

IQ9N Microinverter installation and operation manual



Applicable regions: North America

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FCC compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance may void the user's authority to operate the equipment.

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/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 and the quick install guide for IQ9N Microinverters. For warranty text, refer to <https://enphase.com/installers/resources/warranty>.

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

Safe transport and handling guidelines for microinverters

- Always transport microinverters in their original Enphase packaging, which is designed to protect against shock, vibration, and moisture, and complies with ISTA guidelines.

- Avoid stacking heavy items on top of microinverter boxes.
- Never transport microinverters while connected to any power source or PV module.

Audience

This manual is intended for use by competent personnel for the installation and maintenance of IQ9N Microinverters.

Product marking



1. Important safety information

1.1 Read this first

This manual contains important instructions for use during the installation, operation, and maintenance of the IQ9N Microinverter.

 **IMPORTANT:** The Enphase IQ9N Microinverter listed in this manual requires the IQ Cable. An IQ Gateway, IQ Combiner, or IQ System Controller is required to monitor the performance and, where required, provide control of the IQ9N Microinverter.

1.2 Product labels

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



Risk of electric shock. Energy storage timed discharge.



Risk of electric shock



Hot surface



Refer to safety instructions



Refer to manual



Double insulated

1.3 Safety Instructions

IMPORTANT SAFETY INSTRUCTIONS. SAVE THIS INFORMATION. This guide contains important instructions to follow during the installation of IQ9N Microinverters.

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 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 the installation of this equipment includes the 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 AC/DC connectors under load.



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 competent personnel should troubleshoot, install, or replace Enphase microinverters or the IQ Cable and accessories.



DANGER: Risk of electric shock. Risk of fire. Ensure all AC and DC wiring is correct and that none of the AC or DC wires are pinched or damaged. Ensure 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 20 A maximum breaker or fuse, as appropriate.



DANGER: Risk of electric shock when the solid red light is flashing from the microinverter's LED.



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/grid operator.



WARNING: When the PV array is exposed to light, DC voltage is supplied to the microinverter.



NOTE: To ensure optimal reliability and to meet warranty requirements, install the Enphase microinverters and IQ Cable according to the instructions in this guide.



NOTE: Provide support for the IQ Cable at least every 1.8 m (6 ft.).



NOTE: Perform all electrical installations per all applicable local electrical codes, such as the Canadian Electrical Code, Part 1, and NFPA 70 (NEC).



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

DC cable safety



NOTE: Ensure the following precautions:

- Ensure proper routing of the PV module DC cable using the clips to prevent the leads from resting on the roof. Do not wrap an 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 radius for the DC cable is eight times the cable's outer diameter.
- Avoid overly tightly sized cable clips for routing.

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 a return merchandise authorization (RMA) 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: The maximum open circuit voltage of the PV module must not exceed the specified maximum input DC voltage of the Enphase microinverter. Refer to the Enphase Compatibility Calculator to verify PV module electrical compatibility with the microinverter. Use IQ9N Microinverters only with compatible PV modules as per the Enphase Compatibility Calculator. Using an electrically incompatible PV module voids Enphase warranty.



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, 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 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 100°C. To reduce the risk of burns, use caution when working with microinverters.



NOTE: The Enphase microinverter has field-adjustable voltage and frequency trip points that may need to be set, depending upon local requirements. Depending on the electricity network operator, a grid profile other than the profile set on the microinverter might be needed to set up. Only an authorized

installer with permission and following the requirements of the local electrical authorities should make adjustments.

IQ Cable safety



DANGER: Risk of electric shock. Do not install the IQ Terminator while the power is connected.



DANGER: Risk of electric shock. Risk of fire. When stripping the sheath from the IQ 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 IQ Cable uncovered for an extended period. You must cover any unused connector with a sealing cap.



DANGER: Risk of electric shock. Risk of fire. Ensure 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 IQ Cable, secure any loose cables to minimize tripping hazards.



NOTE: When looping the IQ 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 IQ Disconnect Tool.



NOTE: When installing the IQ Cable and accessories, adhere to the following:

- Do not expose the terminator or cable connections to directed, pressurized liquid (water jets, and so on).
- Do not expose the terminator or cable connections to continuous immersion.
- Do not expose the terminator or cable connections to continuous tension (for example, tension due to pulling or bending the cable near the connection).
- Use only the connectors and cables provided.
- Do not allow contamination, debris, or moisture 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 an 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 IQ Cable; no other method is allowed.

2. Preparing for installation

1. Check the microinverter manufacturing date to ensure the installation date is within one year of the manufacturing date. The manufacturing date is encoded in the microinverter's serial number in the following format:

Serial number format—LLYYWWNNNNNN

LL—manufacturing location

YY—year

WW—work week

NNNNNN—serial number

2. Check PV module compatibility¹ with our microinverter using our module compatibility calculator using the links or QR code.



[US](#)



[Mexico](#)



WARNING: You must match the DC operating voltage range of the PV module with the allowable input voltage range of the Enphase microinverter. Using an electrically incompatible PV module voids Enphase warranty.

