

# RADIO TEMPERATURE AND LUMINOUS FLUX INTENSITY SENSOR

## **RCL-02**

### TECHNICAL DATA

Nominal supply voltage:	3 V DC
Battery type:	2 x LR03 AAA 1,5 V DC
Transmission:	radio 868,32 MHz
Transmission way:	unidirectional
Operating range:	up to 200 m in the open area
Cooperation with system receivers:	yes – with selected receivers
Cooperation with EFC-01/EFC-02 controllers:	no
Interface:	4 push buttons + display
Values adjusted:	Preset temperature value $T_x$ Temperature hysteresis $h_T$ Preset luminous flux intensity value $L_x$ Luminous flux intensity hysteresis $h_L$
Temperature measuring range:	-20 ÷ +60 °C
Luminous flux intensity measuring range:	0 ÷ 165 000 lx
Temperature measuring accuracy:	±0,5 °C in the range of 0 ÷ 50 °C ±1,0 °C in other ranges
Luminous flux intensity measuring accuracy:	±(2 ÷ 5) lx depending on range
Temperature measuring resolution:	0,1 °C
Luminous flux intensity measuring resolution:	1 lx
Temperature operating range:	-20 ÷ +60 °C
Mounting:	surface
Casing protection degree:	IP54
Protection class:	III
Dimensions:	84 x 68 x 43 mm
Weight:	0,09 kg
Reference standard:	PN-EN 60669, PN-EN 60950, PN-EN 61000

## DESCRIPTION

Wireless temperature and luminous flux intensity sensor RCL-02 is designed for a direct cooperation with selected extra free system receivers. This sensor does not cooperate with EFC-01 and EFC-02 controllers. It can be successfully used in the roller blind control or to maintain thermal comfort at home. After adjusting the preset and the hysteresis values, the sensor sends appropriate switching on / switching off commands to its assigned system receivers. The interface in the form of four push buttons and a display allows to quickly adjust the data and to read the current temperature and luminous intensity values. The sensor is battery powered (2 x LR03 AAA). High casing protection degree of the sensor (IP54) allows it can be mounted outdoor. Additionally, the sensor has a special software solutions extending battery life. Wide measuring range, high measuring accuracy and wide operation range are additional advantages of the sensor.

## FEATURES

- Temperature measuring in the range of  $-20 \text{ } ^\circ\text{C}$   $++60 \text{ } ^\circ\text{C}$
- Luminous flux intensity measuring in the range of  $0 \text{ } +165 \text{ } 000 \text{ lx}$
- Interface in the form of 4 push buttons and a display useful during data adjustment
- Mounting possibility outdoor (IP54)
- Battery operated
- Wide operation range (up to 200 m in the open area)

## APPEARANCE

STATUS LED

Display

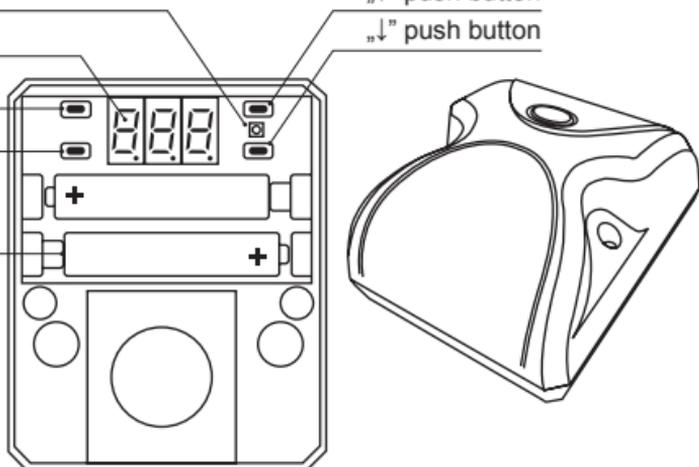
SET push button

NAUKA push button

Batteries 2 x AAA

“↑” push button

“↓” push button



## PUSH BUTTON FUNCTIONALITIES

SET push button	<ul style="list-style-type: none"> <li>• Enter the sensor MENU</li> <li>• Switching between adjustments in sensor's MENU</li> <li>• Confirmation of inserted data</li> <li>• Display of current temperature and luminous flux intensity values</li> </ul>
NAUKA push button	<ul style="list-style-type: none"> <li>• Sending the data frame to the extra free system receiver</li> </ul>
„↑” push button	<ul style="list-style-type: none"> <li>• Increasing the preset values</li> </ul>
„↓” push button	<ul style="list-style-type: none"> <li>• Decreasing the preset values</li> </ul>

## PARAMETERS ADJUSTED IN SENSOR MENU

TAB. 1

Parameter description	Symbol	Adjustment range
Preset temperature value [°C]	Tx	0,1 ÷ 60 °C
Hysteresis for measuring temperature [°C]	hr	0,1 ÷ 10 °C
Preset luminous flux intensity [lx]	Lx	(0 ÷ 165 000 lx)*
Hysteresis for measuring luminous flux intensity [lx]	hL	1 ÷ 100 lx
Operation modes – temperature sensor	t	0 ÷ 8
Operation modes – luminous flux intensity sensor	l	0 ÷ 8

