ITARD-024SA

Radar

User’s Manual

Version 1.0.0

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Welcome

Thank you for purchasing our device!
This user’s manual is designed to be a reference tool for your system.
Please read the following safeguard and warnings carefully before you use this series product!
Please keep this user’s manual well for future reference!

Important Safeguards and Warnings

1．Electrical safety

All installation and operation here should conform to your local electrical safety codes.
The power shall conform to the requirement in the SELV (Safety Extra Low Voltage) and the Limited power source is rated 12V DC (24V AC) in the IEC60950-1.
We assume no liability or responsibility for all the fires or electrical shock caused by improper handling or installation.

2．Transportation security

Heavy stress, violent vibration or water splash are not allowed during transportation, storage and installation.

3．Installation

Do not apply power to the radar before completing installation.
Always follow the instruction guide the manufacturer recommended.

4．Qualified engineers needed

All the examination and repair work should be done by the qualified service engineers.
We are not liable for any problems caused by unauthorized modifications or attempted repair.

5．Environment

The working temperature ranges from -30℃ to +70℃. Please keep it away from the electromagnetic radiation object and environment.
Please keep the sound ventilation.
Do not allow the water and other liquid falling into the radar.

6. Accessories

Be sure to use all the accessories recommended by manufacturer.
Before installation, please open the package and check all the components are included.
Contact your local retailer ASAP if something is broken in your package.

1 General Introduction

ITARD-024SA is high-performance narrow-beam flat radar. It is an auxiliary product in the ITS area of considerable integration and intelligent level. It is to detect the moving vehicle dynamically to promote the modern management level of the road and city traffic.

ITARD-024SA realizes the vehicle detect via the Doppler effect theory. The radar sends out a ray of microwave, and the microwave is reflected after it touched the moving vehicle. The radar can receive the reflected wave. If the object has the radial movement relative to the radar, the frequency of the reflected wave is different from the frequency of the send out wave. At the same time, the difference of the frequency is proportion to the relative moving speed of the object and the radar. Now the radar can detect the difference between the reflected wave and the send out wave to calculate the moving speed of the vehicle.

The radar that used to detect the vehicle speed shall meet some basic requirements.

First, the antenna of the radar shall have sound direction capabilities. The wave beam shall not be too wide. Otherwise, there are several lanes in the radar detect area at the same time; the radar can not distinguish the object and can not calculate the speed. In the actual environments, we can see the wave beam level width of the radar shall be less than 7°. The ITARD-024SA adopts the 4.6°angle. To avoid the interference from the vehicle out of the beam, the side lobe level of the antenna direction shall be general low. Usually it shall be less than －15dB. The ITARD-024SA adopts －21.5 dB. At this value, it can effectively reduce the interference from the neighboring lane. Besides, to accurately locate the vehicle position, the trailing edge of the radar beam shall be steep, the typical and the wave beam-shape factor (－20dB width/－3dB width) shall be less than 2.5.

The second requirement is speed measuring responsive time. It is the delay time from the object enters the detect area to the radar gives the speed data. ITARD-024SA adopts the following principles: for the vehicle of slow speed, the speed measuring responsive time is general long and for the vehicle of high speed, the speed measuring responsive time is short. In this way, the vehicles of all speeds are in the specified distance so that the camera can get the clear plate information.

2 Features

- Adopt flat micro beam array antenna design and manufacture technology. It can get the commonness easily, light weight and high efficiency.
- The speed measuring accuracy is high and the error ranges from -1km/h to +1km/h. High reliability.
- The level angle of the radar is small. In this way, it avoids the interference of reflected wave from the neighboring lane.
- Fast responsive time guarantees the capture rate and real-time feature.
- Advanced radar signal process and data real-time process technology.
- New algorithm, position is stable and the work can sustain.
- It can be widely used in many environments, fully supports the 2nd development.
- Low microwave radiation, low power consumption, long working hour, high stability and reliability.

3 Specifications

Model / Spec	ITARD-024SA
Antenna Type	Flat micro beam array antenna
Radar Mechanism	Single-frame continuous beam
Microwave Working Frequency	24.125GHz±50MHz
Send Power	9.5dBm=8.9mW
Antenna 3dB Beam Width	4.6°(H) ×6.8°(V)
AD Sampling Rate	25KHz
Working Mode	Approaching
Lane Amount	Single-lane
Detect Info	Speed（Instant）
Capture Rate	≥95%
Speed Measuring Accuracy	±1Km/h
Speed Detect Range	10-250Km/h
Communication Interface	StandardRS-232
Cable Definition	Red：DC12V+ or AC24V1，Black：DC12V- or AC24V2，White：Tigger Out，Yellow：RS232 RXD，Green：RS232 TXD，Orange：RS232 GND
Power Input	DC 12V/AC 24V Current 500mA Over voltage, over current, miss connection protection Can supplying the power to the device safely and stably.
Power Consumption	< 5W
Interface Protection	There are over voltage and over current protection for all the corresponding interfaces.
Working Environments	Working temperature: -30℃~+70℃ Working humidity:10%~90%
Dimensions(MM)	Radar：205mm*155mm*65mm Bracket：163.4mm*100mm*155mm
Unit Weight	1kg(Excluding bracket)

4 Dimensions

Please refer to the following figure for detailed information. The unit is mm. See Figure 4-1.

