

UHF Reader

for Application Solution in Parking Lots

Version: 1.0

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1. Prospect

Driven by development of global economy and rapid growth of Asian production and sales markets, the automobile industry is growing steadily all over the world. It is predicated that the global automobile output will be 97.2474 million by 2017. With increase in global automobile output and demands for automobiles and parking spaces in developing countries, the demand for parking lots will explode in the future. A total of 1.5 billion of parking lots are needed worldwide in 2017.

Companies have provided solutions for parking lot-related applications one after another to meet the huge market demands. Currently, three types of mainstream solutions are available: the traditional access controller mode, remote RFID mode, and License Plate Recognition mode, among which the traditional access controller mode still prevails in most of foreign countries. Compared with traditional parking access controllers, ZKTeco's remote Radio Frequency Identification (RFID) products are easy to use without requiring car stop before the barrier gate is opened. Besides, compared with the License Plate Recognition mode, ZKTeco's remote RFID products feature few supporting hardware, low cost, mature technologies, and easy to promote locally. In the overseas market, the remote RFID products will be of huge advantages for the deployment in parking lots.

2. Product overview

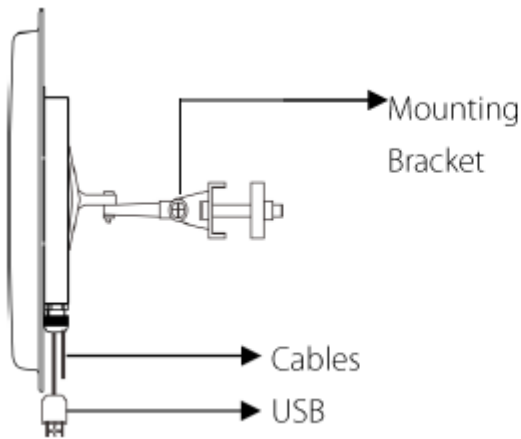
A remote RFID product, the UHF RFID Reader automatically identifies objects, vehicles, and personnel in different statuses (moving or static) through collecting and processing information of remote moving or static targets in a non-contact mode, realizing automatic management of targets. ZKTeco's UHF RFID Reader is CC- and FCC-certified, eligible for sales extensively around the world. With the IP66 water-and dust-proof certification, it can be used outdoors. Its low current and low power consumption design efficiently ensures its service life. Currently, ZKTeco has launched a complete range of solutions for the application of its UHF RFID Reader in parking lots. The effective reading distance of UHF 10 Readers is 12 m, with an optimum distance of about 10 m, serving as a hardware infrastructure for parking plot application solutions.

3. UHF RFID Reader

● Overview:



● Lateral View and Interface:



Cable Definition

NO	Color	Function
1	Red	+12V
2	Black	GND
3	Purple	Trigger Point (Active-low)
4	Green	Wiegand D0
5	White	Wiegand D1

4. Parameters

Technical Parameter		
Model	UHF1-10F, UHF2-10F	UHF1-10E, UHF2-10E
Reading Distance	Effective Distance: 12 m; Optimum Distance: 10 m; (Adjust by Demo)	
Frequency	902 MHz-928 MHz	865 MHz-868 MHz
Output Power	33 dbm (Default) (Adjust by Demo)	
Antenna Gain	12 dBi, Linear Polarization	
Communication	Wiegand26 (Default)/Wiegand34, USB	
Shell Material	Antenna Panel: ABS Engineering Plastics Back Cover: Aluminum Shell	
Interface Protocol	EPC Global UHF Class 1Gen 2/ISO 18000-6C; ISO 18000-6B	
Working Mode	Always Read (Default)/Trigger Read	
Working Current	150 mA (Always Read)	
I/O Interface	Supports External Trigger	
Multiple Tags Identification	<100	
Maximum Power Consumption	<3 W (RF Output 33 dBm, Multiple Tags); <2 W (RF Output 26 dBm, Single Tags);	
Working Voltage	DC 9V - 12V	
Working Temperature	-20 °C - +60 °C	
Working Humidity	<95% (+25 °C)	
Dimension	445mm*445 mm*70 mm	

5. Solution

UHF RFID Reader is widely applied in parking lots due to its remote RFID features.

