R&S®ZS129x
Switch Units
Flexible RF and IF signal distribution

ROHDE&SCHWARZ

Radiomonitoring & Radiolocation

Product Brochure | 03.02

R&S®ZS129x Switch Units

At a glance

The R&S®ZS129x family of switch units is an intelligent and reliable approach to RF and IF signal distribution. Its flexible concept allows adaptation to system requirements by adding optional extensions.

Monitoring systems usually consist of several receiving antennas that have to be dynamically switched to the receivers and spectrum analyzers to achieve the optimum system configuration for the individual tasks. The R&S®ZS129x switch units constitute a cost-effective and flexible solution for stationary, transportable and mobile applications.

The R&S®ZS129x family of universal switch units includes the R&S®ZS129A1 basic model as well as the R&S®ZS129A2, R&S®ZS129A5 and R&S®ZS129Z1 models for enhanced capabilities.

Key facts

- Frequency range DC to 3 GHz; optionally up to 26.5 GHz
- Suitable for indoor and outdoor use
- Suitable for stationary, transportable and mobile applications
- Easy and cost-effective implementation of customer-specific requirements owing to the modular design and wide variety of models and modules

R&S®ZS129A1

R&S®ZS129A2

R&S®ZS129x Switch Units

Benefits and key features

Flexible operation, manually and by remote control

Depending on customer requirements, the antenna paths can be switched manually or via remote control. The keypad on the instrument's front panel enables users to switch the wanted antenna signal directly to the output. The path currently switched and important parameters are indicated on the display next to the keypad. Alternatively, control can be carried out via the system software. In this case, the R&S®ZS129x switch unit is connected with the control PC via USB or RS-232-C. If preferred, the switch matrix can also be controlled via a receiver that is connected with the R&S®ZS129x switch unit by means of a TTL line.

Controlling multiple instruments

The instruments have multiple control outputs, which may be an I^2C bus and/or an open collector – depending on the model. This feature makes it possible, for example, to control two switch matrices by using one control command. As a result, even complex switching processes can be implemented easily and reliably.

Integrated power supply for active antennas

Many models already contain a factory-installed DC feed, which allows power to be fed to most of the active antennas via the R&S®ZS129x switch unit. This eliminates the need to install an additional, external antenna power feed.

Depending on the model, up to six DC feeds can be integrated into a single switching matrix.

GaAs switches for significantly faster switchover times

Instead of standard switches, gallium arsenide (GaAs) switches may be used, allowing considerably faster switching times.

Tried-and-tested, reliable technology

The switching matrices of the R&S®ZS129x family have successfully proved their mettle throughout several years of service. Worldwide, they are performing reliably in well over 400 monitoring stations.

R&S®ZS129A5

R&S®ZS129Z1

R&S®ZS129A1 Switch Unit

Indoor RF and IF switch

The R&S®ZS129A1 has been designed as an indoor RF and IF switch unit for stationary, transportable and mobile systems.

Description

The following standard models of the R&S®ZS129A1 are available:

- R&S®ZS129A1 model 02 with 1-out-of-12 switch, DC to 3 GHz
- R&S®ZS129A1 model 06 with 1-out-of-6 switch, DC to 3 GHz
- R&S®ZS129A1 model 08 with 1-out-of-8 switch, DC to 3 GHz
- R&S®ZS129A1 model 12 with 1-out-of-12 switch, DC to 3 GHz, unused inputs terminated into 50 Ω
- R&S®ZS129A1 model 16 with 1-out-of-6 switch, DC to 3 GHz, unused inputs terminated into 50 Ω
- R&S®ZS129A1 model 18 with 1-out-of-8 switch, DC to 3 GHz, unused inputs terminated into 50 Ω
- R&S®ZS129A1 model 22 with 1-out-of-2 switch, DC to 3 GHz
- R&S®ZS129A1 model 66 with 1-out-of-6 switch, DC to 26.5 GHz

The R&S®ZS129A1 includes a switch, a control board, a chipcard reader, a front-panel keypad, an alphanumeric display and a power supply covering an input voltage range from +10 V to +30 V DC.

Models 02 to 18 are factory-equipped with one DC feed. Up to six DC feeds can be integrated as options. The DC feed (R&S®ZS129F1 option) is used to apply a DC voltage to the inner conductor of the antenna input. This is an ideal solution for the power supply of most active receiving antennas. The DC feed can supply a DC voltage of up to 30 V at a maximum current of 500 mA.

