

# R&S® ZS129x Switch Units Specifications



# CONTENTS

<b>Specifications</b> .....	<b>3</b>
Specifications of the R&S®ZS129A1.....	3
<i>RF data</i> .....	3
<i>Interfaces</i> .....	4
<i>General data</i> .....	4
Specifications of the R&S®ZS129A2.....	5
<i>RF data</i> .....	5
<i>Interfaces</i> .....	5
<i>General data</i> .....	5
Specifications of the R&S®ZS129A5.....	6
<i>RF data</i> .....	6
<i>Interfaces</i> .....	6
<i>General data</i> .....	6
Specifications of the switches for the R&S®ZS129A5.....	7
<i>RF data</i> .....	7
<i>Interfaces</i> .....	7
<i>General data</i> .....	8
Specifications of the power splitter for the R&S®ZS129A5.....	9
<i>RF data</i> .....	9
<i>Interfaces</i> .....	9
<i>General data</i> .....	9
Specifications of the I <sup>2</sup> C control board for the R&S®ZS129A5.....	10
<i>Interfaces</i> .....	10
<i>General data</i> .....	10
Specifications of the R&S®ZS129Z1.....	11
<i>RF data</i> .....	11
<i>Interfaces</i> .....	11
<i>General data</i> .....	11
Specifications of the DC feed for the R&S®ZS129A1, R&S®ZS129A2, and R&S®ZS129A5.....	12
<i>RF data</i> .....	12
<i>Interfaces</i> .....	12
<i>General data</i> .....	12
<b>Ordering information</b> .....	<b>13</b>
R&S®ZS129A1 switch unit.....	13
R&S®ZS129A2 switch unit.....	13
R&S®ZS129A5 switch unit.....	14
R&S®ZS129Z1 switch unit.....	14

# Specifications

Specifications apply under the following conditions: 15 minutes warm-up time at ambient temperature, specified environmental conditions met, calibration cycle adhered to, and all internal automatic adjustments performed. "Typical values" are designated with the abbreviation "typ." These values are verified during the final test but are not assured by Rohde & Schwarz. "Nominal values" are design parameters that are not assured by Rohde & Schwarz. These values are verified during product development but are not specifically tested during production.

Rohde & Schwarz equipment is designed for reliable operation up to an altitude of 2000 m above sea level, and for transport up to an altitude of 4500 m above sea level.

Data without tolerance limits is not binding.

## Specifications of the R&S® ZS129A1

Indoor switch unit, various models from 1-out-of-2 to 1-out-of-12.

### RF data

Frequency range		DC to 3 GHz
	model .66	DC to 26.5 GHz
Input VSWR		
Signal paths without DC feed	DC to 3 GHz	≤1.4
	at 1.3 GHz	typ. ≤1.2
	model .66	
	3 GHz to 6 GHz	≤1.6
	6 GHz to 12 GHz	≤1.8
Signal paths with DC feed	12 GHz to 26.5 GHz	≤2.5
	100 kHz to 3 GHz	≤1.4
Insertion loss (in/out)	at 1.3 GHz	typ. ≤1.2
	Signal paths without DC feed	
Signal paths without DC feed	DC to 1.3 GHz	≤0.6 dB
	DC to 3 GHz	≤1.2 dB
	model .66	
	3 GHz to 6 GHz	≤1.5
	6 GHz to 12 GHz	≤2.0
	12 GHz to 20 GHz	≤2.5
Signal paths with DC feed	20 GHz to 26.5 GHz	≤3.0
	100 kHz to 1.3 GHz	≤1.2 dB
	100 kHz to 3 GHz	≤2 dB
Impedance		50 Ω
RF power (cold switching)	models .02/.06/.08/.22	≤50 W
	models .12/.16/.18	≤3.0 W total, ≤1.0 W per input
	model .66	≤10 W
Switching time		≤15 ms

## Interfaces

RF INPUTS		N female (X1 to X12)
	model .66	26 GHz test port adapter body (X1 to X6)
RF OUTPUT		N female (X13)
	model .66	26 GHz test port adapter body (X13)
COM1		D-Sub male, 9 pins (X20), RS-232-C serial interface
USB		USB 1.1 (X30)
TTL IN		HD-Sub male, 26 pins (X40), TTL control input
EXP1		D-Sub female, 9 pins (X50), open-collector control output
I <sup>2</sup> C REM CTRL		D-Sub female, 15 pins (X60), I <sup>2</sup> C bus control output
POWER IN		D-Sub male with high-current contacts (X110)

