

## TF02 VS TF02-PRO

### 1. Product Upgrade Overview

In order to provide customer with the best cost-effective products, TF02-Pro has been greatly upgraded and optimized based on TF02. The blind zone is shortened to 5cm, which is 87.5% lower than TF02; The range at 90% and 10% reflectivity can reach 40m and 13.5m respectively, and the most important thing is the outdoor range will not be shortened by strong ambient light. Under the harsh condition of 100Klux and 10% reflectivity, the ranging performance of TF02-Pro is improved by 68.75%, the accuracy has been improved at the same time, the accuracy between 5m and 40m is increased by 50%, the relative error is  $\pm 1\%$ , and the error performance under 10% reflectivity is almost the same as 90% reflectivity; The frame rate is adjustable from 1Hz to 1000Hz, the power consumption is reduced by 50%, while the maximum average power is less than 1W(@5V), it can support the supply voltage from 5V to 12V. The interface has also become richer, it has UART/I2C/IO or RS485 interface(independent hardware version). In conclusion, TF02-Pro can look closer, reach further, higher accuracy, higher frequency, lower power consumption, richer interface, wider range of temperature adaptation and voltage input.

## 2. Technical Specifications and Parameters

Table 1 TF02 and TF02-PRO Key Parameters

Parameter Name		TF02	TF02-PRO
Product performance	Operating Range	0.4~22m@90% reflectivity 0.4~10m@10% reflectivity 0.4~15m@90% reflectivity (100Klux) 0.4~8m@10% reflectivity (100Klux)	0.05~40m@90%reflectivity 0.05~13.5m@10%reflectivity 0.05~40m@90% reflectivity (100Klux) 0.05~13.5m@10% reflectivity (100Klux)
	Accuracy <sup>1</sup>	±5cm (0.4~5m) , ±2% (5~22m)	±5cm (0.05~5m) , ±1% (5~40m)
	Distance Resolution	1cm	1cm
	frame rate	100Hz	100Hz (Adjustable from 1 to 1000Hz)
	Repeatability	1σ: <1cm (0.4~10m) , 1σ: <2cm (10~22m)	1σ: <2cm (0.05~35m@90% reflectivity)
	Ambient light resistance	100Klux	100Klux
	Operation t temperature	-10~60°C	-20~60°C
	Protection Level	IP65	IP65
Optical Parameters	Light source	LED	VCSEL
	Central wavelength	850nm	850nm
	FOV	3°	3°
	Photobiological safety	Exemption Level (EN62471)	Class 1 (IEC60825)
Electrical Parameters	Supply voltage	DC 5V±0.5V	DC 5V~12V
	Average Current	≤400mA	≤200mA
	Power consumption	≤2W	≤1W
	Peak Current	1.6A	300mA
	Communication level	LVTTTL (3.3V)	LVTTTL (3.3V)
	Communication interface	UART/CAN	UART/RS485/I2C
Other Parameters	Dimensions	69mmx46mmx26mm (L*W*H)	69mmx41.5mmx26mm (L*W*H)
	Weight	60g (with cables)	50g (with cables)
	Enclosure material	TPX+Aluminium	ABS+PC
	Storage temperature	-20~80°C	-30~80°C
	Cable length	80cm	80cm

<sup>1</sup> Accuracy is measured in white object (90% reflectivity) at 25°C and will be somewhat different in case of different reflectivity or light sensitivity conditions or temperature.



