The R&S® NGPS32 is a programmable voltage source with two isolated identical outputs. It is suitable for use in automatic calibration and adjustment systems and as a reference voltage source in control processes

Contents of Chapter 10

Range of Products, Introduction

The wide variety of Rohde&Schwarz power supplies falls into three main groups: bench models with output powers up to 350 W – eleven type series with a total of 29 basic models; 19" models with up to 2000 W output power – two type series with 29 basic models; system units/programmable power supplies with IEC625-1/IEEE488 bus – five type series with 27 basic models.

General technical features
All power supplies from Rohde&Schwarz are designed to offer essentially the same features: floating outputs, permissible voltage of the outputs with reference to chassis or ground – or with multiple output power supplies to one another – 1000 V.

Setting of voltage and current
Settings start from a threshold near zero. The rated values specified for current and voltage are the maximally settable levels. Almost all types of the available power supplies are constant-voltage/constant-current units, which means that they can also be used as current regulators. Pilot lamps or LEDs indicate whether the unit is operating in the constant-voltage/constant-current mode or in the current limiting mode. All power supply units feature current limiting which can be continuously adjusted to any value between zero and the rated current. The current limiting of R&S®NGAS models can be set to 1.5 times the rated current.

Parallel and series connection
If higher currents or voltages are required, all power supplies can be parallel- or series-connected. Protective circuits prevent the connected load or the power supply unit from being damaged.

The parallel connection capability is restricted for instruments with fast down programming (R&S®NGPV, R&S®NGPX, R&S®NGPE, R&S®NGMO2, R&S®NGSM).

Output impedance Z_{out}
The output impedance is specified in the tables to describe the effect of load variations on the output quantity. For instance, with constant-current operation of a 100 V/1 A unit, a specified output impedance of $Z_{out}=30$ kΩ means that a load variation between 0 and 100 Ω at a nominal current of 1 A will cause a current deviation of 3 mA corresponding to 0.3%.

Transient recovery time t_r
The value specified refers to a step change from 10% to 90% of the rated current in constant-voltage mode. After t_r the output voltage is again within tolerance. In constant-current mode t_r strongly depends on the load (<100 μs to 1 s).
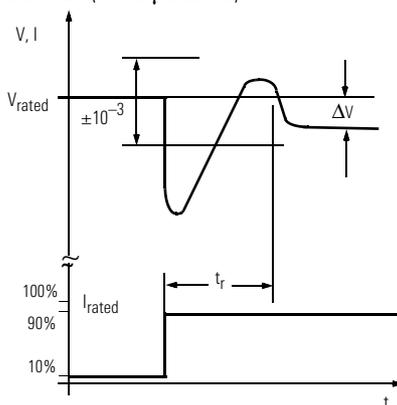
Transient recovery time t_r following step change in load

Remote sensing
With models of >70 W output power, the voltage drop on the supply lead, which varies with the load current, can be corrected, if separate sensor leads are connected to the terminals of the load. A variation of 0.5 V to 1 V on the positive and negative leads can be compensated for.

Remote control
R&S®NGRE power supplies can be equipped for analog remote control on request. R&S®NGRU models can be remote-controlled through external analog voltages as standard.

Programming
Power Supplies R&S®NGPT/NGPV/NGPX/NGSM (with option)/NGPU/NGMO2 and R&S®NGPE are suitable both for manual operation and for control via IEC/IEEE bus, i.e. for use in automatic test systems.

Cooling
The power supplies cannot be damaged by thermal overloading. The models of the R&S®NGM, NGK, NGMD, NGT, NGL and NGRU series have rear-mounted convectional heatsinks. Models of higher output power rating use a two-stage (R&S®NGPT, NGSM, NGPX: continuously variable) thermostat-controlled cooling fan. At low demands the fan is running at low speed; only when high output is required it is switched to full power. The fans are driven by quiet, maintenance-free motors.

Overload protection
To provide protection against undesirably high voltages caused by maloperation or faults, the power supplies are fitted with independent crowbar circuits with an adjustable response threshold (exceptions see table). An external overvoltage protection is also available: Overvoltage Protection R&S®NG-Z, 4.5 V to 100 V/10 A, Order No. 0100.5103.02

Output capacitor
The output capacitor can be switch-selected to match the load: small capacitance with little energy content for sensitive semiconductor circuits, large capacitance for dynamic loads.

Overview of Power Supplies

Type	Designation, Uses	Order No.	V_{max}/V	I_{max}/A	P_{max}/VA	RS	OVP	RC_{DC}	IEC	Page
R&S®NGM7.5	Universal constant-	117.7110.12	7.5	4	30	–	●	–	–	382
R&S®NGM15	current and constant-	117.7110.13	15	2	30	–	●	–	–	
R&S®NGM35	voltage sources	117.7110.14	35	1	35	–	●	–	–	
R&S®NGM70		117.7110.15	70	0.5	35	–	●	–	–	
R&S®NGM280		117.7110.06	280	0.1	28	–	–	–	–	
R&S®NGK15	Same as R&S®NGM, but	192.0003.02	15	4	60	●	●	–	–	382
R&S®NGK35	double output current	192.0003.03	35	2	70	●	●	–	–	
R&S®NGK70		192.0003.04	70	1	70	●	●	–	–	
R&S®NGK280		192.0003.05	280	0.2	56	●	–	–	–	
R&S®NGA7.5	Constant-voltage sources	192.0010.02	7.5	15	112	●	○	–	–	382
R&S®NGA15	with adjustable current	192.0010.03	15	8	120	●	○	–	–	
R&S®NGA35	limiting	192.0010.04	35	4	120	●	○	–	–	
R&S®NGA70		192.0010.05	70	2	120	●	○	–	–	
R&S®NGAS32/10	Same as R&S®NGA, high surge capability	192.0803.04	16/32	10 (15)	160	●	○	–	–	382
R&S®NGB32	Constant-voltage sources	117.7210.90	32	10	320	●	●	–	–	382
R&S®NGB70	with adjustable current	117.7227.90	70	5	350	●	●	–	–	
R&S®NGBI35	timing	192.0910.31	35	10	350	●	●	–	–	
R&S®NGBI70		192.0910.31	70	5	350	●	●	–	–	
R&S®NGMD35	Dual power supply	117.7127.02	2 × 35	2 × 1	70	–	●	–	–	383
R&S®NGL35	Triple power supplies	192.0026.02	3 × 35	3 × 0.6	63	–	○	–	–	383
R&S®NGT20		117.7133.02	20/20/6	1/1/5	70	–	● (6 V)	–	–	
R&S®NGT25		192.0503.02	25/25/6	0.8/0.8/5	70	–	● (6 V)	–	–	
R&S®NGT35		191.2019.02	35/35/6	0.6/0.6/5	72	–	● (6 V)	–	–	
R&S®NGRU35	Precision power supplies	192.0210.03	35	10	150	●	●	●	–	385
R&S®NGRU50		192.0210.05	50	5	150	●	●	●	–	
R&S®NGRU100		192.0210.08	100	3	150	●	●	●	–	
R&S®NGC35	Universal high-power	192.0032.02	35	30	1050	●	○	–	–	387
R&S®NGC70	supplies	192.0032.03	70	15	1050	●	○	–	–	
R&S®NGRE6 to 100		100.8xxx.xx	6 to 100	5 to 80	180 to 2000	●	○	○	–	388

RS = remote sensing
OVP= overvoltage protection

RC_{DC} = remote control with DC voltage
* = fast on/off switching via TTL-compatible signal

IEC = IEC625-2 bus (IEEE488)

● = standard
○ = option

Power Supply

Overview of Power Supplies

Type	Designation, Uses	Order No.	V_{max}/V	I_{max}/A	P_{max}/VA	RS	OVP	RC_{DC}	IEC	Page
R&S®NGPU 70/10	Programmable	192.0049.92	70	10	175	●	●	–	●	390
R&S®NGPU 70/20	power supplies	192.0055.92	70	20	350	●	●	–	●	
R&S®NGPV 8/10		192.0310.8x	7.99	9.99	80	●	●	–	●	391
R&S®NGPV 20/5		192.0310.2x	19.99	4.99	100	●	●	–	●	
R&S®NGPV 20/10		192.0326.2x	19.99	9.99	200	●	●	–	●	
R&S®NGPV 40/3	Programmable	192.0310.4x	39.99	2.99	120	●	●	–	●	
R&S®NGPV 40/5	power supplies	192.0326.4x	39.99	4.99	200	●	●	–	●	
R&S®NGPV 100/1		192.0310.1x	99.99	0.99	100	●	●	–	●	
R&S®NGPV 100/2		192.0326.1x	99.99	1.99	200	●	●	–	●	
R&S®NGPV 300/0.3		192.0310.3x	299.99	0.299	90	●	●	–	●	
R&S®NGPV 300/0.6		192.0326.3x	299.99	0.599	180			–		
R&S®NGPX 35/10	Programmable	192.0610.31	35	10	350	●	●	●*	●	393
R&S®NGPX 70/5	power supplies	192.0610.71	70	5	350	●	●	●*	●	
R&S®NGPX 150/2.3		192.0610.11	150	2.33	350	●	●	●*	●	
R&S®NGPE 40/40	Programmable	192.0332.41	39.99	39.9	800	●	●	–	●	395
R&S®NGPE 35/40	high-power supplies	192.1116.31	35	40	1400	●	–	–	●	395
R&S®NGPE 70/20		192.1116.71	70	20	1400	●	–	–	●	397
R&S®NGPS 32	Programmable power supplies with arbitrary function	192.1016.31	±32	0.1	2 × 32	●	●	–	●	399
R&S®NGMO 2	Dual-channel analyzer/ power supply	192.1500.24	2 × 15	2 × 7	2 × 37.5	●	●	●*	●	400
R&S®NGMO 1	Single-channel analyzer/ power supply	192.1500.21	15	7	37.5	●	●	●*	●	400
R&S®NGPT 7	Programmable triple power	192.0510.71	7/7/18	5/5/2	105	●	●	–	●	403
R&S®NGPT 18	supplies	192.0510.21	18/18/7	2/2/5	105	●	●	–	●	
R&S®NGPT 35		192.0510.31	35/35/7	1/1/5	105	●	●	–	●	
R&S®NGSM 32/10	Programmable	192.0810.31	18/32	20/10	180	●	–	–	❍	405
R&S®NGSM 60/5	power supplies with arbitrary function	192.0810.61	32/60	10/5	180	●	–	–	❍	

RS = remote sensing
OVP= overvoltage protection

RC_{DC} = remote control with DC voltage
* = fast on/off switching via TTL-compatible signal

IEC = IEC 625-2 bus (IEEE 488)

● = standard
❍ = option

Single Power Supplies

R&S®NGM

R&S®NGK

R&S®NGAS

R&S®NGBI

R&S®NGM, R&S®NGK:
30/70 W lab models

◆ Compact bench models
◆ High-resolution ten-turn potentiometer for voltage and current
◆ Single switchable meter on R&S®NGM, separate meters on R&S®NGK

The power supplies of the R&S®NGM series can be used either as constant-voltage or as constant-current sources, e.g. in the laboratory. The power supplies of the R&S®NGK series provide twice the output current of the otherwise identical R&S®NGM models and are provided with remote-sensing sockets to compensate for voltage drops in the load leads.

R&S®NGA:
120 W compact models

◆ High-resolution ten-turn potentiometer for voltage
◆ Separate meters, remote-sensing sockets

The power supplies of the R&S®NGA series are constant-voltage sources with adjustable current limiting. They are mainly used for the supply of modules and systems in testshops and labs.

R&S®NGAS:
160 W compact model

◆ High surge capability, twice the rated current can be drawn for short periods
◆ Use as battery eliminators
◆ Separate meters for voltage and current

R&S®NGAS is suitable both for general lab applications and for the supply of loads with high surge or pulse-type current demands, e.g. test systems for car electronics or transceivers with switching power supplies.

Thanks to its compact design, R&S®NGAS is suitable for mobile use. It is insensitive to RF voltages radiated by other equipment or a nearby antenna.

The current limiting threshold can be set to 1.5 times the rated current which may be drawn for up to 5 minutes. Due to the delayed response of current limiting, twice the rated current may be drawn for several milliseconds. The output voltage range can be set to 16 V or 32 V.

