

Enphase IQ8MC AC Module Installation and Operation Manual



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<https://enphase.com/contact/support>



Other information.

Product information is subject to change without notice. All trademarks are recognized as the property of their respective owners.

User documentation is updated frequently; check the Enphase website for the latest information.

<https://enphase.com/en-au/installers/resources/documentation>

To ensure optimal reliability and to meet warranty requirements, the Enphase microinverter must be installed according to the instructions in this manual. For warranty text refer to

enphase.com/installers/resources/warranty

For Enphase patent information refer to <https://enphase.com/patents>

Note for third-party products

Any third-party manufacturer or importer product(s) used to install or commission Enphase product(s) shall comply with the applicable EU Directive(s) and requirements in the EEA (European Economic Area). It is the responsibility of the installer to confirm that all such products are labeled correctly and have the required compliant supporting documentation.

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Importer:

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Compliance with EU Directives

This product complies with the following EU Directives and can be used in the European Union without any restrictions.

- Electro Magnetic Compatibility (EMC) directive 2014/30/EU
- Low voltage directive (LVD) 2014/35/EU
- Restriction of Hazardous Substances (RoHS) 2011/65/EU

The full text of the EU declaration of conformity (DoC) is available at the following internet address

<https://enphase.com/en-au/installers/resources/documentation>

Audience

This manual is intended for use by professional installation and maintenance personnel.

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Important safety information

Read this first

This manual contains important instructions for use during the installation and maintenance of IQ8MC Microinverter.

IMPORTANT: The IQ8MC Microinverter listed in this manual require an IQ Cable. An IQ Gateway is required to monitor microinverter performance and, where required, provides control of the microinverters.

Product labels

The following symbols appear on the **product label** and are described here:



WARNING: Hot surface



DANGER: Refer to safety instructions



DANGER: Risk of electric shock







Refer to manual



Double insulated

Safety and advisory symbols

To reduce the risk of electric shock, and to ensure the safe installation and operation of the IQ8MC Microinverter system, the following safety symbols appear throughout this document to indicate dangerous conditions and important safety instructions.

| | | |
|---|-----------------|---|
|  | DANGER: | This indicates a hazardous situation, which if not avoided, will result in death or serious injury. |
|  | WARNING: | 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. |
|  | WARNING: | This indicates a situation where failure to follow instructions may result in a burn injury. |
|  | NOTE: | This indicates information that is very important for optimal system operation. Follow instructions closely. |

IQ8MC Microinverter safety instructions

General safety






DANGER: Risk of electric shock.
Risk of fire.





Only use electrical system components approved for wet locations.





Only competent personnel should install, troubleshoot, or replace Enphase microinverters or IQ Cables and accessories.

Ensure that all AC and DC wiring is correct, and that none of the AC or DC cables are pinched, shorted, or damaged. Ensure that all AC junction boxes are properly closed.





| | | |
|---|--|--|
| | | Do not exceed the maximum number of microinverters in an AC branch circuit as listed in the manual. You must protect each microinverter AC branch circuit with a breaker or fuse of 20 A or 25 A for single-phase and three-phase systems. Note that single-phase IQ Relays are rated for 20 A, whereas three-phase IQ Relays are rated for 25 A. |
|  | 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. Be aware that installation of this equipment includes the risk of electric shock. The DC conductors of this photovoltaic system are ungrounded and may be energized. |
|  | WARNINGS: | For shutting down the system, always de-energize the AC branch circuit breaker. Never disconnect the DC or AC connectors under load. Before installing or using Enphase microinverters, read all instructions and cautionary markings in the technical descriptions of the Enphase equipment and the photovoltaic (PV) equipment. Do not connect Enphase microinverters to the grid or energize AC circuit(s) until you have completed all the installation procedures and have received approval from the electrical network operator. When the PV array is exposed to light, DC voltage is supplied to the power conversion equipment (PCE). Risk of equipment damage. Enphase male and female connectors must only be mated with the identical type and brand of male and female connector. |
|  | NOTES: | To ensure optimal reliability and to meet warranty requirements, install the Enphase equipment according to the instructions in this manual. The AC and DC connectors on the cabling are rated as a disconnect only when used with an Enphase microinverter. Protection against lightning and resulting voltage surge must be in accordance with local electrical codes and standards. Perform all electrical installations in accordance with all applicable local electrical codes and standards. |

Microinverter safety

| | | |
|---|---|---|
|  | WARNING: Risk of skin burn. | The chassis of an Enphase microinverter is the heat sink. Under normal operating conditions, the temperature could be 20°C above ambient temperature, but under extreme conditions, microinverters can reach a temperature of 90°C. To reduce the risk of burns, use caution when working with microinverters. |
|  | DANGER: Risk of fire. | The DC conductors of PV modules must be labelled “PV Wire” or “PV Cable” when paired with Enphase microinverters. |
|  | DANGER: Risk of electric shock. Risk of fire. | Only competent personnel may connect Enphase microinverters to the electricity grid. Do not attempt to repair Enphase microinverters; they contain no user-serviceable parts and do not require any regular maintenance. If one fails, contact Enphase Support to obtain a return merchandise authorization (RMA) number and start the replacement process. Tampering with or opening an Enphase microinverter will void its warranty. |
|  | 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 IQ Cable, PV module, or microinverter) to rain or condensation before the connectors are mated. |

| | | |
|--|---|---|
| | | The maximum open circuit voltage of the PV module must not exceed the specified maximum input DC voltage of the microinverter. Refer to the Enphase compatibility calculator to verify PV module electrical compatibility with the microinverter. Use IQ8MC Microinverter only with compatible PV modules as per the Enphase compatibility calculator. Using an electrically incompatible PV module will void the microinverter's warranty. |
|  | WARNING: Risk of equipment damage. | <p>You must match the DC operating voltage range of the PV module with the allowable input voltage range of the microinverter.</p> <p>The 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 microinverters' warranty.</p> |
|  | WARNING: Risk of equipment damage. | The 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, non-Enphase batteries, etc. These devices do not behave like standard PV modules, so operation and compliance are not guaranteed. These devices may also damage the microinverter by exceeding its electrical rating, making the system potentially unsafe. |
|  | NOTES: | The microinverter has field-adjustable voltage and frequency trip points that may need to be set, depending upon local requirements. Only a competent authorized installer with the permission from local electrical authorities should make adjustments. |
|  | NOTES: | Installers must check the manufacturing date of the IQ8MC Microinverter to ensure that the installation date is within one year of the manufactured date of the products. Contact your local distributor to validate the date code. |

IQ Cable safety

| | | |
|---|---|--|
|  | DANGER: Risk of electric shock. | Do not install the IQ Terminator while the power is connected. |
|  | WARNING: Risk of electric shock. Risk of fire. | <p>When stripping the sheath from an IQ Cable, make sure the conductors are not damaged. If the exposed conductors are damaged, the system may not function properly.</p> <p>Do not leave AC connectors on an IQ Cable uncovered for an extended period. You must cover any unused connector with an IQ Sealing Cap.</p> <p>Make sure protective IQ Sealing Caps have been installed on all unused AC connectors. Unused AC connectors are live when the system is energized.</p> |
|  | WARNING: | <p>Use an IQ Terminator only once. If you open an IQ Terminator following installation, the latching mechanism will be destroyed. If the latching mechanism is defective, do not use the IQ Terminator. Do not circumvent or manipulate the latching mechanism.</p> <p>When installing an IQ Cable, secure any loose cable to avoid the risk of cable insulation abrasion against the roof surface.</p> |
|  | NOTES: | <p>When looping an IQ Cable, do not form loops smaller than 120 mm in diameter.</p> <p>Provide support for an IQ Cable every 300 mm.</p> <p>If you need to remove an IQ Sealing Cap, you must use an IQ Disconnect Tool.</p> <p>When installing an IQ Cable and accessories, adhere to the following:</p> <ul style="list-style-type: none"> Do not expose the IQ Terminator cap or cable connections to directed, pressurized liquid (water jets, etc.). Do not expose the IQ Terminator or IQ Cable to continuous immersion. |

- Do not expose the IQ Terminator cap or IQ Cable connections to continuous tension (e.g., tension due to pulling or bending the cable near the connection).
- Use only the compatible IQ connectors.
- Do not allow contamination or debris in the connectors.
- Use the IQ Terminator cap and cable connections only when all parts are present and intact.
- Do not install or use in potentially explosive environments.
- Do not allow the IQ Terminator to come into contact with an open flame.
- Fit the IQ Terminator cap using only the prescribed tools and in the prescribed manner.
- Use only the IQ Terminator to seal the conductor end of the IQ Cable; no other method is allowed.

DC Cable safety



NOTES:

- Ensure proper routing of PV module DC cable using the clips to prevent the leads from resting on the roof. Do not wrap excess DC cable around the microinverter.
- Avoid direct exposure to sunlight.
- Avoid sharp edges on racking.
- Avoid cable contacting rough surfaces or moving parts within the racking system.
- Avoid overly tight bending radii. The minimum bend radii for the DC cable is 8 X cable outer diameter.
- Avoid overly tight-sized cable clips for routing.

