RADIO REMOTE CONTROLLER SET
RXH-2K/RXH-4K

rxh24k_en 08/12

The RXH-2K/RXH-4K remote controller set enables electrical equipment to be remotely controlled by means of radio transmitters (remote keyfobs). The remote controller set can work with up to 340 remote keyfobs. **The RXH-2K/RXH-4K only supports SATEL-manufactured 433 MHz remote keyfobs.**

The remote controller design is based on the components of Microchip Technology Inc. which use the KEELOQ® code-hopping technology for transmission between the transmitter and the receiver. It ensures both security of use and resistance to spurious control signals coming from other devices.

Interaction of the RXH-2K/RXH-4K with security systems is facilitated by inputs which provide information on the system status. They make it possible to easily organize signaling of arming/disarming, as well as of alarm clearance.

1. Description of electronics board

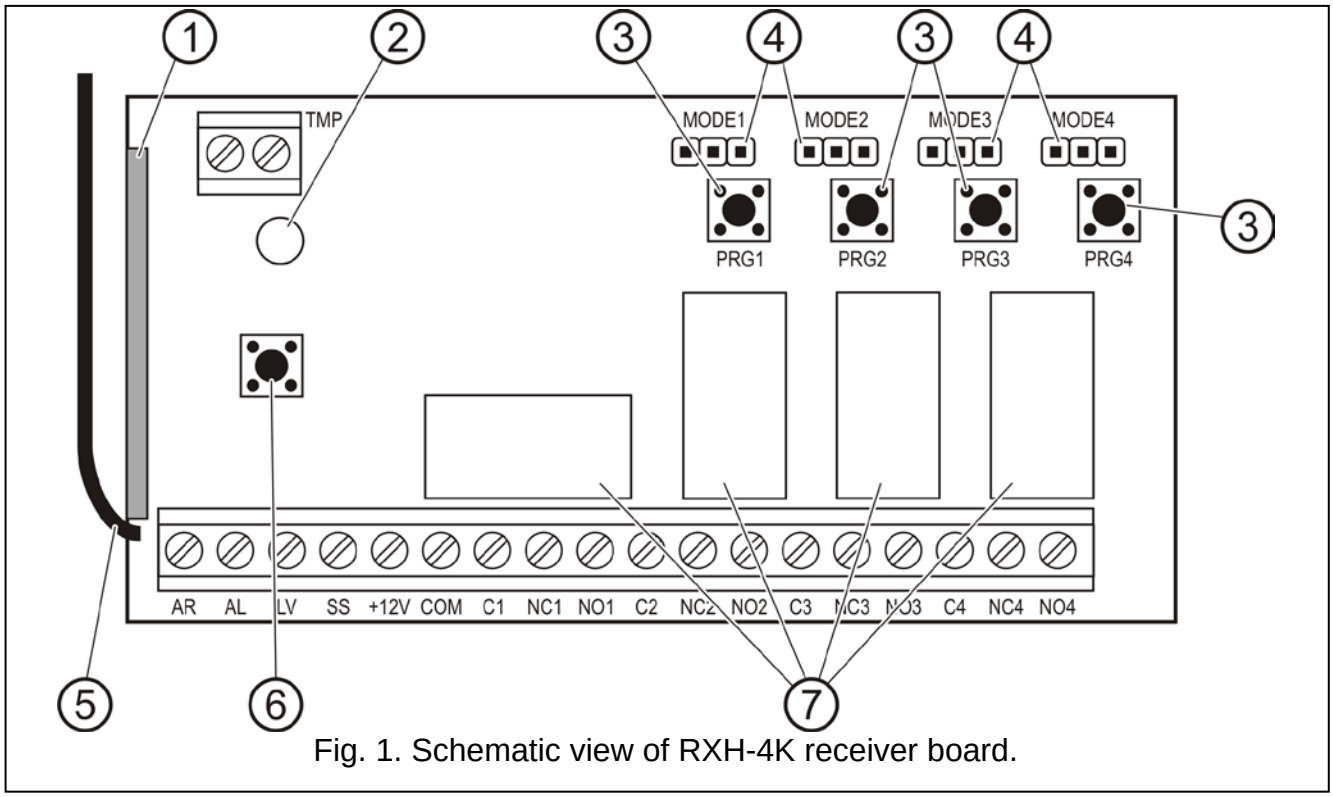

Fig. 1. Schematic view of RXH-4K receiver board.

