ROHDE&SCHWARZ

Make ideas real

POWER SUPPLIES. VERSATILE AND COMPACT.

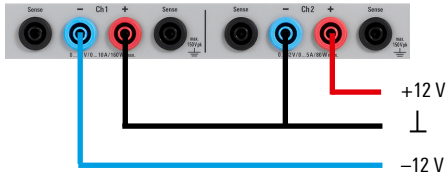
Flyer | Version 06.00

UNIQUE FEATURES FOR BETTER RESULTS

Galvanically isolated, floating channels

The Rohde&Schwarz power supply family consists of instruments with up to four channels. The circuitry of each individual channel is completely isolated from the others; there is no connection to the chassis ground. This makes it easy to combine the channels to drive bipolar circuitries that might need +12 V/–12 V, for example, and avoids any ground problems in complex DUTs.

Supplying balanced circuits: two channels can be connected together to supply balanced circuits with e.g. +12 V/–12 V.



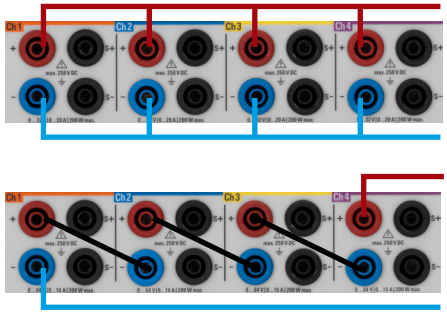
Channels have the same voltage range

Most of the Rohde&Schwarz power supplies offer the same voltage range on all channels. You can select any channel for a specific application. Each channel can be regarded as a separate power supply.

Parallel and serial operation

Because channels are electrically equivalent, they can be combined in serial mode to achieve higher voltages. Up to 250 V can be achieved with the R&S®NGP824, for instance. In parallel mode, the channels can be bundled for higher current. For example, combining all four channels of the R&S®NGP804 allows for currents up to 80 A. Moreover, utilizing the tracking function enables simultaneous adjustment of voltage and current across all selected channels.

The output channels can be configured in parallel to achieve higher output current, or in series for higher output voltage (example: R&S®NGP800).



Parallel operation: max. 80 A

Serial operation: max. 250 V

Channel fusion

The R&S®NGA102 and R&S®NGA142 even support channel fusion. After activating serial or parallel channel fusion, the device will start to act like a one-channel power supply with double voltage or current capability.

Constant voltage and constant current modes

Configuring and regulating the output voltage (constant voltage mode) is the standard application for power supplies. However, all Rohde&Schwarz power supplies can also be used in constant current mode, with each channel separately configurable. If the configured current level is exceeded, current limiting ensures that only the configured current can flow. The output voltage is accordingly reduced below the configured value. This prevents damage to the test circuit in the event of a fault.

Protection functions to safeguard instrument and DUT

Since even the most experienced user is occasionally distracted, the outputs are protected against overloading and short circuits so that the power supply will not be damaged.

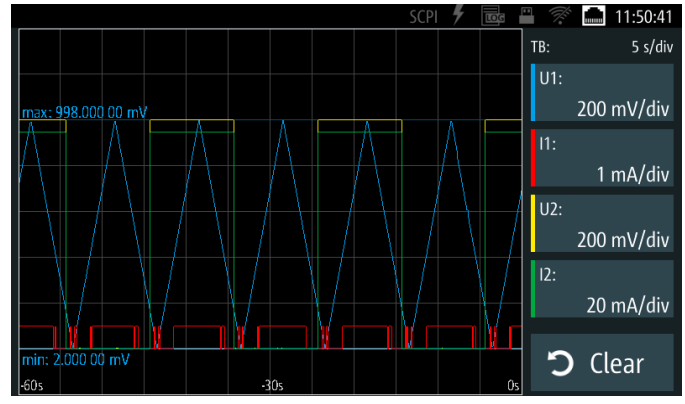
Rohde&Schwarz power supplies provide multipurpose protection functions. Depending on the model, users can separately configure the following for each channel:

- Maximum current (electronic fuse, overcurrent protection, OCP)
- Maximum voltage (overvoltage protection, OVP)
- Maximum power (overpower protection, OPP)

If such a limit is reached, the affected output channel will be automatically switched off and a message will be displayed.

