



# «RTD Astra-Y»

## Receiving terminal device (receiver)

### Operating manual



This operation manual is intended to study the principle of operation, correct use and maintenance of the radio receiver "RTD Astra-Y" (firmware Y-UOP-v4\_0 and higher) (Figure 1). The manufacturer reserves the right to make changes in the design, software, circuitry solutions and product configuration that do not degrade its technical characteristics, do not violate mandatory regulatory requirements, without prior notice to the consumer.

#### List of abbreviations:

**ARM-Y** – software for configuration and monitoring of the system (for windows 7 or higher);  
**OC** – “open collector” output;  
**PC** – personal computer;  
**CP** – control panel Astra-712;  
**Astra-Y MP** – Astra-Y monitoring panel;  
**Astra-Y system** – wireless monitoring system «Astra-Y»;  
**TTD** – radio transceiver “TTD Astra-Y”;  
**RTD** – radio receiver «RTD Astra-Y»;  
**AL** – alarm loop (hardwired zone).

## 1 Purpose

**1.1** RTD is designed to receive over the radio channel notifications from registered TTDs, decode and send notifications to three built-in LED indicators, two signal relays and one OC output, as well as via the LIN interface in standalone operating mode or via the RS-485 interface in extended operating mode.

**1.2** The main purpose is the organization of centralized monitoring via radio channel (433 MHz) of cottage settlements, industrial facilities, etc.

**1.3** The radio channel communication between the RTD and the TTD is two-way.

**1.4** RTD supports up to 48 of TTD in standalone operating mode and up to 250 of TTD in extended operating mode.

**1.5** RTD supports working in **standalone mode** without connected Astra-Y MP.

**1.6** Remote indication panel unit Astra-861 can be connected to the RTD in standalone mode via the LIN interface.

**1.7** RTD supports working in extended mode, connecting via RS-485 interface to the Astra-Y MP or to a PC with installed software ARM-Y through connector F7. To connect to a PC, the Astra-984 interface unit is used.

**1.8** RTD supports two-level retransmission of the signal and tracks the routes of signals through TTD repeaters. Current routes can be viewed using the ARM-Y software in the configuration mode.

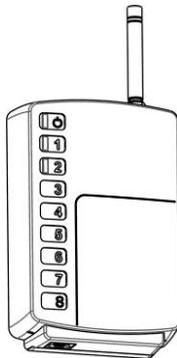


Figure 1

## 2 Specifications

### Technical parameters of the radio channel

Operation frequency range, MHz ..... 433,92 ± 0,2 %  
 Number of the frequency channels..... 16  
 Power of the RTD transceiver\*, mW,..... 10/30/100  
 Wireless coverage range\*\* between RTD and TTD, m, up to:  
 - with standard whip antenna (0,17 m length)  
 power 10/100 mW ..... 2500/3400  
 - with external antenna (3 dB gain)  
 power 10/100 mW ..... 4500/8700  
 The sensitivity of the RTD receiving path,  
 dBm, not more ..... -102  
 RF supervision time\*\*\*, min ..... from 3 to 40  
 Radio exchange rate, bit/sec ..... 19200

### General technical parameters

Power supply voltage, V ..... from 10,5 to 15,0  
 Current consumption, mA, not more:  
 - receiving mode ..... 115  
 - 10 mW power ..... 200  
 - 30 mW power ..... 200  
 - 100 mW power ..... 230  
 Boot time, sec, not more ..... 5

### Outputs

Relay 1, 2 (terminals **Relay1**, **Relay2**):

- max load voltage, V ..... 100  
 - max load current, mA ..... 100

«Open collector» output (terminal **OC**):

- max load current, mA ..... 100  
 - max load voltage DC, V ..... 45

### RS-485 interface:

Interface line length, m, not more ..... 1000  
 Exchange rate, bit/sec ..... 9600

### LIN interface:

Interface line length, m, not more ..... 200  
 Active resistance of the wires, Ohm, not more ..... 100  
 Capacity between the wires, uF, not more ..... 0,033  
 LIN interface exchange rate, bit/sec ..... 4800  
 Overall dimensions (without antenna), mm ..... 121 × 79 × 31  
 Weight (without antenna), kg, not more ..... 0,1

### Operation conditions

Temperature range, °C ..... from -10 to +50  
 Relative air humidity, % ..... to 95 at +35°C  
 without moisture condensation

## 3 Delivery set

RTD:

Astra-Y RTD ..... 1 pcs.  
 Whip antenna ..... 1 pcs.  
 Screw 2,9×25 ..... 4 pcs.  
 Dowel 5×25 ..... 4 pcs.  
 Operating manual ..... 1 copy.

