

R & S<sup>®</sup> ESSENTIALS

# R&S<sup>®</sup> NGP800 POWER SUPPLY SERIES

Boost your efficiency with quadcore power



Data Sheet  
Version 03.00

3 year  
warranty

**ROHDE & SCHWARZ**

Make ideas real



# AT A GLANCE

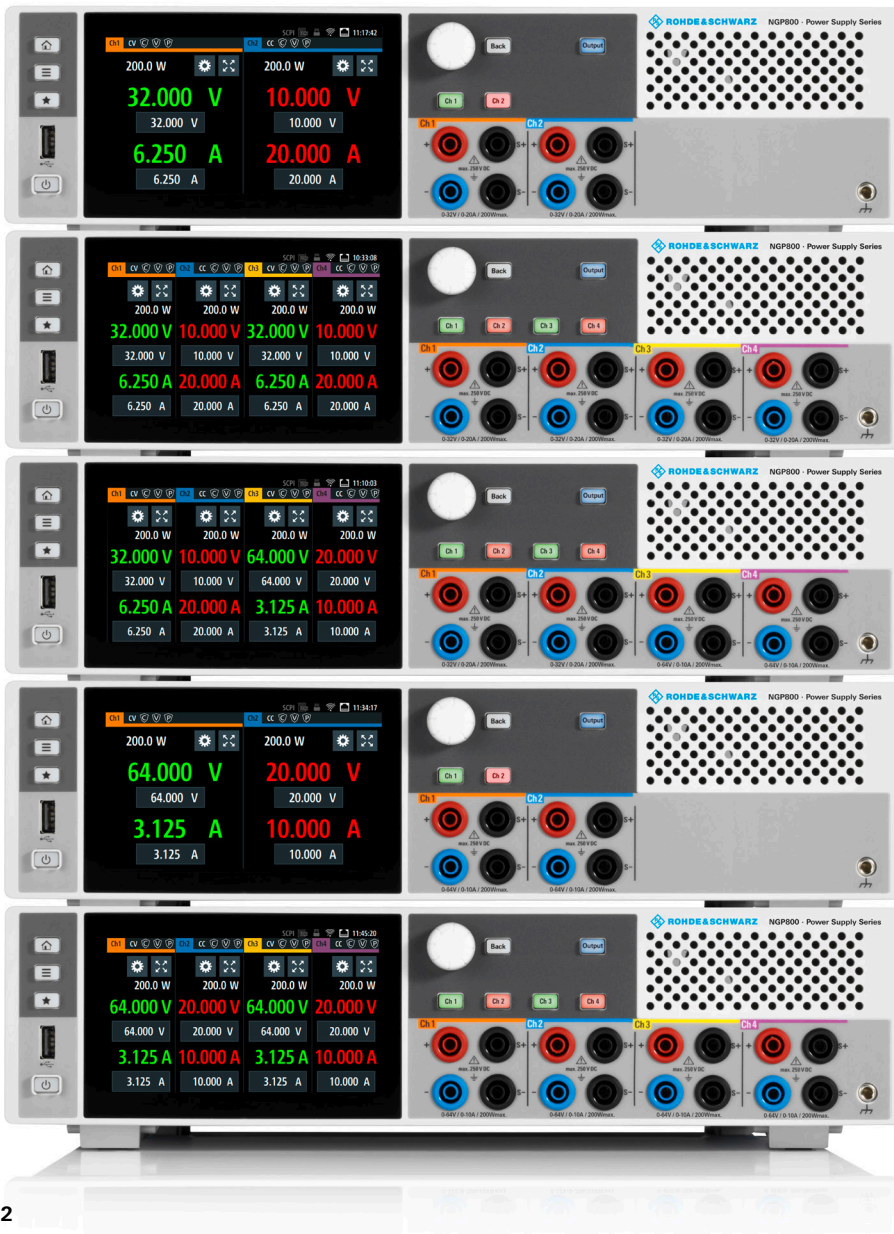
## Comprising five powerful models

The R&S®NGP800 DC power supply series, comprising five models with 400 W or 800 W, provides maximum power at a variety of operating points. The two or four 200 W outputs can each supply up to 64 V or up to 20 A. Electrically equivalent and galvanically isolated outputs can be wired in series or parallel for up to 250 V or 80 A.

Synchronizing your outputs, performing waveform tests and logging data for in-depth analysis – all this becomes easy with the R&S®NGP800 power supply series.

An intuitive operating concept and a large touchscreen allow you to enter values much faster and to display statistics in real time.

All R&S®NGP800 power supplies include sense terminals, USB and a LAN interface. A user-installable GPIB interface, a digital trigger I/O, an analog input and a wireless LAN interface are optional, making these instruments great on the bench or in an automated test system.