Graphical view

The graphical view function enables fast and convenient analysis of measured data, particularly for dynamic processes such as charging, discharging and switching between different operating states of a device under test (DUT). By integrating time-varying measurements on a single screen, advanced Rohde&Schwarz power supplies such as the R&S®NGP800 ensure the integrity and correlation of all data points by design.

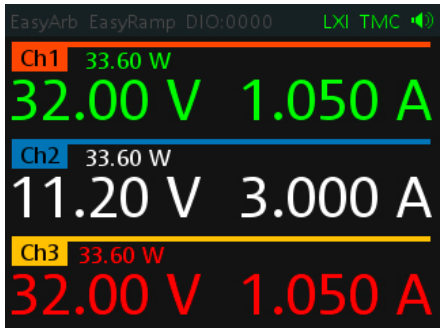


The graphical view function interface on an R&S®NGP800 power supply.

Color coding of operating states

All settings and operating conditions, including the output power and the status of any protective functions, are indicated on the display. The colors of the values and the illuminated channel keys indicate the different operating conditions:

- Green: constant voltage operation
- Red: constant current operation
- White: inactive channels
- Cyan: constant resistance operation



The different operating conditions are indicated by colors (example: R&S®NGE103B).

Remote sensing for more stringent accuracy requirements

There is often a significant voltage drop over the connection leads, especially in applications with high current consumption. Since power supplies usually maintain a constant output voltage, the voltage on the DUT will be lower than the voltage displayed on the instrument. Remote sensing compensates for this voltage drop over the supply leads. The voltage actually present at the load is measured by an additional pair of sense lines, and this value is used to regulate the voltage directly at the load. Depending on the model, the Rohde&Schwarz power supplies provide remote sensing for each output channel.

Connections for all channels – including sense lines – are also provided on the rear panel (example: R&S®HMP4040).

Source and sink operation with arbitrary polarity

The high-precision power supplies offer a two or four-quadrant architecture, depending on the model. This feature enables them to operate as both a source and a sink in both polarities. The power supplies can simulate batteries or loads, allowing current to flow into the power supply, which is indicated by a negative current reading.

The R&S®NGU401/NGU411 power supplies facilitate tasks such as measuring the forward and reverse characteristics of semiconductor devices in a single test operation without requiring changes to the circuit.

Fast logging

The R&S®NGM200 and R&S®NGU power supplies offer a fast logging feature with a sample rate of up to 500 ksample/s, allowing spikes to be detected that might go unnoticed with slower instruments. This feature enables voltage and current values to be captured over time in a manner similar to an oscilloscope, with a resolution of up to 2 µs. Fast logging facilitates the analysis of energy consumption across various functional blocks of a device under test (DUT) and helps identify faults within the DUT's circuitry.

Fast load regulation

Consumer electronics such as mobile phones and IoT devices require very little power in sleep mode. However, the current increases abruptly as soon as the device switches to transmit mode. A power supply used to power such DUTs must be capable of handling load changes from a few nA to the ampere range without creating voltage drops or overshoots.

The R&S®NGL/NGM/NGU power supplies have a circuit design that achieves recovery times of < 30 µs.

Minimum residual ripple and low noise

Advanced electronic circuitry is often very complex and sensitive to interference on the supply lines. In order to supply interference-free voltage to such sensitive DUTs, the power supplies must provide extremely stable output voltages and currents. All types of ripple and noise need to be avoided. The R&S®NGA/NGL/NGM/NGU power supplies have linear regulation and are ideal for sensitive DUTs.

Control your instrument from anywhere

With VNC remote access and FTP file transfer capabilities, advanced power supplies such as the R&S®NGP800 can be controlled and operated from any location. All functions are accessible via remote control, and files can be transferred between your computer and the instrument using FTP.

