

Installation manual RiCo Ethernet-Converter

Version SMA inverter SunSpec

November 2016

Firmware 1.01

Version 1.02

Scope of delivery

- RiCo Ethernet Converter
- Power supply unit (7.5 VDC / 600 mA)
- RJ45 patch cable (2 m)
- Crossover adapter
- Manual

Function

The Ethernet Converter establishes a connection between one or more SMA inverters (max. 31) with Speedwire interface and SunSpec support (supported devices see appendix) and a RiCo large display. The Ethernet Converter communicates with the SMA inverters via the network interface (10/100 Mbit), using TCP. The Ethernet Converter and the SMA inverters must be in the same local area network and the same subnet. The Ethernet Converter receives the actual data from the SMA inverters (actual power, total energy).

Alternatively **one** SMA inverter and the Ethernet Converter can be connected together directly via a crossover link.

The data is transmitted to the large display via the RS-485 interface. This allows a cabling length up to 1000 meters between the Ethernet Converter and the display. A shielded data cable is used for the connection, for example JY-ST-Y, CAT5. A twisted wire pair must be used for data connection.

Important hints

- The installer must have extensive skills in configuring SMA inverters
- For installation a SMA Grid Guard-Code is necessary
- The SMA inverters must have a Speedwire interface
- The SMA inverters must have the latest firmware
- The SMA inverters must support the SunSpec protocol
- The SMA inverters must be in operation
- The Modbus TCP Server of the SMA inverters must be enabled
- The IP address of the SMA inverters and of the converter are assigned static and must be unique at the network
- The RiCo large display must be configured to data source number '7'
- The Ethernet Converter is supplied with the delivered power supply (7.5 VDC)
- The Ethernet Converter and the power supply unit are for indoor use only

Settings at delivery

IP address Ethernet Converter: 192.168.0.199 _____

IP address first SMA inverter: 192.168.0.200 _____

Subnet mask: 255.255.255.0 _____

Inverter count: 1 ____

Factor CO₂ saving: 0,51 _____

TCP port: 502 (may need to be unlocked in the firewall)

Output Protocol: RiCo RS-485 9600 Baud 8N1

Serial number: _____

Configuration

The following settings can be configured:

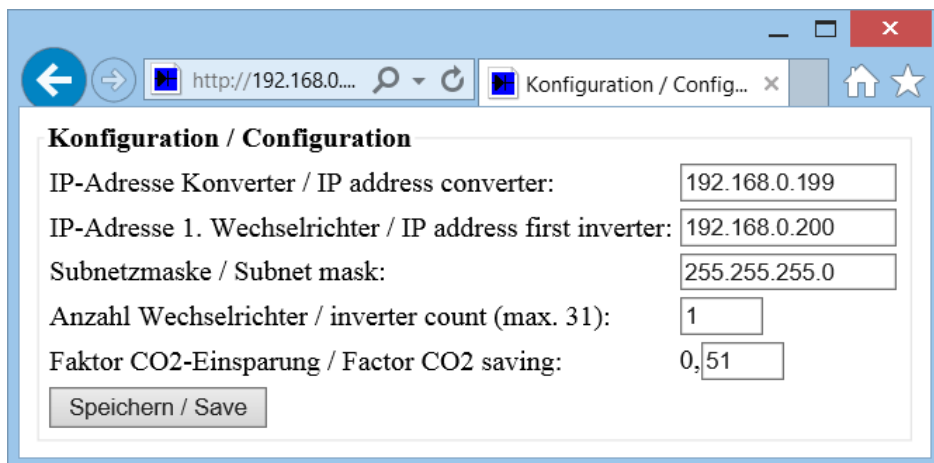
- IP address Ethernet Converter
- IP address of **first** SMA inverter
- Subnet mask
- Number of inverters
- Factor CO₂ saving

The settings can be changed by accessing the Ethernet Converters web interface. Establish the power supply to the Ethernet Converter and connect it to the network, or directly to your PC. Enter the IP address of the Ethernet Converter in the address line of your web browser. (Ethernet Converter and PC must be in the same subnet to get access).

Use for **Authentication**:

Username: ***admin***

Password: ***rico***



The screenshot shows a web browser window with the address bar displaying 'http://192.168.0...'. The page title is 'Konfiguration / Configuration'. The form contains the following fields:

IP-Adresse Konverter / IP address converter:	<input type="text" value="192.168.0.199"/>
IP-Adresse 1. Wechselrichter / IP address first inverter:	<input type="text" value="192.168.0.200"/>
Subnetzmaske / Subnet mask:	<input type="text" value="255.255.255.0"/>
Anzahl Wechselrichter / inverter count (max. 31):	<input type="text" value="1"/>
Faktor CO ₂ -Einsparung / Factor CO ₂ saving:	<input type="text" value="0,51"/>

At the bottom of the form is a button labeled 'Speichern / Save'.

