



SE-1035F11

Lidar Sensor

Manual

Thank you for using our products.

This manual explains the usage and safety of the product.

*Read this manual carefully and pay attention to safety during use.

*Keep this manual in a appropriate place for easy reference at any time.

Guangdong Hinson Technology Co., Ltd

VERSION DECLARATION

Version	Added/remove information
V1.3.6	Updated company information and added Ethernet sample message description;
V1.3.7	Added Ethernet protocol area status acquisition protocol 2

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1 SAFETY GUIDELINES

1.1 APPLICABLE ENVIRONMENT CAUTION



The sensor may sense incorrect or unusable under steam, smoke, dust and particles in air.



Qualified technician check the connection and installation is correct or not at regular intervals is required.



The maximum lifetime of the sensor is 10 years, after which it must be replaced, otherwise the required performance requirements may not be met.



The sensor should be inspect and clean at regular intervals.



This product is only allowed to be used within the specified limits and specified technical parameters and operating conditions at any time.

1.2 WIRING ENVIRONMENT CAUTION



Do not connect the power supply reversely or connect it to a voltage higher than the maximum working voltage, otherwise the sensor will be damaged.



The power supply is lower than the minimum working voltage, which will cause the sensor to fail or work abnormally.



Please follow the instructions of the manual for wiring, otherwise the sensor may not be able to detect the input signal correctly.



Do not exceed the load capacity of the sensor when the output signal terminal is connected to the device, otherwise it will cause the sensor fault.

1.3 DEBUGGING ENVIRONMENT CAUTION



Only qualified and authorized person are allowed to connect, install, debug and set up the laser sensor;



Confirm that the peripheral equipment associated with the sensor is in a reliable shutdown state;



Confirm debugging technician is in a safety environment;



Confirm other people or object are out of the range of equipment.

2 FUNCTION OVERVIEW

2.1 MAIN CHARACTERISTICS

Basic characteristics	
Detection distance	0.05-10m (90%)
	0.05-6m (10%)
Detection range	270°
Detection angle accuracy	0.1°、0.2° software can configure
Laser scanning frequency	144K
Light source	Infrared laser (905nm)
Rotate motor scanning speed	20HZ
Performance	
Response time	Typical value 50ms
Systematic error	<20mm
Statistical error	<20mm
Channels	64 (each channel include 3 detection area, out1, out2, out3)
Detection open time-delay	0ms-500ms settable within range
Detection close time-delay	0ms-500ms settable within range
Detection object size filtering angle	0.5°-5° settable within range
Detection data	Support Ethernet TCP/UDP output 270° detection data
Support multiple echo numbers	3 multiple echoes
Interface	
Ethernet port	1 (configuration port), Ethernet output detection data
CAN BUS port	1, Can open output whether there is an obstacle signal in the set detection area
Switch output	4 NPN signals (3 detection signals, 1 fault signal), single-channel load capacity 100mA
Indicator light	4 (3 detection indicator light, 1 status light)
Electrical performance	
Operating voltage	DC18 - 32V (suggest 24V±10%)
Consumption current	140mA typical value (DC 24V voltage) (without output load)
Working environment	
Object reflectivity	2%-1000%
Working environment	0℃- 50℃ (no condensation, no frost)
Ambient light strength	< 15000lx

2.2 MODEL RULES

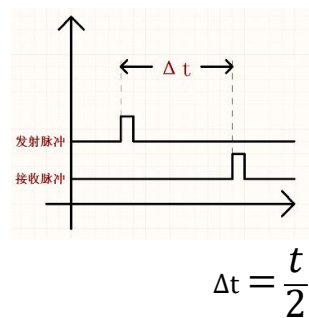
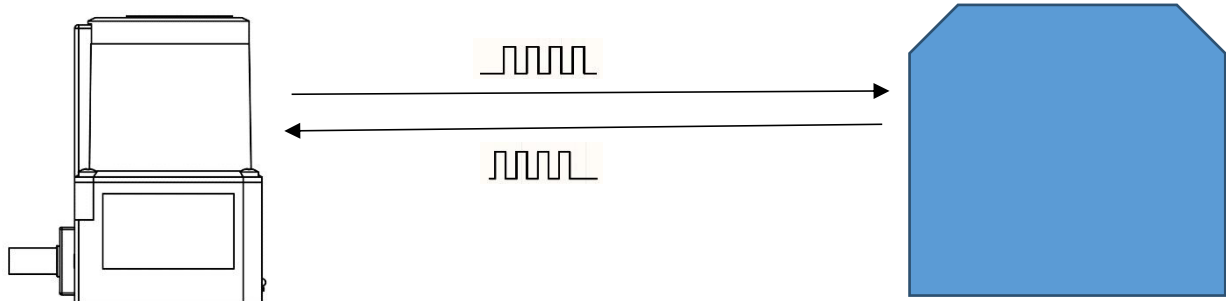
SE-0533F

Part 1	Sensor Series SE: 270° scanning range sensor series;
Part 2	Detection distance 05: Detection range 0.05-5 meters; 10: Detection range 0.05-10 meters;
Part 3	Output type 2: Output switch quantity; 3: Output switch quantity and measurement data
Part 4	Subdivision version 2: IO port NPN signal output 3: Communication type (1 RS232, 1 RS485, 1 CAN BUS, 1 output) 5: 1 Ethernet port, 1 CAN BUS port (CAN OPEN) 6: IO port PNP signal output
Part 5	Customized version F: Supports multi-echo

2.3 FUNCTION

*Detection principle

The laser scanning sensor is operated according to the time of flight (TOF) measurement principle. Under the extremely high synchronous clock, the laser is emitted at uniform time intervals. The laser beam will be reflected back when it encounters the object. After the scanning sensor receives the reflected beam, the time difference Δt between the emission and reception is used to calculate the distance from the laser sensor to the object.



$$S = V * \Delta t$$

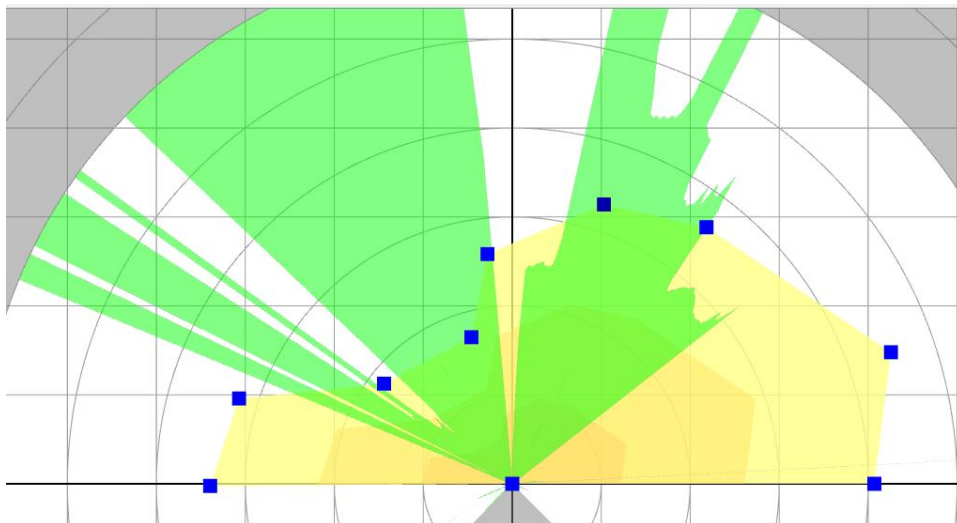
s : detection distance

v : laser flight speed

Δt : time difference

t : laser flight time (round trip)

Use the laser beam to scan the surroundings in two dimensions to obtain an environmental profile. The scope of the protection area is established through software configuration. Once an object is in the set area, the sensor will have a corresponding output port signal output, and the host computer will make further judgment and processing after obtaining the signal.



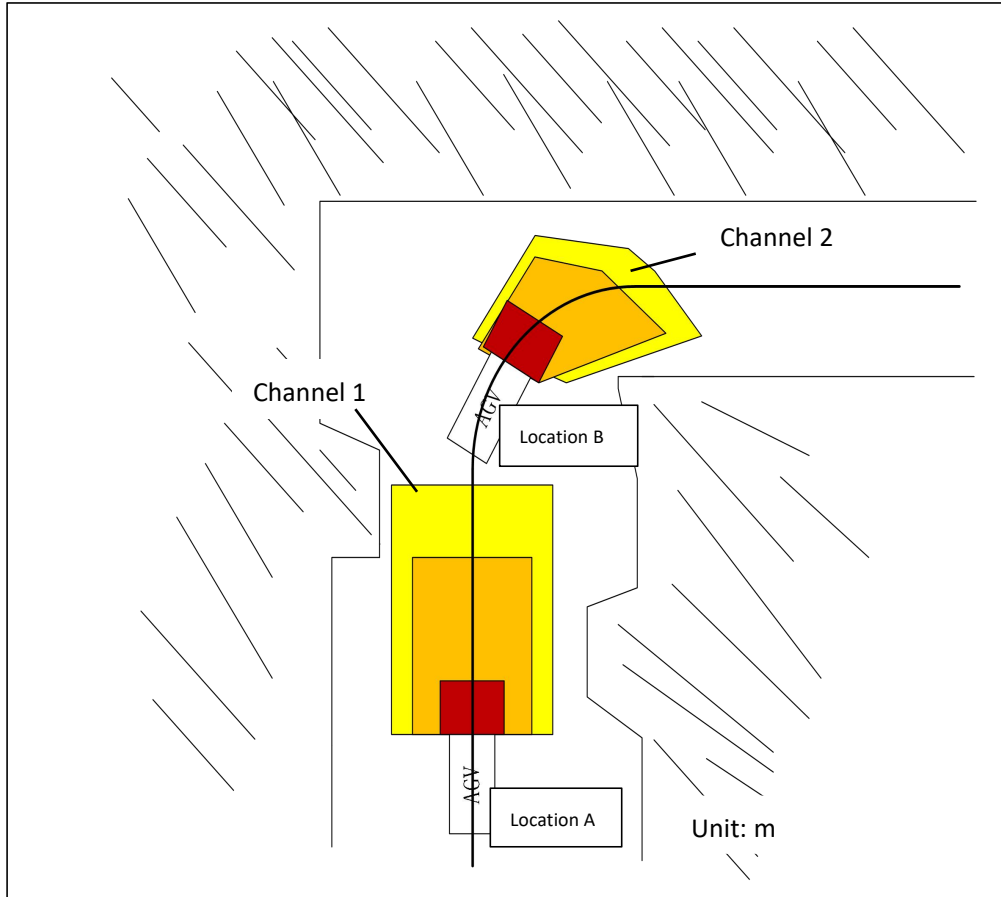
***Area detection**

There are 64 channels in the sensor, and up to 64 different sensing ranges can be set. Meet the detection needs in different situations.

The AGV use process application shown as below figure:

When the AGV runs to the line A position, use the sensing range detection set by channel 1;

When the AGV runs to the line B position, Since the original channel 1 sensing range cannot pass through the external space change, switch to channel 2 with a smaller sensing range setting to run through.



3 DETECTION PRECAUTIONS

3.1 DETECTION CAPABILITIES

Weak reflectivity object detection:

Objects with a reflectivity lower than 1.5% may not be detected. Objects with a reflectivity lower than 70% may not reach the nominal detection distance

Glass detection:

Detection of glass is unstable and may not be detected or the detection distance may be close due to glass penetration or reflection

High reflectivity object detection:

When detecting highly reflective objects, such as mirror objects, glossy objects, reflective films, etc., the size of the detected object will be larger than the actual object

Dust and rain interference:

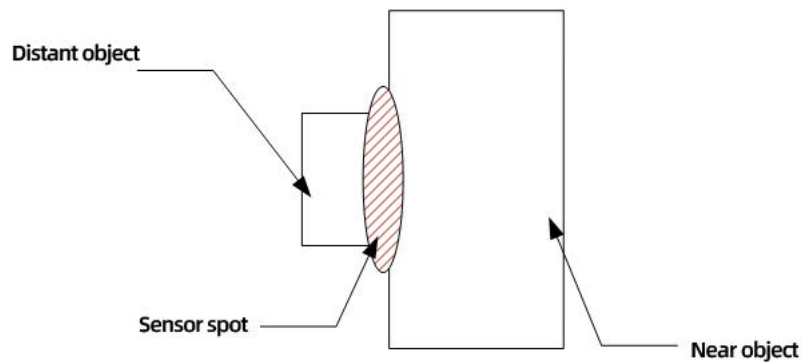
Dust and rain particles will cause the sensor to detect motion

Detection characteristics:

Scanning plane, no height direction detection

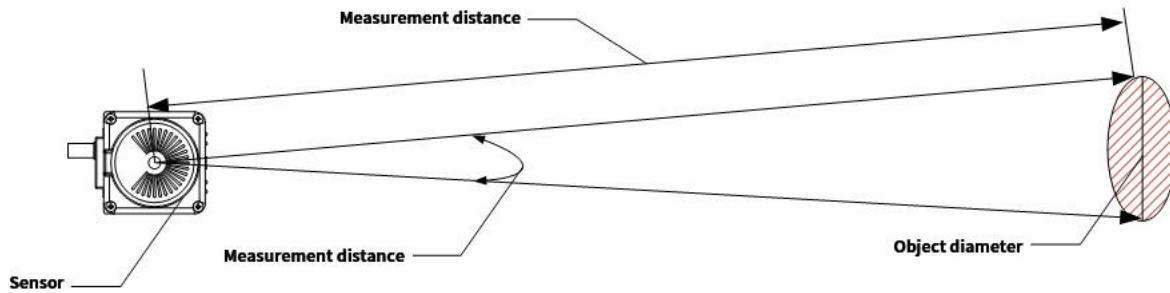
Detection of object edges:

Detection of edges is unstable



3.2 DETECTION OBJECT SIZE

The LIDAR sensor has a rotating mirror. The laser beam will continuously emit laser as the mirror rotates, so that it can scan a sector-shaped area with a maximum angle of 270°. The emitted laser beam will cover a sector-shaped surface, so that objects can be detected within an area of up to 270°.



- SE-XX35X series sensors, the point cloud angle resolution is 0.1° 0.2°, which can be configured through the configuration software.
- When using the obstacle detection function, the sensor actually detects at 0.5°.
- Minimum resolution D of the detected object, unit mm
- Calculation formula for the minimum detection object diameter D

$$D = 2\pi L \frac{\text{angle} \sim \text{resolution}}{360}$$

L: The distance from any point to the sensor, which is also the distance from the measured point to the laser sensor.

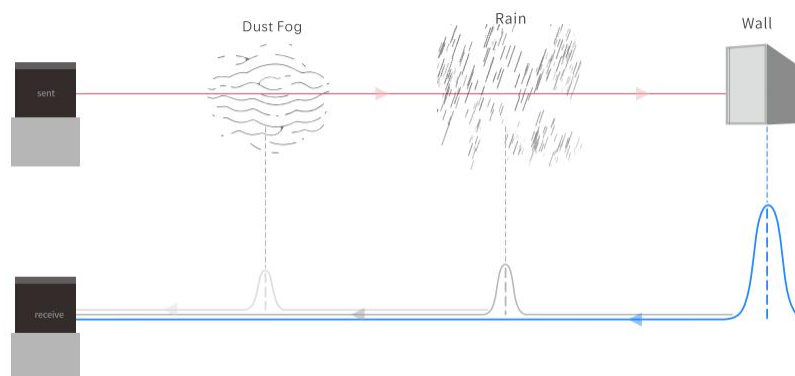
For example: when L is 1000mm, and the laser angle resolution is set to 0.1°, the minimum resolution of the object that can be detected is 1.74mm. (Round to 2 decimal places).

3.3 MULTIPLE ECHO TECHNOLOGY

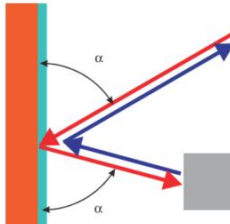
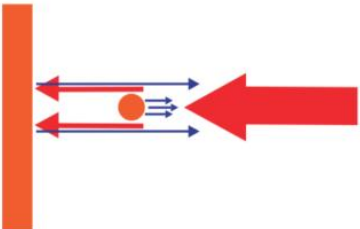
3.3.1 Filtering environment and minimum distance

The multi-echo technology detects multiple echo signals per measuring beam. This allows echoes caused by rain or fog, complex structures, etc., in the middle of the transmission beam cycle to be identified and filtered out if necessary.

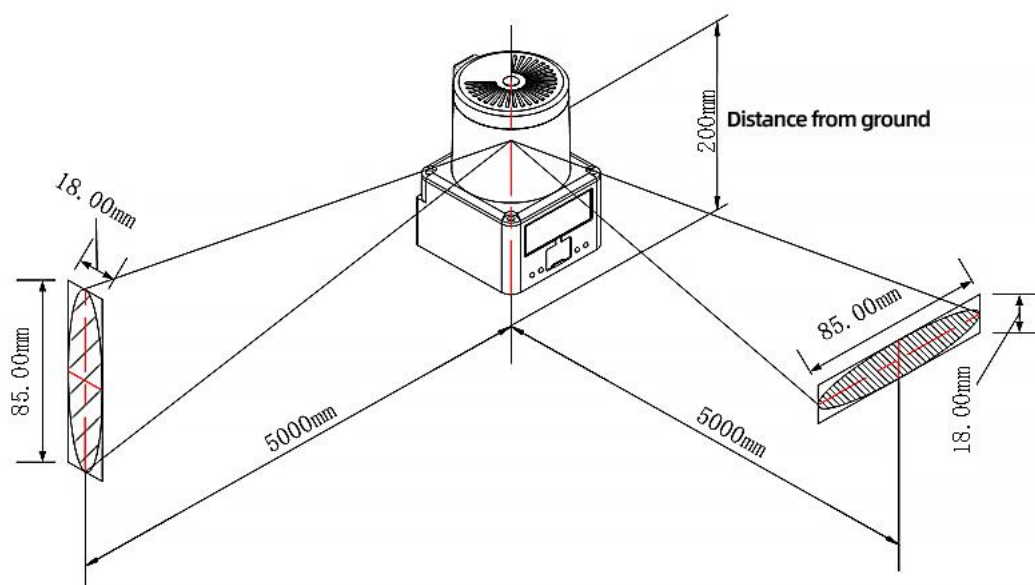
In order to be able to display the echoes as individual measured values, there must be a minimum distance of about 3.5 m between two objects.



3.3.2 Effect of object surface on measurement

 Highly reflective surface	Smooth reflective surfaces Smooth reflective surfaces cannot be detected, but objects illuminated by the reflected light from the smooth reflective surface can be detected
 Objects smaller than the light spot or weakly reflective objects	If the detected object is a small object smaller than the beam diameter, it is possible that ① the small object surface is not reflective enough and there is no background object, so it cannot be detected; ② the small object is not reflective enough, but the background object is reflective enough, so the detection is wrong; ③ the small object and the background object are both reflective enough, so the measurement value is distorted;

3.4 SENSOR LIGHT SPOT DIAGRAM



4 PREPARATION

4.1 PACKING LIST

Please confirm whether the product name and product model on the outer label of the product box are consistent with the one you purchased.

Please confirm the product name and model number through the external label of the product.

