

K10 24GHz Millimeter-Wave Radar Obstacle Avoidance and Warning Manual

Model: K10

The product consists of three 24 GHz short-to-medium-range millimeter-wave obstacle-avoidance radars, one audible and visual alarm, three warning lights, and a wiring harness.



3 radar sensors + 1 audible and visual alarm + 3 warning lights

I. Overview

The K10 24 GHz Short-Range Obstacle-Avoiding Millimeter-Wave Radar is a millimeter-wave radar sensor with one transmitter and two receivers. By transmitting and receiving microwaves at a frequency of 24 GHz, it can detect the approach and departure of moving objects, as well as their real-time distance and horizontal angle, and output the required information to the host in real time, thereby enabling intelligent control.



Schematic diagram of the audible and visual alarm



Schematic diagram of the K10 millimeter-wave radar

II. Overview of Single-Color Linear Lights

The red light remains steady to clearly mark the boundaries of a safe work area; when triggered, the red light flashes rapidly to warn of approaching personnel or objects, alerting on-site personnel to take evasive action. Common applications: forklifts, construction vehicles, mining machinery, logistics equipment, etc.



Constant On/Red Light



Flashing light/Red light



Installing LED clearance lights on the left, right, and rear sides of the forklift provides a clear visual warning to those in the surrounding area.

Single-bar warning light	
Project	Parameters
Operating Voltage	DC 12–80 V
LED Chips	6 high-brightness LED chips
Product Power	30W
Product Specifications	150 × 42 × 42 mm
Wiring Method	Connect the black wire to the negative terminal; connect the red wire to the positive terminal.
Product Material	Acrylic lens cover, aluminum alloy housing, copper-core wiring, stainless steel bracket
Product Color	Red-light type
Product Features	High brightness, soft, glare-free light, versatile applications, long lifespan, adjustable angle, easy installation
Important Notes	Do not exceed the rated voltage or operating range; do not use a 220-volt household test lamp.

Schematic diagram of a single-color linear light



Front



Back

III. Basic Specifications

Parameter Items	Parameter range
Operating frequency	24 GHz
Operating voltage	9V-24V/DC
Suitable power supply ripple	0-60mV
Operating current	20-30mA (5V)
Operating temperature	-20 to +60 °C
Target Type	Moving object
Detection range	0.4m-10m
Detection width	0.4m-8m

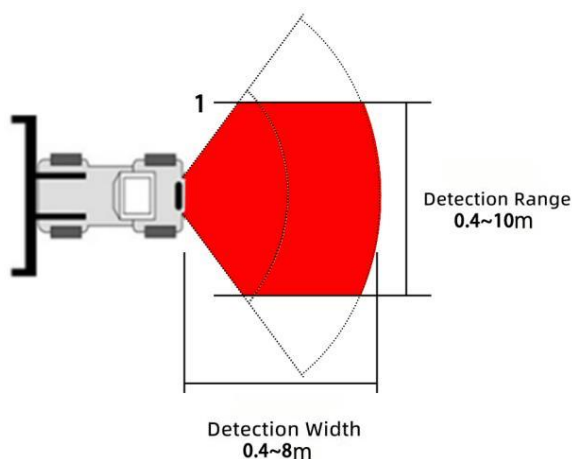
IV. Reliability Testing

Certification Programs	Test Results	
ROHS	Compliant with RoHS 2.0	
EMC	Electrostatic Discharge Immunity Radio Frequency Electromagnetic Field Radiation Immunity Electrical Fast Transient Burst Conducted Immunity to Radio Frequency Fields	Complies with the requirements of EN 55014-2:2015

V. Installation Direction/Angle

Installation instructions: Position the radar face horizontally in the center (there must be no angular deviation in either the horizontal or vertical direction).

