

ROHDE & SCHWARZ INSTRUMENT HEALTH GUIDE

For benchtop oscilloscopes –
tips for avoiding instrument damage.

For further information on the topics below please consult

- ▶ the safety instructions
- ▶ the Windows malware protection white paper on the Rohde&Schwarz website
- ▶ the user manual for your instrument



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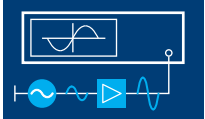
Find more information: <https://training.rohde-schwarz.com>

PREVENTING ELECTRICAL DAMAGE

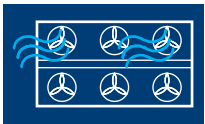
DO:



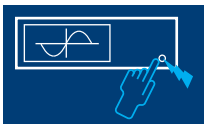
- ▶ Consult the operating manual or data sheet for further information before using any port.



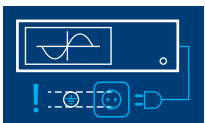
- ▶ Use external attenuators or limiters to avoid overloading the instrument circuitry if the signal is unknown and high voltage levels are expected.
- ▶ Disconnect the instrument from any DC or RF signal before switching the power off. Switch the power on before connecting any DC or RF signal to the instrument.
- ▶ Always use the power key on the front panel to ensure the instrument shuts down properly.



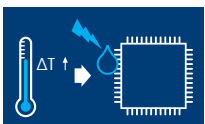
- ▶ Ensure proper airflow by providing a minimum distance of 10 cm from other objects and by cleaning the fan inlets and outlets externally at regular intervals.



- ▶ Use a conductive floor mat and a heel ground strap or use a wrist strap and cord to ground yourself when connecting a DUT or a test fixture to, or disconnecting it from, the instrument's ports.
- ▶ Electrostatically discharge the DUT with a short or match prior to connecting it to the instrument. Even residual charges on cables can cause damage when discharged across the instrument.



- ▶ Consult the data sheet on the permissible characteristics of the instrument's power supply. Always use an AC power socket with a protective earth contact. Use a 3-wire power cable.



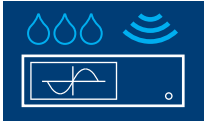
- ▶ Ensure that the ambient temperature is within the range specified in the data sheet.

DO NOT:

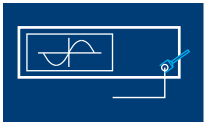
- ▶ Do not operate the instrument outside its specifications.
- ▶ Do not ignore warning labels placed at sensitive connectors.
- ▶ Do not overload the instrument ports by exceeding the applicable input power or voltage limits specified in the data sheet. Excessive voltage (AC or DC) may damage the instrument circuitry.
- ▶ In case of overload, a warning message is shown on the screen of the instrument. If this message appears, the device may already be permanently damaged.
- ▶ Do not place the oscilloscope's air inlet right opposite the warm air outlet of other equipment.
- ▶ Do not bypass the instrument's earth grounding protection by using a power or extension cable without a protective ground conductor.
- ▶ Do not use any AC power cable other than that delivered with the instrument. Other cables may be of poorer quality and could result in damage to the instrument.
- ▶ Do not operate the instrument if it shows signs of condensation. Condensation is the result of rapid temperature changes – following transport, for instance.

PREVENTING MECHANICAL DAMAGE

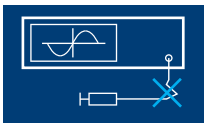
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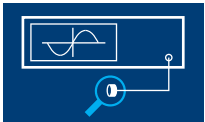
- ▶ Take preventive measures in humid environments or where excessive shock or vibration are present. High humidity can cause condensation. Excessive shock and vibration can cause components to become loose or even disconnected.



- ▶ Clean and inspect each connector prior to use. Make sure to align the connectors on the cable and the instrument along a common axis before tightening. Turn the outer connector nut, not the cable itself. Use a calibrated torque wrench to tighten the connector with the specified torque.
- ▶ Always use the supplied RF adapters to protect the instrument connectors.



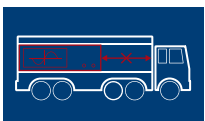
- ▶ Use cables of the proper length to avoid bending cables. Repeatedly bending cables increases wear.



- ▶ Look for dirt and damage to the outside and inside of the conductor before using any cable. If the conductor is dirty, use compressed air to dislodge larger debris. Use foam cleaning swabs moistened with isopropanol alcohol or use wooden cocktail sticks to remove the remaining dirt. Dry the connector using compressed air.



- ▶ Use your fingers or a stylus pen when touching the screen. Use a soft, dry, lint-free dust cloth for cleaning.



- ▶ Use the original packaging for transportation. There is a transit case as an accessory, which can also be used for shipping. It is specifically designed to prevent mechanical damage and provide ESD protection. If the original packaging is lost, it can always be ordered separately.

DO NOT:

- ▶ Do not operate the instrument in a wet or polluted environment or expose it to high electromagnetic interference. These conditions can cause premature aging or damage to the instrument.

- ▶ Do not tighten cables too much or too little. Overtightening can damage cables and connectors, and insufficient tightening can lead to inaccurate measurement results.
- ▶ Do not mix incompatible connector systems.
- ▶ Do not put too much load on connectors. Connectors are sensitive and can easily be damaged. Avoid cascading multiple adapters. Instead, use the correct adapter for each connected system.

- ▶ Do not sharply bend cables. This can result in reflections and may cause permanent cable damage.

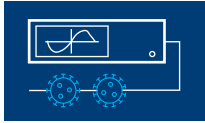
- ▶ Do not apply too much pressure when cleaning the inside of connectors with foam cleaning swabs or wooden cocktail sticks. On female connectors with air dielectrics, the slotted inner conductor contacts are easily bent. On male connectors, the center pin is easily bent.

- ▶ Do not use cleaning agents as they can damage the screen, panel labeling or plastic parts. Never touch the screen with a ballpoint pen or other sharp object.

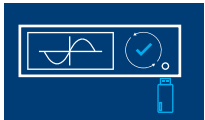
- ▶ Do not leave empty space in the transport box. Loosely packed cargo is easily damaged. Never use styrene pellets for packaging as they do not provide proper cushioning.

PREVENTING FIRMWARE ISSUES

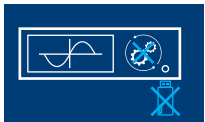
DO:



- ▶ Read the Windows malware protection white paper available on the Rohde&Schwarz website and take the recommended precautions: <http://www.rohde-schwarz.com/appnote/1EF96>



- ▶ Keep your instrument updated by sending it to R&S Service regularly or installing the latest firmware (FW) available on the R&S website. This also provides functional improvements and new features.



- ▶ Leave the device software unchanged with the exception of firmware updates.

DO NOT:

- ▶ Do not connect your instrument to USB memory sticks, computers or networks unless you are sure they are virus-free.
- ▶ Do not neglect critical FW updates. They protect your instrument from the latest malware and ensure it has necessary updates.
- ▶ Never install software on the device that has not been released by Rohde&Schwarz as this can lead to malfunctions of the instrument.

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