
BT08M-RS485 Single-Point LiDAR Based on DTOF Technology

1000Hz Measuring Frequency / 4m Range / High cost-effectiveness

Features

- Based on DTOF principle (Direct Time of Flight)
- Maximum Measuring Range: 4m
- Measuring Blind Zone: 5cm
- Frequency: 1000Hz
- Accuracy: $\pm 5\text{mm}$ (2σ)
- Resolution: 1mm
- Operating Temperature: $-20^{\circ}\text{C} \sim +55^{\circ}\text{C}$
- Supply Voltage: 9-30VDC
- Compact Size: 43.3*29.5*15.5mm
- Weight: 90g (without the cable)
- Ambient Light Immunity: 5KLux



Applications

- Warehouse positioning
- Robot obstacle avoidance
- Material level detection
- Security control



1. Product Overview

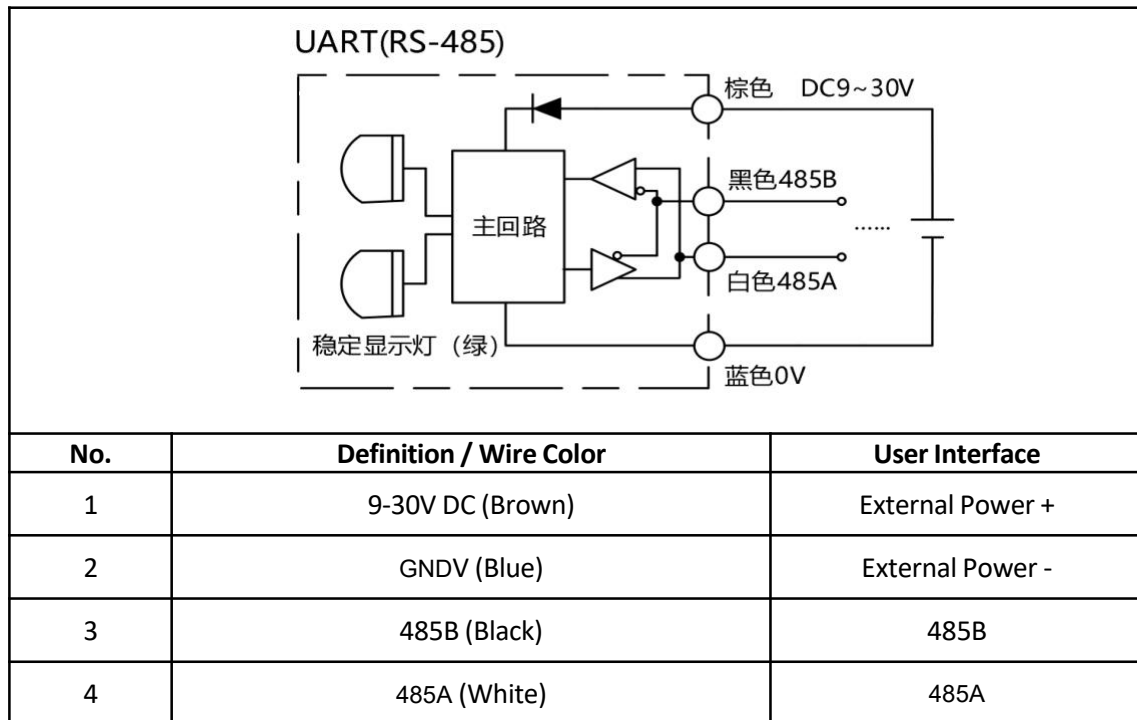
Unlike conventional photoelectric sensors, the BT08M breaks free from limitations in detection distance, detected object color, and sensor size. By adopting TOF (Time Of Flight) technology, it boasts a much wider range of applications, such as use in "production lines for handling different types of objects" and "assembly lines with limited installation space".Specifications.