\* factory default value is 10 mW.

\*\* in line of sight. The radius of action largely depends on the design features of the room, the installation site, and the interference environment.

\*\*\* factory default value is 10 min.

## 4 Design

The RTD is made in the form of a block consisting of a base, a removable cover and an antenna. A printed circuit board (PCB) with radio elements is mounted inside the unit (Figure 2).

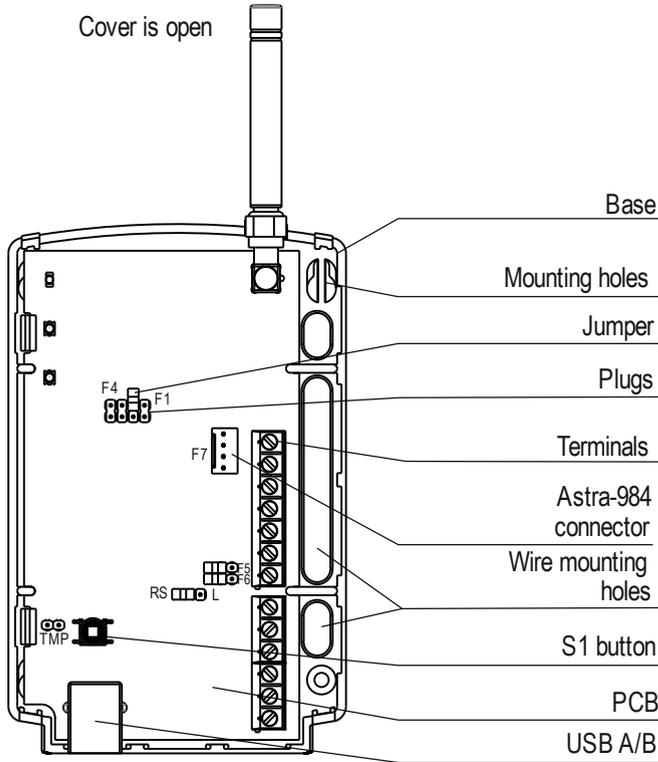


Figure 2

The PCB has indicators for monitoring the operation of the RTD and indicating notifications.

The S1 button is installed on the PCB, which, when the cover is removed, generates the "Tampering" notification and is also used to change the operating modes of the RTD, reset the RTD memory.

Screw terminal blocks are installed on the PCB (table 1).

Table 1

Terminals	Purpose
+TM, -TM	Not used
Relay1, Relay2	Relay outputs
OC	Open collector outputs
-LIN, +LIN	LIN interface for connecting «Astra-861» indication panel
485A, 485B	RS-485 interface for connecting to Astra-Y MP
+12V, GND	Power supply connection

**F7 connector** is intended for connection to a PC through the Astra-984 interface unit in order to configure and monitor the system, update the device firmware using the ARM-Y software.

**USB port** intended for connection to a PC in order to perform a backup using the ARM-Y software.

## 5 Indication

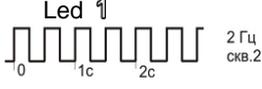
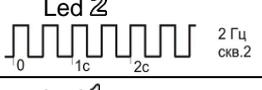
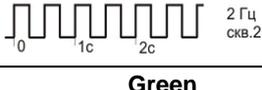
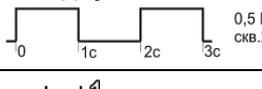
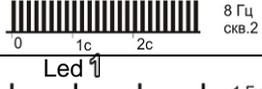
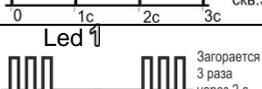
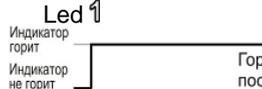
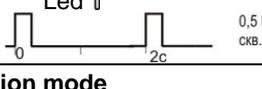
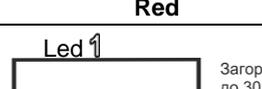
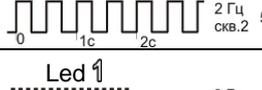
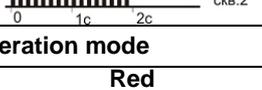
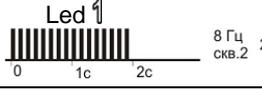
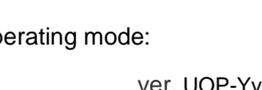
**Green LED**  shows the status of the interference environment (Table 3).

