

Long range integrated reader User Manual

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One Long range integrated reader Brief Introduction

This product is compatible with multi-protocol and with integrated design. It supports quick and multi-tag reading, and is water-proof. It can be used widely in different RFID systems. The typical applications are:

1. Logistics& warehouse management: the management of goods flow, warehouse management, and the flow management of mail, parcel and luggage, etc.
2. Intelligent parking management: parking lot management and automatic charge.
3. Production line management: fixed-point identification in production process.
4. Product counterfeit inspection: Using tag's memory write-protect function to identify true-false of products.
5. Other fields: widely used in club management, library, school management, consumption management, attendance, dinner order management and pool management, etc.



Picture 1 Long range integrated reader

1. Long range integrated reader Uses

Using its good performance, the reader can be used for item identification and data acquisition, especially widely used in the following areas:

- 1) Transport Management: Road, railway and container transportation management and so on.
- 2) Motor Vehicle Management: The police and transportation department's supervision and management of motor vehicles
- 3) Bridge Charge: As the product can read tag data for long-distance at high speed, it can realize non-stop ETC for bridge charge system.
- 4) Customs Clearance Management: Management of goods, materials and vehicles during customs clearance.
- 5) Warehouse and Logistic Management: Management of goods flow, warehouse management, and the flow management of mail, parcel and luggage, etc.
- 6) Parking Lot Management: To realize automatic management and charging in parking system.
- 7) Access Control Management: Access control of vehicles and personnel.
- 8) Production Line Management: Monitoring and controlling components and parts in production process.

2. Long range integrated reader Main Function

- 1) Arouse tag: Only the aroused tag can communicate with readers, in order to prevent interference from other tags and ensure the credible and accurate data transmission between the reader and tag.

2) Reader tag data :Not only can read tags' ID number, but also can read data in the appointed tag storage area; Not only can read single tag's data, but also can read multi-tags' data within the detecting range of the antenna simultaneously.

3) Write tags into data: it can write data into appointed tag storage area.

4) It can directly connect with control equipment through standard Weigand26/34 interface. No need to make secondary development, so it can be used simply.

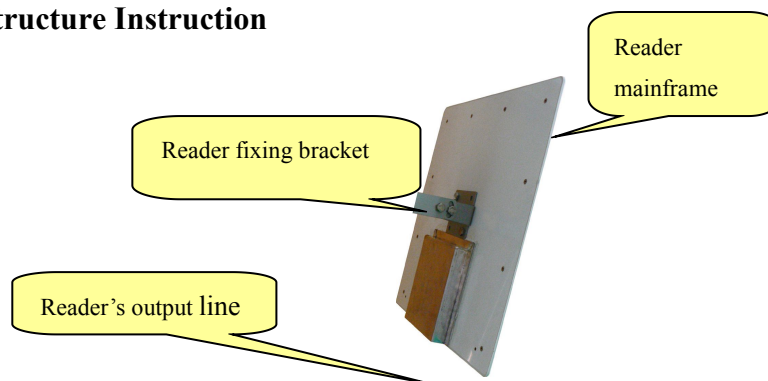
5) Connected with controller or PC through standard communication interface, and make data communication and exchange. Customers can also make secondary development with provided SDK.

3. Long range integrated reader Technical Parameter

- 1) Frequency Range: ISM 902~928MHz (FCC), 865~868MHz or other frequency ranges.
- 2) Read card distance: adjustable range:1-12M, determined by tag.
- 3) Read card sensitivity: dual-polarization reading mode
- 4) Read card time: Single-tag, 64 bits ID number, reading time<6ms
- 5) Working Voltage: DC+9V
- 6) Working Temperature: -20℃ ~ +80℃
- 7) Storage Temperature: -40℃ ~ +125℃;

Two Long range integrated reader Structure and Interface Instruction

1. Reader Structure Instruction



Picture2 Long range integrated reader Structure Instruction

2. Reader Interface Instruction

2.1 RS232

The reader has RS232 communication interface, used for communication with controlling host machine (generally

PC). RS232 interface's data format is 8 data bits, 1 start bit, 1 stop bit, no parity bit. Data rate can be 9600, 19200, 38400, 57600 and 115200 bps. RS232 communication interface supports reader parameter configuration, demonstration software, and all SDK functions for serial communication.

