

## K2150 Long range & high bay occupancy detector

Cost-effective technology for lighting control of high warehouses, production buildings and areas, car parking lots and urban streets



The K2150 occupancy detector for lighting control is designed for installation on the ceiling in warehouses with the height from 3m to 30m. One sensor covers up to 80 meters of the warehouse alley! It can also be installed on a wall, 1.5-2 m from the floor, for controlling the lights of warehouses picking and loading areas, various production areas, car parks, urban streets, squares, and so on, with a large operation zone (at most 160" 40x70 m).

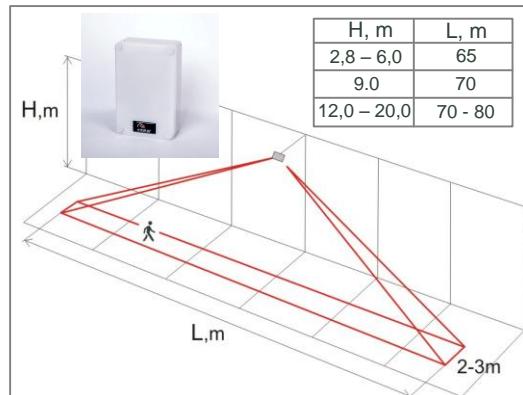
The sensor traces the movement of a person or motor vehicles and transmits the control signal to the lighting, automation or security system.

Energy savings - up to 80%  
The payback period < 1 year (for a warehouses)  
One of a kind!

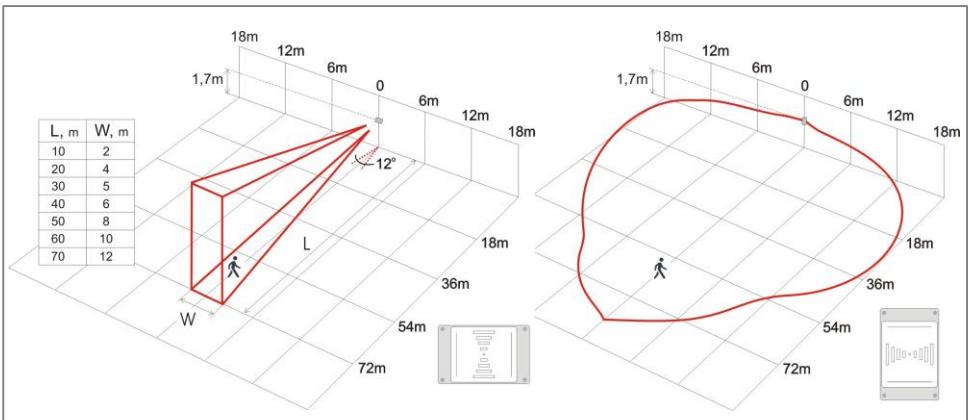
**K2150 is a three-in-one sensor: One sensor and three outputs:**

1. the relay 30A output for switching standard fixtures (if a movement does not occur, then the fixtures are off, if it does, then they are on);
2. the 1-10V output is for adjusting a light flux gradually within 2-100 % (if a movement does not occur, then the fixtures operate at the economical mode set by the installer, from 2 % to 100 % of the light flux, if it does, then they gradually, in 2 seconds, switch to the 100 % light flux mode). For your information: at the 5 % light flux mode, the energy consumption of an LED fixtures decreases by 12-14 times!
3. the special output is for connecting the sensor to a **security alarm system** or to **IP-cameras**. By using this output, the sensor can also be connected to an **automated warehouse control system** for tracing and highlighting bays with a high load (a forklift drives through too often) and underused bays (a forklift drives through seldom) and subsequently optimizing the distribution of items. The sensor may optionally be supplied with **DALI, KNX, LoRa, Sigfox, NB-IoT...** modules and a long-range radio channel (up to 15 km).

### K2150 sensor's sensitive area



The width of the K2150 sensor's sensitive area depending on the installation height H (person's movement tracing!)



