FIMER

Energy Policy Power Platform

Table of contents

Terms and definitions

DHCP
Dynamic Host Configuration Protocol, a protocol where a DHCP server automatically configures the IP settings of the client devices with DHCP enabled.

DNO
A distribution network operator (DNO), also known as a distribution system operator (DSO), is the operator of the electric power distribution system.

Consumer reference system
A power reference system where the current absorbed from the grid assumes a positive sign, opposite to the generator reference system.

Control set-point
The active power target of the export limitation control, calculated as the export limit minus a guard band. It cannot exceed the export limit.

Energy Policy
Energy policy is a general term for a power plant control strategy with a specific purpose. Examples of energy policies include export limitation and self-consumption.

Export limit
The maximum amount of active power that is permitted to be injected by the generators into the grid at the Point of Connection.

Export limitation control
The set of export limitation settings and functionality to guarantee that the export limit is not exceeded.

Fallback
An operative mode, with its own settings, that is activated when the PV plant cannot meet the export limit requirement or when the system exhibits incorrect behaviour. The fallback must be enabled and properly configured for a fail-safe design.

Fail-safe operations
The capability of the export limitation control to satisfy the export limit requirement also in case of one or more failure scenarios.

Fallback activation time
The amount of time allowed, where the output power measured or evaluated at the Point of Connection can continuously exceed the export limit, before triggering the fallback plan.

Fallback set-point
The amount of active power provided by the inverter when a fallback plan is ongoing.

Fixed IP private address
An IP address not assigned by DHCP where the IP settings (IP Address, IP Gateway, Subnet Mask, DNS) are manually configured by the user.

Generator reference system
A power reference system where the current generated by the PV plant and injected into the grid assumes a positive sign, opposite to the consumer reference system. The export limitation function requires the measurement instruments to be aligned with this reference system.

Guard band
The amount of active power used to guarantee an operating margin for the export limitation control. The guard band also includes the accuracy of the measurement equipment to ensure a reliable export limit at the Point of Connection.

Operative re-entry time
The amount of time the inverter will wait before leaving the fallback (e.g. when communication with a meter that was previously lost is restored). Any event that can trigger the fallback must be continuously inactive during the waiting time to permit to the energy policy control to leave a fallback condition.

Plant Nominal Power
The reference value used to define the export power limit, typically the sum of the nominal AC power of the installed inverters.

Point of Connection (PoC)
The contractual electrical point where export limitation must be ensured.

PowerUNO, PowerTRIO
FIMER residential hybrid inverters. The PowerUNO family includes FIM-HY-x.x-SE-A-1PH inverters. The PowerTRIO family includes FIM-HY-x.x-SE-A-3PH inverters.

Control Method
Defines if Export Limitation shall control the output power according to the overall active net power across all phases or the power on each phase.

Aurora Vision
FIMER cloud solution for PV plant monitoring and management.

WEB UI
Web User Interface required to configure the export limitation control. A Web UI is a digital interface that allows users to configure, monitor, and interact with a device through a web browser. the Web UI is hosted on a local web server embedded within the inverter itself, making it accessible both locally and remotely.

Requirements

Before enabling the export limitation control, the following requirements must be met:

Requirements for WEB UI

1. To configure the export limitation function, connect to the WEB UI as outlined in the PowerUNO product manual. The manual is available at this link: https://www.fimer.com/single-phase/poweruno.

Requirements for export limitation control

1. Any inverter involved in export limitation control must be Ethernet connected. However, it is not strictly mandatory to have a direct connection among inverters and networking devices can be installed between inverters. In case of a firewall, this must not block TCP port 5556 or the multicast IP group 239.192.1.1.

2. Any Ethernet IP addresses of inverters involved with the export limitation control must be configured within the same LAN and subnet mask.

3. Energy meter and inverter firmware release must support the export limitation according to **Annex 1: Meters supported by FIMER Power Platform (PowerUNO & PowerTRIO).**

4. A compatible energy meter must be properly installed and configured at the Point of Connection according to meter manual and the Meter configuration chapter.

5. A generator reference system must be used according to Reference system chapter. However, in case of a different reference system, it is possible to align it as described in **Step 3: verify the reference system and meter data acquisition.**

Energy Policy overview

The PowerUNO and PowerTRIO inverters allow for the configuration of an energy policy to manage the energy flow.
The available policies are:

- **Self-consumption:** This policy prioritises the use of generated energy for the building or facility, maximising on-site consumption and reducing dependence on grid electricity.

- **Export Limitation:** This policy controls the amount of energy that can be exported to the grid, ensuring that the system does not exceed a predefined limit.

Export limitation overview

Many Distribution Network Operators (**DNO**) set limits on generator size, or the amount of power allowed to be exported to the grid. Export limitation is a key control feature that restricts the total power fed into the grid to comply with grid code requirements. When grid codes mandate export limits, this can be achieved seamlessly using FIMER inverters with a meter, without requiring additional external controllers or devices.

Operation Scenarios

With no export-limit set: When no export limit is set, FIMER inverters will maximize PV power output by exporting any surplus power not consumed by loads to the Point of Connection (PoC).
With export-limit set: If an export limit is enforced by the DNO, FIMER inverters will manage power output accordingly. When PV power exceeds the load demand, the inverter limits the exported power to the PoC below the prescribed export limit. In cases of stringent restrictions, this limit can reach zero (zero-injection).

Integration with Battery Energy Storage System (BESS)

When combined with a Battery Energy Storage System (e.g., PowerX), FIMER inverters extend export control functionality:
Low PV power relative to load demand: If PV generation is insufficient to meet load requirements, the inverter will draw additional power from the BESS to sustain the load.
Excess PV power relative to load demand: If PV generation exceeds load requirements, the inverter prioritizes charging the BESS with the surplus. If the BESS is fully charged, any additional power will be exported to the PoC and limited as per the export restrictions set by the DNO.
This approach provides flexible power management and ensures compliance with DNO grid codes while optimizing energy use across PV, BESS, loads and grid.

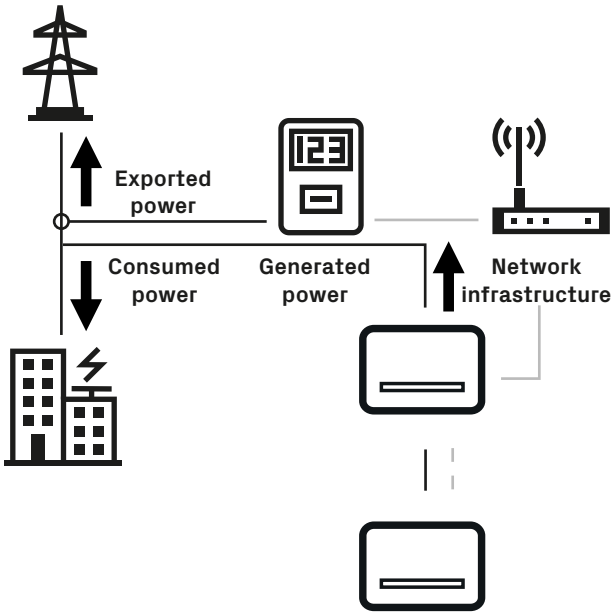
⚠ **ATTENTION – It is not possible to completely avoid exceeding the export limit in case of a sudden change in the load but the time the power exceeds the export limit is constrained by the control.**

Connection diagram

Export limitation curtails the overall power exported from the PV site into the grid as the net power flowing measured at the Point of Connection. To achieve this control, it is required to install a compatible energy meter according to Annex 1: Meters supported by FIMER Power Platform (PowerUNO & PowerTRIO). A communication channel between the inverters and meter must be set up. Communication between the inverter and meter can be realized in three different ways:

1. A direct serial RS-485 connection between the inverter and energy meter
2. A direct Ethernet connection between inverter and energy meter
3. Through or an existing network infrastructure

Connection between inverters is always realized by an Ethernet connection. Refer to the inverter manuals for details on the possible Ethernet connection options.