**Led 1** shows the status of all alarm loops (hardwired zones) of the intrusion type, as well as the status of the TTD and the control panel connected to the TTD.

**Led 2** shows the status of all alarm loops (hardwired zones) of the fire type.

The duration of the indication - until setting to another status or to the "normal" status.

Table 2 - LED 1 and LED 2 indication

Notification	LED 1 and 2
Test (after powering the device)	Light up <b>red</b> for 1 sec, then <b>green</b>
<b>Standalone operation mode</b>	
<b>Red</b>	
No registered TTD	-
Wireless jamming RTD	<p><b>Led 1</b></p>  <p>synchronously with the led </p>
Fire zone alarm	<p><b>Led 2</b></p> 
Intrusion zone alarm	<p><b>Led 1</b></p> 
<b>Green</b>	
TTD tampering or CP, connected to the TTD tampering	<p><b>Led 1</b></p> 
No connection with TTD or CP, connected to TTD	<p><b>Led 1</b></p> 
Power failure of the TTD or CP, connected to the TTD	<p><b>Led 1</b></p> 
Intrusion type hardware zone failure	<p><b>Led 1</b></p> 
Fire type hardware zone failure	<p><b>Led 2</b></p> 
Arming of at least one zone	<p><b>Led 1</b></p> <p>Индикатор горит / Горит постоянно</p> 
All intrusion type zones disarmed	<p><b>Led 1</b></p> 
<b>Registration mode</b>	
<b>Red</b>	
Wait for TTD registration	<p><b>Led 1</b></p>  <p>Загорается до 30 с</p>
Successful registration of TTD	<p><b>Led 1</b></p> 
Unsuccessful registration of TTD	<p><b>Led 1</b></p> 
<b>Extended operation mode</b>	
<b>Red</b>	
Removing of the TTD	<p><b>Led 1</b></p> 

Priority of status indication in operating mode:

- Led :
- «RF jamming of the RTD»,
- «Interference»;
- Led :
- «RF jamming of the RTD»,
- «TTD or CP tampering»,
- «Intrusion alarm»,
- «No connection with the TTD or CP»,
- «Intrusion type hardware zone failure»,
- «TTD or CP power failure»,
- «All intrusion type hardware zones disarmed» / «At least one intrusion zone is armed»;
- Led :
- «RF jamming of the RTD»,
- «Fire alarm»,
- «Fire type hardware zone failure».

«No connection with the TTD» is performed when there are no signals from at least one registered TTD during the RF supervision time.

Relay 1 is opening when jumper **F1** is removed.

"RF jamming of the RTD" is performed in the absence or impossibility of decoding signals from all registered TTD within **3 minutes**.

In addition to the notifications given in Table 2, the RTD gives out to the interface the notifications "Power supply of the RTD is low", "Fire danger" of the fire type hardware zone, "short circuit" and "open circuit" for the fire type hardware zone of the TTD in standalone mode.

**Table 3 - Led  notifications**

Notifications	Led 
Interference	Off or flashing
No interference at operating frequency	Lights up constantly
RF jamming of the RTD	 Flashing synchronously with the led 

## 6 Relay outputs operation modes (Relay1, Relay2, OC)

**Relay 1 (terminals Relay 1):** displays the state of all alarm loops of the intrusion type and the state of the TTD and the control panel connected to the TTD:

- **closed**, when at least one alarm loop (zone) of the registered TTD or Control Panel is armed, the RTD cover is installed and there are no "Alarm" notifications.