R&S®NGB, R&S®NGBI:
350 W bench models

◆ High-resolution ten-turn potentiometer for voltage and current
◆ Surge current capability – several times the rated current may be drawn for short periods

Suitable for use as constant-voltage/constant-current sources with automatic regulation of voltage-to-current transition (LED indication) and as battery eliminator with switch-selected delay for current regulation (higher surge current), e.g. for incandescent lamps, blinkers, voltage converters. Other features: large panel meters for voltage and current, voltage compensation on leads up to 1 V, adjustable overvoltage protection.
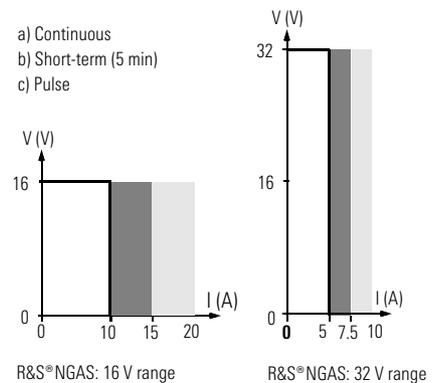
a) Continuous
b) Short-term (5 min)
c) Pulse

R&S®NGAS: 16 V range

R&S®NGAS: 32 V range

Current drain of R&S®NGAS as a function of selected output voltage

Power Supply

Dual and Triple Power Supplies

R&S® NGMD35

R&S® NGL35

R&S® NGT20

R&S®NGMD 35 – 2 × 0 to 35 V/1 A

◆ Independent or tracking operation
◆ Isolated floating outputs, permanently shortcircuit-proof

Two R&S®NGM 35 power supplies are accommodated in one cabinet and can be used either separately or in tracking mode. In the tracking mode, unit II follows unit I. Relative to a common reference point, R&S®NGMD supplies a positive and a negative voltage of 0 to 35 V, which are concurrently and equally variable by a percentage of the voltage. The current limits can be set independently of each other.
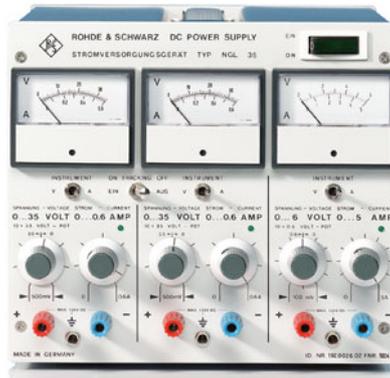
R&S®NGL 35 – 3 × 0 to 35 V/0.6 A

◆ Three voltages at a time, series or parallel connection
◆ Thermal overload protection, automatic power-up

R&S®NGL35 has three equal, separate and floating outputs. The voltages can be independently adjusted between 0 and 35 V and the current limiting threshold between 0 and 0.6 A. Voltage or current ratings can be tripled by parallel or series connection. A switchable panel meter is provided for each output.

R&S®NGT – 2 × 0 to 20/25/35 V 1/0.8/0.6 A; 1 × 0 to 6 V/5 A

◆ Independent or tracking operation of 20/25/35 V outputs
◆ Shortcircuit-proof, adjustable overvoltage protection (6 V output)

R&S®NGT models combine three independent voltage sources in one unit. A switchable panel meter is provided for each output. The 20 V, 25 V, 35 V outputs can be used separately, in series or parallel connection or in tracking mode. The independent 6 V output with its load rating of 5 A is especially designed for the supply of digital integrated circuits; overvoltage protection is adjustable.

Single Power Supplies, Dual and Triple Power Supplies

Specifications in brief of Single Power Supplies

Type R&S®...		Order No.	Setting ranges Voltage V	Current A	Resolution V %	I %	Max. deviation ΔV AC supply ±10% V(%)	I(%)	Δt_amb −10°C to +40°C V(%/°C)	I(%)	Z_{out} V mΩ	I kΩ	t_r V µs	Max. PARD V_rms mV	I_rms mA	Remote sensing S	Overvoltage protec. O	Dimens. W×H×D (mm) Weight (kg)
NGA	7.5	192.0010.02	0.01 to 7.5	0.2 to 15	0.02	0.5	0.01	0.2	0.01	0.1	0.25	0.25	75	0.15	–	S	–	129/172/330 (8)
	15	192.0010.03	0.01 to 15	0.1 to 8	0.02	0.5	0.01	0.2	0.01	0.1	0.375	1	75	0.3	–	S	–	
	35	192.0010.04	0.01 to 35	0.05 to 4	0.02	0.5	0.01	0.2	0.01	0.1	0.875	4.4	75	0.6	–	S	–	
	70	192.0010.05	0.01 to 70	0.025 to 2	0.01	0.5	0.01	0.2	0.01	0.1	3.5	17.5	75	1	–	S	–	
NGAS	32/10	192.0803.04	0.01 to 32 / 0.01 to 16	0.1 to 10 (15)	0.02	0.5	0.01	0.2	0.01	0.1	0.16	1	75	0.6	–	S	–	129/172/330 (8)
NGB	32	117.7210.90	0.01 to 35	0.02 to 10	0.02	0.02	0.001	0.002	0.01	0.01	0.43	14	50	0.2	10	S	0	190/172/330 (10)
	70	117.7227.90	0.01 to 70	0.01 to 5	0.02	0.02	0.001	0.002	0.01	0.01	1.75	56	50	0.5	5	S	0	
NGBI	35	192.0910.31	0.01 to 35	0.02 to 10	0.02	0.02	0.001	0.001	0.01	0.01	0.438	14	50	0.2	1	S	0	190/172/330 (10)
	70	192.0910.71	0.01 to 70	0.01 to 5	0.02	0.02	0.001	0.001	0.01	0.01	1.75	56	50	0.5	1	S	0	
NGK	15	192.0003.02	0.01 to 15	0.01 to 4	0.02	0.02	0.001	0.002	0.01	0.01	0.75	37.5	50	0.2	0.1	S	0	190/172/278 (8)
	35	192.0003.03	0.01 to 35	0.01 to 2	0.01	0.02	0.001	0.002	0.01	0.01	1.75	175	50	0.4	0.05	S	0	
	70	192.0003.04	0.01 to 70	0.01 to 1	0.01	0.02	0.001	0.002	0.01	0.01	7	700	50	0.8	0.015	S	0	
	280	192.0003.05	0.01 to 280	0.002 to 0.2	0.01	0.02	0.001	0.002	0.01	0.01	140	700	50	3	0.005	S	–	
NGM	7.5	117.7110.12	0.01 to 7.5	0.01 to 4	0.02	0.02	0.001	0.002	0.01	0.01	0.75	10	50	0.2	0.1	–	0	95/172/278 (4)
	15	117.7110.13	0.01 to 15	0.01 to 2	0.02	0.02	0.001	0.002	0.01	0.01	1.5	40	50	0.2	0.05	–	0	
	35	117.7110.14	0.01 to 35	0.01 to 1	0.02	0.02	0.001	0.002	0.01	0.01	3.5	175	50	0.4	0.02	–	0	
	70	117.7110.15	0.01 to 70	0.01 to 0.5	0.01	0.02	0.001	0.002	0.01	0.01	14	700	50	0.8	0.001	–	0	
	280	117.7110.06	0.01 to 280	0.002 to 0.1	0.01	0.02	0.001	0.002	0.01	0.01	280	1400	50	3	0.002	–	–	

Specifications in brief of Dual and Triple Power Supplies

Type R&S®...	Order No.	Setting ranges Voltage V	Current A	Resolution V %	I %	Max. deviation ΔV AC supply ±10% V(%)	I(%)	Δt_amb −10°C to +40°C V(%/°C)	I(%)	Z_{out} V mΩ	I kΩ	t_r V µs	Max. PARD V_rms mV	I_rms mA	Overvoltage protec.	Dimens. W×H×D (mm) Weight (kg)
Dual Power Supplies																
NGMD35	117.7127.02	0.01 to 35 (2×)	0.01 to 1	0.02	0.02	0.001	0.001	0.01	0.01	3.5	175	50	0.4	0.02	●	190/172/278 (8)
Triple Power Supplies																
NGL35	192.0026.02	0.01 to 35 (3×)	0.01 to 0.6	contin.	1	0.01	0.2	0.1	0.1	3.5	15	75	0.2	–	–	190/172/278 (7)
NGT20	117.7133.02	0.01 to 20 (2×) / 0.01 to 6 (1×)	0.01 to 1 / 0.01 to 5	0.02	1	0.01	0.2	0.01	0.1	2 / 1	9 / 0.4	75 / 75	0.15 / 0.2	– / –	– / ●	190/172/278 (7)
NGT25	192.0503.02	0.01 to 25 (2×) / 0.01 to 6 (1×)	0.01 to 0.8 / 0.01 to 5	0.02	1	0.01	0.2	0.01	0.1	2.5 / 1	10 / 0.4	75 / 75	0.2 / 0.2	– / –	– / ●	190/172/278 (7)
NGT35	191.2019.02	0.01 to 35 (2×) / 0.01 to 6 (1×)	0.01 to 0.6 / 0.01 to 5	0.02	1	0.01	0.2	0.01	0.1	3.3 / 1	15 / 0.4	75 / 75	0.25 / 0.2	– / –	– / ●	190/172/278 (7)

Power Supply

Power Supplies R&S®NGRU

R&S® NGRU 35: 0 V to 35 V/0 A to 10 A

R&S® NGRU 50: 0 V to 50 V/0 A to 5 A

R&S® NGRU 100: 0 V to 100 V/0 A to 3 A
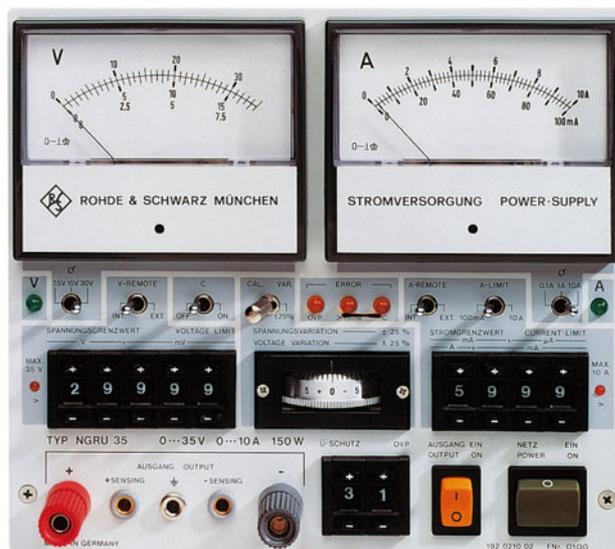
R&S®NGRU35

Brief description

Power Supplies of the R&S®NGRU series are precision laboratory units providing high accuracy and repeatability of voltage and current settings via digital potentiometers.

The power supplies can be used as constant-voltage or constant-current sources. The maximum output power is 150 W and remains constant over a wide voltage range. The current loadability depends on the output voltage.

Main features

◆ Compact bench models
◆ High resolution and reproducibility through digital potentiometers
◆ Output voltage continuously variable with calibrated potentiometer
◆ Automatic power matching ensuring full power over wide output voltage range
◆ Digitally settable overvoltage protection
◆ Output voltage can be modulated – simulation of interference factors
◆ Remote programming of voltage and current
◆ Panel meter for voltage and current indication in three ranges
◆ Large LED indicators for overload, over-temperature, overvoltage protection and selected operating mode
◆ Switch-selectable output capacitor
◆ Remote sensing

Operation

The voltage can be set in five digits and continuously varied by ±25% with a calibrated potentiometer.

The current can be set in four digits within two ranges. The low range is 100 mA for all R&S®NGRU models so that even currents in the μA range can be reliably regulated.

The overvoltage protection is also set via digital potentiometer. In addition to manual operation, remote programming of voltage and current is possible by means of analog control signals.