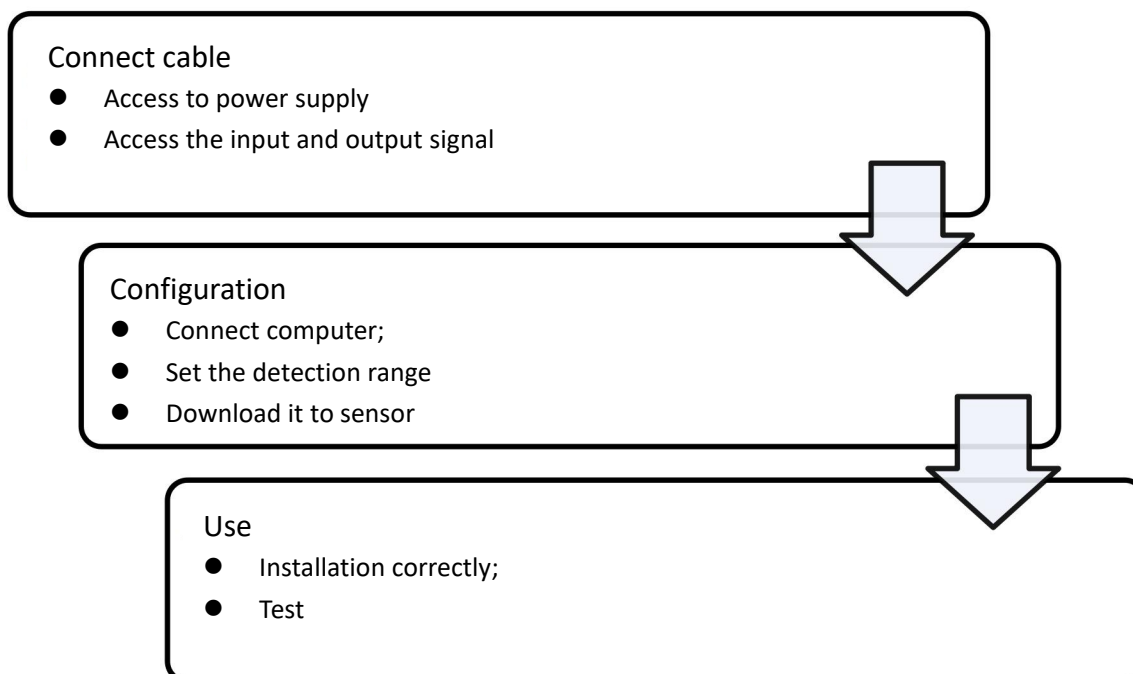
Please confirm whether the following items are complete after unpacking, if not, please contact the supplier.

Laser obstacle sensor	SE-1035FXX	1
Configuration software	Hinson configuration software V1.3 version or above	1 set

4.2 DEBUGGING TOOL

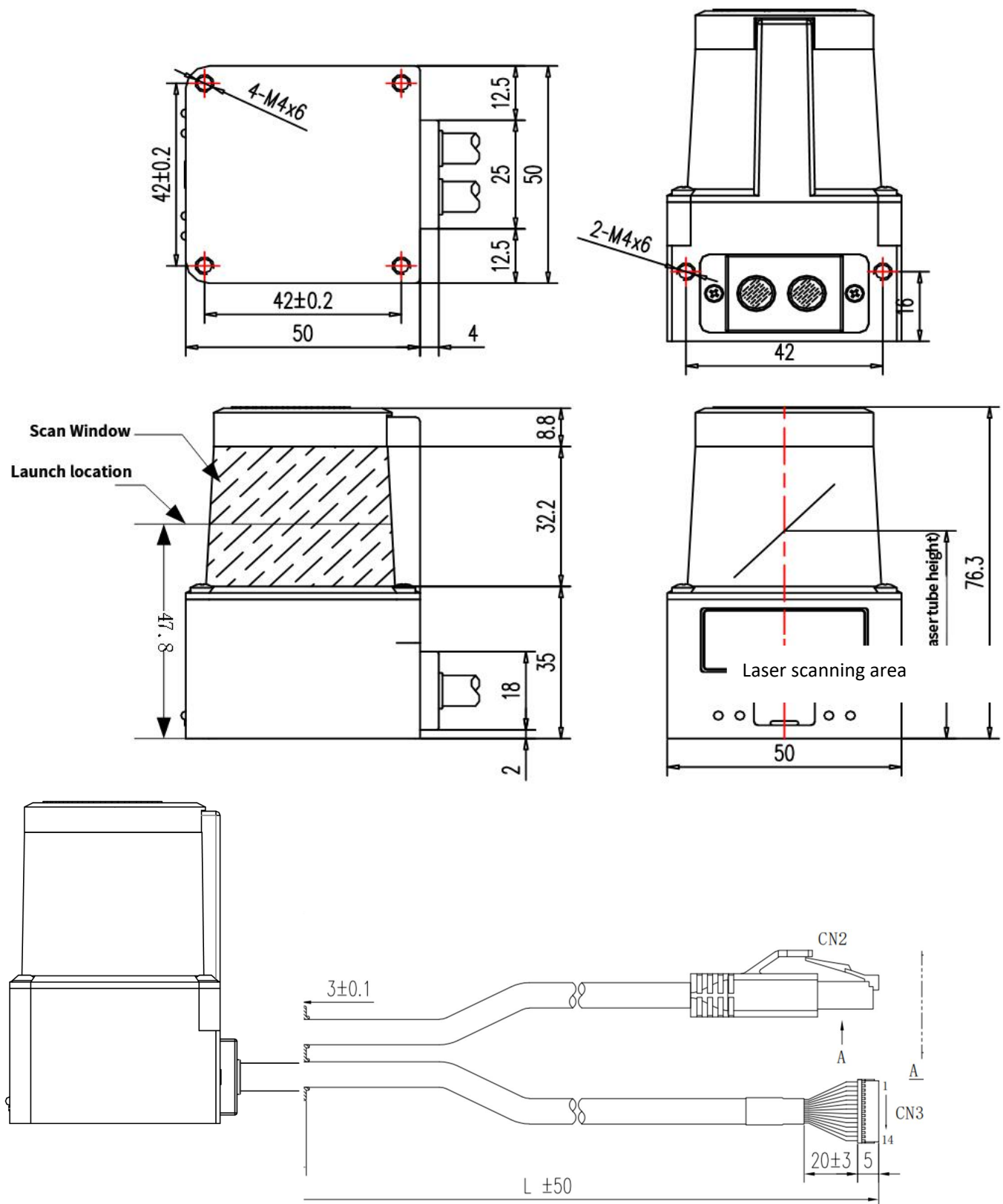
Computer	Running Windows 7 and above, with RJ45 port, or using an adapter cable	1
Power	DC 10-30V power	1

4.3 USE PROCEDURE



5 INSTALLATION

5.1 DIMENSION PARAMETER

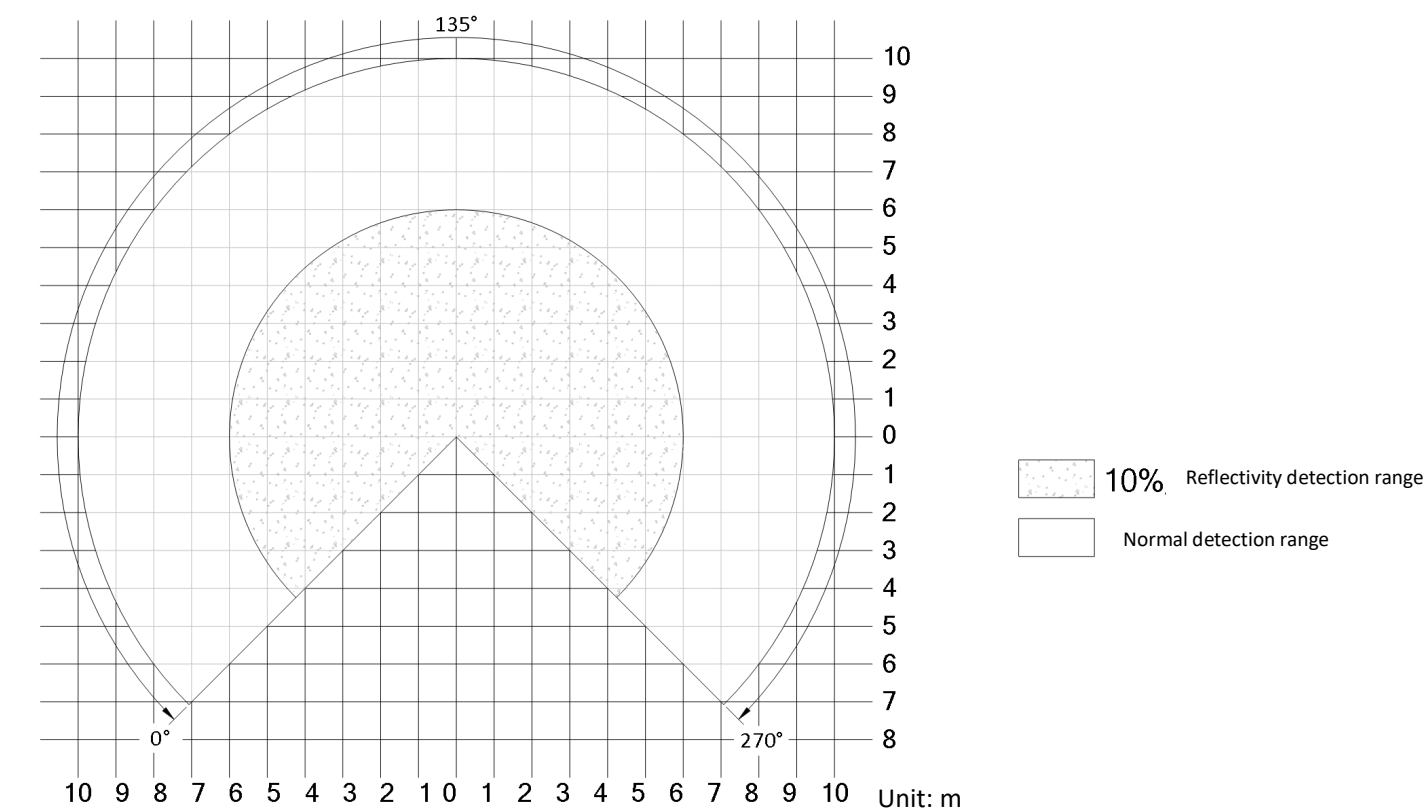


Port	Specification	Function
CN2	RJ45 Port	Ethernet communication port
CN3	Brand: TXGA Housing model: FHG10001-S14M2W1B Crimp terminal: FT10001-F2H	Power supply, output, CAN BUS port

L cable length, default is 1.5 meters, other lengths need to be discussed before purchase;

5.2 DETECTION ABILITY

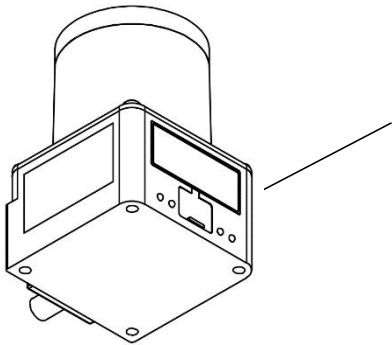
Detection range:
The sensor will detect the measurement data of 45°-315° and output it through Ethernet. The measurement angle range is as follows:



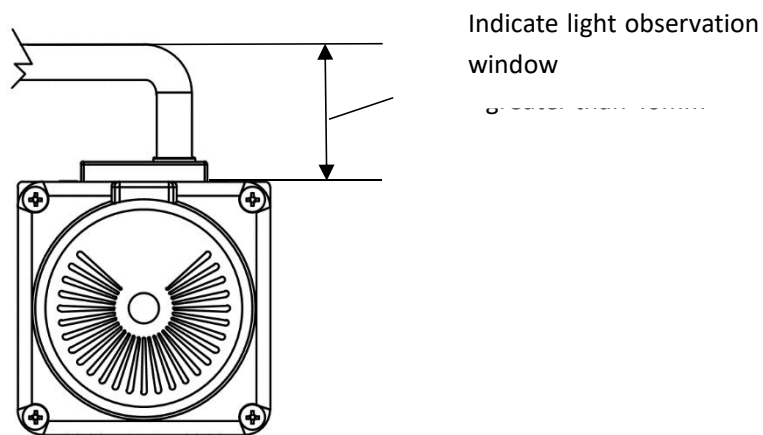
5.3 INSTALLATION REQUIREMENTS

The laser scanning sensor has its own cable, and the cable position needs to be reserved for the outlet position to avoid excessive bending of the cable. There should be an indicator light observation window in front of the laser obstacle sensor base to facilitate observation of the sensor status

Reserve front space requirements



Reserve back space requirements



180° detection range installation position reserved;

Installation reserved

	190° detection space is reserved
When using a protective cover for shielding, you need to install the reserved window shown in the figure above;	To ensure a 180° detection angle, it needs to be installed forward according to the above position.

1. When two or more sensors are installed face to face, it is recommended that the inclination angle be above 3° to prevent mutual interference.



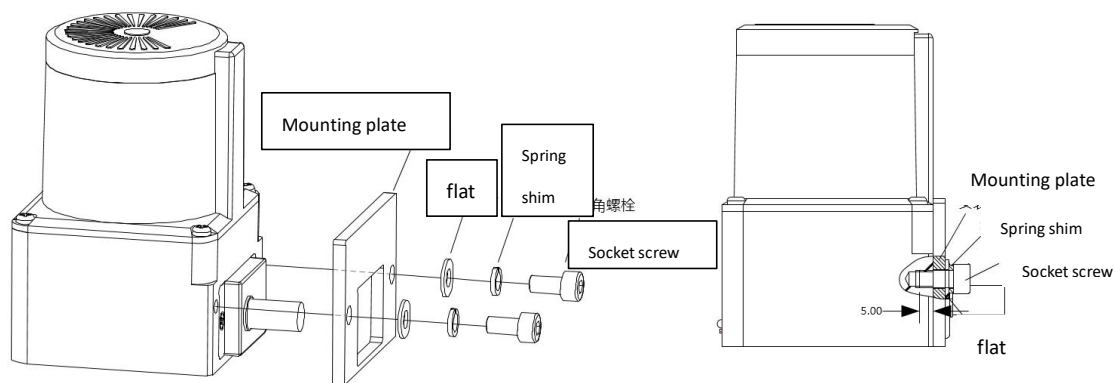
2. When two or more sensors are installed at same direction and level, it is recommended that the inclination angle be above 3° to prevent mutual interference.



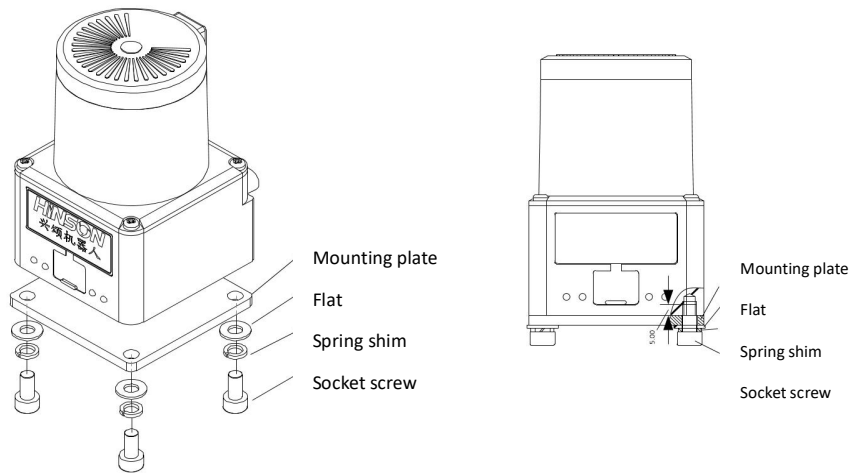
3. Due to the conical and divergent emission of the sensor's light spot, it is recommended that the laser scanning sensor be installed with a height of $\geq 200\text{mm}$ from the ground. If the installation height from the ground is less than 200mm, please tilt the laser scanning sensor upward by $1\sim 3^\circ$



Front installation diagram



Base installation diagram



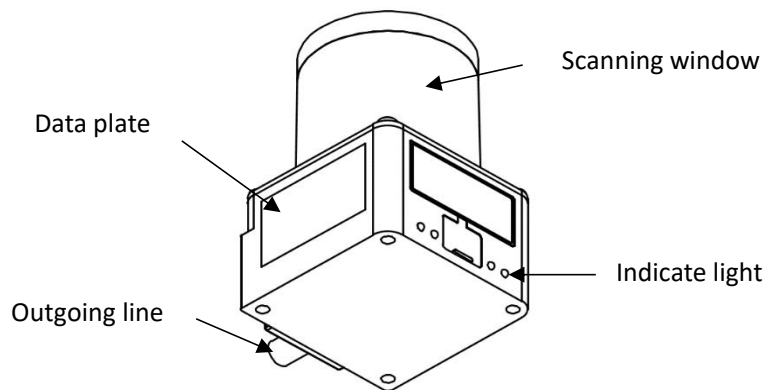
Use screw specifications

Screw specifications	Tightening torque
M4*10mm	0.1N.M

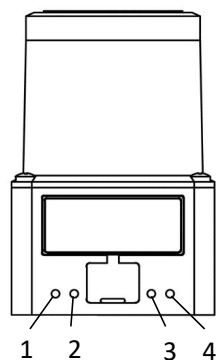
Note

The mounting plate must be made of a metal material with good heat conduction, otherwise the sensor's low heat conduction efficiency may cause the sensor to fault.

5.4 PORT



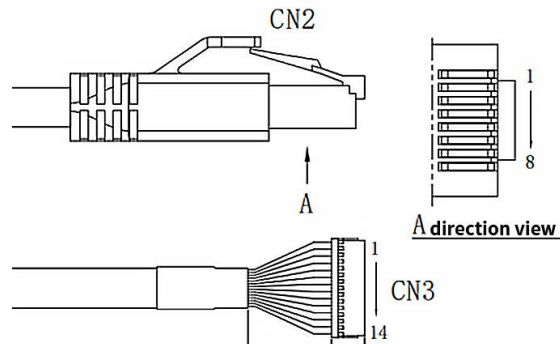
5.5 LED STATUS DISPLAY



NO	Name	Functional description
1	Power indicator	The sensor lights up when it is properly powered, and the green indicator light is on. When a fault occurs, the power indicator light flashes
2	OUT3 indicator	When an intrusion is detected within the setting range of sensor OUT3, the red indicator light is on, and it will not light up when no intrusion is detected
3	OUT2 indicator	When an intrusion is detected within the setting range of sensor OUT2, the orange indicator light is on, and it will not light up when no intrusion is detected
4	OUT1 indicator	When an intrusion is detected within the setting range of sensor OUT1, the yellow indicator light is on, and it will not light up when no intrusion is detected

6 WIRING

6.1 CABLE DEFINITION

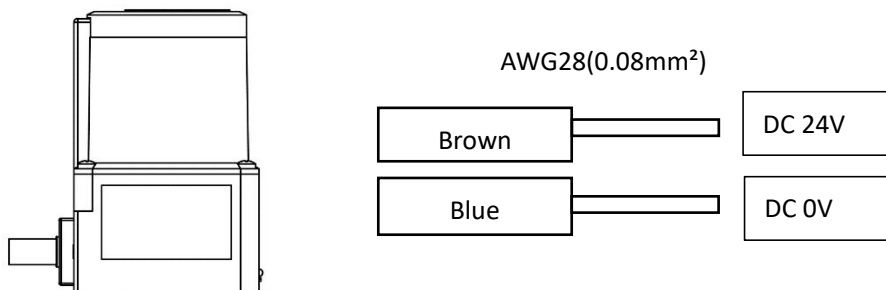


Port	Port NO.	Color	Signal type	Single	Function description
CN3	1	Brown	Power supply	24V	Positive power supply, recommended 24V±10%
	2	Blue		0V	Negative power supply
	3	White-brown	Switch output	COM-	Output common terminal, connected to negative power supply
	4	Black		OUT1	Output 1
	5	Orange		OUT2	Output 2
	6	Yellow		OUT3	Output 3
	7	White-blue		EOUT	Fault output
	8	Purple	CAN BUS	C-H	CAN BUS communication H terminal
	9	Gray		C-L	CAN BUS communication L terminal
	10	White		GND	CAN BUS communication common ground terminal
	11		invalid		
	12				

		13				
		14				
	CN2	3	white green	Enthnet	ETHTX+	Ethernet communication TX+
		6	green		ETHTX-	Ethernet communication TX-
		1	white red		ETHRX+	Ethernet communication RX+
		2	red		ETHRX-	Ethernet communication RX-

6.2 POWER SUPPLY CONNECTION

Access to power supply: DC24V±10%. In the AGV system or other power equipment network, it is necessary to add a DC24V voltage stabilizing device to ensure that the interference of the power supply part will not affect the normal operation of the sensor.