- **open**, when there are no registered TTD in the memory of the RTD, when the RTD is tampered, a notification is received with the "Alarm" status, when all alarm loops (zones) are disarmed, there is RF jamming of the RTD (table 2).

Relay 1 opens according to these events when a jumper is installed on **plug F1**.

When the **jumper is removed from F1 plug**, the following events are additionally processed: opening of the Control Panel or TTD connected to the Control Panel; there is no connection with the TTD or with the Control Panel connected to the TTD (Table 2).

**Relay 1 (terminals Relay 1):** displays the status of all alarm loops (zones) of the fire alarm type and operates in 24-h security mode:

- **closed**, if all registered TTD, alarm loops (zones) are in "Arming" state and the RTD cover is installed.

- **open** in the absence of registered TTD, alarm loops (zones) of the fire alarm type in the memory of the RTD, receiving a "Fire" notification from TTD.

Operating mode of **OC output**:

- **turns on for 2 minutes** when at least one alarm notification

is received from **intrusion alarm** loop,

- **switches within 10 minutes** when at least one fire alarm notification is received from **fire alarm** loop,

- **turned off** in all other cases.

## 7 Factory settings

The delivered **RTD** has the following factory settings:

- operating mode - standalone;
- radio supervision time - 10 min;
- the power of the transmitter - 10 mW.
- frequency channel number - 1.

## 8 Operation modes

8.1 The operating modes of the RTD are set using jumpers.

**Table 4**

Plug	Purpose	Jumper	Note
<b>F1</b>	Relay 1 operating mode	<b>+</b>	See P. 6, Relay 1
		<b>-</b>	See P. 6, Relay 1
<b>F2</b>	Memory reset	<b>+</b> <b>after</b> enabling power	Press S1 for 5-6 sec interval
	TTD registration		Short press S1
<b>F3</b>	Firmware update	<b>+</b> <b>before</b> enabling power	Work with a PC for updating firmware or making a backup copy
	Switching of a frequency channel		Pressing the S1 button after installing the jumper on the F3 plug
<b>F4</b>	RTD operation mode switching (standalone / extended)	<b>+</b>	Short press of the button S1 after installing a jumper on plug F4
<b>F5</b>	Terminating resistor connection to LIN interface	<b>+</b>	Standalone mode
		<b>-</b>	Extended mode
<b>F6</b>	Terminating resistor connection to interface RS-485	<b>+</b> just on one RTD, the last one in the RTD chain, connected to the monitoring station or PC	Extended mode
<b>RS-L</b>	Choosing interface	<b>RS</b>	Interface RS-485
		<b>L</b>	Interface LIN
<b>TMP</b>	Simulation of closing the cover when the cover is open	<b>+</b>	S1 close
		<b>-</b>	S1 open
«+» - the jumper is installed on two pins of the plug «-» - jumper removed (or installed on one pin of the plug)			

**ATTENTION!** When the RTD is operating in extended mode

(the jumper is removed from the F5 and L plugs), it is necessary to disconnect the wires from the screw terminal blocks +LIN and -LIN!

## 8.2 Switching the operating mode of the RTD (F4) (standalone / extended)

With the power on, set a jumper on the F4 plug on the RTD. Indicators will indicate the number of the RTD operation mode:

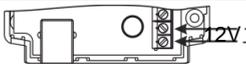
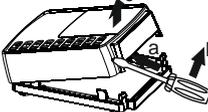
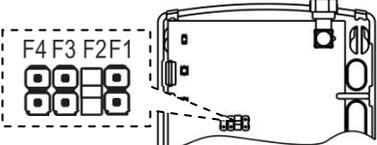
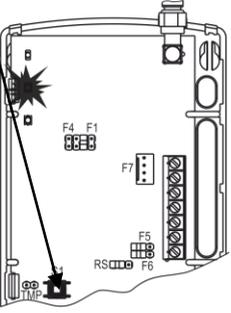
- 1 flash – standalone mode;
- 2 flashes – extended mode.

To change the mode, press the S1 button on the RTD for 1 sec. Remove the jumper from the F4 plug.