### R&S®NGP802

- ▶ Two-channel power supply
- ▶ 400 W – 2 × 32 V/20 A

### R&S®NGP804

- ▶ Four-channel power supply
- ▶ 800 W – 4 × 32 V/20 A

### R&S®NGP814

- ▶ Four-channel power supply
- ▶ 800 W – 2 × 32 V/20 A  
2 × 64 V/10 A

### R&S®NGP822

- ▶ Two-channel power supply
- ▶ 400 W – 2 × 64 V/10 A

### R&S®NGP824

- ▶ Four-channel power supply
- ▶ 800 W – 4 × 64 V/10 A

# BOOST YOUR EFFICIENCY WITH ...

## ... full flexibility

- ▶ 5" high-resolution touch display
- ▶ FlexPower
- ▶ Four power supplies in a single instrument
- ▶ Parallel and serial operation
- ▷ page 4

## ... full functionality

- ▶ Ramp function
- ▶ Output delay
- ▶ Arbitrary function
- ▶ Remote sensing
- ▶ Built-in measurements
- ▶ Data logging
- ▷ page 6

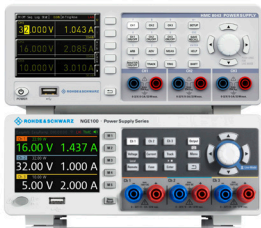
## ... full safety

- ▶ Protection functions
- ▶ Safety limits
- ▶ Safe working environment
- ▷ page 8

## ... full connectivity

- ▶ Digital remote control
- ▶ Digital trigger I/O
- ▶ Analog input
- ▷ page 9

## Different classes of power supplies



R&S HMC8043 and R&S NGE103B  
three-channel power supplies

### Basic power supplies

- ▶ Economical, quiet and stable instruments
- ▶ For manual and simple computer-controlled operation
- ▶ In applications where speed and accuracy are a low consideration
- ▶ Used in education, on the bench and in system racks



R&S HMP4040 and R&S NGP804  
four-channel power supplies

### Performance power supplies

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



R&S NGL201 single-channel and  
R&S NGM202 two-channel power supply

### Specialty power supplies

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

Basic class

Performance class

Specialty class

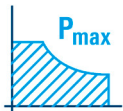
# FULL FLEXIBILITY



## 5" high-resolution touch display

The large high-resolution touch display makes operation easy. Quickly navigate through the menus to access all functions and settings. Enter values much faster using the virtual keyboard instead of turning the knob.

The home screen gives you a clear overview of all your channels. Each channel can be selected for a more detailed view with a wide variety of additional information, such as statistics and icons indicating the status of set protection or special functions.

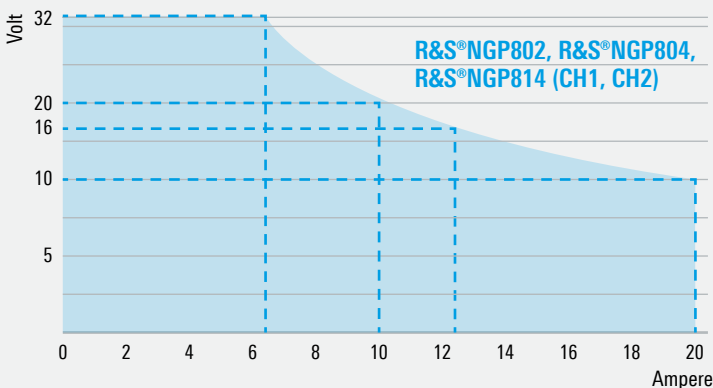


## FlexPower

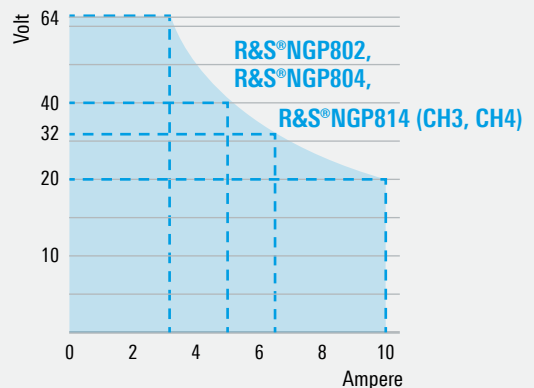
Get the maximum power at various operating points. Unlike with single range power supplies, you can generate variable voltage and current combinations within the overall power limit of 200 W per channel.