3. IQ9N Microinverters require the IQ Cable and IQ accessories.



IMPORTANT: IQ9N Microinverters include AC and DC connectors integrated into the bulkhead. The AC port connects to the IQ Cable or the Enphase IQ Field Wireable Connector. UL has evaluated the DC port for intermateability with Stäubli 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 MC4 connectors.

4. Enphase IQ9 Microinverters must be connected to an IQ Gateway or IQ Combiner to ensure functionality. The system software periodically verifies this connection, and if an IQ Gateway is not connected, the microinverters may stop functioning. Additionally, an IQ Gateway or IQ Combiner is required to manage, monitor, and control the system, and receive software updates.
5. The system's functionality may be impacted if the IQ Gateway or IQ Combiner is not installed on-site or remains disconnected from the internet or microinverters. A flashing orange LED on the microinverter may indicate a communication issue with the IQ Gateway.
6. The microinverter has a Class II double-insulated rating, which includes ground fault protection (GFP). To support GFP, use only PV modules equipped with DC cables labeled PV wire or PV cable. Refer to local electrical codes and standards for grounding requirements of the PV array and racking.
7. Check the compatibility when expanding an IQ7 or IQ8 system with IQ9N Microinverters:
 - IQ9N Microinverters can be added to the existing IQ8 or IQ7 systems on the same IQ Gateway/IQ Combiner only in the following configurations: (i) Solar Only or (ii) Solar Plus Battery (IQ Battery 3/10 or IQ Battery 3T/10T or IQ Battery 5P or IQ Battery 10C) grid-tied or with backup with IQ System Controller, IQ System Controller 2/3/3G/3M.
 - IQ7 Series Microinverters or IQ8 Series Microinverters cannot be added to a site with existing IQ9N Microinverters on the same gateway.
 - The Sunlight Jump Start feature is supported only in systems composed entirely of IQ8 Series Microinverters and IQ9N Microinverters. Systems that include IQ7 Series Microinverters—even if combined with IQ8 Series Microinverters or IQ9N Microinverters—do not support this function.

¹ IQ9N Microinverter is compatible with bifacial PV modules if the temperature-adjusted electrical parameters (open circuit voltage (V_{OC}), short circuit current (I_{SC})) of the modules, considering the electrical parameters, including the bifacial gain, are within the allowable microinverter input parameters range. In evaluating the amount of bifacial gain, follow the recommendations of the module manufacturers.

- Refer to the Enphase Power Control web page to check the availability of power-control features across different system types with IQ9N Microinverters: <https://enphase.com/installers/storage/power-control>.
 - The combined maximum continuous power output of the IQ7 Series Microinverters, IQ8 Series Microinverters, and IQ9N Microinverters in the system must not exceed 150% of the IQ Battery array's rated power output. If the microinverter array exceeds this ratio, PV shedding must be implemented to shed excess PV when the system transitions to the off-grid mode. However, this ratio (PV/ESS) increases to a 200% limit for a mixed system of IQ8 Series Microinverters and IQ9N Microinverters.
8. Download the Enphase Installer App and log in to your Enphase Account. To download, go to <https://enphase.com/installers/apps> or scan the following QR code.



Android



iOS



NOTE: After you log in to your Enphase Account from the Enphase Installer App, scan the microinverter serial numbers (standard 1D bar code) and connect to the IQ Gateway to track the system installation progress. Ensure you are using the latest version of the Enphase Installer App.

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

Maximum IQ9N Microinverters per AC branch circuit (single-phase)

240 V	9
208 V	8



NOTE: Refer to local regulations for circuit breaker sizing and define the number of microinverters per branch in your area.



NOTE: For a system containing a mix of IQ7, IQ8, IQ9N or IQ8, IQ9N Microinverters on the same branch, ensure that the total output current of all microinverters on the branch does not exceed 16 A.

10. Size the AC conductor to account for the voltage rise. Select the correct conductor size based on the distance from the last microinverter in the circuit to the breaker in the electrical panel/AC switchboard. Center-feed the branch to minimize voltage rise.
11. Protect your system with lightning and/or surge suppression devices. It is also important to have insurance that protects against lightning and electrical surges.
12. Verify that the AC voltage² on-site is within range:

Single-phase service: L1 to L2

240 V	211 to 264 VAC
208 V	183 to 229 VAC

13. The following are the IQ Cable coloring codes:

² Nominal voltage range can be extended beyond nominal if required by the utility.

Black—L1

Red—L2



WARNING: Incorrect termination may irreparably damage any connected microinverters.

