

R&S® NGA100 Power Supply Series Getting Started

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Version 13

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This manual describes the following R&S®NGA100 models with firmware version 1.00 and higher:

- R&S®NGA101 One-Channel 35V/6A Power Supply 40 W (5601.8002.02)
- R&S®NGA102 Two-Channel 35V/6A Power Supply 80 W (5601.8002.04)
- R&S®NGA141 One-Channel 100V/2A Power Supply 40 W (5601.8002.03)
- R&S®NGA142 Two-Channel 100V/2A Power Supply 80 W (5601.8002.05)

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Muehldorfstr. 15, 81671 Muenchen, Germany

Phone: +49 89 41 29 - 0

Email: info@rohde-schwarz.com

Internet: www.rohde-schwarz.com

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5601.8902.02 | Version 13 | R&S®NGA100

Throughout this manual, products from Rohde & Schwarz are indicated without the ® symbol, e.g. R&S®NGA is indicated as R&S NGA100.

Contents

1 Safety and regulatory information.....	5
1.1 Safety instructions.....	6
1.2 Labels on R&S NGA100.....	9
1.3 Warning messages in the documentation.....	10
1.4 Korea certification class A.....	11
2 Documentation overview.....	12
2.1 Manuals.....	12
2.2 Data sheet.....	13
2.3 Calibration certificate.....	13
2.4 Release notes, open source acknowledgment (OSA).....	13
2.5 Application notes, application cards, white paper, etc.....	13
2.6 Remote control driver.....	14
3 Welcome to R&S NGA100.....	15
4 Preparing for use.....	16
4.1 Lifting and carrying.....	16
4.2 Unpacking and checking.....	16
4.3 Choosing the operating site.....	17
4.4 Setting up the R&S NGA100.....	17
4.5 Considerations for test setup.....	20
4.6 Connecting to power.....	22
4.7 Switching on or off.....	24
4.8 Connecting to LAN.....	25
4.9 Connecting USB devices.....	26
5 Instrument tour.....	27

5.1 Front panel.....	27
5.2 Rear panel.....	30
5.3 Bottom panel.....	32
6 Trying out the instrument.....	34
6.1 Selecting the channels.....	34
6.2 Setting the output voltage and current limits.....	34
6.3 Activating the channel output.....	35
6.4 Storing/Recalling of instrument settings.....	35
7 Instrument control.....	36
7.1 Ways to operate the instrument.....	36
7.2 Means of manual interaction.....	36
7.3 Remote control.....	46
8 Contacting customer support.....	47

1 Safety and regulatory information

The product documentation helps you use the product safely and efficiently. Follow the instructions provided here and in the following chapters.

Intended use

The product is intended for the development, production and verification of electronic components and devices in industrial, administrative, and laboratory environments by personnel familiar with the potential risks of measuring electrical quantities.

Use the product only for its designated purpose. Observe the operating conditions and performance limits stated in the data sheet.

Target audience

Only connect, set up and use a power supply if you are an electrically skilled person. Electrically skilled persons have the relevant education and experience to enable them to perceive risks and to avoid hazards that electricity can cause.

This document targets at all users, including installers, operators, technicians, maintenance and service personnel.

Follow the safety instructions provided in [Chapter 1.1, "Safety instructions"](#), on page 6 and the additional information provided during setup or operation procedures.

Where do I find safety information?

Safety information is part of the product documentation. It warns you of potential dangers and gives instructions on how to prevent personal injury or damage caused by dangerous situations. Safety information is provided as follows:

- In [Chapter 1.1, "Safety instructions"](#), on page 6. The same information is provided in many languages as printed "Safety Instructions". The printed "Safety Instructions" are delivered with the product.
- Throughout the documentation, safety instructions are provided when you need to take care during setup or operation.

1.1 Safety instructions

Products from the Rohde & Schwarz group of companies are manufactured according to the highest technical standards. To use the products safely, follow the instructions provided here and in the product documentation. Keep the product documentation nearby and offer it to other users.

Use the product only for its intended use and within its performance limits. Intended use and limits are described in the product documentation such as the data sheet, manuals and the printed "Safety Instructions". If you are unsure about the appropriate use, contact Rohde & Schwarz customer service.

Only people skilled in electrical work should connect, set up and use the product. Such persons have the education and experience needed to recognize risks and avoid hazards of working with electricity. These users also need sound knowledge of at least one of the languages in which the user interfaces and the product documentation are available.

Reconfigure or adjust the product only as described in the product documentation or the data sheet. Any other modifications can affect safety and are not permitted.

Never open the casing of the product. Only service personnel authorized by Rohde & Schwarz are allowed to repair the product. If any part of the product is damaged or broken, stop using the product. Contact Rohde & Schwarz customer service at <https://www.rohde-schwarz.com/support>.

Lifting and carrying the product

Look up the maximum weight in the data sheet. A single person can only carry a maximum of 18 kg safely depending on age, gender and physical condition. If your product is heavier than 18 kg, do not move or carry it by yourself.

To move the product safely, you can use lifting or transporting equipment such as lift trucks and forklifts. Follow the instructions provided by the equipment manufacturer.

Choosing the operating site

Only use the product indoors. The product casing is not waterproof. Water that enters can electrically connect the casing to live parts, which can lead to electric shock, serious personal injury or death if you touch the casing.

Unless otherwise specified, you can operate the product up to an altitude of 2000 m above sea level. The product is suitable for pollution degree 2 environ-

ments where nonconductive contamination can occur. For more information on environmental conditions such as ambient temperature and humidity, see the data sheet.

Setting up the product

Always place the product on a stable, flat and level surface with the bottom of the product facing down. If the product is designed for different positions, secure the product so that it cannot fall over.

If the product has foldable feet, always fold the feet completely in or out to ensure stability. The feet can collapse if they are not folded out completely or if the product is moved without lifting it. The foldable feet are designed to carry the weight of the product, but not an extra load.

If stacking is possible, keep in mind that a stack of products can fall over and cause injury.

If you mount products in a rack, ensure that the rack has sufficient load capacity and stability. Observe the specifications of the rack manufacturer. Always install the products from the bottom shelf to the top shelf so that the rack stands securely. Secure the product so that it cannot fall off the rack.

Connecting to power

The product is an overvoltage category II product. Connect the product to a fixed installation used to supply energy-consuming equipment such as household appliances and similar loads. Keep in mind that electrically powered products have risks, such as electric shock, fire, personal injury or even death. Replace parts that are relevant to safety only by original parts, e.g. power cables or fuses.

Take the following measures for your safety:

- Before switching on the product, ensure that the voltage and frequency indicated on the product match the available power source. If the power adapter does not adjust automatically, set the correct value and check the rating of the fuse.
- If a product has an exchangeable fuse, its type and characteristics are indicated next to the fuse holder. Before changing the fuse, switch off the product and disconnect it from the power source. How to change the fuse is described in the product documentation.
- Only use the power cable delivered with the product. It complies with country-specific safety requirements. Only insert the plug into an outlet with protective conductor terminal.

- Only use intact cables and route them carefully so that they cannot be damaged. Check the power cables regularly to ensure that they are undamaged. Also ensure that nobody can trip over loose cables.
- Only connect the product to a power source with the safety fuse specified in the data sheet.
- Ensure that you can disconnect the product from the power source at any time. Pull the power plug to disconnect the product. The power plug must be easily accessible. If the product is integrated into a system that does not meet these requirements, provide an easily accessible circuit breaker at the system level.