**FlexPower**  
32 V/20 A (max. 200 W per output)



**FlexPower**  
64 V/10 A (max. 200 W per output)



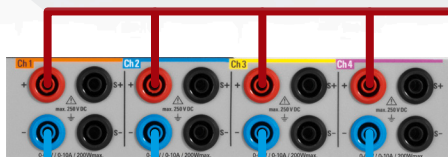
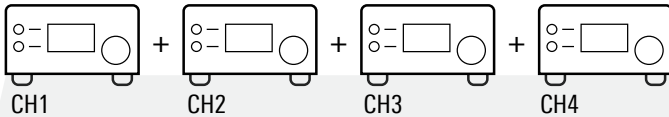


### Four power supplies in a single instrument

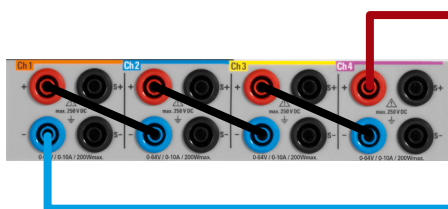
Save cost and space on your bench or in your rack by powering up to four DUTs with a single instrument. Each output is completely independent and floating.

All outputs can operate in constant voltage (CV) or constant current (CC) mode with automatic crossover and mode indication.

A separate output button allows you to synchronously switch all channels on or off. This is crucial for circuitries that can be damaged if one voltage rail is present without the other. The individual channel buttons let you select the channels you want to operate.



Parallel operation – max. 80 A



Serial operation – max. 250 V



### Parallel and serial operation

If your application requires more voltage or current, simply connect the outputs in series or parallel and get up to 250 V (R&S®NGP824) or 80 A (R&S®NGP804) – now you have the flexibility you always asked for. Using the tracking function, voltage and current are adjusted on all selected channels simultaneously.

# FULL FUNCTIONALITY



## Ramp function (EasyRamp)

To control inrush currents, some test setups require a continuously rising supply voltage instead of a rapid jump. Increase the output voltage continuously within a timeframe of 10 ms to 60 s with the EasyRamp function.



## Arbitrary function (QuickArb)

Emulate the normal behaviors of your power subsystems early in the design process and simulate power problems for DUT design verification.

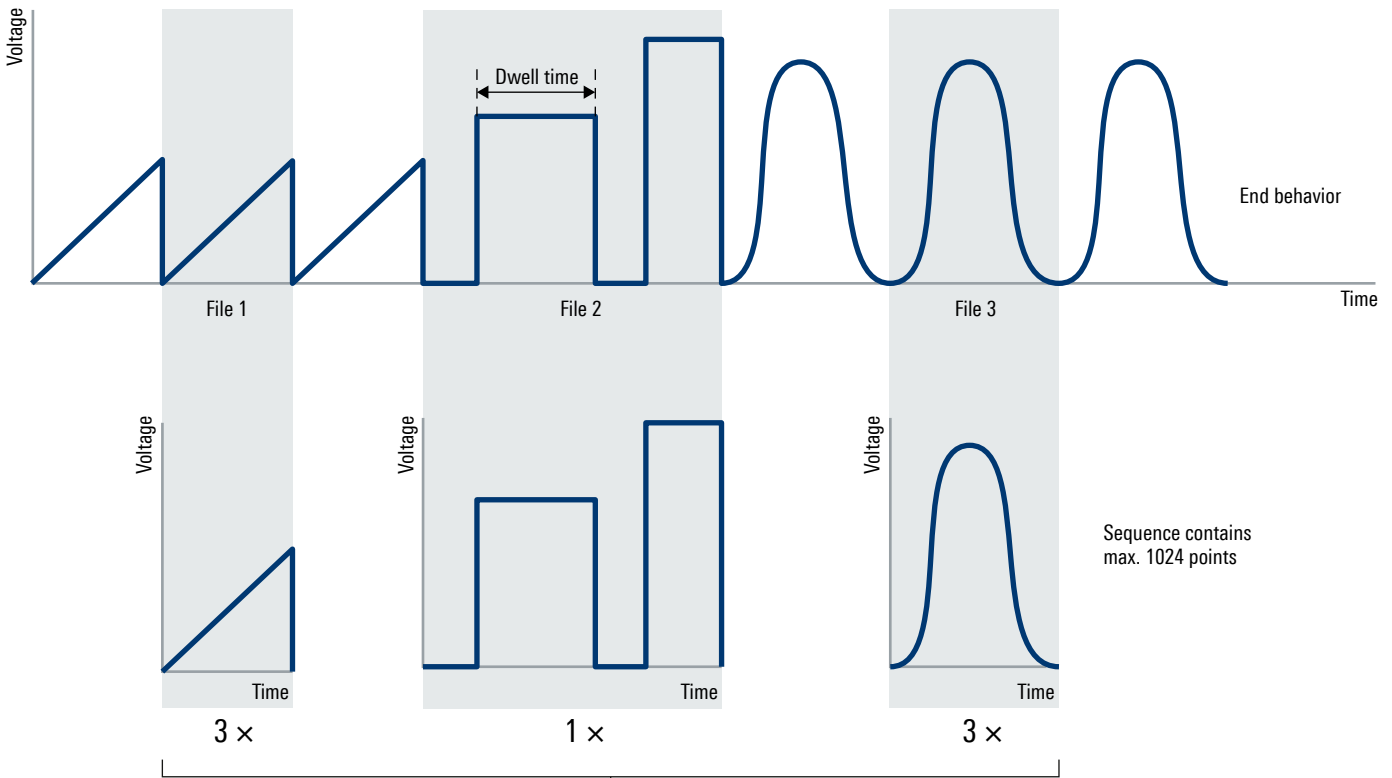
The QuickArb function lets you generate voltage and current sequences that vary over time with dwell times down to 1 ms. Load up to eight subgroup files into one sequence to create complex patterns.