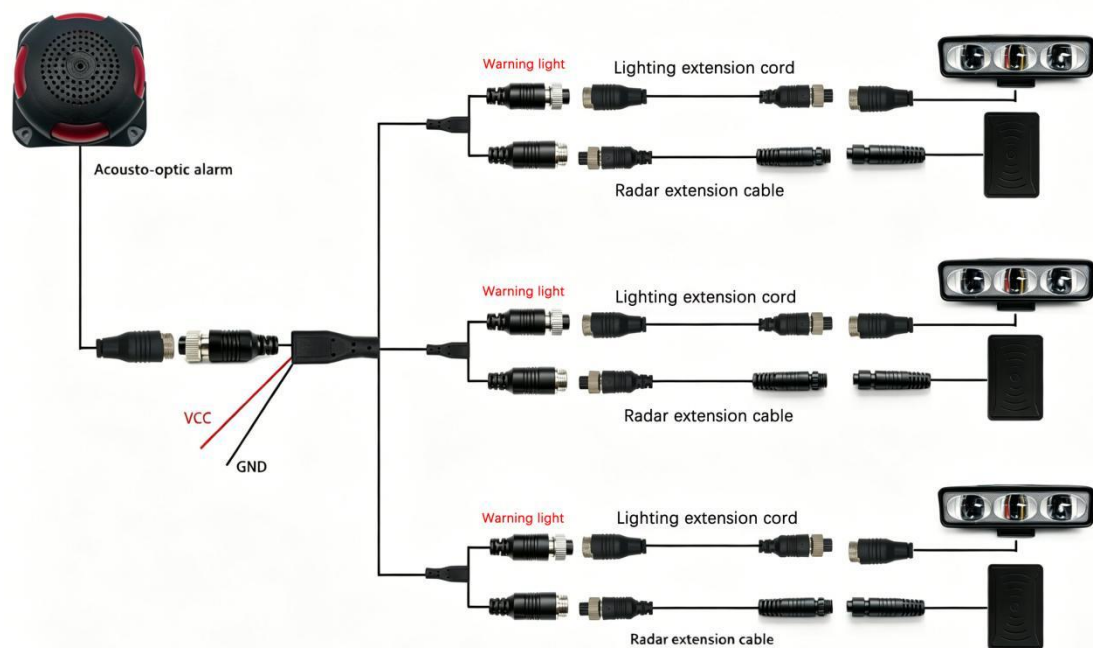
Detection area: a rectangle measuring 8 meters long and 2 meters wide



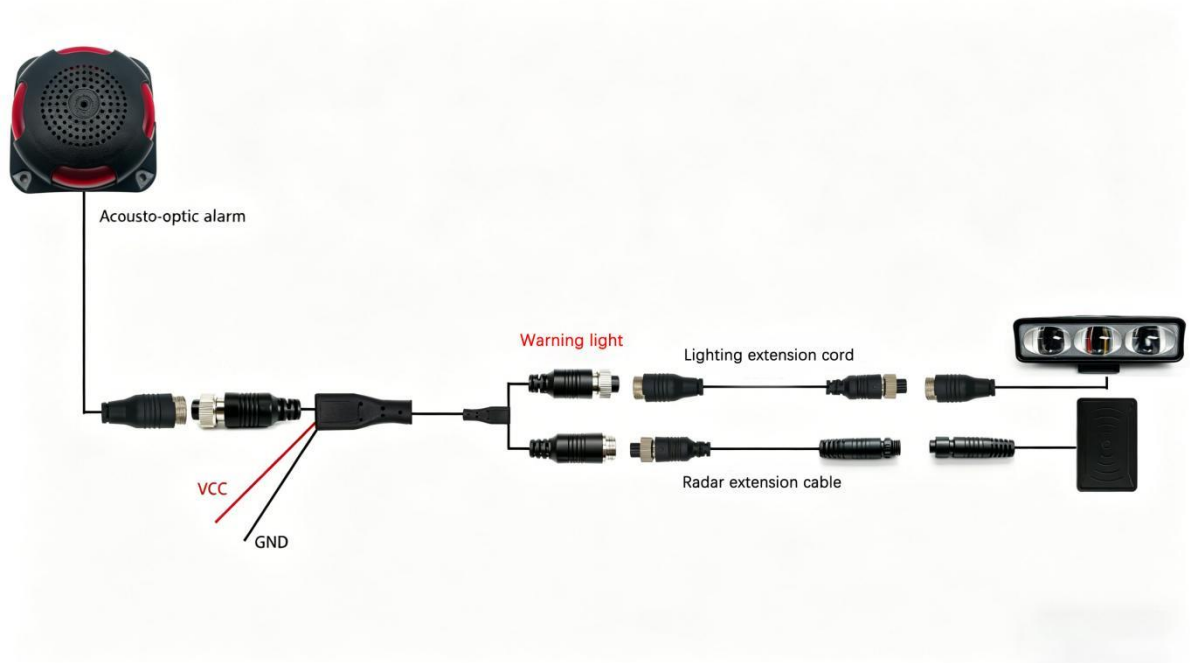
Detection width: 0.4–8 meters; detection range: 0.4–10 meters; detection range and width can be adjusted as needed

Measurement example, Measurement example, 55cm above the ground	Notes
 Distance from the person to the microwave radar	Test conditions: Moving human subject at a speed of 0.3–1 m/s within 10 m of the module The error between the actual distance and the displayed distance is: ± 50 cm

