

Product User Manual

Product Introduction | Camera Installation | Software Operation
Instructions | FAQ and Handling | Terms

VSensorLaser_V1.01.00



www.mvstek.com



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Technology Innovation Park

Catalogue

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Summary

1. VSensor Laser Software is the supporting software for PSN series line laser camera, which is used to configure line laser camera parameters, generate display point cloud and save data.
2. It can automatically identify multiple devices connected to the computer. After connecting the devices, it can collect point clouds scanned by line lasers. Users can set up software/hardware triggers for collection, and can display target area point clouds in the area of interest. It also features automatic exposure, exposure time settings, projection level settings, filtering settings, point cloud saving, and grayscale image saving functions.
3. The software provides application interfaces and examples for C#, C++, Linux, and Python environments to meet users' secondary development needs.

VSensorLaser_V1.01.00 supports devices

Camera model	software support	SDK support
PSN0270	√	√
PSN0600	√	√
PSN3000(GB)	√	√
PSN3000(GA)	×	×

Before using the VSensorLaser line laser camera, please read this manual carefully to ensure the correct and safe use of the camera.

Attention



1. Product presentation

1.1 Introduction of line laser 3D camera

The VS-PSN series line laser 3D camera obtains the surface profile information of objects based on the principle of laser triangulation measurement, and outputs high-precision 3D point cloud data in real time. It is resistant to the influence of welding arc splatter, and is suitable for high brightness, high light materials and high reflection scenarios such as bevels, maintaining high precision, high efficiency and continuous stable operation within the field of view.

☛ Main models of line scanning cameras

Camera	Model	Illuminant	Characteristic
	PSN0270G	Red light/blue light	The laser light intensity can be adjusted and the anti-sunlight ability is strong High speed, high precision, small volume Low power consumption and stable performance
	PSN0600G	glow	The laser light intensity can be adjusted at high speed Small size, low cost welding special machine
	PSN3000G	blue light	At a distance, the depth of field is large Small size, high precision

This manual mainly introduces the line laser 3D camera, for more product details please consult the sales staff, or log on to the official website to obtain relevant information www.mvstek.com

1.2 Working environment

Work Environment

Before shooting, you need to choose the right shooting environment. Generally speaking, indoor shooting should be chosen in a place with sufficient light and clean environment.

Working temperature

Do not use in excessively high or low ambient temperatures. The operating temperature of the camera is 0-50°C.

Working process

Keep the camera stable during use, and avoid vibration and bump as much as possible. Pay attention to protect the lens, camera body, splash guard, connection line and other important parts to avoid damage or loss.

1.3 Maintenance and maintenance

Regular cleaning

Clean the camera lens and housing regularly to keep them clean and tidy. After point cloud collection, close the splash guard cover before performing the operation. Keeping the lens clean has a positive effect on point cloud collection.

Periodic inspection

Check the adapter power cable, data cable, etc. regularly to ensure that there is no short circuit, open circuit, broken line.

Storage environment

Store the camera in a dry, well-ventilated place away from direct sunlight to prevent moisture or damage.

Software update

Keep the camera's firmware and drivers up to date for better performance and stability.

1.4 Safety use specifications

☛ Check before use

Before using the camera, check whether the power cord and data cable are connected properly and whether the battery is fully charged to ensure the safety of the use process.

☛ Pay attention to personal safety during use

In the process of use, attention should be paid to the surrounding environment and other personnel conditions to ensure the safety of oneself and others.

This product uses strong laser projection, do not look directly at the camera when working, otherwise it may cause eye discomfort or injury.

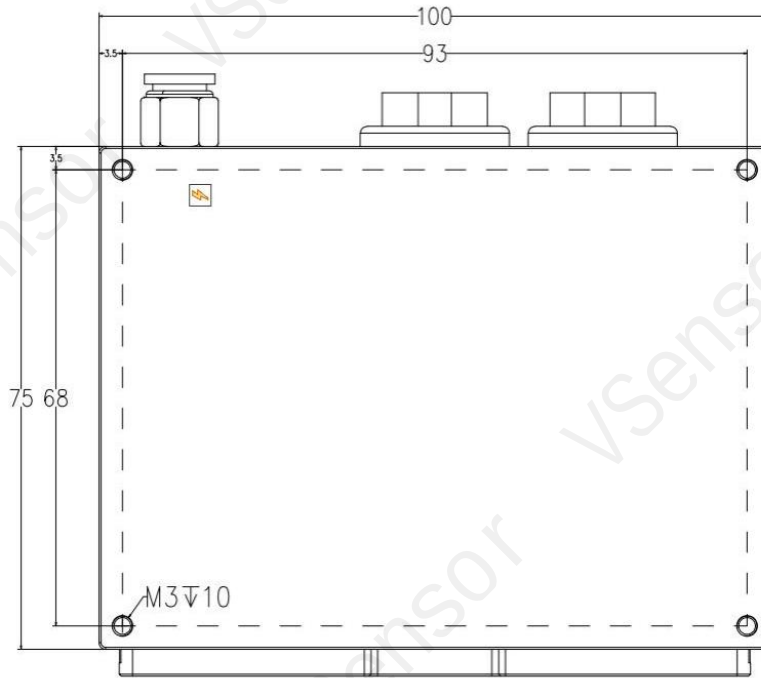
Caution



2. Camera installation

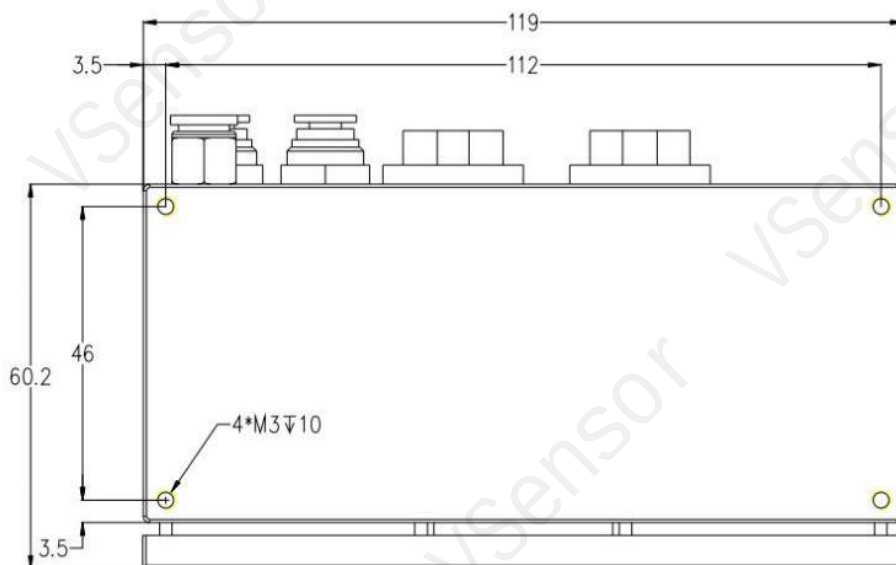
2.1 Camera mounting hole description

VS-PSN0270 series



Figs2-1

VS-PSN0600 series

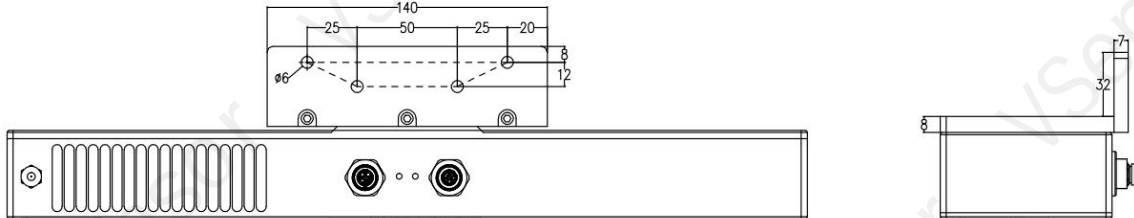


Figs2-2

■ VS-PSN3000GB series

PSN3000GB The vertical scanning mode is adopted. When installed, the side containing the camera lens and laser is installed vertically to the ground, and the L-shaped mounting bracket is provided with the factory.

Schematic diagram of mounting bracket:



Figs2-3

2.2 Definition and usage method of power supply port

2.2.1 Interface definition

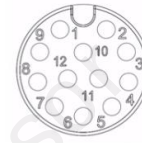
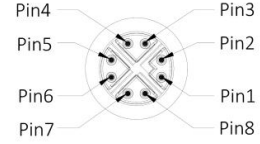
☛ The VS-PSN0270 and PS0600 series utilize the GX16-6 aviation plug-in interface.

PSN 系列相机接口定义说明				
接口说明	PSN 系列相机接口定义如下表所示			
网络接口 定义	编号	名称	颜色	
	1	MX1_P	白橙	
	2	MX2_P	白绿	
	3	MX4_P	白棕	
	4	MX4_N	棕	
	5	MX2_N	绿	
	6	MX3_P	蓝	
	7	MX1_N	橙	
电源接口 定义	8	MX3_N	白蓝	
	编号	名称	颜色	定义
	1	电源正极	红	VCC_24V
	2	电源负极	黑	GND
	3	硬件触发反馈信号正极	黄	STB+
	4	硬件触发反馈信号负极	绿	STB-
备注	5	硬件触发输入负极	棕	TRIG-
	6	硬件触发输入正极	蓝	TRIG+
触发输入，输出信号均采用光耦隔离，上升沿触发输入，电压范围 5-24V。				

Figs2-4

☛ The VS-PSN3000GB series utilizes the M12A interface.

PSN3000系列接口定义说明				
接口说明	PSN3000系列接口定义如下表所示			
网络接口定义	编号	名称	颜色	
	1	PIN1	白/橙	
	2	PIN2	橙	
	3	PIN3	白/绿	
	4	PIN4	绿	
	5	PIN5	白/棕	
	6	PIN6	棕	
	7	PIN7	白/蓝	
	8	PIN8	蓝	
电源接口定义	编号	名称	颜色	定义
	1、8、9	电源正极	棕、灰、红	VCC_24V
	2、3、4	电源负极	蓝、白、深绿	GND
	5	光耦隔离信号输入负/编码器com	粉	TRIG-/com
	6	光耦隔离信号输入负/编码器in	黄	TRIG+/编码器in
	7	预留	黑	
	10	电源地	紫	GND
	11	编码器电源12V	橙	12V输出
	12	编码器电源24V	浅绿	24V输出
备注	触发输入，输出信号均采用光耦隔离，上升沿触发输入，电压范围5-24V。			

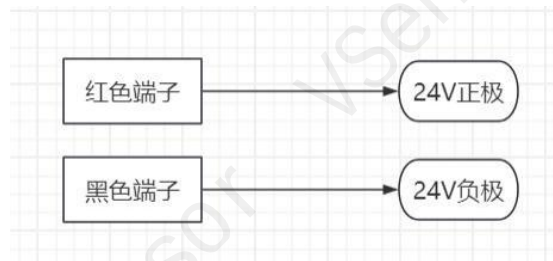
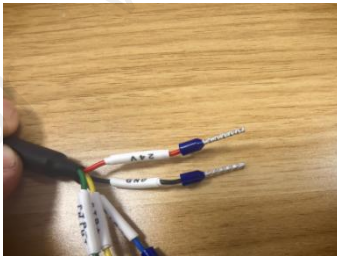


Figs2-4

2.2.2 Usage method

2.2.2.1 GX16-6

The PSN0270/PS0600 series utilizes the GX16-6 aviation plug interface and does not include a power adapter. The usage method is as follows: connect the red terminal to the positive terminal of the 24V power supply, and the black terminal to the negative terminal of the 24V power supply. The rated current is 24V/2A (as shown in Figure 2-6).

