



Quick Start Guide

R&S[®] DVSG DIGITAL VIDEO SIGNAL GENERATOR

The Quick Start Guide the following models and options of the DIGITAL VIDEO SIGNAL GENERATOR:

◆ R&S® DVSG 2113.0008.02

U.S. Patent Nos. 4,631,603; 4,819,098; 4,907,093; 5,315,448; 6,381,747; and 6,516,132.

The firmware of the instrument makes use of several valuable open source software packages. For information see the release notes, included in the firmware package.

Rohde&Schwarz would like to thank the open source community for their valuable contribution to embedded computing.

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Printed in Germany – Subject to change – Data without tolerance limits is not binding.

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The following abbreviations are used throughout this manual:

R&S® DVSG is abbreviated as R&S DVSG.

Basic Safety Instructions

Always read through and comply with the following safety instructions!

All plants and locations of the Rohde & Schwarz group of companies make every effort to keep the safety standards of our products up to date and to offer our customers the highest possible degree of safety. Our products and the auxiliary equipment they require are designed, built and tested in accordance with the safety standards that apply in each case. Compliance with these standards is continuously monitored by our quality assurance system. The product described here has been designed, built and tested in accordance with the EC Certificate of Conformity and has left the manufacturer's plant in a condition fully complying with safety standards. To maintain this condition and to ensure safe operation, you must observe all instructions and warnings provided in this manual. If you have any questions regarding these safety instructions, the Rohde & Schwarz group of companies will be happy to answer them.

Furthermore, it is your responsibility to use the product in an appropriate manner. This product is designed for use solely in industrial and laboratory environments or, if expressly permitted, also in the field and must not be used in any way that may cause personal injury or property damage. You are responsible if the product is used for any purpose other than its designated purpose or in disregard of the manufacturer's instructions. The manufacturer shall assume no responsibility for such use of the product.

The product is used for its designated purpose if it is used in accordance with its product documentation and within its performance limits (see data sheet, documentation, the following safety instructions). Using the product requires technical skills and, in some cases, a basic knowledge of English. It is therefore essential that only skilled and specialized staff or thoroughly trained personnel with the required skills be allowed to use the product. If personal safety gear is required for using Rohde & Schwarz products, this will be indicated at the appropriate place in the product documentation. Keep the basic safety instructions and the product documentation in a safe place and pass them on to the subsequent users.








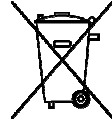

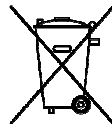


Observing the safety instructions will help prevent personal injury or damage of any kind caused by dangerous situations. Therefore, carefully read through and adhere to the following safety instructions before and when using the product. It is also absolutely essential to observe the additional safety instructions on personal safety, for example, that appear in relevant parts of the product documentation. In these safety instructions, the word "product" refers to all merchandise sold and distributed by the Rohde & Schwarz group of companies, including instruments,

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systems and all accessories. For product-specific information, see the data sheet and the product documentation.

Safety labels on products

The following safety labels are used on products to warn against risks and dangers.

Symbol	Meaning	Symbol	Meaning
	Notice, general danger location Observe product documentation	○	ON/OFF supply voltage
	Caution when handling heavy equipment	⏻	Standby indication
	Danger of electric shock	≡	Direct current (DC)
	Warning! Hot surface	~	Alternating current (AC)
	Protective conductor terminal	⎓	Direct/alternating current (DC/AC)
	Ground	□	Device fully protected by double (reinforced) insulation
	Ground terminal		EU labeling for batteries and accumulators For additional information, see section "Waste disposal/Environmental protection", item 1.
	Be careful when handling electrostatic sensitive devices	 	EU labeling for separate collection of electrical and electronic devices For additional information, see section "Waste disposal/Environmental protection", item 2.
	Warning! Laser radiation For additional information, see section "Operation", item 7.		

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Signal words and their meaning

The following signal words are used in the product documentation in order to warn the reader about risks and dangers.



Indicates a hazardous situation which, if not avoided, will result in death or serious injury.



Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



Indicates information considered important, but not hazard-related, e.g. messages relating to property damage. In the product documentation, the word ATTENTION is used synonymously.

These signal words are in accordance with the standard definition for civil applications in the European Economic Area. Definitions that deviate from the standard definition may also exist in other economic areas or military applications. It is therefore essential to make sure that the signal words described here are always used only in connection with the related product documentation and the related product. The use of signal words in connection with unrelated products or documentation can result in misinterpretation and in personal injury or material damage.

Operating states and operating positions

The product may be operated only under the operating conditions and in the positions specified by the manufacturer, without the product's ventilation being obstructed. If the manufacturer's specifications are not observed, this can result in electric shock, fire and/or serious personal injury or death. Applicable local or national safety regulations and rules for the prevention of accidents must be observed in all work performed.

1. Unless otherwise specified, the following requirements apply to Rohde & Schwarz products:
predefined operating position is always with the housing floor facing down, IP protection 2X, use only indoors, max. operating altitude 2000 m above sea level, max. transport altitude 4500 m above sea level. A tolerance of $\pm 10\%$ shall apply to the nominal voltage and $\pm 5\%$ to the nominal frequency, overvoltage category 2, pollution severity 2.

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2. Do not place the product on surfaces, vehicles, cabinets or tables that for reasons of weight or stability are unsuitable for this purpose. Always follow the manufacturer's installation instructions when installing the product and fastening it to objects or structures (e.g. walls and shelves). An installation that is not carried out as described in the product documentation could result in personal injury or even death.
3. Do not place the product on heat-generating devices such as radiators or fan heaters. The ambient temperature must not exceed the maximum temperature specified in the product documentation or in the data sheet. Product overheating can cause electric shock, fire and/or serious personal injury or even death.

Electrical safety

If the information on electrical safety is not observed either at all or to the extent necessary, electric shock, fire and/or serious personal injury or death may occur.

1. Prior to switching on the product, always ensure that the nominal voltage setting on the product matches the nominal voltage of the AC supply network. If a different voltage is to be set, the power fuse of the product may have to be changed accordingly.
2. In the case of products of safety class I with movable power cord and connector, operation is permitted only on sockets with a protective conductor contact and protective conductor.
3. Intentionally breaking the protective conductor either in the feed line or in the product itself is not permitted. Doing so can result in the danger of an electric shock from the product. If extension cords or connector strips are implemented, they must be checked on a regular basis to ensure that they are safe to use.
4. If there is no power switch for disconnecting the product from the AC supply network, or if the power switch is not suitable for this purpose, use the plug of the connecting cable to disconnect the product from the AC supply network. In such cases, always ensure that the power plug is easily reachable and accessible at all times. For example, if the power plug is the disconnecting device, the length of the connecting cable must not exceed 3 m. Functional or electronic switches are not suitable for providing disconnection from the AC supply network. If products without power switches are integrated into racks or systems, the disconnecting device must be provided at the system level.

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5. Never use the product if the power cable is damaged. Check the power cables on a regular basis to ensure that they are in proper operating condition. By taking appropriate safety measures and carefully laying the power cable, ensure that the cable cannot be damaged and that no one can be hurt by, for example, tripping over the cable or suffering an electric shock.
6. The product may be operated only from TN/TT supply networks fuse-protected with max. 16 A (higher fuse only after consulting with the Rohde & Schwarz group of companies).
7. Do not insert the plug into sockets that are dusty or dirty. Insert the plug firmly and all the way into the socket provided for this purpose. Otherwise, sparks that result in fire and/or injuries may occur.
8. Do not overload any sockets, extension cords or connector strips; doing so can cause fire or electric shocks.
9. For measurements in circuits with voltages $V_{\text{rms}} > 30 \text{ V}$, suitable measures (e.g. appropriate measuring equipment, fuse protection, current limiting, electrical separation, insulation) should be taken to avoid any hazards.
10. Ensure that the connections with information technology equipment, e.g. PCs or other industrial computers, comply with the IEC60950-1/EN60950-1 or IEC61010-1/EN 61010-1 standards that apply in each case.
11. Unless expressly permitted, never remove the cover or any part of the housing while the product is in operation. Doing so will expose circuits and components and can lead to injuries, fire or damage to the product.
12. If a product is to be permanently installed, the connection between the protective conductor terminal on site and the product's protective conductor must be made first before any other connection is made. The product may be installed and connected only by a licensed electrician.
13. For permanently installed equipment without built-in fuses, circuit breakers or similar protective devices, the supply circuit must be fuse-protected in such a way that anyone who has access to the product, as well as the product itself, is adequately protected from injury or damage.
14. Use suitable overvoltage protection to ensure that no overvoltage (such as that caused by a bolt of lightning) can reach the product. Otherwise, the person operating the product will be exposed to the danger of an electric shock.
15. Any object that is not designed to be placed in the openings of the housing must not be used for this purpose. Doing so can cause short circuits inside the product and/or electric shocks, fire or injuries.

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16. Unless specified otherwise, products are not liquid-proof (see also section "Operating states and operating positions", item 1). Therefore, the equipment must be protected against penetration by liquids. If the necessary precautions are not taken, the user may suffer electric shock or the product itself may be damaged, which can also lead to personal injury.
17. Never use the product under conditions in which condensation has formed or can form in or on the product, e.g. if the product has been moved from a cold to a warm environment. Penetration by water increases the risk of electric shock.
18. Prior to cleaning the product, disconnect it completely from the power supply (e.g. AC supply network or battery). Use a soft, non-linting cloth to clean the product. Never use chemical cleaning agents such as alcohol, acetone or diluents for cellulose lacquers.

Operation

1. Operating the products requires special training and intense concentration. Make sure that persons who use the products are physically, mentally and emotionally fit enough to do so; otherwise, injuries or material damage may occur. It is the responsibility of the employer/operator to select suitable personnel for operating the products.
2. Before you move or transport the product, read and observe the section titled "Transport".
3. As with all industrially manufactured goods, the use of substances that induce an allergic reaction (allergens) such as nickel cannot be generally excluded. If you develop an allergic reaction (such as a skin rash, frequent sneezing, red eyes or respiratory difficulties) when using a Rohde & Schwarz product, consult a physician immediately to determine the cause and to prevent health problems or stress.
4. Before you start processing the product mechanically and/or thermally, or before you take it apart, be sure to read and pay special attention to the section titled "Waste disposal/Environmental protection", item 1.
5. Depending on the function, certain products such as RF radio equipment can produce an elevated level of electromagnetic radiation. Considering that unborn babies require increased protection, pregnant women must be protected by appropriate measures. Persons with pacemakers may also be exposed to risks from electromagnetic radiation. The employer/operator must evaluate workplaces where there is a special risk of exposure to radiation and, if necessary, take measures to avert the potential danger.

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6. Should a fire occur, the product may release hazardous substances (gases, fluids, etc.) that can cause health problems. Therefore, suitable measures must be taken, e.g. protective masks and protective clothing must be worn.
7. Laser products are given warning labels that are standardized according to their laser class. Lasers can cause biological harm due to the properties of their radiation and due to their extremely concentrated electromagnetic power. If a laser product (e.g. a CD/DVD drive) is integrated into a Rohde & Schwarz product, absolutely no other settings or functions may be used as described in the product documentation. The objective is to prevent personal injury (e.g. due to laser beams).
8. EMC classes (in line with EN 55011/CISPR 11, and analogously with EN 55022/CISPR 22, EN 55032/CISPR 32)
 - Class A equipment:
Equipment suitable for use in all environments except residential environments and environments that are directly connected to a low-voltage supply network that supplies residential buildings
Note: Class A equipment is intended for use in an industrial environment. This equipment may cause radio disturbances in residential environments, due to possible conducted as well as radiated disturbances. In this case, the operator may be required to take appropriate measures to eliminate these disturbances.
 - Class B equipment:
Equipment suitable for use in residential environments and environments that are directly connected to a low-voltage supply network that supplies residential buildings

Repair and service

1. The product may be opened only by authorized, specially trained personnel. Before any work is performed on the product or before the product is opened, it must be disconnected from the AC supply network. Otherwise, personnel will be exposed to the risk of an electric shock.
2. Adjustments, replacement of parts, maintenance and repair may be performed only by electrical experts authorized by Rohde & Schwarz. Only original parts may be used for replacing parts relevant to safety (e.g. power switches, power transformers, fuses). A safety test must always be performed after parts relevant to safety have been replaced (visual inspection, protective conductor test, insulation resistance measurement, leakage current measurement, functional test). This helps ensure the continued safety of the product.

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Batteries and rechargeable batteries/cells

If the information regarding batteries and rechargeable batteries/cells is not observed either at all or to the extent necessary, product users may be exposed to the risk of explosions, fire and/or serious personal injury, and, in some cases, death. Batteries and rechargeable batteries with alkaline electrolytes (e.g. lithium cells) must be handled in accordance with the EN 62133 standard.

1. Cells must not be taken apart or crushed.
2. Cells or batteries must not be exposed to heat or fire. Storage in direct sunlight must be avoided. Keep cells and batteries clean and dry. Clean soiled connectors using a dry, clean cloth.
3. Cells or batteries must not be short-circuited. Cells or batteries must not be stored in a box or in a drawer where they can short-circuit each other, or where they can be short-circuited by other conductive materials. Cells and batteries must not be removed from their original packaging until they are ready to be used.
4. Cells and batteries must not be exposed to any mechanical shocks that are stronger than permitted.
5. If a cell develops a leak, the fluid must not be allowed to come into contact with the skin or eyes. If contact occurs, wash the affected area with plenty of water and seek medical aid.
6. Improperly replacing or charging cells or batteries that contain alkaline electrolytes (e.g. lithium cells) can cause explosions. Replace cells or batteries only with the matching Rohde & Schwarz type (see parts list) in order to ensure the safety of the product.
7. Cells and batteries must be recycled and kept separate from residual waste. Rechargeable batteries and normal batteries that contain lead, mercury or cadmium are hazardous waste. Observe the national regulations regarding waste disposal and recycling.

Transport

1. The product may be very heavy. Therefore, the product must be handled with care. In some cases, the user may require a suitable means of lifting or moving the product (e.g. with a lift-truck) to avoid back or other physical injuries.
2. Handles on the products are designed exclusively to enable personnel to transport the product. It is therefore not permissible to use handles to fasten the product to or on transport equipment such as cranes, fork lifts, wagons,

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etc. The user is responsible for securely fastening the products to or on the means of transport or lifting. Observe the safety regulations of the manufacturer of the means of transport or lifting. Noncompliance can result in personal injury or material damage.

3. If you use the product in a vehicle, it is the sole responsibility of the driver to drive the vehicle safely and properly. The manufacturer assumes no responsibility for accidents or collisions. Never use the product in a moving vehicle if doing so could distract the driver of the vehicle. Adequately secure the product in the vehicle to prevent injuries or other damage in the event of an accident.

Waste disposal/Environmental protection

1. Specially marked equipment has a battery or accumulator that must not be disposed of with unsorted municipal waste, but must be collected separately. It may only be disposed of at a suitable collection point or via a Rohde & Schwarz customer service center.
2. Waste electrical and electronic equipment must not be disposed of with unsorted municipal waste, but must be collected separately. Rohde & Schwarz GmbH & Co. KG has developed a disposal concept and takes full responsibility for take-back obligations and disposal obligations for manufacturers within the EU. Contact your Rohde & Schwarz customer service center for environmentally responsible disposal of the product.
3. If products or their components are mechanically and/or thermally processed in a manner that goes beyond their intended use, hazardous substances (heavy-metal dust such as lead, beryllium, nickel) may be released. For this reason, the product may only be disassembled by specially trained personnel. Improper disassembly may be hazardous to your health. National waste disposal regulations must be observed.
4. If handling the product releases hazardous substances or fuels that must be disposed of in a special way, e.g. coolants or engine oils that must be replenished regularly, the safety instructions of the manufacturer of the hazardous substances or fuels and the applicable regional waste disposal regulations must be observed. Also observe the relevant safety instructions in the product documentation. The improper disposal of hazardous substances or fuels can cause health problems and lead to environmental damage.

For additional information about environmental protection, visit the Rohde & Schwarz website.

Instrucciones de seguridad elementales

¡Es imprescindible leer y cumplir las siguientes instrucciones e informaciones de seguridad!

El principio del grupo de empresas Rohde & Schwarz consiste en tener nuestros productos siempre al día con los estándares de seguridad y de ofrecer a nuestros clientes el máximo grado de seguridad. Nuestros productos y todos los equipos adicionales son siempre fabricados y examinados según las normas de seguridad vigentes. Nuestro sistema de garantía de calidad controla constantemente que sean cumplidas estas normas. El presente producto ha sido fabricado y examinado según el certificado de conformidad de la UE y ha salido de nuestra planta en estado impecable según los estándares técnicos de seguridad. Para poder preservar este estado y garantizar un funcionamiento libre de peligros, el usuario deberá atenerse a todas las indicaciones, informaciones de seguridad y notas de alerta. El grupo de empresas Rohde & Schwarz está siempre a su disposición en caso de que tengan preguntas referentes a estas informaciones de seguridad.

Además queda en la responsabilidad del usuario utilizar el producto en la forma debida. Este producto está destinado exclusivamente al uso en la industria y el laboratorio o, si ha sido expresamente autorizado, para aplicaciones de campo y de ninguna manera deberá ser utilizado de modo que alguna persona/cosa pueda sufrir daño. El uso del producto fuera de sus fines definidos o sin tener en cuenta las instrucciones del fabricante queda en la responsabilidad del usuario. El fabricante no se hace en ninguna forma responsable de consecuencias a causa del mal uso del producto.









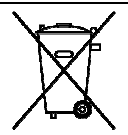
Se parte del uso correcto del producto para los fines definidos si el producto es utilizado conforme a las indicaciones de la correspondiente documentación del producto y dentro del margen de rendimiento definido (ver hoja de datos, documentación, informaciones de seguridad que siguen). El uso del producto hace necesarios conocimientos técnicos y ciertos conocimientos del idioma inglés. Por eso se debe tener en cuenta que el producto solo pueda ser operado por personal especializado o personas instruidas en profundidad con las capacidades correspondientes. Si fuera necesaria indumentaria de seguridad para el uso de productos de Rohde & Schwarz, encontraría la información debida en la documentación del producto en el capítulo correspondiente. Guarde bien las informaciones de seguridad elementales, así como la documentación del producto, y entréguelas a usuarios posteriores.

Instrucciones de seguridad elementales


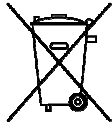

Tener en cuenta las informaciones de seguridad sirve para evitar en lo posible lesiones o daños por peligros de toda clase. Por eso es imprescindible leer detalladamente y comprender por completo las siguientes informaciones de seguridad antes de usar el producto, y respetarlas durante el uso del producto. Deberán tenerse en cuenta todas las demás informaciones de seguridad, como p. ej. las referentes a la protección de personas, que encontrarán en el capítulo correspondiente de la documentación del producto y que también son de obligado cumplimiento. En las presentes informaciones de seguridad se recogen todos los objetos que distribuye el grupo de empresas Rohde & Schwarz bajo la denominación de "producto", entre ellos también aparatos, instalaciones así como toda clase de accesorios. Los datos específicos del producto figuran en la hoja de datos y en la documentación del producto.

Señalización de seguridad de los productos

Las siguientes señales de seguridad se utilizan en los productos para advertir sobre riesgos y peligros.

Símbolo	Significado	Símbolo	Significado
	Aviso: punto de peligro general Observar la documentación del producto	○	Tensión de alimentación de PUESTA EN MARCHA / PARADA
	Atención en el manejo de dispositivos de peso elevado	⏻	Indicación de estado de espera (standby)
	Peligro de choque eléctrico	— — —	Corriente continua (DC)
	Advertencia: superficie caliente	~	Corriente alterna (AC)
	Conexión a conductor de protección	⎓	Corriente continua / Corriente alterna (DC/AC)
	Conexión a tierra		El aparato está protegido en su totalidad por un aislamiento doble (reforzado)
	Conexión a masa		Distintivo de la UE para baterías y acumuladores Más información en la sección "Eliminación/protección del medio ambiente", punto 1.

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Símbolo	Significado	Símbolo	Significado
	Aviso: Cuidado en el manejo de dispositivos sensibles a la electrostática (ESD)		Distintivo de la UE para la eliminación por separado de dispositivos eléctricos y electrónicos Más información en la sección "Eliminación/protección del medio ambiente", punto 2.
	Advertencia: rayo láser Más información en la sección "Funcionamiento", punto 7.		

Palabras de señal y su significado

En la documentación del producto se utilizan las siguientes palabras de señal con el fin de advertir contra riesgos y peligros.



Indica una situación de peligro que, si no se evita, causa lesiones graves o incluso la muerte.



Indica una situación de peligro que, si no se evita, puede causar lesiones graves o incluso la muerte.



Indica una situación de peligro que, si no se evita, puede causar lesiones leves o moderadas.



Indica información que se considera importante, pero no en relación con situaciones de peligro; p. ej., avisos sobre posibles daños materiales.

En la documentación del producto se emplea de forma sinónima el término CUIDADO.

Las palabras de señal corresponden a la definición habitual para aplicaciones civiles en el área económica europea. Pueden existir definiciones diferentes a esta definición en otras áreas económicas o en aplicaciones militares. Por eso se deberá tener en cuenta que las palabras de señal aquí descritas sean utilizadas siempre solamente en combinación con la correspondiente documentación del producto y solamente en combinación con el producto correspondiente. La utilización de las palabras de señal en combinación con productos o documentaciones que no les correspondan puede llevar a interpretaciones equivocadas y tener por consecuencia daños en personas u objetos.

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Estados operativos y posiciones de funcionamiento

El producto solamente debe ser utilizado según lo indicado por el fabricante respecto a los estados operativos y posiciones de funcionamiento sin que se obstruya la ventilación. Si no se siguen las indicaciones del fabricante, pueden producirse choques eléctricos, incendios y/o lesiones graves con posible consecuencia de muerte. En todos los trabajos deberán ser tenidas en cuenta las normas nacionales y locales de seguridad del trabajo y de prevención de accidentes.

1. Si no se convino de otra manera, es para los productos Rohde & Schwarz válido lo que sigue:
como posición de funcionamiento se define por principio la posición con el suelo de la caja para abajo, modo de protección IP 2X, uso solamente en estancias interiores, utilización hasta 2000 m sobre el nivel del mar, transporte hasta 4500 m sobre el nivel del mar. Se aplicará una tolerancia de $\pm 10\%$ sobre el voltaje nominal y de $\pm 5\%$ sobre la frecuencia nominal. Categoría de sobrecarga eléctrica 2, índice de suciedad 2.
2. No sitúe el producto encima de superficies, vehículos, estantes o mesas, que por sus características de peso o de estabilidad no sean aptos para él. Siga siempre las instrucciones de instalación del fabricante cuando instale y asegure el producto en objetos o estructuras (p. ej. paredes y estantes). Si se realiza la instalación de modo distinto al indicado en la documentación del producto, se pueden causar lesiones o, en determinadas circunstancias, incluso la muerte.
3. No ponga el producto sobre aparatos que generen calor (p. ej. radiadores o calefactores). La temperatura ambiente no debe superar la temperatura máxima especificada en la documentación del producto o en la hoja de datos. En caso de sobrecalentamiento del producto, pueden producirse choques eléctricos, incendios y/o lesiones graves con posible consecuencia de muerte.

Seguridad eléctrica

Si no se siguen (o se siguen de modo insuficiente) las indicaciones del fabricante en cuanto a seguridad eléctrica, pueden producirse choques eléctricos, incendios y/o lesiones graves con posible consecuencia de muerte.

1. Antes de la puesta en marcha del producto se deberá comprobar siempre que la tensión preseleccionada en el producto coincida con la de la red de alimentación eléctrica. Si es necesario modificar el ajuste de tensión, también se deberán cambiar en caso dado los fusibles correspondientes del producto.

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2. Los productos de la clase de protección I con alimentación móvil y enchufe individual solamente podrán enchufarse a tomas de corriente con contacto de seguridad y con conductor de protección conectado.
3. Queda prohibida la interrupción intencionada del conductor de protección, tanto en la toma de corriente como en el mismo producto. La interrupción puede tener como consecuencia el riesgo de que el producto sea fuente de choques eléctricos. Si se utilizan cables alargadores o regletas de enchufe, deberá garantizarse la realización de un examen regular de los mismos en cuanto a su estado técnico de seguridad.
4. Si el producto no está equipado con un interruptor para desconectarlo de la red, o bien si el interruptor existente no resulta apropiado para la desconexión de la red, el enchufe del cable de conexión se deberá considerar como un dispositivo de desconexión.
El dispositivo de desconexión se debe poder alcanzar fácilmente y debe estar siempre bien accesible. Si, p. ej., el enchufe de conexión a la red es el dispositivo de desconexión, la longitud del cable de conexión no debe superar 3 m).
Los interruptores selectores o electrónicos no son aptos para el corte de la red eléctrica. Si se integran productos sin interruptor en bastidores o instalaciones, se deberá colocar el interruptor en el nivel de la instalación.
5. No utilice nunca el producto si está dañado el cable de conexión a red.
Compruebe regularmente el correcto estado de los cables de conexión a red. Asegúrese, mediante las medidas de protección y de instalación adecuadas, de que el cable de conexión a red no pueda ser dañado o de que nadie pueda ser dañado por él, p. ej. al tropezar o por un choque eléctrico.
6. Solamente está permitido el funcionamiento en redes de alimentación TN/TT aseguradas con fusibles de 16 A como máximo (utilización de fusibles de mayor amperaje solo previa consulta con el grupo de empresas Rohde & Schwarz).
7. Nunca conecte el enchufe en tomas de corriente sucias o llenas de polvo. Introduzca el enchufe por completo y fuertemente en la toma de corriente. La no observación de estas medidas puede provocar chispas, fuego y/o lesiones.
8. No sobrecargue las tomas de corriente, los cables alargadores o las regletas de enchufe ya que esto podría causar fuego o choques eléctricos.
9. En las mediciones en circuitos de corriente con una tensión $U_{\text{eff}} > 30 \text{ V}$ se deberán tomar las medidas apropiadas para impedir cualquier peligro (p. ej. medios de medición adecuados, seguros, limitación de tensión, corte protector, aislamiento etc.).