Working with hazardous voltages

Voltages higher than 30 V RMS, or 42 V peak, or 60 V DC are regarded as hazardous contact voltages. Direct contact with them can cause serious injuries.

When working with hazardous contact voltages, use protective measures to preclude direct contact with the measurement setup:

- Before each measurement, inspect all components for damage and replace them if necessary.
- Do not touch exposed connections and components when power is applied.
- Casing, chassis and all measuring terminals are connected to a grounding connection. Never disconnect a grounding connection on the product.
- Switch off the power before connecting or disconnecting the terminal block to the rear panel connector. Tighten all wires connected to the terminal block.
- Only use the wires and terminal blocks delivered with the product.
- Only use insulated wires, not stripped wires, for the terminal connections.
- Turn the mains switch off when the product is not in use.
- When operating measuring accessories, only use the cables delivered with the accessory. If you have to use cables from other manufacturers, make sure that they are of the required overvoltage category.

Do not operate the product in series or parallel unless that setup is supported. If accessories are provided for a product, only use them for that product. See the data sheet.

In series or parallel setups, protect yourself against electric shock before connecting access ports such as the Ethernet port or the USB port using one of the following measures:

- Ensure that all products are grounded by connecting them to the AC power.
- Disconnect all power connections to the product, including outputs.

Measurement categories

IEC 61010-2-030 defines measurement categories that rate products on their ability to resist short transient overvoltages that occur in addition to the working voltage.





This product is designed for measuring within measurement category 0 only. Measurements in this category are performed on circuits not directly connected to mains, such as electronics, battery powered circuits, and specially protected secondary circuits. This measurement category is also known as CAT I.

Cleaning the product

Use a dry, lint-free cloth to clean the product. When cleaning, keep in mind that the casing is not waterproof. Do not use liquid cleaning agents.

Meaning of safety labels

Safety labels on the product warn against potential hazards.

	Potential hazard Read the product documentation to avoid personal injury or product damage.
	Electrical hazard Indicates live parts. Risk of electric shock, fire, personal injury or even death.
	Hot surface Do not touch. Risk of skin burns. Risk of fire.
	Protective conductor terminal Connect this terminal to a grounded external conductor or to protective ground. This connection protects you against electric shock if an electric problem occurs.

1.2 Labels on R&S NGA100






Labels on the casing inform about:

- Personal safety, see ["Meaning of safety labels"](#) on page 9.
- Product and environment safety, see [Table 1-1](#).

Warning messages in the documentation

- Device information is provided on a sticker attached to the [rear panel](#) of R&S NGA100. The sticker contains a barcode and the device ID. The device ID is a combination of the order number and the serial number.

Table 1-1: Labels regarding R&S NGA100 and environment safety

	Labeling in line with EN 50419 for disposal of electrical and electronic equipment after the product has come to the end of its service life. For more information, see the product user manual, chapter "Disposal".
	Grounding terminal (earth ground contact)
	ON (supply voltage)
	OFF (supply voltage)
	Chassis grounding terminal

1.3 Warning messages in the documentation

A warning message points out a risk or danger that you need to be aware of. The signal word indicates the severity of the safety hazard and how likely it will occur if you do not follow the safety precautions.

DANGER

Imminently hazardous situation. Will result in death or serious injury if not avoided.

WARNING

Potentially hazardous situation. Could result in death or serious injury if not avoided.

CAUTION

Potentially hazardous situation. Could result in minor or moderate injury if not avoided.

NOTICE

Potential risks of damage. Could result in damage to the supported product or to other property.

1.4 Korea certification class A

이 기기는 업무용(A급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

2 Documentation overview

This section provides an overview of the R&S NGA100 user documentation.

2.1 Manuals

You find the documents on the R&S NGA100 product page at:

www.rohde-schwarz.com/manual/nga100

Getting started

Introduces the R&S NGA100 power supply series and describes how to set up and start working with the instrument. The printed document is delivered with the instrument.

User manual

Contains the description of all instrument modes and functions. It also provides an introduction to remote control, a complete description of the remote control commands with programming examples, and information on maintenance and instrument interfaces. Includes the contents of the getting started manual.

The *online version* of the user manual provides the complete contents for immediate display on the internet.

In addition to the user manual, there is a separate R&S HMEexplorer software user manual. This manual contains an overview of all supported instruments, information on how to set up R&S HMEexplorer and detailed description of individual software modules: SCPI terminal program with script function, EMC precompliance software, software for storing instrument settings and create screenshots, CSV software and arbitrary software.

Printed safety instructions

Provides safety information in many languages. The printed document is delivered with the product.

Application notes, application cards, white paper, etc.

Instrument security procedures manual

Deals with security issues when working with the R&S NGA100 in secure areas. It is available for download on the internet.

2.2 Data sheet

The datasheet contains the technical specifications of the R&S NGA100 power supply series. It also lists all options with their order numbers and accessories.

See www.rohde-schwarz.com/brochure-datasheet/nga100

2.3 Calibration certificate

The document is available on <https://gloris.rohde-schwarz.com/calcert>. You need the device ID of your instrument, which you can find on a label on the rear panel.

2.4 Release notes, open source acknowledgment (OSA)

The release notes list new features, improvements and known issues of the current firmware version, and describe the firmware installation. The open source acknowledgment document provides verbatim license texts of the used open source software. It can also be downloaded from the instrument.

See www.rohde-schwarz.com/firmware/nga100

2.5 Application notes, application cards, white paper, etc.

These documents contain information about possible applications and background information on various topics:

www.rohde-schwarz.com/application/nga100

2.6 Remote control driver

The instrument drivers enable remote control via the corresponding interfaces. The drivers and installation instructions are available for download on the product page at:

www.rohde-schwarz.com/driver/nga100

3 Welcome to R&S NGA100

The one-channel or two-channel power supply series are based on a classical transformer concept with high efficiency electronic pre-regulators and secondary linear regulators. This concept allows the instrument to achieve the high output power within a minimum space, high efficiency and lowest residual ripple.

The R&S NGA100 power supply series feature galvanically isolated, floating over-load and short-circuit proof outputs with adjustable power ratings. The outputs can be connected in series or in parallel, thus making high currents and voltages available.

Multi-purpose protection functions are available for each channel which you can set separately, such as overcurrent protection (FUSE), overvoltage protection (OVP), overpower protection (OPP) and overtemperature protection (OTP). If such a limit is reached, the affected output channel is automatically turned off and an indicator message (FUSE, OVP, OPP or OTP) is displayed. The overcurrent protection can be linked to other channel (FuseLink function). In this case, all linked channels are turned off when the set channel reaches its limit.

The EasyArb function allows channel 1 (Ch 1) to have freely definable voltage and current sequences with a timeframe as short as 10 ms. It allows you to vary the voltage or current limit during a test sequence, for example to simulate different charging conditions of a battery. With EasyRamp function, the R&S NGA100 provides the operating condition to simulate the continuous rise of the supply voltage within a defined timeframe of 10 ms to 10 s.

Four data lines of the digital I/O interface are mutually independent and can be used as trigger input or trigger output separately. Various trigger conditions (e.g. fuse tripped, voltage, current, indicator messages) can be used to turn off, on or invert the output state when the trigger condition is met.

All R&S NGA100 power supply series are equipped with a color LCD display (320 x 240 pixels resolution). The R&S NGA100 comes with a USB interface and LAN interface.

This user manual contains a description of the functionalities that the instrument provides. The latest version is available for download at the product homepage (<http://www.rohde-schwarz.com/product/nga100>).

