

R16-10DB

Long-Range UHF RFID Reader

User Manual



1. Introduction

This product features multi-protocol compatibility, fast reading speed, and a waterproof design, meeting the requirements of harsh working environments.

1.1 It fully supports ISO-18000-6C (EPC G2) electronic tags.

1.2 Supports multiple communication methods such as USB, RS232, and Wiegand26/34.

1.3 Adjustable output power up to 30dBm, supporting various working modes such as timed mode, master-slave mode, and trigger mode.

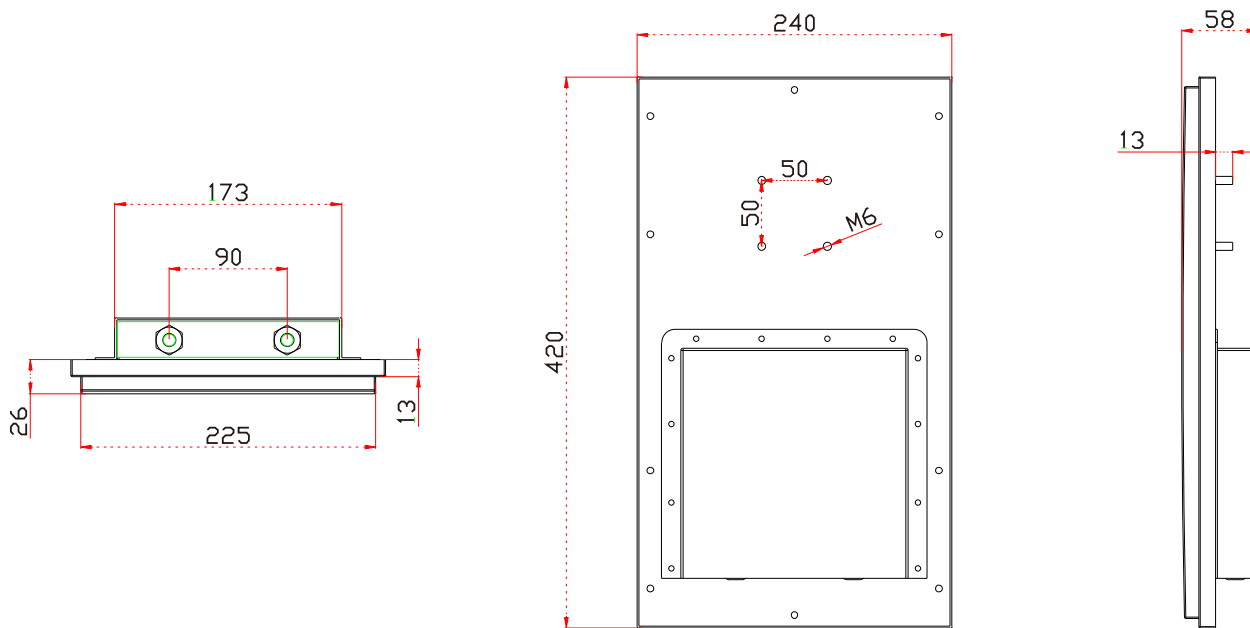
1.4 Suitable applications include vehicle access control, toll-free automatic toll collection, personnel access management, logistics monitoring, production automation management, and other fields.

2. Technical Specifications

Operating Frequency	Standard configurations include ISM 902928MHz and ISM 865868MHz, with other frequency bands available upon customization.
Antenna Gain	Built-in circularly polarized antenna with a gain of 10dBi
Protocol	ISO18000-6C (EPC G2)
Development Kit	Provides SDK development kit with C#, VC, VB, Java, Delphi development examples
Software	Provides test DEMO and automatic card writing, card reading DEMO for convenient card issuance and writing.
Output Power	0~30dBm, adjustable via software
Communication Interfaces	Type N: Wiegand26/34, RS232/RS485, USB; Type E: Wiegand26/34, RS232/RS485, TCP, USB.
Input Interface	1 trigger input
Reading Method	Timed automatic card reading and externally triggered card reading, set by software
Reading Speed	Set by software, with an average reading time of less than 6ms per 64 bits for a single card
Reading Distance	Stable reading distance greater than 12M (reading distance varies with the tag and the environment)
Operating Temperature	-40℃~+65℃
Storage Temperature	-45℃~+95℃
Power	DC12V, 3A
Dimensions	240mm×420mm×56mm
Weight	1.55 Kg (3kg with packaging)