Tailored for use in labs and system racks

Rohde&Schwarz power supplies cover a wide range of applications – when used on the lab bench and when integrated into a production test system.

Remote control functions and rack adapters are essential in system applications. Rear panel connectors and, above all, the compact design are key factors for use in test systems.

POWER SUPPLY PORTFOLIO



	Basic units		
	R&S®NGE102B/103B	R&S®NGC101(-G)/NGC102(-G)/ NGC103(-G)	R&S®NGA101/102/141/142
Electrical specifications			
Number of output channels	2/3	1/2/3	1/2
Maximum output power	66 W/100 W	100 W	40 W/80 W
Maximum output power per channel	33.6 W	100 W/50 W/33 W	40 W
Output voltage per channel	0 V to 32 V	0 V to 32 V	R&S®NGA101/102: 0 V to 35 V R&S®NGA141/142: 0 V to 100 V
Maximum output current per channel	3 A	10 A/5 A/3 A	R&S®NGA101/102: 6 A R&S®NGA141/142: 2 A
Voltage ripple and noise (RMS) (20 Hz to 20 MHz)	< 1.5 mV (typ.)	R&S®NGC101: < 1 mV (meas.); R&S®NGC102/103: < 450 µV (meas.)	R&S®NGA101/102: < 0.5 mV (meas.); R&S®NGA141/142: < 1.5 mV (meas.)
Current ripple and noise (RMS) (meas.) (20 Hz to 20 MHz)	< 2 mA	R&S®NGC101: < 1.5 mA; R&S®NGC102/103: < 1 mA	< 500 µA
Load recovery time [1] (meas.)	< 200 µs	< 1 ms	R&S®NGA101/102: < 100 µs; R&S®NGA141/142: < 50 µs
Programming/readback resolution			
Voltage	10 mV	1 mV	programming: R&S®NGA101/102: 1 mV R&S®NGA141/142: 10 mV readback: 1 mV
Current	1 mA	< 1 A: 0.1 mA (R&S®NGC101: 0.5 mA); ≥ 1 A: 1 mA	readback: 10 µA low-current measurement range: 1 µA
Readback accuracy (± (% of output + offset))			
Voltage	< 0.1 % + 20 mV	< 0.05 % + 2 mV	R&S®NGA101/102: 0.02 % + 5 mV R&S®NGA141/142: 0.02 % + 10 mV
Current	< 0.1 % + 5 mA	R&S®NGC101: < 0.2 % + 10 mA; R&S®NGC102: < 0.1 % + 5 mA; R&S®NGC103: < 0.05 % + 2 mA	< 0.05 % + 500 µA low-current measurement range: < 0.15 % + 40 µA
Special functions			
Measurement functions	voltage, current, power	voltage, current, power, energy	voltage, current, power
Protection functions	OVP, OCP, OPP, OTP	OVP, OCP, OPP, OTP	OVP, OCP, OPP, OTP
FuseLink function	●	● (R&S®NGC102/103)	● (R&S®NGA102/142)
Fuse delay	●	●	●
Remote sensing	–	●	●
Sink mode	–	–	–
Output delay	–	● (R&S®NGC102/103)	–
Trigger input/output	○/○	●/–	○/○
Arbitrary function	● (CH1: EasyArb)	● (EasyArb)	● (CH1: EasyArb)
Analog/modulation interface	–	●	–
Channel fusion	–	–	●
Data logging	–	● (standard mode)	● (standard mode)
Display and interfaces			
Display	3.5" QVGA	3.5" QVGA	3.5" QVGA
Rear panel connections	–	16-pin connector block	8-pin connector block
Remote control interfaces	standard: USB; optional: LAN	standard: USB, LAN; R&S®NGC10x-G models with IEEE-488 (GPIB)	standard: USB, LAN
General data			
Dimensions (W × H × D)	222 × 97 × 310 mm	222 × 97 × 291 mm	222 × 97 × 448 mm
Weight	4.9 kg/5.0 kg	2.6 kg (R&S®NGC10x-G models: 2.7 kg)	6.6 kg/7.0 kg/6.9 kg/7.3 kg
Rack adapter	R&S®HZC95 option	R&S®HZC95 option	R&S®HZN96 option

[1] 10 % to 90 % load change within a band of ±20 mV of set voltage.
[2] In the most sensitive measurement range.

