



Dynamic feed-in management with several Fronius inverters in one system

Application guide

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Business Unit Solar Energy

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1 Area of application

When working with photovoltaic systems, operators are often faced with the challenge of adhering to active power limits set by the grid operators. These specifications can be met either by static or dynamic adjustment of the power at the grid feed-in point. The advantage of dynamic reduction is that the system operator's own consumption is taken into account. This means that self-consumption is first covered before the power to be fed into the grid is reduced.

It is important to note that our system does not support certain functions. These functions include:

- Forwarding external Modbus commands
- Transmission of utility ripple control signals (I/O power reduction)
- Operation of several hybrid inverters, each with one or more batteries
- Backup power operation with several hybrid inverters in a network

2 Components

Dynamic power reduction is implemented using the following components:

Fronius inverters:

- Fronius Primo & Symo GEN24 and GEN24 Plus
- Fronius Tauro & Tauro ECO
- Fronius SnapINverter

All Fronius Primo, Symo and Symo Advanced SnapINverters are able to support dynamic power reduction. At least one SnapINverter with Datamanager is required. Further information on the technical details can be found in the chapter Configuration properties.

Attention: the master inverter that controls the remaining devices in the network must be a Fronius GEN24, GEN24 Plus or Tauro and cannot be a Fronius SnapINverter. The minimum software version for the implementation of dynamic feed-in limitation for GEN24, GEN24 Plus or Tauro is **≥ 1.31.x**

Fronius Smart Meter:

- Smart Meter
- Smart Meter TS
- Smart Meter IP
- Smart Meter WR

Router:

A router is required so that all components can communicate with each other. Ensuring that all devices operate on the same network is a fundamental prerequisite for efficient cooperation between the individual components.

3 Configuration properties

Certain properties must be observed to ensure smooth operation and optimum configuration of the system:

Network configuration:

All components must be integrated on the same network/subnet to ensure efficient communication.

Smart Meter connection:

The Smart Meter should be continuously connected to the master inverter, on which the configuration settings specified by the grid operator must also be made via the user interface. This master inverter must be either a GEN24 [Plus] or a Tauro inverter and must not be a SnapINverter.

Maximum number of inverters:

The system can support a maximum of 20 inverters (1 Master + 19 Slaves). Exceeding this limit can impair data transmission.

SnapINverter chains:

There may be a maximum of five SnapINverters in a chain that are connected via the Solar.net ring. The first SnapINverter in the chain must have a data manager, while the remaining four SnapINverters can be “light” devices without a data manager. Several SnapINverter chains can also be operated in parallel.

Data transmission and communication:

Data communication within the system takes place via Modbus TCP, which ensures efficient and reliable transmission.

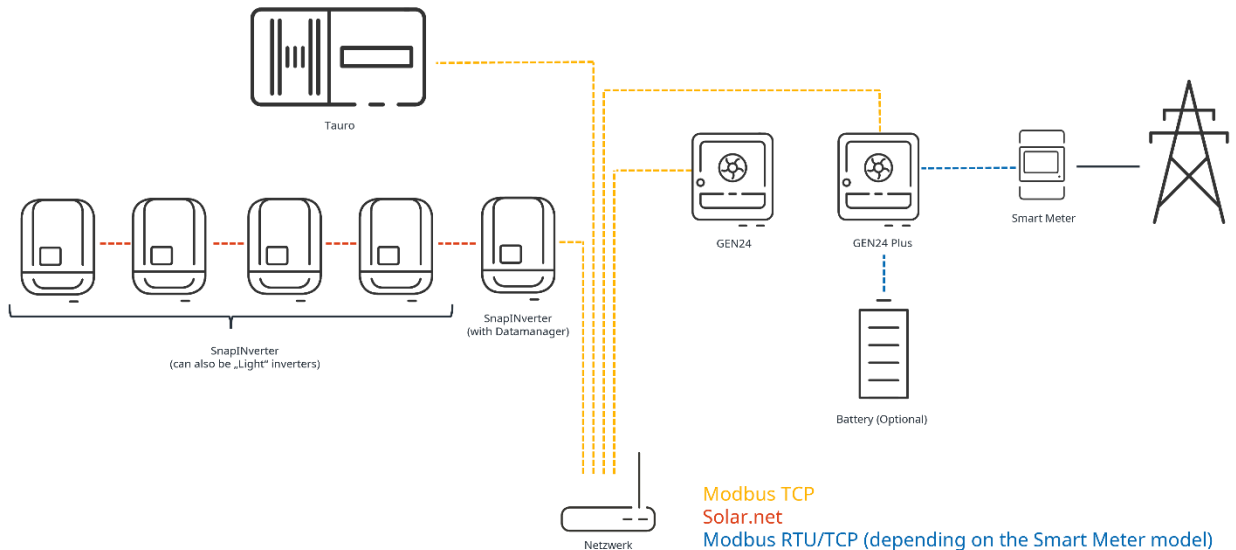
Control of the inverter via Modbus TCP must be activated for each inverter (except for the master inverter and the SnapINverter “Light”). The specific steps for activation are described in chapter **Fehler!**