2. Main Parameters

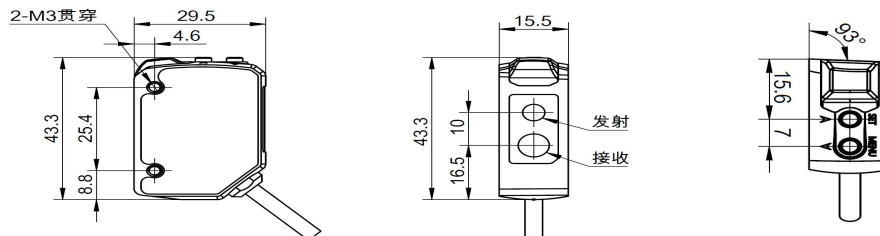
#	Model	BT08M-RS485
1	Range	0.05m ~ 4m (80% reflectivity), 0.05m ~ 4m (10% reflectivity) ¹
2	Frequency	1000Hz
3	Accuracy	±5mm(2σ)
4	Repeatability	5mm
5	Ambient Light Immunity	5KLux
6	Central Wavelength	660nm660nm(visible light)
7	Photobiological Safety	Class 1
8	FOV	N/A
9	Wavelength for Indication	N/A
10	Photobiological Safety for Indication	N/A
11	Supply Voltage	9-30V DC
12	Peak Current	N/A
13	Average Current	20mA@24VDC
14	Average Power Consumption	0.5W
15	Communication Interface	RS485
16	Protection Level	IP67
17	Dimension	43.3*29.5*15.5mm
20	Weight	90g
21	Operating Temperature	-20℃~+55℃ (No Condensation)
20	Wire Specification	0.2mm 4 core PVC cable, length: 2m
21	Customization	available in communication protocol

(Note: 1. This parameter was measured at 25℃ in an indoor environment.)

3. Definitions of Pins



4. Dimensions



5. Communication Protocol

5.1 Communication Interface Parameters

RS485 serial port	
protocol	MODBUS
baud rate	115200 (configurable)
Data bits	8
Stop bit	1
Check bit	none

5.2 Data Communication Protocol

1.Communication Interface: Serial RS485 Communication

Default Baud Rate: 115200

Parity Bit: None

Data Bits: 8 Bits

Stop Bits: 1 Bit

2. Operating mode: Response-based command control

3. Modbus Register Address List

Register address (hexadecimal)	Function definition (16-bit register)	Notes
0 0 00	Distance value	The unit is mm. When the measurement is undetectable or exceeds the range, the output is 65535. Read-only.
0 0 01	baud rate	The default value is 1152. Increasing it by 100 times indicates a baud rate of 115200 , with a range of 9600/19200/38400/57600/115200/230400/256000 . R / W
0 0 02	4.85 slave address	Default value is 1, value range is 1-247 , R /W
0 0 03	Reserved	
0 0 04	Software version number	2 bytes, 01 00 indicates the module software version number is V1.0, read-only.
0 0 05	Module serial number high 2 bytes	The module serial number is 6 bytes long , big-endian, and read-only.
0 0 0 6	The middle 2 bytes of the module serial number	
0 0 0 7	The lower 2 bytes of the module serial number	
00 0F	Factory reset	Writing 0x01 restores the 485 address to 1 and the baud rate to 115200. (Write only)

4. Examples of commonly used Modbus protocol commands (commands take effect immediately upon successful configuration and are saved even after power failure).

(1) Module distance measurement value reading:

send	XX	0 4	0 0	0 0	0 0	01	CRC_L	CRC_H
return	X X	0 4	0 2	03	E8	CRC_L	CRC_H	

Measured distance = $256 * 3 (0 \times 03) + 232 (0 \times E8) = 1000 \text{ mm}$

(2) Module 4 85 address broadcast read (broadcast command, suitable for connecting a single module when the module 485 address is unknown):

send	FF	0 3	0 0	0 2	0 0	0 1	CRC_L	CRC_H
return	FF	0 3	0 2	0 0	X X	CRC_L	CRC_H	

XX is the module's 485 address , and its range is 1 to 247. Values outside this range are invalid.

(3) Module 4 85 address read (applicable when the module 4 85 address is known to be XX)

send	XX	0 3	0 0	0 2	0 0	0 1	CRC_L	CRC_H
return	XX	0 3	0 2	0 0	X X	CRC_L	CRC_H	

XX is the module's 485 address , and XX ranges from 1 to 247. Addresses outside this range are invalid.

(4) Module 4 85 address settings

send	XX	0 6	0 0	0 2	0 0	YY	CRC_L	CRC_H
return	X X	0 6	0 0	0 2	00	YY	CRC_L	CRC_H

XX is the module's source address on the 485 port , and YY is the module's new address on the 485 port .

XX and YY range from 1 to 247; settings outside this range are invalid.

(5) Module serial port baud rate reading:

send	XX	0 3	0 0	0 1	0 0	01	CRC_L	CRC_H
return	X X	0 3	0 2	04	80	CRC_L	CRC_H	

The serial port baud rate reads as 115200: 04 80 (hexadecimal) = 1152 (decimal) , multiplied by 100.