3. Dimensions and Structure of the Reader

Unit: mm



4. The purpose of the reader

Can be used for item identification and data collection, taking advantage of its good characteristics, especially in the following areas:

- Transport management: road, rail transport management and container transport management;
- Motor vehicle management: public security, transportation and other departments of various motor vehicles monitoring and management;
- Road bridge toll: Because this product has the ability to read label data at high speed over long distances, road bridge toll can be carried out without parking;
- Customs clearance management: customs clearance, customs clearance of goods and vehicles management;
- Warehouse logistics management: commodity flow and storage management, as well as mail, parcels, air baggage and other flow management;
- Parking management: to achieve management and fee automation;
- Access control management: including vehicle and personnel access management;
- Process production process: monitoring components throughout the production process;

5. The main function of the reader

5.1 Wake-up label: Only the wake-up label can communicate with the reader, prevent interference

with other labels outside the system, and ensure the reliable and accurate exchange of information between the reader and the system label information.

5.2 Read label data: Not only can you read the ID number of the label, but you can also read the data of the specified label store;

5.3 Write label data: You can write data to the specified label store.

5.4 It can be connected directly to control devices with standard Wiegand26/34 interfaces, without development and ease of use.

5.5 Connect to a controller or PC via a standard communication interface for data communication and exchange, and provide SDK development packages for users to further develop applications.

5.6 Precautions for use

5.6.1 R16 series readers are typically connected to computers via the RS232 data interface for data exchange. Since the R16 Series readers can only read and write electronic tags after receiving control commands from the controller, we provide our customers with SDK development packages that users can use to develop applications.

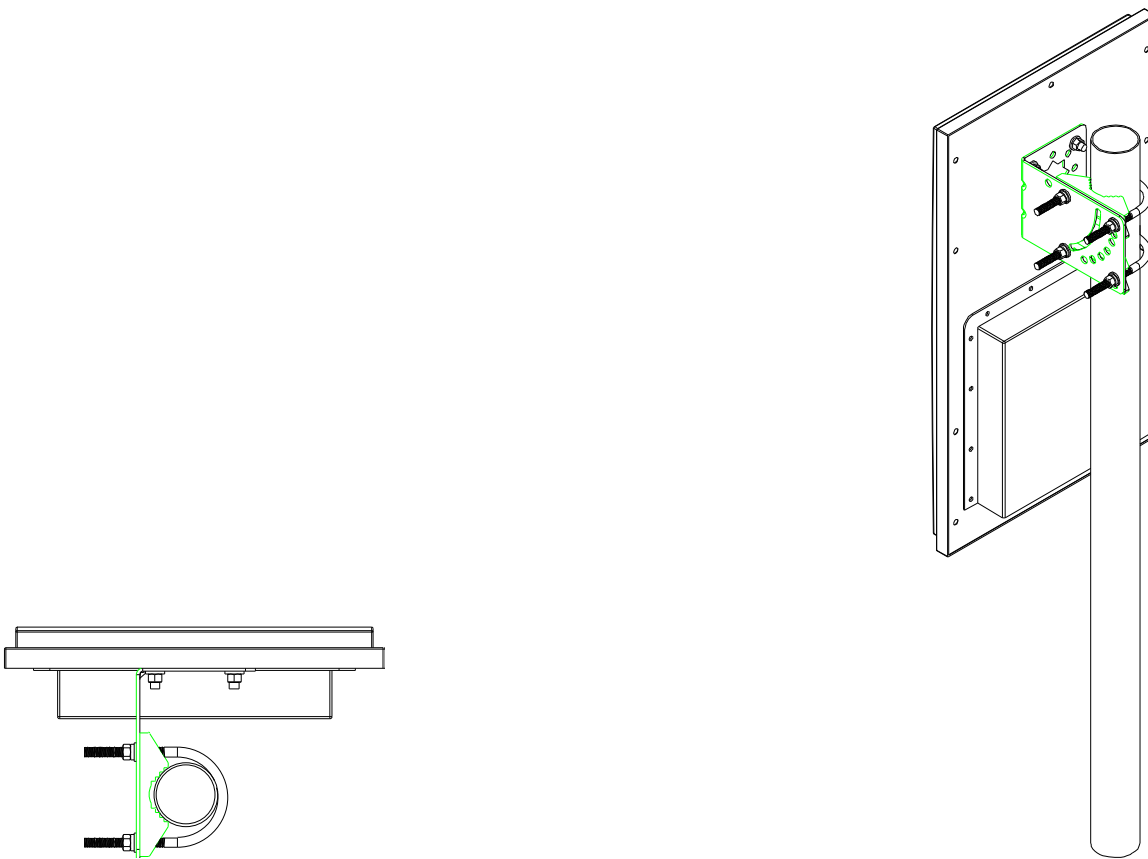
5.6.2 The operating temperature of the reader is: -40 degrees C to 65 degrees C. Therefore, when using this reader in cold areas and during the season, care should be taken to pre-start and warm up 15 minutes before the reader is officially used to ensure the proper operation of the reader.