Explanations for figure 1:

1 – **superheterodyne receiver**, high sensitivity, immune to spurious signals;

2 – **LED indicator**;

3 – **programming buttons** (PRG1 – channel 1; PRG2 – channel 2; PRG3 – channel 3; PRG4 – channel 4);

4 – **pins to program the operating mode of relay** (MODE1 – channel 1; MODE2 – channel 2; MODE3 – channel 3; MODE4 – channel 4);

5 – **antenna**;

6 – **tamper contact**;

7 – **relays** (in RXH-2K only 2).

Description of terminals:

AR – information signal input – security system status (armed/disarmed);

AL – information signal input – alarm;

LV – signal output – low battery in remote keyfob (OC); the output activates when the receiver detects low voltage in the remote keyfob battery and remains active until a remote keyfob with good battery is used (it can be used e.g. to report a trouble in the security system);

SS – siren control output (OC);

+12V – supply voltage input (direct voltage from 9 V to 16 V);

COM – common (ground);

Cn – common terminal of relay;

NCn – normally closed terminal of relay;

NOn – normally open terminal of relay;

} n – relay (channel) number

TMP – tamper contact terminals.

The two-color **LED** indicates the module operating status and facilitates programming of the receiver parameters:

- green light – normal operating mode;
- red light – receiving signal from remote keyfob in normal operating mode;
- green blinking light – waiting for the first press of the remote keyfob button when entering new remote keyfob into the receiver memory by means of programming buttons;
- red blinking light:
  - waiting for the second press of the remote keyfob button when entering new remote keyfob into the receiver memory by means of programming buttons;
  - the remote keyfob battery is exhausted (after pressing the remote keyfob button normal operating mode);
  - clearance of the receiver memory;
- alternately blinking red and green light – programming the monostable relay ON time;
- blinking by the sequence: red color, green color, extinction – started mode of programming from the computer.

The programming buttons PRG1 to PRG4 allow:

- entering remote keyfobs into the receiver memory;
- programming the monostable relay changeover time for the given channel;
- **PRG1 button** – clearing the receiver memory;
- **PRG2 (RXH-2K) / PRG4 (RXH-4K) button** – establishing communication between the controller and the computer.

2. Installation

The receiver electronics board includes components sensitive to electrostatic discharges. These electrostatic discharges should be removed prior to installation. Also, touching the receiver board components should be avoided in the process of installation.

The RXH-2K/RXH-4K is mounted in a plastic housing. When closing the housing, be particularly careful so that the programming button is not pressed in by the cables.

It is recommended that the manufacturer specified batteries be used in the remote keyfobs. The battery status must be periodically checked (e.g. by noting how the LED on the receiver

board lights when the remote keyfob button is being pressed) and, if necessary, the used batteries must be replaced by new ones.

Notes:

- *Do not discard the used batteries. They should be disposed of as required by the existing regulations European Union Directives 91/157/EEC and 93/86/EEC.*
- *Making any construction changes or unauthorized repairs is prohibited. This applies, in particular, to modification of assemblies and components.*

3. Programming

The RXH-2K/RXH-4K can be programmed by means of programming buttons or a computer with DLOAD10 program installed. **The DLOAD10 program is available on web-site www.satel.eu**. The DLOAD10 provides a possibility for more advanced configuration of radio transmitters. It allows edition of the list of remote keyfobs by their unique serial numbers, deletion of individual remote keyfobs already entered in the system, and assignment of user names to remote keyfobs.

3.1 Starting communication with DLOAD10 program

Notes:

- *As the controller does not have a separate RS port socket, the data transmission is done with the use of some terminals, whose function has been changed by software means.*
- *If any other wires are connected to the AL and LV terminals, disconnect them before connecting the PIN3/RX adapter wires.*
- *If there are any troubles in communication after connecting the controller to the computer, put a 47 kΩ resistor between the LV and +12 V terminals.*

In order to establish communication between the controller and the computer, do the following:

1. Connect the computer COM port to the corresponding terminals on the controller electronics board. The cables for making connections are available as a set manufactured by SATEL and designated DB9FC/RJ-KPL. To make the connection, use the PIN3/RX adapter included in the delivery set and connect it to the 3-pin plug. The adapter cables should be connected to the controller terminals as shown in Table 1.