## 8.3 Frequency channel switching (F3)

With the power on, install a jumper on the F3 plug. The indicators 1 and 2 or 1 and 3 of RTD flashing synchronously of repeating series (1, 2, 3, etc. times, depending on the channel "1", "2", "3" ... "8", respectively). By pressing the S1 button, change channel "1" to "2", "2" to "3", etc. After setting the required channel, remove the jumper from the F3 plug. The indicators 1 and 2 show **1-8 channels numbers**. The indicators 1 and 3 show **9-16 channel numbers**, for determine the channel number in this case it necessary to add 8 to the number of flashes.

## 8.4 RTD memory reset (F2)

<p><b>1</b> Turn on the power of the RTD</p>	
<p><b>2</b> Push the base catches out of the groove of the RTD cover. Remove the cover</p>	
<p><b>3 Memory reset</b> Install jumper on the <b>F2</b> plug, remove jumper from <b>TMP</b> plug.</p>	
<p><b>4</b> Press and hold the <b>S1</b> button for 5-6 seconds until the red indicator 1 turns out. Release S1 button, 1 indicator will start to flash up to 30 sec., the procedure of resetting memory. As soon as the indicator 1 turns off, the RTD memory is completely reset. Memory reset is performed for RTD before registering the first TTD.</p>	

## 8.5 Firmware update

Updating the RTD firmware is carried out using **ARM-Y software** via USB or RS-485 interface.

### 8.5.1 Firmware update via USB

- turn off the power of the RTD;
- install a jumper on the F3 plug on the RTD;
- connect the RTD to a PC via a USB cable using a USB cable of the A/B type;
- run the **ARM-Y software** on the PC;
- select the "Device firmware update" mode;
- update the firmware, following the advice of the program.

### 8.5.2 Firmware update via RS-485

- set RTD to extended operating mode, see clause 8.2;
- install a jumper on the RS plug on the RTD;
- connect the RTD to the PC through the F7 connector or through the 485A, 485V terminals using the Astra-984 interface unit;

- run the ARM-Y software on the PC;
- select the "Device firmware update" mode;
- update the firmware, following the advice of the program.

## 8.6 Data backup

A data backup is created in order to preserve and ensure data restoration in case of failure and physical replacement of the failed RTD, without re-registration of the TTD.

Backup copying of the RTD registration memory is carried out using the ARM-Y software.

### 8.6.1 Data backup via RS-485 interface

- set RTD to extended mode, see clause 8.2;
- install a jumper on the RS plug on the RTD;
- connect the RTD to the PC through the F7 connector or through the 485A, 485V terminals using the Astra-984 interface unit;
- run the ARM-Y software on the PC;
- select the "Configuration of the system" mode, the "Backup" menu item;
- backup the registration data, following the advice.

## 8.7 Restore data backup

Before restoring the data backup copy, set the channel number on which the Astra-Y system was operating.

The channel can be installed in any convenient way: using the F3 jumper and the S1 button according to the method p.8.3, from the menu "Monitoring panel Astra-Y" or through the ARM-Y software.

Restoring a backup copy is performed using the ARM-Y software in a sequence similar to clause 8.6, and in accordance with the instructions in the "Tips" window of the program.

If the data backup was restored to a new RTD, then wait until the new RTD is connected with all TTDs of the system (about 30 minutes), and create a new backup for this RTD (see clause 8.6).

## 9 Preparing for standalone mode operation

9.1 RTD and TTD after transportation in conditions different from the operating conditions, keep unpacked under operating conditions for at least 4 hours.