Instrucciones de seguridad elementales

10. Para la conexión con dispositivos informáticos como un PC o un ordenador industrial, debe comprobarse que éstos cumplan los estándares IEC60950-1/EN60950-1 o IEC61010-1/EN 61010-1 válidos en cada caso.
11. A menos que esté permitido expresamente, no retire nunca la tapa ni componentes de la carcasa mientras el producto esté en servicio. Esto pone a descubierto los cables y componentes eléctricos y puede causar lesiones, fuego o daños en el producto.
12. Si un producto se instala en un lugar fijo, se deberá primero conectar el conductor de protección fijo con el conductor de protección del producto antes de hacer cualquier otra conexión. La instalación y la conexión deberán ser efectuadas por un electricista especializado.
13. En el caso de dispositivos fijos que no estén provistos de fusibles, interruptor automático ni otros mecanismos de seguridad similares, el circuito de alimentación debe estar protegido de modo que todas las personas que puedan acceder al producto, así como el producto mismo, estén a salvo de posibles daños.
14. Todo producto debe estar protegido contra sobretensión (debida p. ej. a una caída del rayo) mediante los correspondientes sistemas de protección. Si no, el personal que lo utilice quedará expuesto al peligro de choque eléctrico.
15. No debe introducirse en los orificios de la caja del aparato ningún objeto que no esté destinado a ello. Esto puede producir cortocircuitos en el producto y/o puede causar choques eléctricos, fuego o lesiones.
16. Salvo indicación contraria, los productos no están impermeabilizados (ver también el capítulo "Estados operativos y posiciones de funcionamiento", punto 1). Por eso es necesario tomar las medidas necesarias para evitar la entrada de líquidos. En caso contrario, existe peligro de choque eléctrico para el usuario o de daños en el producto, que también pueden redundar en peligro para las personas.
17. No utilice el producto en condiciones en las que pueda producirse o ya se hayan producido condensaciones sobre el producto o en el interior de éste, como p. ej. al desplazarlo de un lugar frío a otro caliente. La entrada de agua aumenta el riesgo de choque eléctrico.
18. Antes de la limpieza, desconecte por completo el producto de la alimentación de tensión (p. ej. red de alimentación o batería). Realice la limpieza de los aparatos con un paño suave, que no se deshilache. No utilice bajo ningún concepto productos de limpieza químicos como alcohol, acetona o diluyentes para lacas nitrocelulósicas.

Instrucciones de seguridad elementales

Funcionamiento

1. El uso del producto requiere instrucciones especiales y una alta concentración durante el manejo. Debe asegurarse que las personas que manejen el producto estén a la altura de los requerimientos necesarios en cuanto a aptitudes físicas, psíquicas y emocionales, ya que de otra manera no se pueden excluir lesiones o daños de objetos. El empresario u operador es responsable de seleccionar el personal usuario apto para el manejo del producto.
2. Antes de desplazar o transportar el producto, lea y tenga en cuenta el capítulo "Transporte".
3. Como con todo producto de fabricación industrial no puede quedar excluida en general la posibilidad de que se produzcan alergias provocadas por algunos materiales empleados —los llamados alérgenos (p. ej. el níquel)—. Si durante el manejo de productos Rohde & Schwarz se producen reacciones alérgicas, como p. ej. irritaciones cutáneas, estornudos continuos, enrojecimiento de la conjuntiva o dificultades respiratorias, debe avisarse inmediatamente a un médico para investigar las causas y evitar cualquier molestia o daño a la salud.
4. Antes de la manipulación mecánica y/o térmica o el desmontaje del producto, debe tenerse en cuenta imprescindiblemente el capítulo "Eliminación/protección del medio ambiente", punto 1.
5. Ciertos productos, como p. ej. las instalaciones de radiocomunicación RF, pueden a causa de su función natural, emitir una radiación electromagnética aumentada. Deben tomarse todas las medidas necesarias para la protección de las mujeres embarazadas. También las personas con marcapasos pueden correr peligro a causa de la radiación electromagnética. El empresario/operador tiene la obligación de evaluar y señalar las áreas de trabajo en las que exista un riesgo elevado de exposición a radiaciones.
6. Tenga en cuenta que en caso de incendio pueden desprenderse del producto sustancias tóxicas (gases, líquidos etc.) que pueden generar daños a la salud. Por eso, en caso de incendio deben usarse medidas adecuadas, como p. ej. máscaras antigás e indumentaria de protección.

Instrucciones de seguridad elementales

7. Los productos con láser están provistos de indicaciones de advertencia normalizadas en función de la clase de láser del que se trate. Los rayos láser pueden provocar daños de tipo biológico a causa de las propiedades de su radiación y debido a su concentración extrema de potencia electromagnética. En caso de que un producto Rohde & Schwarz contenga un producto láser (p. ej. un lector de CD/DVD), no debe usarse ninguna otra configuración o función aparte de las descritas en la documentación del producto, a fin de evitar lesiones (p. ej. debidas a irradiación láser).
8. Clases de compatibilidad electromagnética (conforme a EN 55011 / CISPR 11; y en analogía con EN 55022 / CISPR 22, EN 55032 / CISPR 32)
 - Aparato de clase A:
Aparato adecuado para su uso en todos los entornos excepto en los residenciales y en aquellos conectados directamente a una red de distribución de baja tensión que suministra corriente a edificios residenciales.
Nota: Los aparatos de clase A están destinados al uso en entornos industriales. Estos aparatos pueden causar perturbaciones radioeléctricas en entornos residenciales debido a posibles perturbaciones guiadas o radiadas. En este caso, se le podrá solicitar al operador que tome las medidas adecuadas para eliminar estas perturbaciones.
 - Aparato de clase B:
Aparato adecuado para su uso en entornos residenciales, así como en aquellos conectados directamente a una red de distribución de baja tensión que suministra corriente a edificios residenciales.

Reparación y mantenimiento

1. El producto solamente debe ser abierto por personal especializado con autorización para ello. Antes de manipular el producto o abrirlo, es obligatorio desconectarlo de la tensión de alimentación, para evitar toda posibilidad de choque eléctrico.
2. El ajuste, el cambio de partes, el mantenimiento y la reparación deberán ser efectuadas solamente por electricistas autorizados por Rohde & Schwarz. Si se reponen partes con importancia para los aspectos de seguridad (p. ej. el enchufe, los transformadores o los fusibles), solamente podrán ser sustituidos por partes originales. Después de cada cambio de partes relevantes para la seguridad deberá realizarse un control de seguridad (control a primera vista, control del conductor de protección, medición de resistencia de aislamiento, medición de la corriente de fuga, control de funcionamiento). Con esto queda garantizada la seguridad del producto.

Instrucciones de seguridad elementales

Baterías y acumuladores o celdas

Si no se siguen (o se siguen de modo insuficiente) las indicaciones en cuanto a las baterías y acumuladores o celdas, pueden producirse explosiones, incendios y/o lesiones graves con posible consecuencia de muerte. El manejo de baterías y acumuladores con electrolitos alcalinos (p. ej. celdas de litio) debe seguir el estándar EN 62133.

1. No deben desmontarse, abrirse ni triturarse las celdas.
2. Las celdas o baterías no deben someterse a calor ni fuego. Debe evitarse el almacenamiento a la luz directa del sol. Las celdas y baterías deben mantenerse limpias y secas. Limpiar las conexiones sucias con un paño seco y limpio.
3. Las celdas o baterías no deben cortocircuitarse. Es peligroso almacenar las celdas o baterías en estuches o cajones en cuyo interior puedan cortocircuitarse por contacto recíproco o por contacto con otros materiales conductores. No deben extraerse las celdas o baterías de sus embalajes originales hasta el momento en que vayan a utilizarse.
4. Las celdas o baterías no deben someterse a impactos mecánicos fuertes indebidos.
5. En caso de falta de estanqueidad de una celda, el líquido vertido no debe entrar en contacto con la piel ni los ojos. Si se produce contacto, lavar con agua abundante la zona afectada y avisar a un médico.
6. En caso de cambio o recarga inadecuados, las celdas o baterías que contienen electrolitos alcalinos (p. ej. las celdas de litio) pueden explotar. Para garantizar la seguridad del producto, las celdas o baterías solo deben ser sustituidas por el tipo Rohde & Schwarz correspondiente (ver lista de recambios).
7. Las baterías y celdas deben reciclarse y no deben tirarse a la basura doméstica. Las baterías o acumuladores que contienen plomo, mercurio o cadmio deben tratarse como residuos especiales. Respete en esta relación las normas nacionales de eliminación y reciclaje.

Transporte

1. El producto puede tener un peso elevado. Por eso es necesario desplazarlo o transportarlo con precaución y, si es necesario, usando un sistema de elevación adecuado (p. ej. una carretilla elevadora), a fin de evitar lesiones en la espalda u otros daños personales.

Instrucciones de seguridad elementales

2. Las asas instaladas en los productos sirven solamente de ayuda para el transporte del producto por personas. Por eso no está permitido utilizar las asas para la sujeción en o sobre medios de transporte como p. ej. grúas, carretillas elevadoras de horquilla, carros etc. Es responsabilidad suya fijar los productos de manera segura a los medios de transporte o elevación. Para evitar daños personales o daños en el producto, siga las instrucciones de seguridad del fabricante del medio de transporte o elevación utilizado.
3. Si se utiliza el producto dentro de un vehículo, recae de manera exclusiva en el conductor la responsabilidad de conducir el vehículo de manera segura y adecuada. El fabricante no asumirá ninguna responsabilidad por accidentes o colisiones. No utilice nunca el producto dentro de un vehículo en movimiento si esto pudiera distraer al conductor. Asegure el producto dentro del vehículo debidamente para evitar, en caso de un accidente, lesiones u otra clase de daños.

Eliminación/protección del medio ambiente

1. Los dispositivos marcados contienen una batería o un acumulador que no se debe desechar con los residuos domésticos sin clasificar, sino que debe ser recogido por separado. La eliminación se debe efectuar exclusivamente a través de un punto de recogida apropiado o del servicio de atención al cliente de Rohde & Schwarz.
2. Los dispositivos eléctricos usados no se deben desechar con los residuos domésticos sin clasificar, sino que deben ser recogidos por separado. Rohde & Schwarz GmbH & Co.KG ha elaborado un concepto de eliminación de residuos y asume plenamente los deberes de recogida y eliminación para los fabricantes dentro de la UE. Para desechar el producto de manera respetuosa con el medio ambiente, diríjase a su servicio de atención al cliente de Rohde & Schwarz.
3. Si se trabaja de manera mecánica y/o térmica cualquier producto o componente más allá del funcionamiento previsto, pueden liberarse sustancias peligrosas (polvos con contenido de metales pesados como p. ej. plomo, berilio o níquel). Por eso el producto solo debe ser desmontado por personal especializado con formación adecuada. Un desmontaje inadecuado puede ocasionar daños para la salud. Se deben tener en cuenta las directivas nacionales referentes a la eliminación de residuos.

Instrucciones de seguridad elementales

4. En caso de que durante el trato del producto se formen sustancias peligrosas o combustibles que deban tratarse como residuos especiales (p. ej. refrigerantes o aceites de motor con intervalos de cambio definidos), deben tenerse en cuenta las indicaciones de seguridad del fabricante de dichas sustancias y las normas regionales de eliminación de residuos. Tenga en cuenta también en caso necesario las indicaciones de seguridad especiales contenidas en la documentación del producto. La eliminación incorrecta de sustancias peligrosas o combustibles puede causar daños a la salud o daños al medio ambiente.

Se puede encontrar más información sobre la protección del medio ambiente en la página web de Rohde & Schwarz.

Grundlegende Sicherheitshinweise

Lesen und beachten Sie unbedingt die nachfolgenden Anweisungen und Sicherheitshinweise!

Alle Werke und Standorte der Rohde & Schwarz Firmengruppe sind ständig bemüht, den Sicherheitsstandard unserer Produkte auf dem aktuellsten Stand zu halten und unseren Kunden ein höchstmögliches Maß an Sicherheit zu bieten. Unsere Produkte und die dafür erforderlichen Zusatzgeräte werden entsprechend der jeweils gültigen Sicherheitsvorschriften gebaut und geprüft. Die Einhaltung dieser Bestimmungen wird durch unser Qualitätssicherungssystem laufend überwacht. Das vorliegende Produkt ist gemäß EU-Konformitätsbescheinigung gebaut und geprüft und hat das Werk in sicherheitstechnisch einwandfreiem Zustand verlassen. Um diesen Zustand zu erhalten und einen gefahrlosen Betrieb sicherzustellen, muss der Benutzer alle Hinweise, Warnhinweise und Warnvermerke beachten. Bei allen Fragen bezüglich vorliegender Sicherheitshinweise steht Ihnen die Rohde & Schwarz Firmengruppe jederzeit gerne zur Verfügung.

Darüber hinaus liegt es in der Verantwortung des Benutzers, das Produkt in geeigneter Weise zu verwenden. Das Produkt ist ausschließlich für den Betrieb in Industrie und Labor bzw., wenn ausdrücklich zugelassen, auch für den Feldeinsatz bestimmt und darf in keiner Weise so verwendet werden, dass einer Person/Sache Schaden zugefügt werden kann. Die Benutzung des Produkts außerhalb des bestimmungsgemäßen Gebrauchs oder unter Missachtung der Anweisungen des Herstellers liegt in der Verantwortung des Benutzers. Der Hersteller übernimmt keine Verantwortung für die Zweckentfremdung des Produkts.









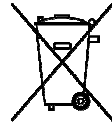
Die bestimmungsgemäße Verwendung des Produkts wird angenommen, wenn das Produkt nach den Vorgaben der zugehörigen Produktdokumentation innerhalb seiner Leistungsgrenzen verwendet wird (siehe Datenblatt, Dokumentation, nachfolgende Sicherheitshinweise). Die Benutzung des Produkts erfordert Fachkenntnisse und zum Teil englische Sprachkenntnisse. Es ist daher zu beachten, dass das Produkt ausschließlich von Fachkräften oder sorgfältig eingewiesenen Personen mit entsprechenden Fähigkeiten bedient werden darf. Sollte für die Verwendung von Rohde & Schwarz-Produkten persönliche Schutzausrüstung erforderlich sein, wird in der Produktdokumentation an entsprechender Stelle darauf hingewiesen. Bewahren Sie die grundlegenden Sicherheitshinweise und die Produktdokumentation gut auf und geben Sie diese an weitere Benutzer des Produkts weiter.

Grundlegende Sicherheitshinweise




Die Einhaltung der Sicherheitshinweise dient dazu, Verletzungen oder Schäden durch Gefahren aller Art auszuschließen. Hierzu ist es erforderlich, dass die nachstehenden Sicherheitshinweise vor der Benutzung des Produkts sorgfältig gelesen und verstanden sowie bei der Benutzung des Produkts beachtet werden. Sämtliche weitere Sicherheitshinweise wie z.B. zum Personenschutz, die an entsprechender Stelle der Produktdokumentation stehen, sind ebenfalls unbedingt zu beachten. In den vorliegenden Sicherheitshinweisen sind sämtliche von der Rohde & Schwarz Firmengruppe vertriebenen Waren unter dem Begriff „Produkt“ zusammengefasst, hierzu zählen u. a. Geräte, Anlagen sowie sämtliches Zubehör. Produktspezifische Angaben entnehmen Sie bitte dem Datenblatt sowie der Produktdokumentation.

Sicherheitskennzeichnung von Produkten

Die folgenden Sicherheitskennzeichen werden auf den Produkten verwendet, um vor Risiken und Gefahren zu warnen.

Symbol	Bedeutung	Symbol	Bedeutung
	Achtung, allgemeine Gefahrenstelle Produktdokumentation beachten	○	EIN/AUS-Versorgungsspannung
	Vorsicht beim Umgang mit Geräten mit hohem Gewicht	⏻	Stand-by-Anzeige
	Gefahr vor elektrischem Schlag	≡	Gleichstrom (DC)
	Warnung vor heißer Oberfläche	~	Wechselstrom (AC)
	Schutzleiteranschluss	⎓	Gleichstrom/Wechselstrom (DC/AC)
	Erdungsanschluss		Gerät durchgehend durch doppelte (verstärkte) Isolierung geschützt
	Masseanschluss		EU-Kennzeichnung für Batterien und Akkumulatoren Weitere Informationen in Abschnitt "Entsorgung / Umweltschutz", Punkt 1.

Grundlegende Sicherheitshinweise

Symbol	Bedeutung	Symbol	Bedeutung
	Achtung beim Umgang mit elektrostatisch gefährdeten Bauelementen		EU-Kennzeichnung für die getrennte Sammlung von Elektro- und Elektronikgeräten Weitere Informationen in Abschnitt "Entsorgung / Umweltschutz", Punkt 2.
	Warnung vor Laserstrahl Weitere Informationen in Abschnitt "Betrieb", Punkt 7.		

Signalworte und ihre Bedeutung

Die folgenden Signalworte werden in der Produktdokumentation verwendet, um vor Risiken und Gefahren zu warnen.



Kennzeichnet eine Gefahrensituation, die zum Tod oder zu schweren Verletzungen führt, wenn sie nicht vermieden wird.



Kennzeichnet eine Gefahrensituation, die zum Tod oder zu schweren Verletzungen führen kann, wenn sie nicht vermieden wird.



Kennzeichnet eine Gefahrensituation, die zu leichten oder mittelschweren Verletzungen führen kann, wenn sie nicht vermieden wird.



Kennzeichnet Informationen, die als wichtig angesehen werden, sich jedoch nicht auf Gefahren beziehen, z.B. Warnung vor möglichen Sachschäden.

Diese Signalworte entsprechen der im europäischen Wirtschaftsraum üblichen Definition für zivile Anwendungen. Neben dieser Definition können in anderen Wirtschaftsräumen oder bei militärischen Anwendungen abweichende Definitionen existieren. Es ist daher darauf zu achten, dass die hier beschriebenen Signalworte stets nur in Verbindung mit der zugehörigen Produktdokumentation und nur in Verbindung mit dem zugehörigen Produkt verwendet werden. Die Verwendung von Signalworten in Zusammenhang mit nicht zugehörigen Produkten oder nicht zugehörigen Dokumentationen kann zu Fehlinterpretationen führen und damit zu Personen- oder Sachschäden führen.

Grundlegende Sicherheitshinweise

Betriebszustände und Betriebslagen

Das Produkt darf nur in den vom Hersteller angegebenen Betriebszuständen und Betriebslagen ohne Behinderung der Belüftung betrieben werden. Werden die Herstellerangaben nicht eingehalten, kann dies elektrischen Schlag, Brand und/oder schwere Verletzungen von Personen, unter Umständen mit Todesfolge, verursachen. Bei allen Arbeiten sind die örtlichen bzw. landesspezifischen Sicherheits- und Unfallverhütungsvorschriften zu beachten.

1. Sofern nicht anders vereinbart, gilt für R&S-Produkte Folgendes:
als vorgeschriebene Betriebslage grundsätzlich Gehäuseboden unten, IP-Schutzart 2X, nur in Innenräumen verwenden, Betrieb bis 2000 m ü. NN, Transport bis 4500 m ü. NN, für die Nennspannung gilt eine Toleranz von $\pm 10\%$, für die Nennfrequenz eine Toleranz von $\pm 5\%$, Überspannungskategorie 2, Verschmutzungsgrad 2.
2. Stellen Sie das Produkt nicht auf Oberflächen, Fahrzeuge, Ablagen oder Tische, die aus Gewichts- oder Stabilitätsgründen nicht dafür geeignet sind. Folgen Sie bei Aufbau und Befestigung des Produkts an Gegenständen oder Strukturen (z.B. Wände und Regale) immer den Installationshinweisen des Herstellers. Bei Installation abweichend von der Produktdokumentation können Personen verletzt, unter Umständen sogar getötet werden.
3. Stellen Sie das Produkt nicht auf hitzeerzeugende Gerätschaften (z.B. Radiatoren und Heizlüfter). Die Umgebungstemperatur darf nicht die in der Produktdokumentation oder im Datenblatt spezifizierte Maximaltemperatur überschreiten. Eine Überhitzung des Produkts kann elektrischen Schlag, Brand und/oder schwere Verletzungen von Personen, unter Umständen mit Todesfolge, verursachen.

Elektrische Sicherheit

Werden die Hinweise zur elektrischen Sicherheit nicht oder unzureichend beachtet, kann dies elektrischen Schlag, Brand und/oder schwere Verletzungen von Personen, unter Umständen mit Todesfolge, verursachen.

1. Vor jedem Einschalten des Produkts ist sicherzustellen, dass die am Produkt eingestellte Nennspannung und die Netznennspannung des Versorgungsnetzes übereinstimmen. Ist es erforderlich, die Spannungseinstellung zu ändern, so muss ggf. auch die dazu gehörige Netzsicherung des Produkts geändert werden.
2. Bei Produkten der Schutzklasse I mit beweglicher Netzzuleitung und Gerätesteckvorrichtung ist der Betrieb nur an Steckdosen mit Schutzkontakt und angeschlossenem Schutzleiter zulässig.

Grundlegende Sicherheitshinweise

3. Jegliche absichtliche Unterbrechung des Schutzleiters, sowohl in der Zuleitung als auch am Produkt selbst, ist unzulässig. Es kann dazu führen, dass von dem Produkt die Gefahr eines elektrischen Schlags ausgeht. Bei Verwendung von Verlängerungsleitungen oder Steckdosenleisten ist sicherzustellen, dass diese regelmäßig auf ihren sicherheitstechnischen Zustand überprüft werden.
4. Sofern das Produkt nicht mit einem Netzschalter zur Netztrennung ausgerüstet ist, beziehungsweise der vorhandene Netzschalter zu Netztrennung nicht geeignet ist, so ist der Stecker des Anschlusskabels als Trennvorrichtung anzusehen.
Die Trennvorrichtung muss jederzeit leicht erreichbar und gut zugänglich sein. Ist z.B. der Netzstecker die Trennvorrichtung, darf die Länge des Anschlusskabels 3 m nicht überschreiten.
Funktionsschalter oder elektronische Schalter sind zur Netztrennung nicht geeignet. Werden Produkte ohne Netzschalter in Gestelle oder Anlagen integriert, so ist die Trennvorrichtung auf Anlagenebene zu verlagern.
5. Benutzen Sie das Produkt niemals, wenn das Netzkabel beschädigt ist. Überprüfen Sie regelmäßig den einwandfreien Zustand der Netzkabel. Stellen Sie durch geeignete Schutzmaßnahmen und Verlegearten sicher, dass das Netzkabel nicht beschädigt werden kann und niemand z.B. durch Stolperfallen oder elektrischen Schlag zu Schaden kommen kann.
6. Der Betrieb ist nur an TN/TT Versorgungsnetzen gestattet, die mit höchstens 16 A abgesichert sind (höhere Absicherung nur nach Rücksprache mit der Rohde & Schwarz Firmengruppe).
7. Stecken Sie den Stecker nicht in verstaubte oder verschmutzte Steckdosen/-buchsen. Stecken Sie die Steckverbindung/-vorrichtung fest und vollständig in die dafür vorgesehenen Steckdosen/-buchsen. Missachtung dieser Maßnahmen kann zu Funken, Feuer und/oder Verletzungen führen.
8. Überlasten Sie keine Steckdosen, Verlängerungskabel oder Steckdosenleisten, dies kann Feuer oder elektrische Schläge verursachen.
9. Bei Messungen in Stromkreisen mit Spannungen $U_{\text{eff}} > 30 \text{ V}$ ist mit geeigneten Maßnahmen Vorsorge zu treffen, dass jegliche Gefährdung ausgeschlossen wird (z.B. geeignete Messmittel, Absicherung, Strombegrenzung, Schutztrennung, Isolierung usw.).
10. Bei Verbindungen mit informationstechnischen Geräten, z.B. PC oder Industrierechner, ist darauf zu achten, dass diese der jeweils gültigen IEC60950-1 / EN60950-1 oder IEC61010-1 / EN 61010-1 entsprechen.

Grundlegende Sicherheitshinweise

11. Sofern nicht ausdrücklich erlaubt, darf der Deckel oder ein Teil des Gehäuses niemals entfernt werden, wenn das Produkt betrieben wird. Dies macht elektrische Leitungen und Komponenten zugänglich und kann zu Verletzungen, Feuer oder Schaden am Produkt führen.
12. Wird ein Produkt ortsfest angeschlossen, ist die Verbindung zwischen dem Schutzleiteranschluss vor Ort und dem Geräteschutzleiter vor jeglicher anderer Verbindung herzustellen. Aufstellung und Anschluss darf nur durch eine Elektrofachkraft erfolgen.
13. Bei ortsfesten Geräten ohne eingebaute Sicherung, Selbstschalter oder ähnliche Schutzeinrichtung muss der Versorgungskreis so abgesichert sein, dass alle Personen, die Zugang zum Produkt haben, sowie das Produkt selbst ausreichend vor Schäden geschützt sind.
14. Jedes Produkt muss durch geeigneten Überspannungsschutz vor Überspannung (z.B. durch Blitzschlag) geschützt werden. Andernfalls ist das bedienende Personal durch elektrischen Schlag gefährdet.
15. Gegenstände, die nicht dafür vorgesehen sind, dürfen nicht in die Öffnungen des Gehäuses eingebracht werden. Dies kann Kurzschlüsse im Produkt und/oder elektrische Schläge, Feuer oder Verletzungen verursachen.
16. Sofern nicht anders spezifiziert, sind Produkte nicht gegen das Eindringen von Flüssigkeiten geschützt, siehe auch Abschnitt "Betriebszustände und Betriebslagen", Punkt 1. Daher müssen die Geräte vor Eindringen von Flüssigkeiten geschützt werden. Wird dies nicht beachtet, besteht Gefahr durch elektrischen Schlag für den Benutzer oder Beschädigung des Produkts, was ebenfalls zur Gefährdung von Personen führen kann.
17. Benutzen Sie das Produkt nicht unter Bedingungen, bei denen Kondensation in oder am Produkt stattfinden könnte oder ggf. bereits stattgefunden hat, z.B. wenn das Produkt von kalter in warme Umgebung bewegt wurde. Das Eindringen von Wasser erhöht das Risiko eines elektrischen Schlages.
18. Trennen Sie das Produkt vor der Reinigung komplett von der Energieversorgung (z.B. speisendes Netz oder Batterie). Nehmen Sie bei Geräten die Reinigung mit einem weichen, nicht fasernden Staublappen vor. Verwenden Sie keinesfalls chemische Reinigungsmittel wie z.B. Alkohol, Aceton, Nitroverdünnung.

Grundlegende Sicherheitshinweise

Betrieb

1. Die Benutzung des Produkts erfordert spezielle Einweisung und hohe Konzentration während der Benutzung. Es muss sichergestellt sein, dass Personen, die das Produkt bedienen, bezüglich ihrer körperlichen, geistigen und seelischen Verfassung den Anforderungen gewachsen sind, da andernfalls Verletzungen oder Sachschäden nicht auszuschließen sind. Es liegt in der Verantwortung des Arbeitsgebers/Betreibers, geeignetes Personal für die Benutzung des Produkts auszuwählen.
2. Bevor Sie das Produkt bewegen oder transportieren, lesen und beachten Sie den Abschnitt "Transport".
3. Wie bei allen industriell gefertigten Gütern kann die Verwendung von Stoffen, die Allergien hervorrufen - so genannte Allergene (z.B. Nickel) - nicht generell ausgeschlossen werden. Sollten beim Umgang mit R&S-Produkten allergische Reaktionen, z.B. Hautausschlag, häufiges Niesen, Bindehautrötung oder Atembeschwerden auftreten, ist umgehend ein Arzt aufzusuchen, um die Ursachen zu klären und Gesundheitsschäden bzw. -belastungen zu vermeiden.
4. Vor der mechanischen und/oder thermischen Bearbeitung oder Zerlegung des Produkts beachten Sie unbedingt Abschnitt "Entsorgung / Umweltschutz", Punkt 1.
5. Bei bestimmten Produkten, z.B. HF-Funkanlagen, können funktionsbedingt erhöhte elektromagnetische Strahlungen auftreten. Unter Berücksichtigung der erhöhten Schutzwürdigkeit des ungeborenen Lebens müssen Schwangere durch geeignete Maßnahmen geschützt werden. Auch Träger von Herzschrittmachern können durch elektromagnetische Strahlungen gefährdet sein. Der Arbeitgeber/Betreiber ist verpflichtet, Arbeitsstätten, bei denen ein besonderes Risiko einer Strahlenexposition besteht, zu beurteilen und zu kennzeichnen und mögliche Gefahren abzuwenden.
6. Im Falle eines Brandes entweichen ggf. giftige Stoffe (Gase, Flüssigkeiten etc.) aus dem Produkt, die Gesundheitsschäden verursachen können. Daher sind im Brandfall geeignete Maßnahmen wie z.B. Atemschutzmasken und Schutzkleidung zu verwenden.