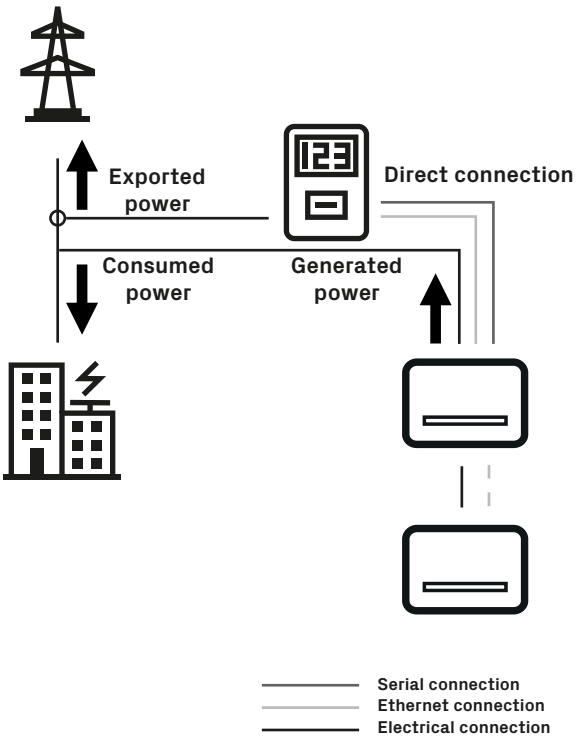


Figure 1 - Export limitation diagram.

Distributed control algorithm

The export limitation control adopts a distributed control algorithm to manage exported power. Each inverter involved in the control decides on its own how much power to generate to meet the export limit without the presence of any defined master of the control.

The distributed algorithm avoids any issue regarding the status of the controller and allows each inverter to define the best solution to achieve the target.

Continuous communication between the inverters is always required to the share meter and inverter details. To establish this communication, there must be no firewall restrictions on TCP port 5556 or the multicast IP group 239.192.1.1.

Reference System

Export limitation requires a generator reference system for all measures and control architecture. A meter must be installed to be compliant with this reference system. If the generator reference system is not applied to the meter, faulty behaviour of the control system will occur.

If an energy meter is installed according to the consumer reference system, it is not necessary to modify the meter configuration or CT direction. In this case the reference system can be automatically fixed through the WEB UI as described in Step 3: verify the reference system and meter data acquisition.

Refer to Figure 2 and Figure 3 generator versus consumer reference systems for details about the signs for the required reference system.

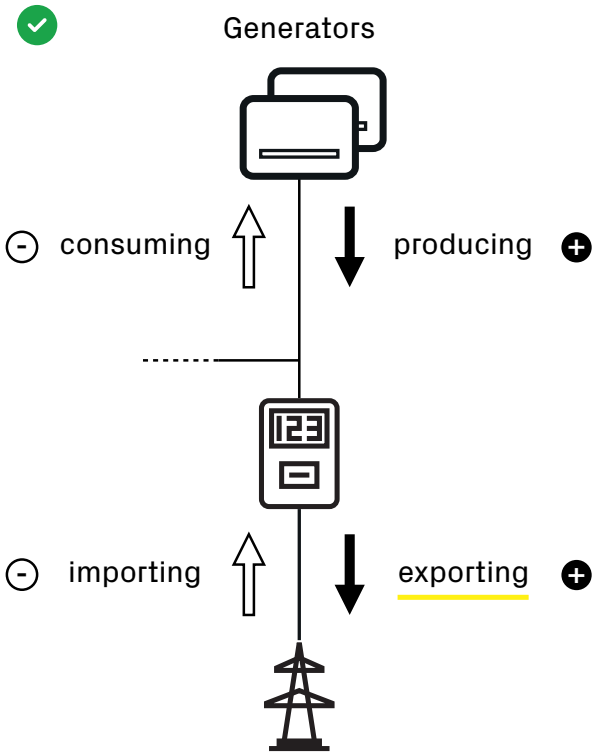


Figure 2 - Generator reference systems; exported power is positive.

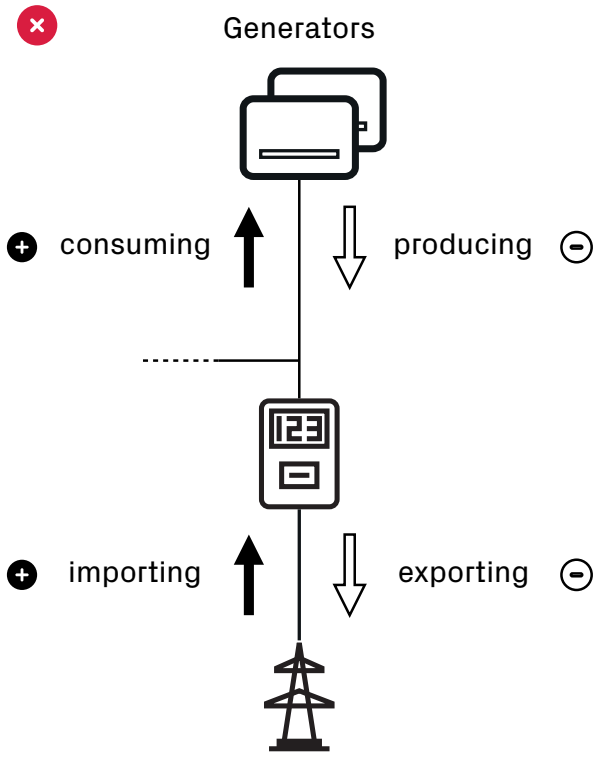


Figure 3 - Consumer reference systems: exported power is negative.

Export limitation control overview

Export limitation applies a control algorithm to limit the power fed into the grid below a user-defined export limit. The control algorithm will stabilize the power exported to the grid at a lower value defined as a control set point to ensure the required export limitation is satisfied.

Room for manoeuvre of the control algorithm is implemented by setting a guard band, which is an adjustable value defined as the difference between export limit and the control set point as shown in the following figure.

The guard band therefore represents a safety margin for the control system to avoid exceeding the export limit. This parameter may include the accuracy of the measuring instruments to implement a true and guaranteed export limitation.

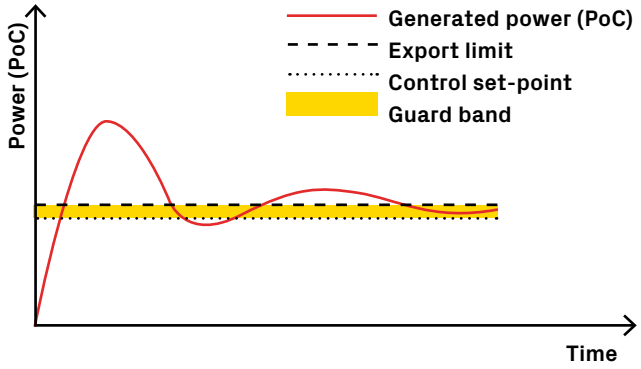


Figure 4 - Export limitation control example.

Fail-safe operations

The export limitation control design includes a fallback plan to guarantee failsafe operations: when a critical event happens, each inverter applies a fallback plan to avoid exceeding the export limit.

The export limitation control activates a fallback plan when one of the following triggering conditions are satisfied:

- Communication loss with the energy meter used for export limitation.
- The export limitation is not reachable, and the triggering event persists for a time greater of fallback activation time.

When a fallback plan is active, each inverter will independently enter a fallback state providing an output power equal to the fallback set point.

The inverter will keep the output power at the fallback set point until the triggering conditions are persistently unmet for a time greater than the operating re-entry time.

The fallback plan can be enabled and configured by using the WEB UI within the export limitation control setup.