Verweisquelle konnte nicht gefunden werden..

Battery storage connection:

In the case of a stationary battery storage system, this must be connected to the GEN24 Plus master—it is not possible to connect the battery storage system to another GEN24 Plus in the system. The connection of battery storage systems is limited to one GEN24 Plus. However, it is possible to operate several battery storage systems in parallel on the GEN24 Plus master in accordance with the manufacturer’s specifications. Please note that splitting battery storage systems between different GEN24 Plus units is not supported.

The following diagram shows a possible system configuration:



4 Settings on the user interface of the inverters

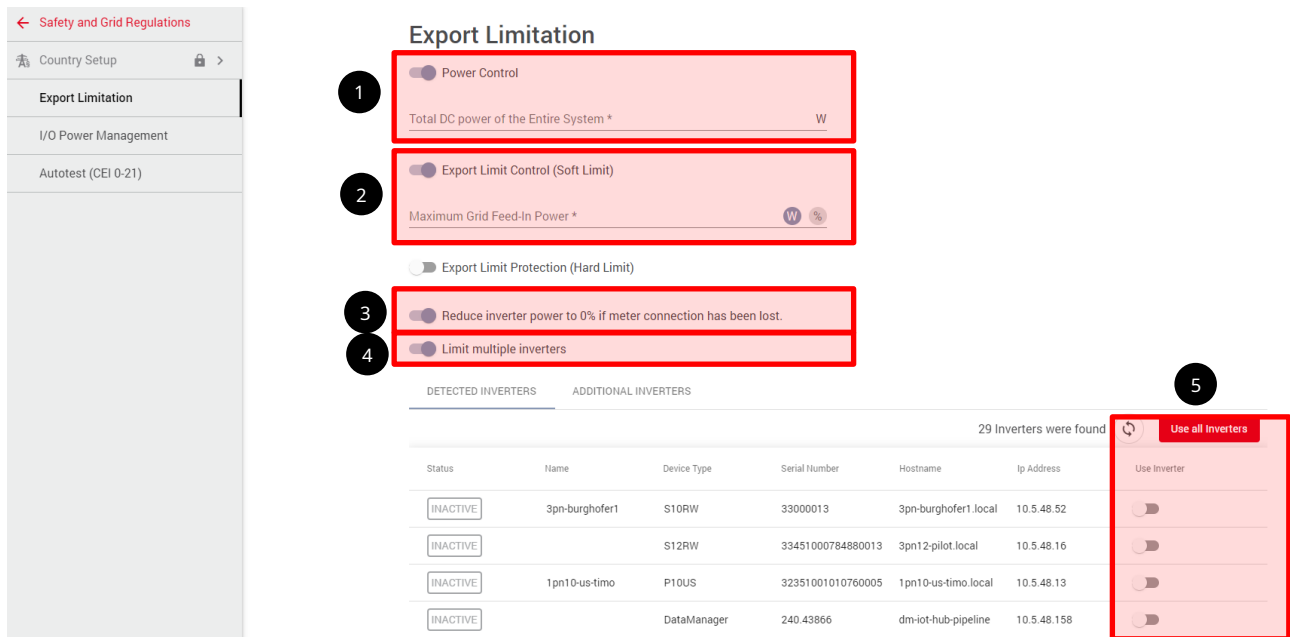
In order to be able to implement the grid operator’s power specifications correctly, a few more steps must be carried out on the user interface of the inverters. Settings must be made on both the “master” inverter and the “slave” inverters.