Fill in the necessary values in the corresponding fields.

Take care to fill in **correct values** especially the fields **IP address converter** and **Subnet mask** otherwise the converter will not be accessible again!

At installations with more than one inverter the IP address of the **first** inverter is entered. The other inverters must be configured to the following addresses each increased by **1**!

Ex.: #1 inverter: 192.168.0.200
#2 inverter: 192.168.0.201
#3 inverter: 192.168.0.202
Etc.

A maximum of 31 inverters can be read out. Please note that due a timing restriction of SMA an amount of 30 seconds per inverter is required to get the data. After collecting the data from **all** inverters the display is updated. So for example at 10 inverters it takes about 5 minutes.

At the input field for the factor of CO₂ saving only the two digits after the decimal point can be entered. The configurable range of the factor is 0.1 to 0.99.

After changing the values click the **Save** button and restart the converter by unplugging the power supply unit for a few seconds.

Start-up

The start-up is done in the following order:

- Configure all inverters. The IP addresses must be set according to the way described at page 4. The configuration is done with the SMA tool **SMA Sunny Explorer**. Help for this tool you will get from SMA.

More information about configuration of the inverters see appendix!

- If necessary change the configuration of the Ethernet Converter, described at page 4 of this manual and the RiCo large display, described at the manual of the display
- Disconnect all devices from their power supply and do the installing corresponding to the connection scheme at page 6
- Reconnect all devices to their power supply

Normally the inverters and the Ethernet Converter are connected via a local area network (LAN). All devices are connected to a switch, router, etc.

It is possible to connect **one** inverter to the Ethernet Converter directly, using a crossover cable. A crossover adapter is in scope of delivery.

The Ethernet Converter provides a red LED (light emitting diode), which indicates the data flow. In the connection scheme the LED is marked with **L**. Every 10 seconds a request is sent to a SMA inverter. This is indicated by a LED flash. If the Ethernet Converter gets a valid answer from the inverter the LED flashes a second time. So if you see these double flashes every 10 seconds, the communication between Ethernet Converter and inverters is successful. At two or more connected inverters the LED blinks four times.

If the LED flashes once every 10 seconds only or never, the communication via network is not possible. Please check the network settings and the LAN connection.

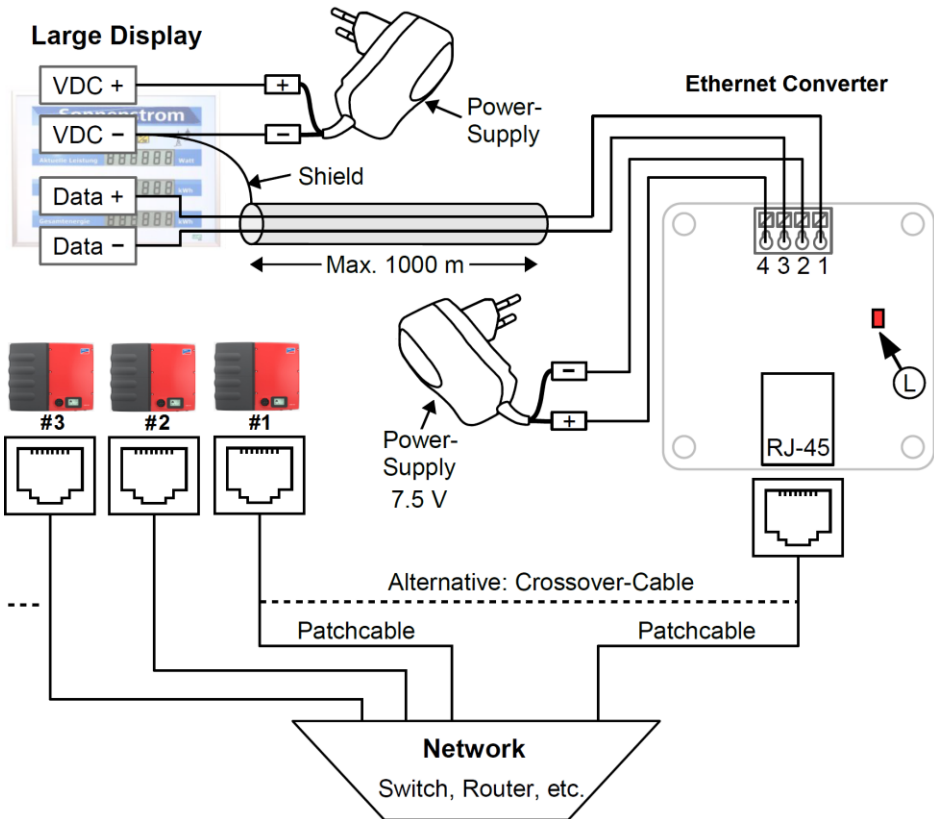
Testing the RS-485 connection between Ethernet Converter and large display