6.3 OUTPUT SIGNAL CONNECTION

Switching period

After the sensor receives the channel switching signal, there is a switching delay due to the influence of the scan period. The switching delay is as shown in the figure below.



Note

When switching to a non-graphic channel, the sensor will maintain the previous status output of the graphic channel;
Switch the channel in this scan period (the scan period is 50ms), and the output port will keep the status before the channel is switched;

6.3.1 Output signal wiring

Output signal use function

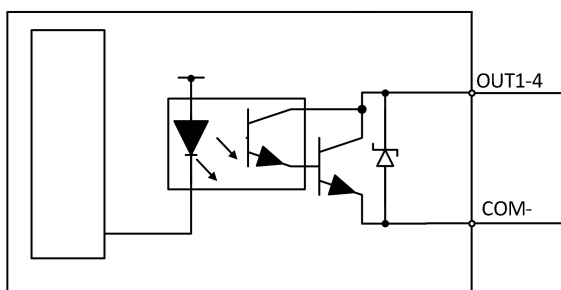
Port	Function	Output logic
OUT1	Used for far-end obstacle warning and deceleration;	Default: active high, can be changed to active low through configuration software;
OUT2	Used for normal obstacle detection and normal stop;	Default: active high, can be changed to active low through configuration software;
OUT3	Used for near-end emergency stop;	Default: active high, can be changed to active low through configuration software;
ERR	Used for sensor fault status output;	Default: active low, cannot be changed;

The output is an open collector (NPN) signal, using optocoupler isolation output;

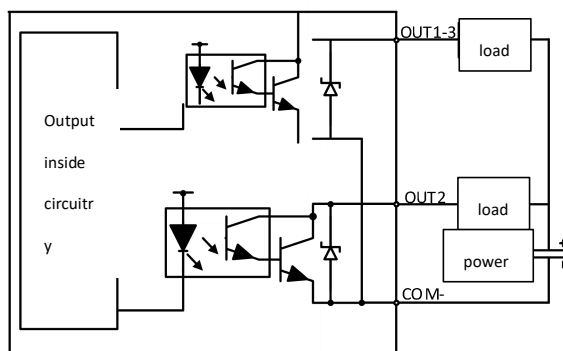
ON: output signal state, 0-0.5V;

OFF: high impedance state;

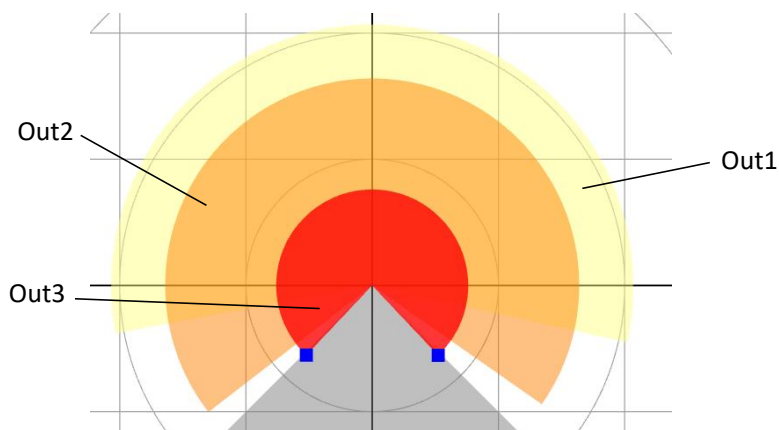
The maximum load capacity of the output port is 100mA;



Output port is NPN output. Output principle diagram shown as follows:



Sensors output port correspond with configuration software's graphic drawing.

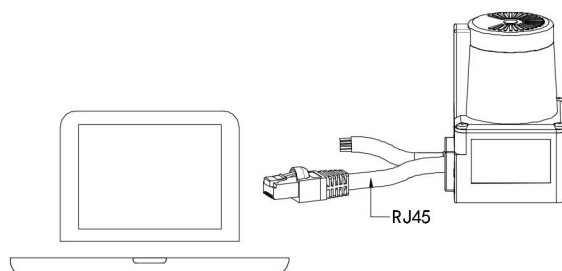


Note

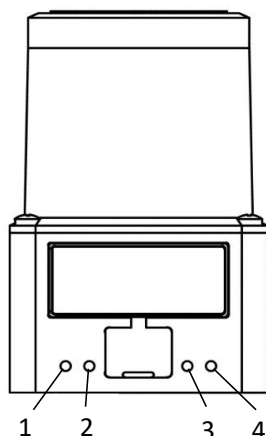
There will be detection output only when the corresponding output has drawn graphics;

6.4 CONFIGURATION WIRING

Use sensor's Ethernet RJ45 port to connect with computer



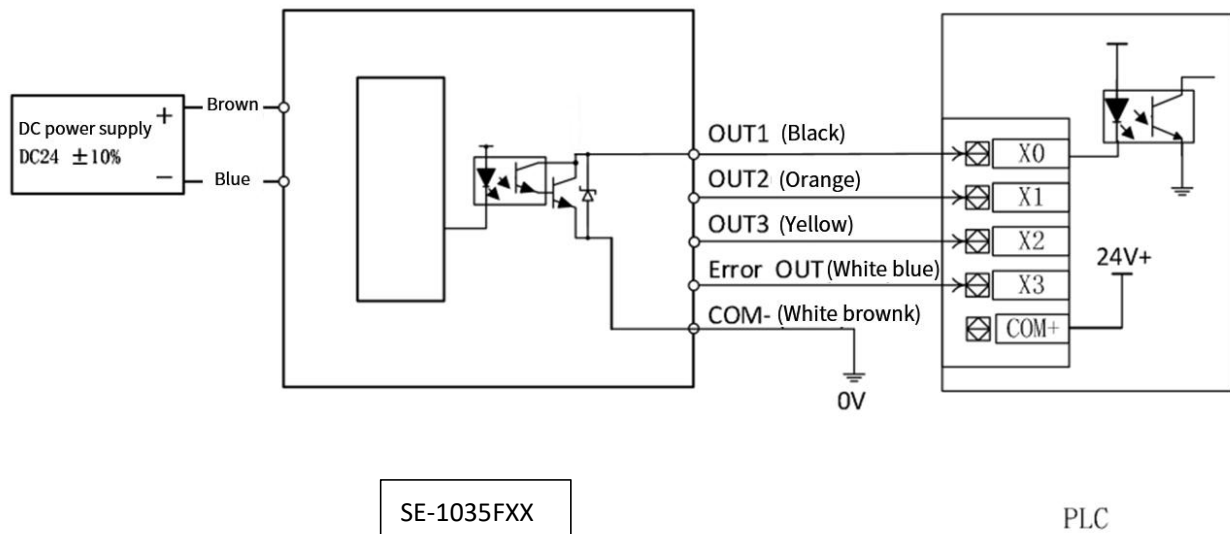
6.5 LED STATUS DISPLAY



NO	Name	Function illustration
1	Power supply indicator light	When the sensor gets the correct power supply, it lights up as a green indicator light. When a fault occurs, the power indicator light flashes
2	OUT3 indicator light	If an intrusion is detected within the setting range of the sensor OUT3, the red indicator light will be on, and it will not be on when the intrusion is not detected.
3	OUT2 indicator light	If an intrusion is detected within the setting range of the sensor OUT2, the orange indicator light will be on, and it will not be on when the intrusion is not detected.
4	OUT1 indicator light	If an intrusion is detected within the setting range of the sensor OUT1, the yellow indicator light will be on, and it will not be on when the intrusion is not detected.

6.6 WIRING INSTANCE

◆ Switch output connection



X0-X3 is PLC's signal input port;

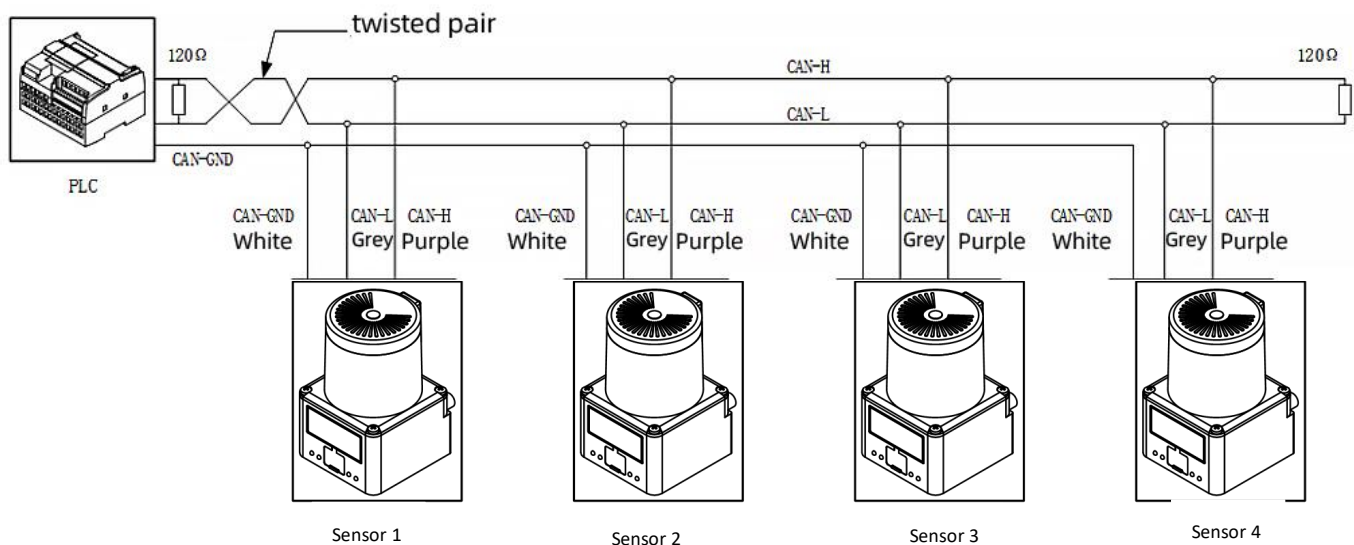
OUT1、OUT2、OUT3、EOUT output current less than 100mA;

Note

Input and output port cannot short-circuit or access load that exceed the rated current, otherwise it will cause sensor damage.

◆ CAN BUS wiring

Sensor wire with host PC



- 1) Use twisted pair cables
- 2) A 120 ohm terminal resistor must be connected
- 3) CAN BUS is a non-isolated port
- 4) CAN -GND is connected to the negative pole of the power supply

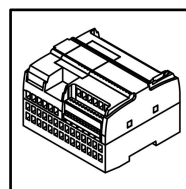
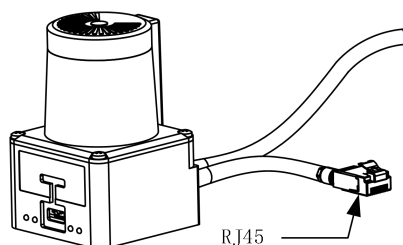
5) Communication distance reference

CAN BUS Baud rate	Total cable length
1Mbit/s	less than 20 meters
500Kbit/s	less than 100 meters
250Kbit/s	less than 250 meters
125Kbit/s	less than 500 meters

The cable length is closely related to the baud rate. For example, the 1M baud rate cannot guarantee that 20m is completely problem-free. In some cases, the 1M baud rate is used, and the communication distance of 5 meters is the most reliable. However, when using the handshake method to connect, in some cases, the actual application is also normal at 20m. If there is a branch 1M, the maximum length of the branch can only be 0.3m. If it is 500K, the branch line length cannot exceed 0.5m, and the total line length cannot exceed 1.5m.

The lower the baud rate, the stronger the anti-interference ability. When the communication bandwidth ratio is less than 70%, try to use a smaller baud rate.

◆ Ethernet wiring



PLC

7 CONFIGURATION SOFTWARE ACQUISITION

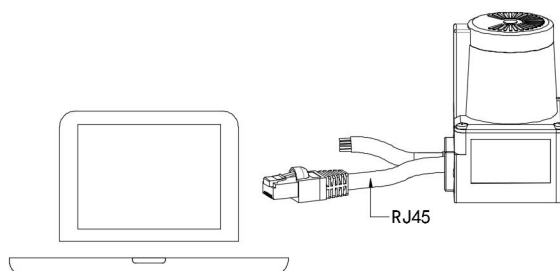
7.1 SOFTWARE ACQUISITION

- 1) Visit the company website to obtain www.hinson-xs.com
- 2) Consult sales and technical support staff to obtain

7.2 SENSOR CONNECTION

Ethernet connection

Use the sensor's Ethernet RJ45 port to connect to a computer



Computer requirements

- 1) Windows 7 or above;
- 2) Ethernet connection, connect to RJ45 port;
- 3) Set the local network connection IP address;

Confirm that the power supply is good, the voltage is $DC24V \pm 10\%$, and the green indicator light of the sensor is always on

Software Operating Environment

System requirements	Windows 7 or above
Display resolution	1280*720 or above
Configuration software requirements	Version V1.5.5

Software decompression

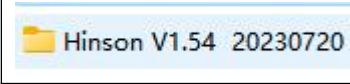
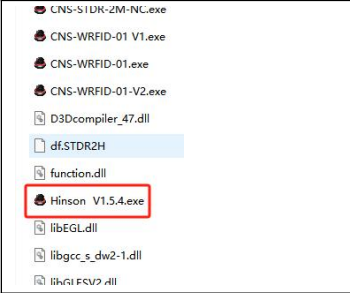


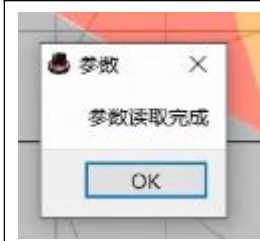
- 1) Double-click to open;
- 2) After the file is self-decompressed, a folder is generated in the current directory;



- 3) Open the folder and select the software to run;

7.3 RUN CONFIGURATION SOFTWARE

	Unzip the configuration software file
	Open the folder, find the configuration software, double-click to open;
	Select -SE-xxxx, LSxx, click to open;
	When opening for the first time, you will be prompted
	Select SE-05XX series; Connection: Confirm the COM port after the driver is installed;
	Waiting for data upload;



Sensor connection successful;

Set the local IP address;

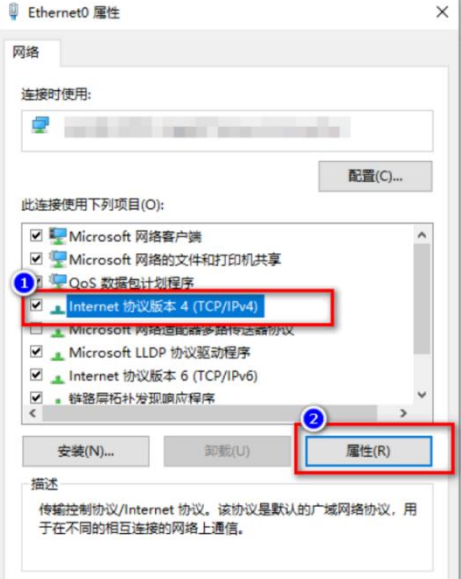
Take Windows 10 system as an example. There will be differences between different system versions. You can search the Internet for specific setting methods;



On the computer desktop, find the network icon in the lower right corner and right-click it; open "Network and Internet Settings";

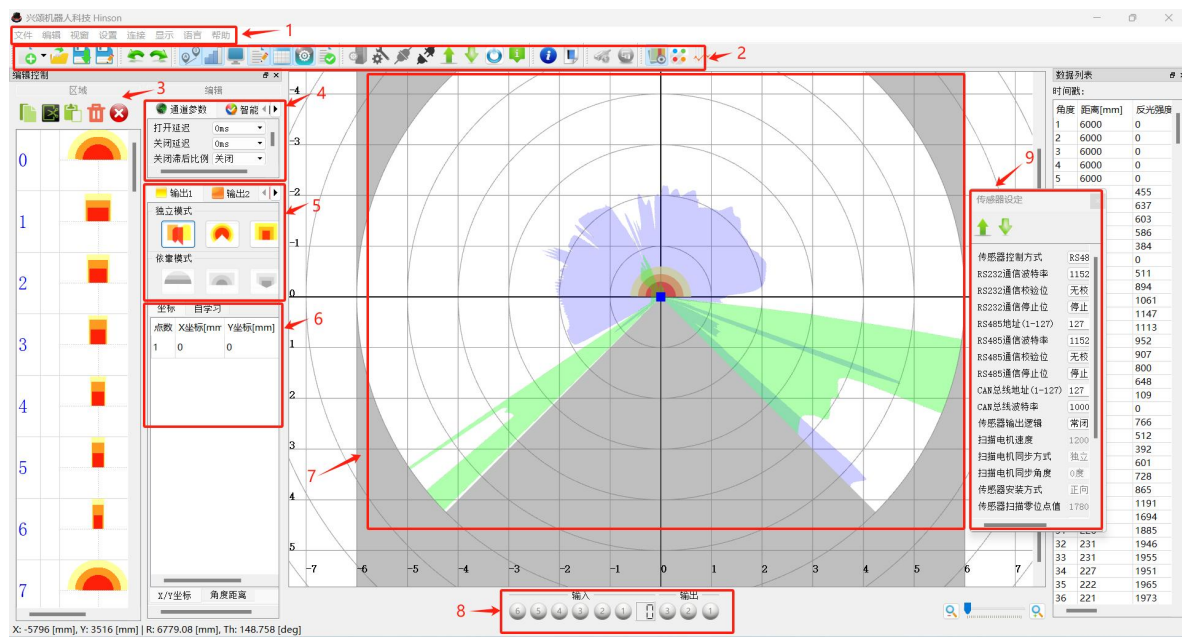


Click Change Network Adapter

	1: Find the local connection of the link sensor; 2: Right-click and select Properties in the pop-up dialog box
	In the "This link uses the following items" section of the local network card properties interface 1: Select "Internet Protocol Version 4 (TCP/IPv4)"; 2: Click the "Properties" button below;
	In the "Internet Protocol Version 4 (TCP/IPv4) Properties" interface, check "Use the following IP address"; fill in the relevant "IP address, subnet mask, default gateway; press the "OK" button to exit after filling in.

7.4 SOFTWARE INTERFACE INTRODUCTION

After the SE-xxxx series is connected to the configuration software, the following interface is displayed:



7.4.1 Menu Bar

First level menu	Secondary menu	Third level menu	Corresponding icon	Notes
File	New	-		Create a new file
	Open	-		Open a created file
	Save	-		Save the edited file
	Save as	-		Save the edited file as
	Quit	-		Exit the current configuration software interface
Edit	Undo	-		Undo the last step
	Redo	-		Restore the last step
	Copy	-		Copy the detection pattern of a detection channel
	Cut	-		Cut the detection pattern of a detection channel
	Paste	-		Paste the detection graph of a detection channel to another channel
	Delete	-		Delete the currently selected detection channel graph

	Delete All	-		Delete all detection channel graphs
	App Settings	-		-
View	Mode	Edition		Click the icon to configure the software to display the edit function box
		Monitoring		Click the icon to configure the software to display the monitoring status
		Sensor settings		Click the icon to configure the software to display the sensor parameter setting function box
		IO simulation		Click the icon to display the sensor input and output simulation function box
		Self-check status		Click the icon to display the sensor self-test status
	Distance	-		Click to close or display the current 120° scanning profile of the sensor
	Intensity	-		Click to close or display the reflective intensity of the obstacle
	Data table	-		The configuration software does not support the distance data output of all current detection points, this item is not available
Setting	Serial port	-		The sensor does not support the serial port connection configuration software, this item is not available
	Ethernet	-		Click to select the Ethernet connection configuration software
	Serial settings	-		The sensor does not support the serial port connection configuration software, this item is not available
	Ethernet settings	-		Click to view the current sensor Ethernet address
Connections	Interface	Serial port		The sensor does not support the serial port connection configuration software, this item is not available
		Ethernet		
	Connection	-		Click to connect the sensor and configuration software
	Disconnection	-		Click to disconnect the sensor and configuration software
	Reading all setting	-		Click to upload the sensor's set detection channel graphics and various parameters
	Write all setting	-		Click to download the detection channel graphics and various parameters
	Soft reboot	-		After setting the detection channel graphics and various parameters, click this icon to restart the sensor so that the parameters can take effect
	Sensor information	-		-

Display	Disp graph	-		Click this icon to display the 120° scanning profile of the sensor as a plane graphic
	Disp cloud	-		Click this icon to display the 120° scanning profile of the sensor as a point cloud
	Disp line	-		Click this icon to display the 120° scanning profile of the sensor as a line
Language	简体中文	-		Click this icon to display the configuration software in Chinese
	English	-		Click this icon to display the configuration software in English
Help	About	-		Click this icon to display the version information of the configuration software
	Manual	-		-

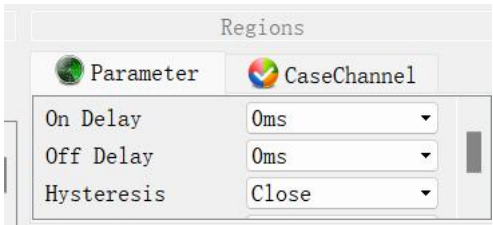
7.4.2 Shortcut Icons

All shortcut icons are explained in Section 1: Menu Bar.

