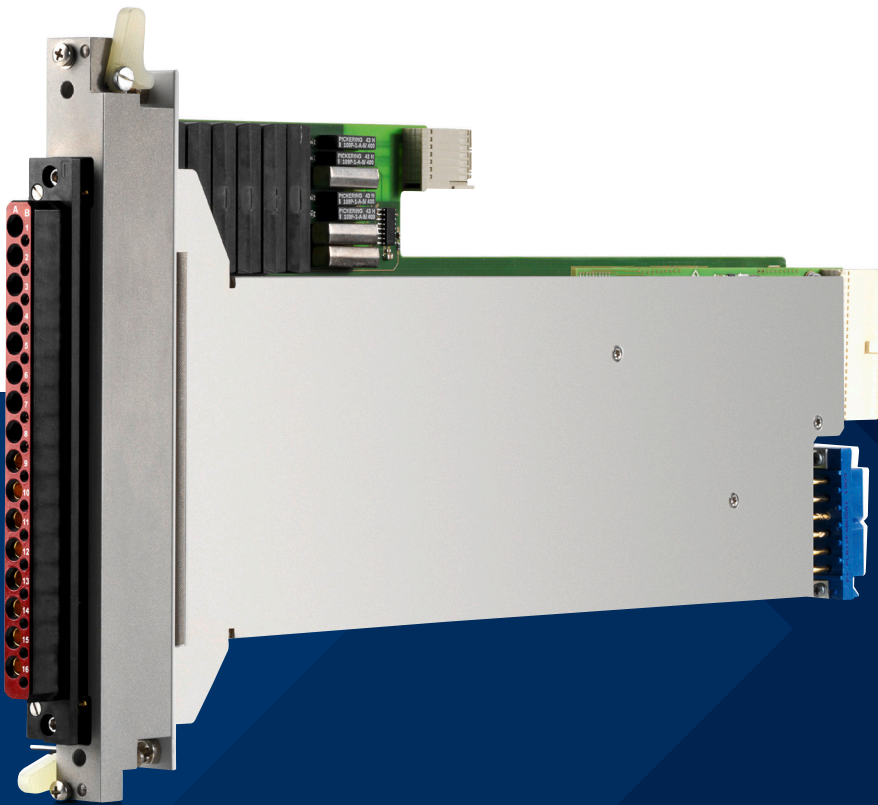


R&S® TS-PSM5 HIGH-POWER SWITCHING MODULE

Automotive DUT supply and load switching up to 50 A



Product Brochure
Version 02.00

ROHDE & SCHWARZ

Make ideas real



AT A GLANCE

The R&S®TS-PSM5 is the innovative implementation of a rugged, modular switching device to make high-current switching an intrinsic part of your test system.

Key facts

- ▶ Four high-power channels for currents up to 50 A (max. 1120 W)
- ▶ Four medium-power channels for currents up to 2 A
- ▶ Integrated current measurement via current sensors and analog bus coupling
- ▶ Rear I/O access to the power signals for unique flexibility during system integration and seamless adaptation to power supplies and loads within a system paradigm based on R&S®PowerTSVP
- ▶ Unique comprehensive self-test and measurement of relay contact resistance
- ▶ Support by the signal routing library provides intelligent and secure switch path computing

Product introduction

The R&S®TS-PSM5 high-power switching module was developed to add high-current switching up to 50 A to the standard functionality of the R&S®TSVP test system versatile platform.

Powerful and flexible switching capabilities are combined with ruggedized signal connection and high availability secured by switching cycle monitoring. The R&S®TS-PSM5 module is a CAN bus controlled unit which takes up two slots in the R&S®TSVP frames.

A switch cycle counter for reliable operation and monitoring strain of the relays is implemented by an FRAM accessible by the onboard microprocessor. Readings can be retrieved from the module via the I/O switch driver.



