

# **LND2xx Series Laser Radar Manual**



# 1、Product Profile

## 1.1 Features

- Aluminum alloy casting shell, strong structure and light weight, easy for installation;
- Grade 1 laser is safe to people eyes;
- 75Hz scanning frequency satisfy the high speed detection demand;
- Self-diagnosis function ensures the normal operation of the laser radar;
- The angle resolution:  $0.25^{\circ} / 0.5^{\circ}$  ;
- The detection angle:  $270^{\circ}$  ;
- Anti-light interference, IP67, fit for outdoor use.。

## 1.2 System Components

The minimum system of LND series lidar consists of one LND lidar, one power cable (Y1), one Ethernet cable (Y2), and upper computer with debugging software.。

### 1.2.1 LND1xx lidar



No	Components	Instruction
1	Power interface (Y1)	Power, I/O Input/output cable are connected with the lidar by this interface
2	Ethernet interface (Y2)	Measurement data output
3①	Indicator window	Indicator light on when there is system operation and output
4	Front lens cover	The transmitting and receiving beams can scan the

		object through the lens cover
--	--	-------------------------------

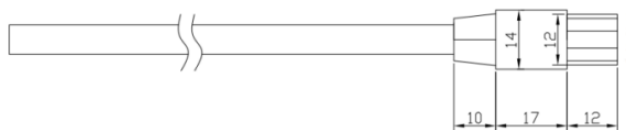
Note: ① 3 details as indicator instruction at Charter 5

**1.2.2 Power cable**



Terminal No	color	definition	Function
1	Brown	24V+	Positive input of power supply
2	Red	IN1	I/O input
3	Grey	COM	Switching output COM
4	Yellow	OUT2	Switching output 2, relay norm open contact
5	Green	OUT3	Switching output 3, relay norm open contact
6	Blue	24V-	Negative input of power supply
7	White	OUT1	Switching output 1, relay norm open contact
8	Black	IN2	I/O input

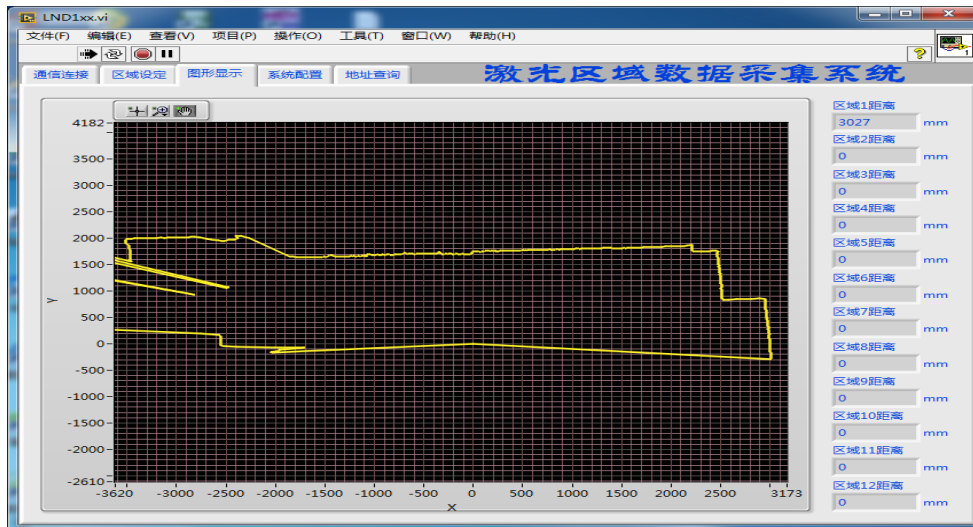
**1.2.3 Communication cable**



No	Color	Definition	Function
1	Orange white	TX+E	Ethernet data emitting
2	Orange	TX-E	Ethernet data emitting
3	Green white	RX+E	Ethernet data receiving
4	Green	RX-E	Ethernet data receiving

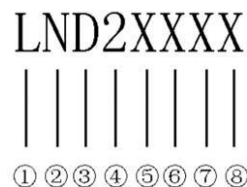
### 1.2.4 Upper computer

The following figure is an example of upper computer test. Please refer to "instructions for Ind1xx series upper computer" for the operation