VII. Product Wiring Diagram



Wiring Diagram for 3 Radars, 3 Lights, and 1 Audible-Visual Alarm



Wiring Diagram for 1 Radar, 1 Light, and 1 Audible and Visual Alarm

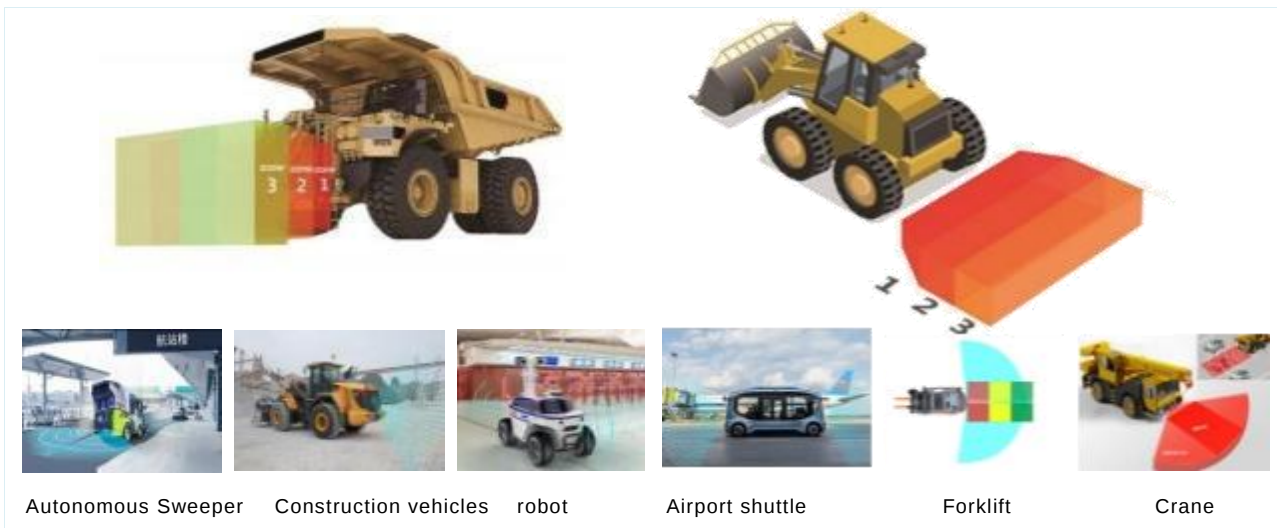
VIII. Instructions for Use

- 1. If the input voltage of the millimeter-wave radar exceeds the specified maximum value, it may cause permanent damage to the circuitry, resulting in product failure.
- 2. If the input voltage of the millimeter-wave radar exceeds the specified minimum value, it may cause abnormal startup or operation of the radar.
- 3. The millimeter-wave radar is an electrostatic-sensitive device. To prevent circuit damage, ESD protection measures must be implemented during all stages of storage, handling, assembly, and testing.
- 4. Connecting to an improperly fitted power supply or using an unstable input voltage may cause variations in detection range.
- 5. Before connecting the millimeter-wave radar to a power source, please verify that the positive and negative terminals, as well as the input and output connections, are correctly aligned. Incorrect connections may cause the radar to malfunction or become damaged; it is recommended to implement foolproof measures to prevent reverse polarity.
- 6. During installation, to prevent a reduction in the millimeter-wave radar's detection range, the radar's detection direction must not be enclosed or obstructed by metal materials or metal layers. Instead, use non-carbon-containing plastic materials or foam; (Note: The housing is made of plastic.)
- 7. During operation and testing after installation, ensure there are no other moving objects within the millimeter-wave radar's radiation range to prevent detection range inaccuracies.

- 8. Unless otherwise specified, all testing shall be conducted indoors. The test data for each millimeter-wave radar reflects only its own functionality and performance.

IX. Product Illustrations and Applications

Systems such as low-speed vehicle collision avoidance, agricultural vehicle collision avoidance, and robot collision avoidance utilize K10 millimeter-wave radar sensors to detect the environment in front of or behind the vehicle, outputting information on the target's distance, speed, and angle to the main control unit. The main control unit combines this environmental data with vehicle information to enable the integrated decision-making system to issue risk warnings or activate automatic braking.



Forward Collision Warning (FCW):

1. Robot Obstacle Avoidance
2. Sanitation trucks
3. Forklift

Forward Collision Warning (FCW):

1. Construction vehicles
2. Shuttle buses
3. Cranes

Advantages of the K10 in Applications:

1. Compact design, solid-state technology
2. High cost-effectiveness, wide detection angle
3. High detection accuracy
4. Leading performance and durability
5. Compact size