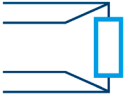
## Output delay

Turn on each channel individually with a delay to meet the requirements of state-of-the-art microcontrollers that use multiple supply voltages and demand specific power-up sequences.

## QuickArb function



Load up to eight subgroup files into one sequence to create complex patterns.



### Remote sensing

Improve your voltage regulation using remote sensing, regulating the output voltage directly at the DUT input terminals instead of the power supply's output terminals.

The four-wire remote sensing compensates for voltage drops in the supply leads, especially in applications with high currents. The R&S®NGP800 power supplies provide sense connections for each output at both the front and rear terminals.



### Built-in measurements

The built-in measurements reduce the need for an external multimeter and simplify the setup. The separate voltage and current meters on each output give a resolution of 1 mV and 0.5 mA over the full output range of 64 V and 20 A, respectively.

The integrated statistics show the min./max. and average values for power, voltage and current as well as an energy count.



### Data logging

Logging data is key to long-term monitoring, reviewing test setups and repeating test conditions when analyzing power behaviors or optimizing power consumption.

The R&S®NGP800 power supplies simultaneously log voltage and current measurements over time on all outputs. You can easily export the timestamped data as a .CSV file for reports and documentation.



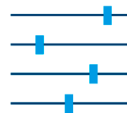
### Save/recall device settings

Continue exactly where you left off last time and avoid frustration when several persons use the same power supply. Save frequently used settings with the save function. The recall function lets you load files to any R&S®NGP800 power supply to ensure the same setup on multiple instruments.



### User button

Configure the user button with a frequently used action to easily access it at the press of a button. Choose between screenshot, toggle logging, reset statistics and TouchLock.



### User adjustment

Immensely reduce your downtime by calibrating your R&S®NGP800 power supply in-house. All you need is a standard 6½ digit DMM, a 10 mΩ shunt resistor and one minute per channel.

# FULL SAFETY

## Protection functions

Protecting your DUT is crucial in limit testing. The R&S®NGP800 power supplies include overcurrent protection (OCP), overvoltage protection (OVP) and overpower protection (OPP).

The internal overtemperature protection (OTP) switches the power supply off if a thermal overload is imminent.

You can set the maximum current, voltage and power values separately for each channel. If an active protection function trips, you are alerted by a beeping sound and the corresponding symbol flashing on the status bar.



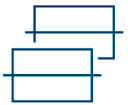
### Overcurrent protection (OCP, electronic fuse)

Adjust the sensitivity and response behavior of the electronic fuse according to your application. The fuse delay at output-on specifies how long the fuse remains inactive after the channel is switched on. The sensitivity of the fuse is specified by the fuse delay time.



### Safety limits

To be sure to protect the device under test, you can set safety limits to restrict the power supply to values that are not dangerous for your DUT.



The FuseLink function allows you to link the fuses between channels, switching off all linked channels as soon as the selected channel reaches the current limit.

### Safe working environment

To eliminate unnecessary noise, the R&S®NGP800 power supplies automatically adjust fan speed to the load condition, allowing you to work in a quiet environment.

The R&S®NGP800 power supplies use 4 mm banana safety plugs, as required by an increasing number of laboratories for safety reasons.



### Overvoltage protection (OVP)

If the voltage exceeds your set maximum value, the channel is switched off.

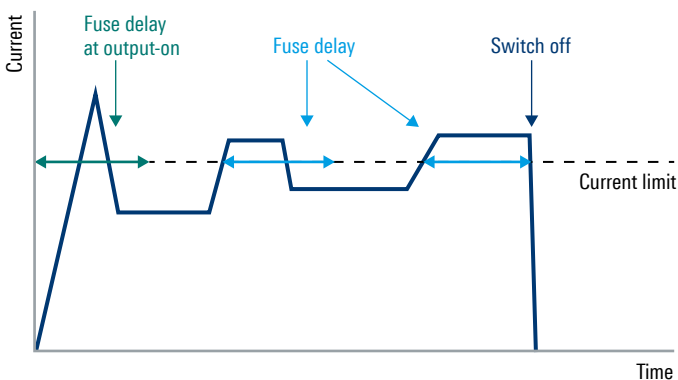


### Overpower protection (OPP)

Instead of the maximum voltage, you can use the maximum power as the switch-off criterion.

