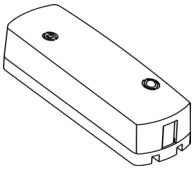**RIELTA**

WIRELESS TEMPERATURE DETECTOR

«Celsius-RK»

Installation Guide

1 General information

1.1 Wireless temperature detector «Celsius-RK» (hereinafter, the Detector) is designed for the temperature measurement and its control within a preset range and for «temperature out-of-range» messages with measured temperature values delivery via wireless two-way communication channel within 433.05 - 434.79 MHz frequency range by the «Rielta-Contact-R» wireless two-way communication protocol to control pane (hereinafter, the CP).

1.2 The Detector operates within 433.05 ... 434.79 MHz frequency range. Radiated power of a transmitter does not exceed 10 mW.

1.3 Two frequencies: the main and the reserve one are used for the wireless signal exchange with the CP. The detector switches to reserve frequency automatically.

1.4 The Detector is powered by a single power-supply battery CR123A type.

1.5 The Detector provides two temperature-measuring and control channels:

Channel 1 − built-in signal processing unit (hereinafter, SPM);
Channel 2 − external temperature sensor (hereinafter, TS).

1.6 Two operating modes are available: single-channel mode and double-channel mode. External TS should be hooked up to the Detector if double-channel mode is chosen. Operational mode selection is available during the Detector logging in the CP.

1.7 The Detector state is displayed by two-colors LED and sound indicators.

1.8 The Detector is able to operate in stand-alone mode (ref. section «Stand-alone mode»).

1.9 The preset limits of temperature range: the lower +17 ˚C, the upper +27 ˚C are stored in nonvolatile memory and may be changed by the relevant command from the CP, assisted for each channel apart.

1.10 The Detector generates and provides transmission of the following messages:

- «Norm» − the temperature is within the preset range;
- «Channel 1 out-of-range» − Channel 1 temperature is out-of-range by > 1˚ ;
- «Channel 2 out-of-range» − Channel 2 temperature is out-of-range by > 1˚ ;
- «Tamper» − case or wall tampering;
- «Failure in channel 1» − SPM failure in channel 1;
- «Failure in channel 2» − TS failure in channel 2;
- «Power-supply low-battery» − under voltage supply drop by > $2.2_{-0.2}$ V.

1.11 The Detector is designed for continuous and uninterrupted operation.

2 Features

Table 1

Features	Value
Measurement error, not more: within the temperature range from minus 10 up to +85 ˚C within the temperature range from minus 55 up to minus 11 ˚C and from +86 ˚C up to +125 ˚C	±1.0 ˚C ±2.0 ˚C
Operating temperature: - the Detector - external TS	minus 20 ... +55 ˚C minus 55 ... +125 ˚C
Permissible relative humidity at +25 ˚C, max	98 %
IP rating: - the Detector - TS	IP30 IP65
Dimensions, max	112 x 41 x 32 mm
TS cable group length, max	10 m
Weight, max	0.1 kg
Battery life, not less	8 years
The operation duration of the Detector powered by one battery under normal climate conditions and specified broadcast period 60 sec, minimum	36 months

3 Scope of Delivery

Table 2

Name	QNT.
Wireless temperature detector «Celsius-RK»	1 pc.
Screw 3-3x30.016	2 pcs.
CR123A battery	1 pc.*
External temperature sensor	**
Wireless temperature detector «Celsius-RK». Installation Guide	1 copy
* Installed ** Available optionally	

4 The Detector Construction

The Detector comprises the following elements: cover, base and printed circuit board (PCB).

The cover (not shown) is fastened to the base (1) by latches located on it's end surfaces. For the cover opening push the latches by fingers.

