R&S®NGM200
POWER SUPPLY SERIES

High-speed accuracy

3 year warranty

Data Sheet
Version 02.00

ROHDE&SCHWARZ
Make ideas real

AT A GLANCE

Thanks to their high accuracy and fast load recovery time, the R&S®NGM200 power supplies are perfect for challenging applications. Their two-quadrant architecture allows them to function both as a source and a sink to simulate batteries and loads. Their short recovery times enable them to handle fast load changes that occur, for example, when mobile communications devices switch from sleep mode to transmit mode. High-speed data acquisition and convenient battery simulation widen the range of applications.

The single-channel R&S®NGM201 and the two-channel R&S®NGM202 deliver up to 60 W of output power per channel. The output channels are floating, galvanically isolated and protected against overload and short circuits.

With four measurement ranges for current and a resolution of up to 6½ digits when measuring voltage, current and power, the R&S®NGM200 power supplies are perfect for characterizing devices that have low power consumption in standby mode and high current in full load operation. In many cases, an additional digital multimeter is no longer necessary.

Thanks to their fast recovery time of < 30 µs, their minimum overshoot even during a demanding load change and fast impedance regulation, the R&S®NGM200 power supplies are ideal for powering IoT devices and other battery-operated devices.

With an acquisition rate of up to 500 000 samples per second, even extremely fast variations in voltage or current can be captured.

The linear two-quadrant design of the output stages allows the R&S®NGM200 power supply series to operate as a source and sink with minimum residual ripple and noise, ideally supporting the development of power amplifiers and MMICs. The optional battery simulation functionality provides test conditions that imitate the use of a real battery.

Key facts

	R&S®NGM201	R&S®NGM202
Number of output channels	1	2
Total output power	60 W	120 W
Max. output power per channel	60 W	
Output voltage per channel	0 V to 20 V	
Max. output current per channel	≤ 6 V: 6 A, > 6 V: 3 A	
Load recovery time	< 30 µs	
Max. power and current per channel when used as a load	60 W, 3 A	

BENEFITS AND KEY FEATURES

Technology for challenging tasks

- Fast load regulation
- Minimum residual ripple and low noise
- Readings with up to 6½ digit resolution
- Digital voltmeter functionality
- Galvanically isolated, floating channels
- Output stage isolated with relays
- Two quadrants: operates as source and sink
- Constant voltage, constant current and constant resistance modes
- Variable output impedance
- High-speed acquisition (FastLog functionality)
- Protection functions to safeguard instrument and DUT
- Safety limits to safeguard the DUT
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Battery simulation

- Battery models
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Easy operation

- High-resolution touchscreen
- Color coding of operating modes
- QuickArb function
- EasyRamp function
- Save and recall instrument settings
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Ideal for use in labs and test systems

- Tailored for use in labs and system racks
- Remote sensing
- Front and rear connectors
- Full remote capabilities
- Fast on the bus and on the bench
- Advanced instrument design: compact form factor, quiet operation
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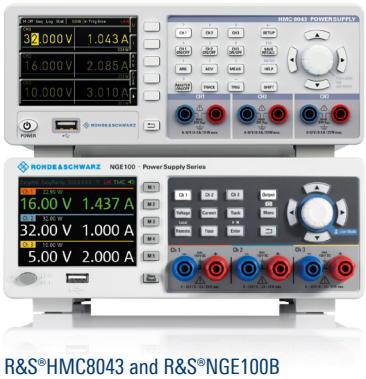
PRODUCT OVERVIEW

Different classes of power supplies



R&S®HMC8043 and R&S®NGE100B
three-channel power supply

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®HMP2030 three-channel and
R&S®HMP4040 four-channel power supply

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

TECHNOLOGY FOR CHALLENGING TASKS

Fast load regulation

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

The R&S®NGM200 power supplies have a circuit design that allows the user to determine how the power supply regulates load changes. The "Fast" default setting is optimized for speed, achieving recovery times of < 30 µs. Deactivating "Fast" slightly increases the recovery time, focusing on preventing overshoots under special load conditions.

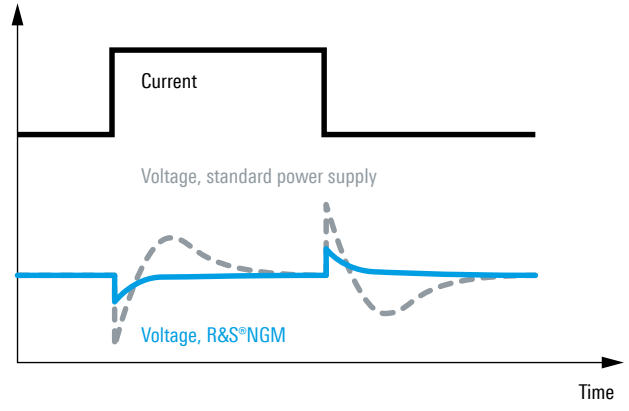
The R&S®NGM200 power supplies regulate the output impedance very fast. Especially in the range from –50 mΩ to 2 Ω, recovery times of < 200 µs can be achieved.

Minimum residual ripple and low noise

Advanced electronic circuitry is often very complex and sensitive to interference on the supply lines. In order to supply interference-free voltage to such sensitive DUTs, the power supplies must provide extremely stable output voltages and currents. All types of ripple and noise need to be avoided. The R&S®NGM200 power supplies have linear regulation and are ideal for sensitive DUTs.

The measured currents and voltages are displayed with 6½ digit resolution. The power supply automatically switches from source to sink mode. In the example, channel 2 is operating as a load. This is indicated by a negative current reading.

Optimized load recovery time



Power supplies usually respond to abrupt load changes with overshoot and slow recovery times. Thanks to specially optimized control circuits, the R&S®NGM200 series achieves recovery times of < 30 µs.

Readings with up to 6½ digit resolution

With a resolution of up to 6½ digits when measuring voltage, current and power, the R&S®NGM200 power supplies are perfect for characterizing devices that have low power consumption in standby mode and high current in full load operation. Two voltage measurement ranges and four current measure ranges provide high accuracy and resolutions down to 1 µV/10 nA.

