



EyeZen RF

**KNX-RF Motion detector
for ceiling mounting (868 / 915 MHz)**

**ZPDEZRF868
ZPDEZRF915**

Application program version: [1.0]
User manual edition: [1.0]_a

www.zennio.com

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1 INTRODUCTION

1.1 EYEZEN RF

EyeZen RF from Zennio is a device that aims the detection of movement, communicating completely wirelessly via radio frequency. This device has been designed for ceiling or false ceiling mounting by means of the bundled accessories.

The most outstanding features of EyeZen RF are:

- **Radiofrequency communication**
- Configurable **transmission power**.
- **Two color of lens:** white and black.
- **Alarms** to indicate if there is tampering or low battery in the device
- **Heartbeat** or periodical “still alive” notification.
- **Movement detection:**
 - Periodic and delayed sending (binary, scene, scaling).
 - Motion-dependent climate control
- **Sensor** with configurable sensitivity.
- **LED** to indicate motion.

1.2 INSTALLATION

EyeZen RF it is entirely powered through a battery. The communication with the other devices of the installation is carried out through the RF antenna that incorporates inside.

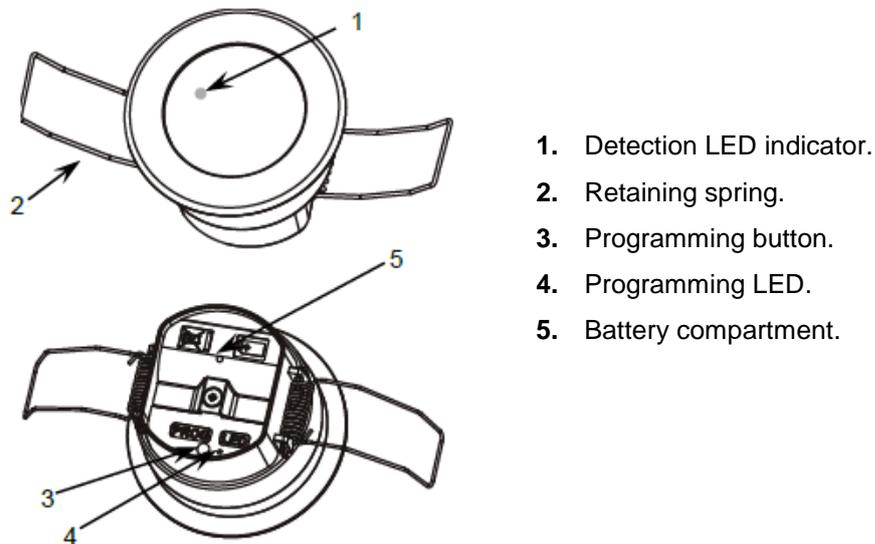


Figure 1. EyeZen RF. Elements

The main elements of the device are described next.

- **Programming button (3):** a short press on this button sets the device into the programming mode, making the associated LED (4) light in red.

Note: *if this button is held while plugging the battery, the device will enter the **safe mode**. In such case, the LED will blink in red every 0.5 seconds.*

- **Detection notification LED (1):** emits a red light flash when the sensor observes motion.

To get detailed information about the technical features of this device, as well as on the installation process and on security procedures, please refer to the corresponding **Datasheet**, bundled with the original packaging of the device and also available at www.zennio.com.

1.3 DEVICE PROGRAMMING

Once the battery is connected, downloading both the physical address and the application program will be possible. To do this, the EyeZen RF must be in “**active**” state. Generally, EyeZen RF remains in a low consumption **idle** state in which it does not respond to orders or reading requests, therefore, it is necessary to force it out of this idle state in order to perform the downloading.

The EyeZen RF enters the active state and remains in the active state for 1 minute when the programming button is pressed.

In addition, after power failure or programming the device will remain in the active state for 10s.

Note: *if the programming LED does not light up when the battery is removed and reconnected, perform a longer power failure (at least 30 seconds).*

1.4 START-UP AND POWER LOSS

During the start-up of the device, the detection notification LED flashes red for **one minute** before the motion sensor is ready.

Furthermore, if the **tamper** and **battery alarms** are enabled, the state of these 2 alarms will be sent after each reset.

2 CONFIGURATION

After importing the corresponding database in ETS and adding the device into the topology of the desired project, the configuration process begins by entering the parameters window of the device.

2.1 GENERAL

In “General” tab all the functionality of the device will be configured, with the exception of the motion detection functionality, which will be configured in a separated tab.

Therefore, since this tab it will be possible configure the **power of the radio frequency transmission**, the **lens color**, **Heartbeat** and two **alarms**:

- **Transmission power:** sets the distance and the power of the radio frequency links.
- **Lens color:** sets the color of the lens of the device
- **Tamper:** notifies whether the device has been tampered with by removing its enclosure.
- **Battery:** warns the user when the battery level is about to run out.