Grundlegende Sicherheitshinweise

7. Produkte mit Laser sind je nach ihrer Laser-Klasse mit genormten Warnhinweisen versehen. Laser können aufgrund der Eigenschaften ihrer Strahlung und aufgrund ihrer extrem konzentrierten elektromagnetischen Leistung biologische Schäden verursachen. Falls ein Laser-Produkt in ein R&S-Produkt integriert ist (z.B. CD/DVD-Laufwerk), dürfen keine anderen Einstellungen oder Funktionen verwendet werden, als in der Produktdokumentation beschrieben, um Personenschäden zu vermeiden (z.B. durch Laserstrahl).
8. EMV Klassen (nach EN 55011 / CISPR 11; sinngemäß EN 55022 / CISPR 22, EN 55032 / CISPR 32)
 - Gerät der Klasse A:
Ein Gerät, das sich für den Gebrauch in allen anderen Bereichen außer dem Wohnbereich und solchen Bereichen eignet, die direkt an ein Niederspannungs-Versorgungsnetz angeschlossen sind, das Wohngebäude versorgt.
Hinweis: Geräte der Klasse A sind für den Betrieb in einer industriellen Umgebung vorgesehen. Diese Geräte können wegen möglicher auftretender leitungsgebundener als auch gestrahlten Störgrößen im Wohnbereich Funkstörungen verursachen. In diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zur Beseitigung dieser Störungen durchzuführen.
 - Gerät der Klasse B:
Ein Gerät, das sich für den Betrieb im Wohnbereich sowie in solchen Bereichen eignet, die direkt an ein Niederspannungs-Versorgungsnetz angeschlossen sind, das Wohngebäude versorgt.

Reparatur und Service

1. Das Produkt darf nur von dafür autorisiertem Fachpersonal geöffnet werden. Vor Arbeiten am Produkt oder Öffnen des Produkts ist dieses von der Versorgungsspannung zu trennen, sonst besteht das Risiko eines elektrischen Schlages.
2. Abgleich, Auswechseln von Teilen, Wartung und Reparatur darf nur von R&S- autorisierten Elektrofachkräften ausgeführt werden. Werden sicherheitsrelevante Teile (z.B. Netzschalter, Netztrafos oder Sicherungen) ausgewechselt, so dürfen diese nur durch Originalteile ersetzt werden. Nach jedem Austausch von sicherheitsrelevanten Teilen ist eine Sicherheitsprüfung durchzuführen (Sichtprüfung, Schutzleitertest, Isolationswiderstand-, Ableitstrommessung, Funktionstest). Damit wird sichergestellt, dass die Sicherheit des Produkts erhalten bleibt.

Grundlegende Sicherheitshinweise

Batterien und Akkumulatoren/Zellen

Werden die Hinweise zu Batterien und Akkumulatoren/Zellen nicht oder unzureichend beachtet, kann dies Explosion, Brand und/oder schwere Verletzungen von Personen, unter Umständen mit Todesfolge, verursachen. Die Handhabung von Batterien und Akkumulatoren mit alkalischen Elektrolyten (z.B. Lithiumzellen) muss der EN 62133 entsprechen.

1. Zellen dürfen nicht zerlegt, geöffnet oder zerkleinert werden.
2. Zellen oder Batterien dürfen weder Hitze noch Feuer ausgesetzt werden. Die Lagerung im direkten Sonnenlicht ist zu vermeiden. Zellen und Batterien sauber und trocken halten. Verschmutzte Anschlüsse mit einem trockenen, sauberen Tuch reinigen.
3. Zellen oder Batterien dürfen nicht kurzgeschlossen werden. Zellen oder Batterien dürfen nicht gefahrbringend in einer Schachtel oder in einem Schubfach gelagert werden, wo sie sich gegenseitig kurzschließen oder durch andere leitende Werkstoffe kurzgeschlossen werden können. Eine Zelle oder Batterie darf erst aus ihrer Originalverpackung entnommen werden, wenn sie verwendet werden soll.
4. Zellen oder Batterien dürfen keinen unzulässig starken, mechanischen Stößen ausgesetzt werden.
5. Bei Undichtheit einer Zelle darf die Flüssigkeit nicht mit der Haut in Berührung kommen oder in die Augen gelangen. Falls es zu einer Berührung gekommen ist, den betroffenen Bereich mit reichlich Wasser waschen und ärztliche Hilfe in Anspruch nehmen.
6. Werden Zellen oder Batterien, die alkalische Elektrolyte enthalten (z.B. Lithiumzellen), unsachgemäß ausgewechselt oder geladen, besteht Explosionsgefahr. Zellen oder Batterien nur durch den entsprechenden R&S-Typ ersetzen (siehe Ersatzteilliste), um die Sicherheit des Produkts zu erhalten.
7. Zellen oder Batterien müssen wiederverwertet werden und dürfen nicht in den Restmüll gelangen. Akkumulatoren oder Batterien, die Blei, Quecksilber oder Cadmium enthalten, sind Sonderabfall. Beachten Sie hierzu die landesspezifischen Entsorgungs- und Recycling-Bestimmungen.

Grundlegende Sicherheitshinweise

Transport

1. Das Produkt kann ein hohes Gewicht aufweisen. Daher muss es vorsichtig und ggf. unter Verwendung eines geeigneten Hebemittels (z.B. Hubwagen) bewegt bzw. transportiert werden, um Rückenschäden oder Verletzungen zu vermeiden.
2. Griffe an den Produkten sind eine Handhabungshilfe, die ausschließlich für den Transport des Produkts durch Personen vorgesehen ist. Es ist daher nicht zulässig, Griffe zur Befestigung an bzw. auf Transportmitteln, z.B. Kränen, Gabelstaplern, Karren etc. zu verwenden. Es liegt in Ihrer Verantwortung, die Produkte sicher an bzw. auf geeigneten Transport- oder Hebemitteln zu befestigen. Beachten Sie die Sicherheitsvorschriften des jeweiligen Herstellers eingesetzter Transport- oder Hebemittel, um Personenschäden und Schäden am Produkt zu vermeiden.
3. Falls Sie das Produkt in einem Fahrzeug benutzen, liegt es in der alleinigen Verantwortung des Fahrers, das Fahrzeug in sicherer und angemessener Weise zu führen. Der Hersteller übernimmt keine Verantwortung für Unfälle oder Kollisionen. Verwenden Sie das Produkt niemals in einem sich bewegendem Fahrzeug, sofern dies den Fahrzeugführer ablenken könnte. Sichern Sie das Produkt im Fahrzeug ausreichend ab, um im Falle eines Unfalls Verletzungen oder Schäden anderer Art zu verhindern.

Entsorgung / Umweltschutz

1. Gekennzeichnete Geräte enthalten eine Batterie bzw. einen Akkumulator, die nicht über unsortierten Siedlungsabfall entsorgt werden dürfen, sondern getrennt gesammelt werden müssen. Die Entsorgung darf nur über eine geeignete Sammelstelle oder eine Rohde & Schwarz-Kundendienststelle erfolgen.
2. Elektroaltgeräte dürfen nicht über unsortierten Siedlungsabfall entsorgt werden, sondern müssen getrennt gesammelt werden. Rohde & Schwarz GmbH & Co. KG hat ein Entsorgungskonzept entwickelt und übernimmt die Pflichten der Rücknahme und Entsorgung für Hersteller innerhalb der EU in vollem Umfang. Wenden Sie sich bitte an Ihre Rohde & Schwarz-Kundendienststelle, um das Produkt umweltgerecht zu entsorgen.

Grundlegende Sicherheitshinweise

3. Werden Produkte oder ihre Bestandteile über den bestimmungsgemäßen Betrieb hinaus mechanisch und/oder thermisch bearbeitet, können ggf. gefährliche Stoffe (schwermetallhaltiger Staub wie z.B. Blei, Beryllium, Nickel) freigesetzt werden. Die Zerlegung des Produkts darf daher nur von speziell geschultem Fachpersonal erfolgen. Unsachgemäßes Zerlegen kann Gesundheitsschäden hervorrufen. Die nationalen Vorschriften zur Entsorgung sind zu beachten.
4. Falls beim Umgang mit dem Produkt Gefahren- oder Betriebsstoffe entstehen, die speziell zu entsorgen sind, z.B. regelmäßig zu wechselnde Kühlmittel oder Motorenöle, sind die Sicherheitshinweise des Herstellers dieser Gefahren- oder Betriebsstoffe und die regional gültigen Entsorgungsvorschriften einzuhalten. Beachten Sie ggf. auch die zugehörigen speziellen Sicherheitshinweise in der Produktdokumentation. Die unsachgemäße Entsorgung von Gefahren- oder Betriebsstoffen kann zu Gesundheitsschäden von Personen und Umweltschäden führen.

Weitere Informationen zu Umweltschutz finden Sie auf der Rohde & Schwarz Home Page.

Consignes de sécurité fondamentales

Lisez et respectez impérativement les instructions et consignes de sécurité suivantes

Dans un souci constant de garantir à nos clients le plus haut niveau de sécurité possible, l'ensemble des usines et des sites du groupe Rohde & Schwarz s'efforce de maintenir les produits du groupe en conformité avec les normes de sécurité les plus récentes. Nos produits ainsi que les accessoires nécessaires sont fabriqués et testés conformément aux directives de sécurité en vigueur. Le respect de ces directives est régulièrement vérifié par notre système d'assurance qualité. Le présent produit a été fabriqué et contrôlé selon le certificat de conformité CE et a quitté l'usine en un parfait état de sécurité. Pour le maintenir dans cet état et en garantir une utilisation sans danger, l'utilisateur doit respecter l'ensemble des consignes, remarques de sécurité et avertissements qui se trouvent dans ce manuel. Le groupe Rohde & Schwarz se tient à votre disposition pour toutes questions relatives aux présentes consignes de sécurité.

Il incombe ensuite à l'utilisateur d'employer ce produit de manière appropriée. Le produit est exclusivement destiné à l'utilisation en industrie et en laboratoire et/ou, si cela a été expressément autorisé, également aux travaux extérieurs ; il ne peut en aucun cas être utilisé à des fins pouvant causer des dommages aux personnes ou aux biens. L'exploitation du produit en dehors de son utilisation prévue ou le non-respect des consignes du constructeur se font sous la responsabilité de l'utilisateur. Le constructeur décline toute responsabilité en cas d'utilisation non conforme du produit.








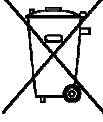
L'utilisation conforme du produit est supposée lorsque celui-ci est employé selon les consignes de la documentation produit correspondante, dans la limite de ses performances (voir fiche technique, documentation, consignes de sécurité ci-après). L'utilisation du produit exige des compétences dans le domaine et connaissances de base en anglais. Il faut donc considérer que le produit ne doit être utilisé que par un personnel qualifié ou des personnes formées de manière approfondie et possédant les compétences requises. Si, pour l'utilisation des produits Rohde & Schwarz, l'emploi d'un équipement personnel de protection s'avérait nécessaire, il en serait alors fait mention dans la documentation produit à l'emplacement correspondant. Gardez les consignes fondamentales de sécurité et la documentation produit dans un lieu sûr et transmettez ces documents aux autres utilisateurs.

Consignes de sécurité fondamentales


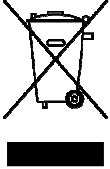

La stricte observation des consignes de sécurité a pour but d'exclure des blessures ou dommages survenant de tous types de danger. A cet effet, il est nécessaire de lire avec soin et de bien comprendre les consignes de sécurité ci-dessous avant l'utilisation du produit et de les respecter lors de l'utilisation du produit. Toutes les autres consignes de sécurité comme par exemple pour la protection de personnes, qui sont présentées à l'emplacement correspondant de la documentation produit, doivent également être impérativement respectées. Dans les présentes consignes de sécurité, l'ensemble des marchandises commercialisées par le groupe Rohde & Schwarz, notamment les appareils, les installations ainsi que les accessoires, est regroupé sous le terme « produit ». Pour les indications spécifiques au produit, voir la fiche technique ainsi que la documentation produit.

Marquages de sécurité des produits

Les symboles de sécurité ci-après sont utilisés sur les produits pour avertir des risques et dangers.

Symbole	Signification	Symbole	Signification
	Avis, source générale de danger Se référer à la documentation produit	○	Tension d'alimentation MARCHE / ARRET
	Attention lors de la manipulation d'appareils ayant un poids élevé	⏻	Indicateur de veille
	Risque de choc électrique	— — —	Courant continu (CC)
	Avertissement, surface chaude	~	Courant alternatif (CA)
	Connexion du conducteur de protection	⎓	Courant continu/alternatif (CC/CA)
	Point de mise à la terre	□	Appareil protégé par isolation double (renforcée)
	Point de mise à la masse		Marquage UE pour piles, batteries et accumulateurs Pour plus d'informations, voir le paragraphe "Elimination / Protection de l'environnement", point 1.

Consignes de sécurité fondamentales

Symbole	Signification	Symbole	Signification
	Avis : Prudence lors de la manipulation de composants sensibles aux décharges électrostatiques		Marquage UE pour la collecte séparée d'appareils électriques et électroniques Pour plus d'informations, voir le paragraphe "Elimination / Protection de l'environnement", point 2.
	Avertissement, rayon laser Pour plus d'informations, voir le paragraphe "Fonctionnement", point 7.		

Mots de signalisation et significations

Les mots de signalisation suivants sont utilisés dans la documentation produit pour avertir des risques et dangers.



Indique une situation dangereuse qui, si elle n'est pas évitée, causera des blessures graves ou mortelles.



Indique une situation dangereuse qui, si elle n'est pas évitée, pourrait causer des blessures graves ou mortelles.



Indique une situation dangereuse qui, si elle n'est pas évitée, pourrait causer des blessures mineures ou modérées.



Indique une information considérée comme importante, mais qui n'a pas trait à un danger particulier, par exemple, messages relatifs à des dommages matériels.

Dans la documentation produit, est synonyme du terme PRUDENCE.

Consignes de sécurité fondamentales

Ces mots de signalisation correspondent à la définition habituelle utilisée dans l'espace économique européen pour des applications civiles. Des définitions divergentes peuvent cependant exister dans d'autres espaces économiques ou dans le cadre d'applications militaires. Il faut donc veiller à ce que les mots de signalisation décrits ici ne soient utilisés qu'en relation avec la documentation produit correspondante et seulement avec le produit correspondant. L'utilisation des mots de signalisation en relation avec des produits ou des documentations non correspondants peut conduire à des erreurs d'interprétation et par conséquent à des dommages corporels ou matériels.

Etats et positions de fonctionnement

L'appareil ne doit être utilisé que dans les états et positions de fonctionnement indiqués par le constructeur. Toute obstruction de la ventilation doit être empêchée. Le non-respect des indications du constructeur peut provoquer des chocs électriques, des incendies et/ou des blessures graves pouvant éventuellement entraîner la mort. Pour tous les travaux, les directives locales et/ou nationales de sécurité et de prévention d'accidents doivent être respectées.

1. Sauf stipulations contraires, les produits Rohde & Schwarz répondent aux exigences ci-après :
faire fonctionner le produit avec le fond du boîtier toujours en bas, indice de protection IP 2X, utilisation uniquement à l'intérieur, fonctionnement à une altitude max. de 2000 m au-dessus du niveau de la mer, transport à une altitude max. de 4500 m au-dessus du niveau de la mer, tolérance de $\pm 10\%$ pour la tension nominale et de $\pm 5\%$ pour la fréquence nominale, catégorie de surtension 2, indice de pollution 2.
2. Ne jamais placer le produit sur des surfaces, véhicules, dépôts ou tables non appropriés pour raisons de stabilité et/ou de poids. Suivre toujours strictement les indications d'installation du constructeur pour le montage et la fixation du produit sur des objets ou des structures (par exemple parois et étagères). En cas d'installation non conforme à la documentation produit, il y a risque de blessures, voire de mort.
3. Ne jamais placer le produit sur des dispositifs générant de la chaleur (par exemple radiateurs et ventilateurs à air chaud). La température ambiante ne doit pas dépasser la température maximale spécifiée dans la documentation produit ou dans la fiche technique. Une surchauffe du produit peut provoquer des chocs électriques, des incendies et/ou des blessures graves pouvant éventuellement entraîner la mort.

Consignes de sécurité fondamentales

Sécurité électrique

Si les consignes relatives la sécurité électrique ne sont pas ou insuffisamment respectées, il peut s'ensuivre des chocs électriques, des incendies et/ou des blessures graves pouvant éventuellement entraîner la mort.

1. Avant chaque mise sous tension du produit, il faut s'assurer que la tension nominale réglée sur le produit correspond à la tension nominale du secteur. Si la tension réglée devait être modifiée, remplacer le fusible du produit si nécessaire.
2. Pour les produits de la classe de protection I, pourvus d'un câble secteur mobile et d'un connecteur secteur, leur utilisation n'est admise qu'avec des prises munies d'un contact de protection raccordé à la terre et d'un conducteur de protection avec prise de terre.
3. Toute déconnexion intentionnelle du conducteur de protection, dans le câble ou dans le produit lui-même, est interdite. Elle entraîne un risque de choc électrique au niveau du produit. En cas d'utilisation des câbles prolongateurs ou des multiprises, ceux-ci doivent être examinés régulièrement afin de garantir le respect des directives de sécurité.
4. Si l'appareil n'est pas doté d'un interrupteur secteur pour le couper du secteur ou si l'interrupteur secteur disponible n'est pas approprié pour couper l'appareil du secteur, le connecteur mâle du câble de raccordement est à considérer comme interrupteur.
L'interrupteur doit être à tout moment facilement accessible. Si, par exemple, le connecteur secteur sert d'interrupteur, la longueur du câble de raccordement ne doit pas dépasser 3 m.
Les commutateurs fonctionnels ou électroniques ne sont pas appropriés pour couper l'appareil du secteur. Si des produits sans interrupteur secteur sont intégrés dans des baies ou systèmes, le dispositif d'interruption secteur doit être reporté au niveau du système.
5. Ne jamais utiliser le produit si le câble secteur est endommagé. Vérifier régulièrement le parfait état du câble secteur. Prendre les mesures préventives et dispositions nécessaires pour que le câble secteur ne puisse pas être endommagé et que personne ne puisse subir de préjudice, par exemple en trébuchant sur le câble ou par des chocs électriques.
6. L'utilisation des produits est uniquement autorisée sur des réseaux secteur de type TN/TT protégés par des fusibles d'une intensité max. de 16 A (pour toute intensité supérieure, consulter le groupe Rohde & Schwarz).

Consignes de sécurité fondamentales

7. Ne jamais brancher le connecteur dans des prises secteur sales ou poussiéreuses. Enfoncer fermement le connecteur jusqu'au bout de la prise. Le non-respect de cette mesure peut provoquer des arcs, incendies et/ou blessures.
8. Ne jamais surcharger les prises, les câbles prolongateurs ou les multiprises, cela pouvant provoquer des incendies ou chocs électriques.
9. En cas de mesures sur les circuits électriques d'une tension efficace $> 30\text{ V}$, prendre les précautions nécessaires pour éviter tout risque (par exemple équipement de mesure approprié, fusibles, limitation de courant, coupe-circuit, isolation, etc.).
10. En cas d'interconnexion avec des équipements informatiques comme par exemple un PC ou un ordinateur industriel, veiller à ce que ces derniers soient conformes aux normes IEC 60950-1 / EN 60950-1 ou IEC 61010-1 / EN 61010-1 en vigueur.
11. Sauf autorisation expresse, il est interdit de retirer le couvercle ou toute autre pièce du boîtier lorsque le produit est en cours de service. Les câbles et composants électriques seraient ainsi accessibles, ce qui peut entraîner des blessures, des incendies ou des dégâts sur le produit.
12. Si un produit est connecté de façon permanente, établir avant toute autre connexion le raccordement du conducteur de protection local et du conducteur de protection du produit. L'installation et le raccordement ne doivent être effectués que par une personne qualifiée en électricité.
13. Sur les appareils installés de façon permanente sans fusible ni disjoncteur automatique ni dispositifs de protection similaires intégrés, le circuit d'alimentation doit être sécurisé de sorte que toutes les personnes ayant accès au produit et le produit lui-même soient suffisamment protégés contre tout dommage.
14. Chaque produit doit être protégé de manière appropriée contre les éventuelles surtensions (par exemple dues à un coup de foudre). Sinon les utilisateurs sont exposés à des risques de choc électrique.
15. Ne jamais introduire d'objets non prévus à cet effet dans les ouvertures du boîtier, étant donné que cela peut entraîner des courts-circuits dans le produit et/ou des chocs électriques, incendies ou blessures.

Consignes de sécurité fondamentales

16. Sauf spécification contraire, les produits ne sont pas protégés contre l'infiltration de liquides, voir aussi le paragraphe "Etats et positions de fonctionnement", point 1. Il faut donc protéger les appareils contre l'infiltration de liquides. La non-observation de cette consigne entraînera le risque de choc électrique pour l'utilisateur ou d'endommagement du produit, ce qui peut également mettre les personnes en danger.
17. Ne pas utiliser le produit dans des conditions pouvant occasionner ou ayant occasionné des condensations dans ou sur le produit, par exemple lorsque celui-ci est déplacé d'un environnement froid dans un environnement chaud. L'infiltration d'eau augmente le risque de choc électrique.
18. Avant le nettoyage, débrancher le produit de l'alimentation (par exemple secteur ou pile). Pour le nettoyage des appareils, utiliser un chiffon doux non pelucheux. N'utiliser en aucun cas de produit de nettoyage chimique, tel que de l'alcool, de l'acétone ou un solvant à base de cellulose.

Fonctionnement

1. L'utilisation du produit exige une formation spécifique ainsi qu'une grande concentration. Il est impératif que les personnes qui utilisent le produit présentent les aptitudes physiques, mentales et psychiques requises ; sinon des dommages corporels ou matériels ne pourront pas être exclus. Le choix du personnel qualifié pour l'utilisation du produit est sous la responsabilité de l'employeur/l'exploitant.
2. Avant de déplacer ou transporter le produit, lire et respecter le paragraphe "Transport".
3. Comme pour tous les biens produits de façon industrielle, l'utilisation de matériaux pouvant causer des allergies (allergènes, comme par exemple le nickel) ne peut être totalement exclue. Si, lors de l'utilisation de produits Rohde & Schwarz, des réactions allergiques surviennent – telles que éruption cutanée, éternuements fréquents, rougeur de la conjonctive ou difficultés respiratoires – il faut immédiatement consulter un médecin pour en clarifier la cause et éviter toute atteinte à la santé.
4. Avant le traitement mécanique et/ou thermique ou le démontage du produit, il faut impérativement observer le paragraphe "Elimination / Protection de l'environnement", point 1.

Consignes de sécurité fondamentales

5. Selon les fonctions, certains produits tels que des installations de radiocommunication RF peuvent produire des niveaux élevés de rayonnement électromagnétique. Etant donné la vulnérabilité de l'enfant à naître, les femmes enceintes doivent être protégées par des mesures appropriées. Des porteurs de stimulateurs cardiaques peuvent également être menacés par des rayonnements électromagnétiques. L'employeur/l'exploitant est obligé d'évaluer et de repérer les lieux de travail soumis à un risque particulier d'exposition aux rayonnements et de prévenir tous les dangers éventuels.
6. En cas d'incendie, des matières toxiques (gaz, liquides, etc.) pouvant nuire à la santé peuvent émaner du produit. Il faut donc, en cas d'incendie, prendre des mesures adéquates comme par exemple le port de masques respiratoires et de vêtements de protection.
7. Les produits laser sont munis d'avertissements normalisés d'après leur catégorie laser. En raison des caractéristiques de leur rayonnement et en raison de leur puissance électromagnétique extrêmement concentrée, les lasers peuvent provoquer des dommages biologiques. Si un produit laser est intégré dans un produit Rohde & Schwarz (par exemple lecteur CD/DVD), il ne faut pas utiliser de réglages ou fonctions autres que ceux décrits dans la documentation produit pour éviter tout dommage corporel (par exemple causé par rayon laser).
8. Classes CEM (selon EN 55011 / CISPR 11 ; selon EN 55022 / CISPR 22, EN 55032 / CISPR 32 par analogie)
 - Appareil de la classe A :
Appareil approprié à un usage dans tous les environnements autres que l'environnement résidentiel et les environnements raccordés directement à un réseau d'alimentation basse tension qui alimente des bâtiments résidentiels.
Remarque : Les appareils de la classe A sont destinés à être utilisés dans un environnement industriel. Ces appareils peuvent provoquer des perturbations radioélectriques dans l'environnement résidentiel en raison de perturbations susceptibles de se présenter sur des lignes ou d'être rayonnées. Dans ce cas, l'exploitant peut exiger la mise en œuvre de mesures appropriées pour éliminer ces perturbations.
 - Appareil de la classe B :
Appareil approprié à un usage dans l'environnement résidentiel ainsi que dans les environnements raccordés directement à un réseau d'alimentation basse tension qui alimente des bâtiments résidentiels.

Consignes de sécurité fondamentales

Réparation et service après-vente

1. Le produit ne doit être ouvert que par un personnel qualifié et autorisé. Avant de travailler sur le produit ou de l'ouvrir, il faut le couper de la tension d'alimentation ; sinon il y a risque de choc électrique.
2. Les travaux d'ajustement, le remplacement des pièces, la maintenance et la réparation ne doivent être effectués que par des électroniciens qualifiés et autorisés par Rohde & Schwarz. En cas de remplacement de pièces concernant la sécurité (notamment interrupteur secteur, transformateur secteur ou fusibles), celles-ci ne doivent être remplacées que par des pièces d'origine. Après chaque remplacement de pièces concernant la sécurité, une vérification de sécurité doit être effectuée (contrôle visuel, vérification du conducteur de protection, mesure de la résistance d'isolation et du courant de fuite, test de fonctionnement). Cela assure le maintien de la sécurité du produit.

Piles, batteries et accumulateurs/cellules

Si les instructions concernant les piles, batteries et accumulateurs/cellules ne sont pas ou insuffisamment respectées, cela peut provoquer des explosions, des incendies et/ou des blessures graves pouvant entraîner la mort. La manipulation de piles, batteries et accumulateurs contenant des électrolytes alcalins (par exemple cellules de lithium) doit être conforme à la norme EN 62133.