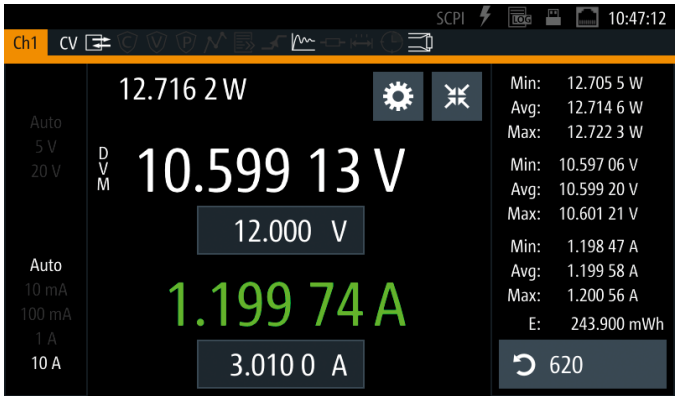
Digital voltmeter functionality

Like other power supplies, the R&S®NGM200 instruments measure the voltage supplied to the DUT. In addition, the R&S®NGM-K104 option activates a port that allows the internal digital voltmeter to be connected to any other point in the customer's circuitry. In many cases, an additional digital multimeter is not necessary.

Galvanically isolated, floating channels

Both channels of the R&S®NGM202 are completely isolated from each other and are not connected to chassis ground. They can be used as independent power supplies or be cascaded. The channels can be connected in parallel to achieve higher currents or in series to achieve higher voltages. Connecting the two channels makes it easy to power bipolar circuits that might need +12 V/–12 V, for example.

The internal digital voltmeter of the R&S®NGM200 power supplies can optionally be used to measure at any point in the customer's circuitry.



Output stage isolated with relays

Switching off an output channel of a standard power supply usually simply switches off the output voltage – the output stage of the supply remains connected to the output terminals. The R&S®NGM200 uses relays to isolate the power supply circuits from the connector sockets.

Two quadrants: operates as source and sink

The two-quadrant architecture of the power supplies allows them to function both as a source and a sink and simulate batteries or loads. The power supply automatically switches from source mode to sink mode. As soon as the externally applied voltage exceeds the set nominal voltage, current flows into the power supply. This is indicated by a negative current reading.

Constant voltage, constant current and constant resistance modes

Configuring and regulating the output voltage (constant voltage mode) is the standard application for power supplies. However, the R&S®NGM200 power supplies can also be used in constant current mode, with each channel separately configurable. If the configured current level is exceeded, current limiting ensures that only the configured current can flow. The output voltage is reduced accordingly below the configured value. This prevents damage to the test circuit in the event of a fault.

When operating as an electronic load, constant resistance mode is also available. In this mode, the power supply behaves like an adjustable resistance over the entire load range. This makes it possible to simulate battery discharge with a constant load resistance, for example.

Two channels can be connected together to supply bipolar circuits with, for example, +12 V/–12 V.

Variable output impedance

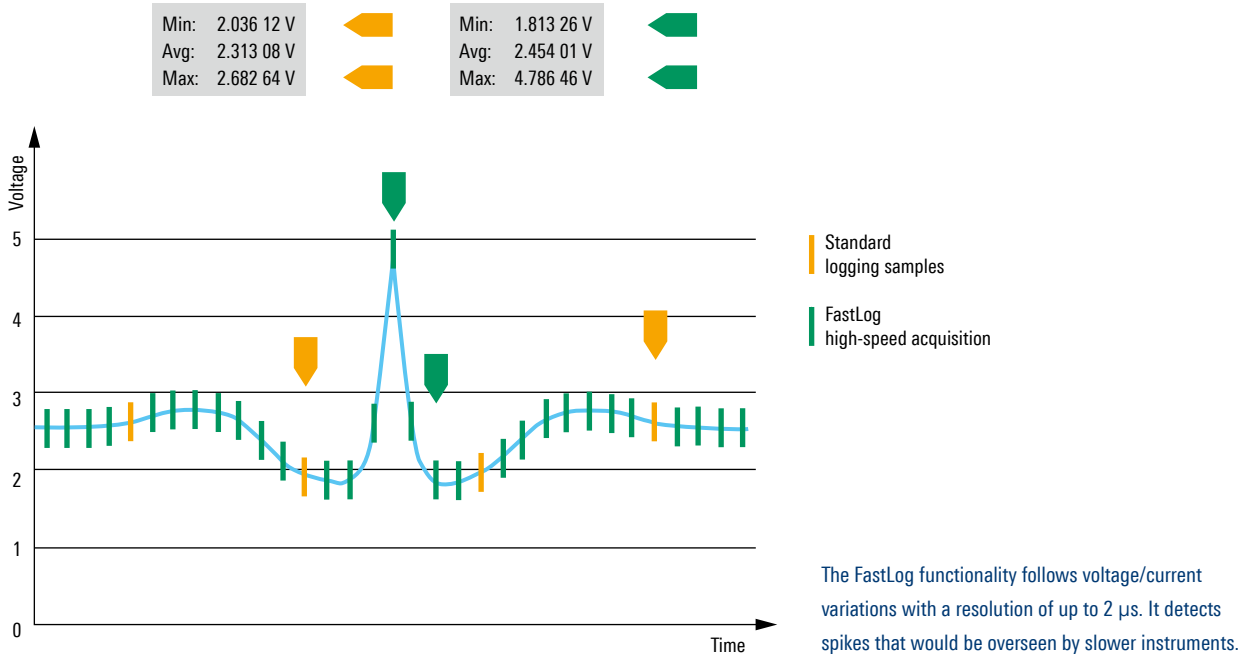
A power supply should have an output impedance as low as possible to suppress loading effects on the DUT. However, there are applications where certain battery types need to be simulated in a controlled manner or where it is necessary to simulate the increase in internal impedance as the battery discharges. The R&S®NGM200 power supplies support these applications due to their adjustable output impedance range.

