# R&S®OSP
# Open Switch and
# Control Platform
# Specifications

**ROHDE & SCHWARZ**

# CONTENTS

# Definitions

### General

Product data applies under the following conditions:

- Three hours storage at ambient temperature followed by 30 minutes warm-up operation
- Specified environmental conditions met
- Recommended calibration interval adhered to
- All internal automatic adjustments performed, if applicable

### Specifications with limits

Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as <, ≤, >, ≥, ±, or descriptions such as maximum, limit of, minimum. Compliance is ensured by testing or is derived from the design. Test limits are narrowed by guard bands to take into account measurement uncertainties, drift and aging, if applicable.
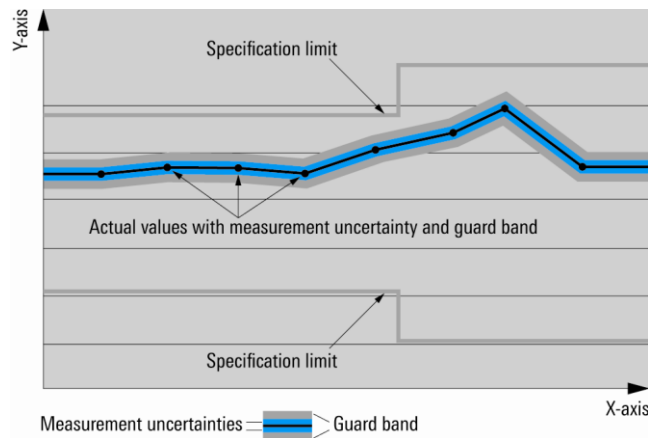


### Specifications without limits

Represent warranted product performance for the specified parameter. These specifications are not specially marked and represent values with no or negligible deviations from the given value (e.g. dimensions or resolution of a setting parameter). Compliance is ensured by design.

### Typical data (typ.)

Characterizes product performance by means of representative information for the given parameter. When marked with <, > or as a range, it represents the performance met by approximately 80 % of the instruments at production time. Otherwise, it represents the mean value.

### Nominal values (nom.)

Characterize product performance by means of a representative value for the given parameter (e.g. nominal impedance). In contrast to typical data, a statistical evaluation does not take place and the parameter is not tested during production.

### Measured values (meas.)

Characterize expected product performance by means of measurement results gained from individual samples.

### Uncertainties

Represent limits of measurement uncertainty for a given measurand. Uncertainty is defined with a coverage factor of 2 and has been calculated in line with the rules of the Guide to the Expression of Uncertainty in Measurement (GUM), taking into account environmental conditions, aging, wear and tear.

Device settings and GUI parameters are indicated as follows: "parameter: value".

Typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

# Introduction

The R&S®OSP is a modular switch and control platform that enables you to perform RF switch and control tasks quickly. The flexibility of the R&S®OSP permits a broad scope of applications ranging from simple RF switch functions to RF wiring of complex systems such as EMC systems.

The following R&S®OSP models are available:

## R&S®OSP120

RF switch and control platform base unit controlled via LAN. It is designed for integration into a test setup as well as for automatic or manual control via a PC application. You can also operate the control platform using an external monitor and a USB keyboard. The R&S®OSP120 has three module slots on the back and two on the front of the instrument.

## R&S®OSP130

Manually operable RF switch and control platform base unit featuring an integrated display. It can be used as a standalone, manually operated instrument, or it can be controlled via Ethernet interface in a system or test setup. This interface allows connection to a PC for automatic and manual control via a software application. The R&S®OSP130 has three module slots on the back of the instrument.

## R&S®OSP150

Extension unit for performing additional or remote RF switch and control tasks. The R&S®OSP150 can be controlled via CAN bus from the R&S®OSP120 or R&S®OSP130. The R&S®OSP150 has three module slots on the back and two on the front of the instrument.

# General data

| Interfaces (front panel) | | R&S®OSP120 | R&S®OSP130 | R&S®OSP150 | |
|---|---|---|---|---|---|
| USB | for keyboard, mouse or USB stick | 2 | 2 | – | 2 × USB 2.0, type A connector (f) |
| DIGITAL MONITOR | for external monitor | 1 | – | – | DVI-D connector (f) |
| Display | for manual operation | – | 1 | – | QVGA, color |
| Control panel | | – | 1 | – | |
| **Control interfaces (rear panel)** | | | | | |
| LAN | remote control via LAN | 1 | 1 | – | Ethernet RJ-45 connector (f), 10/100 Mbit/s |
| CAN | connection of base unit with extension units [1] | 1 | 1 | 1 | 9-pin D-Sub connector (m), 512 kbit/s |

| Environmental conditions | | |
|---|---|---|
| Temperature [2] | operating temperature range | 0 °C to +50 °C |
| | storage temperature range | –25 °C to +70 °C |
| Damp heat | | in line with EN 60068-2-30 +40 °C, 95 %, rel. humidity, constant |

| Mechanical resistance | | |
|---|---|---|
| Vibration | sinusoidal | in line with EN 60068-2-6 5 Hz to 150 Hz, 0.15 mm amplitude const., 55 Hz to 150 Hz, 0.5 g const. |
| | random | in line with EN 60068-2-64 10 Hz to 300 Hz, acceleration 1.2 g RMS |
| Shock | | in line with EN 60068-2-27, MIL-STD-810F, method no. 516.5, procedure I, 40 g shock spectrum |

| Power supply | | |
|---|---|---|
| Rated voltage | | 100 V to 240 V AC (± 10 %) |
| Rated frequency | | 50 Hz to 60 Hz (± 10 %) |
| Rated power | without modules | < 25 W |
| | with modules | 30 W to 100 W (typ.), max. 310 VA [3] |

| Dimensions | | |
|---|---|---|
| **Dimensions** | W × H × D | 465.3 mm × 108.7 mm × 494.8 mm (18.32 in × 4.27 in × 19.5 in) |
| | for rack mounting | 19" 1/1, 2 HU, depth 450 mm (17.7 in) |
| **Weight** | R&S®OSP120 (without module) | approx. 4.5 kg (9.92 lb) |
| | R&S®OSP130 (without module) | approx. 5.0 kg (11.02 lb) |
| | R&S®OSP150 (without module) | approx. 4.5 kg (9.92 lb) |
| | with typical options | approx. 5.5 kg to 6.5 kg (12.12 lb to 14.33 lb) |

| Product conformity | | |
|---|---|---|
| Electromagnetic compatibility | EU EMC Directive 2014/30/EC | in line with EN 61326-1 (industrial environment), EN 61326-2-1, EN 55011 (class B), EN 61000-3-2, EN 61000-3-3 |
| Electrical safety | EU Low Voltage Directive 2014/35/EC | in line with EN 61010-1, VDE certificate no.: 40022952 |
| | USA/Canada | CAN 22.2 No. 61010-1-04, UL 61010-1, cCSAUL certificate no.: 1960595 |

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[1] Up to four R&S®OSP150 extension units can be cascaded.

[2] Temperature ranges apply to all base units and R&S®OSP modules (unless a different range is specified for the respective module).

[3] Depending on the configuration.

## Module slots

| Number of control buses for<br>RF switch and control modules | R&S®OSP120, R&S®OSP130,<br>R&S®OSP150 | 3 |
|---|---|---|
| Number of module slots [4] | R&S®OSP120, R&S®OSP150 | 3 on back of instrument, 2 on front of instrument |
| | | 2 on front of instrument |
| | R&S®OSP130 | 3 on back of instrument |
| Output current | each control bus | max. 800 mA (28 V DC) |
| | to 3 control buses | max. 2 A (28 V DC) |

| Dimensions (W × H × D) | | |
|---|---|---|
| Module slot 1 | module slot without front panel | 95.6 mm × 52.6 mm × max. 70 mm<br>(3.76 in × 2.07 in × max. 2.76 in) |
| Module slots 2, 3, 1F, 2F | module slot without front panel | 95.6 mm × 52.6 mm × max. 370 mm<br>(3.76 in × 2.07 in × max. 14.57 in) |
| Double-width module slot 2 + 3 | module slot without front panel | 204.2 mm × 52.6 mm × max. 370 mm<br>(8.04 in × 2.07 in × max. 14.57 in) |
| Triple-width module slot 1 to 3 | module slot without front panel | 312.8 mm × 52.6 mm × 70 mm,<br>depth: in parts 370 mm<br>(12.31 in × 2.07 in × 2.76 in,<br>depth: in parts 14.57 in) |

## Switching time

| Instruction execution time [5] | R&S® OSP120, R&S®OSP130 (via LAN) | within ms range (depends on application) |
|---|---|---|
| | R&S®OSP150 (via CAN-Bus from R&S®OSP120/130) | + 60 ms |

## Calibration interval

| Basic and extension device | without RF-modules | no calibration necessary |
|---|---|---|
| Basic and extension device | with RF-modules | 3 years or 50 % of switching cycles of the RF relays [6] |

*Rear view (with options).*
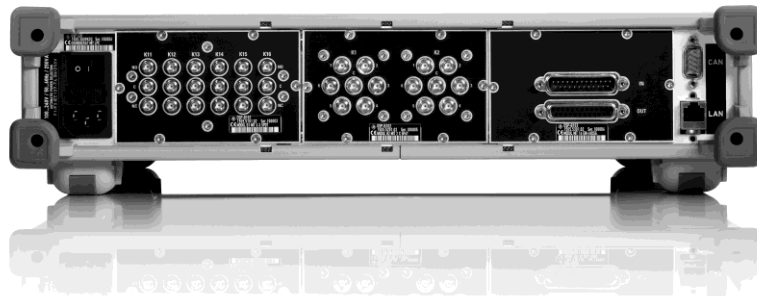


*Front view (with the R&S®OSP-B131 option).*



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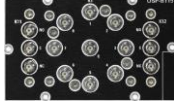
[4] The maximum number of installable modules is limited by the three control buses, see module overview on page 8 to 11.