The switch unit is usually integrated into the rack at the operator position and connected to the system controller via a serial interface or USB interface, or it is connected directly to the receiver via a TTL interface. It may be operated manually from its front-panel keypad or remotely via the system software. The TTL input interface provides a maximum of 16 parallel TTL lines. This makes it possible to control both the internal and the external (via control outputs) RF switches directly from a receiver with TTL control output.
When the R&S®ZS129A1 is operated manually, the user enters the requested setting via the front-panel keypad. The switch unit guides the user by means of menus that are adapted to the specific system configuration. The current settings and relevant parameters can be read from the alphanumeric display.

The R&S®ZS129A1 has two outputs on its rear panel for controlling external units:

- One I^2C bus control output – including an I^2C bus interface, the +28 V DC supply and GND – for connecting an R&S®ZS129A2 or an R&S®ZS129A5 (to control one switch)
- One open-collector control output – including four independent control lines, the +28 V DC supply and GND – for connecting an R&S®ZS129A5 (to control up to four 1-out-of-2 switches or two 1-out-of-3 switches or two 1-out-of-4 switches) or up to four R&S®ZS129Z1 units

The functionality of the system can thus be enhanced without a second control unit being required. If several DC feeds are integrated or several units are connected, users must keep in mind that the maximum supply current is 1.3 A.

The basic firmware of the R&S®ZS129A1 is identical for each unit. Customer- and system-specific information is defined and stored on a chipcard. If the switch unit is delivered as part of a complete monitoring system, the chipcard will usually be programmed to the system-specific configuration by Rohde&Schwarz.

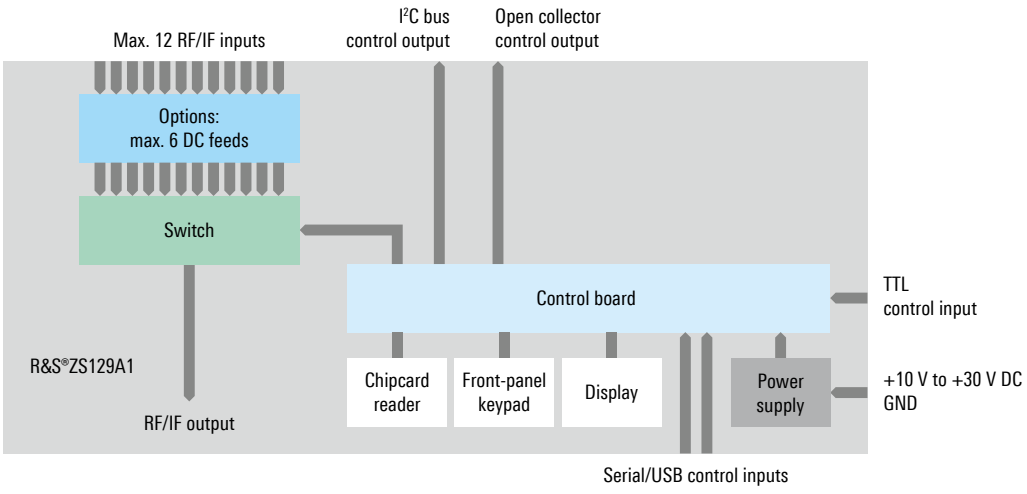
However, programming may also be performed by the customer. A null modem cable connected to the R&S®ZS129A1 and the R&S®ZS129x card editor, which runs under Windows®XP and Windows®2000, are required in order to read from and write to the chipcard. When the chipcard is inserted into the chipcard reader, the R&S®ZS129A1 switch unit is configured automatically for the system in question.

The following information is stored on the chipcard:
- Function of the commands for the switch and the control outputs
- Text to be output on the display

The card editor and the latest firmware are available at www.argus.rohde-schwarz.com

The R&S®ZS129A1 model 66 extends the supported frequency range to 26.5 GHz and was developed specially for measurement tasks in the microwave range. Due to the special characteristics in this high frequency range, the standard DC feed is not required. Since high-quality components are used, the insertion loss can be reduced to under 3 dB even at 26.5 GHz.