The Enphase Energy System

Enphase Energy System includes:

- **IQ8MC Microinverter:** The smart grid-ready IQ8MC Microinverter convert the DC output of PV module into grid-compliant AC power.
- **IQ Gateway:** An IQ Gateway (model ENV-S-WM-230, or ENV-S-WB-230) is required to monitor solar production, propagate a grid profile to the microinverters, and provide microinverter control at sites where power export limitation (PEL) and/or phase imbalance management (PIM) is required through advanced grid functionalities. The IQ Gateway is a communication device that provides network access to the PV array. The IQ Gateway collects production and performance data from the IQ8MC Microinverters over on-site AC power lines, and transmits the data to the Enphase App through a broadband or cellular connection. The IQ Gateway is capable of monitoring up to 300 IQ8MC Microinverter. For details, refer to the [IQ Gateway Installation and Operations Manual](#).
- **Enphase Installer Portal:** Web-based monitoring and management software. Installers can use Enphase Installer Portal to view detailed performance data, manage multiple PV systems, and remotely resolve issues that might impact system performance. Find out more at <https://enphase.com/en-au/installers/apps>.
- **Enphase Installer App:** A mobile app for iOS or Android devices. It allows installers to configure a system while onsite, eliminating the need for a laptop and improving installation efficiency. You can use the app to:
 - Connect to the IQ Gateway over a wireless network for faster system setup and verification.
 - View and email a summary report that confirms a successful installation.
 - Scan device serial numbers and sync system information with the Enphase Installer Portal.

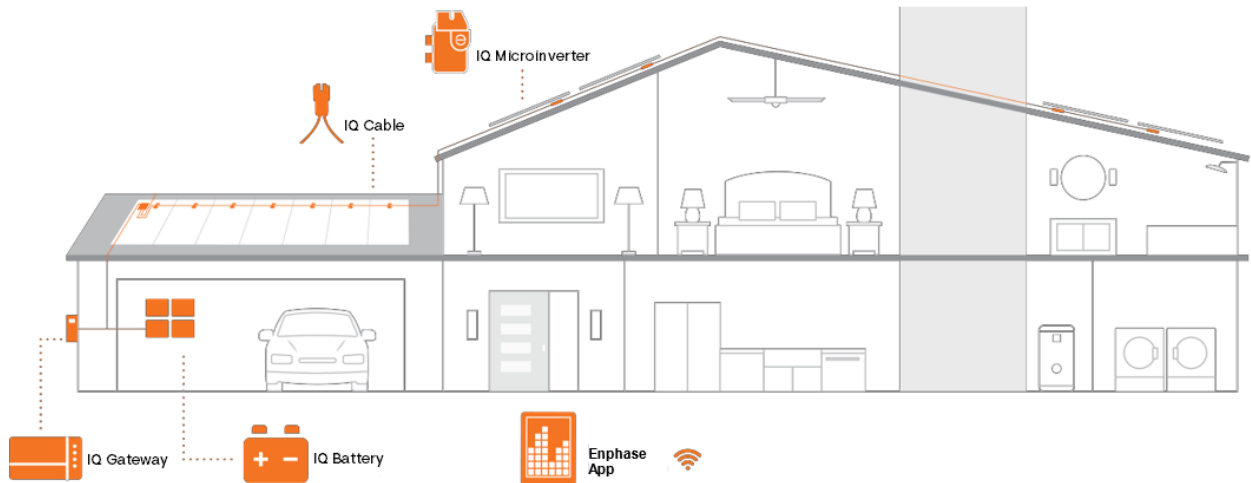
This manual describes the safe installation and operation of the IQ8MC Microinverter.



NOTE: To ensure optimal reliability and to meet warranty requirements, IQ8MC Microinverter must be installed according to the instructions in this manual.

How IQ8MC Microinverter work

The microinverters maximize energy production by using a sophisticated maximum power point tracking (MPPT) algorithm. Each microinverter individually connects to one PV module in your array. This configuration enables an individual MPPT to control each PV module, ensuring that the maximum power available from each PV module is produced regardless of the performance of the other PV modules in the array. While an individual PV module in the array may be affected by shading, soiling, orientation, or PV module mismatch, each microinverter ensures top performance for its associated PV module.



System monitoring

Once you install the IQ Gateway and provide an internet connection through a broadband router or modem, the IQ8MC Microinverters automatically begin reporting to the Enphase Installer Platform. The Enphase Installer Platform presents current and historical system performance trends and informs you of PV system status.

Optimal reliability

Microinverter systems are inherently more reliable than conventional string inverters. The distributed nature of a microinverter system ensures that there is no single point of system failure. IQ8MC Microinverters are designed to operate at full power at ambient temperature.

Ease of design

PV systems using Enphase microinverters are very simple to design and install. You can install individual PV modules in any combination of PV module quantity, type, age, and orientation. Each microinverter quickly mounts on the PV racking beneath each PV module.

Planning for microinverter installation

IQ8MC Microinverters support PV modules with 54-cell/108-half-cell, 60-cell/120-half-cell, 66-cell/132-half-cell, and 72-cell/144-half-cell configurations. Modules can be paired as long as the maximum input voltage is not exceeded and the maximum input current of the inverters at the lowest and highest temperatures is respected. Installers should not exceed the small-scale technology certificate (STC) limit on PV module wattage for claiming the STC. See the compatibility calculator at <https://enphase.com/en-au/installers/microinverters/calculator>.

The microinverter housing is designed for outdoor installation and complies with the IP67 environmental enclosure rating standard.



IP67 rating definition: Indoor or outdoor use primarily to provide a degree of protection against hose-directed water, the entry of water during occasional temporary submersion at a limited depth, and damage from external ice formation.

IQ Cables are available with connector spacing options to accommodate the installation of PV modules in portrait or landscape orientation. For IQ Cable ordering information, see “[IQ Cable planning and ordering](#)” on page 25.

Compatibility

The IQ8MC Microinverter are **electrically compatible** with PV modules as listed in the following table. For specifications, see “[Technical Data](#)” on page 27 of this manual. You can refer to the Enphase compatibility calculator at <https://enphase.com/en-au/installers/microinverters/calculator> to verify PV module electrical compatibility. To ensure **mechanical compatibility**, a microinverter’s male and female connectors must only be mated with the identical type and brand of male and female connector.

IMPORTANT: IQ8MC Microinverter include both AC and DC connectors integrated into the bulkhead. The AC port connects to the IQ Cable or the IQ Field Wireable Connector. The DC port has been evaluated by TUV for intermateability with Stäubli-made MC4 connectors, whose cable coupler models are “PV-KST4/...-UR, PV-KBT4/...-UR, PV-KBT4-EVO2/...-UR, and PV-KST4-EVO2/...-UR”. The DC port of the inverter must be mated with Stäubli-made MC4 connectors.

| Microinverter model | Connector type | PV module cell count |
|---------------------|----------------|--|
| IQ8MC-72-M-AMC-INT | Stäubli MC4 | Pair with 54-cell/108-half-cell, 60-cell/120-half-cell, 66-cell/132-half-cell, 72-cell/144-half-cell |



NOTE: IQ8MC Microinverter will not begin producing power until the IQ Gateway is installed and has detected all the microinverters at the site. The grid profile needs to be configured and the IQ Gateway must have propagated these settings to the microinverters. Refer to the IQ Gateway Installation and Operation Manual at <https://enphase.com/en-au/download/iq-gateway-installation-and-operation-manual>.

Earthing considerations

The microinverter has a Class II double-insulated rating, which includes ground fault protection (GFP). Refer to local electrical codes and standards for earthing requirements of PV arrays and racking.

Branch circuit capacity

Plan your AC branch circuits to meet the following limits for the maximum number of microinverters per branch circuit.

| Maximum* IQ8MC Microinverter per AC branch circuit | |
|--|----------------------|
| Breaker | IQ8MC |
| 20 A Single-phase (single-phase IQ Relay) | 12 |
| 25 A Three-phase (three-phase IQ Relay) | 42 (14 per phase) |



NOTE: *Refer to local regulations for overcurrent protection device (OCPD) sizing and to define the number of microinverters per branch in your area.



NOTE: A minimum of two IQ8MC Microinverter are be required in systems installed in Australia and New Zealand to meet AS/NZS 4777.2:2020 requirements.

Electricity network requirements

The IQ8MC Microinverter work with single-phase or three-phase grid connections. Measure AC line voltage at the point of connection to confirm that it is within the ranges shown:

| Single-phase service | | Three-phase service | |
|----------------------|----------------|---------------------|----------------|
| L1 to N | 184 to 276 VAC | L1 to L2 to L3 | 319 to 478 VAC |
| | | L1, L2, L3 to N | 184 to 276 VAC |

Conductor lengths and voltage rise

When planning a system, you must select the appropriate AC conductor size to minimize voltage rise. Select the correct conductor size based on the distance from the junction with the microinverter AC branch circuit to the circuit breaker in the electrical panel. Enphase recommends a voltage rise total of less than 2% from the start of IQ Cable to the point of supply.