7.4.3 Detection channel graphic editing

The SE series supports detection channels 0-63, and each detection channel supports 3 detection area detection graphic outputs. SE-xx22/SE-xx26 can select the channel through the signal combination of IN1, IN2, IN3, and IN4 and output the channel's OUT1, OUT2, and OUT3 detection areas to see if there are obstacles invading.

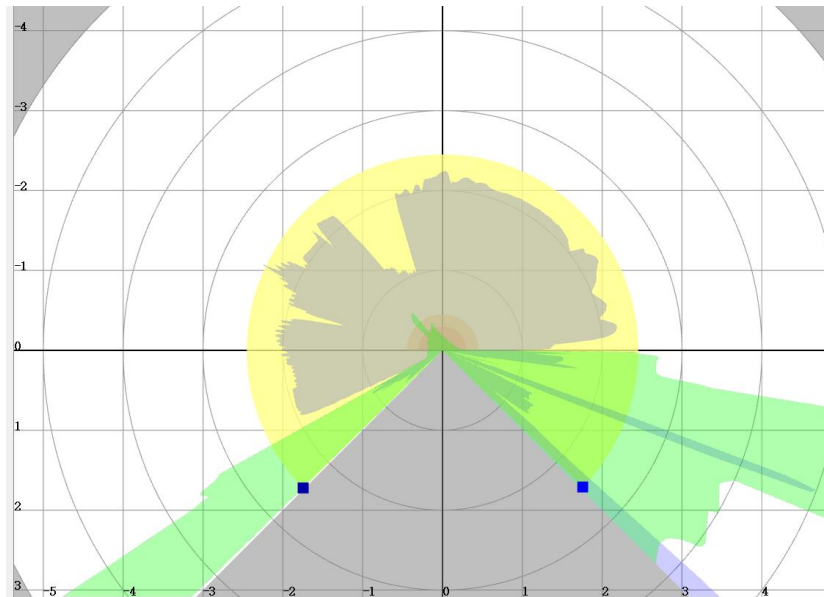
Channel parameters and intelligent selection

	Open delay: 0-500ms The object intrusion time continues to output the signal after the set time, which is used to filter the occasional flashing objects or interference; Close delay: 0-500ms, The object invades and outputs the signal, and then keeps the output signal for the set time after the object leaves, and then resumes the output; It is used to solve the problem of frequent jumps of the sensor output port caused by obstacles; Close hysteresis ratio: 0-10%, After the object intrusion is triggered, the object needs to move away to the set ratio distance before recovery; Detection object size: 0.5°-5° Adjusting the size of the detection object can reduce the false triggering of the sensor caused by dust in the air or unclean sensor detection mirror,
---	--

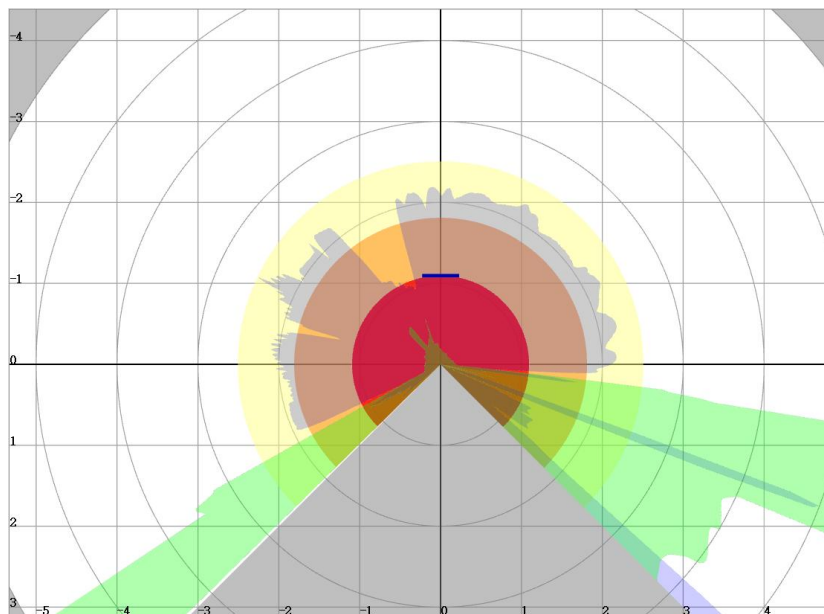
Regions Parameter CaseChannel Dgree Range 0 0 Speed Range 0 0 Operation Type 0	Only applicable to SE-xx33/SE-xx35 series sensors Not applicable to SE-xx22/SE-xx26 series sensors
---	--

Output 1, Output 2, Output 3 editing mode.

Independent mode: In independent mode, the sector and its rectangle can be set separately, and the drawing figure cannot exceed the interval of 45~315° (the horizontal line on the right side of the coordinate origin on the figure is the 0° line, and the interval is marked as -45~225°).

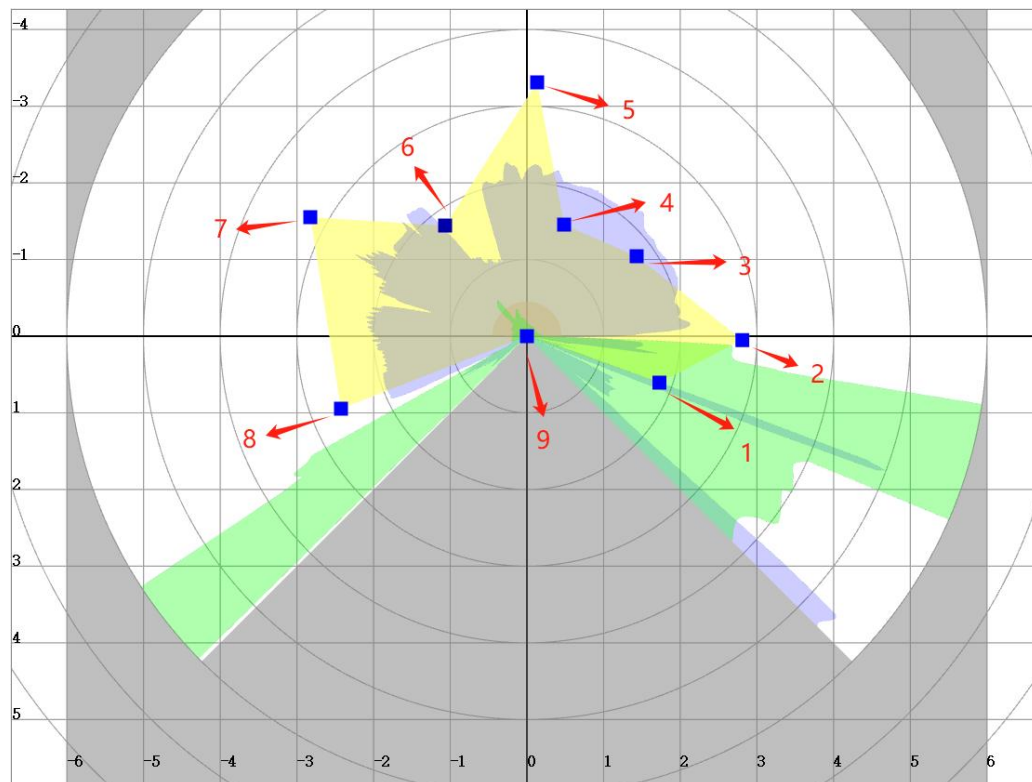


Dependence mode: After setting the graphics of output 1, you can select the dependence mode to copy the graphics of output 1 in different proportions.



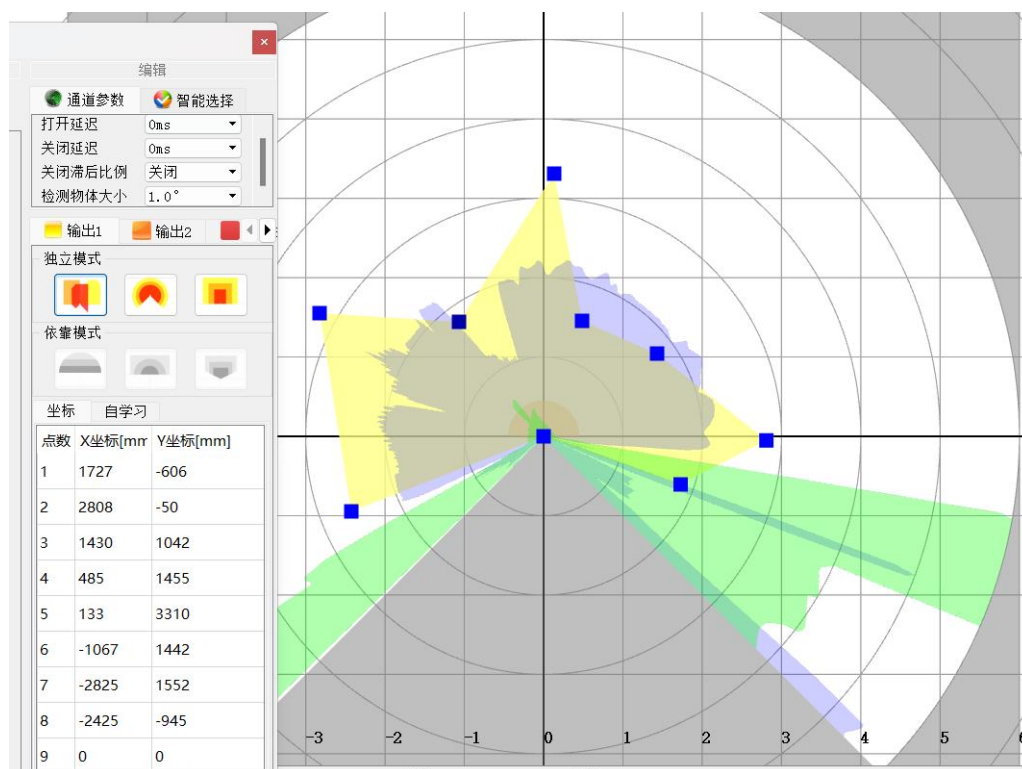
7.4.4 Coordinates and their angle values

Coordinates (X, Y) of each point of the irregular figure in independent mode:



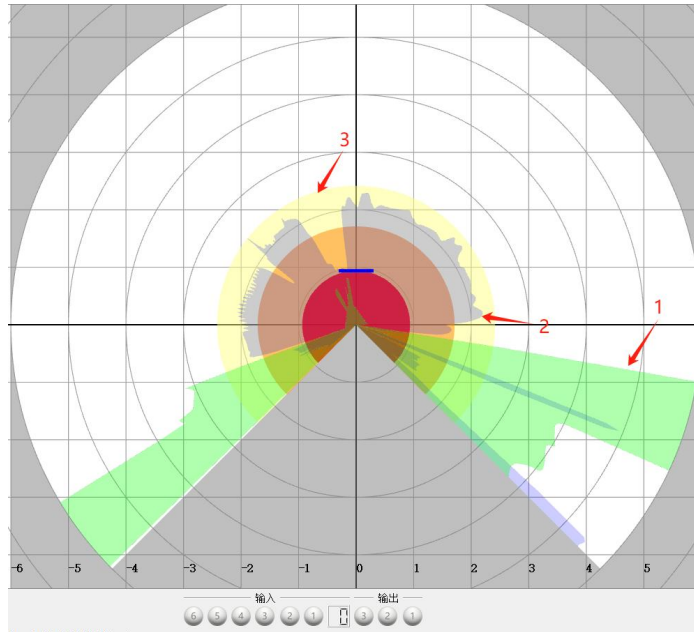
Note: The 9th point is the origin of the coordinates

The distance and angle between each point of the irregular shape and the origin of the coordinates in independent mode:



Note: The 9th point is the origin of the coordinate system.

Scanning profile, reflection intensity, and detection channel graphic display area:



Note: Line 1 shows the scan profile, line 2 shows the reflection intensity, and line 3 is the set detection pattern.

Current channel and current channel output 1 (OUT1), 2 (OUT2), 3 (OUT3) status

7.4.5 Sensor parameter setting

Area Designer by Hinson robot Technology Co,LTD. Version: 1.3.5 Data: 2023-12-26 www.Hinson-xs.com Release Notes Add parameter configuration for multiple echo versions Add some sensors to support trailing filtering algorithms 关闭	Confirm the configuration software version
Sensor Setting ↑ ↓ Control Mode IO Interface RS232 BaudRate 9600 RS232 Verify None RS232 StopBit Stop 1Bit RS485 ID(1-127) 127 RS485 BaudRate 9600 RS485 Verify None RS485 StopBit Stop 1Bit	Parameter configuration list

Parameter name	Parameter	Parameter Description	
Control Mode	IO interface RS232 interface RS485 interface (default) CAN interface Modbus interface CANOPEN interface	Series	Support
		SE-xx33 Series	RS232 communication control RS485 communication control CAN bus control Modbus protocol control
		SE-xx35 Series	CANOPEN protocol control
		SE-xx22/SE-xx26 Series	IO interface control
RS232 BaudRate	1: 9600bps 2: 19200bps 3: 38400bps 4: 57600bps 5: 115200bps (default) 6: 460800bps (supported only by SE-0533F10)	RS232 communication baud rate	
RS232 Verify	1: No parity (default) 2: Odd parity 3: Even parity	RS232 communication check bit	
RS232 StopBit	1: Stop bit 1 bit (default) 2: Stop bit 1.5 bits 3: Stop bit 2 bits	RS232 communication stop bit	
RS485 ID(1-127)	1-127 (default 127)	RS485 address	
RS485 BaudRate	1: 9600bps 2: 19200bps 3: 38400bps 4: 57600bps 5: 115200bps (default) 6: 460800bps (supported by firmware version greater than 2.5.3)	RS485 baud rate	
RS485 Verify	1: None (default) 2: Odd 3: Even	RS485 communication check bit,	
RS485 StopBit	1: Stop Bit 2: Stop 1.5Bit 3: Stop 2Bit(default)	RS485 communication stop bit	
CAN ID(1-127)	1-127(default)	CAN bus address	
CAN BaudRate	1: 125K 2: 250K 3: 500K	CAN bus baud rate	

	4: 1000K(default)	
Output Logic	Active high (default) Active low	Output logic of OUT1-OUT3 ports Active high Object detected; (OUT1-OUT3 are in the disconnected state) Object not detected; (OUT1-OUT3 are in the connected state) Active low Object detected; (OUT1-OUT3- is in the on state) Object not detected; (OUT1-OUT3 is in the off state)
Motor SpeedRatio	1200	Default 1200 Unchangeable settings
MotorSync Mode	Standalone mode	Default independent mode Unchangeable settings
MotorSync Angle	0 degrees	Default 0 degrees Unchangeable settings
Install Direction	Forward installation	Default forward installation Unchangeable settings
Sensor Zero Value	1780	Default 1780 Unchangeable settings
Ethernet Mode	TCP server (default) UDP mode	Set the communication mode Only for SE-xx35 series
Sensor Scan frequency	144K	Set the measurement frequency of the sensor, cannot be changed; Only for SE-xx35 series
Sensor Scan Degree	0.1° 0.2°	Set the sensor scanning angle resolution; Only for SE-xx35 series
Scan Filter Level	Off Easy Moddle Strict	Set the sensor noise filtering level. The higher the level, the smaller the sensor measurement jitter, but the greater the distortion of the image edge.
Multiple Echo	First Second Last Max power	First time: the sensor uses the first return signal; Second time: the sensor uses the second return signal; Last time: the sensor uses the last echo signal in the detection window; Maximum energy: the sensor uses the signal with the highest energy among all echo signals. The echo with the highest energy and the last echo can reduce the impact of dust, rain and fog on the sensor. (When the reflectivity of the object is high, the distance between the objects needs to be greater than 3.5 meters, otherwise the sensor cannot distinguish and detect the second echo. The shorter the distance, the more serious the impact. If it is less than 1m, only the first echo can be detected)
Dirty Distance	0-2000	<u>The function of receiving echo selection setting (second time, last time with maximum energy) takes effect;</u> <u>Distance range of dirt filter function;</u> <u>0-2000mm</u> <u>0: Function off;</u> <u>It is recommended to set it to 100;</u>

Dirty strength	0-2000	The function of receiving echo selection setting (second, last, maximum energy) takes effect; The intensity of the object is filtered by the dirty filter function; According to the echo intensity of the object, according to the set value, objects with an intensity lower than the set value will be filtered out. 0: Function off It is recommended to set it to 200;
Tail filter level	Off Easy Medium Strict	Filter the edge trailing of objects within 2 meters; <u>Recommended setting: Simple;</u> <u>Note: Setting to Strict may filter out small objects at close range;</u>
Ethernet IP address	10.10.0.1--223.255.255.255 (default 192.168.1.88)	Set the sensor IP address; Applicable only to SE-xx35 series

7.5 ICON FUNCTION

7.5.1 IO simulation

The input/output simulation function simulates the action of the IO port of the laser sensor in the configuration software, or sets the simulation conditions to select automatic port switching.



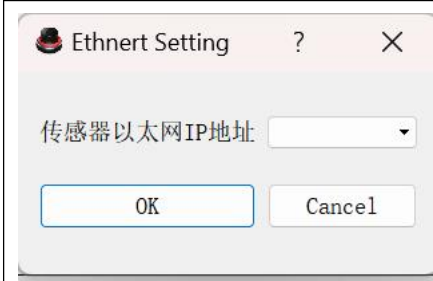
Input port emulation	Enable input port emulation. Input port actions have no effect when the emulation function is enabled. This function switches the zone channel of the analog input port.
Output port emulation	Enable the output port emulation function. When the simulation function is enabled, the action of the output port does not follow the action of the actual sensing object. This function can simulate output port actions.
Abnormal state simulation	Enable the abnormal status port output simulation function. When the simulation function is enabled, the action of the sensor fault output port does not follow the actual sensor abnormal state. This function can simulate

	the sensor fault output port action.
Intelligent selection of simulations	Check "Smart selection simulation" to enable the smart selection simulation function. When the smart selection simulation function is enabled, the sensor automatic switching area function is invalid. This function can simulate intelligent selection conditions to allow the sensor to automatically switch areas.

NOTE

When abnormal sensor input and output are detected, use the input and output port simulation function to test the sensor.

7.5.2 Ethernet Setting

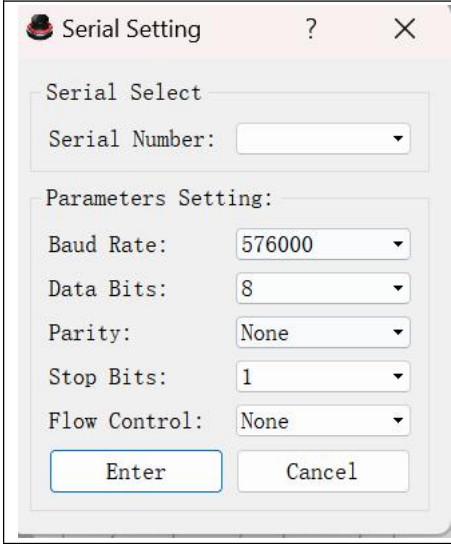


The screenshot shows the 'Ethernet Setting' dialog box. It has a title bar with a question mark and a close button. Inside, there is a label '传感器以太网IP地址' (Sensor Ethernet IP Address) followed by a text input field. At the bottom, there are 'OK' and 'Cancel' buttons.