Power Supplies R&S®NGRU

Specifications in brief

Voltage setting	R&S®NGRU 35	R&S®NGRU 50	R&S®NGRU 100
in 5 digits	<1 mV to 35 V	<1 mV to 50 V	<1 mV to 100 V
Resolution	1 mV	1 mV	1 mV
Max. error at 20°C	±10^{-4} of set value ±20 mV		
analog (continuously)	±25% with ±0.5% setting error of scale		
Resolution	0.25%	0.25%	0.25%
Current setting (2 ranges in 4 digits)			
High range	<1 mA to 10 A	<1 mA to 5 A	>12 mA to 3 A
Resolution	1 mA	1 mA	1 mA
Max. error (20°C)	±2×10^{-3} of set value ±10 mA		
Low range	<10 µA to 100 mA		
Resolution	10 µA	10 µA	10 µA
Max. error (20°C)	±2×10^{-3} of set value ±0.2 mA		
Max. constant current (150 W)	up to 15 V: 10 A up to 20 V: 7.5 A up to 35 V: 4.3 A	up to 30 V: 5 A up to 40 V: 3.8 A up to 50 V: 3 A	up to 50 V: 3 A up to 75 V: 2 A up to 100 V: 1.5 A
Constant-voltage source			
Deviation of output voltage with			
±10% AC supply	<±10^{-5}		
0°C to 40°C	<±10^{-4}/K		
10 to 90% load	<10^{-4}		
PARD (V_{rms})	<0.3 mV	<0.5 mV	<1 mV
Transient recovery time	<75 µs		
Constant-current source			
Deviation of output current with			
±10% AC supply	<±2×10^{-5}		
0°C to 40°C	<±2×10^{-4}/K		
10 to 90% load	<2×10^{-4}		
PARD			
high range (I_{rms})	<2 mA	<1 mA	<0.3 mA
low range (I_{rms})	<20 µA	<20 µA	<20 µA
Sensing sockets			
Max. voltage compensation	<0.5 V	<1 V	<1.5 V

Common data	
Modulation of output voltage (BNC female, floating)	V_{pp} = 10 V for 10 V modulation, 50 Hz to 1 kHz ±3 dB
Input impedance	approx. 3.5 kΩ
Overvoltage protection	
Setting range	1 V to 99 V (response threshold approx. 5% higher)
Programming (external, analog)	
for output voltage	
0% to 100%´	0 V to 10 V
for output current 0% to 100%	0 V to 10 V
Setting time	<3 ms (to within ±1%)
Connector	5-contact Tuchel female
Input impedance	approx. 10 kΩ
Reference potential	positive terminal
General data	
Meter accuracy	±2.5% of full scale
AC supply	110/120/220/240 V ±10%, 47 to 63 Hz
Dimensions (W × H × D); weight	190 mm × 180 mm × 330 mm; 9 kg

Ordering information

Power Supply		
	R&S®NGRU 35	0192.0210.03
	R&S®NGRU 50	0192.0210.05
	R&S®NGRU 100	0192.0210.08

Power Supply

1000 W Power Supplies R&S®NGC

R&S®NGC 35: 0 V to 35 V

0.05 A to 30 A

R&S®NGC 70: 0 V to 70 V

0.025 A to 15 A

R&S®NGC35

Brief description

◆ Surge current capability – several times the rated current can be drawn for short periods

◆ High efficiency, 19" cabinet

The high efficiency of Power Supplies R&S®NGC is achieved through continuous preregulation. A series-pass regulator ensures for excellent static and dynamic characteristics. Special constructional measures allow use in RF systems.

Specifications in brief

	R&S®NGC 35	R&S®NGC 70
Voltage	<10 mV to 35 V	<10 mV to 70 V
Current	<50 mA to 30 A	<25 mA to 15 A
Resolution	<0.02%	<0.02%
Deviation of voltage		
with ±10% AC supply variation	<±10^{-5}	
between 0 and 40°C	<±10^{-4}/K	
from 10% to 90% current	<10^{-4}	
Deviation of current		
with ±10% AC supply variation	<±10^{-4}	
between 0 and 40°C	<±10^{-3}/K	
from 10% to 90% voltage	<10^{-3}	
PARD		
Voltage V$_{rms}$	<1 mV	<2 mV
Current I$_{rms}$	<20 mA	<20 mA
Transient recovery time (10% to 90% load)	<60 µs	
Sensing sockets		
Surge current for 1 ms/0.2 s	80/60 A	40/30 A
Max. voltage compensation	0.5 V per lead	

General data	
Rated temperature range	0°C to +40°C
Meter accuracy	2.5% of full scale
AC supply	220 V ±10%, 50 Hz, 2.4 kVA (other values on request)
Dimensions (W × H × D)	484 mm × 194 mm × 509 mm
Weight	40 kg

Ordering information

1000 W 19" Power Supply	R&S®NGC 35	0192.0032.02
	R&S®NGC 70	0192.0032.03

Power Supplies R&S®NGRE

19" models – from about

200 W to 2000 W

R&S®NGRE in design A and B: cabinet model or rackmount, design B without operating controls

Brief description

Power Supplies R&S®NGRE provide high output power (from about 200 W). This type series is extremely versatile due to the use of standardized modules.

There are 27 basic versions (see table on next page), most of which come in five models. The basic versions only differ in the obtainable maximum voltage and current values and in the output impedance.

Each of these basic versions is equipped differently regarding meters, operating controls, connectors and is available as a cabinet model or rackmount.

Power Supplies of the R&S®NGRE series are designed for operation from 220 V AC supply. The power supplies can be adapted to other voltages upon request and at no extra cost.

Main features

◆ Sustained shortcircuit-proof, thermal overload protection
◆ Series and parallel connection of several units possible
◆ Built-in overvoltage protection (optional)

Operation

Voltage and current are set by means of high-resolution ten-turn potentiometers and indicated on separate panel meters. On request the power supplies are available with digital displays instead of analog panelmeters (ordering information R&S®NGRE MOD.DA). The power supplies are fitted with remote sensing sockets to compensate for voltage drops in the load leads. The two-stage cooling fan is thermostat-controlled and very quiet.

Setting the current ranges
R&S®NGRE models .16 and .17 for currents up to 30 A are available on request with decade current ranges, e.g. a 10 A unit can be set to 0.1/1/10 A.

Remote control
The following functions of models .12, .13, .16, .17 can be modified for remote control: output voltage, output current, power switch on/off/standby and control of power regulating element. Power supplies which have been modified for remote control may be operated in master-slave mode (optional). This mode, in which the output quantity is controlled by only one of the supplies involved, is especially recommended for equally splitting up the load current at high powers.

Surge current capability
Two to three times the rated current may be drawn from the R&S®NGRE Power Supplies. An external or internal (model code number …19) switch is provided for this purpose.

R&S®NGRE MOD.DA fitted with digital displays

Power Supplies R&S®NGRE

Dimensions of different designs

Design	Cabinet model	Rackmount	Seated depth
A	484 mm × 194 mm × 436 mm	483 mm × 177 mm × 425 mm	347 mm
B	484 mm × 194 mm × 509 mm	483 mm × 177 mm × 498 mm	420 mm
C	608 mm × 394 mm × 284 mm	–	–

Specifications in brief and order numbers

Setting ranges		Order number	Max. deviation of output for		Z_{out} for		t_r for	Max. PARD		Power consumption	Available design	Weight
Voltage V	Current A		ΔV AC supply ±10% V, I (%)	Δt$_{amb}$ −10°C to +40°C V, I (%)	V mΩ	(I) (kΩ)	V μs	V_{rms} μV	I_{rms} mA	at 220 V/50 Hz kVA		incl. case in kg
0 to 6	0 to 30	100.8402.xx	±0.001	0.01	1	(1)	<50	300	9	0.9	A, C	22
	0 to 40	100.8419.xx	±0.001	0.01	0.1	(1)	<50	300	12	0.9	A, C	22
	0 to 60	100.8425.xx	±0.001	0.01	0.1	(1)	<50	300	18	0.9	A, C	28
	0 to 80	100.8431.xx	±0.001	0.01	0.1	(1)	<50	300	24	1.8	B, C	29
0 to 10	0 to 20	100.8354.xx	±0.001	0.01	1	(2)	<50	300	6	0.9	A, C	19
	0 to 30	100.8360.xx	±0.001	0.01	1	(2)	<50	300	9	0.9	A, C	28
	0 to 40	100.8377.xx	±0.001	0.01	0.1	(2)	<50	300	12	1.8	A, C	28
	0 to 60	100.8383.xx	±0.001	0.01	0.1	(1)	<50	300	18	1.8	A, C	37
0 to 15	0 to 20	100.8319.xx	±0.001	0.01	1	(2)	<50	300	6	0.9	B, C	28
	0 to 30	100.8325.xx	±0.001	0.01	1	(2)	<50	300	9	1.8	A, C	28
	0 to 40	100.8331.xx	±0.001	0.01	0.1	(2)	<50	300	12	1.8	A, C	37
	0 to 60	100.8348.xx	±0.001	0.01	0.1	(1)	<50	300	18	2.5	B, C	39
0 to 30	0 to 10	100.8254.xx	±0.001	0.01	1	(5)	<50	300	3	0.9	A, C	19
	0 to 15	100.8260.xx	±0.001	0.01	1	(5)	<50	300	4.5	0.9	A, C	28
	0 to 20	100.8277.xx	±0.001	0.01	1	(3)	<50	300	6	1.8	A, C	28
	0 to 30	100.8283.xx	±0.001	0.01	1	(2)	<50	300	9	1.8	A, C	37
	0 to 40	100.8290.xx	±0.001	0.01	0.1	(2)	<50	300	12	2.5	B, C	39
	0 to 60	100.8460.xx	±0.001	0.01	0.1	(2)	<50	300	18	3.5	C	50
0 to 50	0 to 10	100.8219.xx	±0.001	0.01	1	(5)	<50	300	3	0.9	A, C	28
	0 to 15	100.8225.xx	±0.001	0.01	1	(5)	<50	300	4.5	1.4	A, C	28
	0 to 20	100.8231.xx	±0.001	0.01	1	(5)	<50	300	6	1.8	A, C	37
	0 to 30	100.8248.xx	±0.001	0.01	1	(3)	<50	300	9	2.5	B, C	39
	0 to 40	100.8454.xx	±0.001	0.01	0.1	(2)	<50	300	12	3.5	C	50
0 to 100	0 to 5	100.8160.xx	±0.001	0.01	1	(10)	<50	500	1.5	0.9	A, C	28
	0 to 10	100.8183.xx	±0.001	0.01	1	(10)	<50	500	3	1.8	A, C	37
	0 to 15	100.8190.xx	±0.001	0.01	1	(5)	<50	500	4.5	2.5	A, C	39
	0 to 20	100.8448.xx	±0.001	0.01	1	(5)	<50	500	6	3.5	C	50

Completion of order numbers

Model code number (last two digits of Order No.)	Design	Voltage and current setting		Current range in three decades (up to 30 A) at extra cost	Four additional fixed voltages, push button-selected	Large meters for voltage and current
		Precision potentiometer on front panel	Screwdriver adjustment on rear panel			
13	19" cabinet		●			
17		●		●		●
12	19" rackmount		●			
16		●		●		●
19	Aluminium case	●			●	●

Programmable Power Supplies R&S®NGPU

R&S® NGPU 70/10: 175 W

(70 V/max. 10 A)

R&S® NGPU 70/20: 350 W

(70 V/max. 20 A)
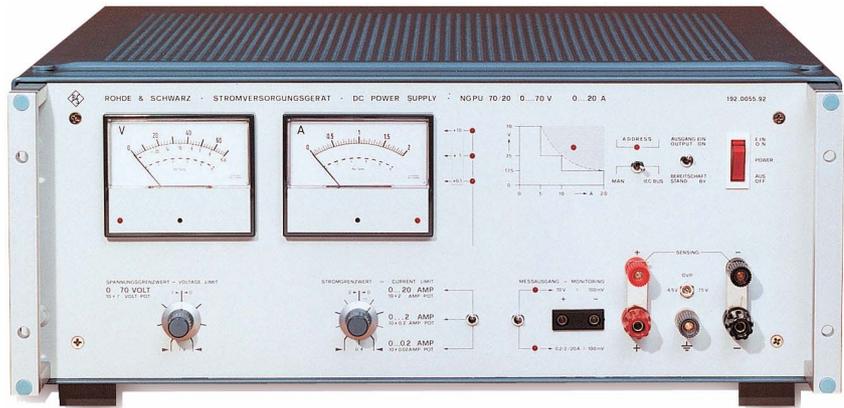
Brief description

R&S®NGPU Power Supplies are constant voltage or constant-current sources, which can be programmed via IEC/IEEE bus or operated manually. Three selectable current ranges and one floating test output which can be switched between voltage and current make the R&S®NGPU ideal for use in IEC/IEEE bus test systems.