At the front side of the PCB (2) the following entry is located: case tamper (3), two-color LED indicator (4), connecting block for TS switching (5), main power supply battery holder plate (6), «RESET» contacts (8), SPM (9), sound alarm (10), antenna (11). Backup power supply battery holder plate and wall tamper are located on PCB back side. The PCB is fixed on the base by means of trip (7) and hooks on the opposite side of the base.
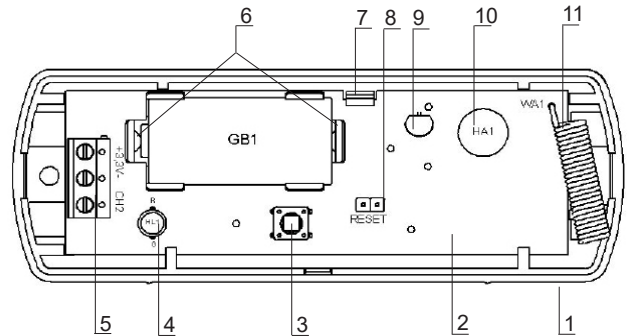

Figure 1 − The Detector with the opened cover

5 Sound and LED Indication

The Detector has the following indication modes:

- «Binding» procedure LED indication (procedure of logging in the CP);
- LED indication of the mode «Identification» is switched on by sending relevant command from CP and remains active during 15 min or until the case is opened;
- LED indication of the Detector state is switched on and remains unchanged for 15 min after the case is closed under conditions:
  a) other LED indication types (except the sound alarm) absence;
  b) alarm «Tamper» message is not generated during this time period;
  c) absence of command from the CP disabling the Detector state indication.

Indication modes are listed in the Table 3.

Table 3

The Detector Mode	Indication	Note
End of «Binding» procedure	LED lighting red for 2 − 3 sec	
«Binding» mode	LED blinking green with 0.25 sec period	The Detector logging in the CP in single-channel mode
	LED blinking green with 1 sec period	The Detector logging in the CP in double-channel mode
«Identification»	Alternate LED red and green blinking	on command from the CP
«Alarm in Channel 1» «Alarm in Channel 2»	LED lighting red for 4 sec *	State indication is on and «Identification» indication is off
Generation «Alarm in Channel 1» «Alarm in Channel 2»	Sound alarm dual switching **	State sound indication is on
Fallback recovery «Alarm in Channel 1» «Alarm in Channel 2»	Single-shot sound alarm switching **	
Radio communication quality appraisal	See sect. «Radio communication quality appraisal»	
«Failure in channel 1» «Failure in channel 2»	Orange LED indication dual switching with 12 sec period *	State indication is on and «Identification» indication is off
«Normal»	Indication is off	
* LED indication of the Detector state ** Sound indication of the Detector state		

6 Binding with the CP

«Binding» mode is used for logging the Detector in the CP and service information exchange.

6.1 Prepare the CP in accordance with CP Installation Guide.

6.2 If it is necessary to log the Detector in double-channel mode, switch TS to the Detector as shown in Figure 3 or short-circuit the terminals of the Detector «-» and «CH 2». For the single-channel mode neither switching on, no short-circuit is required.

6.3 Install the main power-supply battery to its battery-contact clips (6) (or pull out the isolating film if the battery is already installed to its place).

6.4 Set the main power supply battery to the holder plate (6). Periodical LED indicator blinking green is evidence of binding process.

6.5 In case of mentioned above LED indication absence, short-circuit «RESET» terminals for 2 − 3 s.

6.6 Successful binding procedure complying is indicated by LED indicator lighting red for 2 − 3 s.

6.7 The time limit for the binding process of the Detector is 70 sec. To restart the binding procedure, short-circuit «RESET» (8) terminals for 2 − 3 s.

7 «Stand Alone» mode

7.1 The Detector changes to stand-alone mode upon the expiry of 70 s binding procedure.

7.2 During operation in the stand-alone mode LED and sound indication is always ON under condition of «Tamper» message absence.

7.3 During operation in the stand-alone mode the Detector has no communication with CP and it's state is displayed only by means of indication (see Table 4).