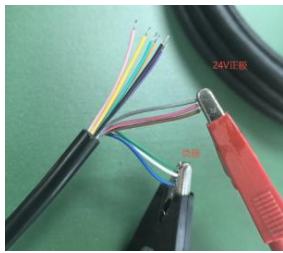


Figs2-6

2.2.2.1 M12A

The PSN3000GB series features an M12A encoding-12pin interface and does not

include a power adapter. Usage instructions are as follows:



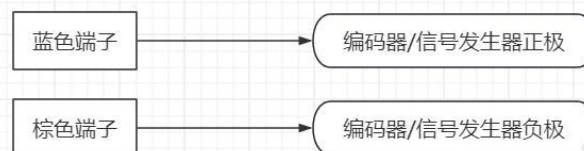
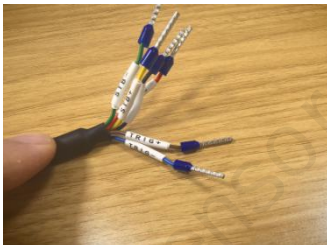
Figs2-7

2.2.3 Hardware trigger usage method

2.2.3.1 GX16-6

☛ Hardware trigger signal input

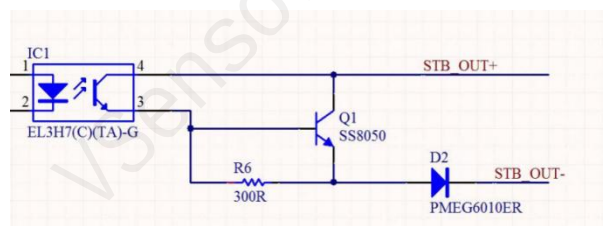
VSensorLaser The software sets the hardware trigger mode. The blue terminal is connected to the positive pole of the encoder or signal generator signal output, and the brown terminal is connected to the negative pole of the encoder or signal generator signal output. The trigger signal voltage range is 5-24V, and the falling edge is triggered (as shown in Figs 2-8).



Figs2-8

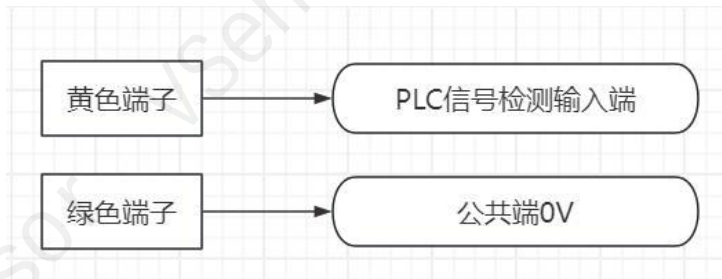
☛ Hardware triggers feedback signals

Whenever the camera detects a hardware trigger signal input, an internal feedback signal output is generated. The feedback signal optocoupler isolation uses an NPN output (as shown in Figs 2-9).



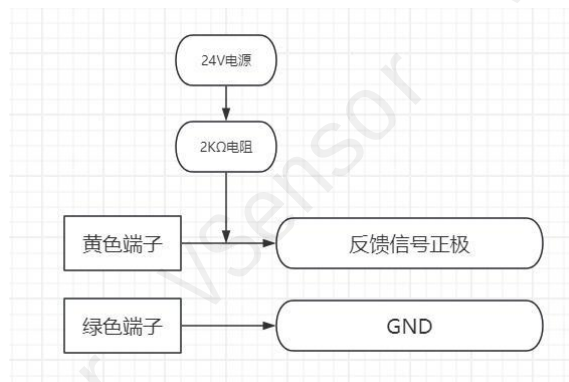
Figs2-9

- If the feedback signal is directly connected to the electronic control cabinet or PLC equipment, the yellow terminal is connected to the PLC signal detection input end, and the green segment is connected to the common end 0V (as shown in Figs 2-10).



Figs2-10

- If the feedback signal needs to be connected to other external circuits, the yellow terminal should be pulled up by a 2K Ω resistor to 24V power supply, and the green segment should be connected to GND.

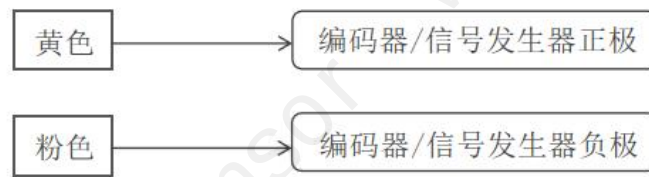


Figs2-11

2.2.3.1 M12A

☛ Hardware trigger signal input

The PSN3000GB series cameras support hardware triggering. In software setup mode, connect the yellow terminal to the positive output of the encoder or signal generator, and the pink terminal to the negative output. The trigger signal operates within a voltage range of 5-24V with a current limit of 5mA, using falling-edge triggering (as shown in Figure 2-12).



Figs2-12

2.3 Anti-Splash usage method



Figs2-13

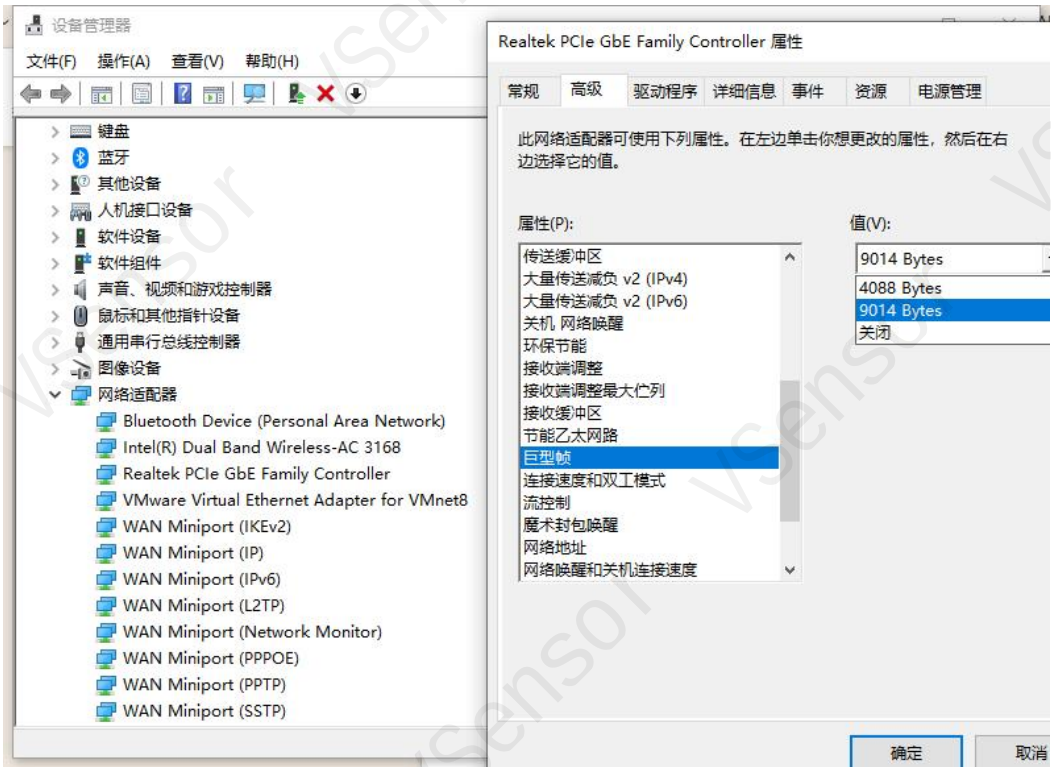
2.4 Software installation

☛ System configuration recommendations

Item	It is recommended to configure
Operating system	VSensorLaser The software supports 64-bit Windows 10/Windows 11, and the SDK synchronously supports Ubuntu18.04 and above
RAM	4GB or above
Network card configuration	Gigabit port or above

 The giant frame is open

Open mode: Device Manager-> Network configuration-> Realtek PCIe Gbe Family Controller-> Advanced-> Giant Frame-> 9014 Bytes (select the maximum number item), schematic diagram is as follows:

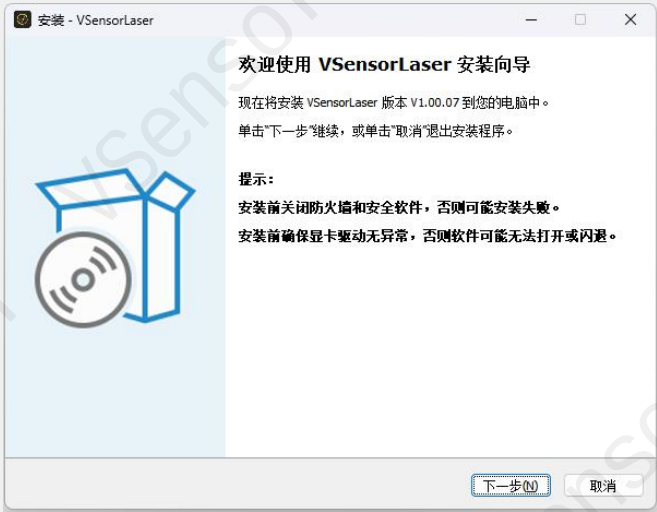
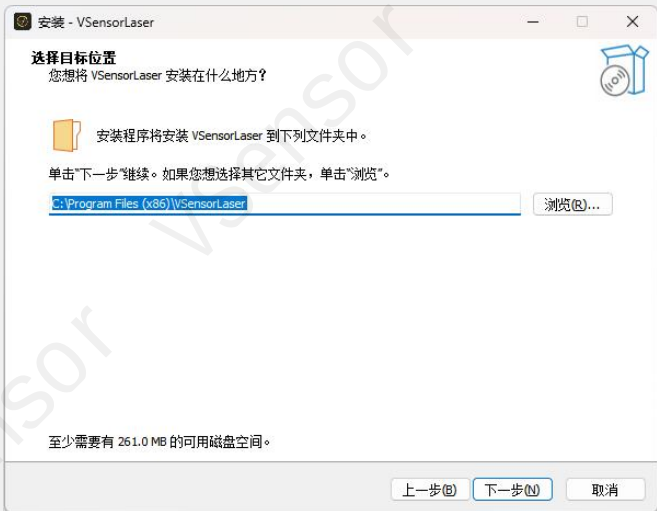


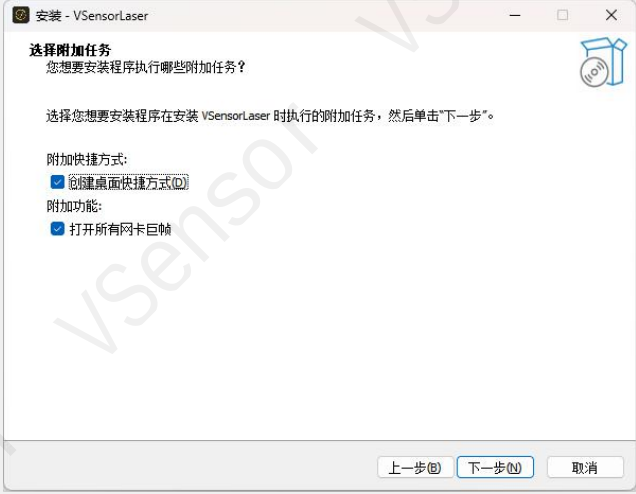
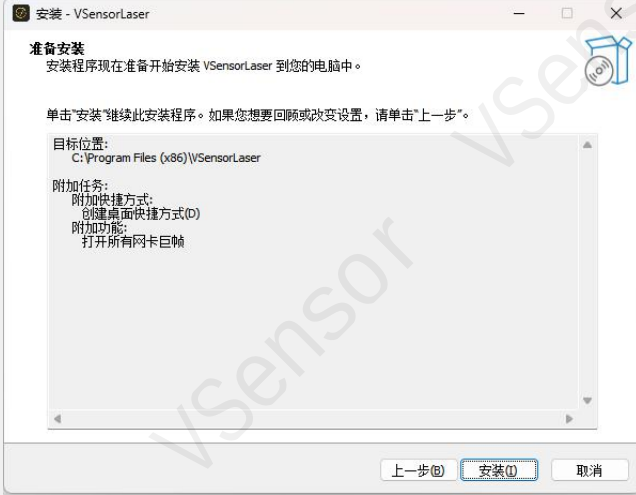
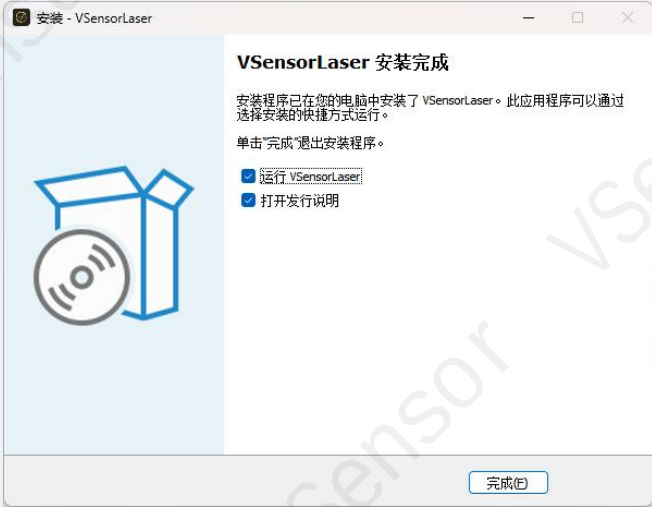
Figs2-14