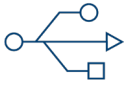
## Fuse delay times

The fuse delay at output-on specifies how long the fuse remains inactive after the channel is switched on. The sensitivity of the fuse is specified by the fuse delay time.





# FULL CONNECTIVITY



## Digital remote control

To meet the requirements of varying environments, an array of interfaces to remotely control your instrument is provided.

USB and LAN (Ethernet) are standard, while the wireless LAN and IEEE-488 (GPIB) interfaces are optional and can also be added at a later date.

The additional output and sense terminals on the rear panel allow easy wiring and make the R&S®NGP800 power supply series a good choice for both your bench and your automated test system.



• IEEE 488 •



## Digital trigger I/O (R&S®NGP-K103 option)

Configure the eight pins of the digital I/O connector as inputs or outputs to generate trigger events for output control and indication. As an input, the trigger I/O can enable or inhibit outputs or start functions such as QuickArb or logging. As an output, the trigger I/O can indicate protection triggers, voltage/current/power level events and actual output operating modes.

In addition, the digital trigger system allows you to control output delays or fuse linking across multiple instruments.



## Analog input (R&S®NGP-K107 option)

An external control voltage from 0 V to 5 V can control any or all of the outputs with an input scaling from 0% to 100%. Now you can control the output voltages and currents directly and much faster.

Galvanic isolation between the control voltage and the outputs greatly simplifies the connection while maintaining user safety even for high-voltage and floating-circuit applications.

For easier access, the R&S®NGP800 power supplies come with pluggable 8-pin terminal blocks for the rear output connections, digital trigger I/O and analog input connections.



# SPECIFICATIONS

## Definitions

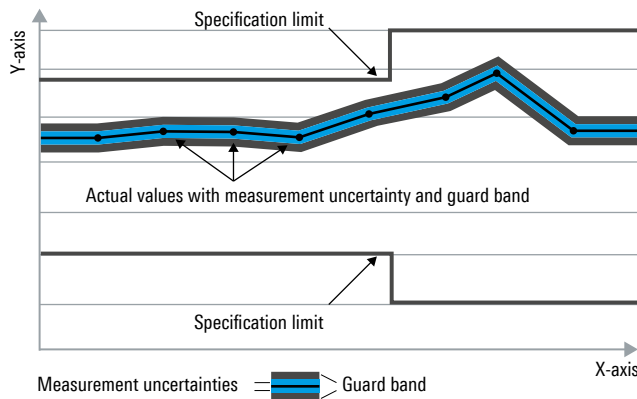
### General

Product data applies under the following conditions:

- ▶ Three hours storage at ambient temperature followed by 30 minutes warm-up operation
- ▶ All data is valid at 23°C (−3°C/+7°C) after 30 minutes warm-up time.
- ▶ Specified environmental conditions met
- ▶ Recommended calibration interval adhered to
- ▶ All internal automatic adjustments performed, if applicable

### Specifications with limits

Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as  $<$ ,  $\leq$ ,  $>$ ,  $\geq$ ,  $\pm$ , or descriptions such as maximum, limit of, minimum. Compliance is ensured by testing or is derived from the design. Test limits are narrowed by guard bands to take into account measurement uncertainties, drift and aging, if applicable.



### Specifications without limits

Represent warranted product performance for the specified parameter. These specifications are not specially marked and represent values with no or negligible deviations from the given value (for example, dimensions or resolution of a setting parameter). Compliance is ensured by design.

### Typical data (typ.)

Characterizes product performance by means of representative information for the given parameter. When marked with  $<$ ,  $>$  or as a range, it represents the performance met by approximately 80% of the instruments at production time. Otherwise, it represents the mean value.

### Nominal values (nom.)

Characterize product performance by means of a representative value for the given parameter (for example, nominal impedance). In contrast to typical data, a statistical evaluation does not take place and the parameter is not tested during production.

### Measured values (meas.)

Characterize expected product performance by means of measurement results gained from individual samples.

### Uncertainties

Represent limits of measurement uncertainty for a given measurand. Uncertainty is defined with a coverage factor of 2 and has been calculated in line with the rules of the Guide to the Expression of Uncertainty in Measurement (GUM), taking into account environmental conditions, aging, wear and tear.

Device settings and GUI parameters are indicated as follows: “parameter: value”.

Typical data as well as nominal and measured values are not warranted by Rohde&Schwarz.

In line with the 3GPP/3GPP2 standard, chip rates are specified in million chips per second (Mcps), whereas bit rates and symbol rates are specified in billion bits per second (Gbps), million bits per second (Mbps), thousand bits per second (kbps), million symbols per second (Msps) or thousand symbols per second (ksps), and sample rates are specified in million samples per second (Msample/s). Gbps, Mcps, Mbps, Msps, kbps, ksps and Msample/s are not SI units.