Applicable when connecting to sensor model SE-xx35 series, automatically finds the sensor IP address.

7.5.3 Serial Setting



The screenshot shows the 'Serial Setting' dialog box. It has a title bar with a question mark and a close button. Inside, there is a 'Serial Select' section with a 'Serial Number:' label and a dropdown menu. Below that is a 'Parameters Setting:' section with several labels and dropdown menus: 'Baud Rate:' (576000), 'Data Bits:' (8), 'Parity:' (None), 'Stop Bits:' (1), and 'Flow Control:' (None). At the bottom, there are 'Enter' and 'Cancel' buttons.



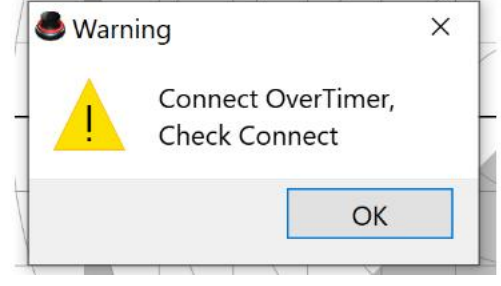
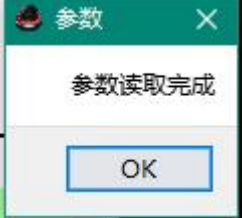
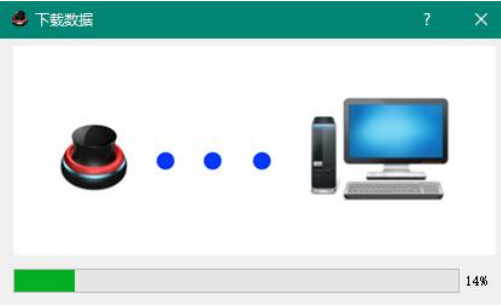
Set the parameters of the parameter configuration port Micro USB. After the sensor is connected via USB, it is connected to the COM port on the computer system.

Parameters	Parameter information
Serial port number	COM-*
Communication rate	576000bps
Data bit	8bit
Parity bit	None
Stop bit	1 bit
Flow control	None

NOTE

The default parameters must be used to connect successfully.

7.6 CONNECTING AND DISCONNECTING

	 Connect the device, read sensor data, and disconnect from the device. After the connection is successful, start uploading data from the sensor once.
	If the device is not connected, a read/write timeout warning will be displayed. After the warning is displayed, troubleshoot according to the fault status.
 	Upload successful prompt; Upload parameters from the sensor, read the current parameters set inside the sensor and the drawn graphic data.
 	Download the parameters set by the configuration software and the drawn graphical data to the sensor.
	If the device is not connected or the connection is disconnected, a read/write timeout warning will be displayed. After the warning, troubleshoot according to the fault status.
 	Control sensor restart for sensor initialization and parameter setting to take effect. The restart process takes about 5 seconds.

7.7 CURRENT SENSOR VERSION INFORMATION

产品信息

产品型号: SE-XXXX
固件版本: 2.40
串行编号: 100.000000
生产日期: 2018年12月13日

OK

After connecting to the sensor, click the Get Version button to get the current sensor version number;
Get the firmware version information of the current sensor.

7.8 SENSOR STATUS BAR

input

output

654321

321

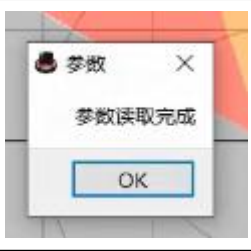
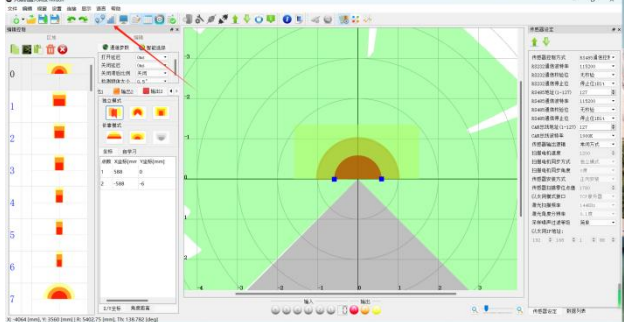
Input status area

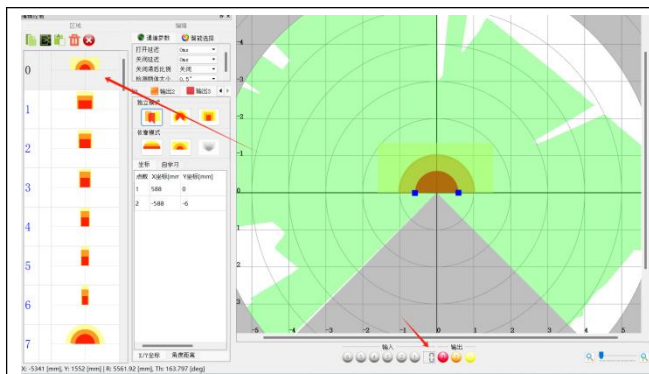
Current channel number

Output status area

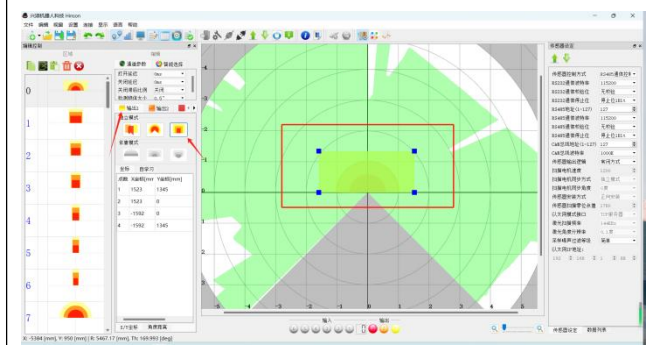
Input status area	Displays the current input port status, numbers 1-4 represent the IN1-IN4 input status respectively; Green: no signal input; Gray: signal input;
Current channel number	The displayed value is the channel number of the current sensor.
Output status area	Displays the current output port status, with numbers 1-3 representing the output status of OUT1-OUT3 respectively; Related to the parameter setting item sensor output logic: Normal closed mode (default) Color: Object detected; (OUT1-OUT3 is in the disconnected state) Gray: No object detected; (OUT1-OUT3 is in the on state) Normal open mode Color: Object detected; (OUT1-OUT3 is in the on state) Gray: No object detected; (OUT1-OUT3 is in the off state)

7.9 QUICK SETUP STEPS

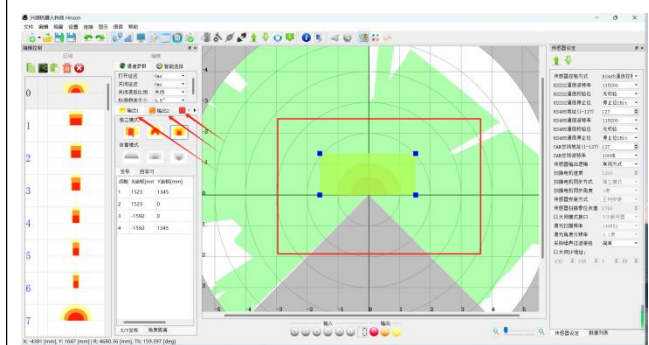
	Open the configuration software
	Select SE-XXXX series icon
	Set the connection series model, Set the current connection port number;
	Waiting for data upload;
	Sensor connection successful;
	Close signal strength



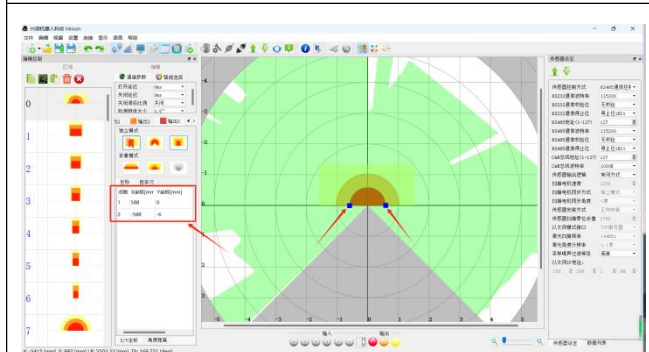
Select the default channel;
Edit in the selected channel number;



Select to output 1
Select edit mode;



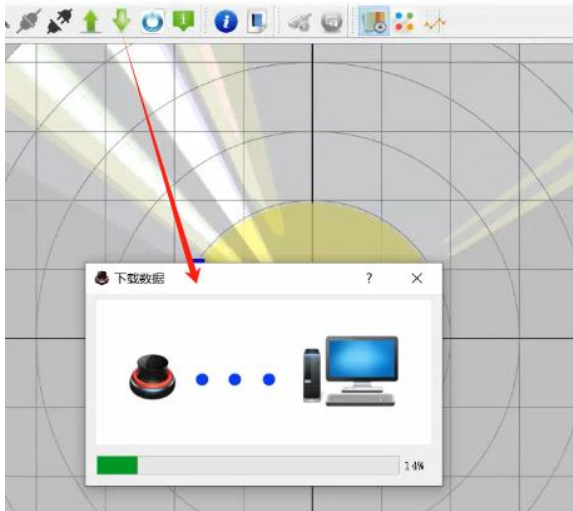
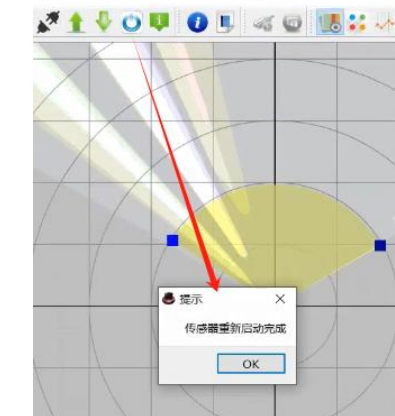
According to the electrical wiring and the defined area number, click the left mouse button to select the area channel to be edited, and then drag the middle blue point in the editing area to draw the required graphics.

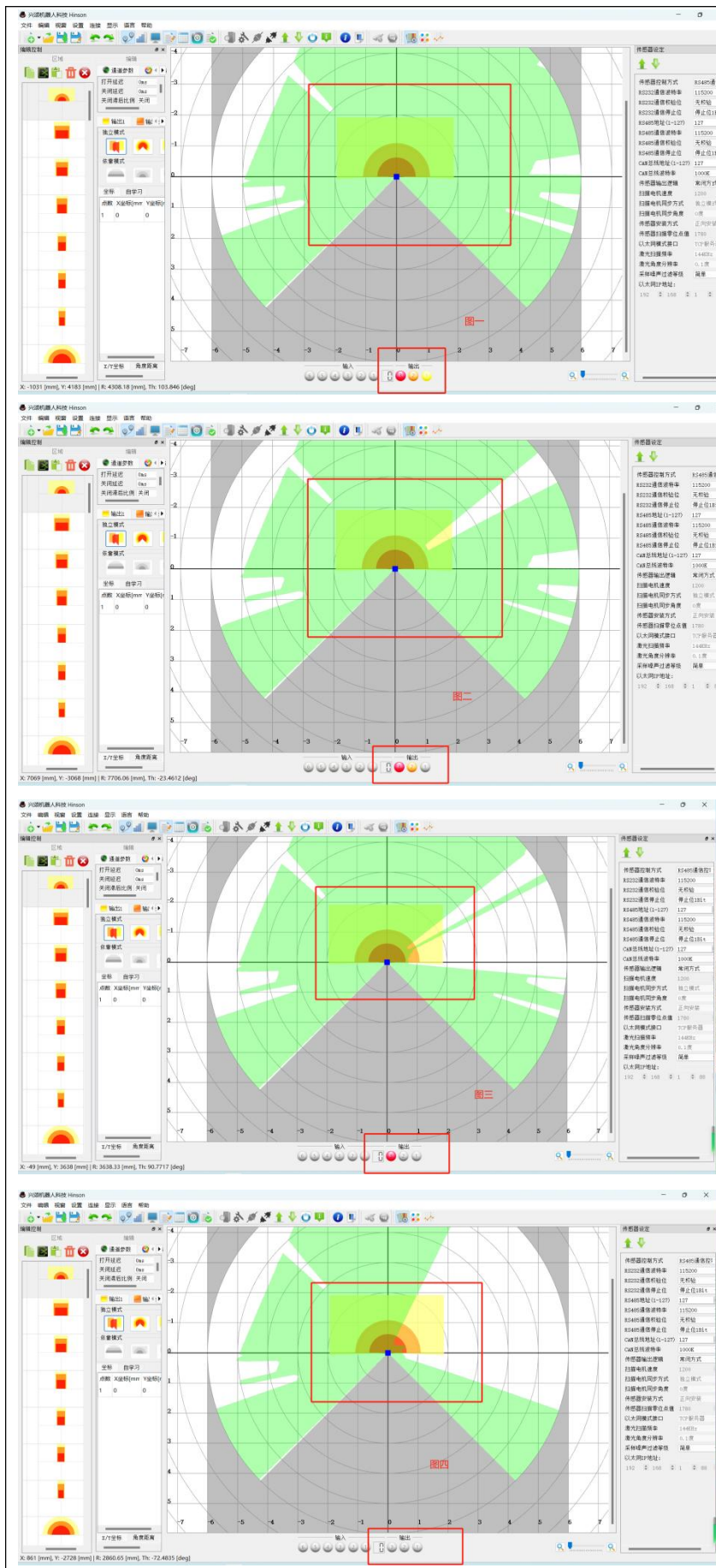


You can also customize the position of the blue dot by directly modifying the coordinates.

传感器控制方式	RS485通信控制#
RS232通信波特率	115200
RS232通信校验位	无校验
RS232通信停止位	停止位1Bit
RS485地址(1-127)	127
RS485通信波特率	115200
RS485通信校验位	无校验
RS485通信停止位	停止位1Bit
CAN总线地址(1-127)	127
CAN总线波特率	1000K
传感器输出逻辑	常闭方式
扫描电机速度	1200
扫描电机同步方式	独立模式
扫描电机同步角度	0度
传感器安装方式	正向安装
佐威奥扫描灵敏度	1.750

Set parameters;

	Download parameters to the sensor
	Write parameters successfully;
	Click Restart to take effect;
	After editing is completed, click the "Download Data" button to download the data to the sensor, and then click the "Restart Device" button to restart the laser scanning sensor online.  Note: After downloading, you need to restart to take effect!



Scanning effect display:

Figure 1: No obstruction is found within the set range, and all three output lights are on;

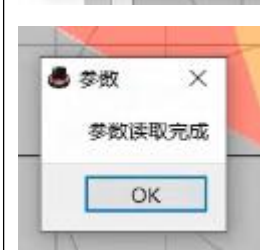
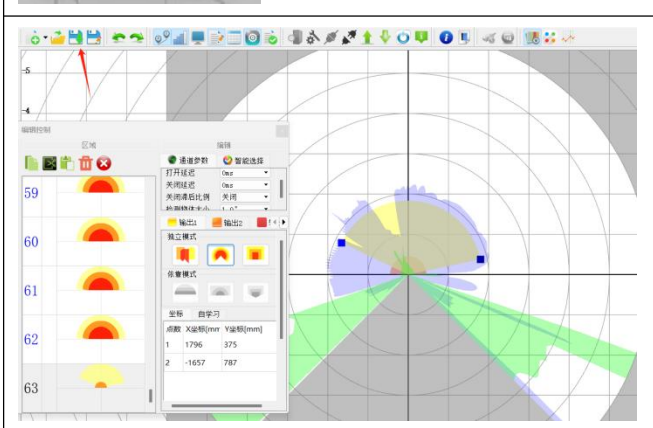
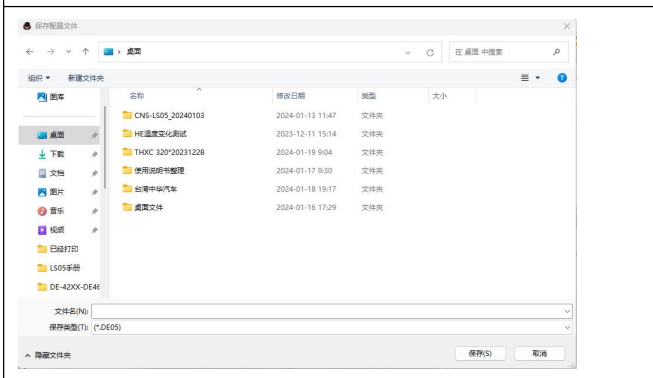
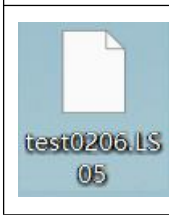
Figure 2: The obstruction enters the output 1 range, the output 1 light is off, and the output 2 and 3 lights are on;

Figure 3: The obstruction enters the output 2 range, the output 1 and 2 lights are off, and the output 3 light is on;

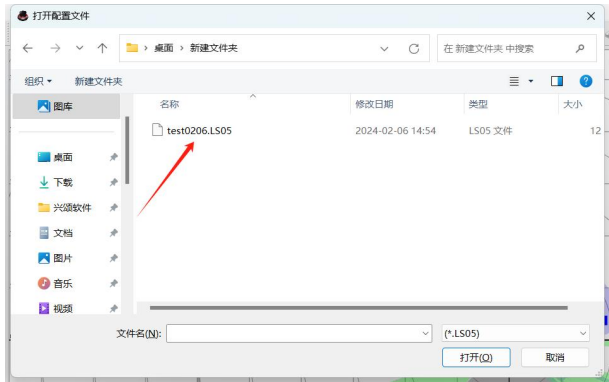
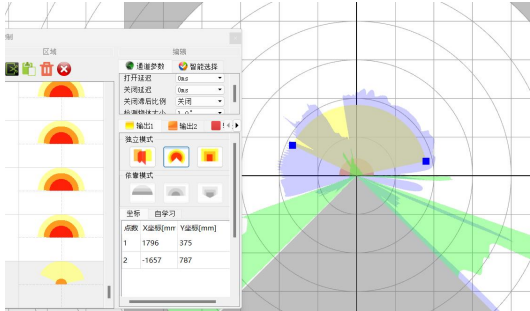
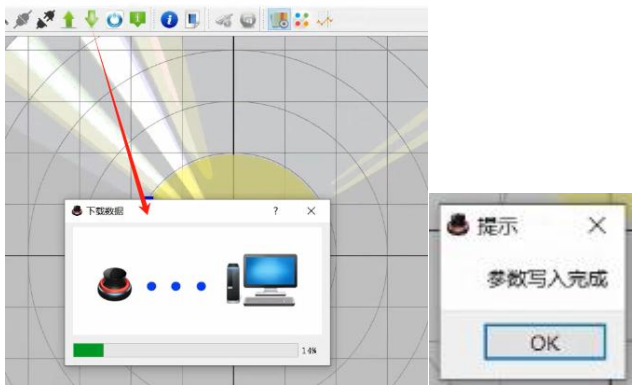
Figure 4: The obstruction enters the output 3 range, and all three output lights are off

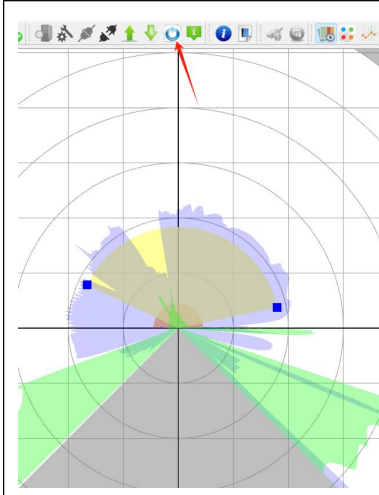
7.10 CONFIGURATION EXPORT AND IMPORT

7.10.1 Configuration Export

	Connect the sensor; and the parameter reading is completed.
	Click the upper left corner and click Save configuration as file;
	Select the path to save; Enter the folder name; Click Save;
	Save the file; The file cannot be opened directly and needs to be imported before it can be used.