Performance units		
R&S®HMP2020/2030	**R&S®HMP4030/4040**	**R&S®NGP802/822/804/814/824**
2/3	3/4	2/4
188 W	384 W	400 W/800 W
80 W, except R&S®HMP2020, CH1: 160 W	160 W	200 W
0 V to 32 V	0 V to 32 V	0 V to 32 V (32 V channels); 0 V to 64 V (64 V channels)
5 A, except R&S®HMP2020, CH1: 10 A	10 A	20 A (32 V channels); 10 A (64 V channels)
< 1.5 mV (meas.)	< 1.5 mV (meas.)	< 3 mV (meas.)
< 1 mA	< 1 mA	< 3.5 mA
< 1 ms	< 1 ms	< 400 µs
1 mV	1 mV	1 mV
< 1 A: 0.1 mA (10 A CH: 0.2 mA); ≥ 1 A: 1 mA	< 1 A: 0.2 mA; ≥ 1 A: 1 mA	0.5 mA
< 0.05 % + 5 mV	< 0.05 % + 5 mV	< 0.05 % + 5 mV (32 V channels); < 0.05 % + 10 mV (64 V channels)
< 0.1 % + 2 mA	< 0.1 % + 2 mA	< 0.1 % + 5 mA
voltage, current	voltage, current	voltage, current, power, energy
OVP, OCP, OTP	OVP, OCP, OTP	OVP, OCP, OPP, OTP
●	●	●
●	●	●
●	●	●
–	–	–
–	–	●
–	–	○/○
● (EasyArb)	● (EasyArb)	● (QuickArb)
–	–	○
–	–	–
–	–	● (standard mode)
240 × 64 pixel LCD	240 × 128 pixel LCD	TFT 5" 800 × 480 pixel WVGA touch
4-pin connector block per channel	8-pin connector block per 2 channels	8-pin connector block per 2 channels
optional: USB, LAN, IEEE-488 (GPIB), RS-232	optional: USB, LAN, IEEE-488 (GPIB), RS-232	standard: USB, LAN; optional: IEEE-488 (GPIB)
285 × 93 × 405 mm	285 × 136 × 405 mm	362 × 100 × 451 mm
7.8 kg/8.0 kg	12.4 kg/12.8 kg	7.5 kg/8.0 kg
R&S®HZ42 option	R&S®HZP91 option	R&S®ZZA-GE23 option

All data valid at +23 °C (– 3 °C/+ 7 °C) after 30 minutes of warm-up time.