## 2、Product parameter

### 2.1 Product Naming

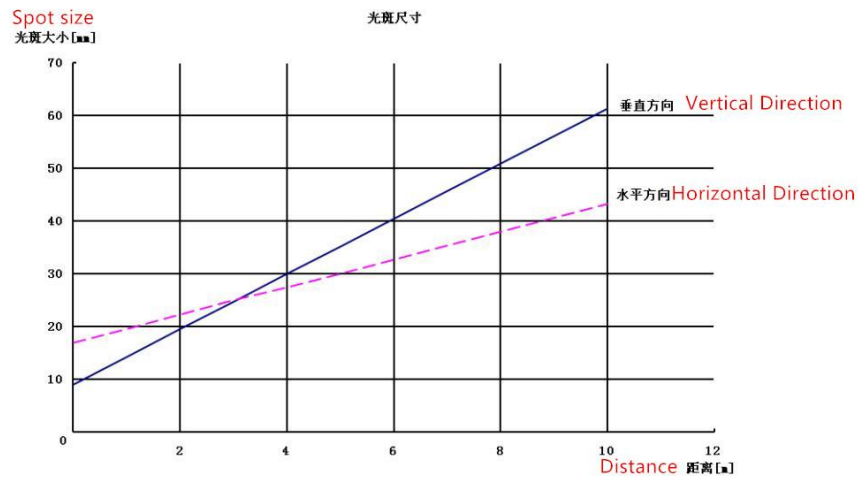


- ① Laser
- ② Mini Type
- ③ Radar
- ④ Product Version
- ⑤ Function: 0: Measurement 1: Obstacle Avoidance
- ⑥ Firmware version
- ⑦ Communication interface: A: Ethernet B: Serial Port
- ⑧ Application:
  - N: Basic type
  - I: Input type
  - O: Output type
  - S: Vehicle separation
  - W: Vehicle Axle Identification
  - F: Feature Recognition