1. Les cellules ne doivent pas être démontées, ouvertes ni réduites en morceaux.
2. Ne jamais exposer les cellules, piles ou batteries à la chaleur ni au feu. Ne pas les stocker dans un endroit où elles sont exposées au rayonnement direct du soleil. Tenir les cellules, piles et batteries au sec. Nettoyer les raccords sales avec un chiffon sec et propre.
3. Ne jamais court-circuiter les cellules, piles ou batteries. Les cellules, piles ou batteries ne doivent pas être gardées dans une boîte ou un tiroir où elles peuvent se court-circuiter mutuellement ou être court-circuitées par des matériaux conducteurs. Une cellule, pile ou batterie ne doit être retirée de son emballage d'origine que lorsqu'on l'utilise.
4. Les cellules, piles ou batteries ne doivent pas être exposés à des chocs mécaniques de force non admissible.
5. En cas de manque d'étanchéité d'une cellule, le liquide ne doit pas entrer en contact avec la peau ou les yeux. S'il y a contact, rincer abondamment l'endroit concerné à l'eau et consulter un médecin.

Consignes de sécurité fondamentales

6. Il y a danger d'explosion en cas de remplacement ou chargement incorrect des cellules, piles ou batteries qui contiennent des électrolytes alcalins (par exemple cellules de lithium). Remplacer les cellules, piles ou batteries uniquement par le type Rohde & Schwarz correspondant (voir la liste des pièces de rechange) pour maintenir la sécurité du produit.
7. Il faut recycler les cellules, piles ou batteries et il est interdit de les éliminer comme déchets normaux. Les accumulateurs ou piles et batteries qui contiennent du plomb, du mercure ou du cadmium sont des déchets spéciaux. Observer les directives nationales d'élimination et de recyclage.

Transport

1. Le produit peut avoir un poids élevé. Il faut donc le déplacer ou le transporter avec précaution et en utilisant le cas échéant un moyen de levage approprié (par exemple chariot élévateur) pour éviter des dommages au dos ou des blessures.
2. Les poignées des produits sont une aide de manipulation exclusivement réservée au transport du produit par des personnes. Il est donc proscrit d'utiliser ces poignées pour attacher le produit à ou sur des moyens de transport, tels que grues, chariots élévateurs, camions etc. Vous êtes responsable de la fixation sûre des produits à ou sur des moyens de transport et de levage appropriés. Observer les consignes de sécurité du constructeur des moyens de transport ou de levage utilisés pour éviter des dommages corporels et des dégâts sur le produit.
3. L'utilisation du produit dans un véhicule se fait sous l'unique responsabilité du conducteur qui doit piloter le véhicule de manière sûre et appropriée. Le constructeur décline toute responsabilité en cas d'accidents ou de collisions. Ne jamais utiliser le produit dans un véhicule en mouvement si cela pouvait détourner l'attention du conducteur. Sécuriser suffisamment le produit dans le véhicule pour empêcher des blessures ou dommages de tout type en cas d'accident.

Elimination / Protection de l'environnement

1. Les appareils marqués contiennent une pile / batterie ou un accumulateur, qui ne doit pas être éliminé(e) avec les déchets urbains non triés, mais doit faire l'objet d'une collecte séparée. Les piles / batteries ou accumulateurs peuvent uniquement être éliminé(e)s par des points de collecte appropriés ou par un centre de service après-vente Rohde & Schwarz.

Consignes de sécurité fondamentales

2. Les déchets d'équipements électriques et électroniques ne doivent pas être éliminés avec les déchets urbains non triés, mais doivent être collectés séparément.

Rohde & Schwarz GmbH & Co. KG a développé un concept d'élimination et assume toutes les obligations en matière de reprise et d'élimination, valables pour les fabricants au sein de l'UE. Veuillez vous adresser à votre centre de service après-vente Rohde & Schwarz pour éliminer le produit de manière écologique.

3. Si les produits ou leurs composants sont travaillés mécaniquement et/ou thermiquement au-delà de l'utilisation prévue, des matières dangereuses (poussières contenant des métaux lourds comme par exemple du plomb, du béryllium ou du nickel) peuvent se dégager le cas échéant. Le démontage du produit ne doit donc être effectué que par du personnel qualifié. Le démontage inadéquat peut nuire à la santé. Les directives nationales pour l'élimination des déchets doivent être observées.
4. Si, en cas d'utilisation du produit, des matières dangereuses ou des combustibles sont dégagés qui exigent une élimination spéciale, comme par exemple liquides de refroidissement ou huiles moteurs qui sont à changer régulièrement, les consignes de sécurité du fabricant de ces matières combustibles ou dangereuses ainsi que les directives d'élimination des déchets en vigueur au niveau régional doivent être respectées. Les consignes de sécurité spéciales correspondantes dans la documentation produit sont à respecter le cas échéant. L'élimination non conforme des matières dangereuses ou combustibles peut provoquer des atteintes à la santé et des dommages écologiques.

Pour plus d'informations concernant la protection de l'environnement, voir la page d'accueil de Rohde & Schwarz.

Safety Instructions for Instruments with Fold-Out Feet

⚠ WARNING

Danger of injury

The feet may fold in if they are not folded out completely or if the instrument is shifted. The feet may break if they are overloaded.

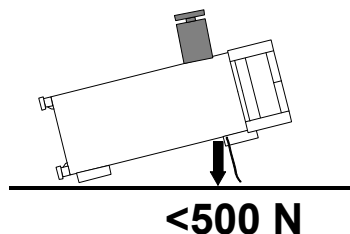
Fold the feet completely in or completely out to ensure stability of the instrument and personal safety.

To avoid injuries, never shift the instrument when its feet are folded out.

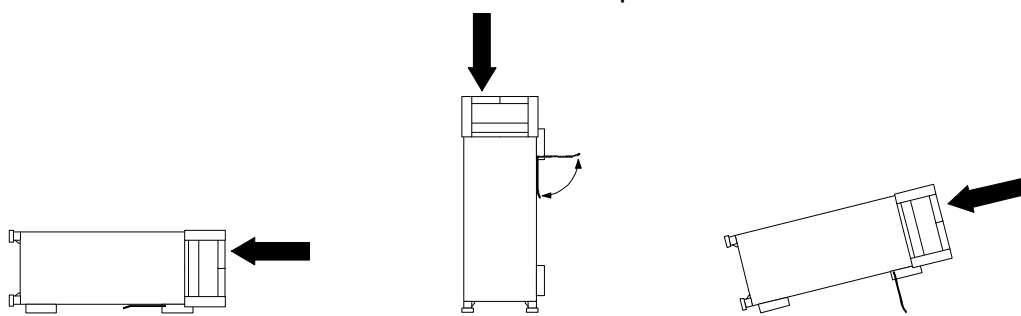
The overall load (the instrument's own weight plus that of the instruments stacked on top of it) on the folded-out feet must not exceed 500 N.

Place the instrument on a stable surface. Secure the instruments stacked on top of it against slipping (e.g. by locking their feet on the top front frame).

When the instrument is standing on its folded-out feet, do not work under the instrument and do not put anything under it, otherwise injuries or material damage could occur.



The instrument can be used in each of the positions shown here.



Informaciones de seguridad para aparatos con telepiés

⚠ ADVERTENCIA

Peligro de heridas

Los telepiés pueden doblarse hacia adentro si no han sido desdoblados por completo o si el aparato es movido. Los telepiés pueden romperse si son sobrecargados.

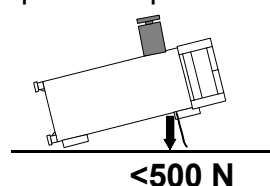
Doblar los telepiés por completo hacia afuera o hacia adentro. De esta manera se puede asegurar la estabilidad del aparato y a la vez la seguridad de las personas.

No mover nunca el aparato con los telepiés desdoblados, para evitar heridas.

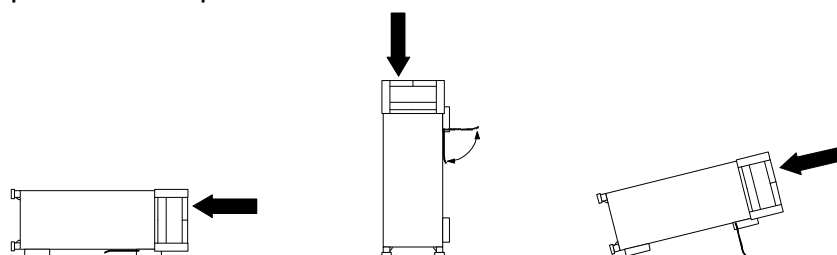
El peso total equilibrado (peso propio más el de los aparatos posicionados sobre este) ejercido sobre los telepiés no deberá exceder a los 500 N.

Posicionar el aparato sobre una superficie estable. Los aparatos puestos encima de éste deben estar asegurados para que no resbalen (por ejemplo fijando los pies del aparato en el listón del marco de delante arriba).

Por favor no manipulen debajo del aparato y no pongan nada debajo de este cuando esté posicionado sobre los telepiés desdoblados, ya que si no pueden originarse heridas o daños en objetos.



El aparato puede ser puesto en funcionamiento en cualquiera de las posiciones aquí descritas.



Sicherheitshinweise für Geräte mit ausklappbaren Stellfüßen

⚠️ WARNUNG

Verletzungsgefahr

Stellfüße können einklappen, wenn nicht vollständig ausgeklappt oder wenn Gerät verschoben wird. Stellfüße können abbrechen, wenn überbelastet.

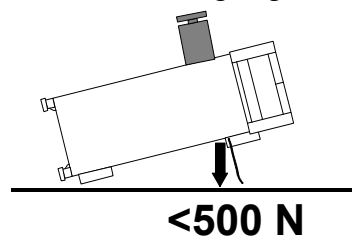
Stellfüße vollständig einklappen oder vollständig ausklappen. Nur so ist die Stabilität des Gerätes und damit die Sicherheit von Personen gewährleistet.

Gerät nie mit ausgeklappten Stellfüßen verschieben, um Verletzungen zu vermeiden.

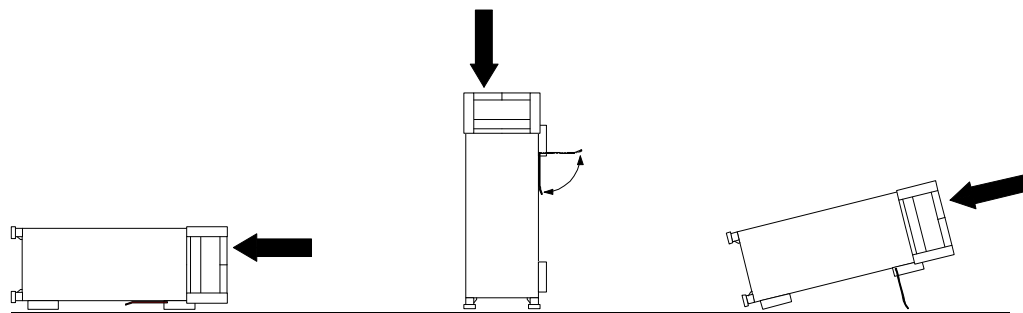
Gleichmäßige Gesamtbelastung (Eigengewicht und darauf abgestellte Geräte) auf die ausgeklappten Stellfüße darf 500 N nicht überschreiten.

Gerät auf stabile Unterlage stellen. Die darauf abgestellten Geräte gegen Verrutschen sichern (z.B. durch Einrasten der Gerätefüße an der oberen Frontrahmenleiste).

Nicht unter dem Gerät hantieren und nichts darunter stellen, wenn es auf ausgeklappten Stellfüßen steht, da andernfalls Verletzungen oder Sachbeschädigungen möglich sind.



Das Gerät kann in jeder hier abgebildeten Lage betrieben werden.



Consignes de sécurité pour appareils avec pieds de positionnement dépliables

⚠ AVERTISSEMENT

Risque de blessures

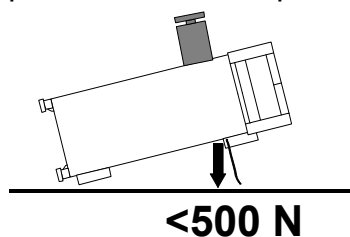
Les pieds de positionnement peuvent se replier s'ils ne sont pas entièrement dépliés ou si l'appareil est décalé. Des pieds de positionnement peuvent se casser si l'appareil est surchargé.

Déplier ou replier complètement les pieds de positionnement. Ce n'est qu'à ces conditions que la stabilité de l'appareil, donc la sécurité des personnes, sont garanties.

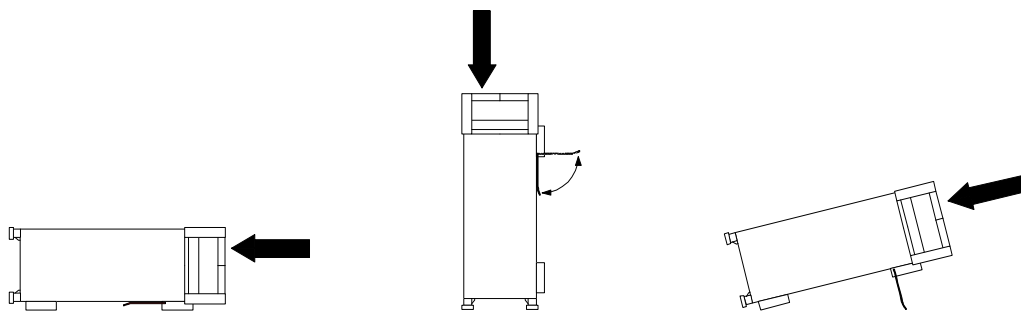
Ne jamais décaler les appareils avec des pieds de positionnement dépliés pour éviter des blessures.

Ne jamais dépasser 500 N de charge totale uniforme (poids propre et appareils posés dessus) sur les pieds de positionnement dépliés. Placer l'appareil sur un support stable. Protéger les appareils contre les glissements (par exemple en emboîtant les pieds des appareils dans la plinthe supérieure de la face avant).

Ne jamais manipuler sous l'appareil ni placer des objets si l'appareil est positionné sur ses pieds afin d'éviter des blessures ou des dommages.



L'appareil peut être utilisé dans toutes les positions illustrées ici.



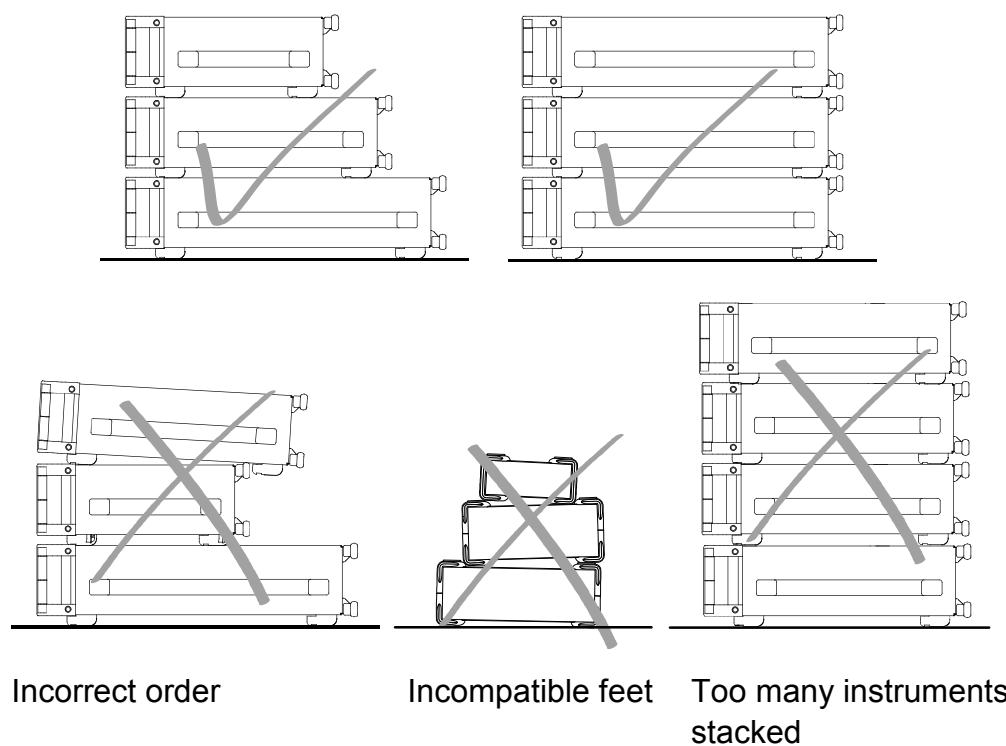
Safety Instructions for Stacking Instruments

⚠ WARNING

Danger of injury

Instruments may slip if they are stacked on top of each other.

Place the instrument on a stable, even surface. Stack the instruments according to their size, with the largest instrument on the bottom. Do not stack more than three instruments directly on top of each other. Instruments may only be stacked if their feet and housing allow horizontal stacking. If these conditions are not met, the instruments must be installed in a rack in order to avoid the risk of personal injury and material damage.



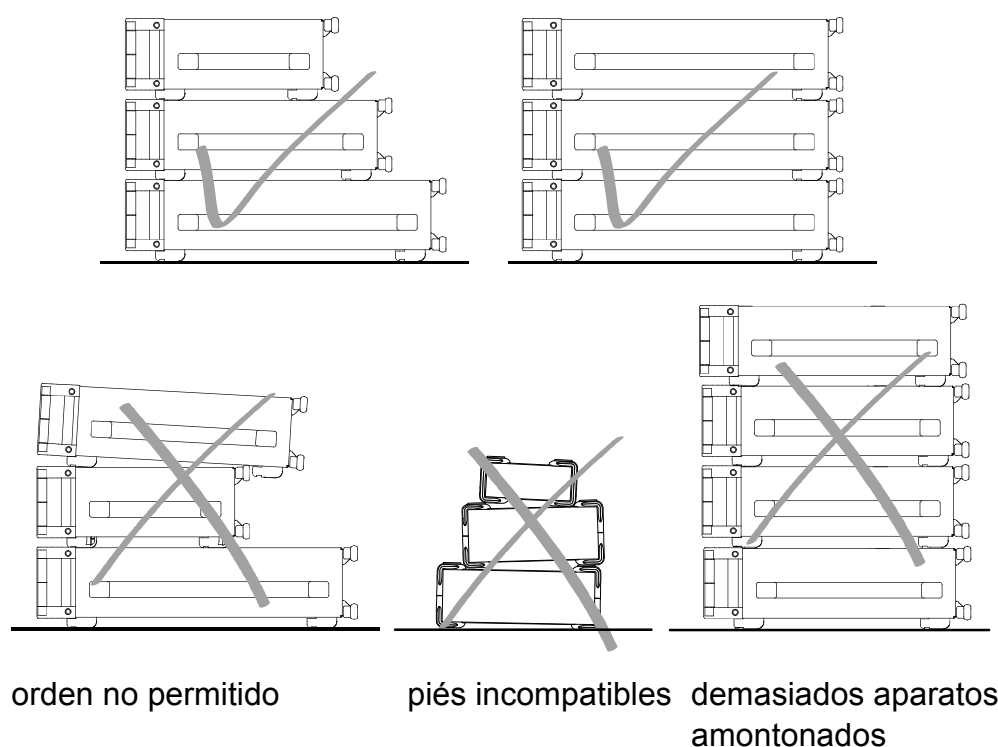
Informaciones de seguridad para el amontonamiento de aparatos

⚠ ADVERTENCIA

Peligro de heridas

Los aparatos pueden desplazarse al ser amontonados.

Posicionar los aparatos sobre una superficie estable y lisa. Amontonar los aparatos por orden de su tamaño. No amontonar nunca más de tres aparatos uno sobre el otro. Los aparatos solamente deberán ser amontonados, si los piés y la caja del aparato correspondiente hacen posible amontonarlos de forma horizontal. Si no se cumplen estas condiciones, deberán ser montados los aparatos en una caja apta para este propósito. De esta manera evitarán el riesgo de daños en personas y daños en el aparato.



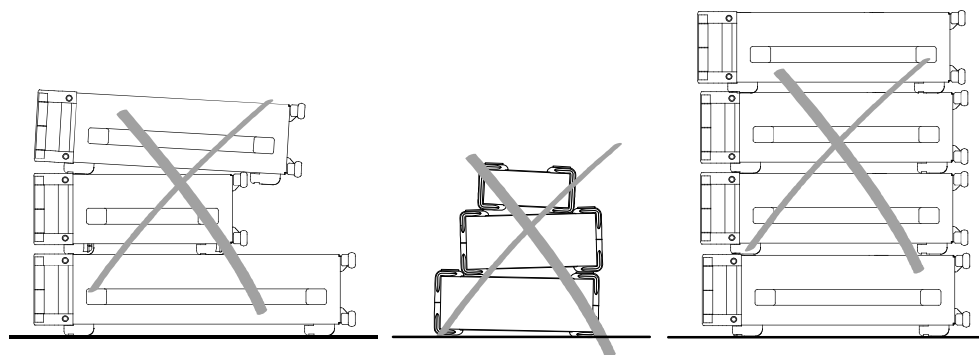
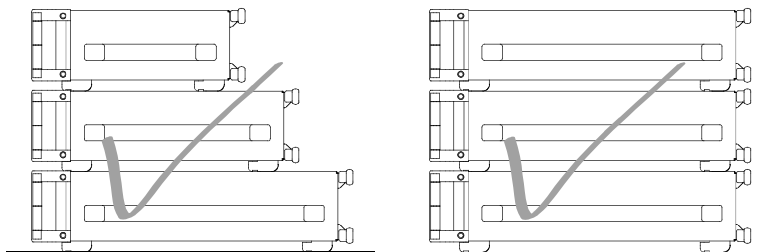
Sicherheitshinweise für das Stapeln von Geräten

⚠️ WARNUNG

Verletzungsgefahr

Geräte können beim Aufeinanderstapeln verrutschen.

Gerät auf stabile, gerade Unterlage stellen. Die Geräte der Größe nach stapeln. Nicht mehr als drei Geräte direkt übereinander stellen. Geräte dürfen nur gestapelt werden, wenn Gerätefüße und Gehäuseteile waagerechtes Stapeln ermöglichen. Wenn diese Bedingungen nicht erfüllt sind, müssen die Geräte in ein Gestell eingebaut werden. So vermeiden Sie das Risiko von Personenschäden und Schäden am Gerät.



falsche Reihenfolge

inkompatible FüÙe

zu viele Geräte gestapelt

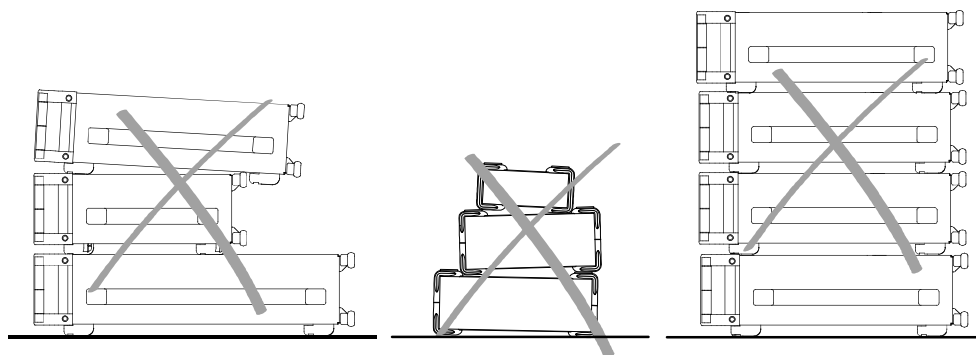
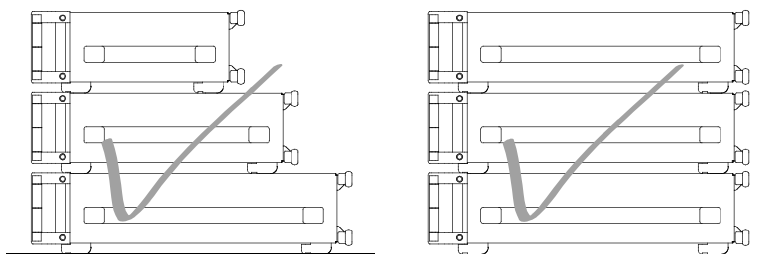
Consignes de sécurité pour l'empilage des appareils

⚠ AVERTISSEMENT

Risque de blessures

Les appareils peuvent se décaler lorsqu'ils sont empilés.

Les appareils doivent toujours être placés sur une surface stable et plane et empilés en fonction de leur taille sans jamais dépasser trois appareils. Empiler uniquement des appareils dont les pieds et boîtiers permettent un positionnement horizontal. En cas d'impossibilité, les appareils doivent être intégrés dans une baie afin d'éviter des dommages corporels et matériels.



mauvaise séquence

pieds incompatibles

trop d'appareils empilés

Customer Support

Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz equipment, contact one of our Customer Support Centers. A team of highly qualified engineers provides telephone support and will work with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz equipment.

Up-to-date information and upgrades

To keep your instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish.

We will take care that you will get the right information.

Europe, Africa, Middle East

Phone +49 89 4129 12345
customersupport@rohde-schwarz.com

North America

Phone 1-888-TEST-RSA (1-888-837-8772)
customer.support@rsa.rohde-schwarz.com

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customersupport.china@rohde-schwarz.com



Quality management and environmental management

Certified Quality System
ISO 9001

Certified Environmental System
ISO 14001

Sehr geehrter Kunde,

Sie haben sich für den Kauf eines Rohde&Schwarz-Produktes entschieden. Sie erhalten damit ein nach modernsten Fertigungsmethoden hergestelltes Produkt. Es wurde nach den Regeln unserer Qualitäts- und Umweltmanagementsysteme entwickelt, gefertigt und geprüft. Rohde&Schwarz ist unter anderem nach den Managementsystemen ISO9001 und ISO 14001 zertifiziert.

Der Umwelt verpflichtet

- ▀ Energie-effiziente, RoHS-konforme Produkte
- ▀ Kontinuierliche Weiterentwicklung nachhaltiger Umweltkonzepte
- ▀ ISO 14001-zertifiziertes Umweltmanagementsystem

Dear customer,

You have decided to buy a Rohde&Schwarz product. This product has been manufactured using the most advanced methods. It was developed, manufactured and tested in compliance with our quality management and environmental management systems. Rohde&Schwarz has been certified, for example, according to the ISO9001 and ISO 14001 management systems.

Environmental commitment

- ▀ Energy-efficient products
- ▀ Continuous improvement in environmental sustainability
- ▀ ISO 14001-certified environmental management system

Cher client,

Vous avez choisi d'acheter un produit Rohde&Schwarz. Vous disposez donc d'un produit fabriqué d'après les méthodes les plus avancées. Le développement, la fabrication et les tests de ce produit ont été effectués selon nos systèmes de management de qualité et de management environnemental. La société Rohde&Schwarz a été homologuée, entre autres, conformément aux systèmes de management ISO9001 et ISO 14001.

