

Specifications

and Operator's Manual

Control unit RSW2 for RLA4



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Specifications

Dimensions (W x H x D):	85 mm x 50 mm x 127 mm
Frequency range:	10 kHz ... 156 MHz
Power supply:	+11.0 ... +15.0 V- / max. 150 mA
Connectors:	BNC 50 ohm, DC pin 2.5 mm
Maximum cable length from control unit to antenna:	depends on RF cable, max. 10 ohm DC resistance
Weight:	<= 500 g
Environmental conditions:	0 ... +50 °C ambient temperature, <=90 % rel. humidity non-condensing, indoor application
Compliance:	CE according to DIN EN 55013, EN 55020, EN 60065 RoHS / WEEE directive, ear reg. nr. 27676700

Specifications are subject to change!

Safety information

Please always observe the following safety instructions!

Never connect the device to any other voltage than indicated in the specifications. Under no circumstances should the device come into contact with the mains voltage of 110 / 230 V ~!

It is essential to observe the lightning protection regulations for the outdoor operation of electrotechnical systems! When connecting an antenna outside the protected area (e.g. your house), it must be professionally provided with lightning protection. The RF bypass / DC bias tee must be equipped with overvoltage protection. In case of risk of lightning hazard, immediately take the antenna out of operation and disconnect it safely from other devices (remove HF connection)!

Observe the permitted temperature range for starting up the device! Do not switch the device on or off again if this range is exceeded or fallen below!

Always ensure a safe installation on a level, even and firm surface of adequate load-bearing capacity! Always transport the device either in solid cardboard or wooden boxes (e.g. the delivery packaging), or transport it by firmly gripping the housing! The device may cause injury in the event of a fall due to its own weight!

Never expose the device to mechanical stress due to impact, pressure, vibration or shock which exceed a normal level.

If you notice any damage to the device, immediately take it out of operation (remove power supply)! If necessary, return it to the supplier for repair.

If you wish to dispose the device due to damage or because you do not use it anymore, return it to the supplier or to your local waste collection center. Never dispose the device in any other way, for example, with your household waste!

Operator's Manual

The RSW2 control unit is designed to operate the RLA4 in a remote configuration and to control mode and direction switching.

You can supply power to the RLA4 via the RF cable ("remote power supply"). The level of the injected voltage determines the operating mode of the antenna. The control unit supplies the antenna cable with the necessary voltages (socket "ANT"). The RF voltage supplied by the antenna can be taken from the "RX" socket and fed to the receiver (DC-free).

Various settings can be selected via the rotary knob. Four LEDs (basic devices, extensions see below) indicate the current setting:

- Rotary knob turned all the way to the left ("Off", all LEDs off): Shutdown of the antenna. There is a delay of about 2 sec before the antenna is actually switched off. This avoids constant switching off and on in case of accidental turning to the Off-range (e.g. when fine adjusting to 0°). In position "Off", no voltage is fed to the antenna. However, the control unit itself still needs some supply current. For complete shutdown of all devices, the power supply must be removed! *Please always do this for environmental reasons, if the control unit and antenna are not to be used for a longer period of time (> several minutes). Do not forget a possibly existing power supply!*

- Rotary knob between "Off" and "Omni" (1 or 2 LEDs are lit): Direction control of the antenna in loop mode. The antenna is supplied with a voltage of approx. 6V. Each time the rotary knob is turned to change the direction setting (127 steps in the rotation range), a data word is sent to the antenna. After switching on the antenna, the values start at 0 (transition "Off" to direction control). In this case, a "transition state" occurs: After switching on, the antenna is in "whip mode" for approx. 2 sec. After approx. 2 sec, the first control word is sent to the antenna. This switches the antenna to loop mode (current direction according to the rotary knob / LED).