3. Additional components and tools

S.N o.	Component	SKU details
1	IQ Gateway or IQ Combiner	To manage and monitor solar production ENV-IQ-AM1-240, ENV2-IQ-AM1-240, IQ Combiner 6C/5/5C/4/4C/3/3C, ENV-S-AM1-230-60 ³ . This is required to apply the grid profile to microinverters. An IQ Gateway or IQ Combiner can manage and monitor up to 300 IQ9N Microinverters.
2	IQ System Controller	The Enphase IQ System Controller, IQ System Controller 2/3/3G/3M connect the home to grid power, the IQ Battery system, and solar PV. It provides microgrid interconnect device (MID) functionality by automatically detecting and seamlessly transitioning the home energy system from grid power to backup power in the event of a grid failure.
3	IQ Meter Collar	IQ Meter Collar (MC-200-011-V01) is a meter socket adapter with an integrated microgrid interconnection device (MID) and Energy Meter. The IQ Meter Collar is compatible with third-generation Enphase Energy Systems, installed with IQ System Controller 3M and IQ Battery 5P. It is also compatible with fourth-generation Enphase Energy Systems installed with the IQ Combiner 6C and IQ Battery 10C.
4	IQ Battery	All-in-one AC-coupled storage solution that integrates seamlessly with your solar energy for maximum performance and energy savings. IQ Battery 10C, IQ Battery 5P, or IQ Battery 3/3T/10/10T.
5	Raw IQ Cable	Continuous 300 m cable. Q-12-RAW-300, single-phase.
6	Tie wraps or cable clips	Stainless steel cable clips to fasten the IQ Cable. ET-CLIP-100.
7	IQ Sealing Caps	For any unused connectors on the IQ Cable Q-SEAL-10.
8	IQ Terminator	Cap for unused IQ Cable ends. A cap for unused ends Q-TERM-10 is needed at the end of each AC cable segment. Typically, one IQ Terminator (End-feeding branch circuit) or two IQ Terminators (Centre-feeding branch circuit) are required per branch circuit.

³ Suitable only for French Polynesia, Antigua and Barbuda, Montserrat, and Saint Kitts.

S.N o.	Component	SKU details			
9	IQ Disconnect Tool	To disconnect the IQ Cable Connectors Q-DISC-10.			
10	IQ Field Wireable Connectors (optional)	Connect IQ Cables without complex wiring. Male and female: Q-CONN-10M and Q-CONN-10F			
11	IQ Cable	12 AWG cables with pre-installed connectors for IQ Microinverters			
		Cable model	Connector spacing	PV model orientation	Connectors per box
		Single-phase			
		Q-12-10-240	1.3 m	Portrait (all)	240
		Q-12-17-240	2.0 m	Landscape (60-cell and 66-cell)	240
		Q-12-20-200	2.3 m	Landscape (72-cell)	200

Additional materials and tools for installation:

- An AC junction box or AC isolator
- Screwdrivers, wire cutter, voltmeter, torque wrench, sockets, and wrenches for mounting hardware
- Crimp tool Multi-Contact PV-CZM-18100, -19100, or -22100 for single-phase IQ Field Wireable Connector



NOTE: The components listed in the preceding table may not be applicable in all countries. Check availability in your country before ordering.

4. Installing IQ9N Microinverters

Install IQ9N Microinverters as follows:

1. Position the IQ Cable.

- Count the required IQ Cable connectors for the branch circuit (considering voltage rise and branch circuit) and cut the cable accordingly, leaving at least 5.9 inches after the last connector for termination.
- Mark microinverter positions at fixed intervals along the PV racking, based on their connection sequence. The maximum spacing between two microinverters depends on the IQ Cable variant (as specified in its SKU), PV module DC cable lengths, and module dimensions.
- Align the IQ Cable along the rack, matching connector locations to the marked positions. Leave slack for individual IQ Cable drops, cable bends, and potential obstructions. Secure the cable using tie-wraps or IQ Cable Clips to avoid tension on the connector.



WARNING: When transitioning between rows, secure the cable to the rail to prevent cable or connector damage. Do not put any connectors on the microinverter under tension.

2. Position the junction box/AC isolator.

- Install the junction box at a suitable location and provide an AC connection from the junction box/AC isolator or IQ Field Wireable Connectors to the electricity network.
- Provide an AC connection from the junction box back to the electricity network connection using equipment and practices as required by local jurisdictions.



NOTE: All installations require that you use the IQ Gateway to commission the microinverters to propagate correct grid profile settings. This also ensures the microinverter's firmware is upgraded whenever a newer version is available.

3. Mount the microinverters.

Mount microinverters under the PV module, either horizontally (bracket facing towards the rear of the PV module is recommended) or vertically or in-plane with the vertical facade PV module, while maintaining the necessary clearances. Microinverters must be protected from direct exposure to rain or directed, pressurized liquid (water jets). It is recommended to avoid direct exposure to sunlight/UV.

- Mount the microinverter either vertically or horizontally while maintaining the necessary clearances.
 - When mounted horizontally or in-plane with a vertical facade PV module, allow a minimum of 19 mm (¾") between the roof/wall (for facade) and the microinverter. Also, allow 13 mm (½") between the rear of the PV module and the top of the microinverter.
 - When mounted vertically to the roof, maintain at least 300 mm (12") clearance from the edges of the PV module to protect the microinverter from direct exposure to rain, UV, and other harmful weather events.
- Torque the mounting fasteners—6 mm mounting hardware: 5 N m or 8 mm mounting hardware: 9 N m.