Graduated current loadability
Since the current drain of many loads – for instance of transceivers – is inversely proportional to the supply voltage, a graduated current loadability is fully compatible with practical requirements. The maximum continuous current drain for the selected output voltage is indicated

on a scale of the panel voltmeter. Brief current surges exceeding this load limit are tolerable. If above 15 V a current exceeding this limit is permanently drawn, the power supply is disconnected from the AC supply via the built-in temperature monitor.

Main features

◆ Programming via IEC/IEEE bus or manual operation
◆ Three-digit programming of voltage and current (1000 steps), resolution: 10 mV to 100 mV, 10 mA to 20 mA
◆ Output current in three decade ranges
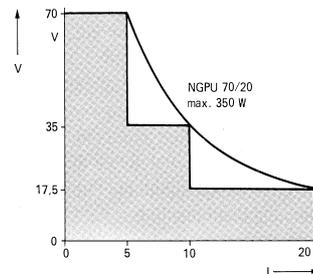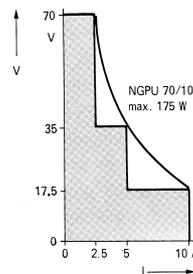
Current loadability is graduated as a function of the output voltage. Full output current can be derived over almost 80% of the voltage range. As the figure shows, the characteristic practically combines the curves, i.e. the performance, of three individual supplies

Specifications in brief

	R&S®NPGU 70/10	R&S®NPGU 70/20
Voltage	<10 mV to 70 V	
Current (3 ranges)	0.1/1/10 A	0.2/2/20 A
Deviation of output voltage/current		
±10% AC supply variation	<10^{-5}/<5 × 10^{-5}	
between 0°C and 40°C	<(10^{-4}/K+100 µV)/<(10^{-4}/K+100 µA)	
with 10% to 90% load	<10^{-4}/<5 × 10^{-4}	
PARD		
Voltage, V_{rms}	<1.5 mV	<1.5 mV
Current, I_{rms}	<5 mA	<10 mA
Transient recovery time		
(10% to 90% load)	<60 µs	<60 µs
Remote sensing	compens. for 0.5 V per lead	
Test output		
for voltage	100 mV ±1% at 70 V	
for current	100 mV ±2% for full scale	
Overvoltage protection	adjustable from 4.5 V to 80 V	

General data

Output quantities	adjustable via ten-turn potentiometer or IEC/IEEE bus
Resolution manual control	0.02%
Remote control	IEC625-1 (IEEE488)
Resolution IEC/IEEE bus	1000 steps/range; for voltage adjustable 10 mV/step to 100 mV/step
AC supply	110/220 V ±10%, 50 Hz to 60 Hz
Power consumption	600 VA	1250 VA
Dimensions (W × H × D) in mm	492 × 161 × 514	492 × 205 × 514
Weight	14 kg	19 kg

Ordering information

Programmable Power Supply	R&S®NGPU 70/10	0192.0049.92
	R&S®NGPU 70/20	0192.0055.92

Power Supply

Programmable Power Supplies R&S®NGPV

Power Supplies suitable for use in test systems and for general laboratory applications

R&S®NGPV

Brief description

Power Supplies of the R&S®NGPV series are suitable for use in test systems and for general laboratory applications.

Nine different models are available

R&S®NGPV 8/10	0 V to 8 V/0 A to 10 A
R&S®NGPV 20/5	0 V to 20 V/0 A to 5 A
R&S®NGPV 20/10	0 V to 20 V/0 A to 10 A
R&S®NGPV 40/3	0 V to 40 V/0 A to 3 A
R&S®NGPV 40/5	0 V to 40 V/0 A to 5 A
R&S®NGPV 100/1	0 V to 100 V/0 A to 1 A
R&S®NGPV 100/2	0 V to 100 V/0 A to 2 A
R&S®NGPV 300/0.3	0 V to 300 V/0 A to 0.3 A
R&S®NGPV 300/0.6	0 V to 300 V/0 A to 0.6 A

Each model comes in two versions
The version for use in systems and labs can be programmed via IEC/IEEE bus or operated manually. These power supplies are provided with the necessary operating controls, a digital LED display for indi-

cation of all input data including IEC/IEEE bus commands, and analog meters for indication of actual voltage and current values. The system version is without operating controls so that models for use in systems are lower-priced.

Main features

◆ Digital setting, high resolution
◆ No discrete output capacitance, true current source
◆ Programmable via IEC/IEEE bus and manual control
◆ Short setting time for down programming thanks to current sinking
◆ Two current ranges – high-resolution current monitoring output
◆ Display of operating status and faults
◆ Thermostat-controlled cooling fan
◆ 19" design

System use
Power Supplies R&S®NGPV are ideal for use in systems because of the short setting time of 2 ms which applies both to the rise time and thanks to controlled current sinking also to the fall time.

The R&S®NGPV models have no discrete output capacitance so that they can be used for regulating extremely low currents. Relay contacts will not be damaged by switching of current paths. A larger output capacitor can be switched into circuit manually or via the program.

Remote sensing
Remote sensing is a particularly system-friendly mode since it is set automatically with no sensing links involved. In the sensing mode, the maximum output voltage of the power supply exceeds the specified nominal voltage only by the amount of the voltage drop in the leads. The load is thus fully protected, even in the presence of a shortcircuit, wrong polarity or interruption of the sensing leads.
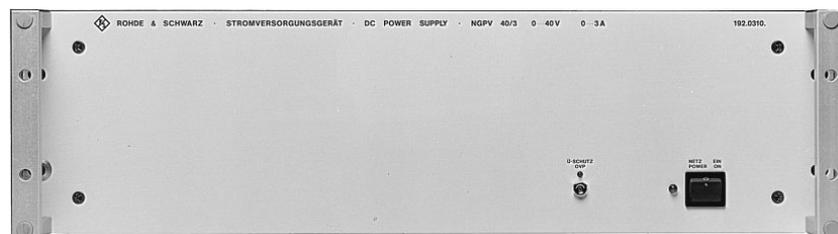
Power Supply R&S®NGPV for use in systems

Power Supply

Programmable Power Supplies R&S®NGPV

Specifications in brief

Type	NGPV 8/10	NGPV 20/5	NGPV 20/10	NGPV 40/3	NGPV 40/5	NGPV 100/1	NGPV 100/2	NGPV 300/0.3	NGPV 300/0.6
A1	0 V to 7.99 V	0 V to 19.99 V	0 V to 19.99 V	0 V to 39.99 V	0 V to 39.99 V	0 V to 99.9 V	0 V to 99.9 V	0 V to 299.9 V	0 V to 299.9 V
A2	10 mV/800	10 mV/2000	10 mV/2000	10 mV/4000	10 mV/4000	100 mV/1000	100 mV/1000	100 mV/300	100 mV/300
A3	$<10^{-3}$	$<10^{-3}$	$<10^{-3}$	$<10^{-3}$	$<10^{-3}$	$<10^{-3}$	$<10^{-3}$	$<10^{-3}$	$<10^{-3}$
B1	0 A to 9.99 A	0 A to 4.99 A	0 A to 9.99 A	0 A to 2.99 A	0 A to 4.99 A	0 A to 0.999 A	0 A to 1.99 A	0 A to 0.299 A	0 A to 0.599 A
B2	10 mA/1000	10 mA/500	10 mA/1000	10 mA/300	10 mA/500	1 mA/1000	10 mA/200	1 mA/300	1 mA/600
B3	$<10^{-3}$	$<2 \times 10^{-3}$	$<10^{-3}$	$<3 \times 10^{-3}$	$<2 \times 10^{-3}$	$<10^{-3}$	$<4 \times 10^{-3}$	$<3 \times 10^{-3}$	$<2 \times 10^{-3}$
B11	0 A to 999 mA	0 A to 999 mA	0 A to 999 mA	0 A to 999 mA	0 A to 999 mA	0 A to 99.9 mA	0 A to 99.9 mA	0 A to 99.9 mA	0 A to 99.9 mA
B12	1 mA	1 mA	1 mA	1 mA	1 mA	0.1 mA	0.1 mA	0.1 mA	0.1 mA
B13	$<10^{-3}$	$<10^{-3}$	$<10^{-3}$	$<10^{-3}$	$<10^{-3}$	$<2 \times 10^{-3}$	$<2 \times 10^{-3}$	$<2 \times 10^{-3}$	$<2 \times 10^{-3}$
C	$<200 \mu V$	$<250 \mu V$	$<250 \mu V$	$<400 \mu V$	$<400 \mu V$	$<600 \mu V$	$<600 \mu V$	$<900 \mu V$	$<900 \mu V$
D	500 pF/220 μF	500 pF/100 μF	750 pF/220 μF	500 pF/47 μF	750 pF/100 μF	500 pF/22 μF	750 pF/47 μF	500 pF/10 μF	750 pF/22 μF
E	4.5 V to 15 V	4.5 V to 25 V	4.5 V to 25 V	4.5 V to 50 V	4.5 V to 50 V	5 V to 110 V	5 V to 110 V	5 V to 330 V	5 V to 330 V

Output voltage	Output current (A range)	Output current (mA range)
A1: setting	B1: setting	B11: setting
A2: resolution (mV/steps)	B2: resolution (mA/steps)	B12: resolution (1000 steps)
A3: deviation (of fs)	B3: deviation (of fs)	B13: deviation (of fs)
C: PARD, V_{rms}	D: output C (OFF/ON)	E: overvoltage protection (OVP)

Common data

Constant-voltage source

Deviation of output voltage	
with ±10% AC supply variation	$<10^{-5}$
between 0°C and 50°C	$<2 \times 10^{-5}$/K
with 10% to 90% load	$<10^{-4}$
Transient recovery time (10% to 90%/90% to 10%)	$<75 \mu s$ (to within $\pm10^{-3}$)

Constant-current source

Deviation of output current	
with ±10% AC supply variation	$<10^{-5}$
between 0°C and 50°C	$<5 \times 10^{-5}$/K
with 10% to 90% load	$<10^{-4}$
Transient recovery time, output C OFF/ON	$<50 \mu s/<2 ms$
PARD, I_{rms}	
in mA range	10 μA
in A range	100 μA/A

Remote control	IEC 625-1 (IEEE 488)
Interface functions	SH0, AH1, T0, TE0, L1, LE0, SR0, RL1, PP1, DC1, DT1, C0
Setting time (0% to 100%/100% to 0%)	$<2 ms$ (to within $\pm2 \times 10^{-3}$)
Remote sensing	compensation for 1 V per lead
Current monitoring output	
mA range	100 mV ±1% for full scale
A range	10 mV ±1%/A

General data

Meter accuracy	±2.5% of fs	
AC supply	110/120/220/240 V ±10%, 47 to 63 Hz	
Power consumption	approx. 250 VA	approx. 500 VA
Dimensions (W × H × D) in mm	492 × 161 × 392	492 × 161 × 420
Weight	12 kg	19 kg

Ordering information

Type R&S®	NGPV 8/10	NGPV 20/5	NGPV 20/10	NGPV 40/3	NGPV 40/5	NGPV 100/1	NGPV 100/2	NGPV 300/0.3	NGPV 300/0.6
F1	192.0310.80	192.0310.20	192.0326.20	192.0310.40	192.0326.40	192.0310.10	192.0326.10	192.0310.30	192.0326.30
F2	192.0310.81	192.0310.21	192.0326.21	192.0310.41	192.0326.41	192.0310.11	192.0326.11	192.0310.31	192.0326.31

F1: system version   F2: system and lab version

Power Supply

Programmable Power Supplies R&S®NGPX

R&S® NGPX 35/10:

0 V to 35 V/0 A to 10 A

R&S® NGPX 70/5:

0 V to 70 V/0 A to 5 A

R&S® NGPX 150/2.3:

0 V to 150 V/0 A to 2.3 A

High-speed power supply for

power pulse emulations

R&S® NGPX 35/10

Brief description

Power Supplies R&S®NGPX are high-performance programmable laboratory units (350 W) using linear regulation. With their excellent regulation characteristics these 19" units are ideal for use in development labs. Thanks to convenient manual operation and IEC/IEEE bus control they can readily be integrated into production test systems. A rear trigger input allows fast on/off switching of the output voltage to support current-saving applications.