Wire color	Function	Module terminals
black	common ground (common terminal)	COM
white	radio controller Tx signal	LV
green	radio controller Rx signal	AL

Table 1.

2. Start the DLOAD10 program in the computer (the program access is protected by password, which is **1234** by default and can be changed to any sequence of 16 characters).
3. Enter the "Communication" menu, select the "Configuration" item, and indicate the computer port, the receiver is connected to.
4. Start the computer programming mode in the receiver, following the procedure below:
   - press and hold down the PRG2 (RXH-2K) or PRG4 (RXH-4K) programming button until the LED changes for a while the color of its light to red;

– release the PRG2 (RXH-2K) or PRG4 (RXH-4K) button momentarily, then press it again and hold down until the LED starts blinking according to the sequence: red color, green color, extinction.

Note: *If communication with the DLOAD10 program fails to be established within one minute, the receiver will return to its normal operating mode.*

5. In the DLOAD10 program, select "New device" in the "File" menu, and then the “Keyfobs receiver RX/RE/RXH". The remote controller sets management window opens (see: Fig. 2). Click on the "Read transmitters" button to open the list of remote keyfobs already entered into the receiver.

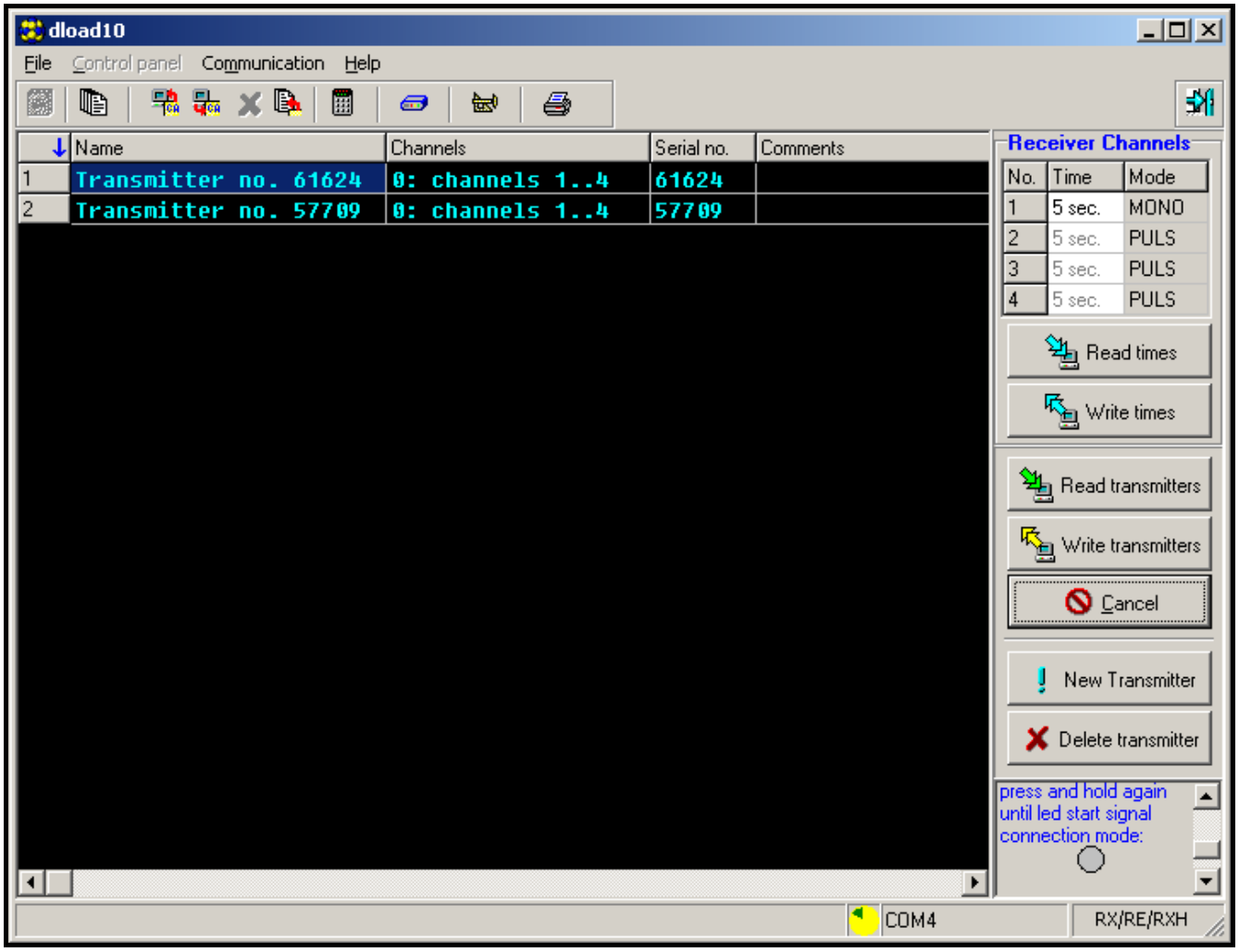

Fig. 2. Management window for RXH-4K in the DLOAD10 program.

3.2 Adding remote keyfobs

Remote keyfobs can be added to the controller memory using either the on-board programming buttons or the DLOAD10 program. Depending on how it has been added, the keyfob can control either all channels, or selected ones only.

Notes:

- *In order to add the MPT-300 keyfobs, use the button marked ○.*
- *When used with the RXH-2K / RXH-4K radio controller, the button marked with the ■ symbol on the MPT-300 remote keyfob is inactive.*

3.2.1 Adding remote keyfobs by means of programming buttons

1. Press the selected programming button – the LED starts blinking green.
