ROHDE&SCHWARZ

USER MANUAL

Test Versatile Platform R&S®PowerTSVP

TS-PWA3

User Manual

for ROHDE & SCHWARZ Test System Versatile Platform R&S PowerTSVP

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ROHDE & SCHWARZ GmbH & Co. KG
Corporate Headquarters
Mühldorfstr. 15
D-81671 München

Telephone: ...49 (0)89/4129-13774
Fax: ...49 (0)89/4129-13777

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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 attached 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 intention 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 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, systems and all accessories.

Symbols and safety labels

							
Notice, general danger location Observe product documentation	Caution when handling heavy equipment	Danger of electric shock	Warning! Hot surface	PE terminal	Ground	Ground terminal	Be careful when handling electrostatic sensitive devices

					
ON/OFF supply voltage	Standby indication	Direct current (DC)	Alternating current (AC)	Direct/alternating current (DC/AC)	Device fully protected by double (reinforced) insulation

Tags 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 the possibility of incorrect operation which can result in damage to the product.
In the product documentation, the word ATTENTION is used synonymously.

These tags 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 tags described here are always used only in connection with the related product documentation and the related product. The use of tags 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, pollution severity 2, overvoltage category 2, use only indoors, max. operating altitude 2000 m above sea level, max. transport altitude 4500 m above sea level. A tolerance of ±10 % shall apply to the nominal voltage and ±5 % to the nominal frequency.
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 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 death.

Electrical safety

If the information on electrical safety is not observed either at all 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 an earthing contact and protective earth connection.
3. Intentionally breaking the protective earth connection 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 the product does not have a power switch for disconnection from the AC supply network, the plug of the connecting cable is regarded as the disconnecting device. In such cases, always ensure that the power plug is easily reachable and accessible at all times (corresponding to the length of connecting cable, approx. 2 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, a disconnecting device must be provided at the system level.
5. Never use the product if the power cable is damaged. Check the power cable on a regular basis to ensure that it is in proper operating condition. By taking appropriate safety measures and carefully laying the power cable, you can ensure that the cable will not 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 fused 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. 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_{rms} > 30 V, suitable measures (e.g. appropriate measuring equipment, fusing, 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 PE terminal on site and the product's PE 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 fused 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.
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", 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.
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. 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).

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, PE conductor test, insulation resistance measurement, leakage current measurement, functional test). This helps ensure the continued safety of the product.

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. Keep cells and batteries out of the hands of children. If a cell or a battery has been swallowed, seek medical aid immediately.
5. Cells and batteries must not be exposed to any mechanical shocks that are stronger than permitted.
6. 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.
7. 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.
8. 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, 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

1. 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.
2. 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.

Informaciones elementales de seguridad

Es imprescindible leer y observar 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 adjunto 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.

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.

Símbolos y definiciones de seguridad

							
Aviso: punto de peligro general Observar la documentación del producto	Atención en el manejo de dispositivos de peso elevado	Peligro de choque eléctrico	Adver-tencia: superficie caliente	Conexión a conductor de protección	Conexión a tierra	Conexión a masa	Aviso: Cuidado en el manejo de dispositivos sensibles a la electrostática (ESD)

					
Tensión de alimentación de PUESTA EN MARCHA / PARADA	Indicación de estado de espera (Standby)	Corriente continua (DC)	Corriente alterna (AC)	Corriente continua / Corriente alterna (DC/AC)	El aparato está protegido en su totalidad por un aislamiento doble (reforzado)

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.

PELIGRO identifica un peligro inminente con riesgo elevado que provocará muerte o lesiones graves si no se evita.

ADVERTENCIA identifica un posible peligro con riesgo medio de provocar muerte o lesiones (graves) si no se evita.

ATENCIÓN identifica un peligro con riesgo reducido de provocar lesiones leves o moderadas si no se evita.

AVISO indica la posibilidad de utilizar mal el producto y, como consecuencia, dañarlo.
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.

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, grado de suciedad 2, categoría de sobrecarga eléctrica 2, 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 ±10 % sobre el voltaje nominal y de ±5 % sobre la frecuencia nominal.
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, pueden causarse lesiones o 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.
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, se deberá considerar el enchufe del cable de conexión como interruptor. En estos casos se deberá asegurar que el enchufe siempre sea de fácil acceso (de acuerdo con la longitud del cable de conexión, aproximadamente 2 m). Los interruptores de función o electrónicos no son aptos para el corte de la red eléctrica. Si los productos sin interruptor están integrados 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_{eff} > 30 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.).
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.

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", 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 señalizar 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.
7. 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).

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.

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. Mantener baterías y celdas fuera del alcance de los niños. En caso de ingestión de una celda o batería, avisar inmediatamente a un médico.
5. Las celdas o baterías no deben someterse a impactos mecánicos fuertes indebidos.

6. 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.
7. 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).
8. 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.
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

1. 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.
2. 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.

Additional safety instructions:

- Any alteration to the basic equipment is prohibited, unless carried out by R&S authorized persons.
- In case that a module is inserted which is specified for an analog bus operation < 60 VDC, then this limit is also restrictively valid for the total system.
- The voltage limits for exposed voltage-carrying parts under DIN EN61010-1/6.3 must on no account be exceeded.
  If the use of higher voltages is required, this may be done only after consultation with R&S.
- The total power which may be drawn from the secondary side depends on the format of the relevant backplane segment (typically 250VA).
- When installing in racks, the ventilation of the system must be such that the specified data sheet values of 0 ... 50 °C are adhered to.

Qualitätszertifikat
Certificate of quality
Certificat de qualité

Certified Quality System
ISO 9001

Certified Environmental System
ISO 14001

Sehr geehrter Kunde,
Sie haben sich für den Kauf eines Rohde&Schwarz-Produktes entschieden. Hiermit erhalten Sie ein nach modernsten Fertigungsmethoden hergestelltes Produkt. Es wurde nach den Regeln unseres Qualitätsmanagementsystems entwickelt, gefertigt und geprüft. Das Rohde&Schwarz-Qualitätsmanagementsystem ist u.a. nach ISO 9001 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. You are thus assured of receiving a product that is manufactured using the most modern methods available. This product was developed, manufactured and tested in compliance with our quality management system standards. The Rohde&Schwarz quality management system is certified according to standards such as ISO 9001 and ISO 14001.

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 respectent nos normes de gestion qualité. Le système de gestion qualité de Rohde&Schwarz a été homologué, entre autres, conformément aux normes ISO 9001 et ISO 14001.

Engagement écologique
- Produits à efficience énergétique
- Amélioration continue de la durabilité environnementale
- Système de gestion de l'environnement certifié selon ISO 14001

ROHDE&SCHWARZ

1171.0200.11 V 04.01

Address List

Headquarters, Plants and Subsidiaries

Headquarters

ROHDE&SCHWARZ GmbH & Co. KG
Mühldorfstraße 15 · D-81671 München
P.O.Box 80 14 69 · D-81614 München
Phone +49 (89) 41 29-0
Fax +49 (89) 41 29-121 64
info.rs@rohde-schwarz.com

Plants

ROHDE&SCHWARZ Messgerätebau GmbH
Riedbachstraße 58 · D-87700 Memmingen
P.O.Box 16 52 · D-87686 Memmingen
Phone +49 (83 31) 1 08-0
+49 (83 31) 1 08-1124
info.rsmb@rohde-schwarz.com

ROHDE&SCHWARZ GmbH & Co. KG
Werk Teisnach
Kaikenrieder Straße 27 · D-94244 Teisnach
P.O.Box 11 49 · D-94240 Teisnach
Phone +49 (99 23) 8 50-0
Fax +49 (99 23) 8 50-174
info.rsdts@rohde-schwarz.com

ROHDE&SCHWARZ závod
Vimperk, s.r.o.
Location Spidrova 49
CZ-38501 Vimperk
Phone +420 (388) 45 21 09
Fax +420 (388) 45 21 13

ROHDE&SCHWARZ GmbH & Co. KG
Dienstleistungszentrum Köln
Graf-Zeppelin-Straße 18 · D-51147 Köln
P.O.Box 98 02 60 · D-51130 Köln
Phone +49 (22 03) 49-0
Fax +49 (22 03) 49 51-229
info.rsdc@rohde-schwarz.com
service.rsdc@rohde-schwarz.com

Subsidiaries

R&S BICK Mobilfunk GmbH
Fritz-Hahne-Str. 7 · D-31848 Bad Münder
P.O.Box 20 02 · D-31844 Bad Münder
Phone +49 (50 42) 9 98-0
Fax +49 (50 42) 9 98-105
info.bick@rohde-schwarz.com

ROHDE&SCHWARZ FTK GmbH
Wendenschloßstraße 168, Haus 28
D-12557 Berlin
Phone +49 (30) 658 91-122
Fax +49 (30) 655 50-221
info.ftk@rohde-schwarz.com

ROHDE&SCHWARZ SIT GmbH
Am Studio 3
D-12489 Berlin
Phone +49 (30) 658 84-0
Fax +49 (30) 658 84-183
info.sit@rohde-schwarz.com

R&S Systems GmbH
Graf-Zeppelin-Straße 18
D-51147 Köln
Phone +49 (22 03) 49-5 23 25
Fax +49 (22 03) 49-5 23 36
info.rssys@rohde-schwarz.com

GEDIS GmbH
Sophienblatt 100
D-24114 Kiel
Phone +49 (431) 600 51-0
Fax +49 (431) 600 51-11
sales@gedis-online.de

HAMEG Instruments GmbH
Industriestraße 6
D-63533 Mainhausen
Phone +49 (61 82) 800-0
Fax +49 (61 82) 800-100
info@hameg.de

Locations Worldwide

Please refer to our homepage: www.rohde-schwarz.com

- Sales Locations
- Service Locations
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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

Latin America

Phone +1-410-910-7988
customersupport.la@rohde-schwarz.com

Asia/Pacific

Phone +65 65 13 04 88
customersupport.asia@rohde-schwarz.com

China

Phone +86-800-810-8228 /
+86-400-650-5896
customersupport.china@rohde-schwarz.com

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1 User Information

1.1 Foreword

We congratulate you on your purchase of a **ROHDE & SCHWARZ** Test System Versatile Platform R&S PowerTSVP.

We would emphasize that only attendance at one of our regular in-house training seminars can ensure your successful operation of the Test System Versatile Platform in the long term.

Please do not hesitate to contact us should you have any queries whilst working with the Test System Versatile Platform.

We look forward to working with you

ROHDE&SCHWARZ

GmbH & Co. KG

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1.2 Related Documentation

Comprehensive documentation is supplied to enable you to use the Test System Versatile Platform R&S PowerTSVP efficiently. The operating manual comprises the following sections:

- User Information
- Safety
- Description
- Commissioning
- Operation
- Maintenance
- Plug-In Modules
- Interface description
- Technical Data

The **Appendices** contain:

- Declaration of Conformity

NOTE:

In the event of any discrepancies between data in this manual and the technical data in the data sheet, the data sheet takes precedence.

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1.3 Purpose of the User Manual

This User Manual provides the information that is necessary for

- the commissioning and
- the proper and safe operation

of the Test System Versatile Platform R&S PowerTSVP.

This User Manual must be carefully read by the operator/engineer who is responsible for working with the R&S PowerTSVP before it is powered up for the first time.

As well as the operating instructions and the health and safety instructions which apply at the site where the system is used, the applicable technical standards and regulations for safe and proper working must be complied with.

The operating instructions must be available at or near the R&S PowerTSVP at all times.

The owner must supplement the operating instructions with national accident prevention and environmental protection regulations as appropriate.

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1.4 Explanation of Symbols

The Test System Versatile Platform R&S PowerTSVP has been manufactured in accordance with accepted engineering practice and the latest scientific and technical findings.

Nevertheless there are certain risks which cannot be designed out of equipment.

Additional safety instructions have been developed to provide adequate safety for the personnel working on the R&S PowerTSVP.

A satisfactory level of safety when using the R&S PowerTSVP cannot be guaranteed unless these instructions are followed.

Certain sections of text are specially highlighted. These sections have the following meaning:

DANGER!

Failure to follow instructions can result in personal injury!

ELECTROCUTION HAZARD!

Failure to follow instructions can result in personal injury!

WARNING!

Failure to following instructions can cause damage to the Test System Versatile Platform R&S PowerTSVP.

CAUTION!

Failure to follow instructions can result in incorrect measurements.

NOTE:

Highlights important details to which special attention must be paid and that make work easier.

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2 Safety

2.1 General

The Test System Versatile Platform must be operated in accordance with the safety regulations which apply in the owner's country.

NOTE:

Safety risks created by an application that is based on the Test System Versatile Platform must be eliminated by suitable additional arrangements (e.g. integration in the Emergency Stop circuit).

NOTE:

Failure to observe the safety regulations governing the operation of the Test System Versatile Platform shall void any liability or guarantee claims against ROHDE & SCHWARZ GmbH & Co. KG.

2.2 Safety Instructions

ELECTROCUTION HAZARD!

The Test System Versatile Platform may only be opened by suitably trained technical personnel! The appropriate regulations governing work carried out on electrical equipment must be complied with.

The R&S PowerTSVP must be isolated from the electrical supply before work commences.

WARNING!

Never link out defective fuses. Always replace defective fuses with fuses of the same rating.

The electrical equipment fitted to the R&S PowerTSVP must be checked at regular intervals. Defects such as loose connections, scorched cables etc. must be rectified immediately.

The enclosed safety sheet must be complied with.

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3 Description

3.1 Usage

3.1.1 General

The **Test System Versatile Platform TSVP** is a standardized modular platform for the program-controlled testing of modules and terminals in the factory or laboratory. With its flexible configuration and the use of worldwide standards, it can be perfectly adapted to suit the needs of the user.

The R&S PowerTSVP is primarily intended as a flexible switching unit for measurement signals, signal sources and UUT loads. This facilitates the migration of existing and proprietary “Rack and Stack” systems to a production test platform.

R&S CompactTSVP (TS-PCA3) and R&S PowerTSVP (TS-PWA3) can be combined to create more complex ATE (**A**utomatic **T**est **E**quipment) systems with a high number of test pins. The R&S PowerTSVP is controlled either by the **system controller** of a R&S CompactTSVP (cPCI system) or by an external PC. A serial bus system (CAN Bus) is used to trigger the modules in the R&S PowerTSVP. External cabling is used to make the connection with the measurement and trigger bus of the R&S CompactTSVP.

The R&S PowerTSVP can be fitted with special ROHDE & SCHWARZ switching and load modules. The unit provides an analog bus that can be used to make complex connections. The modules can also be used without any modification in the R&S CompactTSVP. Up to four R&S PowerTSVP's can be cascaded.

The peripheral modules can be quickly and flexibly adapted to the UUTs by preceding the R&S PowerTSVP with an **adapter frame** which connects the signals securely and with a low rate of wear.

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3.1.2 Explanation of Terms

The following terms and standards are used in this manual:

CompactPCI (abbreviated to “cPCI” in this document) is an open standard of the PICMG (PCI Industrial Manufacturers Group) that adapts the PCI standard for industrial applications. It uses high-grade connection techniques and mechanical components, and applies the same electrical specifications as the PCI standard. This makes it possible to use inexpensive components and existing PCI developments even under industrial conditions. Other features include a high integration density, the option of a 19" installation and shielding for the plug-in modules. Its definition as an open standard means that a large, worldwide variety of cards is available. This standard is used in the R&S CompactTSVP.

PXI (PCI eXtensions for Instrumentation) is a standard defined by National Instruments which extends cPCI. The R&S PowerTSVP adopts the same mechanical specifications and the interfacing with the trigger system.

CAN (Controller Area Network) is a serial bus system whose high system and configuration flexibility is achieved by a content-oriented addressing scheme, i.e. it defines so-called “message identifiers“ and not device addresses. Systems can be added to an existing network without the need for hardware or software modifications. The CAN protocols is defined in ISO 11898.

Rear I/O is the name given to a design that allows input and output lines of the cPCI connectors P1 and P2 to be accessed from the rear of a backplane. Pluggable Rear I/O modules can be used for this purpose in the R&S CompactTSVP and the R&S PowerTSVP.

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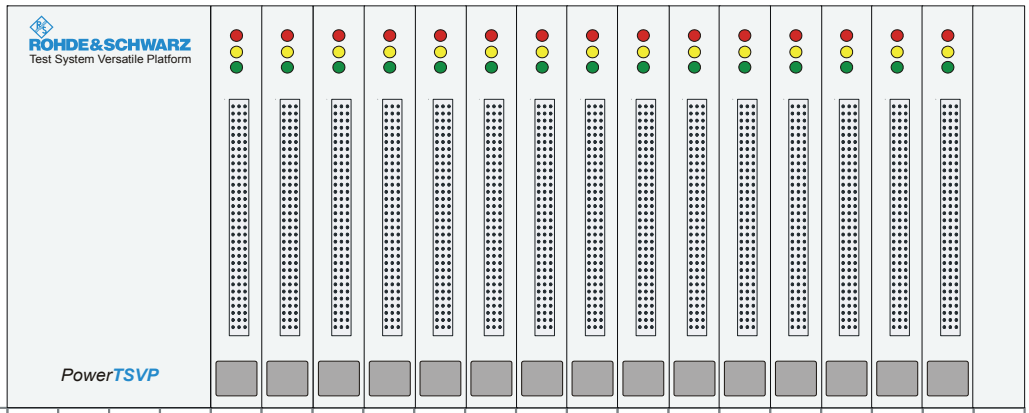
3.1.3 System Information

The R&S PowerTSVP has a modular structure that allows a range of system configurations tailored to the specific needs of the user.