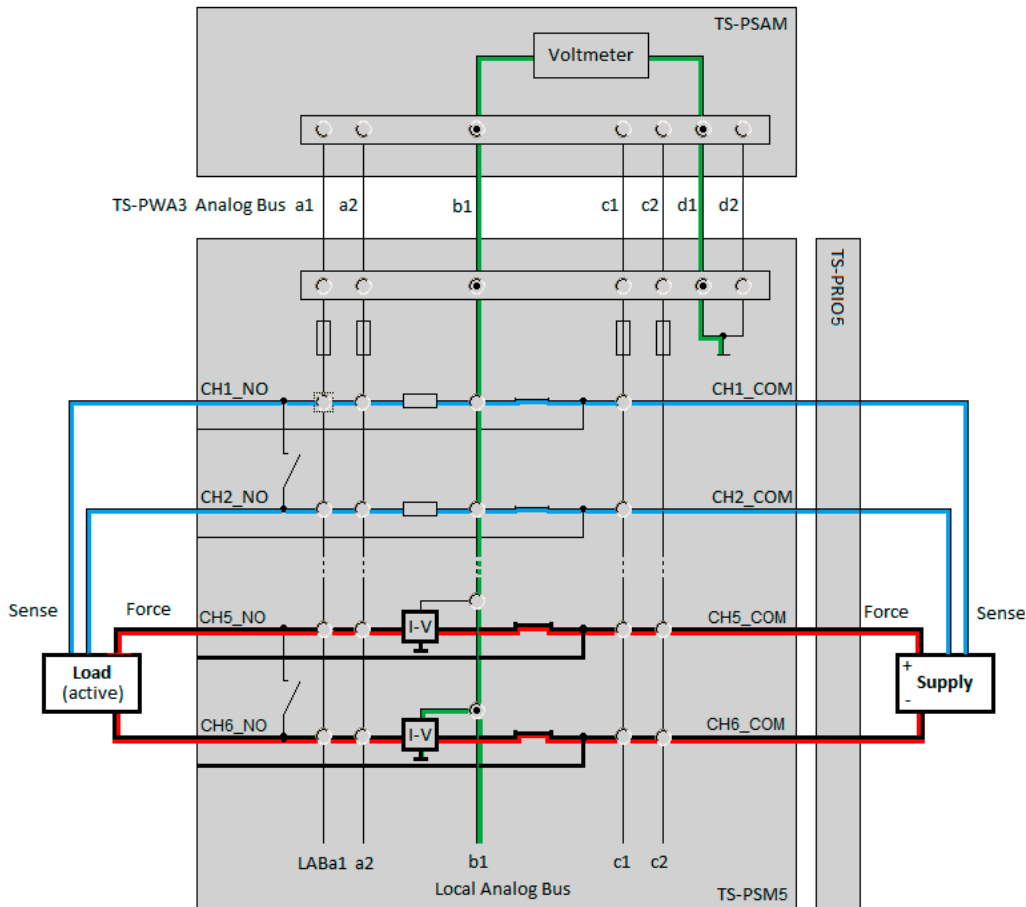
KEY FEATURES

- ▶ Ruggedized mechanical construction
- ▶ Industrially approved Virginia Panel Corp. power connector available for sophisticated test receiver deployment
- ▶ Suitable Virginia Panel Corp. GEMINI test receivers available for the R&S®TSVP chassis
- ▶ High-quality cage clamp terminal blocks for reliable power cabling and convenient dismantling
- ▶ Switch cycle counter

TYPICAL APPLICATIONS

- ▶ Distribution of a power supply to multiple DUTs
- ▶ Flexible distribution of power supplies to DUTs including sense lines via medium-power relays
- ▶ Connection of test loads, original loads or simulated and electronic actuators in automotive test scenarios
- ▶ Multiplexing of power supplies and electronic loads
- ▶ Switching of DUT supplies and loads with optional current measurement via current/voltage converters
- ▶ Routing of measurement signals to adjacent modules via analog measurement bus
- ▶ Automotive and general purpose switch simulation

Application example: measuring high current through an active load involves sensing the supply voltage



ELABORATED SOFTWARE FRAMEWORK FOR EASE OF USE

Use the module's soft front panel (SFP) to interactively control and evaluate test scenarios and verify DUT adaptation.

The SFP provides sophisticated access to the full scope of functions.

The R&S®TS-PSM5 high-power switching module is supplied with a IVI-style driver that supports the IVI switch class to control the module.

All additional hardware functions are supported by specific driver extensions. All driver functions are documented extensively in the help files and on the LabWindows/CVI function panels.

Alternatively, switch path management can be done via the intelligent signal routing library as part of the generic test software library (GTSL).

