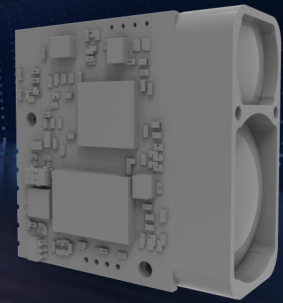


Benewake TFA1500-L

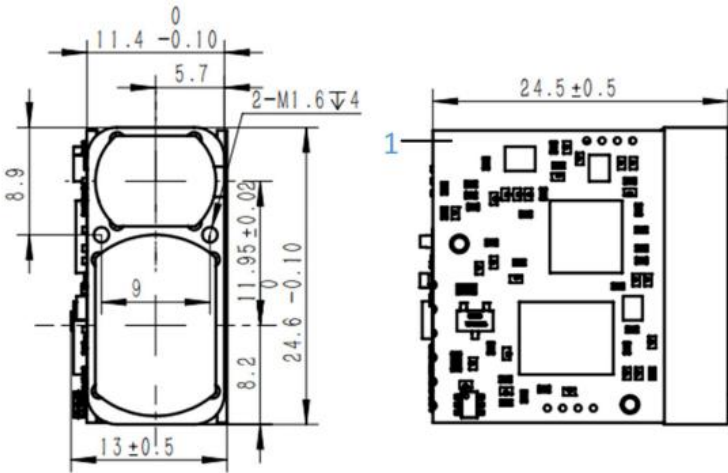
Datasheet



The TFA1500-L long range laser rangefinder module is a compact sensor based on a 905nm semiconductor laser. It features a small size, lightweight design, and long measurement range. Typical applications include handheld rangefinders, mini drones, and rangefinding scopes. The module is equipped with a UART (TTL 3.3V) data interface and comes with PC software and a communication protocol command set to support secondary development by users.

Technical Specifications

Performance Parameters	
Model	TFA1500-L
Ranging capability ^①	0.5 ~ 1500 m
Precision	± 0.5m(≤ 80m), ± 1.0m (> 80m)
Distance resolution	1 cm
Default frame rate	60 ~ 800Hz (adaptive)
Beam divergence	~ 6 mrad
False detection rate	≤ 1%
Target discrimination	≤ 30m
Central wavelength	905± 5 nm
Mechanical and Electrical Parameters	
Size (L×W×H)	≤ 25 mm × 26 mm × 13 mm
Weight	11± 0.5 g
Operating temperature	-20 ~ +60 °C
Storage temperature	-45 ~ +70 °C
Supply voltage	DC 3.0 ~ 5.0 V
Shock resistance	1000 g, 20 ms
Vibration resistance	5 to 50 to 5 Hz, 1 oct/min, 2.5 g
Operating power consumption	≤ 1.8W
Standby Power Consumption	≤ 0.8W

Communication Protocol	
Communication Interface	UART
Baud rate	500000 bps
Dimensions (Unit: mm)	
 The image contains two technical drawings of a device. The left drawing is a top view showing a rectangular shape with rounded corners. Dimensions include a width of 13 ± 0.5 mm, a height of 24.6 ± 0.10 mm, and a central horizontal slot with a width of 9 mm. The right drawing is a side view showing the device's profile with a width of 24.5 ± 0.5 mm. A blue number '1' is placed between the two drawings.	

Notes:

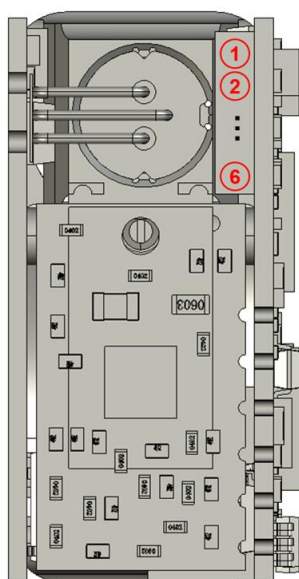
- ① Under test conditions: visibility not less than 10 km, relative humidity $\leq 70\%$, and large target refers to a target whose dimensions exceed the laser spot size.

Interface

Electrical Interface: The interface model is FWF08002-S06B13W5M. The interface definition is detailed in the table below.

Pin Number	Definition	Notes
1	GND	Vin-/TTL GND
2	Vin+	VCC+ DC 3 ~ 5V
3	UART_Tx	TTL serial port transmitter, high-frequency output pin
4	--	Not used
5	UART-Rx	TTL serial port receiver, 3.3V voltage level
6	Power_EN	Module power supply enable, TTL_3.3V level; Module is activated (>2.5V or floating), Module is turned off (<0.3V);

Pin sequence description: The pins of the interface terminal are numbered 1~6 from top to bottom.



Protocol

Output definition

- Communication format: default baud rate of 500000bps;
- Data format: 8-bit data, one start bit, one stop bit, no parity check, data from the beginning
- Byte, command part, data length, parameter part, and checksum byte.

- Communication method: The master control and rangefinder adopt a master-slave communication method, and the master control sends control commands to the rangefinder. The rangefinder receives and executes instructions. The measurement data is counted through the high-frequency output port.

The high-frequency ranging start command is as follows:

Byte	1	2	3	4	5	6	7	8
Value	0x55	0xAA	0xCB	0xCC	0xCC	0xCC	0xCC	0xFB

The high-frequency ranging shutdown command is as follows:

Byte	1	2	3	4	5	6	7	8
Value	0x55	0xAA	0xCC	0xCC	0xCC	0xCC	0xCC	0xFC

Output data format

Example: 5C D1 00 00 2E

- 5C: Fixed frame header
- D1 00 00: Three bytes represent measurement distance of 209cm, little-endian (i.e. 0000D1), range: 0-130000cm.
- 2E: From 02 to 03, perform a sum check and reverse, one byte
- Note: If the converted distance measurement value is 3FFFFFF (4194303cm), it is an invalid number, indicating that the target has not been tested.

Precautions for use

- This rangefinder module emits a 905 nm laser classified as eye-safe. However, despite being within the eye-safe wavelength range, direct eye exposure is not recommended.
- The front window of the rangefinder module should be coated with an anti-reflection film (905 ± 20 nm, transmittance > 95%). As the module is not hermetically sealed, please ensure that it is operated in an environment with a relative humidity below 80% and that cleanliness is maintained to avoid potential damage to the laser.
- The rangefinder performance of the module is influenced by atmospheric visibility and target characteristics. Adverse conditions such as fog, rain, or sandstorms may significantly reduce the effective range. Targets with high reflectivity—such as green foliage, white walls, or exposed limestone—can help extend the measurement distance. However, an increased angle between the laser beam and the target surface will lead to reduced rangefinder performance.
- Strictly prohibit plugging or unplugging cables while the device is powered on. Ensure correct power supply polarity at all times; incorrect connection may result in permanent damage to the device.
- High-voltage and heat-generating components are present on the circuit board after power-on. Do not touch the board during operation to avoid risk of injury.