High-speed acquisition (FastLog functionality)

The R&S®NGM200 power supplies offer the high-speed FastLog functionality to capture voltage and current measurement results. This data can be stored on an external USB storage device or can be transferred to an external PC via USB or LAN. With an acquisition rate of up to 500 ksample/s, voltage and current results are available every 2 µs. Instead of the readback voltage, also the voltage measured by the optional digital voltmeter functionality (R&S®NGM-K104) can be logged with 500 ksample/s. Using the two-channel R&S®NGM202, the data acquisition can run on both channels in parallel.

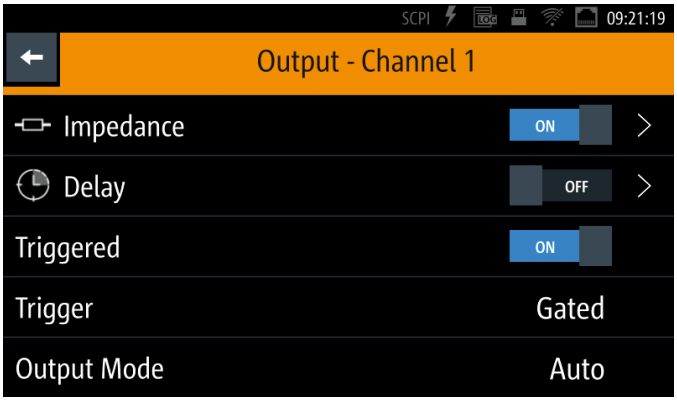
With this high-speed acquisition, even spikes in the microsecond range that cannot be detected with slower instruments, can be detected in min./max. values.

FastLog high-speed acquisition

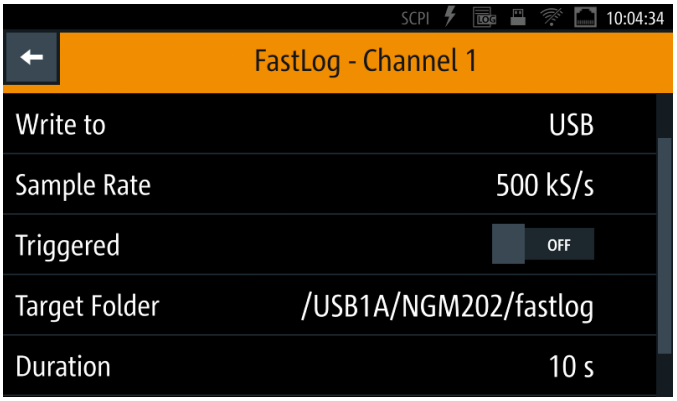


The FastLog functionality follows voltage/current variations with a resolution of up to 2 µs. It detects spikes that would be overseen by slower instruments.

Various parameters can be set at the outputs of the R&S®NGM200 power supplies, for example the output impedance, a delay to switch on the outputs and different trigger modes.



The high-speed FastLog functionality provides an acquisition rate up to 500 ksample/s.



Protection functions to safeguard instrument and DUT

The R&S®NGM200 power supplies provide protection functions to make sure the DUT and the power supply are not damaged in the event of a fault. The output channels are protected against overload and short circuits. The maximum voltage, current and power can be set separately for each channel. When a channel reaches the set limit, it is automatically switched off and a message is displayed.

Overvoltage protection (OVP)

If the voltage exceeds the configured maximum value, the channel is switched off and the corresponding symbol flashes on the display.

Overcurrent protection (electronic fuse, OCP)

To better protect sensitive loads, the channels of R&S®NGM200 power supplies provide electronic fuses that can be set individually. If the channel current exceeds the set current, the channel is automatically switched off and the overcurrent symbol flashes.

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

There are two settings to define the response behavior of the electronic fuses. The "Fuse delay at output-on" specifies how long the fuse remains inactive after the channel is activated. The sensitivity of the fuse is specified using the "Fuse delay time". This allows users to modify the behavior of the power supply to prevent a channel from being switched off due to a short current spike during operation.

Overpower protection (OPP)

Alternatively, instead of the maximum voltage, the maximum power can be set and used as the switch-off parameter.

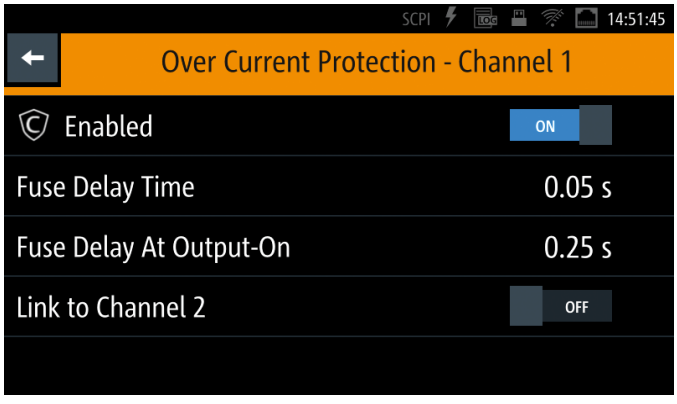
Overtemperature protection (OTP)

The R&S®NGM200 power supplies have internal overtemperature protection that switches the channel off if a thermal overload is imminent.

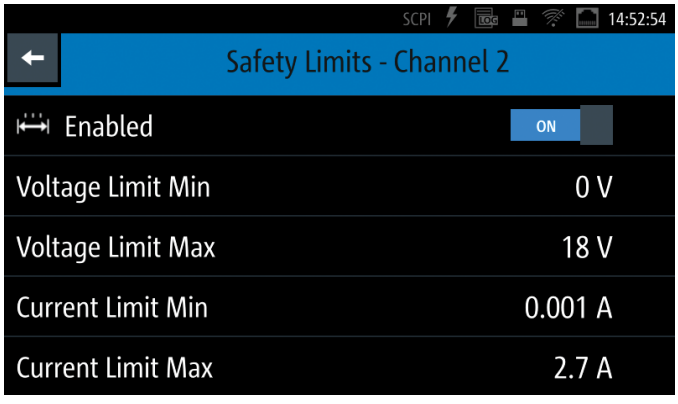
Safety limits to safeguard the DUT

To prevent a DUT from being destroyed by a too high voltage, safety limits can be set on the R&S®NGM200 power supplies. Before starting the actual measuring task, the user can limit the power supply to values that are not dangerous for the DUT.