4 Preparing for use

Here, you can find basic information about setting up the product for the first time.

4.1 Lifting and carrying

See "[Lifting and carrying the product](#)" on page 6.

4.2 Unpacking and checking

1. Unpack the R&S NGA100 carefully.
2. Retain the original packing material. Use it when transporting or shipping the R&S NGA100 later.
3. Using the [delivery package](#) list, check the equipment for completeness.
4. Check the equipment for damage and loose parts.

If the delivery is incomplete or equipment is damaged, contact Rohde & Schwarz.

Delivery package

The delivery package contains the following items:

- R&S NGA100 power supply preloaded with two 230 V fuses
- Four power cables
- Two 115 V fuses (replace the preloaded fuses with these fuses depending on the mains voltage, see "[To replace the power fuse](#)" on page 23 for more information)
- One 5-pin plug (P/N: 3643.6463.00) for digital I/O port connections
- One 8-pin terminal block plug (P/N: 3660.3381.00) for output connections
- One Getting Started manual
- One document folder with multilingual safety instruction and CE certificate

4.3 Choosing the operating site

Specific operating conditions ensure proper operation and avoid damage to the product and connected devices. For information on environmental conditions such as ambient temperature and humidity, see the data sheet.

For safety information, see ["Choosing the operating site"](#) on page 6.

Electromagnetic compatibility classes

The electromagnetic compatibility (EMC) class indicates where you can operate the product. The EMC class of the product is given in the data sheet.

- Class B equipment is suitable for use in:
 - Residential environments
 - Environments that are directly connected to a low-voltage supply network that supplies residential buildings
- Class A equipment is intended for use in industrial environments. It can cause radio disturbances in residential environments due to possible conducted and radiated disturbances. It is therefore not suitable for class B environments. If class A equipment causes radio disturbances, take appropriate measures to eliminate them.

4.4 Setting up the R&S NGA100

Adequate air circulation must be ensured during operation. For continuous operation, a horizontal or inclined position (integrated stand) is preferable.

See also:

- ["Setting up the product"](#) on page 7
- ["Intended use"](#) on page 5

4.4.1 Placing the R&S NGA100 on a bench top

To place the product on a bench top

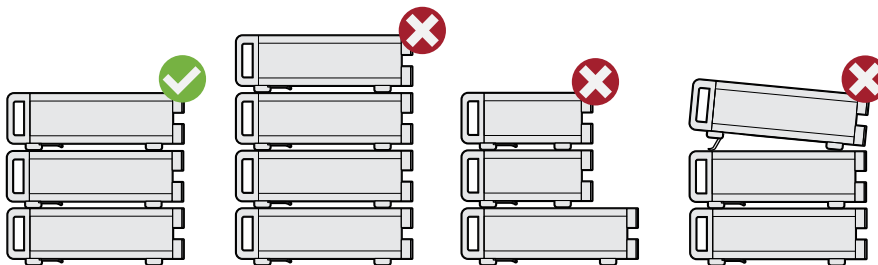
1. Place the product on a stable, flat and level surface. Ensure that the surface can support the weight of the product. For information on the weight, see the data sheet.
2. **CAUTION!** Foldable feet can collapse. For safety information, see "[Setting up the product](#)" on page 7.

Always fold the feet completely in or out. With folded-out feet, do not place anything on top or underneath the product.

3. **WARNING!** A stack of products can fall over and cause injury. Never stack more than three products on top of each other. Instead, mount them in a rack.

Stack as follows:

- If the products have foldable feet, fold them in completely.
- All products must have the same dimensions (width and length).
- Do not exceed a total load of 50 kg placed on the product at the bottom of the stack.



- Left = Stacked correctly
 Middle left = Stacked incorrectly, too many products
 Middle right = Stacked incorrectly, different dimensions
 Right = Stacked incorrectly, folded-out feet

4. **NOTICE!** Overheating can damage the product.

Prevent overheating as follows:

- Keep a minimum distance of 10 cm between the fan openings of the product and any object in the vicinity to provide sufficient airflow and ventilation.
- Do not place the product next to heat-generating equipment such as radiators or other products.

4.4.2 Mounting the R&S NGA100 in a rack

To prepare the rack

1. Observe the requirements and instructions in "[Setting up the product](#)" on page 7.
2. **NOTICE!** Insufficient airflow can cause overheating and damage the product. The heat produced inside the instrument is guided to the exterior via temperature-controlled fan. The R&S NGA100 has multiple temperature sensors which check the heat generation in the instrument and control the fan speed. It is necessary to ensure that there is sufficient space around the instrument sides for heat exchange. Ensure that fan openings and ventilation holes are unobstructed and airflow vents are unimpeded. If the temperature inside the instrument increases more than the allowed limit, overtemperature protection is triggered and the affected outputs are switched off automatically.

To mount the R&S NGA100 in a rack

1. Use an adapter kit that fits the dimensions of the R&S NGA100 to prepare the R&S NGA100 for rack mounting.
 - a) Order the R&S HZN96 rack adapter kit (P/N: 3638.7813.02) designed for the R&S NGA100.
 - b) Mount the adapter kit. Follow the assembly instructions provided with the adapter kit.
2. Lift the R&S NGA100 to shelf height.
3. Push the R&S NGA100 onto the shelf until the rack brackets fit closely to the rack.
4. Tighten all screws at the rack brackets with a tightening torque of 1.2 Nm to secure the R&S NGA100 at the rack.

To unmount the R&S NGA100 from a rack

1. Loosen the screws at the rack brackets.
2. Remove the R&S NGA100 from the rack.

Considerations for test setup

- If placing the R&S NGA100 on a bench top again, unmount the adapter kit from the R&S NGA100. Follow the instructions provided with the adapter kit.

4.5 Considerations for test setup

The product is built in compliance with DIN EN 61010-1 (VDC 0411 part 1), EN 61010-1 and IEC 61010-1. It is designed with the regulations of protection class 1, for supplying power-on circuits that are only indirectly connected to the low voltage mains or not connected at all.

The instrument is not intended for measurements within the measurement categories II, III or IV; the maximum potential against earth generated by the user must not exceed 250 VDC in this application.

See also "[Measurement categories](#)" on page 9.

General instrument specification

See [Table 4-1](#) for the general data on the instrument specification. Refer to the instrument data sheet for details.

Table 4-1: General data on instrument specification

Mains nominal voltage	AC	100 V / 115 V / 230 V ($\pm 10\%$) 50 Hz / 60 Hz
Power consumption	Maximum input power	230 W
Mains fuses (fuse size: 5 mm x 20 mm)	100 V / 115 V AC	IEC 60127 T5.0H250V
	230 V AC	IEC 60127 T2.5H250V
Temperature	Operating temperature range	5 °C to + 40 °C
	Storage temperature range	- 20 °C to + 70 °C
Humidity	Non-condensing	5 % to 80 %
Display		3.5 " (QVGA)
Rackmount capability		R&S HZN96 rack adapter 2U (P/N: 3638.7813.02)
Dimensions	W x H x D	222 mm x 96 mm x 446 mm (8.74 in x 3.78 in x 17.56 in)

Considerations for test setup

Weight	R&S NGA101, R&S NGA141	6.6 kg (14.55 lb), 6.9 kg (15.21 lb)
	R&S NGA102, R&S NGA142	7.0 kg (15.43 lb), 7.3 kg (16.09 lb)

Operating limits

The R&S NGA100 is equipped with a protective overload feature. The protective overload feature prevents damage to the instrument and is intended to protect against a possible electrical shock. The maximum values for the instrument must not be exceeded. The protection limits are listed on the front panel of the R&S NGA100 to ensure safe operation of the instrument.

