



# Demo Guide

## R&S®NGM200 Power Supply Series



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# 1 Prearrangement


This step-by-step demo guide describes a 20 minutes presentation, highlighting the key features of the instrument.

An easy way to demonstrate the R&S®NGM200 Power Supply Series is to use:

- the dual-channel R&S®NGM202
- equipped with R&S®NGM-K0 option (respectively R&S®NGM-K104 and -K106 installed)
- two cables with banana plugs to connect channel 1 to channel 2



This paper describes how to operate the instrument for demonstration, and, marked by the ► sign, recommends what to explain to customers.

Starting point is the default setting of the instrument (menu button  → “Device” → “Save/Recall Device Settings” → “Factory Reset” → reset to factory default = YES, → delete all files = NO → instrument will reboot).

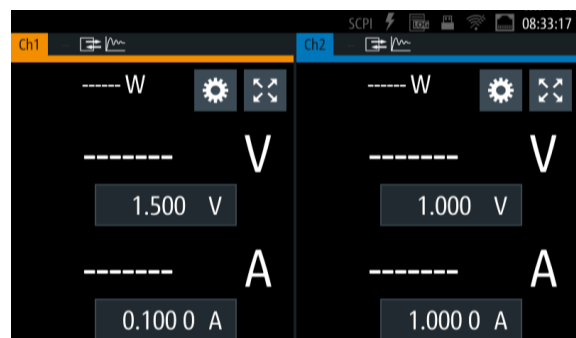
## 2 Demo Hints

### 2.1 Switch-on the instrument

For the first few seconds of booting, you will hear the fan running full speed.


- Explain, this is a functional test, done whenever switching-on the instrument
- Stress the very low operation noise: “The fan is temperature-controlled, it often runs at a low speed or powers down completely”
- Point out: compact design, optimized for bench use or rack installation

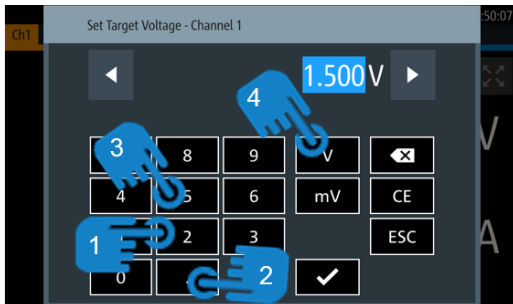
After about 25 seconds of booting, the following screen appears:



- Stress touch screen: “R&S®NGM200 is the first instrument in this class of power supplies using a high-resolution touch screen which is the central operating element.”

## 2.2 Set output voltage and current

1. Touch the voltage input field , the on-screen keyboard will appear. Key-in for example 2.5 V.



Repeat this for 0.5 A in channel 1.

- Explain how to enter values numerically and mention that, alternatively, values can be set using the rotary knob.

2. Select channel 1 by pressing the key “Ch 1” and switch the output on by pressing the “Output” key.

- Explain the selecting function of the channel keys and the use of the “Output” key to switch the set voltage level to the selected output channel terminal.
- Explain the green color used for the displayed voltage and current values and for the channel key. “Green indicates constant voltage mode.”

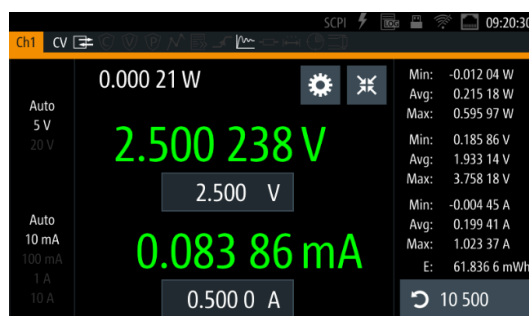


3. Now switch-on channel 2, values and channel key for channel 1 will change to red color, channel 2 will be displayed in green.

- Explain constant current mode being indicated by red color.
- Explain the two quadrant architecture of the R&S®NGM200. “The power supply automatically switches from source mode to sink mode as soon as the externally applied voltage exceeds the set nominal voltage. Current flows into the power supply which is indicated by a negative current reading.”

4. Switch-off channel 2.

5. Press the “Expand/Collapse” button and show the additional information coming up now.



## 2.3 Protection functions

1. Press the “Settings” button and show the upcoming menu structure.



- ▶ Explain: “The menus are organized in three categories, depending whether they are used for the instrument independent of the channels (“Device”) or are used for a specific channel.”



