



# Barrier gate radar User's Manual

## Contents

1. Product introduction .....	1
2. Product specification .....	1
2.1. Technical indicators .....	2
2.2. Detection accuracy .....	2
2.3. mechanical properties .....	2
2.4. Power supply .....	2
2.5. Operating conditions .....	2
2.6. Reliability .....	3
3. Operation conditions .....	3
4. Technical characteristics .....	3
4.1. All-day and all-weather working .....	3
4.2. Detection accuracy .....	3
4.3. Operational reliability .....	4
4.4. Flexibility in installation and use .....	4
4.5. Low installation and maintenance cost .....	4
4.6. Convenient power supply .....	4
4.7. Adaptability of using environment .....	5
5. Installation and debugging .....	5
5.1. Installation of barrier gate radar .....	5
5.2. External interfaces and connections .....	8
5.3. Induction distance setting .....	9
5.4. Debugging of Barrier gate radar .....	10
5.4.1. Debugging Steps Applied to Straight Bar Gates: .....	10
5.4.2. Debugging Steps Applied to Billboard/Fence Gate: .....	11
6. Use precautions .....	11

## 1. Product introduction

Barrier gate radar is a non-contact detection device for vehicles, pedestrians and other targets. It works in the millimeter wave band. It uses chirp continuous wave signals to transmit to the target, and carries out high-speed real-time processing on the reflected echo of the target to realize rapid detection of the target.

Barrier gate radar is mainly applied to the management of parks, residential quarters, company vehicle entrances and exits, highway entrances and exits, parking lots, etc. It replaces the existing ground loop, controls the landing function of the brake lever.

The physical outline of the barrier gate radar is shown in Figure 1.



Fig. 1 Outline of barrier gate radar

The barrier gate radar has the advantages of convenient installation and maintenance, no need to damage the road surface, no influence on vehicle access, advanced technology, reliable and stable work, low cost, flexible setting of working distance, all-day and all-weather work, compatibility with straight bars and billboard/fence brake bar applications, etc.

## 2. Product specification

The barrier gate radar includes two types: DZLD-001 and DZLD-002.

DZLD-001 product: 1 channel switching value output;

DZLD-002 product: 2 switch outputs and 1 RS485/RS232 bus.

### **1.1. Technical indicators**

- Center frequency: 24 GHz;
- Beam width in vertical direction(-3dB) : 43°;
- Beam width in horizontal direction(-3dB) : 11°;
- Coverage distance range: 0~6 m;
- Distance adjustment range: 2.0~6 m (8 gears);
- Response time: 100 ms;
- Signal output: switching value.

### **1.2. Detection accuracy**

- Miss detection rate of vehicle: 0.1%;
- Miss detection rate of pedestrian: 0.1%;
- False detection rate: 0.05%.

### **1.3. mechanical properties**

- Size: 105×78×26 mm;
- Weight: 85g;
- Waterproof grade conforms to IP-65 standard.

### **1.4. Power supply**

- Operating voltage range: DC 6~18 V;
- Operating current: less than 80 mA/12 V.

### **1.5. Operating conditions**

- Temperature range:-40℃ ~+85℃;

- Humidity range: 99% relative humidity at 25°C.

## **1.6. Reliability**

Operating under specified conditions, the equipment can work continuously day and night, and its mean time between failures (MTBF) meets the following requirements:  $MTBF \geq 15000$  h.

## **3.Application conditions**

The radar product is only applicable to the scene where vehicles go straight through the gate, and cannot be used for the scene where vehicles go curve lane through the gate.

## **4.Technical characteristics**

### **1.7. No detection distance dead zones**

The barrier gate radar detects the nearest distance of the target to 0m, and truly realizes the work without blind spots.

### **1.8. All-day and all-weather working**

The working signal of the barrier gate radar is in millimeter wave band and does not need special heat dissipation treatment. Under the weather conditions of rain, snow, hail, smog etc., the barrier gate radar has the capability of continuous working day and night. The product shell has the IP-65 waterproof requirement and does not need to worry about radar damage caused by rainwater entering the radar.