2.2 RS485

Long range integrated reader supports RS485 communication interface. It can be connected with PC's serial interface through RS485 interface, using RS232-RS485 converter. In this mode, RS485 interface can support all supported functions by RS232 interface. In addition, RS485 is also tag data output interface. When using RS485 interface to upload tag data, there're 3 kinds of transmission modes:

Active Uploading: Uploading data at once when the reader reads a tag.

Passive Uploading: No uploading of data when the reader reads a tag. Upload data when receiving command frame from host machine.

Response Transmission: When the reader reads a tag, the reader will upload tag data repeatedly every 10 seconds till it receives response frame from host machine.

Reader RS485 uploading data format as follows:

SOF	Add	Add	Antenna	Tags data	EOF	Check
0x02	high byte	Low byte	1 byte	8 byte (ASCII)	0x03	1 byte

Thereinto, the mode of check is all bytes XOR CHECK.

Format of host machine's data fetch Command Frame

SOF	Identify	Module	Add	Command	EOF
0x09	0x5B	1byte	1byte	0x83	0x0D

Format of host machine's response frame when receiving data

SOF	Identify	Module	Add	Command	EOF
0x09	0x5B	1byte	1byte	0x82	0x0D

2.3 Wiegand Interface

Reader offers Wiegand data interface. User can choose Weigand26/34 communication protocol. The data format of these two protocols is below:

Table 1 Wiegand26 format

P0	Front 12	Back 12	P1
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Thereinto, P0 is even parity check of front 12; P1 is odd parity check of back 12.

Table 2 Wiegand34 format

P0	Front 16	Back 16	P1
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Thereinto, P0 is even parity check of front 16; P1 is odd parity check of back 16.

Wiegand interface consists of three wires: one negative impulse shows “0”, one shows “1”, another one is ground wire. Each data’s typical format is showed below. Certainly, user can set data format of Wiegand interface according to the specific requirement of controlling machine.



Table 3 Weigand Signal Schematic Diagram

In order to improve the reliability of data transmission, the reader offers multi-output functions. Namely, when reading a tag, Wiegand interface will transfer the tag data repeatedly at regular intervals. The number of transmission times can be 1-3. The transmission interval can be set up by configuration software.

3 Tag Operation

1) ISO18000-6B Tag

- Multi-tag identification: Search all tags in the antenna’s radiated range, and read their 8 bytes UID.
- Multi-tag reading: search all tags in antenna radiated range, and read the 8 bytes data in appointed address.
- Single-tag writing: write 1 byte data in the appointed tag’s address.
- Single-tag locking: lock the data in the appointed tag address. If the address is locked, the data in this address cannot be revised.
- Inquiry of single-tag locking: inquiry the locking state of the appointed address.

2) EPC GEN2 (ISO18000-6C) Tag

- Multi-tags identification: Search all tags in the antenna’s radiated range, and read its EPC. The length of EPC Gen 2 can be 256 bits at the longest. Currently 96 bits is available.

- Single-tag initialization: Define the EPC length of the tag. Generally, it is 96 bits.
- Single-tag writing: Writing into the tag's EPC. Each time can write 16 bits.
- Single-tag locking: Lock the tag's EPC. If locked, the tag's EPC cannot be revised.
- Single-tag destroying: Destroy tag. If destroyed, the tags cannot be used anymore.

4 Working Mode

1) COMMAND READ MODE

In this working mode, reader works under the control of PC machine and other control equipments. The reader communicates with control equipment via RS232, RS485 or Internet interface. This working mode supports all the functions provided by the secondary development kits.