The R&S PowerTSVP contains 16 slots for front plug-in modules conforming to Rohde & Schwarz format. The connector P2 that is defined in the cPCI standard is referred to here as P20, because of a different assignment. Slots A3, A4 are fitted with a PSU as standard. An optional R&S TS-PCPA power pack or the optional R&S TS-PXB2 backplane extension can be plugged into slots A1 and A2. Slots 1 to 16 provide access to the PXI trigger bus, CAN bus and analog bus. If an optional R&S TS-PXB2 is used, the CAN bus is also available at slots A1 and A2. Space for Rear I/O modules is provided at the back of the R&S PowerTSVP.

The configuration of the R&S PowerTSVP is shown in Figure 3-1.



Bus / Slot	A1	A2	A3	A4	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PXI Trigger																				
CAN	*1)	*1)																		
Analog Bus																				
Rear I/O																				
Power Supplies	*2)	*2)																		

*1) with option TS-PXB2
*2) with option TS-PCPA

Figure 3-1 Configuration of the R&S PowerTSVP

Table 3-1 summarizes some further characteristics of the R&S PowerTSVP that are important for a Test System Versatile Platform.

Other Characteristics R&S PowerTSVP
Powerful cPCI PSU for 250 W (expandable to 500 W)
Controlled by **CAN Bus**
The internal **analog bus** makes it possible to distribute measurement/stimuli signals among the plug-in modules with no additional cabling work.
Optional: Front mounted **adapter interface** on the R&S PowerTSVP that uses spring contacts to facilitate rapid and high-pole contacting with the UUTs (see Figure 3-4).
System serviceability is monitored by a built-in **self-test capability** and **system monitor** (operating voltages, temperature)

Table 3-1 Other Characteristics R&S PowerTSVP

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3.2 Views

Figure 3-2 and Figure 3-3 show the R&S PowerTSVP with slots covered.

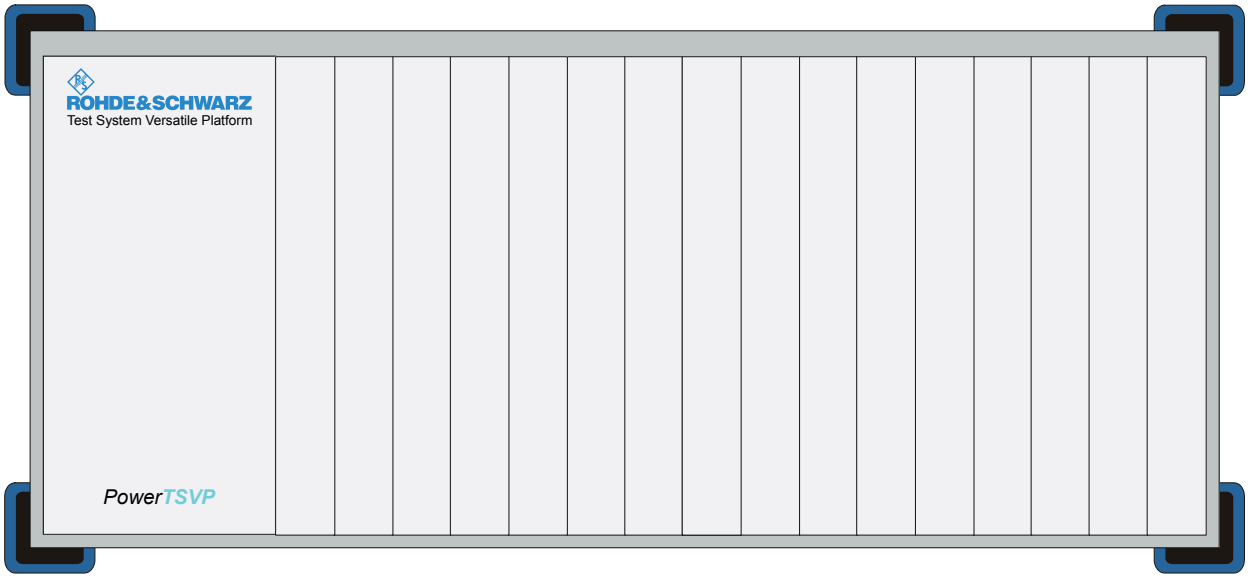

Figure 3-2 Front View

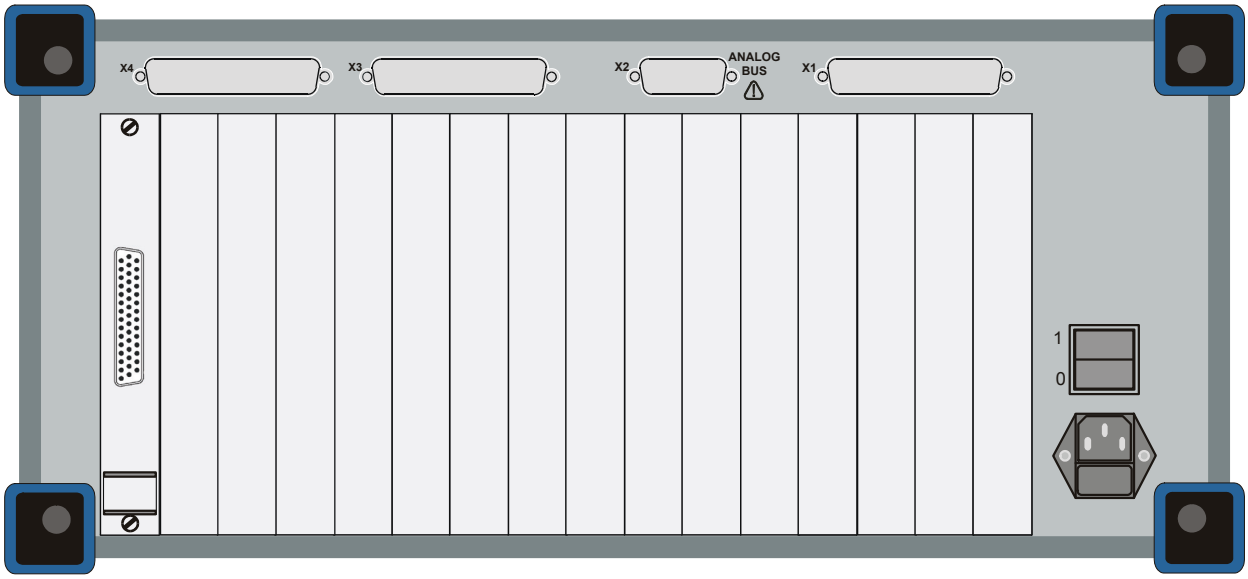

Figure 3-3 Rear View

The R&S PowerTSVP can be operated with an adapter interface (optional) which is flange-mounted to the front panel (see Figure 3-4)

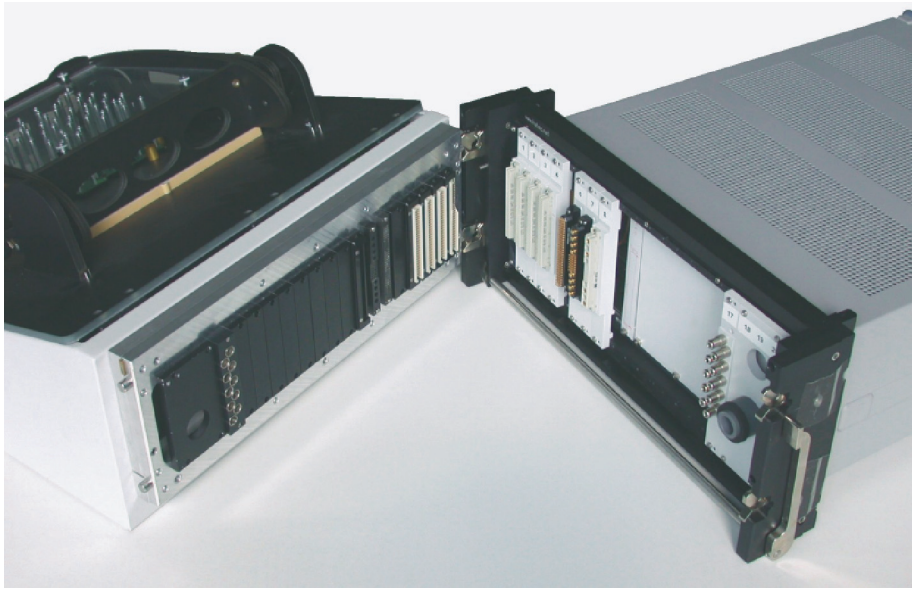

Figure 3-4 Adapter Interface

3.3 Layout

3.3.1 Case

The R&S PowerTSVP uses the standard Rohde & Schwarz case of the “Design 2000” (see Figure 3-5). The characteristics of the case are summarized in the Table 3-2.

Figure 3-5 BW 2000 Case

HF-immune case to Rohde & Schwarz “Design 2000”
Dimensions: 19", height 4U, 430mm deep
Use as desktop unit or rack-mounted case
Mounted in 19" rack using the telescopic slide set or on support rails
Side case handles that remain on the unit when mounted in the rack.
Four rugged detachable rubber feet provide rear protection.
Unused slots can be covered by front sub-panels that maintain the integrity of the HF-immunity. Contact springs are mounted between the individual front sub-panels for this purpose.
The case is suitable for 3U high plug-in boards.
The remaining space in the case can be used for adaption to the standard UUT connector or for concealed (cross) cabling.

Table 3-2 Features of the BW 2000 Case

3.3.2 Slot Layout

3.3.2.1 Plan View

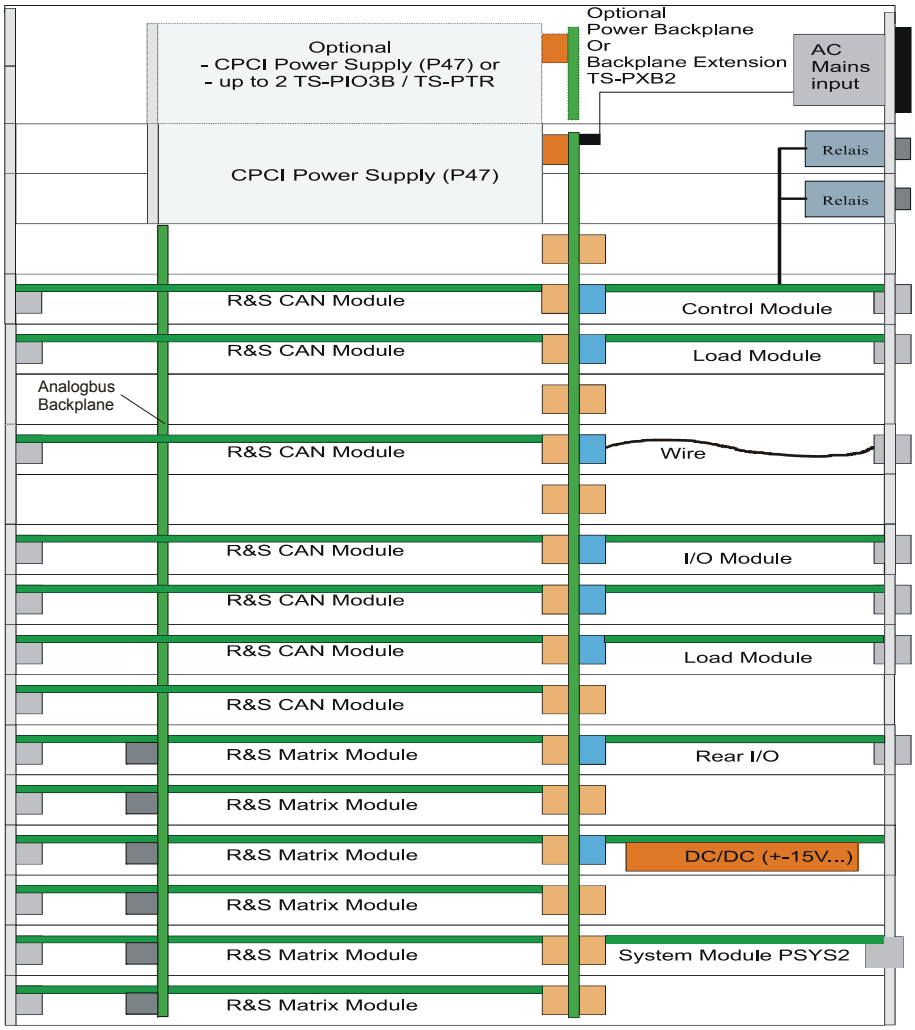

Figure 3-6 Plan View (example)

3.3.2.2 Side View

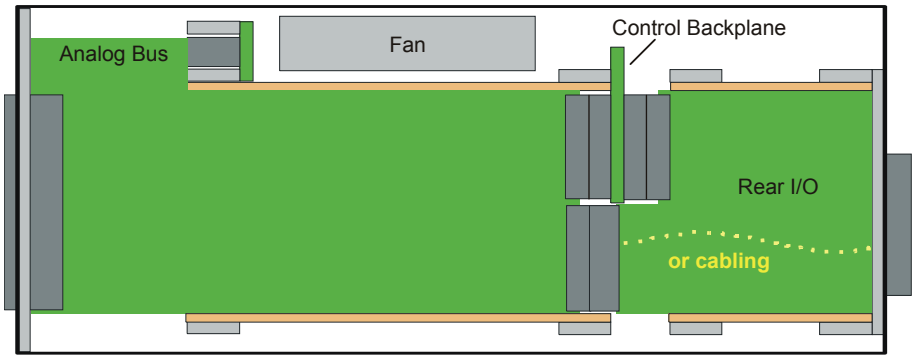

Figure 3-7 Side View

3.3.3 Backplanes

The R&S PowerTSVP contains the following backplanes:

- Control backplane with PICMG Power Interface and Rear I/O support
- Analog Bus Backplane
- Power backplane with PICMG Power Interface (optional)

Figure 3-8 shows the backplanes with the bus systems. The assignment of the connectors is detailed in Section 8.

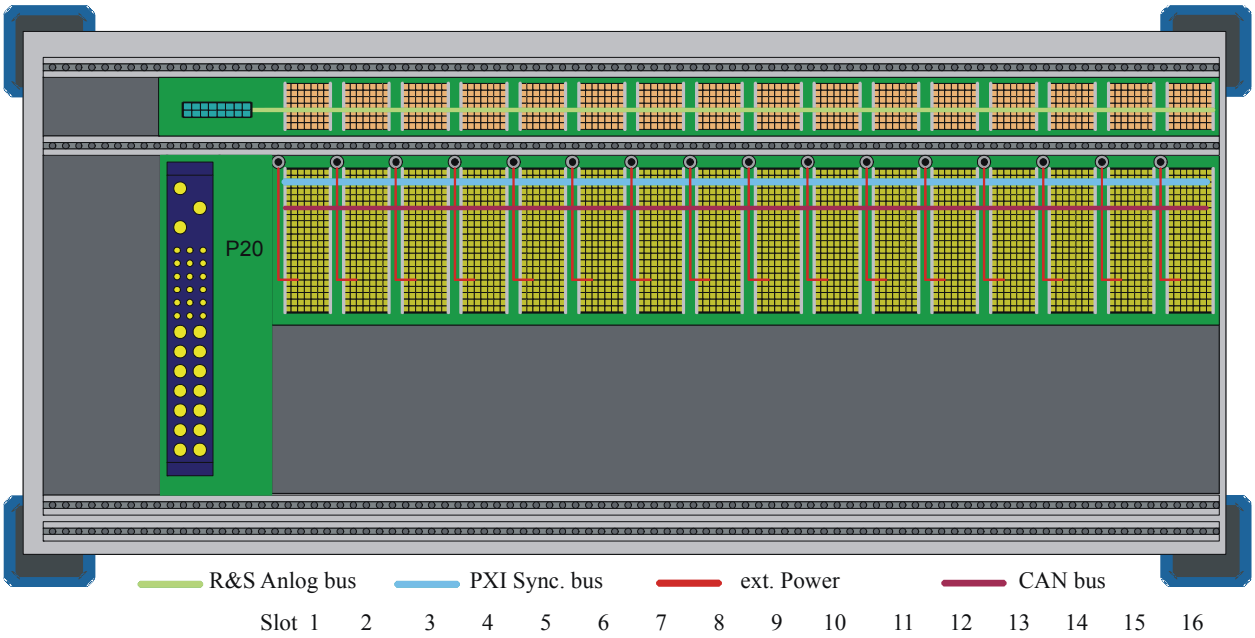

Figure 3-8 Backplanes and Bus Systems

3.3.3.1 Control Backplane

The control backplane is implemented for 16 plug-in modules to R&S format with front slots. The P2 connector of the cPCI system is used for the control interface. Pin assignment is R&S-specific (designation: P20) and compatible with the R&S CompactTSVP, so plug-in modules for the R&S PowerTSVP can also be operated in the R&S CompactTSVP.