2. Press any button on the remote keyfob – the LED starts blinking red.
3. Press again the same remote keyfob button – the LED light changes to steady green. The remote keyfob has been entered into the memory.

Note: *If the memory is already full or the remote keyfob is incorrect (from another manufacturer), the receiver will return to its normal status after the first press of the remote keyfob button.*

The number of channels which the remote keyfob will be able to control depends on the controller button that will be used to enter the remote keyfob to the device memory.

For example, if the remote keyfob is entered with the use of the **PRG2** button, the remote keyfob will be able to operate the channel 2 (RXH-2K) or the channels **2**, **3** and **4** (RXH-4K). The channel 1 will be unavailable to it. The active buttons of the remote keyfob will be 1 / ○ (RXH-2K) or 1 / ○, 2 / ● and 3 / □ (RXH-4K). The others will be inactive. Table 2 shows channels available in the remote keyfob, depending on which programming button was used to enter the remote keyfob. A blank field means that the button is inactive.

			Remote keyfob available channels	Keyfob button				
				1 / ○	2 / ●	3 / □	4 / ▲	5 / ■
Programming button used	RXH-4K	PRG1	1–4	**1**	**2**	**3**	**4**	
		PRG2	2–4	**2**	**3**	**4**		
		PRG3	3–4	**3**	**4**			
		PRG4	4	**4**				
	RXH-2K	PRG1	1–2	**1**	**2**			
		PRG2	2	**2**				

Table 2.

Note: *The numbers refer to the P-2, P-4, T-1, T-2, T-4 keyfobs, and the symbols to the MPT-300 keyfob.*

3.2.2 Adding remote keyfobs by means of DLOAD10 program

1. Click on the "New transmitter" button. The new remote keyfob adding window opens.
2. According to the displayed command, press any button of the remote keyfob.
3. According to the displayed command, press the remote keyfob button again.
4. Select, how many channels is the remote keyfobs to operate (see: Table 2).

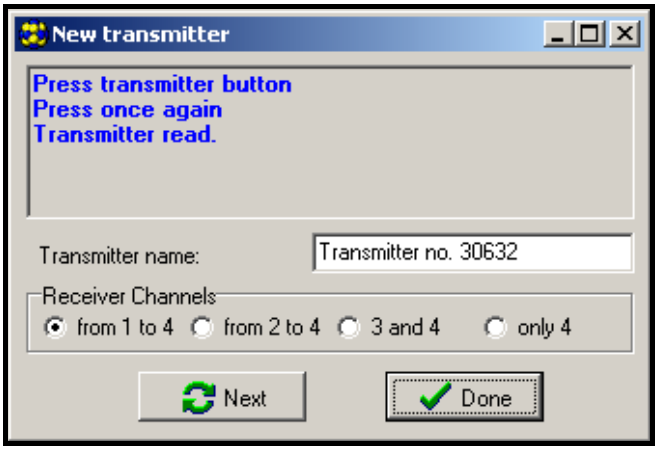

Fig. 3. Window for adding new remote keyfobs in the DLOAD10 program.