[5] Plus switching time of the relay, see technical data of the relays and fig. switching parameter on page 16.

[6] Recommended period. No calibration is needed when the R&S®OSP120/130/150 and RF modules are part of a system whose RF paths are regularly calibrated.
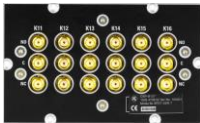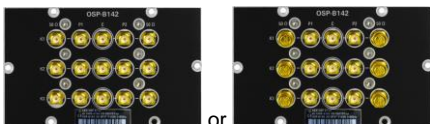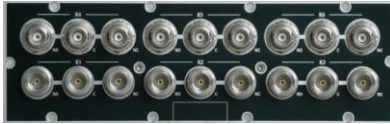
# Overview of modules [7]
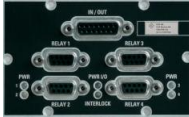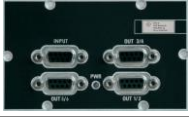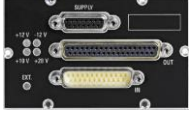
| Type | Module designation | View of module width | | Buses | Page |
|---|---|---|---|---|---|
| | | standard module | | | |
| | | double-width module | | | |
| | | triple-width module | | | |

## Universal RF switch modules with SMA or K (2.92 mm) connector

| Type | Module designation | View of module width | Buses | Page |
|---|---|---|---|---|
| R&S®OSP-B101 | RF switch module, 6 × coaxial changeover relays (SPDT), 0 Hz to 18 GHz, non-terminated | | 1 | 12 |
| R&S®OSP-B102 | RF switch module, 2 × coaxial multiposition relays (SP6T), 0 Hz to 18 GHz, non-terminated | | 1 | 12 |
| R&S®OSP-B111 | RF switch module, 6 × coaxial changeover relays (SPDT), 0 Hz to 40 GHz, non-terminated | | 1 | 10 |
| R&S®OSP-B112 | RF switch module, 2 × coaxial multiposition relays (SP6T), 0 Hz to 40 GHz, non-terminated | | 1 | 12 |
| R&S®OSP-B116 | RF switch module, 2 × RF transfer relays (DPDT), 0 Hz to 18 GHz, non-terminated | | 1 | 10 |
| R&S®OSP-B119 [8] | RF switch module, 1 × coaxial multiposition relays (SP8T), 2 × coaxial changeover relays (SPDT), 0 Hz to 18 GHz, non-terminated | | 1 | 11 |

## Universal RF switch modules with SMA, latching

| Type | Module designation | View of module width | Buses | Page |
|---|---|---|---|---|
| R&S®OSP-B101L | RF switch module, 6 × coaxial changeover relays (SPDT), 0 Hz to 18 GHz, non-terminated, latching | | 1 | 10 |
| R&S®OSP-B102L | RF switch module, 2 × coaxial multiposition relays (SP6T), 0 Hz to 18 GHz, non-terminated, latching | | 1 | 10 |

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[7]  All relay modules contain monostable (failsafe) relays unless otherwise designated.

[8]  The R&S®OSP-B119, R&S®OSP-B122 to R&S®OSP-B126 and R&S®OSP-B129 relay modules can be built-in or retrofitted in the R&S®OSP120/130/150 models produced in May 2010 or later.

| Type | Module designation | View of module width | Buses | Page |
|------|--------------------|----------------------|-------|------|
| | | standard module | | |
| | | double-width module | | |
| | | triple-width module | | |

## Universal RF switch modules with SMA or K (2.92 mm) connector, terminated

| Type | Module designation | View of module width | Buses | Page |
|------|--------------------|----------------------|-------|------|
| R&S®OSP-B121 | RF switch module, 3 × coaxial changeover relays (SPDT), 0 Hz to 18 GHz, terminated | | 1 | 14 |
| R&S®OSP-B121H | RF switch module, 3 × coaxial changeover relays (SPDT), 0 Hz to 40 GHz, terminated | | 1 | 13 |
| R&S®OSP-B122 [8] | RF switch module, 1 × coaxial multiposition relays (SP6T), 0 Hz to 18 GHz, terminated | | 1 | 14 |
| R&S®OSP-B123 [8] | RF switch module, 6 × coaxial changeover relays (SPDT), 1 × coaxial multiposition relays (SP6T), 0 Hz to 18 GHz, terminated | | 2 | 14 |
| R&S®OSP-B124 [8] | RF switch module, 3 × coaxial changeover relays (SPDT), 2 × coaxial multiposition relays (SP6T), 0 Hz to 18 GHz, terminated | | 1 | 14 |
| R&S®OSP-B125 [8] | RF switch module, 6 × coaxial changeover relays (SPDT), 3 × coaxial multiposition relays (SP6T), 0 Hz to 18 GHz, terminated | | 2 | 14 |
| R&S®OSP-B126 [8] | RF switch module, 3 × coaxial multiposition relays (SP6T), 0 Hz to 18 GHz, terminated | | 2 | 14 |
| R&S®OSP-B129 [8] | RF switch module, 1 × coaxial multiposition relays (SP8T), 0 Hz to 18 GHz, terminated 2 × coaxial changeover relays (SPDT), 0 Hz to 18 GHz, non-terminated | | 1 | 15 |

| Type | Module designation | View of module width<br>standard module<br>double-width module<br>triple-width module | Buses | Page |
|---|---|---|---|---|
| **RF switch modules with solid-state relays (SSR), SMA** | | | | |
| R&S®OSP-B107 | RF switch module,<br>6 × coaxial changeover relays (SPDT),<br>SSR, 9 kHz to 6 GHz,<br>non-terminated | | 1 | 16 |
| R&S®OSP-B127 | RF switch module,<br>6 × coaxial changeover relays (SPDT),<br>SSR, 9 kHz to 10 GHz, terminated | | 1 | 16 |
| R&S®OSP-B128 | RF switch module,<br>1 to 3 coaxial multiposition relays<br>(SP6T), SSR, 9 kHz to 10 GHz,<br>terminated | | 1 | 16 |
| R&S®OSP-B142 | RF switch module,<br>1 to 3 coaxial changeover relays<br>(DP3T), power SSR 10 W,<br>9 kHz to 8 GHz,<br>optional with or without external<br>termination 1 W | | 1 | 17 |
| **RF switch modules with N connectors** | | | | |
| R&S®OSP-B106 | RF switch module,<br>3 × changeover relays (SPDT),<br>BNC connector (f),<br>0 Hz to 900 MHz,<br>3 × coaxial changeover relays (SPDT),<br>N connector (f), 0 Hz to 12 GHz | | 1 | 18 |
| R&S®OSP-B136 | RF switch module,<br>2 × RF transfer relays (DPDT),<br>N connector (f), 0 Hz to 12.4 GHz,<br>non-terminated | | 1 | 18 |
| R&S®OSP-B131 | RF switch module,<br>2 × coaxial changeover relays (SPDT),<br>N connector (f), 0 Hz to 12.4 GHz | | 1 | 18 |
| R&S®OSP-B132 | RF switch module,<br>6 × coaxial changeover relays  (SPDT),<br>N connector (f), 0 Hz to 12.4 GHz | | 2 | 18 |
| R&S®OSP-PM-I | Passive module for integration of one<br>R&S®NRP-Zxx power sensor,<br>N feedthrough connector (f)<br>USB feedthrough filter | | - | 19 |

| Type | Module designation | View of module width | | | Buses | Page |
|------|-------------------|----------------------|---|---|-------|------|
| | | standard module | | | | |
| | | double-width module | | | | |
| | | triple-width module | | | | |