Directly after establishing the power supply to the Ethernet Converter the LED lights up for two seconds. In this time the Ethernet Converter sends zero valued protocols via RS-485 to the large display. With this option the communication between Ethernet Converter and large display can be tested independent from the communication with the inverters.

Do the following steps:

- Power up the ready configured and wired large display and wait until the display shows dashes in all lines
- **Only now** power up the Ethernet Converter
- After the flashing of the LED, the large display must show 0 in all lines

Connection scheme



Pin assignment:

1: Data+	↔	Data+ large display
2: GND	↔	(-) power supply unit
3: Data-	↔	Data- large display
4: +7.5V	↔	(+) power supply unit 7.5 VDC

All mentioned trademarks and brands are the property of their respective owners.

Manufacturer:

RiCo Electronic Design GbR Glasbergweg 7 D-79822 Titisee-Neustadt
Phone 07651 5848 info@rico-electronic.de www.rico-electronic.de

Appendix

Configuring the SMA inverters

At factory delivery the Modbus TCP Server at the supported SMA inverters is deactivated. (Supported SMA inverters see next page). The Modbus TCP Server must be activated to use it.

Requirements

- All SMA devices with Speedwire interface must be commissioned (see installation manual of the inverter or of the retrofitted Speedwire interface).
- Sunny Explorer must be installed on the computer (Sunny Explorer is available free of charge at www.SMA-Solar.com).

Procedure

- Start Sunny Explorer on the computer and create a Speedwire system (see Sunny Explorer user manual)
- Log into the Speedwire system as **Installer**
- Select the SMA inverter to be configured in the system tree
- Select the tab **Settings**
- Select the parameter group **External Communication**
- Select [**Edit**]
- At the group **Modbus** below you will see group **TCP Server**
- In the **Activated** drop-down list, select the entry **Yes**
- Let field **Port** at factory setting **502**
- Select [**Save**]

Hint: The settings may be taken only after entering the SMA Grid Guard-Code!

After a reset of an inverter to factory settings check, if the Modbus TCP Server is still activated.

Further information can be found in the SMA document ,**Technical Information SunSpec® Modbus®-Interface for SUNNY BOY / SUNNY TRIPOWER**‘.

SMA inverters with SunSpec support

Stand: 07.11.2016

Type	Necessary software package
SUNNY BOY 1.5-1VL-40	2.03.02.R
SUNNY BOY 2.5-1VL-40	2.03.02.R
SUNNY BOY 2500 TLST-21	2.60.05.R
SUNNY BOY 3000 TLST-21	2.60.05.R
SUNNY BOY 3000 TL-21	2.60.05.R
SUNNY BOY 3600 TL-21	2.60.05.R
SUNNY BOY 4000 TL-21	2.60.05.R
SUNNY BOY 5000 TL-21	2.60.05.R
SUNNY BOY 3600 SE-10	2.05.02.R
SUNNY BOY 5000 SE-10	2.05.02.R
SUNNY BOY STORAGE 2.5-1VL-40	2.04.09.R
SUNNY TRIPOWER 10000 TL-10	2.65.02.R
SUNNY TRIPOWER 12000 TL-10	2.65.02.R
SUNNY TRIPOWER 15000 TL-10	2.65.02.R
SUNNY TRIPOWER 17000 TL-10	2.65.02.R
SUNNY TRIPOWER 15000 TLEE-10	2.50.87.R
SUNNY TRIPOWER 20000 TLEE-10	2.50.87.R
SUNNY TRIPOWER 5000TL-20	2.55.03.R
SUNNY TRIPOWER 6000TL-20	2.55.03.R
SUNNY TRIPOWER 7000TL-20	2.55.03.R
SUNNY TRIPOWER 8000TL-20	2.55.03.R
SUNNY TRIPOWER 9000TL-20	2.55.03.R
SUNNY TRIPOWER 10000TL-20	2.55.03.R
SUNNY TRIPOWER 11000TL-20	2.55.03.R
SUNNY TRIPOWER 12000TL-20	2.55.03.R
SUNNY TRIPOWER 20000 TL-30	2.80.06.R
SUNNY TRIPOWER 25000 TL-30	2.80.06.R