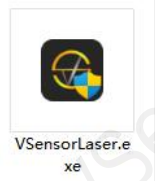
 Installation steps

Please contact customer service or sales staff for the latest VSensorLaser installation package. The software is compatible with Windows 10 (64-bit) and later. The installation steps are as follows:

step	explain
Step 1	Double-click the executable file VSensorLaser V1.01.XX.exe to install  VSensorLaser_V1.00.07.exe VSensorLaser Setup V-Sensor, Inc.

Step 2	Open the installation wizard, read the prompt message, and click "下一步(N)": 
Step 3	Select the installation path, by default C disk, select complete and click "下一步(N)": 
Step 4	Select whether to create a desktop shortcut and open all network card giant frames (note that only the built-in network port is opened here, except the external one. Click "下一步(N)":

	
Step 5	Displays the current installation information. Click "安装(I)": 
Step 6	Complete the installation and run the software 

Step 7	After the installation, VSensorLaser appears on the desktop. Double-click to open the software interface. 
--------	--

Before installing the software, please close the firewall, 360 anti-virus software, and other VSensor series software.

Attention



2.5 Demonstration process of camera installation and debugging

🔧 Step 1

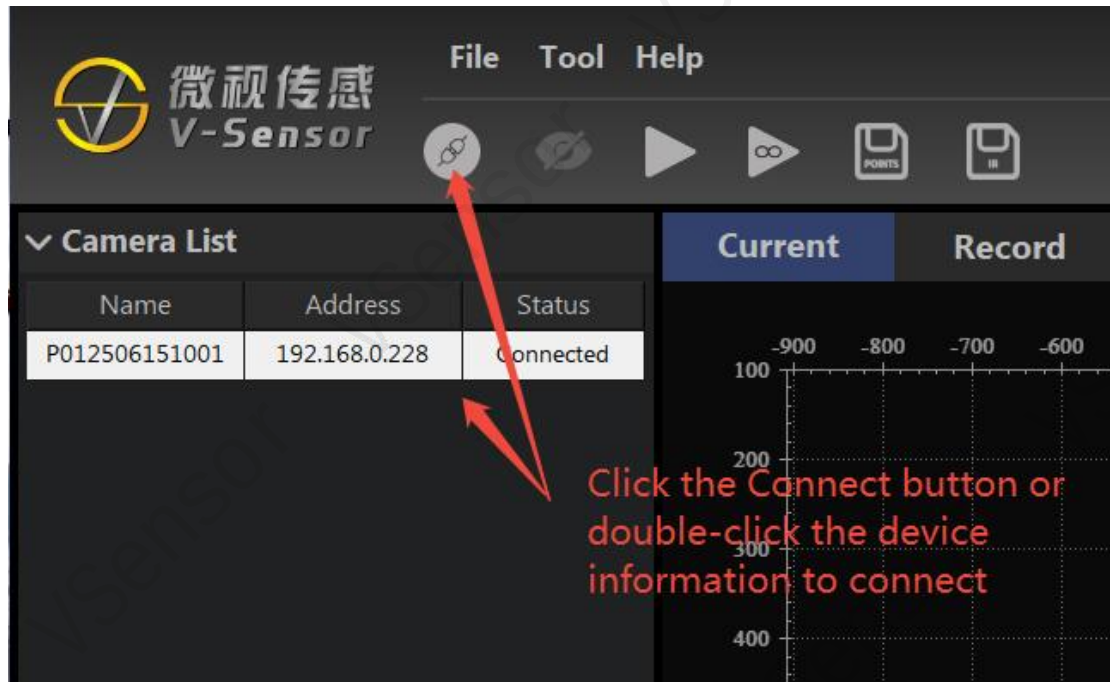
Connect the camera power supply, network and air pressure valve. When the indicator light is stable and long on, the connection is successful.



Figs2-15

🔧 Step 2

Open the VSensorLaser software, find the camera in the camera list column and connect it. At this time, the device status bar becomes "connected".



Figs2-16

Step 3

Adjust the camera to the required shooting position, the camera laser is turned off by default, set the "projection level" to open the laser line, and click single acquisition/continuous acquisition to obtain the point cloud map of the object scan.

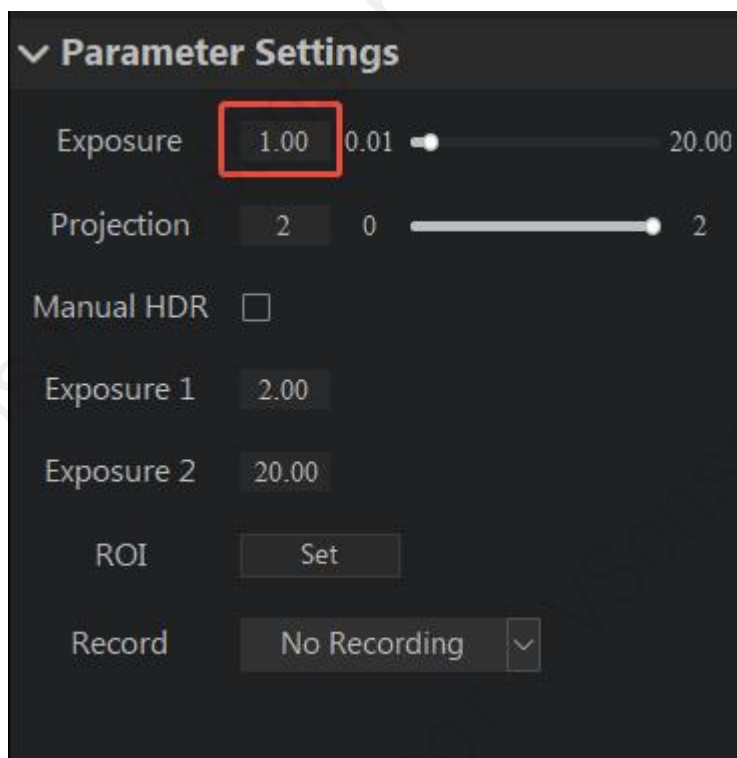


Figs2-17

Step 4

Address: 6th Floor , Ruiyun 5, Xishan Science and Technology Park, Wuxi

The exposure time is set to 1.00 by default. If the point cloud is missing or the number of point clouds is small, the exposure time can be manually adjusted and collected.



Figs2-18

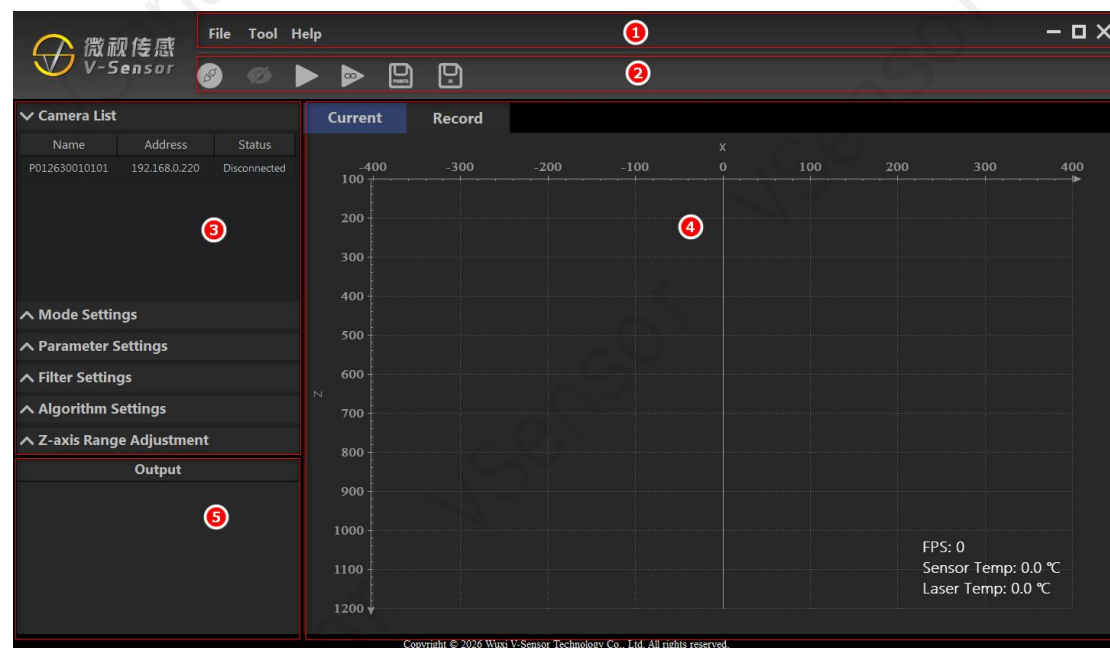
3. VSensorLaser Software operation instructions

3.1 Interface overview

☛ Operation the main interface

The main interface of the operation includes the basic functions of the software, which are used to control camera connection, acquisition, data viewing and saving.