5. If required, enter the remote keyfob name.
6. Click on the "Next" button to add another remote keyfob, or on the "End" button to close the window. The new remote keyfobs will now be included in the list of operated remote keyfobs with the annotation: "New, to write".
7. Click on the "Write transmitters" to save the entered changes. If the changes are not saved, the receiver will not be able to handle the new remote keyfobs.

Changing the number of channels used by the remote keyfob as well as editing its name can be done at any moment by means of DLOAD10 program.

3.3 Removing remote keyfobs

Individual deletion of remote keyfob is possible by using the DLOAD10 program. The programming buttons allow to erase full content of the receiver memory, i.e. also the remote keyfob entered into it.

3.3.1 Clearance of receiver memory

1. Press and hold down the PRG1 programming button until the LED changes for a while the color of its light to red (which will occur after approx. 3 seconds).
2. Release the PRG1 button momentarily, then press it again and hold down until the LED starts blinking red (which will occur after approx. 3 seconds), signaling thereby that the receiver memory is being erased.

When the LED starts lighting steadily green again, the receiver is ready for programming new remote keyfobs.

3.3.2 Removing remote keyfobs by means of DLOAD10 program

1. Click on the remote keyfob to be removed on the list of remote keyfobs.
2. Click on the "Delete transmitter" button and confirm selection in the pop-up window.
3. Click on the "Write transmitters" button to save the entered changes. If the changes are not saved, the receiver will continue handling the remote keyfob that were to be removed.

3.4 Programming relay operating mode

The relay can work in one of the three modes, depending on how the jumpers are set on pins.

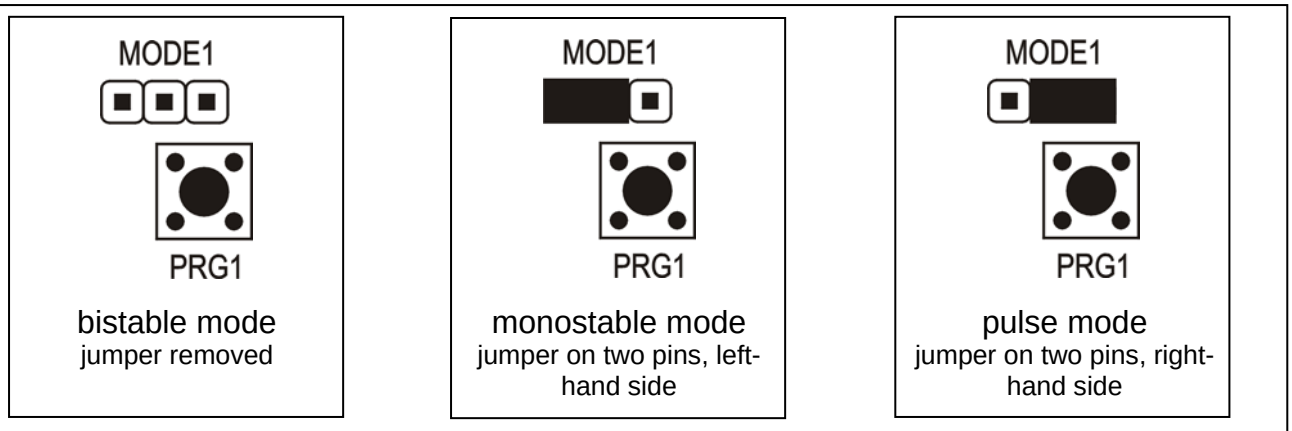

Fig. 4. Example of setting the operating mode on pins – channel 1.

Bistable mode (see: fig. 4) – each press of remote keyfob button changes the relay status to the opposite one.

Monostable mode (see: fig. 4) – relay activated for a preset time.

Pulse mode (see: fig. 4) – relay activated for the time when remote keyfob button is pressed. After the button is held down for more than 30 seconds, the keyfob stops transmitting, thus preventing the battery discharge.