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TAB. 2

0 ÷ 999 lx – adjustments with an interval of 1 lx  
 1.00 ÷ 9.90 lx (1000 lx ÷ 9900 lx) – adjustments with an interval of 100 lx  
 10.0 ÷ 99.0 lx (10000 lx ÷ 99000 lx) – adjustments with an interval of 1000 lx  
 100. ÷ 165. lx (100000 lx ÷ 165000 lx) – adjustments with an interval of 10000 lx

Mode number	Conditions	Receiver's operation
0	-	Sensor is switched off
1	$T > T_x + h_T$ $T < T_x - h_T$	Switching on a receiver (ON) Switching off a receiver (OFF)
2	$T > T_x + h_T$ $T < T_x - h_T$	Switching off a receiver (OFF) Switching on a receiver (ON)
3	$T > T_x + h_T$	Switching on a receiver (ON)
4	$T > T_x + h_T$	Switching off a receiver (OFF)
5	$T < T_x - h_T$	Switching on a receiver (ON)
6	$T < T_x - h_T$	Switching off a receiver (OFF)
7	$T > T_x + h_T$ or $T < T_x - h_T$ $T < T_x + h_T$ or $T > T_x - h_T$	Switching on a receiver (ON) Switching off a receiver (OFF)
8	$T > T_x + h_T$ or $T < T_x - h_T$ $T < T_x + h_T$ or $T > T_x - h_T$	Switching off a receiver (OFF) Switching on a receiver (ON)

It means:

T – currently measured temperature value

$T_x$  – adjusted preset temperature value

$h_T$  – adjusted hysteresis value for temperature

# OPERATION MODES (I) Luminous flux intensity sensor TAB. 4

Mode number	Conditions	Receiver's operation
0	-	Sensor is switched off
1	$L > L_x + h_L$ $L < L_x - h_L$	Switching on a receiver (ON) Switching off a receiver (OFF)
2	$L > L_x + h_L$ $L < L_x - h_L$	Switching off a receiver (OFF) Switching on a receiver (ON)
3	$L > L_x + h_L$	Switching on a receiver (ON)
4	$L > L_x + h_L$	Switching off a receiver (OFF)
5	$L < L_x - h_L$	Switching on a receiver (ON)
6	$L < L_x - h_L$	Switching off a receiver (OFF)
7	$L > L_x + h_L$ or $L < L_x - h_L$ $L < L_x + h_L$ or $L > L_x - h_L$	Switching on a receiver (ON) Switching off a receiver (OFF)
8	$L > L_x + h_L$ or $L < L_x - h_L$ $L < L_x + h_L$ or $L > L_x - h_L$	Switching off a receiver (OFF) Switching on a receiver (ON)

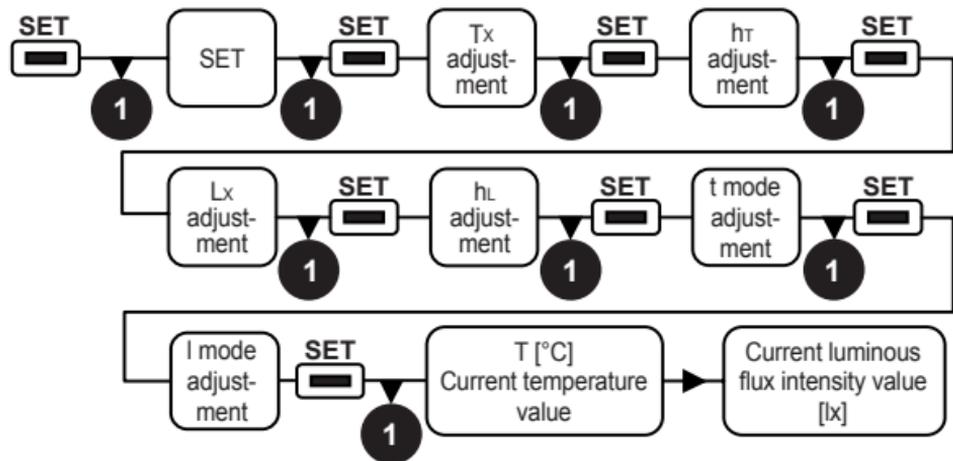
It means:

L – currently measured luminous flux intensity value

$L_x$  – adjusted preset luminous flux intensity value

$h_L$  – adjusted hysteresis value for luminous flux intensity

## SWITCHING THROUGH SENSOR MENU



## PROGRAMMING SENSOR'S PARAMETERS

### Adjustment of the preset temperature value (Tx):

- 1 Press SET push button and enter the "Tx adjustment" tab
- 2 By means of  $\uparrow\downarrow$  push buttons adjust the preset temperature  $T_c$  value in  $^{\circ}\text{C}$ .
- 3 Adjustment can be done in the range of  $0,1 \div 60$   $^{\circ}\text{C}$ .
- 4 Confirm the adjustment by means of SET push button.
- 5 After 5 s. the sensor will display current temperature and luminous flux intensity values and will switch to normal operation mode.