Table 4

Detector state	Indication	Period
«Battery discharge»	LED lighting orange for 2 sec Single-shot sound alarm signal	12 s
«Alarm in Channel 1» «Alarm in channel 2»	Single-shot LED indicator blinking red Single-shot sound alarm signal	4 s
«Failure in channel 1» «Failure in channel 2»	Orange LED indication dual blinking Single-shot sound alarm signal	12 s
«Norm»	Single-shot LED indicator blinking green	12 s

8 Communication Quality Appraising

8.1 For radio communication quality appraisal it is necessary to:
- place firstly backup and then main power supply batteries to the correspondent holder plates;
- set the Detector on the assumed place of installation;
- push and then release case tamper.

8.2 After case tamper releasing the Detector generates case tamper alarm message, transmits it via radio communication channel and represents communication quality with CP by LED indication in accordance with the Table 5.

Table 5

LED Indication		Radio communication quality appraisal	Recommendations
Color	Mode		
Green	Three blinks	Excellent	Install the Detector on this place
Green	Two blinks	Good	
Green	One blink	Communication established	Choose another place for installation or use the «Ladoga-RK» system repeater
Red	Four blinks	No communication	

9 Installing the Detector

Open the Detector cover and remove the PCB. The cover is fixed on the base by means of latches.

For PCB removal push up the trip (7) (See Figure 1) on the base.

Prepare the fixation holes. For the holes layout mark, the base of the Detector can be used (See Figure 2).

Fasten the base by means of screws. For the wall tamper control screw the second screw to the wall tamper clip.

Install the PCB and if it is necessary, hook up TS to the terminals in accordance with Figure 3. Put the cover on it's place.

Attention! Antenna should be installed into the holder (see Figure 2).

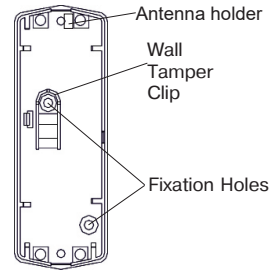Antenna installation outside of a holder essentially reduces radio communications range.
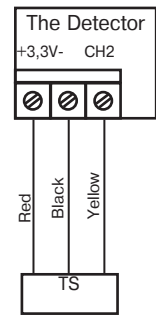

Figure 2 − The Detector Base

Figure 3 − The TS Hooking up to the Detector

10 Storage and Transportation

10.1 The Detectors are transported without power supply battery. The Detector in their original packaging are resistant to:
- transport jolting with the acceleration up to 30 m/sec^2 at impact frequency range from 10 to 120 per minute or 15 000 strikes;
- ambient temperature range minus 50 ... +50 ℃;
- relative air humidity (95 ± 3) % at a temperature +35 ℃.

10.2 The Detector in original package may be transported by any means of transportation in closed vehicles over any distances in compliance with the existing shipping rules concerning the respective means of transportation.

10.3 After transportation under the conditions different to exploitation conditions the Detector shall be ready to operate after a maximum of six hours.

10.4 The storage room shall be free from current-conducting dust, acid vapors, alkali and gases that cause corrosion and destroy insulation.

11 Manufacturer's Guarantees

11.1 The Manufacturer guarantees conformity of the Detector to the requirements of specification provided that conditions of transportation, storage, assembling and operation are observed.

The guaranteed storage period is 39 months since the date of manufacturing the Detector.

11.2 The guaranteed period of operation is 36 months since the date of commissioning within the storage period guaranteed.

11.3 If non-conformity of the Detector to technical requirements is detected during the guaranteed period provided that rules of operation are observed it shall be repaired by the Manufacturer.

Note − The guaranteed period for the Detectors isn't applied to the power supply batteries.

12 Acceptance and Packing Certificate

Wireless temperature detector «Celsius-RK» has been manufactured in compliance with the active technical documentation, classified as fit for operation and packed by «Development and Production Enterprise RIELTA» LLC.

Packing date _____
month, year