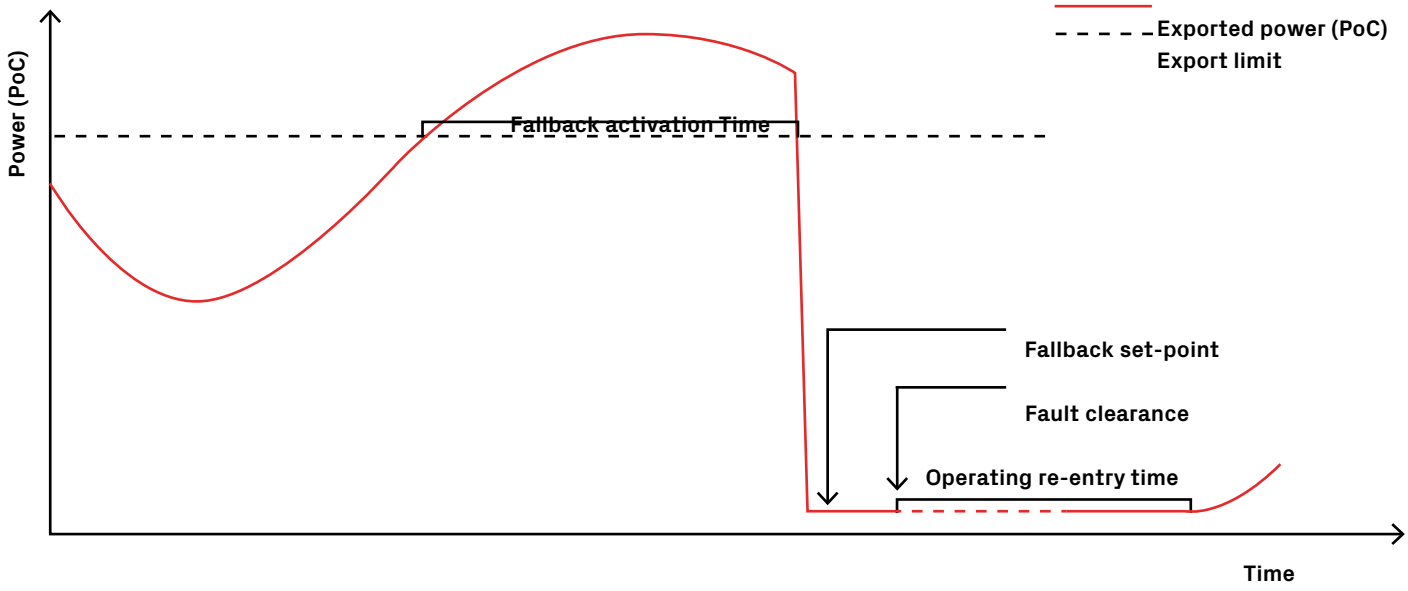


Figure 5 - Fallback example.

Control method

Control method shall be selected to configure which active power measure is used as reference for the control.
In case single phase method is selected the control will avoid exceeding the Export Limit for each phase, for example with an Export Limit of 9kW the control will avoid exceeding 3kW per phase.
In case Total power method is selected the control will avoid exceeding the Export Limit for the whole total active power, for example with an Export Limit of 9kW the control will avoid exceeding 9kW of total power across the three phases.
The configuration of the Control method shall be chosen to satisfy the requirements of the grid standard, just for example Spanish grid code requires a Power per phase control method whereas Australia requires to apply Total power method.

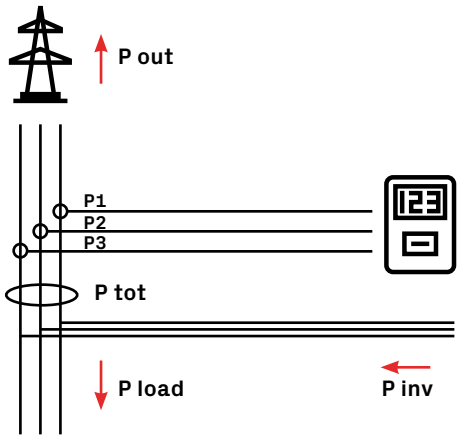


Figure 6 - Control method diagram

Self-Consumption overview

Self-consumption of an inverter refers to the process where the electricity generated by a photovoltaic (PV) system is used directly by the building or facility where the system is installed, rather than being exported to the grid. The inverter's role is to convert the direct current (DC) electricity produced by the solar panels into alternating current (AC) power, making it usable for household or commercial needs. By consuming the generated electricity on-site, self-consumption reduces reliance on grid power, lowering energy costs and maximising the use of renewable energy.

In this context, an Energy Storage System (ESS) can further enhance self-consumption. An ESS, typically composed of batteries, stores excess solar energy that is generated during the day but not immediately needed. This stored energy can then be used during times when solar generation is low, such as at night or on cloudy days. The combination of a PV system, an inverter, and an ESS allows for greater energy independence, as it ensures that energy produced is available for use at any time, while reducing or even eliminating the need to import electricity from the grid. The ESS also helps to manage peak energy demands and can serve as a backup power source in case of grid outages, making the overall energy system more efficient and reliable.

Meter configuration

Before activating the export limitation function, at least one meter must be properly configured and acquired by the inverters. The meter selected must be compliant with the export limit function according to the compatibility list in Annex 1: compatibility matrix and must be installed at the Point of Connection. Refer to the meter manual for the meter installation procedure.

NOTE – The meter, whether equipped with a current transformer or not, must be installed in compliance with the generator reference system. Specifically, if it measures the flow towards the grid, the exported power must be recorded as positive.

NOTE – Connect only one meter to the RS485 serial line of the PowerUNO and PowerTRIO inverter to minimise regulation latency and comply with the strictest standards.

Once the electrical installation and serial configuration of the meter is completed, a serial line must connect the meter to an inverter involved in the control. Any inverter compatible with the Annex 1: Meters supported by FIMER Power Platform (PowerUNO & PowerTRIO) can be selected for the communication with the energy meter, but it is suggested to choose the inverter next to the Ethernet switch or gateway if the inverters are directly connected to the Internet.

Configuration of the meter through Serial Line

Serial line settings can be left as default but must be noted for the meter configuration procedure with the Web UI as described in the section titled Meter data acquisition through the internal web server (WEB UI).

NOTE – The meter must be installed at Point of Connection, an incorrect position will lead to fail and issues on export limitation control.

The following paragraphs provides the PowerUNO (FIM-HY-x.x-SE-A-1PH) and PowerTRIO (FIM-HY-x.x-SE-A-3PH) pin-out for the RS-485 serial line connections: the **user RS-485** serial communication line is available on the smart plug terminals [485+], [485]-, and [RTN], which are accessible from the bottom, through the Hypercap junction box. It is a 2 wires serial line for half-duplex applications.

NOTE – Currently, in PowerUNO and PowerTRIO, the RS485 bus can support only one additional device.

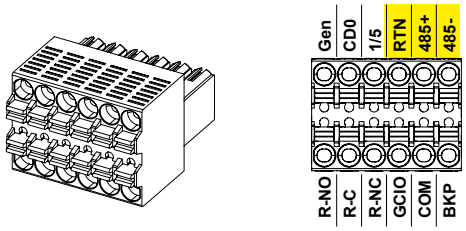


Figure 7 – PowerUNO and PowerTRIO RS485 pinout.

For more information on PowerUNO connectivity, please refer to the product manual.

Generally, manufacturers label RS485 serial line pins with the following designations:

- RS485+ > A, A+, D+, TX+
- RS485- > B, B-, D-, TX-.

This notation can vary slightly by manufacturer.

NOTE – For long distances, use a shielded twisted pair cable with a characteristic impedance of 120 Ω.

NOTE – The meters listed in Annex 1: Meters supported by FIMER Power Platform (PowerUNO & PowerTRIO) can be either direct insertion type or CT/VT connected. CT and VT must be properly chosen and configured on the meter. An incorrect configuration will lead to failures and issues with the export limitation control.

Configuration of the meter through Ethernet

The connection between an Ethernet energy meter and inverter can be established directly by using an existing network as described in the paragraph Connection diagram. The energy meter LAN port should be connected to the inverter daisy chain or to a switch or router within the existing network.
Inverters and meter must be connected and configured for the same LAN. IP settings must be defined by the customer or site IT manager to avoid conflicts or communication issues.

NOTE – Export limitation requires a fixed IP address for meter to continuously acquire meter measures. For this purpose, DHCP must be disabled and a reachable IP address assigned to the meter.

Configuration for ABB M4M-Ethernet

The Ethernet configuration of an ABB M4M meter can be done through the display in the Home:

- Configuration
- Communication
- Modbus
- TCP/IP section or through the internal web server of the meter according to the M2M-Ethernet manual.

