Cell Modem Recommendation and Data Plan

Version 6

05/2025

Introduction

This document contains an overview of the application options for a cellular modem in combination with Fronius inverters as well as a summary of the hardware requirements and details of the expected data volume.
Fronius accepts no liability for the actual data volume.

In the following, Fronius describes the options for connecting to a cellular modem. Fronius is not liable for costs which may arise from data transmission by the user via the mobile networks. Furthermore, Fronius is not responsible for the security of the data transmission via the mobile networks and is not liable for any damages which may occur therefrom.

Validity

This white paper covers the following inverter generations:

/ GEN24 inverter

Hardware

The cell modem can be powered by the inverter if it meets the following criteria:

/ Supply voltage: 12 V

/ Power consumption <= 6 W

If additional loads are connected (signal lamps, relays, etc.), their consumption must be considered in the performance measurement.

The communication between the cell modem and inverter takes place via the LAN interface (Ethernet).

Attention: no communication via USB!

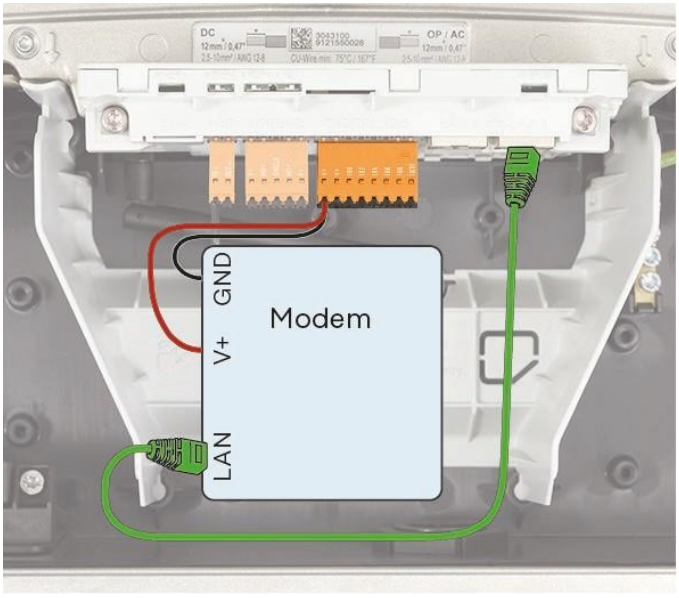
To guarantee reception, the antenna should be positioned outside the inverter; however, the use of adhesive antennas within the inverter has been tested and provides good cellular reception at our testing location. Depending on the cell modem,

a corresponding antenna cable extension may be necessary. If the cell signal is still weak, a directional antenna can help. The general direction of the nearest cell tower will have to be found and some fine tuning using the signal strength LEDs on the cell modem or even better the signal strength on the cell modem's Web User Interface. Fronius USA has tested a range of cell modems (the Digi IX10 cell modem is used in the following as an example of a cell modem that has passed all tests and is recommended by Fronius USA):

/ Ethernet interface
/ LTE Cat 4 with speeds of up to 150 Mbps
/ 9-30 VDC voltage input
/ Open VPN and IPsec
/ Embedded firewall
/ Mini SIM (2FF)
/ Remote Management: Digi Remote Manager, SNMP v2/v3
/ Local Management: WebUI (HTTP/HTTPS), CLI (Telnet, SSH)
/ Operating temperature of -40 °C to 70 °C
/ Size (L x W x H): 118 x 88 x 35 mm (4.65 x 3.46 x 1.38 inches)
/ Weight: approx. 134 grams
/ MobileMark EM-LTE-2C-24 antennas (inside inverter)

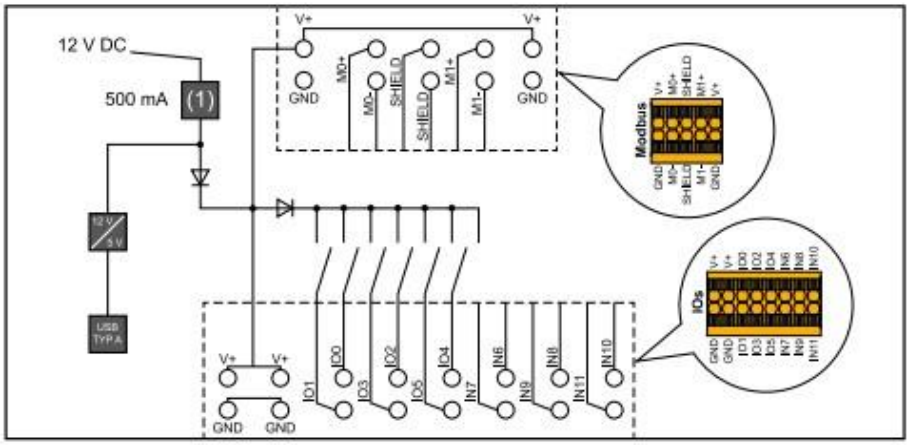
The cell modem is powered via the IO connector on the inverter at terminals "V+" and "GND". Communication is established via a CAT5 cable between the "Ethernet port" on the cell modem and "Ethernet port" on the inverter ("LAN 1").