1) Register the UHF tag

Connect the 915 MHz card enroller to a computer, start ZKAccess3.5, and click the **Personnel Profile** tab to register the UHF tag, as shown in the figure below:

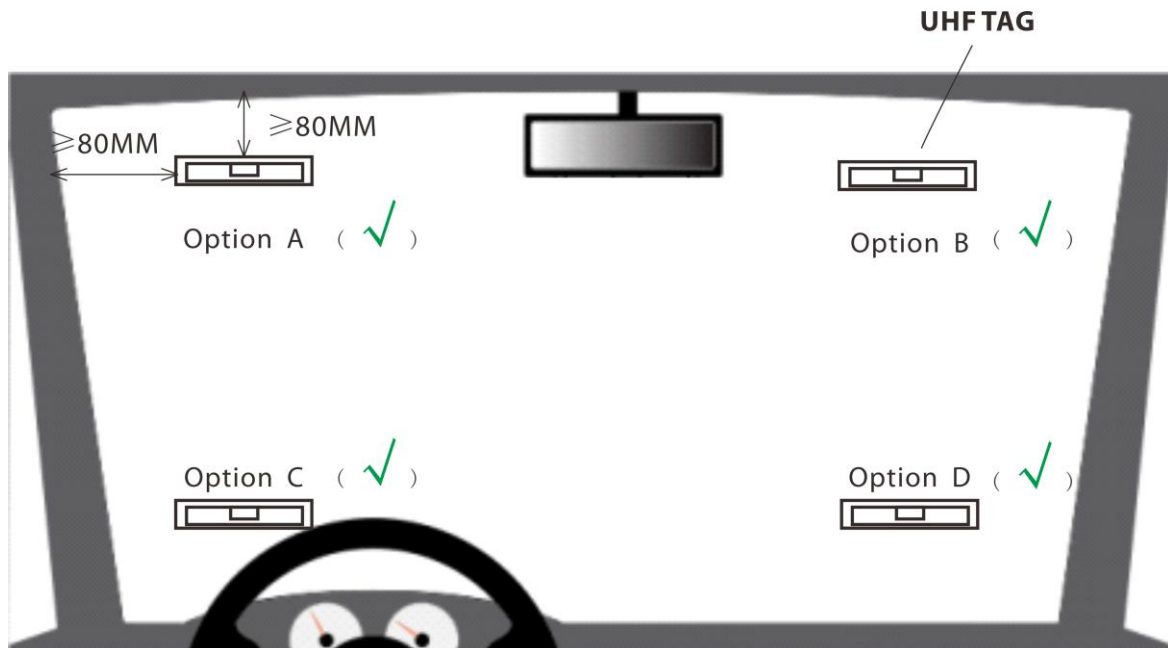
The screenshot shows the 'Add' window in ZKAccess3.5. It has three tabs: 'Personnel Profile', 'Details', and 'Access Levels'. The 'Personnel Profile' tab is active. The form contains the following fields and options:

- Personnel ID: *
- First Name:
- Last Name:
- Gender:
- Password:
- Email:
- Fingerprint Reg.: USB FP Sensor Device
- Department: *
- Card Number:
- Mobile Phone:
- Hired Date:
- Birthday:
- Privilege:

On the right side, there is a placeholder for a photo with a 'Browse' button below it. Below the photo placeholder, it says '(Optimal Size 230x230 Pixel)'. At the bottom of the window, there are three buttons: 'Save and Continue', 'OK', and 'Cancel'.