Engagement écologique

- ▀ Produits à efficience énergétique
- ▀ Amélioration continue de la durabilité environnementale
- ▀ Système de management environnemental certifié selon ISO 14001



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0 Documentation Overview

Quick Start Guide

The printed Quick Start Guide is delivered with the R&S DVSG. On CD-ROM, the Quick Start Guide is provided in the PDF format. It contains the following information:

- ◆ Chapter 1
Describes the instrument's controls and the connectors using front- and rear-panel views. How to prepare the instrument for operation is also described. The procedure for connecting external devices such as a printer, keyboard, mouse, and monitor is also explained. Specifications for the interfaces are contained in the data sheet.
- ◆ Chapter 2
Provides an overview of the instrument's functions and operating concept.
- ◆ Chapter 3
Explains the instrument's individual menus and functions.

Operating Manual

The Operating Manual is provided on the CD-ROM in PDF format. It contains the following information:

- ◆ Chapter 4
Describes the basic principles of remote control.
- ◆ Chapter 5
Describes how to use the remote operation commands.
- ◆ Chapter 6
Describes the instrument's interfaces.
- ◆ Chapter 7
Describes how to maintain the instrument.
- ◆ Chapter 8
Contains an overview of the error messages that the instrument may produce.

Online Help

The Online Help is available on the R&S DVSG and on the CD-ROM. It includes all information provided by the Quick Start Guide and the Operating Manual.

On the R&S DVSG, the Online Help is context-sensitive and is called by means of the HELP hardkey. For detailed information on using the Online Help refer to Chapter "Manual Operation" in the Quick Start Guide or the Online Help.

CD-ROM

The CD-ROM is delivered with the instrument. It provides the manuals in PDF format and the Online Help in CHM format.

1 Putting the Instrument into Operation

1.1 Explanation of the Front Panel

This section provides an overview of the controls and connectors on the instrument's front panel. Each control or connector is briefly described along with a reference to the chapter(s) containing detailed information about its usage.

Figure 1.1-1 Explanation of the front panel



The ON/OFF button switches the instrument from standby mode to ready mode.

The AC power switch on the back of the instrument must be switched on.

The yellow LED to the right is illuminated in standby mode.

The green LED to the left is illuminated in ready mode (see "[Switching the Instrument On](#)").

WARNING

Shock hazard

In standby mode, the instrument is still power-supplied.

Hardkeys



Sets a defined instrument state. (see Operating Manual, Chapter 4).

(PC keyboard analogy: F4)



Switches from REMOTE mode (remote control) to LOCAL mode (manual operation). (see Operating Manual, Chapter 4).

(PC keyboard analogy: F3)



Used to manage the favorites and the user fields in the information area of the display. (see Operating Manual, Chapter 4).

(PC keyboard analogy: F2)



Button for accessing context-sensitive help. (see Operating Manual, Chapter 4).

(PC keyboard analogy: F1)



Used to save and reload instrument states and manage files.

(PC keyboard analogy: F5)



Used for instrument configuration.

(PC keyboard analogy: F6)



Resets the navigation.

(PC keyboard analogy: F8)



Switches to another application, e.g. TS Player, Native Video Generator, Broadcast Video Generator.

(PC keyboard analogy: F9)

Softkeys



Executes the commands displayed by the softkey labels.

(PC keyboard analogy: CTRL + 1 – 8)

Keypad



Keypad for entering data.



Used to enter zero.

Used to enter a space.



Used to enter a decimal point.

Used to enter a special character.



Used to enter the sign.

Switches between uppercase and lowercase letters.

Multiplier of the input values.



- ◆ Calls up the next menu level.
(PC keyboard analogy: ALT + F9)



- ◆ Activates editing mode for the marked numeric and alphanumeric parameters.
(PC keyboard analogy: ALT + F10)



- ◆ Data entry is completed and the new value is accepted. For numeric parameters, the unit is displayed in the menu next to the value.
(PC keyboard analogy: ALT + F11)



- ◆ Switches the marked status parameters on/off (State On/Off). Confirms (OK) and closes message windows.
(PC keyboard analogy: ENTER)



Deletes the character to the left of the cursor

(PC keyboard analogy: Backspace key)



Changes between the insert and overwrite modes.

(PC keyboard analogy: ESC key)

Rotary Knob



Moving the rotary knob left or right:

- ◆ Varies the input value at the cursor position. You can set and activate a fixed step size for the frequency and the level.
- ◆ Navigates within the tree and the work view.
- ◆ Moves the cursor in the tables and drop-down lists.

(PC keyboard analogy: Tab key corresponds to moving left, Shift + Tab key combination to moving right)



To complete your entry, press the rotary knob (click = Enter). The editing mode is terminated and the value is accepted.

(PC keyboard analogy: Shift + ENTER)

Cursor Keys



- ◆ Moves the cursor in the input fields in editing mode.
- ◆ Marks the parameters in the menus and in the tables (left/right).

(PC keyboard analogy: cursor keys)

Interfaces and Connectors on the Front Panel



USB interfaces

(USB = Universal Serial Bus) type A (host USB).

- ◆ Connection of external devices such as a mouse, keyboard.
- ◆ Connection of the memory stick for transferring files.

Another USB interface type A (host USB) is available on the rear panel.



TS Output

75 Ω BNC output for the serial transport stream according to DVB ASI and SMPTE 310M.

1.2 Explanation of the Rear Panel

This section provides an overview of the connectors on the instrument's rear panel. Each connector is briefly described along with a reference to the chapter(s) containing detailed information about its usage. Specifications for the connectors are contained in the data sheet.

Figure 1.2-1 Rear-panel view



AC power connector

The R&S DVSG is equipped with AC voltage detection. The instrument will automatically set itself to the AC voltage it detects (range: see the type label). No external switching or modification of the fuses is necessary.



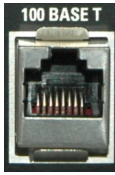
AC power switch

The AC power switch is located below the AC power connector.



AC power fuse

See "[AC Power Fuses](#)" and the data sheet.

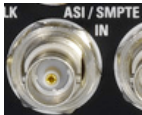
**LAN interface**

For remote control and FTP file transfer.

**REF CLK IN**

BNC Connector, female, 75 Ω

10 MHz reference clock input for external synchronization of the generator

**ASI / SMPTE IN**

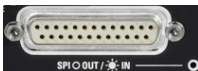
BNC Connector, female, 75 Ω

TS ASI /SMPTE 310M input

**ASI / SMPTE OUT**

BNC Connector, female, 75 Ω

TS ASI /SMPTE 310M output

**SPI OUT / IN**

25pin, female

Parallel transport stream input (LED OFF) / output (LED ON)

**HDMI**

High-Definition Multimedia Interface, 19pin, female

Digital video and audio output

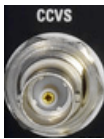


USB

USB interfaces (USB = Universal Serial Bus) type A (host USB).

- ◆ Connection of external devices such as mouse, keyboard, printer.
- ◆ Connection of the memory stick for transferring files.

Further USB interfaces type A (host USB) are located on the front panel of the instrument.



CCVS

BNC Connector, female, 75 Ω

Analog composite video output for PAL / NTSC signals



G/Y; B/Pb; R/Pr

BNC Connector, female, 75 Ω

Analog component video output for GBR / YCBCR signals.

The unlabeled connector at the right is for future use.



VGA

15 pin VGA connector, female

Analog video output for GBR



HD-SDI

BNC Connector, female, 75 Ω

Digital component video output in SDI and HD-SDI format; only available with the AV Signal Player option (R&S DVSG-B30).



SCART

21 pin scart connector (female)

Analog composite and component video output and analog stereo audio output.



D4

14 pin D-video connector (female)

Analog composite and component video output

**S-VIDEO**

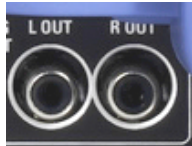
4 pin Mini-DIN (female)
Y/C analog video output

**DIG IN / DIG OUT**

TOSLINK connector (female)
Optical Digital audio (stereo) input and output.

**Note:**

The input signal can be looped through as audio content onto the HDMI output.

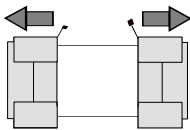
**L OUT / R OUT**

RCA Jack (female)
Stereo output for analog audio;
only available with the SDI/HD-SDI Output option (R&S DVSG-K30).

1.3 Preparing for Operation

The following section describes how to prepare the instrument for operation and how to connect external devices. Please observe the general safety instructions for operating the instrument. For information on installing options and updating the software, refer to the service manual.

1.3.1 Unpacking the Instrument



Remove
protective
covers

- ◆ After unpacking the instrument, check the supplied equipment against the delivery note and the lists of accessories to make sure that everything is present.
- ◆ Remove the two protective covers at the front and the rear of the instrument and carefully check the instrument for possible damage.
- ◆ If you find any damage, inform the carrier immediately. Keep the packaging material to support your claim.
- ◆ The original packaging is also useful for transporting or shipping the instrument later on. Retain at least the two protective covers for the front and rear panel to keep the controls and connectors from being damaged during subsequent shipping..

1.3.2 Positioning the Instrument or Installing It in a 19" Rack

The instrument is designed for interior use only. You can set it up individually or install it in a 19" rack.

To install it in a 19" rack, you must use a rack mounting adapter (see data sheet for order number). Instructions are included with the adapter.

1.3.3 Safety Instructions

1.3.3.1 General Safety Instructions

NOTICE

Prior to putting the instrument into operation, check the following:

- ◆ The instrument cover is in place and screwed on.
- ◆ Vent holes are not obstructed, and air flow is not blocked on the rear panel and the lateral vent. The spacing from the wall should be at least 10 cm.
- ◆ The signal levels at the inputs do not exceed permissible limits.
- ◆ The outputs of the instrument are not overloaded or incorrectly connected.
- ◆ The instrument may be operated only in a horizontal position and the surface on which it is placed must be level.
- ◆ The ambient temperature must be in the range specified in the data sheet.

Any noncompliance with these instructions can damage the instrument.

1.3.3.2 Protective Measures Against Electrostatic Discharge

NOTICE**Risk of damaging electronic components**

To avoid damage to the electronic components of the equipment under test (EUT) due to electrostatic discharge when touched, always use the appropriate protective equipment.

1.3.3.3 Positioning the Instrument

WARNING

Risk of physical injury

Before positioning the instrument, read the safety instructions for instruments with fold-out feet at the beginning of this manual and respectively on the CD-ROM carefully.

1.3.3.4 EMC Safety Precautions

NOTICE

Risk of electromagnetic interference

To prevent electromagnetic interference, the instrument must be operated only when closed and with all shielding covers fitted. Only suitable and shielded signal and control cables may be used.

- ◆ This applies particularly to cables that are connected to the serial transport stream connectors TS ASI/SMPTE 310M inputs and outputs. Regardless of the data rate and the packet timing of the transport stream, high signal levels can occur at individual points in the signal spectrum. To avoid EMC problems, the cables should have at least 80 dB shielding protection up to 1 GHz. This generally requires the use of cables with double shielding.
- ◆ When connecting the USB interfaces, use only peripheral equipment that does not cause limit violations.
- ◆ When wiring the LAN interface (100BaseT), be sure to use a suitable cable (e.g. Category 6).

1.3.4 Connecting the Instrument to AC Power

The R&S DVSG is equipped with AC voltage detection. The instrument will automatically set itself to the AC voltage it detects (see "[Explanation of the Rear Panel](#)"). No external switching or modification of the fuses is necessary. The AC power connector is at the rear of the instrument.

1.3.5 Switching the Instrument On

Instruments with an AC power switch



- ◆ Use the supplied AC power cable to connect the instrument to the AC power mains.
- ◆ Since the instrument is in compliance with safety class EN61010-1, it should only be connected to a socket with a ground contact.
- ◆ Change the AC switch on the rear of the instrument to the I position.

Once the instrument is switched on, it will be in the STANDBY state or in the ON state depending on the position of the ON/STANDBY switch on the front of the instrument (see below).

**Note:**

The AC power switch can be left permanently switched on. You need to switch off the instrument only if it is to be completely disconnected from the AC power line.



- ◆ Press the ON/STANDBY switch on the front of the instrument; the green LED should illuminate.

The instrument is now ready for operation. All of the subassemblies in the instrument are now live.

1.3.6 AC Power Fuses



Before replacing fuses, switch off the instrument and disconnect it from the power supply.

The instrument is equipped with two fuses of type F1/F2: IEC127-T2.0H/250 V. The fuses are located under the AC power switch on the rear panel of the instrument.

Replacing the fuses:

- ◆ Open the cover on the fuse box and remove the fuse holder.
- ◆ Replace defective fuses and put fuse holder back into place.
- ◆ Close the fuse box cover.

1.3.7 Startup Screen and Booting the R&S DVSG

Once the instrument is powered on, the installed BIOS version and some of the computer features are displayed on the screen for a few seconds.

The Windows XP Embedded operating system will then be booted, followed by the instrument firmware. During boot up, the instrument firmware is subjected to a self test. Once boot up is complete, the main screen of the broadcast tester will appear and the instrument can be operated. The settings that were active before the instrument was last switched off are used unless another instrument setting was selected in the **File** menu.



Note:

If the software freezes unexpectedly, you can reboot the instrument by pressing the Standby key for about 5 seconds.

1.3.8 Switching the Instrument Off



- ◆ Press the ON/STANDBY switch on the front of the instrument.

The R&S DVSG saves the current settings to the hard disk and then shuts down the Windows operating system. The power supply is then switched to STANDBY.

Only the power supply has the operating voltage supplied to it, and the crystal oven is maintained at its operating temperature.

The yellow LED should be illuminated.

⚠ WARNING**Shock hazard**

In standby mode, the instrument is still power-supplied.

Only in case of complete disconnection from the AC line

- ◆ Change the AC switch on the rear of the instrument to the **O** position. None of the LEDs on the front panel should be illuminated.

**Note:**

Always switch to standby prior to complete disconnection from the AC line. If you set the power switch to the **O** position before the instrument is switched to standby mode, the current settings will be lost.

1.3.9 Functional Check

The generator automatically monitors the main instrument functions during power-on and continuously during operation.

If an error is detected, an ERROR indication will appear in the error/warnings line of the display along with a brief description of the error.

To obtain more information about the error, press the **Error Details** softkey. A description of the error(s) will be shown in the display (see Operating Manual, Chapter 9).

Besides automatic monitoring of instrument functions, the R&S DVSG also offers other ways of ensuring proper operation:

- ◆ **System error correction (“internal adjustment”)**
Internal adjustment can be carried out in the **Setup Adjustments** menu. This is a way to obtain the best possible level accuracy, for example.
- ◆ **Self checks**
If necessary, self checks can be defined.
- ◆ **Test points**
You can also query certain internal measurement points and display the results (see Operating Manual, Chapter 4).

1.3.10 Presets

Press the PRESET button to reach a defined state for the instrument.

PRESET sets all parameters and switching states to specific values (even for operating modes that are not currently enabled).

The IP address of the instrument is unchanged.

1.3.11 Connecting an External Keyboard



The R&S DVSG allows you to connect a standard external keyboard with a USB interface. A keyboard will make it easier to enter comments, file names, etc. A keyboard is necessary if you want to have easy access to the power of Windows XP.

The keyboard is connected to one of the USB interfaces (type A) on the instrument's front or rear panel.

The keyboard will be automatically detected once you connect it. The default language setting is for a UK keyboard. You can change the language and modify other settings such as the repetition rate in Windows XP under **Start → Control Panel → Keyboard** or **Regional and Language Options**. Access this menu by pressing the Windows key on an external keyboard.

1.3.12 Connecting a Mouse



The R&S DVSG allows you to connect a standard mouse with a USB interface. The mouse will make it easier to use the block diagram with the associated menus. It is necessary if you want to have easy access to the power of Windows XP.

The keyboard is connected to one of the USB interfaces on the instrument's front or rear panel.

The mouse will be automatically detected once you connect it. Some settings such as the speed of the mouse cursor can be modified in the Windows XP menu **Start → Control Panel → Mouse**. You can access this menu by pressing the Windows key on an external keyboard.

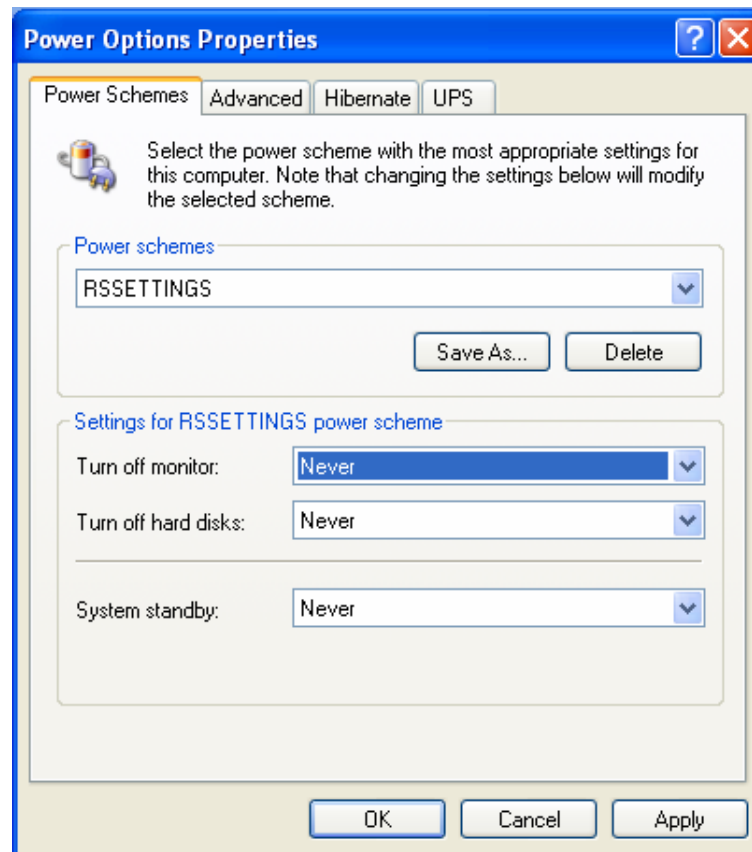
1.3.13 Displaying the Screen on an External Monitor

The R&S DVSG does not have a connector for connecting an external monitor with an analog interface. However, it is possible to display the screen on external monitors by launching manual remote operation on an external computer (using the Windows program Remote Desktop Connection).

1.3.14 Activating Power Saver Mode

Power Saver mode is not set by default for the R&S DVSG.

If the display is not needed, the monitor can be switched off in Windows XP under **Start** → **Control Panel** → **Power Options** after a specific amount of time.



1.4 Notes on Operating System and Firmware Update

1.4.1 Installation of the Software

NOTICE

- ◆ Only software authorized by Rohde & Schwarz for use in the instrument may be installed. In case of doubt, please contact your local Rohde & Schwarz representative.
- ◆ Changes to the system are only permissible in agreement with Rohde & Schwarz.
- ◆ Updating the operating system, e.g. installing a service pack, is not allowed without permission.

Otherwise, the stability and performance of the system may be impaired. Rohde & Schwarz shall not assume any liability for faults caused by impermissible manipulations of the system.

1.1.1 Windows XP Embedded

NOTICE

The drivers and programs that are used with Windows XP have been modified to suit the DIGITAL VIDEO SIGNAL GENERATOR. To avoid disrupting the operation of the instrument, do not change any settings unless they are mentioned in the following section. The existing software may be modified only by using update software approved by Rohde & Schwarz. Likewise, only run programs on the instrument that have been approved by Rohde & Schwarz for such purposes.

The DIGITAL VIDEO SIGNAL GENERATOR is equipped with the Windows XP Embedded operating system. When the instrument is delivered, the configuration of this operating system has been set to permit the optimum operation of the DIGITAL VIDEO SIGNAL GENERATOR and test transmitter. Changes to the system settings are

required only if you install peripherals such as a keyboard and printer or if you configure the network and the settings do not conform to the default settings (see the following sections).

When you power on the DIGITAL VIDEO SIGNAL GENERATOR, the operating system will boot up and then automatically launch the instrument firmware without asking for a password (“autologin”).

**Note:**

Auto login uses the user name and the password “Instrument”. This standard user has administrator rights so that it is possible to install printers and networks.

Access to the operating system requires the connection of an external keyboard. Use the **Windows** key on the external keyboard (next to the CTRL key) to open the Windows XP start menu so that you can run Windows XP programs. You should connect a mouse if you want more convenient access to Windows XP.

The instrument screen will be brought to the foreground if you double-click the Windows button DVSG [xxx] in the taskbar.

You can modify the system settings under Windows XP in the **Start - Control Panel** menu (see the documentation for Windows XP and for the hardware for the required settings).

The instrument does not have a disk drive. Data can be exchanged using a memory stick which you plug into one of the USB interfaces. The memory stick is automatically assigned a free drive letter, and you can use Windows Explorer to transfer data.

1.4.2 Firmware Update

Update instructions for the firmware are provided together with the new firmware. Be sure to follow these instructions carefully.

Your instrument is delivered with the latest firmware version available. Firmware updates are provided via Rohde & Schwarz service centers or sales offices.

The installation of a new firmware version can be performed either via the USB or the LAN interface.

The downloaded update files have to be stored on the memory stick for an update via the USB interface or on a network directory for an update via the LAN interface (due to the speed recommended).

1.5 Connecting the R&S DVSG to Network (LAN)

The instrument is equipped with a network connection and can be connected to an Ethernet LAN (local area network).

Provided the appropriate rights have been granted by the network administrator, files can be transferred via the network, and network resources, e.g. network directories, can be used. The instrument can also be remote-controlled and manually operated in the network. Manual remote control allows someone to operate the instrument from an external computer situated anywhere in the world. For example, a user working in one part of a building can operate one or more instrument units that are part of a test setup situated in another part of the building.

Remote control of the instrument via the LAN interface is described in the Operating Manual, Chapter 5.

1.5.1 Connecting to the Network

NOTICE

Always coordinate the connection of the instrument to the network with the network administrator. Any errors that occur during the connection process can affect the entire network.

Make sure that the instrument is switched off (standby mode) when you connect and disconnect the network cable. This is the only way to ensure that the network connection is reliably detected and any disruptions during the operation of the instrument are avoided.



The instrument is connected to the LAN using a standard RJ-45 cable via the LAN interface on the rear of the instrument.

In the Operating Manual, Chapter 7, the connector is described in detail.

Configuring the instrument for network operation

The network interface functions with 100 MHz Ethernet IEEE 802.3u. The TCP/IP network protocol and the associated network services are preconfigured.

To exchange data within a LAN, every computer or instrument that is connected must have a unique IP address or a unique computer name. Access between different users is managed with access authorizations. These access authorizations determine which of the available network resources such as file storage systems are available for the instrument, for example.

Networks with DHCP

The instrument is preconfigured for networks using the dynamic host configuration protocol (DHCP). In such networks, the instrument is automatically assigned a free IP address. In this case, identification in the network is based on the use of a unique computer name.

Every instrument is assigned an individual computer name at the factory. You can view and modify this name in the Windows XP **Start - My Computer** menu (see "[Querying the Computer Name](#)").

Networks that assign fixed IP addresses

In networks that assign fixed IP addresses, the network administrator usually handles this process. The fixed IP address must be entered under Windows XP **Start - Control Panel** (see "[Entering the IP address](#)").

Point-to-point connections

To set up a single network (a LAN connection between an instrument and a single computer without integration into a larger network), an IP address needs to be assigned to the instrument and the computer. The IP addresses 192.168.xxx.yyy are available for use here, where xxx and yyy can assume values of 1 to 254, and the value for the subnet mask is 255.255.255.0.

In this case, a standard RJ-45 crossover cable is required for the connection.

User parameters

For the instrument, the standard user name is **Instrument**. The user name is used for auto login when the instrument is started up and for manual remote control. The password is also **Instrument**. The network administrator must grant authorization to this user to determine which network directories and resources can be accessed by the instrument.

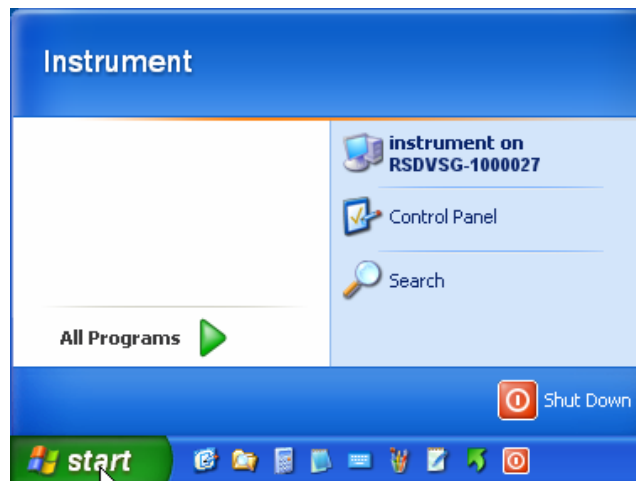
Preparations

The instrument is configured for network operation in the menus of the Windows XP Embedded operating system. The operating system can be accessed only when an external keyboard is connected. The use of a mouse makes operation more convenient. Power down the instrument prior to connecting the keyboard and mouse so that the operating system will properly recognize them.

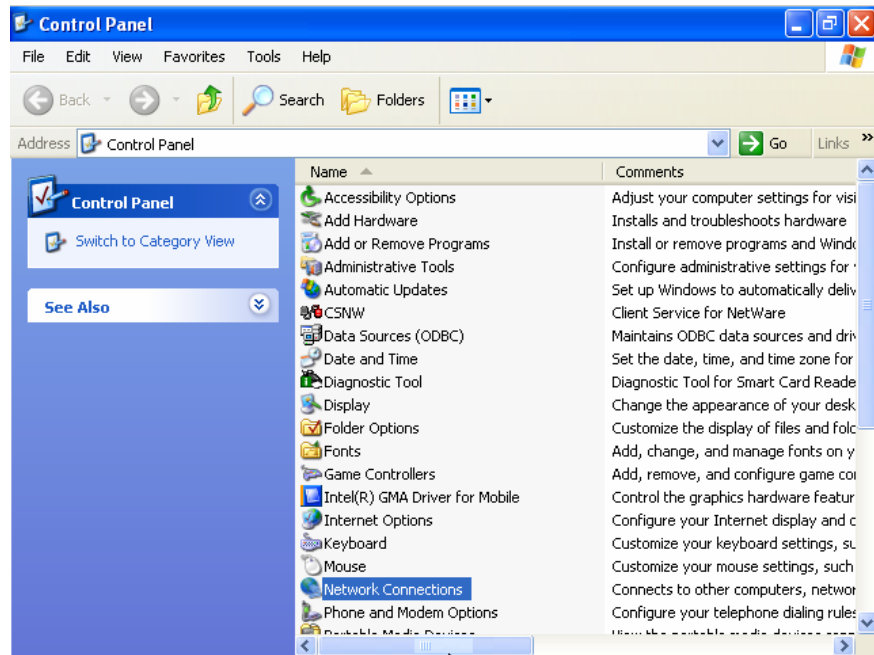
1. Switch off the instrument.
2. Connect the external keyboard and mouse to the USB interface.
3. Switch on the instrument.