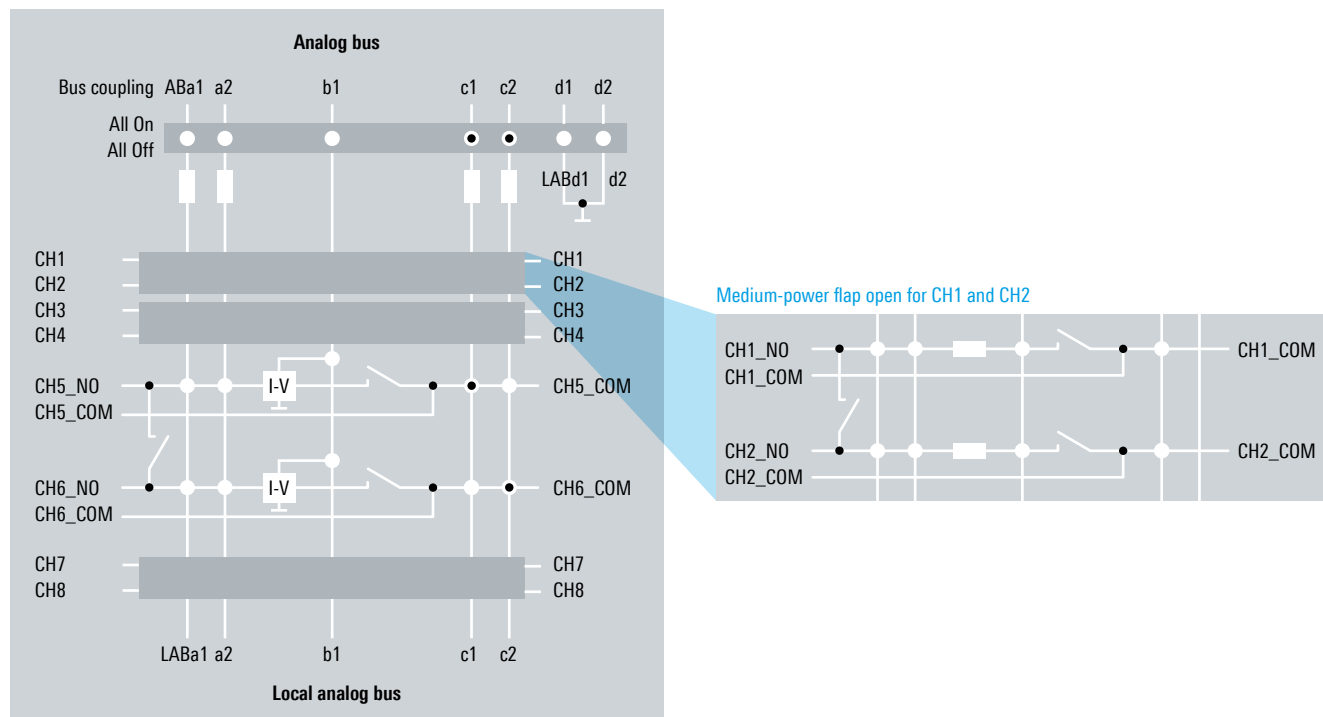
The voltage drop corresponding to the current flow through each power channel of the R&S®TS-PSM5 can be measured via shunt resistors on the medium-power channels and current-to-voltage converters on the high-power channels via the analog bus. The precise values of the shunt resistors are determined during calibration. Likewise, the current-to-voltage characteristics are stored for each high-current channel so that the driver constantly computes of accurate measurement values.

SELF-TEST AND DIAGNOSTICS FOR RELIABLE OPERATION

The module's built-in self-test provides fast diagnostics to verify basic functionality. Diagnostic LEDs on the front panel speed up system integration and allow proper operation to be determined at a glance.

Soft front panel of the module for interactive operation

High-power flap open for CH5 and CH6



SPECIFICATIONS

Specifications		
Application in the R&S®TSVP platform	CAN bus controlled	two slots on front
Interface		
Control bus		CAN 2.0b (1 Mbit/s)
DUT connector (front)	R&S®TS-PSM5B high-power switching module	none
	R&S®TS-PSM5 high-power switching module with VPC connector bracket	TriPaddle signal/mini power module, receiver, 16/16 positions (Virginia Panel Corporation) contacts: ▶ mini power, receiver, 12 to 14 AWG, 50 μ gold ▶ signal, receiver, TriPaddle, 7 AMP, 20 to 24 AWG, 30 μ gold
Rear I/O connector	CompactPCI	110 pins
	power	2 × 12 pins
Maximum operating voltages		
Channel to channel		max. 87 V DC
Channel to GND		max. 63 V DC
Channel switching characteristics		
50 A high-power channels¹⁾		4 channels
Relay type		Zettler AZ983
Switching voltage	DC	max. 22 V (at 50 A)
Switching current	DC	max. 50 A
Switching power	DC	max. 1120 W
Operate/release time		typ. < 14 ms
Switching duty cycle	at maximum operating frequency of 1 Hz	1 : 10 (on/off)
Short path high-power channels¹⁾		2 paths
Switching voltage	DC	max. 14 V (at 30 A)
Switching current	DC	max. 30 A
Switching power	DC	max. 420 W
Operate/release time		typ. < 4 ms
2 A medium power channels		4 channels
Relay type		AxiCom IM03
Switching voltage	DC	max. 30 V (at 2 A)
	AC	max. 46 V (peak)
Switching current		max. 2 A
Switching power	DC	max. 60 W
	AC	max. 62.5 VA
Operate/release time		typ. < 6 ms
Analog measurement bus access and coupling relays		
Switching current		max. 1 A
Switching power	DC	max. 10 W
	AC	max. 10 VA
Operate/release time		typ. < 0.5 ms

¹⁾ If the contact-applied voltage and contact-applied current are small, contact resistance may become a larger value due to a small amount of film on a contact surface.