- Start the VSensorLaser software and enter the PSN series camera interface:



Figs3-1

- The main interface functions are as follows:

order number	name	functional description
1	menu bar	Contains files, tools, and help
2	Quick operation	It includes the functions of connecting/disconnecting devices, switching between center lines/clouds, collecting clouds once/continuously, saving clouds and gray scale images
3	Parameter setting module	It includes Camera List, Mode Setting, Filter Settings, Filter Settings, Algorithm Senttings, and Z-axis Range Adjustment
4	Point cloud shows the area	It includes real-time point cloud and stitched point cloud. The real-time point cloud generated by camera scanning is displayed on the X-axis and Z-axis, the center line information is displayed,

		and the scan frame rate and temperature information are displayed; when using the point cloud recording function, the stitched point cloud can be displayed
5	outgoing message	Display the operation and operation time, operation results

3.2 Menu bar

 In the main interface, the menu bar functions are as follows:

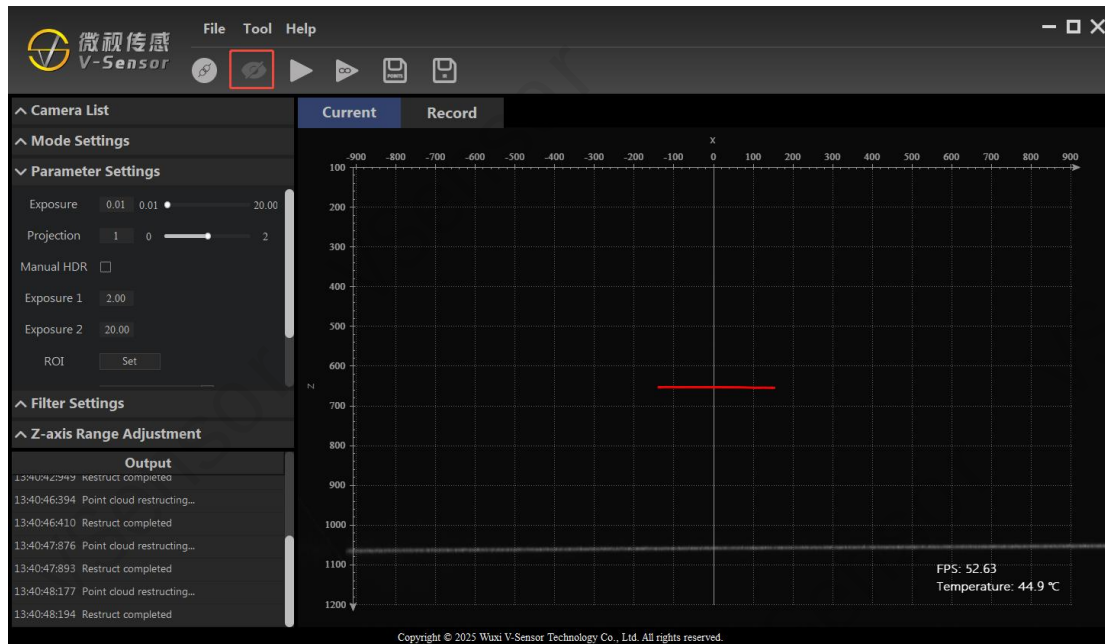
Menu	Submenu	Functional description
File	Log	Open the log folder. The encounter will save error logs to help locate the problem
	Profile	Open the configuration folder. It is used to store the camera configuration information saved by the user and can be loaded directly
	Exit	Click to exit the current application
Tool	Log Viewer	Include search and categorize log information
	Path Settings	The functions such as point cloud, grayscale image, and the storage path and format of recorded point cloud can be set. If not set, it is saved to the desktop by default
	Profile Settings	You can save the current software Settings as a configuration file or import the saved configuration file. You can view the saved files in the Configuration File option under the File menu
	IP Settings	After connecting the Internet port camera, if you need to modify the device IP, select the IP Settings in the toolbar, select the corresponding device name, enter the IP address, subnet mask and default gateway you want to set, click OK, and then restart the device. At this time, the IP on the PC needs to be modified to the corresponding network segment
help	Parameter Reset	Reset the current camera parameters to the preset value. The preset value varies slightly for different models of cameras
	Usage manual	Open the user manual folder. It contains the following documents: User Manual, SDK instructions
	SDK	Open the SDK path. Currently supports C#, C++, Linux, and Python. For Linux and Python usage, refer to the readme.txt in their respective folders
	Language	You can switch between Chinese and English, which will take effect after the software restarts
	About	Display device platform, software, SDK version and other related information

3.3 A brief introduction to quick operations

 The function of the shortcut operation button on the main interface is as follows:

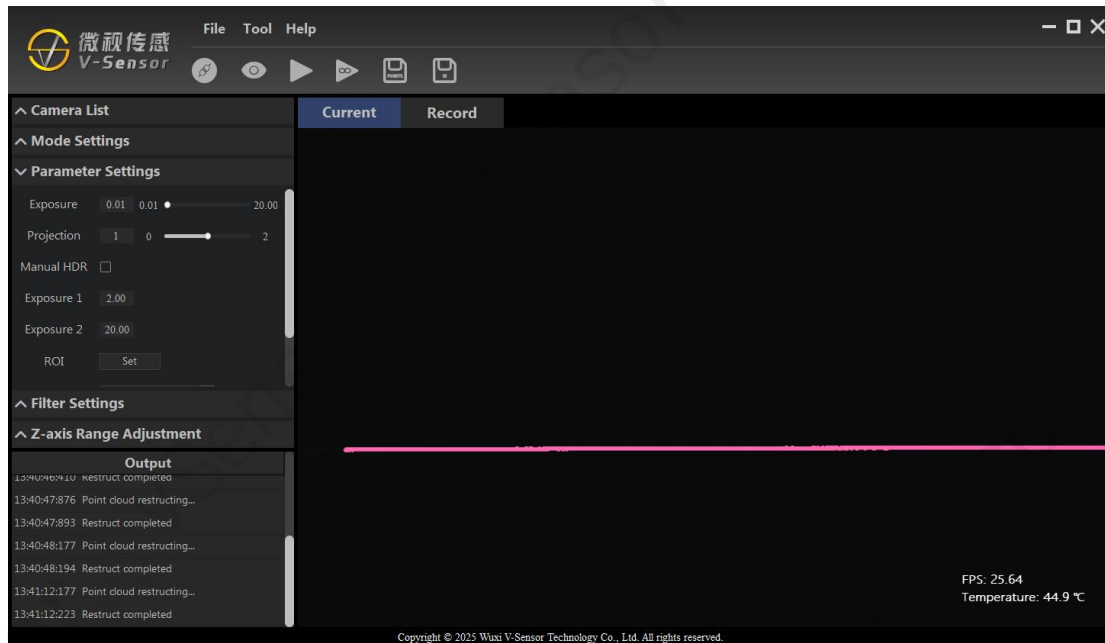
order number	name	functional description
	ununitied	The camera is not connected. Click to connect the selected camera in the  list, and the icon becomes connected
	Already connected	The camera is connected. Click to disconnect the connected  camera, and the icon becomes disconnected
	Point cloud display	After clicking, the main interface displays the point  cloud information and the icon becomes open
	The center line is shown	After clicking, the information of the central  auxiliary line is displayed and the icon becomes closed
	Single collection	Click to collect point cloud data once and display it
	Continuous collection	Click to collect point cloud data in real time and display it
	Save the point cloud	After clicking, a point cloud save dialog box will pop up. Select the path of point cloud save through "Tools" - "Save Path Settings". Point cloud data can be saved to the local in three selectable formats: PCD,PLY and TXT. If no path is selected, it will be saved to the desktop by default
	Save the grayscale image	After clicking, the grayscale image will be automatically saved. Select the path of grayscale image to save it to the local by selecting "Save Path Settings" in the menu bar. The grayscale image can be saved to three selectable formats: JPG, BMP and PNG. If no path is selected, it will be saved to the desktop by default

☞ Point cloud effect



Figs3-2

☞ Center auxiliary line display effect

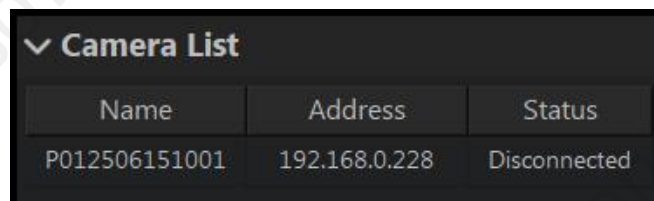


Figs3-3

3.4 Parameter setting module

3.4.1 Camera list

The list shows the camera Name, Address and Status. Double-click the corresponding camera list row to connect or disconnect the camera. Only one device is supported in the same window. If you need to connect multiple cameras, you can open multiple Windows to connect.



Name	Address	Status
P012506151001	192.168.0.228	Disconnected

Figs3-4

3.4.2 Mode Settings

When using the device, you can choose different trigger modes, including Soft Trigger and External Trigger, with Soft Trigger being the default.

☛ Soft Trigger

All laser cameras support soft trigger, which allows manual single acquisition or continuous acquisition during software triggering.

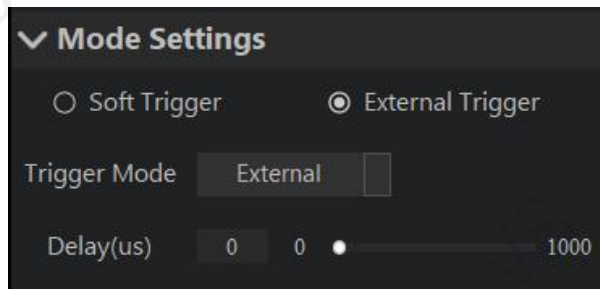


Figs3-5

External Trigger

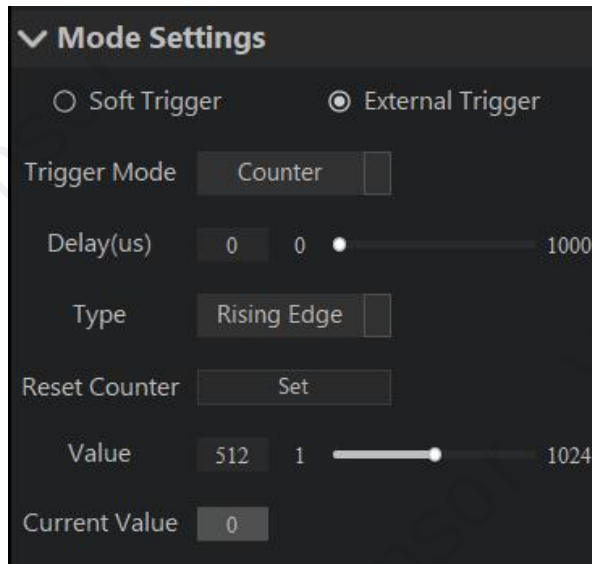
The External Trigger mode includes "External" and "Counter". The PSN270/PSN0600 only supports "External" and hides this setting. The PSN0300GB allows this setting.

In "External", the point cloud display is activated after waiting for the hardware trigger signal. (Use the relevant hardware trigger interface, see Section 2.3 for Hardware Trigger Usage).



Figs3-6

In "Counter", you need to configure Type and Value. The default counter value is 512 (adjustable). During encoder operation, the current counter value increments with the encoder's movement, triggering a reset every time it reaches 512. Clicking the "Set" button after Reset Counter will clear its current value.

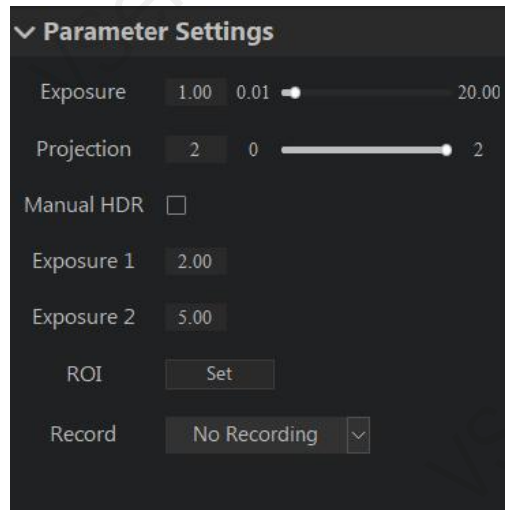


Figs3-7

3.4.3 Parameter Settings

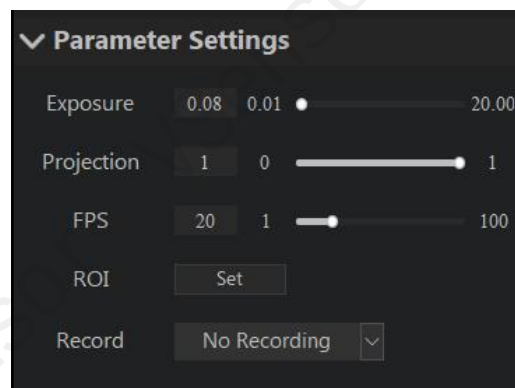
The Parameter Settings include Exposure time, Projection level, manual HDR, FPS, ROI, point cloud recording function:

PSN270/PSN0600:



Figs3-8

PSN3000GB:



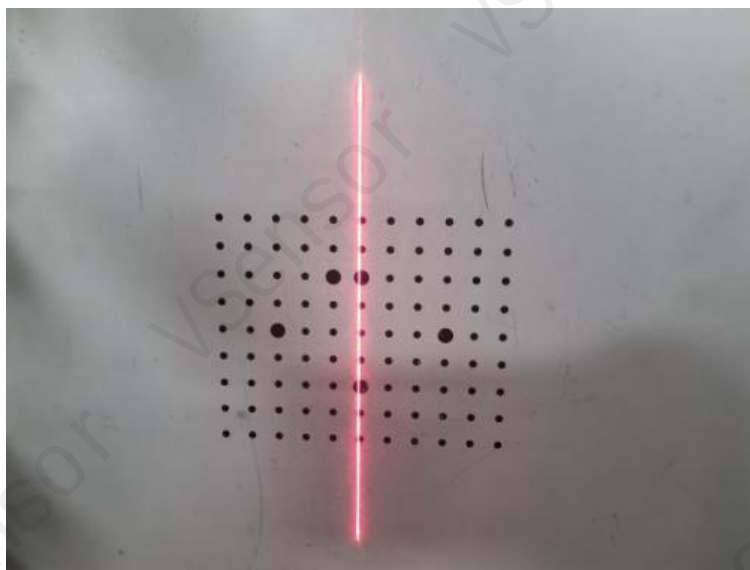
Figs3-9

Name	Functional description
Exposure	The default adjustable range is 0.01-20.00ms
Projection	PSN0270 and PSN0600 cameras can be adjusted from 0 to 2, where 0 is the off state. The larger the parameter, the brighter the projected line laser will be. PSN3000GB The adjustable range of the camera model is 0-1, where 0 is the closed state and 1 is the open state.