ETS PARAMETERISATION

From **General** screen it is possible to activate/deactivate all the required functionality.

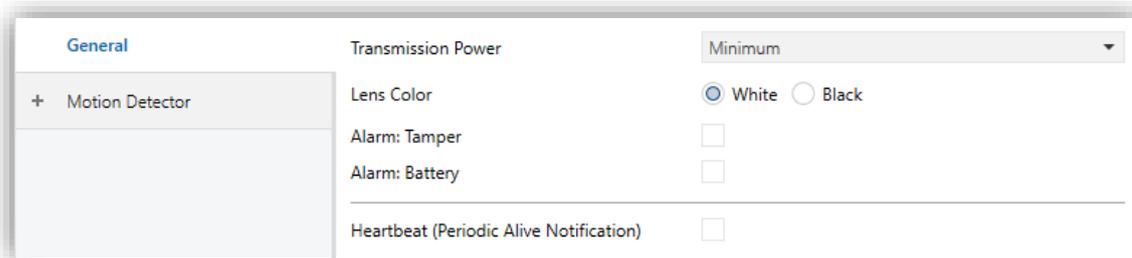


Figure 2. General

- **Transmission Power** [*Minimum* / *Medium* / *Maximum*]¹: allows to set the transmission power of the device.

¹ The default values of each parameter will be highlighted in blue in this document, as follows: [*default/rest of options*].

Note: higher transmission power increases the transmission distance of the EyeZen RF but also shortens battery life.

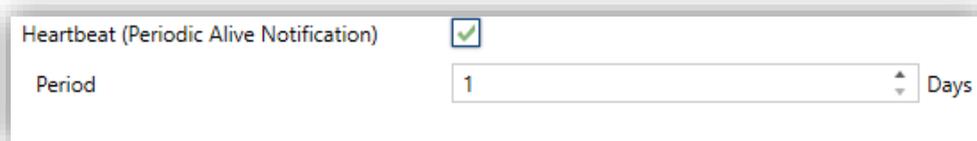
- **Lens Color** [[White](#) / [Black](#)]: selecting the lens color that EyeZen RF has installed, will allow a correct performing of the device.
- **Alarm: Tamper** [[enabled](#) / [disabled](#)]: enables the object “**Alarm: Tamper**” through which an 'Alarm' is sent when the battery cover is removed, and 'No Alarm' when it is replaced

Note: the tamper alarm will be sent 5 times with a period of 2 seconds after each change of state.

- **Alarm: Battery** [[enabled](#) / [disabled](#)]: enables the object “**Alarm: Battery (Status)**” through which a '1' is sent when the battery level is about to run out.

Note: the battery alarm will be sent periodically every day, while the 'No alarm' notification will be sent only once. After each device reset the battery state will be notified

- **Heartbeat (Periodic Alive Notification)** [[enabled](#) / [disabled](#)]: incorporates a one-bit object to the project (“**[Heartbeat] Object to Send '1'**”) that will be sent periodically with a value of “1” to notify that the device is still working (still alive).



Heartbeat (Periodic Alive Notification)

Period Days

Figure 3. Heartbeat

Note: the first sending after download or bus failure takes place with a delay of up to 255 seconds, to prevent bus overload. The following sending match the period set.

Note: with the aim of increase the battery life, Heartbeat will only be configurable in days.

2.2 MOVEMENT DETECTOR

2.2.1 CONFIGURATION

EyeZen RF incorporates **motion detector** functionality, which consists in sending objects to the bus whenever the device observes a moving body (or no longer observes it) in the environment of the room where it has been installed. Also, it will be possible to control the climate depending of the motion detection.

The operating principle of the motion detection is as follows, in general, the device will remain in low power state in order to increase the battery saving. When a motion is detected, it will be notified by means of the configured objects. Then, the device returns to the low power state during the **waiting time**, which it is configurable, and in case of detects new motions during these will not be taken into account.

After this waiting time has elapsed, a **listening time** starts where the device will again detect motion and where two situations may occur:

- No motion is detected during this time, therefore it is considered that there is no one in the room and no detection objects are sent.
- A new motion is detected during this time, therefore the detection state is maintained, without notifying anything, starting the waiting time again and restarting the operation explained previously

In any case, it is also possible to configure **blind time** to be counted from the transition from detection to no detection transition, where during this time any motion will be ignored.

For a better understanding, an operational diagram of the is added.

