PUMATRONIX

ITSDETECTOR 24L-1 (HT-MTTR-3-485-A)

REAL-TIME MEASUREMENT OF SPEED AND DISTANCE

Product

Pumatronix Equipamentos Eletrônicos Ltda.

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Change History

Date	Revision	Content updated
01/15/2025	1.0	Initial Edition

Summary

1. Product Introdution

HT-MTTR-3-485-A radar, also known as fixed angle radar velocimeter, can measure the distance, speed, driving direction and other information of multiple vehicles in a single lane in real time. It can capture certain vehicles, such as speeding vehicles and retrograde vehicles, by means of radar trigger camera. This product is built by military technology and inherits the advantages of strong reliability of aerospace products. Ultra-low power consumption, can adapt to rain, snow, haze and other bad weather, support allweather work. Convenient installation, support remote debugging, suitable for bayonet monitoring, violation detection, intelligent transportation and other application fields, with excellent performance and thoughtful service to win the thrust of users.

2. Equipment Usage and Basic Requirements

2.1. Operating Principle

HT-MTTR-3-485-A radar mainly uses the Doppler Effect theory. If the target approaches the radar antenna, the reflected signal frequency will be higher than the transmitter frequency. Conversely, when the target is away from the antenna, the reflected signal frequency will be lower than the transmission probability. In this way, the relative velocity of target and radar can be calculated by the changing value of frequency. The camera receives the overspeed signal detected by the speed measuring radar, and immediately enters the state of snapshot, which is captured with the high-speed shutter.

2.2. Usage and Occasions

Suitable for fixed and formal test。It is widely used to measure the speed of motor vehicle bayonet, highway and other speed measuring occasions, also can be used to measure the speed of moving target in airport, railway and highway.

2.3. Product Features

HT-MTTR-3-485-A fixed-angle radar velocimeter can measure the lane, distance, speed, driving direction and other information of up to 16 vehicle targets in a single lane in real time. It can also remotely set the radar working mode and working parameters. Through radar trigger camera, it can capture specific vehicles, such as speeding vehicles and retrograde vehicles.

2.4. Products Standards and Numbers

- JJF 1065-2000 《Calibration Specification for RF Communication Test Set》
- JJF 1246-2010 《General Rules for the Examination of the Certificate of Manufacture Metrological Appliance》
- JJG 527-2015 《Fixed Radar Vehicle Speed Measurement Devices》
- JJF 1335-2012《Program of Pattern Evaluation of Fixed-angle Radar Speed Measurement Devices 》

3. Technical Parameters

		ITSDETECTOR 24L-1 (HT-MTTR-3-485-A)
Function parameters	Working frequency band	24,150 GHz
	Speed range	2 a 300 km/h (bi-direcional)
	Field speed measurement error	± 3 km/h
	Working range	0 a 40 metros
	Distance measurement error	± 0,325 metros
	Data update time	50 ms
	Vehicle capture rate	99,5%
	Redundant taking rate	< 1%
	Empty taking rate	< 1%
Power and consumption	Power	DC 12V (com proteção contra inversão de polaridade)
	Power consumption	≤ 6W
Communication interface	Communication	RS485, WIFI
Environmental conditions	Temperature	-40°C a +85°C
	Humidity	0% a 90% @ RH (50°C)
	Atmospheric pressure	86 kPa a 106 kPa
Enclosure protection grade	Standard	IP67

4. Installation Guide

Single-lane multi-target traffic speed radar usually installed on the gantry type or "Γ" on a rod, adopt the formal installation ,assembling a schematic diagram is shown in figure 1.