WARNING: Do not mount the microinverter with connectors oriented upwards.

4. Create an installation map.

- Peel the removable serial number label from each microinverter and the IQ Gateway, and apply them to the respective locations on the paper Enphase installation map.
- Keep a copy of the map for your records.

5. Manage the cabling.

- Use cable clips or tie wraps to attach the cable to the racking. The cable must be supported at least every 1.8 m (6 feet).
- Dress any excess cable in loops so that it does not contact the roof. Do not form loops smaller than 12 cm (4.75 inches) in diameter.

6. Connect the microinverters.

- Cover any unused connectors on the IQ Cable with the IQ Sealing Caps (Q-SEAL-10). Listen for a click as the IQ Sealing Caps engage.



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



DANGER: Risk of electric shock. Risk of fire. Only competent personnel may connect the Enphase microinverter to the utility grid.

7. **Terminate the unused end of the cable:** See section 6, [Additional information for installation](#) on page 15, on how to terminate the cable for single-phase.
8. **Complete the installation of the junction box/AC isolator/IQ Field Wireable Connectors:** Connect the IQ Cable to the junction box/AC isolator/IQ Field Wireable Connectors.



WARNING: To prevent irreversible damage to the system, confirm cable insulation colours at connections before energising the AC supply. Incorrect termination may irreparably damage any connected microinverters.

9. Connect the PV modules.

- a. Connect the DC leads of each PV module to the DC input connectors of the microinverter.
- b. Check the LED on the connector side of the microinverter. The LED flashes green six times when DC power is applied.
- c. Mount the PV modules above the microinverters.

10. 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.
- c. Check the LED on the connector side of the microinverter.

LED	Indicates
Flashing green	Normal operation. The AC grid function is normal, and there is communication with the IQ Gateway. IQ9N Microinverter's LED will flash 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 specification.
Solid red	There is an active DC Resistance Low, Power Off condition. To reset, refer to the <i>IQ Gateway quick install guide</i> at https://enphase.com/installers/resources/documentation/communication . 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 the PV module. Swap out the faulty PV module or microinverter.



WARNING: For shutting down the system, always de-energize the AC branch circuit breaker. Never disconnect the DC or AC connectors under load. For the Enphase Energy Systems that include the IQ System Controller and the IQ Battery, turn the System Shutdown Switch to the OFF position. Wait for at least a minute and use a multimeter to measure the AC voltage on all the following terminals—PV, IQ Battery, mains, and load. Ensure no voltage is detected on any of these terminals.

5. Commissioning the system

1. Open the Enphase Installer App and register a new system.
2. Scan the barcodes to add devices and set up the array.
3. Set the appropriate grid profile for the region.
4. Connect the IQ Gateway to the internet using the wizard in the Enphase Installer App.
5. Provision the devices and complete the commissioning flow.

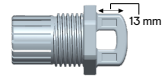
Once provisioned, the system will ramp up to full producing power after grid profile propagation is completed. It may take 20–30 minutes for full power production based on the number of microinverters in the system.

6. Additional information for installation

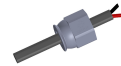
Terminate the unused end of the IQ Cable as follows.

Single-phase IQ Cable

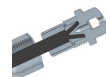
Step 1: Remove 13 mm (0.5 inches) of the cable sheath from the conductors. Use the IQ Terminator body loop to measure.



Step 2: Slide the hex nut onto the cable.



Step 3: Insert the cable into the IQ Terminator body so the two wires land on opposite sides of the internal separator. The grommet inside the IQ Terminator body must remain in place.



Step 4: Insert a screwdriver into the slot on the top of the IQ Terminator to hold it in place. Hold the IQ Terminator body stationary with the screwdriver and turn only the hex nut to prevent the conductors from twisting out of the separator. Torque the nut to 7 N m.



Step 5: Attach the terminated cable end to the PV racking with a cable clip or tie wrap so that the cable and IQ Terminator cannot contact the roof.



WARNING: Use the IQ Terminator only once. If you open the IQ Terminator following installation, the latching mechanism is destroyed. Do not reuse the IQ Terminator.

7. Quick visual installation overview

IQ9N Microinverter installation

1 Count connectors for the branch circuit based on V-rise and branch limits.
2 Cut the IQ Cable leaving at least 15 cm after last connector.
3 Mark the microinverter positions at fixed intervals along PV racking.
4 Align IQ Cable to marks, allow slack for drops/bends. Secure the cable using cable ties/clips.

2 1 Install junction box/AC isolator at a suitable location and connect to the electricity network using best practices.
2 Verify IQ Cable wiring color codes.

3 **Horizontal mount**
Vertical mount

1 Mount microinverters under the PV module either horizontally (bracket facing towards the rear of the PV module is recommended) or vertically or in plane with vertical facade PV modules while maintaining the necessary clearances. Microinverters must be protected from direct exposure to rain or directed, pressurized liquid (water jets). It is recommended to avoid direct exposure to sunlight/UV.

4 1 Peel serial numbers from microinverters and gateway to create a map.
2 Keep a copy of the map for records.