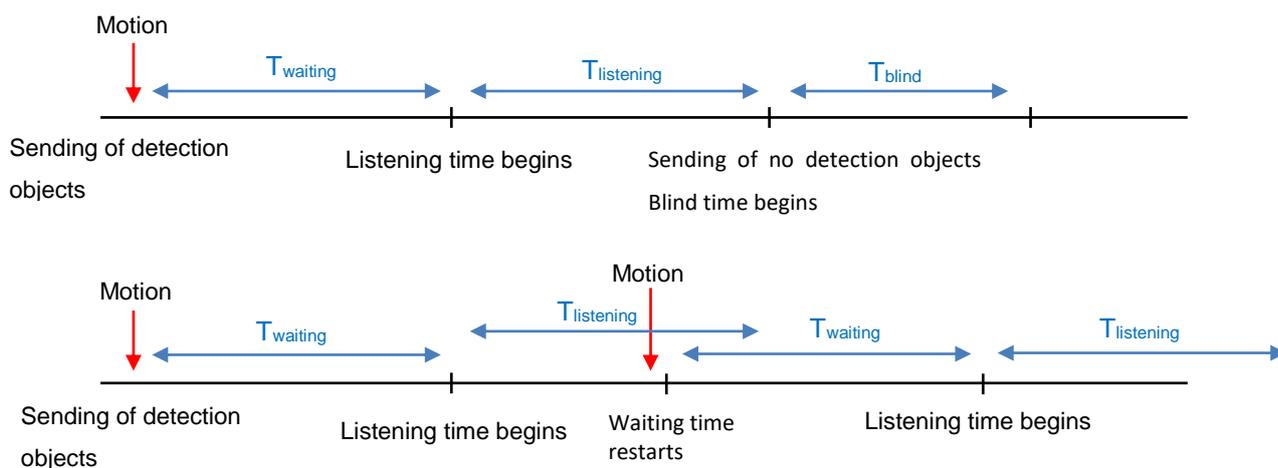


Figure 4. Operating principle of the motion detector

In the case of enable **HVAC control**, this functionality provides a filter to allow switching on the unit only if motion is being detected on a continuing basis, which helps preventing the switch-on of the climate system in case of exceptional or temporary movements.

This filter consists in a set of time windows, which allow switching to the Detection state only if motion has been detected in all of them.

Example: a two 30-second window filter:

- Immediately after the first detection, 30-second count of the first time window will start, considering this window as overcome.
- Once the first 30-second time count finishes, a second window begins. If no motion is detected in this time, the process is aborted and does not start over until a new detection takes place. However, if detections do take place during the second window as well, then the Detection state will be adopted immediately.

Both the number of windows and its duration is configurable from ETS by enabling this functionality, furthermore it is possible to send additionally different **HVAC** modes for detection and no detection states.

In addition, EyeZen RF, allows any detected motion to be notified by means of the **LED detection indicator**

Finally, it is also possible to set custom **sensitivity** values for the motion sensor. Factors such as the motion speed and direction together with the distance to the device may have a positive or negative effect the motion detection.

Distance		Speed		Direction	
Longer	Shorter	Greater	Lower	Front	Tangential
Negative	Positive	Positive	Negative	Negative	Positive

Table 1. Factors conditioning the motion detection

Therefore, **low sensitivity** may prevent the detection of slower and front movements, especially at longer distances from the sensor. On the other hand, **higher sensitivity** may saturate the detection, especially at shorter distances.

ETS PARAMETERISATION

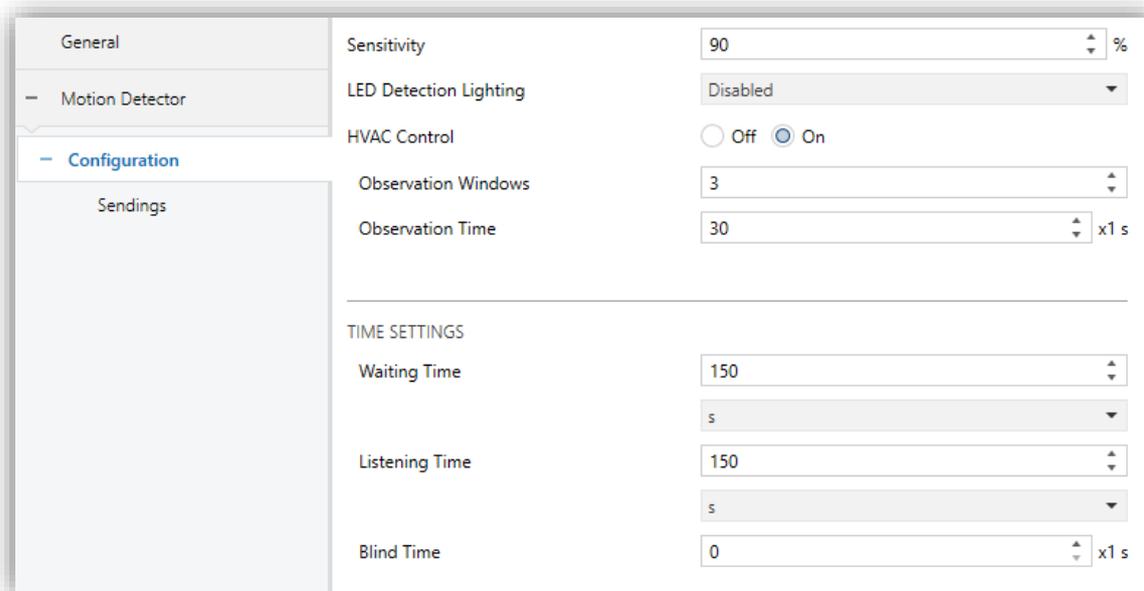


Figure 5. Movement Detector. Configuration.