### 3. Product Appearance and Structure

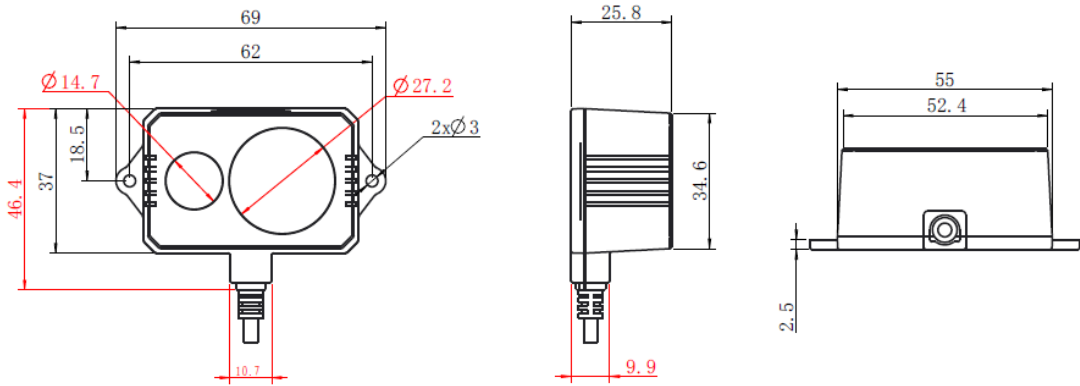


Figure 1 TF02 Dimensions (left 1: front view, left 2: left view, left 3: bottom view)

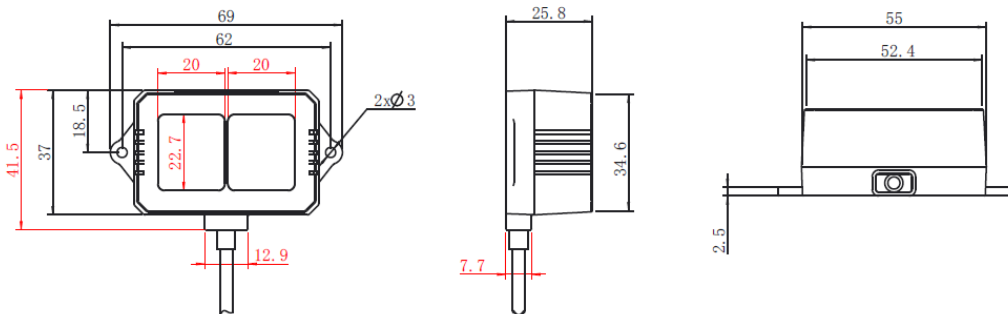


Figure 2 TF02-Pro Dimensions (left 1: front view, left 2: left view, left 3: bottom view)

### 4. Communication Interface

Table 2 Serial port communication protocol

Protocol	UART TF02	UART TF02-PRO
Baud rate	115200	115200
Data bit	8	8
Stop bit	1	1
Parity check	None	None



## 5. Configurable Parameters

Table 3 TF02 Configurable items

Configurable items	Description	Default
Setting trigger source	Setting internal trigger mode or external trigger mode	Internal trigger mode
Setting frame rate	Adjustable from 1Hz to 100Hz	100Hz
Setting serial port baud rate	Support serial port baud rate configuration: 9600, 14400, 19200, 115200, 256000	115200
Setting protocol format	Support output format: 9bytes (cm) 、Pixhawk	9Bytes(cm)
Restore factory settings	Not support	/
Setting communication interface	Not support	UART
Setting exclude threshold of Strength	Minimum strength setting: 20 Value below minimum strength: 2200	2200

Table 4 TF02-Pro Configurable items

Configurable items	Description	Default
Setting trigger source	Setting internal trigger mode or external trigger mode	Internal trigger mode
Setting frame rate	Adjustable from 1Hz to 1000Hz <sup>2</sup>	100Hz
Setting serial port baud rate	Support serial port baud rate configuration: 9600-921600	115200
Setting protocol format	Support 3 kinds of output format: 9bytes (cm) 、Pixhawk、9bytes (mm)	9bytes (cm)
Restore factory settings	Support restoring factory settings	/
Setting communication interface	Support communication interface configuration: UART、I2C	UART
Setting exclude threshold of Strength	Minimum strength setting: 60 Value below minimum strength (adjustable) : 0	0

Note: The configuration commands of TF02-Pro V0 version (such as trigger commands in external trigger mode) are different from the current version of TF02. According to the actual situation of major customers, it will be revised in the subsequent firmware version to maintain the usage habits of major customers.

<sup>2</sup> When the frame rate is beyond 100 Hz, the standard deviation of the ranging will increase.