5 1 Manage the cabling by using cable clips or tie wraps to attach cable to racking.
2 Support cable every 1.8 m (6 feet).
3 Do not form loops less than 12 cm (4.75 inches) in diameter.

6 1 Connect the microinverters and listen for a click.
2 Seal any unused connectors on the IQ Cable with IQ Sealing Caps. Listen for a click as the sealing caps engage.
4 To remove a sealing cap or AC connector, use the IQ Disconnect Tool.
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.

7 1 Terminate the unused end of the IQ Cable using the IQ Terminator. See section 6 for details.
WARNING: The IQ Terminator cannot be reused. If you unscrew the nut, you must discard the terminator.

8 1 Connect the IQ Cable to the junction box/AC isolator.

9 1 Mount the PV modules and connect the DC leads of PV modules to the DC input connectors* of the microinverters.
2 Check the LED on the connector side of the connector. The LED flashes green six times when DC power is applied.

10 1 Turn ON AC disconnect or circuit breaker for branch circuit and main utility.
2 Check the LED on the connector side of the microinverter to be flashing green for normal operation. Refer to section 6.1 for additional details on LED indicators.

Bending radius
IQ Cable: R 6 cm (2.36 in)
8 X OD of DC cable

DC cable: 8 X OD of DC cable

NOTE: After you have installed the microinverters, follow the instructions in Section 5 to commission the system to activate system monitoring, set up grid management functions, and complete the installation.

* IQ9N Microinverters include both AC and DC connectors. The DC port has been evaluated by UL for interchangeability with Stäubli MC4 connectors. Cable coupler models are PV-KST14/...-UR, PV-KB14/...-UR, and PV-KST14-EVO2/...-UR, and PV-KB14-EVO2/...-UR. Mate the DC port of the inverter with the Stäubli MC4 connectors.

7.1 Set up and activate monitoring

See the *IQ Gateway quick install guide* at <https://enphase.com/installers/resources/documentation/communication> to install the gateway and set up system monitoring and grid management functions. This guide leads you through the following:

- Connecting the IQ Gateway
- Detecting devices
- Connecting to the Enphase Installer App
- Registering the system
- Building the virtual array



NOTE: When the utility requires a profile other than the default IEEE 1547 (for example, grids managed by Hawaii Electric Industries [HEI], including HECO), you must select an appropriate grid profile for your installation.

You can set the grid profile anytime through the Enphase Installer Platform, during system registration, or through the Enphase Installer App. An IQ Gateway is required to set or change the grid profile. For more information on setting or changing the grid profile, see the *IQ Gateway installation and operation manual* at <https://enphase.com/installers/resources/documentation/communication>.

8. Troubleshooting

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



WARNING: Risk of electric shock. Do not attempt to repair the Enphase microinverter; it contains no user-serviceable parts. If it fails, contact Enphase Support at <https://enphase.com/contact/support> to obtain an RMA number and start the replacement process.

8.1 Status LED indications and error reporting

The following section describes the microinverter LED indications.

8.1.1 LED operation

See the LED table in the [Installing IQ9N Microinverters](#) on page 12. 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 flashes indicate that no grid is present and the system is not energized.

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

8.1.2 DC Resistance Low – Power Off condition

For the IQ9N 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 gateway will continue to report the fault 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 a 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 reset manually.

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, clearing can be attempted manually. Refer to the following method. If the condition does not clear, contact Enphase Support at <https://enphase.com/contact/support>.

Perform the following steps 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.

Method: Clear this error using the Enphase Installer Platform

1. Log in to the Enphase Installer Platform and access the system.
2. Click the **Events** tab. The next screen shows the current **DC Resistance Low - Power Off** condition of the system.
3. Click **DC Resistance Low - Power Off**.
4. Click the serial number of the affected microinverter.
5. Click **Tasks and Clear GFI** to clear the event.

8.1.3 Other faults

All other faults are reported to the gateway. Refer to the *IQ Gateway installation and operation manual* at <https://enphase.com/installers/resources/documentation/communication> for troubleshooting procedures.

8.2 Troubleshoot an inoperable microinverter

To troubleshoot an inoperable 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. For the Enphase Energy Systems that include the IQ System Controller and the IQ Battery, turn the System Shutdown Switch to the OFF position. Wait for at least a minute and use a multimeter to measure the AC voltage on all the following terminals: PV, IQ Battery, mains, and load. Ensure no voltage is detected on any of these terminals.



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

1. Ensure AC circuit breakers and disconnects are closed.
2. Check the connection to the grid and verify that the grid voltage is within allowable ranges.
3. Verify that AC line voltages at all PV circuit breakers in the electrical panel and subpanels are within the ranges shown in the following table.
4. Verify that the AC line voltage at the junction box for each AC branch circuit is within the ranges shown in the following table.