The values of the control words correspond linearly to the rotation angle of the button between "Off" and "Omni". The LEDs indicate the current value by continuous crossfading from the first LED (0°, data word 0) across all LEDs back to the first LED (data word 126). Due to the antenna's bidirectional operation mode, 0° reception direction also correspond to 180° reception direction. Continuous crossfading (an LED becomes brighter as the former becomes darker) makes it possible to visually assess in which direction between the main directions the antenna approximately receives.

The RLA4 has 4 main reception directions. At 0° (or 180°), only loop 1 operates (the one going from the RX socket on the antenna to the left front). At 90° (= 270°) only loop 2 is in operation (from DC jack to the front right). At 45° (= 225°) or 135° (= 315°) both loops are active with the same gain. Only one LED lights up in the main receiving directions.

When setting directions between these main receiving directions, the loops (or their respective amplifiers) are operated with different gains. Always 2 LEDs with different brightness are lit in this case, in the middle between the main receiving directions with the same, half brightness each. **Caution!** The RLA4 does not linearly follow the setting of the rotary knob or the display of the LEDs! It prefers the main directions for a long time and switches between them in a narrow range with just a few steps.

- Rotary knob turned all the way to the right ("Omni", all LEDs half lit): Switching the antenna to whip mode. The antenna no longer operates as a "magnetic antenna" but as an "electric antenna". This results in fundamentally different reception conditions. There is no longer a main receiving direction, signals are received more or less equally from all directions (omnidirectional over bidirectional loop mode). The signal strength may be higher or lower than loop mode, depending on the location, grounding conditions and many other factors. The noise reception is much more pronounced than in loop mode.

The LEDs flash at approximately 1 Hz in the event of a short-circuit on the antenna cable (current > approx. 150 mA). They flicker at high frequency during idle (interruption of the cable, antenna not connected). The control unit is permanently short-circuit proof.

Further developments for controlling other antennas and increasing the directional resolution

The previous number of steps has proved to be not quite sufficient for the setting of sharp focusing antennas or antennas with pronounced zero position. Therefore, all control units from serial number 0095 operate with an increased number of steps. In addition, a parity bit is now sent to improve transmission security, which can be used by the antenna to detect data errors. The data telegram now follows the setting "9E2": 9 data bits, 1 parity bit with even parity, 2 stop bits. The data rate is still 125 baud.

The 9 data bits allow for extended coding of instructions and / or an increase in the number of steps of continuous settings. For adjustment, no potentiometer with fixed rotation angle is used, but a pulse rotary encoder with "infinite" rotation angle. For each pulse, exactly one step is switched forward or backward. As a result, every possible step is safely adjustable. The control unit is thus suitable for operation with the following antennas:

- Cross loop antenna with "whip" step RLA4 A - F (180° rotation)
- Cross dipole antenna RWA1 A and B (180° rotation)
- Combination RLA4 + RWA1 (2x 180° rotation)
- FM directional antenna RLA5 (360° rotation)
- FM Crossyagi RAP2 (90° rotation polarization plane)

The respective version is supplied with appropriate programming (firmware) to control the desired antenna. For older types (8N2 protocol or similar), the extended control unit can also be supplied with the appropriate firmware.

Control unit with graphic display

In order to display advanced settings, the 4 LEDs have been replaced by a 128 x 64 pixel OLED display. This allows alphanumeric and graphic displays of the respective antenna setting (direction) and other parameters.

Depending on the antenna's model, the antenna type and direction are displayed in degrees. Furthermore, additional readouts are possible. In the RLA4's case, the DC current on the RF line to the antenna is measured. This makes the unambiguous assessment of operational readiness possible. When "0 mA" is displayed, the antenna is switched off (position 0° or not connected or interruption in the cable). If there is a short circuit on the cable, the short-circuit current is displayed. In this case, the control unit switches off the supply for approx. 1 sec and then tries again to feed the antenna. In the event of a permanent short circuit, the display constantly changes between 0 mA (switched off) and short indication of the short-circuit current.