<b>Electrical specifications</b>		
<b>Outputs</b>	The channel outputs are galvanically isolated and not connected to ground.	
Number of output channels	R&S°NGP802, R&S°NGP822	2
	R&S°NGP804, R&S°NGP824, R&S°NGP814	4
Total output power	R&S°NGP802, R&S°NGP822	max. 400 W
	R&S°NGP804, R&S°NGP824, R&S°NGP814	max. 800 W
Maximum output power per channel		200 W
Output voltage per channel	R&S°NGP802, R&S°NGP804, R&S°NGP814 (CH1, CH2)	0 V to 32 V
	R&S°NGP822, R&S°NGP824, R&S°NGP814 (CH3, CH4)	0 V to 64 V
Maximum output current per channel	R&S°NGP802, R&S°NGP804, R&S°NGP814 (CH1, CH2)	20 A
	R&S°NGP822, R&S°NGP824, R&S°NGP814 (CH3, CH4)	10 A
Maximum voltage in serial operation	R&S°NGP802	64 V
	R&S°NGP822, R&S°NGP804, R&S°NGP814	128 V
	R&S°NGP824	250 V
Maximum current in parallel operation	R&S°NGP822	20 A
	R&S°NGP802, R&S°NGP824, R&S°NGP814	40 A
	R&S°NGP804	80 A
Voltage ripple and noise	20 Hz to 20 MHz	< 3 mV (RMS), < 30 mV ( $V_{pp}$ ) (meas.)
Current ripple and noise	20 Hz to 20 MHz	< 3.5 mA (RMS) (meas.)
<b>Load regulation</b>	load change: 10% to 90%	
Voltage	$\pm$ (% of output + offset)	
	R&S°NGP802, R&S°NGP804, R&S°NGP814 (CH1, CH2)	< 0.01% + 5 mV
	R&S°NGP822, R&S°NGP824, R&S°NGP814 (CH3, CH4)	< 0.01% + 10 mV
Current	$\pm$ (% of output + offset)	
Load recovery time	50% to 100% load change to within 0.2% of rated voltage	< 400 $\mu$ s (meas.)
<b>Rise time</b>	10% to 90% of rated output voltage, resistive load	
	R&S°NGP802, R&S°NGP804, R&S°NGP814 (CH1, CH2)	< 10 ms
	R&S°NGP822, R&S°NGP824, R&S°NGP814 (CH3, CH4)	< 12 ms
<b>Fall time</b>	90% to 10% of rated output voltage, resistive load	
	R&S°NGP802, R&S°NGP804, R&S°NGP814 (CH1, CH2)	full load: < 10 ms, no load: < 50 ms
	R&S°NGP822, R&S°NGP824, R&S°NGP814 (CH3, CH4)	full load: < 25 ms, no load: < 50 ms
<b>Programming resolution</b>		
Voltage		1 mV
Current		0.5 mA
<b>Programming accuracy</b>		
Voltage	$\pm$ (% of setting + offset)	
	R&S°NGP802, R&S°NGP804, R&S°NGP814 (CH1, CH2)	< 0.05% + 5 mV
	R&S°NGP822, R&S°NGP824, R&S°NGP814 (CH3, CH4)	< 0.05% + 10 mV
Current	$\pm$ (% of setting + offset)	
		< 0.1% + 5 mA

Output measurements		
Measurement functions		voltage, current, power, energy
Readback resolution		
Voltage		1 mV
Current		0.5 mA
Readback accuracy		
Voltage	±(% of output + offset)	
	R&S®NGP802, R&S®NGP804, R&S®NGP814 (CH1, CH2)	< 0.05% + 5 mV
	R&S®NGP822, R&S®NGP824, R&S®NGP814 (CH3, CH4)	< 0.05% + 10 mV
Current	±(% of output + offset)	
		< 0.1% + 5 mA
Temperature coefficient (per °C)		
	±(% of output + offset), +5°C to +20°C and +30°C to +40°C	
	R&S®NGP802, R&S®NGP804, R&S®NGP814 (CH1, CH2)	voltage: < 0.0075% + 0.75 mV, current: < 0.015% + 0.75 mA
	R&S®NGP822, R&S®NGP824, R&S®NGP814 (CH3, CH4)	voltage: < 0.0075% + 1.5 mV, current: < 0.015% + 0.75 mA
Remote sensing		
Maximum sense compensation		1 V (meas.)

Ratings		
Maximum voltage to ground		250 V DC
Maximum counter voltage	voltage with the same polarity connected to the outputs	
	R&S®NGP802, R&S®NGP804, R&S®NGP814 (CH1, CH2)	35 V
	R&S®NGP822, R&S®NGP824, R&S®NGP814 (CH3, CH4)	70 V
Maximum reverse voltage	voltage with opposite polarity connected to the outputs	0.4 V
Maximum reverse current	for 5 min max.	20 A

Remote control		
Command processing time		< 6 ms (typ.)