## Special switch modules

| Type | Module designation | View of module width | Buses | Page |
|------|-------------------|----------------------|-------|------|
| R&S®OSP-B104 | relay driver module, control of four external RF power relays, additional digital inputs/outputs, interlock | | 1 | 19 |
| R&S®OSP-B114 | module for compact EMC test systems, RF power relay (DPDT), interlock, digital inputs/outputs | | 1 | 19 |
| R&S®OSP-B103 | digital I/O module, 16 × digital inputs, 16 × digital outputs | | 1 | 20 |
| R&S®OSP-B108 | multiplexer module, 6-channel, 4-wire multiplexer 0 V to 60 V, 30 VA | | 1 | 21 |
| R&S®OSP-B158 | digital I/O module with four analog voltages, 16 × digital inputs, 16 × RS-422 outputs, 4 × analog voltages | | 1 | 20 |

# Module specifications

## Universal RF switch modules, failsafe/latching, non-terminated

### Overview (R&S®OSP-B101/-B101L/-B102/-B102L/-B116), 0 GHz to 18 GHz

| Parameter | R&S®OSP-B101 | R&S®OSP-B101L | R&S®OSP-B102 | R&S®OSP-B102L | R&S®OSP-B116 |
|---|---|---|---|---|---|
| Relay type | 6 × SPDT, coaxial relay | | 2 × SP6T, coaxial relay | | 2 × DPDT, coaxial relay |
| | failsafe | latching | failsafe (normally open) | latching | failsafe |
| Connector type | SMA (f) | | | | |
| Relay impedance | 50 Ω | | | | |
| Frequency range | 0 Hz to 18 GHz | | | | |
| Switching time (nominal) [9] | < 10 ms | | < 15 ms | | < 15 ms |
| Number of switching cycles [9] | 10 million | | 5 million per position | | 2.5 million |
| Current consumption (module) | max. 600 mA (+28 V DC) | max. 600 mA (+28 V DC) [10] | max. 200 mA (+28 V DC) | max. 700 mA [11] (+28 V DC) | max. 300 mA (+28 V DC) |
| Dimensions (W × H) | 107.6 mm × 65.5 mm (4.24 in × 2.58 in), standard width | | | | |
| Dimensions (D) | 59.7 mm (2.35 in) | 75.6 mm (2.89 in) | 59.7 mm (2.35 in) | 76.3 mm (3 in) | 76.5 mm (3.01 in) |
| Slot position | 1, 2, 3, 1F, 2F | | | | |
| Weight | approx. 0.4 kg (0.88 lb) | | approx. 0.5 kg (1.10 lb) | | approx. 0.2 kg (0.44 lb) |

**RF characteristics**

| Type | Parameter | 0 Hz to 3 GHz | 3 GHz to 8 GHz | 8 GHz to 12.4 GHz | 12.4 GHz to 18 GHz |
|---|---|---|---|---|---|
| R&S®OSP-B101, R&S®OSP-B101L, R&S®OSP-B102, R&S®OSP-B102L, R&S®OSP-B116 | VSWR [9] | ≤ 1.20 | ≤ 1.30 | ≤ 1.40 | ≤ 1.50 |
| | insertion loss | < 0.5 dB/≤ 0.20 dB [9] | < 0.5 dB/≤ 0.30 dB [9] | < 0.7 dB/≤ 0.40 dB [9] | < 0.7 dB/≤ 0.50 dB [9] |
| | isolation [9] | ≥ 80 dB | ≥ 70 dB | ≥ 60 dB | ≥ 60 dB |
| | average power [9, 12] | 240 W | 150 W | 120 W | 100 W |

### Overview (R&S®OSP- B111/-B112), 0 GHz to 40 GHz

| Parameter | R&S®OSP-B111 | R&S®OSP-B112 |
|---|---|---|
| Relay type | 6 × SPDT, coaxial relay, failsafe | 2 × SP6T, coaxial relay, failsafe (open) |
| Connector type | 2.92 mm, K (f) | |
| Relay impedance | 50 Ω | |
| Frequency range | 0 Hz to 40 GHz | 0 Hz to 40 GHz |
| Switching time (nominal) [9] | < 10 ms | < 15 ms |
| Number of switching cycles [9] | 5 million | 2 million per position |
| Current consumption (module) | max. 500 mA (+28 V DC) | max. 200 mA (+28 V DC) |
| Dimensions (W × H) | 107.6 mm × 65.5 mm (4.24 in × 2.58 in), standard width | |
| Dimensions (D) | 59.7 mm (2.35 in) | 69.5 mm (2.74 in) |
| Slot position | 1, 2, 3, 1F, 2F | |
| Weight | approx. 0.4 kg (0.88 lb) | |

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[9] Nominal values specified by the relay manufacturer at +25 °C.

[10] Only during changeover.

[11] Only during a reset.

[12] Cold switching.

**RF characteristics**

| Type | Parameter | 0 Hz to 6 GHz | 6 GHz to 12.4 GHz | 12.4 GHz to 18 GHz | 18 GHz to 26.5 GHz | 26.5 GHz to 40 GHz |
|---|---|---|---|---|---|---|
| R&S®OSP-B111 | VSWR [9] | ≤ 1.30 | ≤ 1.40 | ≤ 1.50 | ≤ 1.70 | ≤ 1.90 |
| | insertion loss | < 0.5 dB/ ≤ 0.30 dB [9] | < 0.7 dB/ ≤ 0.40 dB [9] | < 0.7 dB/ ≤ 0.50 dB [9] | < 1.0 dB/ ≤ 0.70 dB [9] | < 1.0 dB/ ≤ 0.80 dB [9] |
| | isolation [9] | ≥ 70 dB | ≥ 60 dB | ≥ 60 dB | ≥ 55 dB | ≥ 50 dB |
| | average power [9, 12] | 80 W | 60 W | 50 W | 30 W | 10 W |
| R&S®OSP-B112 | VSWR [9] | ≤ 1.30 | ≤ 1.40 | ≤ 1.50 | ≤ 1.70 | ≤ 2.20 |
| | insertion loss | < 0.5 dB/ ≤ 0.20 dB [9] | < 0.7 dB/ ≤ 0.40 dB [9] | < 0.7 dB/ ≤ 0.50 dB [9] | < 1.0 dB/ ≤ 0.70 dB [9] | < 1.1 dB/ ≤ 1.10 dB [9] |
| | isolation [9] | ≥ 70 dB | ≥ 60 dB | ≥ 60 dB | ≥ 55 dB | ≥ 50 dB |
| | average power [9, 12] | 40 W | 25 W | 15 W | 10 W | 3 W |

## Mixed RF switch module (R&S®OSP-B119)

| Parameter | R&S®OSP-B119 | |
|---|---|---|
| Number and type of relays | 1 × SP8T (non-terminated) | 2 × SPDT (non-terminated) |
| Relay type | coaxial relays, SMA (f) | |
| Relay impedance | 50 Ω | |
| Frequency range | 0 Hz to 18 GHz | |
| Switching time | SP8T: 15 ms | SPDT: 10 ms |
| Current consumption (module) | max. 300 mA (+28 V DC) | |
| Dimensions (W × H × D) | 107.6 mm × 65.5 mm × 76.5 mm (4.24 in × 2.58 × 3.01 in) | |
| Slot position | 1, 2, 3, 1F, 2F | |
| Weight | approx. 0.4 kg (0.88 lb) | |

**RF characteristics**

| Type | Parameter | 0 Hz to 3 GHz | 3 GHz to 8 GHz | 8 GHz to 12.4 GHz | 12.4 GHz to 16 GHz | 16 GHz to 18 GHz |
|---|---|---|---|---|---|---|
| SP8T, non-terminated, failsafe (open) | VSWR [9] | ≤ 1.20 | ≤ 1.30 | ≤ 1.40 | ≤ 1.50 | ≤ 1.60 |
| | insertion loss | < 0.5 dB/ ≤ 0.20 dB [9] | < 0.5 dB/ ≤ 0.30 dB [9] | < 0.7 dB/ ≤ 0.40 dB [9] | < 0.7 dB/ ≤ 0.5 dB [9] | < 0.7 dB/ ≤ 0.5 dB [9] |
| | isolation [9] | ≥ 80 dB | ≥ 70 dB | ≥ 60 dB | ≥ 60 dB | ≥ 60 dB |
| | average power [12] | 240 W | 150 W | 120 W | 100 W | 100 W |
| | number of switching cycles [9] | 2 million per position | | | | |
| SPDT, non-terminated, failsafe | | see SPDT relay of module R&S®OSP-B101 | | | | |