240 VAC, single-phase	
L1 to L2	211 to 264 VAC
L1, L2 to Ground	106 to 132 VAC
208 VAC, single-phase	
L1 to L2	183 to 229 VAC
L1, L2 to ground	106 to 132 VAC

- Using an IQ Disconnect Tool, disconnect the AC cable for the microinverter in question from the IQ Cable.
- Verify that utility power is present at the microinverter by measuring line-to-line and line-to-ground voltage at the IQ Cable connector.
- 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.
- Ensure that any upstream AC disconnects and 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 startup operation, about two minutes after connecting to DC power. The LED subsequently resumes normal operation if the grid is present. See the LED table in the [Installing IQ9N Microinverters](#) on page 12.
- Connect a clamp meter (set to DC mode) to one of the conductors of the DC cables from the PV module to measure the microinverter current. This will be under 1 A if the AC is disconnected.
- Verify the PV module DC voltage is within the allowable range shown in [Specifications](#) on page 22. To verify PV module electrical compatibility with the microinverter, see <https://enphase.com/installers/microinverters/calculator>.
- Swap DC leads with a known good, adjacent PV module. If the problem moves to the adjacent module after periodically checking the Enphase Installer Platform (this may take up to 30 minutes), it indicates that the PV module is not functioning correctly. If it stays in place, the problem is with the original microinverter. Contact Enphase Support at <https://enphase.com/contact/support> for help in reading the microinverter data and for assistance in obtaining a replacement microinverter, if needed.
- 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.
- Verify with your electricity network operator or with a multi-meter measuring frequency at the point of supply that the line frequency is within the range. If the problem persists, contact Enphase Support at <https://enphase.com/contact/support>.

8.3 Disconnect a microinverter

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

- De-energize the AC branch circuit breaker. Never disconnect the DC or AC connectors under load. For the Enphase Energy Systems that include the IQ System Controller and the IQ Battery, turn the System Shutdown Switch to the OFF position. Wait for at least a minute and use a multimeter to

measure the AC voltage on all the following terminals: PV, IQ Battery, mains, and load. Ensure no voltage is detected on any of these terminals.

2. The IQ Cable AC connectors are tool-removable only. To disconnect the microinverter from the IQ Cable, insert the IQ Disconnect Tool and remove the connector.
3. Cover the PV module with an opaque cover.
4. Using a clamp meter (set to DC mode), verify that no current flows through the DC cables between the PV module and the microinverter. If the current continues to flow, check that you have completed the preceding steps.



NOTE: Take care when measuring the DC, as most clamp meters must be zeroed first, as these tend to drift with time.

5. Disconnect the PV module DC cable connectors from the microinverter using the IQ Disconnect Tool.
6. If present, loosen and/or remove any bonding hardware.
7. 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.

8.4 Install a replacement microinverter

1. When the replacement microinverter is available, verify that the AC branch circuit breaker is de-energized. For the Enphase Energy Systems that include the IQ System Controller and the IQ Battery, turn the system shutdown switch to the OFF position. Wait for at least a minute and use a multimeter to measure the AC voltage on all the following terminals: PV, IQ Battery, mains, and load. Ensure no voltage is detected on any of these terminals.
2. To install a replacement microinverter, refer to [Installing IQ9N Microinverters](#) on page 12 for mounting instructions.
3. Mount the microinverter horizontally, bracketed side up, or vertically.
 - a. Mount microinverters under the PV module, either horizontally (bracket facing towards the rear of the PV module is recommended) or vertically or in-plane with the vertical facade PV modules, while maintaining the necessary clearances. Microinverters must be protected from direct exposure to rain or directed, pressurized liquid (water jets). It is recommended to avoid direct exposure to sunlight/UV.
 - i. When mounted horizontally or in-plane with a vertical facade PV module, allow a minimum of 19 mm (¾") between the roof/wall (for facade) and the microinverter. Also, allow 13 mm (½") between the rear of the PV module and the top of the microinverter.
 - ii. When mounted vertically to the roof, maintain at least 300 mm (12") clearance from the edges of the PV module to protect the microinverter from direct exposure to rain, UV, and other harmful weather events.



WARNING: Do not mount the microinverter with connectors oriented upwards.



NOTE: Do not expose the AC or DC connectors (on the IQ Cable connection, PV module, or microinverter) to rain or condensation before the connectors are mated.

4. Connect the microinverter to the IQ Cable connector. Listen for a click as connectors engage.
5. Connect the DC leads of each PV module to the DC input connector of the microinverter.
6. Re-mount the PV module above the microinverter.
7. 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.

8. Use the Enphase Installer App to retrieve the old microinverter serial number from the IQ Gateway database. In the 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 the Enphase Installer App and your device camera.
 - d. Tap **Devices & Array > IQ Microinverters & Array > Add Devices**. Scan the IQ9N Microinverter's barcode and assign it to the array.

or

Go to **Service > Request return and install replacement > Install replacement**. Enter the original device serial number and the replacement device serial number, and submit.
9. Start the provisioning process for the newly added microinverter using the Enphase Installer App and by connecting the Enphase Installer App to the IQ Gateway in AP mode. You can then **Start Provisioning Devices** through the Enphase Installer App.
10. Ship the old microinverter to Enphase using the supplied return shipping label.