7.10.2 Configuration Import

	Connect the sensor; and prompt that parameter reading is completed
	Select the path of the configuration file; Select the corresponding configuration file Click to open;
	After opening the configuration, the current configuration is displayed;
	Click to download parameters; Wait for the download progress to complete; Prompt that the parameters have been written; Download successfully;



Click the restart button and the parameters will take effect;

8 DATA PROTOCOL

SE-1035 sensor support Can open protocol and TCP/UPD protocol transmission under CAN BUS, Can open can only output detect the switch signal of obstacle, Ethernet can only output sensors detection data.

8.1 CANOPEN

8.1.1 Basic concepts

Electrical data file (EDS): a catalog that use to record and describe Can open node all parameter;All CAN open parameters such as node type, manufacturer, serial number, version information, baud rate, etc. can be obtained through the EDS file. When using the CAN OPEN function in PLC, etc., you need to import the EDS file first, and configure it through the object dictionary recorded in the EDS.

Service data object (SDO): SDO is mainly used for the parameter configuration of the CAN OPEN master station to the slave station node. After each SDO message is sent, there will be a response message to ensure that the message is delivered accurately.In a CAN OPEN communication system, there is usually only one master station as the client, and the slave node as the SDO server responds to the SDO message. The client of the master station accesses and modifies the corresponding index parameters in the EDS of any node through the SOD message.

Process data object (PDO): PDO used for transmit real-time data, one path transmit. There is no need receive responds from slave node, A PDO message can transmit up to 8 bytes of data, which is mainly used to transmit real-time data. The master node and the slave node predefine the sending data and receiving data corresponding to the PDO, so there is no need to confirm again during the transmission process, and there is no response time and response data, thereby improving the bus utilization.

8.1.2 Communication specifications

Communication mode	Bus mode
Communication rate	1000k (default), 500k, 250k, 125k
Communication address	1-127 (default)
TPDO	4
RPDO	4
Online message	Support
Heartbeat message	Support
Heartbeat consumption	Support
SDO	Support

8.1.3 Control message

The sensor node supports the control message sent by the master station (NMT Module Control message), control message information no response.

Message format

COB-ID	DLC	Byte 0	Byte 1
0x 000	2	CS control function code	Node-ID

CS: control function code

Command code	NMT service	Function
0x01	Enter operating status	Node start PDO send and receive status
0x02	Enter stop status	Node enter stop status
0x80	Enter pre-operational status	Node enter pre-operational status, used to configure PDO mapping and parameter setting
0x81	Reset node	Reset the node application layer, and the communication parameters are restored to the initial status values;
0x82	Reset communication	Reset node communication, Reinitialize the communication when the communication is disturbed, the node bus is wrong, and the bus is closed.

Node-ID: node address, when Node-ID=0, all node is under control.

8.1.4 Node online message

After the sensor node is powered on and initialized, it sends a frame of online message.

Message format

Node online message's frame ID is 0x700+Node-ID, data length is 1, data is 00

COB-ID	DLC	Byte 0
0x 700+Node-ID	1	00

8.1.5 Heartbeat message

Sensor node support heartbeat message send, according to index 0x1017 configure heartbeat time, send heartbeat message.

Index	Sub index	Data type	Default value	Description
0x1017	None	Uns 16	0x00	Configure heartbeat message transmit period, unit: ms.

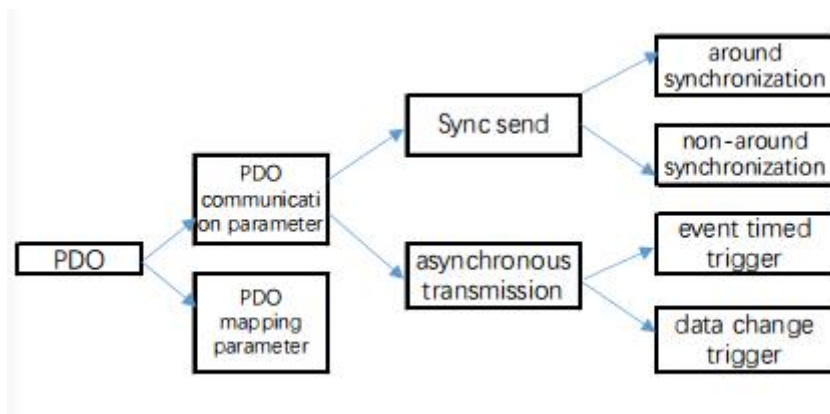
Message format

COB-ID	DLC	Byte 0
0x 700+Node-ID	1	Status code

Node online message's frame ID is 0x700+Node-ID, data length is 1, data represent current node status,
Status code:

Status code	Status
0x05	Enter operation status
0x04	Enter stop status
0x7F	Enter pre-operational status

8.1.6 Process data object (PDO)



PDO transmit/send is observe by (slave) CAN node. Sensor node define 4 TPDO and 4 RPDO;

PDO message format

COB-ID	DLC	Data
	1-8	1-8Byte

COB-ID

Target	COB-ID
TPDO1 (send)	0x180+Node ID
RPDO1 (receive)	0x200+Node ID
TPDO2 (send)	0x280+Node ID
RPDO2 (receive)	0x300+Node ID
TPDO3 (send)	0x380+Node ID
RPDO3 (receive)	0x400+Node ID
TPDO4 (send)	0x480+Node ID
RPDO4 (receive)	0x500+Node ID

Data (1-8Byte) : length is determined by mapping data under mapping parameter.

PDO communication parameter

Index	Sub index	Data type	Default value	Description
RPDO 0x1400--0x15FF TPDO 0x1800--0x19FF	0x00	Uns 8	0x08	Number of reference entries
	0x01	Uns 32	0x 00	COB-ID
	0x02	Uns 8	0x 00	Synchronization type
	0x03	Uns 16	0x 00	Production prohibition time(unit: 100us)
	0x05	Uns 16	0x 00	Event timed trigger time (unit: ms)
	0x06	Uns 8	0x 00	SYNC initial value

Number of parameter entries: The number of sub-citations contained in this citation;

COB-ID: accept and send current PDO's frame ID.

Synchronization type:

Synchronization type	Triggering conditions (B=satisfy 2 conditions, O=satisfy 1 conditions)			PDO transmit
	SYNC (receive synchronization message)	RTR (Remote frame received)	Event (data change or timer)	
00	B	-	B	Acyclic synchronization
01-240	O	-	-	Loop, synchronization (1-240 value represent the times receiving SYNC message between 2 PDO message)
241-251	-	-	-	Reserve
252	B	B	-	Synchronize, after RTR
253	-	O	-	Asynchronous, after RTR
254	-	O	O	Asynchronous, manufacture specify events
255	-	O	O	Asynchronous, device sub protocol specify events

Production prohibition time: the minimum gap between 2 PDO sending, avoid PDO send too frequently to cause bus load too large.

Event timer trigger time: PDO timely sending period time

SYNC initial value: Set the number of received synchronous messages, synchronously transmitted PDO, and reply PDO data only after receiving the set number of synchronous messages. For example, set 5, after receive 5 times synchronous message, respond PDO data.

PDO mapping parameter

Set the data in the corresponding index that the current PDO needs to transmit, and complete the custom transmission of data by setting the PDO to map to the corresponding index, 1 PDO length maximum is 8Byte, mapping data's length cannot exceed 8Byte. Sensor has default mapping, mapping can change according to the requirements.

RPDO default mapping

Default mapping can only use RPDO1, RPDO2, RPDO3;

Index	Sub index	Data type	Default value	Description
RPDO1 0x1600	0x00	Uns 8	8	Number of reference entries
	0x01	Uns 32	0x20000008	8-bit length data mapped to index 0x2000 and sub-index 0x00;
	0x02	Uns 32	0x20010008	8-bit length data mapped to index 0x2001 and sub-index 0x00;
	0x03	Uns 32	0x20020008	8-bit length data mapped to index 2x2002 and sub-index 0x00;
	0x04	Uns 32	0x20030010	16-bit length data mapped to index 0x2003 and sub-index 0x00;
	0x05	Uns 32	0x20040010	16-bit length data mapped to index 0x2004 and sub-index 0x00;
	0x06-0x08	Uns 32	0x00	No mapping;

TPDO default mapping

Index	Sub-index	Data type	Default value	Description
TPDO1 0x1A00	0x00	Uns 8	8	Number of reference entries
	0x01	Uns 32	0x20050008	8-bit length data mapped to index 0x2005 and sub-index 0x00;
	0x02	Uns 32	0x20060008	8-bit length data mapped to index 0x2006 and sub-index 0x00;
	0x03	Uns 32	0x20070008	16-bit length data mapped to index 0x2007 and sub-index 0x00;
	0x04	Uns 32	0x20080008	16-bit length data mapped to index 0x2008 and sub-index 0x00;
	0x05	Uns 32	0x20090008	16-bit length data mapped to index 0x2009 and sub-index 0x00;
	0x06-0x08	Uns 32	0x00	No mapping;

8.1.7 Service data object (SDO)

Sending message format

COB-ID	DLC	LBS							MBS
0x600+Node-ID	8	Control function code	Object index	Object sub-index		Maximum 4-bit			

Control function code

Command code	Description
0x40	Command word when sending message
0x2F	Represent sending data is 1-bit;
0x2B	Represent sending data is 2-bit;
0x23	Represent sending data is 4-bit;

Node response message format

COB-ID	DLC	LBS						
0x580+Node-ID	8	Receive command code	Object index	Object sub-index	Maximum 4-bit			

Control function code

Command code	Description
0x60	SDO message sending successfully
0x80	SDO message wrong
0x4F	Represent receiving data is 1-bit;
0x4B	Represent receiving data is 2-bit;
0x43	Represent receiving data is 4-bit;

8.1.8 EDS file

EDS file please visit Hinson website to get

8.1.9 Index definition

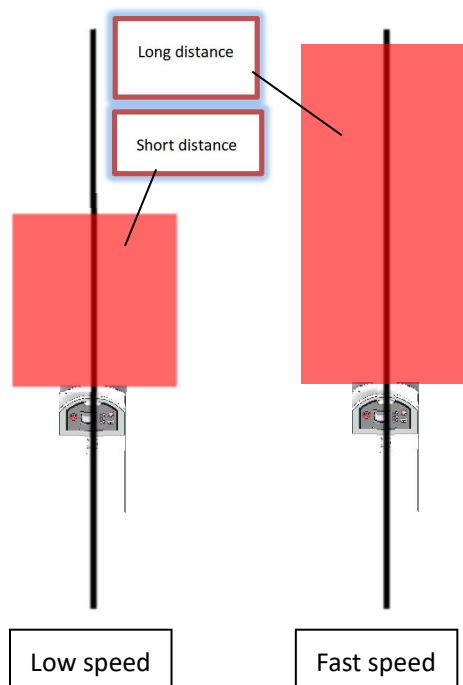
Index (Hex)	Sub-index (Hex)	Parameter name	Type	Property	Write value (D): function
0x2000	0x00	Mode selection	UNS 8	Read /Write	00: Channel designation mode 01: Channel intellectual selection mode
0x2001	0x00	Channel value	UNS 8	Read /Write	Channel designation mode: value range 00-63, control sensor switch to designation mode.
0x2002	0x00	Channel group value	UNS 8	Read /Write	Channel intellectual selection mode: value range 00-04, control sensor switch to designation channel group;
0x2003	0x00	Vehicle speed value	IN 16	Read /Write	Channel intellectual selection mode: channel switch speed value
0x2004	0x00	Vehicle angle value	IN 16	Read /Write	Channel intellectual selection mode: channel switch angle value
0x2005	0x00	OUT2 status	UNS 8	Only read	Sensor Out2 output status Related to the sensor output logic of the parameter setting item: Normally closed mode (default): 00: object detected; 01: object not detected Normally open mode: 01: object detected; 00: object not detected
0x2006	0x00	OUT1 status	UNS 8	Only read	Sensor Out1 output status Related to the sensor output logic of the parameter setting item: Normally closed mode (default): 00: object detected; 01: object not detected Normally open mode: 01: object detected; 00: object not detected

0x2007	0x00	OUT3 status	UNS 8	Only read	Sensor Out3 output status Related to the sensor output logic of the parameter setting item: Normally closed mode (default): 00: object detected; 01: object not detected Normally open mode: 01: object detected; 00: object not detected																
0x2008	0x00	Sensor current channel	UNS 8	Only read	Sensor’s current channel value																
0x2009	0x00	Sensor fault status	UNS 8	Only read	EOUT current status; 00: normal status; Not 00: error status <table><tr><td>Bit8</td><td>invalid</td></tr><tr><td>Bit7</td><td>Transmitter board voltage abnormality</td></tr><tr><td>Bit6</td><td>Overtemperature abnormality</td></tr><tr><td>Bit5</td><td>Simulation error</td></tr><tr><td>Bit4</td><td>Connection abnormality</td></tr><tr><td>Bit3</td><td>Flash memory data abnormality</td></tr><tr><td>Bit2</td><td>Reception abnormality</td></tr><tr><td>Bit1</td><td>Rotation abnormality</td></tr></table> 00: means no trigger; 01: means fault trigger;	Bit8	invalid	Bit7	Transmitter board voltage abnormality	Bit6	Overtemperature abnormality	Bit5	Simulation error	Bit4	Connection abnormality	Bit3	Flash memory data abnormality	Bit2	Reception abnormality	Bit1	Rotation abnormality
Bit8	invalid																				
Bit7	Transmitter board voltage abnormality																				
Bit6	Overtemperature abnormality																				
Bit5	Simulation error																				
Bit4	Connection abnormality																				
Bit3	Flash memory data abnormality																				
Bit2	Reception abnormality																				
Bit1	Rotation abnormality																				

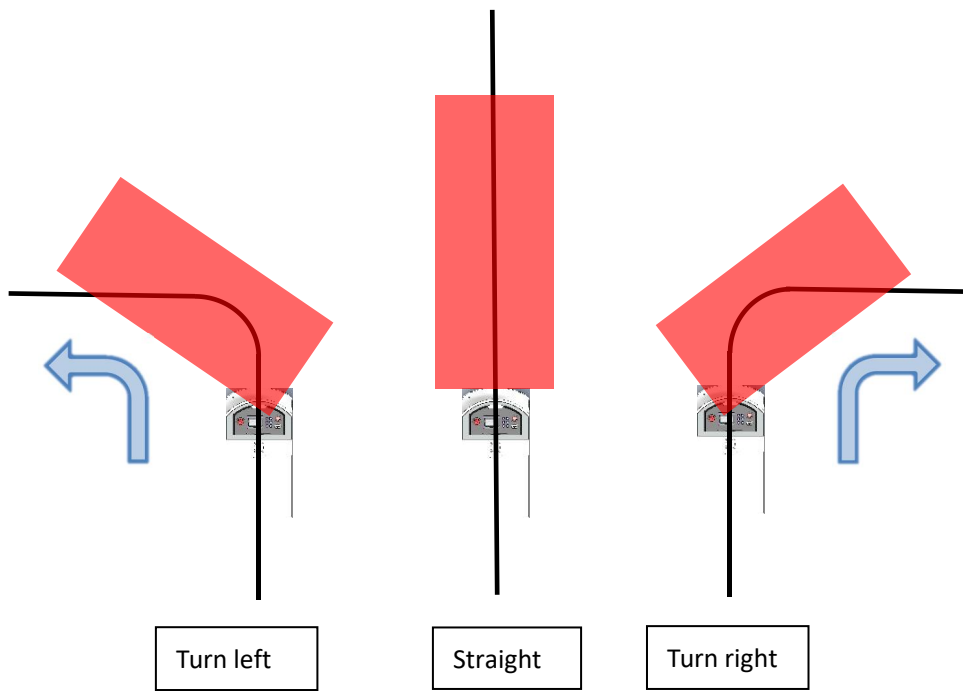
8.1.10Intellectual selection

Use in different environments may require the sensing range of the laser sensor to be different. Such as use on AGV:

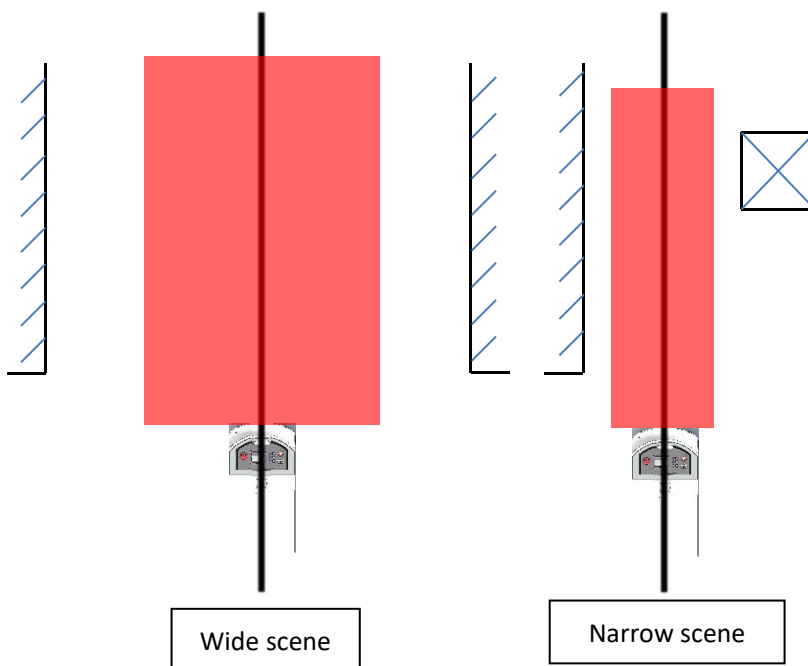
1. Different speed



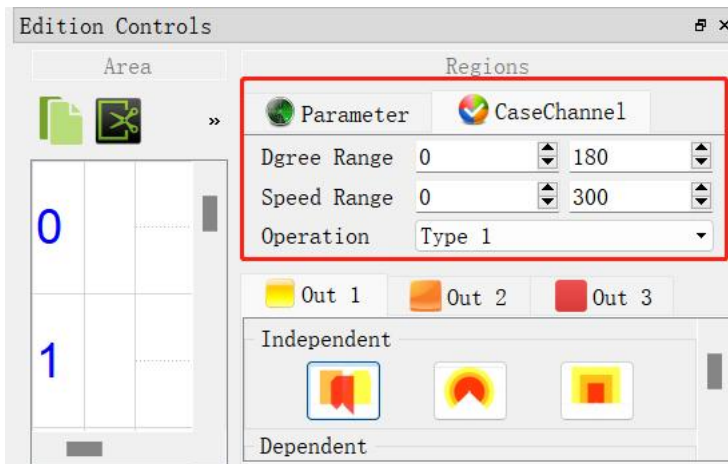
2. Different run direction



3. Different environment



The smart selection function is to set 3 conditions to make the sensor automatically switch to the area that meets the conditions.



Each channel area have 3 conditions to define:

1. driver angle range, range value: -180~180
2. vehicle speed range, range value: -300~300, When the speed has a negative value, it is considered to run in the opposite direction.
3. vehicle operation (1-5)

When 3 conditions are all satisfy it will select. If there is more than 1 area has same condition, it will select minimum area in the same area number.

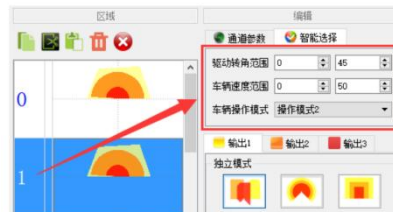
For example:

Area 0 conditions are:

- Driver angle range: 0-35;
- Vehicle speed range: 0-20;
- Vehicle operation mode: mode 1.