Entering the IP address

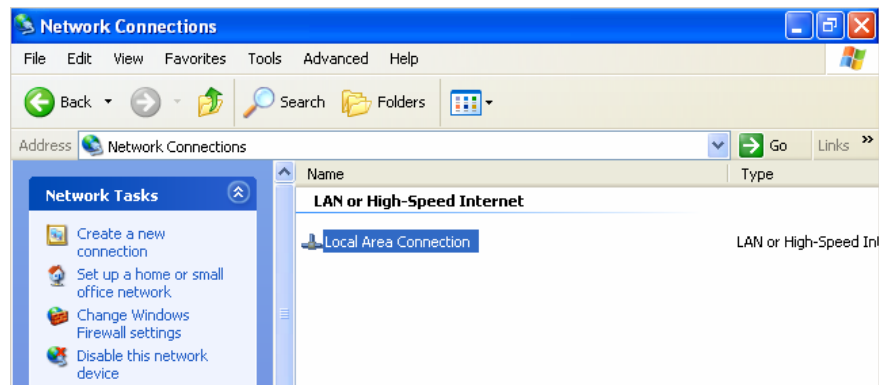
1. Press the **Windows** key on the external keyboard (next to the CTRL key) to call up the start menu.



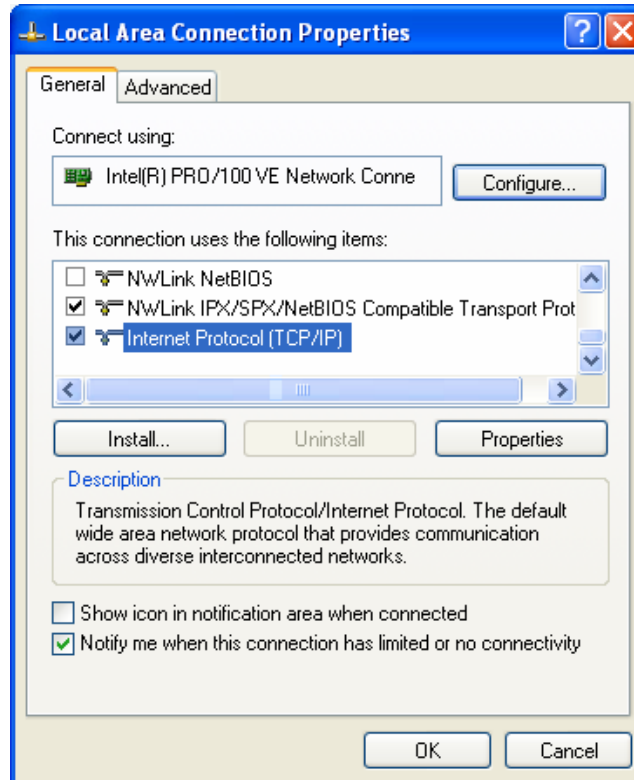
2. Click **Control Panel** and then **Network**



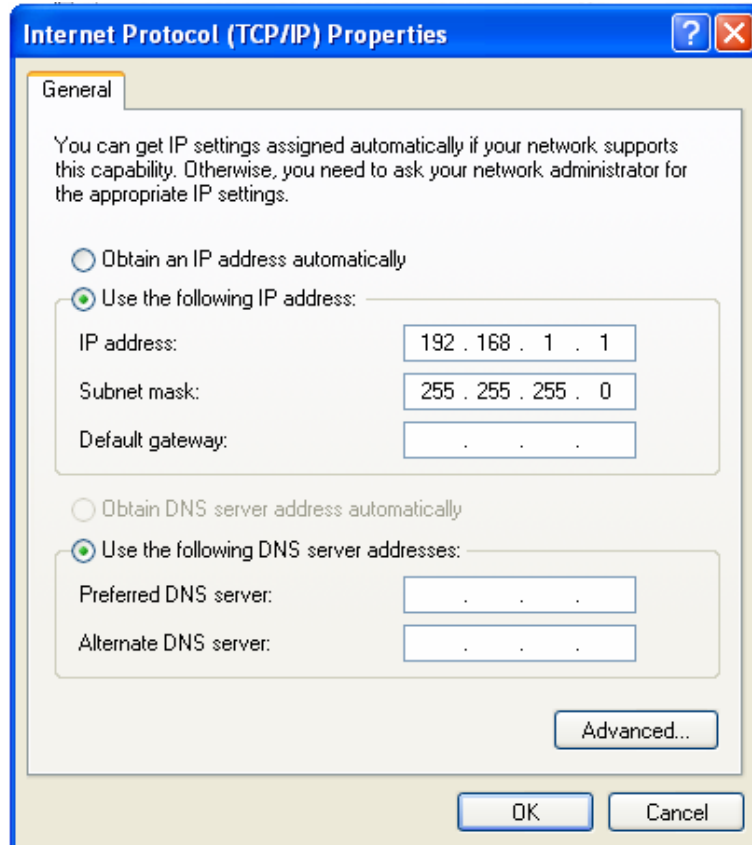
3. In the Network **Connections** menu, click **Local Area Connection** on the right.



4. In the **General** tab, activate Properties. In the field that reads **This connection uses the following items:**, mark the **Internet Protocol (TCP/IP)** item and then click the **Properties** button.

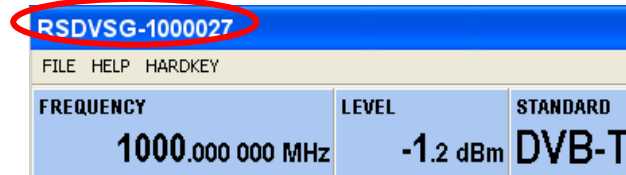


5. In the **Internet Protocol (TCP/IP) Properties** menu, enter the IP address in the field **Use the following IP address** (ask your network administrator if you need more information). Finish by clicking OK in all of the menus.
The default setting will be **Obtain an IP address automatically** (DHCP = Dynamic Host Configuration Protocol).



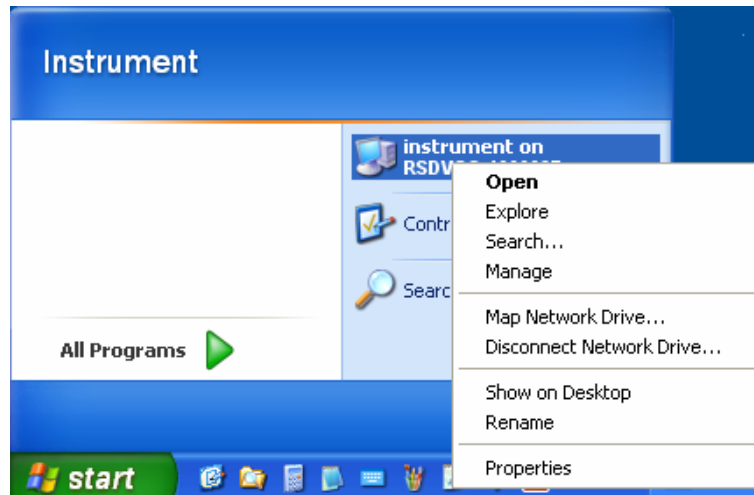
Querying the Computer Name

1. If the instrument has its DEFAULT COMPUTER NAME the computer name is displayed as part of the window title of the application:

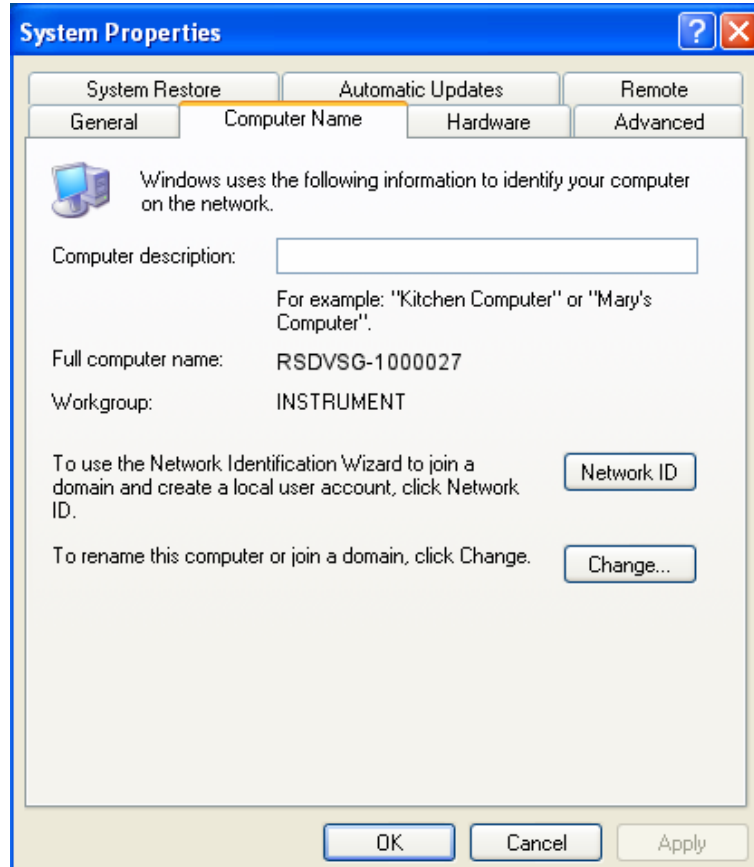


Otherwise follow the next steps:

2. Press the **Windows** key on the external keyboard (next to the CTRL key) to call up the start menu. Select **instrument on RSDVSG-xxxxxx** and call up the context-sensitive menu with the right mouse button



3. Click **Properties** and select the **Computer Name** tab in the menu.
The computer name is shown under **Full computer name**.



2 First Steps

The R&S DVSG is a multiformat video generator platform that supports all common video interfaces and picture resolutions. All types of signals – analog or digital, SDTV or HDTV, uncompressed or compressed – can be generated using only a single instrument. Switching between different standards is quick and easy – a press of a key is enough.

Due to its modular concept, the R&S DVSG can be optimally adapted to the requirements. Its range of functions can also be adapted to new requirements by installing hardware and software options subsequent to purchase.

All generator applications are already equipped with a wide range of signal sets. Optional libraries can be added for special applications.

2.1 Feature Overview

Compact design and convenient operation need not be mutually exclusive: Although the R&S DVSG is only half as wide as the R&S DVRG, it provides the same controls and user interfaces – both locally on the front panel and by means of remote control.

The multistandard capability and the flexible option concept make the R&S DVSG an extremely versatile instrument for many lab applications. Due to its excellent price/performance ratio, the R&S DVSG is also ideally suited for service and quality assurance as well as production applications.

½ 19" × 3 height units

The cabinet of the R&S DVSG, which is only ½ 19" in width, makes it an extremely compact instrument. This is an advantage particularly in production applications, when many instruments have to be installed in racks without much space.

Large VGA color display with 640 × 480 pixels

The R&S DVSG has a 5.7" easy-to-read VGA color display. Together with the straightforward graphical user interface, the display allows quick, easy, and reliable operation of the instrument. The most important operating parameters are always clearly visible.

Intuitive user interface under Windows XP Embedded

The user interface is straightforward, with a tree on the left side and a work view on the right side. The instrument is operated via a keypad and a rotary knob. Additionally, a keyboard and mouse can be connected to the USB interfaces.

Context-sensitive help system

Even during ongoing operation, the R&S DVSG allows you to access the extensive help system, which includes all information from the user manual. The help system always starts with the context-sensitive feature enabled, i.e. with information on the currently selected operating parameter.

User-definable favorites for quick access

Parameters that are often used can be copied to the Favorites menu, which makes operation even quicker and easier. This function is particularly useful when you have to change parameters from different submenus on a frequent basis.

Easy software updates via LAN or USB 2.0

Owing to USB 2.0 and LAN interfaces, software updates for the R&S DVSG can be performed quickly and easily. You merely need to copy the new software to the R&S DVSG by means of a USB memory stick or via FTP and start the fully automatic installation.

Remote operation via Remote Desktop or VNC

The R&S DVSG can be easily remote-operated via an Ethernet connection or in a LAN network over IP and preconfigured for DHCP use by means of the preinstalled Remote Desktop software or the VNC software that comes with the instrument.

Remote control via LAN

Remote control is possible by means of SCPI control commands via LAN (VXI11). The R&S DVSG can thus be integrated into existing test programs very easily.

2.2 Playing AV Signals (R&S DVSG-B30 Option)

Modern TV screens are equipped with complex signal processing to improve the quality of the displayed images and video sequences. This includes de-interlacing, deblocking, noise suppression as well as measures to reduce system-induced motion blur. Development, testing and production therefore require test signals that not only simulate reality but are also suitable for putting image-processing algorithms to the test.

AV player

The AV player provides precisely such test signals. They contain synthetically generated static and dynamic elements as well as real moving pictures with specific characteristics. In addition, real transport streams can be loaded and their video and audio content can be output on the interfaces. This makes it possible to implement even long test sequences and thus demonstrate characteristics of display equipment.

Signal library

The AV player comes with an extensive collection of test signals for a variety of video standards and resolutions. These test signals are indicated by the suffix *.avp. The transport stream generator's test signals and its optional libraries can also be used. These signals have the suffix *.gts.

Customer-specific signals

Owing to the integrated AV decoder, the R&S DVSG can also play signals from the real TV signals. This is done by using transport streams that have been recorded with the integrated transport stream recorder or loaded into the file system of the R&S DVSG via the USB or Ethernet interface. The signals must be present in binary format and the AV elements must not be coded. Such files are typically suffixed with *.trp or *.ts.

Interfaces

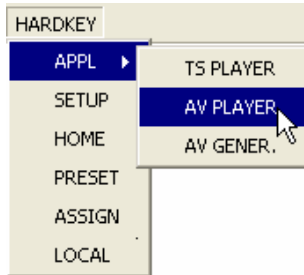
The AV player automatically detects the interfaces on which the signals can be output. These interfaces are marked in the generator tree under "Interface-Settings" with a bright green dot. If a transport stream (*.gts, *.trp or *.ts) serves as a template, then besides the decoded video signal on the AV interfaces the transport stream on the serial and parallel TS interface are available. However, this requires that the instrument is fitted with the R&S DVSG-K20 option.

2.2.1 Selecting the AV Player Application

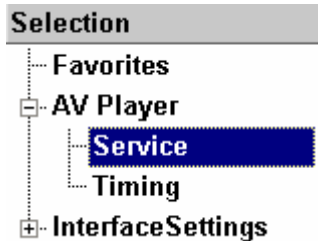
To play an AV signal, the "AV Player" application must be started.



Press the APPL key to choose an application.



Select **AV Player** using the rotary knob or the softkey.



Use the cursor keys to select **Service** in the tree.

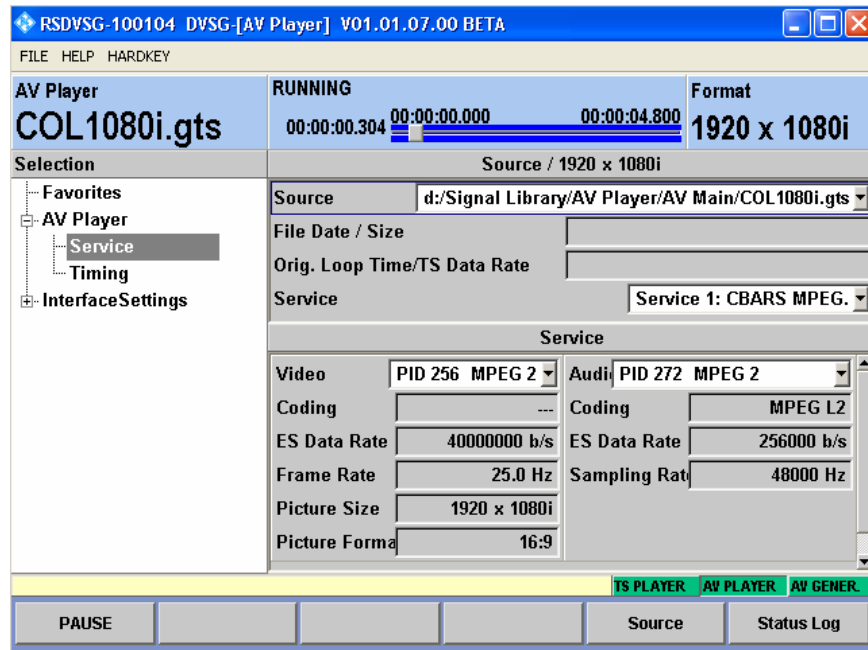


TIP:

The AV Player application can also be selected directly by clicking the desired application in the status field.



Figure 2.2-1 AV Player application



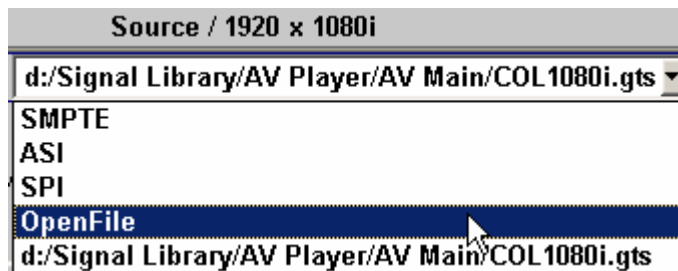
The AV Player application with the information area appears in the upper third of the display, the player tree on the left side of the display and the associated work view.

2.2.2 Selecting a Signal and Starting Replay

The AV player starts automatically with the signal last used. To select a new signal, use the cursor keys to select the **Source** line in the work view and confirm by pressing the ENTER key.

In the following dialog, select a signal that has already been used, or open a file box via **Open File**.

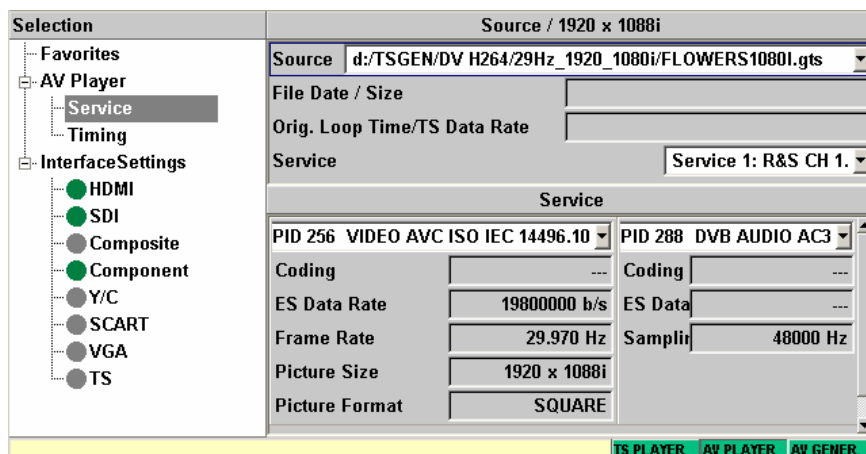
Figure 2.2-2 Selecting an AV signal from internal hard drive



After a signal has been selected, replay starts automatically. In selecting a signal, you also define the video standard with resolution and frame rate. This also determines at which signal outputs the signal is output.

These signal outputs are indicated by a green light field in the navigation tree.

Figure 2.2-3 Green light fields in the navigation tree indicate which signal outputs are active for the selected signal



2.2.3 Selecting a Signal Element in the AV Signal

The signals of the TV player are based on MPEG-2-compatible transport streams. This has the advantage that also real broadcast signals can be played back for test purposes. In addition, different programs can be accommodated in one signal.

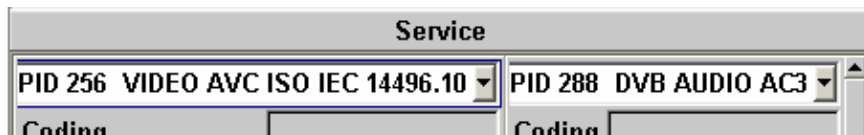
If more than program is contained, the AV player always starts with the program that has the lowest service number. To select another program, open the selection box for service.

Figure 2.2-4 Selection box for a service within a selected signal



If a program contains several video or audio signals, you can select these via the selection boxes under Service. If no selection is made, the player always starts with the AV elements that have the smallest packet identification (PID).

Figure 2.2-5 Selection box for video and audio elements within a selected service



2.3 Generating AV Signals (R&S DVSG-K10 Option)

Modern TV screens are equipped with complex signal processing to improve the quality of the displayed images and video sequences.

AV generator

The AV generator supplies test signals for evaluating and optimizing both the color reproduction and the contrast range. The test signals have a defined bit-level accuracy. They are available for color depths of up to 36 bits.

Signal library

The AV generator comes with an extensive collection of test signals for a variety of video standards and resolutions. These test signals are indicated by the suffix *.avp.

Customer-specific signals

The R&S DVSG is also designed for reproducing customer-specific test patterns. These test patterns must be provided in bitmap format (extension *.bmp).

Interfaces

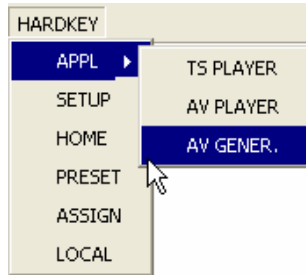
The AV generator automatically detects the interfaces on which the signals can be output. These interfaces are marked in the generator tree under "Interface-Settings" with a bright green dot.

2.3.1 Selecting the AV Generator Application

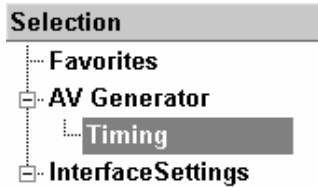
To generate an AV signal, start the AV Generator application.



Press the APPL key to choose an application.



Select **AV Generator** using the rotary knob or the softkey.



Use the cursor keys to select **Timing** in the tree.

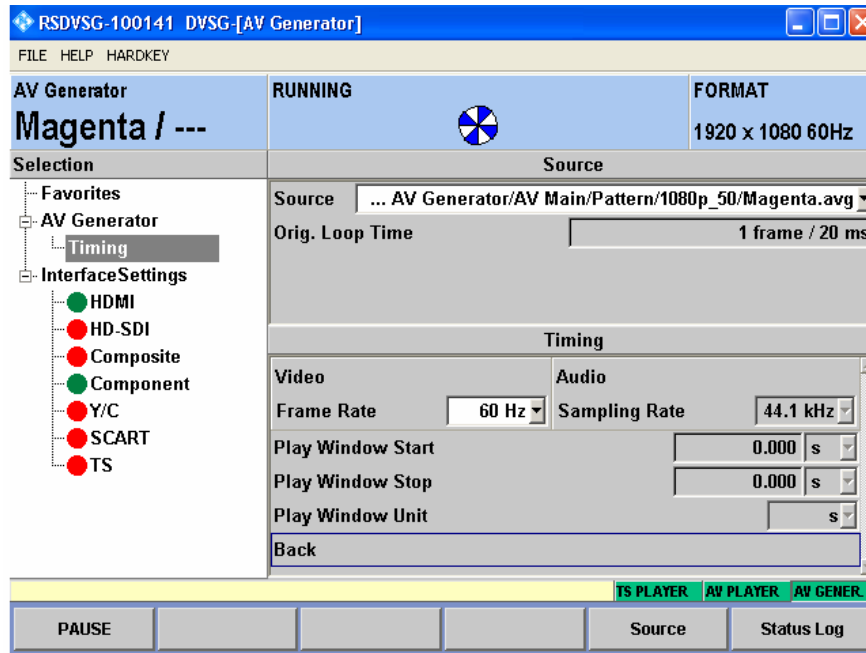


TIP:

The AV Generator application can also be selected directly by clicking the desired application in the status field.



Figure 2.3-1 AV Generator application



The AV Generator application with the information area appears in the upper third of the display, the generator tree on the left side of the display and the associated work view.

2.3.2 Selecting a Signal and Starting Replay

The AV generator starts automatically with the signal last used. To select a new signal, use the cursor keys to select the **Source** line in the work view and confirm by pressing the ENTER key.

In the following dialog, select a signal that has already been used, or open a file box via **Open File**.

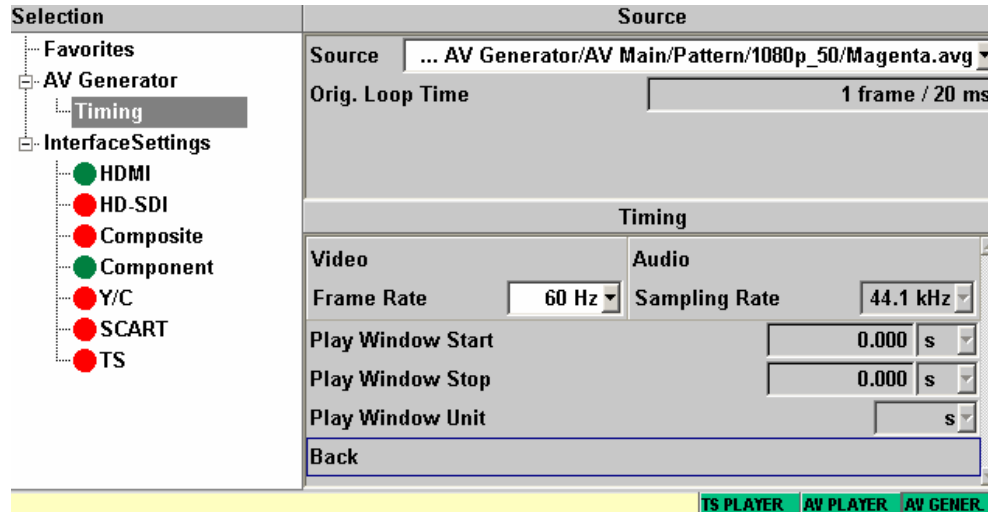
Figure 2.3-2 Selecting an AV signal from internal hard drive



After a signal has been selected, replay starts automatically. In selecting a signal, you also define the video standard with resolution and frame rate. This also determines at which signal outputs the signal is output.

These signal outputs are indicated by a green light field in the navigation tree.

Figure 2.3-3 Green light fields in the navigation tree indicate which signal outputs are active for the selected signal



2.4 Playing and Recording MPEG Transport Streams (R&S DVSG-K20 Option)

Digital transmission methods require video or audio transport streams as a baseband signal. The optional integrated transport stream player and recorder enables the R&S DVSG to generate both.

TS player

The stream player provides test streams and allows you to generate endless and seamless high bit-rate MPEG-2 transport streams. The SDTV transport stream library integrated as standard includes ATSC and DVB test streams. The numerous Rohde & Schwarz transport streams cover a wide variety of applications and test scenarios.

Transport stream libraries

A large number of additional libraries can be integrated. They make development faster and easier and allow new products to be tested.

- ◆ SDTV: test streams for DVB and ATSC
(included in the R&S DVSG-K20 option)
- ◆ HDTV: tests of HDTV receivers
- ◆ DVB-H: tests of mobile receivers
- ◆ ISDB-T: test streams
- ◆ H.264: test streams
- ◆ TCM: STB tests

The range of transport stream libraries is constantly being expanded.

TRP player

The TRP player ideally complements the TS generator and permits users to replay their own transport streams in TRP format. The transport streams can be copied via the USB or LAN interface to the R&S DVSG file system and be replayed from there.

Compatible with the advanced stream combiner from Rohde & Schwarz

The R&S DV-ASC advanced stream combiner provides full flexibility when generating your own streams, which can be used with the R&S DVSG TS generator. It allows you to generate your own transport streams, also for DVB-H.

