# *Power export limit for IQ8 Commercial PV systems*



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TEB-00159-1.0

# Contents

## Applicable countries

- United States of America
- Puerto Rico
- Canada
- Mexico

## Overview

IQ8 Commercial Microinverter in grid-tied mode can work in the following configurations:

- Net energy metering: In this type of application, the utility-interactive IQ8 Commercial Microinverters (IQ8P-3P, IQ8H-3P) can export excess PV production to the grid, which generally results in some form of compensation from the utility.
- Export limiting: For systems interconnected to a utility service that requires an export limit, the PV system must limit the amount of power exported to the utility grid. Any PV generation not consumed locally by loads and exported onto the grid must be limited as defined by the utility interconnection agreement.

System

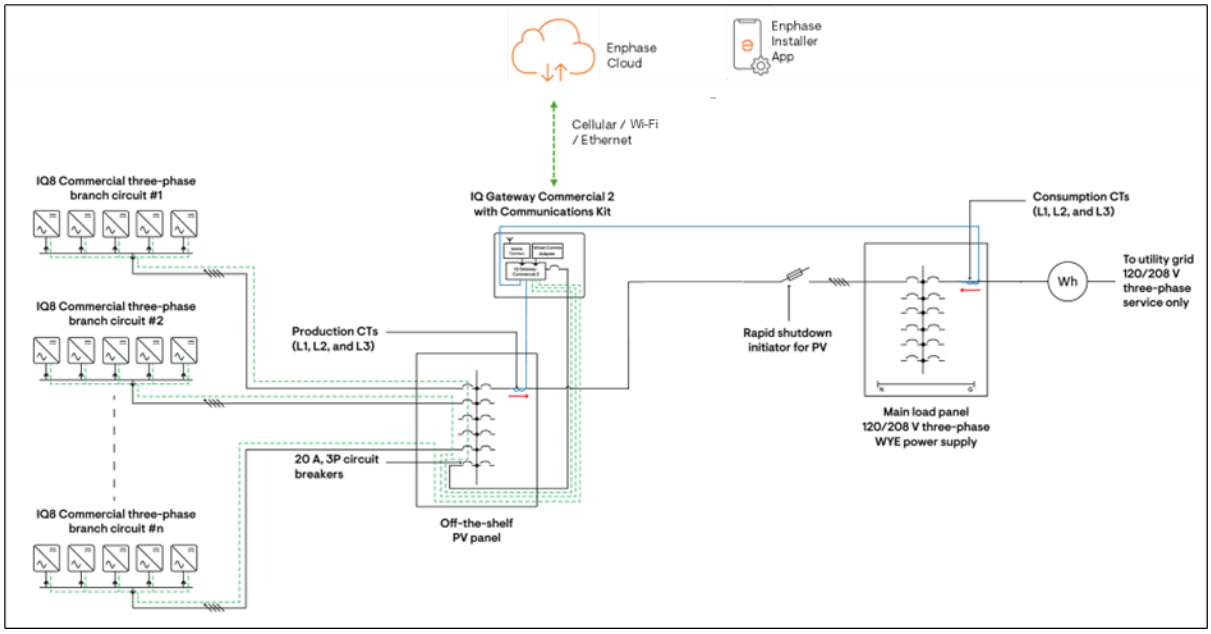


*Figure 1: IQ8 Commercial grid-tied PV system*

This technical brief provides guidelines for design considerations, installation, and configuration of IQ8 Commercial Microinverter systems (refer to figure 1) for power export limitations. Refer to IQ8 Commercial Microinverter grid-tied PV system design guide for commercial system design guidelines.

## Power export limit

The Enphase power export limit (PEL) feature can be configured to operate at different PELs to meet the site's requirements, as specified by the local utility provider. This feature can be defined within a specific grid profile and hence installers must use different grid profiles for different PEL values.

The IQ Commercial PV systems have IQ Gateway Commercial 2 with Production CTs (400 Amp) installed at solar PV subpanels and Consumption CTs (600 Amp) installed at/near the utility service location. The IQ Gateway Commercial 2 limits PV production and ensures that the power export remains within the limits set by the grid profile.

The following settings define the IQ8 Commercial Microinverter system power export limit:

- PEL threshold in watts.
- PEL (Enabled/Disabled) –To enable/disable the PEL feature.
- Per Phase/Aggregate Power Export Limit – To define if the PEL value entered is per phase or aggregate limit. Per phase means a PEL is defined per L1, L2, and L3 phases. An aggregate limit is a cumulative PEL value and does not check for PEL violations for each phase.
- Export limit – Soft limit threshold in watts: This is the primary IQ Gateway Commercial 2 control function.
- Export response time in milliseconds – Expected time within which power export, if exceeded, should be curtailed to the PEL.
- Communication loss time limit in milliseconds – Expected time within which lost communication must recover (minimum comms loss time setting is 10 seconds).