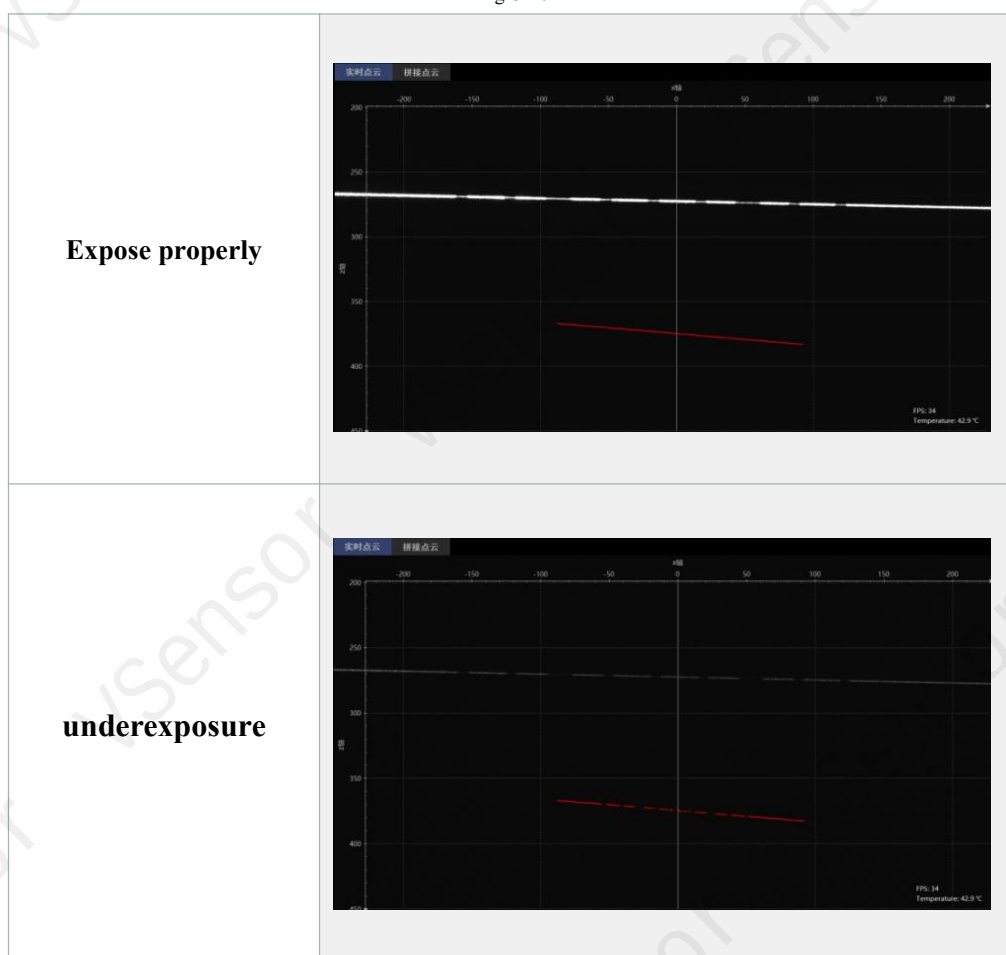
FPS	For PSN3000GB:Set the frame rate level for continuous acquisition. This level is a percentage of the maximum theoretical output frame rate, which is not fixed and depends on exposure and ROI settings. The default is 20%. A higher value increases the acquisition speed. If data is not fully reconstructed after acquisition, reconstruction will continue.
Manual HDR	When checked, manually enter two different exposure times, and the reconstruction process will be based on Exposure 1 and Exposure 2. It is suitable for objects with both bright and dark areas. (Exposure 1 and Exposure 2 are set to maintain an increasing relationship)
ROI	This function is a custom resolution function, and the camera resolution is 1920 * 1200. You can use the mouse to set the image position box in ROI to select the area of interest, or modify it by setting the parameters below, click OK, and collect the data to display the point cloud content of the selected area
Record	This function is for continuous point cloud recording under hardware trigger conditions. It offers two options: fixed-distance recording and moving-speed recording. The adjustable ranges are (0-1000.0) mm and (0-1000.0) mm/s, respectively. This parameter is used to calculate the Y offset of the point cloud recording. By default, the recording files are saved to the desktop, or you can set the save path in "Tool" - "Path Settings."

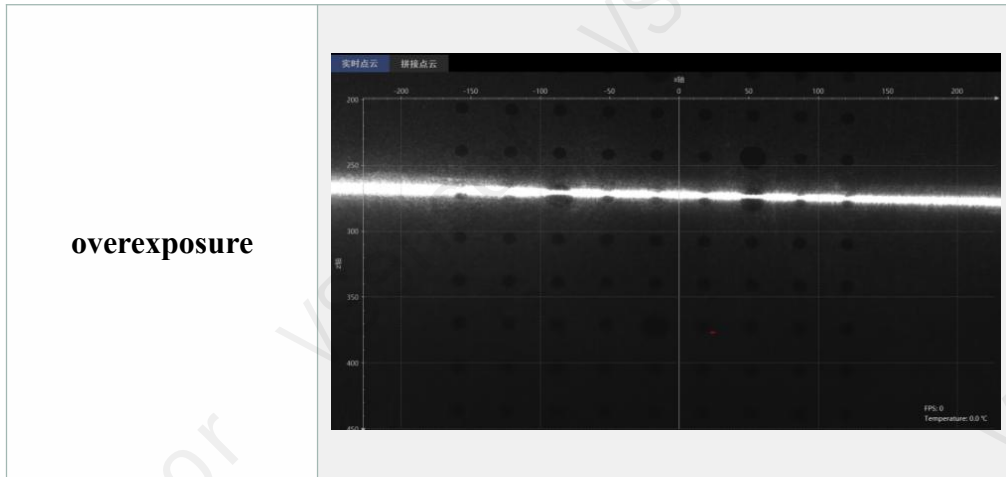
3.4.3.1 Exposure time setting

- When shooting, the missing point cloud is observed. The blank area in the point cloud represents the missing point cloud.
- Different exposure times need to be set for different reflectivity objects. Low reflectivity requires high exposure, and high reflectivity requires low exposure. The appropriate exposure time needs to be adjusted for point cloud collection. The following is the calibration plate collection effect for reference:



Figs3-10



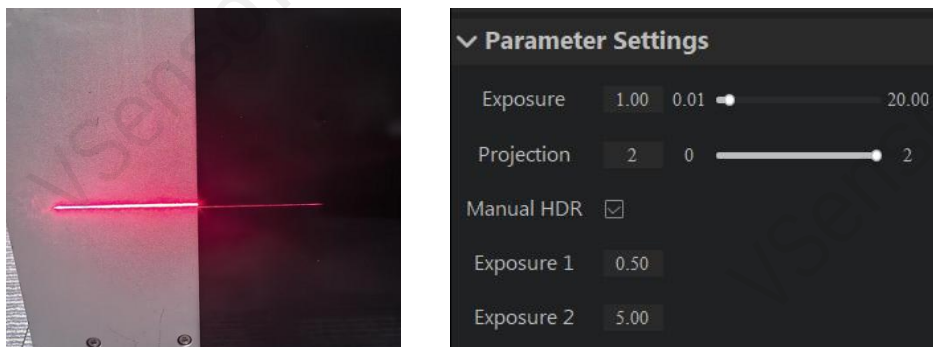


- When the exposure is insufficient, the exposure time needs to be increased, and when the exposure is overexposed, the exposure time should be reduced.

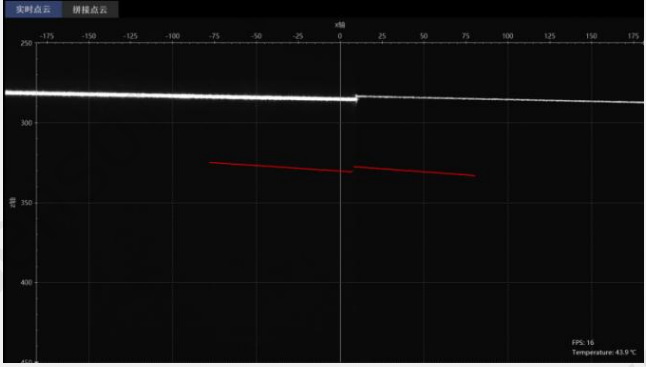
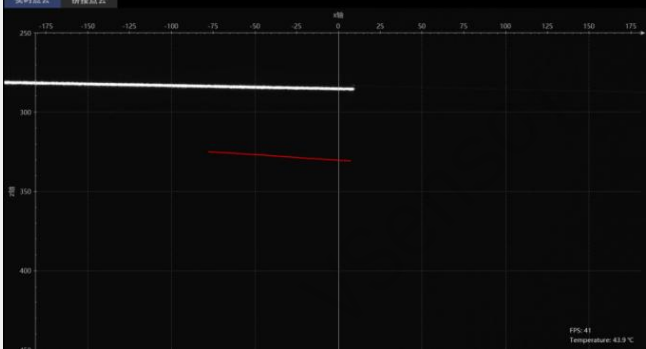
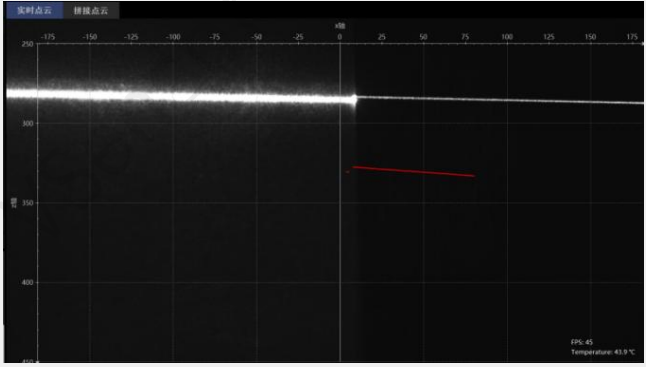
3.4.3.2 Use of manual HDR

When the acquisition scene contains both high reflectivity and low reflectivity objects, high exposure and low exposure cannot meet the acquisition of two objects at the same time. In this case, HDR function can be used to effectively improve the quality of point cloud. Exposure time 1 is low exposure, and exposure time 2 is high exposure.

