SKD-20S Laser Distance Sensor
USER MANUAL

Version 3.1

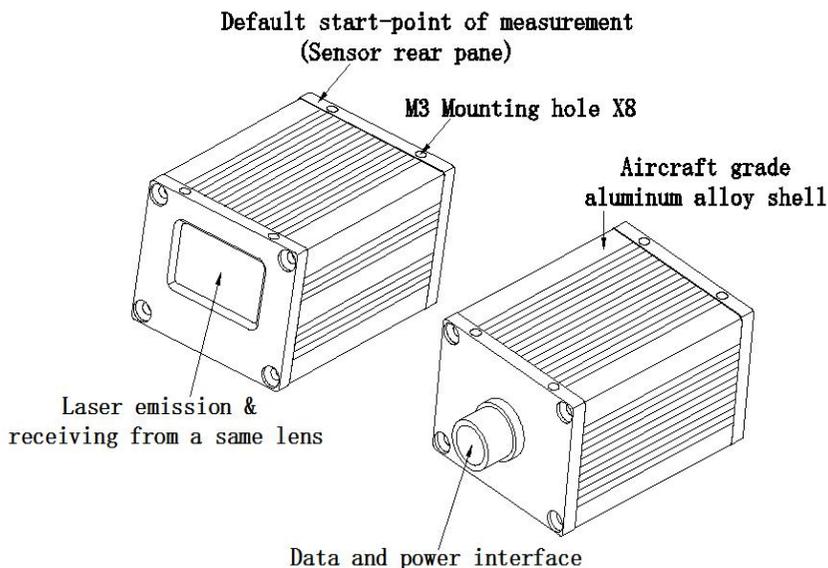Getting more info & supports from **http://www.top1sensor.com**

Contents

Please read the user manual carefully before using our products and avoid looking directly at the laser during operation.

1. Overviews

SANKOE.LTD is a professional manufacturer from China who provides high performance laser distance sensor and customized service. Top1senser.com is our official website for online business.

Laser distance sensor SKD-20S is a new kind of our laser distance measuring instrument. It is characterized by high accuracy, long detection range, fast measuring speed and competitive cost. The product has been widely used in many fields including robot& drones positioning, tunnel & elevator detection and other industrial applications.

SKD-20S Laser distance sensor

Default start-point of measurement (Sensor rear pane)

M3 Mounting hole X8

Aircraft grade aluminum alloy shell

Laser emission & receiving from a same lens

Data and power interface

2. Features

❶ Long detection range (0.2 to 20m)

❷ High measuring accuracy (typical precision: ±2mm)

❸ Fast to install

Using 8 screws can be quickly and firmly installed

❹ Easy to operating

Automatic measurement by simple commands from computer

❺ Safety in use

Laser class 2, harmless to the human body (avoid direct eye exposure)

❻ Kinds of output type

RS232/485 serial data output

❼ Long-life and high reliability with good protection

High waterproof and dustproof performance with aircraft grade aluminum alloy shell (the highest level is IP67)

❽ Fully customized service based on 15+ years industry experience

3. Specifications

Laser Distance Sensor	SKD-20S(RS232)
Measuring Range	0.2m to 20m[①]
Measuring accuracy	Typ: ±2mm
Smallest unit displayed	1mm
Laser class	2
Laser type	635nm，＜1mW
Laser beam diameter approx. -at 10m distance -at 20m distance	 6mm 12mm
Measuring mode -trigger measuring -continuous measuring	 yes yes
Operation mode	commands by computer
Output mode	RS232 serial digital output

Power supply	DC 9~24V/1A
Power consumption	＜3W
Temperature range -storage -operating	 -25℃～70℃ -10℃~50℃②
Dimension	70.8 x 50 x 40mm③
Weight	160g

①Use a target plate to increase the measurement range during daylight or if the target has poor reflection properties.

②The highest operating temperature is 40℃ when sensor works in continuous measuring mode. The lowest operating temperature is -25℃ with special customized edition sensor.

②The details of dimension are shown in the following image.
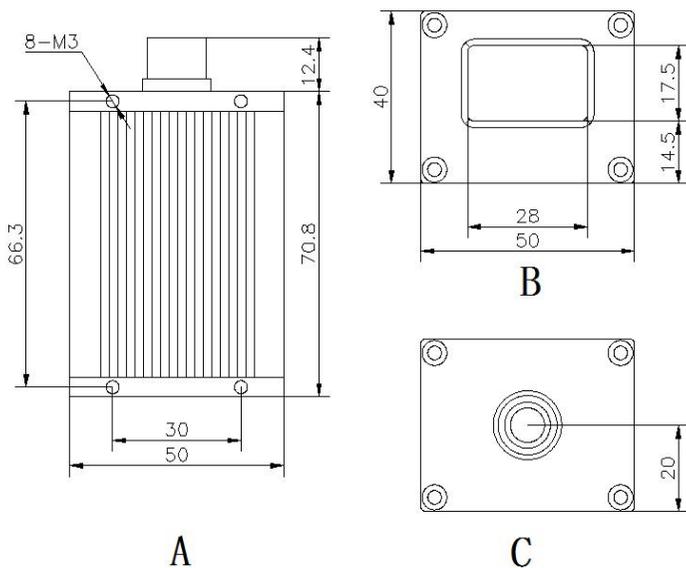
A : Top view   B : Front viewC : Back view

4. Using Instructions

4.1 Definitions of connection cable

Red line   —— VCC
Black line   —— PGND
Yellow line   —— TX
Green line   —— RX
White line   —— Signal GND

4.2 Operating Steps

4.2.1 Connect sensor to a serial port of computer (or other device which has serial ports), then connect to a power port of adapter with special data cable.