# Universal RF switch modules, terminated

### Standard modules (R&S®OSP-B121/-B122)

| Parameter | R&S®OSP-B121 | R&S®OSP-B122 |
|---|---|---|
| Number and type of relays | 3 × SPDT | 1 × SP6T |
| Relay type | coaxial relays, SMA (f) | |
| Frequency range | 0 Hz to 18 GHz | |
| Relay impedance | 50 Ω | |
| Termination impedance | 50 Ω, 1 W per termination | |
| Max. termination power per relay | SPDT: 1 W | SP6T: 3 W |
| Switching time (nominal) | SPDT: 10 ms | SP6T: 15 ms |
| Current consumption (module) | max. 675 mA (+28 V DC) | max. 115 mA (+28 V DC) |
| Dimensions (W × H × D) | 107.6 mm × 65.5 mm × 70.8 mm (4.23 in × 2.58 in × 2.79 in) | |
| Slot position | 1, 2, 3, 1F, 2F | |
| Weight | approx. 0.4 kg (0.88 lb) | approx. 0.3 kg (0.66 lb) |

### Double-width modules (R&S®OSP-B123/-B124)

| Parameter | R&S®OSP-B123 | R&S®OSP-B124 |
|---|---|---|
| Number and type of relays | 6 × SPDT, 1 × SP6T | 3 × SPDT, 2 × SP6T |
| Relay type | coaxial relays, SMA (f) | |
| Frequency range | 0 Hz to 18 GHz | |
| Relay impedance | 50 Ω | |
| Termination impedance | 50 Ω, 1 W per termination | |
| Max. termination power per relay | SPDT: 1 W | SP6T: 3 W |
| Switching time (nominal) | SPDT: 10 ms | SP6T: 15 ms |
| Current consumption (module) | max. 1460 mA (+28 V DC) | max. 900 mA (+28 V DC) |
| Dimensions (W × H × D) | 216.2 mm × 65.5 mm × 70.8 mm (8.51 in × 2.58 in × 2.79 in) | |
| Slot position | 1 + 2, 2 + 3 or 1F + 2F | |
| Weight | approx. 0.9 kg (1.98 lb) | approx. 0.8 kg (1.76 lb) |

### Triple-width modules (R&S®OSP-B125/-B126)

| Parameter | R&S®OSP-B125 | R&S®OSP-B126 |
|---|---|---|
| Number and type of relays | 6 × SPDT, 3 × SP6T | 3 × SP6T |
| Relay type | coaxial relays, SMA (f) | |
| Frequency range | 0 Hz to 18 GHz | |
| Relay impedance | 50 Ω | |
| Termination impedance | 50 Ω, 1 W per termination | |
| Max. termination power per relay | SPDT: 1 W | SP6T: 3 W |
| Switching time (nominal) | SPDT: 10 ms | SP6T: 15 ms |
| Current consumption (module) | max. 1685 mA (+28 V DC) | max. 345 mA (+28 V DC) |
| Dimensions (W × H × D) | 324.8 mm × 65.5 mm × 70.8 mm (12.79 in × 2.58 in × 2.79 in) | |
| Slot position | 1 to 3 | |
| Weight | approx. 1.4 kg (3.08 lb) | approx. 0.9 kg (1.98 lb) |

**RF characteristics**

| Type | Parameter | 0 Hz to 3 GHz | 3 GHz to 8 GHz | 8 GHz to 12.4 GHz | 12.4 GHz to 18 GHz |
|---|---|---|---|---|---|
| SPDT, terminated, failsafe | VSWR [9] | ≤ 1.20 | ≤ 1.30 | ≤ 1.40 | ≤ 1.50 |
| | insertion loss | < 0.5 dB/≤ 0.20 dB [9] | < 0.5 dB/≤ 0.30 dB [9] | < 0.7 dB/≤ 0.40 dB [9] | < 0.7 dB/≤ 0.50 dB [9] |
| | isolation [9] | ≥ 80 dB | ≥ 70 dB | ≥ 60 dB | ≥ 60 dB |
| | average power [12] | 240 W | 150 W | 120 W | 100 W |
| | number of switching cycles [9] | 2 million | | | |
| SP6T, terminated, normally open | VSWR [9] | ≤ 1.20 | ≤ 1.30 | ≤ 1.40 | ≤ 1.50 |
| | insertion loss | < 0.5 dB/≤ 0.20 dB [9] | < 0.5 dB/≤ 0.30 dB [9] | < 0.7 dB/≤ 0.40 dB [9] | < 0.7 dB/≤ 0.50 dB [9] |
| | isolation [9] | ≥ 80 dB | ≥ 70 dB | ≥ 60 dB | ≥ 60 dB |
| | average power [12] | 240 W | 150 W | 120 W | 100 W |
| | number of switching cycles [9] | 2 million per position | | | |

## Standard module (R&S®OSP-B121H) 0 GHz to 40 GHz

| Parameter | R&S®OSP-B121H |
|---|---|
| Number and type of relays (type of termination) | 3 × SPDT terminated |
| Relay type | coaxial relay, 2.92 mm; K (f) |
| Frequency range | 0 Hz to 40 GHz |
| Relay impedance | 50 Ω |
| Termination impedance | 50 Ω (ext.) |
|    Max. termination power | 1 W per termination |
| Switching time (nominal) [9] | 10 ms |
| Current consumption (module) | max. 675 mA (+28 V DC) |
| Dimensions (W × H × D) | 107.6 mm × 65.5 mm × 88.0 mm (4.24 in × 2.58 in × 3.46 in) |
| Slot position | 1, 2, 3, 1F, 2F |
| Weight | 0.35 kg (0.77 lb) |

**RF characteristics**

| Type | Parameter | 0 Hz to 6 GHz | 6 GHz to 12.4 GHz | 12.4 GHz to 18 GHz | 18 GHz to 26.5 GHz | 26.5 GHz to 40 GHz |
|---|---|---|---|---|---|---|
| SPDT, ext. terminated, monostable | VSWR [9] | ≤ 1.30 | ≤ 1.40 | ≤ 1.50 | ≤ 1.90 | ≤ 2.3 |
| | insertion loss | < 0.5 dB/ ≤ 0.30 dB [9] | < 0.7 dB/ ≤ 0.40 dB [9] | < 0.7 dB/ ≤ 0.50 dB [9] | < 1.0 dB/ ≤ 0.70 dB [9] | < 1.0 dB/ ≤ 0.80 dB [9] |
| | isolation [9] | ≥ 70 dB | ≥ 60 dB | ≥ 60 dB | ≥ 55 dB | ≥ 50 dB |
| | average power [12] | 80 W | 60 W | 50 W | 20 W | 10 W |
| | number of witching cycles [9] | 2 million per position | | | | |

## Mixed RF switch module (R&S®OSP-B129), terminated and non-terminated relays

| Parameter | R&S®OSP-B129 | |
|---|---|---|
| Number and type of relays (type of termination) | 1 × SP8T (terminated) | 2 × SPDT (non-terminated) |
| Relay type | coaxial relay, SMA (f) | |
| Frequency range | 0 Hz to 18 GHz | |
| Relay impedance | 50 Ω | |
|    Max. termination power | 50 Ω, 1 W per termination, max. 3 W | – |
| Switching time (nominal) [9] | SP8T: 15 ms | SPDT: 10 ms |
| Current consumption (module) | max. 400 mA (+28 V DC) | |
| Dimensions (W × H × D) | 107.6 mm × 65.5 mm × 70.8 mm (4.24 in × 2.58 in × 2.79 in), standard width | |
| Slot position | 1, 2, 3, 1F, 2F | |
| Weight | approx. 0.4 kg (0.88 lb) | |

**RF characteristics**

| Type | Parameter | 0 Hz to 3 GHz | 3 GHz to 8 GHz | 8 GHz to 12.4 GHz | 12.4 GHz to 16 GHz | 16 GHz to 18 GHz |
|---|---|---|---|---|---|---|
| SP8T relay, terminated, failsafe (open) | VSWR [9] | ≤ 1.20 | ≤ 1.30 | ≤ 1.40 | ≤ 1.50 | ≤ 1.60 |
| | insertion loss | ≤ 0.5 dB/ ≤ 0.20 dB [9] | < 0.5 dB/ ≤ 0.30 dB [9] | < 0.7 dB/ ≤ 0.4 dB [9] | < 0.7 dB/ ≤ 0.5 dB [9] | < 0.7 dB/ ≤ 0.5 dB [9] |
| | isolation [9] | ≥ 80 dB | ≥ 70 dB | ≥ 60 dB | ≥ 60 dB | ≥ 60 dB |
| | average power [12] | 240 W | 150 W | 120 W | 100 W | 100 W |
| | number of witching cycles [9] | 2 million per position | | | | |
| SPDT non-terminated, failsafe | | see SPDT relay of module R&S®OSP-B101 | | | | |