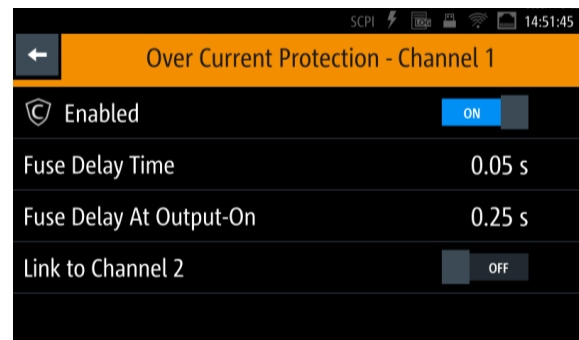
2. Scroll down to the protection functions and open the settings for “Over Current Protection (OCP)”

- ▶ Explain: “The R&S®NGM200 power supplies provide protection functions to make sure the DUT and the power supply are not damaged in the event of a fault. The maximum voltage, current and power can be set separately for each channel. When a channel reaches the set limit, it is automatically switched off and a message is displayed.”

- ▶ Explain the OCP (electronic fuse) in more details: “In the two-channel R&S®NGM202, the electronic fuse can be linked to the other channel (FuseLink function). Then both channels are switched off as soon as the selected channel reaches the maximum current value.

There are two settings to define the response behavior of the electronic fuses. The “Fuse delay at output-on” specifies how long the fuse remains inactive after the channel is activated.

The sensitivity of the fuse is specified using the “Fuse delay time”. This allows users to modify the behavior of the power supply to prevent a channel from being switched off due to a short current spike during operation.”



3. Activate the OCP, then switch back to the channel display using the “Home” button

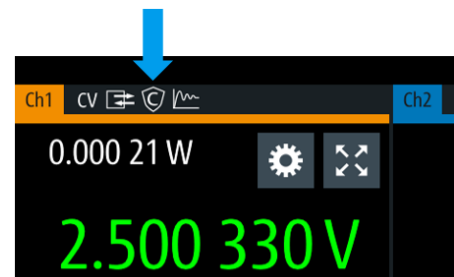


- ▶ Explain: “The “Home” button always brings you back to the channel display.”

Now an icon will be shown to indicate the OCP being switched on.

- ▶ Explain: “The OCP icon indicates the electronic fuse being switched-on; If the channel current exceeds the set current, the channel is automatically switched off and the overcurrent symbol flashes.”

You can show this by activating channel 2 again.

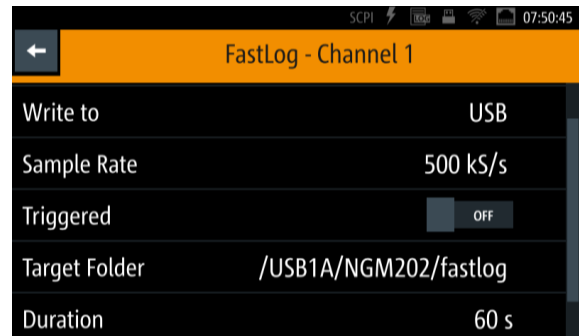


4. Deactivate the over-current protection before continuing with the next setting.

## 2.4 High-speed acquisition (FastLog functionality)

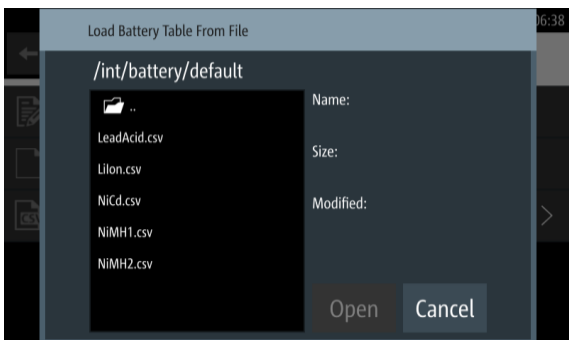
Press the “Settings” button and select “Channel 1”. Scroll down to “FastLog” and open the settings.


- Explain: “The R&S®NGM200 power supplies offer the high-speed FastLog functionality to capture voltage and current measurement results. This data can be stored on an external USB storage device or can be transferred to an external PC via USB or LAN. With an acquisition rate of up to 500 ksample/s, voltage and current results are available every 2  $\mu$ s. Using the two-channel R&S®NGM202, the data acquisition can run on both channels in parallel.”



## 2.5 Battery simulation

- Give a short introduction: “Capacity, open circuit voltage (Voc) and equivalent series resistance (ESR) are important battery characteristics that depend on its state of charge (SoC). The optional R&S®NGM-K106 functionality allows users to simulate the behavior of batteries under different charging conditions, e.g. when powering a DUT. “



1. Press the “Menu” button . Under “Device” you will find “Battery Model Editor”. Open this setting and select “Edit existing file”. Choose the folder “default” and then “Lilon.csv” and open the file.