● yes – no ○ optional

High-precision power supplies

R&S®NGL201/202	R&S®NGM201/202	R&S®NGU201/411/401
1/2	1/2	1
60 W/120 W	60 W/120 W	60 W/20 W/60 W
60 W	60 W	60 W/20 W/60 W
0 V to 20 V	0 V to 20 V	R&S®NGU201: 0 V to 20 V R&S®NGU411/401: –20 V to +20 V
≤ 6 V output voltage: 6 A; > 6 V output voltage: 3 A	≤ 6 V output voltage: 6 A; > 6 V output voltage: 3 A	≤ 6 V output voltage: 8 A; (R&S®NGU411: ≤ 10 V: 2 A) > 6 V output voltage: 3 A (R&S®NGU411: > 10 V: 1 A)
< 500 µV (meas.)	< 500 µV (meas.)	< 500 µV (meas.)
< 1 mA	< 1 mA	< 1 mA
< 30 µs	< 30 µs	< 30 µs
1 mV/10 µV	1 mV/5 µV[2)]	50 µV/1 µV[2)]
0.1 mA/10 µA	0.1 mA/10 nA[2)]	100 nA/100 pA[2)]
< 0.02 % + 2 mV	< 0.02 % + 500 µV[2)]	< 0.02 % + 500 µV[2)]
< 0.05 % + 250 µA	< 0.05 % + 15 µA[2)]	< 0.025 % + 15 nA[2)]
voltage, current, power, energy	voltage, current, power, energy	voltage, current, power, energy
OVP, OCP, OPP, OTP	OVP, OCP, OPP, OTP	OVP, OCP, OPP, OTP
● (R&S®NGL202)	● (R&S®NGM202)	–
●	●	●
●	●	●
●	●	●
● (R&S®NGL202)	● (R&S®NGM202)	–
o/o	o/o	o/o
● (QuickArb)	● (QuickArb)	● (QuickArb)
–	–	R&S®NGU411/401: modulation interface
–	–	–
● (standard mode)	● (standard and fast mode)	● (standard and fast mode)
TFT 5" 800 × 480 pixel WVGA touch	TFT 5" 800 × 480 pixel WVGA touch	TFT 5" 800 × 480 pixel WVGA touch
8-pin connector block per channel	8-pin connector block per channel	8-pin connector block
standard: USB, LAN; optional: IEEE-488 (GPIB)	standard: USB, LAN; optional: IEEE-488 (GPIB)	standard: USB, LAN; optional: IEEE-488 (GPIB)
222 × 97 × 436 mm	222 × 97 × 436 mm	222 × 97 × 436 mm
7.1 kg/7.3 kg	7.2 kg/7.4 kg	7.1 kg
R&S®HZN96 option	R&S®HZN96 option	R&S®HZN96 option

DIFFERENT POWER SUPPLY CLASSES

R&S®NGE103B power supply.

Basic power supplies

- Affordable, quiet and stable
- For manual operation and simple computer-controlled operation
- Used in education, on the bench and in system racks

R&S®NGP814 four-channel power supply.

Performance power supplies

- When speed, accuracy and advanced programming features are vital to test performance
- Features such as DUT protection, fast programming times and downloadable V and I sequences
- Used in labs and ATE applications

R&S®NGU401 four-quadrant source measure unit.

High-precision power supplies

- Tailored to specific applications
- Unique features such as
  - Emulation of unique battery characteristics
  - Electronic loads to accurately sink current and dissipate power in a controlled manner
- Used in labs and ATE environments

CONNECTIVITY – EVERYTHING YOU NEED

Rohde&Schwarz power supplies offer a variety of interfaces to remotely control the instruments and to connect external devices. Depending on the model, different types of interfaces are provided.

- USB: the instrument can be controlled from external PCs. Rohde&Schwarz power supplies support VCP/CDC and some also support TMC.
- LAN (Ethernet): to control the power supplies, a fixed IP address can be used or, alternatively, the DHCP function can be used to allocate dynamic IP addresses. Some instruments support LXI.
- IEEE-488: most Rohde&Schwarz power supplies can be equipped with an IEEE-488 (GPIB) interface.
- RS-232: to support existing environments.
- Digital in/out interfaces are provided by a selection of instruments and can be individually used as trigger inputs or outputs.
- Analog/modulation input: fast and direct control of the output voltages and currents using an external control voltage.

Rohde&Schwarz
The Rohde&Schwarz technology group is among the trailblazers when it comes to paving the way for a safer and connected world with its leading solutions in test&measurement, technology systems and networks&cybersecurity. Founded 90 years ago, the group is a reliable partner for industry and government customers around the globe. The independent company is headquartered in Munich, Germany and has an extensive sales and service network with locations in more than 70 countries.

www.rohde-schwarz.com

Service at Rohde&Schwarz
You're in great hands

- Worldwide
- Local and personalized
- Customized and flexible
- Uncompromising quality
- Long-term dependability

Sustainable product design

- Environmental compatibility and eco-footprint
- Energy efficiency and low emissions
- Longevity and optimized total cost of ownership

Certified Quality Management
ISO 9001

Certified Environmental Management
ISO 14001

Rohde&Schwarz training
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Power supplies. Versatile and compact.
Data without tolerance limits is not binding | Subject to change