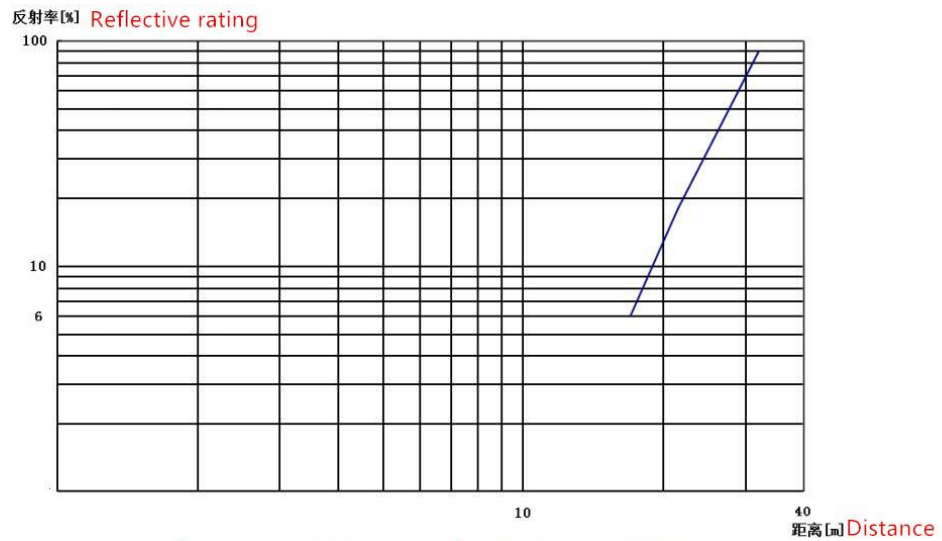
## 2.2 Product Technique parameter

Model	LND202AN	LND202AI	LND202AS	LND202AF	LND202AW	LND212BN
	Basic measurement	Input type	Vehicle separating	Feature recognition	Vehicle axle identification	Obstacle avoidance
Supply voltage	12-30VDC					
Power	< 30W					
Data interface	Ethernet, 10/100MBd, TCP/IP					RS232
Frequency	50Hz	50Hz	50Hz	50Hz	75Hz	25Hz
Laser wave	905nm					
Laser grade	Grade 1 (safe to people eyes)					
Anti-light	80000lux					
Angle range	0°~ 180°	0°~ 180°	0°~ 180°	0°~ 140°	0°~ 180°	0°~ 270°
Angle resolution	0.25°	0.25°	0.25°	0.25°	0.5°	0.5°
Distance	0~20 @90% reflective rate			0.3~2m >1% reflective rate	0~20m 90% reflective rate	0~10m >1% reflective rate
Repeatability	±10mm					
In put function	—	I/O 24V	—	—	—	5 way Input
Output function	—	—	Relay output NO	—	Relay output NO	Relay output NO
Area division	—	—	●	—	—	●
Dimension	95mm × 96mm × 109mm					
Protection rate	IP68					
Temperature	Work : -30°C ~ +60°C / storage :-40°C ~ +85°C					

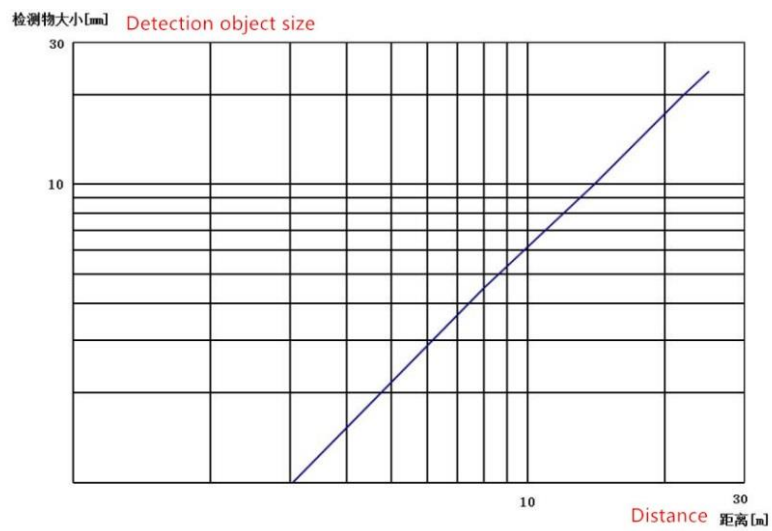
## 2.3 Characteristic curve



Relation curve for light spot and distance



Relation curve for reflective rate and Max detection distance



Relation curve for detection object and detection distance (90% reflective rate)

### 3、Electrical Connection


#### 3.1 Output interface

##### 3.1.1 Function description

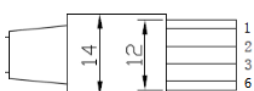
NO	Interface	Interface connector	Function description
1	Y1	8 Pin connector	Logic Interface: 1. Power Supply 2. Output ( for LND221A、LND231B、LND241B )
2	Y2	Modular Plugs	Ethernet Interface: 1. Transmission of measurement data 2. Sensor interface settings, area settings and fault information reading

##### 3.1.2 Interface definition

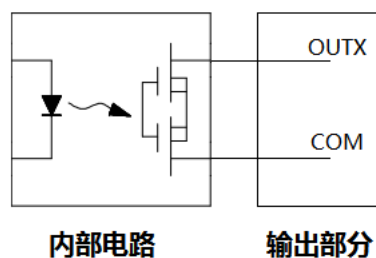
###### 3.1.2.1 Power cable Y1

Pin	No	Wire Color	Signal definition	Function description
	1	Brown	24V+	Positive input of power supply
	2	Red	NC	Reserved
	3	Grey	COM	Switching output COM
	4	Yellow	OUT2	Switching output 2, relay norm open contact
	5	Green	OUT3	Switching output 3, relay norm open contact
	6	Blue	24V-	Negative input of power supply
	7	White	OUT1	Switching output 1, relay norm open contact
	8	Black	NC	Reserved