Electronic fuse with additional functions: "Fuse delay at output-on" specifies how long the fuse remains inactive after the channel is activated. The sensitivity of the fuse is specified using the "Fuse delay time".



The user can set safety limits to limit the adjustment range of the power supply and prevent a DUT from being damaged due to accidentally using the wrong setting.



BATTERY SIMULATION

Battery models

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

To define a battery model, the data of the battery can be entered easily using the integrated battery model editor. Data sets for the common battery types Pb, LiIon, NiCd and NiMH are available as preconfigured files. These can be easily modified according to the needs of a specific application. Additional battery model data sets can be loaded from a USB device and stored on the R&S®NGM200 power supplies.

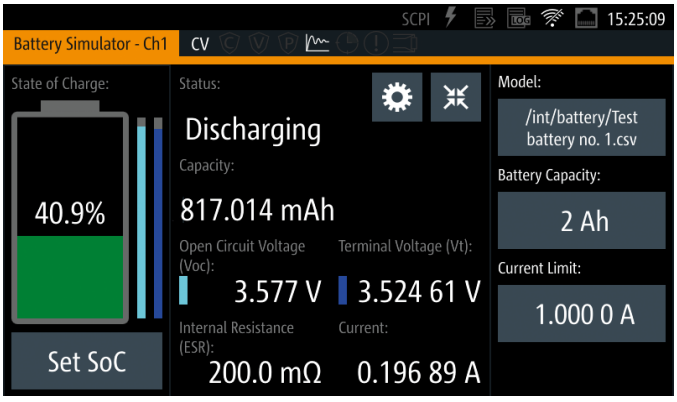
Battery simulation

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

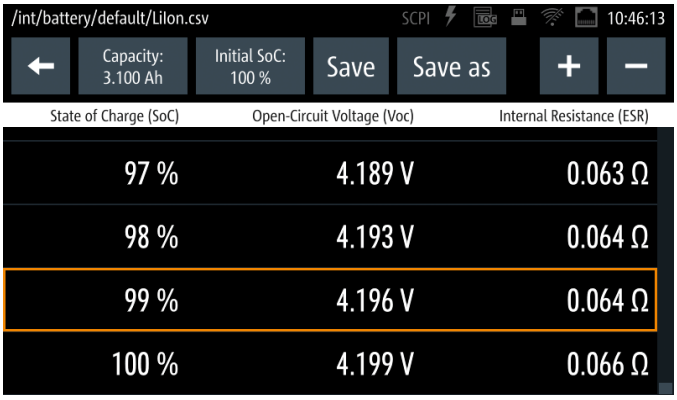
The charging behavior of a battery can also be simulated. This is particularly important when designing battery chargers. In this application, the R&S®NGM200 power supply is used in sink mode.

Both cases provide dynamic simulation, meaning Voc, ESR and SoC change according to charging/discharging conditions like a real battery. The state of charge is shown graphically; all other values are displayed numerically.

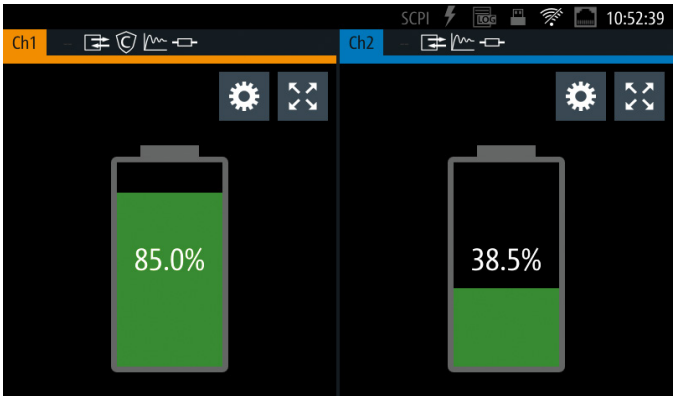
Battery simulation: the main parameters to characterize a battery's condition are summarized in one display.



The battery simulation software includes data sets of common battery types that can be easily modified.



Using the two-channel R&S®NGM202, battery simulation can be used simultaneously on both channels.



EASY OPERATION

High-resolution touchscreen

The large capacitive touchscreen is the central operating element for R&S®NGM200 power supplies. Lightly tapping a numerical value will display a virtual keyboard to input the desired value. Alternatively, the voltage, current and limits for the various protection functions can be set using the rotary knob. Functions that are less frequently used can be accessed and operated via menus.