Main features

◆ 350 W output power
◆ Low PARD thanks to linear regulation
◆ Accurate return signalling of voltage and current values, also via IEC/IEEE bus
◆ Effective current measurement with dynamic loads
◆ Fast up and down programming (typ. 10 µs for R&S®NGPX35/10)
◆ Large alphanumeric LCD display for output of nominal and actual values as well as status information

◆ Nominal value input via numeric keypad; increment and decrement key
◆ Rear, isolated trigger input
◆ Rear isolating and polarity reversal relay (optional)
◆ Current monitor in 3rd current range with 25 µA resolution (optional)
◆ Nonvolatile storage of 10 complete instrument setups
◆ Selectable foldback function
◆ Temperature-controlled cooling fan
◆ Soft limits for current and voltage
◆ Hardware overvoltage protection
◆ Remote sensing
◆ 19" system unit with IEEE488.2
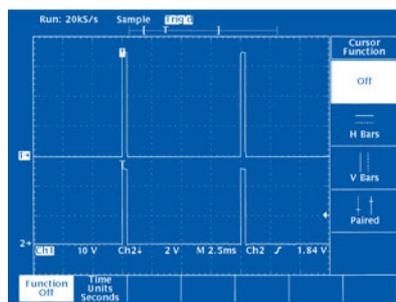
DECT time slot simulation
CH1 = R&S® NGPX output
CH2 = R&S® NGPX trigger input
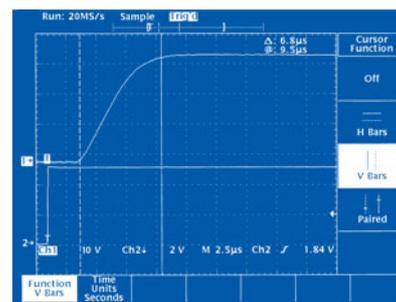
Rise and fall times of only a few µs can be reached under all load conditions that comply with the R&S® NGPX specifications
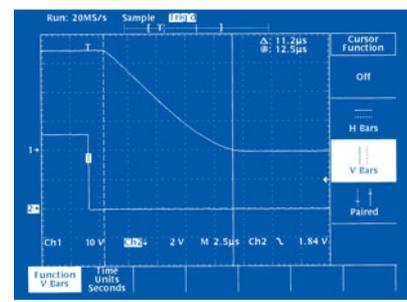
Programmable Power Supplies R&S®NGPX

Specifications in brief

Constant-voltage source	35/10	70/5	150/2.3
Voltage setting	0 V to 35.00 V	0 V to 70.00 V	0 V to 150.00 V
Resolution (mV/steps)	10/3500	20/3500	50/3000
Deviation from nominal value (±1 LSB)	<25 mV	<50 mV	<125 mV
±10% AC supply variation	<±0.35 mV	<±0.7 mV	<±1.5 mV
with load variation (10% to 90% of fs)	<±1 mV	<±2 mV	<±3.5 mV
Transient recovery time with load variation (10% to 90% of fs) to ±0.15%	<75 µs	<75 µs	<75 µs
Rise/fall time of output voltage (fast mode)	<10 µs typ.	<20 µs typ.	<20 µs typ.
PARD, V_{rms} (C_{ON}/C_{OFF})	<0.25/<0.5 mV	<0.5/<1.0 mV	<1/<2 mV
Voltage measurement	0 V to 40.95 V	0 V to 81.9 V	0 V to 204.75 V
Resolution (mV/steps)	10/4095	20/4095	50/4095
Deviation from measured value ±2 LSB)	<±35 mV	<±70 mV	<±150 mV
Constant-current source			
Current setting	0 A to 10.00 A	0 A to 5.00 A	0 A to 2.30 A
Resolution (mA/steps)	2.5/4000	1.25/4000	1/2300
Deviation from nominal value[1]	<±10 mA ±1 LSB	<±10 mA ±1 LSB	<±5 mA ±1 LSB
±10% AC supply variation	<±0.2 mA	<±0.2 mA	<±0.2 mA
with load variation (10 to 90% of fs)	<±1 mA	<±1 mA	<±0.5 mA
PARD, I_{rms} (C_{ON}/C_{OFF})	<0.2/<0.6 mA	<0.1/<0.3 mA	<0.05/0.15 mA
Current measurement in range 1	0 A to 10.2375 A	0 A to 5.1188 A	0 A to 4.095 A
Resolution (mA/steps)	2.5[1]/4095	1.25[1]/4095	1/4095
Deviation from measured value ±2 LSB)	<±20 mA	<±10 mA	<±5 mA
Current measurement in range 2	0 A to 1.02375 A	0 to 511.88 mA	0 to 409.5 mA
Resolution (µA/steps)	250/4095	125[2]/4095	100/4095
Deviation from measured value ±2 LSB)	<±2 mA	<±1 mA	<±0.5 mA
Current measurement in range 3 (option)	0 A to 102.375 mA		
Resolution (µA/steps)	25[3]/4095	25[3]/4095	25[3]/4095
Deviation from measured value (±2 LSB)	<±30 µA[3] ±2.5 µA/°C		
Overvoltage protection			
Operating range	4 V to 99.95 V	4 V to 99.95 V	4 V to 200 V
Resolution	50 mV	50 mV	100 mV
Response accuracy	±4 V	±4 V	±4 V

[1] Readout rounded to full mA.

[2] Readout rounded to full 100 µA.

[3] Readout rounded to full 10 µA.

General data	
Refresh rate of display	3 updates per second
Refresh rate of measured value	update on each query
Setting time (incl. command processing)	typ. 4 ms (R&S®NGPX mode)
Outputs	floating, max. 250 V DC
AC supply	100/120/220/240 V; 47 Hz to 63 Hz
Power consumption	1400 VA
Dimensions (W × H × D)	492 mm × 161 mm × 513 mm
Weight	23 kg
Programming	IEC 625-2/IEEE 488.2

Ordering information

Programmable Power Supply	R&S®NGPX 35/10	0192.0610.31
	R&S®NGPX 70/5	0192.0610.71
	R&S®NGPX 150/2.3	0192.0610.11
Options		
Rear isolating and polarity reversal relay for	R&S®NGPX 35/10	0192.0610.32
	R&S®NGPX 70/5	0192.0610.72
	R&S®NGPX 150/2.3	0192.0610.12
Current monitor in current range 3 for	R&S®NGPX 35/10	0192.0610.33
	R&S®NGPX 70/5	0192.0610.73
	R&S®NGPX 150/2.3	0192.0610.13

Programmable Power Supply R&S®NGPE 40/40

0 V to 40 V

0 V to max. 40 A

Brief description

Programmable Power Supply R&S®NGPE is suitable for use in test systems and for general laboratory applications. The relatively small output capacitance, the short setting time even for down programming (thanks to built-in current sinking) as well as the voltage and current monitoring outputs are significant benefits in system use.

Main features

- ◆ 0 V to 40 V/0 V to max. 40 A
- ◆ Primary-switched regulator with high efficiency and low heat dissipation
- ◆ Low PARD, excellent EMC, RFI suppression grade B
- ◆ Good regulation characteristics even with partial loading thanks to push-push converter configuration using power FETs

- ◆ Wide AC supply regulation range: 190 V to 265 V/95 V to 135 V
- ◆ Clear front-panel layout and LED display for voltage and current as well as IEC/IEEE bus commands
- ◆ Manual setting or via IEC/IEEE bus
- ◆ Separate panel meters for voltage and current, each with two switch-selected ranges
- ◆ High resolution and reproducibility due to decade setting
- ◆ High setting speed (for up programming independent of preset current limit, for down programming due to current sinking)
- ◆ Current monitoring output (two ranges)
- ◆ Voltage monitoring output
- ◆ Overvoltage protection (OVP)
- ◆ Thermostat-controlled cooling fan
- ◆ Remote sensing similar to R&S®NGPV
- ◆ 19" system unit
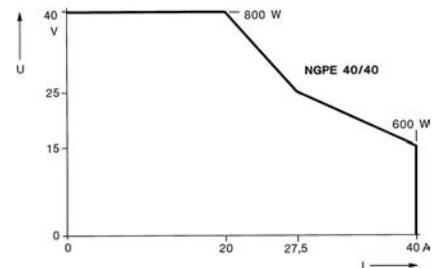
The autoranging output characteristic shows that higher currents are available at lower voltages. At 15 V and 40 A the output power is still 600 W

Power Supply

Programmable Power Supply R&S®NGPE 40/40

Specifications in brief

Voltage setting, in 4 digits	0 V to 39.99 V
Resolution/Deviation	10 mV (4000 steps)/$<10^{-3}$ of full scale
Current setting, in 3 digits	0 A to 39.9 A
Resolution/Deviation	100 mA (400 steps)/ $<2\times10^{-3}$ of full scale
Constant-voltage source	
Deviation of output voltage	
with ±10% AC supply variation	$<10^{-4}$
between 0°C and 45°C	$<2 \times 10^{-5}$/°C
with 10% to 90% nominal current	$<10^{-4}$
Transient recovery time at 40 V	
from 2 A to 18 A or conversely	2.0 ms (to 150 mV)
from 2 A to 4 A or conversely	0.2 ms (to 50 mV)
from 16 A to 18 A or conversely	0.2 ms (to 50 mV)

Setting time	without load	with load
from 0 V to 39 V	50 ms	60 ms
from 39 V to 0.4 V	100 ms	30 ms
from 39 V to 0.1 V	120 ms	40 ms

PARD, V_{rms}/V_p	2 mV/20 mV
Constant-current source	
Deviation of output current	
with ±10% AC supply variation	$<10^{-4}$
between 0°C and 45°C	$<10^{-4}$/°C
with 10% to 90% nominal current	$<10^{-4}$

PARD, I_{rms}	<40 mA
Remote control	IEC 625-1 (IEEE 488)
Functions	SH0, AH1, T0, TE0, L1, LE0, SR0, RL1, PP1, DC1, DT1, C0
Remote sensing	compensation for 0.5 V per lead
Panel meters	
Voltmeter (2 ranges)	10/40 V ±2.5% of full scale
Ammeter (2 ranges)	4/40 A ±2.5% of full scale
Monitoring output	
for current	400 mV corresp. to 4 A, 2% of fs 400 mV corresp. to 40 A, 0.2% of fs
for voltage	0 V to 40 V, 0.2% of fs
General data	
Overvoltage protection (OVP)	4.5 V to 50 V
AC supply, selectable	95 V to 135 V or 190 V to 265 V, 47 Hz to 63 Hz, 1600 VA
Dimensions (W × H × D)	492 mm × 161 mm × 420 mm
Weight	14 kg

Ordering information

Programmable Power Supply	R&S®NGPE 40/40	0192.0332.41

Programmable DC Power Supplies R&S®NGPE35/40 and R&S®NGPE70/20

0 V to 35 V/0 A to 40 A

0 V to 70 V/0 A to 20 A

1400 W output power

IEEE488 interface

New
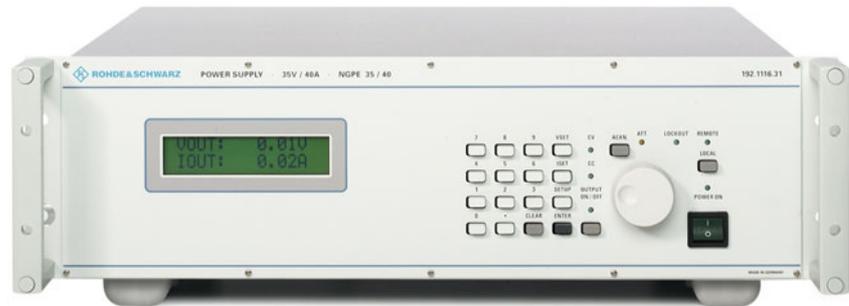
Programmable DC Power Supplies R&S®NGPE35/40

Brief description

R&S®NGPE35/40 and R&S®NGPE70/20 are programmable power supplies with max. 1400 W permanent output power. The requested values for voltage and power can be set either manually (with help of a 10 button keyboard) or through an IEEE488 interface. Also the measured values of voltage and current can not only be digitally read out on the front panel, but also through the IEEE488 interface.