###### 3.1.2.2 Communication cable Y2

Pin (M12)	No	Wire Color	Signal definition	Function description
	1	Orange white	TX+E	Ethernet data emitting
	2	Orange	TX-E	Ethernet data emitting
	3	Green white	RX+E	Ethernet data receiving
	6	Green	RX-E	Ethernet data receiving

### 3.2 Wiring



#### Relay output parameter

	Max continuous current	Peak inrush current	Max voltage	Max internal resistance
Parameter	160mA	360mA	30V DC	7Ω

## 4、Function and application

### 4.1 Function

The main function of LND series lidar is distance measurement, Object recognition, area detection. LND lidar is connected to the upper computer through Ethernet cable, through the upper computer software, the data graphic can be displayed and the detection area can be set.

### 4.2 Measurement and Detection

#### 4.2.1 Distance measurement

After the sensor is powered on and passes the system self-test, it will start to measure the distance value of each point within the detection range and output these values through the Ethernet interface, the measurement data is in hexadecimal format, and the unit is mm。

#### 4.2.2 Object recognition

By detecting the feature size of the object, the shape and position information of the measured object can be obtained and the object passing or distance information can be output.

#### 4.2.3 Area detection

By setting the detection area, judge whether there is an object entering into the set area, if there is an object in, the output signal will be given , so as to realize the object detection. The detection



area is not set when the lidar leaves the factory. When necessary, it can be set and saved in the upper computer software by connecting the Ethernet interface

Through the upper computer software, the rectangular detection area can be set in the detection area. Coordinate of each point is required for rectangular detection area. The coordinates of rectangular four vertices A0 (x0, Y0), A1 (x1, Y1), A2 (X2, Y2), A3 (X3, Y3) are set by the upper computer. When an object enters the detection area, the relay will give output signal ( See the LND upper computer operation instructions for details of setting)

## 5、 Status indicator

### 5.1 indicator

Indicator	Description
Left blue indicator	1、 When the system is powered on for self-checking, the indicator flashes and goes out after the system works normal. 2、 when the lidar collect background information , the indicator light on and extinguish after collecting completion
Right blue indicator	1、 Power indicating: light on at normal operation state.

## 6、 Communication interface setting

### 6.1 Default interface setting

LND default Ethernet factory setting :

IP address: 192.168.80.6      Port No: 6008

MAC address: 07-E1-48-xx-xx-xx(The last three digits are assigned MAC)

### 6.2 Interface setting change

If you need to change the IP address or port number, you can use the upper computer to change it through the upper computer software. Login permission: The user name is “admin” and the password is “gtek2017”

#### 6.2.1 Changing through system configuration

You can modify it in the 【系统配置】 dialog box in the upper computer software, and the specific operation is shown in the following figure

The screenshot shows a configuration panel with three rows of input fields and buttons. The first row is for 'New IP' with four boxes containing '192', '168', '80', and '6', followed by a button labeled '修改IP'. The second row is for 'New Port' with a single box containing '6008'. The third row is for 'New MAC' with six boxes containing '07', 'E1', '48', '00', '00', and '00', followed by a button labeled '修改MAC'.

### 6.2.2 Changing through sending command

(1) Change the IP address and port number by sending the command. The specific operation is as follows

Step1: Send technician login instruction: 0x67, 0x31, 0x37, 0x03

Step2: Send IP, Port revising instruction:

0x02 ,0x57 ,0x03 ,0x02 ,0x43 ,0x54 ,0x20 ,ip1 ,ip2 ,ip3 ,ip4 ,port1 ,port2 , Reserve 7 bytes

the port is the big end mode, that is

Port = port1\*256 + port2

For example: revise IP address as 192.168.80.6, Port as 6008, command should be:

02 57 03 02 43 54 20 C0 A8 50 06 17 78 00 00 00 00 00 00

(2) Change MAC by sending the command:

Step1: Send technician login instruction: 0x67, 0x31, 0x37, 0x03

Step2: Send MAC revising instruction:

0x02 ,0x57 ,0x03 ,0x02 ,0x43 ,0x43 ,0x54 ,0x54 ,0x20 ,mac1 ,mac2 ,mac3 , Reserved 1 , Reserved 2

For example, change the last three digit of MAC as 0A-0B-0C, then the command should be:

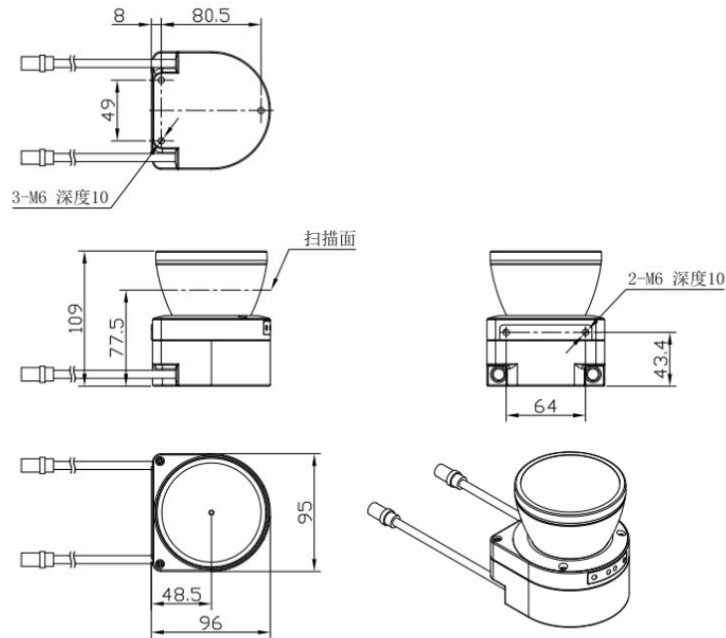
02 57 03 02 43 43 54 54 20 0A 0B 0C 00 00

## 6.3 Communication protocol

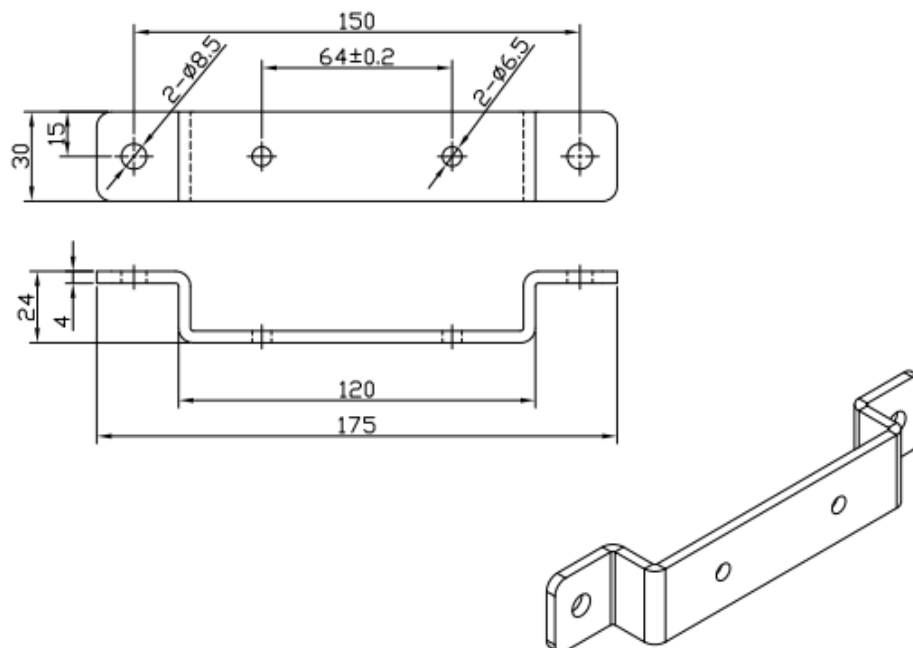
Detail as “LND Ethernet communication protocol”