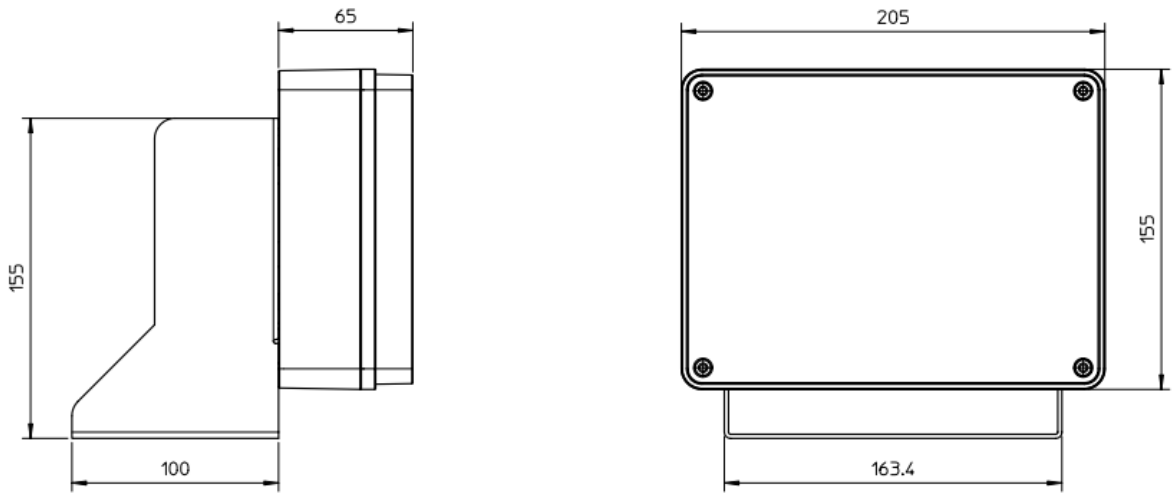

Figure 4-1

5 Installation

ITARD-024SA high-performance narrow beam flat radar detect min speed is 10Km/h. It can not directly provide the vehicle direction. The width of the microwave beam level and tilt is less than 3dB and usually it is used in the ANPR (Auto Number Plate Recognition).

Step1

The radar shall be installed at the transverse arm (it is 5.5-7.5M height from the ground) at the top of the lane. Please use three screws to fix the bracket and keep it standstill. See Figure 5-1.

Figure 5-1

Step2

The antennae shall face the approaching vehicle. The radar wave beam shall have an angle with the ground. Please adjust according to the project requirements and camera snap, usually the distance from the centre of the radar monitor area to the projection ground distance of the radar ranges from 10m to 20m.

Step3

Radar Installation Angle

For the environment of high traffic flow or strong wind, the recommend angle shall be 23°.It can enhance the capture rate and performance is more stable. But the shortcoming is it can not snap some vehicles that running on the traffic line and the vehicle snap position are about 15-17m.

If the traffic flow is low (such as the express road), the recommend angle shall be 22°.In this situation, the capture rate may be lower than in the 23°, but the capture rate of the vehicles running on the traffic line may be higher. At the same time, the snap position is general nearer. It is about 16-18m. In this way, the camera can snap the human face.

Please note the above angle is for reference only. Please select the reasonable snap position. Usually, the nearer the distance is, it is easy to distinguish the vehicles one by one. But the speed error correction value may be high， and vice versa. Besides, the radar wave beam level width is fixed 3dB. It shall guarantee the single-lane (There is no interference form neighboring lane) and at the same, it can capture the vehicle running on the line. It has requirements of the radar beam level angle. When the projection distance is far, the width of the level 3dB shall be smaller. When the projection distance is near, the width of the level 3dB shall be larger. When the distance is fixed, the width of the level 3dB is high if the you want the lane becomes width. The narrow the lane is, the width of the level 3dB is smaller.

Please refer to Figure 5-2 and Figure 5-3 for ANPR installation information.