☞ **HDR acquisition effect reference for high and low reverse scenarios:**

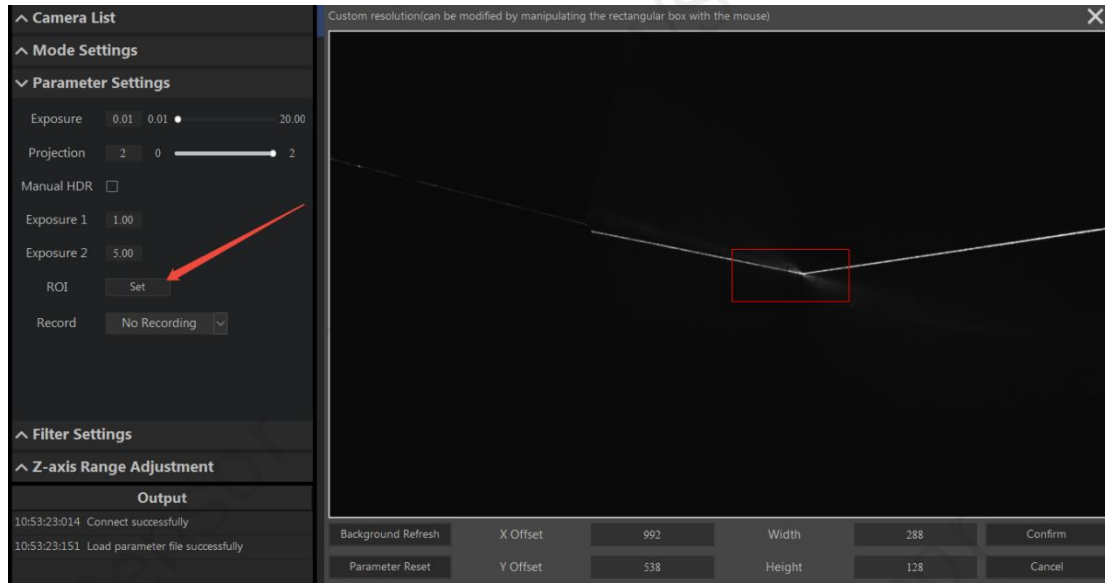


Figs3-11

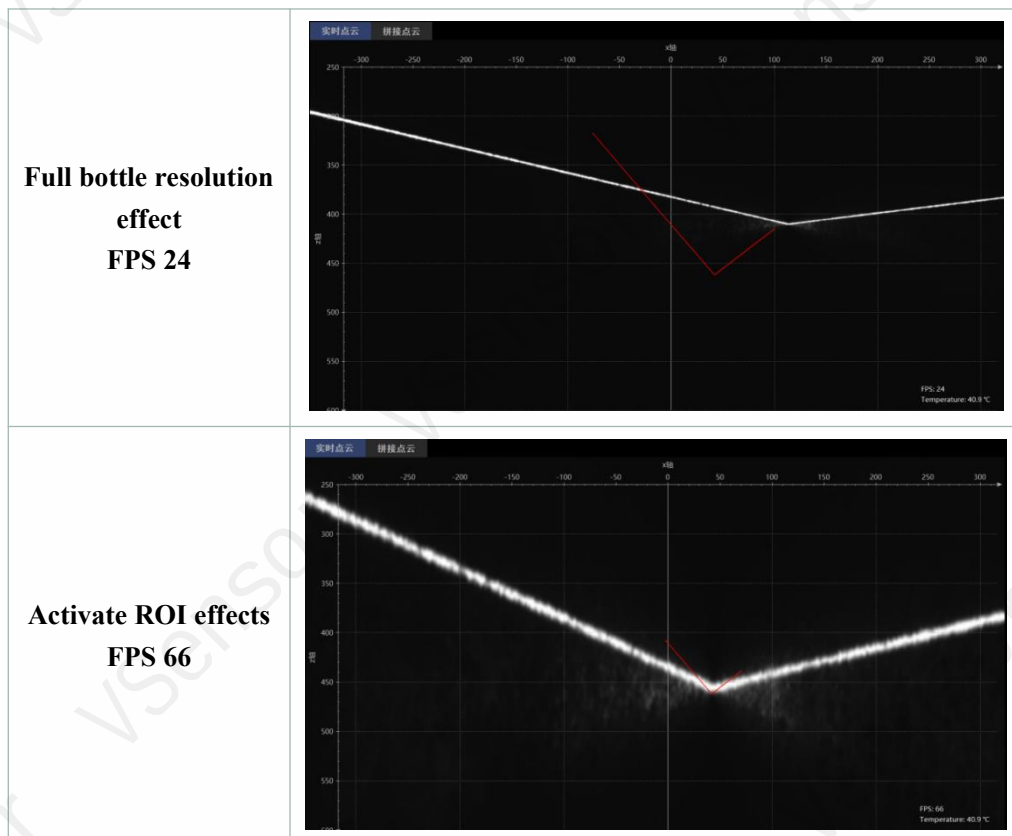
HDR take	
Low exposure (exposure time 0.5ms)	
High exposure 5ms	

3.4.3.3 Use of ROI

- When the processing efficiency and accuracy need to be improved in use, ROI function can be used to frame the required area for collection, so as to reduce unnecessary calculation amount, improve processing speed and matching accuracy.
- Click the "Settings" button behind ROI, frame the area of interest, click OK, and then click again to set the collection Settings.



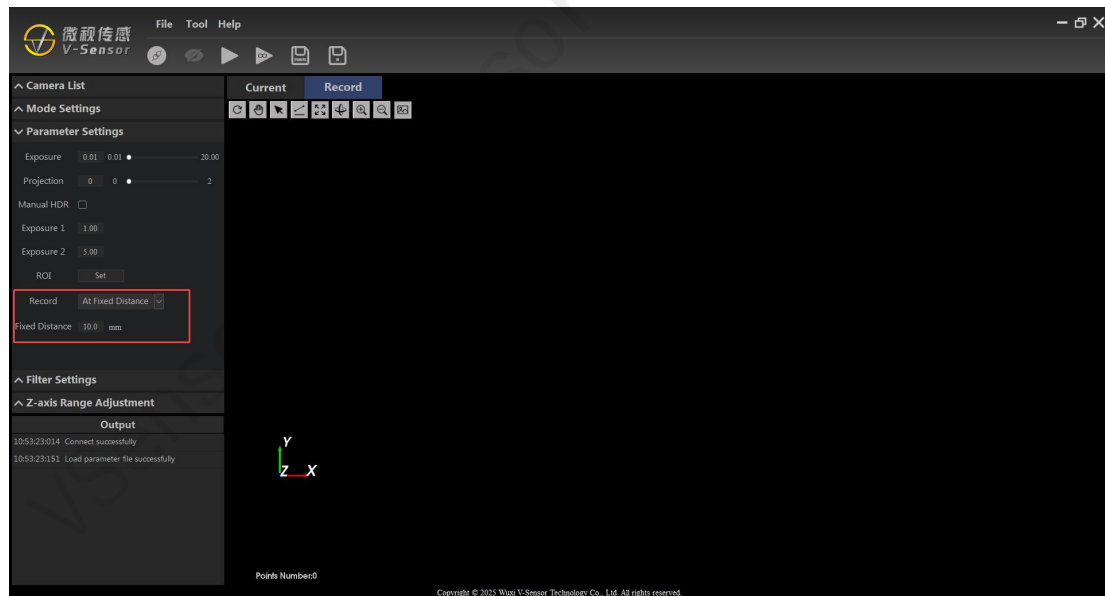
Figs3-12



3.4.3.4 Record

Scanning a complete workpiece can be achieved using the point cloud recording function, which is activated under continuous acquisition and hardware triggering. The recording methods include "At Fixed Distance" and "At Moving Speed." After pausing continuous acquisition and turning off the hardware triggering mode, the

recorded point cloud data is automatically saved, with a maximum of 10000 frames per file. It is also displayed synchronously in the stitched point cloud area.



Figs3-13

Description of the tool for stitching point cloud areas:

order number	name	functional description
	Reset the point cloud	Click to reset the point cloud image display Angle
	The point cloud moves	After clicking, you can move the point cloud display position by controlling the mouse
	Single point selection	Click to select the point cloud single point and print the coordinate of the point
	Point spacing measurement	Select two points in the point cloud, calculate and print the coordinates of the two points and the distance between the two points
	The point cloud is displayed in full screen	After clicking, the interface only shows the current point cloud picture
	Axes	After clicking, the point cloud area displays the coordinate axis and can adjust the display Angle
	The point cloud is enlarged	Click to zoom in on the point cloud image displayed on the point cloud display interface
	The point cloud shrinks	Click to zoom in and out the point cloud image displayed on the point cloud display interface
	The sticker shows	Click to cancel or display the sticker

☞ Point cloud recording camera installation method

● Step 1

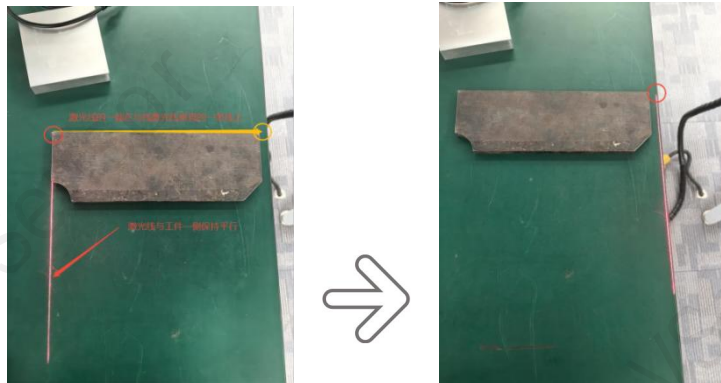
As shown in the figure, PSN600 is an example. The camera is fixed on the mechanical arm, the front of the camera is perpendicular to the surface of the workpiece, and the scanning distance is within the recommended working range of 350-600mm.



gFigs3-14

● Step 2

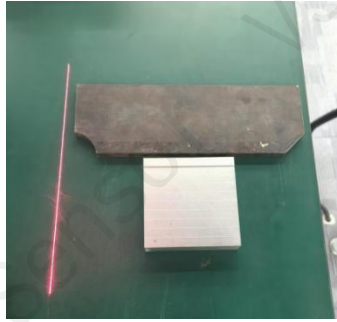
Adjust the position of the laser line, make the line laser parallel to one side of the workpiece, and keep one end of the laser line on a line perpendicular to the laser line when starting and ending the movement.



Figs3-15

● Step 3

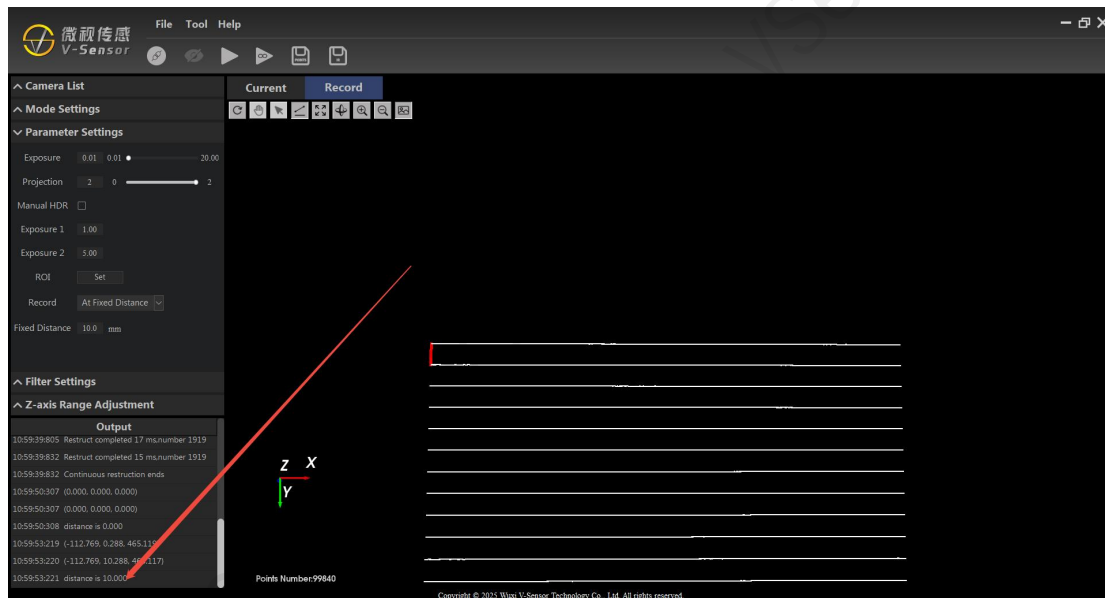
Select different recording modes and use continuous acquisition or hardware-triggered scanning for the following scenarios.