5.6.3 It is recommended that you do not have any object blocking within at least 30 meters in front of the reader, and when holding the card, touch your finger to the edges of both sides of the card, as this antenna is horizontally polarized, the card should be placed across the face-to-reader during the test to ensure the card reading effect.

5.6.4 The Wigan communication interface must be connected to the GND ground line.

5.6.5 The mounting height is more than 1.8M and the pole diameter is 30-50CM.

5.7 The installation diagrams



6. How the reader works and wiring instructions

6.1 The wiring instructions for the reader

Red	Black	Green	White	Grey	Purple
DC+(7-12V)	GND	RX	TX	WG-D1	WG-D0

6.2 Label action

EPC GEN2 (ISO18000-6C) label

- Single label initialization: Defines the EPC length of the label, typically 96 bits.
- Single label write: Writes the EPC of the label to write one address or multiple addresses at a time (based on one address).
- Single label lock: The EPC that locks the label. Once locked, the label's EPC will not be overwritten.
- Single label destruction: Destroy labels. After destruction, the label will no longer be available.

6.3 How it works

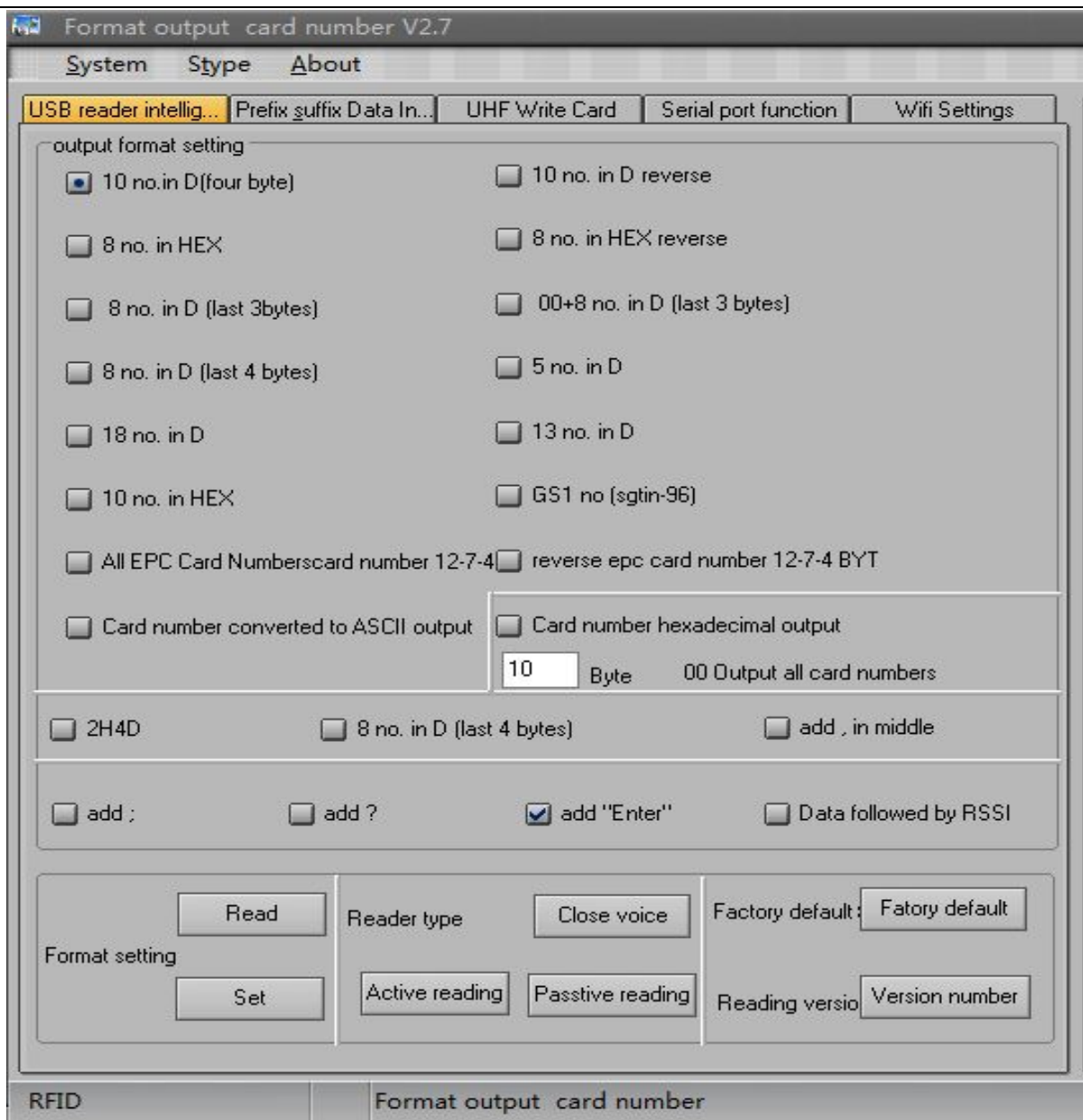
- **Master-from-work mode (COMMAND):**In this mode of operation, the reader operates under the control of a PC or other controller. The reader and the controller can communicate through one of the RS232,RS485, or Ethernet interfaces. This way of working supports all the features provided by the secondary development package.
- **Timing READ:**The reader automatically reads the card for a certain period (configurable) and the read data is output through the specified communication port. This method is read-only for labels.
- **Trigger Mode of Operation (TRIGGER READ):**When a low power is entered on the trigger input port, the reader starts reading the card periodically and automatically closes after a period of time.