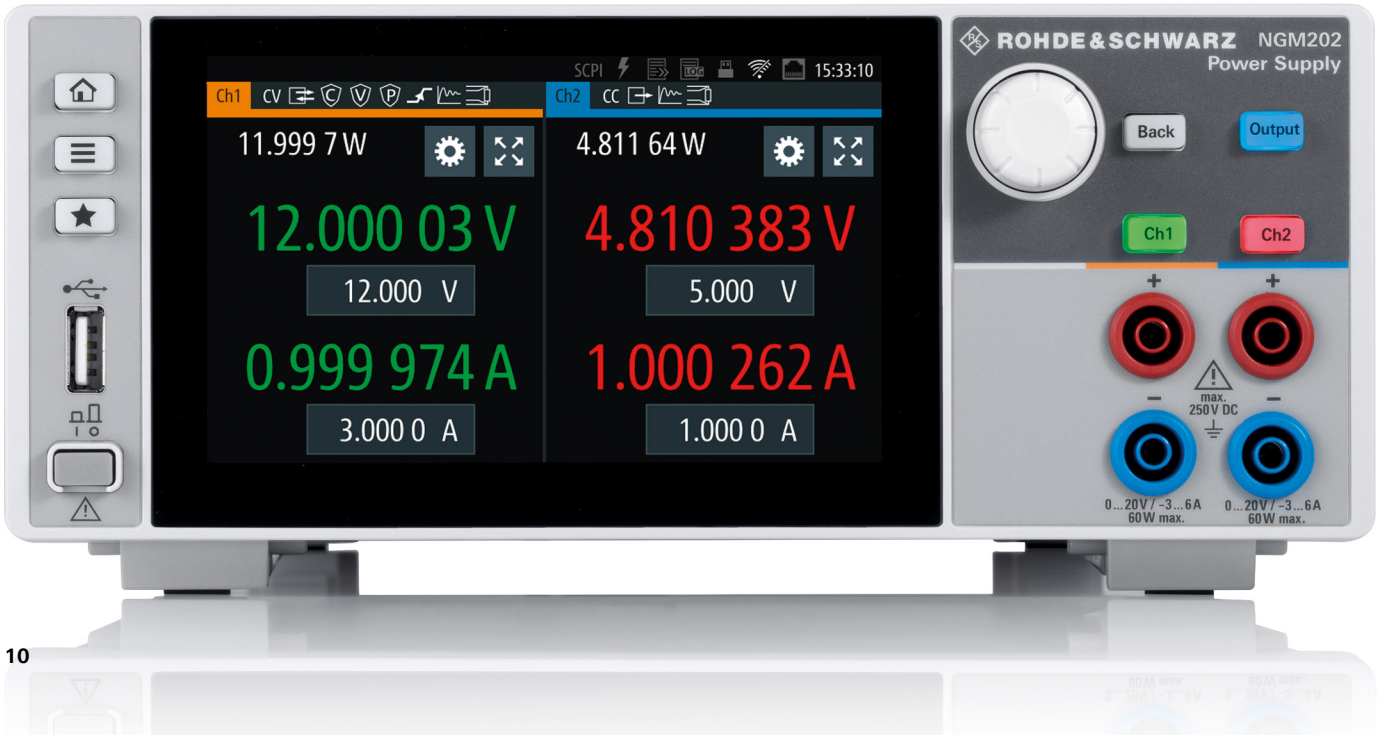
With a very high resolution of 800 × 480 pixel, the display sets new standards for power supplies. This makes it easy to read the voltage and current values, even at long distances. A variety of additional information such as power values and statistics can also be displayed. Icons clearly show the status of the actual configuration.

Color coding of operating modes

Colors are used to indicate the different modes. For example, active channels in constant voltage mode light up green, while red is used for constant current mode. When the power supply is in constant resistance mode, the numbers are displayed in cyan.

Each of the R&S®NGM202 channels can be selected individually using the channel keys. The Output button is used to switch the selected channels on or off. The button lights up blue when it is switched on.

All settings and operating modes are easy to read. When the power supply is in constant voltage mode, the numbers and the buttons light up green. Red is used for constant current mode. The Output button lights up blue to indicate that channels are switched on (active).



QuickArb function

Some applications require the voltage or the current to be varied during a test sequence, for example when simulating different charging conditions of a battery. The Arb function allows users to manually configure time/voltage or time/current sequences via the user interface or to program them via external interfaces.

Other power supplies also offer an Arb function, but the QuickArb function of the R&S®NGM200 power supplies sets new standards. More points (4096 points) are supported per cycle. It is also possible to interpolate between the discrete points and select whether the sequence of voltage values 1 V – 2 V – 3 V is to be run as steps, or whether the voltage values are to be increased using linear interpolation.

Arb sequences can be programmed to run much faster with the R&S®NGM200 than with other power supplies.

The dwell time for a single voltage or current value can be set with a resolution of up to 1 ms. This makes it possible to program very short drops in voltage to test the power-up behavior of a DUT. The dwell times can also be set in the range of hours to implement test sequences extending over days or weeks for long-term testing.

EasyRamp function

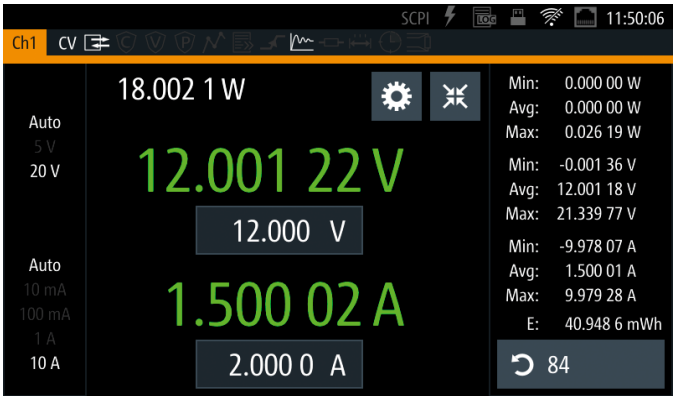
Sometimes test sequences have to simulate operating conditions where the abrupt rise of the supply voltage has to be avoided. The EasyRamp function of the R&S®NGM200 power supplies provides the solution. The output voltage can be increased continuously within a time frame of 10 ms to 10 s. The EasyRamp function can be operated both manually and remotely.

Save and recall instrument settings

The save and recall functions make it easy to save and recall frequently used settings.

Numerical values can be entered using the virtual touchscreen keyboard or the rotary knob.

The large high-resolution display makes it easy to read the voltage and current values (even at great distances) and provides a lot of additional information.



IDEAL FOR USE IN LABS AND TEST SYSTEMS

Tailored for use in labs and system racks

The R&S®NGM200 power supplies are the right choice for challenging applications. They are used in R&D labs and integrated into production test systems.

The power supplies can be installed in 19" racks using the R&S®HZN96 rack adapter. Connectors on the rear panel and a compact design are important criteria for use in test systems.

Remote sensing

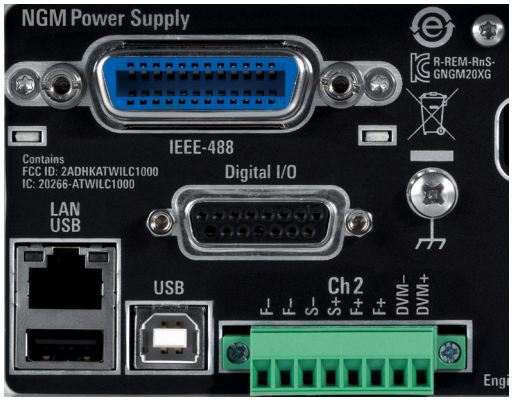
There is often a significant voltage drop over the supply leads, especially in applications with high current consumption. Since power supplies usually maintain a constant output voltage, the voltage on the DUT will be lower than the voltage displayed on the power supply. The remote sensing function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

The connectors for the sense lines are located on the rear panel. The R&S®NGM201 also has sense line connectors on the front panel.