### 9.1 RTD wiring diagram (standalone mode)

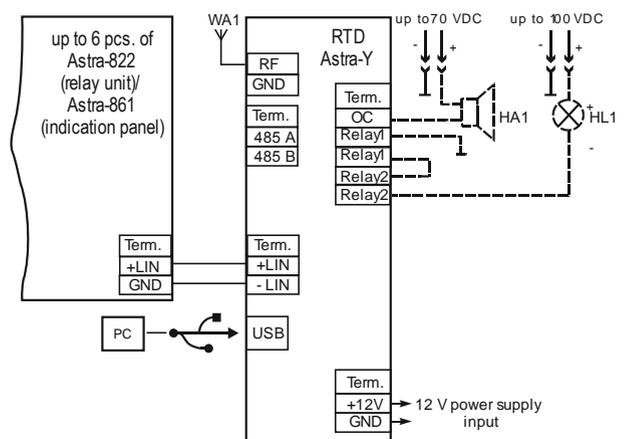
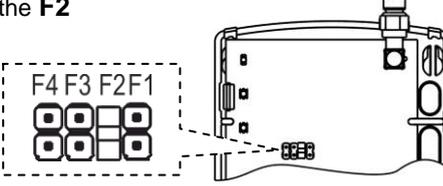
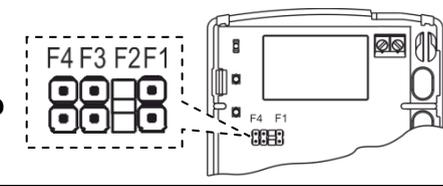
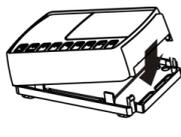


Figure 3

- Remote indication units "Astra-861" (up to 6 pcs.) provide indication of the notifications for the RTD (Figure 3).
- Information on "Astra-861" is given in the operation manual for "Astra-861".

## 9.2 Registration (assigning) of the TTD

<p><b>1</b> Power on the RTD and TTD Set <b>standalone</b> operation mode of the RTD, <b>p.8.2</b>. Set TTD operation mode according to the TTD's manual.</p> <p><b>Note</b> - If you plan to use the retransmission, then to configure the "Astra-Y" system, it required to use the <b>ARM-Y software</b>, where at registration the level of retransmission of the TTD is set from "1" to "3".</p>	
<p><b>2</b> Install jumper on the <b>F2</b> plug of the <b>RTD</b>, remove jumper from the <b>TMP</b> plug of the <b>RTD</b></p>	
<p><b>3</b> Press shortly <b>S1</b> button of the <b>RTD</b>. Led 1 of the <b>RTD</b> will turn on red</p>	
<p><b>4</b> Close <b>F2</b> plug of the <b>TTD</b> for 1 sec., <b>Led 1</b> of the <b>TTD</b> will turn on red</p>	
<p><b>5</b> In case of successful registration, the led 1 on the devices will flash red.</p>	
<p><b>6</b> After registering all <b>TTDs</b>, remove the jumper on the <b>RTD</b> from the <b>F2</b> plug</p>	
<p><b>7</b> Replace the cover on the <b>RTD</b> and on all <b>TTDs</b> (after checking the quality of connection according to p. 9.5)</p>	

**Note** - When switching the RTD from standalone mode to extended mode, re-registration of the TTD is not required.

### a. Configuring of the RTD

You can configure the RTD using **ARM-Y** software.

#### Configuration order:

- run ARM-Y software;
- plug **Astra-984** interface unit to **F7** connector;
- power on the RTD;
- set extended operation mode of the RTD (see. p.8.2);
- plug Astra-984 to USB port of the PC;
- select «System configuration» on the ARM-Y software;
- register RTD, according the embedded manual;
- register all of TTD, set TTD's operation mode and parameters, according the embedded manual;

#### On the facility:

- Run the channel selection procedure to determine the most optimal frequency channel.
- Change the system parameters: frequency number, radio supervision time, power.
- Further, if the monitoring will be organized without using the ARM-Y software, disconnect the RTD from the PC, remove the Astra-984 interface unit, set the RTD standalone operation mode.

**The Astra-Y system is ready to operate.**

### b. Connection quality test

After the installation of the TTD, it is recommended to perform a connection quality test between the TTD and the RTD. This test is performed only for TTDs working directly with RTD. For the rest of the TTD, the connection with the RTD is assessed by the indication of receiving the receipt from the RTD (the indicator lights up red 1 time per 1 sec.) after an event is created, for example, tampering or restoring the tampering of the TTD.

- 1) Plug in the wires to **+TM** and **-TM** terminals of the TTD;
- 2) Close **+TM** and **-TM** terminals for the second. Led 1 will indicate the transmitting of the test signal by the short flashes of the red light (the number of transmissions from 1 to 15) and the receiving of the receipt – turn on 1 time for 1 sec. In case of good connection quality, receiving of a receipt after the 1st to 5th transmission of the notification. If the receipt is received after 6th transmissions or is not received, we recommend to change the location of the TTD or using external antennas of the 433 MHz.