See [Table 4-2](#) for protection limits of the R&S NGA100.

Table 4-2: Protection limits for R&S NGA100

Specification	Limits
Maximum output voltage	35 V module: 35.00 VDC 100 V module: 100.00 VDC
Maximum output current	35 V module: 6.0 100 V module: 2.0
Maximum voltage against earth	250 VDC
Maximum reverse voltage	35 V module: 36.00 VDC 100 V module: 102.00 VDC
Maximum inverse voltage	0.4 VDC
Maximum permitted current in case of inverse voltage	35 V module: 6.00 A 100 V module: 2.00 A
Power supply	100 VAC, 115 VAC or 230 VAC (tolerance $\pm 10\%$)
Frequency	50 Hz / 60 Hz
Maximum power output	40 W (R&S NGA101, R&S NGA141) 80 W (R&S NGA102, R&S NGA142)

Cable selection and electromagnetic interference (EMI)

Electromagnetic interference (EMI) can affect the measurement results.

To suppress electromagnetic radiation during operation:

- Use high-quality shielded cables, for example double shielded USB and LAN cables.

Connecting to power

- Use at least a CAT6+ LAN cables with a length ≤ 3 m and passive USB cable with a length ≤ 1 m.
- Use insulated wires for output supply/terminal connections.
- Always terminate open cable ends.
- Ensure that connected external devices comply with EMC regulations.
- Check regularly that all cables, including power cables are in perfect conditions.

Signal input and output levels

Information on voltage levels is provided in the data sheet. Keep the voltage levels within the specified ranges to avoid damage to the product and connected devices.

See also "[Output terminals](#)" on page 32.

4.6 Connecting to power

For safety information, see "[Connecting to power](#)" on page 7 and "[Working with hazardous voltages](#)" on page 8.

Before connecting the instrument to the mains, check whether the mains voltage conforms to the mains voltage range specified on the label located at the left of the [AC power connector](#).

Check also that the mains voltage corresponds to the [voltage selector](#) at the bottom panel.

The power supply module covers a wide power supply range and normally does not require adjustment. See [Table 4-1](#) for the supported mains voltage and the corresponding fuse types and ratings. If the power supply exceeds the permissible range, contact Rohde & Schwarz customer service.

To connect to power

1. Ground the R&S NGA100 using the ground terminal on the rear panel. See "[To connect to ground](#)" on page 23.
2. Plug the AC power cable into the AC power connector.
Use power cable that complies with the IEC 60320-1 standard.
3. Plug the AC power cable into a power outlet with ground contact.

The required ratings are listed next to the AC connector and in the data sheet.

To replace the power fuse

By default, the R&S NGA100 is preloaded with two time lag fuses (IEC 60127 T2.5H250V). The fuse holder is located below the AC power connector.

1. Disconnect the product from the power source by removing the power cable from the power plug on the rear panel of the R&S NGA100.

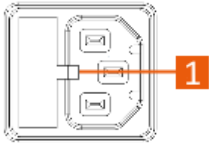


Figure 4-1: AC power connector

1 = Small notch of the fuse holder

2. Insert a flathead screwdriver in the small notch at the top of the fuse holder.
3. Lever out the fuse holder with the screwdriver.
4. Check the fuse rating on the caps of both fuses that you want to replace.
5. Once verified, insert the fuse into the groove of the fuse holder.
6. Return the fuse holder to its position in the panel.
The fuse holder is inserted against the spring pressure until it locks into place.

To connect to ground

If necessary, ground the instrument using the grounding connection \perp located at the [rear panel](#):

1. Unscrew the screw of the ground terminal using a cross-recess screw driver.
2. Attach a ground cable with a ring terminal and pass the screw through it.
3. Fasten the screw with a tightening torque of 1.2 Nm.
4. Connect the cable to ground.

4.7 Switching on or off

 Specifications with tolerance data apply after a warm-up period of at least 30 minutes at a temperature of 23 °C (tolerance -3 °C / +7 °C).

Before switching on the instrument, check that the [voltage selector](#) corresponds to the mains voltage. See [Table 4-1](#) for the available mains voltage.

See also [Chapter 4.6, "Connecting to power"](#), on page 22.

To switch on the product

The product is off but connected to power.


- ▶ Press the [Power] key on the [front panel](#) of the R&S NGA100.

The instrument performs a system check, boots the operating system and starts the R&S NGA100 firmware.

By default, the output channel is turned off when the instrument is switched on to prevent connected loads from being damaged unintentionally.

During startup, the R&S NGA100 is loaded with the last auto-saved parameters. See "Save and recall" in the user manual.

To disconnect R&S NGA100 from power

 For safety reason, switch off at the mains switch when the instrument is not in use.

1. Press [Power] key.
The operating system shuts down.
2. Disconnect the AC power cable from the socket outlet.

4.8 Connecting to LAN

To establish LAN connection

The R&S NGA100 provides Ethernet (LAN) connectivity. Provided the corresponding rights are assigned, you can use these interfaces for remote control and data transfer from a controller PC. The controller PC must also be connected in the network.

The LAN connector is at the [rear panel](#) of R&S NGA100.

1. **NOTICE!** Recommendation on secure operation. The R&S NGA100 is designed to operate at local workplaces or in secured networks (LAN). It should not be accessible from the internet because of a potential security risk, e.g. attackers could misuse or damage your device.

Always install the latest firmware.

By default, the R&S NGA100 configuration uses DHCP that assigns the IP address automatically.

2. Connect the LAN socket using an RJ-45 cable to the LAN.
3. **NOTICE!** If the R&S NGA100 cannot obtain an IP address automatically, or cannot establish the connection, the status shows "Disconnected" in the [Figure 4-2](#).

Possible reasons are that the LAN does not support DHCP or requires a specific TCP/IP configuration, or that the connection is missing.

To troubleshoot the problem, proceed as follows:

- a) Check if you have connected both, the R&S NGA100 and the controller PC to the LAN.
- b) Consult your network administrator to request support for an IP address, if necessary.
- c) If necessary, assign the IP address manually as described in chapter "LAN Connection" in the user manual.

If switched on and connected, the R&S NGA100 indicates the address information and LAN parameters in the Ethernet settings dialog. See [Figure 4-2](#).

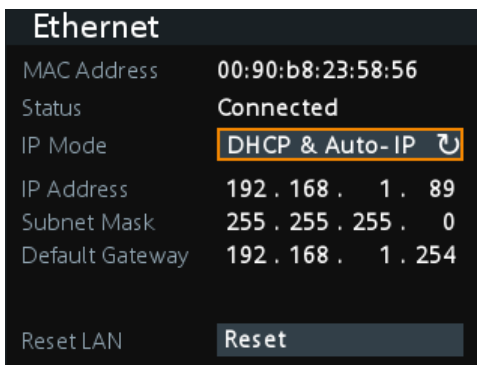


Figure 4-2: Ethernet settings dialog

4.9 Connecting USB devices

The USB Type-A connector is at the [front panel](#). You can connect or disconnect all USB devices from the R&S NGA100 during operation. But do not remove an external USB memory stick while the instrument is performing firmware update, data logging and storing of screen captures, since it leads to unsuccessful updates and loss of data.