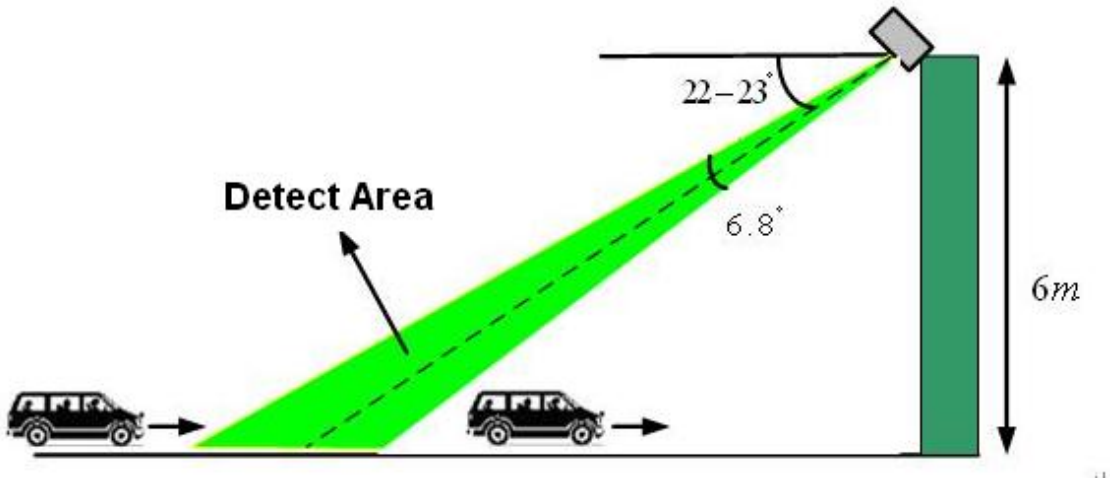

Figure 5-2

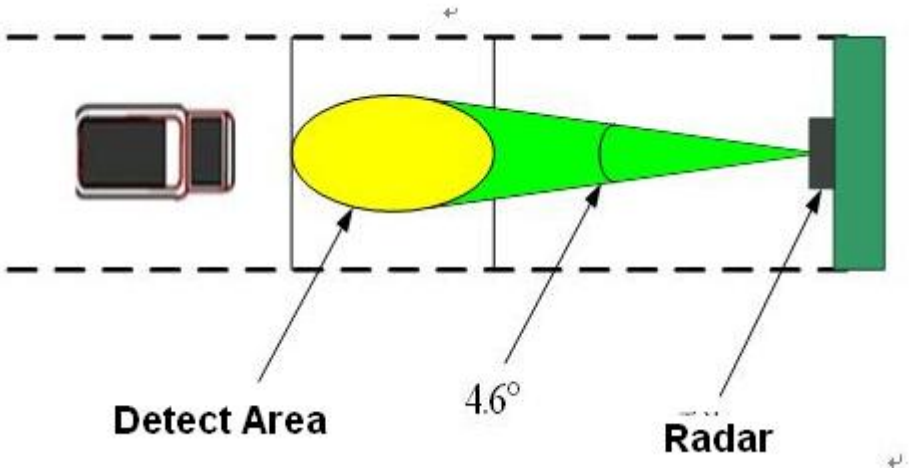

Figure 5-3

Step 4

Connect the radar to the camera.

Connect the radar to the camera via the RS232 port.

Radar			Camera
Cable Color	Signal		Signal
Green	TXD	↔	RXD
Yellow	RXD	↔	TXD

Brown	GND	↔	GND

Step5

Connect the power cable and boot up the device; you can see the indication light is on. See Figure 5-4.