## 10 Installation

### 10.1 Installation place

**10.1.1** RDT and TTD, with a standard antenna (0.17 m whip), should be placed at the maximum height (not less than 2 m from the floor and 0.2 m from the ceiling) to ensure the largest wireless coverage range.

**10.1.2** The wires of the power supply circuits of the RTD and connecting other devices to the RTD should be located away from powerful power and high-frequency cables.

**10.1.3** Devices connected to the RTD via the LIN interface should be installed at a distance of no more than 200 m from the RTD.

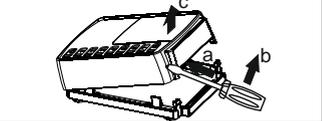
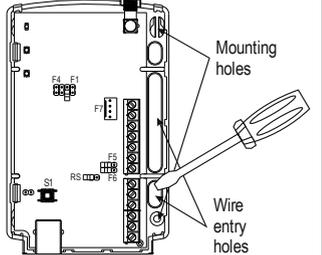
#### RTD and TTD are not recommended to place:

- on massive metal structures or closer than 1 m from them;
- closer than 1 m from power lines and metal water or gas pipes, sources of radio interference;
- inside of the metal structures;
- closer than 4 m from a personal computer and a power source.

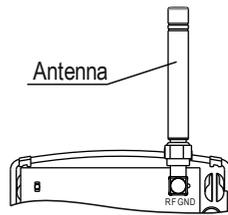
**10.1.4** Set the installation place according to the state of the green led 1:

- the **green led** is constantly on - there is no interference at the operating frequency,
- **green led** is off or flashing - interference on the operating frequency.

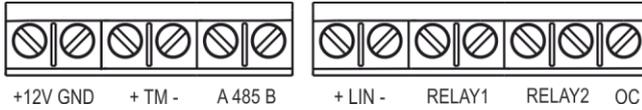
### 10.2 Installation order

<p><b>1</b> Push the base catches out of the cover groove. Remove the cover</p>	
<p><b>2</b> Remove the PCB by bending the hooks at the base.</p> <ul style="list-style-type: none"> <li>• On a flat surface, make markings for mounting holes, using the OPS base as a stencil.</li> <li>• Route the wires from the power supply, interface through the wire entry holes.</li> </ul>	
<ul style="list-style-type: none"> <li>• Fix the RTD base on the supporting surface, install the PCB in place</li> </ul>	

**3** Connect antenna to RF GND terminals



**4** Electrical installation to the output terminals of the RTD should be carried out in accordance with the selected connection diagram (Section 8)



**5** Place the cover

## 11 Maintenance

**11.1** Maintenance of the RTD is carried out according to a scheduled preventive system at least once a year.

**11.2** Maintenance work includes:

- checking the exterior of the RTD, the reliability of the RTD mount, the condition of the external installation wires, contact connections;
- cleaning the RTD case;
- checking the performance of the RTD.

## 12 Compliance with standards

**12.1** Ingress Protection Code IP41.

**12.2** Operation frequencies 433,92 MHz  $\pm$  0,2 % do not have prohibitions on use in all EU countries.

## 13 Warranty

**13.1** The quality management system is certified for compliance with **ISO 9001**

**13.2** Warranty period of operation - **5 years** from the date of commissioning, but not more than **5 years 6 months** from the date of manufacture.

**13.3** The average service life of the RTD is 8 years.

**13.4** The manufacturer is obliged to repair or replace the RTD during the warranty period.

**Warranty doesn't come into effect in the following cases:**

- non-observance of this operating manual;
- mechanical damage to the RTD;
- repair of the RTD by another person other than the Manufacturer.

The warranty applies only to the RTD. All equipment from other manufacturers used in conjunction with the RTD, including batteries, is subject to their own warranties.

**The manufacturer is not liable for any damage to health, property or other accidental or intentional loss, direct or consequential damage based on the user's statement that the RTD did not perform its functions, or as a result of misuse, failure or temporary inoperability of the RTD.**

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