WT50A

WT50A 1000Hz 100Klux high cost-effectiveness dToF Lidar

WT50A is a mid-range laser ranging module featuring high frequency, high accuracy, a switchable coaxial aiming light, and strong ambient light immunity for reliable indoor and outdoor applications.

Key Features

- High frequency & accuracy
- Coaxial aiming light
- Strong ambient light immunity
- Indoor & outdoor use

Applications

- Overhead Crane Positioning
- Carriage Coupling Distance Control
- Safety Monitoring & Protection
- Industrial Inspection Robots

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Important User Information

Thank you for choosing our product. To ensure safe and reliable operation, please read the following information carefully before use.

1. Safe Operation

Always follow the instructions provided in the manual. Improper use may result in device malfunction or personal injury. Keep the device away from direct eye exposure if it includes laser or optical components.

2. Handling and Maintenance

Handle the product with care. Avoid exposure to extreme temperatures, moisture, or dust. When cleaning, use a soft, dry cloth. Do not attempt to disassemble or modify the device, as this may void the warranty.

3. Specifications and Updates

Product specifications, features, and performance may change as improvements are made. Always refer to the official website for the latest technical information.

4. Documentation and Intellectual Property

This document is proprietary. Do not copy, alter, or translate it without written authorization.

5. Support and Inquiries

If you encounter any issues, questions, or need technical assistance, please contact our support team: surertech@surertech.cn

* Technical support: surertech@surertech.cn

* Sales or product information: surertech@surertech.cn

Headquater Address:

13-14th Floor, Building 1, China, Railway Software Valley Headquarters, Economic Park, No. 66 Fengzhan Road, Yuhuatai District, Nanjing City, Jiangsu, Province,210012 P.R. China

Note: Proper use and regular maintenance will help maximize device performance and longevity. Following these guidelines ensures your product operates safely and efficiently.

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Contents

1. Specifications

No	Model	WT50A
1	Range	0.05m ~ 50m (90%reflectivity), 0.05m ~ 15m (10%reflectivity)[1]
2	Frequency	20Hz ~ 10KHz (Default: 1KHz)
3	Accuracy	±5cm(< 10m) ，1%(≥10m)(2σ)
4	Repeatability	±5cm
5	Ambient Light Immunity	45m@100KLux[2]
6	Central Wavelength	905nm
7	Photobiological Safety	Class 1
8	FOV	about 4mrad
9	Wavelength for Indication	650nm (visible red light)
10	Photobiological Safety for Indication	Class 2
11	Supply Voltage	9~36VDC
12	Peak Current	24V@100mA
13	Average Current	24V@34mA
14	Average Power Consumption	0.8W
15	Communication Interface	UART
16	Protection Level	N/A
17	Dimension	38 x 20 x 30 mm
18	Weight	15±2g
19	Operating Temperature	-20℃~+60℃ （No freezing will occur under these conditions. With the indicator laser disabled, the operating temperature range is -20°C to +60°C.）
20	Wire Specification	5-pin 1.25mm terminal, specification M1250V-05P, with 50cm tinned loose wire
21	Customization	available in appearance / structure / output protocol

(Note: 1. This parameter was measured at 25°C in an indoor environment.