Area 1 conditions are:

- Driver angle range: 0-45;
- Vehicle speed range: 31-50;
- Vehicle operation mode: mode 2.



If:

- Current driver angle is 40;
- Vehicle speed is 40;
- Vehicle operation mode is mode 2



Choose area 1

If:

If the current conditions do not meet the set area, area 0 will be selected.

If the current conditions match multiple set areas, the area with the smallest area number will be selected.

8.1.11 Data sending

When the customer uses the non-CAN open master function mode, send the following data.

The RPDO and TPDO addresses are pre-mapped in the sensor, and the communication parameters need to be configured;

RPDO

RPDO default configuration

index	Sub-index	Description	Data Types	Default initial value
1600h	00h	Number of parameters	Un8	6
	01h	COB-ID; PDO address	Un32	RPDO1: 0x200+node address
	02h	Send type	Un8	00
	03h	Production prohibition constraint time	Un16	0000
	05h	Event timer trigger time	Un16	0000
	06h	SYNC synchronization initial value	Un8	00

RPDO data--sensor receiving data

RPDO1 Data Send Data

Default data frame format

CAN-ID	DLC	0Byte	1Byte					6 Byte
200h+ID	8	2000 (h)	2001 (h)	2002 (h)	2003 (L)	2003 (H)	2004 (L)	2004 (H)
		Mode Selection	Channel Value	Channel Group Value	Vehicle speed value	Vehicle speed value	Vehicle angle value	

TPDO data--sensor feedback data;

TPDO1 communication parameter configuration

Send data 1, configure synchronous mode, FE--asynchronous mode;

CAN-ID	DLC	0Byte							7Byte
600h+ID	8	2F(h)	00(h)	18((h)	02(h)	FE(h)	00(h)	00(h)	00(h)

Return data;

CAN-ID	DLC	0Byte							7Byte
580h+ID	8	60(h)	00(h)	18(h)	02(h)	00(h)	00(h)	00(h)	00(h)

Configuration successful

Send data 2, configure the event trigger time to 10ms, TPDO sending time;

CAN-ID	DLC	0Byte							7Byte
600h+ID	8	2B(h)	00(h)	18((h)	05(h)	0A(h)	00(h)	00(h)	00(h)

Return data;

CAN-ID	DLC	0Byte							7Byte
580h+ID	8	60(h)	00(h)	18(h)	05(h)	00(h)	00(h)	00(h)	00(h)

Configuration successful

TPDO2 configuration communication parameter configuration

Send data 1, configure synchronous mode, FE--asynchronous mode;

CAN-ID	DLC	0Byte							7Byte
600h+ID	8	2F(h)	01(h)	18((h)	02(h)	FE(h)	00(h)	00(h)	00(h)

Return data;

CAN-ID	DLC	0Byte							7Byte
580h+ID	8	60(h)	01(h)	18(h)	02(h)	00(h)	00(h)	00(h)	00(h)

Configuration successful

Send data 2, configure the event trigger time to 10ms, TPDO sending time;

CAN-ID	DLC	0Byte							7Byte
600h+ID	8	2B(h)	01(h)	18((h)	05(h)	0A(h)	00(h)	00(h)	00(h)

Return data;

CAN-ID	DLC	0Byte							7Byte
580h+ID	8	60(h)	01(h)	18(h)	05(h)	00(h)	00(h)	00(h)	00(h)

Configuration successful

Sending a startup message

CAN-ID	DLC	0Byte	1Byte
000h	2	01(h)	00(h)

Data returned by the sensor, TPDO1 data definition

CAN ID	DLC	Byte0	Byte1	Byte2	Byte3	Byte4
180h+ID	5	2005h	2006h	2007h	2008h	2009h
		OUT2 state	OUT1 state	OUT3 state	Sensor current channel	Sensor Fault Status

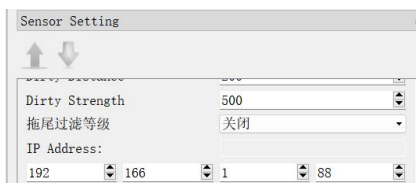
The RPDO1 data sent defines the control sensor channel value

CAN ID	DLC	Byte0	Byte1	Byte2	Byte3(L)	Byte4(H)	Byte5(L)	Byte6(H)
200h+ID	5	2000h	2001h	2002h	2003h		2004h	
		Channel Mode	Control the current channel value of the sensor. Control is switched to channel 1	The current channel group number of the sensor	Enter the switching speed value		Enter the switching angle value	
		0x00	0x01	0x00	0x00	0x00	0x00	0x00

8.2 ETHERNET TCP PROTOCOL DATA

◆ Parameter setting

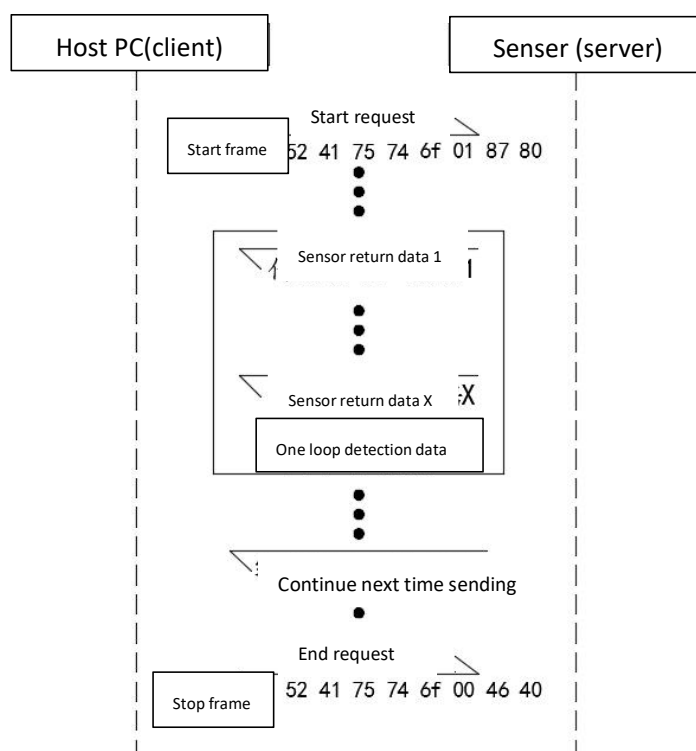
Open configuration software, enter sensor (server) setting surface, set 3 parameters related with Ethernet mode.



Parameter name	Parameter value					Default value
Ethernet mode interface	TCP server					TCP server
	UDP mode					
Ethernet IP address		192	168	1	1	192.168.1.88
	Range	192-254	0-255	0-255	1-254	
	<u>Sensor (server) port fixed at 8080</u>					
Laser angle resolution	0.1°					0.1°
	0.2°					

8.2.1 Measurement data acquisition

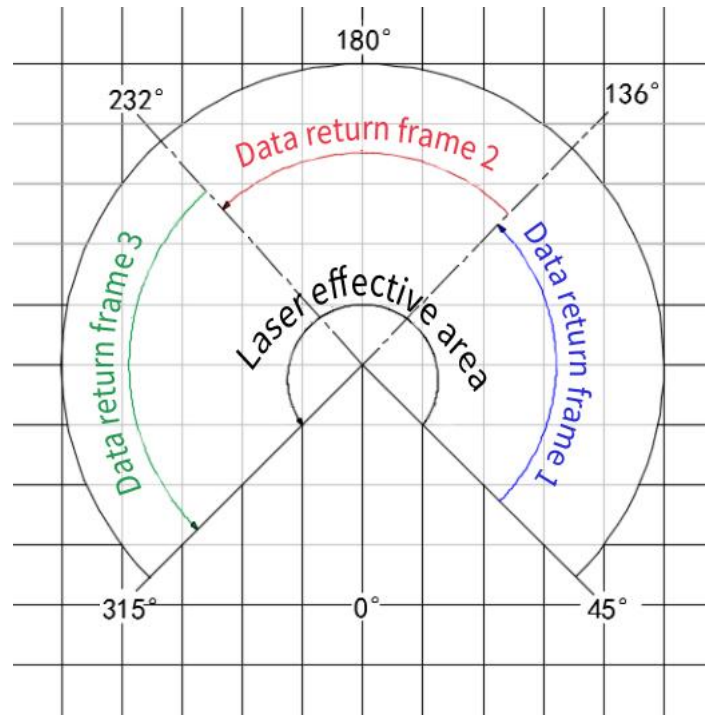
After the client initiates a request and establishes a connection, data transmission starts, and the transmission method is as follows.



The host computer (client) sends the start data frame to the sensor (server), and the sensor returns 45°-315° measurement data in several frames. After returning the complete 45°-315° measurement data, the sensor continues the next measurement Data is sent until the sensor receives the stop data frame sent by the host computer.

◆ The sensor returns the measurement data frame (Hex)

The sensor measures three times within a 270° range, and the point cloud data is sent multiple times. The data is returned according to the following angles;



◆ Start data frame (Hex)

Data frame format

NO.	position	Description	Length
1	0-4	Identifier	5Byte (high byte first)
2	5	Control bit	1Byte (high byte first)
3	6-7	Check bit	2Byte (low byte first)

Identifier

Fixed data: 0x52 0x41 0x75 0x74 0x6F

Control bit

Controls whether the sensor point cloud data is sent;

0x01: The sensor starts to send point cloud data automatically;

0x00: The sensor stops sending point cloud data;

Check bit

The low bit is in front and the high bit is in the back. The check bit is calculated using the Modbus-CRC16 calculation method.

When the control bit is 0x01, the check data is: 0x87 0x80;

When the control bit is 0x00, the check data is: 0x46 0x40;

Return data frame format

NO.	position	Description	Length
1	0-4	Identifier	5Byte (high byte first)
2	5	Reserved	1Byte
3	6-7	Start angle	2Byte (high byte first)
4	8-9	End angle	2Byte (high byte first)
5	10-11	Total number of measurement points in the	2Byte (high byte first)

		current data frame	
6	Indefinite length	Measurement data	Data length measurement points*4byte

Identifier

Return data fixed bit: 0x43 0x6C 0x6F 0x75 0x64

Reserved

Fixed data: 0x00

Start angle

The starting angle value of the current data frame data, the data is parsed in decimal, taking 45° as an example, the feedback data is: 0x00 0x2D

End angle

The ending angle value of the current data frame data, the data is parsed in decimal, taking 136° as an example, the feedback data is: 0x00 0x88

Number of measurement points

The number of measurement points is related to the starting angle, ending angle, and laser angle resolution.

Number of measurement points = (ending angle - starting angle) / laser angle resolution, as shown in the following table.

Starting angle	45°	136°	232°	45°	136°	232°
Ending angle	136°	232°	315°	136°	232°	315°
Laser angle resolution	0.1°	0.1°	0.1°	0.2°	0.2°	0.2°
Number of measurement points	910	960	830	455	480	415

Measurement data

The sensor feedback measurement data includes the distance value of the object relative to the sensor and the signal strength value returned by the object.

1 st point measurement data (4Byte)				2 nd point measurement data (4Byte)				 (4Byte)				Last point measurement data (4Byte)			
Measurement distance(2Byte)		Measurement strength (2Byte)		Measurement distance(2Byte)		Measurement strength (2Byte)		Measurement distance(2Byte)		Measurement strength (2Byte)		Measurement distance(2Byte)		Measurement strength (2Byte)	
L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H

Measuring distance: unit is mm;

0-10000	The output is the distance data between the target point and the sensor, parsed in decimal data;
65535	The signal cannot be detected;

Measuring Intensity: Intensity values are unitless quantities;

0	The signal cannot be detected;
1-8000	The data represents the reflection intensity of the object. The higher the reflectivity of the object, the greater the intensity value;

8.2.2 Example of obtaining measurement data

Sensor Setting Parameters

Parameter name	Parameter value
Ethernet mode interface	TCP server
Ethernet IP address	192.168.1.88 <u>The sensor (server) port is fixed to 8080</u>
Laser angle resolution	0.1°

Sending Data

The host computer sends a start data frame to the sensor	Send 1 time										
0x52 0x41 0x75 0x74 0x6F 0x01 0x87 0x80											
0x52 0x41 0x75 0x74 0x6F: Flag bit; 0x01: Control the sensor to start sending measurement data; 0x87 0x80: Check bit;											
The sensor returns the measurement data frame to the host computer	Measurement data is sent cyclically According to the 0.1 resolution, 9 frames of data are required to complete the transmission of single-circle scanning data.										
Measurement data 1	The starting angle is 45°, the ending angle is 136°, the number of measurement points = (136-45)/0.1 = 910, and the measurement data returned is 3640 Byte.										
	1		2	3		4		5		6	
	Identifier		Reserve	Starting Angle		End Angle		Number of measurement points		Measurement data	
	0x43 0x6C 0x6F 0x75 0x64		0x00	H L 0x00 0x2D		H L 0x00 0x88		H L 0x03 0x8E		xx xx xx xx ... xx xx xx xx The measurement data returned is 910*4Byte=3640Byte	
	The total amount of data for the first time is 12Byte+3640Byte=3652Byte. The TCP data frame sends 1460 Byte of data at a time, and the data will be split into three frames for data transmission.										
	Data frame 1						Data length: 1460 Byte				
	Data frame 2						Data length: 1460 Byte				
	Data frame 3						Data length: 732 Byte				
	Data frame 1 carries fixed data with a frame header, and data frames 2 and 3 directly output data without fixed data with a frame header.										
	Measurement data 2	The starting angle is 136°, the ending angle is 232°, the number of measurement points = (232-136)/0.1 = 960, and the measurement data returned is 3840 Byte.									

	1		2	3		4		5		6		
	Start Code		Reserve	Starting Angle		End Angle		Number of measurement points		Measurement data		
	0x43 0x6C 0x6F 0x75 0x64		0x00	H	L	H	L	H	L	<u>xx xx xx xx ... xx xx xx xx</u> The measurement data returned is 960*4Byte=3840Byte		
	The total amount of data measured for the second time is 12Byte+3840Byte=3852Byte. A TCP data frame sends 1460 Byte of data at a time, and the data is split into three frames for data transmission.											
	Data frame 1						Data length: 1460 Byte					
	Data frame 2						Data length: 1460 Byte					
	Data frame 3						Data length: 932 Byte					
	Data frame 1 carries fixed data with a frame header, and data frames 2 and 3 directly output data without fixed data with a frame header.											
	Measurement data 3		The starting angle is 232°, the ending angle is 315°, the number of measurement points = (315-232)/0.1 = 830, and the measurement data returned is 3320Byte.									
		1		2	3		4		5		6	
Start Code		Reserve	Starting Angle		End Angle		Number of measurement points		Measurement data			
0x43 0x6C 0x6F 0x75 0x64		0x00	H	L	H	L	H	L	<u>xx xx xx xx ... xx xx xx xx</u> The measurement data returned is 830*4Byte=3320Byte			
The total amount of data in the third measurement is 12Byte+3320Byte=3332Byte. A TCP data frame sends 1460 Byte of data at a time, and the data is split into three frames for data transmission.												
Data frame 1						Data length: 1460 Byte						
Data frame 2						Data length: 1460 Byte						
Data frame 3						Data length: 412 Byte						
Data frame 1 carries fixed data with a frame header, and data frames 2 and 3 directly output data without fixed data with a frame header.												
The host computer sends a stop data frame to the sensor			Send once									
0x52 0x41 0x75 0x74 0x6F 0x00 0x46 0x40												
The sensor stops returning measurement data.												

8.3 ETHERNET UDP PROTOCOL DATA

◆ Parameter setting

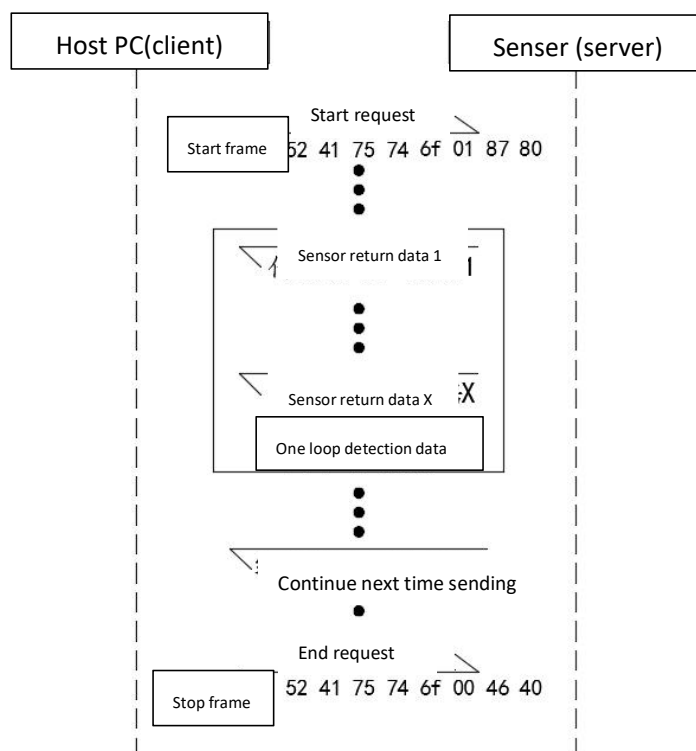
Open configuration software, enter sensor (server) setting surface, set 3 parameters related with Ethernet mode.



Parameter name	Parameter value					Default value
Ethernet mode interface	TCP server					TCP server
	UDP mode					
Ethernet IP address		192	168	1	1	192.168.1.88
	Range	192-254	0-255	0-255	1-254	
	Sensor (server) port fixed at 8080					
Laser angle resolution	0.1°					0.1°
	0.2°					

8.3.1 Measurement data acquisition

After the client initiates a request and establishes a connection, data transmission starts, and the transmission method is as follows.



The host computer (client) sends the start data frame to the sensor (server), and the sensor returns 45°-315° measurement data in several frames. After returning the complete 45°-315° measurement data, the sensor continues the next measurement Data is sent until the sensor receives the stop data frame sent by the host computer.

◆ **Start data frame (Hex)**

Data frame format

NO.	position	Description	Length
1	0-4	Identifier	5Byte (high byte first)
2	5	Control bit	1Byte (high byte first)
3	6-7	Check bit	2Byte (low byte first)

Identifier

Fixed data: 0x52 0x41 0x75 0x74 0x6F

Control bit

Controls whether the sensor point cloud data is sent;

0x01: The sensor starts to send point cloud data automatically;

0x00: The sensor stops sending point cloud data;

Check bit

The low bit is in front and the high bit is in the back. The check bit is calculated using the Modbus-CRC16 calculation method.