Once a PEL is defined (using a grid profile) and enabled, the IQ Gateway Commercial 2 continually monitors Consumption CT readings (every 200 ms) and checks if the PEL is violated. If exported power is greater than the PEL, then the PEL algorithm sends a control signal within the first second followed by periodic 3-second control signals to ramp down PV production until power export is within limits again. The algorithm ensures that power is curtailed within the export response time defined in the grid profile. However, if primary protection fails to control power export and the export limit is violated for a duration greater than the export response time, then PV is shut down/ramped down to zero.

## System requirements

In addition to the general system components necessary for an IQ8 Commercial Microinverter system, export limiting requires the following system components:

- IQ Gateway Commercial 2. A site must have only a single IQ Gateway Commercial 2 installed to be PEL capable. **Sites with multiple gateways cannot perform PEL collectively.**
- Consumption Current Transformers (600 A) fitted and enabled through the Enphase Installer App.
- A grid profile that includes the PEL value set to the export limit is required. If no pre-existing grid profile is required for the export limit, contact Enphase Support to request a new custom grid profile.

## On-site configuration

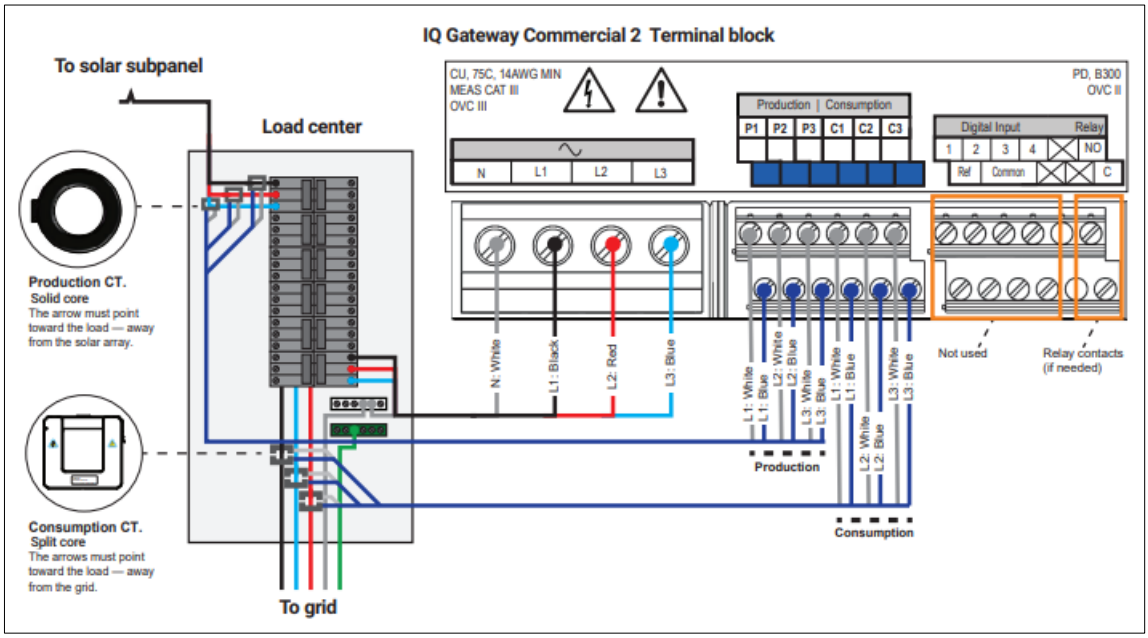


*Figure 2: IQ Gateway Commercial 2 terminal block diagram for PEL*

Refer to the IQ Gateway Commercial 2 quick install guide to activate system monitoring. Set up the correct grid profile as per PEL requirements and complete the installation. Ensure IQ Gateway Commercial 2 has detected all microinverters on site with at least three bar communication levels for all devices.

## Production and Consumption CTs

The IQ Gateway Commercial 2 includes three Production CTs, and you can order three Consumption CTs for consumption monitoring if PEL is needed. Ensure CTs have been correctly oriented, wired, and activated. Refer to the IQ Gateway Commercial 2 Quick Install Guide for CT installation guidelines.

When installing CTs, install the CTs in a panel where they do not exceed 75% of the wiring space of any cross-sectional area within the panel. Refer to local standards for guidance.

To install Consumption CTs (order CT-600-SPLIT separately)

- Ensure there is sufficient room to install both CTs around lines 1, 2, and 3 from the main feeds.
- Consumption CT must be installed between the utility and main panel. Refer to figure 1.