2) TIMING READ MODE

The reader can read tag automatically and periodically (configurable). Then the data can output via appointed communication interface. Under this mode, the operation of tag is "only read"

3) TRIGGER READ MODE

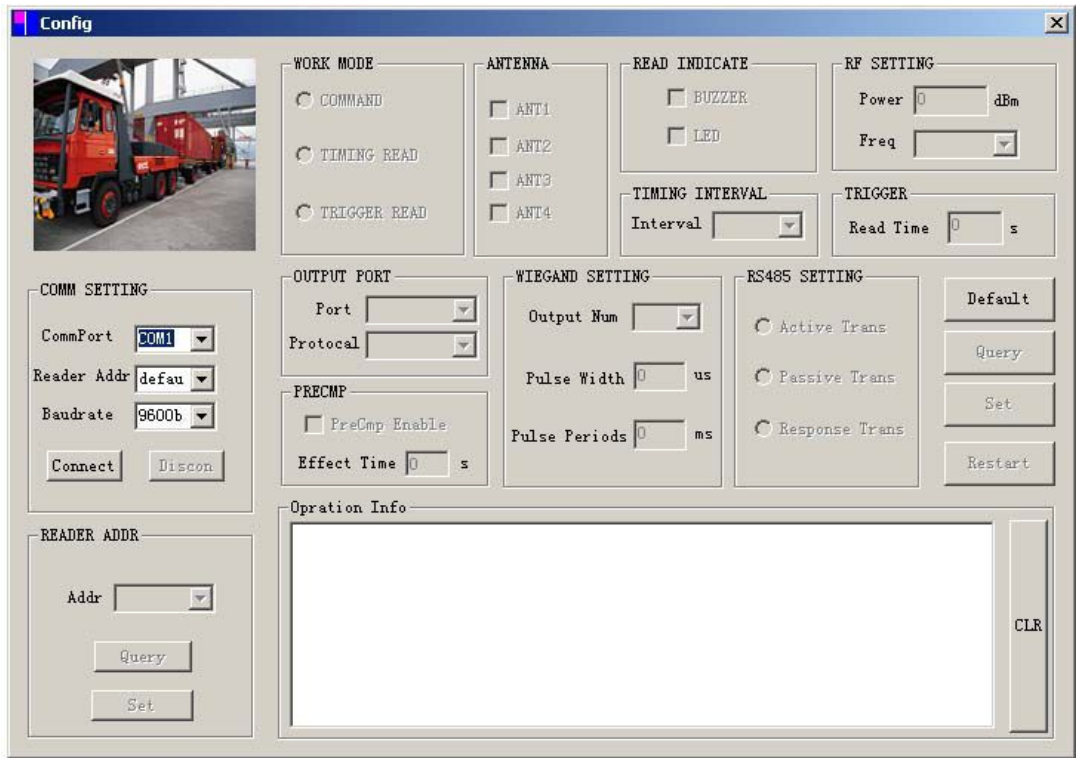
When the trigger input port receives low level input signal, the reader begins to auto reading of tag periodically. After a period, it will stop reading automatically.

5 Precmp

Precmp is designed just to reduce redundancy of uploaded data. If you choose this function, when the reader reads the same tags repeatedly, it uploads only one set of data. User can set the effective time of precmp. That is to say, if the interval between two reading time of tags exceeds the effective time, the reader will not do precmp. Users should choose this function according to specific requirements.