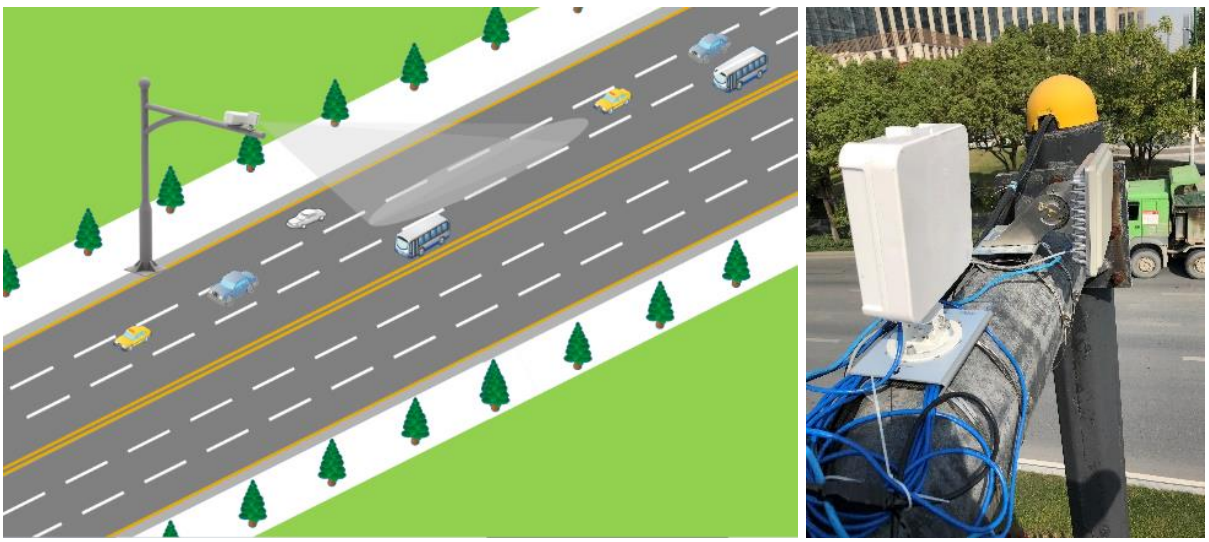

Figure 1 – Formal assembly diagram of the product

The schematic diagram of radar elevation adjustment is shown in figure 2. H is the installation height of the radar, and α is the pitch angle of radar.

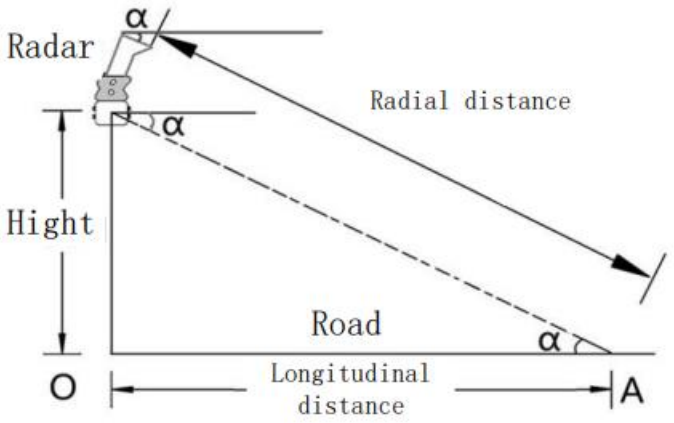

Figure 2 – Schematic diagram of radar adjusting pitch angle

The pitch angle α is adjusted according to the installation height of the radar ,as shown in table:

Installation height（Apart from the ground)	Pitch angle α
5 meters	14°
6 meters	15°
7 meters	15°
8 meters	16°
9 meters	16°

After the radar pitch angle is adjusted, the actual installation height of radar is input on the interface of radar host computer to complete the binding of radar parameters.

After radar installed to the gantry type or "Γ" bar, recommend adjustment radar profile according to the following steps. The installation method of radar is as follows:

1) Tighten the bottom screw to fix the radar on the bracket, adjust the deflection of the radar, and put the bubble in the center of the level instrument to make the radar in the horizontal state (Figure 3), and record the pitch angle γ displayed by the side scale (Figure 4).