The figure below depicts the cabling of a cell modem with a GEN24 inverter.



Connection diagram on the data communication interface of the inverter:

IMPORTANT!
If the total output (6 W) is exceeded, the inverter switches off the entire external power supply.



(1) Power limitation

The cell modem can be installed both within the inverter's connection area and outside of it.

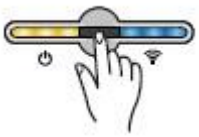
(The specification of the cell modem manufacturer for outdoor use must be considered and appropriate adjustments made for installation outside the inverter)

Software/ Configuration

The configuration of the cell modem at the inverter is identical to the network set-up of a "conventional" LAN connection:

For the GEN24 inverter

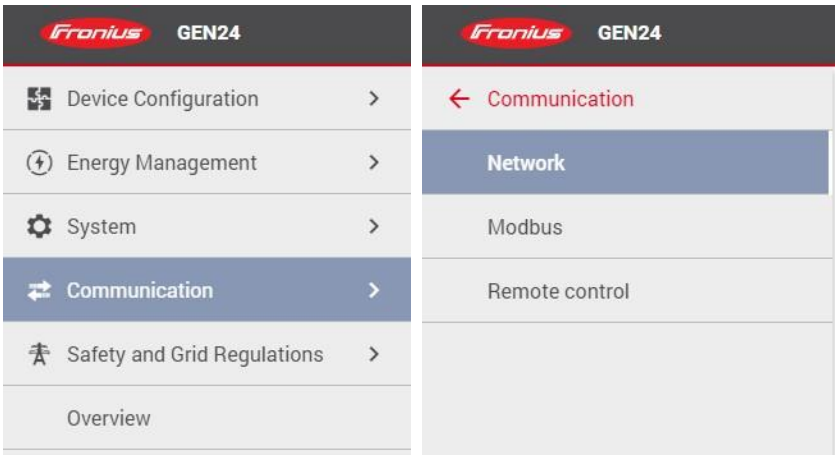
- Open the access point of the inverter by actuating the sensor -> right LED flashes blue



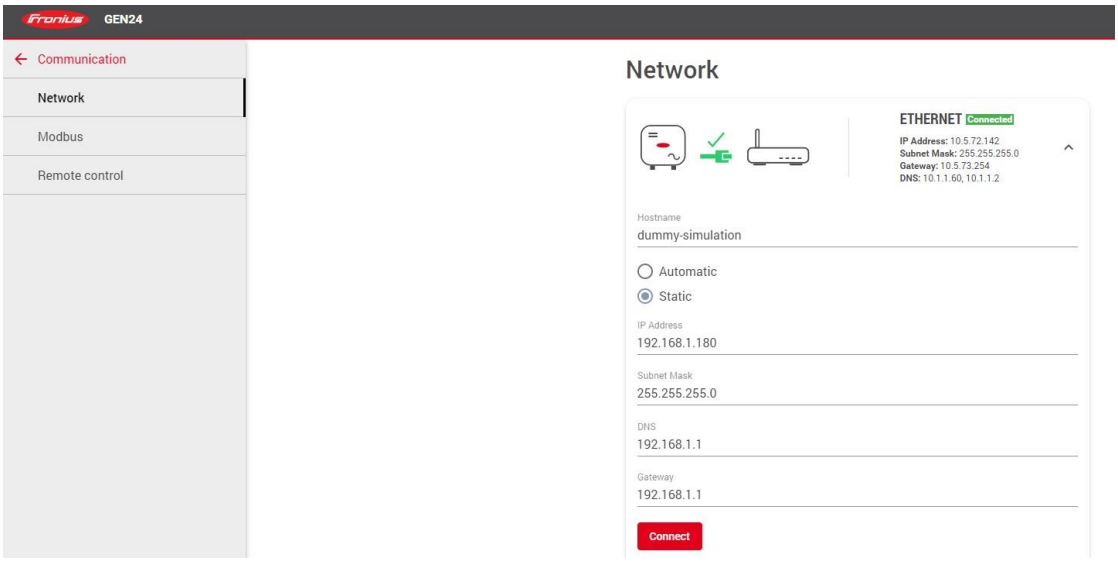
- Connect to the access point.
- Open a browser and open the user interface of the inverter by entering the IP 192.168.250.181

- Conversely, you can use the Solar.Start APP and select “Web Interface”

– In the “Communication” tab of the user interface of the inverter, go to the tab “network”



– Click on LAN and apply the settings
– Make sure Automatic is selected then complete the configuration by clicking "Connect"



Configuration Digi IX10

Settings can be changed using either the Digi Remote Manager or the Web User Interface (WebUI) with a direct connection to the device. To access the WebUI, plug a network cable into the ethernet port of the device and the other end to the ethernet port on a computer. In a browser, go to 192.168.210.1. The default username is admin

and the password is the unique password printed on the label packaged with the device and the label on the bottom of the device (they are the same).

Everything needed to start using the device is at: www.digi.com/ix10/start

On the Digi IX10, since the default password is unique to each unit, it is not necessary to change the password for security reasons.