Figs3-16

Record in the "At Fixed Distance" mode

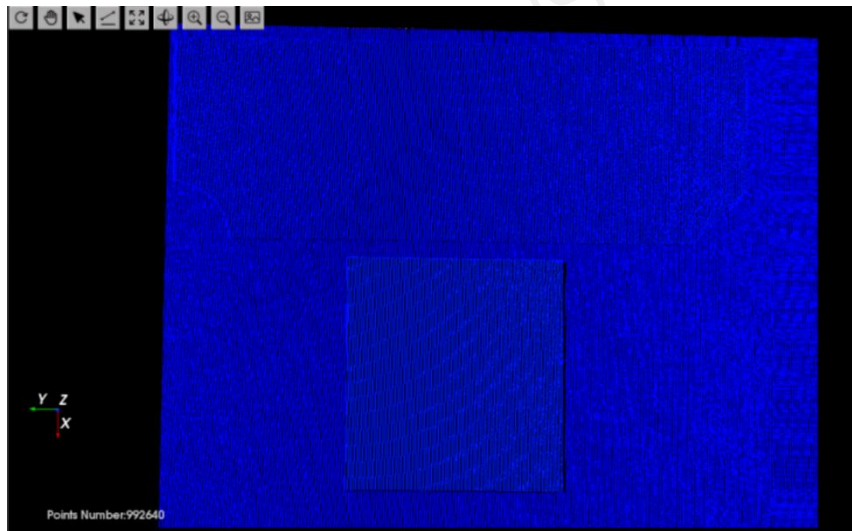
Select the "At Fixed Distance" mode, set the fixed distance 10.0mm, and collect continuously. The point cloud effect is shown in the figure. Measure the interval between two frames of data, which is 10mm. Settings can be made according to actual requirements.



Figs3-17

Record in the "At Moving Speed" mode

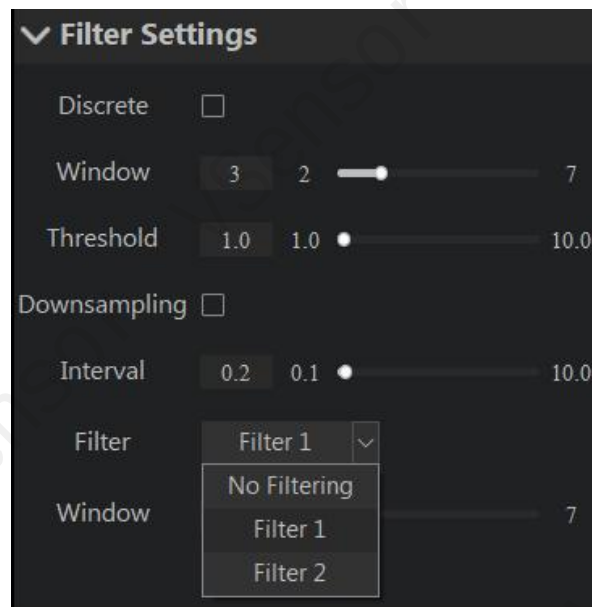
Select "Move speed" mode, and set the move speed 10.0mm/s, which is the moving speed of the robot arm. The point cloud recording effect is shown in the figure:



Figs3-18

3.4.4 Filter Settings

The module is mainly used for preprocessing of point cloud, including removing discrete points, anti-arc light, downsampling and different filtering methods:



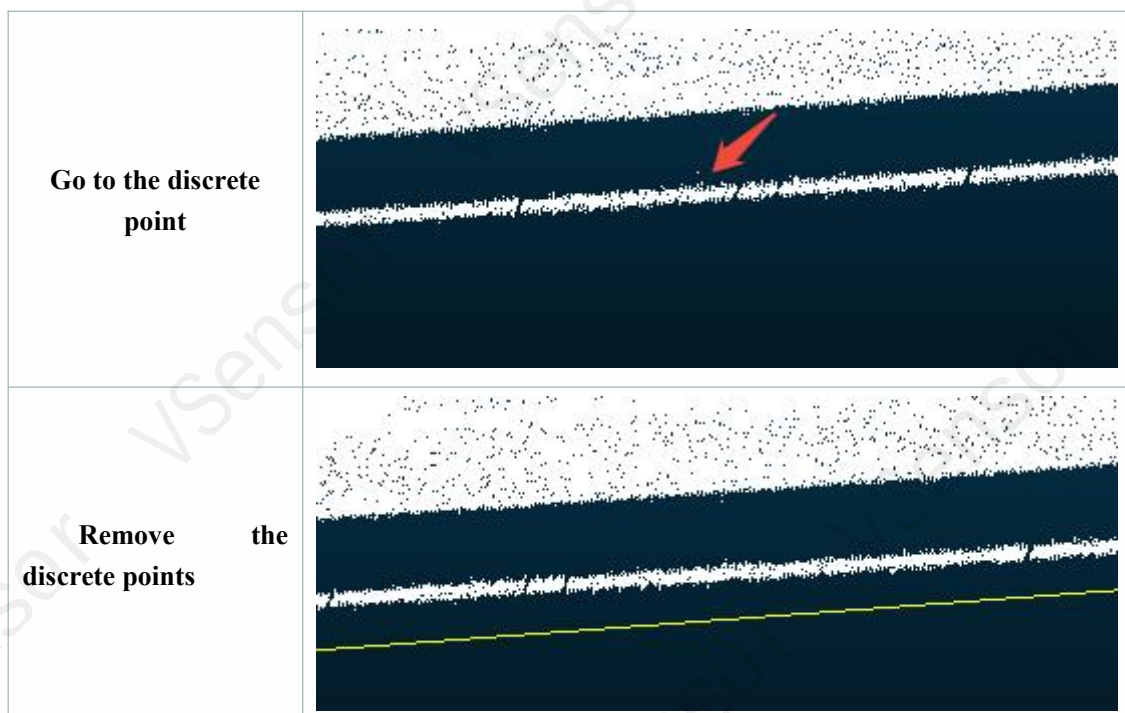
Figs3-18

name	functional description
Remove the discrete points	Select whether to perform the de-dispersion operation on the collected point cloud data. The range of the discrete window is 2-7, the smaller the value, the weaker the removal of discrete points, it is recommended to be 2; the range of the discrete threshold is 1.0-10.0, the smaller the value, the stronger the removal of discrete points, it is recommended to be 2.0

Down sampling	Reduce the number of point cloud collection. The sampling interval ranges from 0.1 to 2.0. The smaller the value is, the less the number of point cloud collection will be reduced. It is recommended that 0.2 be used
ROI	The filtering operation is selected for the collected point cloud data, which is divided into Filter 1 and Filter 2. The window range of Filter 1 is 2-7, and the larger the parameter, the smoother the point cloud is. The window range of Filter 2 is 2-7, and the larger the parameter, the smoother the point cloud is
Filter	The filtering operation is selected for the collected point cloud data, which is divided into Filter 1 and Filter 2. The window range of Filter 1 is 2-7, and the larger the parameter, the smoother the point cloud is. The window range of Filter 2 is 2-7, and the larger the parameter, the smoother the point cloud is

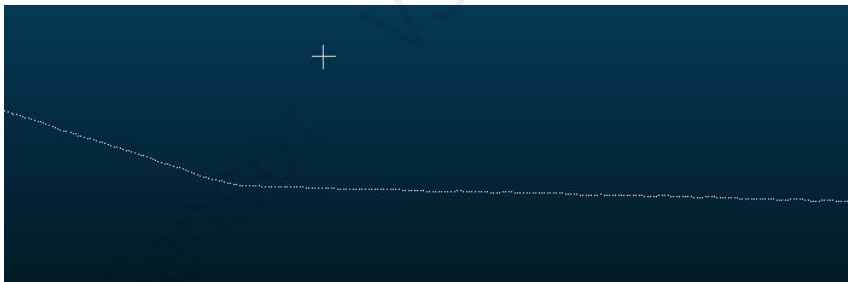
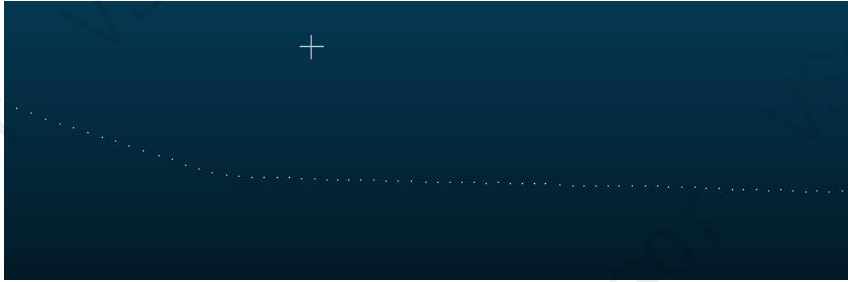
3.4.4.1 Remove discrete points

After the discretization is turned on, some stray points can be removed. The following is the effect of discretization when the point cloud is recorded.



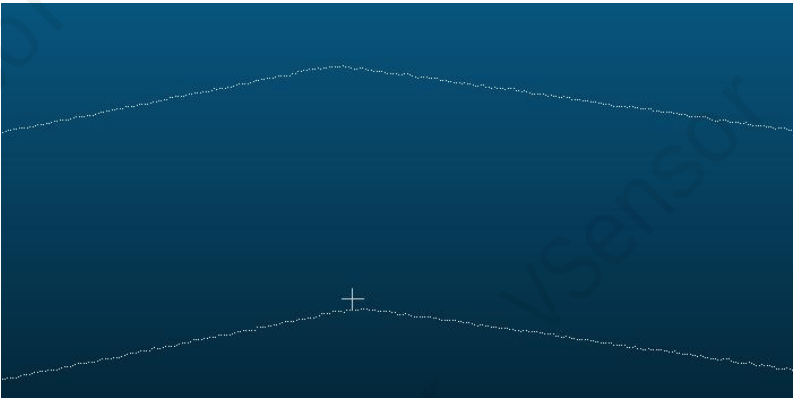
3.4.4.2 Down sampling

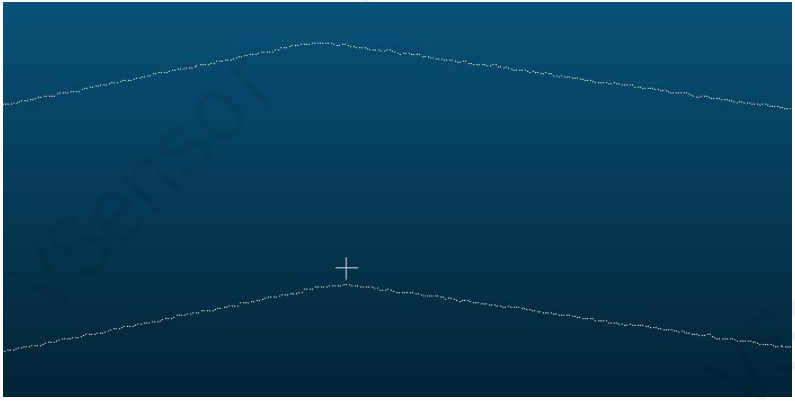
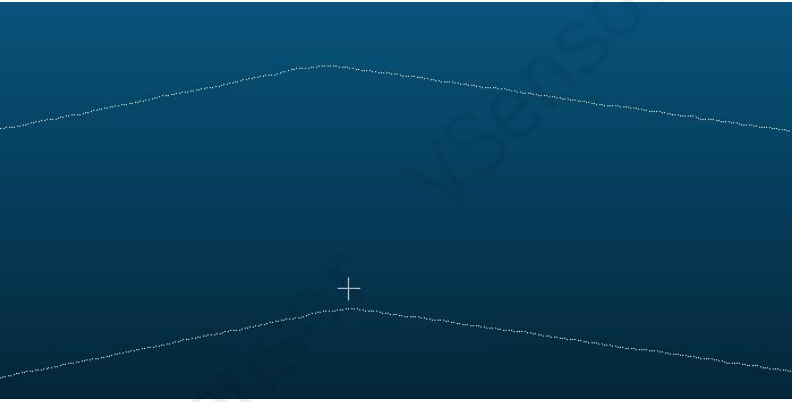
Using the down-sampling function can reduce the number of point cloud acquisition:

Normal collection	 A dark blue rectangular area representing a point cloud. A white crosshair is centered in the upper half. A thin, slightly curved white line runs horizontally across the middle, representing a plane.
Turn on the down sampling	 A dark blue rectangular area representing a point cloud. A white crosshair is centered in the upper half. A thin, slightly curved white line runs horizontally across the middle, representing a plane. The line appears slightly more defined than in the normal collection image.