### **1.9. Detection accuracy**

Millimeter wave working signals used by barrier gate radars have high working frequency, good directivity and strong anti-interference performance. The radars are not interfered by the outside equipment and will not cause interference to external electronic equipment. The signal propagation attenuation is large and the radiation signal strength meets the requirements of national environmental protection.



The detection rate for different types of vehicles (including cars, trucks and aluminum vehicles) is higher than 99.9%. When the vehicle is at a large angle with the brake radar, it can also be reliably detected.

The detection rate for pedestrians is higher than 99.9%.

### **1.10. Operational reliability**

The casing of the barrier gate radar adopts a waterproof design conforming to IP-65 standard. The product has low power consumption, is suitable for extreme high temperature and low temperature weather, and works continuously day and night. Under normal use environment conditions, the product will not be inadvertently damaged.

### **1.11. Flexibility in installation and use**

The barrier gate radar is installed and fixed on the outer surface of the gate machine and vertically shines through the gate opening of vehicles or pedestrians. The installation is very convenient and flexible. For gate crossings with different widths, the barrier gate radar has the convenience of setting different sensing distances through the dip switch, thus eliminating the inconvenience of depending on a computer to download software or to delimit detection areas to adapt to different distances.

### **1.12. Low installation and maintenance cost**

The barrier gate radar is simple to install, maintenance-free, highly reliable and easy to replace quickly, which not only overcomes the problems of high construction cost and maintenance difficulty caused by the original use of ground loop to destroy the road surface, but also solves the problem of rod drop control of one gateway exit gate rod or entrance gate rod with one radar.

### **1.13. Convenient power supply**

The barrier gate radar uses standard 12V DC power supply, which can adapt to the power supply voltage range of 6V ~ 18V and large voltage fluctuation. The power supply current requirement is not large. It can be directly supplied by the gate control board without using a separate power supply device.

## 1.14. Adaptability of using environment

The barrier gate radar adopts the automatic detection technology and does not need personnel intervention, which can meet the application of straight bar gateway and billboard/fence gateway.

## 5. Installation and debugging

### 1.15. Installation of barrier gate radar

The installation diagram of the barrier gate radar at the gateway entrance is shown in Figure 2.

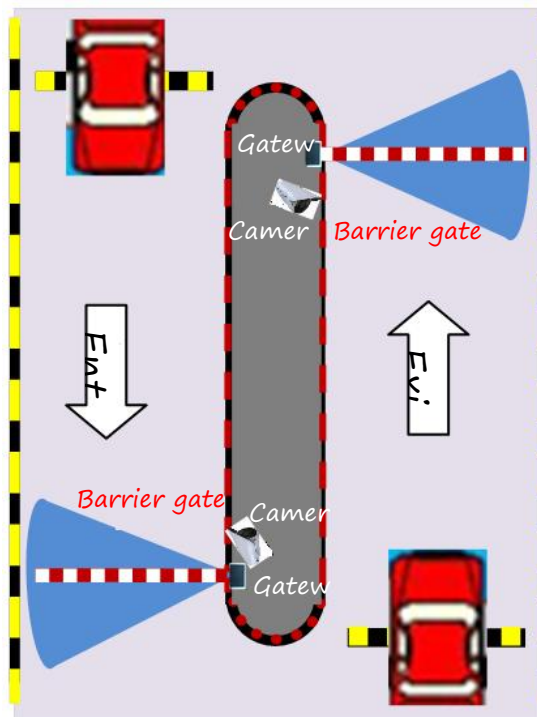


Fig. 2 Installation diagram of barrier gate radar

The barrier gate radar is directly installed on the outer surface of the gateway box at the gateway entrance, and the irradiation direction of the barrier gate radar is perpendicular to the entrance or exit direction of the gateway channel.

The installation height of the barrier radar is about 0.7m to 1m from the ground center of the radar (0.7m is recommended for the car traffic gate, and 1m is recommended for the large car traffic gate). The installation and fixing dimension of

the barrier gate radar is 67×67 mm, and four M4×35 screws are used to connect with the gateway box.