To connect USB storage devices

USB storage devices, such as memory sticks, allow easy data transfer from or to the R&S NGA100. You can also use them for firmware updates.

- ▶ Connect the USB storage device to the USB type A connector.
If you use the front panel connectors, connect the USB storage device directly, without connecting cable. Connecting cables can cause electromagnetic radiation and impair the measurement result.

5 Instrument tour

The following sections help you to get familiar with the instrument and perform the first steps:

- [Chapter 5.1, "Front panel"](#), on page 27
- [Chapter 5.2, "Rear panel"](#), on page 30
- [Chapter 5.3, "Bottom panel"](#), on page 32

These sections explain the controls and connections on the front, rear and bottom of the R&S NGA100. For specifications of the interfaces, see the data sheet.

The meanings of the labels on the R&S NGA100 are described in [Chapter 1.2, "Labels on R&S NGA100"](#), on page 9.

5.1 Front panel

The front panel of the R&S NGA100 is as shown in [Figure 5-1](#). The function keys and navigation controls are located at the right side of the display. The various connectors are located below the display and function keys.

Table 5-1: Power supply models

Models	Number of output channels
R&S NGA101 (0 V - 35 V/6 A), R&S NGA141 (0 V - 100 V/2 A)	1 (maximum 40 W)
R&S NGA102 (0 V - 35 V/6 A), R&S NGA142 (0 V - 100 V/2 A)	2 (maximum 80 W)

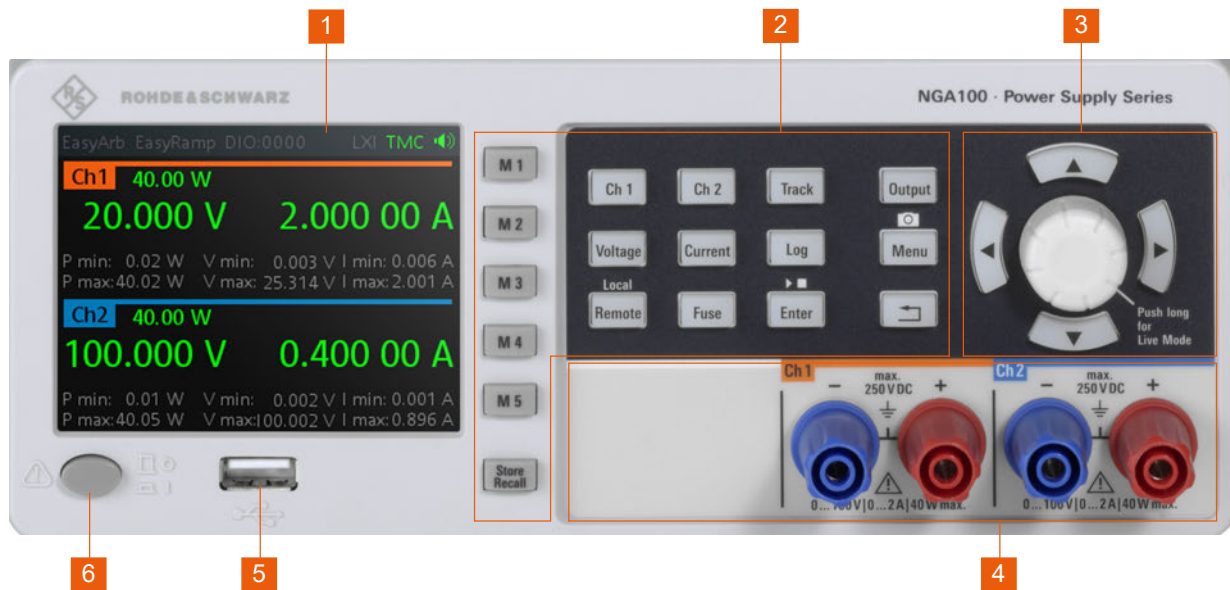


Figure 5-1: Front panel of R&S NGA100 with two channels

- 1 = Display
- 2 = Function keys
- 3 = Rotary knob and arrow keys
- 4 = Output channels (see [Table 5-1](#))
- 5 = USB connector
- 6 = Power key

Display (1)

The display is a color LCD screen. Depending on the instrument models, up to two channels are shown on the screen. The respective measurement settings and functions are displayed in the individual channel section. There is a status bar above the channel section to indicate the functions used and operation mode of the instrument.

For a detailed description on-screen layout, see [Chapter 7.2.1, "Understanding the display information"](#), on page 37.

Function keys (2)

Function keys are means of input for manual operation of the instrument functions. When a function key is pressed, all the related keys are also illuminated.

For detailed description on function keys, see chapter "Function Keys" in the user manual.

Rotary knob and arrow keys (3)

Rotary knob and arrow keys are means of navigation and adjustment. When pressed or rotated, they perform tasks like navigation around the screen, adjustment of parameter values or confirmation of entries.

For detailed description on rotary knob and arrow keys, see [Chapter 7.2, "Means of manual interaction"](#), on page 36.

Output channels (4)

Depending on the instrument models, up to two output channels are available for output of power to the connected load. See [Table 5-1](#).

See also "[Output terminals](#)" on page 32.

USB connector (5)

USB Type-A connector is provided for connecting a USB flash drive to perform firmware update, data logging and store screen captures.

The USB flash drive file system supports FAT32 only. See also [Chapter 4.9, "Connecting USB devices"](#), on page 26.

Power key (6)

The [Power] key switches the instrument on and off, see [Chapter 4.7, "Switching on or off"](#), on page 24.

5.2 Rear panel

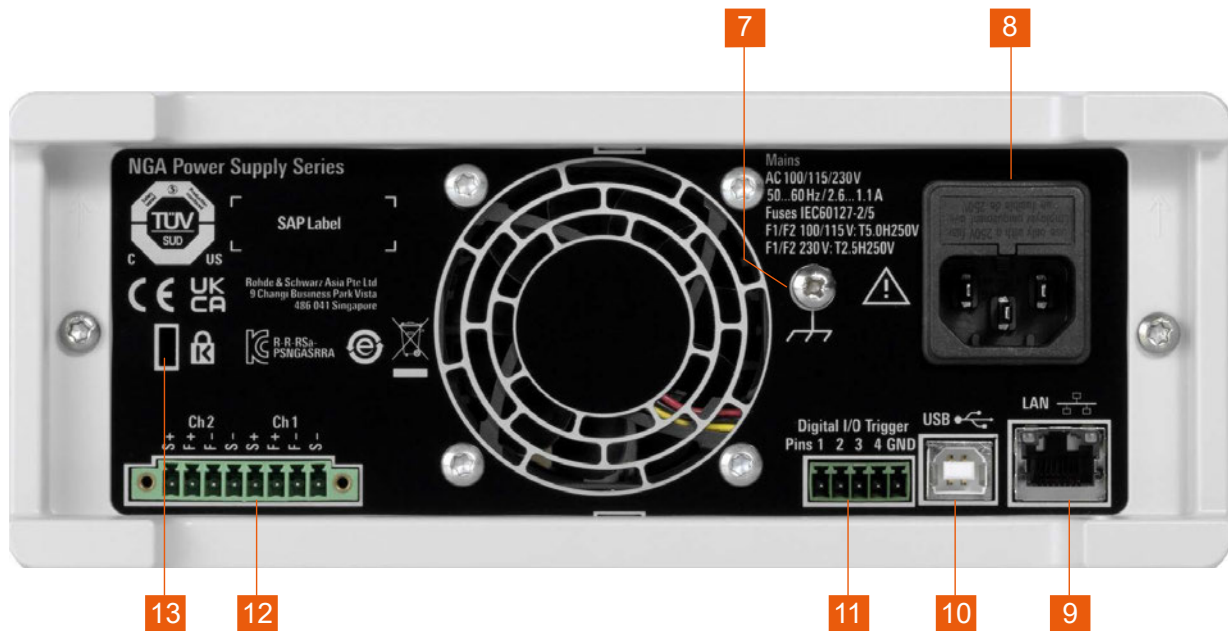


Figure 5-2: Rear panel of R&S NGA100

- 7 = Ground terminal
- 8 = AC inlet with fuse holder
- 9 = Ethernet (LAN) connector
- 10 = USB connector
- 11 = Digital I/O connector
- 12 = Rear panel connector
- 13 = Kensington lock

Ground terminal (7)

Protective ground terminal to secure the R&S NGA100, e.g. with a ground external conductor, see [Chapter 1.2, "Labels on R&S NGA100"](#), on page 9.