Figure 3 - Schematic diagram of horizontal state adjustment

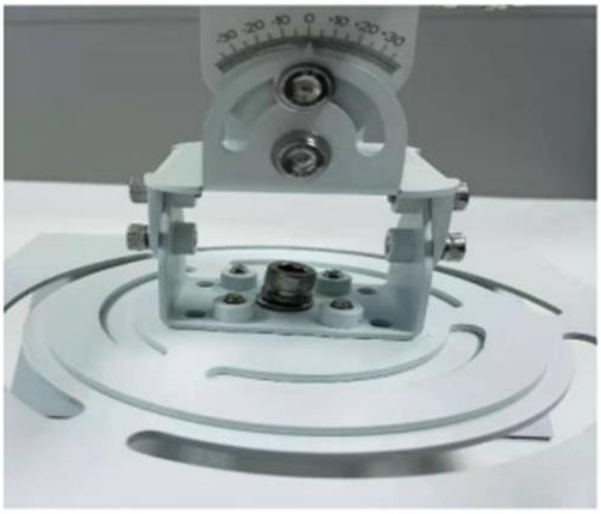

Figure 4 - Initial angle recording

2) Combined with the actual installation height, as shown in Figure 2, adjust the radar attitude so that the radar pitch angle alpha is equal to the angle value given in table 1, and the final pitch angle is (γ+α) on the side scale, with the allowable error of ±1°. If the radar is installed at an altitude of 7 meters H, the initial pitch angle is 0°, and the radar pitch angle (α+γ) is 15°(Figure 5).

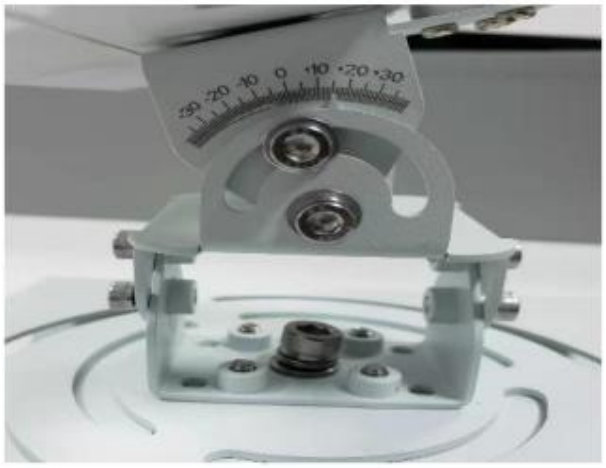

Figure 5 – Pitch angle recording

3) Aim at the center of the monitoring area (the center point of the target lane) according to the sight on the radar structure bracket (Figure 6).

Figure 6 – Installation diagram

5. Debugging method

5.1. System Connection

After the radar is installed according to the actual environment, connect the equipment according to the communication path, as shown in Figure 7.

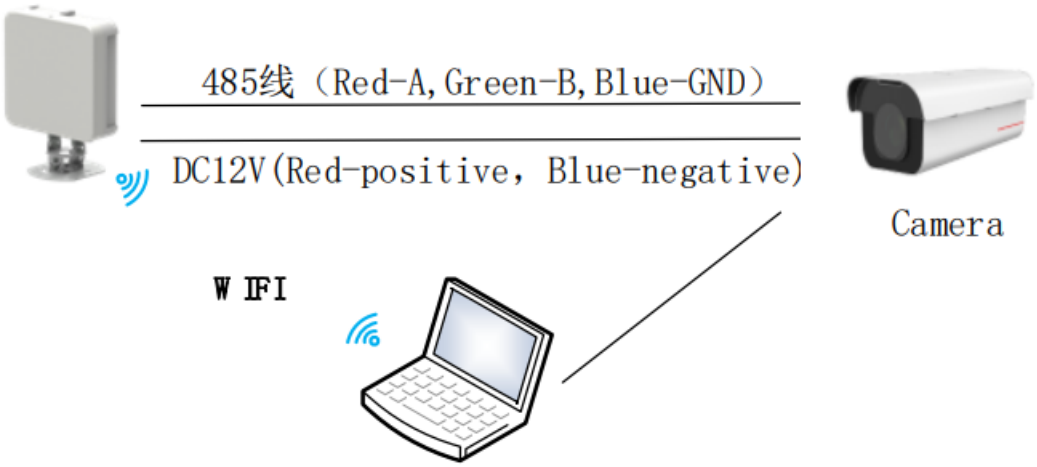

Figure 7 – Schematic diagram of radar connection

The radar and Huawei camera are connected by a 485 line and a 12V power line, as shown in Figure 7. The radar is directly connected and debugged through WIFI, the steps are as follows:

Connect the corresponding WIFI with a computer (WIFI NameHT-MTTR-XX-XX-XX, WIFI Password: 12345678) Open the HT-MTTR-3-485-A radar debugging host computer, select TCP / IP transparent transmission mode, the server IP is 192.168.1.1, the port number is 8899, click "connect to network", the radar debugging host computer should display "connected radar", as shown in Figure 8.