2) Install the UHF tag

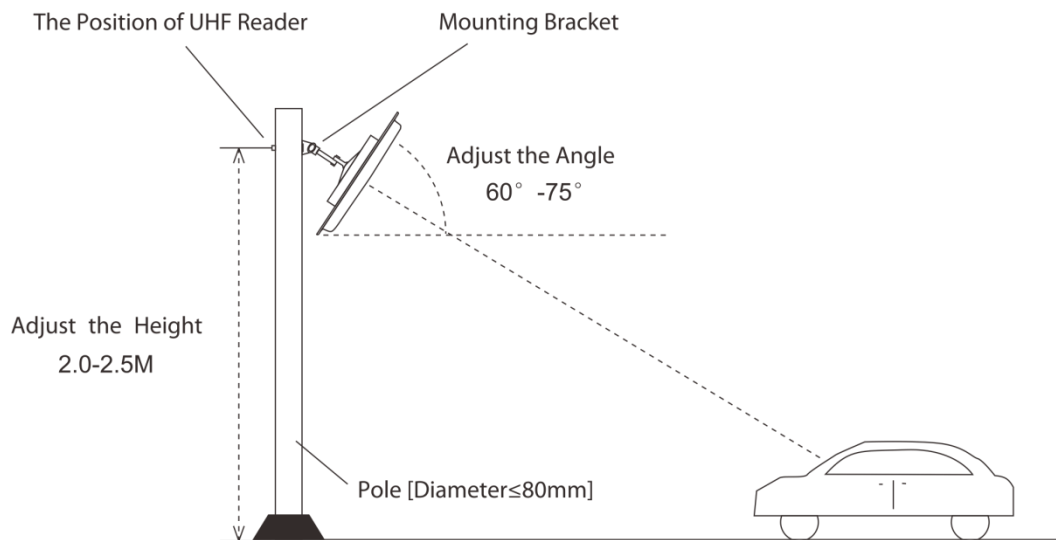
After registration, install the UHF tag in an appropriate place on the windshield inside the car, as shown in the figure below:




Note: The distance between the UHF tag and the metal frame shall be 80 mm at least. The checked options in the figure above are recommended.

3) Install the reader

Install the reader as illustrated in the following figure:



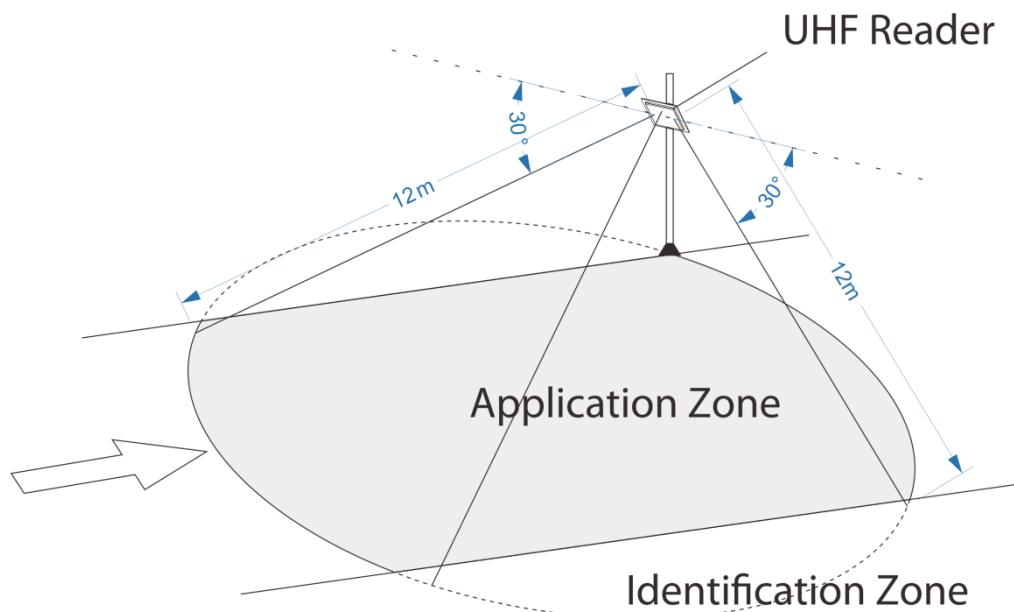
 **Note:** The left and right angles of the reader shall be adjusted so that the reader faces the coming vehicles.