AC inlet with fuse holder (8)

Main supply cord

Use a detachable mains supply cord according to IEC60320-1 standard. Never use the product if the power cable is damaged.

Main power supply with fuse holder and IEC socket.

- Fuse holder

Socket for the fuse securing the line voltage. The fuse is factory fitted. See "[To replace the power fuse](#)" on page 23.

- IEC socket
Power supply connector for connecting the R&S NGA100 to the mains, see [Chapter 4.6, "Connecting to power"](#), on page 22.

Ethernet connector (9)

This connector is used for establishing remote control via SCPI. For more information on the connection setup, see [Chapter 4.8, "Connecting to LAN"](#), on page 25.

USB connector (10)

The USB connector is a Type-B connector for remote control operation via USB TMC or USB VCP.

For more information, see chapter "USB Connection" in the user manual.

Digital I/O connector (11)

NOTICE

Risk of instrument damage

Do not exceed the maximum voltage rating of the digital I/O pins (5.25 V max) when supplying voltages to the pins.

The digital I/O is a 5-pin terminal block for external trigger input or output.

Measurement control for digital I/O can be achieved with an external input signal or as an output signal to trigger other instruments for measurements.

The digital trigger I/O option (R&S NGA100-K103) must be installed for this function to be available in the instrument.

For more information, see chapter "Digital trigger I/O" in the user manual.

Rear panel connector (12)

NOTICE

Output terminals

Either the output terminals at the front panel or the rear panel connector at the back panel can be used.

Both terminals cannot be used at the same time as it can cause the instrument to malfunction.

The rear panel connector contains both output ("F+", "F-") and sense ("S+", "S-") connections. Connector for "Ch 2" is only available in the R&S NGA102, R&S NGA142 models.

1. **DANGER!** Shock Hazard. Risk of electric shock if AC power is turned on when connecting wires to the rear panel connector.
Turn off AC power when connecting wires to the rear panel connector.
2. Insert shielded wire to the pluggable terminal block.
3. Tightened all the wires with the screw on the pluggable terminal block.
4. Connect the pluggable terminal block to the output terminal.

Kensington security slot (13)

A Kensington lock can be anchored to the R&S NGA100 power supply housing to secure it to a workstation mechanically.

5.3 Bottom panel

The voltage selector is located at the bottom panel. On your first power-on connection, you should see a yellow label sticker attached over the [AC inlet](#). Before peeling off the yellow label sticker, make sure that the correct fuse rating is used for the mains voltage.

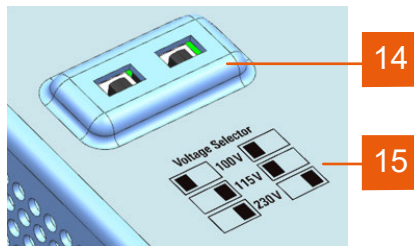


Figure 5-3: Bottom panel of R&S NGA100

14 = Voltage selector

15 = Voltage selector label

Voltage selector (14), Voltage selector label (15)

The voltage selector selects the mains voltage between 100 V, 115 V and 230 V. See [Table 4-1](#) for the fuse rating.

To set the correct fuse rating, use a tool e.g. a flat screwdriver to move the selector according to the voltage selector label.

- To select 100 V, slide both voltage selector to the left
- To select 115 V, slide both voltage selector facing inward
- To select 230 V, slide both voltage selector to the right

6 Trying out the instrument

This chapter describes some basic functions that you can perform with the R&S NGA100.

6.1 Selecting the channels

To select a channel, press the corresponding channel key. The selected channel key illuminates.

6.2 Setting the output voltage and current limits

To set the output voltage and current limit via live-mode:

1. Long press the rotary knob to enter into editing mode.
By default, the voltage at channel 1 is selected.
2. Use arrow keys to select the desired parameter (voltage or current).
3. Rotate the rotary knob to adjust value.
4. To exit live-mode, press the rotary knob.

Alternatively:

1. Press [Voltage] or [Current] key on the front panel.
2. For the two-channel R&S NGA100, press the desired channel key to activate the respective voltage or current limit setting of that channel. The value on the respective channel becomes editable and is positioned by a blue cursor.
3. Press the [Left] / [Right] arrow key to move the cursor.
4. Press the [Up] / [Down] arrow key to change the value.
Alternatively, turn the rotary knob to change the value.
The new value registers immediately.

6.3 Activating the channel output

The output voltages can be switched on or off regardless of the operating mode of the instrument.

To activate the channel output, press the [Output] key on the front panel followed by the desired channel key or vice versa.

For single channel models, press the [Output] key to activate the channel output.

Depending on the instrument operating mode, the display font color changes to green in CV (constant voltage) mode and red in CC (constant current) mode.

By default, the output is turned off when the instrument is switched on.

See also [Chapter 7.2.1.3, "Operating mode"](#), on page 40.

6.4 Storing/Recalling of instrument settings

The instrument settings can be stored in the instrument memory by long pressing the [Store Recall] key followed by the desired memory location key ([M1] to [M5]). The previous saved settings are overwritten.

To retrieve the settings, press [Store Recall] key and select the desired memory location key ([M1] to [M5]).

7 Instrument control

This chapter provides an overview on how to work with the R&S NGA100. It introduces the possibilities for operating the instrument and describes the basic functionality of the control elements. If a measurement configuration requires specific operating steps, the corresponding settings description in the user manual points it out separately.

- [Ways to operate the instrument](#)..... 36
- [Means of manual interaction](#)..... 36
- [Remote control](#)..... 46

7.1 Ways to operate the instrument

You can operate an R&S NGA100 in two ways:

- **Manual operation**
Use the front panel controls to configure the R&S NGA100 settings.
See [Chapter 7.2, "Means of manual interaction"](#), on page 36 for basic information on manual operation of the instrument.
- **Remote control**
Create programs to automatize repeating settings, tests and measurements. A controller PC with remote access to the instrument runs the programs.
See [Chapter 7.3, "Remote control"](#), on page 46 for an overview of the interfaces provided for remote control.

7.2 Means of manual interaction

For manual interaction with the R&S NGA100, you have several methods that you can use as an alternative to perform a task:

- **Memory, menu and function keys**
The front panel function keys provide all the functions and controls needed to operate the instrument.
You can access the different instrument functions and parameters settings, operating modes and configure general instrument settings.
- **Navigation controls**

Means of manual interaction

The navigation controls include a rotary knob and arrow keys ([Up], [Down], [Left], [Right]).