Transport stream recorder

The transport stream recorder allows recording of transport streams on hard disk using a variety of word widths and formats.

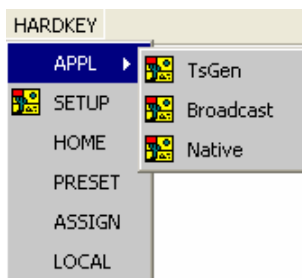
2.4.1 Playing MPEG Transport Streams (R&S DVSG-K20 Option)

2.4.1.1 Selecting the TS Generator Application

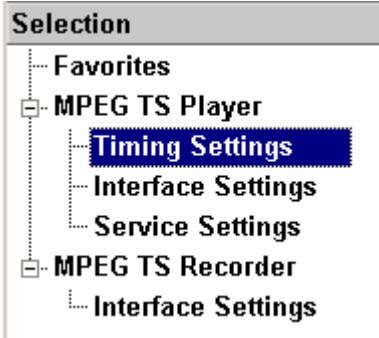
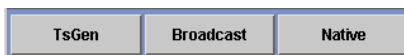
To play a transport stream, the TS Generator application must be started and the Player function selected.



Press the APPL key to choose an application.



Select **TsGen** using the rotary knob or the softkey.



Use the cursor keys to select **Timing Settings** in the tree.

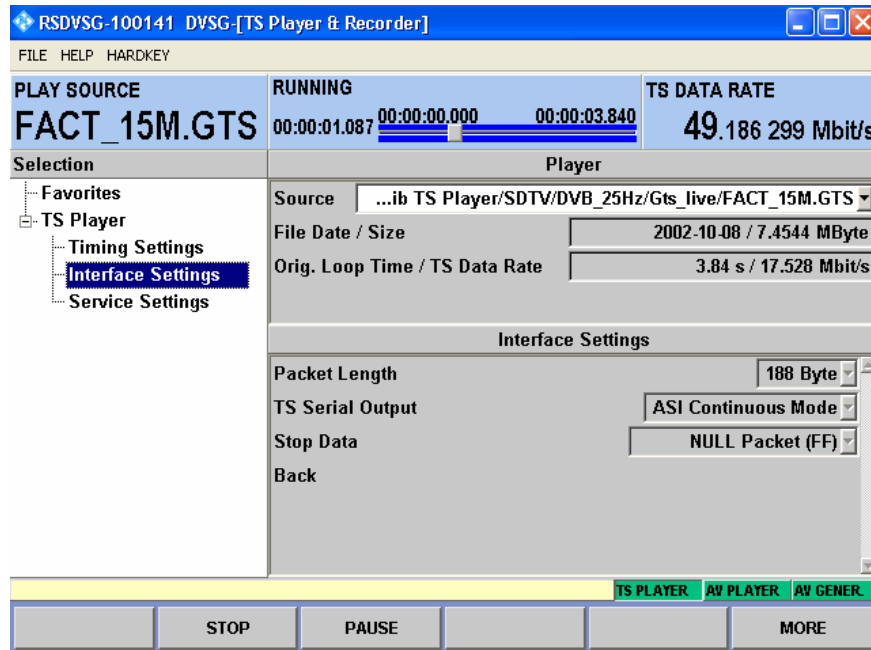


TIP:

The TS Generator application can also be selected directly by clicking the desired application in the status line.



Figure 2.4-1 TS Generator application



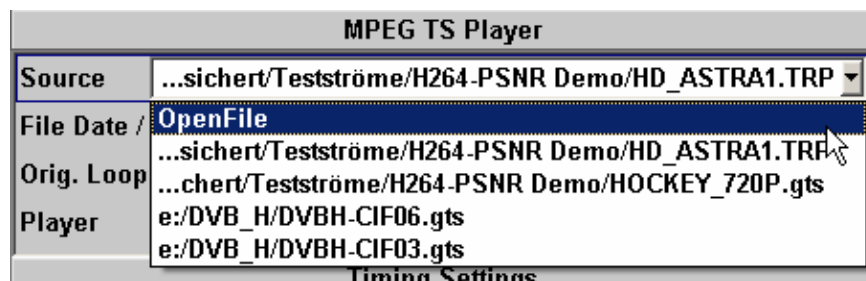
The TS Generator application with the generator information area appears in the upper third of the display, the generator tree on the left side of the display and the associated work view.

2.4.1.2 Selecting a Transport Stream and Starting Replay

The TS generator starts automatically with the transport stream last used. To select a new signal, use the cursor keys to select the **Source** menu item in the work view and confirm by pressing the ENTER key.

In the following dialog, select a signal that has already been used, or open a file dialog via **Open File**.

Figure 2.4-2 Selecting a transport stream



After a signal has been selected, replay starts automatically.

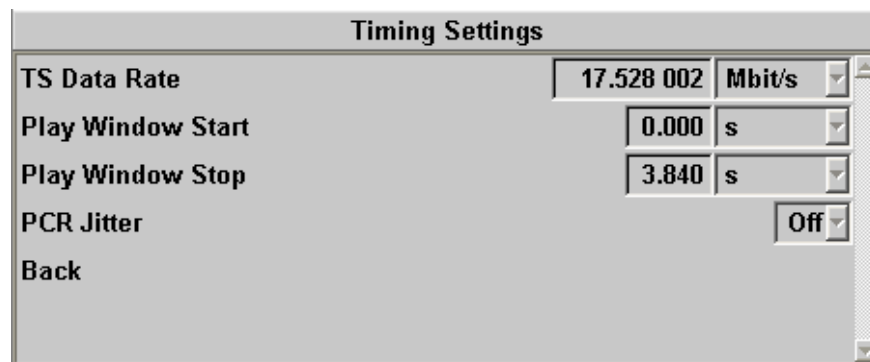
2.4.1.3 Selecting Timing Settings (Optional)

The selected transport stream can be played using changed timing settings. The following features are available:

- ◆ **TS Data Rate**
Changes the transport stream data rate.
- ◆ **Play Window Start/Stop**
Defines the segment of the selected transport stream to be played.
- ◆ **PCR Jitter**
Plays the transport stream with a defined PCR jitter.

To change the interface settings, use the rotary knob in the tree (left side) to select **Timing Settings** and end the replay using the **Stop** softkey.

Figure 2.4-3 Timing Settings dialog



The image shows a dialog box titled "Timing Settings". It contains the following fields and controls:

Setting	Value	Unit
TS Data Rate	17.528 002	Mbit/s
Play Window Start	0.000	s
Play Window Stop	3.840	s
PCR Jitter	Off	

There is also a "Back" button at the bottom left of the dialog.

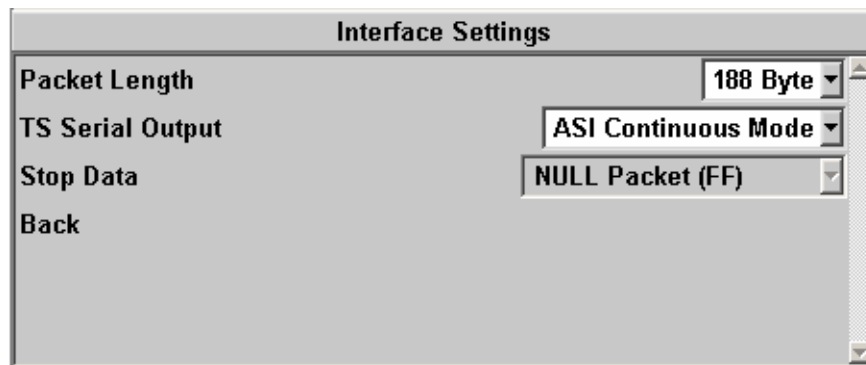
2.4.1.4 Setting the Interface (Optional)

The following interface settings can be changed for the replay:

- ◆ Packet Length
Length of the transport stream packets.
- ◆ TS Serial Output
Playback mode of the serial interface.
- ◆ Stop Data
Contents of the stop data.

To change the interface settings, use the rotary knob in the tree (left side) to select **Interface Settings** and end the replay using the **Stop** softkey.

Figure 2.4-4 Interface Settings dialog



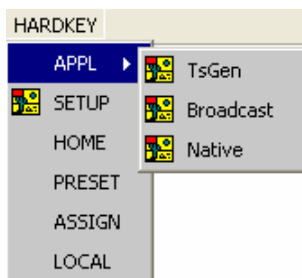
2.4.2 Recording MPEG Transport Streams (R&S DVSG-K20 Option)

2.4.2.1 Selecting the TS Recorder Application

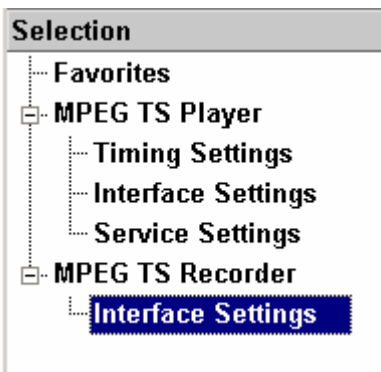
To record a transport stream, the TS Generator application must be started and the Recorder function selected.



Press the APPL key to choose an application.



Select **TsGen** using the rotary knob or the softkey.



Use the cursor keys to select **Interface Settings** under **MPEG TS Recorder**.

If **MPEG TS Recorder** is not visible in the tree, a transport stream is currently being played with the TS player. To be able to record a transport stream, you must first end the replay using the **Stop** softkey.

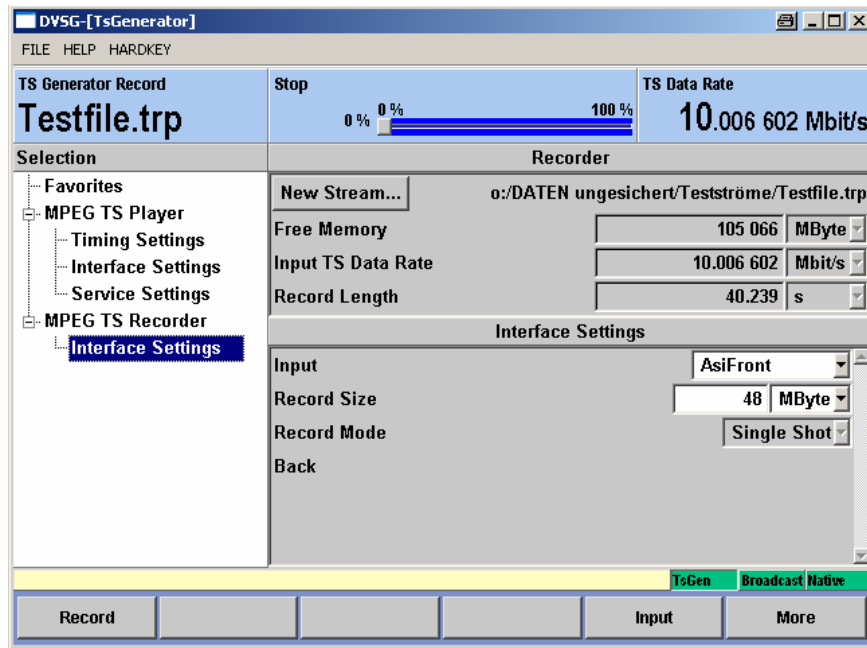


TIP:

The TS Generator application can also be selected directly by clicking the desired application in the status line.



Figure 2.4-5 TS Recorder application



The TS Recorder application with the generator information area appears in the upper third of the display, the generator tree on the left side of the display and the associated work view.

The available memory space, the data rate of the current transport stream and the expected length of the recording are indicated at the top of the work view. The record length is automatically calculated from the transport stream data rate and the set record size selected further below.

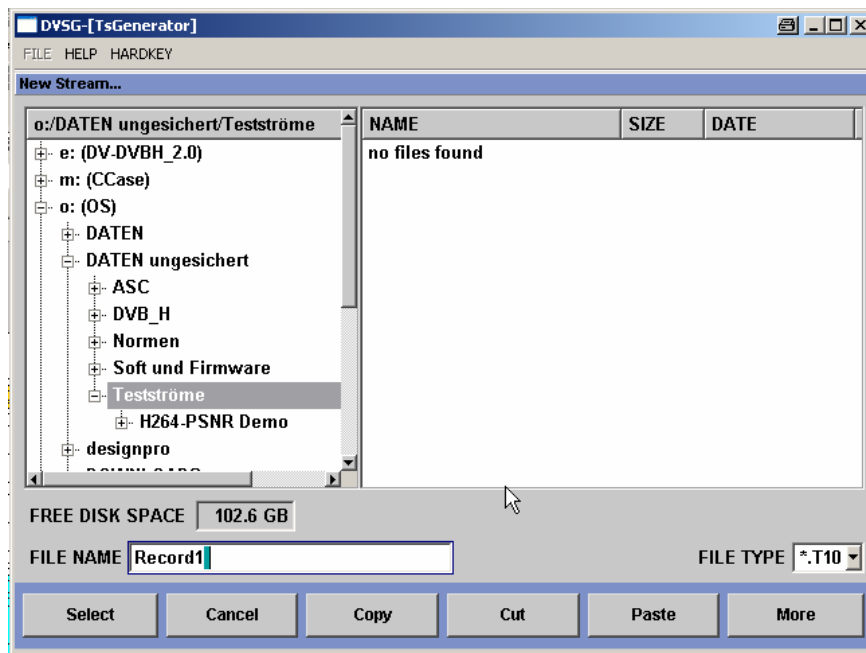
2.4.2.2 Selecting the Memory Location for the Transport Stream

Using the cursor keys, select the **New Stream** menu item in the work

view and confirm by pressing the  key.

In the following dialog, a file dialog opens for selecting the memory location and assigning a file name.

Figure 2.4-6 TS recorder file dialog



Select a memory location using the cursor keys and enter a file name via a keyboard.

Confirm your entries with the  key.

2.4.2.3 Selecting a Signal Input

Using the cursor keys, select the **Input** menu item in the work view and

open the selection dialog with the  key. Select the desired input in the subsequent selection dialog.

2.4.2.4 Defining the Recording Length

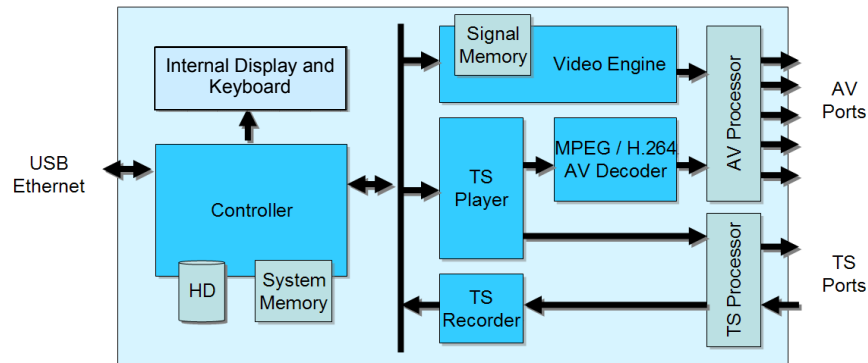
Using the cursor keys, select the **Record Size** menu item in the work view and enter the desired record size via the numeric keypad.

2.4.2.5 Starting the Recording

Start the recording with the **Record** softkey.

2.5 Basic Hardware Concept

Figure 2.5-1 The R&S DVSG functional diagram



The R&S DVSG is based on a flexible hardware platform.

The high-performance **controller** allows fast operation of all instrument functions. Owing to the Windows XP Embedded™ operating system, the instrument can be easily integrated into existing networks.

The **video engine** is used to generate native AV sequences. The fast signal memory makes it possible to create test signals with high resolutions and moving elements. (AV Generator application)

The **TS player** plays MPEG transport streams. In combination with the **MPEG/H.264 AV decoder**, it also generates broadcast AV signals. This makes it possible to assess DUTs using exactly those signals that occur later on in operation. Depending on the operating mode, the transport streams come directly from the **system memory** or from the **hard disk**. (TS and AV Player application)

The **AV processor** operates all audio/video interfaces for uncompressed TV signals. Transport streams are controlled via the **TS processor**.

3 Manual Operation

3.1 Introduction

The instrument can be operated manually in several different ways:

◆ **Controls on the front panel:**

The instrument is operated using the buttons on the front panel and the rotary knob. Pressing the rotary knob has the same function as pressing the ENTER key.

◆ **External keyboard and mouse:**

A USB keyboard and also a USB mouse can be connected to the USB jacks on the front panel or the rear panel.

The hardkeys of the instrument can be selected in the **HARDKEY** menu.



◆ **Remote operation:**


The instrument can be operated if so desired using remote operation (e.g. with Remote Desktop or VNC).

The instrument has to be connected to an Ethernet network. The Ethernet address is used to connect the PC and instrument. The screen of the R&S DVSG is then displayed on the PC monitor. The R&S DVSG can now be operated with the PC keyboard and mouse. The hardkeys of the instrument can be selected in the **HARDKEY** menu.

Equal access rights for manual operation

The access rights are the same whether the instrument is operated using the front-panel controls or the keyboard and mouse.

Use the rotary knob and the buttons on the front panel ( ) to

navigate in the tree. Each entry is terminated with the  key. The rotary knob and its Enter function (press the rotary knob) can be used for navigation purposes too.


Navigation in the tree is possible using the USB keyboard and the cursor keys (or the USB mouse and the mouse buttons).

Local operation and remote operation also have equal access rights during VNC operation. In “Remote Desktop” mode, remote operation is the only choice.

All operating modes are possible simultaneously

Example:

During VNC operation using a connected PC, a user selects the **Setup** menu item in the menu tree using the USB mouse. At the same time, another user can change the value using the rotary knob and the numerical keys on the instrument's front panel.


The entry can be terminated using the  key on the instrument or the Enter key with the USB mouse that is connected.

3.2 Operation Concept

Different Applications in the R&S DVSG

The R&S DVSG is an instrument platform that is designed for diverse applications (e.g. TS Player & Recorder, AV Broadcast Signal Player, AV Native Sequence Generator). These applications are like separate units and operates independently of the other applications.

Selecting the Application

When you press the  key, the applications available in the instrument will be displayed above the soft keys. Select the application to appear in the foreground.

To change the settings or to read off the measured values, navigate in the application's tree. The main parameters of each application are shown in the INFO area. The softkey assignments will change when you change applications. All of the other applications will be in the background. They are displayed when you switch to them.

Information About the Different Applications


To obtain details about settings or measured values for a specific application, you must select the application in question (i.e. bring it to the foreground). In each application, there is a different number of user fields available in the INFO area. A setting or a measured value from another application can be shown in these user fields.

Navigating in the Tree


The menu tree is used to navigate in the application's menus. The tree consists of main items and sub items (where necessary). The position in the tree of the currently selected application is marked accordingly.

Use the rotary knob to navigate in the vertical direction or place the mouse pointer on a tree element and mark it by means of a mouse click.

The marker will appear at the location where the cursor is currently located. This marker will move appropriately. Any sub items present in the branches of the tree can be opened and closed for a given main item.

Open and close the sub items with the  button or by pressing the rotary knob. Double-clicking the mouse will have the same effect.

When navigating with the rotary knob in the opened tree, you will automatically branch to the subtree. After passing through the subtree, you will reach the next main item in the tree.


Each work view has a corresponding tree element that is always displayed in relation to the marking in the tree. The work view changes dynamically based on how you navigate in the tree. If the marker is on a sub item in the tree or on a main item without any sub items, the work view can be activated by pressing the  key.


Double-clicking the mouse will have the same effect. The tree will stay marked at the place that you switched to in the work view.

Navigating in the Work View

You can use the rotary knob and the cursor keys to navigate in the work view. The marker in the work view will follow the cursor commands. Using the rotary knob, you can mark all of the selectable items in the work view one after the other. When using the mouse, you can place the mouse pointer on a selected item.

Use the  key (ESCAPE) or the  button to exit the work view. The **Back** menu item in the work view has the same function.

If you exit a given work view, you can press the  key to reactivate it.

The  key does not have the same effect.


Actions in the Work View

You can switch a parameter (toggle function), e.g. ON/OFF.




You can make a selection, e.g. 1 out of n selection.


You can enter values, e.g. a frequency value.

However, the relevant parameter must be marked in the work view to perform such actions.

Pressing the  key, pressing the rotary knob, or double-clicking the mouse immediately executes a toggle function. A selection or value input is now activated.

A window will open after you make your selection. Use the cursor or rotary knob to make your selection and terminate your entry with the

 key. Use the  key to exit the window without changing the values. The input area is activated in case you need to input values. A value that is already present can be modified using the cursor keys and/or the rotary knob. The change will take effect immediately. Use the digit keys on the front panel or the external keyboard (if present) to enter a new numerical value. Terminate your entry with the  key. When entering frequencies or levels, you can also use the unit keys on the front panel.

If you want to exit the input area without making a change, press the  key.

As soon as the action is terminated in the work view and then executed, the parameter will be updated (assuming it is used in an INFO field).

Fast Access to Commonly Used Menu Items With Favorites

To allow fast access to commonly used menu items, you can add any of the menu items to your favorites. (You can also delete them from the favorites if you need to.)

The list of favorites can be accessed from every application. Menu items can be added to the list of favorites from any application. This allows fast operation that goes beyond individual applications.

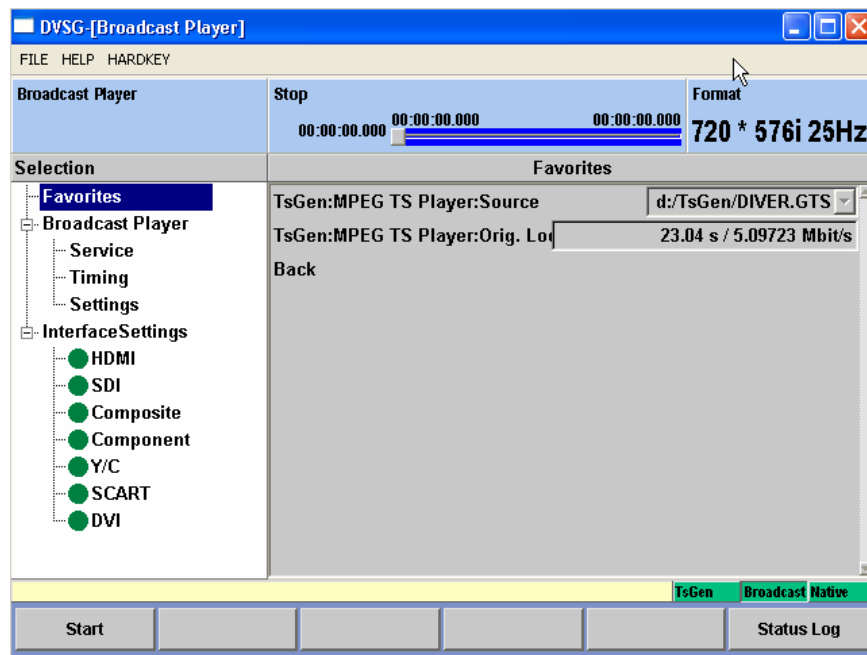
Press the HOME hardkey to call up the **Favorites** in the tree of the application in question. Since the favorites can contain menu items from all of the applications, the operating speed will be significantly higher with the HOME hardkey.

3.3 Display

3.3.1 Graphical User Interface

The display content depends on the current application and the selected operating mode.

Figure 3.3-1 Graphical user interface



Menu bar

Contains the **FILE**, **HELP**, and **HARDKEY** menus. The **HARDKEY** menu provides additional access to the hardkeys on the front panel (used primarily for remote operation).

Information area

Displays the main parameters for the selected application.

Tree

To navigate within the main areas of the active application.

Work view

Displays the parameters for the active application. Parameters can be modified here.

Error / status display

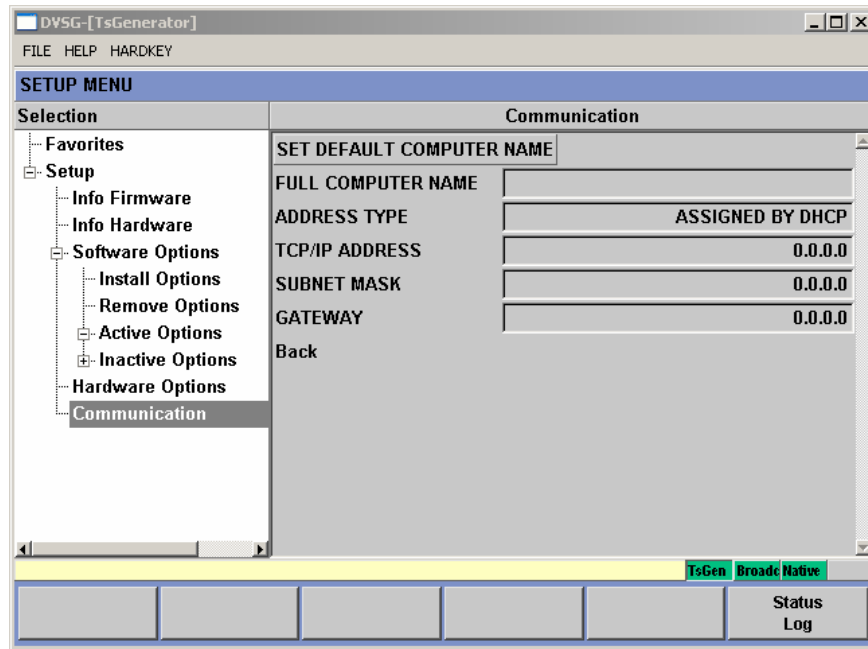
Displays the current error messages and warnings for the application that is running. Shows overview of other active applications.

Softkey labels

Displays the executable commands. The keys for execution of commands, so-called softkeys, are positioned directly below on the front panel.

3.3.2 Setup

Figure 3.3-2 Setup menu



Menu Bar

The menu bar shows all of the information that is relevant for the **Setup** menu.

In this menu bar, you can operate the instrument's front-panel hardkeys from the screen using the mouse. This is also necessary in the case of remote operation (e.g. VNC).

Tree and Work View

The tree is arranged on the left side. You can use the tree to navigate the **Setup** menu items. You can open and close the existing branches of the tree.

Located to the right of the tree is the work view, which corresponds to the selected tree element. In the work view for Setup, you can input data and make settings that apply to the whole instrument (i.e. all applications).

The user can also get information about the software version used in the instrument.

Calibration routines and software updates are also activated here.

Error / Status Display

Error messages for the current application are shown in the upper line. Warnings are displayed in the lower line.

The right part of the two lines contains fields that show all of the active applications.

Softkey Labels

There are six softkeys. The labeling for the softkeys can vary from tree element to tree element.