Figure 3 shows the installation dimensions of the barrier gate radar.

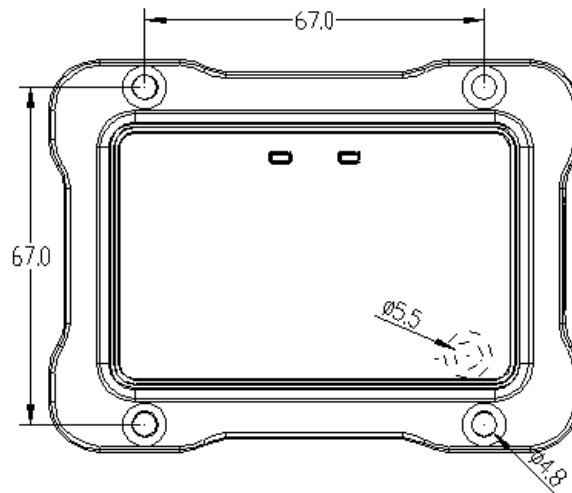


Fig. 3 Installation dimension diagram of barrier gate radar

The schematic diagram of installation and connection of barrier gate radar is shown in fig. 4.

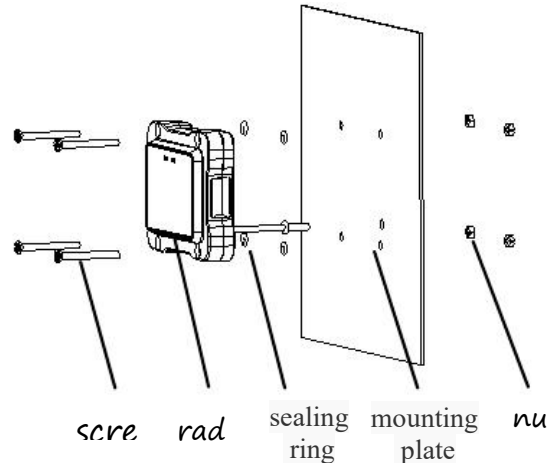


Fig. 4 Schematic diagram of installation and connection of barrier gate radar

Installation and fixing steps of barrier gate radar:

- a) According to the application type of the straight bar or billboard gate machine, determine the installation direction of the barrier gate radar;
- b) Drill four  $\Phi 4.8$  diameter screw holes and one  $\Phi 5.5$  diameter cable threading hole on the brake radar mounting plate;



c) After the cable is sleeved with the sealing ring, the cable is connected into the brake cabinet body through the cable hole, four screws are inserted into the fixing hole of the radar, and the radar is connected to the mounting plate in turn after the sealing ring is sleeved.

d) Put washers and fixing nuts on the 4 connecting screws in turn and tighten them to ensure reliable radar fixing.

For the straight bar gate and the gate with billboard/fence, the installation method of the barrier gate radar is different. the installation and fixed use method of the straight bar gate is shown in fig. 5.

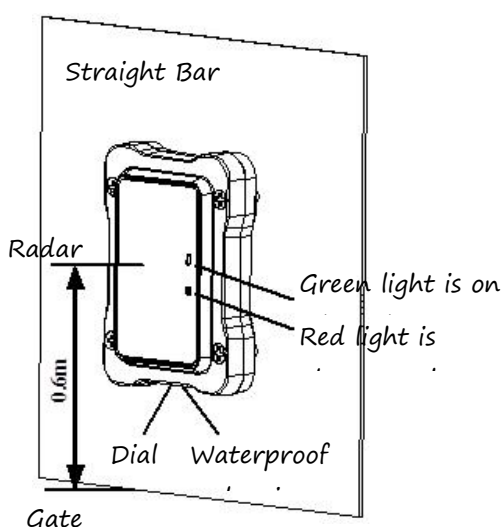


Fig. 5 Application and installation diagram of straight bar gate

The installation and fixed usage of billboard/fence gate is shown in fig. 6. Note: For application scenarios where the installation position of the radar is close to the fence bar (The distance is less than about 0.4m), a nut or washers is respectively placed on the two installation screws between the radar and the installation plate in the direction where the radar is close to the billboard/fence.