The monitoring functions are e.g. alarms for low mains voltage, for failure of the power unit, for thermal overload and the case, that the output power is beyond the max. permitted value. The status of the regulator (voltage or current regulation) can also be obtained through the IEEE488 interface. Therefore, a sufficient integration in automatic test systems is possible.

Because of the technical concept as a switched-mode regulator, the R&S®NGPE35/40 and R&S®NGPE70/20 have a good efficiency (depending on the mains voltage between 85% and 90%). The active power factor correction enables a power factor between 0.99 to 0.98 at 100% to 50% output power. The use of remote-sensing connectors facilitates the compensation of voltage losses between power supply force connectors and D.U.T. of up to 1 V per load line.

The temperature controlled fan keeps the noise low, so that the R&S®NGPE35/40 and R&S®NGPE70/20 also pleasantly can be used in a lab.

Main features

◆ High output power
◆ High efficiency
◆ Switched-mode regulator with active power factor correction
◆ Comfortably manual operation
◆ IEEE488 remote control
◆ Read out of current and voltage values
◆ Low noise fan (temperature controlled)
◆ Extensive monitoring functions

Programmable DC Power Supplies R&S®NGPE 35/40 and R&S®NGPE 70/20

Specifications

Voltage	
Output voltage	
R&S®NGPE 35/40	0 V to 35.00 V in 3500 steps
R&S®NGPE 70/20	0 V to 70.00 V in 3500 steps
Setting resolution	
R&S®NGPE 35/40	10 mV = 1 LSB
R&S®NGPE 70/20	20 mV = 1 LSB
Deviation of the setted value	<2 LSB
Voltage measurement	
R&S®NGPE 35/40	0 V to 35.00 V in 3500 steps
R&S®NGPE 70/20	0 V to 70.00 V in 3500 steps
Measurement resolution	
R&S®NGPE 35/40	10 mV
R&S®NGPE 70/20	20 mV
Deviation of measured value	≤ ±4 LSB
Deviation at mains fluctuations from 95 V to 265 V (constant-voltage mode)	
R&S®NGPE 35/40	<1 mV
R&S®NGPE 70/20	<2 mV
Deviation at load variations 10% to 90%	
R&S®NGPE 35/40	<5 mV
R&S®NGPE 70/20	<10 mV
R&S®NGPE 35/40 Ripple and noise (at 35 V, 39.9 A load and constant-voltage mode)	<2 mV (RMS, bandwidth 0 to 1 MHz) <10 mV (peak, bandwidth 0 to 50 MHz)
R&S®NGPE 70/20 Ripple and noise (at 70 V, 19.9 A load and constant-voltage mode)	<6 mV (RMS, bandwidth 0 to 1 MHz) <25 mV (peak, bandwidth 0 to 50 MHz)
Load regulation time at load changes	
10% to 90% of the rated current	<10 ms
90% to 10% of the rated current	<10 ms
Setting time at voltage changes from 0 V to maximum	
R&S®NGPE 35/40 (load current 36 A)	<13 ms
R&S®NGPE 70/20 (load current 18 A)	<13 ms
R&S®NGPE 35/40 (load current 4 A)	<8 ms
R&S®NGPE 70/20 (load current 2 A)	<8 ms
Settling time at voltage changes from maximum to 0 V	
R&S®NGPE 35/40 (load current 36 A)	<15 ms
R&S®NGPE 70/20 (load current 18 A)	<15 ms
R&S®NGPE 35/40 (load current 4 A)	<150 ms
R&S®NGPE 70/20 (load current 2 A)	<150 ms

Current	
Output current	
R&S®NGPE 35/40	0 A to 40 A in 4000 steps
R&S®NGPE 70/20	0 A to 20 A in 4000 steps
Setting resolution	
R&S®NGPE 35/40	10 mA = 1 LSB
R&S®NGPE 70/20	5 mA = 1 LSB
Deviation of the setted value	<5 LSB
Current measurement	
R&S®NGPE 35/40	0 A to 40.00 A in 4000 steps
R&S®NGPE 70/20	0 A to 20.00 A in 4000 steps
Deviation of measured value	≤ ±4 LSB
Deviation at mains fluctuations from 95 V to 265 V at maximum load current (constant-current mode)	< 2 mA
Ripple and noise (at 1 V and maximum load current in constant current mode)	
R&S®NGPE 35/40	<15 mA (RMS, bandwidth 0 to 50 MHz)
R&S®NGPE 70/20	<10 mA (RMS, bandwidth 0 to 1 MHz) <15 mA (peak, bandwidth 0 to 50 MHz)

General data	
Efficiency at 1400 W output power and 230 V mains voltage	90%
Power factor	0.99 at 1400 W output power
Max. voltage compensation by help of sense lines	1 V per line
Isolation test voltage at output terminals	
vs. mains connectors	2500 V DC
vs. housing	500 V DC
mains connectors vs. housing	2500 V DC
Nominal temperature range	0 °C to +40 °C
Mains voltage range	95 V to 265 V
Space needed in a 19" system	1/1 (19") 3 HU
Dimensions (W × H × D)	442 mm × 131 mm × 442 mm
Weight	14 kg

Ordering information

Programmable DC Power Supply	NGPE 35/40	192.1116.31
	NGPE 70/20	192.1116.71

Programmable Voltage Source R&S®NGPS32

2 × −32 V to +32 V, max. 100 mA,

500 µV resolution

Brief description

The R&S®NGPS32 is a programmable voltage source with two isolated identical outputs. The bipolar output voltages (−32 V to +32 V) can be set with high resolution either manually or via the IEEE488 interface. Two integrated simple arbitrary generators allow independent output of low-frequency waveforms. The R&S®NGPS32 is suitable for use in automatic calibration and adjustment systems and as a reference voltage source in control processes.

Main features

◆ 2 × −32 V to +32 V with 500 µV resolution

◆ Selectable current limit (100mA or 10mA)

◆ Two integrated simple arbitrary generators

◆ High thermal and long-term stability

◆ Floating output voltages, combinable as required

◆ Rear outputs with additional sensing connectors

◆ Ease of operation

In addition to static voltage values, low-frequency waveforms can be output. For this purpose, reference points (consisting of voltage value and time) can be entered manually or via IEC/IEEE bus. Between two neighbouring points, the arbitrary generator operates like a ramp generator, i.e. the programmed voltage difference is sampled as a ramp with the time T of the preceding point. The step size of the ramp is calculated automatically. The arbitrary generator can output the waveform only once or cyclically. The reference points are stored in a nonvolatile memory.

Specifications in brief

Outputs	2 isolated, floating channels with rear outputs on terminal strip
Output voltage (per channel)	−32.7675 V to 32.7675 V in 131071 steps
Setting	via decimal keypad, rotary knob or IEEE488 bus
Setting resolution	500 µV
Deviation of full scale	±2 mV
Display	alphanumeric LCD display with 2 lines and 16 characters/line with adjustable LED lighting
Output current	selectable current limit, 10 mA or 100 mA, short-circuit-proof
Accuracy of current limit	±25%
Voltage deviation with AC supply variation of ±10%	±10 ppm
Voltage deviation with temperature variation from 0°C to +40°C	±10 ppm/°C
Instability	±1 ppm/h
Ripple and noise (20 Hz to 1 MHz)	<500 µV
Nonlinearity	<500 µV
Settling time	<700 µs over full output voltage range <100 µs for smallest programming step (500 µV)
Sensing voltage compensation	max. 250 mV per output line

Arbitrary generator	
Programming range	−32.7675 V to 32.7675 V in 500 µV steps
Max. number of reference points	200
Smallest time interval between 2 reference points	1 ms
Largest time interval between 2 reference points	32767 ms
Operating temperature range	0°C to +40°C
AC supply	100/120/220/240 V ±10%, 50 Hz to 60 Hz; 62.5 VA
Dimensions (W × H × D)	465 mm × 110 mm × 400 mm
Weight	6.75 kg

Ordering information

Dual Programmable Voltage Source (bipolar) with arbitrary function	R&S®NGPS32	0192.1016.31
Option		
19" Rack Adapter 2 HU	R&S®ZZA-211	1096.3260.00

Dual-Channel Analyzer/Power Supply R&S®NGMO2

Precise power supply and measurements under critical test conditions
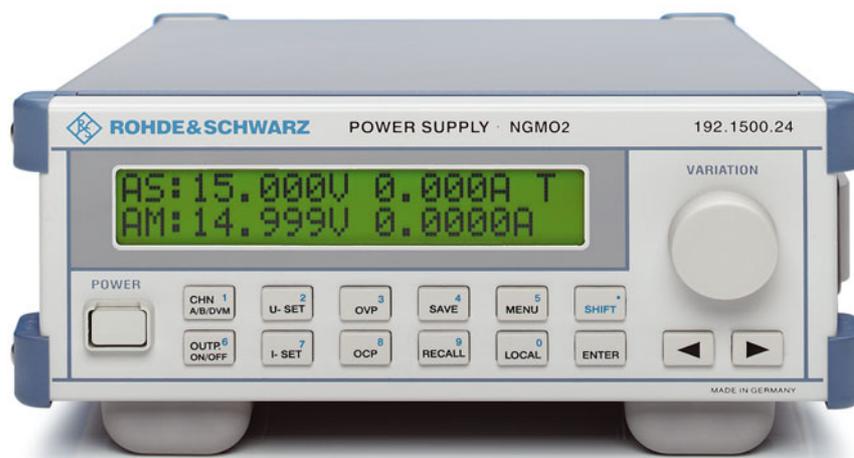
Brief description

The Dual-Channel Analyzer/Power Supply R&S®NGMO2 is more than just a simple power supply for test and measurement applications. This is shown by its advanced features:

◆ Accurate high-speed voltage source
◆ Programmable DC load
◆ Precise digital voltmeter
◆ Transient recorder
◆ Simple squarewave generator delivering high output power

and two of each of these features are provided. Two independent channels, installed in an enclosure which is ½ 19" wide and only 2 HU, ensure a simple and accurate power supply for battery-operated mobile-radio products now and in the future.

R&S®NGMO1
A single-channel solution of the R&S®NGMO2, containing only one of the both identical channels, is the R&S®NGMO1. The outside view and the channel specification is the same as from the R&S®NGMO2.

Main features

◆ Two channels 15 V/2.5(5) A with 7 A peak
◆ Fast load regulation
◆ Result memory for fast current and voltage measurements
◆ Internal and external triggers
◆ Two separate voltage measurement channels
◆ Sinking to 2.8 A (static)
◆ High-resolution voltage settings
◆ Precise measurements in µA range
◆ Minimal ripple and noise
◆ Adjustable output impedance for battery emulation
◆ OVP/OCP
◆ Detection of open sense pins
◆ Auxiliary inputs/outputs (output inhibit, relay, complete, trigger)
◆ Compact design (2 HU, ½ 19")
◆ IEEE 488.2, RS-232-C
◆ Fast programming
◆ Convenient manual operation

Further characteristics

Critical test environments involving pulsed current drain, e.g. GSM mobiles
Power-saving transmission technologies have been, and will continue to be, the key to expanding the capabilities of mobile radio. This is particularly true of transmission technologies that make use of time division multiplexing, for example GSM or TDMA, and also applies to the "slotted mode" used for CDMA – in both cases power supplies have to meet special requirements. R&S®NGMO2 can meet voltage drops without any hint of output voltage instability.

Emulation of various battery types and charging states
The R&S®NGMO2 can be used to emulate this critical case as its output impedance is adjustable. This also means that different types of batteries (NiCd, NiMH, Li-ion, Li-polymer etc) can be emulated to a certain extent. This ensures that nothing can happen to invalidate tests despite the general trend to lower supply voltages.