9. Technical data

9.1 Anti-islanding



WARNING: Risk of equipment damage. You must match the DC operating voltage range of the PV module with the allowable input voltage range of the Enphase microinverter.



WARNING: Risk of equipment damage. The maximum open circuit voltage of the PV module must not exceed the specified maximum input voltage of the Enphase microinverter.

Be sure to apply the following when installing the Enphase IQ9N Microinverter system:

- PV modules must have conductors labeled **PV Wire** or **PV Cable** to comply with the NEC for ungrounded PV power systems.
- Verify that the voltage and current specifications of the PV module match those of the microinverter.
- The PV module's maximum short circuit current rating must be equal to or less than the microinverter's maximum input DC short circuit current rating.

The output voltage and current of the PV module depend on the PV cells' quantity, size, and temperature, and the insolation of each cell. The highest PV module output voltage occurs when the cells' temperature is the lowest and the PV module is in an open circuit (not operating).

9.2 Bifacial modules

Enphase IQ9N Microinverters are compatible with bifacial PV modules if the temperature-adjusted electrical parameters (maximum power, voltage, and current) of the modules, considering the electrical parameters, including the bifacial gain, are within the allowable microinverter input parameters range. In evaluating the amount of bifacial gain, follow the recommendations of the module manufacturers. Bifacial solar modules produce power from both sides of a bifacial module, increasing total energy generation. The power gained from the rear side (bifacial gain) is highly influenced by various design factors such as albedo, module elevation, pitch, temperature, and

shading. The bifacial gain can be anywhere between 0% to 30% of the module's nominal (front-side power rating). As various design considerations highly influence the bifacial gain, pairing the bifacial module with the right microinverter depends on the electrical characteristics of a given module.

10. Specifications

The IQ9N-A-US specifications are provided in the following table.

Input data (DC)	Units	IQ9N-A-US/IQ9N-A-DOM-US	
Commonly used module pairings	W	340-580	
Module compatibility	—	To meet compatibility, the PV modules' open-circuit voltage (Voc) at the lowest temperature and short-circuit current (Isc) at the highest temperature must be within the microinverter's maximum input DC voltage and maximum module Isc. Module compatibility can be checked at https://enphase.com/en-us/installers/microinverters/calculator .	
MPPT voltage range	V	28-45	
Operating range	V	18-58	
Minimum/Maximum start voltage	V	21-58	
Maximum input DC voltage	V	60	
Maximum continuous input DC current	A	16	
Maximum input DC short-circuit current	A	25	
Maximum module Isc	A	20	
Overvoltage class DC port	—	II	
DC port backfeed current	mA	0	
PV array configuration	—	Ungrounded array; no additional DC side protection required; AC side protection requires a maximum of 20 A per branch circuit	
Output data (AC)	Units	IQ9N-A-US/IQ9N-A-DOM-US @ 240 V	IQ9N-A-US/IQ9N-A-DOM-US @ 208 V
Maximum continuous output power	VA	427	405
Nominal grid voltage (L-L)	—	240 V, split-phase (L-L), 180°	208 V, single-phase (L-L), 120°
Minimum and maximum grid voltage ⁴	V	211-264	183-229

Output data (AC)	Units	IQ9N-A-US/IQ9N-A-DOM-US @ 240 V	IQ9N-A-US/IQ9N-A-DOM-US @ 208 V
Maximum continuous output current	A	1.78	1.95
Nominal frequency	Hz	60	
Extended frequency range	Hz	47–68	
AC short-circuit fault current over three cycles	Arms	2.3	
Maximum units per 20 A (L-L) branch circuit ⁵	—	9	8
Total harmonic distortion	%	<3	
Overvoltage class AC port	—	III	
AC port backfeed current	mA	30	
Power factor setting	—	1.0	
Grid-tied power factor (adjustable)	—	0.85 leading ... 0.85 lagging	
Peak efficiency	%	97.8	
CEC weighted efficiency	%	97.5	
Measurement accuracy for active power	%	5% of rated	
Measurement accuracy for reactive power	%	5% of rated	
Measurement accuracy for voltage (AC)	%	1% of nominal	
Measurement accuracy for frequency	mHz	10	
Measurement accuracy for trip time	—	2 cycles for 100 ms to <5s, 1% of trip duration for >5s	
Nighttime power consumption	mW	54	63
Mechanical data		IQ9N-A-US/IQ9N-A-DOM-US @ 240 V	IQ9N-A-US/IQ9N-A-DOM-US @ 208 V
Ambient temperature range		–40°C to 65°C (–40°F to 149°F)	
Relative humidity range		4% to 100% (condensing)	