The arrow keys allow you to navigate on the channel display screen or dialogs to set parameters.

For basic instructions on how to control the R&S NGA100, see [Chapter 7.2.2, "Accessing the functionality"](#), on page 43.

7.2.1 Understanding the display information

The initial display screen shows the [channel display area](#), [status bar information](#) and [historical channel information](#). The channel area displays the voltage, current values and [operating mode](#) of the output.

For detailed information, see chapter "Operation Modes" in the user manual.

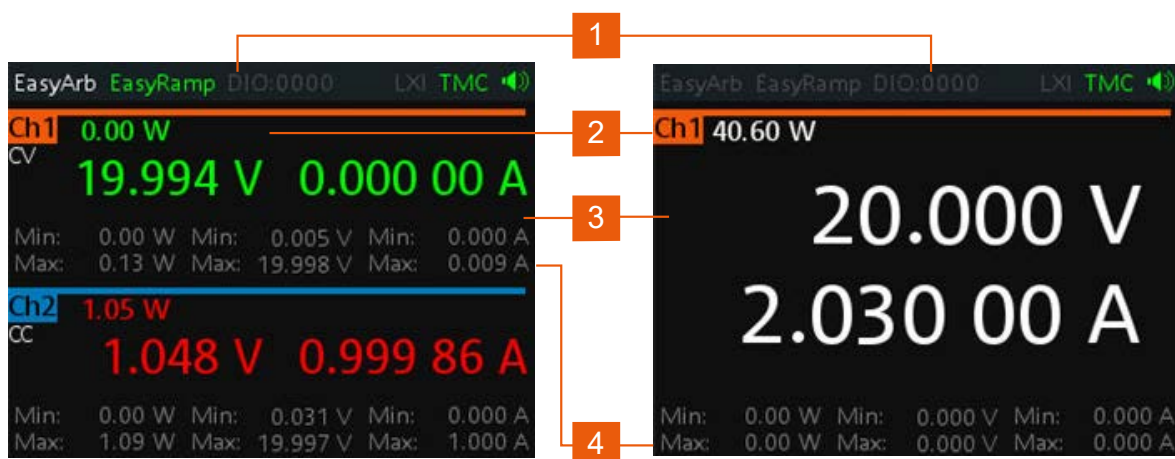


Figure 7-1: Example of screen display

- 1 = Device status bar
- 2 = Channel status bar
- 3 = Channel display area
- 4 = Historical channel information

The following sections explain the information areas as labeled.

7.2.1.1 Status bar information

There are two types of status bar information located at the top of the screen layout:

- Device status
- Channel status


Device status

The device status displays the state of the functions activated in the device.



Figure 7-2: Device status bar

Table 7-1: Device status bar information

Function	Description
EasyArb	Arbitrary output sequences on Ch 1. If in use, the icon is highlighted in green. If enabled, the icon is highlighted in white else it shows gray.
EasyRamp	Output voltage to ramp continuously within a 10 ms to 10 s until set voltage, V_{set} . If in use, the icon is highlighted in green (with output turns on). If enabled, the icon is highlighted in white else it shows gray.
DIO:xxxx	Digital trigger I/O (digital trigger I/O option R&S NGA100-K103 must be installed). The "xxxx" refers to I/O status for DIO1, DIO2, DIO3, DIO4. If in use, the icon is highlighted in green. If enabled, the icon is highlighted in white. If disabled or option not installed, the icon is highlighted in gray.
LXI	Wired LAN connection with LXI service for remote control operation. If LAN/LXI is in operation, the icon is highlighted in green. If LAN/LXI is in fault, the icon is highlighted in gray.
TMC/VCP	USB connection with USB-VCP or USB-TMC setting. If TMC or VCP is selected, the icon is highlighted in green.
	Indicate buzzer state ("Disabled", "Fault Events", "Any Events"). If speaker is enabled, the icon is highlighted in green, else it shows gray.

Channel status

The channel status displays the state of the indicators available in the device channel.

A horizontal bar representing the channel status. From left to right, it contains: 'Ch1' in white on a black background, '40.60 W' in white on a black background, 'PAR' in white on a black background, 'SNS' in green on a black background, 'OPP' in red on a black background, 'OTP' in red on a black background, and 'FUSE' in red on a black background.

Figure 7-3: Channel status bar

Table 7-2: Channel status bar information

Indicator	Description
Channel number	Channel number indication.
Power	Display output power in watt.
SER/PAR	Indicator to show the series or parallel mode if channel fusion is enabled. Available only for the two-channel models. If enabled, the indicator displays in white.
SNS	Remote sense status indication. If enabled, the indicator displays in green.
OVP / OPP / OTP	Indicator to show that the overload voltage, power or temperature protection is triggered. When triggered, the indicator shows flashing and displays in red. The OVP and OPP indicators are located in the same position. If both are triggered at the same time, the indicator flashes between OVP and OPP.
Fuse	Indicator to show the fuse status (on or off). When triggered, the indicator shows flashing and displays in red.

7.2.1.2 Channel display area

The R&S NGA100 displays two channels display area (Ch 1, Ch 2) for R&S NGA102 and R&S NGA142 and a single channel display area for R&S NGA101 and R&S NGA141.

The channel display area shows the voltage and current values and the corresponding operating mode (CC, CV) of the R&S NGA100 when the device output is turned on. See [Chapter 7.2.1.3, "Operating mode"](#), on page 40 for the different operating modes that the R&S NGA100 supported.

Historical channel information

The historical information at the bottom of the channel display area shows the maximum and minimum values for power ("W"), voltage ("V") and current ("A").

To reset the historical channel information, long press on the  [BACK] key.

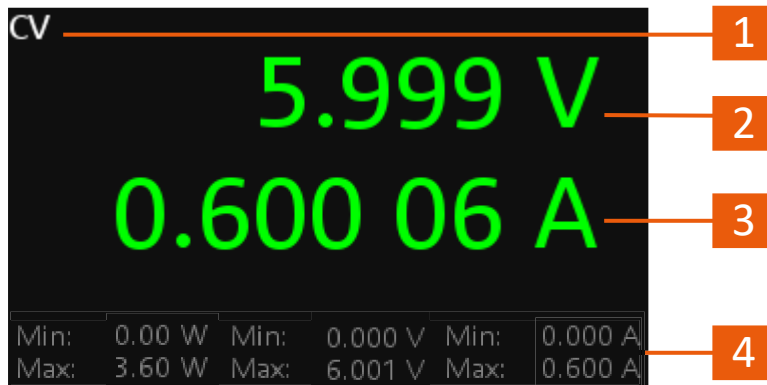


Figure 7-4: Channel display area for one-channel model

- 1 = [Operating mode](#).
- 2 = Output voltage displays in volt. The display resolution for voltage is three digits after the decimal point.
- 3 = Output current displays in ampere. The display resolution for current is five digits after the decimal point.
- 4 = [Historical channel information](#).

To change the voltage or current value, see "[To correct value in the channel display area](#)" on page 44.

7.2.1.3 Operating mode

Different font colors on the screen are used to differentiate the various output status and operating conditions of the instrument. It is easy to know and confirm the different output status and operating conditions of the instrument by looking at the colors.