Front and rear connectors

The safety sockets on the front panel of the R&S®NGM200 power supplies are designed for 4 mm banana plugs. Additional connections for all channels (including sense lines) are provided on the rear panel to simplify use in rack systems.

All connections are also provided on the rear panel
(example: R&S®NGM202 with IEEE-488 option installed).



Digital inputs and outputs are optionally available. They can be used as trigger/inhibit inputs and control/fault outputs. The hardware of the R&S®NGM-K103 option is preinstalled. The function can be activated using a keycode (to be ordered separately).

Full remote capabilities

For use in test systems, the R&S®NGM200 power supply series can be remotely controlled. The following interfaces are available.

USB and LAN

USB and LAN (Ethernet) interfaces are installed as standard. All supply parameters can be remotely controlled via these interfaces.

Wireless LAN (R&S®NGM-K102 option)

As an alternative, the R&S®NGM200 power supplies can be remotely controlled via the WLAN interface. The WLAN module, which is activated by keycode (to be ordered separately), supports CLIENT mode, which means that the power supplies automatically connect to a network.
Note: The WLAN function is not available in all regions due to country-specific regulations.

IEEE-488 (GPIB) interface (R&S®NGM-B105 option)

The R&S®NGM-B105 interface with an IEEE-488 (GPIB) port is available as an option that can be ordered ex-factory.

Fast on the bus and on the bench

Complicated measurement sequences require ever faster setting, measuring and command processing times. The R&S®NGM200 power supplies meet these needs. Thanks to a state-of-the-art multicore architecture, they not only process control commands much faster than conventional power supplies, they process them internally in parallel. Users benefit from this in ATE systems. There are also advantages in manual operation, such as faster sequences in Arb mode.

Advanced instrument design: compact form factor, quiet operation

There is never enough space on the bench or in the rack. The R&S®NGM200 power supplies take up very little space thanks to their compact design.

Since the built-in fan is temperature-controlled, it often runs at a low speed or powers down completely, resulting in very low operating noise.

SPECIFICATIONS

Definitions

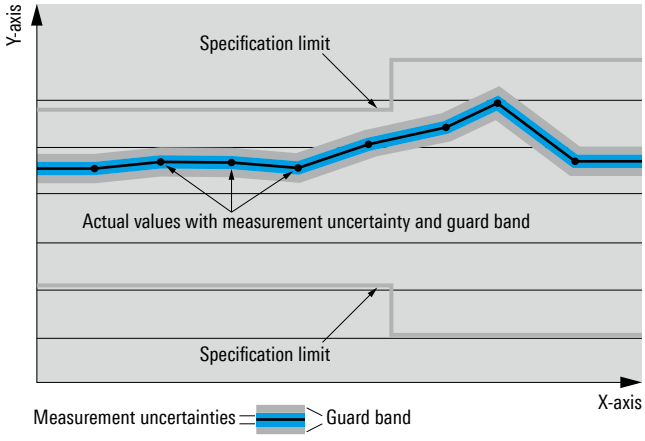
General

Product data applies under the following conditions:

- Three hours storage at ambient temperature followed by 30 minutes warm-up operation
- 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 <, ≤, >, ≥, ±, 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 Mcps (million chips per second), whereas bit rates and symbol rates are specified in Mbps (million bits per second), kbps (thousand bits per second), Msps (million symbols per second) or ksps (thousand symbols per second), and sample rates are specified in Msample/s (million samples per second). Mcps, Mbps, Msps, kbps, ksps and Msample/s are not SI units.

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

Electrical specifications		
Outputs	The channel outputs are galvanically isolated and not connected to ground.	
Number of output channels	R&S®NGM201	1
	R&S®NGM202	2
Total output power	R&S®NGM201	max. 60 W
	R&S®NGM202	max. 120 W
Maximum output power per channel		60 W
Output voltage per channel		0 V to 20 V
Maximum output current per channel	≤ 6 V output voltage	6 A
	> 6 V output voltage	3 A
Maximum voltage in serial operation	R&S®NGM202	40 V
Maximum current in parallel operation	R&S®NGM202, ≤ 6 V output voltage	12 A
	R&S®NGM202, > 6 V output voltage	6 A
Adjustable output impedance		–50 mΩ to 100 Ω
Increments		1 mΩ
Recovery time	≤ 2 Ω, resistive load	< 200 µs
	> 2 Ω, resistive load	< 10 ms
Voltage ripple and noise	20 Hz to 20 MHz	< 500 µV (RMS), < 2 mV (peak-to-peak) (meas.)
Current ripple and noise	20 Hz to 20 MHz	< 1 mA (RMS) (meas.)
Electronic load		yes, R&S®NGM202: both channels
Maximum sink power	R&S®NGM201	60 W
	R&S®NGM202	120 W (60 W per channel)[1]
Maximum sink current per channel		3 A
Sink modes		constant voltage, constant current, constant resistance
Constant resistance range		0 Ω to 10 kΩ (0.1 Ω increments)
Load regulation	load change: 10 % to 90 %	
Voltage	±(% of output + offset)	< 0.01 % + 1 mV
Current	±(% of output + offset)	< 0.01 % + 0.1 mA
Load recovery time	regulation to within ±20 mV of the set voltage	< 30 µs (meas.)
Rise time	10 % to 90 % of rated output voltage, resistive load	full load: < 125 µs no load: < 125 µs
Fall time	90 % to 10 % of rated output voltage, resistive load	full load: < 125 µs no load: < 125 µs
Programming resolution		
Voltage		1 mV
Current		0.1 mA
Programming accuracy		
Voltage	±(% of setting + offset)	< 0.02 % + 3 mV
Current	±(% of setting + offset)	< 0.05 % + 2 mA

[1] Time limited at an operating temperature of > 30 °C and total power > 90 W.