2. This parameter was measured with a 90% reflector in an outdoor environment at 25°C.)

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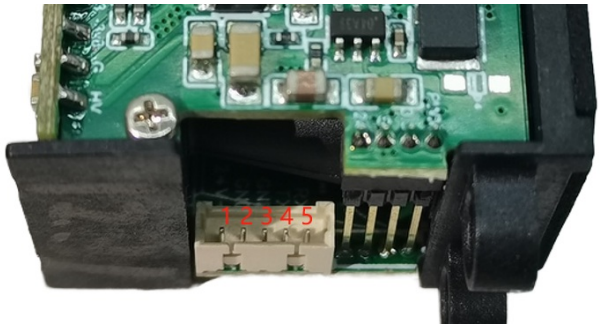
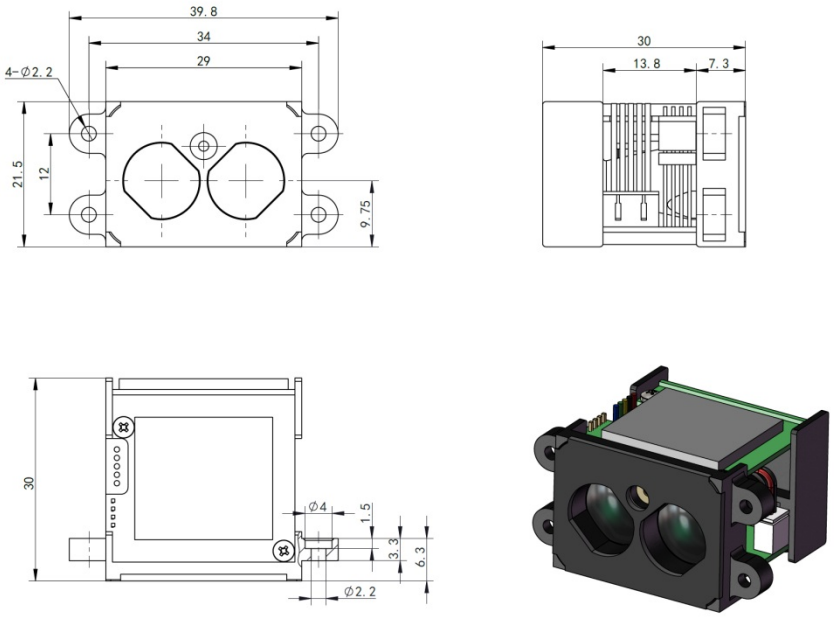
2. Definitions of Pins



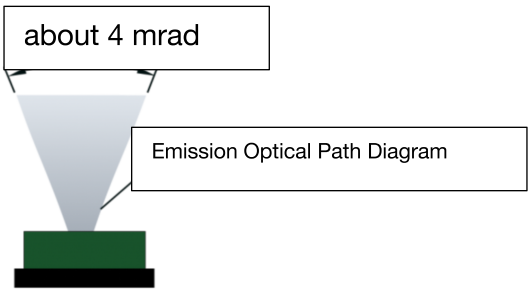
No.	Definition / Wire Color	User Interface
1	9~36V (Red)	External Power +
2	GND (Black)	GND
3	GND (Yellow)	GND
4	TX (Green)	RX
5	RX (Blue)	TX

3. Dimensions



4. Measuring Characteristic

Due to the **beam divergence angle**, the laser forms a **light spot on the target surface**, and the **spot size increases as the distance increases.** For accurate distance measurement, the **surface area of the target object should be larger than the laser spot size** at the corresponding measuring distance.



The diameters of the light spot of WT50A in different distances are shown below:

Distance	1m	2m	5m	10m	20m	50m
Diameter of the light spot	0.4cm	0.8cm	2cm	4cm	8cm	20cm

5. Communication Protocol: UART

5.1 Communication Interface

UART	
Baud Rate	460800 (adjustable)
Data Bit	8
Stop Bit	1
Parity Bit	None

5.2 Output Format

The data frames below are all hexadecimal.

(1) Default frequency 1kHz. One full data has 4 bytes. The format shown as follows:

Frame Header	Distance 2 Bytes		Check Byte
5C	02	11	EC

5C: Frame header 1 byte

02 11: Distance value 2 bytes means the measuring distance is 4354cm, little-endian, range 0-65535cm. When out of range, it would output 65535cm.

EC: From 02 to 11, opposite of the Check byte, 1 byte

（2）Set and Read Commands:

No.	Function Description	Upstream	Downstream	Remarks
1	Reading serial number	5A 0D 02 0D 0D D6(checksum)	5A 8D 02 10 01 5F(checksum)	01 indicates the product serial number is 272: little-endian mode, the product serial number displayed on the host computer is: S00272 (displayed with 'S' added before the 5-digit number)
2	Reading software version number	5A 16 02 16 16 BB(checksum)	5A 96 02 03 02 62(checksum)	03 02 indicates the product software version is V2.3: little-endian mode, 02 represents 2, 03 represents 3, with a dot (.) in between
3	Modifying baud rate	5A 06 02 80 04 73(checksum)	5A 86 02 80 04 F3(checksum)	60 00 (9600); C0 00 (19200); 80 01 (38400); 80 04 (115200); 00 09 (230400); 00 0A (256000); 00 12 (460800); Other baud rates are not supported
4	Modifying frequency	5A 0B 02 E7 03 08(checksum)	5A 8B 02 E7 03 88(checksum)	E7 03 indicates the serial data frequency division factor: little-endian mode, representing the set serial frequency division factor is 999 (E7 03), and the corresponding serial data output frequency f=1000000/(999+1)=1000Hz; Serial frequency only supports 20-10KHz
5	Reading frequency	5A 1B 02 1B 1B AC(checksum)	5A 9B 02 E7 03 78(checksum)	E7 03 indicates the serial data frequency division factor: little-endian mode, representing the read serial frequency division factor is 999 (E7 03), and the corresponding serial data output frequency f=1000000/(999+1)=1000Hz; Serial frequency only supports 20-20KHz
7	Stopping distance measurement	5A 0A 02 00 00 F3	5A 8A 02 00 00 73	Returns 5A 8A 02 00 00 73; Stops distance measurement

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8	Starting distance measurement	5A 0A 02 02 00 F1	5A 8A 02 02 00 71	Returns 5A 8A 02 02 00 71; Starts distance measurement
9	Turn off the indicator laser	5A 0C 02 00 00 F1	5A 8C 02 02 00 71	Response: 5A 8C 02 02 00 71 – Turn off the indicator laser
10	Turn on the indicator laser	5A 0C 02 01 00 F1	5A 8C 02 01 00 71	Response: 5A 8C 02 02 01 71 – Turn on the indicator laser

5.3 Check function

Begin with the second byte and end with the last second byte, find the inverse of the sum.

```
uint8_t Check_Sum(uint8_t *_pbuff, uint16_t _cmdLen)
{
uint8_t cmd_sum=0;
uint16_t i;
for(i=0;i<_cmdLen;i++)
{
cmd_sum += _pbuff[i];
 }
 cmd_sum = (~cmd_sum);
 return  cmd_sum;
}
```

6.Quick Test

- TTL to USB adapter board
- 9－36V DC power supply **or**, alternatively, our company’s self-developed universal test kit with Type-C data cable (as shown in the figure below)

Host computer/serial port assistant.

After the WT50A successfully connected to your computer, select the baud rate and click “disconnect” then click “connect”, then the data can be monitored on the upper computer.

Here is a sample figure of upper computer:

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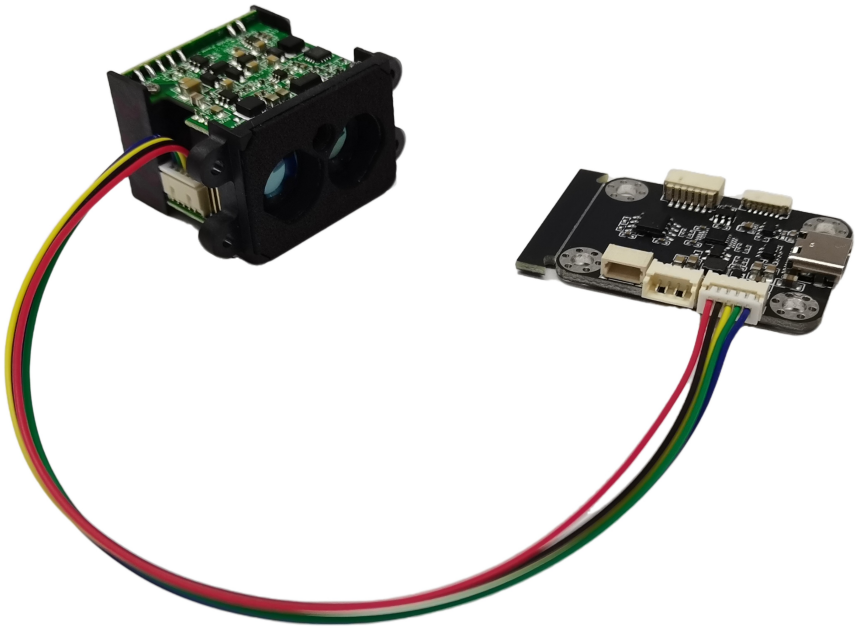