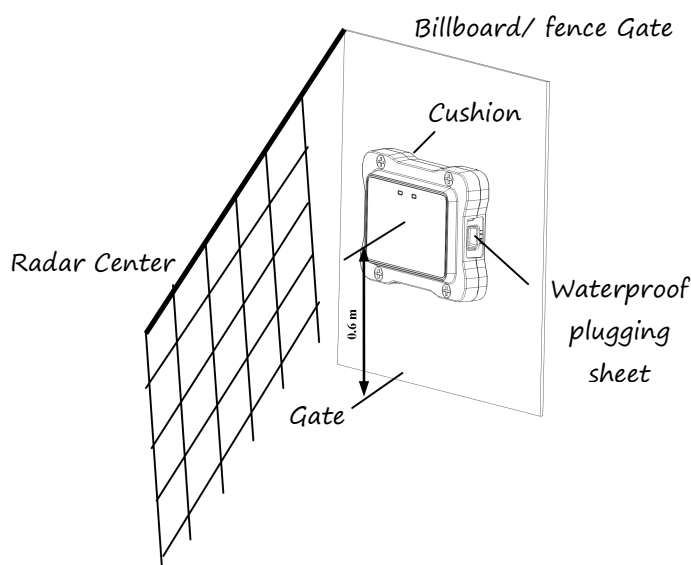


Fig. 6 Application and installation diagram of billboard/fence gate

### 1.16. External interfaces and connections

The barrier gate radar uses an 8-core cable externally, including power supply input, switching value output and radar measurement data output interface.

The external interface definition of barrier gate radar is shown in Figure 7.

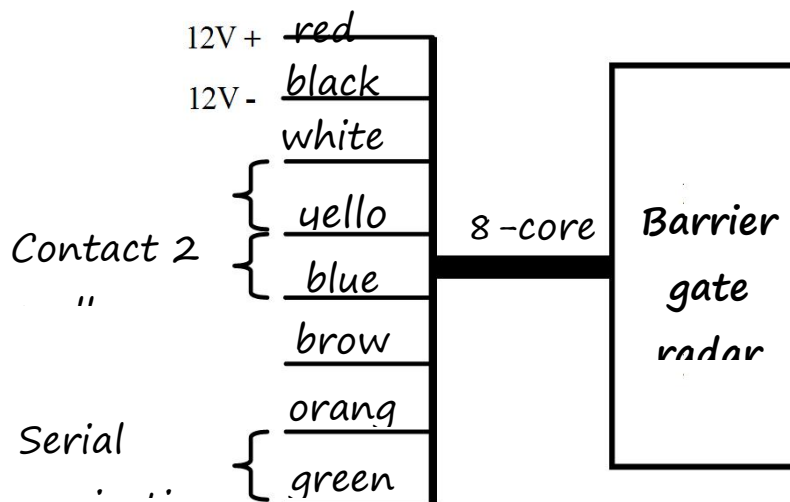


Figure 7 Definition of External Interface of Barrier gate radar

Specific interface definitions are shown in Table 1.

Table 1 Definition of External Interface of Barrier gate radar

Line color	Interface definition	Note
Red	12V +	DC12V±3V
Black	12V -	Power supply ground
White	Switch contact 2	Normally open, anti-smashing
Yellow	the public side	Output
Blue	Switch contact 2	Normally open, anti-smashing
Brown	/	/
Orange	RS485/RS232	Serial data output
Green	RS485/RS232	Serial data output

## 1.17. Induction distance setting

The barrier gate radar uses dial switch to set the distance, which can flexibly meet the application of gateways with different widths, adjust the state of dip switch's "1", "2" and "3" dialing keys, and can set a total of 8 gear distances. [Adjust the dial switch "4" dial key status, you can select the background learning status.](#) The relationship between the setting of dip switch and the induction distance of the barrier gate radar is shown in Figure 8.