# Universal solid-state RF switch module

## R&S®OSP-B107 SSR, non-terminated, R&S®OSP-B127 and R&S®OSP-B128 SSR terminated

| Parameter | R&S®OSP-B107 | R&S®OSP-B127 | R&S®OSP-B128 |
|---|---|---|---|
| Relay type | 6 × SPDT, solid-state relay (SSR) type 1, non-terminated | 6 × SPDT, solid-state relay (SSR) type 2, terminated | 1 to 3 × SP6T, solid-state relay (SSR) type 3, terminated |
| Connector type | SMA (female) | | |
| Relay impedance | 50 Ω | | |
| Termination impedance, power | – | 50 Ω, 0.25 W | 50 Ω, 0.25 W |
| Frequency range | 9 kHz to 6 GHz | 9 kHz to 10 GHz | 9 kHz to 10 GHz |
| Switching time (nominal) [9], [13] | 7 µs | 10 µs | 10 µs |
| Settling time [14] | 15 µs | 15 µs | 25 µs |
| Number of switching cycles [9] | > 100 million | | |
| Current consumption (module) | max. 100 mA (+28 V DC) | max. 100 mA (+28 V DC) | max. 100 mA (+28 V DC) |
| Dimensions (W × H) | 107.6 mm × 65.5 mm (4.24 in × 2.58 in), standard width | | |
| Dimensions (D) | 61.5 mm (2.42 in) | 54.2 mm (2.13 in) | 59.0 mm (2.34 in) |
| Slot position | 1, 2, 3, 1F, 2F | | |
| Weight | approx. 0.3 kg (0.66 lb) | approx. 0.3 kg (0.66 lb) | approx. 0.3 kg (0.66 lb) |

**RF characteristics**

| Type | Parameter | 9 kHz to 3 MHz | 3 MHz to 10 MHz | 10 MHz to 1 GHz | 1 GHz to 2.5 GHz | 2.5 GHz to 5 GHz | 5 GHz to 6 GHz |
|---|---|---|---|---|---|---|---|
| R&S®OSP-B107 SSR type 1 | VSWR | < 1.30 | < 1.30 | < 1.30 | < 1.30 | < 1.30 | < 1.45 |
| | insertion loss | < 1.0 dB | < 1.0 dB | < 1.0 dB | < 1.0 dB | < 1.3 dB | < 1.3 dB |
| | isolation | > 38 dB | > 38 dB | > 38 dB | > 28 dB | > 20 dB | > 18 dB |
| | max. power | 15 mW (12 dBm) | 1 W (30 dBm) | | | | |
| | max. voltage | +2.5 V | | | | | |

| Type | Parameter | 9 kHz to 10 MHz | 10 MHz to 2.5 GHz | 2.5 GHz to 5 GHz | 5 GHz to 10 GHz |
|---|---|---|---|---|---|
| R&S®OSP-B127 SSR type 2 | VSWR | ≤ 1.43 | ≤ 1.43 | ≤ 1.9 | ≤ 1.9 |
| | insertion loss | < 1.4 dB | < 1.4 dB | < 1.7 dB | < 2.5 dB |
| | isolation | ≥ 42 dB | ≥ 36 dB | ≥ 30 dB | ≥ 23 dB |
| | max. power (for feed-through) | ≤ 1 MHz: 2.5 mW (4 dBm), > 1 MHz: 1 W (30 dBm) | 1 W (30 dBm) | | |
| | max. voltage | –0.3 V to +3.0 V | | | |

| Type | Parameter | 9 kHz to 1 GHz | 1 GHz to 2 GHz | 2 GHz to 5 GHz | 5 GHz to 8 GHz | 8 GHz to 10 GHz |
|---|---|---|---|---|---|---|
| R&S®OSP-B128 SSR type 3 | VSWR | ≤ 2.2 | ≤ 1.9 | ≤ 1.9 | ≤ 1.9 | ≤ 2.2 |
| | insertion loss | < 5 dB | < 5.5 dB | < 6.5 dB | < 7.5 dB | < 8.0 dB |
| | isolation | ≥ 70 dB | ≥ 70 dB | ≥ 60 dB | ≥ 45 dB | ≥ 35 dB |
| | crosstalk | ≥ 70 dB | ≥ 70 dB | ≥ 60 dB | ≥ 45 dB | ≥ 35 dB |
| | max. power (for feed-through) | ≤ 1 MHz: 2.5 mW (4 dBm), > 1 MHz: 1 W (30 dBm) | 1 W (30 dBm) | | | |
| | max. voltage | –0.3 V to +3.0 V | | | | |

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[13] 50 % CRTL on module bus to 90 % of the final value.

[14] 50 % CRTL on module bus to 0.1 dB of final value.

## R&S®OSP-B142 power SSR 10 W, non-terminated or with external termination 1 W

| Parameter | R&S®OSP-B142 (V03) | R&S®OSP-B142 (V11, V12, V13) |
|---|---|---|
| Relay type | 3 × DP3T, solid-state relay (SSR) type 4, (without external termination) | 1 to 3 × DP3T, solid-state relay (SSR) type 4, (with external termination) |
| Connector type | SMA (female) | |
| Relay impedance | 50 Ω | |
| Termination impedance, power | no | yes, 2 pieces 50 Ω, 1 W |
| Frequency range | 9 kHz to 6 (8) GHz [15] | |
| Switching time (nominal) [16] | ≤ 5 µs | |
| Rise time/fall time [17] | ≤ 1 µs | |
| Settling time (nom.) [9, 18] | ≤ 20 ms | |
| Number of switching cycles [9] | > 100 Mio. | |
| Current consumption (module) | max. 50 mA (+28 V DC) | |
| Dimensions (W × H) | 107.6 mm × 65.5 mm (4.24 in. × 2.58 in.), standard width | |
| Dimensions (D) | 65 mm (2.56 in.) | |
| Slot position | 1, 2, 3, 1F, 2F | |
| Weight | approx.. 0.3 kg | |

### RF characteristics

| Type | Parameter | 9 kHz to 2.5 GHz | 2.5 GHz to 5 GHz | 5 GHz to 6 GHz | 6 GHz to 7 GHz [15] | 7 GHz to 8 GHz [15] |
|---|---|---|---|---|---|---|
| R&S®OSP-B142 SSR type 4 | VSWR | ≤ 1.33 | ≤ 1.67 | ≤ 1.9 | ≤ 2.32 | ≤ 3.00 |
| | insertion loss | < 1.5 dB | < 2.0 dB | < 2.8 dB | < 2.8 dB | < 3.5 dB |
| | isolation | ≥ 45 dB | ≥ 40 dB | ≥ 30 dB | ≥ 30 dB | ≥ 25 dB |
| | max. power (for feed-through) | 10 W (40 dBm) | | | | |
| | max. voltage | −0.3 V to +3.0 V | | | | |



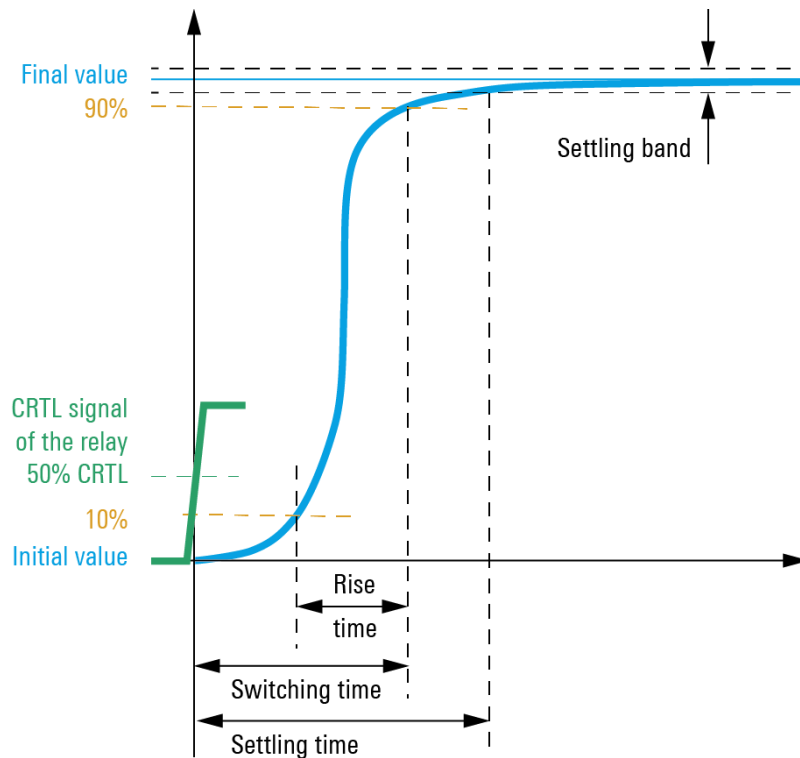*Diagram switching and settling time coaxial relays and SSR*

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[15] Operational up to 6 GHz, functional up to 8 GHz.