6.4 ID adjacent discrimination

ID adjacency is designed to reduce the redundancy of reader upload data. When this feature is selected, only one set of data is uploaded within a set time when the reader reads the card number of the same label multiple times in a row. Adjacent discrimination can select a valid time, that is, if the adjacent two card reading intervals exceed the valid time, they will not be adjacent to the evaluation. Users should be selected according to specific needs. Commonly used in Wigan communications.

7. Reader configuration

The Company provides DEMO software programs for the configuration of the working parameters of the reader. The parameter configurator interface looks like this:

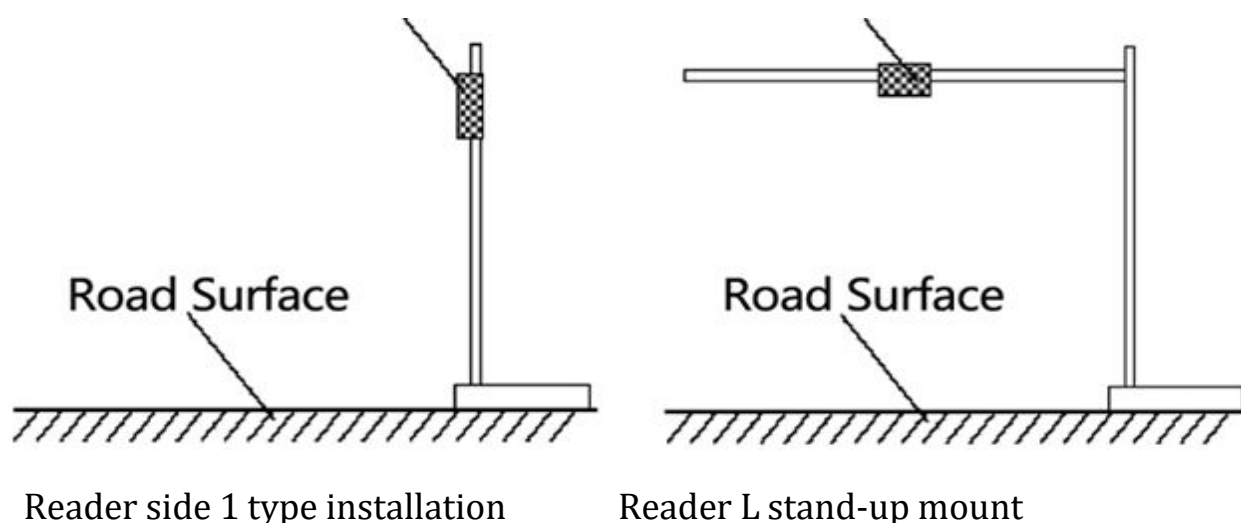


For demo software use, please refer to the <UHF Settings Software Manual>

8. How the reader is installed

8.1 Installation Method

There are two ways to install a reader stand: "Side 1 type mount" and "L stand mount" see figure below: You can choose the installation method according to the application needs and the actual situation on site. In general, side mount reading and writing distance is closer, but the installation is simple;