4.1 “Master” inverter (GEN24 or Tauro):

Attention: Before making the settings on the "master" inverter, all inverters in the system (including all “slave” inverters) must be commissioned with the Solar.start app or on the user interface.

The first step is to connect to the user interface. This process is explained in *How-To video: Connecting to the GEN24/Tauro user interface*¹ on YouTube. Please log in with your “Technician” password.

Once connected, click on “Safety and grid requirements” in the menu on the left and then select “Feed-in limitation”.



Activate the “Power limitation” slider and enter the total system power in watts (1). Then activate “Dynamic feed-in limitation (soft limit)” and enter the maximum feed-in power in watts or % (2). Please ensure that the slider for “Reduce inverter power to 0% when the connection to the smart meter is disconnected” is also activated (3). The slider for “Limit multiple inverters” must then be activated (4), before selecting the inverters to be limited from the list (5). Finally, click on “Save”.

Status description of the “slave” inverters:

Inactive	The “slave” inverter is not configured for power control
Disconnected	The “slave” inverter is configured for power control, but does not respond via Ethernet/WLAN
Connected	The “slave” inverter is configured for power control and is available and controllable via Ethernet/WLAN

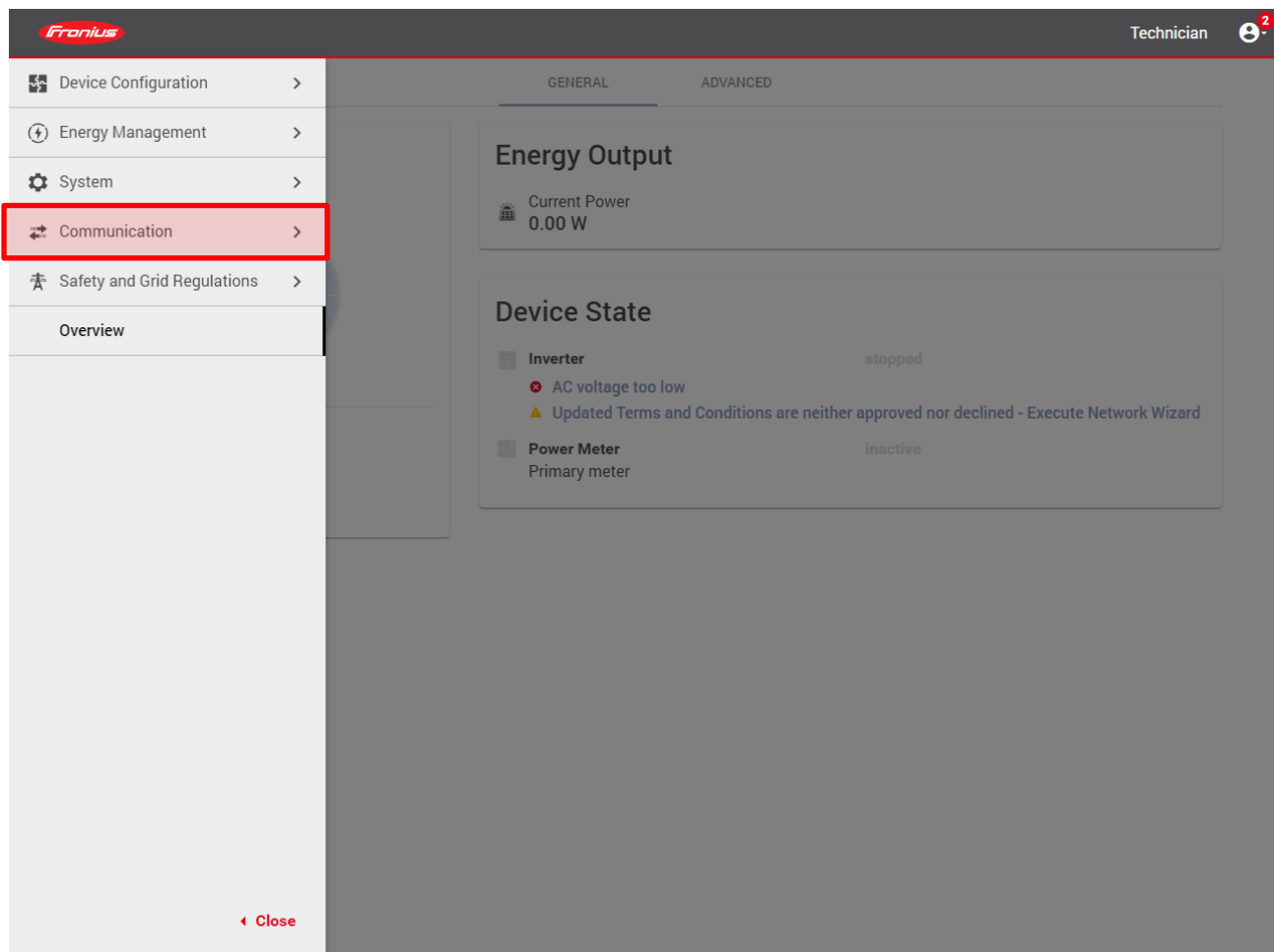
¹ <https://youtu.be/IJIo6lfwao?si=jsw bsEvexmE Mq->