[16] 50 % CRTL on module bus to 90 % of the final value.

[17] 10 % to 90% of final value.

[18] 50 % CRTL on module bus to 0.1 dB of the final value. The SSR of the R&S®OSP-B142 shows a creeping effect due to GaN technology. Settling time to 0.01 dB of final value is in the range of seconds.

# RF switch modules with N and BNC connectors

## R&S®OSP-B106, mixed module with N and BNC relays

| Parameter | R&S®OSP-B106 | |
|---|---|---|
| Number of relays | 3 × SPDT with N connector (f) | 3 × SPDT with BNC connector (f) |
| Relay type | RF coaxial relays, failsafe | shielded LF relays, failsafe |
| Relay impedance | 50 Ω | |
| Current consumption | module, max. 600 mA (+28 V DC) | |
| Dimensions (W × H × D) | 216.2 mm × 65.5 mm × 152.0 mm (8.51 in × 2.58 in × 5.98 in) double-width | |
| Slot position | 2 + 3, 1F + 2F | |
| Weight | approx. 1.22 kg (2.69 lb) | |

**RF characteristics**

| Type | Parameter | 0 Hz to 1 GHz | 1 GHz to 2 GHz | 2 GHz to 3 GHz | 3 GHz to 8 GHz | 8 GHz to 12.4 GHz |
|---|---|---|---|---|---|---|
| SPDT relay, N connector (f) | VSWR [9] | ≤ 1.15 | ≤ 1.20 | ≤ 1.25 | ≤ 1.35 | ≤ 1.50 |
| | insertion loss | ≤ 0.15 dB [9] | < 0.4 dB/ ≤ 0.20 dB [9] | < 0.4 dB/ ≤ 0.25 dB [9] | < 0.4 dB/ ≤ 0.35 dB [9] | < 0.5 dB/ ≤ 0.50 dB [9] |
| | isolation [9] | ≥ 85 dB | ≥ 80 dB | ≥ 75 dB | ≥ 70 dB | ≥ 60 dB |
| | average power [9, 12] | 700 W | 500 W | 400 W | 250 W | 200 W |
| | number of switching cycles [9] | 1 million | | | | |

| Type | Parameter | | 0 Hz to 10 MHz | 10 MHz to 100 MHz | 100 MHz to 500 MHz | 500 MHz to 900 MHz |
|---|---|---|---|---|---|---|
| SPDT relay, BNC connector (f) | VSWR | | < 1.25 | < 1.25 | < 1.45 | < 1.95 |
| | insertion loss | | < 0.5 dB | < 0.5 dB | < 1 dB | < 1.2 dB |
| | isolation | | > 35 dB | > 35 dB | > 23 dB | > 15 dB |
| | average power | AC/RF [12] | 60 W | 60 W | 40 W | 20 W |
| | | DC | max. 60 W (max. 2 A, < 60 V) | | | |
| | number of switching cycles [9] | | AC/RF (cold switching): 2 million; DC: 30 V/1 A, to max. 30 W: 0.5 million; 30 V/2 A, to max. 60 W: 0.1 million | | | |

## R&S®OSP-B131, R&S®OSP-B132 and R&S®OSP-B136

| Parameter | R&S®OSP-B132 | R&S®OSP-B131 | R&S®OSP-B136 |
|---|---|---|---|
| Number of RF relays | 6 × SPDT with N connector (f) | 2 × SPDT with N connector (f) | 2 × DPDT with N connector (f) |
| Relay type | coaxial relays, failsafe | | |
| Relay impedance | 50 Ω | | |
| Current consumption | max. 900 mA (+28 V DC) | max. 300 mA (+28 V DC) | max. 300 mA (+28 V DC) |
| Dimensions (W × H × D) | 216.2 mm × 65.5 mm × 85 mm (8.51 in × 2.58 in × 3.35 in) | 107.6 mm × 65.5 mm × 84.5 mm (4.24 in × 2.58 in × 3.27 in) | 107.6 mm × 65.5 mm × 88.3 mm (4.24 in × 2.58 in × 3.48 in) |
| | double-width | standard width | standard width |
| Slot position | 2 + 3, 1F + 2F | 1, 2, 3, 1F, 2F | 1, 2, 3, 1F, 2F |
| Weight | approx. 1.3 kg (2.87 lb) | approx. 0.4 kg (0.88 lb) | approx. 0.5 kg (1.10 lb) |
| Number of switching cycles [9] | 1 million | 1 million | 2.5 million |

**RF characteristics**

| Type | Parameter | 0 Hz to 1 GHz | 1 GHz to 2 GHz | 2 GHz to 3 GHz | 3 GHz to 8 GHz | 8 GHz to 12.4 GHz |
|---|---|---|---|---|---|---|
| relay, N connector (f) | VSWR [9] | ≤ 1.15 | ≤ 1.20 | ≤ 1.25 | ≤ 1.35 | ≤ 1.50 |
| | insertion loss | ≤ 0.15 dB [9] | < 0.4 dB/ ≤ 0.20 dB [9] | < 0.4 dB/ ≤ 0.25 dB [9] | < 0.4 dB/ ≤ 0.35 dB [9] | < 0.5 dB/ ≤ 0.50 dB [9] |
| | isolation [9] | ≥ 85 dB | ≥ 80 dB | ≥ 75 dB | ≥ 70 dB | ≥ 60 dB |
| | average power [9, 12] | 700 W | 500 W | 400 W | 250 W | 200 W |

## R&S®OSP-PM-I, module for integration of one power sensor [19]

| Parameter | R&S®OSP-PM-I | |
|---|---|---|
| Interfaces | for R&S®NRP-Zxx power sensor | USB feedthrough filter (ext. USB-B connector [f] to ODU connector [f], series L) |
| | | RF feedthrough (N connector (f) to N connector (f)) |
| Current consumption | no module bus required | – |
| Dimensions (W × H × D) | standard width | 107.6 mm × 65.5 mm × 200 mm (8.51 in × 2.58 in × 7.87 in) |
| Slot position | | 1, 2, 3, 1F, 2F |
| Weight | | approx. 0.25 kg (0.55 lb) |

# Modules for EMS test systems

## EMS module with drivers for external power relays (R&S®OSP-B104)

| Interfaces for external relays | RF high-load relay [20] | 4 |
|---|---|---|
| Control signal | impulse, presetting adjustable | 100 ms |
| | | 0 s to 12.75 s, step width 50 ms |
| Control lines | pick-up current, max. 2.5 A at 24 V | 2 per relay |
| Number of switching cycles [9] | | max. 100000 |
| Return signal line (optocoupler input) | 24 V DC, 7.5 mA (typ.) | 1 per relay |
| Power supply of relay | +24 V DC, ± 2 V | max. 2.5 A short-time, 0.1 A continuous |
| Interlock loop (optocoupler input) | 24 V DC, 15 mA (typ.) | 1 |
| Number of digital input channels | 0 V to 3.3 V DC, max. 5.5 V (LV-CMOS) | 4 |
| Number of digital output channels | open drain, max. 28 V DC, max. 200 mA | 5 |
| Connectors | interfaces for external relays | 4 × 9-pin D-Sub connector (f) |
| | digital I/O, interlock | 1 × 15-pin D-Sub connector (f) |
| Current consumption | module, | max. 800 mA (+28 V DC) |
| | internal separate current feed | max. 15 A (+5 V DC) |
| Dimensions (W × H × D) | standard width | 107.6 mm × 65.5 mm × 264.1 mm (4.24 in × 2.58 in × 10.40 in) |
| Slot position | | 2 and/or 3 |
| Weight | | approx. 0.4 kg (0.88 lb) |

## EMS module with N relay for compact test systems (R&S®OSP-B114)

| Number of RF relays | DPDT (N female) | 1 |
|---|---|---|
| | SPDT (SSR) terminated (SMA female) [21] (interlock controlled) | 1 |
| Connectors | digital output interface | 1 × 9-pin D-Sub connector (f) |
| | digital input and interlock interface | 1 × 9-pin D-Sub connector (m) |
| Interlock loop (optocoupler input) | 24 V DC, 15 mA (typ.) | 1 |
| Interlock output (relay contact) | max. 30 V DC, max. 1 A | 2 |
| Interlock output (LED driver) | 1.8 V DC (typ.), max.1.4 mA | 1 |
| Number of digital input channels | 0 V to 3.3 V DC, max. 5.5 V (LV-CMOS) | 4 |
| Number of digital output channels | open drain, max. 28 V DC, max. 200 mA per output, max. 600 mA in total | 4 |
| Current consumption | module | max. 200 mA (+28 V DC), excluding digital outputs |
| Dimensions (W × H × D) | standard width | 107.6 mm × 65.5 mm × 88 mm (4.24 in × 2.58 in × 3.46 in) |
| Slot position | | 1, 2, 3, 1F, 2F |
| Weight | | approx. 0.3 kg (0.66 lb) |

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[19] For R&S®NRP-Zxx power sensors with USB connecting cable, length 40 cm, e.g.for R&S®NRP-Z211.