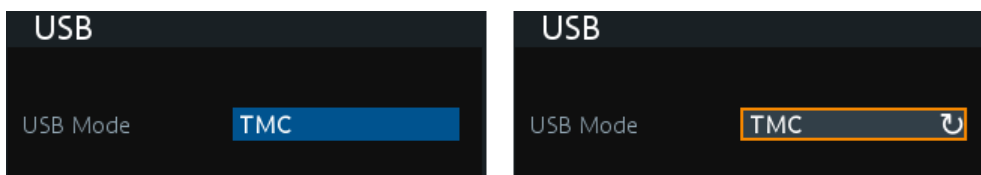
Figure 7-5: Color coding of difference operating conditions

Color	Operating mode	Description
□	OFF mode	Output is OFF.
■	Editing mode	A solid blue cursor is shown when an item is selected. All cursor keys are also lit up.
■	CV mode	Active outputs are operated in a constant voltage mode. Label "CV" is displayed at the top left-hand corner below channel number.
■	CC mode	Active outputs are operated in a constant current mode. Label "CC" is displayed at the top left-hand corner below channel number.

7.2.1.4 Additional display characteristics

The following section provides a short insight on the indication of the screen in general in dialogs or settings.

- Appearance of active elements
 - Elements selected have a blue background. In channel display area, the selected element (Voltage or Current) is in editing mode.
 - Selected element pending for editing are highlighted in orange frame with a rotary icon and selection of data is via the rotary knob.



- Menus and dialogs

Other than the corresponding hardkey functions located at the instrument front panel, all other functions are accessed via the [MENU] key. When pressed, the R&S NGA100 displays the menu.

The instrument functions are grouped into the various menus based on the categories of "Output", "Interface", "Device" and "Utilities". For more information, see chapter "Menu Key" in the user manual.

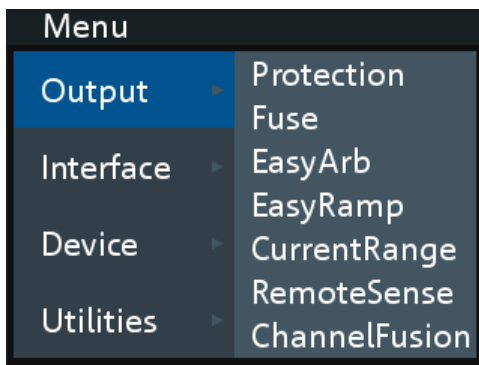


Figure 7-6: Example of a menu selection

The term dialog refers to the views that cover the parameters of a certain function.

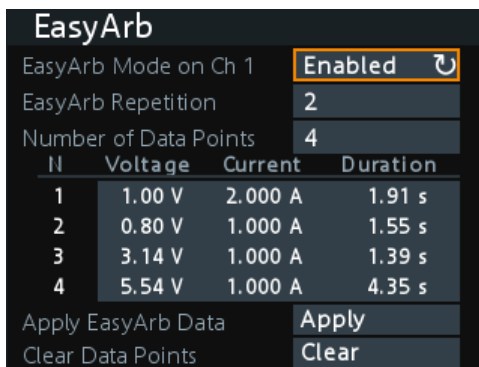


Figure 7-7: Example of a dialog

- On-Screen keypad

The on-screen keypad appears if alphanumeric entry field is required. See [Chapter 7.2.3.2, "Entering alphanumeric parameters"](#), on page 45.



Figure 7-8: On-screen keyboard

7.2.2 Accessing the functionality


All functionalities of the R&S NGA100 are provided by the corresponding functions keys on the front panel. This section provides an overview of the accessing methods. For detailed information, see chapter "Function keys" in the user manual.

Apart from the main menu, we use the term "dialog" to refer the editable windows in the instrument.

To open the menu

1. Press [Menu] key at the front panel.
The main menu of the instrument is displayed.
2. Rotate the rotary knob or press the [UP] / [DOWN] arrow key to navigate the menu.
3. Press the rotary knob or [Enter] key on the front panel to confirm the selection.
The selected dialog is opened for setting.

To close or exit a dialog or menu

- ▶ Press  [Back] key at the front panel.
The instrument returns to previous menu level or exit the menu mode if it is already at the main menu level.

To select a parameter in a dialog

All except the arbitrary editor dialogs have its parameters fixed in a single view. For arbitrary editor dialog, the number of data points indicate the available rows of data for selection:

1. Rotate the rotary knob or press the [UP] / [DOWN] arrow key to navigate.
2. Press the rotary knob or [Enter] key to confirm your selection.

To go into live-mode

In live-mode, the instrument automatically sets the voltage to editing mode. Duration of the live-mode depends on the key fallback time. Set a longer key fallback time if you need more time in this mode.

For information, see chapter "General Instrument Settings" in the user manual.

For more information on live-mode operation, see [Chapter 6.2, "Setting the output voltage and current limits"](#), on page 34.

7.2.3 Entering data

Data can be entered using one of the following methods:

- Using the navigation controls on the front panel, e.g. rotary knob, arrow keys
 - The rotary knob acts like the [ENTER] key when it is pressed.
 - Long press on the [UP] / [DOWN] arrow key to increase or decrease the value to maximum or minimum value.
Press rotary knob to stop.
- Using on-screen keyboard for alphanumeric input field in the dialog

7.2.3.1 Entering numeric parameters

If the input field requires numeric input, you can use either the rotary knob or arrow keys on the front panel to adjust to required values.

To correct value in a dialog

1. Rotate the rotary knob to increase (clockwise direction) or decrease (counter-clockwise direction) to the required value.
2. Alternatively, use the [Up] arrow key to increase and [Down] arrow key to decrease to the required value.

To correct value in the channel display area

1. Select the corresponding function key at the front panel, e.g. select [Voltage] key for voltage setting.
2. Press the [Left] / [Right] arrow key to position at the entry point for correction.
3. Rotate the rotary knob to increase (clockwise direction) or decrease (counter-clockwise direction) to the required values.
4. Alternatively, use the [Up] arrow key to increase and [Down] arrow key to decrease to the required value.


To complete the entry

- ▶ Press the rotary knob and returns to the previous screen.

7.2.3.2 Entering alphanumeric parameters

If a field requires alphanumeric input, you can use the on-screen keyboard to enter letters and (special) characters.

To correct an entry

1. To delete an entry, set the cursor to the right of the entry you want to correct.
2. Press rotary knob to display on-screen keyboard.
3. Use the arrow keys or rotate the rotary knob to go to the desired character on the on-screen keyboard.
4. Select  to delete the entry to the left of the cursor. Alternatively, select "CLR" to delete the current entry.
5. Enter your correction.

To complete the entry

To confirm the entry:

- ▶ On the on-screen keyboard, select "OK" to confirm the input.

The dialog closes with changes to the settings.


Pressing the rotary knob also confirms the action and returns to the previous screen.

To abort the entry

- ▶ On the on-screen keypad, select "ESC".

The dialog closes without changing the settings.

To alternate between lowercase and uppercase

- ▶ On the on-screen keypad, select .

7.3 Remote control

In addition to operating the R&S NGA100 directly on the instrument, it is also possible to operate and control it from a remote PC.

Remote control interfaces

The R&S NGA100 provides several interfaces for remote control:

- Ethernet (LAN) interface
- USB standard interface

For detailed information on how to configure the remote control interfaces, see chapter "Interfaces and Protocols" in the user manual.

See [Chapter 4.8, "Connecting to LAN"](#), on page 25 for an example of how to set up LAN connection for remote control.

8 Contacting customer support

Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz product, contact our customer support center. A team of highly qualified engineers provides support and works with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz products.

Contact information

Contact our customer support center at www.rohde-schwarz.com/support, or follow this QR code:



Figure 8-1: QR code to the Rohde & Schwarz support page



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