Three Long range integrated reader Configuration

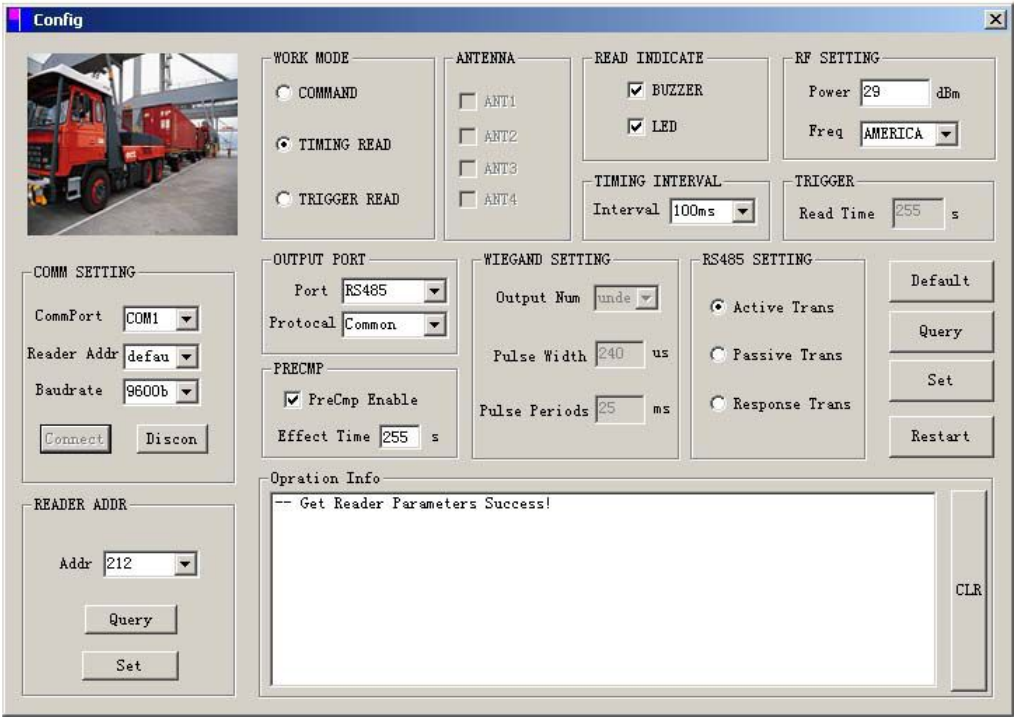
We offer Config.exe program, which is used to configure the reader's working parameter. The interface of config.exe is below:



Picture4 Displaying software interface

1. Serial Port Setup

It includes port choosing, baud rate setup and reader address choosing. The reader address can be from 1 to 240. The reader will start communication only when user chooses right address. In addition, user can choose “default”, which is effective to all reader. After click “connect” button, the communication between PC and reader is built successfully. When software and reader is connected successfully, the reader’s current parameters displays as below:



Picture5 Displaying interface

2. READER ADDR ALTERATION



Picture6 Displaying interface

If need to change reader’s address, select the new address and then click “set”button. Then alteration is successful. New address is effective after reset the reader.

3. WORK MODE CHOOSING



Picture7 Displaying interface

User can set up reader's work mode displayed in Picture 7. When choosing COMMAND, user can set up RF and antenna (for multi-port reader). Other setup parts become gray. When choosing timing and trigger read mode, user can set up RF, the timer and communication interface. When choosing trigger read mode, user also can set up the trigger. The setting mentioned above will be explained in details below.

4. RF SETTING



Picture8 Config Interface

User can set up reader's radio frequency power and frequency range according to application requirement. The largest power can be 30dBm. Radio frequency range can be 865~868MHz, 920MHz~925MHz or 902MHz~928MHz. Other frequency ranges customization is available.

5. ANTENNA SETTING

When using multi-port reader, user can choose antenna. You could select corresponding antenna, then the selected antenna (s) will start to work.

6. READ INDICATE SETTING

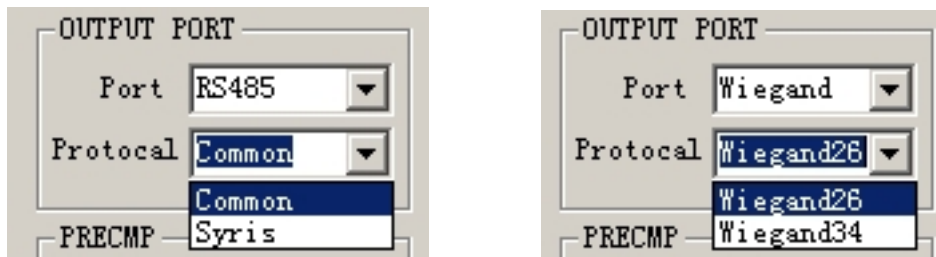
The optional read indicator are BUZZER and LED. User can also choose according to needs.