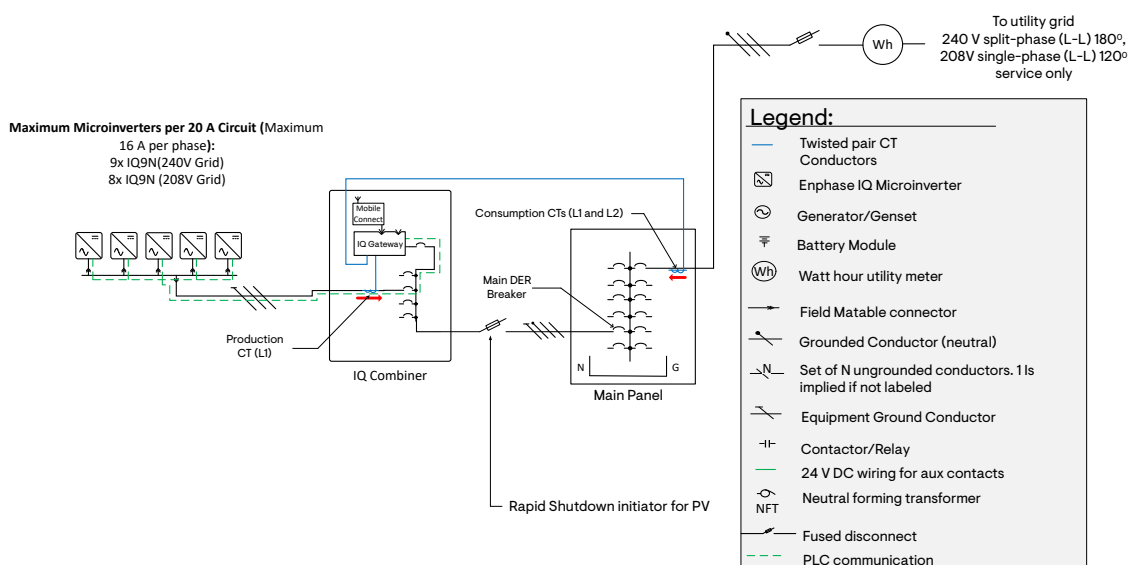
⁴ The grid voltage range can be adjusted from the specified range if required to meet utility grid requirements.

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

Mechanical data		IQ9N-A-US/IQ9N-A-DOM-US @ 240 V	IQ9N-A-US/IQ9N-A-DOM-US @ 208 V
DC connector type	Stäubli MC4		
Dimensions (H × W × D)	214 mm (8.4") × 176 mm (6.9") × 30.8 mm (1.2")		
Weight	1.1 kg (2.4 lb)		
Cooling	Natural convection – no fans		
Approved for wet locations	Yes		
Pollution degree	PD3		
Enclosure	Class II double-insulated, corrosion-resistant polymeric enclosure		
Environmental category	NEMA Type 6		
UV exposure rating	Outdoor		
Altitude	<3000 m (9843 ft)		
Compliance		IQ9N-A-US/IQ9N-A-DOM-US @ 240 V	IQ9N-A-US/IQ9N-A-DOM-US @ 208 V
Certifications	CA Rule 21 (UL 1741-SA), UL 62109-1, IEEE 1547:2018 (UL 1741-SB 3rd Ed.), FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01. This product is ETL Listed as PV rapid shutdown equipment and conforms with NEC 2014, NEC 2017, NEC 2020 and NEC 2023 section 690.12 and C22.1-2018 Rule 64-218 rapid shutdown of PV systems for AC and DC conductors when installed according to the manufacturer's instructions.		
Standards	Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources [UL 1741:2021 Ed.3+R 22Apr2025]. Grid Support Utility Interactive Equipment - Supplement SA to UL 1741:2021 Ed 3—Inverters, Converters, Controllers and Interconnection System Equipment for use with Distributed Energy Resources. Functional Safety [UL 1741:2021 Ed.3 (Supplement SA)]. Grid Support Utility Interactive Inverters and Converters Based Upon IEEE 1547:2018 & IEEE 1547.1:2020 - Supplement SB to UL 1741:2021 Ed.3—Inverters, Converters, Controllers and Interconnection System Equipment for use with Distributed Energy Resources. Functional Safety [UL 1741:2021 Ed.3 (Supplement SB)]. Power conversion equipment [CSA C22.2 #107.1:2016 Ed 4] Interconnection of Distributed Energy Resources and Electricity Supply Systems [CSA C22 3#9:2020 Ed 2]. Safety of Power Converters for Use in Photovoltaic Power Systems—Part 1: General Requirements [UL 62109-1:2014 Ed. 1+R 28Nov2023]. Safety of Power Converters for Use in Photovoltaic Power Systems—Part 1: General Requirements [CSA C22 2#62109-1:2016 Ed.1].		

Compliance	IQ9N-A-US/IQ9N-A-DOM-US @ 240 V	IQ9N-A-US/IQ9N-A-DOM-US @ 208 V
	Safety Of Power Converters for Use In Photovoltaic Power Systems—Part 2: Particular Requirements for Inverters [CSA C22 2#62109-2:2016 Ed.1]. Photovoltaic rapid shutdown systems [CSA C22.2#330:2023 Ed.2]. EMI Standard: IEEE Std C37.90.2.	

11. Enphase wiring diagram



12. Revision history

Revision	Date	Description
IOM-00136-2.0	January 2026	Editorial corrections.
IOM-00136-1.0	December 2025	Initial release.