Block diagram of the R&S®ZS129A1



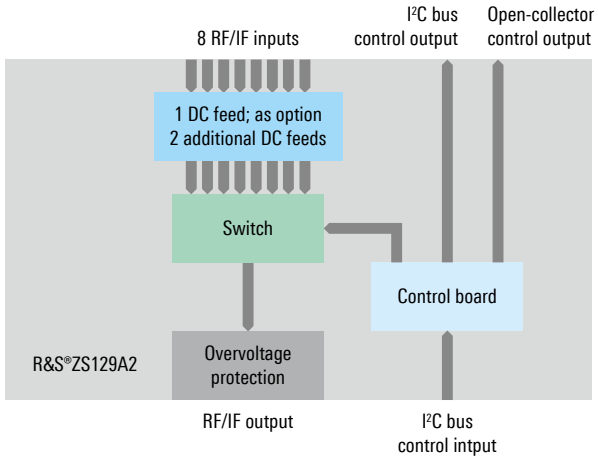
Rear view of the R&S®ZS129A1.

R&S®ZS129A2 Switch Unit

Outdoor unit

The R&S®ZS129A2 switch unit has been designed as an outdoor unit to be mounted on top of masts close to receiving antennas.

Block diagram of the R&S®ZS129A2



Description

Since the R&S®ZS129A2 is mounted on the mast and thus close to the antennas, the lengths of the RF cables can be reduced. Only one RF cable and one control cable need to be routed to the equipment inside the station.

The R&S®ZS129A2 contains a control board, a 1-out-of-8 switch, one DC feed and overvoltage protection for the RF output. As an option, the unit may also be equipped with two additional DC feeds (R&S®ZS129F1 option) to supply power to more than one active antenna. The R&S®ZS129A2 is controlled from the R&S®ZS129A1 switch unit or from the R&S®GB127S antenna control unit.

The R&S®ZS129A2 is operated via the I²C bus control interface. A single control cable is used, incorporating an I²C bus interface, a +28 V DC supply and GND. The control cables supplied by Rohde&Schwarz for connecting the control unit and the R&S®ZS129A2 have been tested for lengths up to 80 m. For ranges above 10 m, the control cable for the I²C bus interface and the +28 V DC supply is split. For minimum requirements, refer to the data sheet (PD 5213.8080.22). The connection between the two units requires additional overvoltage protection at the point of entry into the building.

The R&S®ZS129A2 has two outputs on its rear panel for controlling external units:

- One I²C bus control output – including an I²C bus interface, the +28 V DC supply and GND – for connecting an R&S®ZS129A2 or an R&S®RD127 (only if the R&S®ZS129A2 is controlled from the R&S®GB127S or R&S®GB127M antenna control unit)
- One open-collector control output – including four independent control lines, the +28 V DC supply and GND – for connecting up to four R&S®ZS129Z1 units

The functionality of the system can thus be enhanced without an additional control unit or another control cable from the control unit to the external unit on the mast.

R&S®ZS129A5 Switch Unit

Configurable indoor unit

The configurable R&S®ZS129A5 switch unit is ideal for a wide variety of indoor RF and IF switching applications. Its flexible concept allows adaptation to system requirements by adding optional modules.

Description

The R&S®ZS129A5 is of modular design. Various switches, power splitters and DC feeds can be integrated into an empty prefabricated enclosure to meet specific requirements.

The base unit is a rugged 19" rackmount with a height of two units for easy integration into system racks. Since the R&S®ZS129A5 does not have to be operated manually, it can be placed at an out-of-the-way spot, e.g. somewhere inside a rack so that no space is wasted at the front. The base unit contains an integrated connection board and connectors for control inputs, control outputs and an optional external power supply. Inside, a lot of space is available for integrating optional modules.

The following switch modules have been designed as standard for the R&S®ZS129A5:

- R&S®ZS129S1: 1-out-of-2, DC to 3 GHz
- R&S®ZS129S2: 1-out-of-6, DC to 3 GHz
- R&S®ZS129S3: 1-out-of-8, DC to 3 GHz
- R&S®ZS129S8: 1-out-of-12, DC to 3 GHz
- R&S®ZS129S4: 1-out-of-2, DC to 3 GHz, unused inputs terminated into 50 Ω
- R&S®ZS129S7: 1-out-of-6, DC to 3 GHz, unused inputs terminated into 50 Ω
- R&S®ZS129S6: 1-out-of-8, DC to 3 GHz, unused inputs terminated into 50 Ω
- R&S®ZS129S9: 1-out-of-12, DC to 3 GHz, unused inputs terminated into 50 Ω
- R&S®ZS129S5: 2-out-of-2, DC to 3 GHz

The power splitter (R&S®ZS129M1 option), which can be integrated into the base unit, is a cost-effective solution for taking a signal to two outputs in the frequency range from DC to 4 GHz. Since this module is a resistive power splitter with low output decoupling, it can be combined only with terminated relays. The DC feed (R&S®ZS129F1 option) is used to supply power to an active antenna.