The K2150 sensor's sensitive area when vertically installed on a wall, when horizontally installed on a wall

### How the K2150 sensor works and how it is different from an infrared motion sensor (PIR)

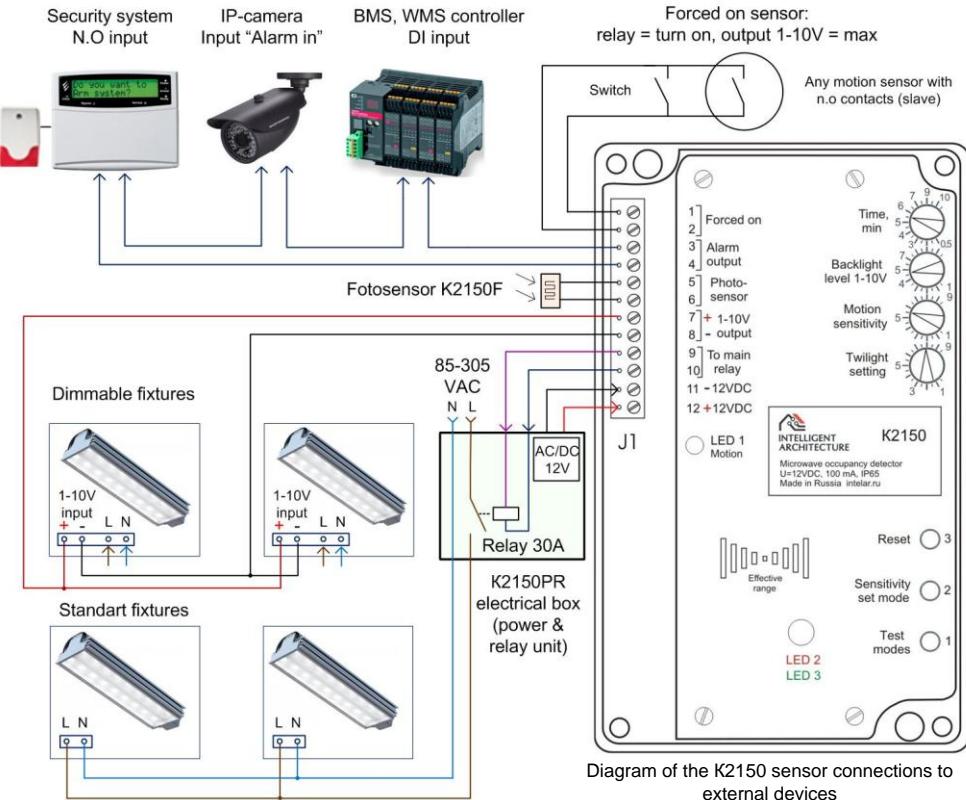
The K2150 sensor's functional principle is based on radiating an electromagnetic field to the surrounding area and registering its changes caused by its reflection from the objects moving in the sensor's sensitive area. Nowadays, the main competitors are generally German ceiling passive infrared motion sensors with the installation height of 12-14 m and the sensitive area width of about 30 m.

At the same time, infrared motion sensors have a significant drawback, namely, they trace not the movement itself but the difference between the temperatures of the moving object and the surrounding area. That is why infrared motion sensors miss the movement if, for example, the forklift has cooled down to the ambient temperature, and the driver's cabin is covered by plexiglass or the driver is wearing warm coveralls.

The same problem occurs in warehouses in hot weather when the air gets warmed up to 34-36 °C, and the sensors cease to trace a person's movement.

Another feature of infrared sensors is that they trace the movement at certain points of its area, and the distance between those points can amount to several meters; therefore a few of them must be installed for one alley with the turn-off delay of about 5-10 min, which significantly reduces their effectiveness and pay-off period (the alley is already empty, but the lights still enabled for 5-10 min).