[20] Relay types, e.g. DPDT relay, Spinner 512670 (1 kW/5 GHz) or DPDT relay, Spinner 640075 (10 kW/1 GHz).

[21] For data on SPDT (SMA) relay, see R&S®OSP-B127.

**RF characteristics**

| Type | Parameter | 0 Hz to 1 GHz | 1 GHz to 2 GHz | 2 GHz to 3 GHz | 3 GHz to 8 GHz | 8 GHz to 12.4 GHz |
|---|---|---|---|---|---|---|
| DPDT relays, N connector, failsafe | VSWR [9] | ≤ 1.15 | ≤ 1.20 | ≤ 1.25 | ≤ 1.35 | ≤ 1.50 |
| | insertion loss | ≤ 0.15 dB [9] | < 0.4 dB/ ≤ 0.20 dB [9] | < 0.4 dB/ ≤ 0.25 d [9] | < 0.4 dB/ ≤ 0.35 dB [9] | < 0.5 dB/ ≤ 0.50 dB [9] |
| | isolation [9] | ≥ 85 dB | ≥ 80 dB | ≥ 75 dB | ≥ 70 dB | ≥ 60 dB |
| | average power [9, 12] | 700 W | 500 W | 400 W | 250 W | 200 W |
| | impedance | 50 Ω | | | | |
| | number of switch cycles [9] | 1 million | | | | |

# Digital I/O modules

### R&S®OSP-B103

| | | |
|---|---|---|
| Digital input channels | 0 V to 3.3 V DC (LV-CMOS), max. 5.5 V | 16, 25-pin D-Sub connector (m) |
| Digital output channels | open drain, max. 28 V DC, max. 200 mA | 16, 25-pin D-Sub connector (f) |
| Switching time | | < 10 ms |
| Output current | e.g. for open drain | max. 800 mA (+28 V DC) |
| Current consumption | module | max. 800 mA (+28 V DC) |
| Dimensions (W × H × D) | standard width | 107.6 mm × 65.5 mm × 63.4 mm (4.24 in × 2.58 in × 2.50 in) |
| Slot position | | 1, 2 and/or 3, F1, F2 |
| Weight | | approx. 0.1 kg (0.22 lb) |

### R&S®OSP-B158

| | | |
|---|---|---|
| Digital input channels | 0 V to 3.3 V DC (LV-CMOS), max. 5.5 V | 16, 25-pin D-Sub connector (m) |
| Digital output channels | RS-422 | 16, 37-pin D-Sub connector (f) |
| Switching time | | < 10 ms |
| Analog voltages | | 4 ×, 15-pin D-Sub connector (f) |
| | 1 × +28 V DC | +0.5 V/–4 V (max. 0.8 A) |
| | 1 × +12 V DC | +0.5 V/–1 V (max. 1.0 A) |
| | 1 × –12 V DC | ± 0.5 V (max. 0.3 A) |
| | 1 × +10 V DC | ± 0.5 V (max. 1.0 A) |
| Current consumption | module | max. 800 mA (+28 V DC) |
| Dimensions (W × H × D) | standard width | 107.6 mm × 65.5 mm × 63.4 mm (4.24 in × 2.58 in × 2.50 in) |
| Slot position | | 1, 2 and/or 3, F1, F2 |
| Weight | | approx. 0.1 kg (0.22 lb) |

# Multiplexer module, 6-channel, 4-wire

### R&S®OSP-B108

| | | |
|---|---|---|
| Number of inputs | | 1 × 4-wire, 1 × ground, unswitched |
| Number of outputs | | 6 × 4-wire, 3 × ground, unswitched (1 × per connector) |
| Relay type | | electromechanical, failsafe |
| Max. switchable power | | 60 W (UL 2 A/30 V) |
| Max. current | continuous load/short-time < 10 ms | 2 A/4 A |
| Max. switchable current | | 2 A |
| Max. switchable voltage | | 60 V DC, 30 V AC |
| Spreading resistance | switched path | 0.1 Ω |
| Switching time (nominal) | | < 10 ms |
| Number of switching cycles [8] | 30 V DC/1 A, to max. 30 W | 10 million |
| | 30 V DC/2 A, to max. 60 W | 1 million |
| Connectors (external) | input | 1 × 9-pin D-Sub connector (m) |
| | outputs | 3 × 9-pin D-Sub connector (f) |
| Current consumption | module | < 40 mA (+28 V DC) |
| Dimensions (W × H × D) | standard width | 107.6 mm × 69.5 mm × 70 mm (4.24 in × 2.74 in × 2.76 in) |
| Slot positions | | 1, 2 and/or 3, F1, F2 |
| Weight | | 0.16 kg (0.352 lb) |

### R&S®OSP-B011 and R&S®OSP-B012 module panels for RF feedthroughs

| | | |
|---|---|---|
| R&S®OSP-B011 | module panel, 12 × SMA mounting holes for R&S®OSP-Z011 or R&S®OSP-Z012, standard width |  |
| R&S®OSP-B012 | module panel, 4 × N mounting holes for R&S®OSP-Z010 or R&S®OSP-Z011, standard width |  |

### R&S®OSP-Z010, R&S®OSP-Z011 and R&S®OSP-Z012 cable sets for the module panels

| | | |
|---|---|---|
| R&S®OSP-Z010 | | 4 × RF cables, N female to N female |
| R&S®OSP-Z011 | | 4 × RF cables, N female to SMA female |
| R&S®OSP-Z012 | | 4 × RF cables, SMA female to SMA female |

| Type | Parameter | 0 Hz to 1 GHz | 1 Hz to 3 GHz | 3 GHz to 6 GHz | 6 GHz to 12.4 GHz | 12.4 GHz to 18 GHz |
|---|---|---|---|---|---|---|
| R&S®OSP-Z010 | VSWR | ≤ 1.07 | ≤ 1.1 | ≤ 1.1 | ≤ 1.2 | ≤ 1.4 |
| | insertion loss | < 0.35 dB | < 0.6 dB | < 0.8 dB | < 1.2 dB | < 1.4 dB |
| | average power | 700 W | 400 W | 250 W | 200 W | 150 W |
| R&S®OSP-Z011 | VSWR | ≤ 1.07 | ≤ 1.1 | ≤ 1.1 | ≤ 1.2 | ≤ 1.4 |
| | insertion loss | < 0.35 dB | < 0.6 dB | < 0.8 dB | < 1.2 dB | < 1.4 dB |
| | average power | 240 W | 240 W | 150 W | 120 W | 100 W |
| R&S®OSP-Z012 | VSWR | ≤ 1.05 | ≤ 1.07 | ≤ 1.1 | ≤ 1.15 | ≤ 1.2 |
| | insertion loss | < 0.35 dB | < 0.6 dB | < 0.8 dB | < 1.2 dB | < 1.4 dB |
| | average power | 240 W | 240 W | 150 W | 120 W | 100 W |

# Ordering information

| Designation | Type | Order No. |
|---|---|---|
| **Open Switch and Control Platform, base unit with monitor interface** | R&S®OSP120 | 1505.3009K12 |
| Accessories: power cord, operating manual (quick start guide), comprehensive documentation and operating software on CD-ROM | | |
| **Open Switch and Control Platform, base unit with display and control panel** | R&S®OSP130 | 1505.3009K03 |
| Accessories: power cord, operating manual (quick start guide), comprehensive documentation and operating software on CD-ROM | | |
| **Open Switch and Control Platform, extension unit** | R&S®OSP150 | 1505.3009K15 |
| Accessories: power cord, operating manual (quick start guide), comprehensive documentation on CD-ROM | | |