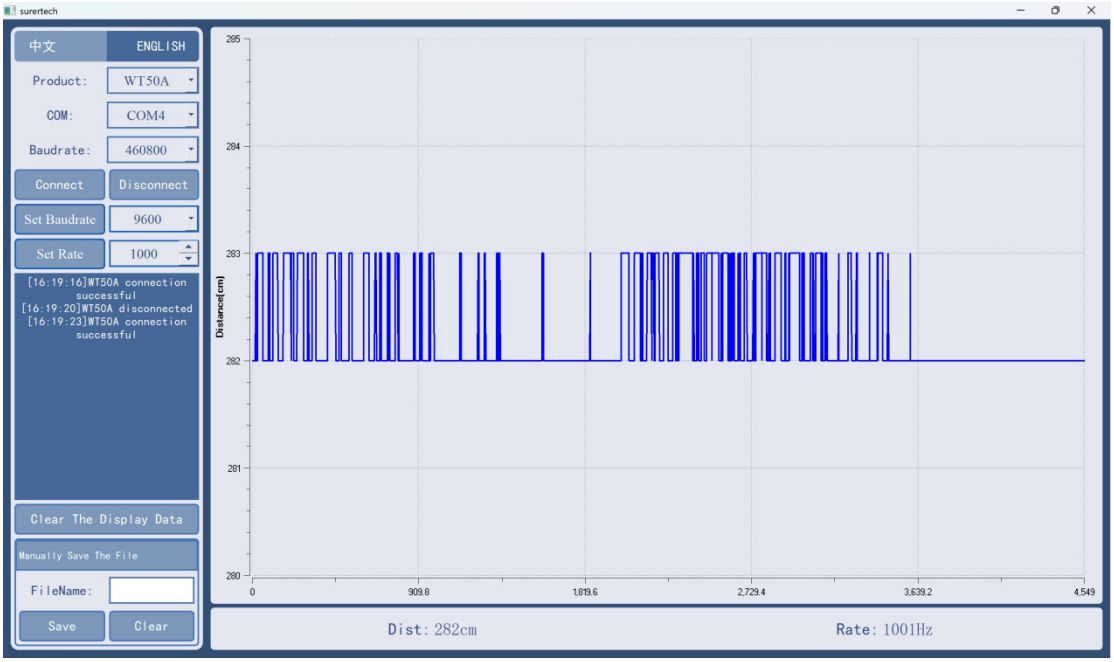
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中文
ENGLISH
Product:
WT50A
COM:
COM4
Baudrate:
460800
Connect
Disconnect
Set Baudrate
9600
Set Rate
1000
[16:19:16]WT50A connection successful
[16:19:20]WT50A disconnected
[16:19:23]WT50A connection successful
Clear The Display Data
Manually Save The File
FileName:
Save
Clear
Distance(cm)
285
284
283
282
281
280
0
909.8
1,819.6
2,729.4
3,639.2
4,549
Dist: 282cm
Rate: 1001Hz

Region	Function Description
Region 1	Set serial port baud rate and other parameters for corresponding models
Region 2	Configure baud rate and frequency
Region 3	Real-time distance point-line graph
Region 4	Read real-time frequency values
Region 5	Read real-time distance values
Region 6	Save data to file
Region 7	Clear all displayed data

6. Attentions

- This specification is the property of Surertech and may be updated without prior notice.
- The product does not support reverse polarity or overvoltage protection. Please strictly follow the specified power supply and wiring requirements.
- The laser safety classification of this product is Class 2. Do not look directly into the lens after the device is powered on.
- When operating in dusty environments, it is recommended to place a red transparent glass or acrylic protective cover over the lens for dust protection.
- The material should have a transmittance ⩾ 85% at 905 nm wavelength.
- Please wear anti-static gloves when handling the product to prevent electrostatic damage.
- Measurement errors or failures may occur when measuring highly reflective objects (e.g., 3M reflective tapes) or mirror surfaces.

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7.Update History

Version	Date (YY/MM/DD)	Content
V0.5	22/03/10	Mass produced first editions
V1.0	24/12/30	Updated the format
V2.0	25/03/05	Revised some parameters
V3.0	25/07/09	Expanded Function,New Host Computer Added

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