## General data

Temperature	operating temperature range	0 °C to +50 °C
	storage temperature range	-40 °C to +70 °C
Humidity		95 % relative humidity at +40 °C
Vibration	sinusoidal	5 Hz to 150 Hz
	random	10 Hz to 300 Hz
Shock		40 g shock spectrum
EMC		in line with EMC directive of EU (89/336/EEC) and German EMC law
Safety		in line with EN 60950/VDE 0805
Quality standard		developed and manufactured in line with ISO 9000
Power supply		+10 V to +30 V DC/max. 8 A/60 W 100 V to 240 V AC/max. 70 W with external power supply
Dimensions (W × H × D)		19" rackmount 2 HU, 427 mm × 89 mm × 485 mm (16.81 in × 3.50 in × 19.09 in)
	overall	484 mm × 89 mm × 495 mm (19.06 in × 3.50 in × 19.49 in)
Weight	depending on installed options	approx. 6 kg (13.23 lb)

# Specifications of the R&S® ZS129A2

Outdoor switch unit, 1-out-of-8.

## RF data

Frequency range		DC to 3 GHz
Input VSWR		
Signal paths without DC feed	DC to 3 GHz	≤1.4
	at 1.3 GHz	typ. ≤1.2
Signal paths with DC feed	100 kHz to 3 GHz	≤1.4
	at 1.3 GHz	typ. ≤1.2
Insertion loss (in/out)		
Signal paths without DC feed	DC to 1.3 GHz	≤0.6 dB
	DC to 3 GHz	≤1.2 dB
Signal paths with DC feed	100 kHz to 1.3 GHz	≤1.2 dB
	100 kHz to 3 GHz	≤2 dB
Impedance		50 Ω
RF power (cold switching)		≤50 W
Switching time		≤15 ms

## Interfaces

X1 to X8		N female, RF inputs from receiving antennas
OUTPUT		N female (X10), RF output
CONTROL IN		MIL connector, 10-pin male (X100)
CONTROL OUT		MIL connector, 10-pin female (X60)
EXT/AUX		MIL connector, 6-pin female (X50)

## General data

Temperature	operating temperature range	-35 °C to +55 °C
	storage temperature range	-40 °C to +70 °C
Humidity		95 % relative humidity at +55 °C
Vibration	sinusoidal	5 Hz to 150 Hz
	random	10 Hz to 300 Hz
Shock		40 g shock spectrum
EMC		in line with EMC directive of EU (89/336/EEC) and German EMC law
Safety		in line with EN 60950/VDE 0805
Quality standard		developed and manufactured in line with ISO 9000
Power supply	via control input	+28 V DC
Dimensions (W × H × D)	without connectors	404 mm × 313 mm × 183 mm (15.91 in × 12.32 in × 7.20 in)
	overall	404 mm × 335 mm × 183 mm (15.91 in × 13.19 in × 7.20 in)
Weight	depending on installed options	approx. 11.2 kg (24.69 lb)

If the distance between the R&S® ZS129A2 and the control unit (R&S® ZS129A1 or R&S® GB127S) is greater than 10 m, two separate cables must be used to carry control data and power supply. The following minimum requirements must be observed.

For the data line, use a KAWAFLEX 00072422 cable (Rohde & Schwarz material number 1137.6397.00) with an impedance of 100 Ω at 1 MHz and max. 57 pF/m wire-to-wire and max. 110 pF/m wire-to-shield. The two SCL and SDA signals must be connected to a twisted pair of stranded wire.

For the power supply line, a GSC-3067 cable (Rohde & Schwarz material number 0360.6108.00) with max. 3.6 mΩ/m per wire must be used.

At the point of entry into the building, the following types of overvoltage protection are required: LEUTRON DataPro 2x1-30V/30V-Tr for the data line, and LEUTRON EnerPro 36V-Tr for the power supply line.

For more detailed information, contact the Rohde & Schwarz customer support.