Connector X0 (P47) serves as a power interface for a cPCI standard PSU. An additional PSU can be plugged onto an optional power backplane, in which case the connection with the control backplane is made with an ATX power supply cable.

Support for the Rear I/O concept according to Standard IEEE 1101.11-1998 is implemented for P20. Voltages up to 125 VDC can be routed in the Rear I/O area.

The PXI trigger bus according to PXI R2.0 is also implemented.

The **CAN bus** *[1] is integrated as the management bus, and is available at all slots. Signals CAN_L and CAN_H can be terminated with jumpers and resistors (Figure 3-9). Instead of being terminated, the bus can be extended externally using the extension connector X80.

*[1] to standard CAN 2.0b (1Mbit)

If the optional R&S TS-PXB2 backplane extension is used, the CAN bus is also available at slots A1 and A2. The R&S TS-PXB2 is connected to the main backplane via X80. The use of the backplane extension does not change the termination principle.

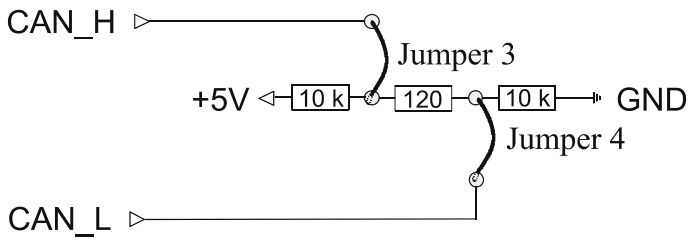

Figure 3-9 CAN Bus Termination

Number Lines	U_{max} (VDC)	Pin
2	5	CAN_H: P20/C1 CAN_L: P20/D1

Table 3-3 CAN Bus

Two additional **external signals** (e.g. supply voltages) can be fed in via a plug-in module in P20. This input can come from an internal AC/DC module or from other external signal sources. One way in which this feature can be used is to provide a primary voltage for generating local supply voltages (DC/DC converter).

Number Lines	U_{max} (VDC)	I_{max}/Slot (ADC)	Pin
2	60	2	input for ext. signals: P20: AUX1 B20, E19 P20: AUX2 A20, D19

Table 3-4 External Additional Signals

Lines with +5 V and +12 V are taken from connector X0 (P47) to optional threaded studs. This makes it easy to connect AUX1 to +5 V and AUX2 to +12 V, e.g. using an optional bus bar or cable (see Figure 3-10).

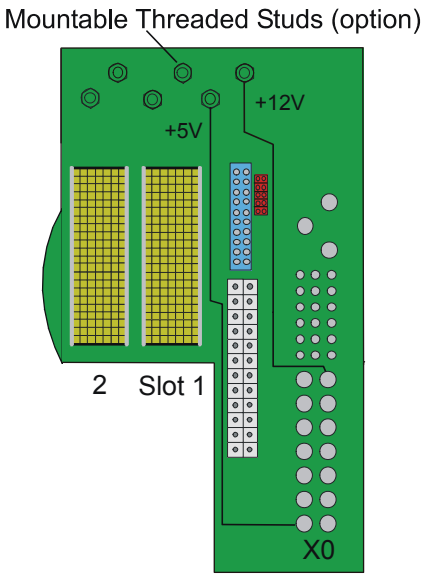

Figure 3-10 Mountable Threaded Studs on the Control Backplane

3.3.3.2 Analog Bus Backplane

To make cabling easy, the R&S PowerTSVP contains an analog bus with 8 signals to facilitate the noise-immune and variable connection of switching modules and measuring instruments. The analog bus backplane is located in the front section above the control backplane. Requirements for high crosstalk attenuation and low capacitance of the signal lines to GND are met by a special layout.

The C module (2 mm connector system) is used as the connectors (X1...X16). Plug-in modules with no analog bus connector access the analog bus via a 26-pin connector (X22) and R&S switch modules. Signals IL1_x and IL2_x (Instrument Line) are passed from slots 5 to 16 to connector X22 (see Section 4.4.2).

The analog bus signals pass from connector X21 to connector X2 at the back of the R&S PowerTSVP (see Section 4.4.2).

The electrical characteristics of the analog lines are:

- Voltage 125 VDC max.
- Current 1 A max.

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3.3.3.2.1 Concept of the Analog Bus

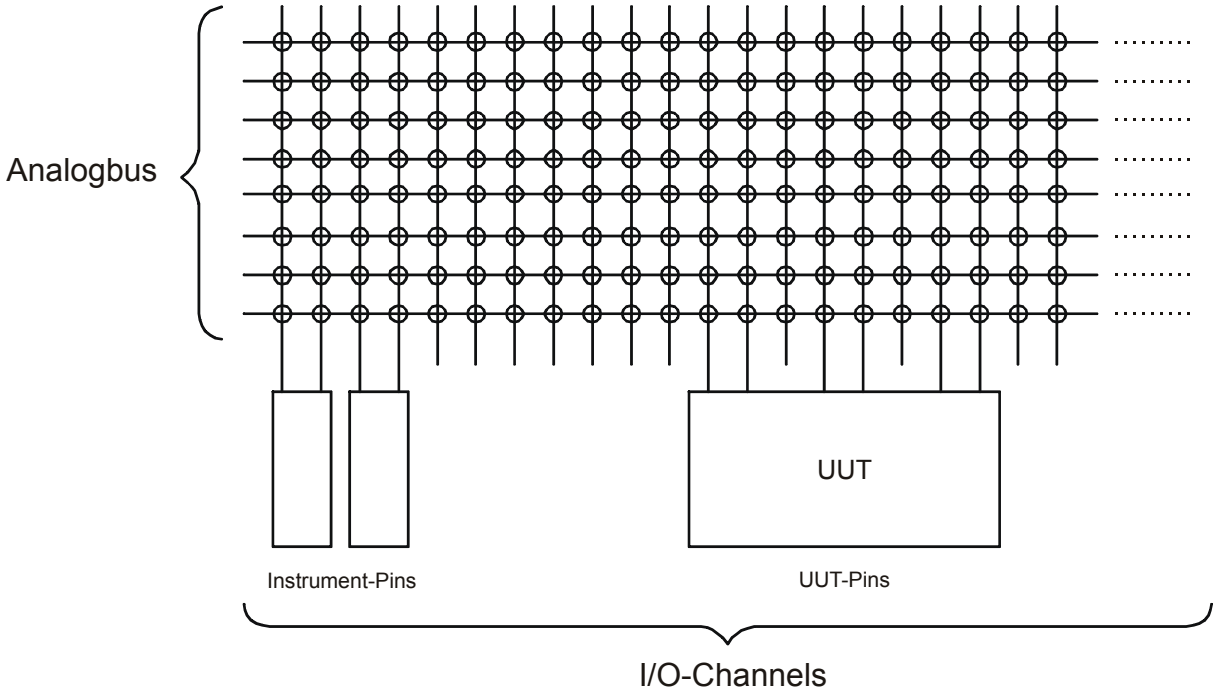

Figure 3-11 Principle of the Analog Bus

The analog bus in the R&S PowerTSVP connects I/O channels of different plug-in modules to each other under program control. I/O channels may be connections of instruments (measuring and stimuli devices) and connections of the device on test. Up to 8 different signals can be connected simultaneously (see Figure 3-11).

The analog bus can be used flexibly with the ROHDE & SCHWARZ-specific plug-in modules. 8 equivalent lines are basically available (ABa1, ABa2, ABb1, ABb2, ABc1, ABc2, ABd1, ABd2). External instruments are usually connected to the R&S PowerTSVP with a rear I/O connection. The signals for the UUT are made available at the front-end connector of the various plug-in modules on the R&S PowerTSVP.

The analog bus can be used in different ways:

- as 1 bus with 8 lines.
- in 2 part-buses with 4 lines each.

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The split of the analog bus into part-buses depends on the plug-in modules which are used and the application that is to be implemented..

The analog bus concept of the R&S PowerTSVP corresponds to the most reqirements of the measurement technology:

- A small number of buses for a large number of I/O channels (e.g. In-Circuit-Test with 3 to 6 buses.)
- As many signals as possible simultaneously for a moderate number of I/O channels (e.g. function test with 8 buses of 50 to 100 I/O channels).
- Parallel test with split analog bus.

Line paths or higher-frequency signals are usually connected locally by special switching modules and not via the analog bus.

3.3.3.2.2 Typical Use of the Analog Bus

The use of the analog bus and individual bus lines is illustrated with available R&S modules and standard modules (see Figure 3-12).

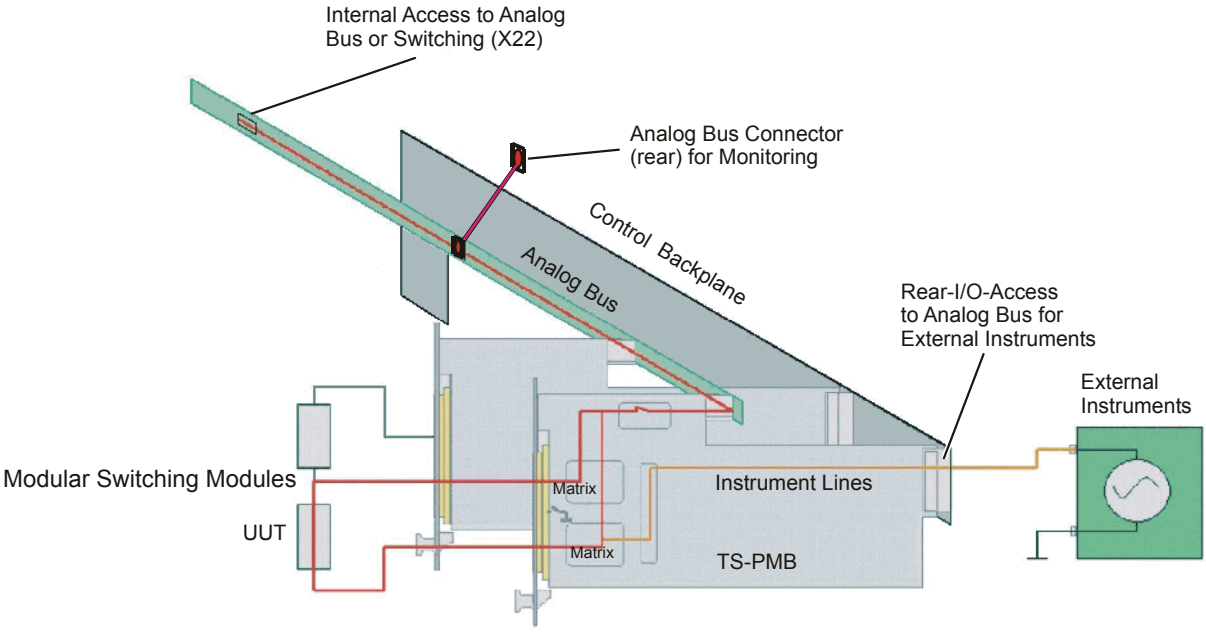

Figure 3-12 Use of the Analog Bus in the R&S PowerTSVP (Example)

3.3.3.3 Power Backplane

The use of a second cPCI PSU in slots A1, A2 requires the optional Power Backplane (conforms to standard PICMG 2.0). From the power backplane, a cable with three connectors leads to a 24-pin ATX connector on the control backplane. The three connectors are as follows (see also Section 8, Interface Description):

- X12, 20-pin
- X13, 10-pin
- X16, 4-pin

The second PSU can be used to boost the power of the standard PSU when connected in parallel. Alternatively it can be used to supply the device on test.

3.3.3.4 Backplane Extension R&S TS-PXB2 (Option)

The R&S TS-PXB2 option expands the Test System Versatile Platform R&S PowerTSVP by 2 CAN bus slots (A1 and A2). It can be integrated ex works only.

The two slots are intended for the R&S TS-PIO3B or R&S TS-PTR options. The R&S TS-PIO3B is an 8-channel, 8-bit Open Collector Digital I/O card with additional functions.

The R&S TS-PTR is a passive feedthrough circuit board. It can be used to feed as many as 24 signals through the device.

Ports 5, 6 and 7 of the R&S TS-PIO3B in slot A1 are routed to connector X1 on the rear panel. Ports 5, 6 and 7 of the R&S TS-PIO3B in slot A2 are available on connector DIO on the rear I/O slot A4.

In addition, the system CAN bus is available at the CAN connector on the rear I/O slot A4.

The option R&S TS-PXB2 cannot be used together with the power backplane. The jumpers and the assignment of the connectors in the rear I/O area are described in chapter 8.6.

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3.3.4 Ground Concept

An electrically conductive CHA-GND (chassis GND) pad in the mounting area on the control backplane provides an impedance grounding to the chassis. Screw connections and a busbar on the control backplane are used to make a low-resistance connection for GND and CHA-GND, while a star connection between GND and CHA-GND using a busbar prevents unwanted ground loops.

A capacitor creates the HF connection between GND and CHA-GND at each slot. A 1 MOhm resistor discharges the capacitors and dissipates static.

A 3-pin connector provides the 230 VAC supply for the PSU on the control backplane (at X0).

The optional power backplane is supplied with AC voltage parallel to the control backplane.

The PE conductor must be bonded to the case with a grounding cable.

The GND signal of the analog bus backplane is connected by a cable and screw terminal to the GND on the cPCI backplane. This prevents the large induction loops that would occur if a return via chassis were to be used.

The ground screen of the analog bus between two R&S PowerTSVP is connected to CHA-GND (chassis).

In the second R&S PowerTSVP CHA-GND must not be connected to GND to prevent ground loops. The connections are sketched in Figure 3-13.

GND sense of +5 V and +3.3 V (of the second PSU as well) are connected to GND at the grounding star point.

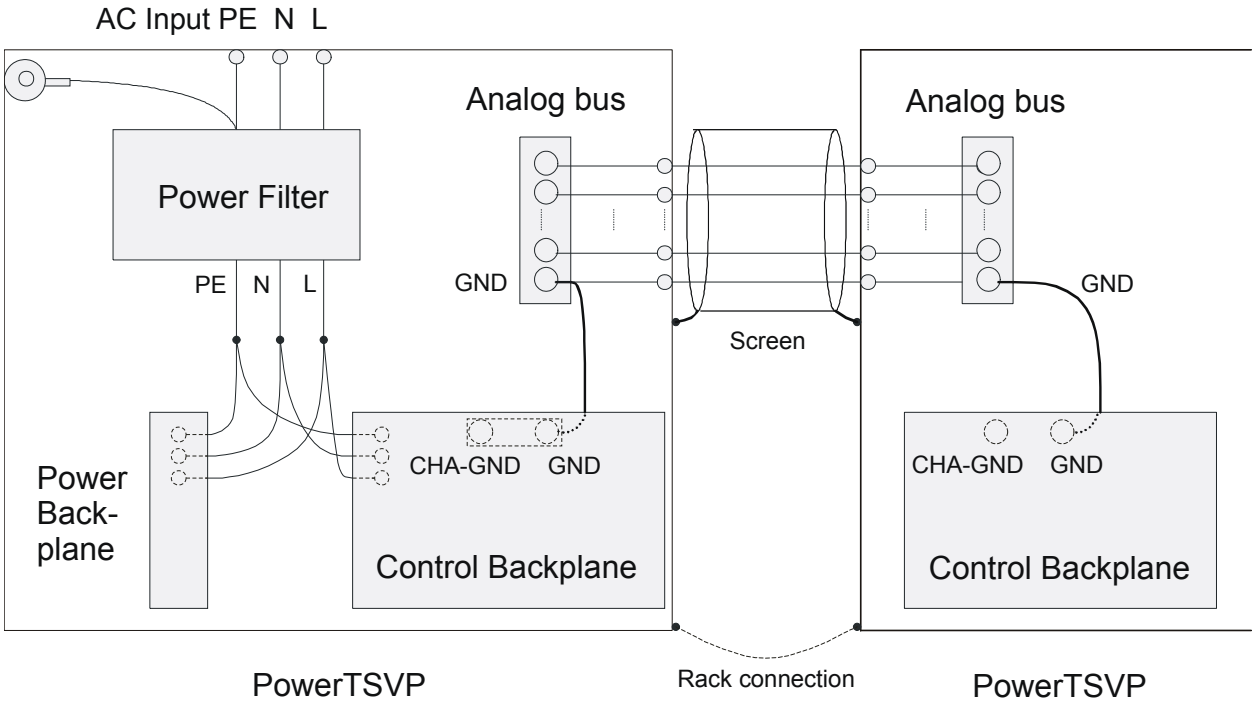

Figure 3-13 Ground Concept

3.3.5 Geographical Addressing of the Slots with GA0 ... GA5

The physical slot addresses are coded with the signals GA0 ... GA5 (see cPCI specification). For slot 1, GA0 ... GA3 are connected to GND. In order to distinguish between slots of different connected R&S PowerTSVP basic units , GA4 and GA5 are configured with jumpers (see jumper field in Section 8).