7. TIMING INTERVAL SETTING

This includes setting of time interval and precmp. Time interval can be 10ms~1000ms. User can select precmp, and also set the effective time for precmp.. When no need to set effective time, it can be set as "0"

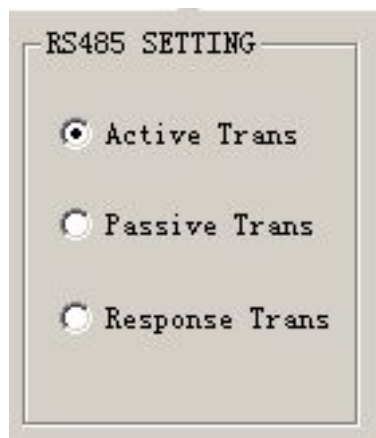
8. Communication Parameter Setting (OUT PORT)

Set data output communication interface and its communication protocol. When choosing RS485 communication interface, use can choose Syris protocol and common transmission protocol. The format of common transmission protocol is explained as above. As for Syris protocol, please refer to the related information of Syris controller. When choosing Wiegand interface, user can choose Weigand26 or Weigand34 protocol.



Picture9 Set interface

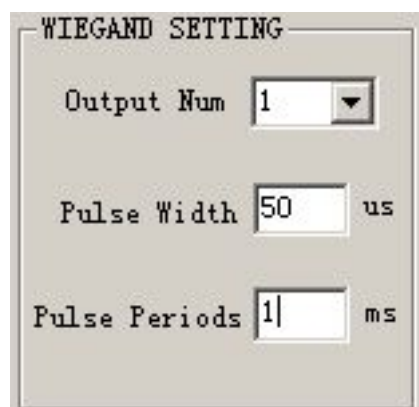
9. RS485 PARAMETER SETTING



Picture10 Displaying interface

When choosing common RS485 transmission, user can choose Active Trans, Passive Trans, and Response Trans. RS485. The transmission speed is 9600bps. When choosing Syris protocol to transmit, please choose RS485 Passive Trans format. The transmission speed of Syris protocol is 19200bps.

10. Wiegand Setting



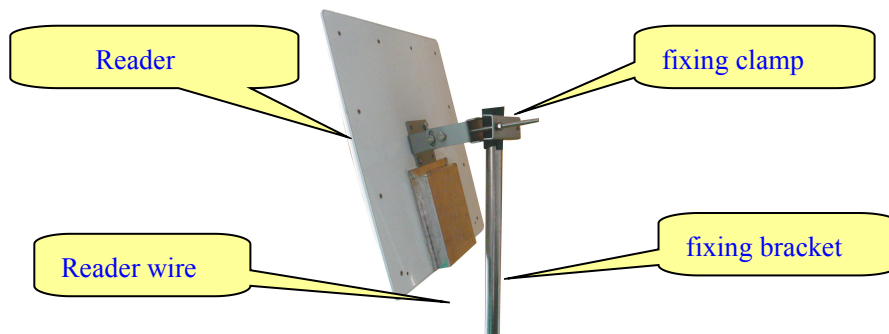
Picture11 Displaying interface

Picture 11 This interface is used to set Wiegand interface's parameter, including Wiegand output times and signal format. User needs to set Wiegand pulse width (refers to low pulse width) and pulse periods (refers to the time of 1 bit data)

After all functions are chosen, click “SET” button. The successfully set parameter will come into effect after restart the reader. User can click “Restart” button to reset the reader.