4.2 “Slave” inverter (GEN24, Tauro or SnapINverter):

The first step is to connect to the user interface. This process is described in *How-To video: Connecting to the user interface of the GEN24/Tauro* or *How-To Video: Connecting to the Fronius SnapINverter (Datamanager) user interface*² on YouTube. Please log in with your “Technician” password (GEN24/Tauro) or “Admin” password (SnapINverter/Datamanager).

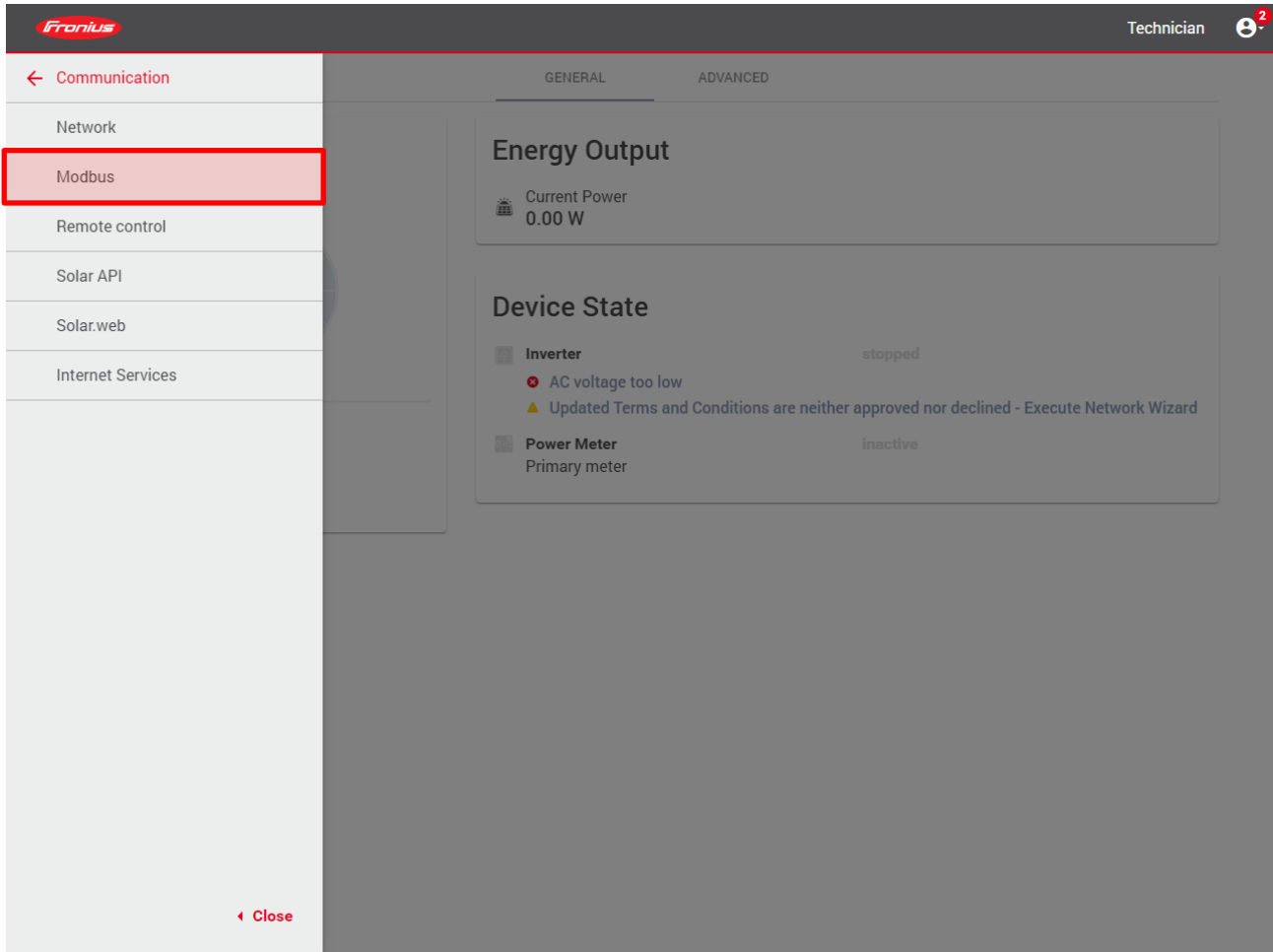
4.2.1 GEN24/Tauro

Click on “Communication” in the menu on the left.



² <https://youtu.be/WETHwfrKJ4w?si=P3QceYQmFRtNXFNc>

Then click on "Modbus".



In this window, activate "Slave as Modbus TCP". The remaining settings such as the port or the SunSpec model type do not need to be changed. Make sure that "Inverter control via Modbus" is also activated.

Modbus Data Export

Modbus RTU Interface 0

Master Slave Disabled

Modbus RTU Interface 1

Master Slave Disabled

Slave as Modbus TCP

Slave as Modbus TCP

Modbus Port *
502

SunSpec Model Type *
int + SF

Meter Address *
200

Inverter Control via Modbus

Inverter Control via Modbus

Restrict Control

CANCEL | SAVE

Finally, click on "Save".

To guarantee that all slave inverters also reduce to 0% feed-in as soon as the connection to the master device is lost, please proceed as follows:

Click on "Safety and grid regulations" in the menu on the left and then select "Export limitation".

Export Limitation

The screenshot shows the 'Export Limitation' settings page. It features several toggle switches and input fields. Three specific areas are highlighted with red boxes and numbered callouts:

- 1:** A red box highlights the 'Power Control' section. The 'Power Control' toggle is turned on. Below it, the 'Total Power Limit' is set to 0 W. The label 'Total DC power of the Entire System *' is visible above the input field.
- 2:** A red box highlights the 'Export Limit Control (Soft Limit)' section. The toggle is turned on. The 'Maximum Grid Feed-In Power *' is set to 0 W. A red arrow points to the '0 Watt' value.
- 3:** A red box highlights the toggle for 'Reduce inverter power to 0% if meter connection has been lost.', which is turned on.

Other visible settings include 'Export Limit Protection (Hard Limit)' (turned off) and 'Limit multiple inverters' (turned off).

Activate the "Power control" slider and enter the total system power in watts (1). Then activate "Export limit control (soft limit)" and set the maximum feed-in power to **0 watts** (2). Please ensure that the slider for "Reduce inverter power to 0% if meter connection has been lost" is also activated (3). Finally, click on "Save".