Dual-Channel Analyzer/Power Supply R&S®NGMO 2

### Current-/voltage transient analysis

Conclusions can be drawn about whether or not the subassemblies to be tested are functioning properly by forming the differences of the measured current drain of a sequence of signals occurring in rapid succession.

It goes without saying that long-term monitoring (current drain) can also be performed on DUTs by choosing sampling intervals of the appropriate length so that the effect of other operating parameters on current drain can be investigated. However, power consumption is also becoming more and more critical for subassemblies which are not battery-operated. Operating modes such as idle, sleep or power down are being encountered more frequently in electronic equipment because higher clock frequencies coupled with an increasing level of integration are making it impossible to ignore efficient energy management.

Analysis software

The R&S®NGMO 2-K10 operating software for the R&S®Current Sniffer is a user-friendly tool for performing long-term analyses of energy consumption, short-term current/voltage analyses with high time resolution or simple battery tests on DUTs. The recorded trace files can be ported to other programs or analyzed again in a postprocessing run with high time resolution.
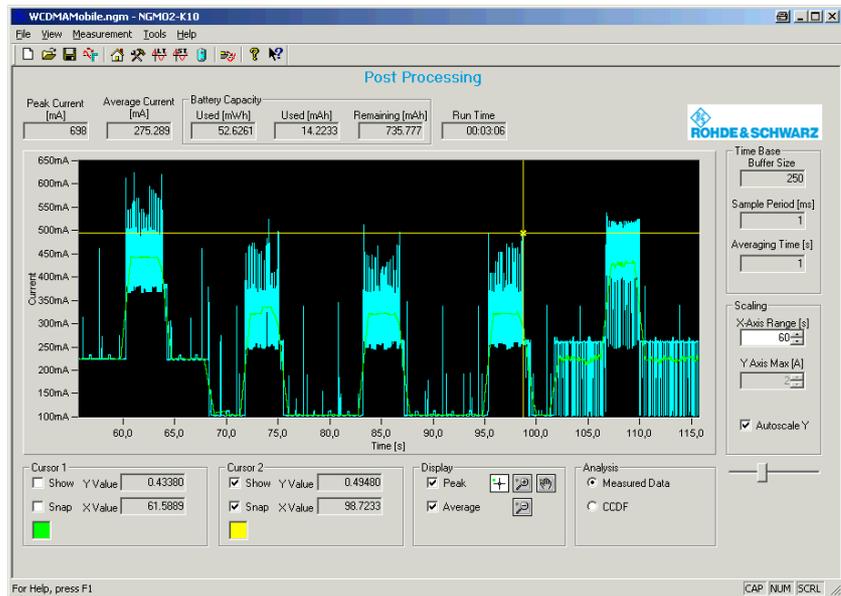
"Fingerprint" of a WCDMA mobile phone in the long-term current analysis mode of the Current Sniffer R&S®NGMO 2-K10 reveals possible energy guzzlers

High-resolution current measurements and voltage settings

There are extremely wide variations in the current taken by mobile telephone operating modes. It is essential to have enough resolution to detect deviations from the normal mobile mode whenever they might occur. The R&S®NGMO 2, therefore, has different current measurement ranges for both static and dynamic current measurements. The R&S®NGMO 2 also has the necessary voltage setting resolution to calibrate and adjust DUTs and to provide reproducible voltage levels.

Recording characteristics of semiconductor components

The R&S®NGMO 2 has two completely identical supply and measurement channels. This means that this small power supply unit can be used to form the basis of an independent parameter test setup for semiconductor components. The R&S®NGMO 2 can also handle up to four relays and respond to remote control commands. As each channel has an inhibit input, if required, a pulsed supply voltage can be fed to the components to prevent overheating during tests or to simulate a standard pulsed operating mode (e.g. TDMA power amplifier).

Power Supply

Dual-Channel Analyzer/Power Supply R&S®NGMO2

Specifications

Constant voltage source	Channels 1 + 2 (both channels with identical specs)
Voltage setting	0 V to 15 V
Resolution	1 mV
Deviation	0.05 % + 5 mV
at ±10 % AC supply fluctuation	0.5 mV
at 10 % to 90 % nom. current	0.01 % + 3 mV
Setting time on load steps (0.1 A to 1.6 A) at ≤20 mV	
Deviation at large bandwidth directly connected on "long" lines, with sense lead	<35 µs <50 µs
Deviation at small bandwidth directly connected on "long" lines, with sense lead	<80 µs <100 µs
Temporary voltage drop after load step (0.1 A to 1.6 A) at large bandwidth on "long" lines, with sense lead	<60 mV
Ripple (rms)	<1 mV
Output impedance	0 Ω to 1 Ω, adjustable in 10 mΩ steps
Voltage compensation	up to 1 V (4 V) per line
Constant current source	
Peak current (1 ms)	7 A
Current setting from 1.8 V to 5 V	0 A to 5 A
Current setting outside 1.8 V to 5 V	0 A to 2.5 A
Resolution	1 mA
Deviation	0.1 % + 5 mA
at ±10 % AC supply fluctuation	1 mA
at 10 % to 90 % nom. current	0.01 % + 2 mA
Sinking	2.8 A (0 V to 5 V), dropping to 1 A at 15 V
Voltage measurement	
Range	−5 V to +25 V
Resolution	1 mV
Deviation	0.03 % + 3 mV
Measurement rate	2 ms to 200 ms, adjustable
Averaging of	1 to 10 values
Current measurement	
Ranges	7 A/0.5 A/5 mA
Resolution	200 µA/10 µA/0.1 µA
Deviation	0.2 % + (2 mA/100 µA/1 µA)
Measurement rate	2 ms to 200 ms, adjustable
Averaging of	1 to 10 values

Transient measurement	
Sample memory	1 to 5000 samples
Sampling interval (adjustable)	10 µs to 1 s in 10 µs steps
Averaging of	1 to 100 values
Measurement system trigger	
Current transients measurement ranges	5 A / 0.5 A
Adjustable trigger thresholds	
Range 5 A	0 mA to 5 A in 200 µA steps
Range 0.5 A	0 mA to 0.5 A in 10 µA steps
Voltage transients	−5 V to +25 V in 1 mV steps
Pre-/posttrigger	−5000 to +50000 samples
Measurement functions	Peak Min, Peak Max, Hi, Low, RMS, Average
Protection functions	
OVP	1.5 V to 22 V, adjustable
OCP	on/off
Detection of sense line interruptions	
General data	
Programming	IEEE 488.2, RS-232-C
Inputs	2 × measurement system trigger, 2 × output inhibit
Outputs	2 × complete, 4 × relay, fault
AC supply	115/230 V, 47 Hz to 63 Hz
Dimensions (W × H × D)	210.8 mm × 87.6 mm × 420 mm
Weight R&S®NGMO2 R&S®NGMO1	 7.5 kg 5.02 kg

Ordering information

Dual-Channel Analyzer/ Power Supply	R&S®NGMO2	192.1500.24
Recommended extras		
Front-Panel Output Connectors	R&S®NGMO2-B0	192.1500.00
19" Adapter for 1 unit	R&S®NGMO2-B1	192.1500.01
19" Adapter for 2 units	R&S®NGMO2-B2	192.1500.02
Current Sniffer Software	R&S®NGMO2-K10	192.1500.04
Single-Channel Analyzer/ Power Supply	R&S®NGMO1	192.1500.21

Triple Power Supply R&S®NGPT

R&S®NGPT 35:

2 × 35 V/1 A and 1 × 7 V/5 A

R&S®NGPT 18:

2 × 18 V/2 A and 1 × 7 V/5 A

R&S®NGPT 7:

2 × 7 V/5 A and 1 × 18 V/2 A

Triple Power Supply R&S®NGPT35

Main features

- ◆ Insensitive to RF voltages radiated by device under test or nearby antenna
- ◆ Very low PARD (periodic and random deviation) due to linear regulation
- ◆ 14 bit resolution
- ◆ Precise and stable over wide temperature range
- ◆ Simultaneous readout of nominal and actual values of all channels
- ◆ Output voltage of all channels simultaneously variable by a percentage value
- ◆ Nonvolatile storage of up to six complete setups
- ◆ Software calibration via IEC/IEEE bus without potentiometer adjustment
- ◆ Coupled protection mode for DUTs which should not be supplied from an asymmetrical voltage source

- ◆ Floating outputs, max. 120 V DC
- ◆ Remote sensing (0.5 V per lead)
- ◆ Soft limits for defined voltage and current limiting
- ◆ Hardware overvoltage protection
- ◆ Quiet, temperature-controlled fan
- ◆ 19" system unit, full system capability via IEC/IEEE bus interface (IEC 625-1/IEEE 488-2)

Operation

Setting and display

Three displays are provided for indication of the nominal and actual values. A separate display is provided for status information and menu-guided operation.

Variable by percentage

For module testing, R&S®NGPT35 provides the possibility of varying the output voltage of all three channels simultaneously in percent. After selection of the channels to be included in this operating mode, the desired variation can either be set via the numeric keypad or in steps of 0.1%, 1% or 10% using the increment/decrement keys.

Power Supply

Triple Power Supply R&S®NGPT

Specifications in brief

Constant-voltage source	35 V	18 V	7 V
Voltage range	0 V to 35 V	0 V to 18 V	0 V to 7 V
Resolution	2.5 mV	2.0 mV	0.5 mV
Deviation of full scale	<0.01%	<0.01%	<0.01%
±10% AC supply variation	<0.001%	<0.001%	<0.001%
0°C to 45°C	<0.005%/°C	<0.005%/°C	<0.005%/°C
10% to 90% rated current	0.01%	0.01%	0.01%
Transient recovery time following load variation	75 µs	75 µs	150 µs
Programming time	35 ms	35 ms	35 ms
PARD (V_{rms})	200 µV	200 µV	100 µV
Constant-current source			
Current range	0 A to 1 A	0 A to 2 A	0 A to 5 A
Resolution	0.1 mA	0.2 mA	0.5 mA
Deviation of full scale	<0.02%	<0.02%	<0.02%
±10% AC supply variation	<0.002%	<0.002%	<0.002%
0°C to 45°C	<0.01%/°C	<0.01%/°C	<0.01%/°C
10% to 90% rated voltage	0.02%	0.02%	0.02%
Transient recovery time following load variation	10 ms	10 ms	5 ms
Programming time	60 ms	60 ms	60 ms
PARD (I_{rms})	20 µA	20 µA	100 µA
Display			
Voltage measurement	0 V to 40 V	0 V to 32.7660 V	0 V to 8 V
Resolution	2.5 mV	2.0 mV	0.5 mV
Deviation of full scale	<0.01%	<0.01%	<0.01%
0°C to 45°C	<0.005%/°C	<0.005%/°C	<0.005%/°C
Measurement rate	2 per s	2 per s	2 per s

	35 V	18 V	7 V
Current measurement	0 A to 1 A	0 A to 3,2766 A	0 A to 5 A
Resolution	0.1 mA	0.2 mA	0.5 mA
Deviation of full scale	0.02%	0.02%	0.02%
0°C to 45°C	<0.01%/°C	<0.01%/°C	<0.01%/°C
Measurement rate	2 per s	2 per s	2 per s
Soft limits			
Voltage range	0 V to 35 V	0 V to 18 V	0 V to 7 V
Resolution	2.5 mV	2.0 mV	0.5 mV
Current range	0 A to 1 A	0 A to 2 A	0 A to 5 A
Resolution	0.1 mA	0.2 mA	0.5 mA
Overvoltage protection			
Voltage range	1.5 V to 40 V	1.5 V to 25.55 V	1.5 V to 10 V
Resolution	100 mV	50 mV	20 mV
Deviation of full scale	<2%	<2%	<2%
Response time	50 µs	50 µs	50 µs
Voltage variation			
Resolution	0.1%	0.1%	0.1%
Range	0 V to 35 V	0 V to 18 V	0 V to 7 V
General data			
AC supply	100/120/220/40 V ±10%, 50 Hz to 60 Hz, 350 VA		
Dimensions (W × H × D)	492 mm × 161 mm × 514 mm		
Weight	16 kg		

Ordering information

Triple Power Supply	R&S®NGPT35	0192.0510.31
	R&S®NGPT18	0192.0510.21
	R&S®NGPT7	0192.0510.71

Power Supply

DC Power Supplies R&S®NGSM 32/10, R&S®NGSM 60/5

R&S®NGSM 32/10:

0 V to 18 V/10 A (20 A)

0 V to 32 V/5 A (10 A)

R&S®NGSM 60/5:

0 V to 32 V/5 A (10 A)

0 V to 60 V/2.5 A (5 A)

Designed for car electronics

applications in service,

laboratory and production

R&S®NGSM 32/10

Brief description

DC Power Supplies R&S®NGSM are versatile supply and measuring units for testing electronic car components by simulating real operating conditions. In addition to a wide field of car electronics, it can be used in mobile radio, car hifi applications and mechanical engineering. Due to its compact design, the units take up only one half 19" width. A 19" adapter is available for mounting the R&S®NGSM into test racks.