3.4 Tree Overview

The trees for various applications are shown below:

Figure 3.4-1 The TS Player and Recorder tree

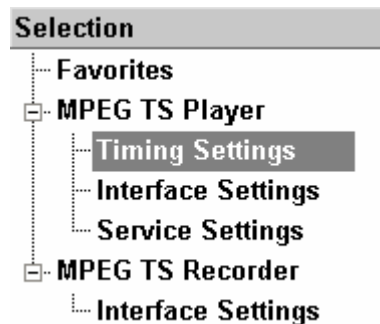
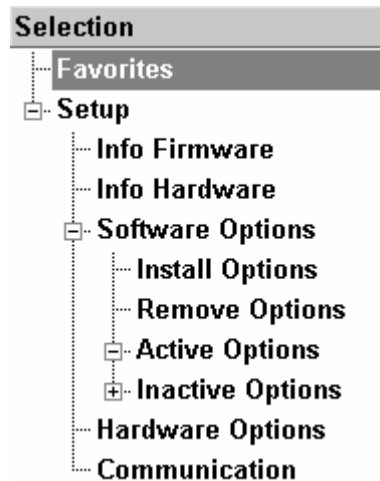


Figure 3.4-2 The Setup tree

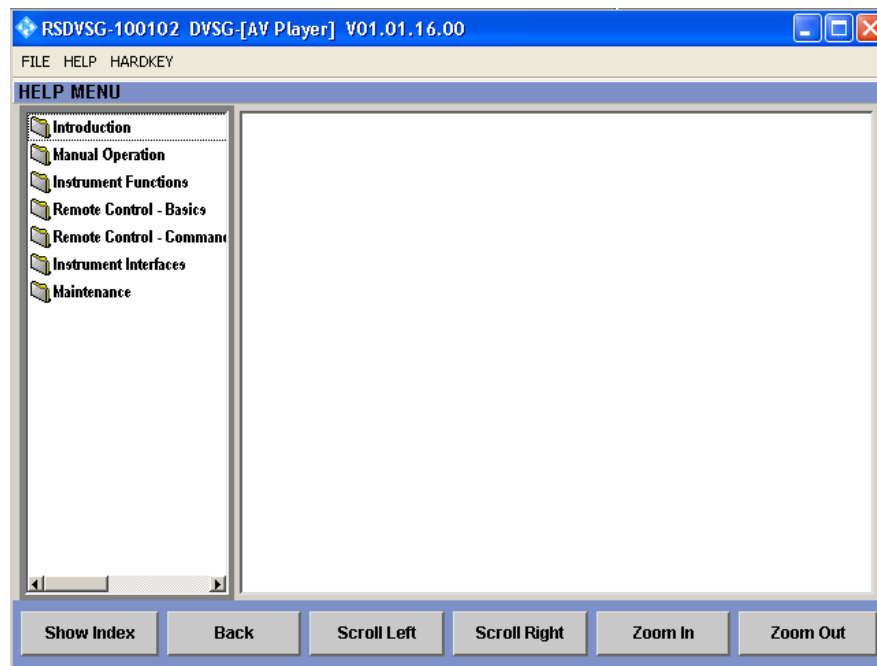


3.5 Help System

The instrument has a context-sensitive help system. The help system provides a help page for every parameter and can be called up at any time while the instrument is being operated.

The help system has a navigation bar, i.e. starting from the context-sensitive page, you can navigate to other help pages by using the contents list, the index, scroll arrows, and page-internal links.

Figure 3.5-1 Help menu



In addition to the context-sensitive help, online help for all functions of the instrument is compiled on the supplied CD-ROM. This help can be called up on any computer using the Internet Explorer (version 4.0 and higher).

Operating the context-sensitive help

Function	Front panel	Mouse
Open help Help page for selected parameter is displayed.	Press HELP key.	Click HELP/CONTENTS
Close help	Press HELP key again.	Click HELP/CONTENTS
Activate link Help opens linked page.	Highlight link using rotary knob or arrow keys and activate with rotary-knob click or ENTER key.	Click the link.
Scroll through help	Highlight Previous or Next in help window using cursor keys and activate with rotary-knob click or ENTER key.	Click Previous or Next .
Select item from contents list Help page for selected item is displayed.	Press Show Contents button below index list. Highlight item you want using rotary knob or cursor keys and then press rotary knob or ENTER key.	Click Show Contents Click the item.
Select index item Help page for selected item is displayed.	Press Show Index button below contents. Type desired term in entry field and then press rotary knob or ENTER key or highlight item using rotary knob or cursor keys and then press rotary knob or ENTER key.	Click Show Index Click the item.

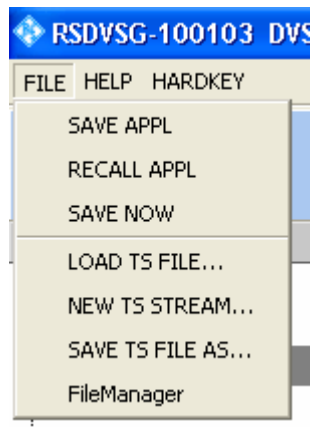
3.6 File Management

The instrument uses files to store all instrument data, i.e. system and user data. User data includes saved instrument settings, fading profiles for the fading option, transport streams for the TS generator option, and curve shapes for the arbitrary waveform generator.

The files are stored on the instrument's hard disk. The D: drive is available for storing user-defined data and can have any number of directory structures. Various default directories are preconfigured; however, you can change them at any time.

The C: drive is a protected system drive. The files on this drive contain data that must not be changed. Therefore, this drive should not be accessed since reconstruction of the system partition will lead to data loss. To prevent system files from being deleted or overwritten inadvertently, the C: drive is not displayed in the **FILE** menu. It can be accessed by disabling a protection level (see **Protection Level** in the **Setup** menu).

Figure 3.6-1 FILE menu



Files can be exchanged either via a memory stick or a connected network.

A memory stick is connected to the USB interface and is assigned the E:\ drive.

When the instrument is connected to a network, you will also see all of the network drives for which you have access rights.

You can access the **FILE** menu via the FILE key or the menu bar.

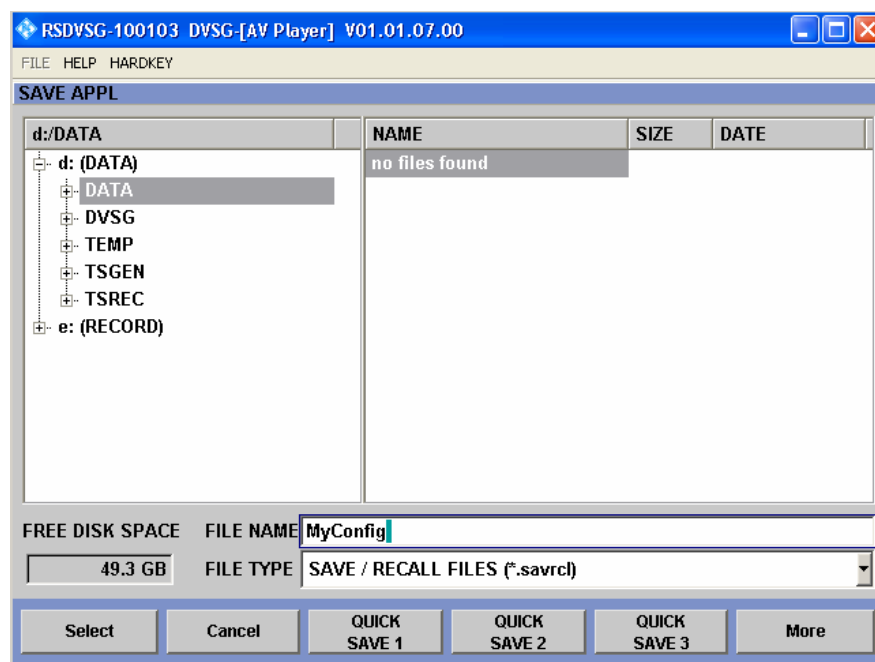
SAVE APPL

The available drives and directories are shown on the left-hand side, and the files in the selected directory are shown on the right-hand side. Only the relevant files (without file extensions) are shown.

Any file name can be used when saving and creating files; the file extension, however, is assigned automatically and cannot be entered. The file is saved on the selected path.

SAVE APPL calls the menu for storing the current instrument setting.

Figure 3.6-2 The **SAVE APPL** menu



The available drives and directories are shown on the left-hand side, and the files in the selected directory are shown on the right-hand side.

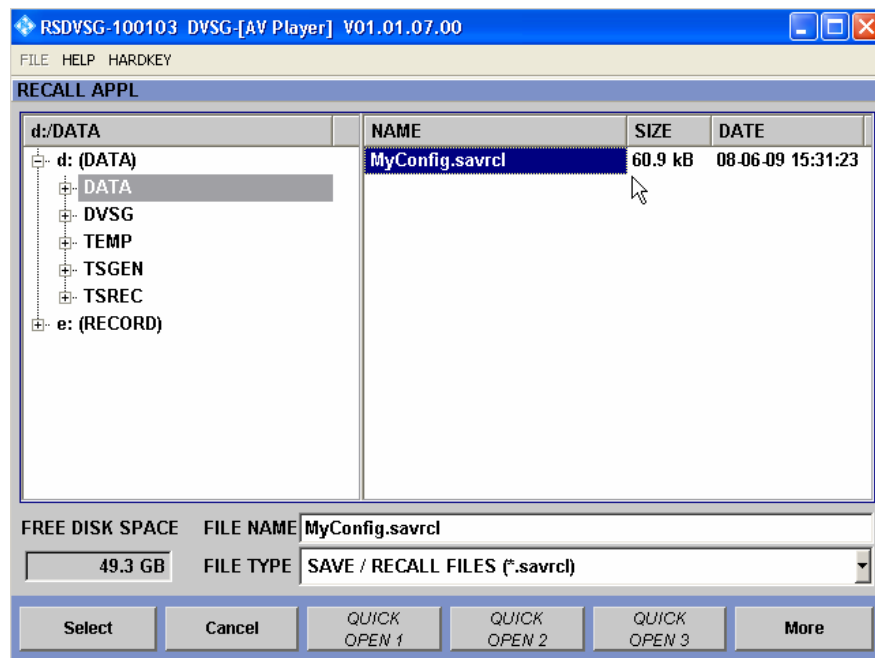
- ◆ **"Directory"** Selects the directory in which the file is to be stored.
- ◆ **DISK FREE SPACE** Displays the available disk space.
- ◆ **FILE NAME** For entering the file name of the file without file extension. This file is then created.
- ◆ **FILE TYPE** For selecting the file extension.
- ◆ **SELECT** Stores the current instrument settings under the specified path.

- ◆ **QUICK SAVE 1-5** Stores the current instrument settings in one of the five intermediate memories. These instrument settings are retained until a different instrument setting is stored in the intermediate memory. When the instrument is switched off, the contents of the intermediate memories are retained.
- ◆ **FILE MANAGER** Calls the **File Management** menu.

RECALL APPL

RECALL APPL calls the menu for calling up a stored instrument setting.

Figure 3.6-3 The **RECALL APPL** menu



The existing modes of operation and listings are indicated on the left side. The files in the selected listing are seen on the right side.

- ◆ **"Directory"** Selects the directory in which the file is to be stored.
- ◆ **DISK FREE SPACE** Displays the available disk space.
- ◆ **FILE NAME** For entering the file name of the file without file extension. This file is then created.
- ◆ **FILE TYPE** For selecting the file extension.
- ◆ **SELECT** Stores the current instrument settings under the specified path.

- ◆ **QUICK SAVE 1-5** Stores the current instrument settings in one of the five intermediate memories. These instrument settings are retained until a different instrument setting is stored in the intermediate memory. When the instrument is switched off, the contents of the intermediate memories are retained.
- ◆ **FILE MANAGER** Calls the **File Management** menu.

Remote control commands:

SAVE APPL

*SAV 1; MMEemory:STORe:STATe 1, <string>

Example for <string>: "D:\DATA\SaveApplExample.savrcf"

RECALL APPL

MMEemory:LOAD:STATe 1, <string>; *RCL 1

Example for <string>: "D:\DATA\SaveApplExample.savrcf"

SAVE NOW

No remote command available

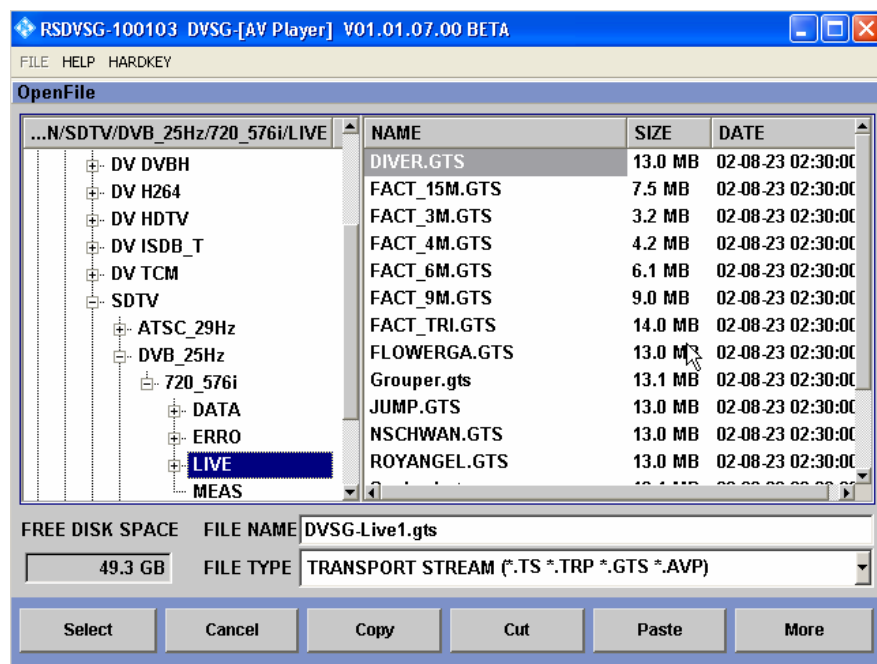
SAVE NOW

For storing the current instrument setting immediately.

FileManager

The **File Management** menu provides all the functions required for file management. Directories can be created, and files copied, deleted, and moved between the directories on the drives (hard disk, memory stick, and network drives).

Figure 3.6-4 FileManager



The available drives and directories are shown on the left-hand side, and the files in the selected directory are shown on the right-hand side.

The buttons/softkeys trigger the assigned action, e.g. copying, moving, or deleting the highlighted file.

In addition, it is possible to create a new directory in the level below the highlighted directory.

◆ **Moving file:**

Highlight the file and then use the **CUT** button/softkey. Highlight the directory to which the file is to be moved and then use the **PASTE** button/softkey. If a file with the same name already exists in the target directory, a confirmation query appears which the user must acknowledge before the file will be overwritten.

◆ **Copying file:**

Highlight the file and then use the **COPY** button/softkey. Highlight the directory to which the file is to be copied and then use the **PASTE** button/softkey. If a file with the same name already exists in the target directory, a confirmation query appears which the user must acknowledge before the file is overwritten.

◆ **Renaming file:**

Highlight the file and then use the **RENAME** button/softkey. A window opens in which the new file name can be entered. Enter the name and press the Enter key. If a file with the same name already exists, a confirmation query appears which the user must acknowledge before the file is overwritten.

◆ **Deleting file:**

Highlight the file and then use the **DELETE** button/softkey. A confirmation query then appears which the user must acknowledge before the file is deleted.

◆ **Creating a new directory:**

Highlight the drive or directory level under which the new directory is to be created, and then use the **NEW FOLDER** button/softkey. A window opens in which the new directory name can be entered. Enter the name and press the Enter key.

Table 3.6-1 List of user-file extensions that are assigned automatically in the instrument

List type	Content	File extension
Instrument state	Instrument settings	*.savrc1
Transport stream	MPEG data files	*.trp *.ts *.gts
AV Player	AV data files	*.avp

Remote control commands:**FILE MANAGER**

MMEMemory:ATTRibute
MMEMemory:CATalog:LENGth?/qonly/
MMEMemory:CATalog?/qonly/
MMEMemory:CDIRectory
MMEMemory:COPI/nquery/
MMEMemory:DATA
MMEMemory:DCATalog:LENGth?/qonly/
MMEMemory:DCATalog?/qonly/
MMEMemory:DELeTe/nquery/
MMEMemory:DRIVes?/qonly/
MMEMemory:LOAD:STATe/nquery/
MMEMemory:MDIRectory/nquery/
MMEMemory:MOVE/nquery/
MMEMemory:MSIS
MMEMemory:RDIRectory/nquery/
MMEMemory:STORe:STATe/nquery/

3.7 Manual Remote Operation

The instrument can be remote-controlled from an external PC. This allows the convenient operation of the instrument from the desktop although the instrument is integrated in a rack in the next room.

Manual remote control (in contrast to **remote control**) does not use remote-control commands but separate Windows software, which is installed on the external PC.

There are two choices: use of VNC or Remote Desktop.

3.7.1 Remote Desktop

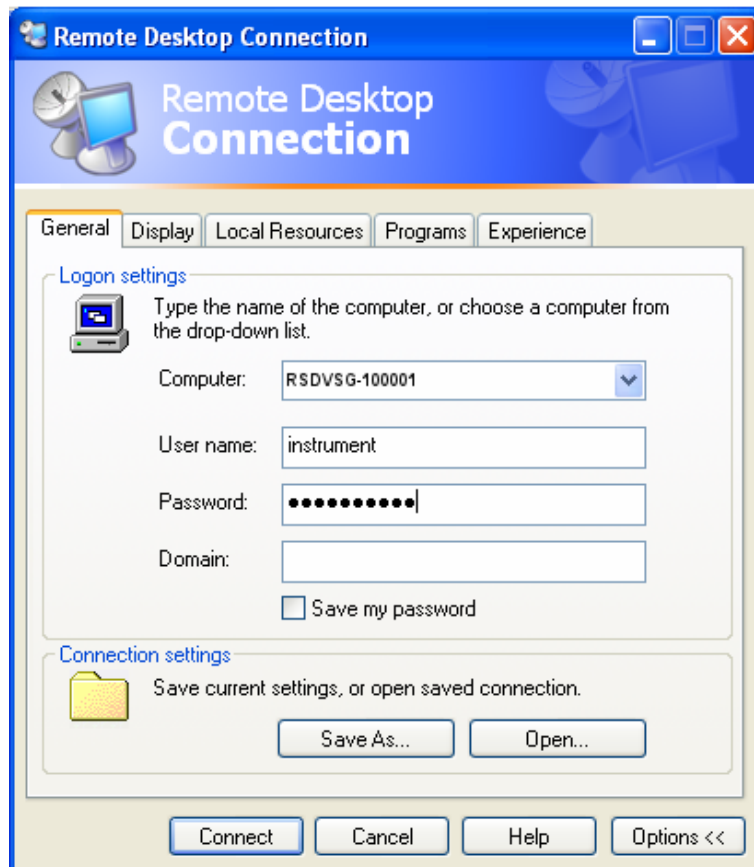
When started, the Windows XP **Remote Desktop Connection** software simulates the instrument user interface. This allows the instrument to be manually operated from the external computer in the same way as from the instrument itself.

Two preconditions for manual control are a connection between the instrument and the PC via a LAN network and the installation of the software on the PC.

The procedures for setting up a connection and installing the remote operation software on the external computer are described in Chapter 1.

Manual remote control is started on the external computer by calling up the **Remote Desktop Connection** program and clicking the **Connect** button. The instrument must be selected for remote control, i.e. its computer name must be displayed in the **Computer:** window.

If the PC is configured for the remote-control of multiple instruments, the instruments are in the list selected with the button. The user ID and password (**instrument** in both cases) can be stored when the software is first installed. The entries are made in the extended dialog displayed by clicking the **Options>>** button.

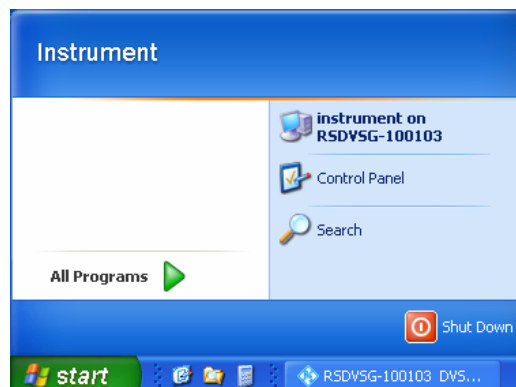


After login, the instrument firmware of the instrument boots on the external PC. After booting is completed, the instrument's screen appears and the instrument is ready for manual remote control from the external computer. The start settings that were active before the connection was established are used unless another start setting is explicitly selected in the **FILE** menu. The individual functions are operated using the mouse and keyboard. Front-panel keys that are not directly available on the keyboard can be substituted by key combinations (see table in the section below).

The device GUI of the instrument is disabled when the connection is set up. Operation from the instrument itself is not possible during manual remote control. Access by an external computer and the identity of the remote user is indicated on the login display of Windows XP Embedded.

For return to direct operation on the instrument, the external user must be logged off and the local user logged on.

The external user can log off in the **Start** menu on the external controller by clicking **Disconnect** in the lower right-hand corner of the dialog.



This logoff is also possible in the remote-control message window on the instrument.

Login of the local user is possible only in the remote-control display on the instrument. In the instrument, the local user can log in with the name "**instrument**" as standard; the password is also "**instrument**".

After local login, the instrument software starts with the settings made during manual remote control unless another start setup was explicitly selected in the **FILE** menu.

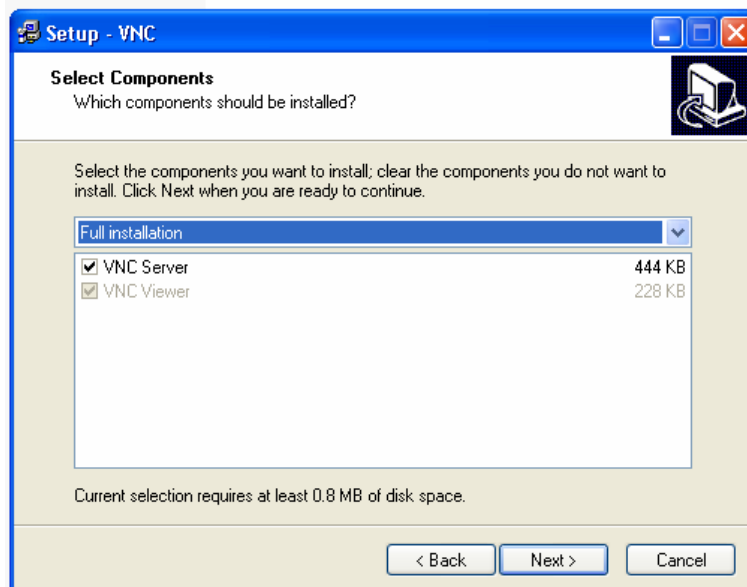
3.7.2 VNC

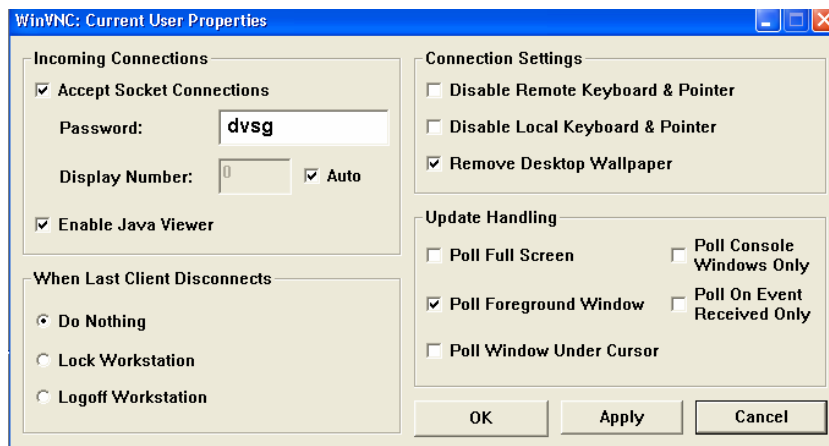
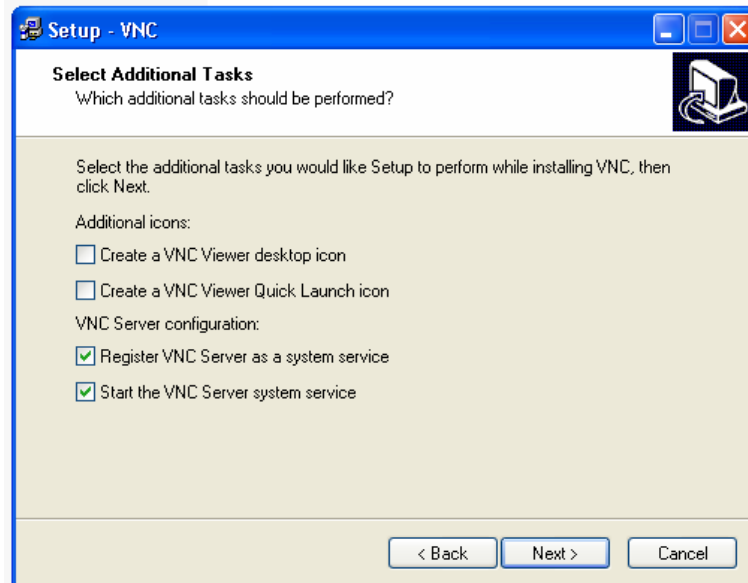
Once VNC is started, VNC simulates the user interface of the instrument. This allows you to operate the instrument manually from an external computer in the same way as from the instrument itself.

Before using VNC for the first time, you have to install it.

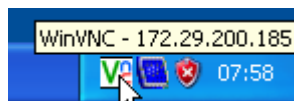
Installing VNC

- ◆ In the **c:\Program Files\VNC** folder, execute the **vnc-3.3-x86_win32.exe** file and follow the instructions using the following settings:





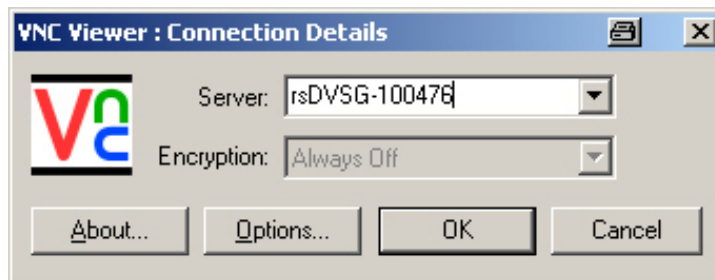
After a successful installation, the VNC icon is displayed in the Notification area.



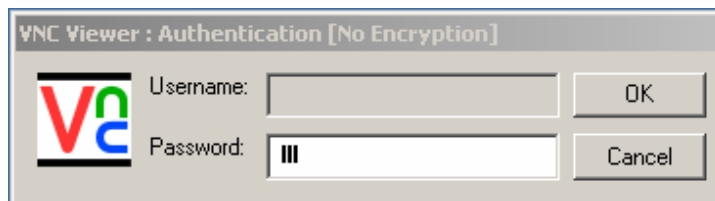
Working with VNC

For manual remote control to work, the following requirements must be met: There must be a connection between the instrument and computer via a LAN, the VNC viewer must be installed on the computer, and the VNC server must be installed on the R&S DVSG.

1. Start manual remote control on the external computer by starting the VNC viewer.
2. Select the instrument as the instrument for remote control, i.e. enter its IP address or computer name in the Connection details dialog.



3. Click **OK** to establish the connection.
You will be prompted for the session password.



4. Enter the password **dvsg** (or as specified above).
The screen of the instrument will appear on the external computer.
5. To end the remote control on the external computer, close the VNC application.

**Note:**

If you need to directly operate the R&S DVSG, it is not necessary to log off the external user.