## Specifications of the R&S® ZS129A5

Configurable indoor switch unit, remote controlled via R&S® ZS129A1, R&S® GB127S or R&S® GB127M.

### RF data

Frequency range		DC to 3 GHz
Input VSWR		depending on hardware configuration
Insertion loss (in/out)		depending on hardware configuration
Impedance		50 Ω

### Interfaces

SIGNAL 1 to 18		RF inputs/outputs, depending on hardware configuration (unused connectors not installed)
CTRL IN 1 and 2		D-Sub male, 15 pins (X21 and X22)
CTRL OUT 1 and 2		D-Sub female, 15 pins (X31 and X32)
POWER		round connector, 3 pins (X100)
SER CTRL	for I <sup>2</sup> C control option	D-Sub male, 9 pins (X23)

### General data

Temperature	operating temperature range	-35 °C to +55 °C
	storage temperature range	-40 °C to +70 °C
Humidity		95 % relative humidity at +55 °C
Vibration	sinusoidal	5 Hz to 150 Hz
	random	10 Hz to 300 Hz
Shock		40 g shock spectrum
EMC		in line with EMC directive of EU (89/336/EEC) and German EMC law
Quality standard		developed and manufactured in line with ISO 9000
Power supply	via control input	+28 V DC
	from external power supply	+5 V to +35 V DC depending on configuration
Dimensions (W × H × D)		19" rackmount without front panel 2 HU, 450 mm × 85 mm × 460 mm (17.72 in × 3.35 in × 18.11 in)
Weight	depending on installed options	basic model: approx. 3.6 kg (7.94 lb)

## Specifications of the switches for the R&S® ZS129A5

### RF data

Frequency range		DC to 3 GHz
Input VSWR		≤1.4
Insertion loss (in/out)		≤1 dB
Impedance		50 Ω
RF power (cold switching)	R&S® ZS129S1	≤70 W
	R&S® ZS129S2	≤50 W
	R&S® ZS129S3	≤50 W
	R&S® ZS129S4	≤0.5 W
	R&S® ZS129S5	≤50 W
	R&S® ZS129S6	≤1.0 W per input, ≤3.0 W total
	R&S® ZS129S7	≤1.0 W per input, ≤3.0 W total
	R&S® ZS129S8	≤50 W
	R&S® ZS129S9	≤1.0 W per input, ≤3.0 W total
Switching time	R&S® ZS129S1	≤10 ms
	others	≤15 ms
Life	R&S® ZS129S1	5000000 operations
	R&S® ZS129S2	1000000 operations
	others	2000000 operations

### Interfaces

RF inputs		SMA female
RF output		SMA female
CONTROL (wires)	R&S® ZS129S1	+28 V DC/60 mA, GND
	R&S® ZS129S2	+28 V DC/150 mA, CTRL 1 to 6
	R&S® ZS129S3	+28 V DC/150 mA, CTRL 1 to 8
	R&S® ZS129S4	+28 V DC/205 mA, GND
	R&S® ZS129S5	+28 V DC/140 mA, GND
	R&S® ZS129S6	+28 V DC/150 mA, CTRL 1 to 8
	R&S® ZS129S7	+28 V DC/150 mA, CTRL 1 to 6
	R&S® ZS129S8	+28 V DC/150 mA, CTRL 1 to 12
	R&S® ZS129S9	+28 V DC/150 mA, CTRL 1 to 12