Best practice: Center-feed the branch circuit to minimize voltage rise in a fully populated branch. This practice substantially reduces the voltage rise as compared with an end-fed branch. To center-feed a branch, divide the circuit into two sub-branch circuits protected by a single OCPD.

Lightning and surge suppression

IQ8MC Microinverters have integral surge protection, greater than most conventional inverters. However, if a surge has sufficient energy, the protection built into the microinverter can be exceeded and the equipment can be damaged. For this reason, Enphase recommends that you protect your system with a lightning and/or surge suppression device. In addition to having some level of surge suppression, it is also important to have insurance that protects against lightning and electrical surges. For more details, refer to <https://support.enphase.com/s/article/Surge-Protection-for-Enphase-Microinverter-Systems>.



NOTE: Protection against lightning and resulting voltage surge must be in accordance with local electrical codes and standards.

Parts and tools required

In addition to the microinverters, PV modules, and racking, you will need the following:

Enphase equipment

- **IQ Gateway:** Required to monitor production. For installation information, refer to the [IQ Gateway Installation and Operation Manual](#).

Enphase Installer App: Download the Enphase Installer App, open it, and log in to your Enphase Account. Use it later to scan the microinverter serial numbers and connect to the IQ Gateway to track system installation progress. To download, go to <https://enphase.com/en-au/installers/apps> or scan the QR code at right.



Android



iOS

- **IQ Relay:** Single-phase (Q-RELAY-1P-INT) or three-phase (Q-RELAY-3P-INT).



NOTE: The three-phase IQ Relay also provides phase coupling to allow microinverters on all phases to communicate with the IQ Gateway. Use a legrand phase coupler (LPC-01) for the three-phase system for phase coupling if an IQ Relay is not installed in a three-phase system.

- **Tie wraps or IQ Cable Clip** (ET-CLIP-100): Works with both single-phase and three-phase IQ Cable.
- **IQ Sealing Caps** (Q-SEAL-10): For any unused connectors on the IQ Cable.
- **IQ Terminator** (Q-TERM-R-10 for single-phase or Q-TERM-3P-10 for three-phase): Enphase recommends one terminator for each AC cable segment end; typically, two are needed per branch circuit.
- **IQ Disconnect Tool** (Q-DISC-10).
- **IQ Field Wireable Connectors** (male and female single-phase: Q-CONN-R-10M and Q-CONN-R-10F; male and female three-phase: Q-CONN-3P-10M and Q-CONN-3P-10F).
- **IQ Cable:**

| Cable model | Connector spacing | PV module orientation | Connector count per box |
|---------------------|-------------------|-----------------------|-------------------------|
| Single-phase | | | |
| Q-25-10-240 | 1.3 m | Portrait | 240 |
| Q-25-17-240 | 2.0 m | Landscape (60-cell) | 240 |
| Q-25-20-200 | 2.3 m | Landscape (72-cell) | 200 |
| Three-phase | | | |
| Q-25-10-3P-200 | 1.3 m | Portrait | 200 |
| Q-25-17-3P-160 | 2.0 m | Landscape (60-cell) | 160 |
| Q-25-20-3P-160 | 2.3 m | Landscape (72-cell) | 160 |

- **IQ Raw Cable** (Q-25-RAW-300 for single-phase, Q-25-RAW-3P-300 for three-phase): Length 300 m. Raw cable with no connectors.

Other items

- AC junction box
- Screwdrivers
- Wire cutters, clamp meter
- Torque wrench, sockets, and wrenches for mounting hardware

Enphase microinverters installation

Installing IQ8MC Microinverter involves below 11 key steps. Each step listed here is detailed in the following pages.

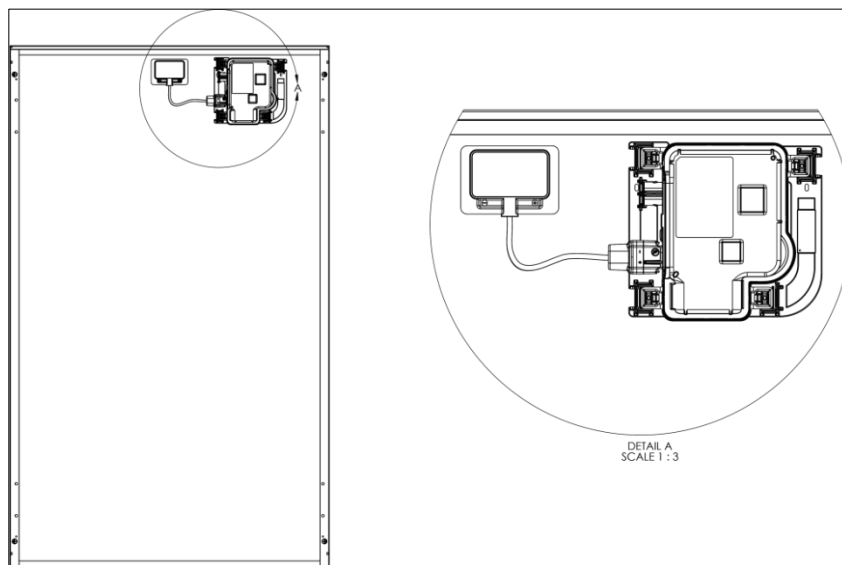
- Step 1:** Install a junction box
- Step 2:** Position the IQ Cable
- Step 3:** Terminate the unused end of the IQ Cable
- Step 4:** Prepare the AC Modules
- Step 5:** Create the installation map
- Step 6:** Mount the AC Modules
- Step 7:** Connect the microinverters
- Step 8:** Manage the cabling
- Step 9:** Ground the AC Modules
- Step 10:** Energize the system
- Step 11:** Set up and activate monitoring

Step 1: Install a junction box

- A. Verify that the AC voltage at the site is within range.

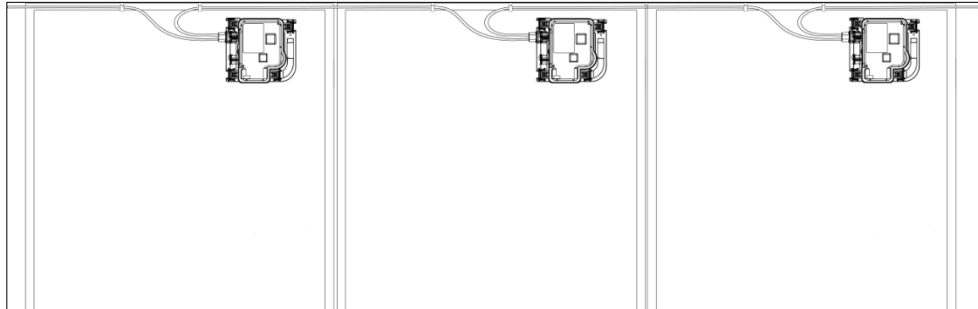
| Single-phase service | | Three-phase service | |
|----------------------|----------------|---------------------|----------------|
| L1 to N | 184 to 276 VAC | L1 to L2 to L3 | 319 to 478 VAC |
| | | L1, L2, L3 to N | 184 to 276 VAC |

- B. Install a junction box at a suitable location on the racking.
- C. Provide an AC connection from the junction box back to the electricity network using equipment and practices as required by local jurisdictions.



Step 2: Position the IQ Cable

- Plan each cable segment to allow drop connectors on the IQ Cable to align with each AC Module. Allow extra length for slack, cable turns, and any obstructions.
- Mark the approximate centers of each PV module on the PV racking.
- Lay out the cabling loosely on the roof for the AC branch circuit. Make sure the cable is positioned in a way that allows you to connect it to each of the microinverter.



- Cut each segment of cable to meet your planned needs.

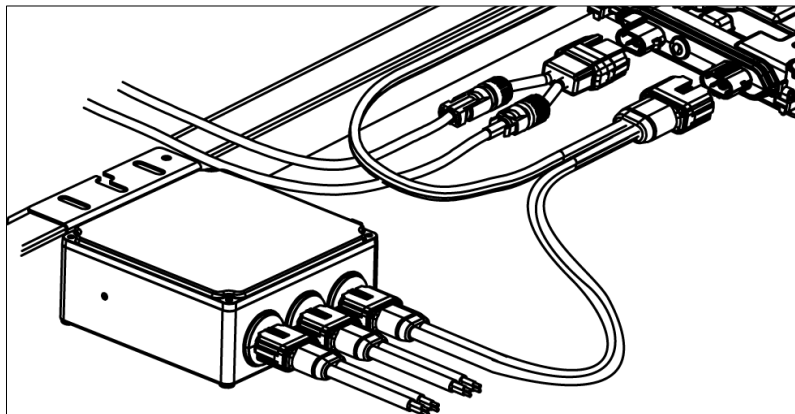


WARNING: Do not install the modules in a way that creates continuous tension on the IQ Cable.

- Connect the IQ Cable to the AC junction box. The IQ Cable follows the wiring color code: Black = L1, Red = L2.