Protection functions		
Overvoltage protection		
		adjustable for each channel
Programming resolution		1 mV
Overpower protection		
		adjustable for each channel
Overcurrent protection (electronic fuse)		
		adjustable for each channel
Programming resolution		0.5 mA
Response time	$(I_{load} > I_{resp} \times 2)$ at $I_{load} \geq 2$ A	< 1 ms
Fuse linking (FuseLink function)		yes
Fuse delay at output-on	adjustable for each channel	10 ms to 10 s (1 ms increments)
Fuse delay time	adjustable for each channel	10 ms to 10 s (1 ms increments)
Response time for linked channels		< 5 ms
Overtemperature protection		
		independent for each channel

<b>Special functions</b>		
<b>Output ramp function</b>		EasyRamp
EasyRamp time		10 ms to 60 s (1 ms increments)
<b>Output delay</b>		
Synchronicity		< 1 ms (typ.)
Delay per channel		10 ms to 10 s (1 ms increments)
<b>Arbitrary function</b>		QuickArb
Parameters		voltage, current, time
Maximum number of points		1024
Maximum number of subgroups		8
Dwell time		1 ms to 60 s (1 ms increments)
Repetition		continuous or burst mode with 1 to 65535 repetitions
Trigger		manually, by remote control or via optional trigger input
<b>Trigger and control interfaces</b>	R&S®NGP-K103	digital I/O, 16-pin connector block
Trigger response time		< 3 ms (typ.)
Maximum voltage (IN/OUT)		5.5 V
Input trigger level		TTL
Maximum drain current (OUT)		5 mA
<b>Analog control interface</b>	R&S®NGP-K107	analog input, 16-pin connector block
Input voltage	0% to 100% control of voltage or current	0 V to 5 V
Output accuracy	R&S®NGP802, R&S®NGP804, R&S®NGP814 (CH1, CH2)	voltage: < 0.1% + 16 mV, current: < 0.1% + 30 mA
	R&S®NGP822, R&S®NGP824, R&S®NGP814 (CH3, CH4)	voltage: < 0.1% + 32 mV, current: < 0.1% + 15 mA
Temperature coefficient (per °C)	±(% of output + offset), +5°C to +20°C and +30°C to +40°C	
	R&S®NGP802, R&S®NGP804, R&S®NGP814 (CH1, CH2)	voltage: < 0.015% + 2.4 mV, current: < 0.015% + 4.5 mA
	R&S®NGP822, R&S®NGP824, R&S®NGP814 (CH3, CH4)	voltage: < 0.015% + 4.8 mV, current: < 0.015% + 2.25 mA
Update rate		1 ms
<b>Data logging</b>		
Maximum acquisition rate		125 sample/s
Memory depth		800 Mbyte internal or external memory
Voltage resolution		see readback resolution
Voltage accuracy		see readback accuracy
Current resolution		see readback resolution
Current accuracy		see readback accuracy
<b>Display and interfaces</b>		
Display		TFT 5" 800 × 480 pixel WVGA touch
Front panel connections		4 mm safety sockets (channel outputs, remote sensing)
Rear panel connections	R&S®NGP802, R&S®NGP822	8-pin connector block (channel outputs and remote sensing)
	R&S®NGP804, R&S®NGP824, R&S®NGP814	2 × 8-pin connector block (channel outputs and remote sensing)
Remote control interfaces	standard	USB-TMC, USB-CDC (Virtual COM), LAN
	R&S®NGP-K102	WLAN
	R&S®NG-B105	IEEE-488 (GPIB)

## General data

### Environmental conditions

Temperature	operating temperature range	+5°C to +40°C
	storage temperature range	-20°C to +70°C
Humidity	noncondensing	5% to 95%

### Power rating

Mains nominal voltage		100 V to 250 V
Mains frequency		50 Hz to 60 Hz
Maximum power consumption	R&S®NGP802, R&S®NGP822	650 W
	R&S®NGP804, R&S®NGP824, R&S®NGP814	1125 W
Mains fuses	internal (not user accessible)	16 A 250 V IEC 60127-2/7 fast acting

### Product conformity

Electromagnetic compatibility	EU: in line with Radio Equipment Directive 2014/53/EU	applied standards: <ul style="list-style-type: none"> <li>▶ ETSI EN 300328 V2.1.1</li> <li>▶ EN 61326-1</li> <li>▶ EN 61326-2-1</li> <li>▶ EN 55011 (Class A)</li> <li>▶ EN 55032 (Class A)</li> <li>▶ ETSI EN 301489-1 V2.2.0</li> <li>▶ ETSI EN 301489-17 V3.2.0</li> </ul>
	Korea	KC mark
Electrical safety	USA, Canada	FCC47 CFR Part 15B, ICES-003 Issue 6
	EU: in line with Low Voltage Directive 2014/35/EU	applied harmonized standards: EN 61010-1
WLAN approvals	USA, Canada	UL61010-1, CSA C22.2 No. 61010-1
	Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom	CE
RoHS	Singapore	iMDA standards DB102020
	USA, Canada	FCC, IC
	in line with EU Directive 2011/65/EU	EN50581