Specifications

Conditions

Temperature range		+23°C ±5°C
Additional error specified by the temperature coefficient in the range		+5°C to +18°C and +28°C to +40°C
Warm-up		30 min

Shunt resistor (2 A medium power channels)

Nominal value		22 mΩ (nom.)
Accuracy	correction values included, measured by R&S®TS-PSAM	±(1% + 4 mA)
Temperature coefficient		±75 ppm/K

I-to-V converter (50 A high-power channels)

Type		LEM CAS 15
Theoretical sensitivity		41.67 mV/A (nom.)
Accuracy	correction values included, measured by R&S®TS-PSAM	±(1% + 60 mA)
Temperature coefficient		±40 ppm/K

General data

Power consumption	reset state	5 V/0.3 A
	all CHx relays activated, one channel connected to analog bus	5 V/1.5 A

Environmental conditions

Temperature	operating temperature range	+5°C to +40°C
	storage temperature range	-10°C to +60°C
Damp heat		+40°C, 80% rel. humidity, steady state, in line with EN 60068-2-78
Altitude	operating	up to 2000 m

Mechanical resistance

Vibration	sinusoidal	in line with EN 60068-2-6, frequency range: 5 Hz to 55 Hz, displacement: 0.3 mm (peak-to-peak) (1.8 g at 55 Hz), frequency range: 55 Hz to 150 Hz, acceleration: 0.5 g constant
	random	in line with EN 60068-2-64, 8 Hz to 500 Hz, acceleration 1.2 g (RMS); 5 min/axis
Shock		shock test in line with MIL-STD-810G, method 516.6, procedure I: shock response spectrum ramp 6 dB/octave up to 45 Hz, 45 Hz to 2000 Hz: max. 40 g

Product conformity

Electromagnetic compatibility	EU: in line with EMC Directive 2014/30/EC	applied harmonized standards: ▶ EN 61326-1 (industrial environment) ▶ EN 61326-2-1 ▶ EN 55011 Group 1, Class A
Electrical safety	EU: in line with Low Voltage Directive 2014/35/EC	applied harmonized standard: EN 61010-1
	USA	applied standard: UL 61010
	Canada	applied standard: CSA-C22.2 No. 61010-1
RoHS	EU: in line with the restriction of the use of hazardous substances in electrical and electronic equipment 2011/65/EU	compliant; applied harmonized standard: EN IEC 63000
Dimensions (W × H × D)	R&S®TS-PSM5	40 mm × 174 mm × 316 mm (1.58 in × 6.85 in × 12.44 in)
	R&S®TS-PRIO5	40 mm × 130 mm × 180 mm (1.58 in × 5.12 in × 7.09 in)
Weight	R&S®TS-PSM5B	945 g (2.08 lb)
	R&S®TS-PSM5	1213 g (2.67 lb)
	R&S®TS-PRIO5	292 g (0.64 lb)
Calibration interval	recommended for highest accuracy	24 months

ORDERING INFORMATION

Designation	Type	Order No.
High-power switching module	R&S®TS-PSM5B	1519.2768.02
High-power switching module, with VPC connector bracket	R&S®TS-PSM5	1519.2768.03
Rear module, for R&S®TS-PSM5, integration to R&S®PowerTSVP only	R&S®TS-PRI05	1519.3112.02
Rear extension module: ▶ Mandatory for configuration of the R&S®TS-PSM5 in a PXI bus based R&S®TSVP, slots 5, 6 to 13, 14 ▶ Rear I/O is supported only for the 2 A medium-power channels	R&S®TS-PRI04	1510.8005.04

Service options		
Extended warranty, one year	R&S®WE1	Please contact your local Rohde & Schwarz sales office.
Extended warranty, two years	R&S®WE2	
Extended warranty, three years	R&S®WE3	
Extended warranty, four years	R&S®WE4	
Extended warranty with calibration coverage, one year	R&S®CW1	
Extended warranty with calibration coverage, two years	R&S®CW2	
Extended warranty with calibration coverage, three years	R&S®CW3	
Extended warranty with calibration coverage, four years	R&S®CW4	

Service that adds value

- ▶ Worldwide
- ▶ Local and personalized
- ▶ Customized and flexible
- ▶ Uncompromising quality
- ▶ Long-term dependability

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Sustainable product design

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- ▶ Energy efficiency and low emissions
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