Step 3: Terminate the unused end of the cable

Place sealing caps on unused connectors and terminate the unused end of the IQ Cable as follows.



- Cover any unused connectors with IQ Sealing Caps. Listen for a click as the connectors engage.

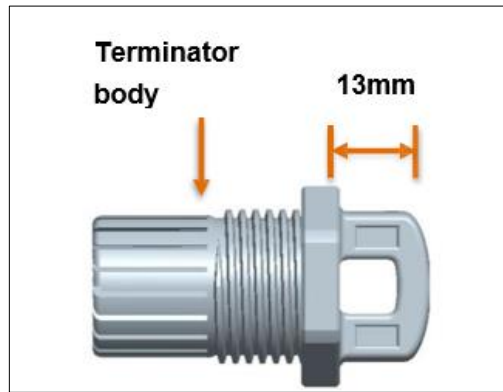


WARNING: Risk of electric shock. Risk of fire. Install sealing caps on all unused AC connectors, as these connectors become live when the system is energized. IQ Sealing Caps are required for protection against moisture ingress.

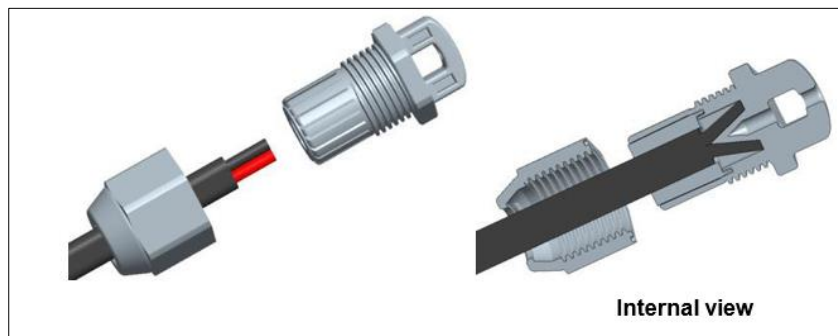


NOTE: If you need to remove a sealing cap, you must use an IQ Disconnect Tool. For more information, refer to the [“Remove and replace a microinverter”](#) on page 23.

- Remove 13 mm (½ inch) of the cable sheath from the conductors. Use the terminator loop to measure 13 mm.



- C. Slide the hex nut onto the cable.
- D. Insert the cable into the terminator body so that each of the two wires land on opposite sides of the internal separator. There is a grommet inside the hex nut that should remain in place.



- E. Insert a screwdriver into the slot on the top of the terminator to hold it in place, and torque the nut to 7 N m.
- F. Hold the terminator body stationary with the screwdriver and turn only the hex nut to prevent conductors from twisting out of the separator.
- G. Attach the terminated cable end to the PV racking with a cable clip or tie wrap so that the cable and terminator do not touch the roof.

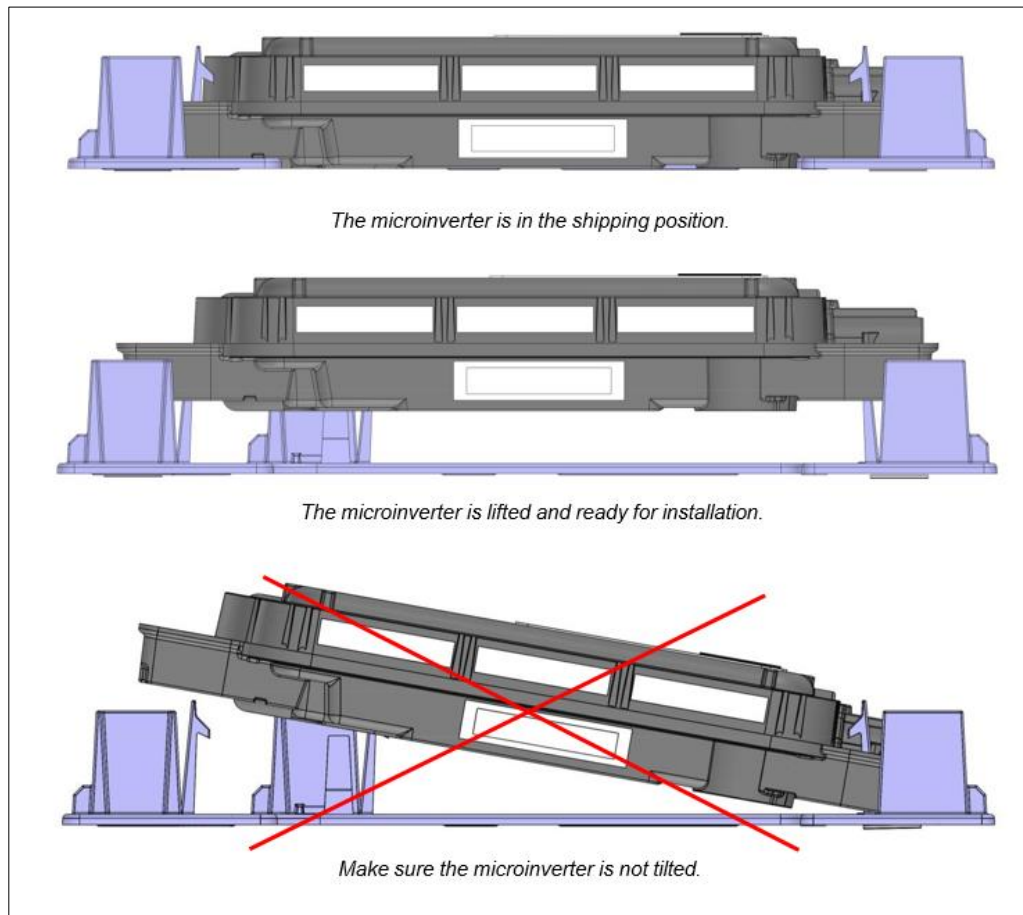


WARNING: The terminator cannot be reused. If you unscrew the nut, you must discard the terminator.



Step 4: Prepare the AC Module

- A. Before installing the AC Module, the microinverters must be lifted from the shipping position. On the ground, turn the AC Module so that the microinverter faces you. Using both hands, lift the microinverter. You will hear four clicks as the microinverter locks into the installation position. Ensure the four latches are locked and the microinverter is not tilted.



NOTE: If you need to move the module, you can return the microinverter to the shipping position using an IQ Disconnect Tool. Use the tool to depress the four locking mechanisms on each corner of the microinverter to return it to the shipping position.

- B. Position the AC Modules as planned on the rail.



Step 5: Use the serial number labels to create the installation map

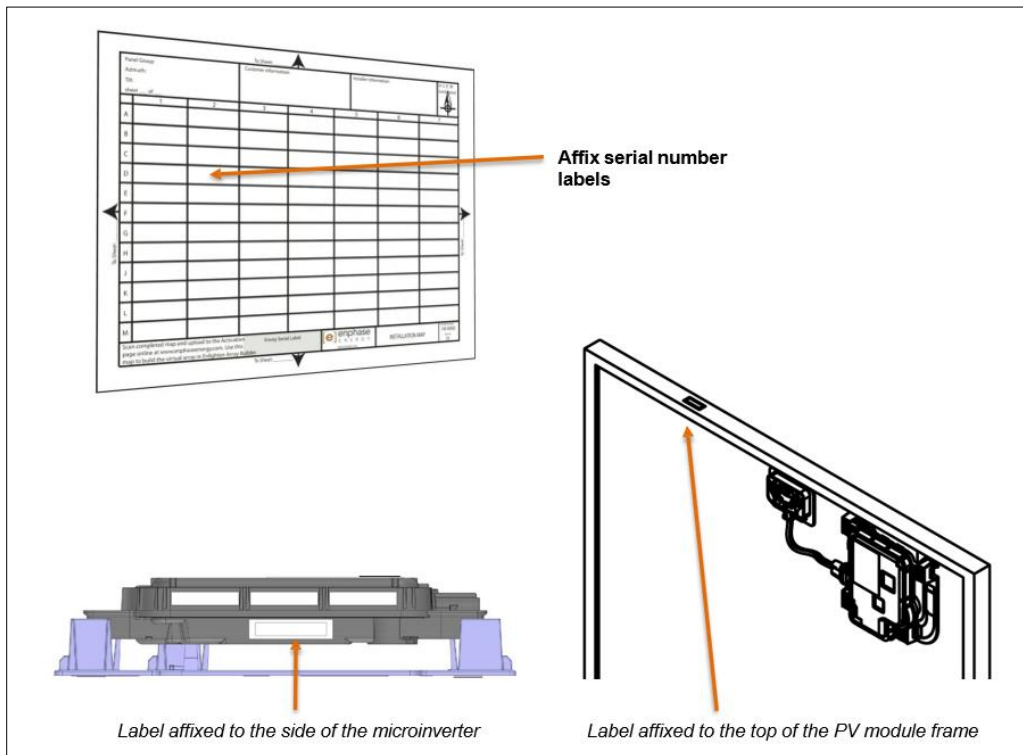
The Enphase installation map is a diagram of the physical location of each module in your PV installation. Copy or use the blank map to record module placement for the system, or provide your own layout if you require a larger or more intricate installation map.