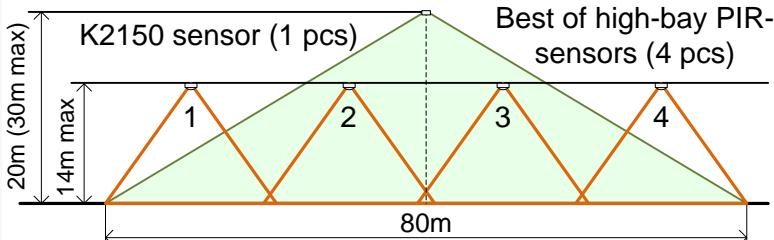
The K2150 sensor does not have these drawbacks. At the place where four infrared motion sensors must be installed, one K2150 sensor with the turn-off delay of about 0.5 min is sufficient because the sensor traces each step of the person, that is, it has a high sensitivity level.



## K2150 sensor applications:

- Warehouses with the height from 3 m to 30 m
- Indoor and outdoor car parks (installation on the wall); the wide sensitive area up to 3000 m<sup>2</sup>
- Server rooms and DPCs (70m - the length of the corridor area at the 2.8-30 m installation height).
- Any production facilities, including those with thermal radiation sources in which infrared motion sensors will not work.
- As a traffic intensity control sensor, including transport + pedestrians for the Smart City and Smart Street systems. Transport detection range is up to 100 m.
- As a motion sensor for controlling street light at parks, squares, and car parks at shopping malls.
- As an intruder detection sensor for guarding a protected area's perimeter and volume, including ones with an additional function of controlling the area lights by movement.

## Warehouse



## One K2150 vs 3-4 PIR sensors

When installed in a warehouse, one Sensor replaces 3-4 PIR-sensors and saves 160,000 kWh over a 15-year life cycle (if a warehouse is open around the clock). In monetary terms, the savings will be 16,000 Eu or 1060 Eu per year at a price of 1kWh = 0.1Eu. One sensor in a life cycle will reduce CO<sub>2</sub> emissions to the atmosphere by 63 tons.

The only one in the world works in freezing warehouses and warehouses with a height of more than 15m.

The installation cost is reduced several times.

## K2150 sensor's cost effectiveness (using the example of a warehouse)

The object is an actual warehouse with the 72x78 m area, 17 m height, and shelf storage of items. The length of the alleys is 68 m. The forklift drives through the alley every 7 min and stays there for about 1 min. 150 W LED fixtures without a dimming function, 216 pcs. The number of bays is 18; the number of fixtures per bay is 12. The lights duty cycle is 24 hours per day. Energy consumption without automation is 283,824 kWh per year. Energy consumption with automation (3 emergency fixtures, 9 fixtures that get turned off by the sensor) is 97,567 kWh per year. Savings: 283,824 - 97,567 = 186,257 kWh per year or 186,257 x 0,15 € = 27,938 € per year. The modernization cost, including the installation cost, is approximately 24,000 €. The payback period: 24,000/27,938 = **0.8 years**.



If food is stored in the warehouse, that is, the warehouse is artificially cooled, then it is necessary to consider the following. Nowadays, even the best LEDs use only 20 % of the energy for light emission and 80 % for heat generation. Therefore, the 150 W fixture is not only a light source but also a constantly working 120 W heater ( $150 \text{ W} \times 0.8 = 120 \text{ W}$ )!

Thus, the total heat generation of the lamps in such warehouse is 216 pcs.  $\times 0.12 \text{ kW} = 25.9 \text{ kW}$ , and the warehouse cooling system must constantly compensate for this heat generation! Using motion sensors at such facilities will give additional, significant savings, and the pay-off period of the automated light system will be reduced.

We recommend that you install dimming fixtures in warehouses and parking lots. Their price is almost compatible to the price of a standard lamp today! The dimming function will allow to create a light environment comfortable to eyes without abrupt changes in illumination when the automatics operate, to avoid commutation network loads, and to extend the lifetime of the lamps.

**Sensor samples are available for order.**

OEM is welcome!