3.4.1 Programming monostable mode on-time

By default, the monostable mode on-time is preprogrammed at 5 seconds. It can be changed by the user and set within the range of **1 to 255 seconds**.

In order to enter the new monostable mode on-time for the selected channel (relay) by means of the programming buttons you should:

1. Press the selected channel programming button twice – the LED will go out.
2. Press one of the active remote keyfob buttons (see: Adding remote keyfobs) – the LED will start blinking green and red.
3. Having measured off the required time, press the remote keyfob button again – the LED light will turn into steady green.

You can change the monostable mode on-time in the DLOAD10 program by entering from the keypad a new value for the selected channel. To save the entered changes in the receiver memory, click on the "Save times" button.

4. Interaction with the security system

Using the remote keyfob button you can arm/disarm the security system or trigger/clear an alarm. To be able to do so, connect the terminals of relays selected for control to the suitably preprogrammed control panel zones.

The SS receiver output can signal arming/disarming/disarming and alarm clearing by means of the remote keyfob. In order to ensure such signaling, it is necessary to connect suitably preprogrammed control panel outputs to the AR, AL inputs (the armed mode information output to the AR input, and the output signaling alarm to be canceled – to the AL input). The AR and AL inputs are monitored for 4 seconds since the remote keyfob was used. If there is a change in the status of the monitored inputs during that time, the SS output will be shorted to the common ground for the pulse duration (0.16 second). The event can be identified by the number of pulses:

- 1 pulse – arming;
- 2 pulses – disarming;
- 4 pulses – disarming plus alarm clearing.

The SS output can be used e.g. to control a siren. Permissible current-carrying capacity of the SS output is 500 mA.

In the presented example (see Fig. 5), the channel 1 (relay 1) controls the control panel armed mode, while the channel 4 (relay 4) triggers the silent PANIC alarm. These relays operate in the pulse mode (jumpers suitably set on the MODE1, MODE4 pins) and feed the common ground (0 V) to the CTL, Z1 zones of the control panel. The remote keyfob must be entered into the receiver memory by means of the PRG1 button. In order to arm/disarm the system, press and hold down the button No. 1 / ○ on the remote keyfob. To trigger the panic alarm, press the button No. 4 / ▲. In order to avoid the risk of accidental alarm triggering, set a suitable sensitivity of the Z1 zone in the control panel (e.g. 3 seconds).