# Configuring PEL

Commission your system through the Enphase Installer App from your smartphone or tablet as normal. Within the Enphase Installer Platform and Enphase Installer App, grid profiles with different PELs are available. Grid profiles that define PELs usually have the keyword '*x*' kW PEL as a suffix in the title, for example, 10 kW PEL, 15 kW PEL, and so on.

In the Enphase Installer Platform dashboard, click **Grid Profile** to find a list of all available grid profiles and a detailed summary of parameters within it. You can confirm the PEL parameters within the grid profile settings.

| POWER EXPORT LIMITING | | |
|---|---|---|
| Export limit type | | Aggregate |
| Communication loss time limit | | 10,000 ms |
| **Export limit** | **Threshold** | **Response time** |
| Soft limit | 10,000.0 W | |
| Hard limit | | 10,000 ms |

*Figure 3: Grid profile export limit setting*

On-site, the necessary grid profile can be selected on the Enphase Installer App.

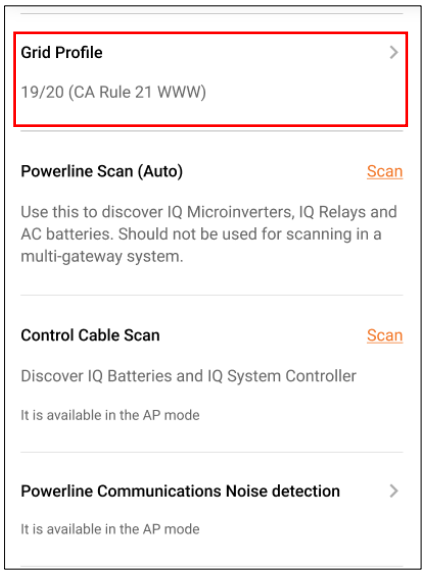


*Figure 4: Enphase Installer App*

**NOTE:** This configuration can be done on both the Enphase Installer App and through the Enphase Installer Platform (Refer to figure 5).

In the Enphase Installer Portal, click **Settings** to select/change the Grid Profile for a specific site.

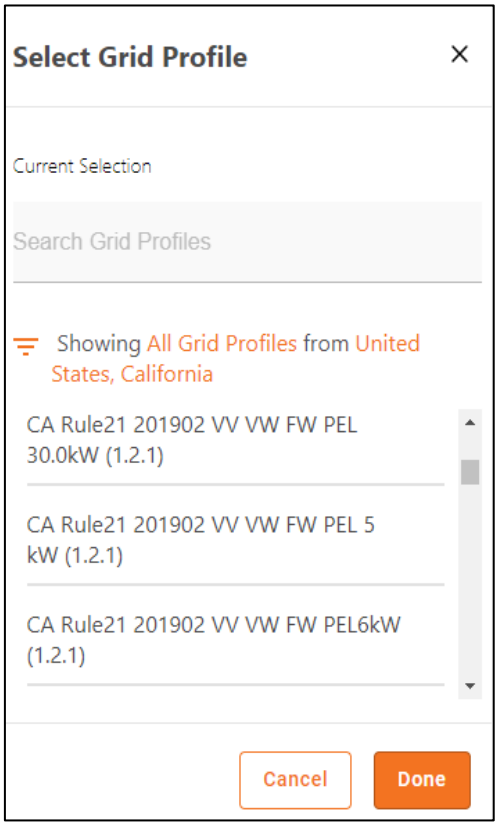


*Figure 5: Grid profile - Enphase Installer Platform*

**NOTE:** Site consumption data can be accessed on the Enphase Installer Platform. PEL functionality can be validated by monitoring consumption data to verify if it crosses the PEL threshold defined by the user. Contact Enphase Support if issues are observed.

## Failure modes and resolutions

*Table 1: Failure modes and resolution*

| Failure mode | Resolution mechanism |
|---|---|
| One or more microinverters failed or stopped communicating with the IQ Gateway. | If the IQ Gateway loses communication with the PV microinverter for more than x seconds (as defined in the Communication loss time limit in PEL settings), the PV microinverter automatically curtails its output current to the static safe limit. |
| Consumption CT is not reporting the correct value or missing Consumption CT. | The PV production from each of the microinverters automatically defaults to the safe limit, such that the aggregate PV production is set to a static safe limit. |
| IQ Gateway failure. | If the IQ Gateway fails, the PV detects a communication loss after x seconds (as defined in the Communication loss time limit) and the PV microinverter curtails its output current to the static safe limit. The homeowner can contact Enphase Support. |

**NOTE:** The static safe limit for each microinverter is determined by the IQ Gateway based on the defined PEL, microinverter rating, and the number of microinverters in the system. It ensures that in the event of a failure, each microinverter defaults to the static safe limit and is well within the PEL even at an aggregate level.

## Revision history

| Revision | Date | Description |
|---|---|---|
| TEB-00159-1.0 | July 2024 | Initial release. |