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The coding for slot recognition is carried out with GA0 ... GA3 as follows:

Slot	Code
1	0000
2	0001
3	0010
4	0011
5	0100
6	0101
7	0110
8	0111
9	1000
10	1001
11	1010
12	1011
13	1100
14	1101
15	1110
16	1111

Note:
0: Pin connected to GND via resistor
1: Pin open

3.3.6 CAN Bus

For controlling of the switch modules R&S TS-PMB and R&S TS-PSM1 as well as the control modules R&S TS-PSYS1 and R&S TS-PSYS2, the CAN bus is used in TS-PCA3 and TS-PWA3. The CAN bus numbering results from the following scheme:

CAN*u::v::w::x*

u = Board Number
v = Controller Number
w = Device Number
x = Slot Number

Board Number and Controller Number are always 0. The Device Number of the frame is determined by the settings of the jumpers on the backplane (see Section 3.3.7). For Rear-I/O modules like R&S TS-PSYS1 and R&S TS-PSYS2, a 4 has to be added to the Device Number.

Example: CAN*0::0::5::15*

Board Number: *0*
Controller Number: *0*
Device Number: *5* (Device 1, Rear-I/O)
Slot Number: *15*

The following table shows the jumper configuration for the bus terminations CAN1 (System) und CAN2 (User).

Modul	CAN-Bus	offen	terminiert
TS-PCA3	CAN1 (System)	Jumper J3 and Jumper J4 open	Jumper J3 and Jumper J4 geschlossen
TS-PWA3	CAN1 (System)	Jumper J4 and Jumper J5 open	Jumper J4 and Jumper J5 closed
R&S TS-PSYS1, R&S TS-PSYS2	CAN1 (System)	Jumper JP6 open	Jumper JP6 closed
R&S TS-PSYS1, R&S TS-PSYS2	CAN2 (User)	Jumper JP7 open	Jumper JP7 closed

Table 3-5 CAN Bus Termination

3.3.7 Configurations with several Frames or Option R&S TS-PXB2

In the following figure, the terminating resistors are depicted in yellow.

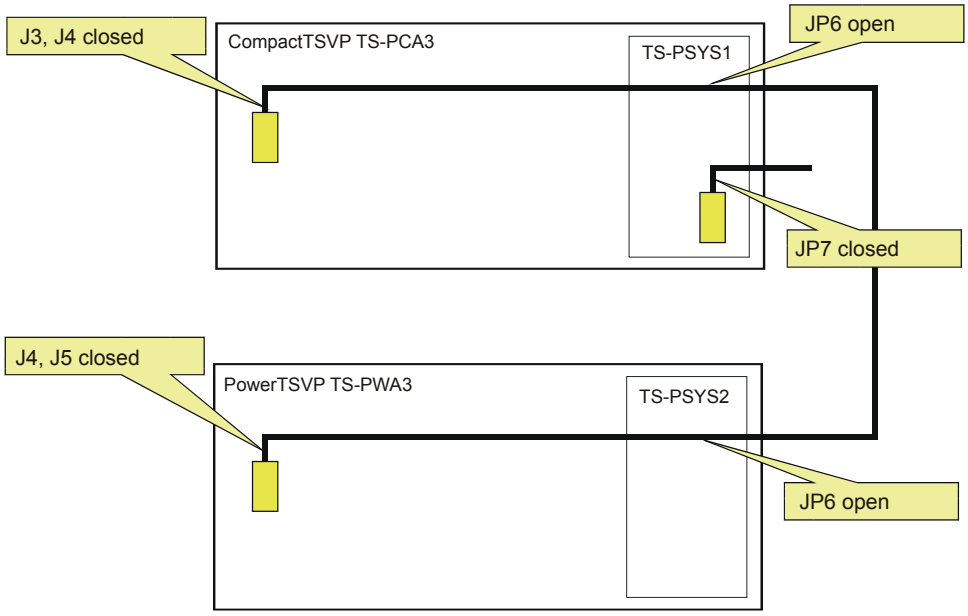

Figure 3-14 Configuration example TS-PCA3 und TS-PWA3

CAN1 (System) is being connected between the two frames via cable R&S TS-PK02 (option). The termination is carried out on both back-planes. The jumpers on the system modules R&S TS-PSYS1 and R&S TS-PSYS2 have to be left open.

According to Section 3.3.5, the jumpers for device addressing must be set as follows:

TS-PCA3: J1 set → Device 1

TS-PWA3: J1 set, J2 not set → Device 2

J1 (GA4)	J2 (GA5)	Device
set	set	1
not set	set	2
set	not set	3
not set	not set	4

Table 3-6 Device Addressing

The optional R&S TS-PXB2 backplane extension also uses the CAN bus. For the modules plugged there (only R&S TS-PIO3B or R&S TS-PTR permitted), GA4 and GA5 can also be configured via jumpers. For this reason, the optional R&S TS-PXB2 backplane extension behaves like a complete device for the purpose of the CAN bus.

Table 3-7 is applicable to the optional R&S TS-PXB2 backplane extension:

X11 (GA4)	X10 (GA5)	Device
set	set	1
not set	set	2
set	not set	3
not set	not set	4

Table 3-7 Device addressing for R&S TS-PXB2

If the optional R&S TS-PXB2 backplane extension is used in the R&S CompactTSVP TS-PCA3, X10 (GA5) can remain set and X11 (GA4) can be plugged in the same way as on the main backplane. In this way, the addressing range of the CAN bus is expanded to slot codes 0000 (slot A1) and 0001 (slot A2).

If the optional R&S TS-PXB2 backplane extension is used in the R&S PowerTSVP TS-PWA3, the R&S TS-PXB2 must be configured as a new "device" to prevent addressing collisions with slots 1 and 2.

3.3.8 Switching the PSU

Signal PS-ON is used to power the PSU outputs on and off. Jumper 3 is removed for this purpose (see jumper field in Section 8) and replaced by an external switch. Signal PS-ON is available at the extension connector X80.

3.3.9 Line Inlet and Power Switch

The line inlet and power switch are at the back of the R&S PowerTSVP (see Figure 3-3).

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3.3.10 Cooling

The R&S PowerTSVP possesses a powerful cooling concept. The slots at the front (optional in the Rear I/O area) are cooled by a vertical flow of air. The four fans are above the slots and are connected to the back-plane by series contact connectors (see Figure 3-15). The fan speed is controlled by the internal temperature.

For the rear I/O area, fans can be retrofitted through the R&S TS-RFAN option. The supply voltage for this fan unit is tapped at the +12 V studs (refer to Figure 3-10) and earth (sheet metal flashing).

The R&S TS-RFAN fan unit is especially required if

- for lack of space, slots cannot remain free between modules with DC/DC converter module R&S TS-PDC in the rear IO area, or
- the R&S PowerTSVP TS-PCA3 is not operated in normal horizontal standard position.

WARNING!

Adequate space for air inlet and outlet should be allowed when the case is rack mounted, with at least half a height unit (22 mm) being left above and below the chassis!

For desktop mounting, ensure that the case is not covered over!

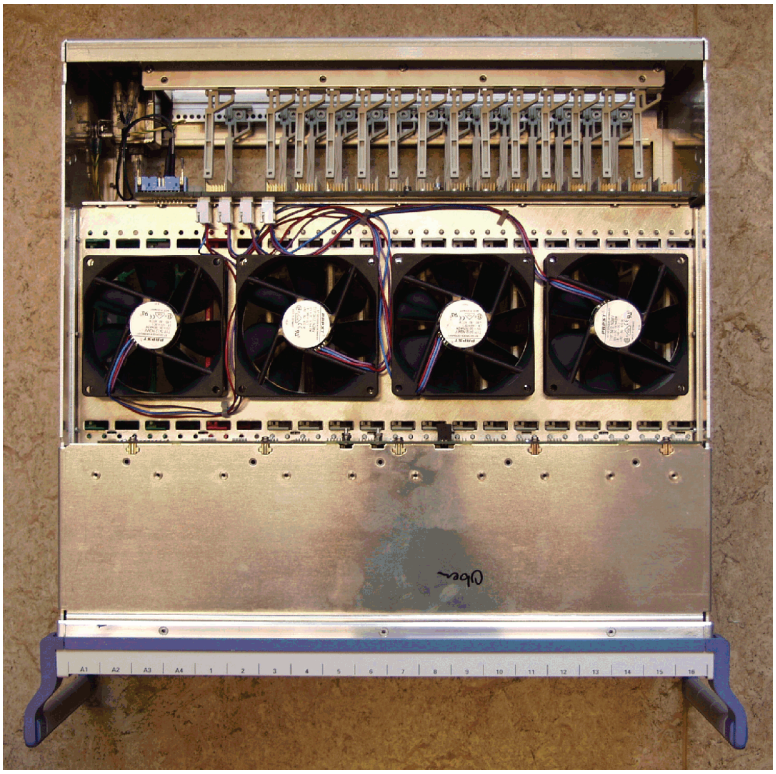

Figure 3-15 Layout of Fans in the Frame

3.4 System Module R&S TS-PSYS2

3.4.1 General

The R&S TS-PSYS2 is in the **Rear I/O slot 15** of the R&S PowerTSVP. It acts primarily as a CAN-Interface and therefore as an interface for communication with R&S CAN modules in the R&S CompactTSVP and R&S PowerTSVP.

Additional system functions such as voltage and temperature monitoring, trigger signals and optocoupler interface are used to integrate the R&S CompactTSVP and R&S PowerTSVP in a complete system.

3.4.2 Characteristics

R&S TS-PSYS2
RTM type with cPCI interface
2 independent CAN interfaces (2.0 A/B, 1 Mb/s)
System functions via CAN node (microcontroller) - Voltage monitor - Temperature measuring (internal) - Enable of the PXI trigger signals to the exterior - 4 optocoupler outputs - 4 optocoupler inputs - 2 switchable, short-circuit proof output voltages - System identification
Manual selection of the local or external system clock, and its buffering with jumper

Table 3-8 Characteristics of the R&S TS-PSYS2

3.4.3 Circuit Diagram of the R&S TS-PSYS2

Figure 3-16 shows the circuit diagram of the R&S TS-PSYS2

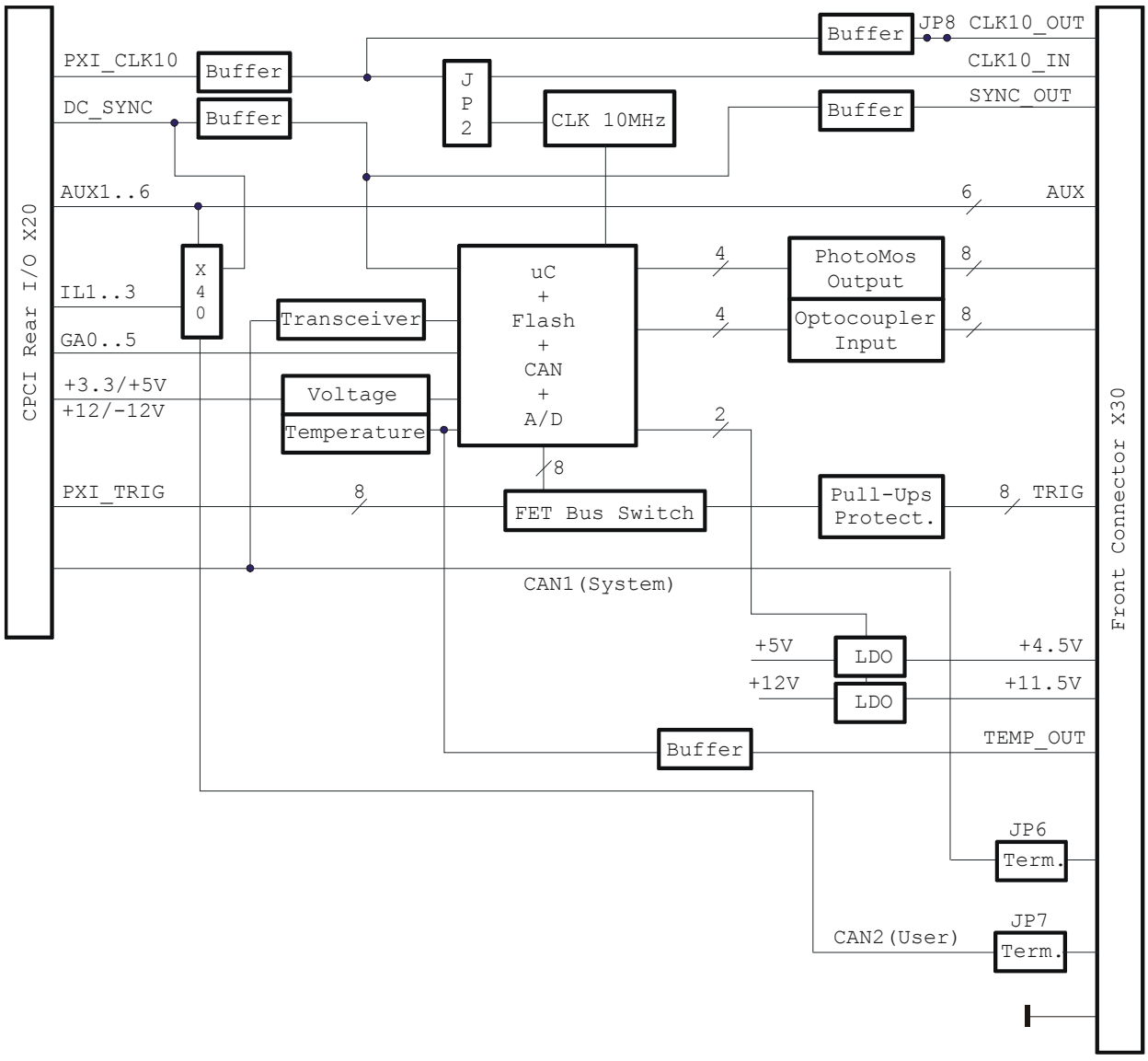

Figure 3-16 Circuit Diagram of the R&S TS-PSYS2

3.4.4 Structure of the R&S TS-PSYS2

The R&S TS-PSYS2 is the size of a standard cPCI-RTM (Rear Transmission Module) and is mounted in slot 15 at the rear of the TSVP chassis.

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Connector X20 is used to make the connections to the Rear I/O side of the control backplane in the R&S PowerTSVP. Connector X30 is a 44-pin D-sub socket (High Density). Jumper field X40 as well as the Jumpers JP2, JP6, JP7 and JP8 are placed on the circuit board.

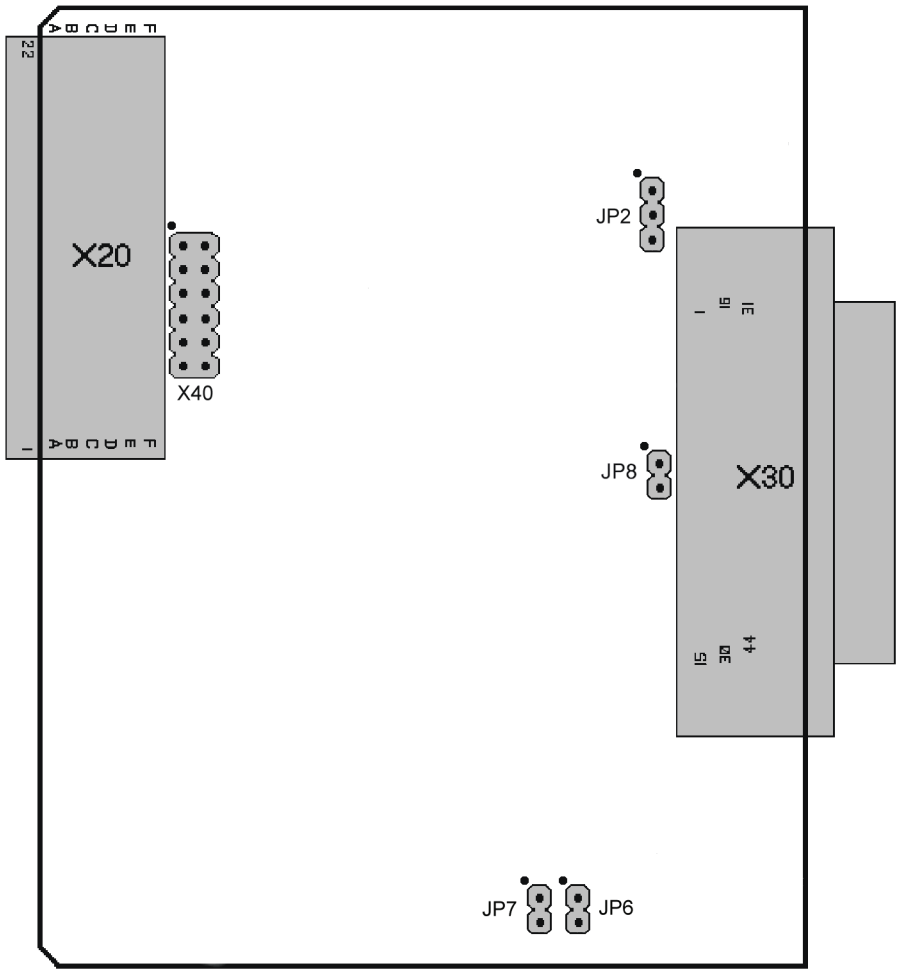

Figure 3-17 Connectors and Jumpers on the R&S TS-PSYS2

Symbol	Use
X20	Rear I/O
X30	Front Connector
X40	Jumper field Rear I/O signals

Table 3-9 Connectors on the R&S TS-PSYS2

3.4.5 Functional Description of the R&S TS-PSYS2

(see also Figure 3-16)

3.4.5.1 Control

The R&S TS-PSYS2 is controlled by the R&S CompactTSVP or PC. It provides two CAN bus channels (type 2.0 A/B to ISO 11898):

- CAN1: Internal connection, for controlling the R&S modules
- CAN2: General Usage

The CAN lines are terminated manually with a jumper on the PSYS2 (see Section 8.4)

3.4.5.2 System Functions

The system functions are implemented by an 8 bit microcontroller which operates at a 10 MHz system speed. It communicates with the system controller in the R&S CompactTSVP or PC across the CAN1 port. The following functions are available:

- 8 x enable of PXI trigger signals to the outside (e.g. R&S PowerTSVP)
- 4 x optocoupler outputs (for PLC or handling systems)
- 4 x optocoupler inputs (for PLC or handling systems)
- 2 x enable for additional supply voltages (+4.5 V / +11.5 V)
- 3 x supply voltage measurement
- 1 x measurement of the internal temperature

3.4.5.2.1 PXI Trigger

The input/output of trigger signals (X20) is controlled separately for each signal. On the output side the signals are terminated by pullup resistors and protected by self-healing fuses and d.c. clamp diodes. The external trigger lines are available at connector X30.