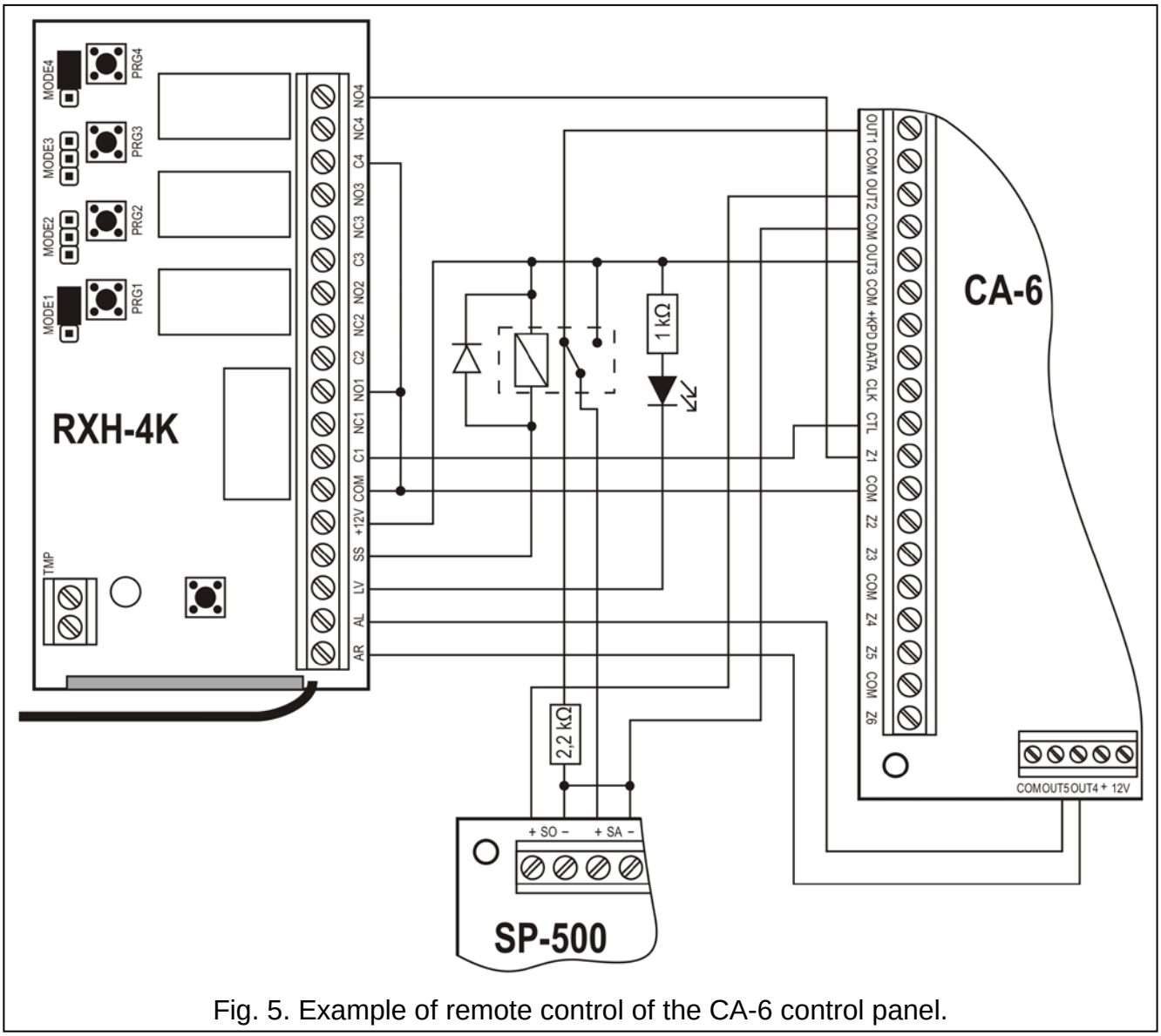

Fig. 5. Example of remote control of the CA-6 control panel.

The SS output controls the relay, which supplies +12 V voltage to the +SA siren input and, consequently, generates a sound signal. The OUT1 control panel output remains connected via the 2.2 kΩ resistor to the common ground in the siren, thus ensuring presence of the load on the OUT1 output, as well as cabling control when armed/disarmed states are being signaled. The resistor should be installed inside the siren housing.

The figure shows also a simple solution to low-battery indication in the remote keyfob (the LED is connected to the LV input).

The CA-6 control panel makes it possible to program the following parameters:

OUT1 – alarm on for preset time (+12 V during the output on-time);

OUT2 – alarm on until canceled (+12 V during the output on-time);

OUT3 – power supply output (+12 V);

OUT4 – armed mode indicator (type OC output – program +12 V during on-time);

OUT5 – alarm on until canceled (type OC output – program +12 V during on-time);

CTL – arming/disarming one or both partitions (FS 125);

Z1 – 24H silent zone (using the remote keyfob button No. 4 / ▲ will send a code to the monitoring station).

5. Specifications

Radio communications range in open area..... up to 200 m
(an obstacle between the transmitter and the receiver will reduce the device operating range)
Supply voltage ..... 12 V DC ±15%
Standby current consumption: RXH-2K .....20 mA
RXH-4K .....25 mA
Max. current consumption: RXH-2K .....70 mA
RXH-4K .....100 mA
Relay contacts rating (resistive load) ..... 2 A / 24 V DC
Adjustment range of changeover time in monostable mode ..... 1 to 255 s
Current-carrying capacity of LV (OC) output.....50 mA
Current-carrying capacity of SS (OC) output .....500 mA
Operating frequency band .....433.05–434.79 MHz
Environmental class according to EN50130-5 II
Maximum humidity.....93±3%
Operating temperature range, receiver.....-10 to +55 ºC
Operating temperature range, transmitter (remote keyfob).....-10 to +55 ºC
Housing dimensions .....72x118x24 mm
Receiver weight: RXH-2K ..... 66 g
RXH-4K ..... 82 g
Transmitter (keyfob) weight ..... 30 g

Hereby, SATEL sp. z o.o., declares that this remote controller set is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity may be consulted at www.satel.eu/ce

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