The R&S®ZS129A5 is remote-controlled from the R&S®ZS129A1 switch unit or from the R&S®GB127S or R&S®GB127M antenna control unit via the control inputs.

The switch unit is operated via three control inputs:

- Two control inputs including eight independent switched GND control lines, the +28 V DC supply and GND; the number of switches that can be controlled depends on the number of control lines; the control cable supplied by Rohde&Schwarz has been tested for lengths up to 10 m

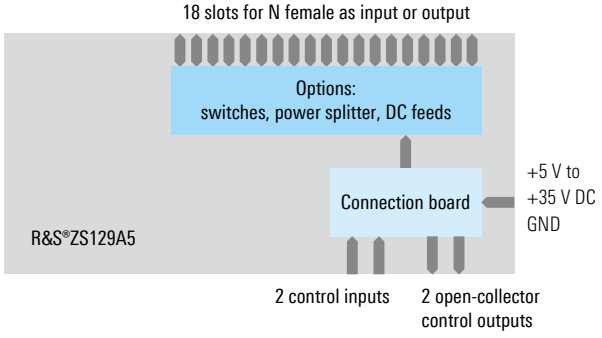
- If the I²C control board (R&S®ZS129C1 option) is included: one I²C bus control input with I²C bus interface, +28 V DC supply and GND; in this case, the two open-collector control inputs are disconnected internally. Internally, a maximum of 16 independent control lines can be used to control the switches. The control cable supplied by Rohde&Schwarz has been tested for lengths of up to 80 m

For minimum requirements, refer to the data sheet (PD 5213.8080.22).

For special purposes, two open-collector control outputs are provided to connect additional units, e.g. to cascade two or more units. The power connector (+5 V to +35 V DC supply and GND) may be used to feed an external supply voltage for active modules, e.g. when an amplifier or additional DC feed is integrated in the R&S®ZS129A5.

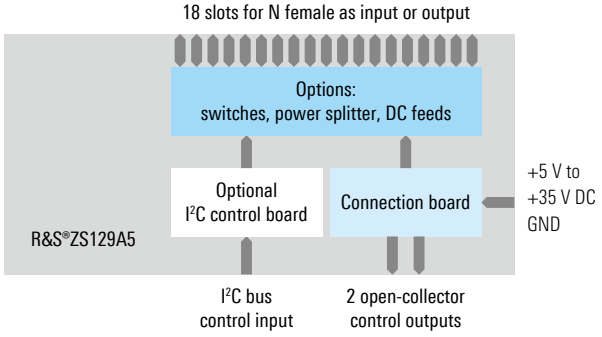
The backplane can be equipped with up to 18 N jacks, used as inputs or outputs, depending on the specific configuration. Owing to its modular concept, the hardware of the switch unit is easy to configure. The number of components used is limited by the space in the base unit, the number of control lines of the controlling units and the current drain.