## General data

Temperature	operating temperature range	
	R&S <sup>®</sup> ZS129S4	-40 °C to +85 °C
	R&S <sup>®</sup> ZS129S5	-55 °C to +85 °C
	others	-40 °C to +70 °C
	storage temperature range	-55 °C to +85 °C
Humidity		95 % relative humidity at +55 °C
Vibration	sinusoidal	5 Hz to 150 Hz
	random	10 Hz to 300 Hz
Shock		40 g shock spectrum
Quality standard		developed and manufactured in line with ISO 9000
Power supply	via control input	+28 V DC
	from external power supply	+5 V to +35 V DC
Dimensions (W × H × D)	R&S <sup>®</sup> ZS129S1	25 mm × 52 mm × 50 mm (0.98 in × 2.05 in × 1.97 in)
	R&S <sup>®</sup> ZS129S2	80 mm × 69 mm × 65 mm (3.15 in × 2.72 in × 2.56 in)
	R&S <sup>®</sup> ZS129S3	80 mm × 69 mm × 65 mm (3.15 in × 2.72 in × 2.56 in)
	R&S <sup>®</sup> ZS129S4	25 mm × 60 mm × 70 mm (0.98 in × 2.36 in × 2.76 in)
	R&S <sup>®</sup> ZS129S5	56 mm × 52 mm × 60 mm (2.20 in × 2.05 in × 2.36 in)
	R&S <sup>®</sup> ZS129S6	80 mm × 69 mm × 65 mm (3.15 in × 2.72 in × 2.56 in)
	R&S <sup>®</sup> ZS129S7	80 mm × 69 mm × 65 mm (3.15 in × 2.72 in × 2.56 in)
	R&S <sup>®</sup> ZS129S8	89 mm × 79 mm × 65 mm (3.50 in × 3.11 in × 2.56 in)
	R&S <sup>®</sup> ZS129S9	89 mm × 79 mm × 65 mm (3.50 in × 3.11 in × 2.56 in)
Weight	R&S <sup>®</sup> ZS129S1	0.1 kg (0.22 lb)
	R&S <sup>®</sup> ZS129S2, R&S <sup>®</sup> ZS129S4, R&S <sup>®</sup> ZS129S5	0.2 kg (0.44 lb)
	R&S <sup>®</sup> ZS129S3, R&S <sup>®</sup> ZS129S6, R&S <sup>®</sup> ZS129S7	0.3 kg (0.66 lb)
	R&S <sup>®</sup> ZS129S8, R&S <sup>®</sup> ZS129S9	0.4 kg (0.88 lb)



## Specifications of the power splitter for the R&S® ZS129A5

### RF data

Frequency range		DC to 4 GHz
Attenuation	in/out	typ. 6.5 dB
	out/out	>6 dB
Impedance		50 Ω
Max. input power	no damage	≤+27 dBm

### Interfaces

RF IN		SMA male
RF OUT 1 to 2		SMA male

### General data

Temperature	operating temperature range	–20 °C to +65 °C
	storage temperature range	–55 °C to +100 °C
Humidity		95 % relative humidity at +55 °C
Vibration	sinusoidal	5 Hz to 150 Hz
	random	10 Hz to 300 Hz
Shock		40 g shock spectrum
Quality standard		developed and manufactured in line with ISO 9000
Dimensions (W × H × D)		28 mm × 65 mm × 55 mm (1.10 in × 2.56 in × 2.16 in)
Weight		0.1 kg (0.22 lb)

# Specifications of the I<sup>2</sup>C control board for the R&S<sup>®</sup> ZS129A5

## Interfaces

SER CTRL	X23 at rear panel of the R&S <sup>®</sup> ZS129A5	D-Sub male, 9 pins
CTRL 1 and 2		flat cables with 16-pin female connector

## General data

Temperature	operating temperature range	-35 °C to +55 °C
	storage temperature range	-40 °C to +70 °C
Humidity		95 % relative humidity at +55 °C
Vibration	sinusoidal	5 Hz to 150 Hz
	random	10 Hz to 300 Hz
Shock		40 g shock spectrum
Quality standard		developed and manufactured in line with ISO 9000
Power supply		+28 V DC
Dimensions (W × H × D)	without cables	123 mm × 31 mm × 53 mm (4.84 in × 1.22 in × 2.09 in)
Weight		0.2 kg (0.44 lb)

# Specifications of the R&S® ZS129Z1

Outdoor switch unit, 1-out-of-2.