3.4.5.2.2 Floating Outputs

4 PhotoMos relays (with internal current limiter) are triggered by a µC port. The signals are available at connector X30.

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3.4.5.2.3 Floating Inputs

A C port reads the status of 4 optocoupler inputs (2 x 2-pin). The current at the inputs is limited so that inputs signals can be fed in unconditioned within a wide voltage range. These inputs are available at connector X30.

3.4.5.2.4 Output voltages

Two voltage regulators with output-enable control generate switchable, short-circuit proof voltages of +4.5 V and +11.5 V at X30. These voltages can be used to supply external components (e.g. signal lamps).

3.4.5.2.5 Measuring the cPCI Supply Voltages

The supply voltages present at connector X20 (+5 V / +12 V / -12 V) are measured with the A/D ports of the µC.

3.4.5.2.6 Temperature Measurement

An A/D port of the C is used to measure the ambient temperature of the plug-in module. A temperature-to-voltage converter is used as the sensor. The temperature-proportional analog voltage is also output at connector X30 for monitoring purposes (TEMP_OUT).

3.4.5.2.7 Geographical Addressing

According to the cPCI specification, each slot is assigned its own digital slot code (GA code). This code is used internally to directly address the µC.

3.4.5.3 System Clock

A local quartz crystal generates the 10 MHz system pulse for the PXI system (PXI_CLK10). Alternatively a very accurate reference pulse can be fed in across X30. Jumper JP2 is used to select an internal or external clock source. The jumper functions are shown in Section 8.4.

3.4.5.4 Signal Looping

A number of signal lines are looped from connector X30 to connector X20. These are used to input/output Rear I/O signals (e.g. for the R&S switching modules R&S TS-PMB, R&S TS-PSAM)

Number Lines	Signal Name	Current Carrying Capacity
2 4	AUX1 ... 2 AUX3 ... 6	3 A 1.5 A

3.4.5.5 Local Signal Outputs

Special signals of the Power-TSVP can be connected to connector X20 (Rear I/O) with the help of jumper field X40. The jumper functions are described in Section 8.4.

WARNING!

Jumpers only permitted when system voltages are < 60 VDC

Number Lines	Signal Name	Current Carrying Capacity
3	AUX4 ... 6	1.5 A
3 (6)	IL1 ... 3	1.5 A
2	CAN2	

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3.4.6 Driver Software

The R&S TS-PSYS2 is triggered by a universal driver software. The local microcontroller is triggered by the CAN1 bus and the R&S-specific protocol.

The following software modules are installed during driver installation:

- RSCAN
- RSPSYS

3.4.7 Self-Test

The R&S TS-PSYS2 has no built-in self-test capability. The function of the internal CAN bus can be checked with the local CAN node.

3.5 Function Description

The functionality of the R&S PowerTSVP depends essentially on the installed plug-in modules and the related software. The R&S PowerTSVP is basically suitable for all types of production tests.

An adapter interface can be flange-mounted on the front of the R&S PowerTSVP for the rapid and high-pole adaption of UUTs (see Figure 3-4).

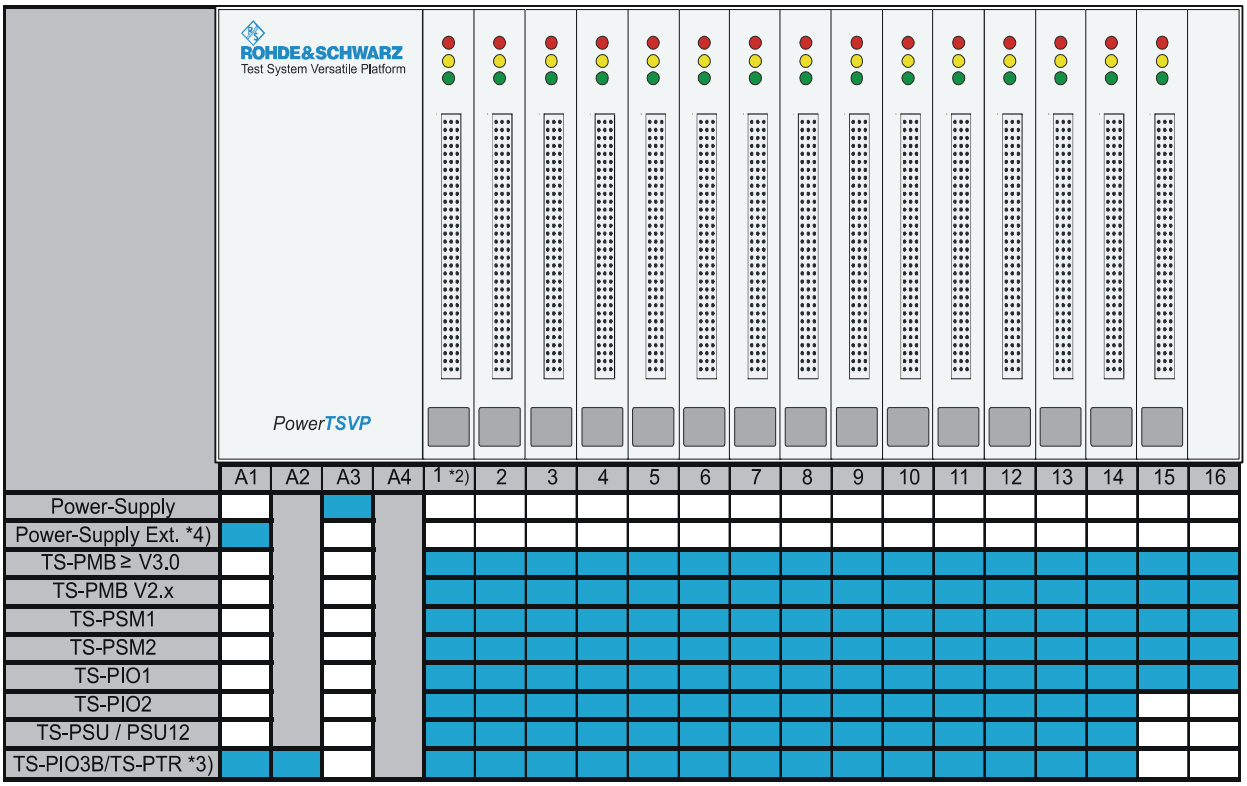
3.6 Permitted Module Configurations

Because of the different properties of plug-in modules, for example

- control bus
- power supply
- rear-I/O module required
- controller function
- power pack

there are restrictions on the use of plug-in slots

Figure 3-18 shows an overview of which modules can be operated in which plug-in slots.



	A1	A2	A3	A4	1 *2)	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Power-Supply			■																	
Power-Supply Ext. *4)	■																			
TS-PMB ≥ V3.0					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TS-PMB V2.x					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TS-PSM1					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TS-PSM2					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TS-PIO1					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TS-PIO2					■	■	■	■	■	■	■	■	■	■	■	■	■	■		
TS-PSU / PSU12					■	■	■	■	■	■	■	■	■	■	■	■	■	■		
TS-PIO3B/TS-PTR *3)	■	■			■	■	■	■	■	■	■	■	■	■	■	■	■	■		

Rear side																				
TS-PSYS2																			■	
TS-PSYS2 Option							■	■					■	■	■	■	■	■		
TS-PDC, *1)					■	■	■	■	for TS-PIO2, TS-PSU12				■	■	■	■	■	■		
TS-PAC					■	■	■	■	for TS-PSU				■	■	■	■	■	■		
TS-PCAL2					■	■	■	■	for TS-PMB				■	■	■	■	■	■		
TS-PRIO					■	■	■	■	for TS-PMB, TS-PSM2				■	■	■	■	■	■		
TS-PRIO4					■	■	■	■	for TS-PIO3B, TS-PTR				■	■	■	■	■	■		

*1) TS-PDC, all Versions, Frame numbering limited to 1 TS-PWA3-frame, no restriction with Version ≥1. , Ser ≥ 100325
*2) Module solder side must be isolated against the front panel in the left neighbor slot.
*3) only with optional backplane extension TS-PXB2. Cannot be combined with power backplane TS-PCPA.
*4) only with optional power backplane TS-PCPA. Cannot be combined with backplane extension TS-PXB2.

Figure 3-18 Module Configuration TS-PWA3

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4 Commissioning

4.1 Safety Instructions

When commissioning the R&S PowerTSVP the safety instructions in Section 2 must be followed.

4.2 Setting Up

4.2.1 Requirements for Repeatable Measurements

The ambient conditions listed below are recommended for the installation site of a Test System Versatile Platform with R&S PowerTSVP:

- Temperature variance within 24 hours not to exceed approx. 3 °C.
- Maximum temperature variance within one hour not to exceed approx. 0.5 °C.
- Extreme vibrations from mechanical or dynamic sources such as presses, power punches etc. must be avoided.
- The TSVP should be warmed up for approx. 15 minutes before measurements commence. This time will depend on the type of measuring modules and can be longer.

Compliance with these guidelines will ensure accurate and repeatable measurements.

4.2.2 Rack Mounting

The rack mounting kit supplied by ROHDE & SCHWARZ must be used for rack mounting the TSVP.

WARNING!

A minimum clearance of half a height unit should be allowed above and below the R&S PowerTSVP !
This space can be used to fit filter mats.

The TSVP is installed in six steps:

- Unscrew the four case feet from the base.
- Screw the 19 inch brackets contained in the rack mounting kit under the side handles, replacing the old screws with the longer

screws.

- Remove the four rubber tips from the feet.

WARNING!

Do not unscrew the rear four feet as this will loosen the body of the case!

- Affix the self-adhesive plastic slide rails.
- Place the unit into the rack on prepared aluminum rails.
- Fix the R&S PowerTSVP by screwing the 19 inch side brackets to the rack.

NOTE:

Check the position of the locknuts in the rack before sliding in the R&S PowerTSVP.

- If required, insert and attach filter mats above and below the TSVP.

An optional **telescopic rail set** is also available. The telescopic rails are fitted to the side of the “BW 2000” case. The R&S PowerTSVP can then be pushed into the prepared support in the rack.

4.2.3 Desktop Setup

When the TSVP is set up on a desktop, the minimum gap under the unit is provided by the feet on the “BW 2000” case.

WARNING!

Do not obscure the ventilation louvers on the top of the unit! The minimum clearance of half a height unit must be ensured!

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4.2.4 Operating Position

The Test System Versatile Platform R&S PowerTSVP can be operated in the following operating positions:

1. Normally, upright on the device bases on the bottom of the device
2. Supported on the rear bases (on the bases holding the tube)
3. Any tilt angles between the two above positions are possible.

NOTE:

For operating positions 2 and 3 or when equipped with R&S TS-PDC rear I/O modules without spacing, the use of the R&S TS-RFAN fan option is strongly recommended.

4.3 Installation

4.3.1 Safety Instructions

WARNING!

Comply with ESD (Electrostatic Discharge) regulations when fitting plug-in modules.

4.3.2 Compatibility

NOTE:

Only the ROHDE & SCHWARZ specific modules with CAN bus triggering can be plugged into the R&S PowerTSVP.

4.3.3 Module Installation

To install an R&S plug-in module, proceed as follows:

- Run down and power off the R&S PowerTSVP
- Select a suitable slot (see Section 4.3.2)
- Remove the appropriate front panel by slackening off the screws

WARNING!

Check backplane connectors for bent pins! Any bent pins must be straightened!
Failure to do this may permanently damage the backplane!

- Push in the plug-in module using moderate pressure
- The top snap pin on the module must locate in the right-hand and the bottom pin in the left-hand hole on the TSVP chassis

WARNING!

Use both hands to guide the module and carefully plug it into the backplane connectors

- The module is correctly located when a distinct 'stop' can be felt
- Tighten the top and bottom screws on the front panel of the plug-in module

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Please observe the following instructions for installation of a Rear I/O module:

- Rear I/O modules (for example R&S TS-PDC) must be inserted with extra caution, making certain the connector is correctly guided into the socket opening in the backplane. It must not be inserted at an angle or with incorrect alignment, etc. The short circuit board guides alone do not ensure absolutely reliable guiding.
- Multiple adjacent R&S TS-PDC modules should be inserted in order “from left to right” and removed in the opposite order. Because the spaces are so narrow, care must be taken not to damage any components on the solder side of the module.

4.3.4 Driver Installation

The drivers to be installed for the plug-in modules will depend on the operating system and the module itself, and you should therefore consult the documentation supplied for the particular module.

4.4 Connections

4.4.1 Line Inlet

The R&S PowerTSVP requires a supply with the range of 110 V_{AC} / 60 Hz or 230 V_{AC} / 50 Hz. Fuse protection for the line inlet must not exceed a rating of 16 A.

The PSU used in the R&S PowerTSVP has **automatic voltage selection** between 100 and 240 VAC (see also Section 9, Technical Data).

4.4.2 Connections at the Rear

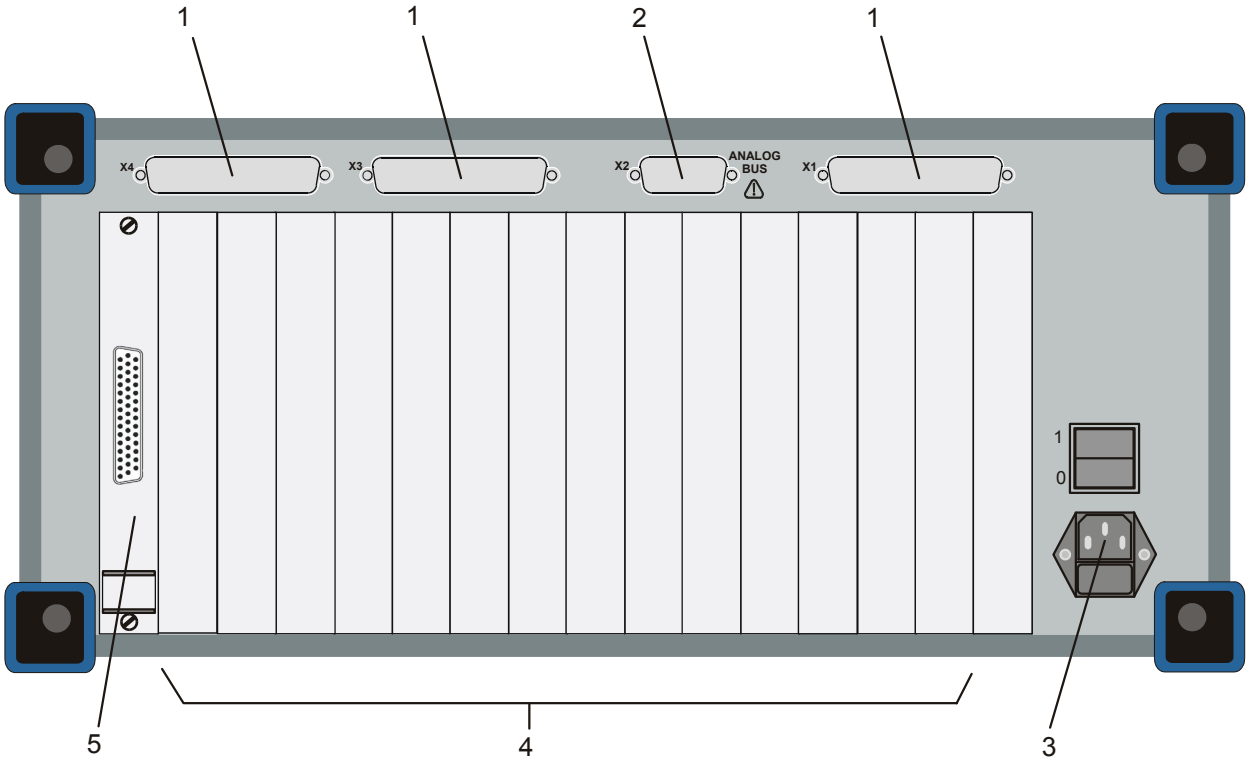

Figure 4-1 Rear Connections without Options

1 Knockouts for system and user-specific connections
2 Analog bus connections
3 Line Inlet
4 Slots for Rear I/O modules
5 System module

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In its basic configuration, the R&S PowerTSVP only has the power connection (3), the analog bus connection (2) and the connector for the system module (5). All other connections are system and user-specific.