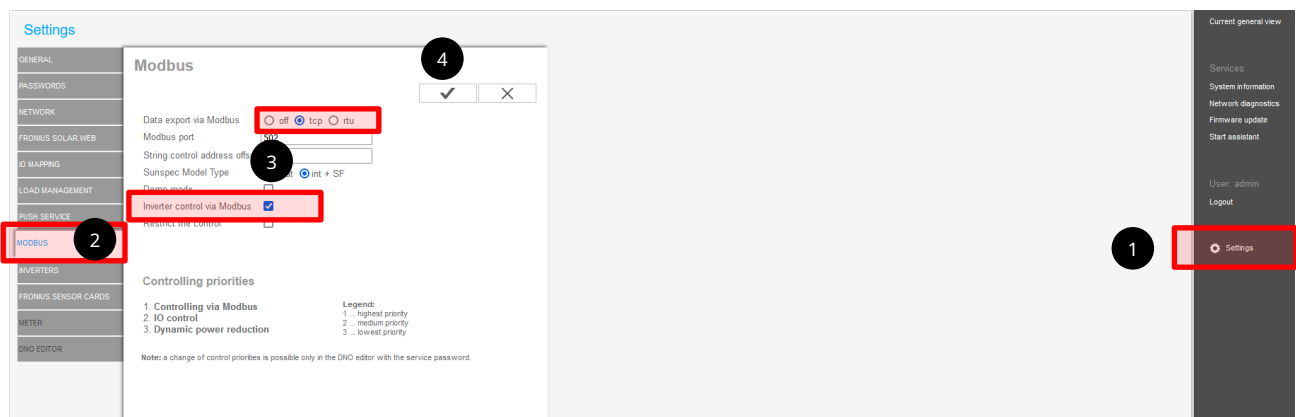
Next, switch to the “I/O power management” menu item and change the control priorities as shown in the following illustration:

The screenshot displays the 'I/O Power Management' configuration page in the Fronius web interface. On the left, a sidebar shows navigation options: 'Safety and Grid Regulations', 'Country Setup', 'Export Limitation', 'I/O Power Management' (highlighted), and 'Autotest (CEI 0-21)'. The main content area is titled 'I/O Power Management' and includes a pin configuration grid with columns for V+/GND, IO, and I, and rows for V+, V-, GND, and GND. Below the grid is a 'DND feedback pin' dropdown menu set to 'Pin 0'. A 'Rules' section contains four rules, each with a delete icon, a toggle switch, and a dropdown arrow. At the bottom of the rules section are 'Import' and 'Export' buttons. A red-bordered box highlights the 'Controlling Priorities' section, which lists the following priorities in order: 1. IO Powerlimit, 2. Modbus Control, and 3. Export Limitation.

Then click on “Save” again.

4.2.2 SnapINverter (Datamanager)

1. Click on "Settings" in the menu on the right.
2. Select "Modbus" from the menu on the left.
3. Set the point at "tcp". The remaining settings such as the port or the SunSpec model type do not need to be changed. Make sure that "Inverter control via Modbus" is also activated.
4. Click on the checkmark to save the settings.



To guarantee that all slave inverters also reduce to 0% feed-in as soon as the connection to the master device is lost, please proceed as follows:

Switch to the "DNO editor" menu item and set the "Limit entire system" in the "Dynamic power reduction" section. Leave "Total DC system power" and "Maximum grid feed-in power" at 0 watts. It is important to check the box "Reduce inverter power to 0% if meter connection has been lost".

Set the control priorities to those shown in the following illustration:

Dynamic power reduction

Export Limitation No Limit Limit Entire System Limit per Phase (not for single-phase devices)

total DC power of the system

Export Limit Protection (Hard Limit Trip)

Export Limiting Control (Soft Limit)
Maximum Grid Feed-In Power W

Reduce inverter power to 0% if meter connection has been lost.

Controlling priorities

1. IO control

2. Controlling via Modbus

3. Dynamic power reduction

Legend:
1 ... highest priority
2 ... medium priority
3 ... lowest priority

Click on the checkmark to save the settings.

5 Display in Solar.web

For the uniform display and visualization of the entire system in Solar.web, the individual data sources of the inverters must be added to the same Solar.web system. This can be done either directly when creating the PV system or subsequently under "Settings" and then "Components".