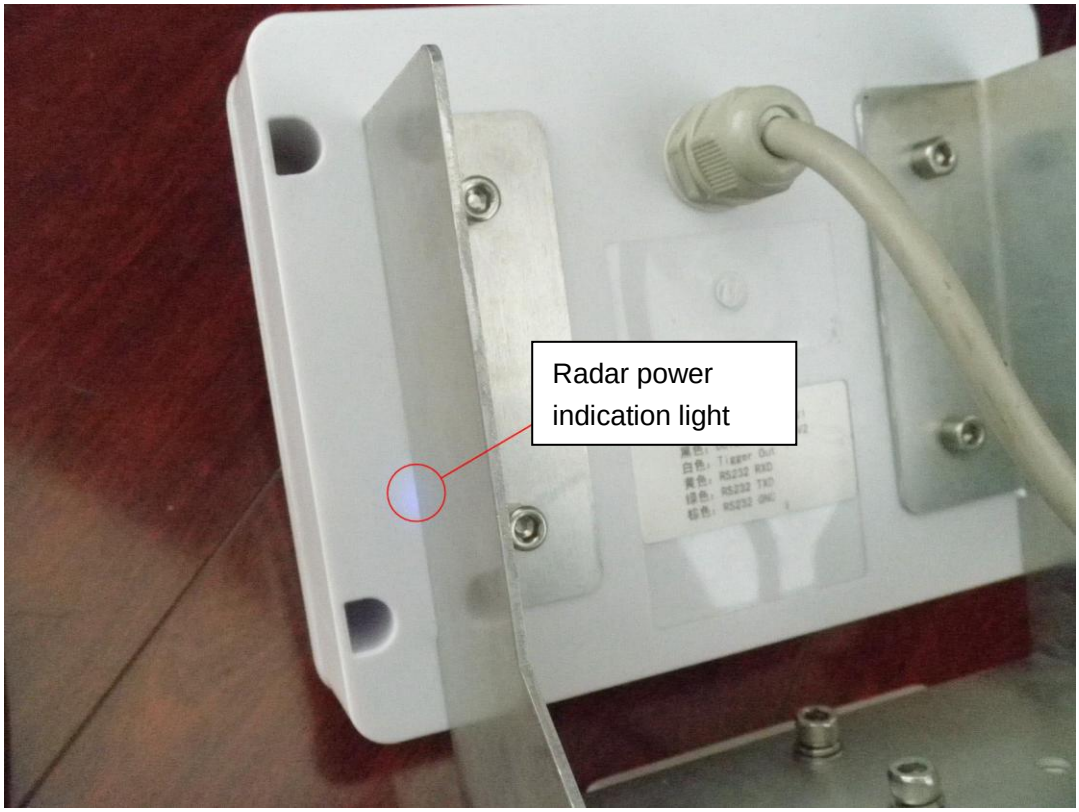

Figure 5-4

6 FAQ

Radar is a professional product of high technology and high sensitivity. Please read the user's manual carefully before you use.

Bug	Fix
There is no output, no response, after I connected the power to the device.	● Check power connection and voltage ● Check power positive end and the negative end connection are right or not. ● Check the communication cable connection is OK or not. The cable connection SN is right or not. ● Check the COM can get the applications properly or not. ● Check application COM setup is OK or not.
I just got some disordered code	● Check the communication cable connection is OK or not. The cable connection SN is right or not. ● Make sure there is no strong interference on the communication cable. ● Check COM baud rate is OK or not.
There is no speed when a vehicle passed.	● Check the radar installation angle. Make sure it is facing the corresponding lane. ● The radar installation angle is within the reasonable range. ● Check the distance from the radar to the object is in the specified range. ● The radar sensitivity is too low.
There is a speed but there is no vehicle passing by.	● There is strong electromagnetism interference or rotation object. ● Check the radar installation angle, whether there is interference from the neighboring lane. ● The radar sensitivity is too high.
It missed vehicle	● Check the radar installation angle. Make sure it is facing the corresponding lane. ● Check the distance from the radar to the object is in the specified range,. ● The radar sensitivity is too low.
The camera does not snap	● Check the communication cable connection is OK or not. The cable connection SN is right or not. ● Check camera protocol is right or not. ● Check the RS232 setup; make sure the baud rate setup is right. ● The camera snap function is enabled. ● The radar working mode such as min object interval, detect direction, sensitivity is right.

Appendix Toxic or Hazardous Materials or Elements

Component Name	Toxic or Hazardous Materials or Elements					
	Pb	Hg	Cd	Cr VI	PBB	PBDE
Circuit Board Component	○	○	○	○	○	○
Device Construction Material	○	○	○	○	○	○
Wire and Cable/AC Adapter	○	○	○	○	○	○
Packing Components /Accessories	○	○	○	○	○	○

O: Indicates that the concentration of the hazardous substance in all homogeneous materials in the parts is below the relevant threshold of the SJ/T11363-2006 standard.

X: Indicates that the concentration of the hazardous substance of at least one of all homogeneous materials in the parts is above the relevant threshold of the SJ/T11363-2006 standard.

Note

- **This manual is for reference only. Slight difference may be found in the user interface.**
- **All the designs and software here are subject to change without prior written notice.**
- **All trademarks and registered trademarks are the properties of their respective owners.**
- **If there is any uncertainty or controversy, please refer to the final explanation of us.**
- **Please visit our website or contact your local service engineer for more information.**

FCC Warning

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interferencereceived, including interference that may cause undesired operation.

CAUTION: changes or modifications not expressly app roved by the party responsible for compliance could void the user's authority to operate the equipment.

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:
NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the **instructions, may cause harmful interference to radio communications.**However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-- Reorient or relocate the receiving antenna.
-- Increase the separation between the equipment and receiver.
-- Connect the equipment into an outlet on a circuit differentfrom that to which the receiver is connected.
-- Consult the dealer or an experienced radio/TV technician for help