The following are the main default settings. If any changes are needed, login to the Digi Remote Manager or the WebUI locally and make the desired changes. No changes should be needed for the cell modem to function and send/receive data with basic security (firewall). **It is not recommended to forward the network port of the web interface to the WAN interface.**

Default interface configuration

Interface type	Preconfigured interfaces	Devices	Default configuration
Wireless Wide Area Network (WWAN)	▪ **Modem**	▪ **Modem**	▪ Firewall zone: External ▪ WAN priority: Metric=3 ▪ SIM failover after 5 attempts ▪ SureLink enabled for IPv4
Local Area Network (LAN)	▪ **ETH**	▪ Ethernet: **ETH**	▪ Firewall zone: Internal ▪ IP Address: 192.168.2.1/24 ▪ DHCP server enabled ▪ LAN priority: Metric=5
	▪ **Loopback**	▪ Ethernet: **Loopback**	▪ Firewall zone: Loopback ▪ IP address: 127.0.0.1/8

Interface type	Preconfigured interfaces	Devices	Default configuration
	▪ **Default IP**	▪ Ethernet: **ETH**	▪ Firewall zone: Setup ▪ IP address 192.168.210.1/24
	▪ **Default Link-local IP**	▪ Ethernet: **ETH**	▪ Firewall zone: Setup ▪ IP address 169.254.100.100/16

Other default configuration settings

Feature	Configuration
Central management	▪ Digi Remote Manager enabled as the central management service.
Security policies	▪ Packet filtering allows all outbound traffic. ▪ SSH and web administration: • Enabled for local administration • Firewall zone: Internal
Monitoring	▪ Device heath metrics uploaded to Digi Remote Manager at 60 minute interval. ▪ SNMP: Disabled
Serial port	▪ Enabled ▪ Serial mode: Remote ▪ Label: None ▪ Baud rate: 9600 ▪ Data bits: 8 ▪ Parity: None ▪ Stop bits: 1 ▪ Flow control: None

Firmware update

Firmware updates can be performed via Digi Remote Services or the WebUI. The system firmware files are digitally signed to ensure that only Digi-approved firmware loads onto the device. The IX10 device validates the system firmware image as part of the update process and only successfully updates if the system firmware image can be authenticated. A firmware update can be initiated for the cell modem as soon as its online connection has been established.

Using the WebUI:

1. Log into the IX10 as a user with Admin access.
2. On the main menu, click System>Administration>Firmware Update
3. Click Download from server.
4. For Version:, select the appropriate version of the device firmware.
5. Click Update Firmware.

One cell modem for several inverters

If a single cell modem needs to be used for more than one inverter, a suitable network switch with its own power supply is required because the inverter and cell modem only

have one network port each and the inverter will not be able to power the switch and cell modem at the same time.

Recommended data package for GEN24

We recommend a data plan with a data volume of at least 2 GB per month for a cell modem with a Fronius GEN24 inverter. Data consumption varies widely according to the system design (inverter, Smart Meter and/or battery, as well as service messages on the inverter). An update requires a data volume of approximately 120 MB (up to four update files may be released per year).

For information on how to reduce the data of the inverters, please visit our website www.Fronius-USA.com or contact technical support at 219-734-5500 and ask them to send you the guide title “settings for minimal data”.

Choosing a provider

Before you choose a provider and purchase a SIM card, the on-site reception situation (installation site of the cell modem) must be checked. It can be as easy as taking the cell modem to the site, powering it from the vehicle and watching the signal LEDs. This enables you to ensure that the signal quality is sufficient for data transfer, that the connection is stable and that the cell modem is working correctly.

/ The size of the SIM card for the Digi IX10 cell modem is Mini SIM (2FF). Make sure the proper size SIM card is purchased.

SECURITY SETTINGS

For the admin password, use a secure password that contains letters, symbols and numbers.

If you are using a router with a WLAN connection, position it such that the signal is strong enough and can guarantee a stable connection.

It is also recommended that you choose a password that contains letters, symbols and numbers to prevent unwanted access to the WLAN network.

For router/cell modem updates, follow the recommendations of the router/cell modem manufacturer.

VENDORS AND TECHNICAL SUPPORT

CyberReef is a data plan provider that supplies a cellular data plan using Verizon's network with the unique feature of filtering traffic on the network. Fronius USA has worked with this vendor to only allow data to and from Solar.web so there is less data on your plan being used by random queries to the cell modem and more security since only data to Solar.web is allowed.

When purchasing the hardware through Source Inc. special data plan pricing is available. They will install the SIM card and activate the service, so it is ready to install when it arrives. The cell modem must be purchased from Source Inc. to be eligible for the data plan from CyberReef. No calling to activate a plan on site is required!

For purchasing of the cellular device & data plan, please contact **Damon Zimmer** of Source Inc. at dzimmer@sourceinc.com or **913-663-2700** from 8am to 6pm Central time.

Technical support for the data plan provider, CyberReef is John Langman at john.langman@cyberreef.com or 630-930-8704s