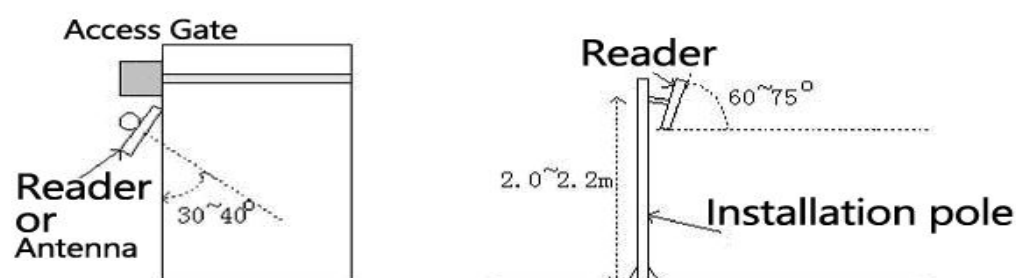


8.2 Installation and Height Adjustment of the Reader

When installing the R16-10DB reader/writer on the side of a I-shaped stand, the installation pole is required to have a diameter of 30–50mm and a length of 2.2m, with stainless steel material of a wall thickness preferably greater than 1.2mm being recommended. Use the fasteners provided in the R16-10DB reader/writer packaging to secure the reader/writer at the top of the pole. Adjust the height of the R16-10DB reader/writer center to the lane horizontal plane according to vehicle type (mainly referring to large and small vehicles), typically around 2.0m (ranging from 1.8 to 2.2m).

When installing the R16-10DB reader/writer on top of an L-shaped stand, the L-shaped stand pole (or gantry-shaped structure) is required to have a diameter of 60–80mm, with the crossbar having a diameter of 30–50mm. Stainless steel material with a wall thickness preferably greater than 1.2–2.0mm is recommended. Similarly, use the fasteners provided in the packaging to fix the R16-10DB reader/writer on the crossbar near the middle of the lane. The height of the crossbar from the ground should be adjusted between 3.5m and 4.0m according to the height of the vehicles.

8.3 Reader adjudication adjustment



Antenna pitch: refers to the angle between the antenna tilting to the ground and the horizontal line, about 60 to 75 degrees

Antenna adage: refers to the offset angle of the antenna in the direction of the lane, about 30 to 40 degrees.

9. Installation Example - Vehicle Parking Lot Management

The principles for selecting the installation location of the R16-10DB reader system are as follows::

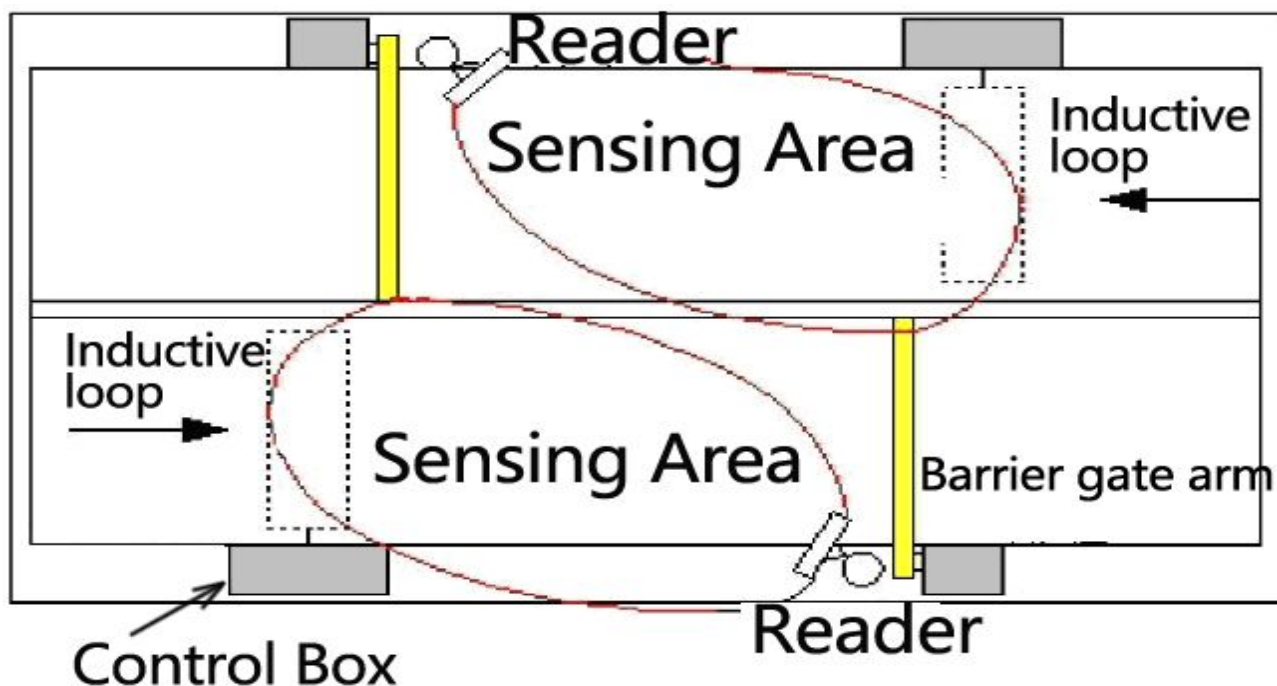
9.1 The straight-line distance between the R16-10DB reader and the barrier gate should not exceed 1 meter.

