

# Power export limit for IQ7 and IQ8 Series Microinverter systems

IQ7 and IQ8 Series Microinverter systems in grid-tied mode can work in the following configurations:

- **Net energy metering:** In this type of application, the utility-interactive IQ7 and IQ8 Series Microinverters 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. This means that any PV generation not consumed locally by loads and exported to the grid must be limited as defined by the utility interconnection agreement.

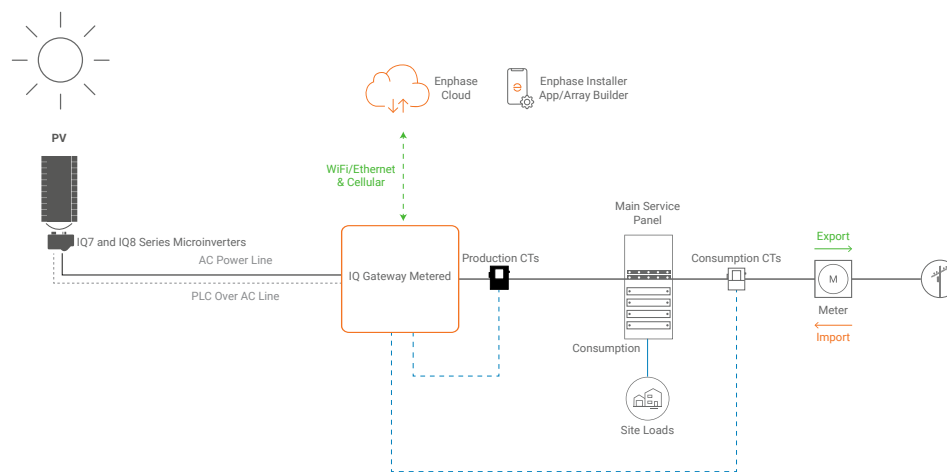


Figure 1

**Note:** Power Export Limit is supported only by IQ Gateway Metered, not IQ Gateway standard

This technical brief provides guidelines for design considerations, installation, and configuration of IQ7 and IQ8 Series Microinverter systems for power export limitations (PEL).

The Enphase PEL function can be configured to operate at different power export limits to meet the site requirements, as the local utility service requires. The value for the power export limit is defined within a specific Enphase grid profile. The installer needs to use different grid profiles for different power export limit values. Enphase IQ7 and IQ8 Series systems provide two levels of power export limit protection—primary protection is where IQ Gateway Metered limits the power production based on a set limit in the grid profile, and secondary protection is through an external contactor.

**Note:** This document is applicable only for regions that require power export limiting.

### Primary protection

An Enphase IQ7 or IQ8 system can support the power export limit by using a power export limit grid profile and an IQ Gateway Metered with Production CTs installed at the solar PV sub-panel and Consumption CTs installed at/near the utility service location. When configured for power export limit, the Enphase system automatically limits the PV generation so that energy exported to the grid is zero or the set power export limit within the grid profile. This functionality is set through the grid profile and is called the soft export limit.

### Secondary protection

IQ Gateway also has a secondary level of protection called hard PEL that operates a voltage-free contact in the IQ Gateway Metered that can be wired to an external contactor to physically disconnect the microinverters from the grid if the power export limit target is not reached in the configurable time frame. Refer to Figure 2 to check for relay contacts on IQ Gateway Metered.

The following settings define the IQ7 and IQ8 Series Microinverter system power export limiting in the grid profile:

- Power Export Limit (Enabled/Disabled)
- Per Phase/Aggregate Power Export Limit
- Export Limit – Soft limit threshold in watts (min, max)—primary IQ Gateway Metered control function
- Export Limit – Hard Limit (Enabled/Disabled)—optional secondary protection via external contactor
  - Export response time in milliseconds (min, max)
  - Communication loss time limit in milliseconds (min, max)
  - Hard limit threshold in watts (min, max)
  - Hard limit response time in milliseconds (min, max)

## IQ7 and IQ8 system requirements

Export limiting for IQ7 and IQ8 systems shall require the following system components:

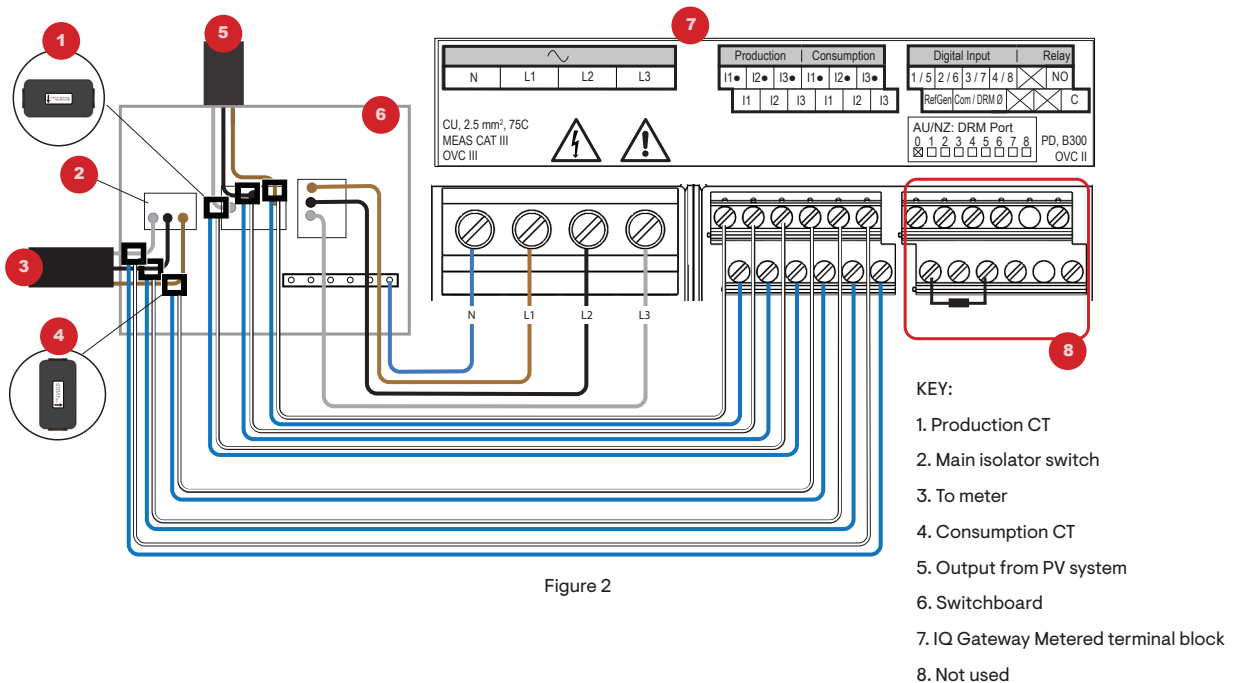
- IQ7 and IQ8 Series Microinverters (maximum 300 microinverters per IQ Gateway Metered).
- IQ Gateway Metered. Note that a site must have only a single IQ Gateway Metered installed to be PEL capable. Sites with multiple IQ Gateway Metered cannot perform power export limits collectively.

- Production Current Transformer (100 A) and Consumption Current Transformers (100 A) fitted and enabled via the Enphase Installer App.
- Adequate power-line communication signal strength between IQ Gateway Metered and microinverters—showing three bars or more in the Enphase Installer App for all installed microinverters. Installer should also troubleshoot and identify if power-line communication is degraded or disrupted by noise using the FFT analysis in the Enphase Installer App.
- A grid profile for the site includes a power export limit value set to the export limit required. If there is no pre-existing grid profile for the export limit required, contact [Enphase customer support](#) to request a new custom grid profile.
- Line communication filter usage shall depend on PLC strength and noise levels on-site based on FFT analysis.

## On-site configuration

### IQ Gateway Metered terminal block diagram for power export limit

Refer to the Enphase IQ Gateway Metered Quick Install Guide at <https://enphase.com/installers/resources/documentation> to activate system monitoring, set up a correct grid profile as per power export limit requirements, and complete the installation. Ensure IQ Gateway Metered has detected all microinverters on-site with at least three bars communication level for all devices.



### Production and Consumption CTs

The IQ Gateway Metered includes one Production CT, and you can order two Consumption CTs for consumption monitoring if PEL is needed. Ensure CTs have been correctly oriented, wired, and activated. Refer to the Enphase IQ Gateway Metered Quick Install Guide at: <https://enphase.com/installers/resources/documentation> for CT installation guidelines.

**Note:** The IQ Combiner already ships with two Consumption CTs

**Note:** For three phase systems, you can order 2 additional Production and Consumption CTs

### When installing CTs:

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

To install the Production CT

- Ensure there is sufficient room to install the Production CT around line 1 of the solar PV disconnect.

To install Consumption CTs

- For net consumption metering, ensure there is sufficient room to install both CTs around lines 1 and 2 from the main feeds.
- For total consumption metering, ensure there is sufficient room to install the CTs around the lines that feed the consumption circuit.

### When commissioning CTs:

Use the meter wizard in the Enphase Installer App to configure Production and Consumption CTs.