Baud rate range: 9600/19200/115200/230400/256000/460800

(6) Module serial port baud rate settings:

send	XX	0 6	0 0	0 1	0 0	6 0	CRC_L	CRC_H
return	X X	0 6	00	0 1	00	6 0	CRC_L	CRC_H

The serial port baud rate is set to 9600: 0 0 60 (hexadecimal) = 96 (decimal) , multiplied by 100. Baud

rate range: 9600/19200/115200/230400/256000/460800

(7) Module software version number reading:

send	XX	0 3	0 0	0 4	0 0	01	CRC_L	CRC_H
return	X X	0 3	0 2	01	00	CRC_L	CRC_H	

01 00 indicates that the module software version number is V1.0.

(8) Reading the module serial number (6 bytes) :

send	XX	0 3	0 0	0 5	0 0	0 3	CRC_L	CRC_H			
return	X X	0 3	0 2	71	FA	56	15	50	01	CRC_L	CRC_H

71 FA 56 15 50 01 indicates that the module serial number is 125320000000001

(9) Restore factory settings:



send	XX	0 6	0 0	0 F	0 0	01	CRC_L	CRC_H
return	X X	0 6	00	0 F	00	01	CRC_L	CRC_H

Factory reset : 485 address is reset to 1, baud rate is reset to 115200.

6. Quick Test

Test materials list: RS485 to USB adapter board, 9-30V DC power supply or choose our self-developed universal 485 test kit + type-c data cable , host computer/serial port assistant.

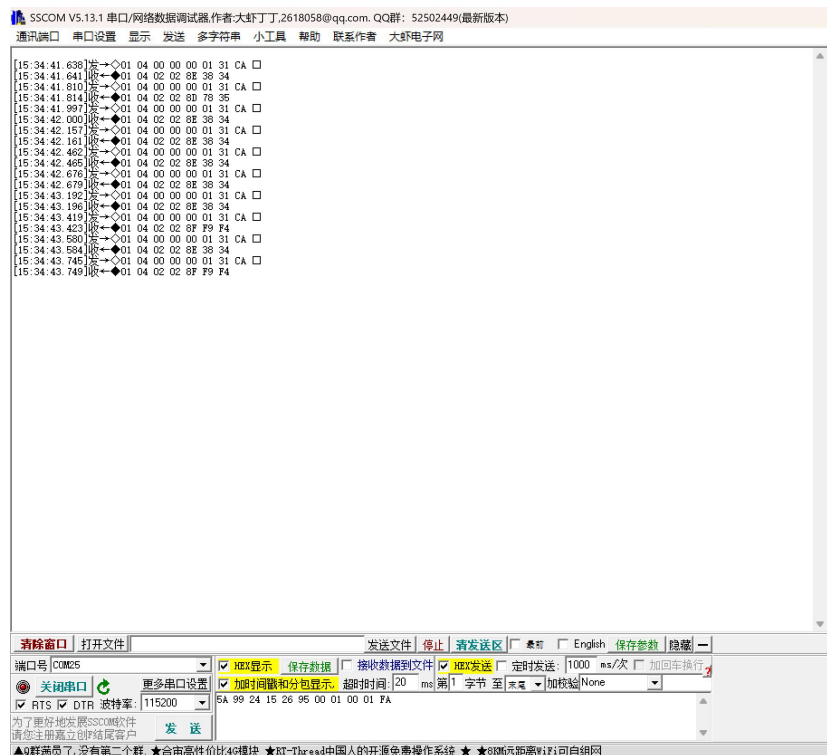


After the BT08M is correctly connected, select the appropriate baud rate, click "Open Serial Port," and the serial port assistant will display the following:

Send: 01 0 4 00 0 0 00 01 31 ca

Return: 01 0 4 02 0 B DF 60 80

The data frame test command is as follows:



7. Precautions for use

- Please power on and wire the wires correctly according to the specifications.
- The product's laser is Class 2; do not look directly at the lens after the product is powered on.
- When handling the product, please wear anti-static gloves to prevent product malfunction.
- When measuring highly reflective objects (such as 3M tape), mirrors, or other unconventional targets, the ranging accuracy of the product may decrease.

8. Update resume

Document Version	Update time	Update content
V1.0	2024/12/30	Based on the current design scheme, prepare the initial draft.
V 2 .0	2025/6/17	Corrected some parameters and revised the protocol.
V 3.0	2025/9/8	Add model specification sheets and revise the agreement.



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