damage due to moisture trapped in cabling systems. Never mate microinverters to cables that have been left disconnected and exposed to wet conditions. This voids the Enphase warranty.
	WARNING: Risk of equipment damage. The Enphase Microinverter functions only with a standard, compatible PV module with appropriate fill-factor, voltage, and current ratings. Unsupported devices include smart PV modules, fuel cells, wind or water turbines, DC generators, and non-Enphase batteries, etc. These devices do not behave like standard PV modules, so operation and compliance is not guaranteed. These devices may also damage the Enphase Microinverter by exceeding its electrical rating, making the system potentially unsafe.
	WARNING: Risk of skin burn. The chassis of the Enphase Microinverter is the heat sink. Under normal operating conditions, the temperature could be 20°C above ambient, but under extreme conditions the microinverter can reach a temperature of 90°C. To reduce risk of burns, use caution when working with microinverters.
	NOTE: Many Enphase Microinverter models have 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.

Enphase Q Cable Safety

	DANGER: Risk of electric shock. Do not install the Enphase Q Cable terminator while power is connected.
	DANGER: Risk of electric shock. Risk of fire. When stripping the sheath from the Enphase Q Cable, make sure the conductors are not damaged. If the exposed wires are damaged, the system may not function properly.
	DANGER: Risk of electric shock. Risk of fire. Do not leave AC connectors on the Enphase Q Cable uncovered for an extended period. You must cover any unused connector with a sealing cap.
	DANGER: 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.
	WARNING: Use the 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.
	WARNING: When installing the Enphase Q Cable, secure any loose cable to minimize tripping hazard
	NOTE: When looping the Enphase Q Cable, do not form loops smaller than 12 cm (4.75 inches) in diameter.
	NOTE: If you need to remove a sealing cap, you must use the Enphase disconnect tool.
	NOTE: When installing the Enphase Q Cable and accessories, adhere to the following: <ul style="list-style-type: none"> • Do not expose the terminator or cable connections to directed, pressurized liquid (water jets, etc.). • Do not expose the terminator or cable connections to continuous immersion. • Do not expose the terminator or cable connections to continuous tension (e.g., tension due to pulling or bending the cable near the connection). • Use only the connectors and cables provided. • Do not allow contamination or debris in the connectors. • Use the terminator and cable connections only when all parts are present and intact. • Do not install or use in potentially explosive environments. • Do not allow the terminator to come into contact with open flame. • Fit the terminator using only the prescribed tools and in the prescribed manner. • Use the terminator to seal the conductor end of the Enphase Q Cable; no other method is allowed.

INSTALLATION MAP

↑ To Sheet / A la hoja de: _____

Panel Group/Grupo de los paneles: Azimuth/Azimut: Tilt/Inclinación: Sheet/Hoja ____ of/de ____		Customer/Ciente:			Installer/Instalador:			N S E W N S E O	
1	2	3	4	5	6	7	8	9	
A									
B									
C									
D									
E									
F									
G									
H									
J									
K									
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M									

↓ To Sheet / A la hoja de: _____

Scan completed map and upload it to Enphase. Click "Add a New System" at <https://enlighten.enphaseenergy.com>. Use this map to build the virtual array in Enlighten's Array Builder.

Escanee el mapa completo y cárguelo en Enphase. Haga clic en "Añadir nuevo sistema" en <https://enlighten.enphaseenergy.com>. Utilice este mapa para crear el conjunto de paneles virtual en el Creador de conjuntos de paneles de Enlighten.

Enphase Serial Number Label /
Número de serie de Enphase



↓ To Sheet / A la hoja de: _____