Each AC Module, IQ Gateway, and IQ Battery has a removable serial number label. Build the installation map by peeling the serial number labels from the modules and placing the labels on the map. You would also place the IQ Gateway (required) and IQ Battery (optional) serial numbers on the map after installation.

After you have created the installation map, use the Enphase Installer App to record serial numbers and configure the system.

For more information, refer to “Detect the Microinverters” in the help topics of the Enphase Installer App.

- Remove the label from each module before passing it up to the roof. Apply the label to the proper position on the installation map.
- Peel the label from the IQ Gateway (and IQ Battery, if installed) and affix it to the installation map.
- Always keep a copy of the installation map for your records.



Step 6: Mount the AC Module

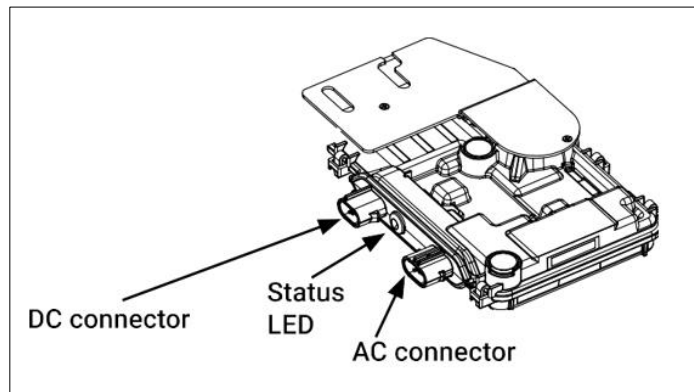
- Install the AC Module with a clearance of at least 10 cm (4 inch) from the roof. Also, make sure that the microinverter on the underside of the AC Module is at least 19 mm (0.75 inch) away from the roof or installation surface.
- Do not place the AC Modules in such a way that places pressure on the microinverters. The minimum distance from the top edge of the module to the rail should be about 30 cm (12 inch).
- Make sure that the minimum gap between modules is 10 mm (0.4 in) or greater.
- Check that rails and clamps are clear of the microinverters by at least 3.8 cm (1.5 inch). Do not obstruct module drain holes.

Step 7: Connect the microinverters as you install the AC Modules

- Check again that the AC Modules are not placing pressure on the microinverters. The minimum distance from the top edge of the module to the rail should be about 30 cm (12 inch).
- As you install each AC Module, connect the IQ Cable to the microinverter. Listen for a click as the connectors engage.
- Cover any unused connectors on the AC cable with IQ Sealing Caps. Listen for a click as the sealing caps engage.

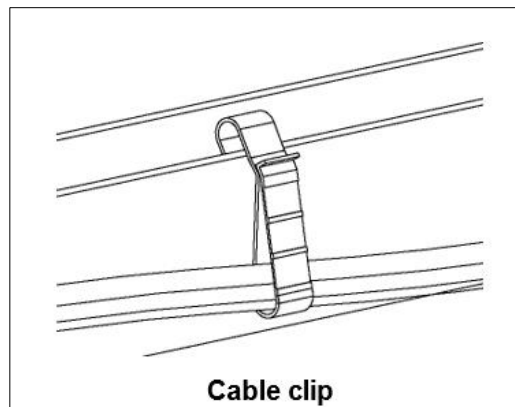


WARNING: Risk of electric shock. Risk of fire. Install sealing caps on all unused AC connectors, as these connectors become live when the system is energized. Sealing caps are required for protection against moisture ingress.



Step 8: Manage the cabling

Use cable clips to attach the cable to the module frame. Leave no more than 1.8 m (6 feet) between cable clips.



Dress any excess cabling in loops so that it does not contact the roof. Do not form loops smaller than 12 cm (4¾ inch) in diameter.



WARNING: Loose cables can become a tripping hazard. Dress the IQ Cable to minimize this potential.



NOTE: Some modules do not include framing on their shortest side. Cable clips cannot attach to the frameless side for cable management. Plan to use the longer, framed side for cable management when this is the case.

Step 9. Ground the AC Modules

Ground the AC Modules per the module manufacturer's instruction.

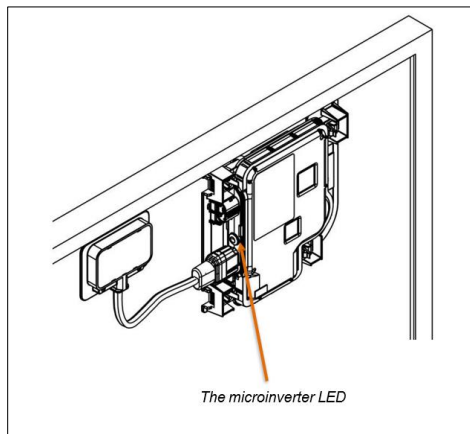
Step 10: Energize the system

- 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.
- Check the LED on the connector side of the microinverter.

| LED colour | Indicates |
|-----------------|---|
| Flashing green | Normal operation. AC grid function is normal and there is communication with the IQ Gateway. The microinverter's LED will be flashing green only after provisioning. |
| Flashing orange | The AC grid is normal, but there is no communication with the IQ Gateway. |
| Flashing red | The AC grid is either not present or not within the specification. |
| Solid red | There is an active "DC Resistance Low, Power Off" condition. To reset, refer to the IQ Gateway Installation and Operation Manual at https://enphase.com/en-au/download/iq-gateway-installation-and-operation-manual . If the problem persists, measure resistance between PV+ to EARTH and then PV- to EARTH on the PV module and then inverter. Anything less than ~7 kΩ will trigger the "DC Resistance Low - Power Off" condition. Usually, the value is in MΩ on the inverter or PV module. Swap out faulty PV module or microinverter. |



NOTE: For shutting down the system, always de-energize the AC branch circuit breaker. Never disconnect the DC or AC connectors under load.



Step 11: Set up and activate monitoring

Refer to the [IQ Gateway Quick Install Guide](#) to install the IQ Gateway and set up system monitoring and grid management functions. This guide leads you through the following:

- Connecting the IQ Gateway
- Detecting devices and scanning the installation map
- Connecting to the Enphase Installer Portal
- Registering the system
- Building the virtual array



NOTE: When the utility requires a profile other than the profile resident on the microinverter, you must select an appropriate grid profile for your installation. You can set the grid profile through the Enphase App, during system registration, or through the Enphase Installer App at any time. You must have an IQ Gateway to set or change the grid profile. For more information on setting or changing the grid profile, refer to the [IQ Gateway Installation and Operation Manual](#).

Troubleshooting

Follow all safety measures described in this manual. Competent personnel can use the following troubleshooting steps if the PV system does not operate correctly.



WARNING: Risk of electric shock. Do not attempt to repair Enphase microinverters, as they contain no user-serviceable parts. If one fails, contact Enphase Support to obtain a return merchandise authorization (RMA) number and start the replacement process.

Status LED indications and error reporting

The following section describes LED indications.

LED operation

| LED colour | Indicates |
|------------------------|---|
| Flashing green | Normal operation. AC grid function is normal, and there is communication with the IQ Gateway. |
| Flashing orange | The AC grid is normal, but there is no communication with the IQ Gateway. |
| Flashing red | The AC grid is either not present or not within the specification. |
| Solid red | There is an active “DC Resistance Low – Power Off” condition. To reset, refer to the IQ Gateway Installation and Operation Manual at: https://enphase.com/en-au/download/iq-gateway-installation-and-operation-manual . If the problem persists, measure resistance between PV+ to EARTH and then PV- to EARTH on the PV module and then inverter. Anything less than ~7 kΩ will trigger the “DC Resistance Low – Power Off” condition. Usually, the value is in MΩ on the inverter or PV module. Swap out faulty PV module or microinverter. |

The status LED on each microinverter lights green about six seconds after DC power is applied. It remains lit solid for two minutes, followed by six green flashes. After that, red blinks indicate that no grid is present if the system is not yet energized.

Any short red blinks after DC power are first applied to the microinverter indicate a failure during microinverter startup.

DC Resistance Low – Power Off condition

For all IQ8MC Microinverter, a solid red status LED when DC power has been cycled indicates the microinverter has detected a DC Resistance Low – Power Off event. The LED will remain red and the fault will continue to be reported by the gateway until the error has been cleared.

An insulation resistance (IR) sensor in the microinverter measures the resistance between the positive and negative PV inputs to the ground. If either resistance drops below a threshold of 7 kΩ, the microinverter stops power production and raises this condition. This may indicate defective module insulation, defective wiring or connectors, moisture ingress, or a similar problem. Although the cause may be temporary, this microinverter condition persists until the sensor is manually reset.

An IQ Gateway is required to clear this condition. The condition clears on operator command unless its cause is still present.

If a microinverter registers a “DC Resistance Low – Power Off” condition, you can attempt to clear this condition. If the condition does not clear after you perform the following procedure, contact Enphase Support at <https://enphase.com/contact/support>.