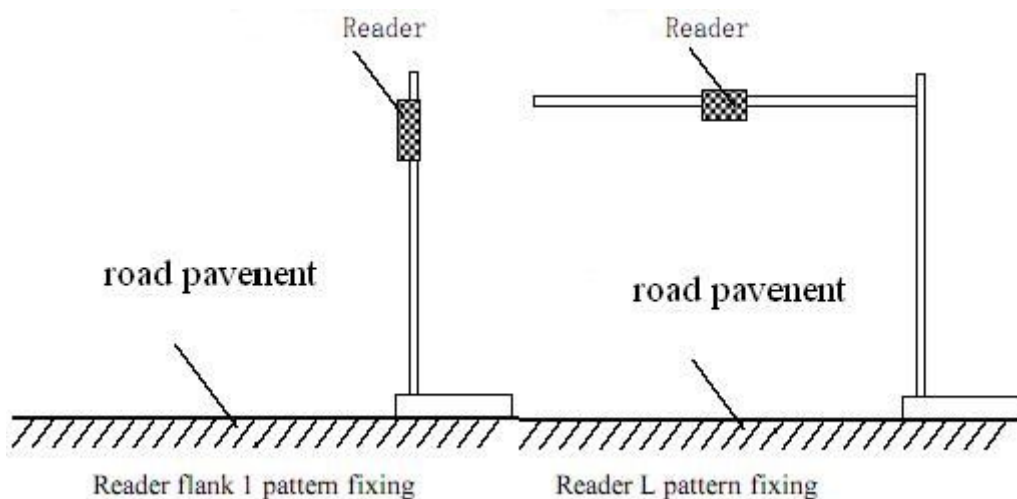
Four Long range integrated reader Installation

1 Reader's Installation Method



Picture12 installation picture

There're 2 floor-stand installation methods for Long range integrated reader: “flank 1 pattern fixing” and “L pattern fixing” as showed in the following chart. User can choose installation methods according to application requirement and practical situation. Generally speaking, if adopt “flank 1 pattern fixing”, the reading distance is a bit shorter, but it's simple to install. If select “L pattern fixing”, the reading distance is longer than “flank 1 pattern fixing”, but the installation is complicated.



Picture13 Reader Installation Method

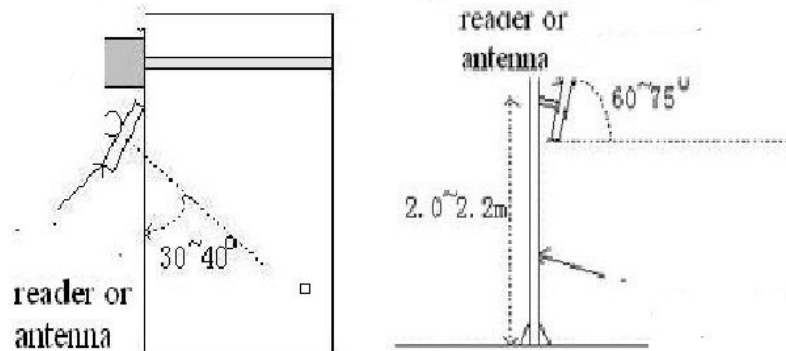
2 Reader Fixing and Length Adjustment

If select “frank 1 pattern fixing”, the diameter of the standing pole should be 50~60mm, and length 2.2m. It's better to use stainless steel material with thickness no less than 1.2mm. Then fix the reader on the top of the pole

with the provided fastening piece in the carton of Mid-range integrated reader. According to the vehicle type (mainly the oversize vehicle and small vehicle), adjust the height from the central point of reader to the horizontal plane of lane. Generally, it's about 2.0m (from 1.8m to 2.2m).

If select "L patter fixing", the diameter of the L shape standing pole should be 60~80mm, while that of the crossbar should be 50~60mm. It's better to use stainless steel material with thickness more than 1.2 to 2.0mm. Then fix the Mid-range integrated reader to the crossbar, where it's near the middle of the lane. According to the height of vehicles, the height from the crossbar to the ground is adjustable from 3.5~4.0m.