4) Application

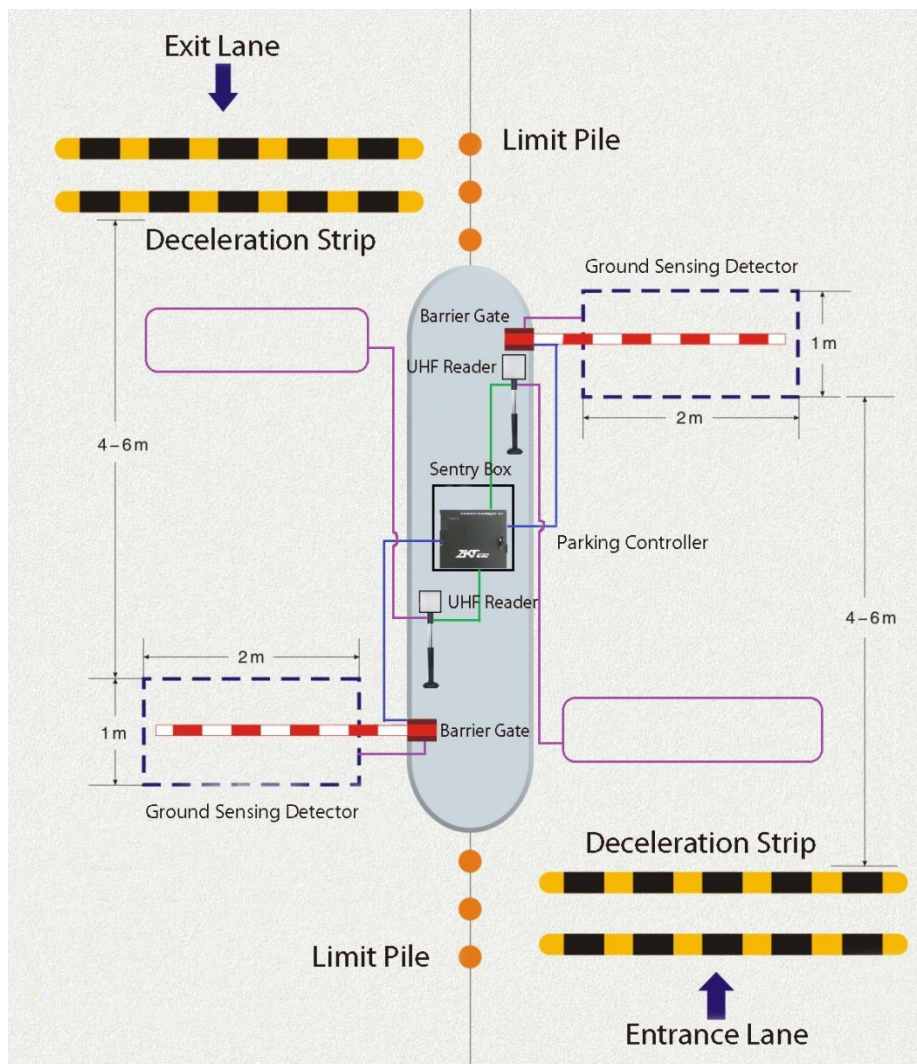
The remote RFID system consists of a trigger, a detector, a controller, and a reader.

- **Trigger:** Ground sensing detector. When a vehicle drives into an area in which the ground induction coil is laid, the ground sensing detector is triggered and the UHF Reader reads the card. The ground sensing detector is optional as long as the card can be read within the effective distance.
- **Detector:** UHF RFID reader. When a vehicle enters the card reading distance, the reader reads the card and transmits the card information to the controller.
- **Controller:** ZKTeco controllers or other common controllers available in the market. The controller verifies the card information and outputs a relay signal for cards passing verification to the barrier gate of the parking lot.
- **Executor:** Upon receiving the relay signal from the controller, the barrier gate is opened, and the whole remote identification is finished.