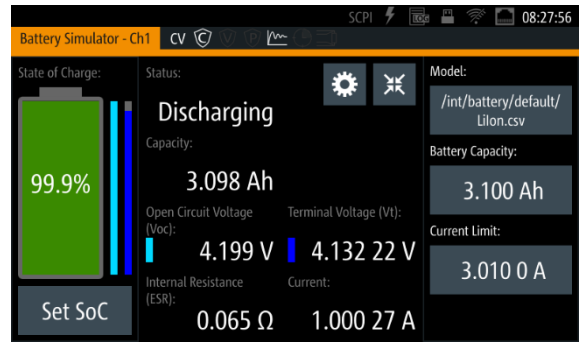
- Explain: “To define a battery model, the data of the battery can be entered easily using the integrated battery model editor. Data sets for the common battery types Pb, Lilon, NiCd and NiMH are available as preconfigured files. These can be easily modified according to the needs of a specific application.”

State of Charge (SoC)	Open-Circuit Voltage (Voc)	Internal Resistance (ESR)
0 %	3.003 V	0.083 $\Omega$
1 %	3.493 V	0.074 $\Omega$
2 %	3.494 V	0.073 $\Omega$
3 %	3.572 V	0.068 $\Omega$

2. Go back to the main menu and select “Channel 1”. Scroll down to “Battery Simulator”, switch it on and open the settings. Select “Load from file...” and load the settings of the Lilon battery as described before. Switch back to the channel display and expand it to display channel 1 only.

3. Switch on both channels and activate the “Output” key. Now, the simulated battery will be discharged by channel 2 and you will see the following display.

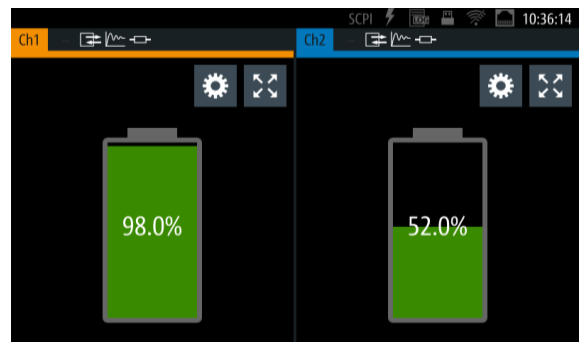
- ▶ Explain: “When battery-operated devices have to be optimized for lifecycle, the discharging behavior of the used battery type needs to be considered. The battery simulator function of the R&S®NGM200 makes it possible to simulate the real battery output performance. Testing can be based on a selected battery model, while battery capacity, SoC and Voc can be set to any state to test the device under specific circumstances. “



4. Switch off the outputs.

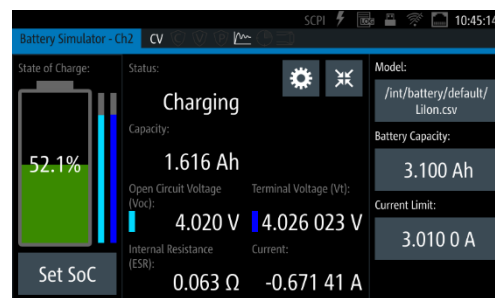
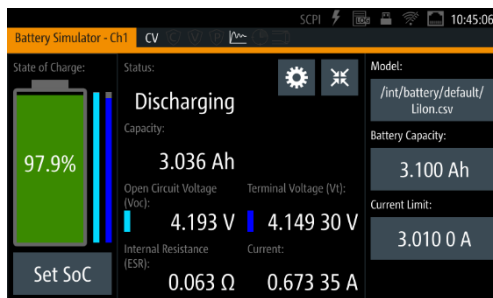
5. Move to the menu of channel 2 and activate the battery simulation for this channel as well. Use the Lilon battery as you did for channel 1. Move to the channel display of channel 2 and set the SoC value to 50 %. Switch on both channels.

6. Going back to the channel display having both channels side by side, you will see two battery diagrams.



- ▶ Explain: the battery on the left side (100 % SoC) will charge the battery on the right side (50 % SoC). The percentage values change according to this process.

7. If you expand the two channels to full-screen mode, you will see channel 1 running in discharging mode, while channel 2 simulates a battery being charged.



- ▶ Point out: “Using the two-channel R&S®NGM202, battery simulation can be used simultaneously on both channels.”
- ▶ Explain: “The charging behavior of a battery can also be simulated. This is particularly important when designing battery chargers. In this application, the R&S®NGM200 power supply is used in sink mode. “
- ▶ Point out: “Both cases provide dynamic simulation, meaning Voc, ESR and SoC change according to charging/discharging conditions like a real battery. Other instruments on the market provide static simulation only, meaning parameters like Voc or ESR stay the same during simulation.”