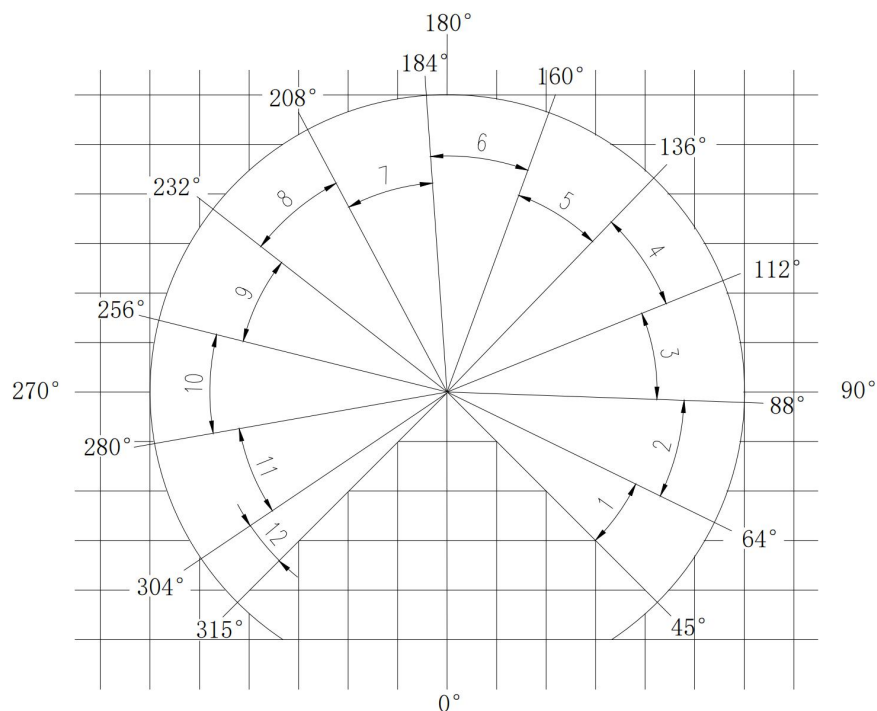
When the control bit is 0x01, the check data is: 0x87 0x80;

When the control bit is 0x00, the check data is: 0x46 0x40;

◆ **The sensor returns the measurement data frame (Hex)**

The sensor measures 13 times within 270° and returns data based on the following angles;

Starting angle	45°	64°	88°	112°	136°	160°	184°	208°	232°	256°	280°	304°
Ending angle	64°	88°	112°	136°	160°	184°	208°	232°	256°	280°	304°	315°



Return data frame format

NO.	position	Description	Length
1	0-4	Identifier	5Byte (high byte first)
2	5	Reserved	1Byte
3	6-7	Start angle	2Byte (high byte first)
4	8-9	End angle	2Byte (high byte first)
5	10-11	Total number of measurement points in the current data frame	2Byte (high byte first)
6	Indefinite length	Measurement data	Data length measurement points*4byte

Identifier

Return data fixed bit: 0x43 0x6C 0x6F 0x75 0x64

Reserved

Fixed data: 0x00

Start angle

The starting angle value of the current data frame data, the data is parsed in decimal, taking 45° as an example, the feedback data is: 0x00 0x2D

End angle

The ending angle value of the current data frame data, the data is parsed in decimal, taking 136° as an example, the feedback data is: 0x00 0x88

Number of measurement points

The number of measurement points is related to the starting angle, ending angle, and laser angle resolution.

Number of measurement points = (ending angle - starting angle) / laser angle resolution, as shown in the following table.

Measurement data

The sensor feedback measurement data includes the distance value of the object relative to the sensor and the signal strength value returned by the object.

1 st point measurement data (4Byte)				2 nd point measurement data (4Byte)				 (4Byte)				Last point measurement data (4Byte)			
Measurement distance(2Byte)		Measurement strength (2Byte)		Measurement distance(2Byte)		Measurement strength (2Byte)		Measurement distance(2Byte)		Measurement strength (2Byte)		Measurement distance(2Byte)		Measurement strength (2Byte)	
L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H

Measuring distance: unit is mm;

0-10000	The output is the distance data between the target point and the sensor, parsed in decimal data;
65535	The signal cannot be detected;

Measuring Intensity: Intensity values are unitless quantities;

0	The signal cannot be detected;
1-8000	The data represents the reflection intensity of the object. The higher the reflectivity of the object, the

	greater the intensity value;
--	------------------------------

8.3.2 Example of obtaining measurement data

Sensor Setting Parameters

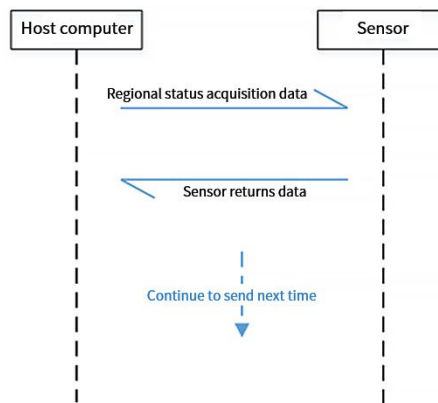
Parameter name	Parameter value
Ethernet mode interface	TCP server
Ethernet IP address	192.168.1.88 <u>The sensor (server) port is fixed to 8080</u>
Laser angle resolution	0.1°

Sending Data

The host computer sends a start data frame to the sensor	Send 1 time										
0x52 0x41 0x75 0x74 0x6F 0x01 0x87 0x80											
0x52 0x41 0x75 0x74 0x6F: Flag bit; 0x01: Control the sensor to start sending measurement data; 0x87 0x80: Check bit;											
The sensor returns the measurement data frame to the host computer	Measurement data is sent cyclically According to the 0.1 resolution, 9 frames of data are required to complete the transmission of single-circle scanning data.										
Measurement data 1	The starting angle is 45°, the ending angle is 136°, the number of measurement points = (136-45)/0.1 = 910, and the measurement data returned is 3640 Byte.										
	1	2	3		4		5		6		
	Identifier	Reserve	Starting Angle		End Angle		Number of measurement points		Measurement data		
	0x43 0x6C 0x6F 0x75 0x64	0x00	H	L	H	L	H	L	<u>xx xx xx xx ... xx xx xx xx</u> The measurement data returned is 910*4Byte=3640Byte		
	The total amount of data for the first time is 12Byte+3640Byte=3652Byte. The TCP data frame sends 1460 Byte of data at a time, and the data will be split into three frames for data transmission.										
	Data frame 1						Data length: 1460 Byte				
	Data frame 2						Data length: 1460 Byte				
	Data frame 3						Data length: 732 Byte				
	Data frame 1 carries fixed data with a frame header, and data frames 2 and 3 directly output data without fixed data with a frame header.										

8.3.3 Regional Data 1 Acquisition

After the client initiates a request and establishes a connection, data transmission begins according to the following rules.



The data transmission cycle needs to be kept within 500ms. After 500ms, the sensor automatically switches to channel 0.

Regional status acquisition data frame format

NO.	position	Description	Length
1	0-4	Identifier	5Byte (high byte first)
2	5	Control mode	1Byte
3	6	Sensor channel value	1Byte
4	7-8	Switch angle value	2Byte (high byte first)
5	9-10	Switch speed value	2Byte (high byte first)
6	11-12	Channel group number	2Byte (high byte first)
7	13-15	Invalid data	3Byte
8	16-17	Check bit	2Byte (low byte first)

- Data identifier (5 bytes)

The identifier is fixed data: 0x57 0x53 0x69 0x6d 0x75 This data function;

- Sensor control mode (1 byte)

00: Invalid instruction

01: Channel specified mode

02: Intelligent channel selection mode

- Sensor channel value (1byte)

Controls the current sensing channel of the sensor, data range 00-63;

- Sensor angle (2byte)

Intelligent channel selection mode: angle value in channel group mode, data is signed data range -180-180;

Sensor channel speed value (2byte)

Intelligent channel selection mode: speed value in channel group mode, data is signed data range -300-300;

Sensor channel group number (2byte)

Intelligent channel selection mode: Controls the channel group number used by the current sensing sensor,

data range 00-04;

- Invalid data (3byte)

Invalid data, default data must be sent 0x00;

- Check bit (2byte)

Data check bit, using modbus low-order CRC16 check method. The check value is calculated by the check formula, and the specific calculation method is detailed in the appendix.

Sensor return data format

NO.	position	Description	Length
1	0-4	Identifier	5Byte (high byte first)
3	5	Sensor channel value	1Byte
4	6	Invalid data	1Byte
5	7	Output port status	1Byte
6	8	Invalid	1Byte
7	9-10	Fault status	2Byte
8	11-12	Check bit	2Byte (low byte first)

- Output Status (1byte)

Data identifier (5 bytes)

- The identifier is fixed data: 0x57 0x53 0x69 0x6d 0x75 This data function;

Current channel value (1 byte)

- Current channel value of the sensor;

Invalid data (1 byte)

- Invalid data;

Output status (1 byte)

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Invalid					OUT3	OUT2	OUT1

Related to the parameter setting item sensor output logic:

Normal closed mode (default)

00: object detected;

01: no object detected

Normal open mode

01: object detected;

00: no object detected;

- Invalid data (1byte)

Invalid data;

- Current state of sensor (2Byte)

Shows the current state of the sensor, the high bit is invalid;

00: Normal state of the sensor;

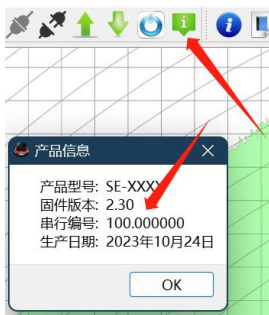
Bit8	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1
Invalid	Abnormal voltage on the transmitting board	Over temperature abnormality	Simulation Error	Connection abnormality	Flash memory data abnormality	Receiving exception	Rotational abnormality
00: means no trigger; 01: means fault trigger;							

- Check bit (2 bytes)

Data check bit, using the modbus CRC16 check method with the low bit first. The check value is calculated by the check formula. For details on the calculation method, see the appendix.

8.3.4 Regional Status Acquisition 2 Data

The sensor firmware version must be greater than V2.3



After the client initiates a request and establishes a connection, data transmission begins, and the transmission method is as follows.

Regional status acquisition data data frame format

NO.	position	Description	Length
1	0-4	Identifier	5Byte (high byte first)
2	5	Control mode	1Byte
3	6	Sensor channel value	1Byte
4	7-8	Switch angle value	2Byte (high byte first)
5	9-10	Switch speed value	2Byte (high byte first)
6	11-12	Channel group number	2Byte (high byte first)
7	13-15	Invalid data	3Byte
8	16-17	Check bit	2Byte (low byte first)

- Data identifier (5byte)

The identifier is fixed data: 0x52 0x4F 0x6E 0x63 0x6E This data function;

- Sensor working mode (1byte)

00: Invalid instruction

01: Channel specified mode

02: Intelligent channel selection mode

- Sensor channel value (1byte)

Control the current sensing channel of the sensor, data range 00-63;

- Sensor channel angle (2byte)

Angle value in channel group mode, data is signed data range -180-180;

- Sensor channel speed value (2byte)

Speed value in channel group mode, data is signed data range -300-300;

- Sensor channel group number (2byte)

Control the current sensing channel group number of the sensor, data range 00-04;

- Invalid data (3byte)

Invalid data, default data must be sent 0x00;

- Check bit (2byte)

Data check bit, using modbus low bit first CRC16 check method. The check value is calculated by the check formula. For detailed calculation method, please see the appendix.

Sensor return data format

NO.	position	Description	Length
1	0-4	Identifier	5Byte (high byte first)
3	5	Sensor channel value	1Byte
4	6	Invalid data	1Byte
5	7	Output port status	1Byte
6	8	Invalid	1Byte
7	9-10	Fault status	2Byte
8	11	Frame count value	1Byte
9	12-13	Parity bit	2Byte (low byte first)

- Data identifier (5 bytes)

The identifier is fixed data: 0x52 0x4F 0x6E 0x63 0x6E This data function;

- Current channel value (1 byte)

Current channel value of the sensor;

- Invalid data (1 byte)

Invalid data;

- Output status (1 byte)

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Invalid					OUT3	OUT2	OUT1

Related to the parameter setting item sensor output logic:

Active high mode (default)

00: Object detected;

01: No object detected

Active low mode

01: Object detected;

00: No object detected;

- Invalid data (1byte)

Invalid data;

- Current state of sensor (2Byte)

Shows the current state of the sensor, the high bit is invalid;

00: Normal state of the sensor;

Bit8	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1
Invalid	Abnormal voltage on the transmitting board	Over temperature abnormality	Simulation Error	Connection abnormality	Flash memory data abnormality	Receiving exception	Rotational abnormality
00: means no trigger; 01: means fault trigger;							

- Frame count value (1 Byte)

Count the data frames, and add 1 for each reply. The data range is 0x00-0xFF;

- Check bit (2 bytes)

Data check bit, using the modbus CRC16 check method with the low bit first. The check value is calculated by the check formula. For details on the calculation method, see the appendix.

8.3.5 CRC verification algorithm

```

C language CRC check code
cBuffer: calculate CRC check code digit group
iBufLen: length of digit group
unsigned int CRC_Verify(unsigned char *cBuffer, unsigned int iBufLen)
{
    unsigned int i, j; //define wPolynom 0xA001
    unsigned int wCrc = 0xffff;
    unsigned int wPolynom = 0xA001;
    /*-----*/
    for (i = 0; i < iBufLen; i++)
    {
        wCrc ^= cBuffer[i];
        for (j = 0; j < 8; j++)
        {
            if (wCrc & 0x0001)
            { wCrc = (wCrc >> 1) ^ wPolynom; }
            else
            { wCrc = wCrc >> 1; }
        }
    }
    return wCrc;
}

```

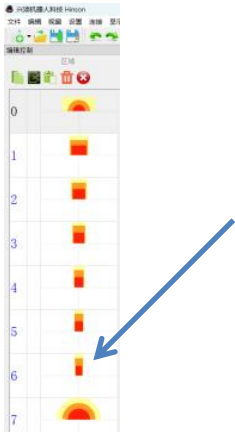
8.4 EXAMPLE OF GETTING REGIONAL DATA

Sensor Setting Parameters

Parameter name	Parameter value
Ethernet mode interface	TCP server
Ethernet IP address	192.168.1.88 <u>The sensor (server) port is fixed to 8080</u>
Laser angle resolution	0.1°

Send data

The host computer sends a start data frame	Maintain a 100ms period to send the following data (Hex);
57 53 69 6D 75 01 06 00 00 00 00 00 00 00 00 81 D7	
0x57 0x53 0x69 0x6D 0x75: Identifier; 0x01: Channel designation mode; 0x06: Control channel switches to channel 06, and the corresponding configuration software displays the setting range of channel 6;	

	
0x00 0x00: Angle value in intelligent channel switching mode, invalid in specified channel mode, send 00; 0x00 0x00: Speed value in intelligent channel switching mode, invalid in specified channel mode, send 00; 0x00 0x00: Channel group value in intelligent channel switching mode, invalid in specified channel mode, send 00; 0x00 0x00 0x00: Invalid data; 0x81 0xD7: Check bit data;	
The sensor returns a frame of area data	Sensor response data (Hex)
57 53 69 6D 75 00 00 00 0F 00 00 FF F8 (the first return data, showing the channel value when the sensor is not currently switched;) 57 53 69 6D 75 06 00 00 0F 00 00 FF 9E	
0x57 0x53 0x69 0x6D 0x75: identifier 0x06: The current sensor uses the 06 channel to set the range; 0x00: input port signal status, currently there is no input signal; 0x00: output port status, currently OUT1, OUT2, OUT3 three areas have been triggered. 0x0F: invalid data; 0x00 0x00: the sensor is in normal state; 0xFF 0x9E: check bit data;	

9 FAULT HANDLING

9.1 TROUBLESHOOTING

When a sensor does not function properly or the sensor status cannot be determined, follow the process below to troubleshoot and confirm.

Fault	Solution
Unable to detect object	Use the configuration software to view and monitor the current channel status and the drawn detection area;
Cannot switch channels	Check whether the sensor correctly receives the channel switching instruction;
Output signal flashes	(1) When the sensing range is at a critical point, the output port may become unstable. If necessary, you should consider expanding the protection area. (2) There is dust on the sensor detection window;
Power indicator flashes	Contact Us

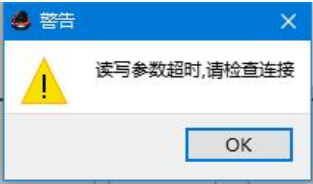
10 FAULT DIAGNOSIS AND TROUBLESHOOTING

10.1 POSSIBLE FAILURES

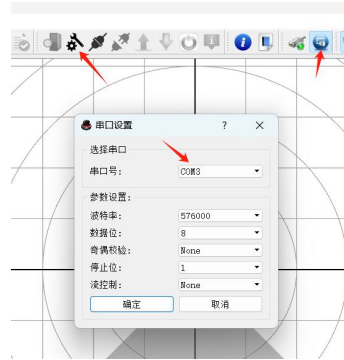
10.1.1 Installation Errors

Error	Solution
Insufficient reserved space	Increase the installation interval;
No electrostatic protection	Increase the grounding wire of the shell;
Detection range is blocked	Adjust the installation position to a position without obstruction;

10.1.2 Electrical installation errors

Error points	Processing
Power cord not connected	Connect the power cord
Power cord connected in reverse	Recheck the power polarity and change the line
Power voltage incorrect	Check the power voltage;
Configuring software connection timeout 	1) Check whether the configuration software model is consistent with the sensor  2) Check whether the sensor is powered on and running normally  3) Confirm whether the configuration software version is normal 

4) Check whether the COM port in the configuration software is correct



10.1.3 Configuration Errors

Error point	Processing
The output has no signal	1) Check whether the normally closed and normally open settings meet the requirements; 2) Check whether the sensor detection range is appropriate; 3) Check whether the line wiring is normal;
The output has a signal	1) Check whether the normally closed and normally open settings meet the requirements; 2) Check whether the sensor detection range is appropriate; 3) Check whether the line wiring is normal;
The output signal flickers unsteadily	1) Check whether the sensor circuit is normal; 2) Check whether there is edge trigger in the sensor setting area;
The object cannot be detected	1) Use the configuration software to view and monitor the current channel status and the drawn detection area; 2) Check whether the output signal line is normal; 3) Check whether the radar data is responsive; Try after restarting;
Channel cannot be switched	Check whether the sensor receives the channel switching instruction correctly
Output signal flashes	1) When the sensing range is at a critical point, the output port may become unstable. If necessary, you should consider expanding the protection area. 2) Increase the opening

	 delay; 3) The sensor detection window is dusty, dirty, damaged or cracked;
Power indicator flashes	1) Restart the power supply; 2) After restarting the power supply, the same situation still occurs. Try again after replacing the sensor;

10.2 FAULT STATUS

The sensor indicates a fault through the power indicator light, and the sensor will stop outputting signals when the green LED flashes;

Fault Codes	LED flashes	Fault description
1	1	Abnormal rotation
2	2	Abnormal reception
3	3	Abnormal flash data
4	4	Abnormal connection
5	5	Simulation error
6	6	Abnormal overtemperature
7	7	Abnormal transmitter voltage
0	Steady on	Normal state

10.3 OBTAINING SUPPORT

In order to quickly locate the fault, please obtain product information and provide it to technical support personnel;

Product model
Approximate usage time
Pictures or videos of the fault
Reproduction process
Description of fault phenomenon
Current device parameter configuration information

10.4 REPAIR

The equipment will be sent back to the equipment manufacturer for repair and will be taken care of by professionals;

10.5 MAINTENANCE

Maintenance Plan

Maintenance content	Time interval
Check cables and cable joints;	Depending on the site environment, it is recommended that: at least 6 months;
Check optical windows;	Depending on the site environment;
Check fixing screws and brackets;	Depending on the site environment, it is recommended that: at least 6 months;
Check indicator lights;	Depending on the site environment;

10.6 CLEANING

Materials used

Cleaning cloth	Use lens cleaning cloth or lens cleaning paper
Cleaning agent	Plexiglas (acrylic) cleaner

11 AFTER-SALE INFORMATION

11.1 WARRANTY PERIOD

SE-1035FXX provide a limited time warranty. During the warranty period, if the product cannot be used normally due to quality problems, design defects, etc., we will carry out after-sales maintenance for free.

- Warranty period: 2 years from sale.

11.2 WARRANTY RANGE

If the product is within the scope of the warranty during the warranty period, we will repair or replace it free of charge.

- The product warranty and after-sales service are limited to China mainland .
- The product cannot be used normally when it is out of the box due to transportation.
- Failure to work normally caused by damage to the product's own components.
- Product design defects can not be used normally

11.3 EXEMPTION SCOPE

Please pay attention to the following conditions during the use of the product, we will not provide free after-sales and warranty.

- Failure to install the product according to the instructions correctly, causing damage to the product.
- Use this product under unsuitable environments and conditions, causing product damage.
- Damage to the product due to non-compliance with the product manual.
- Disassemble or repair the product without the permission of the company.
- Product damage caused by irresistible external forces such as natural disasters and fires.

11.4 TECHNICAL SUPPORT

If a fault occurs that cannot be rectified, please contact us as follows.

- 1) Tel: +86-757-22218956
- 2) Email: lixianjiao@hinson-xs.com
- 3) Company website: www.hinson-xs.com
- 4)Manufacturer: Guangdong Hinson Technology Co., Ltd.
- 5)WhatsApp:+8618670078135