System-specific connectors (e.g. D-sub) can be installed at the back of the R&S PowerTSVP (1). You will find more details in Section 4.5: Cabling.

4.4.3 Connections at the Front

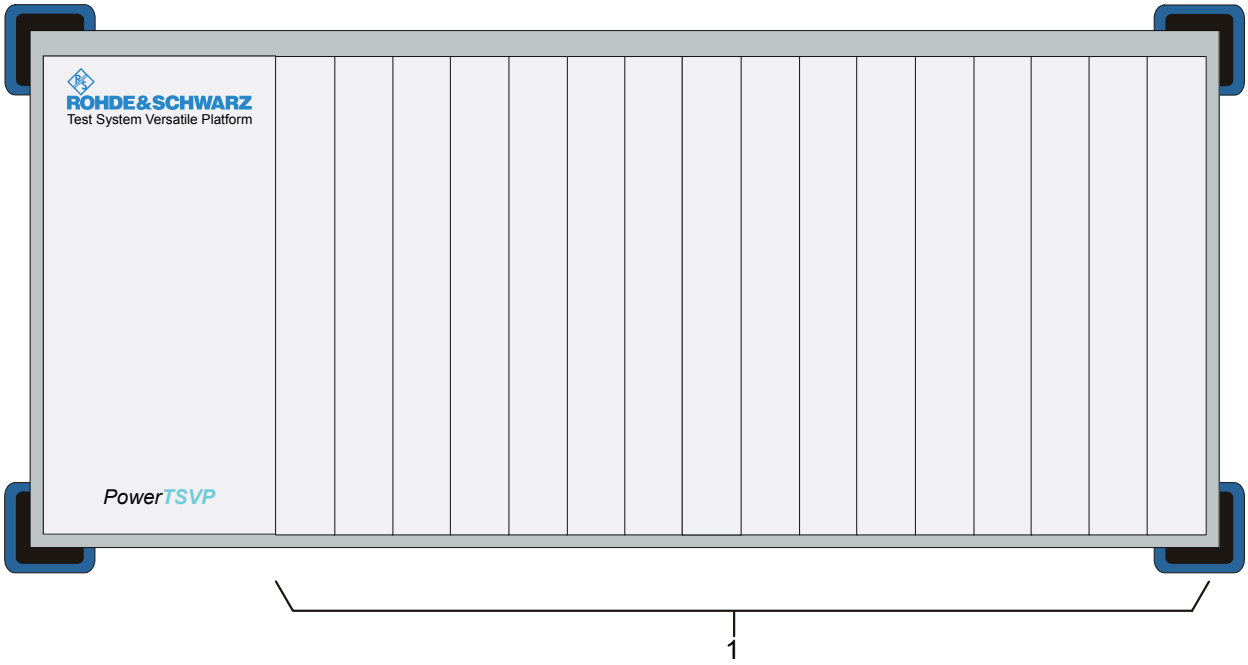

Figure 4-2 Front Connections

1 Slots (16)

The Test System Versatile Platform R&S PowerTSVP has no connections in its basic configuration. The existing slots can be fitted with system and user-specific plug-in modules and connections.

4.5 Cabling

4.5.1 Concept

The R&S PowerTSVP offers comprehensive options for inner, internal and external cabling.

- **Inner cabling:** Cabling by bus systems permanently installed in the R&S PowerTSVP.
  - CAN bus on the control backplane
  - PXI Trigger bus on the control backplane
  - Analog bus on separate backplane
- **Internal cabling:** Cabling inside the case of the R&S PowerTSVP. Here, plug-in modules are connected with connectors used in the R&S PowerTSVP case:
  - Cabling of the analog bus
  - Cabling of ROHDE & SCHWARZ modules to rear connectors or to each other
- **External cabling:** Cabling outside the case.

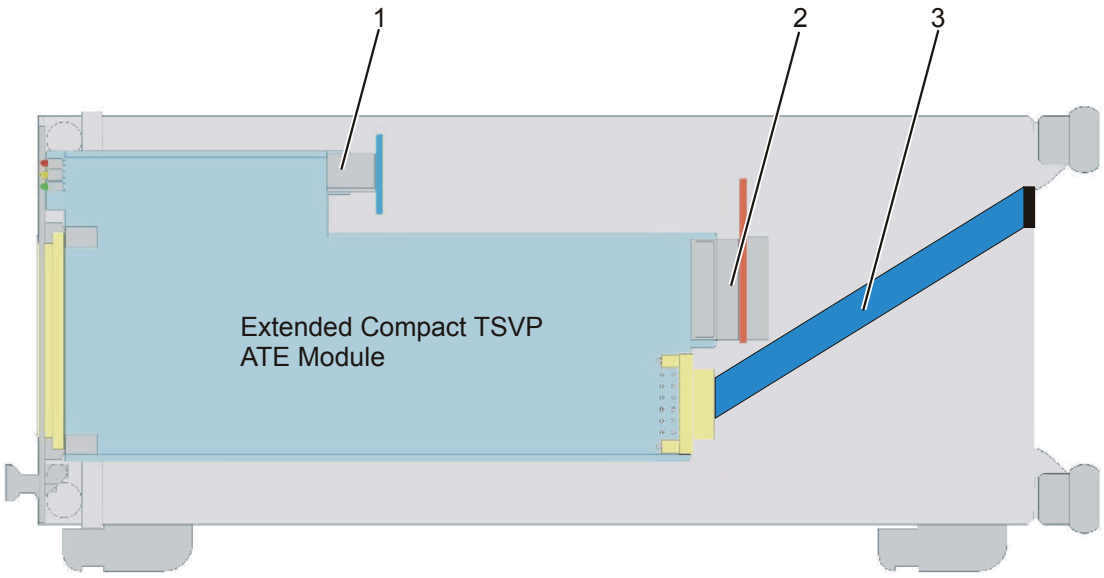

Figure 4-3 Inner and Internal Cabling Variants

1 Analog bus
2 PXI Trigger Bus
3 Cabling of R&S modules to rear connectors

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These various cabling options provide a number of benefits:

- Separating the adapter side (front) from the infeed of external devices (rear) creates a clear signal concept with no cross-wiring outside the case.
- Wiring is kept safe from inadvertent changes.
- The simple inner cabling concept means that modules can be quickly replaced during servicing. Bus connections are used instead of cable connections.
- System-specific connectors (e.g. D-sub) can be installed at the rear, from where signals are connected to the analog bus or the adapter interface. HF signals can also be carried in this way, for example.

4.5.2 Analog bus

The analog bus is available at all slots of the R&S PowerTSVP with its own backplane. Switching modules can access the analog bus via connectors X1 ... X16 at the various slots; this is described in Section 3 “Construction”.

The following are available

- 8 bus-structured lines for user-defined signal paths up to max. 125 VDC (1 A) between ROHDE & SCHWARZ specific plug-in modules.

NOTE:

Only the Rohde & Schwarz plug-in modules use the analog bus directly. However external access to the analog bus is possible using R&S switching modules or the analog bus connector at the back of the unit.

4.5.3 PXI Trigger Bus

Measurement and switching modules can be synchronized with the PXI trigger bus. The external output of the signals is provided by the system module.

The following signals are available

- Trigger bus with 8 lines (PXI_TRIG0 ...7)

4.5.4 External Cabling

External cabling is used to connect measuring and stimuli devices as well as the UUT to the R&S PowerTSVP.

Implementing the following concept should ensure the clarity of external cabling design:

- **Cabling to the test devices should be at the front of the TSVP**. An adapter frame can be flange-mounted here if required.
- **The cabling to measuring and stimuli devices is at the rear of the TSVP**. System and user-specific terminals and plug and socket connectors can be fitted in the back for this purpose (see Figure 4-1 and Figure 4-3).

This concept ensures a high degree of clarity, rapid adaption to different test tasks and allows the simple replacement of plug-in modules.

4.5.5 Opening the Case

ELECTROCUTION HAZARD!

- **The case of the Test System Versatile Platform R&S PowerTSVP should only be opened by qualified engineers!**
- **Before opening the case, the R&S PowerTSVP must be powered off and isolated from the power supply!**

WARNING!

The ESD (electrostatically sensitive device) regulations must be complied with when opening the case of the R&S PowerTSVP.

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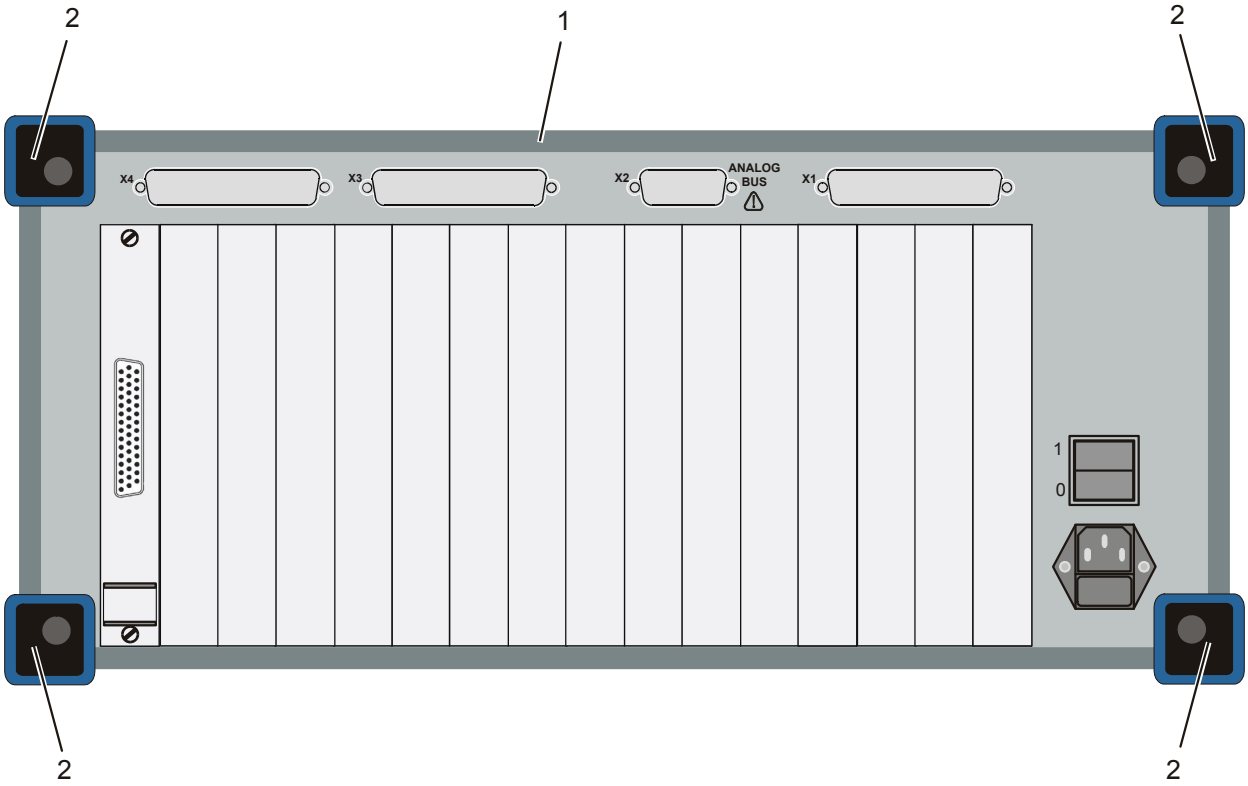

Figure 4-4 R&S PowerTSVP Rear View

1 Case body
2 Rear case feet (4)

The case of the R&S PowerTSVP must be opened for internal cabling purposes. To do this, proceed as follows:

1. Disconnect all connections at the front and rear of the R&S PowerTSVP.
2. Unscrew the four feet at the back of the R&S PowerTSVP.
3. Set the R&S PowerTSVP on its front handles and carefully pull down the case body from the R&S PowerTSVP.

The R&S PowerTSVP is now accessible from all sides. The case is closed in reverse order of opening.

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5 Operation

5.1 General

The R&S PowerTSVP does not have any controls - all operation is performed by the software.

HINWEIS:

Please refer to the appropriate documentation for details of software operation.

5.2 Self-Test

A system self-test consists of:

- A self-test of the R&S PowerTSVP
- System self-test, including connections between the individual devices
- With rack-mounting, there is a self-test of the built-in devices, where supplied (GPIB devices, PSU etc.)

The system self-test is expandable. The self-test can also be called by remote control.

HINWEIS:

The call of the system self-test depends on the software that is used.

The DMM contacts the installed ROHDE & SCHWARZ plug-in modules in succession via the analog measuring bus. In this way it is possible to test all connections and relay contacts for volume resistance and insulation.

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6 Maintenance

6.1 Important User Information

NOTE:

The Test System Versatile Platform R&S PowerTSVP is maintenance free.

DANGER!

Only clean the R&S PowerTSVP when it is powered down.

WARNING!

Electrical interfaces must not be cleaned with liquid products such as contact spray.

6.2 Cleaning

The following equipment and materials are recommended for cleaning the Test System Versatile Platform R&S PowerTSVP:

- Vacuum cleaner
- Brush
- Soft, lint-free cloths

WARNING!

Never use aggressive products to clean the R&S PowerTSVP.

Depending on the environmental conditions, it may be necessary to remove the individual plug-in modules from the R&S PowerTSVP and clean them with a vacuum cleaner.

WARNING!

Comply with ESD (electrostatic discharge) regulations when working on the plug-in modules of the R&S PowerTSVP.

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6.3 Fuse Replacement

The power supply to the R&S PowerTSVP is protected by fuses. These are located in the built-in plug at the rear of the R&S PowerTSVP.

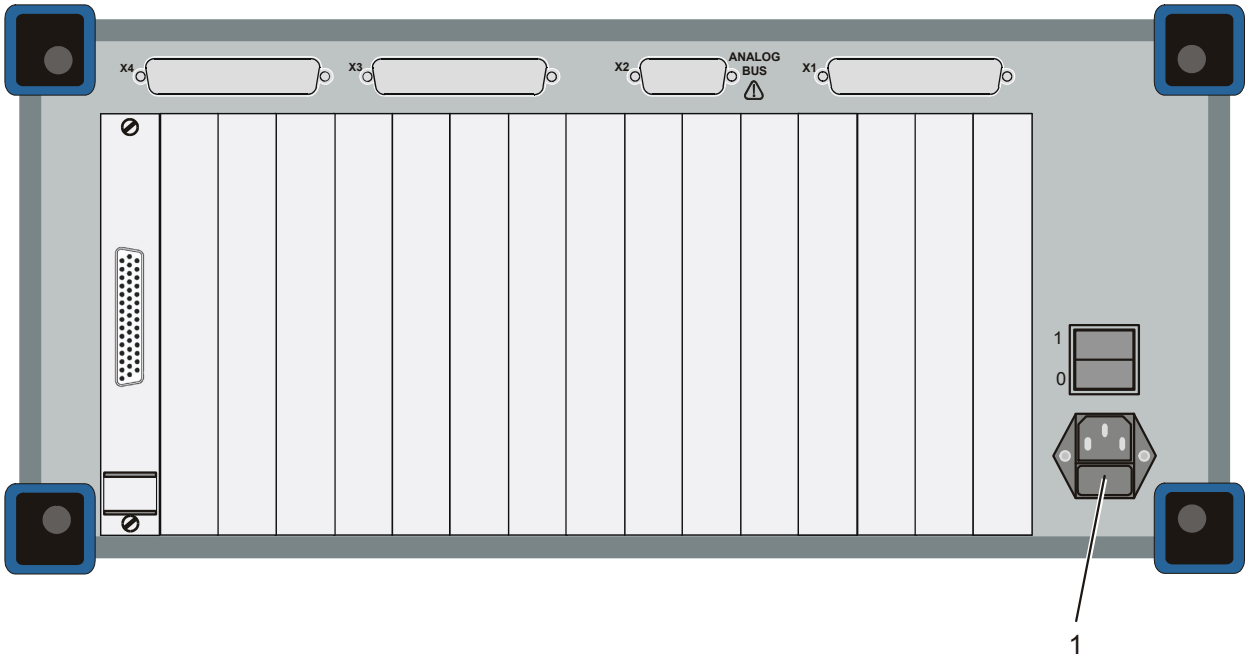

Figure 6-1 R&S PowerTSVP Rear View

1 Built-in plug with fuses (2 x IEC 127-T6.3H/250V)

A blown fuse is replaced as follows:

1. Power off the R&S PowerTSVP.
2. Isolate the R&S PowerTSVP from the power supply (built-in plug).
3. Remove the fuseholder from the built-in plug.
4. Replace the blown fuses.

NOTE:

You may be able to tell a blown fuse just by looking at it. In case of doubt, test the fuse with a multimeter.

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WARNING!

You should identify the cause of the problem and rectify it before replacing the fuse.

Fuses are fitted in reverse order of removal.

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7 Plug-In Modules

7.1 General

Various types of plug-in modules can be used in the R&S PowerTSVP (see Figure 7-1).