M4M energy meter should apply the following default settings:

- DHCP = Disabled
- Default IP = 192.168.1.12
- Default Subnet mask = 255.255.255.0
- Default Gateway = 192.168.1.1
- Default TCP Port = 502

Configuration for SATEC EM133 meter with TCP communication module

The Ethernet configuration of a SATEC EM133 energy meter can be done through the display. To enter programming mode from the display, press and hold the SELECT/ENTER button for more than 5 seconds, then Ethernet setting s are available on Net menu

EM133 energy meter should apply the following default settings:

- Default IP Address = 192.168.0.203
- Default Subnet mask = 255.255.255.0
- Default Gateway = 192.168.0.1
- Default TCP Port = 502

Adjust Lan settings (Ip address, Subnet Mask and Gateway) according to the inverter and existing network configuration.

NOTE – SATEC meter can be used only in LV systems with a PT/VT ratio equal to one.

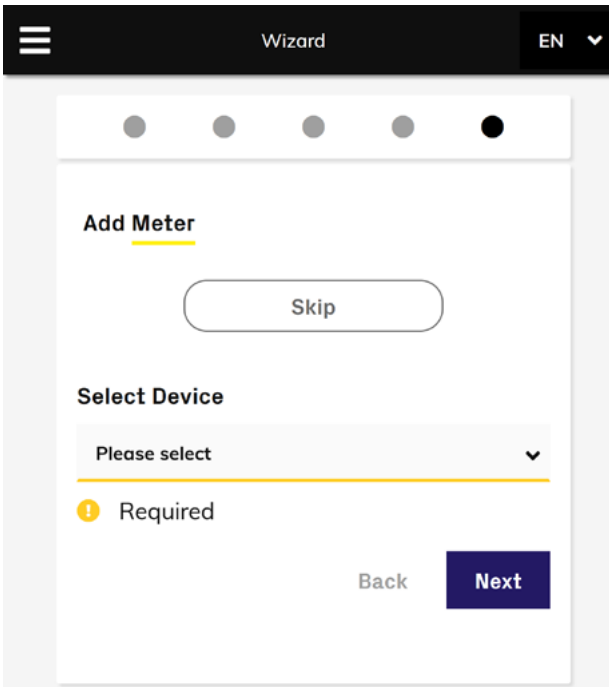
NOTE – Export Limitation require to use measures at high resolution. Resolution can be configured through EM133 display on user-configurable device options.

Meter data acquisition through the internal web server (WEB UI)

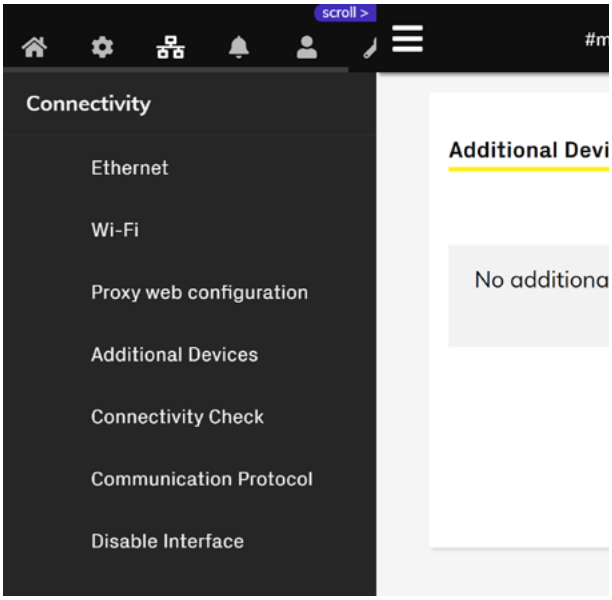
The export limitation control function requires continuously acquiring meter data to keep the output power below the export limit. To achieve integration between the meter and inverter it is necessary to use the WEB UI. On Monitored Devices it is possible to add the data acquisition of an external device, a meter in this case, to the inverter. Select just the inverter that shall acquire the meter. Do this by opening Monitored Device on the Settings tab.

Accessing the meter configuration through the WEB UI

The meter must be configured via the web UI.
We recommend configuring the meter during the commissioning wizard. The figure illustrates the meter configuration step in the commissioning wizard. A (**Skip**) button is available to bypass this step; however, we recommend configuring the meter immediately if it is available.



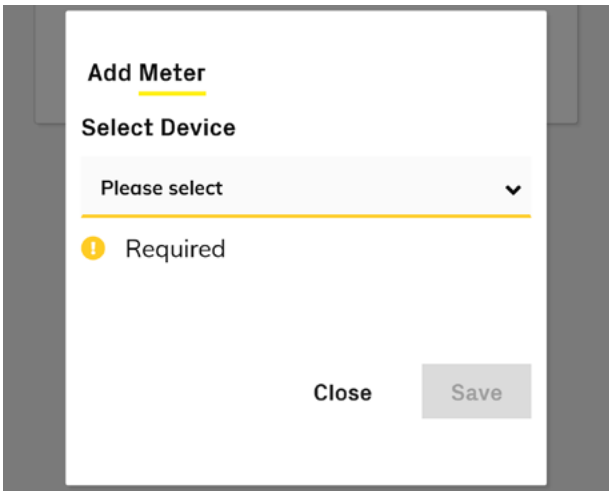
If the meter is not available during the wizard, it can be configured later via the user interface by navigating to the "**Connectivity > Additional Devices" page.**



Meter configuration

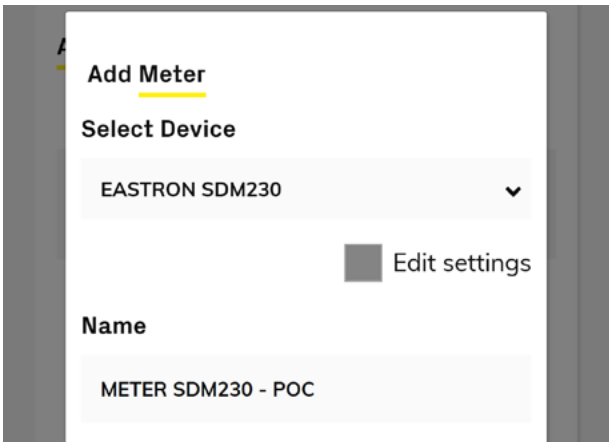
After navigating to the Additional devices page, select “**Add Meter**”.

From the drop-down menu, select the installed meter.

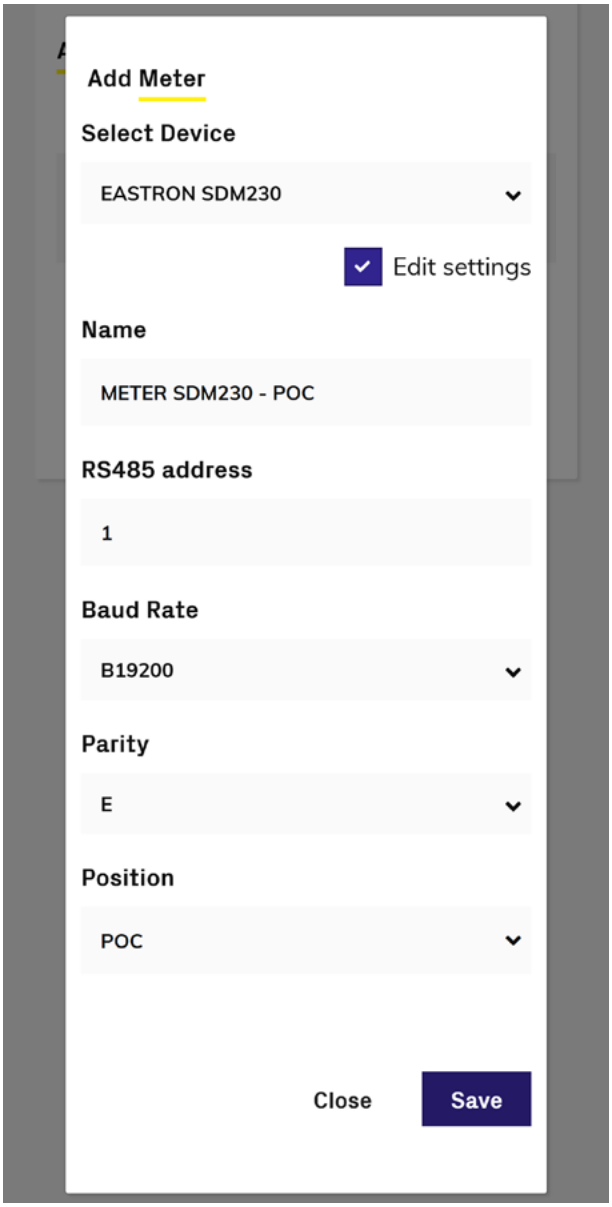


Serial Meter Configuration

Assign a descriptive name to the meter; in this example, it is named "METER SDM230 - POC".