Follow the steps below to send a clear message to the microinverter. Note that the condition will not clear after the sensor reset if the cause of the failure is still present. If the condition persists, contact support.

Clearing this error using the Enphase Installer Platform

- Log in to the Enphase Installer Platform and access the system.
- Click the “**Events**” tab. The next screen shows a current “DC Resistance Low – Power Off” condition for the system.
- Click “DC Resistance Low – Power Off”.
- Click the serial number of the affected microinverter.
- Click “Tasks and Clear GFI” to clear the event.

Other faults

All other faults are reported to the gateway. Refer to the IQ Gateway Installation and Operation Manual at <https://enphase.com/en-au/download/iq-gateway-installation-and-operation-manual> for troubleshooting procedures.

Troubleshooting a non-functional microinverter

To troubleshoot a non-functional microinverter, follow the steps in the order shown:



WARNING: Risk of electric shock. Always de-energize the AC branch circuit before servicing. Never disconnect the DC or AC connectors under load.



WARNING: The Enphase microinverters are powered by DC power from the PV modules. Make sure you disconnect the DC connections and reconnect the DC power and then watch for the solid green for about six seconds after connection to DC power.

- Make sure AC circuit breakers and isolator switches are closed.
- Check the connection to the grid, and verify that the grid voltage is within allowable ranges.
- Verify that AC line voltages at all PV circuit breakers at the electrical panel and subpanels are within the ranges shown in the following table.
- Verify that the AC line voltage at the junction box for each AC branch circuit is within the ranges shown in the following table.

| Single-phase service | | Three-phase service | |
|----------------------|-----------------|---------------------|-----------------|
| L1 to N | 184 to 276 VAC* | L1 to L2 to L3 | 319 to 478 VAC* |
| | | L1, L2, L3 to N | 184 to 276 VAC* |

*Nominal voltage range can be extended beyond nominal if required by the electricity network operator.

- Using an IQ Disconnect Tool, disconnect the AC cable for the microinverter in question from the IQ Cable.
- Verify that the grid is present at the microinverter by measuring line-to-line voltage and line-to-ground voltage at the IQ Cable connector.
- Visually check that the AC branch circuit connections (IQ Cable and AC connections) are properly seated. Reset if necessary. Check for any damage, such as rodent 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.
- Disconnect and reconnect the DC PV module connectors. The status LED of each microinverter will light solid green for a few seconds after connection to DC power, and then flash 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. See page 21 for normal “[LED operation](#)”.

- J. Connect a clamp meter (set to DC current mode) to one of the conductors of the DC cables from the PV module to measure microinverter current. This will be under 1 A if AC is disconnected.
- K. Verify the PV module DC voltage is within the allowable range shown in “[Specifications](#)”. Refer to the Enphase compatibility calculator at <https://enphase.com/en-au/installers/microinverters/calculator> to verify PV module electrical compatibility with the microinverter.
- L. Swap DC leads with a known good, adjacent PV module. After checking the Enphase Installer Platform periodically (this may take up to 30 minutes), the problem moves to the adjacent module, this indicates that the PV module is not functioning correctly. If it stays in place, the problem is with the original microinverter. Contact [Enphase Support](#) for help in reading the microinverter data and obtaining a replacement microinverter, if needed.
- M. 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.
- N. Verify with your electricity network operator or with a multi-meter measuring frequency at the point of supply that line frequency is within range. If the problem persists, contact Enphase Support at <https://enphase.com/contact/support>

Disconnecting a microinverter

If problems remain after following the troubleshooting steps listed previously, contact Enphase Support at <https://enphase.com/contact/support>. If Enphase authorizes a replacement, follow the steps below. To ensure the microinverter is not disconnected from the PV modules under load, follow the disconnection steps in the order shown:

- A. De-energize the AC branch circuit breaker.
- B. IQ Cable AC connectors are tool-removable only. To disconnect the microinverter from the IQ Cable, insert an IQ Disconnect Tool and remove the connector.
- C. Cover the PV module with an opaque cover.
- D. Using a clamp meter set to DC mode, verify there is no current flowing in the DC cables between the PV module and the microinverter. If the current is still flowing, check that you have completed steps A, B, and C above.



NOTE: Take care when measuring DC current. Most clamp meters must be zeroed first, as they tend to drift with time.

- E. Disconnect the PV module DC cable connectors from the microinverter using an IQ Disconnect Tool.
- F. If present, loosen and/or remove any bonding hardware.
- G. Remove the microinverter from the PV racking.



WARNING: Risk of electric shock. Risk of fire. Do not leave any connectors on the PV system disconnected for an extended period. If you do not plan to replace the microinverter immediately, you must cover any unused connector with an IQ Sealing Cap.

Removing and replacing a microinverter

If problems remain after following the troubleshooting steps listed previously, contact Enphase Support at <https://enphase.com/en-au/support/contact>. If Enphase authorizes a replacement, make sure the

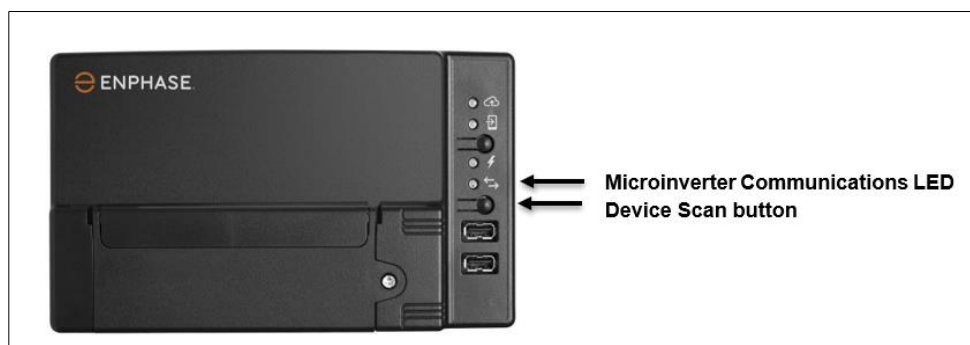
microinverter is not disconnected from the PV modules under load, and follow the disconnection steps in the order shown:

- A. De-energize the AC branch circuit breaker.
- B. AC connectors are tool-removable only. To disconnect the microinverter from the IQ Cable, insert the IQ Disconnect Tool and remove the connector.
- C. Remove the AC Module from the roof per the manufacturer's instructions.
- D. Once on the ground, disconnect the PV module DC connector from the microinverter using the IQ Disconnect Tool.
- E. Press each of the four clips to free the microinverter.
- F. Snap a new replacement microinverter into place.
- G. Connect the PV module DC connectors to the microinverter.
- H. Scan the new serial number.



NOTE: The serial number of the replacement microinverter will be different from the serial number on the AC Module frame.

- I. Bring the AC Module back onto the roof or other mounting location.
 - J. Connect the AC Module AC connector and DC connector to the IQ Cable.
 - K. Energize the AC branch circuit breaker and verify the operation of the replacement microinverter by checking the "Status LED" on the connector side of the microinverter.
 - L. Use the Enphase Installer App to retrieve the old microinverter serial number from the IQ Gateway database. In Enphase Installer App, once connected to the IQ Gateway:
 - a. Tap "Devices & Array" > "IQ Microinverters & Array" > "IQ Microinverter Serial Number"
 - b. Tap "RETIRE" to retire the old microinverter serial number from the IQ Gateway database.
 - c. Add the new microinverter serial number to the gateway database by scanning the barcode using Enphase Installer App and your device camera.
 - d. Tap "Devices & Array" > "IQ Microinverters & Array" > "ADD DEVICES". Scan the IQ8MC Microinverter's barcode and assign it to the array.
- OR
- e. Go to "Service" > "Request return and install replacement" > "Install Replacement". Enter the original device serial number and replacement device serial number and submit.



- M. Start the provisioning process for the newly added microinverter using Enphase Installer App and by connecting Enphase Installer App to IQ Gateway in AP mode. You can then "Start Provisioning Devices" through Enphase Installer App.
- N. Ship the old microinverter to Enphase using the supplied return shipping label.

IQ Cable planning and ordering

The IQ Cable is a continuous length of double-insulated, outdoor-rated cable with integrated connectors for microinverters. These connectors are preinstalled along the IQ Cable at intervals to accommodate varying PV module widths. The microinverters plug directly into the cable connectors.

Connector spacing options

IQ Cables are available in three connector spacing options. The gap between connectors on the cable can be 1.3 m, 2.0 m, or 2.3 m. The 1.3 m spacing is best suited for connecting PV modules installed in portrait orientation, while the 2.0 m and 2.3 m spacing allows you to install in landscape orientation for PV modules with 54-cell/108-half-cell, 60-cell/120-half-cell, 66-cell/132-half-cell, 72-cell/144-half-cell configurations.