## RF data

Frequency range		DC to 3 GHz
Input VSWR	DC to 3 GHz	≤1.4
	at 1.3 GHz	typ. ≤1.2
Insertion loss (in/out)	DC to 1.3 GHz	≤0.5 dB
	DC to 3 GHz	≤1 dB
Impedance		50 Ω
RF power (cold switching)		≤50 W
Switching time		≤15 ms

## Interfaces

RF inputs		N female
RF output		N female
CONTROL	pin 1 = GND pin 2 = n. c. pin 3 = +28 V DC/60 mA	3-pin male

## General data

Temperature	operating temperature range	-35 °C to +55 °C
	storage temperature range	-40 °C to +70 °C
Humidity		95 % relative humidity at +55 °C
Vibration	sinusoidal	5 Hz to 150 Hz
	random	10 Hz to 300 Hz
Shock		40 g shock spectrum
EMC		in line with EMC directive of EU (89/336/EEC) and German EMC law
Safety		in line with EN 60950/VDE 0805
Quality standard		developed and manufactured in line with ISO 9000
Power supply		+28 V DC
Dimensions (W × H × D)	without connectors	125 mm × 80 mm × 58 mm (4.92 in × 3.15 in × 2.28 in)
	overall	169 mm × 98 mm × 58 mm (6.65 in × 3.86 in × 2.28 in)
Weight		0.7 kg (1.54 lb)

# Specifications of the DC feed for the R&S<sup>®</sup> ZS129A1, R&S<sup>®</sup> ZS129A2, and R&S<sup>®</sup> ZS129A5

## RF data

Frequency range		100 kHz to 3 GHz
Input VSWR		≤1.4
Insertion loss (in/out)		≤2 dB
Impedance		50 Ω
RF power		≤1 W

## Interfaces

RF		SMA female
RF & DC		SMA male
POWER	depending on antenna supplied from this unit	GND, up to +30 V DC/max. 500 mA

## General data

Temperature	operating temperature range	−40 °C to +70 °C
	storage temperature range	−55 °C to +85 °C
Humidity		95 % relative humidity at +55 °C
Vibration	sinusoidal	5 Hz to 150 Hz
	random	10 Hz to 300 Hz
Shock		40 g shock spectrum
Quality standard		developed and manufactured in line with ISO 9000
Power supply		+28 V DC
Dimensions (W × H × D)		28 mm × 65 mm × 55 mm (1.10 in × 2.56 in × 2.16 in)
Weight		0.1 kg (0.22 lb)

## Ordering information

### R&S® ZS129A1 switch unit

Designation	Type	Order No.
<b>Basic versions</b>		
Switch Unit, 1-out-of-12, DC to 3 GHz For indoor use, control via USB, RS-232-C or TTL interface and manual operation, one DC feed included	R&S® ZS129A1	3026.3012.02
Switch Unit, 1-out-of-6, DC to 3 GHz For indoor use, control via USB, RS-232-C or TTL interface and manual operation, one DC feed included	R&S® ZS129A1	3026.3012.06
Switch Unit, 1-out-of-8, DC to 3 GHz For indoor use, control via USB, RS-232-C or TTL interface and manual operation, one DC feed included	R&S® ZS129A1	3026.3012.08
Switch Unit, 1-out-of-12, DC to 3 GHz, unused inputs terminated into 50 Ω For indoor use, control via USB, RS-232-C or TTL interface and manual operation, one DC feed included	R&S® ZS129A1	3026.3012.12
Switch Unit, 1-out-of-6, DC to 3 GHz, unused inputs terminated into 50 Ω For indoor use, control via USB, RS-232-C or TTL interface and manual operation, one DC feed included	R&S® ZS129A1	3026.3012.16
Switch Unit, 1-out-of-8, DC to 3 GHz, unused inputs terminated into 50 Ω For indoor use, control via USB, RS-232-C or TTL interface and manual operation, one DC feed included	R&S® ZS129A1	3026.3012.18
Switch Unit, 2-out-of-2, DC to 3 GHz For indoor use, control via USB, RS-232-C or TTL interface and manual operation	R&S® ZS129A1	3026.3012.22
Switch Unit, 1-out-of-6, DC to 26.5 GHz For indoor use, control via USB, RS-232-C or TTL interface and manual operation	R&S® ZS129A1	3026.3012.66
<b>Options</b>		
DC Feed, 100 kHz to 3 GHz Supplies up to 30 V DC at max. 500 mA	R&S® ZS129F1	3024.6614.02
Additional options such as GaAs switches and switches for higher frequencies are available on request.		