Figure 8 – Connecting Radar

5.2. System Debugging

1) Set the mode to "continuous tracking "

Set the mode to "continuous tracking", select "continuous tracking", and click "working mode setting". "working mode setting successfully" will be displayed in the information bar.

Figure 9 - Mode setting

2) Set Radar parameters

The radar generally has two kinds of installation states, namely formal and side-mounted, as shown in Figures 10 and 11.

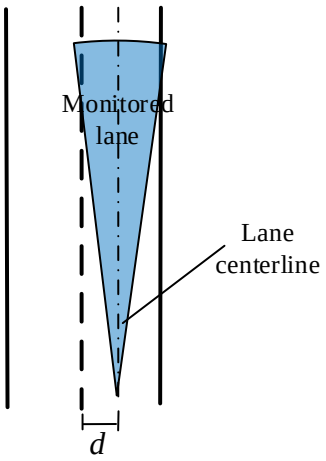

Figure 10 - formal

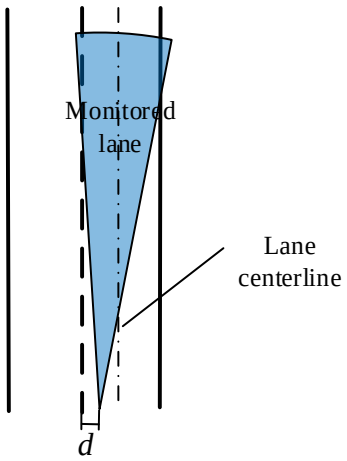

Figure 11 side-mounted

Estimate the horizontal coordinate d (left negative right positive) of the left edge of 1 lane relative to the radar (origin), and bind the width of 1 lane (generally 3.8m). For single lane radar, the width of 2/3 lane is set to 0, Click the lane setting binding, the text box appears, the lane setting binding is successful, as shown in Figure 12.

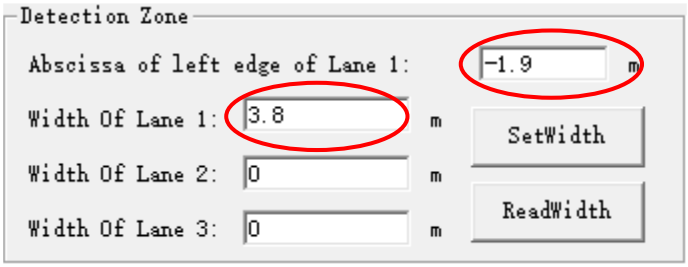

Figure 12 - Lane setting

If the radar is in formal installation, the installation angle is set to 0 °; if the radar is in side installation, the radar deflection angle (left negative right positive) is bound, and then click "parameter binding", the text box appears parameter binding success, as shown in Figure 13.

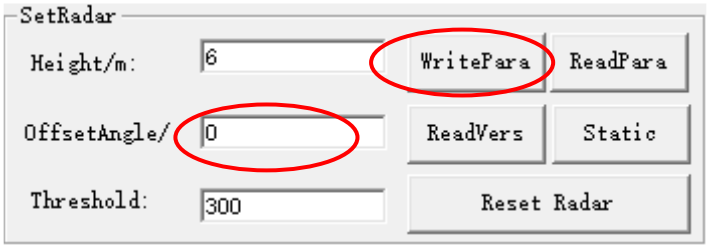

Figure 13 - Installation height and deflection angle settings

3) Observe vehicle trajectory

In the trajectory display interface on the left side of the debugging host computer, observe whether the trajectory of the passing vehicle is upright (start tracking from 40 meters away, the tracking trajectory is in the set lane), as shown in Figure 14. If the tracking trajectory is too short, the pitch angle of the radar is too large, and the radar needs to be raised upward. If the tracking trajectory is not straight, the radar deflection angle of the previous step is incorrectly bound.