IQ Cable options

The IQ Cable ordering options as given:

| Cable model | Connector spacing | PV module orientation | Connector count per box |
|---------------------|-------------------|-----------------------|-------------------------|
| Single-phase | | | |
| Q-25-10-240 | 1.3 m | Portrait | 240 |
| Q-25-17-240 | 2.0 m | Landscape (60-cell) | 240 |
| Q-25-20-200 | 2.3 m | Landscape (72-cell) | 200 |
| Three-phase | | | |
| Q-25-10-3P-200 | 1.3 m | Portrait | 200 |
| Q-25-17-3P-160 | 2.0 m | Landscape (60-cell) | 160 |
| Q-25-20-3P-160 | 2.3 m | Landscape (72-cell) | 160 |

The cabling system is flexible enough to adapt to almost any solar design. To determine the cable type you need, apply the following considerations:

- When mixing PV modules in both portrait and landscape orientation, you may need to transition between cable types. See the preceding table for available cable types.
- To transition between cable types, install an IQ Field Wireable Connector pair.
- In situations where portrait modules are widely spaced, you may need to use landscape-spaced cables for the portrait-oriented PV modules and create loops of excess cable, if needed.



WARNING: Do not form loops smaller than 120 mm in diameter.

IQ Cable accessories

IQ Cables are available with several accessory options for ease of installation, including:

- **Raw IQ Cable** (Q-25-RAW-300 for single-phase, Q-25-RAW-3P-300 for three-phase): Length 300 m. Raw cable with no connectors (optional).
- **IQ Field Wireable Connectors** (male and female; single-phase: Q-CONN-R-10M and Q-CONN-R-10F; male and female; three-phase: Q-CONN-3P-10M and Q-CONN-3P-10F).

- **IQ Cable Clip** (ET-CLIP-100): Used to fasten cabling to the racking or to secure looped cabling.
- **IQ Disconnect Tool** (Q-DISC-10): Disconnect tool for IQ Cable connectors, DC connectors, and AC Module mounts.
- **IQ Sealing Caps** (female) (Q-SEAL-10): One needed to cover each unused connector on the cabling.
- **IQ Terminator** (Q-TERM-R-10 for single-phase or Q-TERM-3P-10 for three-phase): One for each AC cable segment end; typically, two are needed per branch circuit.
- **IQ Relay**: Single-phase (Q-RELAY-1P-INT) or three-phase (Q-RELAY-3P-INT).
 - The three-phase IQ Relay also provides phase coupling to allow microinverters on all phases to communicate with the IQ Gateway. Use a legrand phase coupler (LPC-01) in a three-phase system for phase coupling support if IQ Relay is not installed in the system.

Technical considerations

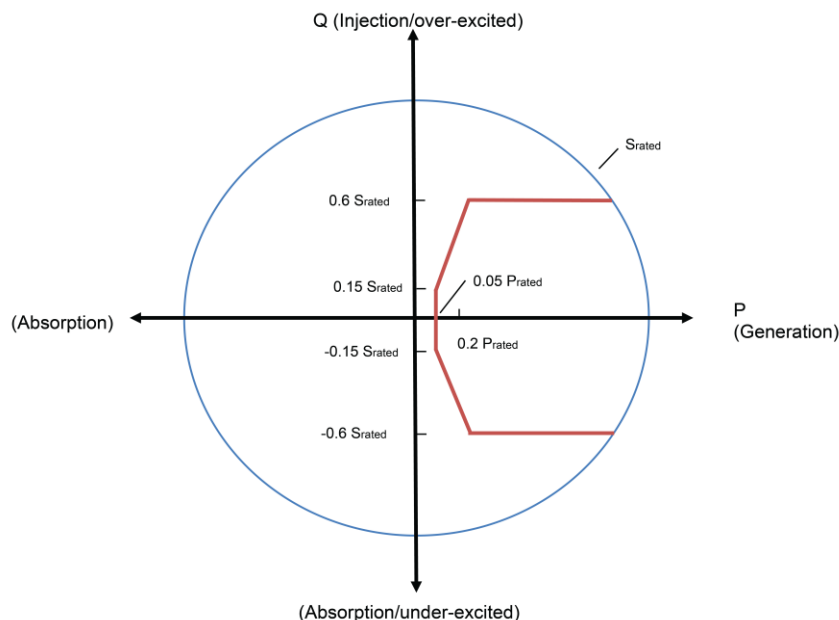


- Verify that the voltage and current specifications of the PV modules match those of the microinverters.
- The maximum short circuit current rating of the PV modules must be equal to or less than the maximum input DC short circuit current rating of the microinverters.

Bifacial modules

Anti-islanding

PQ capability curve



Specifications

Refer to the following table for specifications of the IQ8MC Microinverter covered in this manual:

IQ8MC-72-M-ACM-INT Microinverter specifications

| IQ8MC-72-M-ACM-INT Microinverter parameters | | | | |
|--|---|--|---------|-----------------|
| Topic | Unit | Min | Typical | Max |
| DC parameters | | | | |
| Maximum input power ^{1,2} | W | 480 | | |
| Minimum/Maximum MPP voltage | V | 25 | | 45 |
| Minimum/Maximum operating voltage | V | 18 | | 49 |
| Minimum/Maximum input voltage | V | 18 | | 60 |
| Start-up input voltage | V | 22 | | |
| Maximum input current (I _{dcmax}) | A | | | 14 |
| Maximum short-circuit DC input current (I _{scmax}) | A | | | 25 ³ |
| Protective class (all ports) | | | II | |
| PV array configuration | 1x1 ungrounded array; no additional DC side protection required; AC side protection requires max 20 A (single-phase or three-phase) | | | |
| AC parameters | | | | |
| Rated apparent power | VA | 325 | | |
| Maximum apparent power | VA | 330 | | |
| Power factor range | | 0.8 leading ... 0.8 lagging | | |
| Minimum/Nominal/Maximum grid voltage ⁴ | V _{rms} | 184 | 230 | 276 |
| Rated/Maximum output current | A _{rms} | | 1.41 | 1.43 |
| Nominal frequency | Hz | | 50 | |
| Minimum/Maximum frequency | Hz | 45 | | 55 |
| Maximum AC output over current protection device | A | 20 A single-phase and 25 A three-phase | | |
| High AC voltage trip limit accuracy | % | ±1.0 | | |
| Low AC voltage trip limit accuracy | % | ±1.0 | | |
| Frequency trip limit accuracy | Hz | ±0.1 | | |
| Trip time accuracy (for trip times or delays < 5 sec.) | ±ms | | | 33 |
| Trip time accuracy (for trip times or delays >= 5 sec.) | % | | | 1 |
| Overvoltage class AC port/DC port | | | III/II | |
| Power factor setting | | | 1.0 | |

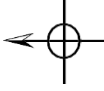
1. No enforced DC/AC ratio. See the compatibility calculator at <https://enphase.com/en-au/installers/microinverters/calculator>.
2. Installers should not exceed the small-scale technology certificate (STC) limit on PV module wattage for claiming the STC.
3. Maximum short circuit current for modules (I_{sc}) allowed to be paired with IQ8MC Microinverter: 20 A (calculated with 1.25 safety factor as per IEC 62548).
4. Nominal voltage range can be extended beyond nominal if required by the electricity network operator.

| Miscellaneous parameters | | | | |
|---|--|--------------------|--|----|
| Maximum ⁵ microinverters per 20 A (max) AC branch circuit 230 VAC (single-phase)/25 A AC branch circuit 400 VAC (three-phase) | | 12 (L+N)/42 (3L+N) | | |
| European weighted efficiency | % | 96.6 | | |
| Total harmonic distortion | % | | | <5 |
| Ambient air temperature range | °C | -40 | | 60 |
| Nighttime power loss | mW | | | 50 |
| Storage temperature range | °C | -40 | | 85 |
| IQ8MC-72-M-ACM-INT Microinverter parameters | | | | |
| Features and specifications | | | | |
| Compatibility | 54-cell/108-half-cell, 60-cell/120-half-cell, 66-cell/132-half-cell, 72-cell/144-half-cell | | | |
| Dimensions (without mounting brackets) | 212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2") | | | |
| DC connector type | Stäubli MC4 | | | |
| Weight | 1.1 kg | | | |
| IP Rating | Outdoor - IP67 | | | |
| Torque specifications for fasteners (Do not over torque) | <ul style="list-style-type: none">6 mm mounting hardware: 5 N m8 mm mounting hardware: 9 N m | | | |
| Cooling | Natural convection - no fans | | | |
| Relative humidity range | 4% to 100% (condensing) | | | |
| Approved for wet locations | Yes | | | |
| Altitude | < 2600 m | | | |
| Pollution degree | PD3 | | | |
| Standard warranty terms | http://enphase.com/warranty | | | |
| IQ8MC-72-M-ACM-INT Microinverter parameters | | | | |
| Compliance | With IQ Relay: AS/NZS 4777-2:2020 ⁶ Safety: EN IEC 62109-1, EN IEC 62109-2 EMC: EN IEC 61000-3-2, 61000-3-3, 61000-6-2, 61000-6-3, EN IEC 50065-1, 50065-2-1 EN55011 (At STC within MPP range) | | | |
| Earthing | The DC circuit meets the requirements for ungrounded PV arrays. Ground fault protection (GFP) is integrated into the Class II double-insulated microinverter. | | | |
| Monitoring | Enphase Installer Platform and Enphase App. Both options require an IQ Gateway. | | | |
| Communication | Power line communication (PLC) | | | |