- Tap “Production Meter” and follow the on-screen instructions to enable the Production Meter.
- Tap “Consumption Meter” and follow the on-screen instructions to enable the Consumption Meter.
- Refer to [How do I use the meter wizard in the Enphase Installer App to configure Production and Consumption CTs?](#) for commissioning the CTs.



#### **WARNING**

With consumption metering, be sure to set the meter type correctly. You cannot change this setting once the meter is enabled.

## Grid profile

Commission your system via the Enphase Installer App on your smartphone or tablet as normal, and ensure the IQ Gateway Metered has detected all microinverters with at least three bars communication level for all devices. Also, confirm CTs have been correctly oriented, wired, and activated.

PEL is applied to the system using the grid profile. Within the Enphase Installer App, you will see grid profiles are available with different power export limits; for example, zero export, and 10 kW PEL.

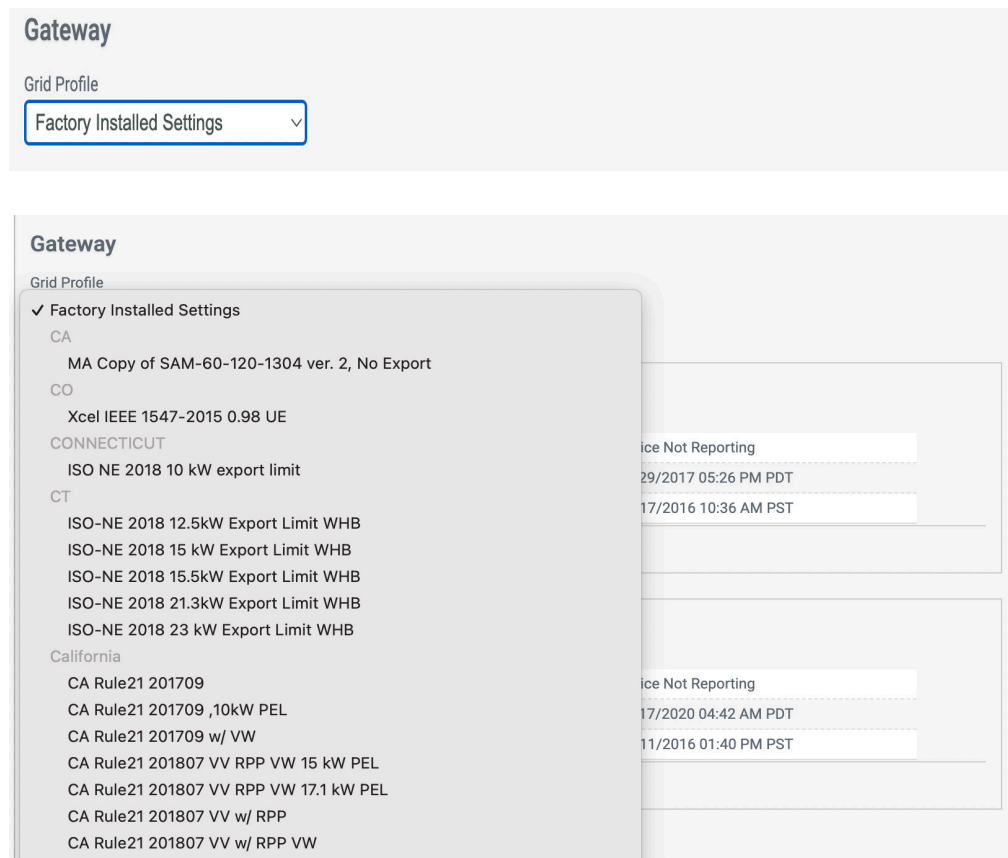


Figure 3: Grid Profile Enphase Installer Platform Activation

If there is no pre-existing grid profile for the export limit required, contact Enphase customer support to request a new custom grid profile. Customer support will need to know what export limit should be applied. When the new custom profile is available, this can be remotely applied to the site via the Enphase App. You can confirm the applied grid profile power export limit parameters by checking the grid profile settings.

### Gateway

Grid Profile

CA Rule21 201807 VV RPP VW
View Settings

#1

Gateway Serial Number  
121447034199

Gateway Status  
Reporting Status: Device Not Reporting  
Last Report Date: 08/17/2016 02:01 PM PDT  
First Report Date: 12/22/2014 11:27 AM PST  
Grid Profile Success

POWER EXPORT LIMITING	
Power export limiting enabled	Yes
Export limit type	Aggregate
Communication loss time limit	10,000 ms
Export limit	Threshold
Soft limit	15,000.0 W

Figure 4: Grid Profile Export Limit Setting