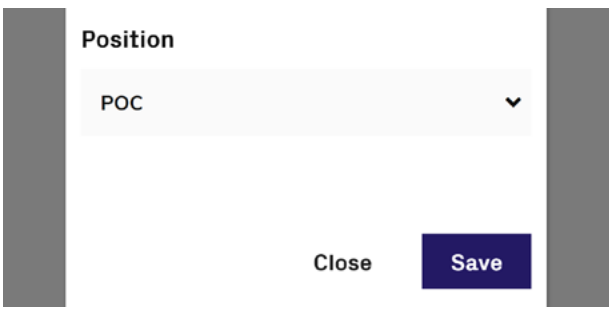


If the selected meter is a serial type, you can adjust its default settings (address, baud rate, parity) by ticking the "Edit settings" checkbox.



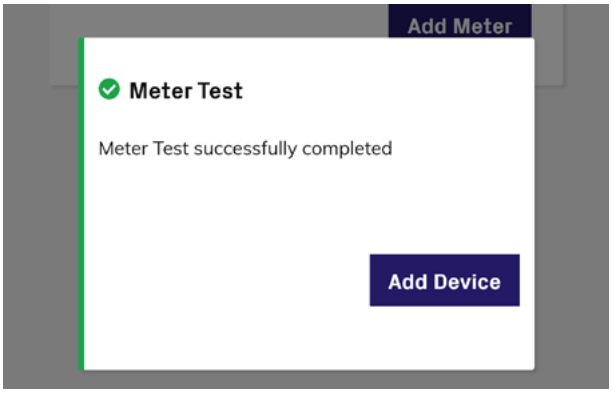
Assign the meter’s measurement point by selecting from:

- POC,
- Generation, or
- Consumption.

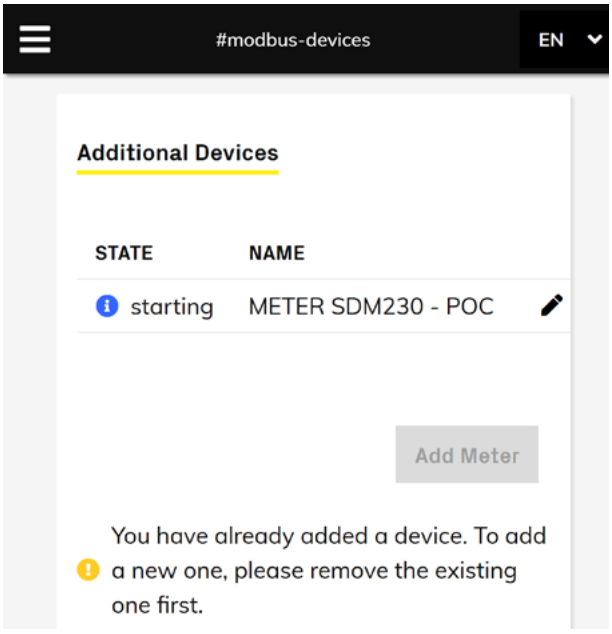


Then press the Save button and wait for the system to recognize the meter.

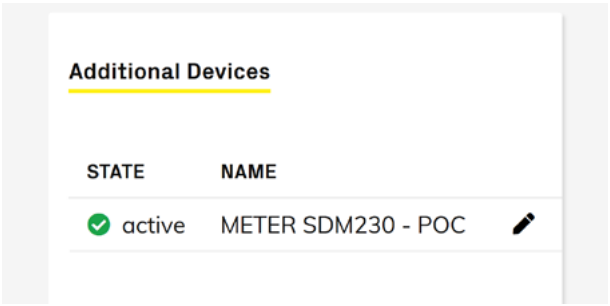
If the test is successful, press the Add device button.



At this point, the newly configured meter will be listed on the **Additional Devices** page. The status flag will indicate its operating state.

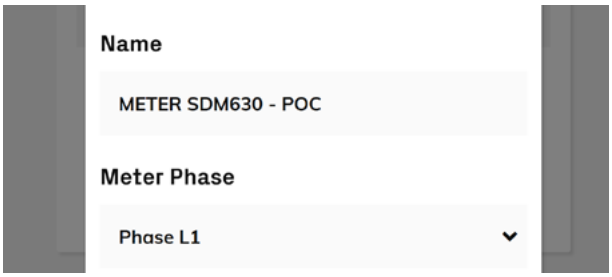


Once the meter's status flag is active, it will turn green.



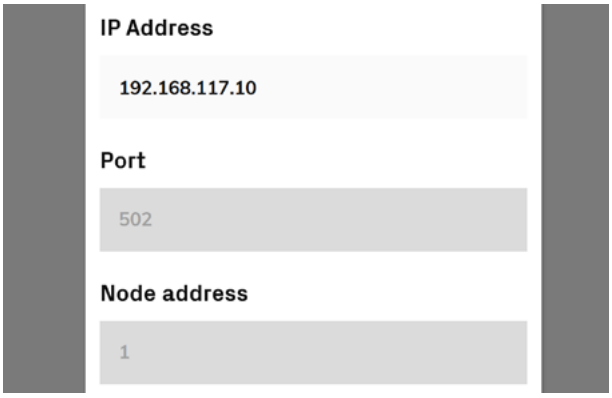
Three-phase Meter

If the meter is three-phase, you will need to select the phase on which the inverter is installed.

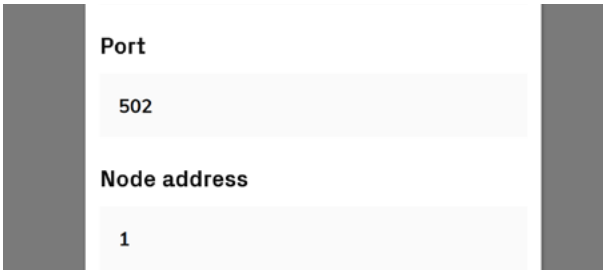


TCP/IP Meter Configuration

If the meter is of the TCP/IP connection type, configure the meter's IP address.



By ticking "Edit settings," you can change the port (default value is 502) and the meter's address.



Export limitation configuration

Before starting

Before proceeding with the export limitation settings and start-up it is mandatory to complete the following steps:

Inverter commissioning
Any inverter included in the control needs to be commissioned and ready to be grid connected before starting the export limitation configuration. It is possible to carry out the commissioning process using the WEB UI.

NOTE – The commissioning process through the web user interface must be repeated for each inverter included on the device list.

Firmware upgrade

All the inverters enabled for export limitation control need to support the control algorithm.

It is strongly suggested to keep the inverters upgraded to the latest firmware and aligned to the same control algorithm release. This functionality can be applied only if all the inverters involved in the control share the latest control algorithm release.

NOTE – The firmware upgrade process using the web user interface needs to be repeated for each inverter included on the device list.

NOTE – The web user interface can upgrade the inverter to any firmware, including a downgrade of the firmware.

Ethernet settings

If the system includes two or more inverters involved in export limitation (participants), they must be connected to the local Ethernet LAN network via a switch or router, and their IP addresses must be configured accordingly.

Inverters and TCP/IP meters must be on the same LAN and reachable, moreover the inverters are required to be configured for the same subnet mask.