3 Reader Azimuth Angel Adjustment



Picture 14 the sketch map of the azimuth angle adjustment of Mid-range integrated reader

Antenna angle of depression: refers to the included angle between the antenna and horizontal level when the antenna slopes towards the ground.

Antenna azimuth angle: refers to the deviation angle when antenna deflects towards the lane.

4 Example of Installation-vehicle parking lot management

The installation principle:

- (1) The straight line distance cannot exceed 1m between Long range integrated reader and control barrier.
- (2) There's no blocking between the reader and tag.
- (3) The distance between reader and control equipment (or PC) should be as close as possible, and use shield communication cable.

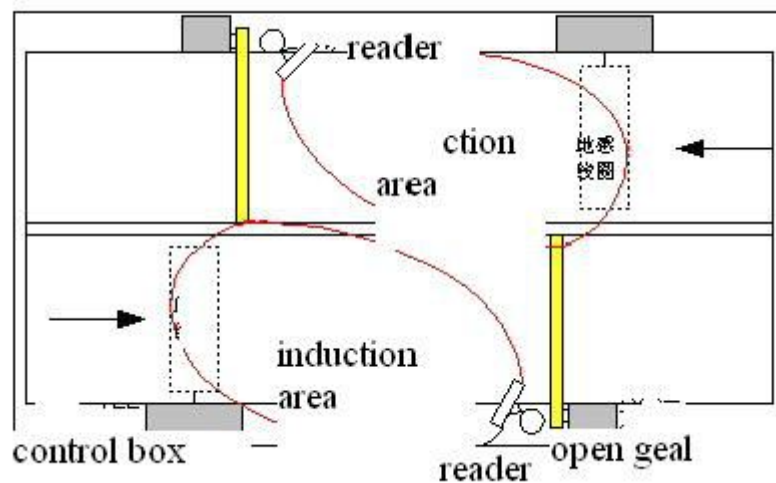
The detailed on-site installation is determined by the local site conditions.

1) Installation Method 1:

No middle isolated Safty island road .Road controlling facility (brake) fix both side of road,vehicle pass reading card area at less than 30km/s

In this instance: reader(antenna)should close to brake ,ensure that tags'effective reading range (the fareset

beeline distance is 0.5m-10m) can cover with entry/exit entry winding or exit winding ..As follows

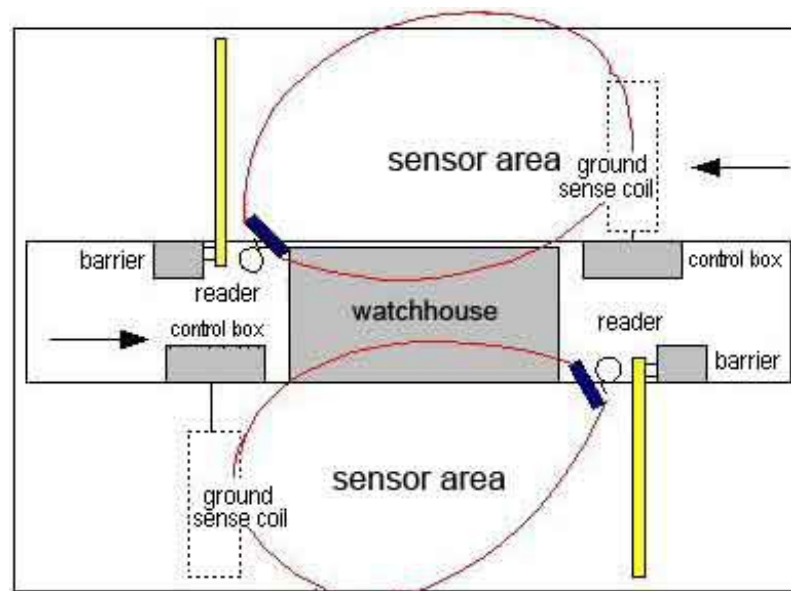


Picture15 Long range integrated reader fixing instructions

2) Installation Method 2:

No middle isolated Safty island road .Road controlling facility (brake) fix on no middle isolated Safty island road ,vehicle pass reading card area at less than 10km/s

In this instance:reader(antenna)should close to brake ,ensure that tags'effective reading range(the farrest beeline distance is 0.5m-10m) can cover with entry/exit entry winding or exit winding ..As follows



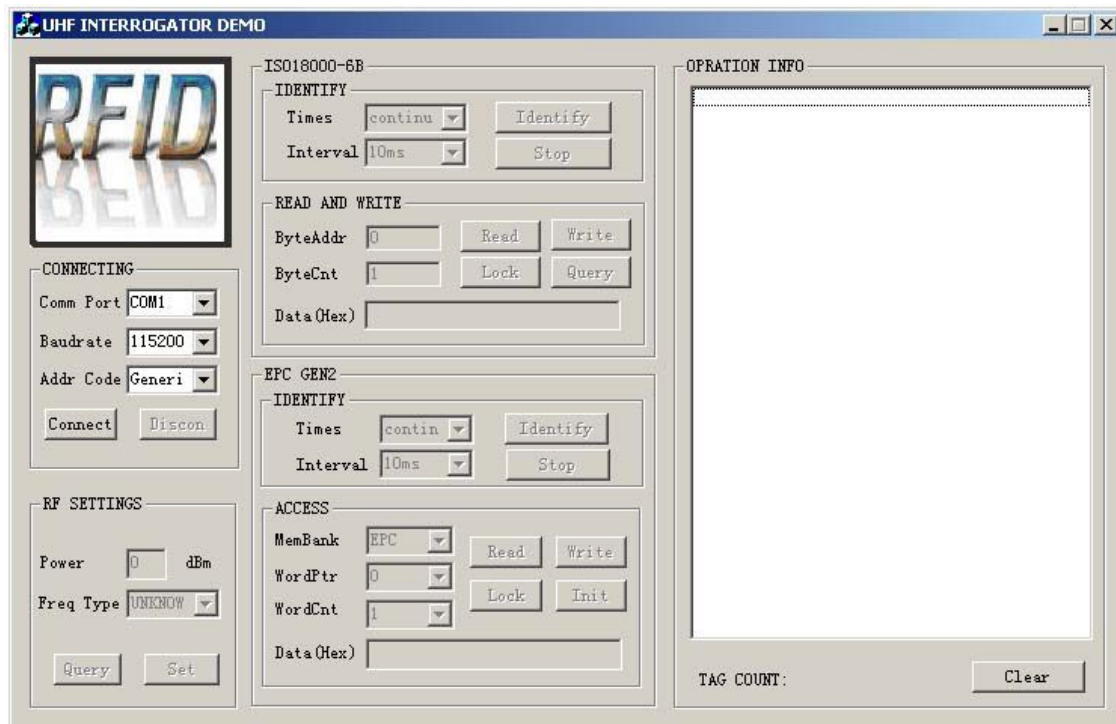
Picture16 Long range integrated reader spot installation shows

Five Long range integrated reader Demo Instruction

The demo program provides the functions of all operations on tag and RFID parameter setting. Users can evaluate

the function of the reader through using this demo program. Moreover, users can also refer to the demo program when making the secondary development of the reader.

The demo program includes "DEMO.exe" and "MR915ApiV10.dll". Please put this two parts in the same document directory. Double-click it and then it will begin to run. The interface is below:



Choose the right communication port, baud rate, and the reader's address. Then click "Connect" to establish connection with the reader. After successful connection, in the right information bar, there will be successful connection message and the version number of the reader firmware. Then users can run all the demo operations.

Six Long range integrated reader The Secondary Development

Users can make the secondary development of application software according to practical needs. We provide SDK based on C language, which supports VC++, VB, Delphi and C++ Builder, etc. Please refer to Long range integrated reader SDK Instruction.