## 7、 Mechanical dimension

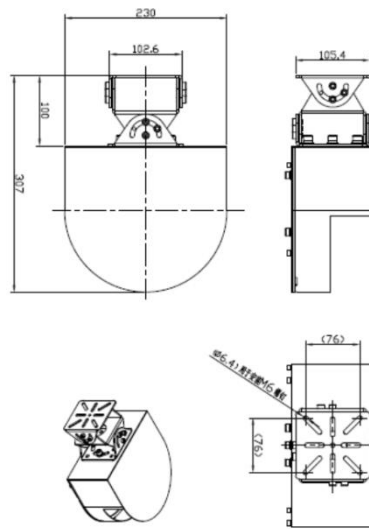
### 7.1 LND Dimension



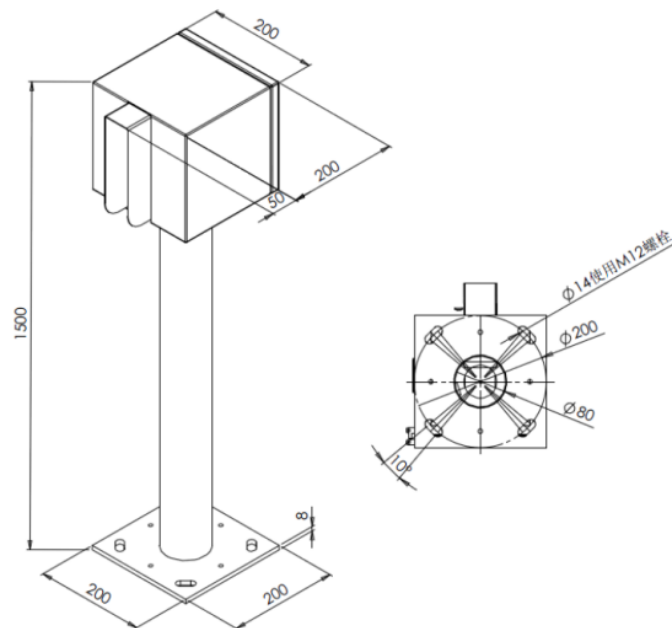
### 7.2 A type bracket dimension



**7.3 Protection housing dimension**



**7.4 Side Protection housing dimension**

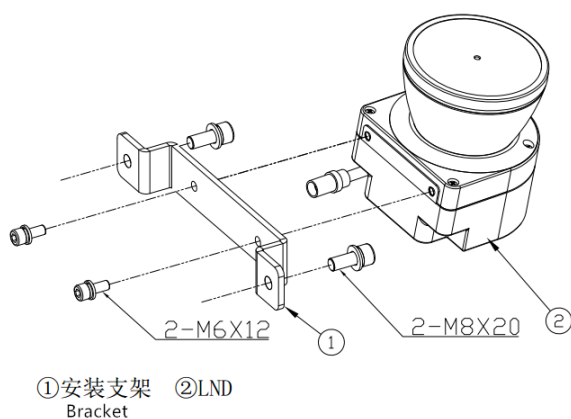


## 8、 Installation

### 8.1 Notes

- In the outdoor working environment, the lnd1xx should be installed with a protective cover to avoid the internal temperature of the sensor rising rapidly due to direct sunlight。
- Do not install the sensor with over vibrating or swinging objects。
- Lnd1xx shall be installed away from the environment with moisture, dirt and danger of sensor damage。
- In order to avoid external light source such as sunlight, incandescent lamp, fluorescent lamp, strobe lamp or other infrared light source, such external light source shall not be within  $\pm 5^\circ$  of the detection plane。
- The same kind of light source interference shall be avoided. When multiple sensors are installed at the same time, the following installation methods shall be followed
  - a. Install isolation plate between adjacent sensors。
  - b. Adjust the installation height of each sensor so that the detection plane of each sensor is not within  $\pm 5$  degrees of each other's detection plane。
  - c. Adjust the installation angle of each sensor so that the detection plane of each sensor is not within  $\pm 5$  degrees of each other's detection plane。