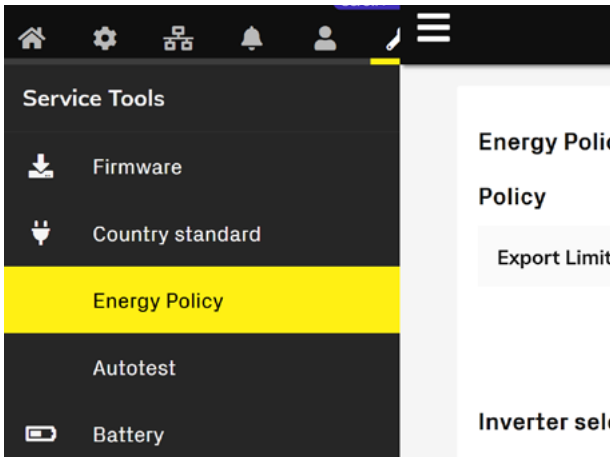
NOTE – Ethernet settings applied by using the web user interface must be repeated for each inverter included on device list.

Export limitation control setup

Export limitation can be configured and enabled only through the WEB User Interface.

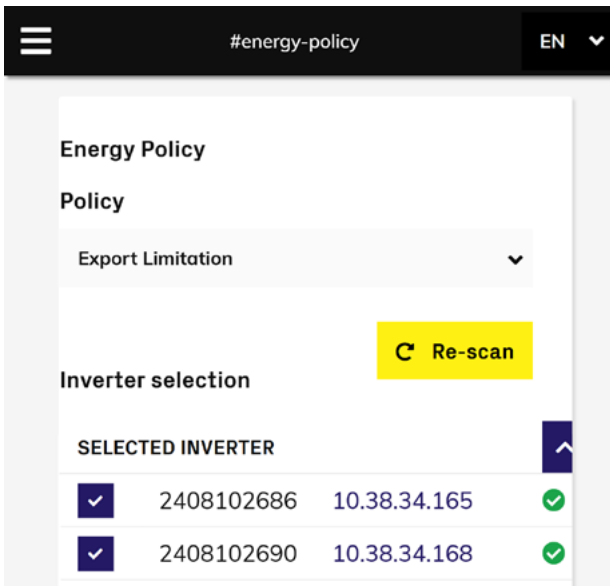
Installation must be compliant with the Requirements chapter and all the above pre-requisites must be completed before activating the export limitation control.

Export limitation settings are accessible from the Device List, on the menu Settings > Energy Policy.



Once the prerequisites are met and confirmed, the WEB UI will initiate a scanning process to detect all inverters on the LAN and all meters that were previously configured via the "Additional Devices" page (see Accessing the meter configuration through the WEB UI).

Step 1: select the inverters
All inverters found during the scanning process that are compatible with the export limitation will be shown on the inverter selection list. Flag all the inverters to be included in the control.



NOTE – It is suggested to check if the overall number of selected inverters match the number that shall be included on Export Limitation and if all the inverters are correctly recognized as commissioned.

NOTE – Inverters are not automatically flagged, pay attention to flag all the inverters that should be included in the control.

NOTE – It is possible to repeat the scanning process with the re-scan button if one or more inverters are missing.

Step 2: select the meter
The scanning process automatically finds and lists all meters previously configured in the monitored device section and that are compatible with Export Limitation.

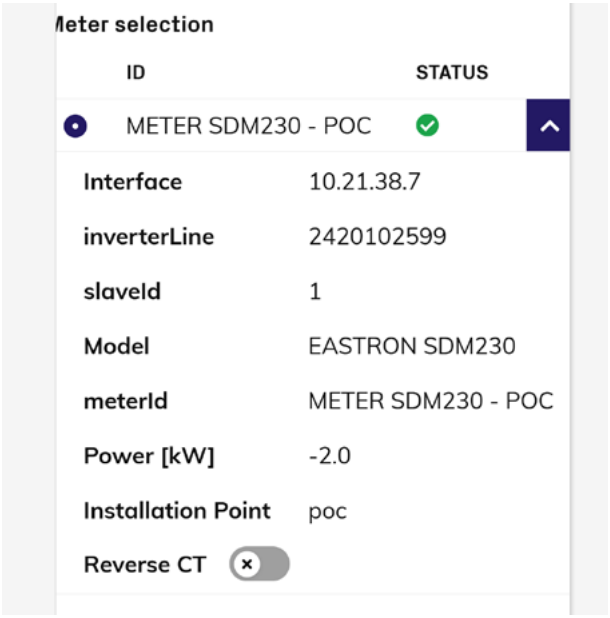
Select only the meter installed at the Point of Connection as a reference meter for the export limitation control.

In case more meters are available, it is possible to expand the selection to find out additional details of the meters.

NOTE – Meter must be configured with generator reference system. Use the edit configuration link and follow the procedure in the next step to manage the link reference system.

Step 3: verify the reference system and meter data acquisition
It is possible to revert the meter data acquisition to the correct generator reference system without the need to rework the installed meter.

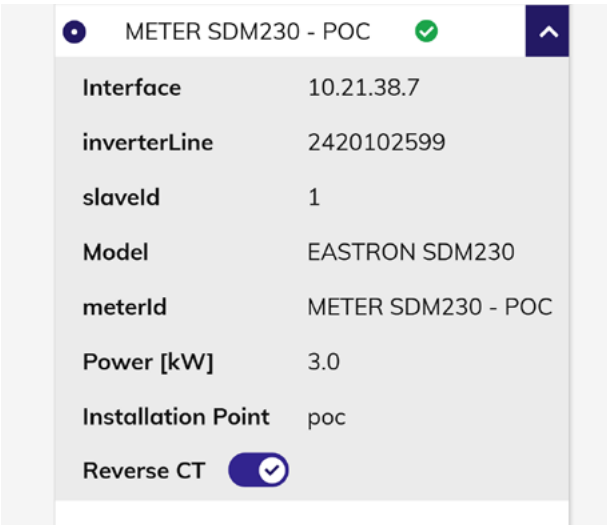
The WEB UI provides the possibility to change the reference system used for export limitation directly without the need to operate on the installed meter.



Expanding the Meter description, Through the reverse CT toggle button, it is possible to apply a sign reversion to any current related measure acquired on the meter.

To check the reference system, select edit meter configuration under meter details and stop inverter productions using the AC disconnection or Remote OFF command.

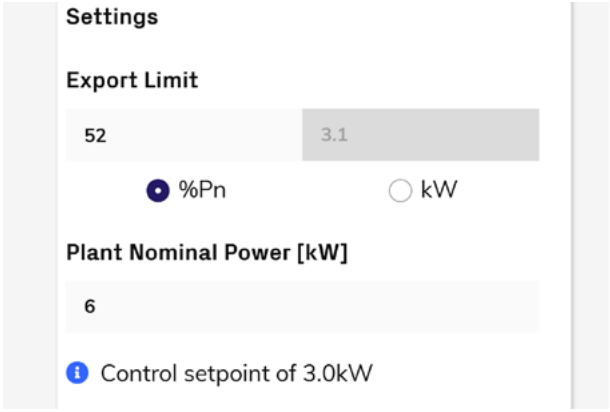
If the active power measured by the meter is positive while the loads are consuming power, for example, at night when the inverter is not injecting energy, this indicates that the meter has been installed in reverse (with the consumer reference system). In this case, it is necessary to press the (Reverse CT) button.



Step 4: configure export limitation
Since all the devices are already selected, it is possible to proceed with export limitation settings.

An Energy Policy
Energy policy is a general term for a power plant control strategy with a specific purpose. Examples of energy policies include export limitation and self-consumption.

Export limit is expressed as a percentage value of the PV plant nominal power, which is used only as reference number.



The PV Plant Nominal Power is the reference value used by a country to define the export power limit, typically the sum of the nominal AC power of the installed inverters. This value is essential for the correct operation of the export limitation system: it must equal the sum of the installed inverters' power.

If PowerUNO/PowerTRIO inverters are used, the field updates automatically when the participating inverters are selected; otherwise, it must be set manually. A check ensures that the value cannot be set lower than the sum of the participating PowerUNO/PowerTRIO inverters' power.

The export limitation control utilizes the export limit parameter as the threshold value for fail-safe operations. PV plant nominal power is not used in the control system.