Block diagram of the R&S®ZS129A5



Block diagram of the R&S®ZS129A5

with I²C control board option



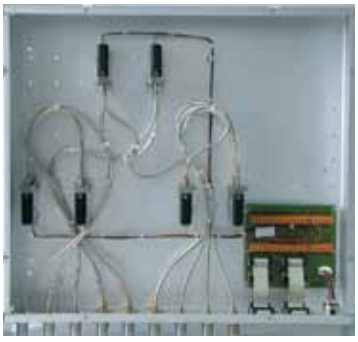
R&S®ZS129A5 Switch Unit

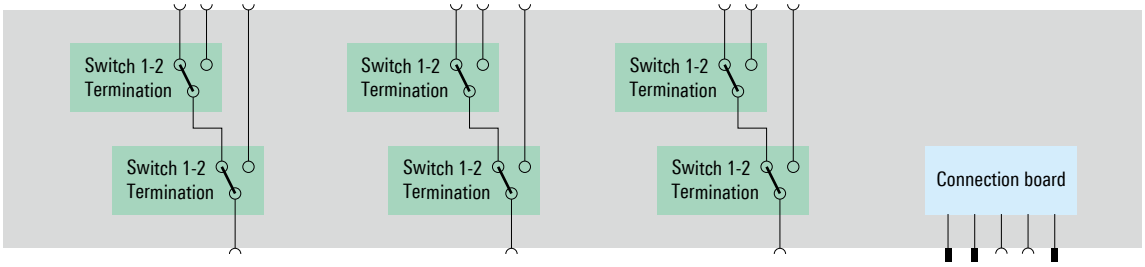
Applications

Example 1

Three independent switches, 1-out-of-3, unused inputs terminated, each implemented by means of two R&S®ZS129S4 units.

Example 1

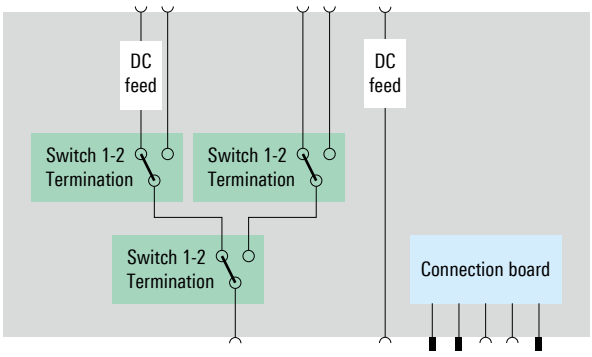




Example 2

One switch, 1-out-of-4, implemented by three R&S®ZS129S1 units, a feedthrough and two R&S®ZS129F1 units.

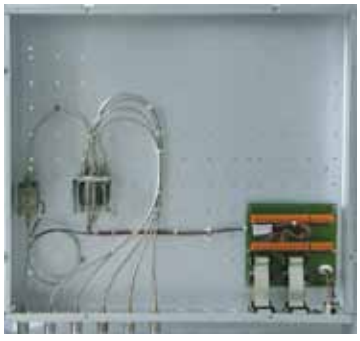
Example 2

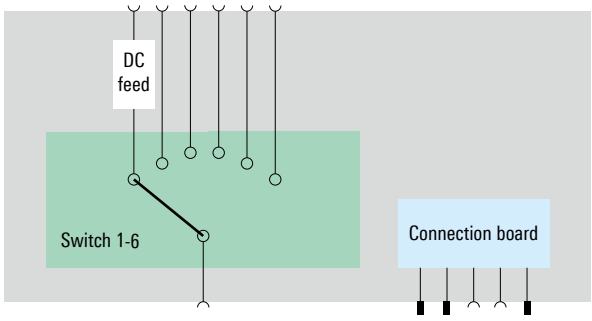


Example 3

One switch, 1-out-of-5, implemented by one R&S®ZS129S2 and one R&S®ZS129F1.

Example 3





R&S®ZS129Z1 Switch Unit

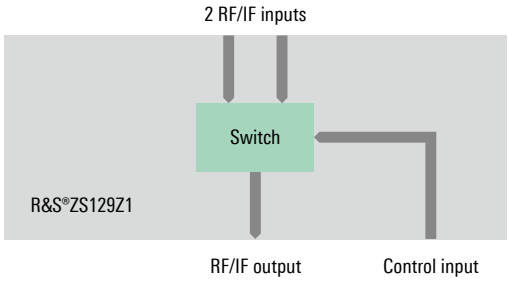
Outdoor unit

The R&S®ZS129Z1 switch unit has been designed as an outdoor unit to enhance the switching functionality of other switch units.

Brief description

The R&S®ZS129Z1 contains a 1-out-of-2 switch. The R&S®ZS129Z1 is remote-controlled from the R&S®ZS129A1 switch unit or from the R&S®GB127S or R&S®GB127M antenna control unit via the control input. A single control cable is used, incorporating a +28 V DC supply and a switched GND control line. The control cable supplied by Rohde&Schwarz has been tested for lengths up to 10 m.

Block diagram of the R&S®ZS129Z1



Multicouplers
Distributing antenna signals

When antenna signals need to be distributed to more than one receiver at a time, a multicoupler is most often the best choice.