- Extended R&S PowerTSVP ATE modules (fitted depth 300 mm)
- Rear I/O modules

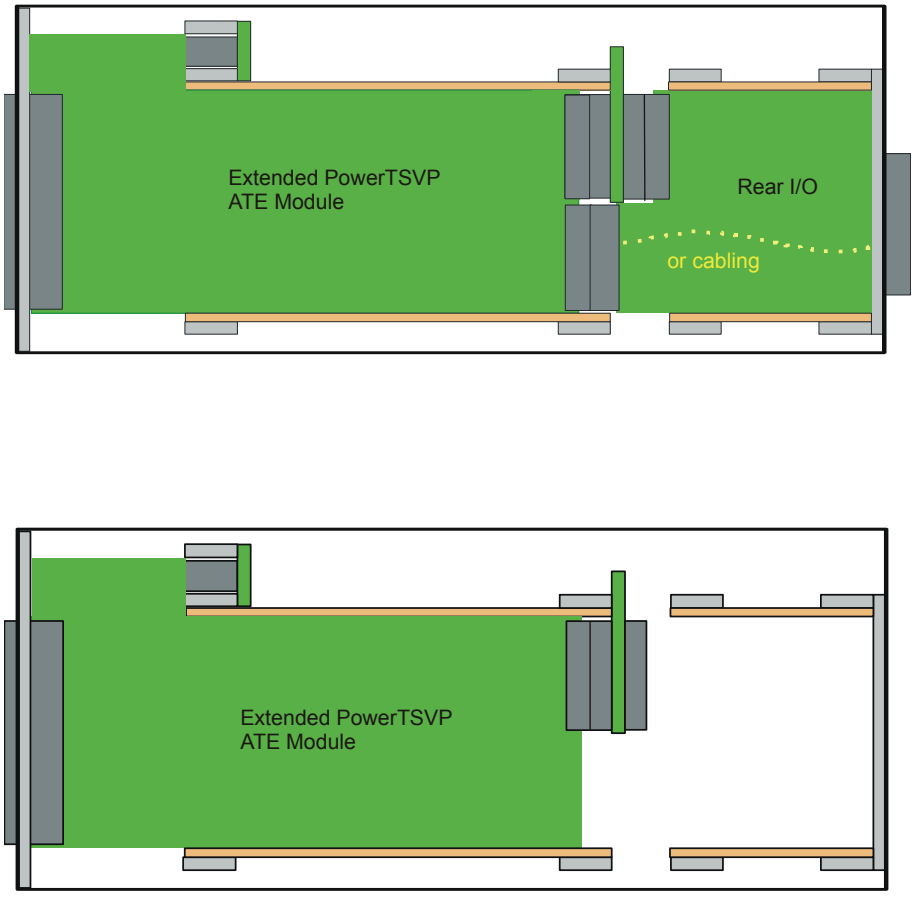

Figure 7-1 Plug-in modules in the R&S PowerTSVP

Connectors and connector shells to DIN 41612 suitable for the front connectors of the plug-in modules are available from a number of suppliers including

Siemens, with the following reference numbers

Case	C42334-Z61-C2
Locking lever, left	C42334-Z61-C11
Locking lever, right	C42334-Z61-C12
Round cable insert	C42334-Z61-C16
96-way plug connector type R	V42254-B1240-R960 (WireWrap)

Other suppliers include Harting (shells and connectors), Erni and Panduit (connectors only).

NOTE:

With adapters, you should remember that the count sequence on connector P20 at the back of the control backplane is the mirror image of the front.

NOTE:

The plug-in modules used in the R&S PowerTSVP are described in separate documents.

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7.2 Configuration Instructions

- Care must be taken to observe EMC regulations. Sufficient shielding can only be achieved with sectional front plates and shield springs on the inner and outer fastening level. The two levels can be connected with option R&S TS-PSK1 (HF shield wall kit). One slot is lost in this process.
- If long cards are plugged in next to short ones, care must be taken to ensure the sectional front plate of the short card cannot touch the lines of the adjacent module (risk of short circuit).
- To achieve even dissipation of heat, modules with R&S TS-PDC should not be fitted immediately next to each other if possible. This makes it easier to cool the R&S TS-PDCs, which can become quite hot. The optionally available rear I/O fan unit R&S TS-RFAN provides for enhanced cooling of the R&S TS-PDC and is required especially when the installation position is not horizontal.
- R&S TS-PSM1 should be connected to slot 16 so that signals from the power plug can be better directed to the back. If an additional TS-PSM1 is required, it should be connected to slot 15.

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8 Interface Description

8.1 Control Backplane

8.1.1 Position of Interfaces

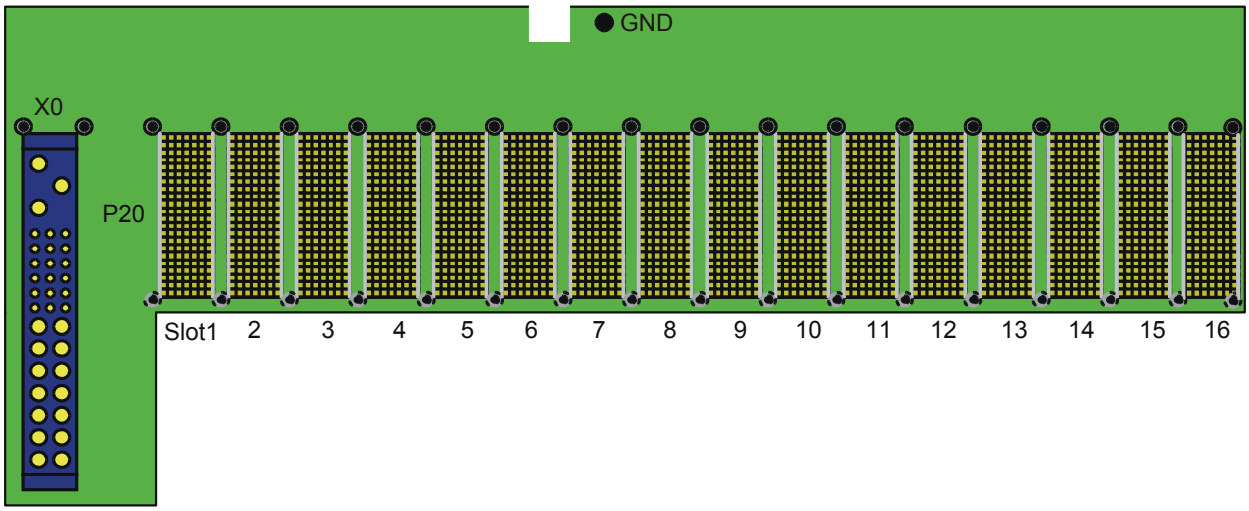

Figure 8-1 Control Backplane (Front View)

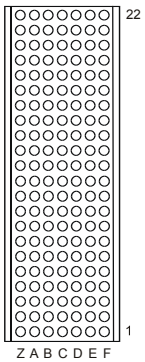

Figure 8-2 Connector P20 Front (Mating Side)

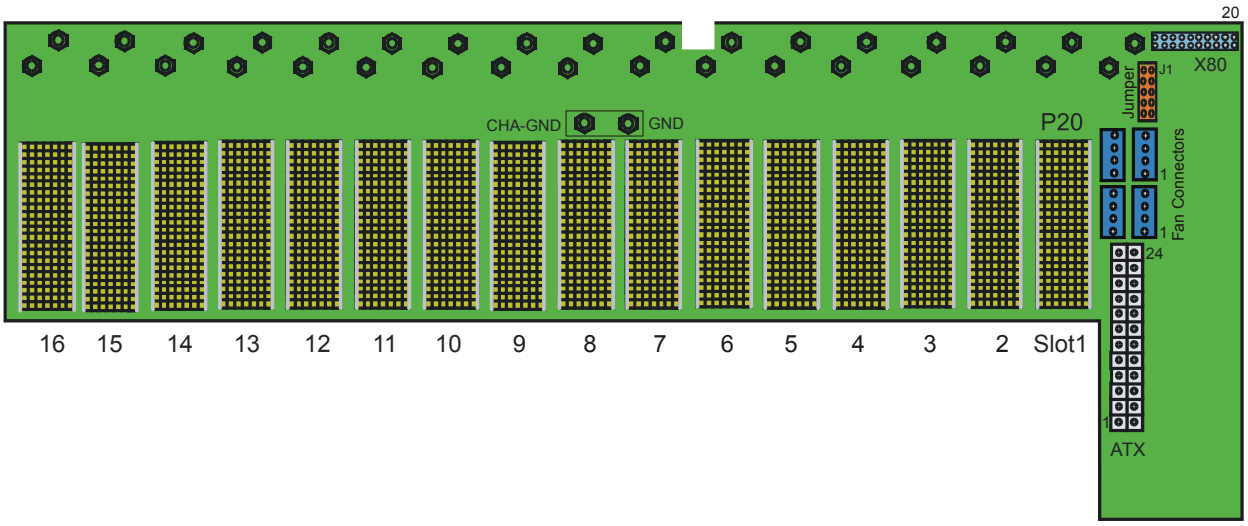

Figure 8-3 Control Backplane (Rear View)

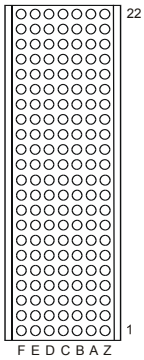

Figure 8-4 Connector P20 Rear (Mating Side)

Note: The count sequence is the mirror image of the front.

8.1.2 Connector P20 (Slots 1 ... 16)

NC = not connected, NP = not populated, BPIO = Backpanel I/O

Pin	Z	A	B	C	D	E	F	
22	GND	GA4	GA3	GA2	GA1	GA0	GND	
21	GND	PXI_LBR0	GA5	PXI_LBR1	PXI_LBR2	PXI_LBR3	GND	
20	GND	PXI_LBR4 AUX2	PXI_LBR5 AUX1	PXI_LBL0	GND	PXI_LBL1	GND	
19	GND	PXI_LBL2	GND	PXI_LBL3	PXI_LBL4 AUX2	PXI_LBL5 AUX1	GND	
18	GND	PXI_TRIG3	PXI_TRIG4	PXI_TRIG5	GND	PXI_TRIG6	GND	P20
17	GND	PXI_TRIG2	GND	RSV AUX3	PXI_STAR AUX4	PXI_CLK10	GND	
16	GND	PXI_TRIG1	PXI_TRIG0	RSV AUX5	GND	PXI_TRIG7	GND	
15	GND	PXI_BRSV DCSYNC	GND	RSV AUX6	PXI_LBL6 +5V	PXI_LBR6 +5V	GND	
14	NC	AD[35] BPIO	AD[34] BPIO	AD[33] BPIO	GND BPIO	AD[32] BPIO	NC	C
13	NC	AD[38] BPIO	GND BPIO	V(I/O) BPIO	AD[37] BPIO	AD[36] BPIO	NC	O
12	NP	AD[42] BPIO	AD[41] BPIO	AD[40] BPIO	GND BPIO	AD[39] BPIO	NP	N
11	NP	AD[45] BPIO	GND BPIO	V(I/O) BPIO	AD[44] BPIO	AD[43] BPIO	NP	N
10	NC	AD[49] BPIO	AD[48] BPIO	AD[47] BPIO	GND BPIO	AD[46] BPIO	NC	E
9	NC	AD[52] BPIO	GND BPIO	V(I/O) BPIO	AD[51] BPIO	AD[50] BPIO	NC	C
8	NC	AD[56] BPIO	AD[55] BPIO	AD[54] BPIO	GND BPIO	AD[53] BPIO	NC	T
7	NC	AD[59] BPIO	GND BPIO	V(I/O) BPIO	AD[58] BPIO	AD[57] BPIO	NC	O
6	NC	AD[63] BPIO	AD[62] BPIO	AD[61] BPIO	GND BPIO	AD[60] BPIO	NC	R
5	NC	C/BE[5]# BPIO	GND BPIO	V(I/O) BPIO	C/BE[4]# BPIO	PAR64 BPIO	NC	
4	NC	V(I/O) BPIO	PXI_BRSV BPIO	C/BE[7]# BPIO	GND BPIO	C/BE[6]# BPIO	NC	
3	GND	PXI_LBR7 BPIO	GND	PXI_LBR8 +12V	PXI_LBR9 BPIO	PXI_LBR10 BPIO	GND	
2	GND	PXI_LBR11 BPIO	PXI_LBR12 +5V	UNC BPIO	PXI_LBL7 1-WIRE	PXI_LBL8 +12V	GND	
1	GND	PXI_LBL9 BPIO	GND	PXI_LBL10 CAN_H	PXI_LBL11 CAN_L	PXI_LBL12 +5V	GND	

Table 8-1 Connector P20 up to Serial Number 100020 (Slots 1 ... 16)

Pin	Z	A	B	C	D	E	F	
22	GND	GA4	GA3	GA2	GA1	GA0	GND	
21	GND	BPIO	GA5	BPIO	BPIO	BPIO	GND	
20	GND	AUX2	AUX1	+5V	GND	+5V	GND	
19	GND	-12V	GND	+5V	AUX2	AUX1	GND	
18	GND	PXI_TRIG3	PXI_TRIG4	PXI_TRIG5	GND	PXI_TRIG6	GND	P20
17	GND	PXI_TRIG2	GND	AUX3	AUX4	PXI_CLK10	GND	
16	GND	PXI_TRIG1	PXI_TRIG0	AUX5	GND	PXI_TRIG7	GND	
15	GND	PXI_BRSVA15	GND	AUX6	+5V	BPIO	GND	
14	NC	BPIO	BPIO	BPIO	BPIO	BPIO	NC	C
13	NC	BPIO	BPIO	BPIO	BPIO	BPIO	NC	O
12	NP	BPIO	BPIO	BPIO	BPIO	BPIO	NP	N
11	NP	BPIO	BPIO	BPIO	BPIO	BPIO	NP	N
10	NC	BPIO	BPIO	BPIO	BPIO	BPIO	NC	E
9	NC	BPIO	BPIO	BPIO	BPIO	BPIO	NC	C
8	NC	BPIO	BPIO	BPIO	BPIO	BPIO	NC	T
7	NC	BPIO	BPIO	BPIO	BPIO	BPIO	NC	O
6	NC	BPIO	BPIO	BPIO	BPIO	BPIO	NC	R
5	NC	BPIO	BPIO	BPIO	BPIO	BPIO	NC	
4	NC	BPIO	PXI_BRSVB4	BPIO	BPIO	BPIO	NC	
3	GND	RSDO	GND	BPIO	RRST#	RSA0	GND	
2	GND	RSCLK	RSA2	RSA1	RSDI	+12V	GND	
1	GND	RCS#	GND	CAN_H	CAN_L	+5V	GND	

Table 8-2 Connector P20 as from Serial Number 100021 (Slots 1 ... 16)

8.1.3 Connector X0 (P47)

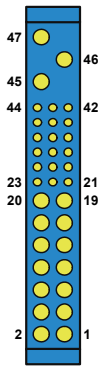

Figure 8-5 Connector X0 (P47) (Mating Side)

Pin[1]	[2]	Signal Name	Description
1-4	M	V1	V1 Output
5-12	M	RTN	V1 and V2 Return
13-18	M	V2	V2 Output
19	M	RTN	V3 Return
20	M	V3	V3 Output
21	M	V4	V4 Output
22	M	RTN	Signal Return
23	M	Reserved	Reserved
24	M	RTN	V4 Return
25	M	Reserved [3]	
26	M	Reserved	Reserved
27	S	EN#	Enable
28	M	Reserved [3]	
29	M	NC	Not connected
30	M	V1SENSE	V1 Remote Sense
31	M	Reserved [3]	
32	N	NC	Not connected
33	M	V2SENSE	V2 Remote Sense
34	M	S RTN	Sense Return
35	M	V1SHARE	V1 Current Share

Table 8-3 Assignment X0 (P47)

Pin[1]	[2]	Signal Name	Description
36	M	V3SENSE	V3 Remote Sense
37	M	Reserved [3]	
38	M	DEG#	Degrade Signal
39	M	INH#	Inhibit
40	M	Reserved [3]	
41	M	V2SHARE	V2 Current Share
42	M	FAL#	Fail Signal
43	M	Reserved [3]	
44	M	V3SHARE	V3 Current Share
45	L	CGND	Chassis Ground
46	M	CAN	AC Input Neutral
47	M	ACL	AC Input Line

Table 8-3 Assignment X0 (P47)

[1] Pin numbers illustrated are of the female backplane connector

[2] L=long length pins, M=medium length pins, S=short length pins

[3] For future options

8.1.4 ATX Connectors

Pin	Signal	Signal	Pin
12	V3 Current Share	V2 Current Share	24
11	5 V Sense	3.3 V Sense	23
10	+12 V	+5 V	22
9	FAL-	V1 Current Share	21
8	PW-OK	PRST-	20
7	GND Sense	GND	19
6	+5 V	GND	18
5	GND	GND	17
4	+5 V	PS-ON	16
3	GND	GND	15
2	+3.3 V	-12 V	14
1	+3.3 V	+3.3 V	13

Table 8-4 ATX Connector Assignment

8.1.5 Fan Connectors X90, X91, X92, X93

Pin	Signal
4	FANCTRL
3	+12V
2	NC
1	GND

Table 8-5 Assignment of X90 ... X93

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8.1.6 Expansion Connector X80