Through the advanced settings, it is possible to configure the **Guard band** value and set the **Fallback set-point.**

Export limitation control monitoring

Once the export-limitation feature is configured, you can monitor its operation through the web UI.

The summary page provides useful information to understand the system's performance.

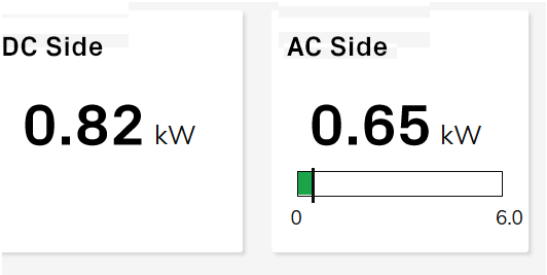


Figure 8 - Inverter AC and DC power cards.

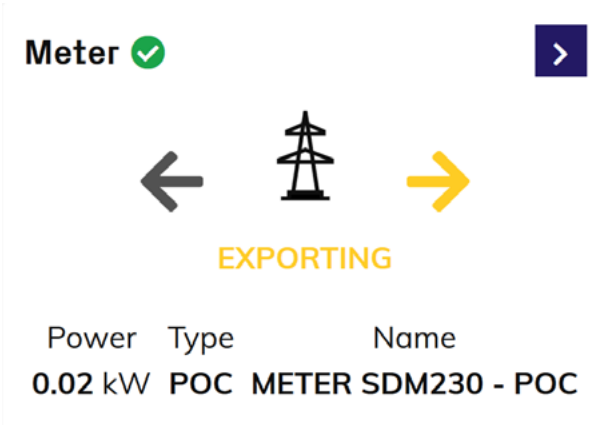


Figure 9 - Summary page, Meter card.

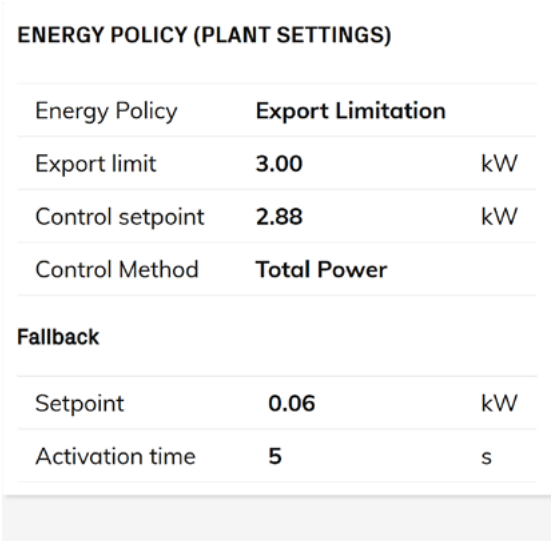


Figure 10 - Summary page - Energy Policy card.

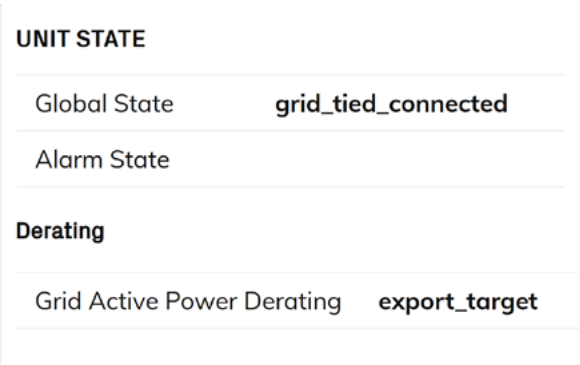
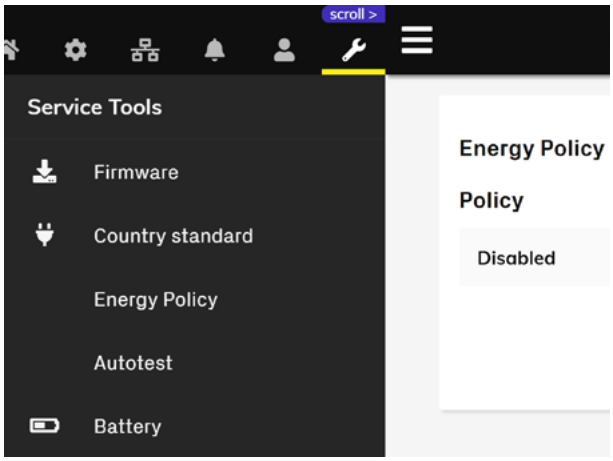


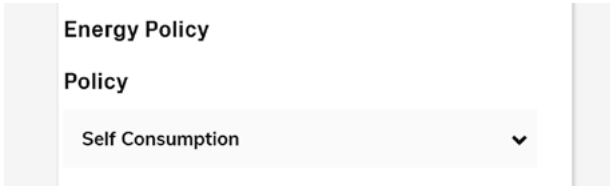
Figure 11 - Summary page, Unit state card.

Self Consumption configuration

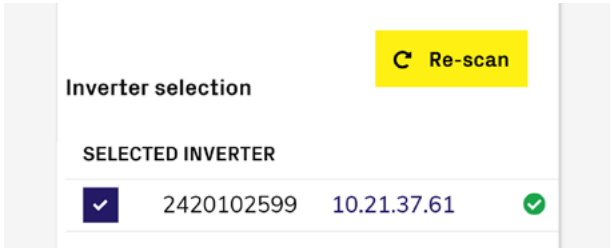
The self-consumption policy can be configured from the "Service Tools > Energy Policy" page.



Once the prerequisites are met and confirmed, the WEB UI will initiate a scanning process to detect all inverters on the LAN and all meters that were previously configured via the "Additional Devices" page (see Accessing the meter configuration through the WEB UI).



Step 1: select the inverters
All inverters found during the scanning process that are compatible with the export limitation will be shown on the inverter selection list. Flag all the inverters to be included in the control.



Step 2: select the meter
The scanning process automatically finds and lists all meters previously configured in the monitored device section and that are compatible with Export Limitation.

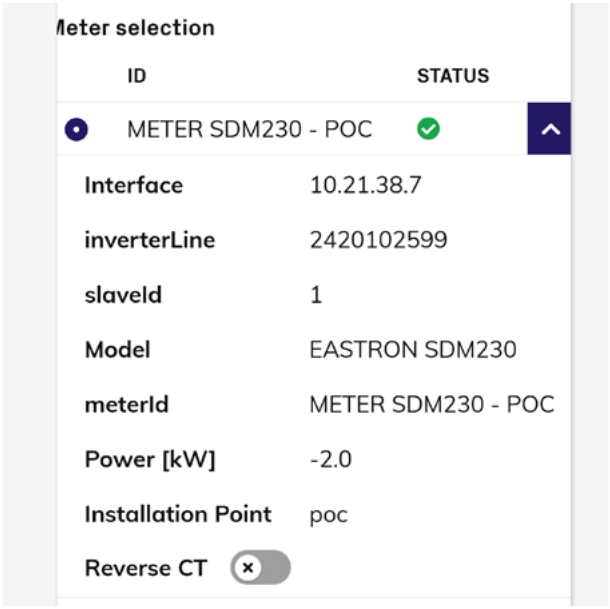
Select only the meter installed at the Point of Connection as a reference meter for the export limitation control.

In case more meters are available, it is possible to expand the selection to find out additional details of the meters.

NOTE – Meter must be configured with generator reference system. Use the edit configuration link and follow the procedure in the next step to manage the link reference system.

Step 3: verify the reference system and meter data acquisition
is possible to revert the meter data acquisition to the correct generator reference system without the need to rework the installed meter.