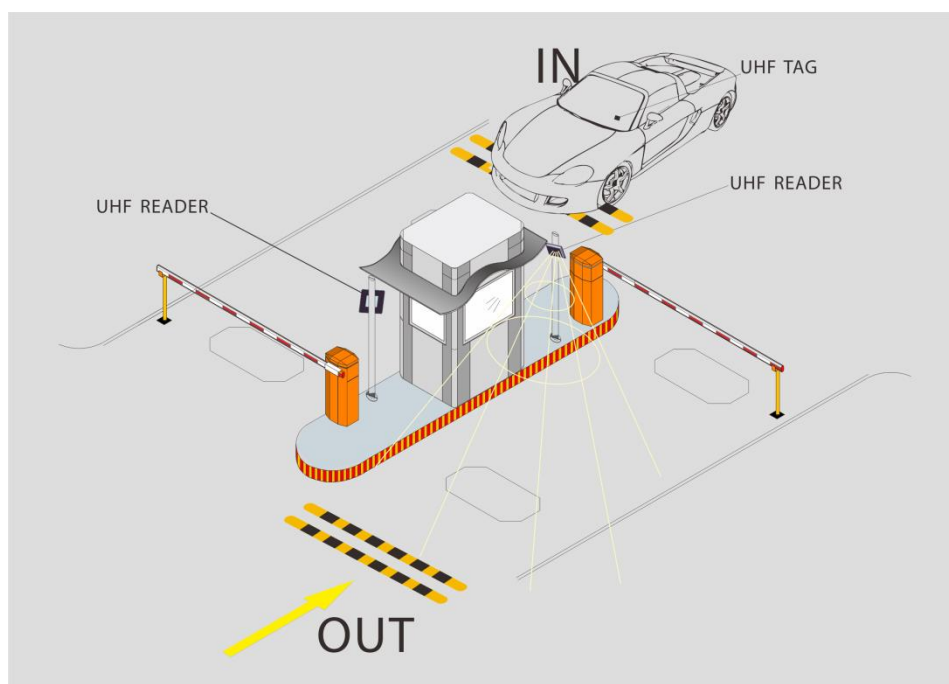
5) Diagram: Simulated reading zone of UHF Reader



6) Diagram: Floor plan of installing and wiring UHF Reader in parking lots



7) Diagram: Application of the UHF Reader in parking lots



6. Note

- The reader cannot be installed in a high-voltage environment, for example, high tension wires and high-voltage transformers.
- The reader cannot be installed near metallic objects.
- If the reader is installed at a T-junction or a 90° corner or in other unfavorable environment, the reader may fail to read the card due to the overlarge reading angle. You can install an additional reader at the corner to solve the problem.
- For such terrains as slopes, adjust where the reader faces, turning it downwards within the effective range of card reading.
- Remote card reading by the UHF Reader is affected by the protective film (explosion-proof film) on car windows to some extent.
- Remote card reading by the UHF Reader is affected on rainy, snowy or windy days to some extent.

7. Segmented applications of remote RFID products

1) Vehicle access control

- (1) Parking lot applications;
- (2) Automatic toll management without parking for the toll stations in the highway, bridge or express way;

2) Personnel access control

- (1) Remote personnel attendance management;
- (2) Meetings sign-in management;
- (3) Campus access control;
- (4) Patrol attendance management;
- (5) Remote personnel access control;

3) Goods access control

- (1) Management of assets, documentations, and books;
- (2) Automatic management of production processes;
- (3) Materials in/out control in a warehouse
- (4) Port container management
- (5) Logistics management;

ZK Building, Wuhe Road, Gangtou,
Bantian, Buji Town, Longgang District,
Shenzhen China 518129

www.zkteco.com