Pin	Signal	Signal	Pin
1	PS-ON	GND	2
3	PW OK	GND	4
5	RESERVED	GND	6
7	CAN_H	CAN_L	8
9	N.C.	N.C.	10
11	+3.3 V	GND	12
13	+5V	GND	14
15	-12V	GND	16
17	+12V	GND	18
19	+12V	GND	20

Table 8-6 Assignment of X80

8.1.7 Jumper Field

J1	GA4
J2	GA5
J3	PS-ON
J4	TERM_CAN_L
J5	TERM_CAN_H

Table 8-7 Jumper Field Assignment

8.2 Analog Bus Backplane

8.2.1 Position of Interfaces

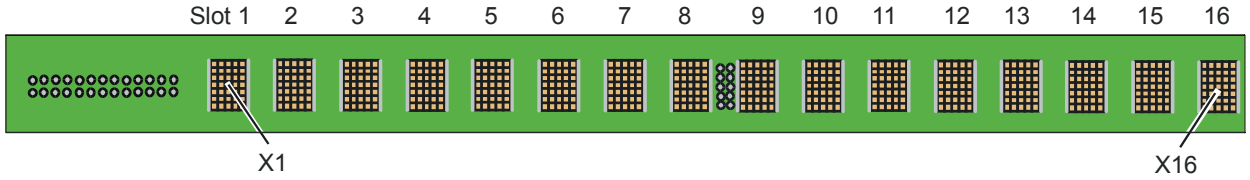

Figure 8-6 Analog Bus Backplane (Front View)

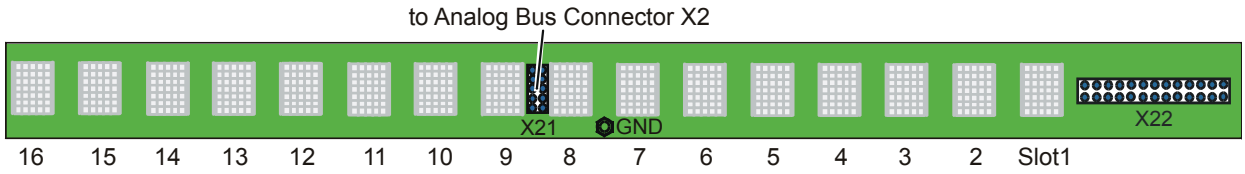

Figure 8-7 Analog Bus Backplane (Rear View)

8.2.2 Analog Bus Connectors X1 ... X16

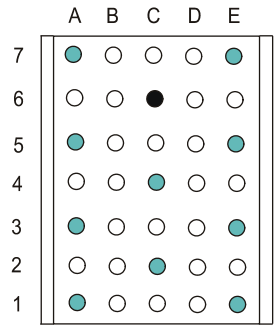

Figure 8-8 Connectors X1 ... X16 (Mating Side)

Pin	A	B	C	D	E
7	IL1_x				IL2_x
6			GND		
5	ABa1				ABc1
4			ABb1		
3	ABb2				ABc2
2			ABa2		
1	ABd1				ABd2

Table 8-8 Assignment of X1... X16

Note:
IL1_x = IL1 of the slot

8.2.3 Analog Bus Connector X21

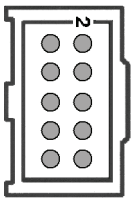

Figure 8-9 Connector X21 (Mating Side)

Pin	Signal	Pin	Signal
1	GND	2	GND
3	ABc1	4	ABa1
5	ABc2	6	ABb1
7	ABa2	8	ABb2
9	ABd2	10	ABd1

Table 8-9 Assignment of X21

8.2.4 Analog Bus Connector X22

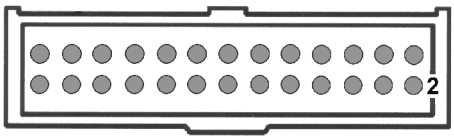

Figure 8-10 Connector X22 (Mating Side)

Pin	Signal	Pin	Signal
1	IL1_5	2	IL2_5
3	IL1_6	4	IL2_6
5	IL1_7	6	IL2_7
7	IL1_8	8	IL2_8
9	IL1_9	10	IL2_9
11	IL1_10	12	IL2_10
13	IL1_11	14	IL2_11
15	IL1_12	16	IL2_12
17	IL1_13	18	IL2_13
19	IL1_14	20	IL2_14
21	IL1_15	22	IL2_15
23	IL1_16	24	IL2_16
25	GND	26	GND

Table 8-10 Assignment of X22

Note:
IL1_5 = IL1 of slot 5

8.3 Power Backplane (Option)

8.3.1 Position of Interfaces

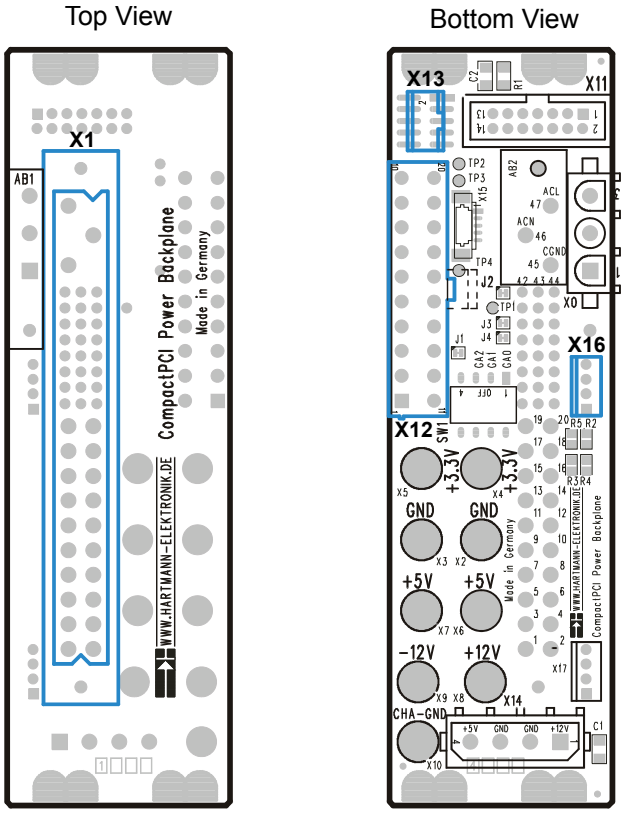

Figure 8-11 Power Backplane

8.3.2 Power Backplane Utility Connector X13

Pin	Signal	Signal	Pin
1	PRST-	FAL-	6
2	DEG-	+3.3 V Sense	7
3	+3.3V	GND Sense (3.3V)	8
4	+5V	+5V Sense	9
5	GND	GND Sense (5V)	10

Table 8-11 Assignment of X13

8.3.3 Power Backplane ATX Connector X12

Pin	Signal	Signal	Pin
10	+12 V	+5 V	20
9	NC	+5 V	19
8	PW-OK	NC	18
7	GND	GND	17
6	+5 V	GND	16
5	GND	GND	15
4	+5 V	PS-ON	14
3	GND	GND	13
2	+3.3 V	-12 V	12
1	+3.3 V	+3.3 V	11

Table 8-12 Assignment of X12

8.3.4 Power Backplane Connector X16

Pin	Signal
1	V1 Current Share
2	V2 Current Share
3	V3 Current Share
4	NC

Table 8-13 Assignment of X16

8.3.5 Power Backplane Connector X1 (P47)

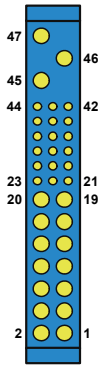

Figure 8-12 Connector X1 (P47) (Mating Side)

Pin [1]	[2]	Signal Name	Description
1-4	M	V1	V1 Output
5-12	M	RTN	V1 and V2 Return
13-18	M	V2	V2 Output
19	M	RTN	V3 Return
20	M	V3	V3 Output
21	M	V4	V4 Output
22	M	RTN	Signal Return
23	M	Reserved	Reserved
24	M	RTN	V4 Return
25	M	Reserved [3]	
26	M	Reserved	Reserved
27	S	EN#	Enable
28	M	Reserved [3]	
29	M	NC	Not connected
30	M	V1SENSE	V1 Remote Sense
31	M	Reserved [3]	
32	N	NC	Not connected
33	M	V2SENSE	V2 Remote Sense
34	M	S RTN	Sense Return
35	M	V1SHARE	V1 Current Share

Table 8-14 Assignment of X1 (P47)

Pin [1]	[2]	Signal Name	Description
36	M	V3SENSE	V3 Remote Sense
37	M	Reserved [3]	
38	M	DEG#	Degrade Signal
39	M	INH#	Inhibit
40	M	Reserved [3]	
41	M	V2SHARE	V2 Current Share
42	M	FAL#	Fail Signal
43	M	Reserved [3]	
44	M	V3SHARE	V3 Current Share
45	L	CGND	Chassis Ground
46	M	CAN	AC Input Neutral
47	M	ACL	AC Input Line

Table 8-14 Assignment of X1 (P47)

[1] Pin numbers illustrated are of the female backplane connector

[2] L=long length pins, M=medium length pins, S=short length pins

[3] For future options

8.4 Interfaces of the R&S TS-PSYS2

8.4.1 R&S TS-PSYS2 Connector X20

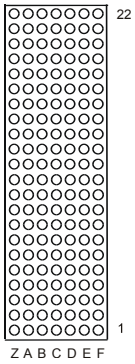

Figure 8-13 R&S TS-PSYS2 Connector X20 (Mating Side)

NC = not connected, NP = not populated

Pin	Z	A	B	C	D	E	F	
22	GND	GA4	GA3	GA2	GA1	GA0	GND	
21	GND	PXI_LBR0	GA5	PXI_LBR1	PXI_LBR2	PXI_LBR3	GND	
20	GND	AUX2	AUX1	+5 V	GND	+5 V	GND	
19	GND	-12 V	GND	+5 V	AUX2	AUX1	GND	
18	GND	PXI_TRIG3	PXI_TRIG4	PXI_TRIG5	GND	PXI_TRIG6	GND	
17	GND	PXI_TRIG2	GND	AUX3	AUX4	PXI_CLK10	GND	X20
16	GND	PXI_TRIG1	PXI_TRIG0	AUX5	GND	PXI_TRIG7	GND	
15	GND	DC_SYNC	GND	AUX6	+5 V		GND	C
14	NC						NC	O
13	NC						NC	N
12	NP						NP	N
11	NP			IL1			NP	E
10	NC						NC	C
9	NC			IL3			NC	T
8	NC						NC	O
7	NC			IL2			NC	R
6	NC						NC	
5	NC						NC	
4	NC						NC	
3	GND		GND				GND	
2	GND					+12 V	GND	
1	GND		GND	CAN1_H	CAN1_L	+5 V	GND	

Table 8-15 R&S TS-PSYS2 Assignment X20

8.4.2 R&S TS-PSYS2 Connector X30

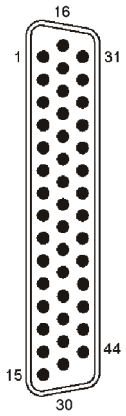

Figure 8-14 R&S TS-PSYS2 Connector X30 (Mating Side)

Pin	Signal	Pin	Signal	Pin	Signal
1	AUX1	16	CLK10_IN	31	TRIG0
2	AUX2	17	CLK10_OUT	32	TRIG1
3	AUX3	18	Reserved	33	TRIG2
4	AUX4	19	GND	34	TRIG3
5	AUX5	20	+4.5 V	35	TRIG4
6	AUX6	21	+11.5 V	36	TRIG5
7	TEMP_OUT	22	GND	37	TRIG6
8	OUT1_COM	23	OUT1_NO	38	TRIG7
9	OUT2_COM	24	OUT2_NO	39	CAN2_H
10	OUT3_COM	25	OUT3_NO	40	CAN2_L
11	OUT4_COM	26	OUT4_NO	41	CAN1_H
12	IN1_H	27	IN1_L	42	CAN1_L
13	IN2_H	28	IN2_L	43	GND
14	IN3_H	29	IN3_L	44	CHA-GND
15	IN4_H	30	IN4_L		

Table 8-16 R&S TS-PSYS2 Assignment X30

8.4.3 R&S TS-PSYS2 Jumper Field X40

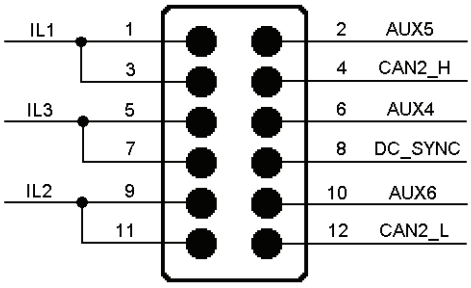

Figure 8-15 Signals at the R&S TS-PSYS2 Jumper Field X40

8.4.4 R&S TS-PSYS2 Jumper JP2

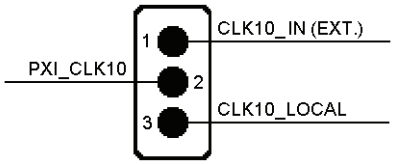

Figure 8-16 Signals at the R&S TS-PSYS2 Jumper JP2

8.4.5 R&S TS-PSYS2 Jumper JP6 and JP7

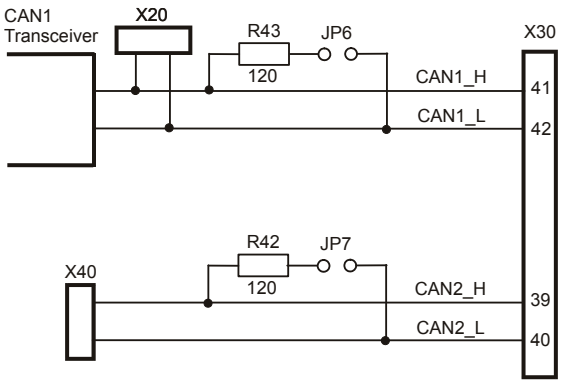

Figure 8-17 R&S TS-PSYS2 Jumper JP6 and JP7

8.4.6 R&S TS-PSYS2 Jumper JP8

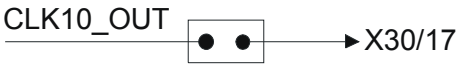

Figure 8-18 Signal at the R&S TS-PSYS2 Jumper JP8

8.5 External Analog Interface

8.5.1 Analog Bus Connector X2

The analog bus connector X2 is located at the back of the R&S PowerTSVP and is connected to analog bus connector X21 on the analog bus backplane.

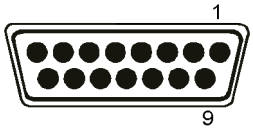

Figure 8-19 Analog Bus Connector X2 (Mating Side)

Pin	Signal
1	GND
2	ABc1
3	GND
4	ABc2
5	GND
6	ABa2
7	GND
8	ABd2
9	GND
10	ABa1
11	GND
12	ABb1
13	GND
14	ABb2
15	ABd1

Table 8-17 Assignment of X2

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8.6 Backplane Extension R&S TS-PXB2 (Option)

NOTE:

The colours in the tables serve for highlighting entire ports.

8.6.1 Jumpers

X10 : GA5 : "0" if plugged

X11 : GA4 : "0" if plugged

X12 : +5 V available at the rear I/O slot A4 / CAN available if plugged

8.6.2 Rear panel slot A4 / CAN

Type: 9-pin socket

Pin	Signal
2	CAN_L
3	GND
6	GND
7	CAN_H
9	+5V

8.6.3 Rear Panel Slot A4 / DIO of Slot A2

Type: 25-pin socket

Pin	Signal
1	A2_P5.IO0
2	A2_P5.IO2
3	A2_P5.IO4
4	A2_P5.IO6
5	A2_P6.IO0
6	A2_P6.IO2
7	A2_P6.IO4
8	A2_P6.IO6
9	A2_P7.IO0
10	A2_P7.IO2
11	A2_P7.IO4
12	A2_P7.IO6
13	GND
14	A2_P5.IO1
15	A2_P5.IO3
16	A2_P5.IO5
17	A2_P5.IO7
18	A2_P6.IO1
19	A2_P6.IO3
20	A2_P6.IO5
21	A2_P6.IO7
22	A2_P7.IO1
23	A2_P7.IO3
24	A2_P7.IO5
25	A2_P7.IO7

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8.6.4 Rear Panel X1 of Slot A1

Type: 37-pin socket

Pin	Signal
1	A1_P5.IO0
2	A1_P5.IO2
3	A1_P5.IO4
4	A1_P5.IO6
5	A1_P6.IO0
6	A1_P6.IO2
7	A1_P6.IO4
8	A1_P6.IO6
9	A1_P7.IO0
10	A1_P7.IO2
11	A1_P7.IO4
12	A1_P7.IO6
13	GND
14-19	not wired
20	A1_P5.IO1
21	A1_P5.IO3
22	A1_P5.IO5
23	A1_P5.IO7
24	A1_P6.IO1
25	A1_P6.IO3
26	A1_P6.IO5
27	A1_P6.IO7
28	A1_P7.IO1
29	A1_P7.IO3
30	A1_P7.IO5
31	A1_P7.IO7
32-37	not wired

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9 Technical Data

NOTE:

Technical data for the Test System Versatile Platform R&S PowerTSVP TS-PWA3 is specified in the corresponding data sheets. If there are discrepancies between the information in this operating manual and the values of the data sheet, the values of the data sheet take precedence

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