### 8.2 A type bracket installation

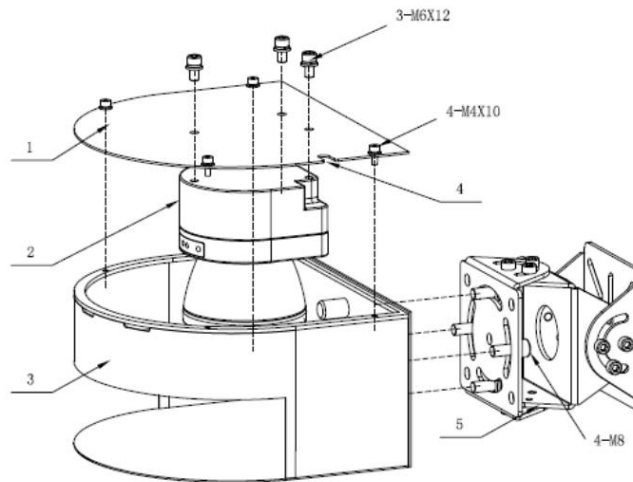


#### Installation steps:

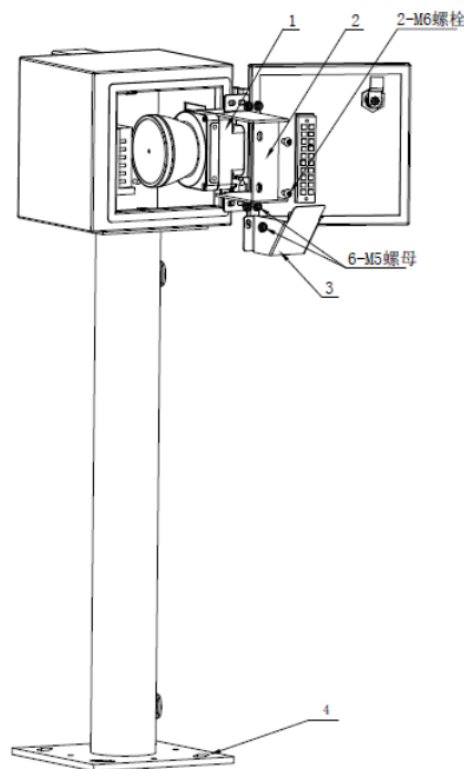
- 1、 Through the 2 threaded holes on the back of lnd1xx lidar, use 2 M6 × 12 hexagon socket head cap screws (equipped with Spring and flat pad)to fix ① horizontal mounting bracket to lnd1xx

2、 Use 2 M8 × 20 hexagon socket head cap screws (equipped with Spring and flat pad) to install the ① horizontal bracket on the desired fixed surface, and the drilling dimension as shown

**8.3 Housing bracket installation**



**8.4 Side housing bracket installation**



## 9、 Trouble codes and troubleshooting

### 9.1 Trouble codes

No	Trouble	Description
001	Front lens cover fault	The cover is polluted or damaged
002	Motor stall	Motor damaged
004	Motor fault	The motor does not reach the set speed, or the speed is unstable
008	Power abnormal	The predetermined voltage is not reached, or the power supply fails

### 9.2 Troubleshooting

#### 9.2.1 Parameter configuration fault

It is necessary to reconfigure the working parameters of the machine through the upper computer and transmit them to the machine。

#### 9.2.2 Front lens cover fault

The front mirror cover is an important part of LND lidar. If the front mirror cover is polluted, the measurement light will be affected, and the measurement error will be large if it is serious. Therefore, the front mirror cover must be kept clean. When the front mirror cover is found dirty, please use a soft cloth dipped with neutral detergent to wipe in the same direction. When there are particles on the front mirror cover, blow them off with gas first, and then wipe them to avoid scratching the mirror cover.

#### 9.2.3 Motor fault

Failure of the motor will cause the machine to fail to scan for measurement or result in inaccurate response time. Need to return to factory for maintenance。

#### 9.2.4 Power fault

Check if there is wrong with the power cable and the machine fault need to be repaired by returning to factory



天津杰泰高科传感技术有限公司

TIANJIN G-TEK SENSOR TECHNOLOGY CO.,LTD

Add: No.6 Guangyuan Road, Zhangjiawo Town Xiqing District, Tianjin City

Tel: 86-22-23050231 Fax: 86-22-23007923 Mobile: 86-13682005660

Email: [fengxialxs@gtekautomation.com](mailto:fengxialxs@gtekautomation.com)

[www.gteksensor.com](http://www.gteksensor.com)