Output measurements		
Measurement functions		voltage, current, power, energy
Readback resolution		
Voltage		20 V range: 10 µV 5 V range: 5 µV
Current		10 A range: 10 µA 1 A range: 1 µA 100 mA range: 100 nA 10 mA range: 10 nA
Readback accuracy		
Voltage	±(% of output + offset)	20 V range: < 0.02 % + 2 mV 5 V range: < 0.02 % + 500 µV
Current	±(% of output + offset)	10 A range: < 0.05 % + 250 µA 1 A range: < 0.05 % + 1 mA 100 mA range: < 0.05 % + 100 µA 10 mA range: < 0.05 % + 15 µA
Temperature coefficient (per °C)	+5 °C to +20 °C and +30 °C to +40 °C	
Voltage		0.15 × specification/°C
Current		0.15 × specification/°C
Remote sensing		yes, R&S®NGM202: both channels
Maximum sense compensation		2 V (meas.)

Ratings		
Maximum voltage to ground		250 V DC
Maximum counter voltage	voltage with the same polarity connected to the outputs	22 V
Maximum reverse voltage	voltage with opposite polarity connected to the outputs	0.5 V
Maximum reverse current	for 5 minutes max.	1 A

Remote control		
Command processing time		typ. < 6 ms

Protection functions		
Overvoltage protection		adjustable, R&S®NGM202: both channels
Programming resolution		1 mV
Overpower protection		adjustable, R&S®NGM202: both channels
Overcurrent protection (electronic fuse)		adjustable, R&S®NGM202: both channels
Programming resolution		0.1 mA
Response time	(I_{load} > I_{resp} × 2) at I_{load} ≥ 2 A	< 1.5 ms
Fuse linking (FuseLink function)	R&S®NGM202	yes
Fuse delay at output-on	for R&S®NGM202: both channels	0 ms to 10 s (1 ms increments)
Fuse delay time	for R&S®NGM202: both channels	0 ms to 10 s (1 ms increments)
Overtemperature protection		yes

Special functions		
Output ramp function		EasyRamp
EasyRamp time		10 ms to 10 s (10 ms increments)
Output delay		
Synchronicity	R&S®NGM202	typ. < 25 µs
Delay per channel		1 ms to 10 s (1 ms increments)

Special functions		
Arbitrary function		QuickArb
Parameters		voltage, current, time
Maximum number of points		4096
Dwell time		1 ms to 20 h (1 ms increments)
Repetition		continuous or burst mode with 1 to 65535 repetitions
Trigger		manually via the keyboard, via remote control or via optional interface
Statistics (sampling time)	voltage	minimum, maximum, average (2 µs)
	current	minimum, maximum, average (2 µs)
	power	minimum, maximum, average (2 µs)
	energy	(64 ms)
Digital trigger and control interfaces		digital I/O, R&S®NGM-K103
Maximum voltage (IN/OUT)		24 V
Pull-up resistors (IN/OUT)	connected to 3.3 V	20 kΩ
Input level	low	< 0.8 V
	high	> 2.4 V
Maximum drain current (OUT)		500 mA
Data logging standard mode		
Maximum acquisition rate	each recorded sample is the average of 50000 measured values [2]	10 sample/s
Memory depth		internal 800 Mbyte or external memory size
Voltage resolution		see readback resolution
Voltage accuracy		see readback accuracy
Current resolution		see readback resolution
Current accuracy		see readback accuracy
Data logging fast mode		FastLog
Maximum acquisition rate	for voltage, current, DVM input	500 ksample/s (2 µs)
Memory depth		external memory size
Voltage resolution		20 V range: 20 µV 5 V range: 5 µV DVM input: 30 µV
Voltage accuracy	±(% of output + offset)	20 V range: < 0.02 % + 2 mV 5 V range: < 0.02 % + 500 µV DVM input: < 0.02 % + 2 mV
Current resolution		10 A range: 20 µA 1 A range: 2 µA 100 mA range: 200 nA 10 mA range: 20 nA
Current accuracy	±(% of output + offset)	10 A range: < 0.05 % + 2.5 mA 1 A range: < 0.05 % + 1 mA 100 mA range: < 0.05 % + 100 µA 10 mA range: < 0.05 % + 15 µA
Digital voltmeter input		optional, R&S®NGM-K104
DVM voltage		–5 V to +23 V
DVM accuracy	±(% of output + offset)	< 0.02 % + 2 mV

Display and interfaces		
Display		TFT 5" 800 × 480 pixel WVGA touch
Front panel connections	R&S®NGM201	4 mm safety sockets (channels, sense)
	R&S®NGM202	4 mm safety sockets (channels)
Rear panel connections		8-pin connector block per channel
Remote control interfaces	standard	USB-TMC, USB-CDC (virtual COM port),
		LAN
	R&S®NGM-K102	WLAN
	R&S®NGM-B105	IEEE-488 (GPIB)

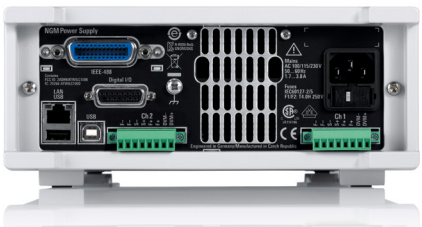
[2] 20 V range or 10 A range: 12500 measured values.