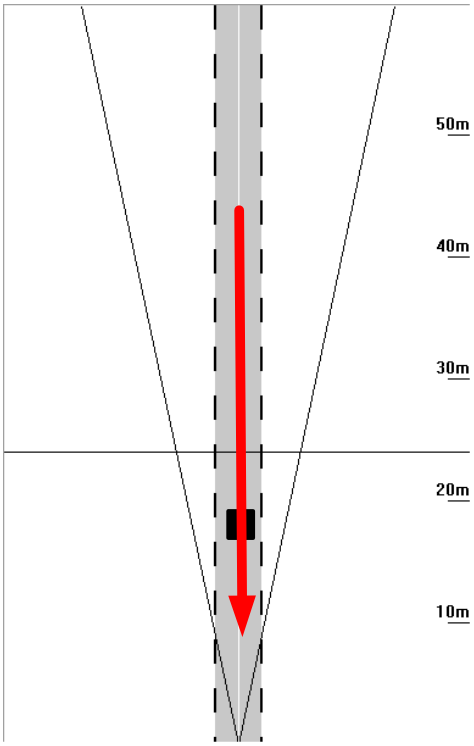

Figure 14 - Schematic diagram of vehicle track

4) Set the radar into the Capture Mode

The radar working mode is set to Capture Mode, as shown in Figure 15.

Figure 15 - Capture Mode set

Binding the radar snap position according to the actual requirements, click the snap distance binding, and the text box appears that the snap distance binding is successful, as shown in Figure 16.

Figure 16 - Capture distance set

The snapshot direction setting bar is shown in Figure 17. The drop-down list has three options: bidirectional, destination, and direction. The user selects the appropriate capture direction in the drop-down list according to the usage scenario, and then clicks the capture direction setting button to complete the setting of the capture direction. When the user needs to query the snapshot direction, click the snapshot direction query button to display the current snapshot direction in the drop-down list.

Figure 17 - Capture direction set

5) Observe the snapshot effect

Every time a car passes, the snapshot information should be displayed in the lower text box area. If there are multiple shots of the big car, adjust the model recognition setting (the default value is 5000) to reduce the threshold of the big car. The recommended value is 4000/3000 / 2000, as shown in Figure 18.

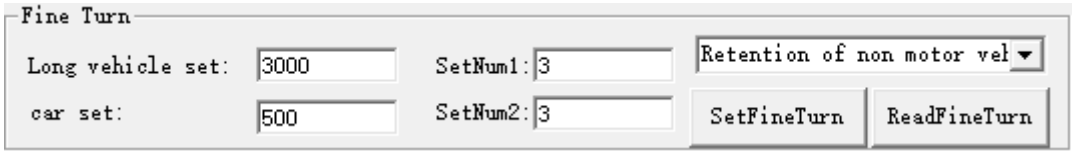

Figure 18 - Long vhicle set

Then set the relevant parameters of the camera, you can observe the captured pictures on the camera.

6. General Warranty Conditions

Pumatronix ensures the product against any defect in material or manufacturing process for a period of 1 year from the date of issue of the invoice, provided that, at the discretion of its authorized technicians, it is found to be defective under normal conditions of use.

The replacement of defective parts and the execution of services resulting from this Warranty will only be carried out at Pumatronix Authorized Technical Assistance or a third party expressly indicated by Pumatronix, where the product must be delivered for repair.

This Warranty will only be valid if the product is accompanied by a Maintenance Form that has been duly completed and has not been erased and is accompanied by an Invoice.

6.1. Situations in which the Product loses its Warranty

1) Use of software/hardware not compatible with the specifications in the Manual;
2) Connecting the product to the mains outside the standards set out in the product manual and installations with excessive voltage variation;
3) Infiltration of liquids from opening/closing the product;

4) Damage caused by natural agents (electric shock, flooding, salt spray, excessive exposure to climatic variations, among other factors) or excessive exposure to heat (beyond the limits established in the Manual);
5) Use the product in environments subject to corrosive gases, excessive humidity and/or dust;
6) Show signs of tampering with security seals;
7) Show signs of opening and modification by the Customer in places of the product not authorized by Pumatronix;
8) Damage caused by accidents/falls/vandalism;
9) Display tampered and/or removed serial number;
10) Damage resulting from the Customer's transportation and packaging of the product in conditions incompatible with it;
11) Misuse and not in accordance with the Instruction Manual.

7. Privacy Policy

In compliance with the General Data Protection Law (LGPD) - Law No. 13709, dated August 14, 2018, this product has programmable functions for capturing and processing images that may infringe the LGPD when used in conjunction with other equipment to capture personal data.

The equipment does not collect, use or store personal information, whether sensitive or not, for its operation.

Pumatronix is not responsible for the purposes, use and handling of the images captured, and control of the information and ways of operating the product are the sole decision of the user or purchaser of the product.


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