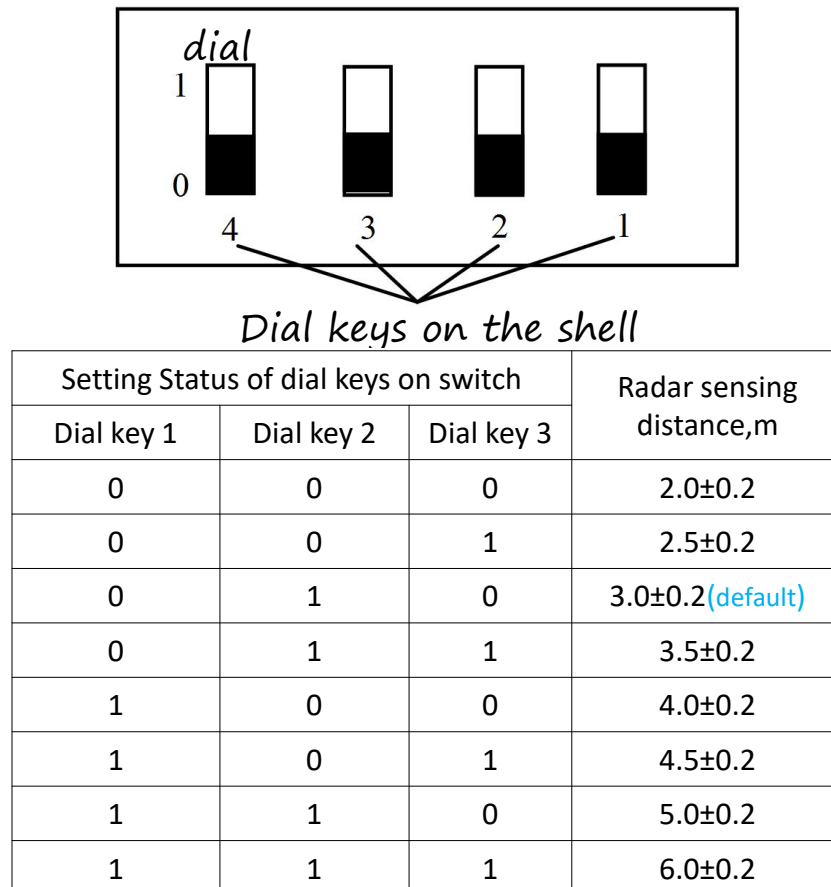


Figure 8 Corresponding Relationship between dip switch Setting and Radar Induction Distance of Gateway

### Note:

- The number of dial key near the shell is "0" and the number far away from the shell is "1".
- [Dial key 4: Background learning status setting; set "1" to learn only the first time, set "0" to learn every time you power on.](#)
- When setting the radar sensing distance of the gate, the three dialing keys of the dial switch must be adjusted under the condition of power failure.



- It is recommended that the setting distance of the barrier gate radar should not exceed the length of the gate rod. **Set the distance to be 0.5m shorter than the length of the gate rod.**

- For billboard/fence gate application, 2.5m/3m long gate rod and 2m barrier gate radar setting distance are recommended. The brake lever is 3.5m/4m long, and the setting distance of the brake radar is recommended to be 2.5 m.

## **1.18. Debugging of Barrier gate radar**

### **1.18.1. Debugging Steps Applied to Straight Bar Gates:**

a) According to the length of the gate rod, set the induction distance of the barrier gate radar and cover the waterproof blocking piece tightly.

b) The wide beam direction (short size of radar) of the barrier gate radar is in a horizontal position and is fixed to a height of about **0.7m~1m** from the gate crossing ground. **The radar sensing distance of the gate is 0.5 meters shorter than the length of the gate.**

c) The horizontal installation position of the barrier gate radar shall be selected, the barrier gate radar shall be powered on, the gate lever shall be lifted and lowered for many times, and the green light of the barrier gate radar shall be fixed at the position where it is continuously extinguished.

d) **Set the radar sensing distance and learning status**, When the barrier gate radar is powered on, its red light will always be on, and the barrier gate radar will automatically detect the gate environment (the gate lever is in a lowered state). At this time, no people, vehicles or objects that can be sensed are allowed in the illuminated area of the barrier gate radar, and the green light cannot be on.

e) When people or vehicles pass through the barrier gate radar sensing area, the green light of the barrier gate radar will light up, and when people or vehicles leave the barrier gate radar sensing area, the green light of the barrier gate radar will go out.

f) **For the first time to learn background radar**, if the radar is powered on for the first time and there is a background learning abnormality (there is a target in the area during learning, or the radar illumination direction is incorrect), you need to dial the dial key 4 back to "0", and after a power-on, then dial back to "1" and repeat the above operation.