9.2 There should be no obstacles between the location of the R16-10DB reader and the RFID tag.

The distance between the R16-10DB reader and the control equipment (or PC) should be as short as possible, and shielded communication cables should be used as required. The specific on-site installation implementation is generally determined based on the actual site conditions. The following provides further explanations.

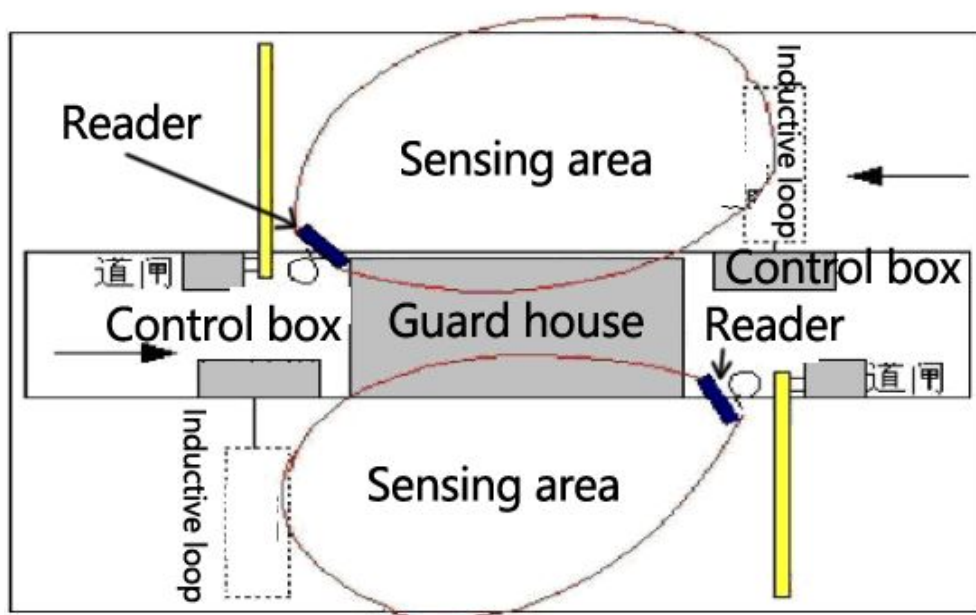
a) On-site Installation Method One: For roads without a median island, the road control equipment (barrier gate) is installed on both sides of the road, and vehicles pass through the card reading area at a speed of less than 30 km/h.

In this scenario: The reader (antenna) should be installed close to the barrier gate equipment, and its effective reading range for tags (with the farthest straight-line distance being 0.5 meters to 12 meters) should cover the entrance loop detector or exit loop detector at the gate, as shown in the diagram below.



b) On-site Installation Method Two: For roads with a median island, the control equipment (barrier gate) is installed on the median island, and vehicles pass through the card reading area at a speed of less than 10 km/h.

In this scenario: The R16-10DB reader/writer should be installed close to the barrier gate equipment, with its effective reading range for tags (the farthest straight-line distance being 0.5 meters to 12 meters) covering the entrance loop detector or exit loop detector at the gate, as shown in the diagram below.



10. R16-10DB Secondary Development

The reader application can be developed twice as needed. We provide call routines such as C, VC, VB, Delphi, Java, etc., and WINCE, LINUX drive development, and please refer to the SDK Development Guide for the use of development packages