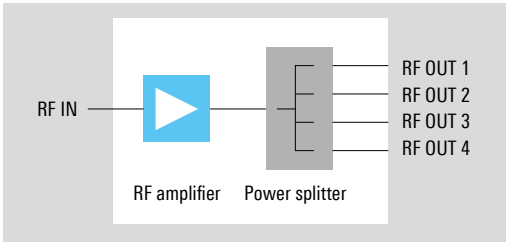
Brief description

A multicoupler consists of an RF amplifier followed by a power splitter. The amplifier compensates for the insertion loss of the power splitter so that the overall gain is about 0 dB to +3 dB. Owing to the high output isolation, expensive terminated RF switches are, in most cases, not required and standard switch modules may be used.

Upon request, Rohde&Schwarz provides different multicouplers as separate 19" rackmounts for the following frequency ranges:

- (10 kHz) 100 kHz to 80 MHz, 4 or 8 outputs, for example suitable for the R&S®HE010, R&S®HE011 and R&S®HUF-Z2 antennas
- 20 MHz to 1300 MHz, 4 or 8 outputs, for example suitable for the R&S®HE309, R&S®HE314A1, R&S®HF214, R&S®HK014, R&S®HK309 and R&S®HL023A1/A2 antennas
- 1000 MHz to 3000 MHz, 4 or 8 outputs, for example suitable for the R&S®HF902 antenna

Block diagram of multicoupler



Specifications in brief

Specifications of the R&S®ZS129A1		
Frequency range		DC to 3 GHz
	model 66	DC to 26.5 GHz
Switching time		≤15 ms
	model 34	≤100 µs
Temperature	operating temperature range	0 °C to +50 °C
	storage temperature range	–40 °C to +70 °C
Power supply		+10 V DC to +30 V DC
Dimensions (W × H × D)		19" rackmount 2 HU, 427 mm × 89 mm × 485 mm (16.81 in × 3.50 in × 19.09 in)
	without connectors	484 mm × 89 mm × 495 mm (19.06 in × 3.50 in × 19.49 in)

Specifications of the R&S®ZS129A2		
Frequency range		DC to 3 GHz
Switching time		≤15 ms
Temperature	operating temperature range	–35 °C to +55 °C
	storage temperature range	–40 °C to +70 °C
Power supply		+28 V DC (via control input)
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)

Specifications of the R&S®ZS129A5		
Frequency range		DC to 3 GHz
Switching time	R&S®ZS129S1	≤10 ms
	others	≤15 ms
Temperature	operating temperature range	–35 °C to +55 °C
	storage temperature range	–40 °C to +70 °C
Power supply	via control input	+28 V DC
	from external power supply	+5 V to +35 V DC
Dimensions (W × H × D)	without connectors	19" rackmount without front panel 2 HU, 450 mm × 85 mm × 460 mm (17.72 in × 3.35 in × 18.11 in)

Specifications of the R&S®ZS129Z1		
Frequency range		DC to 3 GHz
Switching time		≤15 ms
Temperature	operating temperature range	–35 °C to +55 °C
	storage temperature range	–40 °C to +70 °C
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)

Ordering information

R&S®ZS129A1 switch unit

Designation	Type	Order No.
Basic versions		
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
Option		
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.
Basic version		
Switch Unit, 1-out-of-8, DC to 3 GHz, with one DC feed For outdoor use, control via R&S®ZS129A1, R&S®GB127S or R&S®GB127M	R&S®ZS129A2	3023.2015.02
Option		
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^2C bus control cable and the overvoltage protection set for the I^2C bus control cable are available on request.		

R&S®ZS129A5 switch unit

Designation	Type	Order No.
Basic version (can be ordered only together with other options)		
Switch Unit For indoor use, control via R&S®ZS129A1, R&S®GB127S or R&S®GB127M	R&S®ZS129A5	3023.2515.05
Options		
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^2C Bus Control Board	R&S®ZS129C1	3024.6714.02
Additional options such as switches for higher frequencies, the I^2C bus control cable, the overvoltage protection set for the I2C 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.
Basic version		
Switch Unit, 1-out-of-2, DC to 3 GHz For outdoor use, control via R&S®ZS129A1, R&S®GB127S or R&S®GB127M, 28 V DC operation, with 5 m cable	R&S®ZS129Z1	3040.2403.02

Your local Rohde&Schwarz expert will help you find the optimum solution for your requirements and will be glad to provide you with a customized quotation.

To find your nearest Rohde&Schwarz representative, visit
www.sales.rohde-schwarz.com

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

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