### 1.18.2. Debugging Steps Applied to Billboard/Fence Gate:

a) According to the length of the gate billboard/fence bar, set the induction distance of the barrier gate radar. Generally, set the induction distance of the barrier gate radar to be 0.6 ~ 0.8 times of the length of the gate bar, and cover the waterproof blocking piece tightly.

b) The narrow beam direction (length size of radar) of the barrier gate radar is in a horizontal position and is at a certain distance from the billboard/fence bar, so that the barrier gate radar beam cannot cover the billboard/fence bar;

c) The barrier gate radar is fixed to a height of about 0.7m~1m from the gate crossing ground. The horizontal installation position of the radar is controlled at a distance of 0.4m from the railing, if it is less than this distance, the pad is placed on the two screws that fix the radar in the direction of the billboard or fence;

d) Set the radar sensing distance and learning status, when the barrier gate radar is powered on, the barrier gate radar will automatically detect the gate environment (the fence bar is in a lowered state). At this time, no people, vehicles or some objects that can be sensed are allowed in the barrier gate radar irradiation area, nor can they irradiate the billboard/fence bar;

e) When the barrier gate radar is powered on, the red light will always be on, the green light of the barrier gate radar cannot be on, and the green light of the barrier gate radar cannot be on after taking off and landing the gate lever for many times.

f) When people or vehicles pass through the barrier gate radar sensing area, the green light of the barrier gate radar will light up, and when people or vehicles leave the barrier gate radar sensing area, the green light of the barrier gate radar will go out.

g) For first-time background radar only, the operation refers to the straight bar requirements.

## 7. Use precautions

a). The barrier gate radar shall be vertically installed and fixed, and the radiation surface of the radar shall point to the direction of the traffic lane. Any incorrect installation will affect the working performance of the barrier gate radar.



b) . Within the operating range set by the barrier gate radar, it is not allowed to pile up any objects that can be detected by the barrier gate radar, otherwise it will affect the operation of the barrier gate radar.

c) . The radiation surface of the barrier gate radar is not allowed to be shielded by rubberized fabric, metal and other objects, otherwise the normal use of the barrier gate radar will be affected.

d) . The detection targets of the barrier gate radar are mainly vehicles and pedestrians. Any targets smaller than the vehicle and pedestrian (RCS) may be missed by the barrier gate radar.

e) . The target angle that the barrier gate radar can adapt to is limited. When the angle between the vehicle side and the normal irradiated by the barrier gate radar is greater than about 30, the barrier gate radar may miss detection.

f) . Setting the inductive distance of the barrier gate radar must be in a power-off state. If the dip switch dial key is toggled under **power-on** condition, the working distance of the barrier gate radar may be incorrect.

g) . Setting the induction distance of the barrier gate radar must strictly refer to the length of the gate rod and correctly set the dialing code, otherwise the radar work will be affected.

h) . After the barrier gate radar dip switch is set up, the waterproof blocking piece must be tightly covered, otherwise the waterproof performance of the barrier gate radar will deteriorate, affecting the reliable operation of the radar.

i) . After the gate radar is installed, during the radar power-on detection (when the radar green light is flashing), people, vehicles and other objects should not be in the radar coverage area (the first time the radar is powered on to learn the radar, and then the power is turned off again during subsequent use, there is no such requirement); if the pedestrian verifies the integrity of the radar, the pedestrian needs to slowly cross the radar sensing area, cross quickly and the radar may not respond.

j) . Barrier radar installation recommendations: small car traffic gate, installation height of about 0.7m; large car traffic gate, installation height of about 1m, and the radar wide beam in the vertical direction.