Main features

◆ Excellent RF shielding and standby current measurement – ideal for mobile radio applications
◆ Trend indication for current measurements
◆ Car electronics testing by simulating motor startup
◆ Currents up to 20 A for car hifi applications
◆ Voltages up to 60 V for 42-V power-net in motor vehicles
◆ Storage of up to 12 device setups for short tests

◆ DUT protected against erroneous settings by ON/OFF output key
◆ IEC/IEEE bus or RS-232-C interface for use in production environments (optional)
◆ Acoustic signal upon changeover from voltage to current regulation – ideal for long-time testing
◆ Great ease of operation despite numerous functions

Application-specific characteristics

Car electronics
R&S®NGSM is a precise and, thanks to its versatility, an extremely economical tool for use in the production of electronics. With the aid of an IEC/IEEE bus or

RS-232-C interface (optional), the power supply can readily be integrated into in-line production systems. The startup curve in line with DIN 40839 can be adapted to other factory standards by reprogramming it. High surge currents typically occur in applications such as central locking or ABS, but with a pulse current of up to 30 A, R&S®NGSM 32/10 is ideally prepared for these applications.

Mobile radio systems
The high resolution for current measurements allows the maximum operating time of a mobile phone to be accurately predicted; typical voltage drops during the startup of a car – which have to be tolarated by telephones operated at a car net – can be simulated.
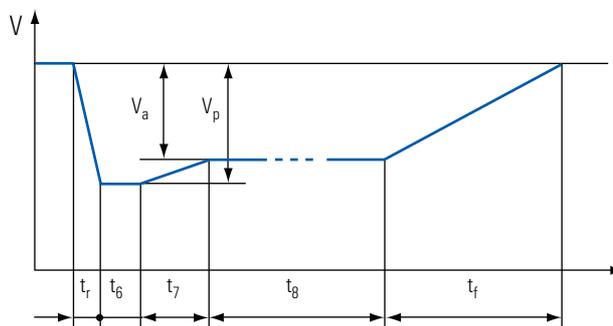
*Startup curve to DIN 40839*

DC Power Supplies R&S®NGSM32/10, R&S®NGSM60/5
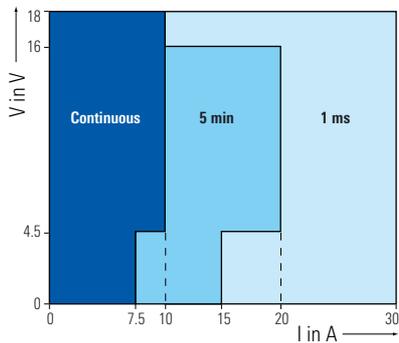
R&S® NGSM32/10:
Current loadability in 18 V range
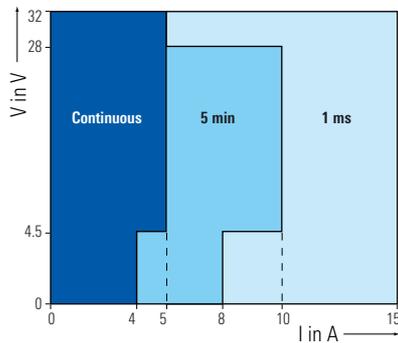
R&S® NGSM32/10:
*Current loadability in 32 V range*
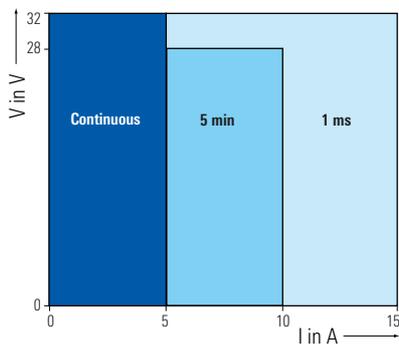
R&S® NGSM60/5:
Current loadability in 32 V range
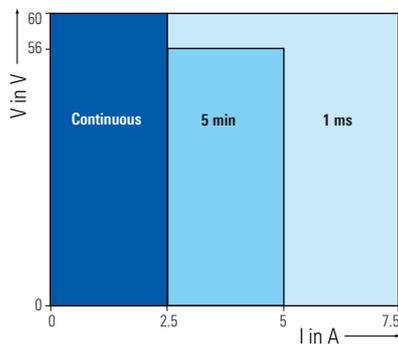
R&S® NGSM60/5:
Current loadability in 60 V range
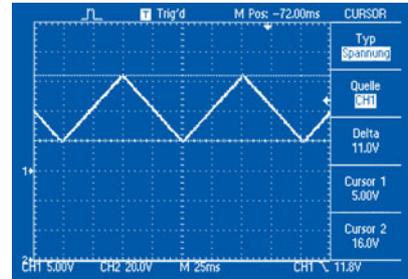
Example of a triangle function, generated with the R&S NGSM
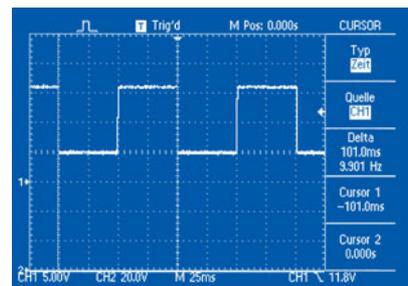
Example of a rectangle function, generated with the R&S NGSM

DC Power Supply R&S®NGSM is insensitive to the RF voltage conducted from a device under test or radiated from a nearby antenna.

Car hifi
With a short-term load current of 20 A (R&S®NGSM32/10), even boosters can be supplied. Peak current measurements allow the power loading of devices to be predicted. Simulation of the startup curve to DIN40839 is also very useful in car hifi applications, e.g. to spot problems due to unexpected data loss of theft-proof car radios with security code.

Simple arbitrary generator
R&S®NGSM can also be used as a simple arbitrary generator – but with the high output power of a power supply unit. Up to 60 reference values are available per voltage range which have to be programmed with lenghts of stay of each 1 ms to 4 s. R&S®NGSM automatically interpolates between two values.

Operation

DC Power Supply R&S®NGSM features a large-size, extremely easy-to-read display and simple operation despite its versatile functions. It always stores the last instrument setting used. Up to six settings as well as the data of the arbitrary generator can be stored for each voltage range and recalled whenever required. Any faults occurring during operation are immediately displayed and signalled by an acoustic alarm; for protection of the DUT in the event of a fault, the user can choose between the constant-current mode or automatic switch-off. The sensing lines are provided with an integrated protection against wrong polarity for added safety.

DC Power Supplies R&S®NGSM 32/10, R&S®NGSM 60/5

Specifications in brief

Constant-voltage source	R&S®NGSM 32/10		R&S®NGSM 60/5	
Voltage setting	0 V to 18 V	0 V to 32 V	0 V to 32 V	0 V to 60 V
Resolution	10 mV	10 mV	20 mV	20 mV
Deviation of full scale	<0.4%	<0.2%	<0.2%	<0.2%
with ±10% AC supply variation	<0.01%	<0.01%	<0.01%	<0.01%
between 0 and 45°C	<0.02%/°C	<0.02%/°C	<0.02%/°C	<0.02%/°C
with 10% to 90% nom. current	0.01%	0.01%	0.01%	0.01%
Transient recovery time after load variation	0.1 ms	0.1 ms	0.1 ms	0.1 ms
PARD, V_{rms}	1 mV	1 mV	2 mV	2 mV
Constant-current source				
Current setting	0 A to 20 A	0 A to 10 A	0 A to 10 A	0 A to 10 A
Resolution 0 A to 9.99 A	10 mA	10 mA	10 mA	10 mA
Resolution 10 A to 20 A	100 mA	100 mA	100 mA	100 mA
Deviation of full scale	<0.5%	<1.5%	<1.5%	<1.5%
with ±10% AC supply variation	<0.02%	<0.02%	<0.02%	<0.02%
between 0°C and 45°C	<0.05%/°C	<0.05%/°C	<0.05%/°C	<0.05%/°C
with 10% to 90% nom. voltage	0.2%	0.2%	0.2%	0.2%
PARD, I_{rms}	20 mA	20 mA	20 mA	20 mA
Current loadability				
Continuous current	0 A to 10 A*	0 A to 5 A	0 A to 5 A	0 A to 2.5 A
Surge current (max. 5 min)	0 A to 20 A*	0 A to 10 A	0 A to 10 A	0 A to 5 A
Impulse current (max. 1 ms)	0 A to 30 A*	0 A to 20 A	0 A to 15 A	0 A to 7.5 A
	*reduced output currents at V ≤4.5 V			
Display				
Voltage measurement	0 V to 40 V	0 V to 40 V	0 V to 80 V	0 V to 80 V
Resolution	10 mV	10 mV	20 mV	20 mV
Deviation of full scale	<0.2%	<0.1%	<0.1%	<0.2%
between 0°C and 45°C	<0.02%/°C	<0.02%/°C	<0.02%/°C	<0.02%/°C
Measurement rate	6/s	6/s	6/s	6/s
Current measurement in mA range	0 mA to 199 mA	0 mA to 199 mA	0 mA to 199 mA	0 mA to 199 mA
Resolution 0 mA to 99.9 mA	0.1 mA	0.1 mA	0.1 mA	0.1 mA
Resolution 100 mA to 199 mA	1 mA	1 mA	1 mA	1 mA
Current measurement in A range	0 A to 40 A	0 A to 40 A	0 A to 40 A	0 A to 40 A
Resolution 0 A to 9.99 A	10 mA	10 mA	10 mA	10 mA
Resolution 10 A to 40 A	100 mA	100 mA	100 mA	100 mA
Deviation of current measurement (mA, A)	<0.5% ±1 LS of rdg	<0.5% ±1 LS of rdg	<0.5% ±1 LS of rdg	<0.5% ±1 LS of rdg
between 0°C and 45°C	<0.1%/°C	<0.1%/°C	<0.1%/°C	<0.1%/°C
Peak current measurement	0 A to 40 A	0 A to 40 A	0 A to 40 A	0 A to 40 A
Resolution	100 mA	100 mA	100 mA	100 mA
Deviation of peak current measurement	<2% of fs	<2% of fs	<2% of fs	<2% of fs
between 0°C and 45°C	<0.2%/°C	<0.2%/°C	<0.2%/°C	<0.2%/°C
General data				
Outputs	max. 120 V DC, floating			
Voltage compensation	1 V per lead (remote sensing)		1 V per lead (remote sensing)	
AC supply	100/120/220/240 V ±10%, 50 Hz to 60 Hz, 690 VA			
Dimensions (W × H × D); weight	211 mm × 150 mm × 350 mm; 8 kg			

Ordering information

DC Power Supply		
	R&S®NGSM 32/10	0192.0810.31
	R&S®NGSM 60/5	0192.0810.61

Options		
19" Adapter (3 HU, 2.8 kg)	R&S®NGSM-B0	0192.0810.00
RS-232-C Interface for R&S®NGSM 32/10	R&S®NGSM-B1	0192.0810.01
IEEE-488 Interface for R&S®NGSM 32/10	R&S®NGSM-B2	0192.0810.02
RS-232-C Interface for R&S®NGSM 60/5	R&S®NGSM-B3	0192.0810.03
IEEE-488 Interface for R&S®NGSM 60/5	R&S®NGSM-B4	0192.0810.04