4.2.2 Single Measuring Mode

4.2.2.1 Send a command "O" (ASCII) by computer to turn on the sensor. Then sensor will emit a laser beam and prepare for working, and return the data " - - - " (ASCII) to the serial interface.

4.2.2.2 Send a command "O" (ASCII) again to the sensor to start to measure distance. The sensor will return the measured data like " XXXXX" (ASCII) to the serial interface and turn off laser beam when it finished a single measurement.

4.2.2.3 Send a command "U" (ASCII) to turn off the sensor.

4.2.3 Continuous Measuring Mode

4.2.3.1 Send a command "O" (ASCII) by computer to turn on the sensor. Then the sensor will turn on the laser and prepare for working, return the data "   - - -" (ASCII)to the serial interface.

4.2.3.2 Send a command "C" (ASCII) to the sensor. The sensor will begin to measure continuously after 2 seconds when it got the order, and return the data continuously like " XXXXX" (ASCII).

If the sensor couldn't get any available data, it will return "   - - -" to the serial interface.

4.2.3.3 Send a command "U" (ASCII) to turn off the whole sensor (include both of laser unit and measuring unit).

5. Inputs and Outputs

5.1 Communication Setting

Baud rate: 9600 bps,   Parity bit: None,   Data bits: 8,   Stop bit: 1

5.2 Input data format

There is only one byte in each input data pack. Users could send different commands to the sensor for different purpose, the functions of command are shown in the following table.

HEX	0X4F	0X43	0X55
ASCII(Capital letter)	O	C	U
Functions of command	Power On & Trigger Measuring	Continuous Measuring	Power Off

5.3 Output data format

Digital output data is displayed by ASCII code, there is 7 bytes in every data frame. The frame header is 0XFF, the next bytes meant measured distance numbers (unit: mm). A: hundreds of thousands, B: tens of thousands, C: thousands, D: hundreds, E: tens, F: ones. (Notice: If any byte in a data frame is not used, the sensor will return 0X20 in that byte.)

Header	A	B	C	D	E	F
0XFF	hundreds of thousands	tens of thousands	thousands	hundreds	tens	ones

The mapping table of HEX and number codes:

HEX	0X30	0X31	0X32	0X33	0X34	...	0X37	0X38	0X39	0x2D	0X20
number	0	1	2	3	4	...	7	8	9	-	space

For example, if the measured distance data is 3456mm, then the sensor will return data as" 3456" (HEX: FF 20 20 33 34 35 36).

Or the measured distance data is 123456mm, then the sensor will return data as "123456"(HEX: FF 31 32 33 34 35 36).

If the sensor couldn't get any available data (out of measurement range or measured in blind zone), it will return "   - - - -"(HEX:FF 20 2D 2D 2D 2D 20)   to the computer.

6. Troubleshooting

6.1 Factors affecting the measurement range

Laser distance sensor is a new of non-contact optical measuring equipment. Its measuring range and accuracy will be effect by many external environmental factors. So actual measuring result might be different with typical value which is measured in standard environment.

The following factors will effect actual measuring range:

Effect Factors	Increase measuring range	Decrease measuring range
Surface of target	Bright and smooth surface with good reflection, like target plate	Deep color and rough surface, like green or blue target surface
Air visibility	Clean air	Dust, fog, storm and rain, snow
Ambient light	Dark environment	Target exposure to strong light, like sunlight in midday
Laser emission	Laser emission lens and protection glass keep clean and smooth	Laser emission lens and protection glass get dirty or scratched

In conclusion, the best measuring result will be happen in a dark environment and with a good reflection target. We strongly suggest to use a target plate when laser distance sensor works in a poor environment.

We also suggest to keep laser emission lens and protection glass clean with a soft cloth before start to using.

6.2 Error code display

All of error codes are displayed as "E 2XX"(HEX: FF 45 20 XX XX XX).

The following errors can be corrected.

Display Notice	Cause	Correction
E 204(FF 4520 32 30 34)	Calculation error	Repeat procedure
E 252(FF 4520 32 3532)	Temperature too high	Let device cool down
E 253(FF 4520 32 3533)	Temperature too low	Warm device up
E 255(FF 4520 32 3535)	Received signal too weak, time for a measurement too long.	Use a target plate
E 256(FF 4520 32 3536)	Received signal too strong	Use target plate(gray side)
E 257(FF 4520 32 3537)	Faulty measurement, too much background light	Use target plate(brown side)

7. Contact Us

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Getting more info & supports from **http://www.top1sensor.com**