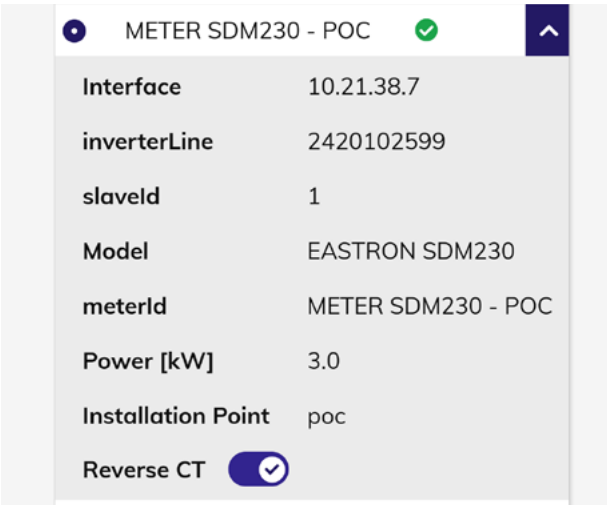
The WEB UI provides the possibility to change the reference system used for export limitation directly without the need to operate on the installed meter.



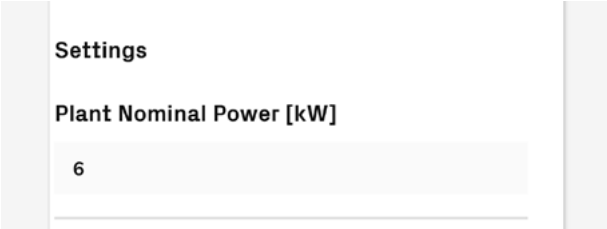
Expanding the Meter description, Through the reverse CT toggle button, it is possible to apply a sign reversion to any current related measure acquired on the meter.

To check the reference system, select edit meter configuration under meter details and stop inverter productions using the AC disconnection or Remote OFF command.

In case the active power measured on the meter is positive when the inverter does not inject energy, for example during the night, the meter is installed with the consumer reference system, and it is necessary to press the reverse CT button.



Step 4: configure Self Consumption
Since all the devices are already selected, it is possible to proceed with self-consumption settings.



The PV Plant Nominal Power is the sum of the nominal AC power of the installed inverters. This value is essential for the correct operation of the export limitation system: it must equal the sum of the installed inverters' power.

If PowerUNO/PowerTRIO inverters are used, the field updates automatically when the participating inverters are selected; otherwise, it must be set manually. A check ensures that the value cannot be set lower than the sum of the participating PowerUNO/PowerTRIO inverters' power.

The advanced settings allow you to configure the Operative re-entry time,

Troubleshooting

The PV plant generated power is fixed at 0W and loads are absorbing power.

1. Check the inverter and meter status. An active fallback for missing meter may reduce the generated power.

2. Check the meter position. The meter should be installed at Point of Connection to include the net power exported into the grid. In case the meter is not located at the connection point, but it is installed on the load output or inverter output, the export limitation may be using an incorrect power value.

3. Check the reference system according to **Step 3: verify the reference system and meter data acquisition**: verify the Reference System and meter data acquisition. The export limitation cannot properly control the exported power if the reference system is not aligned to the generator reference system.

4. Check the meter settings for current (CT) and voltage (VT) transformers, if CT or VT are not properly settled, the meter will not read the effective power flowing through the grid.

5. In the case of an M2M meter and if the reverse CT option is enabled, check on the energy meter to see if the generation mode is enabled.

PV Plant generated power is fixed at full power and plant export power into the grid.

1. Check the meter settings for current (CT) and voltage (VT) transformers. If CT or VT are not properly settled, the meter will not read the effective power flowing through the grid.

2. Check the reference system according to Step 3: verify the reference system and meter data acquisition. Export limitation cannot properly control the exported power if the reference system is not aligned to the generator reference system.

3. Check the flag for export limitation. If export limitation is not enabled or the configuration is not properly applied, the control will not take place.

4. In case of an M2M meter, check if the generation mode is enabled on the energy meter.

PV plant exported power oscillates continuously

1. Oscillations in the export limitation can occur if the inverters enter continuously on fallback, increasing the fallback activation time. If admitted by the grid standard an increase in the guard band will reduce the number of fallback events and consequently the oscillations.

2. Fallback can happen if there is an Ethernet connection failure. An unreliable Ethernet connection can trigger a fallback event independently of the fallback settings. If a fallback is caused by device communication errors, evaluate the integrity of the Ethernet cables using an Ethernet cable tester.

3. Check the meter settings for current (CT) and voltage (VT) transformers. If CT or VT are not properly settled, the meter will not read the effective power flowing through the grid.

It is not possible to retrieve all the inverters during the Export Limitation scan process.

1. If all inverters are not available on the device list, add missing inverters with QR code scan (preferred) or Wi-Fi scan.

2. If all inverters are available on the device list but are lost inside Export Limitation inverter selection check the Ethernet connections and IP settings of inverters. In case of Ethernet ring topology is used, open the ring disconnecting an Ethernet cable form a single inverter and try again.

3. If the network is configured with VLANs, apply the same VLAN ID to all devices, or enable the IGMP protocol on network switches to allow the flow of multicast packets used by the distributed control solution.

Energy meter measures or PoC measures within Control Status page are very low or high.

1. Verify if the CT and VT ratio are properly set within the energy meter.

Aurora Vision does not notify alarms and events about Export Limitation

1. Make sure the Export Limitation category is included in the Event Profile associated with the monitored plant within Aurora Vision Plant Portfolio Manager.

Annex

Annex 1: Meters recommended for new installations

Recommended for new installations

Meter	Meter description				Export Limitation						
					Compliant with grid protection rules					PowerUNO	PowerTRIO
Model Designation	Connection mode	External CT	External VT	Mounting	AS AS/NZS 4777	UK UK G99 - ENA 100	SP UNE 217001	DE AR-N-4105:2018	IT CEI-021;V2	FIM-HY-x.x-SEA-1PH	FIM-HY-x.x-SE-A-3PH
Single phase meter											
FPU230-M (PowerUno) 100ms	RS-485	-	-	DIN rail	√	√	√	√	√	* see note (1)	-
SDM230-M	RS-485	-	-	DIN rail	√	√	-	√	√	√	-
Three phase meter											
FPT630-M (PowerTrio) 100 ms	RS-485	-	-	DIN rail	√	√	√	√	√	* see note (1)	√
FPT630-MCT (PowerTrio CT) 100 ms	RS-485	√	-	DIN rail	√	√	√	√	√	* see note (1)	√
SDM630-M	RS-485	-	-	DIN rail	√	√	-	√	√	√	√
SDM630MCT	RS-485	√	-	DIN rail	√	√	-	√	√	√	√

Notes:
(1) Not supported in 2439A/B software bundle releases. It will be supported in future releases.

Annex

Annex 2: Meter not recommended for new installations

Not recommended for new installations

Meter	Meter description				Export Limitation						
					Compliant with grid protection rules					PowerUNO	PowerTRIO
Model Designation	Connection mode	External CT	External VT	Mounting	AS AS/NZS 4777	UK UK G99 - ENA 100	SP UNE 217001	DE AR-N-4105:2018	IT CEI-021;V2	FIM-HY-x.x-SE-A-1PH	FIM-HY-x.x-SE-A-3PH
Single phase meter											
ABB B21-212-100	RS-485	-	-	DIN rail	√	√	-	-	-	√	-
FIMER REACT-MTR-1PH	RS-485	-	-	DIN rail	√	√	-	-	-	* see note (1)	-
Three phase meter											
ABB B23-212-100	RS-485	-	-	DIN rail	√	√	-	-	-	√	√
ABB B23-312-100	RS-485	-	-	DIN rail	√	√	-	-	-	√	√
ABB B24-212-100	RS-485	√	-	DIN rail	√	√	-	-	-	√	√
ABB B24-352-100	RS-485	√	-	DIN rail	√	√	-	-	-	√	√
ABB M4M 20 - Ethernet	Ethernet	√	√	Front panel	√	√	-	-	-	√	√
ABB M4M 20 - Modbus	RS-485	√	√	Front panel	√	√	-	-	-	√	√
ABB M4M 30 - Ethernet	Ethernet	√	√	Front panel	√	√	-	-	-	√	√
ABB M4M 30 - Modbus	RS-485	√	√	Front panel	√	√	-	-	-	√	√
SATEC EM133	RS-485 and Ethernet (opt.)	√	√	DIN rail	√	√	-	√	√	√	√

Notes:
(1) Not supported in 2439A/B software bundle releases. It will be supported in future releases.

Annex 3: list of figures

Figure list