- **Sensitivity** [1...90...100] [%]: sensitivity for the motion sensor.
- **LED Detection Lighting** [Disabled / Enabled / Enabled during 5 minutes after reset]: activates or deactivates the LEDs that indicate motion detection.

Note: *Enabling this functionality may shorten battery life of the device*
- **HVAC Control** [Off / On]: activates the climate system control, showing the following parameters

- **Observation Windows** [1...3...255]: number of time windows in which motion must be detected before switching to Detection.
- **Observation Time** [1...30...255] [s]: length (in seconds) of each observation window.

- **Waiting Time** [60...150...255][s] [1...255][min] [0...18][h]: sets the value of the waiting time during which motions will be ignored.

- **Listening Time** [60...150...255][s] [1...255][min] [0...18][h]: sets the value of the listening time during which motion will be taken into account in order to establish the appropriate detection state.

- **Blind Time** [0...255][s]: sets the minimum period of time the channel will remain under the “No Detection” state, even if motion detections are taking place in the room, which will be ignored.

2.2.2 SENDINGS

In this tab it is possible to customise the sending for Detection and No detection states, as well as, their periodicity and delay.

ETS PARAMETERISATION

The Sending tab contains the following parameters, which are analogous for both Detection and No Detection.

Figure 6. Movement Detector. Sending.

- **Binary Value** [[enabled](#) / [disabled](#)]: enables or disables the sending of a binary value (as set in **Value** [[Off](#) / [On](#)]) through the “**Motion (Binary)**” communication object.
- **Scene** [[enabled](#) / [disabled](#)]: enables or disables the sending of a scene execution order (as set in **Value** [[1...64](#)]) through the “**Motion (Scene)**” communication object.
- **Scaling** [[enabled](#) / [disabled](#)]: enables or disables the sending of a percentage value (as set in **Value** [[0...100](#)]) through the “**Motion (Scaling)**” communication object.

- **HVAC Mode** [*enabled / disabled*] (only if the “HVAC Control” is enabled): enables or disables the sending of a special HVAC mode value (as set in **Value**) through the “**Motion (HVAC)**” object:

HVAC Mode	Object value
<i>Auto</i>	0
<i>Comfort</i>	1
<i>Standby</i>	2
<i>Economy</i>	3
<i>Building Protection</i>	4

Table 2. HVAC modes

- **Sending Mode** [*Once / Cyclic*]: if the latter is selected, the following field will also be shown:

➤ **Period** [*60...255*][s] [*1...255*][min] [*1...18*][h].

Note: *With the aim of increase the battery life of the device, only in “Detection” state will be possible set periodic sending. In addition, the shorter the sending period, the shorter the life of the battery.*

- **Delay** [*0...255*][s/min] [*0...18*][h]: sets a delay between the detection state switchover and the actual sending to the bus.

ANNEX I. COMMUNICATION OBJECTS

- “Functional range” shows the values that, with independence of any other values permitted by the bus according to the object size, may be of any use or have a particular meaning because of the specifications or restrictions from both the KNX standard or the application program itself.

Number	Size	I/O	Flags	Data type (DPT)	Functional Range	Name	Function
1	1 Bit		C - - T -	DPT_Alarm	0/1	Alarm: Tamper	0 = No Alarm; 1 = Alarm
2	1 Bit		C - - T -	DPT_Alarm	0/1	Alarm: Battery (Status)	0 = No Alarm; 1 = Alarm
3	1 Bit		C - - T -	DPT_Switch	0/1	Motion (Binary)	Binary Value
4	1 Byte		C - - T -	DPT_Scaling	0% - 100%	Motion (Scaling)	0 - 100%
5	1 Byte		C - - T -	DPT_SceneNumber	0 - 63	Motion (Scene)	Scene Value
6	1 Byte		C - - T -	DPT_HVACMode	0=Auto 1=Comfort 2=Standby 3=Economy 4=Building Protection	Motion (HVAC)	Auto, Comfort, Standby, Economy, Building Protection
7	1 Bit		C - - T -	DPT_Trigger	0/1	[Heartbeat] Object to Send '1'	Sending of '1' Periodically

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<https://support.zennio.com>

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