| Options (switch modules) [22] | | |
|---|---|---|
| RF Switch Module, 6 × SPDT (SMA), 0 Hz to 18 GHz, non-terminated | R&S®OSP-B101 | 1505.5101.02 |
| RF Switch Module, 6 × SPDT (SMA), 0 Hz to 18 GHz, non-terminated, latching | R&S®OSP-B101L | 1505.5101.52 |
| RF Switch Module, 2 × SP6T (SMA), 0 Hz to 18 GHz, non-terminated | R&S®OSP-B102 | 1505.5201.02 |
| RF Switch Module, 2 × SP6T (SMA), 0 Hz to 18 GHz, non-terminated, latching | R&S®OSP-B102L | 1505.5201.52 |
| RF Switch Module, 6 × SPDT (K (2.92 mm)), 0 Hz to 40 GHz, non-terminated | R&S®OSP-B111 | 1505.4605.02 |
| RF Switch Module, 2 × SP6T (K (2.92 mm)), 0 Hz to 40 GHz, non-terminated | R&S®OSP-B112 | 1505.4611.02 |
| RF Switch Module, 2 × DPDT (SMA), 0 Hz to 18 GHz, non-terminated | R&S®OSP-B116 | 1515.5827.02 |
| RF Switch Module, 1 × SP8T (SMA), 2 × SPDT (SMA), 0 Hz to 18 GHz, non-terminated | R&S®OSP-B119 | 1515.5856.02 |
| RF Switch Module, 6 × SPDT (SMA), SSR, 9 kHz to 6 GHz, non-terminated | R&S®OSP-B107 | 1505.5901.02 |
| RF Switch Module, 6 × SPDT (SMA), SSR, 9 kHz to 10 GHz, terminated | R&S®OSP-B127 | 1505.4728.02 |
| RF Switch Module, 1 × SP6T (SMA), SSR, 9 kHz to 10 GHz, terminated | R&S®OSP-B128 | 1505.4734.11 |
| RF Switch Module, 2 × SP6T (SMA), SSR, 9 kHz to 10 GHz, terminated | | 1505.4734.12 |
| RF Switch Module, 3 × SP6T (SMA), SSR, 9 kHz to 10 GHz, terminated | | 1505.4734.13 |
| RF Switch Module, 3 × DP3T (SMA), power SSR, 9 kHz to 8 GHz | R&S®OSP-B142 | 1505.4792.03 |
| RF Switch Module, 1 × DP3T (SMA), power SSR, 9 kHz to 8 GHz, ext. termination 1W (SPDT) | | 1505.4792.11 |
| RF Switch Module, 2 × DP3T (SMA), power SSR, 9 kHz to 8 GHz, ext. termination 1W (SPDT) | | 1505.4792.12 |
| RF Switch Module, 3 × DP3T (SMA), power SSR, 9 kHz to 8 GHz, ext. termination 1W (SPDT) | | 1505.4792.13 |
| RF Switch Module, 3 × SPDT (SMA), 0 Hz to 18 GHz, terminated | R&S®OSP-B121 | 1515.5504.02 |
| RF Switch Module, 3 × SPDT (K (2.92 mm)), 0 Hz to 40 GHz, terminated | R&S®OSP-B121H | 1515.5504.40 |
| RF Switch Module, 1 × SP6T (SMA), 0 Hz to 18 GHz, terminated | R&S®OSP-B122 | 1515.5510.02 |
| RF Switch Module, 6 × SPDT (SMA), 1 × SP6T, 0 Hz to 18 GHz, terminated | R&S®OSP-B123 | 1515.5527.02 |
| RF Switch Module, 3 × SPDT (SMA), 2 × SP6T, 0 Hz to 18 GHz, terminated | R&S®OSP-B124 | 1515.5533.02 |
| RF Switch Module, 6 × SPDT (SMA), 3 × SP6T, 0 Hz to 18 GHz, terminated | R&S®OSP-B125 | 1515.5540.02 |
| RF Switch Module, 3 × SP6T (SMA), 0 Hz to 18 GHz, terminated | R&S®OSP-B126 | 1515.5556.02 |
| RF Switch Module, 1 × SP8T (SMA), terminated, 2 × SPDT (SMA) non-terminated, 0 Hz to 18 GHz | R&S®OSP-B129 | 1517.7004.02 |
| RF Switch Module, 3 × SPDT (N), 0 Hz to 12.4 GHz, 3 × SPDT (BNC), 0 Hz to 900 MHz, n.t. | R&S®OSP-B106 | 1505.5601.02 |
| RF Switch Module, 2 × SPDT (N), 0 Hz to 12.4 GHz, non-terminated | R&S®OSP-B131 | 1505.4740.02 |
| RF Switch Module, 6 × SPDT (N), 0 Hz to 12.4 GHz, non-terminated | R&S®OSP-B132 | 1505.4757.02 |
| RF Switch Module, 2 × DPDT (N), 0 Hz to 12,4 GHz, non-terminated | R&S®OSP-B136 | 1522.4500.02 |
| Passive Module for integration of one R&S®NRP-Zxx power sensor | R&S®OSP-PM-I | 1515.5985.02 |
| Relay Driver Module, control of four external RF power relays, additional digital inputs/outputs, interlock | R&S®OSP-B104 | 1505.5401.02 |
| EMC Module (DPDT, SPDT, interlock, digital I/O) | R&S®OSP-B114 | 1505.4711.02 |
| Digital I/O Module, 16 × digital inputs, 16 × digital outputs | R&S®OSP-B103 | 1505.5301.02 |
| Digital I/O Module, 16 × digital inputs, 16 × RS-422 outputs, 4 × analog voltages | R&S®OSP-B158 | 4094.7300.02 |
| Multiplexer Module, 6-channel, 4-wire multiplexer | R&S®OSP-B108 | 1505.5718.02 |

| Options for RF feedthroughs | | |
|---|---|---|
| Module Panel with 12 × SMA mounting holes | R&S®OSP-B011 | 1505.4763.02 |
| Module Panel with 4 × N mounting holes | R&S®OSP-B012 | 1505.4770.02 |
| Cable Set (4 × RF cables, N female to N female) | R&S®OSP-Z010 | 1505.4534.02 |
| Cable Set (4 × RF cables, N female to SMA female) | R&S®OSP-Z011 | 1505.4540.02 |
| Cable Set (4 × RF cables, SMA female to SMA female) | R&S®OSP-Z012 | 1505.4557.02 |

| Accessories for the R&S®OSP150 | | |
|---|---|---|
| CAN Bus Cable, length: 0.5 m | R&S®OSP-Z101 | 1505.4505.02 |
| CAN Bus Cable, length: 5 m | R&S®OSP-Z102 | 1505.4511.02 |
| CAN Bus Y Cable, length: 0.5 m | R&S®OSP-Z103 | 1505.4528.02 |
| Additional Relay for R&S®OSP-B128 (upgrade kit for R&S®OSP-B128 with 1 or 2 relays) | R&S®OSP-Z128 | 1505.4734.10 |

[22] Relays not designated as bistable (latching) are monostable (failsafe).

| Designation | Type | Order No. |
|---|---|---|
| **Recommended extras for manual operation of the R&S®OSP120 via Ethernet [23]** | | |
| Industrial Controller, 19", 1 HU | R&S®PSL1 | 1161.5000.14 |
| Mouse with USB Interface, optical | R&S®PSL-Z10 | 1157.7060.04 |
| Keyboard with USB Interface (US/UK assignment) | R&S®PSL-Z2 | 1157.6870.04 |
| 17" TFT Monitor | R&S®PMC3 | 1082.6004.12 |
| **Recommended extras for installation in 19" racks** | | |
| 19" Rack Adapter, 2 HU | R&S®ZZA-211 | 1096.3260.00 |

| **Service options** | | |
|---|---|---|
| Extended Warranty, one year | R&S®WE1 | Please contact your local |
| Extended Warranty, two years | R&S®WE2 | Rohde & Schwarz sales office. |
| Extended Warranty, three years | R&S®WE3 | |
| Extended Warranty, four years | R&S®WE4 | |
| 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 | |
| Documentation of calibration values | R&S®DCV-1 | 0240.2187.14 |
| DKD (ISO 17025), calibration including ISO 9000 (per module slot can only be ordered with the instrument) | R&S®OSP-DKD | 1502.0044.14 |

**Extended warranty with a term of one to four years (WE1 to WE4)**

Repairs carried out during the contract term are free of charge [24]. Necessary calibration and adjustments carried out during repairs are also covered. Simply contact the forwarding agent we name; your product will be picked up free of charge and returned to you in top condition a couple of days later.

**Extended warranty with calibration (CW2 to CW4)**

Enhance your extended warranty by adding calibration coverage at a package price. This package ensures that your Rohde & Schwarz product is regularly calibrated, inspected and maintained during the term of the contract. It includes all repairs and calibration at the recommended intervals as well as any calibration carried out during repairs or option upgrades.

**For product brochure, see PD 5214.1437.12.**

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[23] A crossover Ethernet cable is required to directly connect the R&S®OSP120/130 with a PC/laptop.
A standard Ethernet cable is required to directly connect the R&S®OSP120/130 with a network.
[24] Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.

## About Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, radiomonitoring and radiolocation. Founded more than 80 years ago, the independent company which is headquartered in Munich, Germany, has an extensive sales and service network with locations in more than 70 countries.

## Sustainable product design

ı Environmental compatibility and eco-footprint
ı Energy efficiency and low emissions
ı Longevity and optimized total cost of ownership

Certified Quality Management
**ISO 9001**

Certified Environmental Management
**ISO 14001**

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