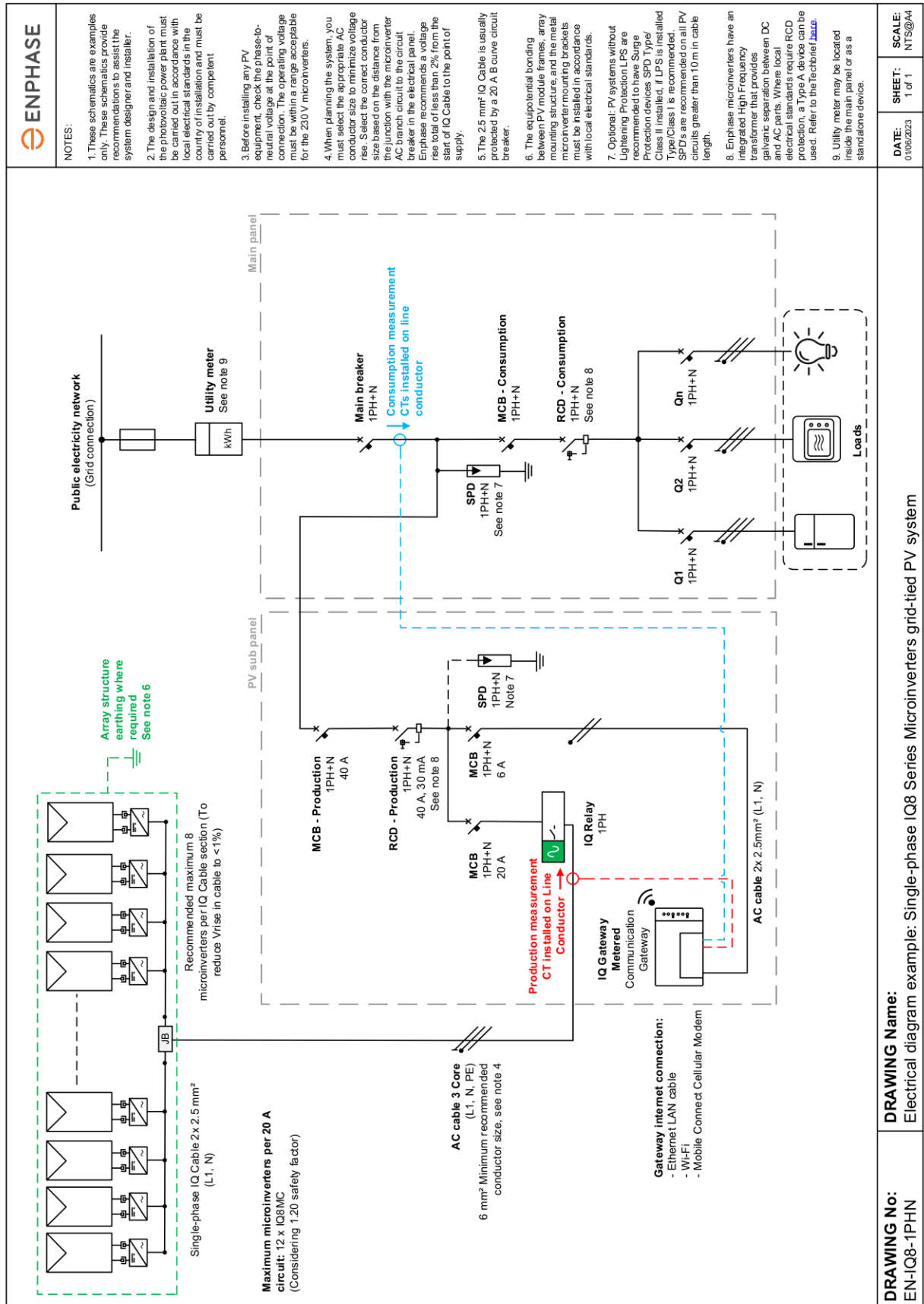
5. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

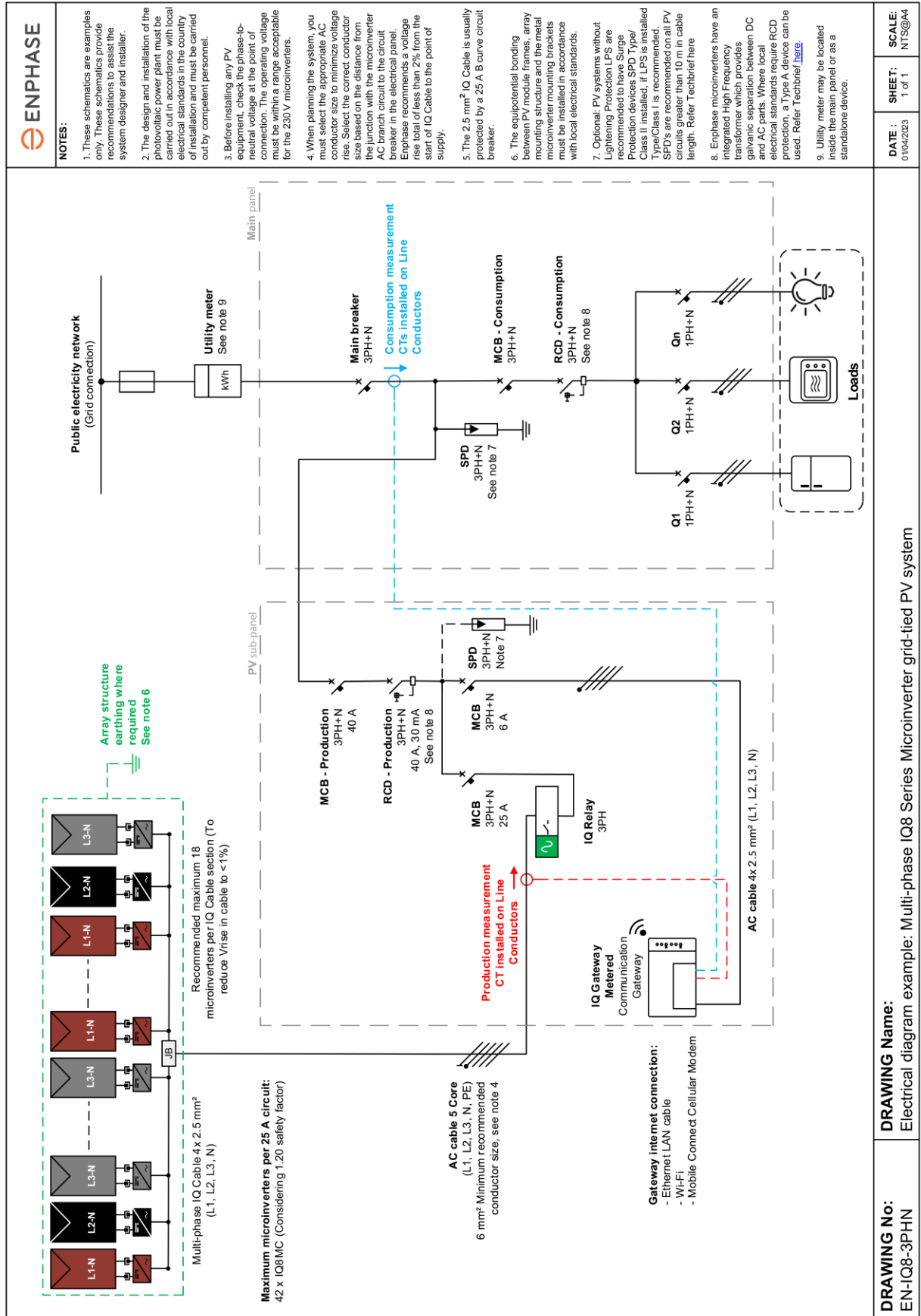
6. Minimum of two IQ8MC Microinverter shall be required in the system.

Enphase installation map

| | | | | | | | |
|---|---------|---|---|---|------------|---|--|
| Panel Group: Azimuth Tilt: Sheet ____ / ____ | Client: | | | | Installer: | | N S E W  |
| | 1 | 2 | 3 | 4 | 5 | 6 | |
| A | | | | | | | |
| B | | | | | | | |
| C | | | | | | | |
| D | | | | | | | |
| E | | | | | | | |
| F | | | | | | | |
| G | | | | | | | |
| H | | | | | | | |
| J | | | | | | | |
| K | | | | | | | |

Enphase wiring diagram





DRAWING NO: EN-IQ8-3PHN

DRAWING Name: Electrical diagram example: Multi-phase IQ8 Series Microinverter grid-tied PV system

DATE : 01/04/2023

SHEET: 1 of 1

SCALE: NTS@A4

Revision history

| Revision | Date | Description |
|---------------|-----------|-----------------|
| USM-00006-1.0 | July 2023 | Initial release |

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