### Adjustment of the hysteresis for temperature (hr):

- 1 Press SET push button and enter the "hT adjustment" tab
- 2 By means of  $\uparrow\downarrow$  push buttons adjust the hysteresis  $h_T$  value in  $^{\circ}\text{C}$ .
- 3 Adjustment can be done in the range of  $0,1 \div 10$   $^{\circ}\text{C}$ .
- 4 Confirm the adjustment by means of SET push button.
- 5 After 5 s. the sensor will display current temperature and luminous flux intensity values and will switch to normal operation mode.

### Adjustment of the preset luminous flux intensity value (Lx):

- 1 Press SET push button and enter the "Lx adjustment" tab
- 2 By means of  $\uparrow\downarrow$  push buttons adjust the preset luminous flux intensity value [lx].
- 3 Adjustment can be done in the range of  $0 \div 165\ 000$  lx (see the parameters adjusted in sensor menu).
- 4 Confirm the adjustment by means of SET push button.
- 5 After 5 s. the sensor will display current temperature and luminous flux intensity values and will switch to normal operation mode.

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### **Adjustment of the hysteresis for luminous flux intensity (hL):**

- 1 Press SET push button and enter the "hL adjustment" tab
- 2 By means of  $\uparrow\downarrow$  push buttons adjust the hysteresis value for luminous flux intensity [lx].
- 3 Adjustment can be done in the range of  $0,1 \div 100$  lx.
- 4 Confirm the adjustment by means of SET push button.
- 5 After 5 s. the sensor will display current temperature and luminous flux intensity values and will switch to normal operation mode.

### **Adjustment of the operation mode for a temperature sensor (t):**

- 1 Press SET push button and enter the "t mode adjustment" tab.
- 2 By means of  $\uparrow\downarrow$  push buttons adjust the operation mode of a temperature sensor according to TAB. 3.
- 3 Operation modes can be adjusted in the range of  $0 \div 8$  (0 - sensor is switched off).
- 4 Confirm the adjustment by means of SET push button.
- 5 The sensor will display current temperature and luminous flux intensity values and will switch to normal operation mode.

### **Adjustment of the operation mode for a temperature sensor (t):**

- 1 Press SET push button and enter the "t mode adjustment" tab.
- 2 By means of  $\uparrow\downarrow$  push buttons adjust the operation mode of a temperature sensor according to TAB. 3.
- 3 Operation modes can be adjusted in the range of  $0 \div 8$  (0 - sensor is switched off).
- 4 Confirm the adjustment by means of SET push button.
- 5 The sensor will display current temperature and luminous flux intensity values and will switch to normal operation mode.

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## **DISPLAY OF CURRENT TEMPERATURE AND LUMINOUS FLUX INTENSITY SENSOR**

- 1 Press SET push button.
- 2 The display will show SET – wait for about 5 seconds.
- 3 After this time current temperature value in [°C] will be displayed first and then current luminous flux intensity in [lx].

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## **PROGRAMMING TEMPERATURE SENSOR IN EXTA FREE SYSTEM RECEIVERS**

- 1 Press SET push button.
- 2 Press the  $\uparrow$  push button to enter " Operation mode adjustment for a temperature sensor" tab.
- 3 By means of  $\uparrow\downarrow$  push buttons adjust an appropriate number of the operation mode according to TAB. 3.
- 4 Press PROG push button in a receiver till the red STATUS LED switches on.
- 5 Press NAUKA push button in RCL-02 sensor and wait until the sensor sends the data frame.

**CAUTION: NAUKA push button must be pressed before the sensor displays current temperature and luminous flux intensity values.**

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## PROGRAMMING THE LUMINOUS FLUX INTENSITY SENSOR IN EXTA FREE SYSTEM RECEIVERS

- 1 Press SET push button.
- 2 Press ↓ push button to enter „Adjust the operation range for the luminous flux intensity sensor” tab.
- 3 By means of ↑↓ push buttons adjust the proper mode number in accordance with Tab. 4.
- 4 Press PROG push button in a receiver till the red STATUS LED switches on.
- 5 Press NAUKA push button in RCL-02 sensor and wait till the sensor sends a data frame.

**CAUTION:** Press NAUKA push button before the sensor enters the mode indicating current temperature and luminous flux intensity values.

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## DELETING A SENSOR FROM RECEIVERS EXTA FREE

In order to delete a sensor from exta free system receiver press for a longer time (5 sec.) PROG push button in the receiver.

**CAUTION:** In case of exta free system receivers there is no possibility of selective deletion of transmitters / sensors. After a sensor or a transmitter is deleted from a receiver's memory, all other assigned transmitters / sensors are also deleted.

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## MOUNTING AND BATTERY REPLACEMENT

- 1 Remove the cover screws.
- 2 Mount the RCL-02 sensor to the base by means of screws (2 x wall plug 6 x 3,5 x 35 mm).
- 3 Mount the cover and screw it to the base.

In case of battery replacement, first take off the cover and remove the discharge batteries. Next mount new batteries but pay a particular attention to the battery polarity, which is indicated on the PCB plate.