### Mechanical resistance

Vibration	sinusoidal	5 Hz to 55 Hz, 0.3 mm (peak-to-peak), 55 Hz to 150 Hz, 0.5 g const., in line with EN 60068-2-6
	random	8 Hz to 500 Hz, acceleration: 1.2 g (RMS), in line with EN 60068-2-64
Shock		40 g shock spectrum, in line with MIL-STD-810E, method 516.4, procedure I

### Mechanical data

Dimensions	W × H × D	362 mm × 100 mm × 451 mm (14.25 in × 3.94 in × 17.76 in)
Weight	R&S®NGP802, R&S®NGP822	7.5 kg (16.5 lb)
	R&S®NGP804, R&S®NGP824, R&S®NGP814	8.0 kg (17.6 lb)
Rack installation	R&S®ZZA-GE23	19 in, 2 HU

### Recommended calibration interval

	operation 40 h/week over entire range of specified environmental conditions	1 year
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# ORDERING INFORMATION

Designation	Type	Order No.
<b>Base unit</b>		
Two-channel power supply, 400 W, 32 V/20 A	R&S°NGP802	5601.4007.05
Four-channel power supply, 800 W, 32 V/20 A	R&S°NGP804	5601.4007.02
Four-channel power supply, 800 W, 2 x 32 V/20 A, 2 x 64 V/10 A	R&S°NGP814	5601.4007.04
Two-channel power supply, 400 W, 64 V/10 A	R&S°NGP822	5601.4007.06
Four-channel power supply, 800 W, 64 V/10 A	R&S°NGP824	5601.4007.03
<b>Accessories supplied</b>		
Set of power cables, terminal blocks, quick start guide		
<b>Hardware options</b>		
IEEE-488 (GPIB) interface	R&S°NG-B105	5601.6000.02
<b>Software options</b>		
Wireless LAN remote control	R&S°NGP-K102	5601.6400.03
Digital trigger I/O	R&S°NGP-K103	5601.6300.03
Analog input	R&S°NGP-K107	5601.6200.03
<b>System components</b>		
19" rack adapter, 2 HU	R&S°ZZA-GE23	5601.4059.02

<b>Warranty</b>		
<b>Base unit</b>		3 years
All other items <sup>1)</sup>		1 year
<b>Options</b>		
Extended warranty, one year	R&S°WE1	
Extended warranty, two years	R&S°WE2	
Extended warranty with calibration coverage, one year	R&S°CW1	Please contact your local Rohde & Schwarz sales office.
Extended warranty with calibration coverage, two years	R&S°CW2	
Extended warranty with accredited calibration coverage, one year	R&S°AW1	
Extended warranty with accredited calibration coverage, two years	R&S°AW2	

## Extended warranty with a term of one and two years (WE1 and WE2)

Repairs carried out during the contract term are free of charge<sup>2)</sup> Necessary calibration and adjustments carried out during repairs are also covered.

## Extended warranty with calibration coverage (CW1 and CW2)

Enhance your extended warranty by adding calibration coverage at a package price. This package ensures that your Rohde & Schwarz product is regularly calibrated, inspected and maintained during the term of the contract. It includes all repairs<sup>2)</sup> and calibration at the recommended intervals as well as any calibration carried out during repairs or option upgrades.

## Extended warranty with accredited calibration (AW1 and AW2)

Enhance your extended warranty by adding accredited calibration coverage at a package price. This package ensures that your Rohde & Schwarz product is regularly calibrated under accreditation, inspected and maintained during the term of the contract. It includes all repairs<sup>2)</sup> and accredited calibration at the recommended intervals as well as any accredited calibration carried out during repairs or option upgrades.

<sup>1)</sup> For options that are installed, the remaining base unit warranty applies if longer than 1 year. Exception: all batteries have a 1 year warranty.

<sup>2)</sup> Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.

## Service that adds value

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

## Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, monitoring and network testing. Founded more than 80 years ago, the independent company which is headquartered in Munich, Germany, has an extensive sales and service network with locations in more than 70 countries.

[www.rohde-schwarz.com](http://www.rohde-schwarz.com)

## 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

[www.training.rohde-schwarz.com](http://www.training.rohde-schwarz.com)

## Rohde & Schwarz customer support

[www.rohde-schwarz.com/support](http://www.rohde-schwarz.com/support)