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/115 V/230 V (± 10 %)
Mains frequency		50 Hz to 60 Hz
Maximum power consumption		400 W
Mains fuses		2 × T4.0H/250 V
Product conformity		
Electromagnetic compatibility	EU: in line with Radio Equipment Directive 2014/53/EU	applied standards: ► ETSI EN 300328 V2.1.1 ► EN 61326-1 ► EN 55011 (Class A) ► EN 55032 (Class A) ► ETSI EN 301489-1 V2.2.0 ► ETSI EN 301489-17 V3.2.0
	Korea	KC mark
Electrical safety	EU: in line with Low Voltage Directive 2014/35/EU	applied harmonized standards: EN 61010-1
	USA, Canada	CSA-C22.2 No. 61010-1
WLAN approvals	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	CE0682
	Singapore	iMDA standards DB102020
	USA, Canada	FCC, IC
RoHS	in line with EU Directive 2011/65/EU	EN 50581
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
	wideband noise	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	222 mm × 97 mm × 436 mm (8.74 in × 3.82 in × 17.17 in)
Weight	R&S®NGM201	7.2 kg (15.9 lb)
	R&S®NGM202	7.4 kg (16.3 lb)
Rack installation		R&S®HZN96 option
Recommended calibration interval	operation 40 h/week over entire range of specified environmental conditions	1 year

R&S®NGM201, front view

R&S®NGM202, front view

R&S®NGM202, rear view



ORDERING INFORMATION

Designation	Type	Order No.
Base unit		
Single-channel power supply	R&S®NGM201	3638.4472.02
Two-channel power supply	R&S®NGM202	3638.4472.03
Accessories supplied		
Set of power cables, quick start guide		
Options		
Remote control via wireless LAN	R&S®NGM-K102	3644.6367.02
Digital trigger I/O	R&S®NGM-K103	3643.9904.02
Digital voltmeter functionality	R&S®NGM-K104	3643.9927.02
IEEE-488 (GPIB) interface	R&S®NGM-B105	3641.6220.02
Battery simulation	R&S®NGM-K106	3636.6626.02
System components		
19" rack adapter, 2 HU	R&S®HZN96	3638.7813.02

Warranty		
Base unit		3 years
All other items [1]		1 year
Options		
Extended warranty, one year	R&S®WE1	Please contact your local Rohde&Schwarz sales office.
Extended warranty, two years	R&S®WE2	
Extended warranty with calibration coverage, one year	R&S®CW1	
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 [2] 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 [2] 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 [2] and accredited calibration at the recommended intervals as well as any accredited calibration carried out during repairs or option upgrades.

[1] For options that are installed, the remaining base unit warranty applies if longer than 1 year. Exception: all batteries have a 1 year warranty.
[2] Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.

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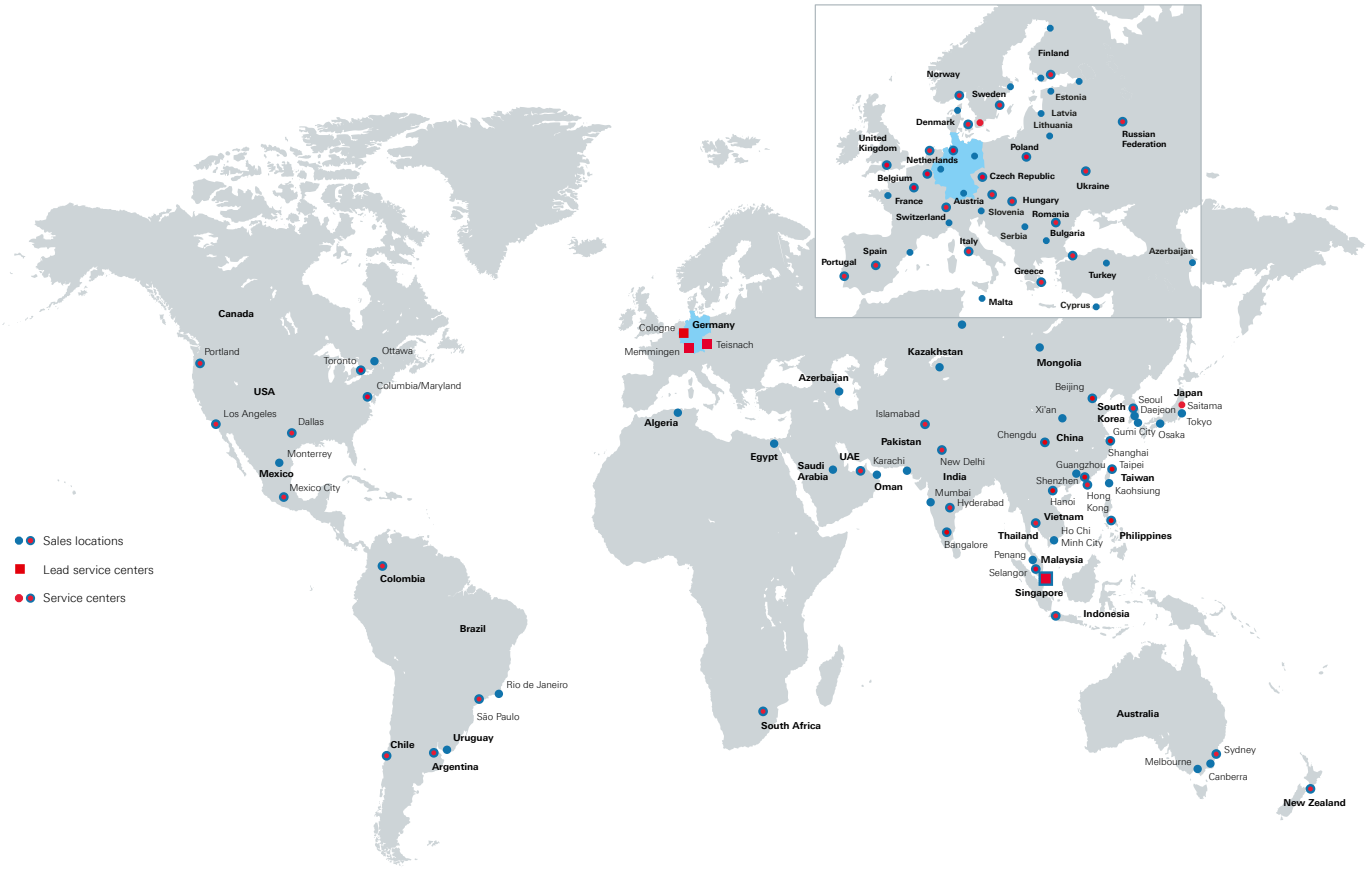

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