3.4.4.3 Filter

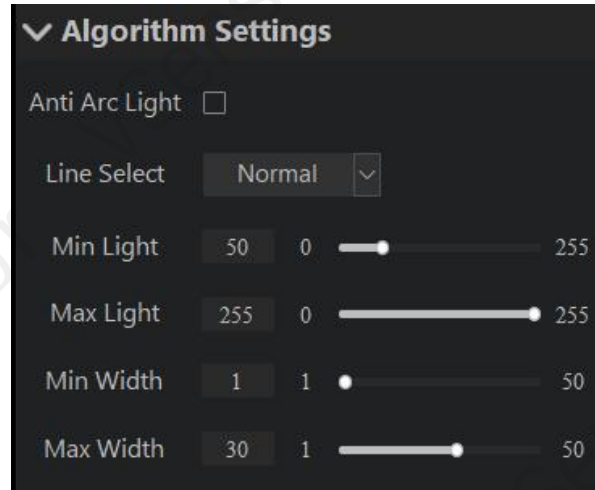
Different filtering methods can be selected according to the needs of different scenes. The following is the filtering effect when shooting a plane, and users can choose the appropriate filtering method according to the actual application scenario

No filtering	 A dark blue rectangular area representing a point cloud. A white crosshair is centered in the lower half. A thin, slightly curved white line runs horizontally across the middle, representing a plane. The line appears slightly more defined than in the normal collection image.
---------------------	--

Filter 1	
Filter 2	

3.4.5 Filter Settings

This module primarily performs preprocessing on point clouds, including arc light suppression, light strip filtering modes, and filtering parameters:



Figs3-20

名称	Function Description
Anti Arc Light	Determination of whether arc flash protection algorithm processing should be applied to the collected point cloud data for arc flash switch selection
Line Select	When multiple valid laser points are detected in the same vertical column, the following filtering rules apply: 1. Normal - Intelligent selection based on comprehensive factors. 2. Light Priority - select the light strip with the highest brightness peak. 3. Width Priority - select the light strip with the smallest width. 4. Nearest - select the light strip closest to the camera. 5. Farthest - select the light strip farthest from the camera.
Min/Max Light	A laser line is deemed valid if its vertical gray level distribution peak value exceeds the minimum brightness but remains below the maximum brightness. Light strips with brightness peaks outside this range are invalid.
Min/Max Width	A laser line is considered valid if the number of pixels occupied by consecutive vertical laser lines is greater than or equal to the minimum line width and less than or equal to the maximum line width. Light strips with line widths outside this range are invalid.

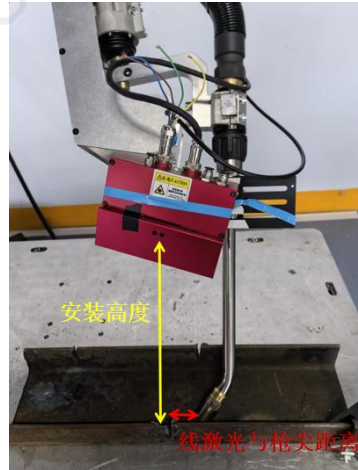
3.4.5.1 Anti Arc Light

For the working scene affected by arc light, the "anti-arc light" function can be checked to collect the data, which can effectively improve the point cloud effect. For example, in the welding tracking scene, it can adapt to the working conditions: current

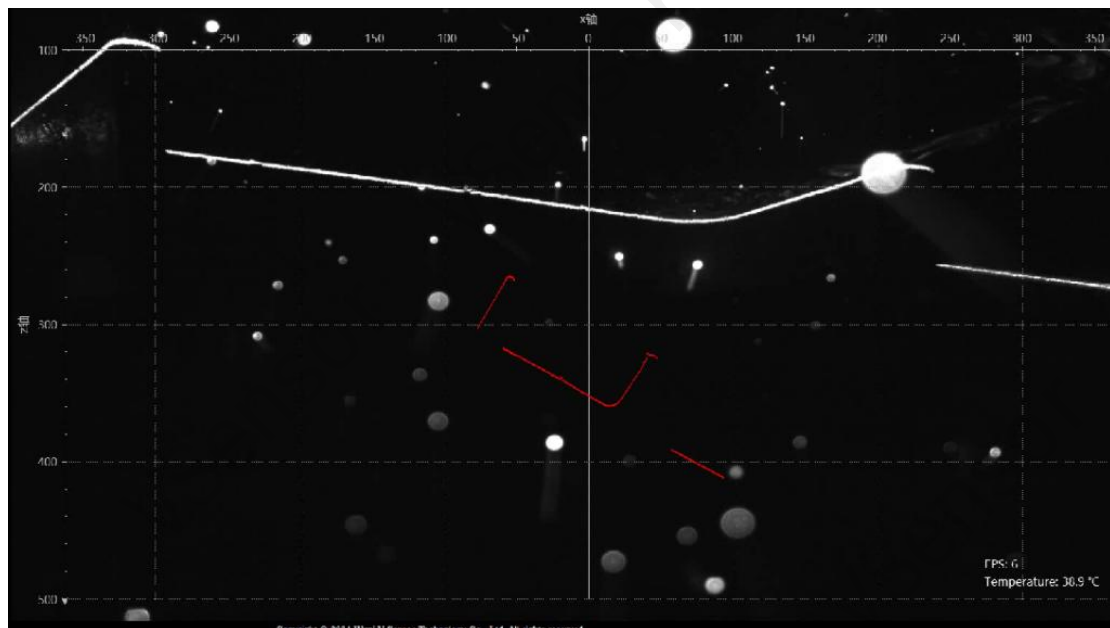
280A and below, the distance between the line laser and the gun tip is 3.5mm and above, and the imaging effect is good.

The camera installation height should be kept within the working range, and try to use the middle part of the laser line for scanning.

☛ Welding scene effect example:



Figs3-21

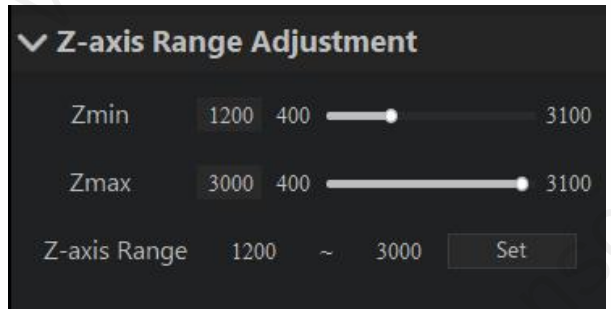


Figs3-22

3.4.5 Z-axis Range Adjustment

The sliding Zmin rail can adjust the minimum value of the Z-axis range, and the sliding Zmax rail can adjust the maximum value of the Z-axis range. Click the "Set" button to save the setting, and collect the point cloud Z-axis range again to take effect.

☛ The Z-axis range varies for different camera models:

PSN0270 Series	
PSN0600 Series	
PSN3000GB Series	

4. Common problems and handling

Problem 1: The camera fails to start properly or fails.

- First check whether the power cable and data cable are connected properly;
- Check whether the LED light can be green;
- Check whether the network is gigabit network, if using a switch, ensure the network stability;
- If there is no problem above, please connect the client to check whether it can connect to the camera. If not, please contact us in time and inform us of the fault problem and error code.

Question 2: The camera indicator light does not light up.

- Check whether the power supply is connected to the power line, including the front and rear plugs of the adapter. Please unplug and reconnect the power supply, and check whether the LED is on. If the above does not make the LED on, please contact our engineers.

Question 3: The software cannot reconstruct the preview or obtain the point cloud.

- Check whether the camera laser line is turned on and whether the exposure is appropriate;
- Check whether ROI is enabled or Z axis range is set;
- If the above tests are not a problem and the problem still exists, please contact our engineers.

Question 4: Point cloud imaging is unstable

- The actual length of the laser line is greater than the actual working length, and try to make the object under collection in the center of the laser;
- Whether the material of the object has changed, it is necessary to adjust the appropriate exposure and projection level;
- Note whether there are any shielding and interference factors near the object to be collected.

Question 5: The positioning is offset or the deviation is large

- When the camera is used with the robot, whether the TCP accuracy of the robot meets the requirements and whether the hand-eye calibration is accurate;
- Whether the welding gun is loose leads to TCP error;
- Whether there are any shielding and interference factors near the collection object.

Question 6: The laser line is extinguished

- When the laser is lit without collection, it will be extinguished after 15min to extend the service life of the laser. It can be restored by resetting the projection level;
- When the camera exceeds 60 °C , the software will automatically disconnect power protection and can be reconnected after cooling.

Question 7: How to obtain real-time 2D video stream during camera scanning

- VSensorLaserResult In the structure, each frame of point cloud has corresponding grayscale information, which can be called.

Question 8: How to install the camera when welding tracking

- Ensure that the tracking object is in;
- When the camera exceeds 60 °C , the software will automatically disconnect power protection and can be reconnected after cooling.

Question 9: The point cloud displayed by the center line is not complete

- Click the "Center line/cloud switching" button to switch to point cloud data display;
- Check the "Z axis range adjustment" setting of the software to check whether the missing part exceeds the Z axis setting range;
- The center line is displayed as the camera preview effect, and the point cloud may be incomplete because this part exceeds the display range of the Z axis.

5. Term

grey-scale map

A non-color image in which each pixel uses a single grayscale value to represent the brightness information. A grayscale image does not use the three color channels RGB, but instead represents the brightness information by converting the RGB color value of each pixel point in the image into a grayscale value.

HDR

High dynamic range imaging (High Dynamic Range Imaging) is used to achieve more than ordinary digital image technology

A set of techniques that increase the dynamic range of exposure (i.e., the difference between light and dark). The principle is to photograph the same scene using different exposure settings, then combine the resulting images with varying exposures into a high dynamic range image. Images synthesized using HDR technology can capture scenes with a wider dynamic range, from dark shadows to bright light sources or high reflectivity.

Reduce sampling

It can be generally understood as reducing the image and reducing the number of sampling points in the matrix. The most common method is to take values at alternate positions, that is, every k points in each row and column.

ROI

Interest area (Region of Interest) is the region selected from the processed image to be processed, which is the focus of image analysis.