### R&S® ZS129A2 switch unit

Designation	Type	Order No.
<b>Basic version</b>		
Switch Unit, 1-out-of-8, DC to 3 GHz, with one DC feed For outdoor use, control via the R&S® ZS129A1, R&S® GB127S or R&S® GB127M	R&S® ZS129A2	3023.2015.02
<b>Option</b>		
DC Feed, 100 kHz to 3 GHz Supplies up to 30 V DC at max. 500 mA	R&S® ZS129F1	3024.6614.03
Additional options such as the I <sup>2</sup> C bus control cable and the overvoltage protection set for the I <sup>2</sup> C bus control cable are available on request.		

## R&S® ZS129A5 switch unit

Designation	Type	Order No.
<b>Basic version (can be ordered only together with other options)</b>		
Switch Unit For indoor use, control via the R&S® ZS129A1, R&S® GB127S or R&S® GB127M	R&S® ZS129A5	3023.2515.05
<b>Options</b>		
Switch, 1-out-of-2, DC to 3 GHz	R&S® ZS129S1	3024.6514.02
Switch, 1-out-of-6, DC to 3 GHz	R&S® ZS129S2	3024.6520.02
Switch, 1-out-of-8, DC to 3 GHz	R&S® ZS129S3	3024.6537.02
Switch, 1-out-of-12, DC to 3 GHz	R&S® ZS129S8	3024.6620.02
Switch, 1-out-of-2, DC to 3 GHz, unused inputs terminated into 50 Ω	R&S® ZS129S4	3024.6543.02
Switch, 1-out-of-6, DC to 3 GHz, unused inputs terminated into 50 Ω	R&S® ZS129S7	3024.6572.02
Switch, 1-out-of-8, DC to 3 GHz, unused inputs terminated into 50 Ω	R&S® ZS129S6	3024.6566.02
Switch, 1-out-of-12, DC to 3 GHz, unused inputs terminated into 50 Ω	R&S® ZS129S9	3024.6637.02
Switch, 2-out-of-2, DC to 3 GHz	R&S® ZS129S5	3024.6550.02
DC Feed, 100 kHz to 3 GHz Supplies up to 30 V DC at max. 500 mA	R&S® ZS129F1	3024.6614.02
Power Splitter, 2 ways – 0 degree, resistive, DC to 4 GHz	R&S® ZS129M1	3025.4515.02
I <sup>2</sup> C Bus Control Board	R&S® ZS129C1	3024.6714.02
Additional options such as switches for higher frequencies, the I <sup>2</sup> C bus control cable, the overvoltage protection set for the I <sup>2</sup> C bus control cable, the open-collector control cable and the 19" front panel (2 HU) are available on request.		

## R&S® ZS129Z1 switch unit

Designation	Type	Order No.
<b>Basic version</b>		
Switch Unit, 1-out-of-2, DC to 3 GHz For outdoor use, control via the R&S® ZS129A1, R&S® GB127S or R&S® GB127M, 28 V DC operation, with 5 m cable	R&S® ZS129Z1	3040.2403.02



## Service you can rely on

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

## About Rohde & Schwarz

Rohde & Schwarz is an independent group of companies specializing in electronics. It is a leading supplier of solutions in the fields of test and measurement, broadcasting, radiomonitoring and radiolocation, as well as secure communications. Established more than 75 years ago, Rohde & Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

## Environmental commitment

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

Certified Quality System  
**ISO 9001**

## Rohde & Schwarz GmbH & Co. KG

[www.rohde-schwarz.com](http://www.rohde-schwarz.com)

## Regional contact

- ▮ Europe, Africa, Middle East | +49 89 4129 12345  
[customersupport@rohde-schwarz.com](mailto:customersupport@rohde-schwarz.com)
- ▮ North America | 1 888 TEST RSA (1 888 837 87 72)  
[customer.support@rsa.rohde-schwarz.com](mailto:customer.support@rsa.rohde-schwarz.com)
- ▮ Latin America | +1 410 910 79 88  
[customersupport.la@rohde-schwarz.com](mailto:customersupport.la@rohde-schwarz.com)
- ▮ Asia/Pacific | +65 65 13 04 88  
[customersupport.asia@rohde-schwarz.com](mailto:customersupport.asia@rohde-schwarz.com)
- ▮ China | +86 800 810 8228/+86 400 650 5896  
[customersupport.china@rohde-schwarz.com](mailto:customersupport.china@rohde-schwarz.com)

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